KJS AND SORRENTO VINEYARD CONVERSION EROSION CONTROL PLAN APPLICATION #P17-00432-ECPA

Draft Environmental Impact Report Appendices

State Clearinghouse #2018092042

Lead Agency
Napa County Department of Planning,
Building and Environmental Services
1195 Third Street, Suite 210
Napa, CA 94559

April 2021

KJS AND SORRENTO VINEYARD CONVERSION EROSION CONTROL PLAN APPLICATION #P17-00432-ECPA

Draft Environmental Impact Report Appendices

State Clearinghouse #2018092042

April 2021

Lead Agency
Napa County Department of Planning,
Building and Environmental Services
1195 Third Street, Suite 210
Napa, CA 94559

2600 Capitol Avenue
Suite 200
Sacramento, CA 95816
916.564.4500
www.esassoc.com

Bend
Camarillo
Delray Beach
Destin
Irvine
Los Angeles
Oakland
Orlando
Pasadena
Petaluma
Portland
San Diego
San Francisco
San Jose
Santa Monica
Sarasota
Seattle
Tampa

171261

APPENDIX A

EROSION CONTROL PLAN AND APPLICATION

KJS INVESTMENT PROPERTIES
& SORRENTO INC.
3370 SAGE CANYON ROAD

EROSION CONTROL PLAN

PPI
ENGINEERING

THIS PAGE IS INTENTIONALLY LEFT BLANK

11411911

KJS INVESTMENT PROPERTIES & SORRENTO INC.
3370 SAGE CANYON ROAD

EROSION CONTROL PLAN

JUNE 2018

PREPARED BY:

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CALIFORNIA 94558
(707) 253-1806

TABLE OF CONTENTS

ITEM	PAGE
EROSION CONTROL PLAN NARRATIVE	EC-1
STANDARD PROVISIONS	ST-1
SPECIAL PROVISIONS	
Section 1 – Surface Drainage Pipeline	SP-1
Section 2 – Cutoff Collar	SP-2
Section 3 – Standard Drop Inlet	SP-3
Section 4 – Non-Standard Drop Inlet	SP-4
Section 5 – Infield Drop Inlet	SP-4
Section 6 – Standard Diversion Ditch	SP-5
Section 7 – Non-Standard Diversion Ditch	SP-5
Section 8 – Infield Ditch	SP-6
Section 9 – Insloped Avenue	SP-7
Section 10 – Outsloped Road	SP-7
Section 11 – Culvert	SP-7
Section 12 – Rocked Water Crossing	SP-8
Section 13 – Rolling Dip	SP-8
Section 14 – Pipe Level Spreader	SP-9
Section 15 – Rock Level Spreader	SP-10
Section 16 – Rock Apron	SP-11
Section 17 – Rock Energy Dissipater	SP-11
Section 18 – Junction Box – Block 8 West	SP-12
Section 19 – Junction Box – Block 8 East	SP-13
Section 20 – Junction Box – Block 33E	SP-14
Section 21 – Headcut Repair	SP-15
Section 22 – Block 33A Pipe Outlets & Headcut Repair	SP-16
Section 23 – Block 23B Pipe Outlets & Headcut Repair	SP-16
Section 24 – Block 23A Pipe Outlet & Headcut Repair	SP-17
Section 25 – Block 24A South Pipe Outlet & Headcut Repairs	SP-18
Section 26 – Block 24A North Pipe Outlet	SP-19
Section 27 – Block 24E South Pipe Outlets & Erosion Repair	SP-19
Section 28 – Block 24E North Pipe Outlets	SP-20
Section 29 – Spillway Berm	SP-21
Section 30 – Pond Overflow Structure	SP-21
Section 31 – Outsloped Bench	SP-23
Section 32 – Temporary Measures	SP-23
Section 33 – Maintenance	SP-23

APPENDICES

Appendix A – Supporting Figures A-1
- Figure 1: Vicinity Map
- Figure 2: Current Parcel Configuration
- Figure 3: Proposed Place of Use
- Figure 4: Deer Fence
- Figure 5: Chemical Mixing and Storage Locations

Appendix B – USLE Calculations B-1
- Figure 6: Soils Map

Appendix C – Vegetation Retention Calculations C-1
- Figure 7: 1993 Parcel Configuration and Vegetation

Appendix D – Slope Calculations D-1

Appendix E – Photographic Documentation E-1

Appendix F – Diversion Works Conceptual Design F-1

Appendix G – Road Plan G-1

DESIGN DRAWINGS BACK FLAPS

KJS INVESTMENT PROPERTIES & SORRENTO INC.
3370 SAGE CANYON ROAD

EROSION CONTROL PLAN

NARRATIVE

1. The nature and purpose of the land disturbing activity and the amount of grading involved.

a) The owners are applying for this ECP in conjunction with a Petition for Change on Applications 13943 and 26165 through the State Water Resources Control Board, Division of Water Rights.

b) This ECP addresses the development of approximately 111.5 net acres (156.8 gross acres) of proposed vineyard on their property located at 3370 Sage Canyon Road, St. Helena. Acreage numbers presented in various locations within this ECP may vary slightly due to rounding. The ranch is located on APNs 025-270-022 and 025-270-025 which consists of approximately 972.82 acres per the Napa County Assessor's Office. Although the Assessor's Office lists the parcels as owned by different entities, both entities are under common ownership.

c) Activities to be accomplished include removal of pasture, hayfield, grass, brush and trees within the proposed clearing limits, ripping, rock removal, cultivating the soil to prepare for planting, seeding cover crop, mulching, trenching for irrigation pipelines, installation of trellis system and deer fence, laying out the vine rows and installing erosion control measures.

d) Ripping will not occur outside of the clearing limits. The average depth of ripping will be 24" with maximum ripping depths up to 48" depending on site conditions. Ripping in Blocks 16, 19, 24G, 25 & 27 shall not exceed 24" per the Engineering Geologic Investigation.

2. General description of existing site conditions, including topography, vegetation and soils.

a) The site is located in the Elder Valley Creek Watershed.

b) The elevations in the vineyard area range from approximately 940 to 1680 feet above mean sea level per USGS Chiles Valley Quadrangle map. Ground slopes within the project boundary range between 3 and 28 percent. There are small pockets of areas with slope over 30% in several vineyard blocks which total approximately 7.3 acres, please see Sheets 2 through 12 for the locations.

c) Topographic mapping was provided by American Aerial Mapping, Inc., flown in February 2011 and August 2014. Portions of select blocks were supplemented with ground topographic survey by PPI Engineering where dense canopy did not allow for accurate mapping by American Aerial Mapping, Inc.

d) Existing vegetation consists of pasture, hayfield, grass, brush and trees. A biological assessment has been prepared by Vinnedge Environmental Consulting and is being updated by Environmental Science Associates (ESA).

e) Please see Appendix C for Vegetation Retention Calculations based on the existing vegetation and parcel configuration in 1993. This project proposes to retain 95% of the tree canopy and 74% of the brush and open (grass) cover that existed on the property in 1993.

f) There are existing structures on the property. A cultural resources report has been prepared by Stevens Consulting.

g) A portion of the property is currently deer fenced. Please see Figure 4 in Appendix A for the Proposed Deer Fence map. The proposed deer fence includes blocks fenced individually and in clusters where appropriate. The existing deer fence is 7 feet tall and is made of smooth wire with square mesh spacing of 4 inch by 4 inch. The proposed deer fence will be of the same height and material.

h) Numerous site visits of the property were performed by PPI Engineering staff from 2015 to 2017. Photographic documentation of pre-project conditions can be found in Appendix E.

3. Natural and man-made features onsite including streams, lakes, reservoirs, roads, drainage, and other areas that may be affected by the proposed activity.

a) A determination of waters and wetlands was performed by Gibson & Skordal LLC. The U.S. Army Corps of Engineers verified the delineation on June 19, 2016. The Waters of the U.S. and wetlands are shown on Sheets 2 through 12.

b) Elder Creek and numerous tributaries on the property that meet the Napa County definition of a stream have the appropriate setbacks, determined by slope as outlined in Napa County Conservation Regulation 18.108.025, shown on Sheets 2 through 12. Prior to construction the Engineer shall stake the appropriate stream setbacks adjacent to vineyard blocks based on in-field determination of the top of bank and slope. All Waters of the U.S. not requiring a Napa County stream setback have been avoided with a minimum 50’ buffer, which includes a 24’ vegetated turnaround avenue and a 26’ undisturbed filter strip.

c) In this ECP all wetlands are avoided with a minimum 50’ buffer, which includes a 24’ vegetated turnaround avenue and a 26’ undisturbed filter strip.

d) A proposed reservoir will be located off-stream and within the proposed clearing limits adjacent to Block 24, see Sheet 9 for the approximate location. The proposed off-stream reservoir will be ±4.5 surface acres and will have a capacity of ±48 acre-feet.

e) There is an existing network of ranch roads throughout the property. The existing road network is sufficient for access to proposed vineyard blocks. The existing roads shall be maintained and surfaced with crushed rock as needed. Please see Sheets 2 through 12 for the roads which will be used as primary access to the vineyard blocks and Appendix G for the Road Plan. The Project will utilize existing access points from Sage Canyon Road.

4. Location and source of water for irrigation or other uses.

a) The proposed water source is surface water. No groundwater will be used for this project.

5. Soil types/soil series identified in the Soil Conservation Service (SCS) Napa County Soil Survey.

a) The USDA – NRCS Web Soil Survey maps the soil within the project boundary as Bressa Dibble Complex with 5 to 15, 15 to 30 and 30 to 50 percent slopes, Los Gatos Loam with 30 to 50 percent slopes, Maymen-Millsholm-Lodo Association with 30 to 75 percent slopes, Millsholm Loam with 6 to 55 percent slopes and Pleasanton Loam with 2 to 5 percent slopes.

b) In addition, analysis of soil pit profiles was completed by Dr. Paul Anamosa in select locations; the soil series assigned to each pit is shown on Sheets 2 through 12 and on Figure 6 in Appendix B. Also see Page B-1 for a listing of the soils mapped in each block.

c) Minimal rock is expected to be generated as a result of this project. All of the rock generated is expected to be used to construct erosion control features such as rock aprons and rock level spreaders. Rock staging areas shall be located inside of proposed clearing limits. No grading activities, ground disturbance or rock storage will occur outside of the proposed clearing limits.

6. Critical areas, if any, within the development site that have serious erosion potential or problems.

a) There is existing erosion occurring in a few places from concentrated flow throughout the proposed development areas. Some of these areas are causing erosion and sedimentation directly into Elder Creek; see Sheets 2 through 12 for locations and Section 8 (below) for details.

b) A geologic assessment has been prepared by Gilpin Geosciences and all recommendations have been incorporated into this Erosion Control Plan.

7. Erosion calculations

a) Universal Soil Loss Equation (USLE) spreadsheets for this project are in Appendix B of this report.

8. Proposed erosion control methods including:

a) All drainage systems and facilities, walls, cribbing or other erosion protection devices to be constructed with, or as a part of the proposed work.

1. A variety of drainage systems will be utilized for erosion control in this project. In some locations ditches will direct runoff to drop inlets, and drainage pipelines will be used to direct runoff to desired locations. Level spreaders and rock aprons will be used at pipe outlets to disperse water and prevent concentrated flow from forming and developing gullies. Some pipe outlets have been designed to discharge directly to Elder Creek in areas where existing erosion is occurring. These outlets were designed to both repair existing erosion and to prevent future erosion and sediment from entering the stream network. Straw wattles will be installed. Please see Sheets 2 through 12 for locations of the above erosion control items. Please see the Detail Sheets 12 through 19 and the Special Provisions for details on the erosion control items. Several different types of drop inlets will be used throughout the project as shown on the Plans and Detail sheets. The Project Engineer may substitute one type for another type during construction based on field conditions providing both types have the same capacity.

2. The final pass with disking equipment shall be performed across slopes to prevent channeling water downhill the first winter after development.

3. Straw wattles shall be installed the year of construction in the location shown on the Site Plan. Additional temporary erosion control measures shall be installed as needed.

b) Proposed vegetative erosion control measures including location, type and quantity of seed, mulch, fertilizer and irrigation, timing and methods of planting, mulching and maintenance of plant material and slopes until a specified percentage of plant coverage is uniformly established.

1. Disturbed areas shall be seeded as described below. Straw mulch shall be applied to all disturbed areas at a rate of 3,000 lbs/acre prior to September 15 of the year of construction.

2. A permanent cover crop strategy will be utilized. The permanent cover crop will be generated the first year by seeding with the following mix: 40% barley, 40% rye grass, 10% crimson clover and 10% blando brome at a minimum of 70 pounds per acre. A pre-approved alternative seed mix may be allowed.

   The permanent cover crop will be managed each year such that any areas which have less than the percent vegetative cover specified below will be reseeded and mulched until adequate coverage is achieved. The permanent cover crop shall be mowed only and not disked.

   Blocks with 75% vegetative cover: 2, 5D, 5G, 8, 9G, 9H, 10, 12, 22, 24C, 24D, 24E, 27 & 31

   Blocks with 80% vegetative cover: 5A, 5H, 13A, 13B, 15B, 21, 23A, 23B, 23D, 23E, 23G, 24A, 24F, 24G, 25, 26, 28, 30, 32, 33A, 33B, 33D & 33E

   Blocks with 85% vegetative cover: 1, 3, 4A, 4B, 5B, 5E, 5F, 6, 7, 9A, 9C, 9D, 9E, 9F, 11, 14, 15A, 16, 19, 20A, 20B, 23C, 23F, 24B, 29A, 29B & 33C

   Blocks with 90% vegetative cover: 5C, 5J, 9B, 17, 18A & 18B

3. No pre-emergent herbicides will be used for weed management. Contact or systemic herbicides may be applied in spring (no earlier than February 15th to ensure adequate vegetative cover in the spray strips for the remainder of the rainy season).

   In hand-farmed Blocks 2, 5D, 5G, 8, 9G, 9H, 12, 22, 24D & 31 the width of the spray strip shall be no wider than 1 foot (based on a 5'-minimum row width) in order to achieve 75% vegetative cover.

   In Blocks 10, 24C, 24E & 27 the width of the spray strip shall be no wider than 1.5' (based on a 6'-minimum row width) in order to achieve 75% vegetative cover.

   In hand-farmed Blocks 5A, 13A, 21, 23D, 23E, 25, 28, 30, 32 & 33B the width of the spray strip shall be no wider than 0.8 foot (based on a 5'-minimum row width) in order to achieve 80% vegetative cover.

   In Blocks 5H, 13B, 15B, 23A, 23B, 23G, 24A, 24F, 24G, 26, 33A, 33D & 33E the width of the spray strip shall be no wider than 1 foot (based on a 6'-minimum row width) in order to achieve 80% vegetative cover.

   In Blocks 1, 3, 4A, 4B, 5B, 5E, 5F, 6, 7, 9A, 9C, 9D, 9E, 9F, 11, 14, 15A, 16, 19, 20A, 20B, 23C, 23F, 24B, 29A, 29B & 33C no strip spraying shall be performed in order to achieve 85% vegetative cover.

   In Blocks 5C, 5J, 9B, 17, 18A & 18B no strip spraying shall be performed in order to achieve 90% vegetative cover.

In Blocks 1, 3, 4A, 4B, 5B, 5C, 5E, 5F, 5J, 6, 7, 9A, 9B, 9C, 9D, 9E, 9F, 11, 14, 15A, 16, 17, 18A, 18B, 19, 20A, 20B, 23C, 23F, 24B, 29A, 29B & 33C, spot spraying of contact or systemic herbicides in spring (no earlier than February 15) will be allowed provided the 85% or 90% vegetative cover is achieved in each block. If the owner chooses to farm without herbicide, an alternative will be to hand-hoe around the base of the vine only, or other methods that do not result in a continuous bare strip.

4. In Blocks 5H, 10, 13B, 15B, 23A, 23B, 23G, 24A, 24C, 24E, 24F, 24G, 26, 27, 33A, 33D & 33E the owner has the option of using a Dwarf Barley cover crop in the first three years that the block is planted to aid with vineyard establishment. If this option is used, seed shall be applied at a rate of 120 pounds per acre if broadcast or at a rate of 60 pounds per acre if drilled. The cover crop within the vineyard may be disked each spring after April 1 for the first three years. An alternative cover crop seed mix may be used upon prior approval. Each year the owner chooses to disk, the area shall be straw mulched at a rate of 3,000 lbs/acre and straw wattles shall be installed prior to September 15. The permanent seed mix will be seeded prior to September 15 of the fourth (or earlier) year.

5. In Block 17 the permanent cover must be established the first year. The permanent cover in Block 17 must be irrigated starting August 15 in order to establish the cover by September 15. The block shall be hand-farmed.

6. Fertilizer shall be applied as necessary by vineyard management personnel for both the vineyard and to ensure specified percent vegetative cover crop is achieved. Site specific soil analysis should be performed.

7. The vineyard avenues shall be mowed only and shall not be disked. Unless otherwise noted, all avenues shall conform to the natural grade. Vineyard avenues shall be seeded and mulched prior to September 15 of the year of construction and in subsequent years in bare or disturbed areas. The cover crop will be managed each year such that any avenues which have less than the percent vegetative cover specified below will be reseeded and mulched until adequate coverage is achieved. Seeding and mulching is not required on avenues and roads properly surfaced with gravel:

   Blocks with 75% vegetative cover: 2, 5D, 5G, 8, 9G, 9H, 10, 12, 22, 24C, 24D, 24E, 27 & 31

   Blocks with 80% vegetative cover: 5A, 5H, 13A, 13B, 15B, 21, 23A, 23B, 23D, 23E, 23G, 24A, 24F, 24G, 25, 26, 28, 30, 32, 33A, 33B, 33D & 33E

   Blocks with 85% vegetative cover: 1, 3, 4A, 4B, 5B, 5E, 5F, 6, 7, 9A, 9C, 9D, 9E, 9F, 11, 14, 15A, 16, 19, 20A, 20B, 23C, 23F, 24B, 29A, 29B & 33C

   Blocks with 90% vegetative cover: 5C, 5J, 9B, 17, 18A & 18B

8. The proposed vine and row spacing is 4' by 6' for tractor-farmed blocks and is 4' by 5' for hand-farmed blocks. Vinerow width shall be increased as necessary in tractor-farmed blocks where side slope is 15% or greater. In these areas, width of tillage equipment shall be no more than 75% of row width to allow for bench formation and to minimize erosion.

   The following blocks will be hand-farmed: 1, 2, 3, 4A, 4B, 5A, 5B, 5C, 5D, 5E, 5G, 6, 7, 8, 9A, 9B, 9C, 9E, 9F, 9G, 9H, 11, 12, 13A, 14, 17, 20B, 21, 22, 23D, 23E, 24D, 25, 28, 29B, 30, 31, 32 & 33B.

9. The owner may further subdivide vineyard blocks within the footprint of the proposed vineyard for irrigation and viticulture purposes. The vinerow directions shall not be altered without an approved modification from Napa County Planning, Building and Environmental Services Department.

10. Irrigation pipelines shall generally be located within existing roadways, vineyards and vineyard avenues, and/or within proposed clearing limits. Regardless of pipeline location, pipeline trenches located on ground slopes greater than 15% shall be backfilled using imported or select native granular material to a depth of 6 inches above the pipelines such that voids do not form below haunches of pipe. Backfill shall be wheel rolled or otherwise compacted to reduce settlement. Final grading over trenches shall be mounded and water-barred such that water is directed away from trenches.

11. As stated in the Napa County Protocol for Re-Planting/Renewal of Approved Non-Tilled Vineyard Cover Crops dated March 23, 2004, when it becomes necessary, either by routine or emergency, to re-establish or renew vineyard cover crop the following measures should be followed:
    - Seek professional consultation, including soil nutrient analysis, to determine the reasons for the original cover crop's failure. Adjust soil fertility, irrigation and seed selection accordingly.
    - When tillage is necessary, alternate rows should be tilled, seeded, and straw-mulched to effectively accomplish the re-establishment/renewal process over a two-year period.
    - Tillage and re-seeding should be conducted in the following manner:
        - In year 1, till to prepare seed bed and sow desired cover crop in every other row ("the evens"), leaving the alternate rows ("the odds") untilled and mowed only.
        - Mulch all tilled rows having an up and down hill (perpendicular to contour) row direction with 3,000 lbs./acre of loose straw, or approved equivalent, after seeding.
        - Tilled rows with cross-slope (parallel to contour) row direction and slope gradients less than 15% may not require straw mulch.
        - In year 2, till to prepare seed bed and sow desired cover crop in "odd" rows.
        - In year 2, leave "even" rows untilled and mowed only.

- Mulch rows tilled in year 2 as specified above.
- Put all re-establishment measures in place by September 1
- In year 3, return all rows to non-tilled culture.

9. Stormwater stabilization measures, if the development of the site will result in increased peak rates of runoff that may cause flooding or channel degradation downstream.

a) A hydrologic analysis of the Project has been prepared by PPI Engineering and submitted under separate cover.

10. An implementation schedule showing the following:

a) The proposed clearing, grading, and/or construction schedule.

DATE	DESCRIPTION
April 1:	Commence clearing and tillage operations.
September 1:	All tillage and erosion control completed. This shall include complete construction of all structural measures required in the blocks which could include diversion ditches, drop inlets, surface drainage pipelines, level spreaders, rock aprons, sediment basins, etc.
September 15:	All winterization complete, including seeding, straw mulching, and straw wattle installation.

b) The proposed schedule for winterizing the site (September 15 of each year the permit is in effect.)

The site shall be winterized and all necessary erosion control measures described in the Erosion Control Plan shall be installed by September 15.

c) The proposed schedule of installation of all interim erosion and sediment control measures, including the stage of completion of such devices at the end of the grading season (September 15) of each year the permit will be in effect.

See Item 10a).

d) The schedule for installation of permanent erosion and sediment control devices where required.

See Item 10a).

11. The estimated cost of implementation of the erosion and sediment control measures.

Typical costs for installing erosion control measures as described in this plan range from $2,000 to $20,000 per acre.

KJS INVESTMENT PROPERTIES & SORRENTO INC
3370 SAGE CANYON ROAD

EROSION CONTROL PLAN

S T A N D A R D P R O V I S I O N S

SECTION 1 - SCOPE OF WORK

These specifications cover the construction of the erosion control measures for approximately 111.5 acres of vineyard to be developed by Sorrento Inc., and KJS Investment Properties LLC.

The drawing numbered 11411901B, Sheets 1 through 19, and these Specifications describe in detail the construction of the complete erosion control system. Requests for further information or clarification of the work to be done can be made to Jim Bushey or Matt Bueno at the Napa office of PPI Engineering, phone (707) 253-1806.

All costs for the complete construction of the erosion control system must be included in the bid items, since no other payment will be made outside of the bid items. This includes all costs for moving onto and off of the job site, all equipment, tools, materials, labor, fuel, taxes, and incidentals for furnishing and installing the erosion control system.

Surveying adequate for construction will be provided by the Owner, at the Owner's expense. The Contractor will be responsible for preserving construction survey stakes and markers for the duration of their intended use. Any restaking costs or additional survey work requested by the Contractor shall be deducted from the final payment to the Contractor. The Owner does not guarantee that the project being bid will be awarded. The Owner also reserves the right to change the quantities of actual work performed as needed with payment made according to the new quantities at the unit price bid.

SECTION 2 - AUTHORITY OF OWNER AND ENGINEER

The property is owned by Sorrento Inc., and KJS Investment Properties LLC. Sorrento Inc., and KJS Investment Properties LLC or their appointed representative shall have the final say in the event of a dispute with the Contractor.

The Owner shall appoint PPI Engineering (PPI) as the Engineer to perform periodic review of the work. PPI Engineering shall report any unsatisfactory work to the Owner. The Contractor shall be responsible for any engineering fees or repair costs associated with bringing the unsatisfactory work into compliance with the Plans and Specifications.

SECTION 3 - CHANGES IN WORK

Materials and the manner of performance of the work performed in this contract shall be according to the Plans and Specifications. Modifications to the Plans or Specifications shall be agreed upon in writing by the Contractor, Owner, and Engineer before the work in question is performed. Materials and construction methods shall be as specified on the Plans and Specifications. The burden of proof that a given material or method constitutes an equivalent to the one specified will rest with the Contractor.

SECTION 4 - UTILITIES

At least two working days prior to beginning any excavation on the project, the Contractor shall contact Underground Service Alert (USA) at 1-800-642-2444 and request field location of all existing utilities.

Certain facilities at the site are existing. The Contractor shall be careful to avoid damaging existing facilities and shall notify the Owner immediately if any damage does occur. The cost of repairing any damage shall be the sole responsibility of the Contractor.

SECTION 5 - PROSECUTION OF THE WORK

Unless otherwise provided, the contract time shall commence upon issuance of a Notice to Proceed by the Owner. The work shall start within ten days thereafter and be diligently prosecuted to completion within the time specified in the Contractor's bid. If weather conditions prevent completion of the project within the specified amount of time, the Owner may extend the completion date of the project.

SECTION 6 - RESPONSIBILITIES OF THE CONTRACTOR

The Contractor agrees that in accordance with generally accepted construction practices, Contractor will be required to assume sole and complete responsibility for job site conditions during the course of construction of the project, including the safety of all persons and property. This requirement shall be made to apply continuously and not be limited to normal working hours. Contractor further agrees to defend, indemnify and hold design professional harmless from any and all liability, real or alleged, in connection with the performance of the work on this project, excepting liability arising from the sole negligence of design professional.

The Contractor shall be responsible for controlling dust and mud generated from construction activities. The Contractor shall not allow dust or mud to obstruct vehicular traffic on County roads or State Highways. The Contractor shall be responsible for cleaning all vehicles prior to leaving the site as required by the California Highway Patrol. The Contractor, at their own expense, shall provide adequate dust control and prevention of mud tracking on roads, and take other preventative measures as directed by the Owner.

The Contractor shall be responsible for following all safety laws that may be applicable. Of particular concern are the trench safety regulations issued by CAL-OSHA. The Contractor alone shall be responsible for the safety of their equipment and methods and for any damage or injury which may result from their failure, improper construction, maintenance, or operation.

The Contractor shall be responsible for installing necessary sediment retention measures to keep sediment from leaving the site if construction activities continue beyond October 1.

The Contractor shall keep the work site clean and free of rubbish and debris throughout the project. Materials and equipment shall be removed from the site as soon as they are no longer necessary or the project is completed.

The Contractor shall also be responsible for ensuring that all permits which are necessary for construction have been obtained and that copies of these permits are maintained onsite at all times.

The Contractor shall, at their own expense, furnish all necessary light, power, pumps, and water necessary for the work.

SECTION 7 - MEASUREMENT AND PAYMENT

Payment shall be made at the unit prices bid according to the actual quantities installed. Measurement of the final quantities shall be the responsibility of the Owner's Engineer.

The Engineer shall periodically observe the project during construction and upon completion of the project any unfinished or unacceptable work observed will be brought to the Contractor's attention verbally and in writing. Final payment will be made upon satisfactory completion of all work items required by these Plans and Specifications.

SECTION 8 - GUARANTEE

In addition to the guarantees from suppliers, the Contractor shall guarantee the work he performs for a period of two years. Any repairs needed to the system within two years of completion due to faulty workmanship or materials shall be promptly repaired at no expense to the Owner. Any costs incurred by the Owner and/or Engineer within two years of completion due to rubbish or debris placed in a trench or other excavation shall be paid by the Contractor.

Unless otherwise provided in writing, payment by the Owner to the Contractor for installation of this system shall constitute acceptance of all provisions in this document by the Contractor.

KJS INVESTMENT PROPERTIES & SORRENTO INC.
3370 SAGE CANYON ROAD

EROSION CONTROL PLAN

S P E C I A L P R O V I S I O N S

SECTION 1 - SURFACE DRAINAGE PIPELINE

1.1 GENERAL:

Surface drainage pipelines shall be installed to collect surface runoff at low points throughout the project area and transport it to protected outlets, as shown on Detail 4, Sheet 13.

1.2 MATERIALS:

Surface drainage pipelines shall be constructed of solid corrugated polyethylene pipe (CPP), either single-wall or dual-wall as shown on Sheets 2 through 12 of the Plans. Corrugated plastic pipe for use as surface drainage pipelines shall meet the standards of ASTM F667 and AASHTO M294, as applicable. Bent or damaged pipe shall not be used in the drainage system and shall be removed from the job site. Pipelines shall be corrugated steel pipe, 14-gauge minimum, where pipes outlet to energy dissipaters or level spreaders if cover is less than 2 feet. Dual-wall CPP may be substituted for corrugated steel pipe with prior approval from the Engineer.

Pipe connections shall be made with fittings manufactured by the same manufacturer who made the pipe. All connections shall be securely fastened and the resulting connection shall not have gaps greater than 1/8 inch wide.

Gravel envelope bedding material may be volcanic rock or other granular material as approved by the Engineer. It shall be free of organic matter, clay, or other material which could prevent it from flowing uniformly around the pipe. One hundred percent of the material must pass the 1-1/2" clear square openings. Ninety to one hundred percent must pass through the 3/4" clear square openings. No more than 3% may pass the #200 U.S. Standard Sieve.

It will be the responsibility of the Contractor to remove and dispose of all envelope material not used on the project.

1.3 INSTALLATION:

The Contractor may use a trencher, or drainage plow with vertical soil displacement or backhoe/excavator for the excavation and placement of the surface drainage pipe as dictated by soil conditions. The operator shall be skillful in laying the tubing. Grade control may be established by visual control with grade stakes set no more than 100 feet apart or by laser control with grade stakes set no more than 200 feet apart.

Construction staking shall be provided by the Owner's Engineer. The slope, alignment, and depth of placement of the tubing shall be as shown on the Plans and as staked in the field. A minimum

cover of 4.0 feet must be provided within vineyard areas, unless otherwise staked in the field by Engineer.

A gradual variation of no more than 0.10 foot from grade will be allowed where slopes are 2% or less. Where slopes are greater than 2%, a gradual variation of no more than 0.20 foot from grade will be allowed. No reverse grade will be allowed. A gradual variation of no more than 1 foot from design alignment is allowed.

Stretching of the tubing should be avoided during installation. No more than 10% stretch will be allowed.

Cobbles and rocks may be present on the project site. The Contractor shall take necessary actions to work around the cobbles and rocks at their own expense.

1.4 BEDDING AND BACKFILL:

Surface drainage piping shall be backfilled with approved gravel envelope material. The trench bottom shall be continuous, firm, relatively smooth, and free of rocks or other objects larger than 1 inch.

Rocks or clods shall not be allowed to fall upon or otherwise strike the pipe during any phase of construction. No rocks larger than 6" may be placed within 12" of the pipe. Final backfill shall be placed and spread in approximately uniform layers to fill the trench completely. Rolling equipment or heavy tampers shall not be used to consolidate backfill.

Where pipe is installed under all-weather roads, backfill shall be Class II Aggregate Base compacted to 90% per ASTM D1557. Road surface shall be regraded or paved as necessary to match original conditions.

SECTION 2 - CUTOFF COLLAR

2.1 GENERAL:

Cutoff collars shall be installed on all solid pipelines with slopes greater than 5%, as shown in Detail 5, Sheet 13. Spacing between collars shall be as specified in the table below or as staked in the field by the Engineer.

Ground Slope (%)	Spacing (Feet)
0-5	None Required
6-15	200
16 and greater	100

2.2 MATERIALS:

Cutoff collars shall be constructed of Portland cement concrete, 3000-psi minimum compressive strength.

The envelope material shall be the same as that specified in Section 1, Subsection 1.2, Materials.

2.3 INSTALLATION:

Cutoff collars shall extend a minimum of 1.0 foot into native, undisturbed material on the sides and bottom of the trench and extend 1.25 feet above the top of the pipe. Cutoff collars shall be a minimum of 8 inches thick. A watertight seal shall be formed between the cutoff wall and the pipeline. The wall of the collar shall be poured against undisturbed soil. Backfill shall be placed around the wall and hand compacted to ensure no voids are present.

The Contractor shall perforate the pipe with a minimum of 30 3/8-inch diameter holes along the pipe a minimum of 3 feet upstream of the cutoff collar to allow water to infiltrate back into the drainline. This perforated section shall be backfilled with approved envelope material. Gravel envelope shall be a minimum of 3 inches thick on all sides of the pipe.

The Contractor shall take precautions to ensure that concrete does not flow through perforations in amounts that would cause any reduction in flow capacity of pipe.

SECTION 3 – STANDARD DROP INLET

3.1 GENERAL:

Drop inlets shall be furnished and installed by the Contractor in the locations shown on the Plans and as staked in the field by the Engineer, according to Details 1 and 2, Sheet 13. The dimensions of the riser and connector pipeline shall be as shown on the Plans and Details. A grate shall be installed over the top of each drop inlet.

3.2 MATERIALS:

Drop inlet risers shall be galvanized, 14-gauge minimum corrugated metal pipe (CMP) of the diameter shown on the Plans, Details, and/or Specifications. Corrugated metal pipe for use as drop inlets shall meet the standards of ASTM A760 and AASHTO M36, as applicable. Dual-walled corrugated polyethylene pipe may be substituted with prior approval from the Engineer.

Grates shall be Agri Drain Bar Guard or equal.

Concrete for the bottom of the inlet shall be Portland cement concrete, 3,000 psi minimum compressive strength.

3.3 INSTALLATION:

Standard Drop inlets shall be installed as shown on the detail sheet and as staked in the field by the Engineer. Connector pipes shall be mortared in place to form a watertight seal. Grates shall be bolted or locked to drop inlet riser. Backfill around the inlet shall be compacted sufficiently by hand or water-jetted such that excessive settlement does not occur**.**

SECTION 4 – NON-STANDARD DROP INLET

4.1 GENERAL:

Non-standard drop inlets shall be furnished and installed by the Contractor in the locations shown on the Plans and as staked in the field by the Engineer, according to Detail 3, Sheet 13. The dimensions of the riser and connector pipeline shall be as shown on the Plans and Details. A grate shall be installed over the top of each drop inlet.

4.2 MATERIALS:

Drop inlet risers shall be galvanized, 14-gauge minimum corrugated metal pipe (CMP) of the diameter shown on the Plans, Details, and/or Specifications. Corrugated metal pipe for use as drop inlets shall meet the standards of ASTM A760 and AASHTO M36, as applicable. Dual-walled corrugated polyethylene pipe may be substituted with prior approval from the Engineer.

Grates shall be Agri Drain Bar Guard or equal.

Concrete for the bottom of the inlet shall be Portland cement concrete, 3,000 psi minimum compressive strength.

4.3 INSTALLATION:

Non-standard drop inlets shall be installed as shown on the detail sheet and as staked in the field by the Engineer. The dimensions for H_A and H_B must meet the minimum requirements shown on the table in the detail. Connector pipes shall be mortared in place to form a watertight seal. Grates shall be bolted or locked to drop inlet riser. Backfill around the inlet shall be compacted sufficiently by hand or water-jetted such that excessive settlement does not occur**.**

SECTION 5 – INFIELD DROP INLET

5.1 GENERAL:

Infield drop inlets shall be furnished and installed by the Contractor in the locations shown on the Plans and as staked in the field by the Engineer, according to Detail 2, Sheet 14. The dimensions of the riser and connector pipeline shall be as shown on the Detail. A grate shall be installed over the top of each drop inlet.

5.2 MATERIALS:

Drop inlet risers shall be corrugated polyethylene pipe (CPP) pipe of the diameter shown in the Detail. Piping used for infield drop inlets shall conform to the standards listed in Section 1, Subsection 1.2, Materials.

Grates shall be Agri Drain Bar Guard or equal.

5.3 INSTALLATION:

The risers shall be connected to the mainline with a tee and 4 galvanized hex-head sheet metal screws no longer than 1 inch. A berm shall be constructed as directed in field by the Engineer to direct water into the inlet. Risers shall be precisely located to ensure they line up with vinerows and are placed between two vines. Alternatively, with the Owner's approval, the inlets may be capped and left one foot above finish grade until final preparation of the vineyard is complete. At that point the vineyard will be marked and the risers moved to their permanent location. **This must be complete and risers cut to final dimension prior to September 1 of the year of construction.**

SECTION 6 – STANDARD DIVERSION DITCH

6.1 GENERAL:

Standard diversion ditches will be constructed to convey surface water through and/or around proposed vineyard areas and direct it to a stable outlet or other storm water conveyance infrastructure.

6.2 MATERIALS:

Ditches will be cut into native material. Rock for lining ditches (if necessary) will be 4-inch to 8-inch diameter. Filter fabric shall be Mirafi 140N or equal.

6.3 INSTALLATION:

Ditches shall be cut into native material to the extent possible. Fill material, if necessary, shall be moisture conditioned and compacted to 90% relative compaction per ASTM D1557. Flowline slope shall be 2% minimum and 5% maximum unless rock-lined. Side slopes of the ditches shall be 2:1 (Horizontal:Vertical) as shown on Detail 4, Sheet 12. The ditch shall be a minimum of 12 inches deep when complete and shall be lined with 4 to 8 inch diameter angular rock where the flowline slope exceeds 5%. A non-woven filter fabric shall be placed between the ground surface and the rock. The rocks shall be keyed into the sides of the ditch such that they do not obstruct or reduce the cross section of the channel.

SECTION 7 – NON-STANDARD DIVERSION DITCH

7.1 GENERAL:

Non-standard diversion ditches will be constructed to convey surface water through and/or around proposed vineyard areas and direct it to a stable outlet or other storm water conveyance infrastructure. Non-standard diversions ditches have a larger cross section than standard diversions and therefore have an increased water conveyance capacity.

7.2 MATERIALS:

Ditches will be cut into native material. Rock for lining ditches (if necessary) will be 4-inch to 8-inch diameter. Filter fabric shall be Mirafi 140N or equal.

7.3 INSTALLATION:

Ditches shall be cut into native material to the extent possible. Fill material, if necessary, shall be moisture conditioned and compacted to 90% relative compaction per ASTM D1557. Flowline slope shall be 2% minimum and 5% maximum unless rock-lined. Side slopes of the ditches shall be 2:1 (Horizontal:Vertical) as shown on Detail 5, Sheet 12. The ditch shall be a minimum of 18 inches deep when complete and shall be lined with 4 to 8 inch diameter angular rock if the flowline slope exceeds 5%. A non-woven filter fabric shall be placed between the ground surface and the rock. The rocks shall be keyed into the sides of the ditch such that they do not obstruct or reduce the cross section of the channel.

SECTION 8 - INFIELD DITCH

8.1 GENERAL:

Infield ditches shall be constructed in certain blocks to reduce the slope run length and intercept surface runoff.

8.2 MATERIALS:

The infield ditches shall be constructed of native material.

8.3 INSTALLATION:

Infield ditches shall be constructed as shown on Detail 3, Sheet 14. Organic matter shall be thoroughly incorporated prior to construction. Flowline grade of the ditch shall be 4% minimum and 5% maximum. Material for construction of the fill portion of the ditch shall be generated by removing a thin wedge of soil on the uphill side of the ditch and compacting it downhill as shown on the detail. This cut and fill wedge will typically be a few inches thick at the far uphill and downhill ends and increase to approximately 8 - 10 inches (or more depending on ground slope) near the flowline. Length of the wedge will typically be about 20 feet both uphill and downhill. These typical dimensions may need to be adjusted to ensure the proper amount of fill is available for construction of the ditch. Longer lengths and shallower depths may be required to ensure farming equipment can safely drive over the ditch without damage.

Fill material shall be moisture conditioned and compacted using wheeled equipment or other means as approved by the Engineer. In the event water is not available, the ditch may be "overbuilt" to allow for settlement over the winter with prior approval from the Engineer. In this case installation of trellis system must be delayed until after April 1 of the following year to allow the ditch to be re-shaped as necessary following settlement.

SECTION 9 - INSLOPED AVENUE

9.1 GENERAL:

Insloped avenues shall be constructed in certain blocks to reduce the slope run length and intercept surface runoff while also providing safe access for farming equipment. Insloped avenues shall be constructed to the lines and grades shown on the drawings and as staked in the field by the Engineer and as shown on Detail 2, Sheet 12. Where insloped avenues are not designated, avenues shall conform to original slope.

9.2 CONSTRUCTION:

The avenues shall be constructed using a bulldozer with six-way blade and slope board or other suitable equipment. A low spot shall be constructed at the proposed drop inlet location. Slopes graded along the flow line of the avenue shall not exceed +/- 1.0% from the design slope of 4%. Vegetation shall be removed or thoroughly incorporated prior to construction of the insloped avenues. Soil for fill material shall be moisture conditioned as necessary and compacted to 90% relative compaction per ASTM D1557. Cut and fill slopes shall be seeded with an Engineer-approved seed mixture by September 15 of the year of Construction.

SECTION 10 – OUTSLOPED ROAD

10.1 GENERAL:

Grading shall be performed in certain areas to form outsloped roads, as shown in Detail 1, Sheet 12. Grading shall be to the extent required to provide a safe and stable road for vehicular travel.

10.2 MATERIALS & INSTALLATION:

Outsloped roads shall be cut into native material to the extent possible. ¾ inch crushed rock may be used as fill material to help achieve the required cross-slope. Alternative fill material may be used with prior approval from the Engineer. All fill material shall be moisture conditioned and compacted to 90% relative compaction per ASTM D1557.

SECTION 11 - CULVERT

11.1 GENERAL:

Culverts shall be installed in the locations shown on the Plans and according to Detail 1, Sheet 14.

11.2 MATERIALS:

The culverts shall be galvanized, 14-gauge minimum corrugated metal pipe (CMP) conforming to AASHTO M36. Backfill for culverts shall be select native granular material approved in the field by the Engineer. Clean 6 inch median field rock will be used for energy dissipation and channel protection. Filter fabric shall be Mirafi 1100N filter fabric or equivalent (if needed).

11.3 INSTALLATION:

Excavate bed of stream so that culvert is set 1 to 2 inches below existing grade. Place 2 inches of 1-inch-minus gravel to bed the culvert. If bed of stream is not bedrock, place filter fabric under gravel. The culvert shall be aligned with the natural stream channel. Backfill with native material free of woody debris and rocks less than 1-inch diameter, compacting in 8-inch maximum lifts to 90% relative compaction per ASTM D1557. The finished road surface shall be a minimum 1.0' from the top of the culvert. Armor inlet & outlet of culvert and fill faces with 6-inch minimum rock.

Care should be taken to not disturb stream channel, bank, and surrounding area any more than is necessary for culvert installation and road construction. All disturbed areas shall be seeded and mulched. Permits from applicable regulatory agencies shall be obtained before construction.

SECTION 12 – ROCKED WATER CROSSING

12.1 GENERAL:

A rocked water crossing shall be constructed as shown on Detail 7, Sheet 13 in locations shown on the Plans and as staked in the field by the Engineer.

12.2 MATERIALS & INSTALLATION:

Excavate channel bed to a depth of 6 to 8 inches. Place clean 6 to 8 inch field rock in excavated channel bed, on grade with natural channel. If bed of channel is not bedrock, place filter fabric (Mirafi 1100N or equal) under rock. The finished grade cross-section of the rocked crossing shall be equivalent to the existing watercourse cross-section.

Care should be taken to not disturb channel, bank and surrounding area any more than is necessary for rocked water crossing and road construction. All disturbed areas shall be seeded and mulched. Permits from applicable regulatory agencies shall be obtained before construction.

SECTION 13 – ROLLING DIP

13.1 GENERAL:

Rolling dips shall be constructed as shown on Detail 6, Sheet 13 in locations shown on Sheets 2 through 12 and as specified by the Engineer.

13.2 INSTALLATION:

The existing roadway within the location of the rolling dip shall be scarified and any vegetation shall be removed and thoroughly incorporated. Excavation into the existing road bed shall begin approximately 20 to 25 feet uphill from the rolling dip location, progressively steepening the grade until the axis is reached. The axis of the rolling dip shall be angled approximately 30 degrees to the road alignment. Fill shall be used to achieve approximately 12" minimum of

elevation between the axis of the trough and the top of the reverse grade. Fill shall be moisture conditioned as necessary and compacted to 90% compaction per ASTM D1557. Construction shall be such that vehicles can easily drive over the rolling dips yet allows the trough to effectively convey surface flow, when present, off the road. Existing dense vegetation shall help diffuse the surface flow on the downstream side of the trough. In the event that existing grade is too rocky for uniform excavation, the Engineer may approve the use of Caltrans Class 2 Aggregate Base to construct the rolling dip as shown in Detail 6, Sheet 13.

SECTION 14 – PIPE LEVEL SPREADER

14.1 GENERAL:

Pipe level spreaders will be installed in the locations shown on the Plans and in accordance with Details 4 and 5 on Sheet 15. The level spreaders will be installed on the contour and will be utilized to return concentrated flows within the pipe to sheet flow. The length of the spreader shall be as shown on the Plans and as staked in the field by the Engineer.

14.2 MATERIALS:

Dual-wall corrugated polyethylene pipe (DWCPP) will be used for the spreaders. The ends of the pipe will be capped with fittings from the same manufacturer as the pipe.

Steel tee posts or #6 rebar and baling wire will be used to anchor/secure the spreaders to the ground.

14.3 INSTALLATION:

TYPE I LEVEL SPREADER:

A 2-inch to 6-inch deep trench, depending on the size of the Level Spreader, will be excavated on the contour. A layer of 3/4-inch-diameter crushed rock will be spread in the trench to aid in the leveling process and to secure the pipe.

End caps will be fastened to the ends of the pipe and secured with screws and a 3-foot to 4-foot long section of #6 rebar or tee posts as shown on the detail.

12-inch-wide notches will be cut into the dual-wall pipe 12 inches apart along the entire length of each pipe. The notches will be cut such that they are level and at the same elevation to assure water flows out of the pipe uniformly. The notches will extend from the spring line to the top of the pipe (1/4 circumference). 3/8 inch holes shall be drilled along the invert of the pipe approximately every 12 inches to allow for drainage. Tee posts shall be installed as shown on the detail and the pipe securely fastened to the posts with wire or an alternate method approved by the Engineer.

TYPE II LEVEL SPREADER:

A trench will be excavated on the contour, approximately 12 to 18-inches deep. A 2-inch to 6-inch layer of 3/4-inch-diameter crushed rock will be spread in the trench to aid in the leveling process

and to secure the pipe. The spring line along the downstream edge of the level spreader shall be set no more than 0.2 feet above the existing ground surface.

End caps will be fastened to the ends of the pipe and secured with screws and a 4-foot to 6-foot long section of #6 rebar or tee posts as shown on the detail.

The trench shall be backfilled and sufficiently compacted with native material to prevent excess settlement.

12-inch-wide notches will be cut into the dual-wall pipe 12 inches apart along the entire length of each pipe. The notches will be cut such that they are level and at the same elevation to assure water flows out of the pipe uniformly. The notches will extend from the spring line to the top of the pipe (1/4 circumference). 3/8 inch holes shall be drilled along the invert of the pipe approximately every 12 inches to allow for drainage. Tee posts shall be installed as shown on the detail and the pipe securely fastened to the posts with wire or an alternate method approved by the Engineer.

SECTION 15 – ROCK LEVEL SPREADER

15.1 GENERAL:

Rock level spreaders shall be installed at the locations shown on the Plans and as staked in the field by the Engineer. The rock level spreaders shall be constructed to uniformly spread water onto the ground surface.

15.2 MATERIALS:

Rock used in the construction of the rock level spreader shall be well-graded 4"-12" diameter field rock to prevent large voids within the structure. Smaller (3-inch minus) field rock and ¾-inch minus gravel will be used to line the trough of the spreader. Gravel may be crushed rock generated onsite but should contain sufficient fines to reduce the overall permeability of the trough and cause water to spread laterally along the length of the trough (generally equivalent to Cal –Trans Class II Aggregate Base).

15.3 INSTALLATION:

The rock level spreader shall be constructed as shown on Detail 6, Sheet 14. The rock shall be placed on undisturbed natural sod where ground slope is less than 15%. On steeper sites a bench shall be cut along the outboard toe for placement of rock. If a bench is cut, straw wattles shall be installed along the outboard edge of the bench **prior** to placing rock. This will help prevent fine sediment from being washed out of the structure. Care shall be taken to remove as much of the fine material (clay and silt size) as possible prior to placing the rock. The rock level spreader shall be parallel to the contour to ensure the water is evenly distributed, and the ends shall be turned uphill at least 4 feet in elevation to prevent water from running around the end. The spreader shall be constructed of large, well-graded rock to a finished cross-section with a trough depth of at least 3 feet. A layer of 3-inch minus field rock shall be spread 6-inches thick within the trough and a 6-inch layer of gravel applied over the smaller rock. Finished depth of the trough shall be at least 2 feet.

SECTION 16 – ROCK APRON

16.1 GENERAL:

Rock aprons will be installed at the outlets of pipes and ditches to help disperse concentrated flow and to minimize erosion downstream of the outlet. Rock aprons shall be installed where shown on the Plans and constructed as shown in Detail 4, Sheet 14.

16.2 MATERIALS:

Rock used in the construction of rock aprons shall be Cal Trans Class "Facing" per Cal Trans Standard Specifications Section 72-2 or equivalent size field rock generated onsite. Filter fabric shall be Mirafi 140N or equal.

16.3 INSTALLATION:

Rock aprons shall be constructed as shown on Detail 4, Sheet 14. All rock shall be placed on undisturbed native vegetation if possible. If soil is disturbed place rock on filter fabric. The apron shall extend approximately 10 feet from the outlet of the pipe. The upstream end of the apron shall be approximately 6 feet wide. The downstream end shall be approximately 10 feet wide. A small keyway shall be excavated into native material at the downstream end of the spreader as shown in the detail. A rock berm shall be constructed at the downstream end of the apron as shown on the detail.

SECTION 17 – ROCK ENERGY DISSIPATER

17.1 GENERAL:

A rock energy dissipater shall be constructed in the location shown on the Plans and as staked in the field by the Engineer. The energy dissipater will be used to dissipate and reduce flow velocities at the outlet of a diversion ditch.

17.2 MATERIALS:

Rock used in the construction of the rock energy dissipater shall be field rock generated onsite, 6-inch to 12-inch diameter. Care shall be taken to remove as much of the fine material (clay and silt size) as possible prior to placing the rock.

17.3 INSTALLATION:

The energy dissipater shall be constructed as shown on Detail 5, Sheet 14. All rock shall be placed on a non-woven geotextile such as Mirafi 140-N or native sod. The apron shall extend approximately 20 feet from the outlet of the ditch or pipe. The upstream end of the apron shall be approximately 8 feet wide. A small keyway shall be excavated into native material at the downstream end of the spreader as shown in the detail. The downstream end shall be approximately 12 feet wide. Actual dimensions shall be as directed in the field by the Engineer to fit the site.

A rock berm shall be constructed along the downslope side(s) of the rock energy dissipater to slow and filter runoff water. The berm shall be a minimum of 3 feet in height. Larger rock shall be used for the outer 2/3 of the berm and smaller rock for the inner (upstream) third.

SECTION 18 – JUNCTION BOX – BLOCK 8 WEST

18.1 GENERAL:

A junction box shall be installed on the west side of Block 8 as shown on the Plans and as staked in the field by the Engineer. Construction of the junction box shall be as shown on Detail 1, Sheet 15. The junction box will transfer water from a proposed surface drainage pipeline to a proposed pipe level spreader.

18.2 MATERIALS:

The junction box riser shall be constructed of 48" diameter galvanized corrugated metal pipe (CMP), 14-gauge minimum. Corrugated metal pipe for use as a junction box shall meet the standards of ASTM A760 and AASHTO M36, as applicable. Dual-walled corrugated polyethylene pipe may be substituted with prior approval from the Engineer.

The cover shall be constructed of a 50” diameter 1/8” steel plate with a 2” rim around the circumference.

Concrete for the bottom of the junction box shall be Portland cement concrete, 3,000 psi minimum compressive strength.

The outlet to the proposed pipe level spreader shall be constructed of 24” dual-wall corrugated polyethylene pipe. Pipe shall meet the standards of AASHTO M294. The fittings for the outlet pipe shall be watertight; no gaps between the pipe and fittings will be allowed.

The envelope material shall be the same as that specified in Section 1, Subsection 1.2, Material.

All pipe connections shall be sealed with mortar where they connect to the junction box.

18.3 INSTALLATION:

The junction box shall be constructed as shown in Detail 1, Sheet 15 and as staked in the field. The junction box shall be set plumb. No more than 2” deviation from vertical at the top shall be allowed. Backfill shall be hand-compacted or water-jetted sufficiently to prevent settlement from occurring.

A child-proof cover shall be constructed of 1\8” steel as shown in the Detail. The steel cover shall have a 2” steel rim to securely fasten the cover to the top of the junction box riser. A hinged and locking viewport 10 inches square shall be provided in the cover.

Pipe connections shall be sealed with mortar. A fillet of mortar shall be applied both inside and outside the CMP, simultaneously to ensure formation of a bond between the inside mortar and

outside mortar. The mortar shall be allowed to fully cure prior to any backfill being placed around the structure.

The bottom 1.0' of the structure shall be filled with concrete per Detail 1, Sheet 15. A series of 1/4" holes on 1-foot centers shall be drilled in the base of the riser to provide drainage of the junction box. Three rows of 1/4" holes shall be drilled within 1.0' from the top of the concrete bottom. The holes shall be staggered so as to not adversely affect the integrity of the CMP riser. Gravel envelope shall be installed along the outside perimeter of the riser to encase the drilled holes.

SECTION 19 – JUNCTION BOX – BLOCK 8 EAST

19.1 GENERAL:

A junction box shall be installed on the east side of Block 8 as shown on the Plans and as staked in the field by the Engineer. Construction of the junction box shall be as shown on Detail 2, Sheet 15. The junction box will transfer water from a proposed surface drainage pipeline to an existing culvert.

19.2 MATERIALS:

The junction box riser shall be constructed of 48" diameter galvanized corrugated metal pipe (CMP), 14-gauge minimum. Corrugated metal pipe for use as a junction box shall meet the standards of ASTM A760 and AASHTO M36, as applicable. Dual-walled corrugated polyethylene pipe may be substituted with prior approval from the Engineer.

The cover shall be constructed of a 50" diameter 1/8" steel plate with a 2" rim around the circumference.

Concrete for the bottom of the junction box shall be Portland cement concrete, 3,000 psi minimum compressive strength.

The outlet to the existing culvert shall be constructed of 18" dual-wall corrugated polyethylene pipe. Pipe shall meet the standards of AASHTO M294. The fittings for the outlet pipe shall be watertight; no gaps between the pipe and fittings will be allowed.

The envelope material shall be the same as that specified in Section 1, Subsection 1.2, Material.

All pipe connections shall be sealed with mortar where they connect to the junction box.

19.3 INSTALLATION:

The junction box shall be constructed as shown in Detail 2, Sheet 15 and as staked in the field. The junction box shall be set plumb. No more than 2" deviation from vertical at the top shall be allowed. Backfill shall be hand-compacted or water-jetted sufficiently to prevent settlement from occurring.

A child-proof cover shall be constructed of 1\8" steel as shown in the Detail. The steel cover shall have a 2" steel rim to securely fasten the cover to the top of the junction box riser. A hinged and locking viewport 10 inches square shall be provided in the cover.

Pipe connections shall be sealed with mortar. A fillet of mortar shall be applied both inside and outside the CMP, simultaneously to ensure formation of a bond between the inside mortar and outside mortar. The mortar shall be allowed to fully cure prior to any backfill being placed around the structure.

The bottom 1.0' of the structure shall be filled with concrete per Detail 2, Sheet 15. A series of 1/4" holes on 1-foot centers shall be drilled in the base of the riser to provide drainage of the junction box. Three rows of 1/4" holes shall be drilled within 1.0' from the top of the concrete bottom. The holes shall be staggered so as to not adversely affect the integrity of the CMP riser. Gravel envelope shall be installed along the outside perimeter of the riser to encase the drilled holes.

SECTION 20 – JUNCTION BOX – BLOCK 33E

20.1 GENERAL:

A junction box shall be installed on the west side of Block 33E as shown on the Plans and as staked in the field by the Engineer. Construction of the junction box shall be as shown on Detail 3, Sheet 15. The junction box will transfer water from a proposed surface drainage pipeline to a proposed pipe level spreader.

20.2 MATERIALS:

The junction box riser shall be constructed of 48" diameter galvanized corrugated metal pipe (CMP), 14-gauge minimum. Corrugated metal pipe for use as a junction box shall meet the standards of ASTM A760 and AASHTO M36, as applicable. Dual-walled corrugated polyethylene pipe may be substituted with prior approval from the Engineer.

The cover shall be constructed of a 50" diameter 1/8" steel plate with a 2" rim around the circumference.

Concrete for the bottom of the junction box shall be Portland cement concrete, 3,000 psi minimum compressive strength.

The outlet to the proposed pipe level spreader shall be constructed of 24" dual wall corrugated polyethylene pipe. Pipe shall meet the standards of AASHTO M294. The fittings for the outlet pipe shall be watertight; no gaps between the pipe and fittings will be allowed.

The envelope material shall be the same as that specified in Section 1, Subsection 1.2, Material.

All pipe connections shall be sealed with mortar where they connect to the junction box.

20.3 INSTALLATION:

The junction box shall be constructed as shown in Detail 3, Sheet 15 and as staked in the field. The junction box shall be set plumb. No more than 2" deviation from vertical at the top shall be allowed. Backfill shall be hand-compacted or water-jetted sufficiently to prevent settlement from occurring.

A child-proof cover shall be constructed of 1\8" steel as shown in the Detail. The steel cover shall have a 2" steel rim to securely fasten the cover to the top of the junction box riser. A hinged and locking viewport 10 inches square shall be provided in the cover.

Pipe connections shall be sealed with mortar. A fillet of mortar shall be applied both inside and outside the CMP, simultaneously to ensure formation of a bond between the inside mortar and outside mortar. The mortar shall be allowed to fully cure prior to any backfill being placed around the structure.

The bottom 1.0' of the structure shall be filled with concrete per Detail 3, Sheet 15. A series of 1/4" holes on 1-foot centers shall be drilled in the base of the riser to provide drainage of the junction box. Three rows of 1/4" holes shall be drilled within 1.0' from the top of the concrete bottom. The holes shall be staggered so as to not adversely affect the integrity of the CMP riser. Gravel envelope shall be installed along the outside perimeter of the riser to encase the drilled holes.

SECTION 21 – HEADCUT REPAIR

21.1 GENERAL:

Headcutting and formation of an eroded gully currently occurs below the proposed pipe outlet in Block 24G. To prevent further downcutting the contractor shall repair the headcut as shown on Detail 2, Sheet 16 and as staked in the field by the Engineer.

21.2 MATERIALS AND INSTALLATION:

The proposed pipe outlets shall be installed projecting through the existing headcut. The pipe outlets shall be installed such that they do not rest on the bottom of the existing headcut.

Prior to placing rock, the existing vegetation shall be removed without disturbing the roots. Rock riprap shall be 6"-12" diameter rock. The rock shall be carefully placed around the proposed pipe outlets so as to avoid damaging the pipe outlets. Rock shall be first placed under the pipe outlets to provide support before additional rock is placed over the outlets. The eroded channel shall be filled with riprap from flowline to the top of the existing headcut as shown in the Detail. The riprap shall completely encase the proposed pipe outlets to provide energy dissipation and prevent further downcutting.

SECTION 22 – BLOCK 33A PIPE OUTLETS & HEADCUT REPAIR

22.1 GENERAL:

Proposed surface drainage lines in Block 33A will outlet in the location shown on the Plans. The pipes will outlet at an existing headcut which shall be repaired as part of the overall pipe outlet construction. The outlet and headcut repair shall be constructed as shown in Detail 3, Sheet 16.

22.2 MATERIALS:

Rock riprap to be placed at the proposed pipe outlets and to be used for headcut repair shall be Caltrans RSP Class II Riprap. An alternative riprap may be used with prior approval by the Engineer.

Geotextile fabric shall be Caltrans Class 8 RSP Fabric or equal.

22.3 INSTALLATION:

The proposed pipe outlets shall be installed projecting through the existing headcut. The pipe outlets shall be installed such that they do not rest on the bottom of the existing headcut.

Prior to grading, vegetation shall be removed from the existing headcut. The vertical headcut shall be regraded as directed by the Engineer in the field to achieve a stable ±2:1 (horizontal:vertical) slope. Class 8 RSP Fabric shall be installed on all disturbed areas. Caltrans RSP Class II Riprap shall be placed in the regraded headcut and shall be carefully placed around the proposed pipe outlets so as to avoid damaging the pipe outlets. Riprap shall be placed at the pipe outlets as shown in the Detail to provide energy dissipation and prevent further downcutting. Riprap shall extend from the pipe outlets to the edge of Elder Creek to provide erosion protection for the existing bank.

SECTION 23 – BLOCK 23B PIPE OUTLETS & HEADCUT REPAIR

23.1 GENERAL:

A network of surface drainage lines in Block 23B shall outlet to an existing swale as shown in the Plans. An existing headcut at the outlet of the swale shall be repaired as part of the overall pipe outlet construction. The proposed pipe outlets and headcut repair shall be constructed as shown in Detail 2, Sheet 17.

23.2 MATERIALS:

Rock riprap to be placed at the proposed pipe outlets and to be used for headcut repair shall be Caltrans RSP Class II Riprap. An alternative riprap may be used with prior approval by the Engineer.

Geotextile fabric shall be Caltrans Class 8 RSP Fabric or equal.

23.3 INSTALLATION

Proposed pipe outlets shall be installed at the toe of the existing swale. Caltrans RSP Class II Riprap shall be installed at the outlets to provide energy dissipation. Riprap shall be installed at the outlets such that the outlet itself is not set directly on native ground. Riprap shall be placed to provide adequate energy dissipation for expected outflows from the pipes and adequate erosion protection for the swale. For the proposed 18" Dual-Wall Corrugated Polyethylene Pipe (DW CPP) outlet, the bank opposite the outlet shall be protected with riprap as shown in the Detail to protect against bank erosion. Riprap placed at pipe outlets shall extend the entire width of the toe of the existing swale to ensure erosion protection within the flowline of the swale itself.

Riprap berms shall be installed on the downhill side of the pipe outlets as shown in the Detail. The berms shall be a minimum 2' high as measured from the invert of the individual pipe outlets to top of berm. The berms shall be installed with ±2:1 (horizontal:vertical) slopes. Berms shall be constructed across the entire width of the existing swale.

Prior to grading, vegetation shall be removed from the existing headcut. The vertical headcut shall be regraded as directed by the Engineer in the field to achieve a stable ±2:1 slope. Class 8 RSP Fabric shall be installed on all disturbed areas. Riprap shall be placed in the regraded headcut as shown in the Detail. A berm shall be constructed a minimum 2' high as measured from the toe of the existing swale to top of berm. The berm shall be installed with ±2:1 slopes.

SECTION 24 – BLOCK 23A PIPE OUTLET & HEADCUT REPAIR

24.1 GENERAL:

A proposed surface drainage line in Block 23A will outlet in the location shown on the Plans. The pipe will outlet at an existing headcut which shall be repaired as part of the overall pipe outlet construction. The outlet and headcut repair shall be constructed as shown in Detail 1, Sheet 17.

24.2 MATERIALS:

Rock riprap to be placed at the proposed pipe outlet and to be used for headcut repair shall be Caltrans RSP Class II Riprap. An alternative riprap may be used with prior approval by the Engineer.

Geotextile fabric shall be Class 8 RSP Fabric or equal.

24.3 INSTALLATION:

The proposed pipe outlet shall be installed projecting through the existing headcut. The pipe outlet shall be installed such that it does not rest on the bottom of the existing headcut.

Prior to grading, vegetation shall be removed from the existing headcut. The vertical headcut shall be regraded as directed by the Engineer in the field to achieve a stable ±2:1

(horizontal:vertical) slope. Class 8 RSP Fabric shall be installed on all disturbed areas. Caltrans RSP Class II Riprap shall be placed in the regraded headcut and shall be carefully placed around the proposed pipe outlet so as to avoid damaging the pipe outlet. Riprap shall be placed at the pipe outlet as shown in the Detail to provide energy dissipation and prevent further downcutting. Riprap shall extend from the pipe outlet to the edge of Elder Creek to provide erosion protection for the existing bank.

SECTION 25 – BLOCK 24A SOUTH PIPE OUTLET & HEADCUT REPAIRS

25.1 GENERAL:

A proposed surface drainage line in Block 24A will outlet in the location shown on the Plans. The pipe will outlet to an existing, eroded swale which has a pronounced headcut. The swale itself is located within an existing, sunken shelf that also has a headcut. Both headcuts shall be repaired as part of the overall pipe outlet construction. The outlet and headcut repairs shall be constructed according to Detail 1, Sheet 18.

25.2 MATERIALS:

Rock riprap to be placed at the proposed pipe outlet and to be used for headcut repairs shall be Caltrans RSP Class II Riprap. An alternative riprap may be used with prior approval by the Engineer.

Geotextile fabric shall be Class 8 RSP Fabric or equal.

25.3 INSTALLATION:

The proposed pipe outlet shall be installed projecting through the existing swale headcut. The pipe outlet shall be installed such that it does not rest on the bottom of the existing headcut. A 90º elbow shall be installed at the end of the outlet to direct flow along the existing flowline of the swale.

Prior to grading, vegetation shall be removed from the existing headcut in the swale. The vertical headcut shall be regraded as directed by the Engineer in the field to achieve a stable ±2:1 (horizontal:vertical) slope. Class 8 RSP Fabric shall be installed on all disturbed areas. Caltrans RSP Class II Riprap shall be placed in the regraded headcut and shall be carefully placed around the proposed pipe outlet so as to avoid damaging the pipe outlet. Riprap shall be carefully placed around the 90º elbow to provide additional bracing and stabilization for the pipe elbow. Riprap shall be placed at the pipe outlet as shown in the Detail to provide energy dissipation and prevent further downcutting.

A riprap berm shall be installed on the downhill side of the outlet as shown in the Detail. The berm shall be a minimum 2’ high as measured from the rock-armored flowline of the swale to top of berm. The berm shall be installed stable with ±2:1 slopes. The berm shall be constructed to extend the entire width of the toe of the existing swale.

Vegetation shall be removed prior to grading the headcut along the eroded shelf. The vertical headcut shall be regraded as directed by the Engineer in the field to achieve a stable ±2:1 slope. Class 8 RSP Fabric shall be installed on all disturbed areas. Caltrans RSP Class II Riprap shall be placed in the regraded headcut. Riprap shall be placed as shown in the Detail to prevent further downcutting.

SECTION 26 – BLOCK 24A NORTH PIPE OUTLET

26.1 GENERAL:

A proposed surface drainage line in Block 24A will outlet into an existing swale as shown on the Plans. The outlet shall be constructed according to Detail 2, Sheet 18.

26.2 MATERIALS:

Rock riprap to be placed at the proposed pipe outlet and to be used for berm construction shall be Caltrans RSP Class II Riprap. An alternative riprap may be used with prior approval by the Engineer.

Geotextile fabric shall be Class 8 RSP Fabric or equal.

26.3 INSTALLATION:

The proposed pipe outlet shall be installed parallel to the existing 12" Corrugated Metal Pipe (CMP) culvert that currently drains to the existing swale. Class 8 RSP Fabric shall be installed at the outlet location. Once the fabric has been installed, Caltrans RSP Class II Riprap shall be placed as shown in the Detail to provide energy dissipation at the outlet. Both the fabric and the riprap should cover the flowline of the existing swale and extend ±4' on both swale banks as shown in the Detail and as approved by the Engineer in the field.

A riprap berm shall be installed on the downhill side of the outlet as shown in the Detail. The berm shall be a minimum 2' high as measured from the rock-armored flowline of the swale to top of berm. The berm shall be installed stable with ±2:1 slopes. The berm shall be constructed to extend the entire width of the swale flowline.

SECTION 27 – BLOCK 24E SOUTH PIPE OUTLETS & EROSION REPAIR

27.1 GENERAL:

Proposed surface drainage lines in Block 24E will outlet into an existing swale as shown on the Plans. A local tributary swale located in this larger swale has considerable erosion that shall be repaired as part of the overall pipe outlet construction. The outlet and swale repair shall be constructed according to Detail 3, Sheet 18.

27.2 MATERIALS:

Rock riprap to be placed at the proposed pipe outlets and to be used for repair shall be Caltrans RSP Class II Riprap. An alternative riprap may be used with prior approval by the Engineer.

Geotextile fabric shall be Class 8 RSP Fabric or equal.

27.3 INSTALLATION:

Proposed pipe outlets shall be installed near the toe of the swale. Class 8 RSP Fabric shall be installed at the outlet location. Once the fabric has been installed, Caltrans RSP Class II Riprap shall be placed as shown in the Detail to provide energy dissipation at the outlet. Both the fabric and the riprap should cover the flowline of the existing swale and extend to the outlet of the existing 12" Corrugated Metal Pipe (CMP) culvert. Additionally, both the fabric and riprap should extend ±4' and ±10' on the respective swale banks as shown in the Detail and as approved by the Engineer in the field.

A riprap berm shall be installed on the downhill side of the outlets as shown in the Detail. The berm shall be a minimum 2' high as measured from the invert of the 18" Single Wall Corrugated Polyethylene Pipe (SW CPP) outlet to top of berm. The berm shall be installed stable with ±2:1 slopes. The berm shall be constructed to extend the entire width of the swale flowline.

Erosion in the tributary swale shall be repaired by first installing Class 8 RSP Fabric along the entire swale. Caltrans RSP Class II Riprap shall then be placed to rock-armor the entire swale and provide energy dissipation. Riprap shall be placed so as to not compromise the overall cross-section of the tributary swale.

SECTION 28 – BLOCK 24E NORTH PIPE OUTLETS

28.1 GENERAL:

Proposed surface drainage lines in Block 24E will outlet into an existing natural basin as shown on the Plans. The outlet shall be constructed according to Detail 3, Sheet 17.

28.2 MATERIALS:

Rock riprap to be placed at the proposed pipe outlet and to be used for berm construction shall be Caltrans RSP Class II Riprap. An alternative riprap may be used with prior approval by the Engineer.

Geotextile fabric shall be Class 8 RSP Fabric or equal.

28.3 INSTALLATION:

Proposed pipe outlets shall be installed near the toe of the existing basin. Class 8 RSP Fabric shall be installed at the outlet location. Once the fabric has been installed, Caltrans RSP Class II

Riprap shall be placed as shown in the Detail to provide energy dissipation at the outlet. Both the fabric and the riprap should cover the flowline of the existing basin.

A riprap berm shall be installed on the downhill side of the outlet as shown in the Detail. The berm shall be a minimum 2' high as measured from the rock-armored flowline of the basin to top of berm. The berm shall be installed stable with ±2:1 slopes. The berm shall be constructed to extend the entire width of the basin flowline.

SECTION 29 – SPILLWAY BERM

29.1 GENERAL:

A berm shall be constructed in the existing pond spillway in the location shown on the Plans. The berm shall be constructed according to Detail 2, Sheet 19.

29.2 MATERIALS:

The berm shall be constructed of native soil collected from excavations for the proposed pond overflow structure (See Section 30 of these Special Provisions).

29.3 INSTALLATION:

Prior to construction, all vegetation and organic matter shall be stripped from the site.

The berm shall be constructed from fill material which shall be free of large rocks and organic material. Berm fill shall be placed in uniform, 4" thick maximum horizontal layers, moisture conditioned as necessary and compacted to 95% relative compaction per ASTM D1557. Material below the berm shall be over-excavated as necessary to expose firm native soils and recompacted to 95% relative compaction per ASTM D1557. The upper 8" of the berm subgrade shall be scarified, moisture conditioned as necessary and compacted to at least 95% relative compaction per ASTM D1557. The berm fill slopes shall be 2:1 (horizontal:vertical) to top of berm Elevation 1535'. The top of the berm shall be ±6' in length and be as wide as the existing spillway at Elevation 1535'. The berm shall be seeded and straw mulched to establish and maintain a 90% vegetative cover.

SECTION 30 – POND OVERFLOW STRUCTURE

30.1 GENERAL:

An overflow structure shall be constructed in the existing pond in the location shown on the Plans. The overflow structure shall be constructed according to Detail 1, Sheet 19.

30.2 MATERIALS:

The overflow riser shall be 24" diameter galvanized, 14-gauge Corrugated Metal Pipe (CMP).

Outlet pipe shall be 12" Single Wall Corrugated Polyethylene Pipe (SW CPP), conforming to AASHTO M294 and SCS 606 specifications as applicable. Bent or damaged pipe shall not be used and shall be removed from the job site. Pipe connections shall be made with fittings manufactured by the same manufacturer who made the pipe. All connections shall be securely fastened, and the resulting connection shall not have gaps greater than 1/8 inch wide.

Grates shall be Agri Drain Bar Guard or equal.

Concrete for the riser encasement shall be Portland Cement concrete, 3000 psi minimum compressive strength.

30.3 INSTALLATION:

The overflow riser shall be embedded 4' below the bottom elevation of the pond and shall be set level. The riser shall be encased in concrete as shown in the detail. Number 4 rebar will be placed on 12-inch centers through the riser encasement. Placement of rebar will be determined in the field by the Engineer at the time of construction. The riser shall be staked down before concrete backfill is poured to prevent floating of the riser itself. Concrete shall be allowed to cure for a minimum of 72 hours before backfilling can begin. Backfill for the concrete-encased riser shall be compacted to 95% relative compaction per ASTM D1557.

The top of the riser shall be set at Elevation 1534' – approximately 2' below the top of pond elevation (Elevation 1536') and 1' below the top of the proposed Spillway Berm (Elevation 1535', see Section 29 of these Special Provisions). A series of eight (8) 1" diameter holes shall be drilled along the circumference of the riser at Elevation 1530'. A series of eight (8) 2" diameter holes shall be drilled along the circumference of the riser at Elevation 1533'. A trash rack shall be installed over the top of the overflow riser.

The trench for the outlet pipe shall be excavated into the existing pond wall and spillway and shall be made sufficiently wide to accommodate the proposed pipe and compaction equipment. The slope, alignment and depth of placement of the piping shall be as shown in the Detail and as staked in the field by the Engineer. The trench bottom shall be continuous, firm, relatively smooth and free of rocks or other objects larger than 1 inch. A gradual variation of no more than 1 foot from design alignment is allowed. The pipe connection to the riser shall be mortared to form a watertight seal. A concrete cutoff collar shall be installed on the outlet pipe as shown in the Detail. Concrete cutoff collars shall be constructed as described in Section 2 of these Special Provisions except that no perforations of the pipe upstream nor gravel backfill shall be required. Backfill around the pipes shall be placed in 8" thick maximum horizontal layers, moisture conditioned as necessary and compacted to 95% relative compaction per ASTM D1557.

SECTION 31 – OUTSLOPED BENCH

31.1 GENERAL:

Outsloped benches shall be constructed in certain areas to allow safe access for equipment due to the cross-slope associated with the chosen row direction.

31.2 MATERIALS & INSTALLATION:

Benches shall be constructed following all other ground-preparation operations using a small dozer with a 6-way blade or other suitable equipment approved by the Engineer. The dimensions of the benches shall be as shown on Detail 1, Sheet 16. Only one vinerow will be planted per bench.

SECTION 32 - TEMPORARY MEASURES

32.1 GENERAL:

Temporary erosion control measures shall be installed or constructed by the Owner. These measures can include water bars, straw wattles, straw mulching, straw bale dikes, and other practices as needed. The measures shall be constructed in conformance with the detail drawings and maintained in a functional condition throughout the rainy season.

SECTION 33 - MAINTENANCE

33.1 GENERAL:

The erosion control measures described in these Specifications and shown on the Plans and Details require regular maintenance in order to function as intended. Vineyard management personnel shall assure that the erosion control measures are monitored throughout the rainy season each year and necessary repairs and/or maintenance are performed immediately. Maintenance operations shall include, but not be limited to the following activities.

33.2 DROP INLETS:

Drop inlets are designed with trash racks at the ground surface. Debris shall be removed from trash racks after each storm event or as necessary to assure a clear flow path for water entering the drop inlet. Damaged trash racks shall be repaired immediately in order to assure that unacceptable quantities of debris do not enter the storm drainage piping system. Drop inlets shall also be inspected annually for any sediment that may have accumulated within the riser. Sediment shall be removed and spread in a safe location and protected as necessary.

33.3 DITCHES:

All ditches shall be maintained to the extent possible throughout the year. The ditches shall be inspected annually prior to the rainy season in order to ensure that no major damage has

occurred. The ditches shall be cleaned of debris and repaired annually such that there is a minimum flow depth of 1.0' for standard ditches and 1.5' for non-standard ditches.

33.4 ROLLING DIPS:

The rolling dips shall be monitored and repaired as needed to ensure water is directed off of the roadway. Any accumulated sediment shall be cleaned out by hand. In the event that a rolling dip requires removal of sediment on a regular basis another rolling dip should be constructed uphill as this indicates that spacing is too wide between rolling dips.

33.5 LEVEL SPREADERS:

Level spreaders shall be inspected after each storm event the first year and at least annually thereafter to ensure proper functioning.

33.6 ROCK ENERGY DISSIPATERS:

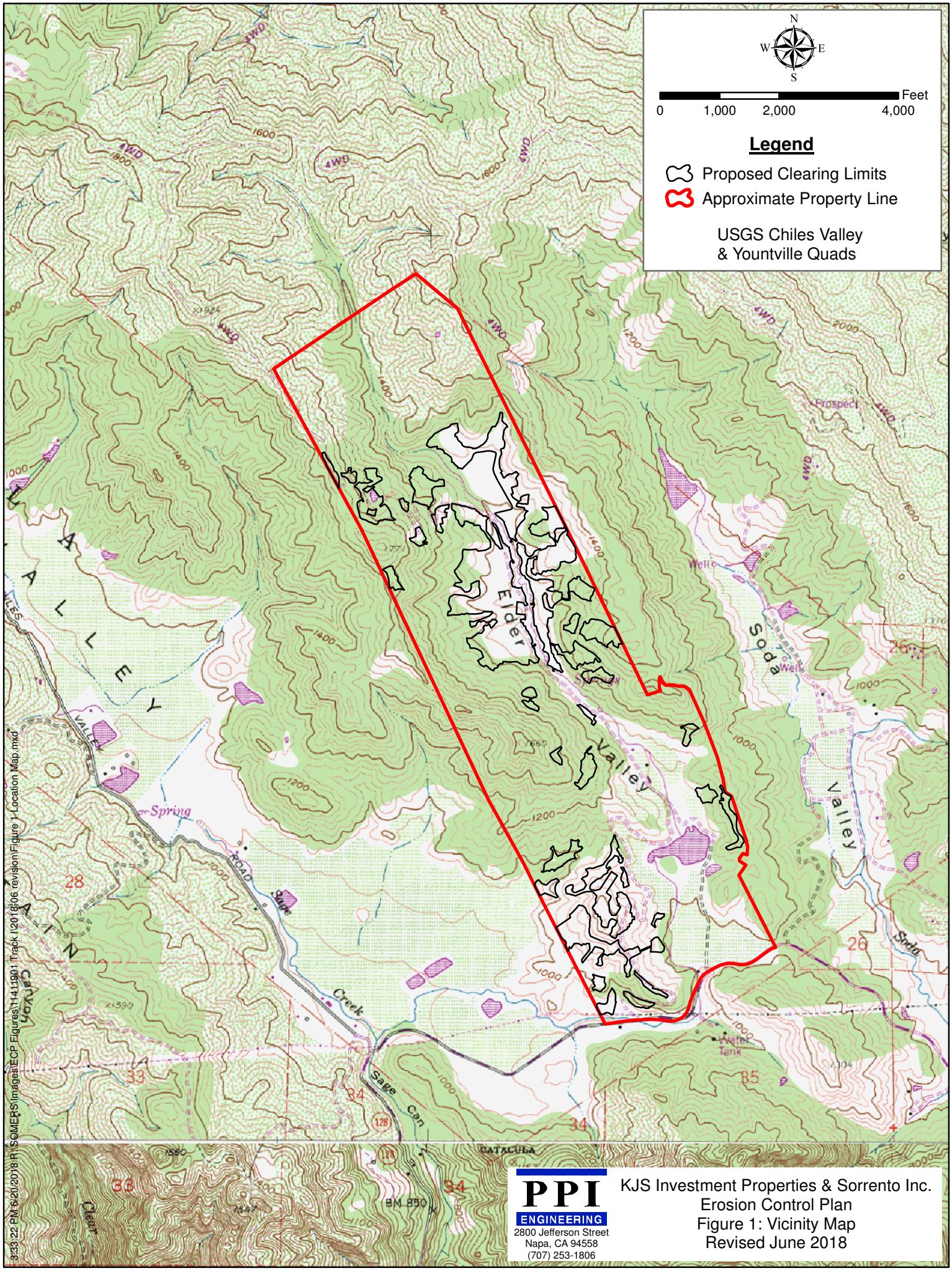
These structures shall be monitored during/after every runoff event the first year and periodically in subsequent years. Adjustments shall be made as necessary to ensure flow is dissipated in a non-erosive manner.

33.7 STRAW WATTLES:

Straw wattles shall be monitored and repaired as needed to ensure water does not run under the wattle or between adjacent wattles. Should excessive erosion cause the wattle to fill with sediment, this material shall be removed to a protected location and the source of the sediment located and protected as needed.

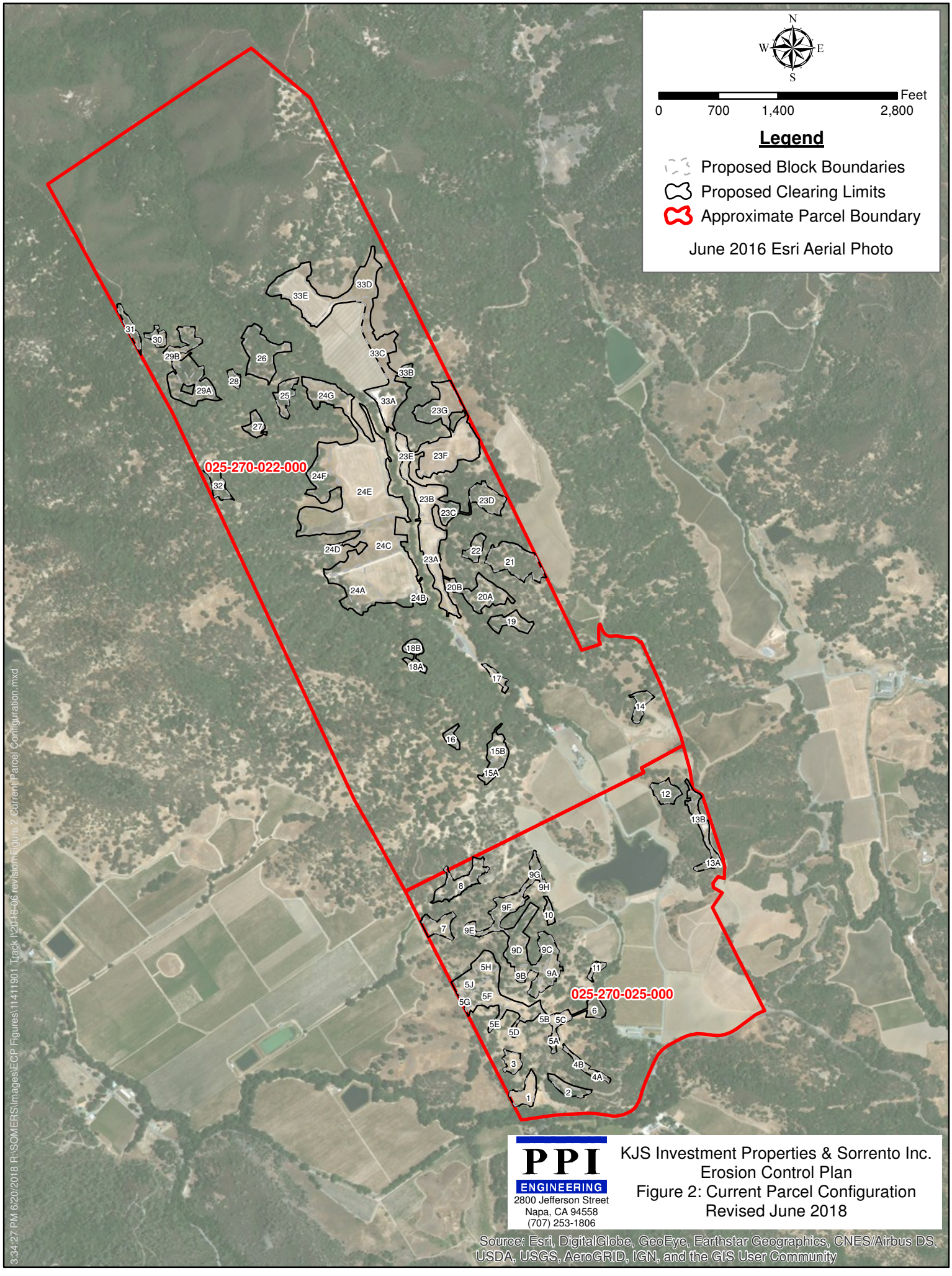
APPENDIX A

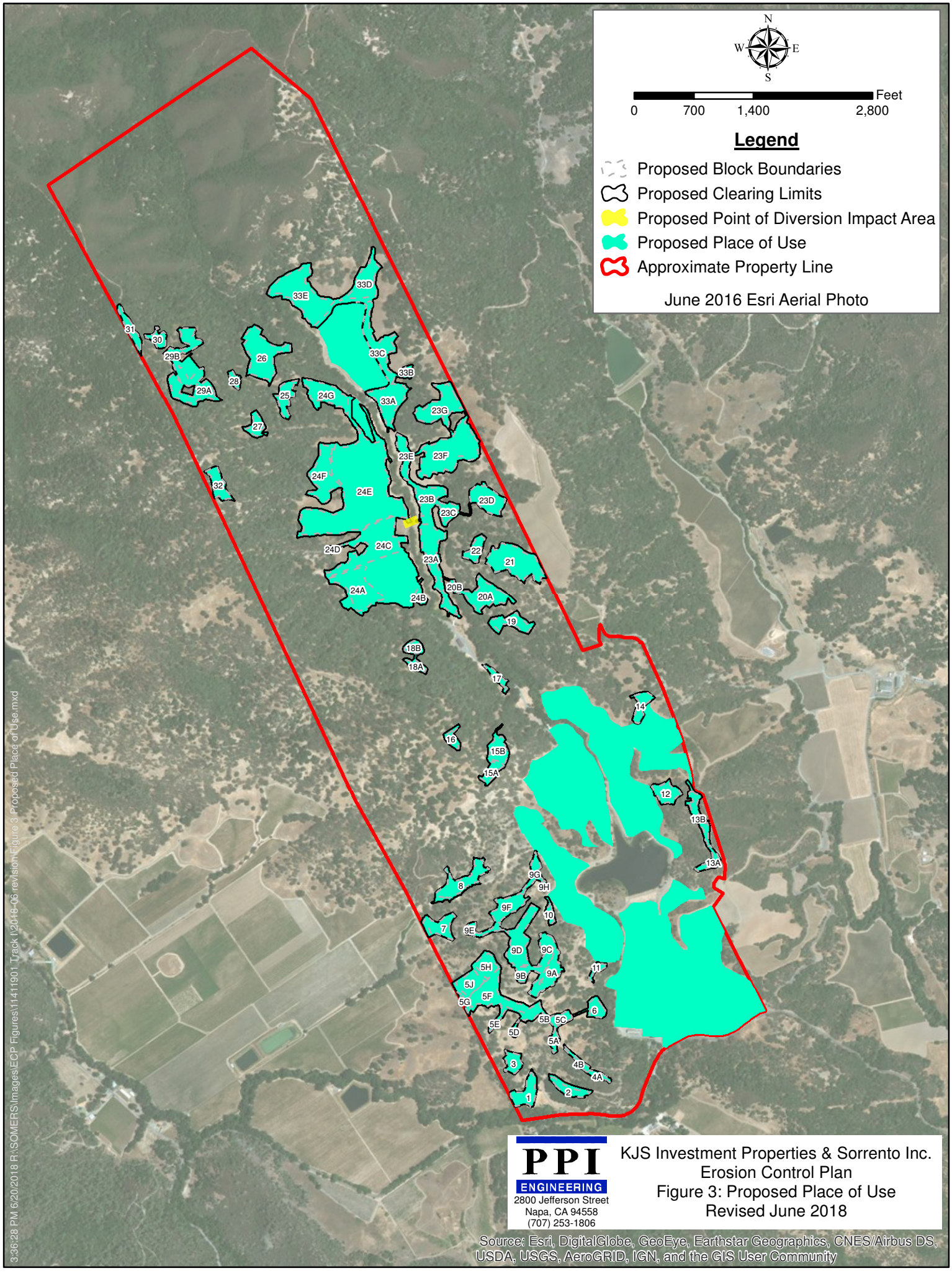
SUPPORTING FIGURES

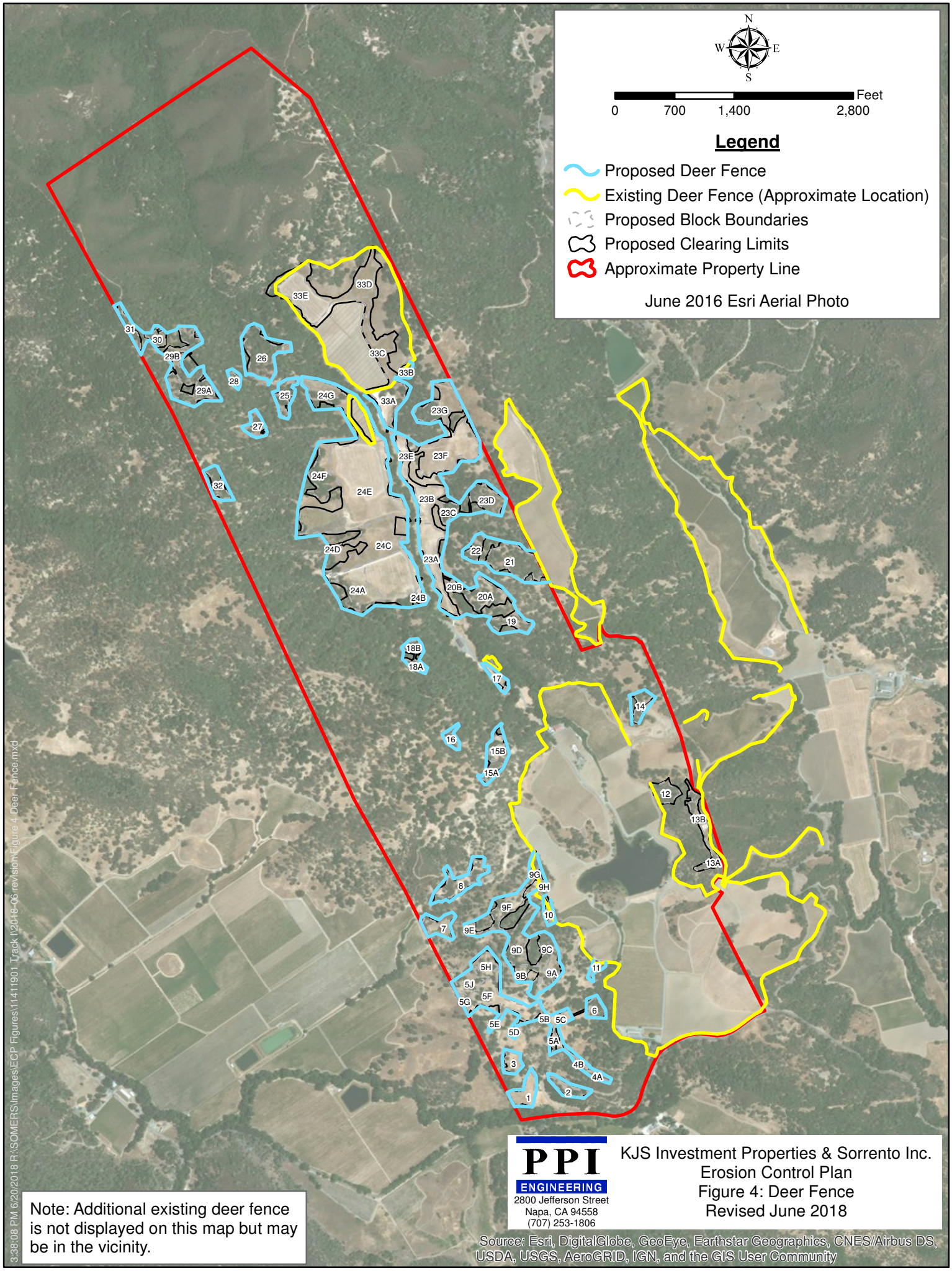


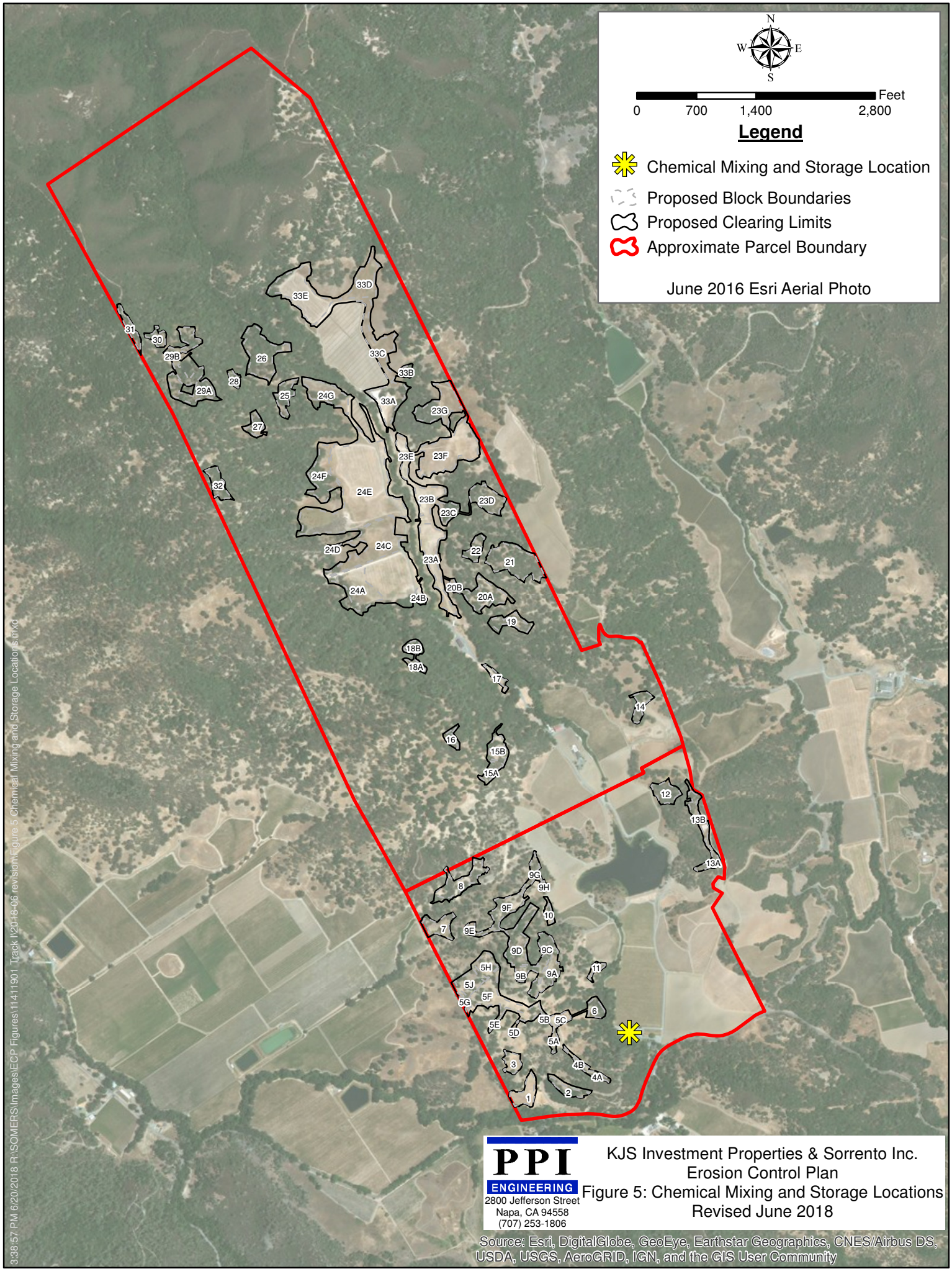
PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

KJS Investment Properties & Sorrento Inc.
Erosion Control Plan
Figure 1: Vicinity Map
Revised June 2018


N
W
E
S
0
700
1,400
2,800
Feet
Legend
Proposed Block Boundaries
Proposed Clearing Limits
Approximate Parcel Boundary
June 2016 Esri Aerial Photo
025-270-022-000
025-270-025-000
33D
33E
31
30
29B
26
33C
33B
28
29A
25
24G
33A
23G
27
23E
23F
24F
24E
23B
23D
23C
24D
24C
22
21
23A
24A
24B
20B
20A
19
18B
18A
17
14
16
15B
15A
12
13B
13A
9G
9H
8
9F
10
7
9E
9D
9C
5H
11
9B
9A
5J
5G
5F
6
5B
5C
5E
5D
5A
4B
3
4A
2
1
PPI
ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806
KJS Investment Properties & Sorrento Inc.
Erosion Control Plan
Figure 2: Current Parcel Configuration
Revised June 2018
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3:34:27 PM 6/20/2018 R:\SOMERS\Images\ECP Figures\11411901 Track I\2018-06 revision\Figure 2 Current Parcel Configuration.mxd


N
W
E
S
0
700
1,400
2,800
Feet
Legend
Proposed Block Boundaries
Proposed Clearing Limits
Proposed Point of Diversion Impact Area
Proposed Place of Use
Approximate Property Line
June 2016 Esri Aerial Photo
33D
33E
31
30
29B
26
33C
33B
28
29A
25
24G
33A
23G
27
23E
23F
24F
32
24E
23B
23D
23C
24D
24C
22
21
23A
24A
24B
20B
20A
19
18B
18A
17
14
16
15B
15A
12
13B
13A
9G
9H
8
9F
10
7
9E
9D
9C
5H
11
9B
9A
5J
5F
5G
6
5B
5C
5E
5D
5A
4B
3
4A
2
1
PPI
ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806
KJS Investment Properties & Sorrento Inc.
Erosion Control Plan
Figure 3: Proposed Place of Use
Revised June 2018
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3:36:28 PM 6/20/2018 R:\SOMERS\Images\ECP Figures\11411901 Track I\2018-06 revision\Figure 3 Proposed Place of Use.mxd


N
W
E
S
0
700
1,400
2,800
Feet
Legend
Proposed Deer Fence
Existing Deer Fence (Approximate Location)
Proposed Block Boundaries
Proposed Clearing Limits
Approximate Property Line
June 2016 Esri Aerial Photo
Note: Additional existing deer fence is not displayed on this map but may be in the vicinity.
PPI
ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806
KJS Investment Properties & Sorrento Inc.
Erosion Control Plan
Figure 4: Deer Fence
Revised June 2018
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3:38:08 PM 6/20/2018 R:\SOMERS\Images\ECP Figures\11411901 Track I\2018-06 revision\Figure 4 Deer Fence.mxd


N
W
E
S
0
700
1,400
2,800
Feet
Legend
Chemical Mixing and Storage Location
Proposed Block Boundaries
Proposed Clearing Limits
Approximate Parcel Boundary
June 2016 Esri Aerial Photo
33D
33E
31
30
29B
26
33C
33B
28
29A
25
24G
33A
23G
27
23E
23F
24F
32
24E
23B
23D
23C
24D
24C
22
21
23A
24A
24B
20B
20A
19
18B
18A
17
14
16
15B
15A
12
13B
13A
9G
9H
8
9F
10
7
9E
9D
9C
11
5H
9B
9A
5J
5F
5G
6
5B
5C
5E
5D
5A
3
4B
4A
1
2
PPI
ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806
KJS Investment Properties & Sorrento Inc.
Erosion Control Plan
Figure 5: Chemical Mixing and Storage Locations
Revised June 2018
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
3:38:57 PM 6/20/2018 R:\SOMERS\Images\ECP Figures\11411901 Track I\2018-06 revision\Figure 5 Chemical Mixing and Storage Locations.mxd

APPENDIX B

USLE CALCULATIONS

KJS Investment Properties & Sorrento Inc.
Percent Vegetative Cover and USLE "R" Value, by Block

Block	USDA Soil Classification	Soil as mapped by Dr. Paul Anamosa	USLE R value	Percent permanent cover crop
1	165, 171	Pleasanton Loam	85	85
2	165		85	75
3	165	Millsholm	85	85
4A	165		85	85
4B	165	Millsholm	85	85
5A	165		85	80
5B	165		85	85
5C	165		85	90
5D	165		85	75
5E	165		85	85
5F	165	Maymen Loam	85	85
5G	165		85	75
5H	165		85	80
5J	165	Maymen Loam	85	90
6	165		85	85
7	112, 165		85	85
8	163, 165		85	75
9A	165		85	85
9B	165	Maymen Loam	85	90
9C	165		85	85
9D	165	Maymen Loam	85	85
9E	165		85	85
9F	165	Lodo	85	85
9G	165		85	75
9H	165		85	75
10	165		85	75
11	165		85	85
12	113, 159		75	75
13A	159, 165		75	80
13B	159, 165		75	80
14	114, 159		75	85
15A	114		85	85
15B	114		85	80
16	114		85	85
17	114, 171	Maymen Loam	85	90
18A	114		85	90
18B	114		85	90
19	114		85	85
20A	114		85	85
20B	114		85	85
21	114		85	80
22	114		85	75

KJS Investment Properties & Sorrento Inc.
Percent Vegetative Cover and USLE "R" Value, by Block

Block	USDA Soil Classification	Soil as mapped by Dr. Paul Anamosa	USLE R value	Percent permanent cover crop
23A	114, 171	Pleasanton Loam	85	80
23B	114, 171	Pleasanton Loam	85	80
23C	114		85	85
23D	114		85	80
23E	114, 171		85	80
23F	114	Bressa Silt Loam, Dibble	85	85
23G	114	Bressa Silt Loam	85	80
24A	114, 171	Bressa Silt Loam	85	80
24B	114, 171		85	85
24C	114, 171	Bressa Silt Loam	85	75
24D	114		85	75
24E	114, 171	Cole-Alluvial Silt Loam, Pleasanton Loam	85	75
24F	114		85	80
24G	114, 171	Bressa Silt Loam	85	80
25	114		85	80
26	114		85	80
27	114		85	75
28	114		85	80
29A	114		85	85
29B	114		85	85
30	114		85	80
31	114, 163		85	75
32	114		85	80
33A	114, 171		85	80
33B	114		85	80
33C	114, 171	Bressa Silt Loam	85	85
33D	114, 171	Pleasanton Loam	85	80
33E	114, 171	Pleasanton Loam	85	80

USDA Soil Classification Guide:
112: Bressa-Dibble Complex, 5-15% slopes
113: Bressa-Dibble Complex, 15-30% slopes
114: Bressa-Dibble Complex, 30-50% slopes
159: Los Gatos Loam, 30-50% slopes
163: Maymen-Millsholm-Lodo Association, 30-75% slopes
165: Millsholm Loam, 6-55% slopes
171: Pleasanton Loam, 2-5% slopes
183: Water

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 5 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 112 & 113 & 114 -K= 0.43
Soil Name Bressa-Dibble -R= 75
-T= 3

Percent Cover		65% Up & Down Hill	70% Up & Down Hill	75% Up & Down Hill	80% Up & Down Hill	85% Up & Down Hill	90% Up & Down Hill
		C= 0.058 P= 1.0	C= 0.046 P= 1.0	C= 0.034 P= 1.0	C= 0.022 P= 1.0	C= 0.015 P= 1.0	C= 0.010 P= 1.0
	2	559,961	1,212,620	3,321,397	14,174,496	50,809,527	196,297,799
	4	11,568	20,650	43,967	130,546	340,089	937,175
	6	1,584	2,519	4,610	11,011	23,686	53,294
	8	730	1,160	2,123	5,071	10,907	24,541
	10	389	619	1,133	2,705	5,819	13,093
	12	236	374	685	1,637	3,522	7,923
P	14	154	246	449	1,074	2,309	5,196
E	16	107	171	313	747	1,607	3,615
R	18	78	124	228	544	1,170	2,633
C	20	59	94	172	411	883	1,987
E	22	46	73	134	319	687	1,545
N	24	37	58	107	254	547	1,232
T	26	30	47	87	207	445	1,002
	28	25	39	72	171	369	830
S	30	21	33	60	144	310	698
L	32	18	28	52	123	265	595
O	34	15	24	44	106	228	514
P	36	13	21	39	93	199	448
E	38	12	19	34	82	176	395
	40	10	17	30	73	156	351
	42	9	15	27	65	140	315
	44	8	13	25	59	126	284
	46	8	12	22	53	115	258
	48	7	11	20	49	105	236
	50	6	10	19	45	96	217

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 5 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 112 & 113 & 114 -K= 0.43
Soil Name Bressa-Dibble -R= 75
-T= 3

Percent Cover		65% Cross-Slope	70% Cross-Slope	75% Cross-Slope	80% Cross-Slope	85% Cross-Slope	90% Cross-Slope
		C= 0.058 P= 0.6	C= 0.046 P= 0.6	C= 0.034 P= 0.6	C= 0.022 P= 0.6	C= 0.015 P= 0.6	C= 0.010 P= 0.6
	2	3,073,641	6,656,102	18,231,227	77,804,144	278,894,690	1,077,483,237
	4	41,483	74,054	157,669	468,151	1,219,591	3,360,799
	6	4,401	6,996	12,806	30,587	65,796	148,040
	8	2,026	3,222	5,897	14,085	30,298	68,171
	10	1,081	1,719	3,146	7,514	16,164	36,369
	12	654	1,040	1,904	4,547	9,782	22,009
P	14	429	682	1,249	2,982	6,415	14,434
E	16	299	475	869	2,075	4,463	10,043
R	18	217	346	633	1,511	3,250	7,313
C	20	164	261	478	1,141	2,454	5,521
E	22	128	203	371	887	1,908	4,293
N	24	102	162	296	707	1,520	3,421
T	26	83	132	241	575	1,237	2,783
	28	69	109	199	476	1,025	2,305
S	30	58	92	168	401	862	1,940
L	32	49	78	143	342	735	1,654
O	34	42	67	124	295	635	1,428
P	36	37	59	108	257	554	1,246
E	38	33	52	95	227	488	1,098
	40	29	46	84	202	434	975
	42	26	41	76	181	388	874
	44	23	37	68	163	351	789
	46	21	34	62	148	318	716
	48	19	31	57	135	291	655
	50	18	28	52	124	268	602

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 5 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 112 & 113 & 114 -K= 0.43
Soil Name Bressa-Dibble -R= 85
-T= 3

Percent Cover		65% Up & Down Hill	70% Up & Down Hill	75% Up & Down Hill	80% Up & Down Hill	85% Up & Down Hill	90% Up & Down Hill
		C= 0.058 P= 1.0	C= 0.046 P= 1.0	C= 0.034 P= 1.0	C= 0.022 P= 1.0	C= 0.015 P= 1.0	C= 0.010 P= 1.0
PERCENT SLOPE	2	368,949	798,974	2,188,410	9,339,328	33,477,508	129,337,185
	4	8,460	15,102	32,154	95,471	248,713	685,372
	6	1,233	1,961	3,589	8,573	18,441	41,492
	8	568	903	1,653	3,948	8,492	19,107
	10	303	482	882	2,106	4,530	10,193
	12	183	292	534	1,275	2,742	6,169
	14	120	191	350	836	1,798	4,045
	16	84	133	243	582	1,251	2,815
	18	61	97	177	423	911	2,050
	20	46	73	134	320	688	1,547
	22	36	57	104	249	535	1,203
	24	29	45	83	198	426	959
	26	23	37	67	161	347	780
	28	19	31	56	134	287	646
	30	16	26	47	112	242	544
	32	14	22	40	96	206	464
	34	12	19	35	83	178	400
	36	10	17	30	72	155	349
	38	9	15	27	64	137	308
	40	8	13	24	56	122	273
	42	7	12	21	51	109	245
	44	7	10	19	46	98	221
	46	6	9	17	41	89	201
	48	5	9	16	38	82	184
	50	5	8	15	35	75	169

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 5 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 112 & 113 & 114 -K= 0.43
Soil Name Bressa-Dibble -R= 85
-T= 3

Percent Cover		65% Cross-Slope	70% Cross-Slope	75% Cross-Slope	80% Cross-Slope	85% Cross-Slope	90% Cross-Slope
		C= 0.058 P= 0.6	C= 0.046 P= 0.6	C= 0.034 P= 0.6	C= 0.022 P= 0.6	C= 0.015 P= 0.6	C= 0.010 P= 0.6
	2	2,025,168	4,385,589	12,012,237	51,263,789	183,758,831	709,934,850
	4	30,337	54,157	115,306	342,367	891,908	2,457,810
	6	3,426	5,447	9,970	23,813	51,225	115,256
	8	1,578	2,508	4,591	10,966	23,588	53,074
	10	842	1,338	2,449	5,850	12,584	28,315
	12	509	810	1,482	3,540	7,616	17,135
P	14	334	531	972	2,322	4,994	11,237
E	16	232	369	676	1,615	3,475	7,819
R	18	169	269	492	1,176	2,530	5,693
C	20	128	203	372	888	1,910	4,298
E	22	99	158	289	691	1,485	3,342
N	24	79	126	230	550	1,184	2,663
T	26	64	102	187	448	963	2,167
	28	53	85	155	371	798	1,795
S	30	45	71	131	312	671	1,510
L	32	38	61	111	266	572	1,288
O	34	33	53	96	230	494	1,112
P	36	29	46	84	200	431	970
E	38	25	40	74	177	380	854
	40	23	36	66	157	338	759
	42	20	32	59	141	302	680
	44	18	29	53	127	273	614
	46	17	26	48	115	248	558
	48	15	24	44	105	227	510
	50	14	22	41	97	208	469

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 5 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 112 & 113 & 114 -K= 0.43
Soil Name Bressa-Dibble -R= 85
-T= 3

Percent Cover		65% Semi-Benched	70% Semi-Benched	75% Semi-Benched	80% Semi-Benched	85% Semi-Benched	90% Semi-Benched
		C= 0.058 P= 0.5	C= 0.046 P= 0.5	C= 0.034 P= 0.5	C= 0.022 P= 0.5	C= 0.015 P= 0.5	C= 0.010 P= 0.5
PERCENT SLOPE	2	3,718,761	8,053,138	22,057,744	94,134,306	337,431,360	1,303,634,119
	4	47,855	85,429	181,888	540,063	1,406,933	3,877,050
	6	4,934	7,844	14,357	34,291	73,764	165,969
	8	2,272	3,612	6,611	15,791	33,967	76,427
	10	1,212	1,927	3,527	8,424	18,122	40,773
	12	734	1,166	2,135	5,098	10,967	24,675
	14	481	765	1,400	3,343	7,192	16,182
	16	335	532	974	2,326	5,004	11,259
	18	244	387	709	1,694	3,644	8,198
	20	184	293	535	1,279	2,751	6,189
	22	143	227	416	994	2,139	4,813
	24	114	181	332	792	1,705	3,835
	26	93	147	270	645	1,387	3,120
	28	77	122	224	534	1,149	2,585
	30	65	103	188	449	966	2,174
	32	55	88	160	383	824	1,854
	34	48	76	138	331	711	1,601
	36	42	66	121	289	621	1,397
	38	37	58	106	254	547	1,230
	40	33	52	95	226	486	1,094
	42	29	46	85	202	435	980
	44	26	42	76	183	393	884
	46	24	38	69	166	357	803
	48	22	35	64	152	326	734
	50	20	32	58	139	300	675

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 4 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 159 -K= 0.28
Soil Name Los Gatos -R= 75
-T= 2

Percent Cover		65% Up & Down Hill	70% Up & Down Hill	75% Up & Down Hill	80% Up & Down Hill	85% Up & Down Hill	90% Up & Down Hill
		C= 0.058 P= 1.0	C= 0.046 P= 1.0	C= 0.034 P= 1.0	C= 0.022 P= 1.0	C= 0.015 P= 1.0	C= 0.010 P= 1.0
	2	1,112,139	2,408,385	6,596,626	28,151,965	100,912,793	389,867,023
	4	19,353	34,548	73,557	218,406	568,975	1,567,912
	6	2,391	3,802	6,959	16,620	35,752	80,442
	8	1,101	1,751	3,204	7,653	16,463	37,043
	10	587	934	1,710	4,083	8,783	19,762
	12	356	565	1,035	2,471	5,315	11,960
P	14	233	371	678	1,620	3,486	7,843
E	16	162	258	472	1,127	2,425	5,457
R	18	118	188	344	821	1,766	3,973
C	20	89	142	260	620	1,333	3,000
E	22	69	110	202	482	1,037	2,333
N	24	55	88	161	384	826	1,859
T	26	45	71	131	312	672	1,512
	28	37	59	108	259	557	1,253
S	30	31	50	91	218	468	1,054
L	32	27	42	78	186	399	899
O	34	23	37	67	160	345	776
P	36	20	32	59	140	301	677
E	38	18	28	52	123	265	596
	40	16	25	46	110	236	530
	42	14	22	41	98	211	475
	44	13	20	37	89	190	429
	46	12	18	34	80	173	389
	48	11	17	31	74	158	356
	50	10	15	28	68	145	327

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 4 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 159 -K= 0.28
Soil Name Los Gatos -R= 75
-T= 2

Percent Cover		65% Cross-Slope	70% Cross-Slope	75% Cross-Slope	80% Cross-Slope	85% Cross-Slope	90% Cross-Slope
		C= 0.058 P= 0.6	C= 0.046 P= 0.6	C= 0.034 P= 0.6	C= 0.022 P= 0.6	C= 0.015 P= 0.6	C= 0.010 P= 0.6
PERCENT SLOPE	2	6,104,557	13,219,683	36,209,037	154,526,796	553,912,694	2,139,989,266
	4	69,402	123,894	263,783	783,225	2,040,400	5,622,682
	6	6,642	10,560	19,330	46,167	99,311	223,450
	8	3,059	4,863	8,901	21,260	45,732	102,896
	10	1,632	2,594	4,749	11,342	24,398	54,895
	12	988	1,570	2,874	6,864	14,765	33,221
	14	648	1,030	1,885	4,501	9,683	21,786
	16	451	716	1,311	3,132	6,737	15,158
	18	328	522	955	2,280	4,906	11,037
	20	248	394	721	1,722	3,704	8,333
	22	193	306	561	1,339	2,880	6,479
	24	153	244	447	1,067	2,295	5,163
	26	125	199	363	868	1,867	4,201
	28	103	164	301	719	1,547	3,480
	30	87	138	253	605	1,301	2,927
	32	74	118	216	516	1,110	2,497
	34	64	102	186	445	958	2,155
	36	56	89	163	388	836	1,880
	38	49	78	143	342	736	1,657
	40	44	70	127	304	654	1,472
	42	39	62	114	273	586	1,319
	44	35	56	103	246	529	1,190
	46	32	51	94	223	481	1,081
	48	29	47	86	204	439	988
	50	27	43	79	188	404	909

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 3 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 163 & 165 -K= 0.32
Soil Name Maymen-Millsholm-Lodo -R= 75
-T= 1

Percent Cover		65% Up & Down Hill	70% Up & Down Hill	75% Up & Down Hill	80% Up & Down Hill	85% Up & Down Hill	90% Up & Down Hill
		C= 0.058 P= 1.0	C= 0.046 P= 1.0	C= 0.034 P= 1.0	C= 0.022 P= 1.0	C= 0.015 P= 1.0	C= 0.010 P= 1.0
	2	273,143	591,504	1,620,144	6,914,175	24,784,370	95,752,069
	4	6,752	12,053	25,662	76,197	198,503	547,010
	6	1,030	1,637	2,997	7,158	15,397	34,643
	8	474	754	1,380	3,296	7,090	15,953
	10	253	402	736	1,758	3,783	8,511
	12	153	243	446	1,064	2,289	5,151
P	14	100	160	292	698	1,501	3,378
E	16	70	111	203	486	1,044	2,350
R	18	51	81	148	354	761	1,711
C	20	38	61	112	267	574	1,292
E	22	30	47	87	208	446	1,005
N	24	24	38	69	165	356	801
T	26	19	31	56	135	289	651
	28	16	25	47	111	240	540
S	30	13	21	39	94	202	454
L	32	12	18	33	80	172	387
O	34	10	16	29	69	148	334
P	36	9	14	25	60	130	292
E	38	8	12	22	53	114	257
	40	7	11	20	47	101	228
	42	6	10	18	42	91	205
	44	5	9	16	38	82	185
	46	5	8	15	35	75	168
	48	5	7	13	32	68	153
	50	4	7	12	29	63	141

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 3 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 163 & 165 -K= 0.32
Soil Name Maymen-Millsholm-Lodo -R= 75
-T= 1

Percent Cover		65% Cross-Slope	70% Cross-Slope	75% Cross-Slope	80% Cross-Slope	85% Cross-Slope	90% Cross-Slope
		C= 0.058 P= 0.6	C= 0.046 P= 0.6	C= 0.034 P= 0.6	C= 0.022 P= 0.6	C= 0.015 P= 0.6	C= 0.010 P= 0.6
	2	1,499,291	3,246,779	8,893,007	37,952,070	136,041,992	525,585,360
	4	24,213	43,224	92,028	273,250	711,850	1,961,629
	6	2,861	4,548	8,325	19,883	42,770	96,232
	8	1,317	2,094	3,833	9,156	19,695	44,314
	10	703	1,117	2,045	4,885	10,507	23,641
	12	425	676	1,238	2,956	6,359	14,307
P	14	279	443	812	1,939	4,170	9,382
E	16	194	309	565	1,349	2,901	6,528
R	18	141	225	411	982	2,113	4,753
C	20	107	170	310	741	1,595	3,589
E	22	83	132	241	577	1,240	2,790
N	24	66	105	192	459	988	2,224
T	26	54	86	157	374	804	1,809
	28	45	71	130	310	666	1,499
S	30	37	60	109	260	560	1,261
L	32	32	51	93	222	478	1,075
O	34	28	44	80	192	412	928
P	36	24	38	70	167	360	810
E	38	21	34	62	147	317	713
	40	19	30	55	131	282	634
	42	17	27	49	117	252	568
	44	15	24	44	106	228	513
	46	14	22	40	96	207	466
	48	13	20	37	88	189	426
	50	12	18	34	81	174	391

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 3 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 163 & 165 -K= 0.32
Soil Names Maymen-Millsholm-Lodo -R= 85
Millsholm Loam -T= 1

Percent Cover		65% Up & Down Hill	70% Up & Down Hill	75% Up & Down Hill	80% Up & Down Hill	85% Up & Down Hill	90% Up & Down Hill
		C= 0.058 P= 1.0	C= 0.046 P= 1.0	C= 0.034 P= 1.0	C= 0.022 P= 1.0	C= 0.015 P= 1.0	C= 0.010 P= 1.0
PERCENT SLOPE	2	179,969	389,732	1,067,484	4,555,629	16,329,988	63,089,363
	4	4,938	8,815	18,767	55,724	145,169	400,038
	6	802	1,275	2,333	5,573	11,987	26,972
	8	369	587	1,074	2,566	5,520	12,420
	10	197	313	573	1,369	2,945	6,626
	12	119	190	347	828	1,782	4,010
	14	78	124	227	543	1,169	2,630
	16	54	86	158	378	813	1,830
	18	40	63	115	275	592	1,332
	20	30	48	87	208	447	1,006
	22	23	37	68	162	348	782
	24	19	29	54	129	277	623
	26	15	24	44	105	225	507
	28	12	20	36	87	187	420
	30	11	17	31	73	157	353
	32	9	14	26	62	134	301
	34	8	12	23	54	116	260
	36	7	11	20	47	101	227
	38	6	9	17	41	89	200
	40	5	8	15	37	79	178
	42	5	8	14	33	71	159
	44	4	7	12	30	64	144
	46	4	6	11	27	58	131
	48	4	6	10	25	53	119
	50	3	5	9	23	49	110

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 3 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 163 & 165 -K= 0.32
Soil Names Maymen-Millsholm-Lodo -R= 85
Millsholm Loam -T= 1

Percent Cover		65% Cross-Slope	70% Cross-Slope	75% Cross-Slope	80% Cross-Slope	85% Cross-Slope	90% Cross-Slope
		C= 0.058 P= 0.6	C= 0.046 P= 0.6	C= 0.034 P= 0.6	C= 0.022 P= 0.6	C= 0.015 P= 0.6	C= 0.010 P= 0.6
PERCENT SLOPE	2	987,856	2,139,246	5,859,447	25,005,955	89,635,688	346,298,996
	4	17,707	31,610	67,302	199,832	520,588	1,434,573
	6	2,227	3,541	6,481	15,480	33,298	74,921
	8	1,026	1,630	2,984	7,128	15,333	34,500
	10	547	870	1,592	3,803	8,180	18,406
	12	331	526	964	2,301	4,951	11,139
	14	217	345	632	1,509	3,247	7,305
	16	151	240	440	1,050	2,259	5,082
	18	110	175	320	765	1,645	3,701
	20	83	132	242	577	1,242	2,794
	22	65	103	188	449	966	2,173
	24	51	82	150	358	769	1,731
	26	42	67	122	291	626	1,409
	28	35	55	101	241	519	1,167
	30	29	46	85	203	436	982
	32	25	40	72	173	372	837
	34	21	34	63	149	321	723
	36	19	30	55	130	280	630
	38	17	26	48	115	247	555
	40	15	23	43	102	219	494
	42	13	21	38	91	197	442
	44	12	19	35	82	177	399
	46	11	17	31	75	161	363
	48	10	16	29	68	147	331
	50	9	14	26	63	135	305

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 7 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 170 & 171 -K= 0.43
Soil Name Pleasanton -R= 75
-T= 5

Percent Cover		65% Up & Down Hill	70% Up & Down Hill	75% Up & Down Hill	80% Up & Down Hill	85% Up & Down Hill	90% Up & Down Hill
		C= 0.058 P= 1.0	C= 0.046 P= 1.0	C= 0.034 P= 1.0	C= 0.022 P= 1.0	C= 0.015 P= 1.0	C= 0.010 P= 1.0
	2	1,718,901	3,722,355	10,195,623	43,511,154	155,968,939	602,571,233
	4	26,827	47,890	101,963	302,750	788,701	2,173,405
	6	3,105	4,937	9,036	21,582	46,425	104,457
	8	1,430	2,273	4,161	9,938	21,378	48,101
	10	763	1,213	2,220	5,302	11,405	25,662
	12	462	734	1,343	3,209	6,902	15,530
P	14	303	481	881	2,104	4,526	10,184
E	16	211	335	613	1,464	3,149	7,086
R	18	153	244	446	1,066	2,293	5,160
C	20	116	184	337	805	1,731	3,895
E	22	90	143	262	626	1,346	3,029
N	24	72	114	209	499	1,073	2,414
T	26	58	93	170	406	873	1,964
	28	48	77	141	336	723	1,627
S	30	41	65	118	283	608	1,369
L	32	35	55	101	241	519	1,167
O	34	30	48	87	208	448	1,007
P	36	26	42	76	182	391	879
E	38	23	37	67	160	344	774
	40	20	33	60	142	306	688
	42	18	29	53	127	274	617
	44	17	26	48	115	247	556
	46	15	24	44	104	225	506
	48	14	22	40	95	205	462
	50	13	20	37	88	189	425

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 7 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 170 & 171 -K= 0.43
Soil Name Pleasanton -R= 75
-T= 5

Percent Cover		65% Cross-Slope	70% Cross-Slope	75% Cross-Slope	80% Cross-Slope	85% Cross-Slope	90% Cross-Slope
		C= 0.058 P= 0.6	C= 0.046 P= 0.6	C= 0.034 P= 0.6	C= 0.022 P= 0.6	C= 0.015 P= 0.6	C= 0.010 P= 0.6
	2	9,435,090	20,432,096	55,964,016	238,833,747	856,117,177	3,307,527,679
	4	96,204	171,739	365,650	1,085,690	2,828,358	7,794,039
	6	8,625	13,713	25,100	59,950	128,959	290,159
	8	3,972	6,314	11,558	27,606	59,384	133,615
	10	2,119	3,369	6,166	14,728	31,681	71,283
	12	1,282	2,039	3,732	8,913	19,173	43,139
P	14	841	1,337	2,447	5,845	12,573	28,290
E	16	585	930	1,703	4,067	8,748	19,683
R	18	426	677	1,240	2,961	6,370	14,333
C	20	322	511	936	2,236	4,809	10,821
E	22	250	398	728	1,738	3,739	8,414
N	24	199	317	580	1,385	2,980	6,705
T	26	162	258	472	1,127	2,425	5,455
	28	134	214	391	934	2,008	4,519
S	30	113	180	329	785	1,690	3,801
L	32	96	153	280	670	1,441	3,242
O	34	83	132	242	578	1,244	2,798
P	36	73	115	211	504	1,085	2,442
E	38	64	102	186	444	956	2,151
	40	57	90	165	395	850	1,912
	42	51	81	148	354	761	1,713
	44	46	73	134	319	687	1,546
	46	42	66	121	290	624	1,404
	48	38	61	111	265	570	1,283
	50	35	56	102	244	524	1,180

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

Napa County
Maximum Length of Slope
for a soil loss of 7 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 170 & 171 -K= 0.43
Soil Name Pleasanton -R= 85
-T= 5

Percent Cover		65% Up & Down Hill	70% Up & Down Hill	75% Up & Down Hill	80% Up & Down Hill	85% Up & Down Hill	90% Up & Down Hill
		C= 0.058 P= 1.0	C= 0.046 P= 1.0	C= 0.034 P= 1.0	C= 0.022 P= 1.0	C= 0.015 P= 1.0	C= 0.010 P= 1.0
PERCENT SLOPE	2	1,132,554	2,452,595	6,717,718	28,668,738	102,765,205	397,023,641
	4	19,619	35,023	74,567	221,406	576,791	1,589,449
	6	2,418	3,843	7,035	16,803	36,144	81,325
	8	1,113	1,770	3,240	7,737	16,644	37,449
	10	594	944	1,728	4,128	8,880	19,979
	12	359	571	1,046	2,498	5,374	12,091
	14	236	375	686	1,638	3,524	7,929
	16	164	261	477	1,140	2,452	5,517
	18	119	190	347	830	1,785	4,017
	20	90	143	262	627	1,348	3,033
	22	70	111	204	487	1,048	2,358
	24	56	89	163	388	835	1,879
	26	45	72	132	316	680	1,529
	28	38	60	110	262	563	1,266
	30	32	50	92	220	474	1,065
	32	27	43	79	188	404	909
	34	23	37	68	162	349	784
	36	20	32	59	141	304	684
	38	18	28	52	125	268	603
	40	16	25	46	111	238	536
	42	14	23	42	99	213	480
	44	13	20	37	90	193	433
	46	12	19	34	81	175	394
	48	11	17	31	74	160	360
	50	10	16	29	68	147	331

NOTES:
C=Cover and Management Factor
P=Practice Factor

PPI Engineering

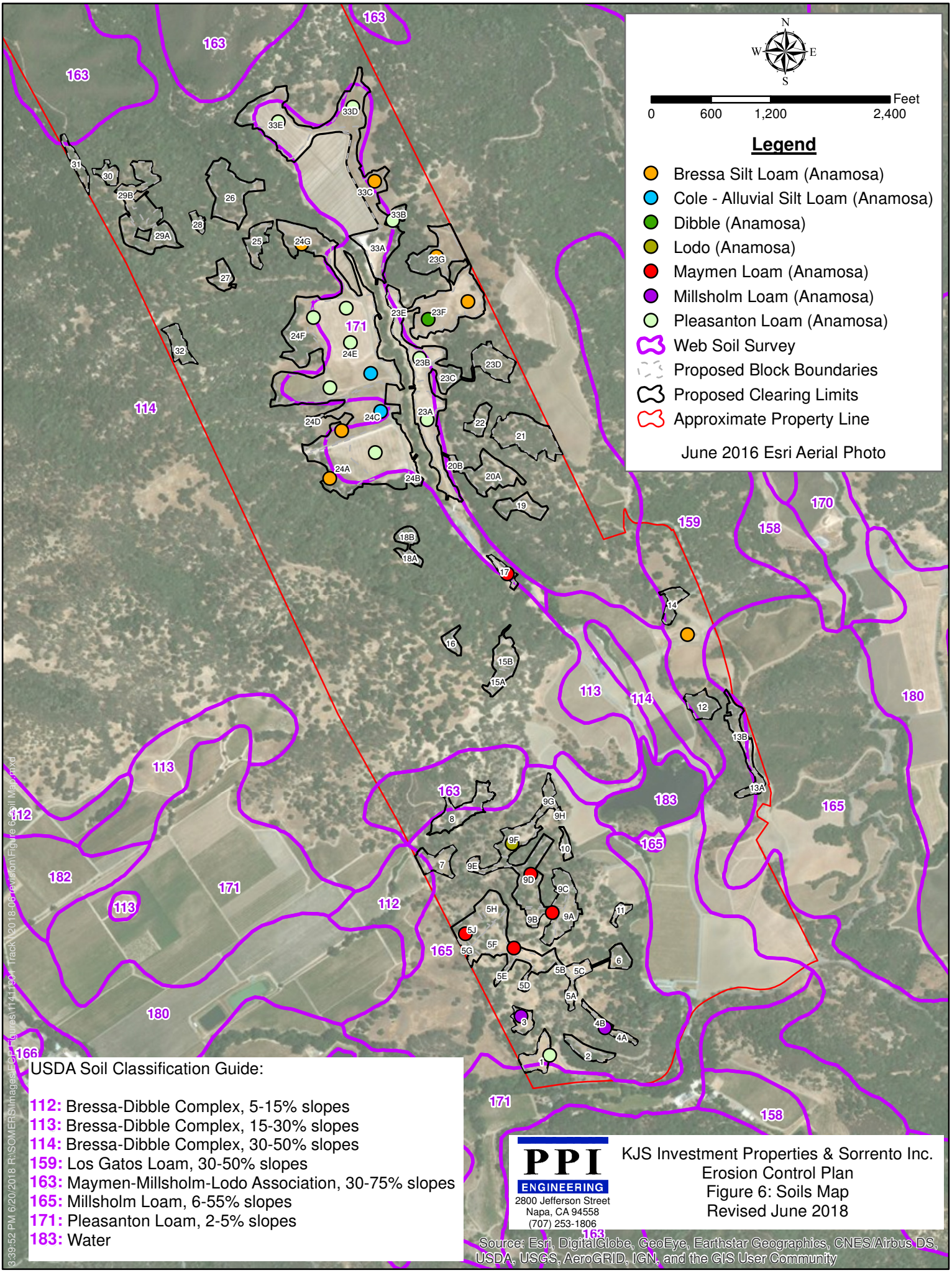
Napa County
Maximum Length of Slope
for a soil loss of 7 tons per acre

NAME: KJS Investment Properties DATE: 3/22/17

Cover Type: Permanent Cover Crop
Soil Unit No. (100-182)--- 170 & 171 -K= 0.43
Soil Name Pleasanton -R= 85
-T= 5

Percent Cover		65% Cross-Slope	70% Cross-Slope	75% Cross-Slope	80% Cross-Slope	85% Cross-Slope	90% Cross-Slope
		C= 0.058 P= 0.6	C= 0.046 P= 0.6	C= 0.034 P= 0.6	C= 0.022 P= 0.6	C= 0.015 P= 0.6	C= 0.010 P= 0.6
	2	6,216,616	13,462,351	36,873,711	157,363,377	564,080,627	2,179,272,109
	4	70,356	125,595	267,406	793,984	2,068,427	5,699,915
	6	6,715	10,676	19,542	46,674	100,401	225,902
	8	3,092	4,916	8,999	21,493	46,233	104,025
	10	1,650	2,623	4,801	11,466	24,665	55,497
	12	998	1,587	2,905	6,939	14,927	33,585
P	14	655	1,041	1,905	4,551	9,789	22,025
E	16	456	724	1,326	3,166	6,811	15,324
R	18	332	527	965	2,305	4,959	11,159
C	20	250	398	729	1,741	3,744	8,424
E	22	195	310	567	1,353	2,911	6,551
N	24	155	247	452	1,079	2,320	5,220
T	26	126	201	367	878	1,888	4,247
	28	105	166	304	727	1,564	3,518
S	30	88	140	256	611	1,315	2,960
L	32	75	119	218	521	1,122	2,524
O	34	65	103	188	450	968	2,179
P	36	57	90	164	393	845	1,901
E	38	50	79	145	346	744	1,675
	40	44	70	129	308	662	1,489
	42	40	63	115	276	593	1,334
	44	36	57	104	249	535	1,203
	46	32	52	95	226	486	1,093
	48	30	47	86	206	444	999
	50	27	43	79	190	408	918

NOTES:
C=Cover and Management Factor
P=Practice Factor


N
W
E
S
0
600
1,200
2,400
Feet
Legend
Bressa Silt Loam (Anamosa)
Cole - Alluvial Silt Loam (Anamosa)
Dibble (Anamosa)
Lodo (Anamosa)
Maymen Loam (Anamosa)
Millsholm Loam (Anamosa)
Pleasanton Loam (Anamosa)
Web Soil Survey
Proposed Block Boundaries
Proposed Clearing Limits
Approximate Property Line
June 2016 Esri Aerial Photo
USDA Soil Classification Guide:
112: Bressa-Dibble Complex, 5-15% slopes
113: Bressa-Dibble Complex, 15-30% slopes
114: Bressa-Dibble Complex, 30-50% slopes
159: Los Gatos Loam, 30-50% slopes
163: Maymen-Millsholm-Lodo Association, 30-75% slopes
165: Millsholm Loam, 6-55% slopes
171: Pleasanton Loam, 2-5% slopes
183: Water
PPI
ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806
KJS Investment Properties & Sorrento Inc.
Erosion Control Plan
Figure 6: Soils Map
Revised June 2018
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
8:39:52 PM 6/20/2018 R:\SOMER\Images\EGPT Figures\141190M Track\2018-06 Revision\Figure 6 Soil Map.mxd

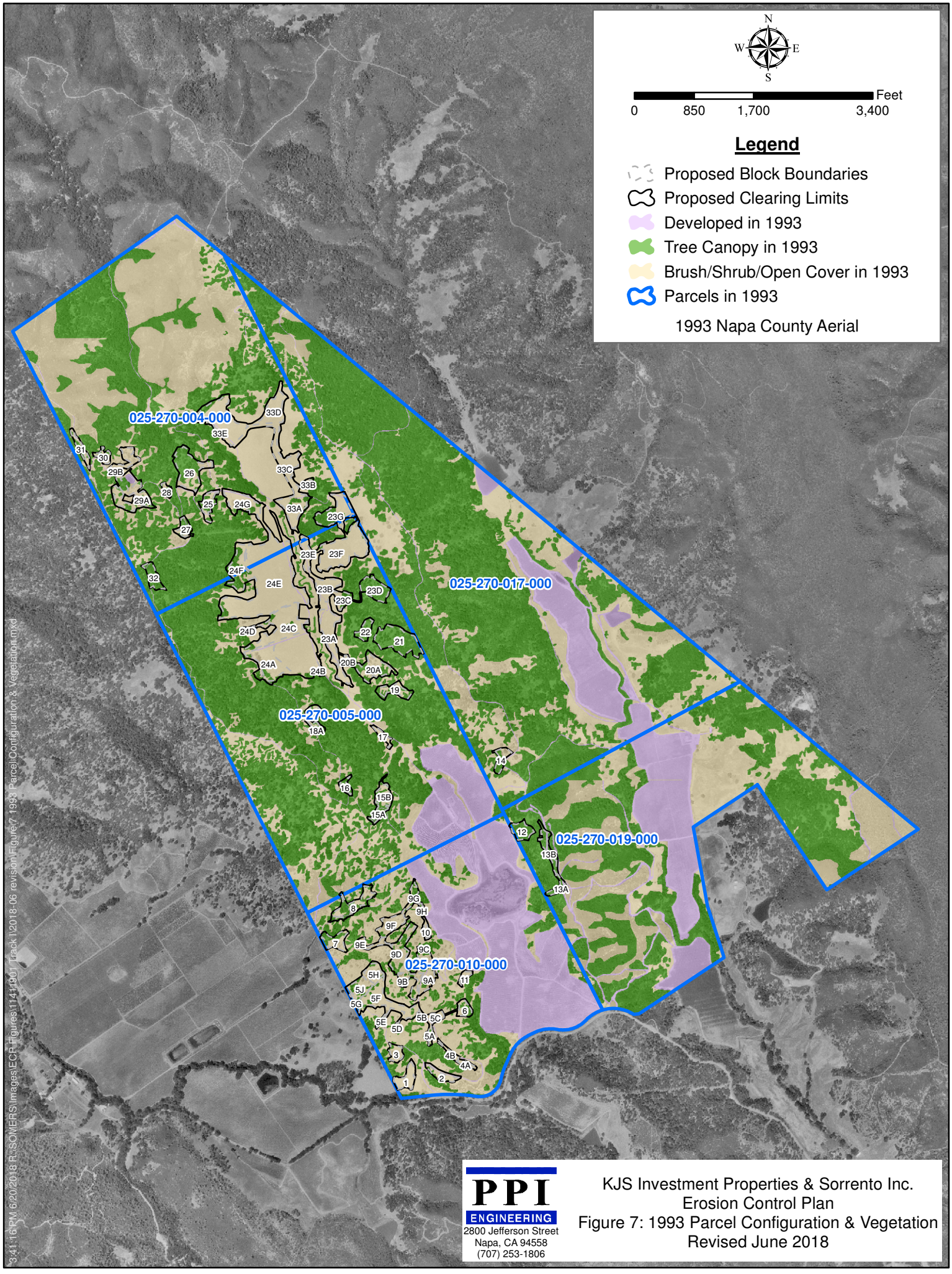
APPENDIX C

VEGETATION RETENTION CALCULATIONS

KJS INVESTMENT PROPERTIES & SORRENTO INC.
3370 SAGE CANYON ROAD
VEGETATION RETENTION CALCULATIONS
BASED ON 1993 PARCELS AND VEGETATION

				Tree Canopy Cover				Brush/ Shrub/Open Cover			
1993 Assessor Parcel Number	**Parcel Acres**	**Proposed Vineyard Area (Acres)**	**Developed in 1993 (Acres)**	**Existing in 1993**	**40% Allowed to be Removed (acres)**	**Proposed to be Removed; Existing and Proposed Vineyards (Acres)**	**Proposed to be Retained (percent)**	**Existing in 1993**	**60% Allowed to be Removed (acres)**	**Proposed to be Removed; Existing and Proposed Vineyards (Acres)**	**Proposed to be Retained (percent)**
025-270-004	343	48	5	161	64	13	92%	177	106	58	67%
025-270-005	345	70	29	198	79	19	91%	118	71	67	43%
025-270-010	228	33	95	49	19	9	82%	85	51	27	69%
025-270-017	390	1	44	244	98	19	92%	102	61	15	85%
025-270-019	283	4	55	130	52	19	85%	97	58	20	80%
Total	**1589**	**157**	**229**	**781**	**163**	**40**	**95%**	**578**	**227**	**151**	**74%**

Note: some rounding may occur


N
W
E
S
0
850
1,700
3,400
Feet
Legend
Proposed Block Boundaries
Proposed Clearing Limits
Developed in 1993
Tree Canopy in 1993
Brush/Shrub/Open Cover in 1993
Parcels in 1993
1993 Napa County Aerial
025-270-004-000
025-270-017-000
025-270-005-000
025-270-019-000
025-270-010-000
33D
33E
31
30
29B
26
28
29A
25
24G
33C
33B
33A
23G
27
23E
23F
24F
32
24E
23B
23D
23C
24D
24C
23A
22
21
24A
24B
20B
20A
19
18A
17
14
16
15B
15A
12
13B
13A
9G
9H
8
9F
10
7
9E
9D
9C
5H
9B
9A
11
5J
5F
5G
5E
5D
5B
5C
6
5A
3
4B
4A
1
2
PPI
ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806
KJS Investment Properties & Sorrento Inc.
Erosion Control Plan
Figure 7: 1993 Parcel Configuration & Vegetation
Revised June 2018
3:41:16 PM 6/20/2018 R:\SOMERS\Images\ECP Figures\141901 Track 1\2018-06 revision\Figure7 1993 Parcel Configuration & Vegetation.mxd

APPENDIX D

SLOPE CALCULATIONS

KJS INVESTMENT PROPERTIES & SORRENTO INC.

Average Slope Of Proposed Vineyard Blocks

Block	Gross Acres	Net Acres	Slope #1	Slope #2	Average slope
1	1.7	1.3	10%	18%	14%
2	1.3	0.8	17%	18%	18%
3	1.0	0.8	24%	25%	25%
4A	0.4	0.3	20%		20%
4B	0.6	0.4	8%		8%
5A	0.5	0.4	21%		21%
5B	0.2	0.06	20%		20%
5C	0.7	0.6	28%	28%	28%
5D	0.3	0.2	16%		16%
5E	0.3	0.1	22%		22%
5F	4.4	3.2	21%	25%	23%
5G	0.5	0.2	14%		14%
5H	1.5	1.1	17%	22%	20%
5J	1.8	1.3	22%	26%	24%
6	1.1	0.7	20%	24%	22%
7	1.7	1.3	21%	21%	21%
8	2.9	2.0	9%	10%	10%
9A	1.5	1.3	23%	27%	25%
9B	1.5	1.2	12%	20%	16%
9C	1.4	1.1	16%	23%	20%
9D	3.3	2.5	12%	20%	16%
9E	0.9	0.6	10%	25%	18%
9F	1.9	1.6	23%	26%	25%
9G	1.0	0.8	16%	21%	19%
9H	0.1	0.1	17%		17%
10	0.6	0.2	19%		19%
11	0.4	0.3	13%		13%
12	1.5	1.3	17%	19%	18%
13A	0.8	0.6	14%	24%	19%
13B	1.7	1.0	15%	18%	17%
14	1.1	0.9	21%	26%	24%
15A	1.0	0.6	25%	27%	26%
15B	1.6	1.1	13%	24%	19%
16	0.7	0.3	25%	27%	26%
17	0.7	0.4	23%	27%	25%
18A	0.6	0.3	25%	26%	26%
18B	0.8	0.5	20%	22%	21%
19	1.8	1.1	26%	26%	26%
20A	3.1	2.3	24%	24%	24%
20B	0.3	0.2	27%		27%
21	4.5	4.0	22%	26%	24%
22	1.1	0.8	19%	21%	20%
23A	4.5	3.0	9%	10%	10%

KJS INVESTMENT PROPERTIES & SORRENTO INC.

Average Slope Of Proposed Vineyard Blocks

Block	Gross Acres	Net Acres	Slope #1	Slope #2	Average slope
23B	2.5	1.6	5%	19%	12%
23C	1.3	0.9	26%	27%	27%
23D	2.4	2.1	21%	23%	22%
23E	1.5	1.0	3%	17%	10%
23F	6.7	5.4	19%	19%	19%
23G	3.9	2.8	22%	23%	23%
24A	4.7	3.5	7%	15%	11%
24B	0.6	0.3	18%		18%
24C	6.3	4.9	20%	23%	22%
24D	0.2	0.2	21%		21%
24E	19.3	16.4	8%	9%	9%
24F	3.6	2.7	18%	21%	20%
24G	3.4	2.2	17%	18%	18%
25	1.6	1.2	17%	20%	19%
26	4.6	3.6	16%	18%	17%
27	1.1	0.6	14%	23%	19%
28	0.5	0.3	26%	27%	27%
29A	2.9	1.9	25%	25%	25%
29B	3.7	2.3	17%	25%	21%
30	0.8	0.6	21%	22%	22%
31	1.0	0.8	16%	19%	18%
32	1.4	1.2	18%		18%
33A	3.3	2.5	7%		7%
33B	0.4	0.2	13%		13%
33C	3.7	2.5	14%	21%	18%
33D	3.2	2.2	11%	11%	11%
33E	6.4	4.8	11%	14%	13%
Reservoir area	6.5				
Total	**156.8**	**111.5**			**19%**

APPENDIX E

PHOTOGRAPHIC DOCUMENTATION

Photo 1 9/13/2017

Photo 2 9/13/2017

Photo 3 9/13/2017

Photo 4 9/13/2017

Photo 5 9/13/2017

Photo 6 11/15/2017

Photo 7

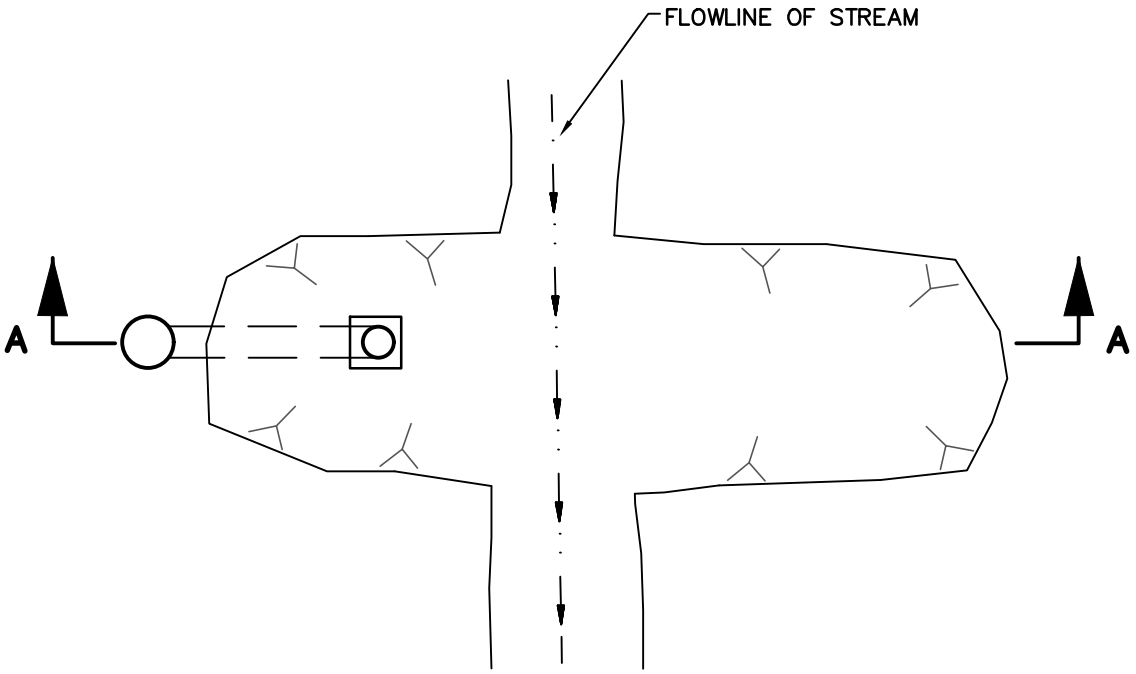
9/13/2017

Photo 8

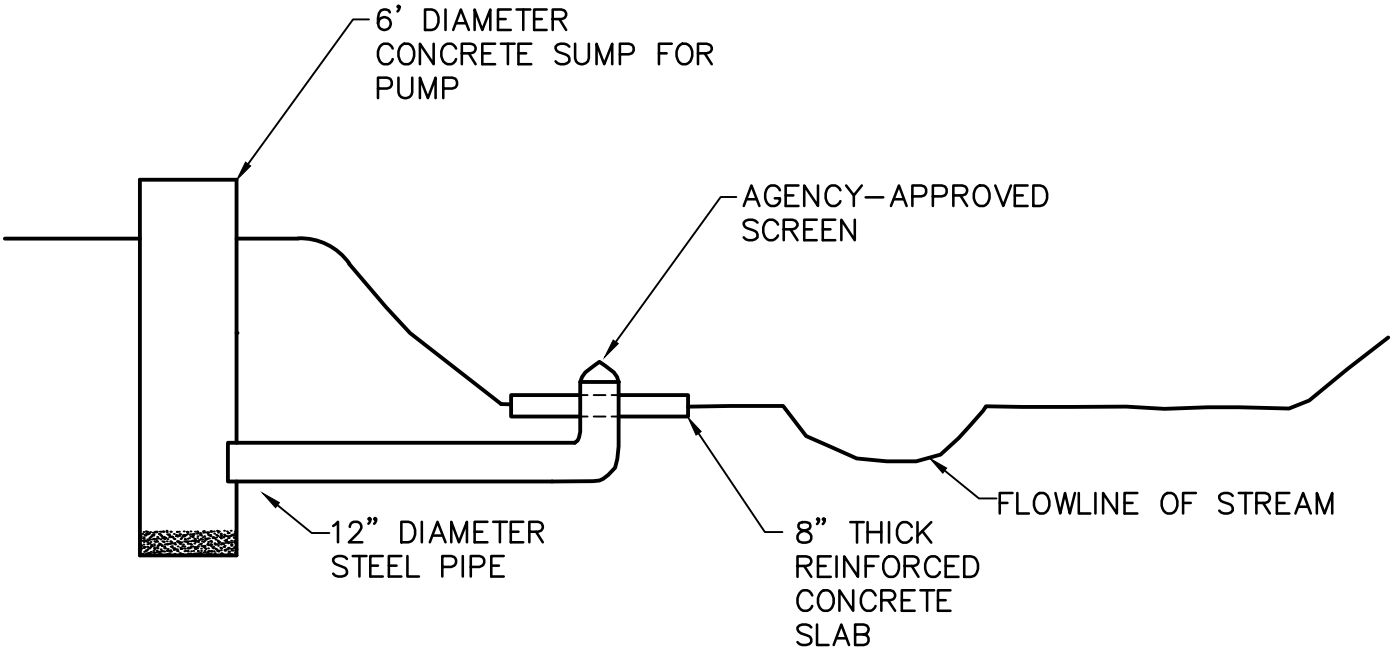
11/16/2017

APPENDIX F

DIVERSION WORKS CONCEPTUAL DESIGN



PLAN VIEW
N.T.S.



SECTION A-A

R:\SOMERS\11411901 Track 1 ECP Phase II\Drawings\11411901B.dwg, Point of Diversion, 6/20/2018 3:32:33 PM

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING

JOB NO: 11411911
DWG. NO: 11411901B
SCALE: AS SHOWN

KJS INVESTMENT PROPERTIES & SORRENTO INC.

DIVERSION STRUCTURE

CONCEPTUAL DESIGN

DESIGN ENGINEER: J BUSHEY
DATE: 6-20-18
SHEET: 1
OF: 1

APPENDIX G

ROAD PLAN

KJS INVESTMENT PROPERTIES
& SORRENTO INC.
3370 SAGE CANYON ROAD

ROAD PLAN

JUNE 2018

PREPARED BY:

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CALIFORNIA 94558
(707) 253-1806

KJS INVESTMENT PROPERTIES & SORRENTO INC
3370 SAGE CANYON ROAD

EROSION CONTROL PLAN

R O A D P L A N

SECTION 1 - INTRODUCTION

Road systems can be a significant but easily controlled source of sediment production and delivery to stream channels (Napolitano et. al. 2009). The recommendations contained within this Road Plan are consistent with recent road management plans prepared by the Napa County Resource Conservation District (RCD) and with guidance presented within the Mendocino County RCD's *Forest and Ranch Roads Handbook* (Weaver, W.E., and Hagans, D.K. 2014).

The KJS Investment Properties & Sorrento Inc. property contains an existing road network of graveled roads, dirt roads, and vegetated vineyard avenues throughout the property at Assessor's Parcel Numbers (APNs) 025-270-022 and 025-270-025. This plan addresses road improvements associated with the proposed new vineyard blocks requested in the Track I Erosion Control Plan (ECP) # P17-00432-ECPA.

There are 12.6 miles of existing roads on the property, of which 6.5 miles are shown on Figure 1 as "Existing Road, Year-Round, Level 1". These graveled roads are surfaced with crushed rock and contain waterbars and rolling dips as necessary. These roads are in excellent condition and will continue to be maintained in their current state, and no changes or improvements are required as a result of this project. In addition to the graveled roads, there are 6.1 miles of existing dirt roads shown as "Existing Roads, Level 2". This network of existing dirt and graveled roadways are used during ongoing vineyard operation and maintenance and grazing operations on the ranch.

Section 2 below discusses proposed improvements and recommendations to ensure that the increased usage of these existing dirt roads does not increase erosion or sedimentation to local waterways. No new roads are required for access to any of the proposed vineyard blocks.

SECTION 2 - PROPOSED IMPROVEMENTS

2.1 LEVEL 1 ROADS

Roads that provide primary access to the proposed vineyard blocks shown on Figure 1 will be surfaced with crushed rock as directed in the field by the Engineer. Approximately 2.3 miles of existing dirt roads will be upgraded to Level 1 roads as part of the project. A 3-inch minus aggregate base material would be applied to the existing road width at a 3-6 inch depth to the road surface to ensure vehicle traffic would not degrade the road surface during wet periods of the year. This material would be applied concurrently with vineyard development. Applying crushed rock to a road surface is an effective means of reducing erosion caused by vehicle traffic

and the subsequent potential for delivery of sediment to the stream system. Roads would be improved to reproduce natural drainage patterns and promote sheet flow through the use of Best Management Practices (BMPs), such as outsloping, berm removal, and frequent (approximately 150-foot spacing) rolling dip or waterbar construction as designated in the field by the Engineer. Rolling dips are proposed in certain locations in the ECP where the existing road runs uphill and there is the potential for runoff to run down the road surface and cause erosion or gullying. The rolling dip serves to direct water off of the road surface and back onto native ground surface where vegetation will slow the water and allow it to infiltrate. In addition to those locations designated in the ECP, rolling dips may be recommended by the Engineer in the field at the time of construction

After implementation of the project, there will be 10.5 miles of Level 1 graveled roads on the property.

2.2 LEVEL 2 ROADS

These are existing dirt roads that will be used seasonally during dry periods of the year to provide secondary access to some vineyard blocks. There are 2.2 miles of existing dirt roads on the property that will remain as Level 2 roads under this project. These roads would receive the same BMPs and road shaping as the Level 1 roads, except that the road surface would not be surfaced with crushed rock.

2.3 DECOMMISSIONED ROADS

Portions of existing roads will be decommissioned by incorporating them into vineyard blocks. In those locations, the access roads will be realigned to the outer vineyard avenue. All roads proposed for decommissioning would be decompacted by the use of a bulldozer ripping to at least a 6-inch depth. When the decommissioned road becomes part of the vineyard block it will be required to maintain the same percentage of vegetative cover as the surrounding vineyard. Approximately 1.6-miles of existing dirt road will be decommissioned as part of the project.

2.4 VEGETATED AVENUES

In addition to the graveled and dirt primary roads on the property, there is also a network of vegetated vineyard avenues that surround vineyard blocks and provide access for farming equipment and workers. These avenues are used less frequently than the Level 1 and Level 2 roads and are reseeded as needed to ensure appropriate levels of vegetative cover are maintained as required in the engineered Erosion Control Plans that cover these avenues. Per the *Forest and Ranch Roads Handbook*, "[v]egetation protects erodible soil from raindrop impact and soil particle detachment, increases surface roughness and reduces surface runoff velocity." Section 8b of the ECP Narrative discusses the percent vegetative cover that is required for each vineyard avenue associated with the proposed vineyard blocks within this ECP.

SECTION 3 - SEDIMENT SAVINGS

The San Francisco Bay Regional Water Quality Control Board (RWQCB), Napa County RCD, and Pacific Watershed Associates (PWA) are considered to be regional experts on the construction and evaluation of roads in this area. These experts estimate that 50 percent of the total road length on the landscape is hydrologically connected to stream systems and assume a 25-foot wide road prism with 0.4-foot road/cutbank surface lowering over two decades on all unpaved roads (PWA, 2003 and Napolitano et al., 2009). By this estimation, 3.05 miles (16,104 feet) of the existing dirt roads on the property are hydrologically connected to onsite drainages and would contribute 5,964.4 cubic yards of sediment to the stream system over two decades under the current, pre-project conditions.

$$\text{Existing erosion from onsite dirt roads} = \frac{16{,}104' * 25' * 0.4'}{27'} = 5{,}964.4 \text{ cubic yards}$$

Upgrading 2.3 miles (12,144 feet) of existing dirt roads to graveled Level 1 roads and decommissioning 1.6 miles (8,448 feet) of dirt roads will result in a sediment savings of approximately 3,813.3 cubic yards.

$$\text{Sediment savings} = \frac{10{,}296' * 25' * 0.4'}{27'} = 3{,}813.3 \text{ cubic yards}$$

The assumption that 50 percent of the ranch roads are hydrologically connected is for a typical property, but likely overstates the hydrologic connectivity of the roads on the KJS Investment Properties & Sorrento Inc. property. This property does not have many stream crossings, most dirt roads are set back from drainages, and there are usually vegetated buffers between the existing dirt roads and drainages, all factors that affect the deposition of sediment from a road surface into a waterway. Using a value of 50 percent of the road length as being hydrologically connected likely overstates the amount of road erosion, and therefore presents a conservative assessment of the existing conditions.

SECTION 4 - CONCLUSIONS

Road-related sediment can be prevented from entering the stream system through a variety of best management practices and erosion prevention treatments that generally involve dispersing road runoff and disconnecting road surface and ditch drainage. The recommendations in this Road Plan are consistent with guidance from the Napa County RCD and the Handbook for Forest and Ranch Roads and will ensure that the existing road network will be upgraded as necessary to minimize potential for erosion and sediment delivery to local drainages. It is estimated that the upgrading of 2.3 miles of existing roads on the property and decommissioning of 1.6 mile of existing road will decrease road-related sediment delivery from 5,964.4 cubic yards to 2,151.1 cubic yards, a decrease of approximately 64 percent.

SECTION 5 - REFERENCES

Napolitano, Potter, Whyte 2009. *Napa River Sediment TMDL and Habitat Enhancement Plan.* California Regional Water Quality Control Board, San Francisco Bay Region.

Pacific Watershed Associates (PWA), 2003a. *Road Assessment and Erosion Prevention Planning Project for the Dry Creek Watershed, Napa County, California.* Prepared for Napa County Resource Conservation District, Napa, California.

Pacific Watershed Associates (PWA), 2003b. *Sediment sources assessment, a component of the watershed management plan for the Carneros Creek Watershed, Napa County, California.* Prepared for Napa County Resource Conservation District, Napa, California.

Weaver, W.E., and Hagans, D.K., 2014, *Handbook for Forest and Ranch Roads*: A Guide for Planning, Designing, Constructing, Reconstructing, Maintaining and Closing Wildland Roads: Ukiah, CA, Mendocino County Resource Conservation District.

N
W E
S

0 400 800 1,600 Feet

Legend

- Existing Road, Year-Round, Level 1 (6.5 miles)
- Existing Road, to be upgraded to Level 1 (2.3 miles)
- Existing Road, Level 2 (6.1 miles)
- Existing Road, to be decomissioned (1.6 miles)
- Proposed Block Boundaries
- Proposed Clearing Limits
- Approximate Parcel Boundary

June 2016 Esri Aerial Photo

025-270-022-000

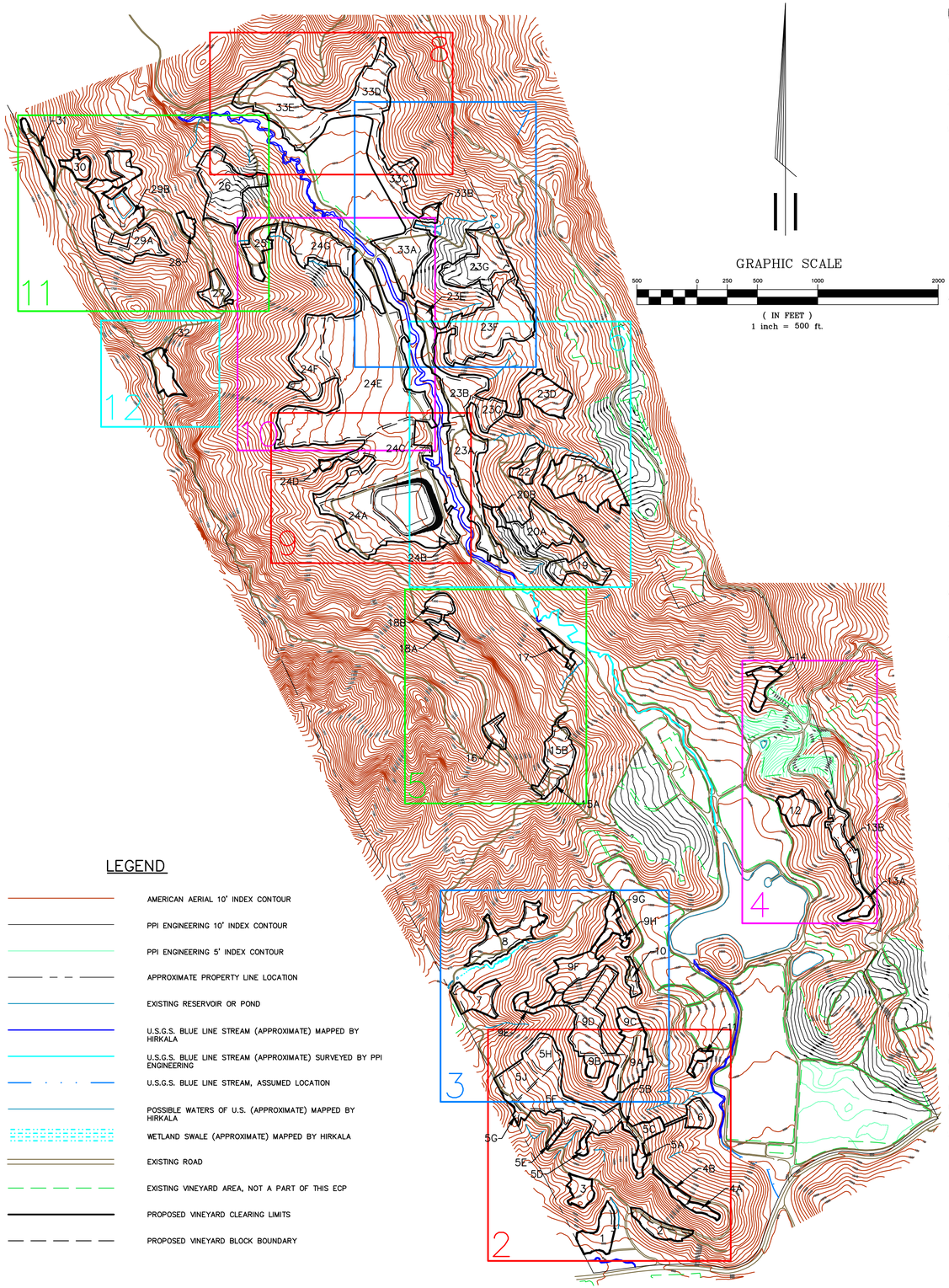
025-270-025-000

PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

KJS Investment Properties & Sorrento Inc.
Road Plan
Figure 1
June 2018

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

4:17:50 PM 6/20/2018 R:\SOMERS\Images\ECP Figures\1411961 Track I\2018-06 revision\Road Plan Figure.mxd



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014. SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015. INTERMEDIATE CONTOURS NOT SHOWN FOR CLARITY.

R:\SOURCES\11411901 Dwgs\11411901 Plans\Erosion\11411901B.dwg, 1:1SITE P 6/21/2018 11:42 AM

NOTES:

1. OWNER: KJS INVESTMENT PROPERTIES & SORRENTO, INC.
   SITE ADDRESS: 3370 SAGE CANYON ROAD, ST. HELENA
   APN: 025-270-022 & 025-270-025

2. ACCESS TO PROJECT IS FROM SAGE CANYON ROAD. THE SITE IS GATED AND LOCKED. ADMITTANCE IS AVAILABLE UPON REQUEST.

3. EXISTING VEGETATION CONSISTS OF GRASS, BRUSH, TREES, PASTURE AND HAYFIELD.

4. DISTURBED AREAS SHALL BE SEEDED AS DESCRIBED BELOW. STRAW MULCH SHALL BE APPLIED TO ALL DISTURBED AREAS AT A RATE OF 3,000 POUNDS PER ACRE PRIOR TO SEPTEMBER 15 OF THE YEAR OF CONSTRUCTION.

5. PERMANENT COVER CROP (NO-TILL):
   A PERMANENT COVER CROP STRATEGY WILL BE UTILIZED. THE PERMANENT COVER CROP WILL BE GENERATED THE FIRST YEAR BY SEEDING WITH THE FOLLOWING MIX: 40% BARLEY, 40% RYE GRASS, 10% CRIMSON CLOVER, 10% BLANDO BROME AT A MINIMUM OF 70 POUNDS/ACRE. A PRE-APPROVED ALTERNATIVE SEED MIX MAY BE ALLOWED.

   THE PERMANENT COVER CROP WILL BE MANAGED EACH YEAR SUCH THAT ANY AREAS WHICH HAVE LESS THAN THE PERCENT VEGETATIVE COVER SPECIFIED BELOW WILL BE RESEEDED AND MULCHED UNTIL ADEQUATE COVERAGE IS ACHIEVED. THE PERMANENT COVER CROP SHALL BE MOWED ONLY AND NOT DISKED:

PERCENT OF VEGETATIVE COVER:	BLOCK:
75%	2, 5D, 5G, 8, 9G, 9H, 10, 12, 22, 24C, 24D, 24E, 27 & 31
80%	5A, 5H, 13A, 13B, 15B, 21, 23A, 23B, 23D, 23E, 23G, 24A, 24F, 24G, 25, 26, 28, 30, 32, 33A, 33B, 33D & 33E
85%	1, 3, 4A, 4B, 5B, 5E, 5F, 6, 7, 9A, 9C, 9D, 9E, 9F, 11, 14, 15A, 16, 19, 20A, 20B, 23C, 23F, 24B, 29A, 29B & 33C
90%	5C, 5J, 9B, 17, 18A & 18B

6. NO PRE-EMERGENT HERBICIDES WILL BE USED FOR WEED MANAGEMENT. CONTACT OR SYSTEMIC HERBICIDES MAY BE APPLIED IN SPRING (NO EARLIER THAN FEBRUARY 15TH TO ENSURE ADEQUATE VEGETATIVE COVER IN THE SPRAY STRIPS FOR THE REMAINDER OF THE RAINY SEASON).

   IN HAND-FARMED BLOCKS 2, 5D, 5G, 8, 9G, 9H, 12, 22, 24D & 31 THE WIDTH OF THE SPRAY STRIP SHALL BE NO WIDER THAN 1 FOOT (BASED ON A 5'-MINIMUM ROW WIDTH) IN ORDER TO ACHIEVE 75% VEGETATIVE COVER.

   IN BLOCKS 10, 24C, 24E & 27 THE WIDTH OF THE SPRAY STRIP SHALL BE NO WIDER THAN 1.5 FEET (BASED ON A 6'-MINIMUM ROW WIDTH) IN ORDER TO ACHIEVE 75% VEGETATIVE COVER.

   IN HAND-FARMED BLOCKS 5A, 13A, 21, 23D, 23E. 25, 28, 30, 32 & 33B THE WIDTH OF THE SPRAY STRIP SHALL BE NO WIDER THAN 0.8 FOOT (BASED ON A 5'-MINIMUM ROW WIDTH) IN ORDER TO ACHIEVE 80% VEGETATIVE COVER.

   IN BLOCKS 5H, 13B, 15B, 23A, 23B, 23G, 24A, 24F, 24G, 26, 33A, 33D & 33E THE WIDTH OF THE SPRAY STRIP SHALL BE NO WIDER THAN 1 FOOT (BASED ON A 6'-MINIMUM ROW WIDTH) IN ORDER TO ACHIEVE 80% VEGETATIVE COVER.

   IN BLOCKS 1, 3, 4A, 4B, 5B, 5E, 5F, 6, 7, 9A, 9C, 9D, 9E, 9F, 11, 14, 15A, 16, 19, 20A, 20B, 23C, 23F, 24B, 29A, 29B & 33C NO STRIP SPRAYING SHALL BE PERFORMED IN ORDER TO ACHIEVE 85% VEGETATIVE COVER.

   IN BLOCKS 5C, 5J, 9B, 17, 18A & 18B NO STRIP SPRAYING SHALL BE PERFORMED IN ORDER TO ACHIEVE 90% VEGETATIVE COVER.

   IN BLOCKS 1, 3, 4A, 4B, 5B, 5C, 5E, 5F, 5J, 6, 7, 9A, 9B, 9C, 9D, 9E, 9F, 11, 14, 15A, 16, 17, 18A, 18B, 19, 20A, 20B, 23C, 23F, 24B, 29A, 29B & 33C, SPOT SPRAYING OF CONTACT OR SYSTEMIC HERBICIDES IN SPRING (NO EARLIER THAN FEBRUARY 15) WILL BE ALLOWED PROVIDED THE 85% OR 90% VEGETATIVE COVER IS ACHIEVED IN EACH BLOCK. IF THE OWNER CHOOSES TO FARM WITHOUT HERBICIDE, AN ALTERNATIVE WILL BE TO HAND-HOE AROUND THE BASE OF THE VINE ONLY, OR OTHER METHODS THAT DO NOT RESULT IN A CONTINUOUS BARE STRIP.

7. IN BLOCKS 5H, 10, 13B, 15B, 23A, 23B, 23G, 24A, 24C, 24E, 24F, 24G, 26, 27, 33A, 33D & 33E THE OWNER HAS THE OPTION OF USING A DWARF BARLEY COVER CROP IN THE FIRST 3 YEARS THAT THE BLOCK IS PLANTED TO AID WITH VINEYARD ESTABLISHMENT. IF THIS OPTION IS USED, SEED SHALL BE APPLIED AT A RATE OF 120 POUNDS PER ACRE IF BROADCAST OR AT A RATE OF 60 POUNDS PER ACRE IF DRILLED. THE COVER CROP WITHIN THE VINEYARD MAY BE DISKED EACH SPRING AFTER APRIL 1 FOR THE FIRST 3 YEARS. AN ALTERNATIVE COVER CROP SEED MIX MAY BE USED UPON PRIOR APPROVAL. EACH YEAR THE OWNER CHOOSES TO DISK, THE AREA SHALL BE STRAW MULCHED AT A RATE OF 3,000 LBS/ACRE AND STRAW WATTLES SHALL BE INSTALLED PRIOR TO SEPTEMBER 15. THE PERMANENT SEED MIX WILL BE SEEDED PRIOR TO SEPTEMBER 15 OF THE FOURTH (OR EARLIER) YEAR.

8. IN BLOCK 17 THE PERMANENT COVER MUST BE ESTABLISHED THE FIRST YEAR.

   THE PERMANENT COVER IN BLOCK 17 MUST BE IRRIGATED STARTING AUGUST 15 IN ORDER TO ESTABLISH THE COVER BY SEPTEMBER 15. THE BLOCK SHALL BE HAND-FARMED.

9. THE VINEYARD AVENUES SHALL BE MOWED ONLY AND SHALL NOT BE DISKED. UNLESS OTHERWISE NOTED, ALL AVENUES SHALL CONFORM TO THE NATURAL GRADE. VINEYARD AVENUES SHALL BE SEEDED AND MULCHED PRIOR TO SEPTEMBER 15 OF THE YEAR OF CONSTRUCTION AND IN SUBSEQUENT YEARS IN BARE OR DISTURBED AREAS. THE COVER CROP WILL BE MANAGED EACH YEAR SUCH THAT ANY AVENUES WHICH HAVE LESS THAN THE PERCENT VEGETATIVE COVER SPECIFIED BELOW WILL BE RESEEDED AND MULCHED UNTIL ADEQUATE COVERAGE IS ACHIEVED. SEEDING AND MULCHING IS NOT REQUIRED ON AVENUES AND ROADS PROPERLY SURFACED WITH GRAVEL:

PERCENT OF VEGETATIVE COVER:	BLOCK:
75%	2, 5D, 5G, 8, 9G, 9H, 10, 12, 22, 24C, 24D, 24E, 27 & 31
80%	5A, 5H, 13A, 13B, 15B, 21, 23A, 23B, 23D, 23E, 23G, 24A, 24F, 24G, 25, 26, 28, 30, 32, 33A, 33B, 33D & 33E
85%	1, 3, 4A, 4B, 5B, 5E, 5F, 6, 7, 9A, 9C, 9D, 9E, 9F, 11, 14, 15A, 16, 19, 20A, 20B, 23C, 23F, 24B, 29A, 29B & 33C
90%	5C, 5J, 9B, 17, 18A & 18B

10. THE OWNER MAY FURTHER SUBDIVIDE VINEYARD BLOCKS WITHIN THE FOOTPRINT OF THE PROPOSED VINEYARD FOR IRRIGATION AND VITICULTURE PURPOSES. THE VINEROW DIRECTIONS SHALL NOT BE ALTERED WITHOUT AN APPROVED MODIFICATION FROM NAPA COUNTY PLANNING, BUILDING & ENVIRONMENTAL SERVICES DEPARTMENT.

11. FERTILIZER SHALL BE APPLIED AS NECESSARY BY VINEYARD MANAGEMENT PERSONNEL FOR BOTH THE VINEYARD AND TO ENSURE SPECIFIED PERCENT VEGETATIVE COVER CROP IS ACHIEVED. SITE-SPECIFIC SOIL ANALYSIS SHOULD BE PERFORMED.

12. THE PROPOSED VINE AND ROW SPACING IS 4' BY 6' FOR TRACTOR-FARMED BLOCKS AND IS 4' BY 5' FOR HAND-FARMED BLOCKS. VINEROW WIDTH SHALL BE INCREASED AS NECESSARY IN TRACTOR-FARMED BLOCKS WHERE SIDE SLOPE IS 15% OR GREATER. IN THESE AREAS, WIDTH OF TILLAGE EQUIPMENT SHALL BE NO MORE THAN 75% OF ROW WIDTH TO ALLOW FOR BENCH FORMATION AND TO MINIMIZE EROSION.

    THE FOLLOWING BLOCKS WILL BE HAND-FARMED: 1, 2, 3, 4A, 4B, 5A, 5B, 5C, 5D, 5E, 5G, 6, 7, 8, 9A, 9B, 9C, 9E, 9F, 9G, 9H, 11, 12, 13A, 14, 17, 20B, 21, 22, 23D, 23E, 24D, 25, 28, 29B, 30, 31, 32 & 33B.

13. IRRIGATION PIPELINES SHALL GENERALLY BE LOCATED WITHIN EXISTING ROADWAYS, VINEYARDS AND VINEYARD AVENUES, AND/OR WITHIN PROPOSED CLEARING LIMITS. REGARDLESS OF PIPELINE LOCATION, PIPELINE TRENCHES LOCATED ON GROUND SLOPES GREATER THAN 15% SHALL BE BACKFILLED USING IMPORTED OR SELECT NATIVE GRANULAR MATERIAL TO A DEPTH OF 6 INCHES ABOVE THE PIPELINES SUCH THAT VOIDS DO NOT FORM BELOW HAUNCHES OF PIPE. BACKFILL SHALL BE WHEEL ROLLED OR OTHERWISE COMPACTED TO REDUCE SETTLEMENT. FINAL GRADING OVER TRENCHES SHALL BE MOUNDED AND WATER-BARRED SUCH THAT WATER IS DIRECTED AWAY FROM TRENCHES

14. THE LOCATION OF THE EXISTING RESERVOIR, THE PROPOSED WATER SOURCE, IS SHOWN ON THE VICINITY MAP.

15. A PORTION OF THE PROPERTY IS CURRENTLY DEER FENCED. SEE APPENDIX A FOR THE DEER FENCE MAP.

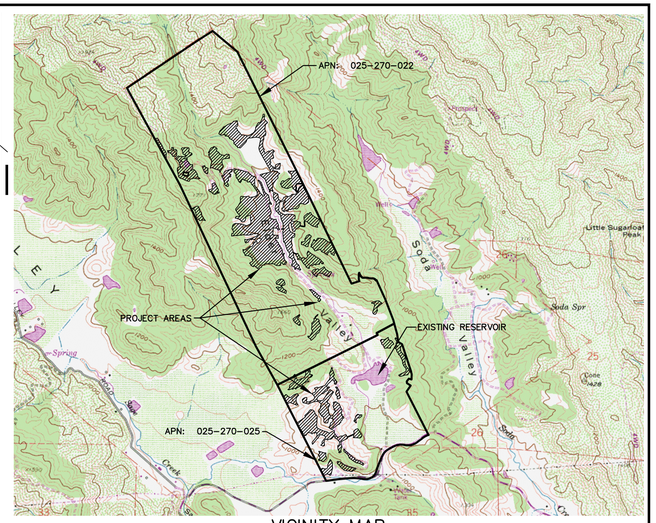
16. REQUESTS FOR FURTHER INFORMATION, CLARIFICATION OF WORK TO BE DONE, OR INSPECTION INFORMATION CAN BE MADE TO JIM BUSHEY OR MATT BUENO AT PPI ENGINEERING IN NAPA, (707) 253-1806.

17. PROPERTY LINES AS SHOWN ARE APPROXIMATE. OWNER SHALL BE RESPONSIBLE FOR SURVEYING PROPERTY LINE(S) AS NECESSARY PRIOR TO ANY SITE DISTURBANCE.

18. THE OWNER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS.

19. AT LEAST 48 HOURS PRIOR TO EXCAVATING, THE CONTRACTOR SHALL CALL UNDERGROUND SERVICES ALERT (U.S.A.) AT 1-800-642-2444 IN ORDER TO LOCATE EXISTING UTILITIES.

20. IT IS THE OWNER'S RESPONSIBILITY TO INSTALL ALL STRUCTURAL MEASURES AS SHOWN ON THE SITE PLAN AND DETAILS AND AS DESCRIBED IN THE SPECIFICATIONS WITHIN THE TIME FRAMES SPECIFIED FOR THIS PROJECT. ANY DEVIATION FROM THESE PLANS MUST BE REVIEWED AND APPROVED BY NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT. IT IS THE OWNER'S RESPONSIBILITY TO INITIATE THIS MODIFICATION PROCESS. PPI ENGINEERING MUST BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF CONSTRUCTION IN ORDER TO SCHEDULE A PRE-CONSTRUCTION MEETING WITH THE OWNER/MANAGER AND CONTRACTOR(S). FOR ONGOING MULTI-YEAR PROJECTS PPI ENGINEERING MUST BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF RESUMING CONSTRUCTION EACH YEAR.



VICINITY MAP
USGS CHILES VALLEY QUADRANGLE
TOWNSHIP 8 N., RANGE 4 W.
SCALE: 1" = ±2000'

REGISTERED PROFESSIONAL ENGINEER JAMES R. BUSHEY No. 49931 EXPIRES: 9-30-18 Civil STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6-20-18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

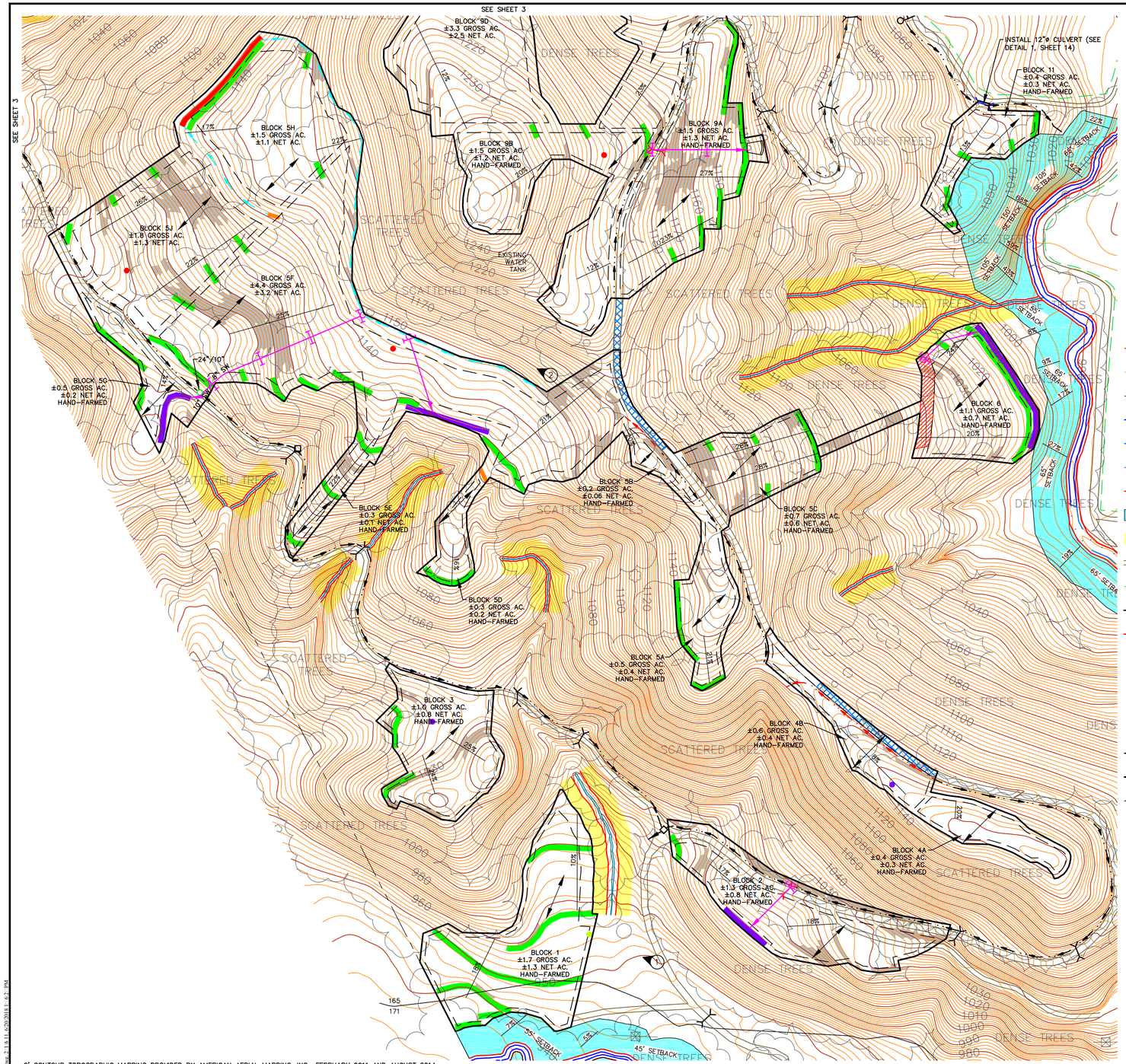
KJS INVESTMENT PROPERTIES & SORRENTO INC.

EROSION CONTROL PLAN

SITE PLAN

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6-20-18	1 OF: 19



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- APPROXIMATE PROPERTY LINE LOCATION
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- U.S.G.S. BLUE LINE STREAM, ASSUMED LOCATION
- POSSIBLE WATERS OF U.S. (APPROXIMATE) MAPPED BY HIRKALA
- TOP OF BANK (APPROXIMATE)
- NAPA COUNTY STREAM SETBACK
- 26' UNDISTURBED FILTER STRIP
- EXISTING ROAD
- EXISTING VINEYARD, NOT A PART OF THIS PLAN
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- EXISTING STANDARD OR INFIELD DROP INLET TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING CONCRETE DROP INLET TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING PIPELINE, APPROXIMATE LOCATION, TO BE REPAIRED & MAINTAINED AS NEEDED
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED OUTSLOPED ROAD (SEE DETAIL 1, SHEET 12)
- PROPOSED STANDARD DIVERSION DITCH (SEE DETAIL 4, SHEET 12)
- PROPOSED INSLOPED AVENUE (SEE DETAIL 2, SHEET 12)
- PROPOSED STANDARD 18" DROP INLET (SEE DETAIL 1, SHEET 13)
- XX"/XX" PROPOSED STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 2, SHEET 13)
- PROPOSED SURFACE DRAINAGE LINE, 8" SW UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 13)
- PROPOSED CUTOFF COLLAR (SEE DETAIL 5, SHEET 13)
- PROPOSED PIPE SIZE AND/OR TYPE CHANGE
- PROPOSED ROLLING DIP (SEE DETAIL 6, SHEET 13)
- PROPOSED TYPE I PIPE LEVEL SPREADER UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 15)
- PROPOSED ROCK LEVEL SPREADER (SEE DETAIL 6, SHEET 14)
- PROPOSED ROCK APRON (SEE DETAIL 4, SHEET 14)
- PROPOSED STRAW WATTLE (SEE DETAIL 3, SHEET 12)
- PROPOSED VINEROW DIRECTION
- X PHOTO POINT NUMBER & LOCATION (SEE APPENDIX E)
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% AVERAGE SURFACE SLOPE
- SW SINGLE WALL CORRUGATED POLYETHYLENE PIPE
- ø DIAMETER

SOILS LEGEND

- ANAMOSA–MAPPED SOIL PIT: MAYMEN LOAM
- ANAMOSA–MAPPED SOIL PIT: MILLSHOLM LOAM
- ANAMOSA–MAPPED SOIL PIT: PLEASANTON LOAM
- 165/171 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 165 MILLSHOLM LOAM, 6–55% SLOPE
- 171 PLEASANTON LOAM, 2–5% SLOPE

REGISTERED PROFESSIONAL ENGINEER
JAMES R. BUSHEY
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6–20–18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253–1806 FAX 707/253–1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

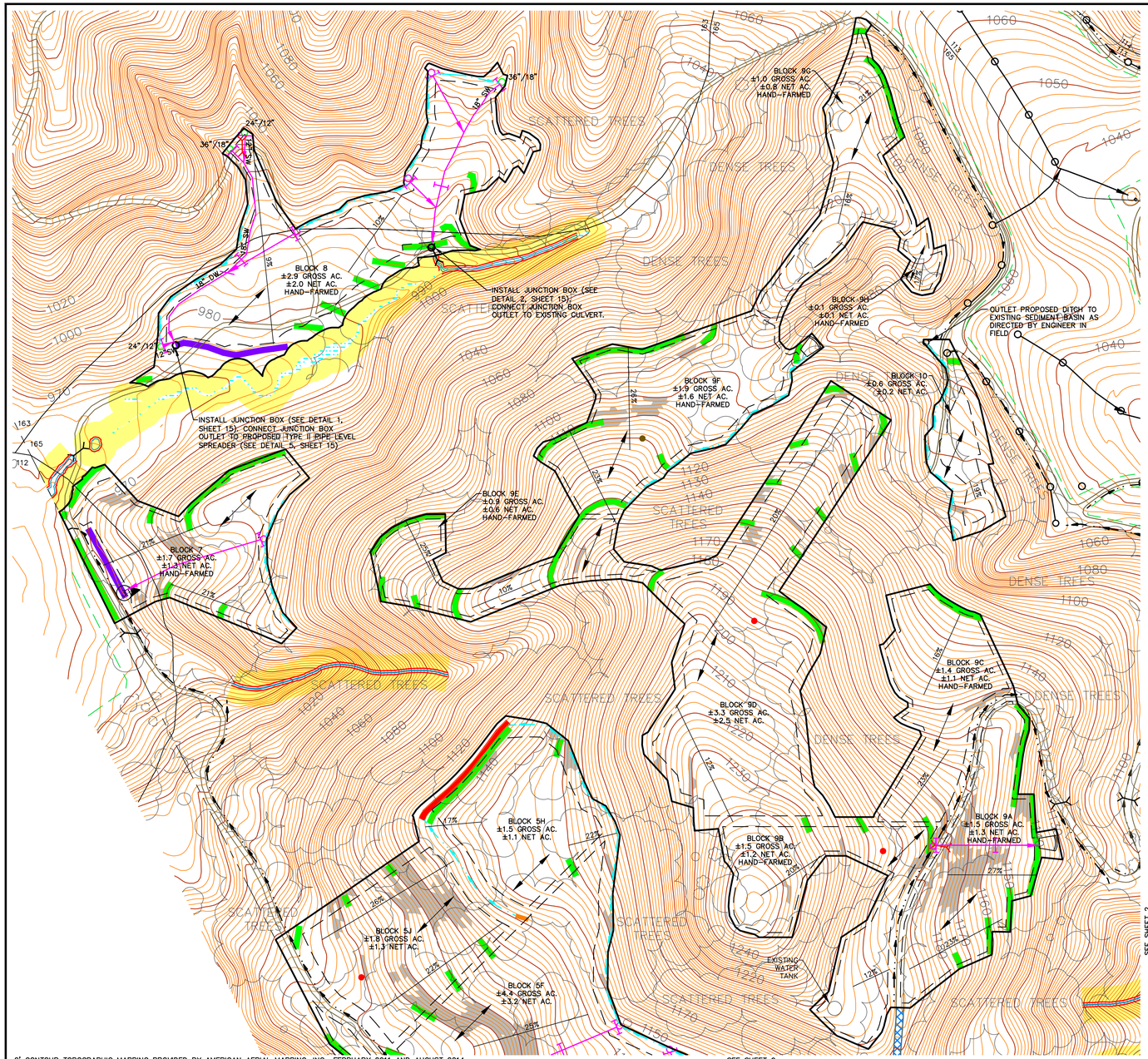
EROSION CONTROL PLAN

BLOCKS 1–6 & 11

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6–20–18	2 OF: 19

S:\SONOMA\11411901 Travis\11CP\Plans\11411901B.dwg, 2/16/11 6:20:38 PM, 6:2 PM



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- APPROXIMATE PROPERTY LINE LOCATION
- POSSIBLE WATERS OF U.S. (APPROXIMATE) MAPPED BY HIRKALA
- WETLAND SWALE (APPROXIMATE) MAPPED BY HIRKALA
- TOP OF BANK (APPROXIMATE)
- 26' UNDISTURBED FILTER STRIP
- EXISTING ROAD
- EXISTING VINEYARD, NOT A PART OF THIS PLAN
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- EXISTING STANDARD OR INFIELD DROP INLET TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING PIPELINE, APPROXIMATE LOCATION, TO BE REPAIRED & MAINTAINED AS NEEDED
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED OUTSLOPED ROAD (SEE DETAIL 1, SHEET 12)
- PROPOSED STANDARD DIVERSION DITCH (SEE DETAIL 4, SHEET 12)
- PROPOSED STANDARD 18" DROP INLET (SEE DETAIL 1, SHEET 13)
- XX"/XX" PROPOSED STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 2, SHEET 13)
- PROPOSED SURFACE DRAINAGE LINE, 8" SW UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 13)
- PROPOSED CUTOFF COLLAR (SEE DETAIL 5, SHEET 13)
- PROPOSED PIPE SIZE AND/OR TYPE CHANGE
- PROPOSED ROLLING DIP (SEE DETAIL 6, SHEET 13)
- PROPOSED TYPE I PIPE LEVEL SPREADER UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 15)
- PROPOSED ROCK LEVEL SPREADER (SEE DETAIL 6, SHEET 14)
- PROPOSED ROCK APRON (SEE DETAIL 4, SHEET 14)
- PROPOSED STRAW WATTLE (SEE DETAIL 3, SHEET 12)
- PROPOSED VINEROW DIRECTION
- PHOTO POINT NUMBER & LOCATION (SEE APPENDIX E)
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% AVERAGE SURFACE SLOPE
- SW SINGLE WALL CORRUGATED POLYETHYLENE PIPE
- DW DUAL WALL CORRUGATED POLYETHYLENE PIPE

SOILS LEGEND

- ANAMOSA–MAPPED SOIL PIT: LODO
- ANAMOSA–MAPPED SOIL PIT: MAYMEN LOAM
- 165/112 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 112 BRESSA–DIBBLE COMPLEX, 5–15% SLOPE
- 113 BRESSA–DIBBLE COMPLEX, 15–30% SLOPE
- 163 MAYMEN–MILLSHOLM–LODO ASSOCIATION, 30–75% SLOPE
- 165 MILLSHOLM LOAM, 6–55% SLOPE

REGISTERED PROFESSIONAL ENGINEER
JAMES R. LAWRENCE
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6–20–18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253–1806 FAX 707/253–1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

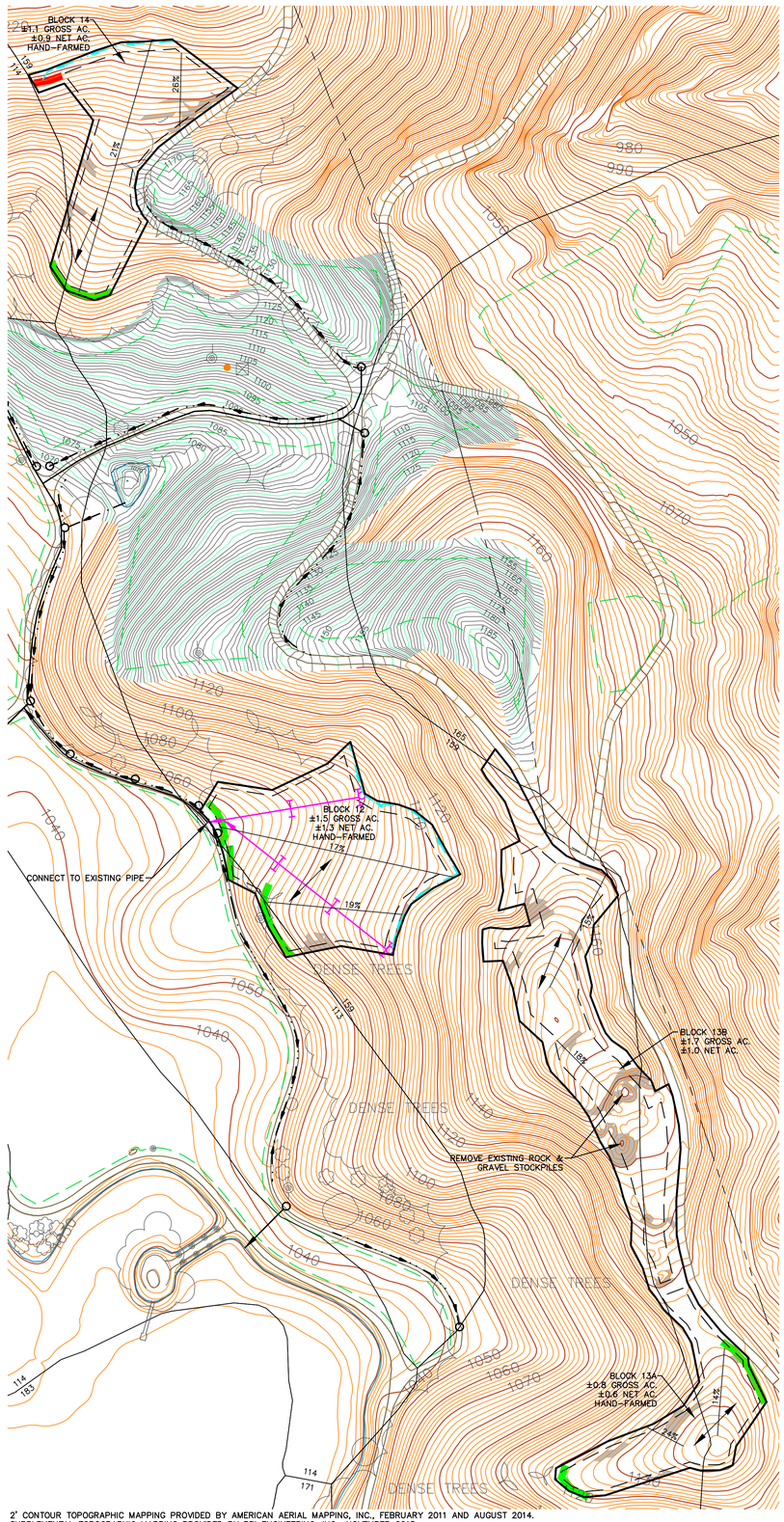
EROSION CONTROL PLAN

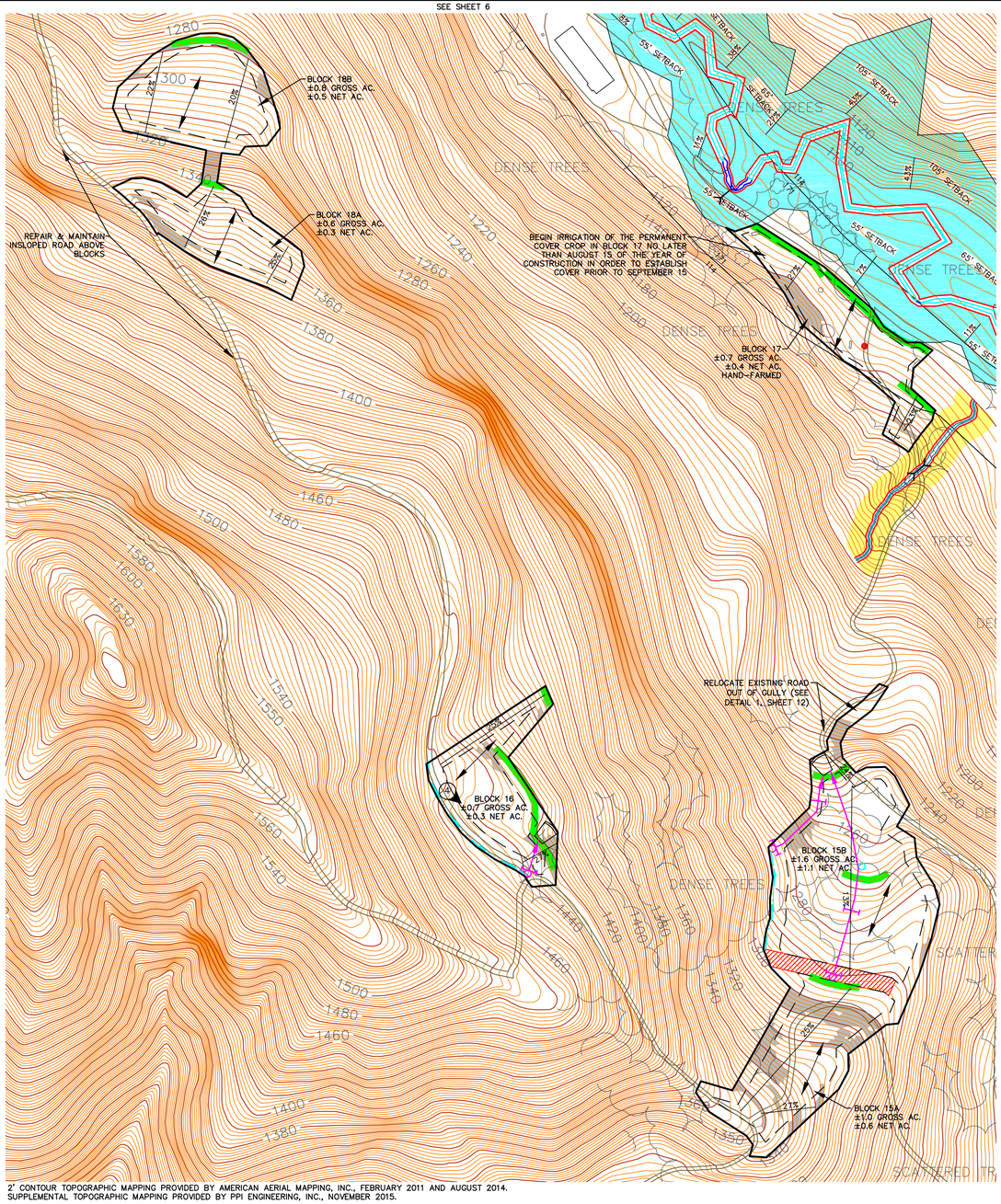
BLOCKS 7–10

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6–20–18	3 OF: 19

R:\SOARES\11411901 Track 1 EC\P Phase II\Drawings\11411901B.dwg, 3 - 10, 6/29/2018 2:49:08 PM


BLOCK 14
±1.1 GROSS AC.
±0.9 NET AC.
HAND-FARMED
BLOCK 12
±1.5 GROSS AC.
±1.3 NET AC.
HAND-FARMED
17%
19%
CONNECT TO EXISTING PIPE
BLOCK 13B
±1.7 GROSS AC.
±1.0 NET AC.
REMOVE EXISTING ROCK & GRAVEL STOCKPILES
BLOCK 13A
±0.8 GROSS AC.
±0.6 NET AC.
HAND-FARMED
14%
DENSE TREES
980
990
1000
1010
1020
1030
1040
1050
1060
1070
1080
1090
1100
1110
1120
1130
1140
1150
1160
1170
1180
1190
1200
1210
1220
1230
1240
1250
1260
1270
1280
1290
1300
1310
1320
1330
1340
1350
1360
1370



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) SURVEYED BY PPI ENGINEERING
- POSSIBLE WATERS OF U.S. (APPROXIMATE) MAPPED BY HIRKALA
- TOP OF BANK (APPROXIMATE)
- NAPA COUNTY STREAM SETBACK
- 26' UNDISTURBED FILTER STRIP
- EXISTING ROAD
- EXISTING BUILDING
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED STANDARD DIVERSION DITCH (SEE DETAIL 4, SHEET 12)
- PROPOSED INSLOPED AVENUE (SEE DETAIL 2, SHEET 12)
- PROPOSED STANDARD 18" DROP INLET (SEE DETAIL 1, SHEET 13)
- PROPOSED INFIELD DROP INLET (SEE DETAIL 2, SHEET 14)
- PROPOSED SURFACE DRAINAGE LINE, 8" SW UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 13)
- PROPOSED CUTOFF COLLAR (SEE DETAIL 5, SHEET 13)
- PROPOSED ROCK APRON (SEE DETAIL 4, SHEET 14)
- PROPOSED STRAW WATTLE (SEE DETAIL 3, SHEET 12)
- PROPOSED VINEROW DIRECTION
- PHOTO POINT NUMBER & LOCATION (SEE APPENDIX E)
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% — AVERAGE SURFACE SLOPE
- SW — SINGLE WALL CORRUGATED POLYETHYLENE PIPE

SOILS LEGEND

- ANAMOSA–MAPPED SOIL PIT: MAYMEN LOAM
- 114 / 171 — USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 — BRESSA–DIBBLE COMPLEX, 30–50% SLOPE
- 171 — PLEASANTON LOAM, 2–5% SLOPE

REGISTERED PROFESSIONAL ENGINEER — JAMES R. LASHBROOK — No. 49931 — EXPIRES: 9-30-18 — Civil — STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6–20–18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253–1806 FAX 707/253–1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

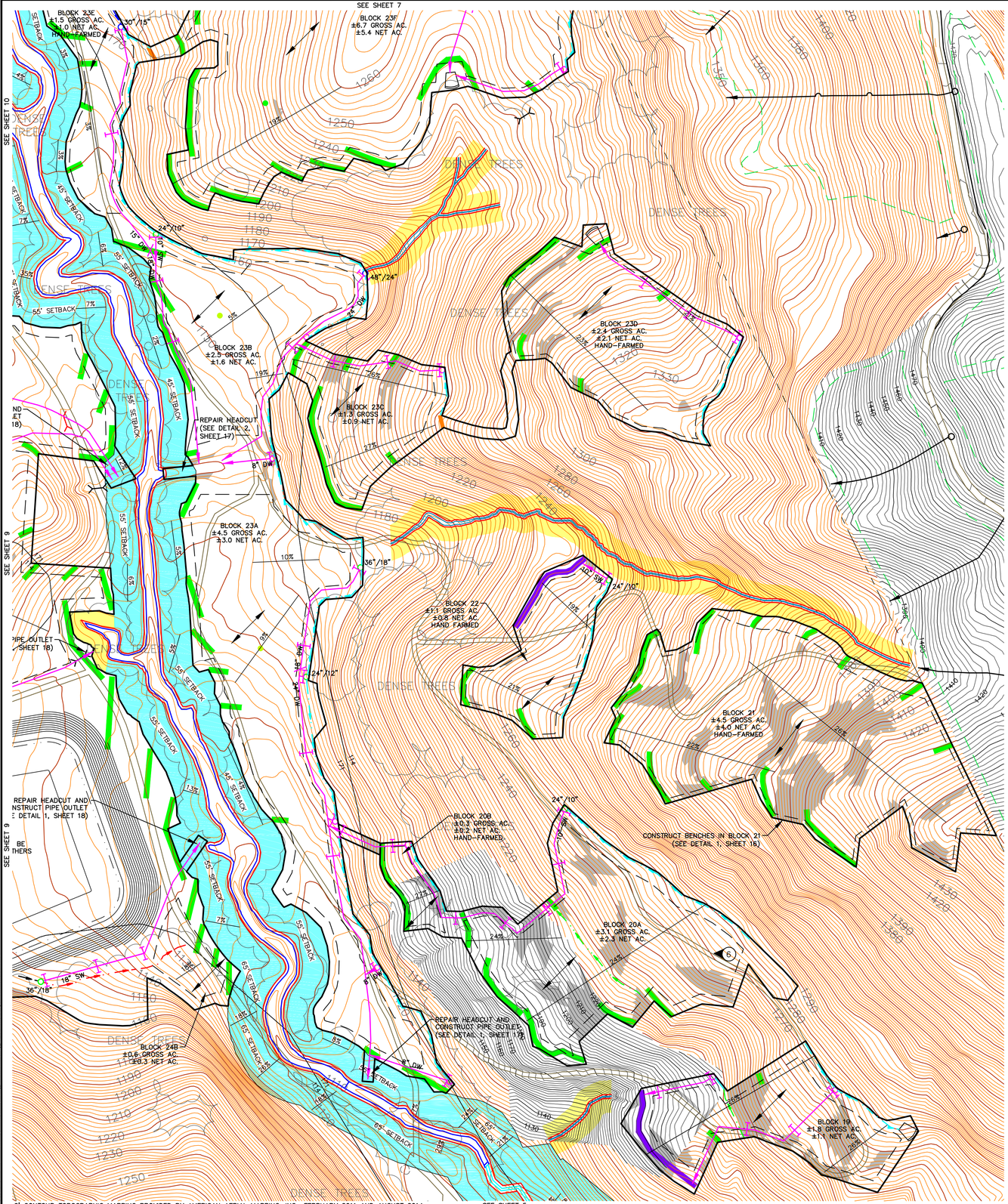
EROSION CONTROL PLAN

BLOCKS 15–18

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6–20–18	5 OF: 19

R:\KSINVEST\11411901\Drawings\Plan\11411901B.dwg, 6/18/2018 11:15:59 AM, Plotted by: Jim Lashbrook



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- APPROXIMATE PROPERTY LINE LOCATION
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) SURVEYED BY PPI ENGINEERING
- POSSIBLE WATERS OF U.S. (APPROXIMATE) MAPPED BY HIRKALA
- TOP OF BANK (APPROXIMATE)
- NAPA COUNTY STREAM SETBACK
- 26' UNDISTURBED FILTER STRIP
- EXISTING ROAD
- EXISTING VINEYARD, NOT A PART OF THIS PLAN
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- EXISTING STANDARD OR INFIELD DROP INLET TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING PIPELINE, APPROXIMATE LOCATION, TO BE REPAIRED & MAINTAINED AS NEEDED
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED STANDARD DIVERSION DITCH (SEE DETAIL 4, SHEET 12)
- PROPOSED NON-STANDARD DIVERSION DITCH (SEE DETAIL 5, SHEET 12)
- PROPOSED INFIELD DITCH (SEE DETAIL 3, SHEET 14)
- PROPOSED STANDARD 18" DROP INLET (SEE DETAIL 1, SHEET 13)
- XX"/XX" PROPOSED STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 2, SHEET 13)
- XX"/XX" PROPOSED NON-STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 3, SHEET 13)
- PROPOSED SURFACE DRAINAGE LINE, 8" SW UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 13)
- PROPOSED CUTOFF COLLAR (SEE DETAIL 5, SHEET 13)
- PROPOSED PIPE SIZE AND/OR TYPE CHANGE
- PROPOSED ROLLING DIP (SEE DETAIL 6, SHEET 13)
- PROPOSED TYPE I PIPE LEVEL SPREADER UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 15)
- PROPOSED ROCK APRON (SEE DETAIL 4, SHEET 14)
- PROPOSED STRAW WATTLE (SEE DETAIL 3, SHEET 12)
- PROPOSED VINEROW DIRECTION
- (X) PHOTO POINT NUMBER & LOCATION (SEE APPENDIX E)
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% AVERAGE SURFACE SLOPE
- SW SINGLE WALL CORRUGATED POLYETHYLENE PIPE
- DW DUAL WALL CORRUGATED POLYETHYLENE PIPE

SOILS LEGEND

- ANAMOSA–MAPPED SOIL PIT: BRESSA SILT LOAM
- ANAMOSA–MAPPED SOIL PIT: COLE – ALLUVIAL SILT LOAM
- ANAMOSA–MAPPED SOIL PIT: DIBBLE
- ANAMOSA–MAPPED SOIL PIT: PLEASANTON LOAM
- 171/114 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 BRESSA–DIBBLE COMPLEX, 30–50% SLOPE
- 171 PLEASANTON LOAM, 2–5% SLOPE

REGISTERED PROFESSIONAL ENGINEER
JAMES R. KOMARES
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6-20-18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

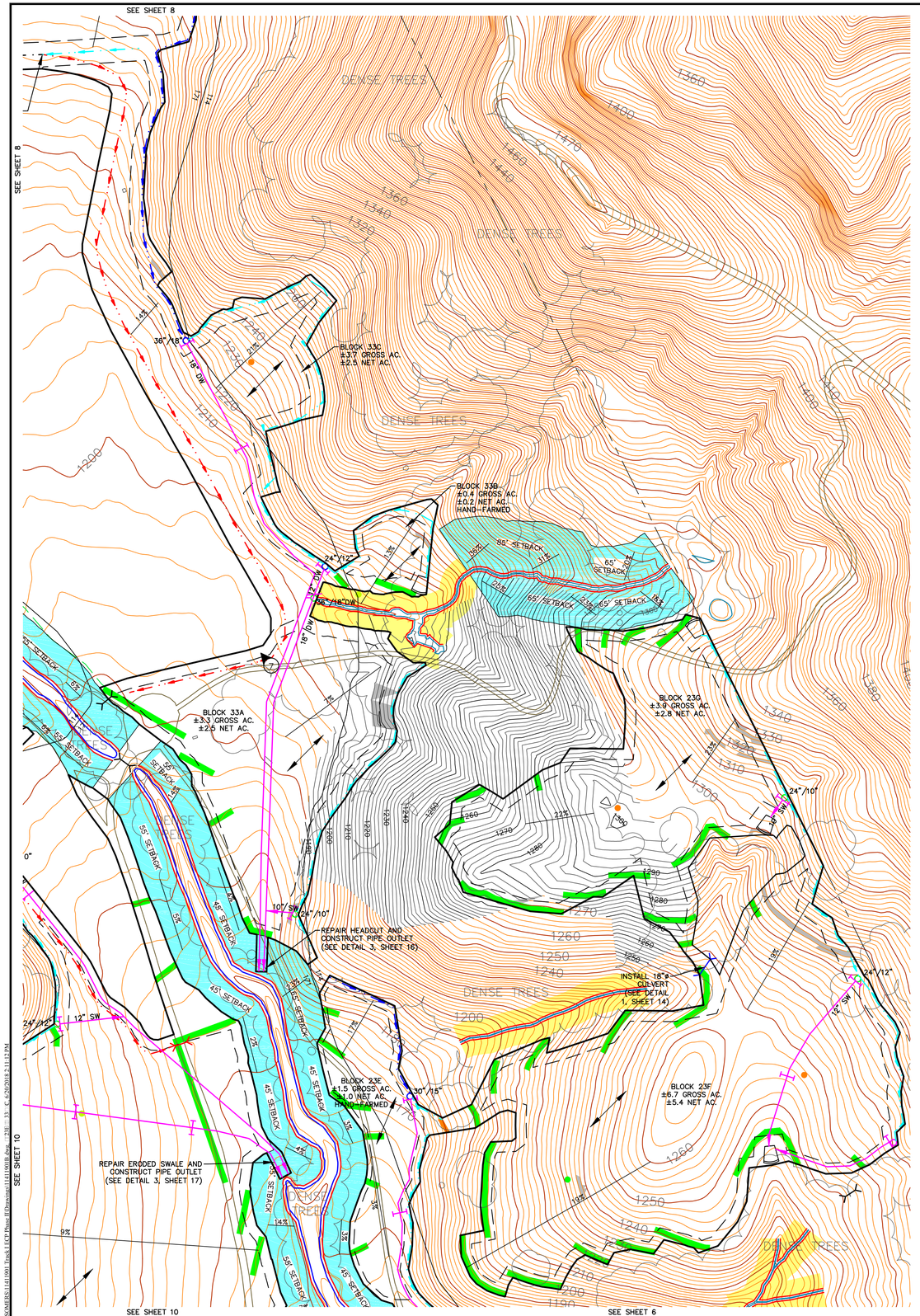
EROSION CONTROL PLAN

BLOCKS 19–22, 23A–23D

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6-20-18	6 OF: 19

R:\DRAWINGS\11411901 Trock LLC\CV Phase II Permitting\11411901B Rev. 6 19 22:53 by KOMARES 6/20/2018 3:09:21 PM



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

R:\SOMERS\11411901 Track\14CV\Proj\ErosionControl\11411901_Base_23E_33_G_6-20-2018_11:12 PM

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- APPROXIMATE PROPERTY LINE LOCATION
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- POSSIBLE WATERS OF U.S. (APPROXIMATE) MAPPED BY HIRKALA
- TOP OF BANK (APPROXIMATE)
- NAPA COUNTY STREAM SETBACK
- 26' UNDISTURBED FILTER STRIP
- EXISTING ROAD
- EXISTING VINEYARD, NOT A PART OF THIS PLAN
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED STANDARD DIVERSION DITCH (SEE DETAIL 4, SHEET 12)
- PROPOSED NON-STANDARD DIVERSION DITCH (SEE DETAIL 5, SHEET 12)
- PROPOSED STANDARD 18" DROP INLET (SEE DETAIL 1, SHEET 13)
- XX"/XX" PROPOSED STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 2, SHEET 13)
- XX"/XX" PROPOSED NON-STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 3, SHEET 13)
- PROPOSED SURFACE DRAINAGE LINE, 8" SW UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 13)
- PROPOSED CUTOFF COLLAR (SEE DETAIL 5, SHEET 13)
- PROPOSED PIPE SIZE AND/OR TYPE CHANGE
- PROPOSED ROLLING DIP (SEE DETAIL 6, SHEET 13)
- PROPOSED ROCK APRON (SEE DETAIL 4, SHEET 14)
- PROPOSED STRAW WATTLE (SEE DETAIL 3, SHEET 12)
- PROPOSED VINEROW DIRECTION
- X PHOTO POINT NUMBER & LOCATION (SEE APPENDIX E)
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% AVERAGE SURFACE SLOPE
- SW SINGLE WALL CORRUGATED POLYETHYLENE PIPE
- DW DUAL WALL CORRUGATED POLYETHYLENE PIPE
- ø DIAMETER

SOILS LEGEND

- ANAMOSA-MAPPED SOIL PIT: BRESSA SILT LOAM
- ANAMOSA-MAPPED SOIL PIT: DIBBLE
- ANAMOSA-MAPPED SOIL PIT: PLEASANTON LOAM
- 114/171 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 BRESSA-DIBBLE COMPLEX, 30-50% SLOPE
- 171 PLEASANTON LOAM, 2-5% SLOPE

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6-20-18

© 2018 PPI ENGINEERING, INC.

REGISTERED PROFESSIONAL ENGINEER
JAMES R. BUSHEY
No. 19931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

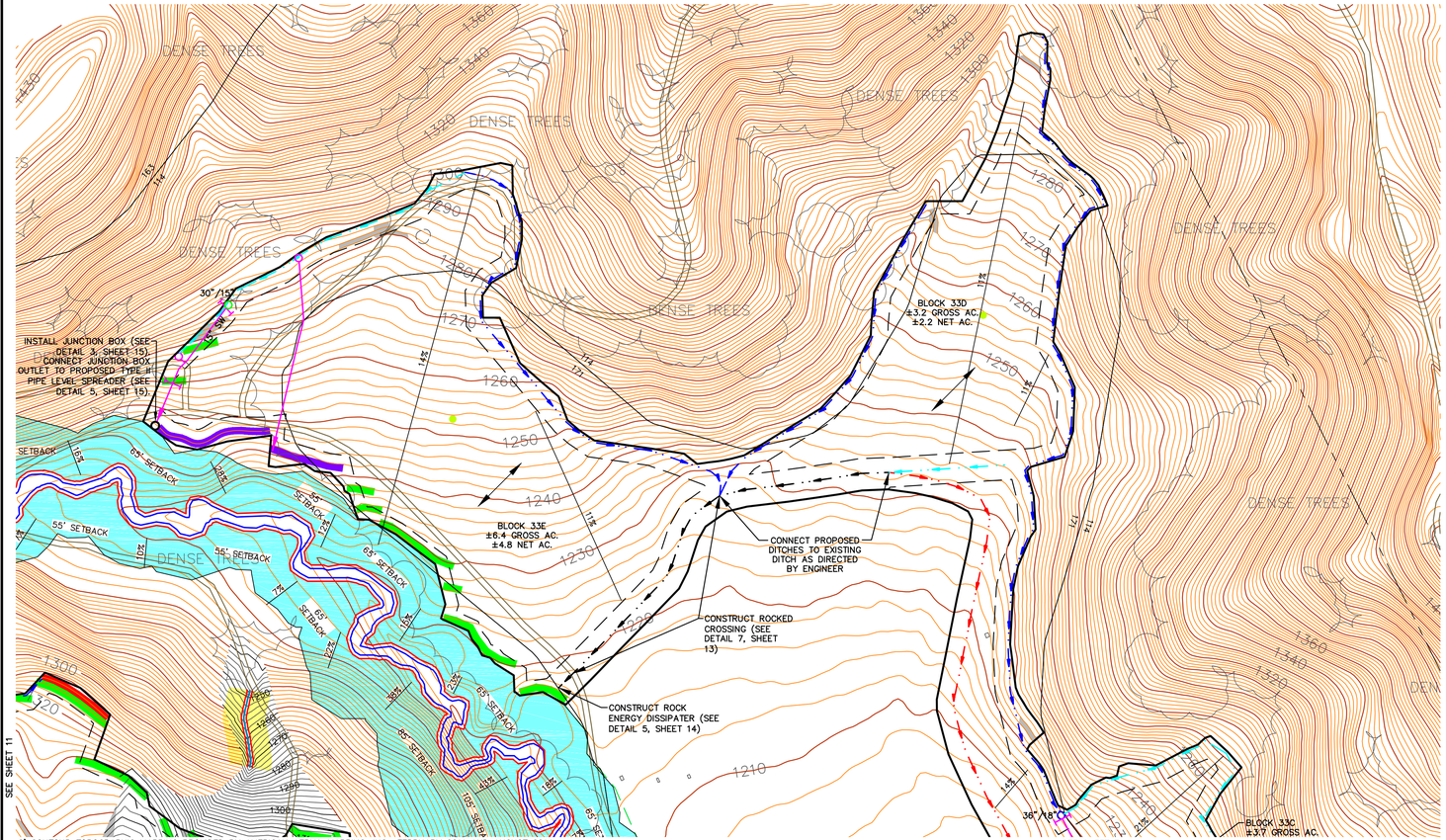
KJS INVESTMENT PROPERTIES & SORRENTO INC.

EROSION CONTROL PLAN

BLOCKS 23E-23G & 33A-33C

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6-20-18	7 OF: 19



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- APPROXIMATE PROPERTY LINE LOCATION
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- POSSIBLE WATERS OF U.S. (APPROXIMATE) MAPPED BY HIRKALA
- TOP OF BANK (APPROXIMATE)
- NAPA COUNTY STREAM SETBACK
- 26' UNDISTURBED FILTER STRIP
- EXISTING ROAD
- EXISTING VINEYARD, NOT A PART OF THIS PLAN
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED STANDARD DIVERSION DITCH (SEE DETAIL 4, SHEET 12)
- PROPOSED NON-STANDARD DIVERSION DITCH (SEE DETAIL 5, SHEET 12)
- PROPOSED STANDARD 18" DROP INLET (SEE DETAIL 1, SHEET 13)
- XX"/XX" PROPOSED STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 2, SHEET 13)
- XX"/XX" PROPOSED NON-STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 3, SHEET 13)
- PROPOSED SURFACE DRAINAGE LINE, 8" SW UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 13)
- PROPOSED CUTOFF COLLAR (SEE DETAIL 5, SHEET 13)
- PROPOSED TYPE I PIPE LEVEL SPREADER UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 15)
- PROPOSED ROCK LEVEL SPREADER (SEE DETAIL 6, SHEET 14)
- PROPOSED STRAW WATTLE (SEE DETAIL 3, SHEET 12)
- PROPOSED VINEROW DIRECTION
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% AVERAGE SURFACE SLOPE
- SW SINGLE WALL CORRUGATED POLYETHYLENE PIPE

SOILS LEGEND

- ANAMOSA–MAPPED SOIL PIT: PLEASANTON LOAM
- 114/171 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 BRESSA–DIBBLE COMPLEX, 30–50% SLOPE
- 163 MAYMEN–MILLSHOLM–LODO ASSOCIATION, 30–75% SLOPE
- 171 PLEASANTON LOAM, 2–5% SLOPE

REGISTERED PROFESSIONAL ENGINEER
JAMES R. LASSEN
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6–20–18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253–1806 FAX 707/253–1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

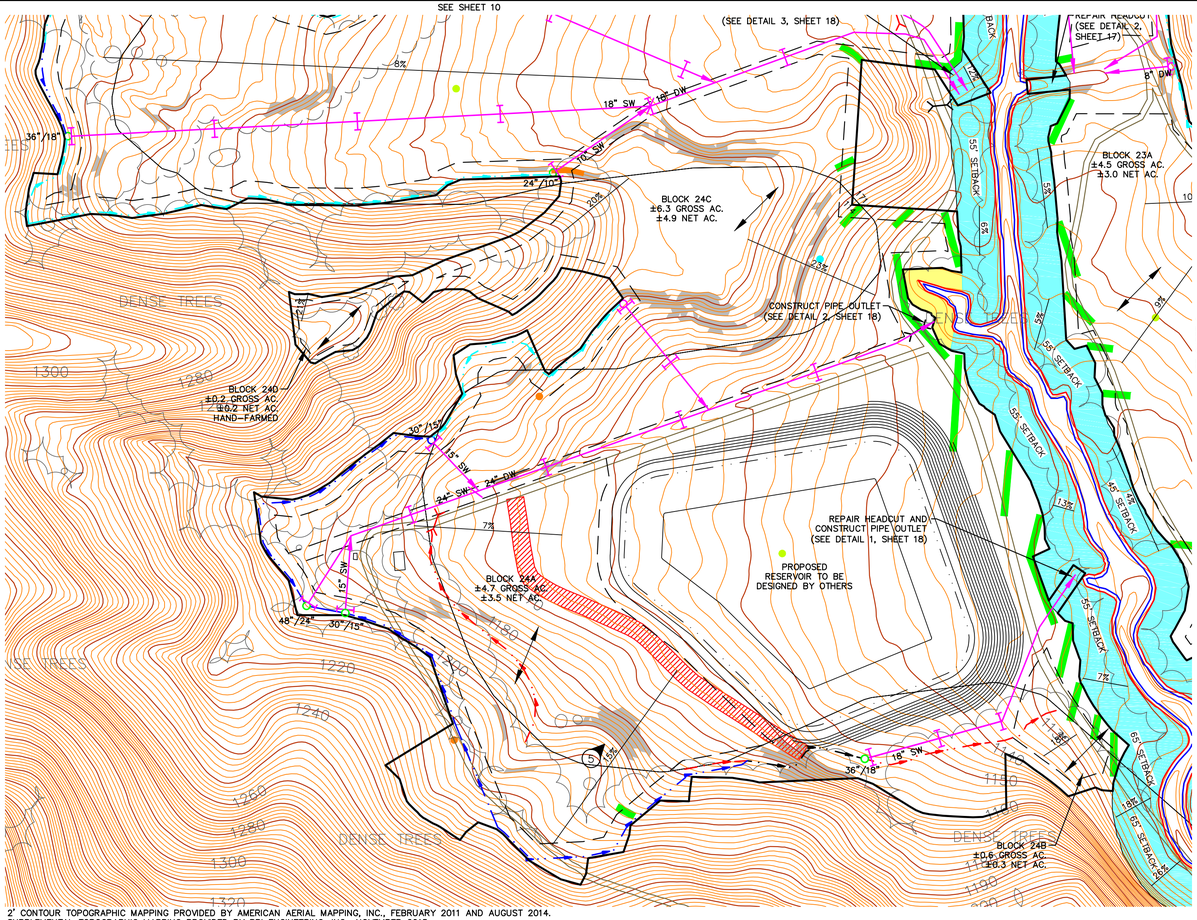
EROSION CONTROL PLAN

BLOCKS 33D & 33E

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6–20–18	8 OF: 19

R:\SOARES\11411901 Track 1 EC\CP Phase 1\Drawings\11411901B.dwg, 8.5x11, 6/20/2018 2:12:29 PM, JAMES



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- TOP OF BANK (APPROXIMATE)
- NAPA COUNTY STREAM SETBACK
- 26' UNDISTURBED FILTER STRIP
- EXISTING ROAD
- EXISTING BUILDING
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED STANDARD DIVERSION DITCH (SEE DETAIL 4, SHEET 12)
- PROPOSED NON-STANDARD DIVERSION DITCH (SEE DETAIL 5, SHEET 12)
- PROPOSED INSLOPED AVENUE (SEE DETAIL 2, SHEET 12)
- PROPOSED STANDARD 18" DROP INLET (SEE DETAIL 1, SHEET 13)
- XX"/XX" PROPOSED STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 2, SHEET 13)
- XX"/XX" PROPOSED NON-STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 3, SHEET 13)
- PROPOSED SURFACE DRAINAGE LINE, 8" SW UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 13)
- PROPOSED CUTOFF COLLAR (SEE DETAIL 5, SHEET 13)
- PROPOSED PIPE SIZE AND/OR TYPE CHANGE
- PROPOSED ROLLING DIP (SEE DETAIL 6, SHEET 13)
- PROPOSED STRAW WATTLE (SEE DETAIL 3, SHEET 12)
- PROPOSED VINEROW DIRECTION
- X PHOTO POINT NUMBER & LOCATION (SEE APPENDIX E)
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% AVERAGE SURFACE SLOPE
- SW SINGLE WALL CORRUGATED POLYETHYLENE PIPE
- DW DUAL WALL CORRUGATED POLYETHYLENE PIPE

SOILS LEGEND

- ANAMOSA–MAPPED SOIL PIT: BRESSA SILT LOAM
- ANAMOSA–MAPPED SOIL PIT: COLE – ALLUVIAL SILT LOAM
- ANAMOSA–MAPPED SOIL PIT: PLEASANTON LOAM
- 171 / 114 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 BRESSA–DIBBLE COMPLEX, 30–50% SLOPE
- 171 PLEASANTON LOAM, 2–5% SLOPE

REGISTERED PROFESSIONAL ENGINEER
JAMES R. BUENO
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6–20–18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

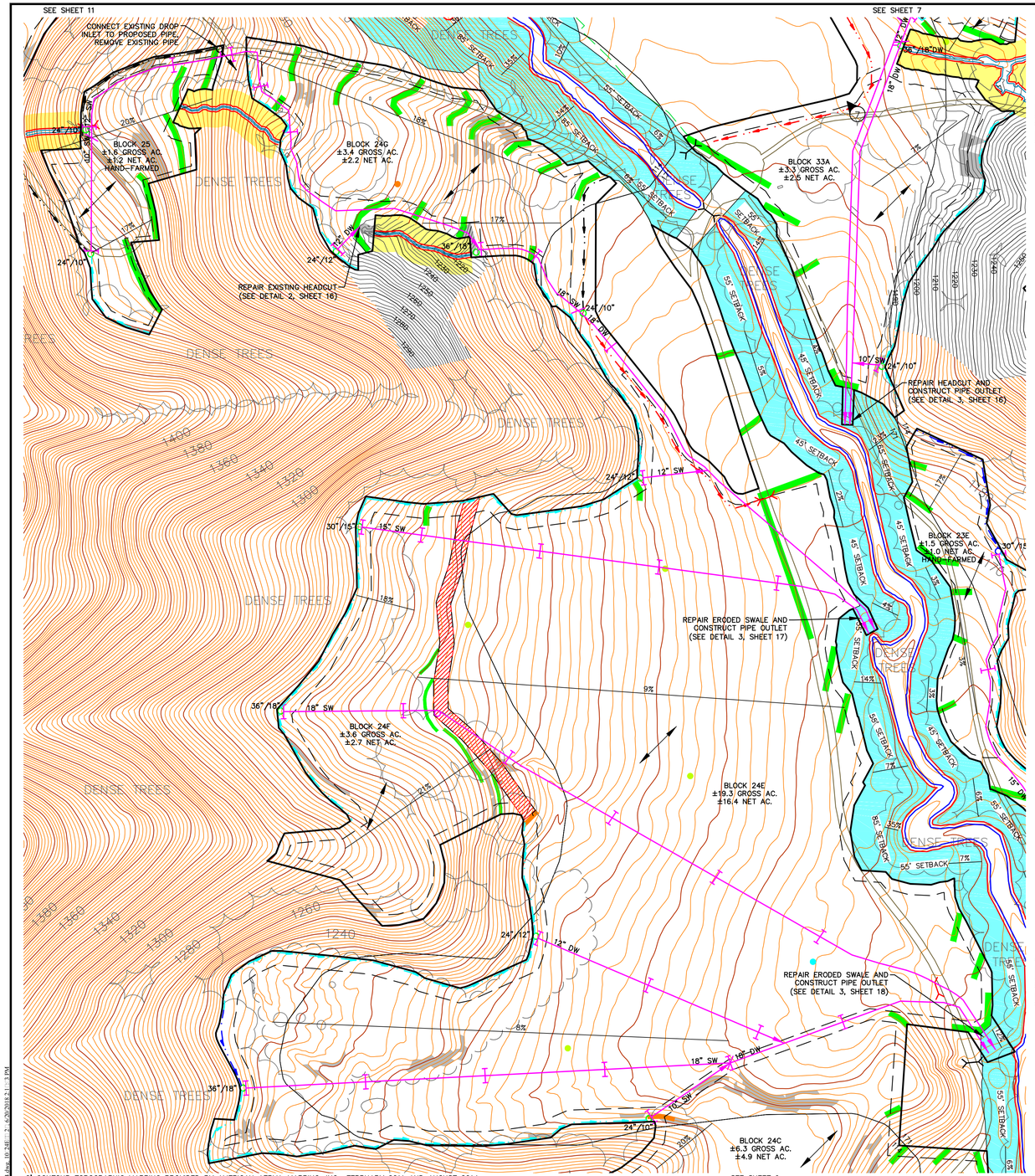
EROSION CONTROL PLAN

BLOCKS 24A–24D

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6–20–18	9 OF: 19

R:\Projects\11411901 Tasks\11411901 Plan Sheets\11411901B Sheet 9.dwg 6/20/2018 2:41:41 PM



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- POSSIBLE WATERS OF U.S. (APPROXIMATE) MAPPED BY HIRKALA
- TOP OF BANK (APPROXIMATE)
- NAPA COUNTY STREAM SETBACK
- 26' UNDISTURBED FILTER STRIP
- EXISTING ROAD
- EXISTING VINEYARD, NOT A PART OF THIS PLAN
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED STANDARD DIVERSION DITCH (SEE DETAIL 4, SHEET 12)
- PROPOSED NON-STANDARD DIVERSION DITCH (SEE DETAIL 5, SHEET 12)
- PROPOSED INSLOPED AVENUE (SEE DETAIL 2, SHEET 12)
- PROPOSED STANDARD 18" DROP INLET (SEE DETAIL 1, SHEET 13)
- XX"/XX" PROPOSED STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 2, SHEET 13)
- XX"/XX" PROPOSED NON-STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 3, SHEET 13)
- PROPOSED SURFACE DRAINAGE LINE, 8" SW UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 13)
- PROPOSED CUTOFF COLLAR (SEE DETAIL 5, SHEET 13)
- PROPOSED PIPE SIZE AND/OR TYPE CHANGE
- PROPOSED ROLLING DIP (SEE DETAIL 6, SHEET 13)
- PROPOSED STRAW WATTLE (SEE DETAIL 3, SHEET 12)
- PROPOSED VINEROW DIRECTION
- X PHOTO POINT NUMBER & LOCATION (SEE APPENDIX E)
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% AVERAGE SURFACE SLOPE
- SW SINGLE WALL CORRUGATED POLYETHYLENE PIPE
- DW DUAL WALL CORRUGATED POLYETHYLENE PIPE

SOILS LEGEND

- ANAMOSA-MAPPED SOIL PIT: BRESSA SILT LOAM
- ANAMOSA-MAPPED SOIL PIT: COLE - ALLUVIAL SILT LOAM
- ANAMOSA-MAPPED SOIL PIT: PLEASANTON LOAM
- 114/171 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 BRESSA-DIBBLE COMPLEX, 30-50% SLOPE
- 171 PLEASANTON LOAM, 2-5% SLOPE

REGISTERED PROFESSIONAL ENGINEER
JAMES P. MURRAY
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6-20-18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

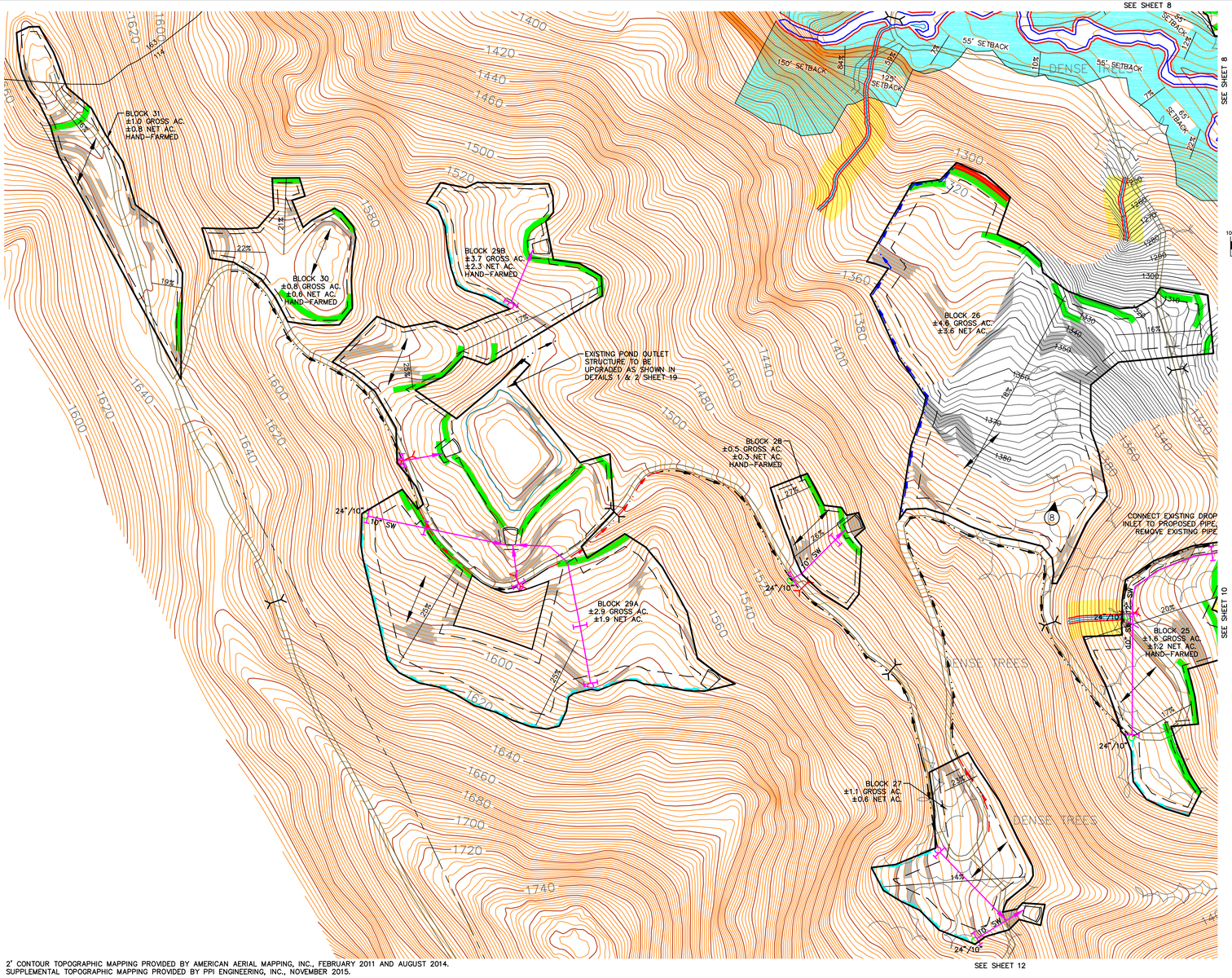
EROSION CONTROL PLAN

BLOCKS 24E-24G & 25

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6-20-18	10 OF: 19

R:\KSINVEST\11411901\Drawings\Erosion Control Plan\11411901B_ECP_24E-24G_25.dwg, 6/20/2018 2:34:46 PM, Jim Murray



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- APPROXIMATE PROPERTY LINE LOCATION
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- EXISTING RESERVOIR OR POND
- POSSIBLE WATERS OF U.S. (APPROXIMATE) MAPPED BY HIRKALA
- TOP OF BANK (APPROXIMATE)
- NAPA COUNTY STREAM SETBACK
- 26' UNDISTURBED FILTER STRIP
- EXISTING ROAD
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED STANDARD DIVERSION DITCH (SEE DETAIL 4, SHEET 12)
- PROPOSED NON-STANDARD DIVERSION DITCH (SEE DETAIL 5, SHEET 12)
- PROPOSED STANDARD 18" DROP INLET (SEE DETAIL 1, SHEET 13)
- XX"/XX" PROPOSED STANDARD DROP INLET WITH RISER/CONNECTOR PIPE SIZES (SEE DETAIL 2, SHEET 13)
- PROPOSED SURFACE DRAINAGE LINE, 8" SW UNLESS OTHERWISE NOTED (SEE DETAIL 4, SHEET 13)
- PROPOSED CUTOFF COLLAR (SEE DETAIL 5, SHEET 13)
- PROPOSED PIPE SIZE AND/OR TYPE CHANGE
- PROPOSED ROCK LEVEL SPREADER (SEE DETAIL 6, SHEET 14)
- PROPOSED ROCK APRON (SEE DETAIL 4, SHEET 14)
- PROPOSED STRAW WATTLE (SEE DETAIL 3, SHEET 12)
- PROPOSED VINEROW DIRECTION
- X PHOTO POINT NUMBER & LOCATION (SEE APPENDIX E)
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% AVERAGE SURFACE SLOPE
- SW SINGLE WALL CORRUGATED POLYETHYLENE PIPE

SOILS LEGEND

163/114 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

114 BRESSA-DIBBLE COMPLEX, 30-50% SLOPE

163 MAYMEN-MILLSHOLM-LODO ASSOCIATION, 30-75% SLOPE

REGISTERED PROFESSIONAL ENGINEER
JAMES R. IRWIN
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6-20-18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

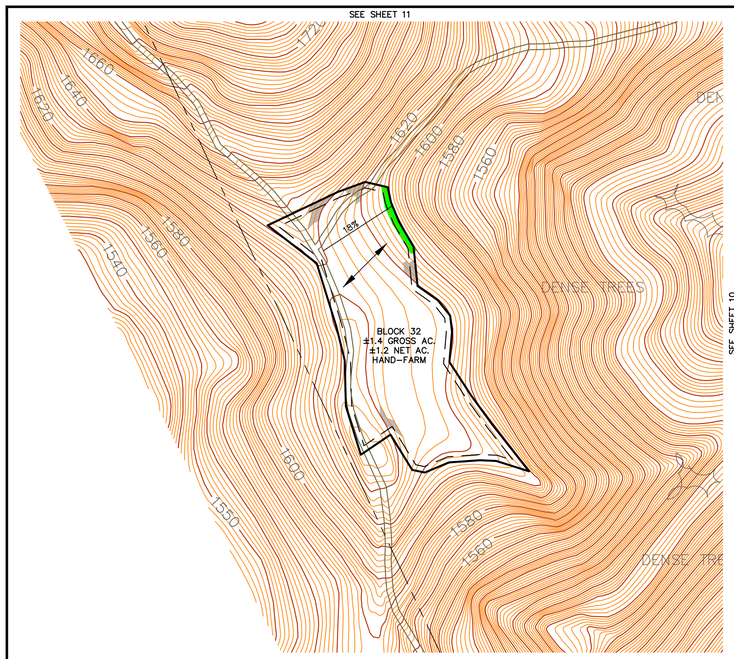
EROSION CONTROL PLAN

BLOCKS 26-31

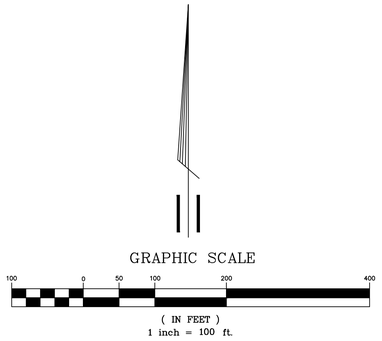
DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6-20-18	11 OF: 19

R:\KSINVEST\11411901\Drawings\11411901B.dwg, 6/20/2018 11:26:07 AM, Plotted by: Ryan Lewis

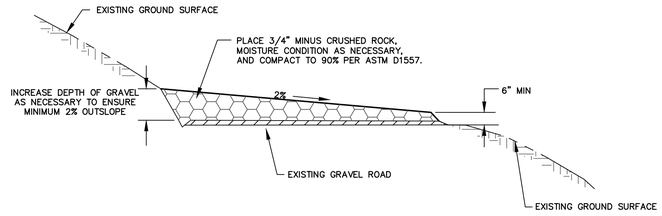


2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.

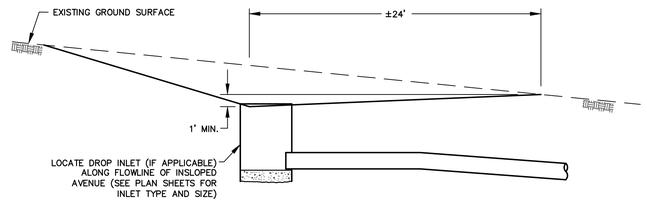


LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- APPROXIMATE PROPERTY LINE LOCATION
- EXISTING ROAD
- PROPOSED VINEYARD CLEARING LIMITS
- PROPOSED VINEYARD BLOCK BOUNDARY
- PROPOSED STRAW WATTLE (SEE DETAIL 3, THIS SHEET)
- PROPOSED VINEROW DIRECTION
- AREA WHERE GROUND SLOPE IS 30 PERCENT OR GREATER
- X% — AVERAGE SURFACE SLOPE



1/12 TYPICAL OUTSLOPED ROAD
N.T.S.



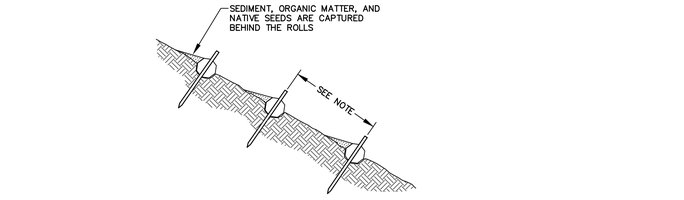
2/12 INSLOPED AVENUE
N.T.S.

SOILS LEGEND

USDA SOIL CLASSIFICATIONS:

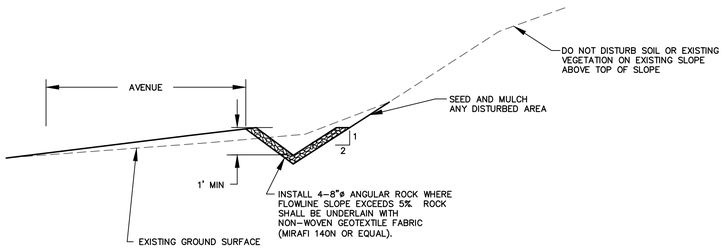
ALL SOILS ON THIS SHEET MAPPED AS:

114 BRESSA-DIBBLE COMPLEX, 30-50% SLOPE

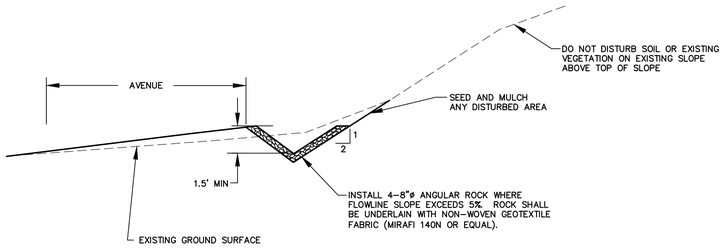


NOTE: VERTICAL SPACING FOR SLOPE INSTALLATION SHALL BE DETERMINED BY SITE CONDITIONS. WATTLE SPACING AND LOCATIONS SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.

3/12 STRAW WATTLE INSTALLATION
N.T.S.



4/12 STANDARD DIVERSION DITCH
N.T.S.



5/12 NON-STANDARD DIVERSION DITCH
N.T.S.

DETAILS ON THIS SHEET:
TYPICAL OUTSLOPED ROAD
INSLOPED AVENUE
STRAW WATTLE INSTALLATION
STANDARD DIVERSION DITCH
NON-STANDARD DIVERSION DITCH

REGISTERED PROFESSIONAL ENGINEER
JAMES R. BUSHEY
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6-20-18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

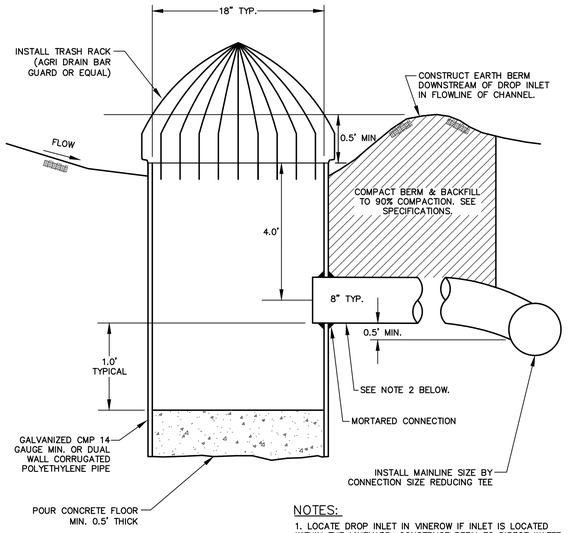
EROSION CONTROL PLAN

BLOCK 32 & DETAILS

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6-20-18	12 OF: 19

R:\DRAWINGS\11411901 Tocks\14CP Phase II\Documents\11411901B.dwg, 12/21/2017 1:8, 6/20/2018 2:20:10 PM

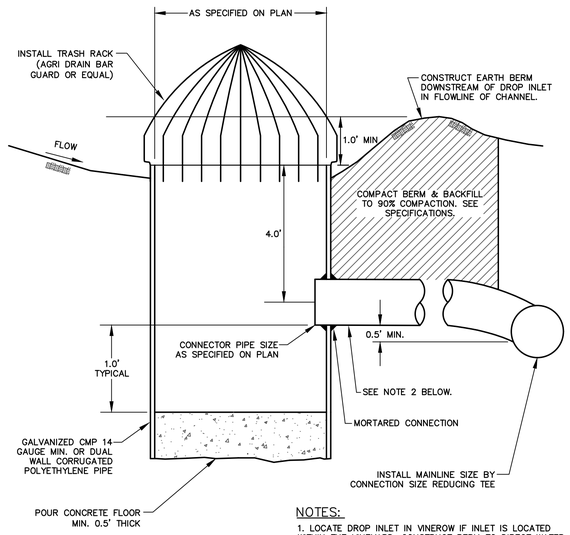


NOTES:

1. LOCATE DROP INLET IN VINEROW IF INLET IS LOCATED WITHIN THE VINEYARD. CONSTRUCT BERM TO DIRECT WATER TO DROP INLET.

2. NO ADDITIONAL CONNECTOR PIPE SHALL BE REQUIRED WHERE THE INLET IS LOCATED AT UPPER END OF ALL MAINLINES. MAINLINE SIZES AS SPECIFIED SHALL CONNECT DIRECTLY TO DROP INLET.

1/13 STANDARD 18" DROP INLET
N.T.S.

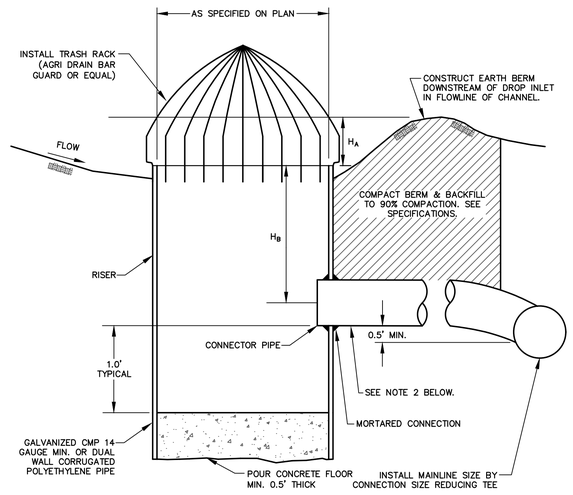


NOTES:

1. LOCATE DROP INLET IN VINEROW IF INLET IS LOCATED WITHIN THE VINEYARD. CONSTRUCT BERM TO DIRECT WATER TO DROP INLET.

2. NO ADDITIONAL CONNECTOR PIPE SHALL BE REQUIRED WHERE THE INLET IS LOCATED AT UPPER END OF ALL MAINLINES. MAINLINE SIZES AS SPECIFIED SHALL CONNECT DIRECTLY TO DROP INLET.

2/13 STANDARD DROP INLET
N.T.S.



Block	Riser Diameter (in.)	Connector Pipe Diameter (in.)	H_A (ft.)	H_B (ft.)
23B	48	24 (DW[1])	1.5	5.5
23E	30	15 (DW)	1	4.5
24C	30	15	1.5	5.7
33B	24	12 (DW)	1.5	5.5
33C	36	18 (DW)	1	4.5

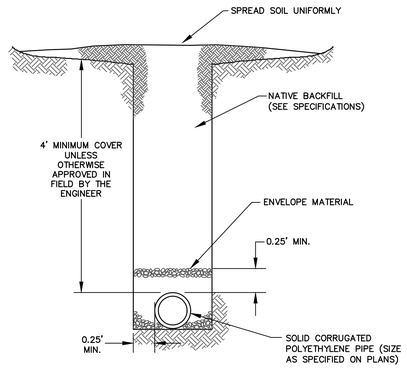
[1] = Dual Wall Corrugated Polyethylene Pipe

NOTES:

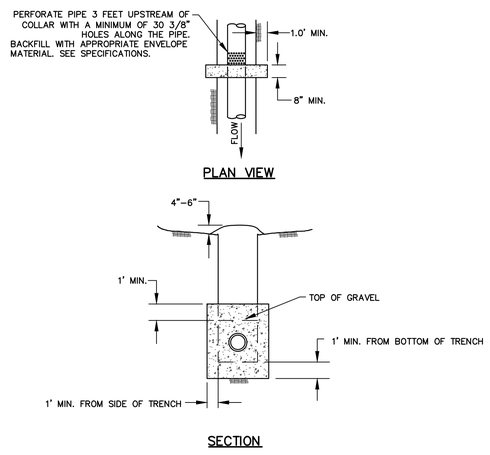
1. LOCATE DROP INLET IN VINEROW IF INLET IS LOCATED WITHIN THE VINEYARD. CONSTRUCT BERM TO DIRECT WATER TO DROP INLET.

2. NO ADDITIONAL CONNECTOR PIPE SHALL BE REQUIRED WHERE THE INLET IS LOCATED AT UPPER END OF ALL MAINLINES. MAINLINE SIZES AS SPECIFIED SHALL CONNECT DIRECTLY TO DROP INLET.

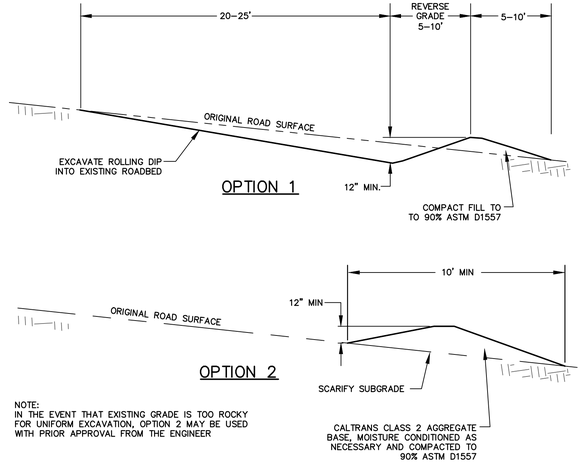
3/13 NON-STANDARD DROP INLET & SIZING TABLE
N.T.S.



4/13 SURFACE DRAINAGE PIPELINE
N.T.S.

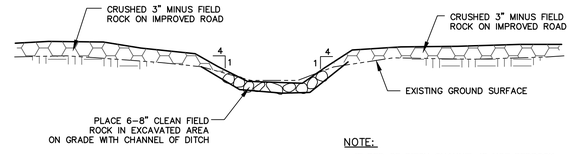


5/13 CUTOFF COLLAR
N.T.S.



NOTE:
IN THE EVENT THAT EXISTING GRADE IS TOO ROCKY FOR UNIFORM EXCAVATION, OPTION 2 MAY BE USED WITH PRIOR APPROVAL FROM THE ENGINEER

6/13 TYPICAL ROLLING DIP
N.T.S.



NOTE:
IF BED OF DITCH CHANNEL IS NOT BEDROCK PLACE FILTER FABRIC (MIRAFI 1100N OR EQUAL) UNDER ROCK.

7/13 TYPICAL ROCKED WATER CROSSING
N.T.S.

DETAILS ON THIS SHEET:
STANDARD 18" DROP INLET
STANDARD DROP INLET
NON-STANDARD DROP INLET & SIZING TABLE
SURFACE DRAINAGE PIPELINE
CUTOFF COLLAR
TYPICAL ROLLING DIP
TYPICAL ROCKED WATER CROSSING

REGISTERED PROFESSIONAL ENGINEER
JAMES R. BUSHEY
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6-20-18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

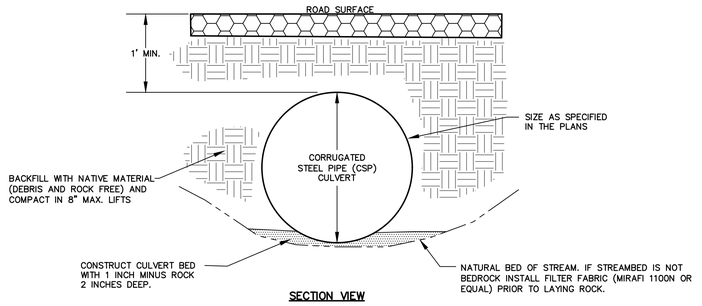
EROSION CONTROL PLAN

DETAILS

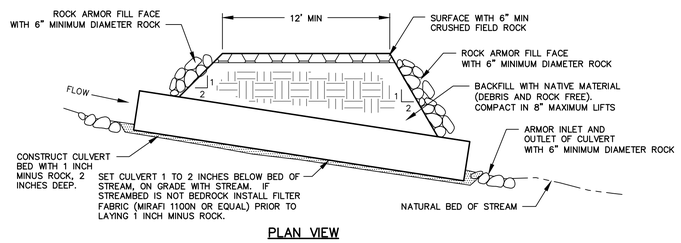
DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6-20-18	13 OF: 19

R:\JOBS\R5\11411901 Trp\S1 CVP Phase II\Drawings\11411901B.dwg, 13 DET, 11 X, 6/20/2018 2:21:3 PM

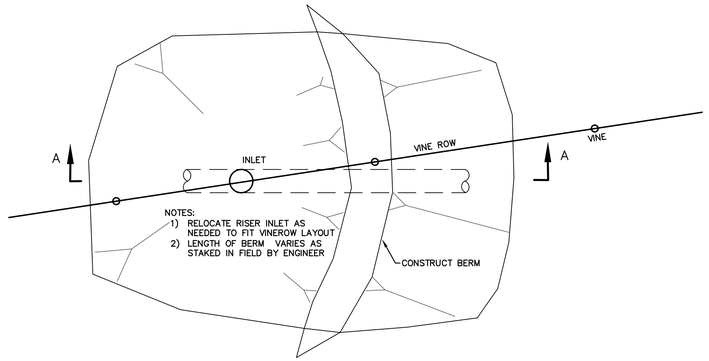


SECTION VIEW

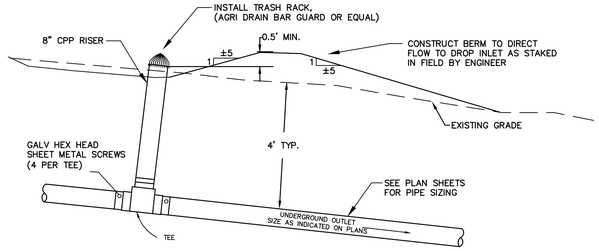


PLAN VIEW

1/14 TYPICAL CULVERT INSTALLATION
N.T.S.

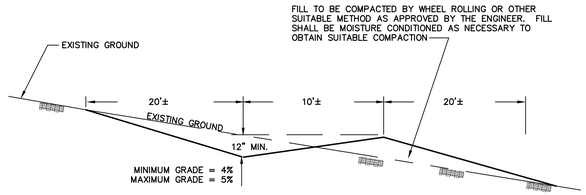


PLAN VIEW

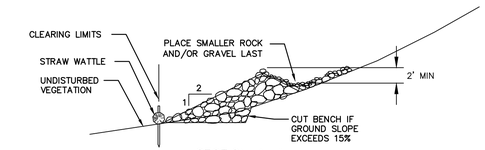


SECTION A–A

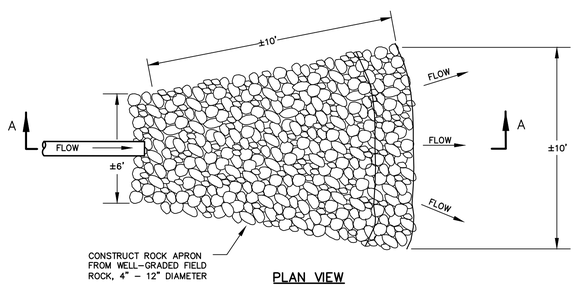
2/14 INFIELD DROP INLET
N.T.S.



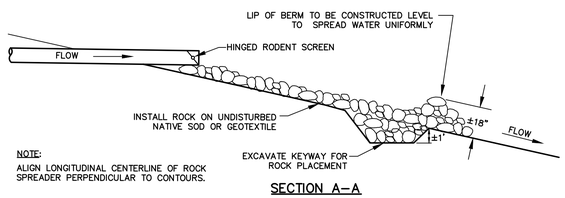
3/14 INFIELD DITCH TYPICAL X–SECTION
N.T.S.



SECTION A–A



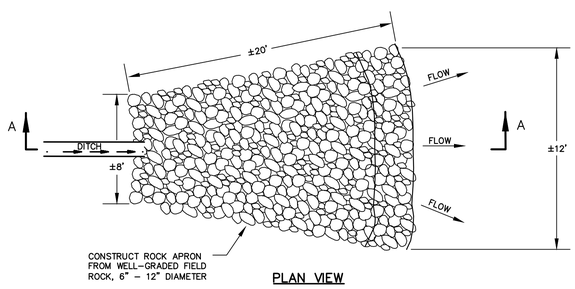
PLAN VIEW



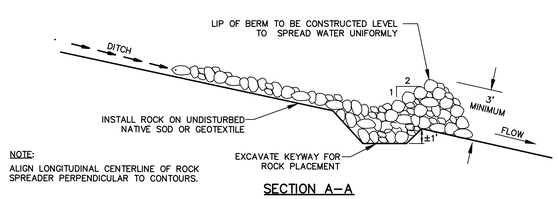
NOTE:
ALIGN LONGITUDINAL CENTERLINE OF ROCK SPREADER PERPENDICULAR TO CONTOURS.

SECTION A–A

4/14 ROCK APRON
N.T.S.



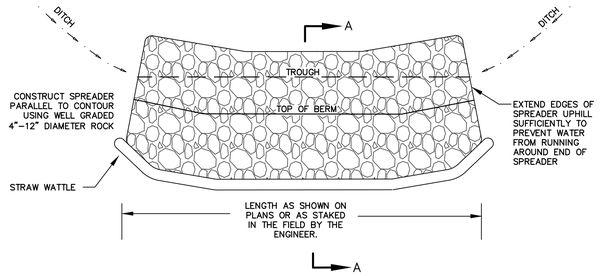
PLAN VIEW



NOTE:
ALIGN LONGITUDINAL CENTERLINE OF ROCK SPREADER PERPENDICULAR TO CONTOURS.

SECTION A–A

5/14 ROCK ENERGY DISSIPATER
N.T.S.



PLAN VIEW

6/14 ROCK LEVEL SPREADER
N.T.S.

S:\SORRENTO\11411901\Drawings\11411901B.dwg, May 14, 2018 - 8:30:24 AM

REGISTERED PROFESSIONAL ENGINEER
JAMES R. BUENO
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

DETAILS ON THIS SHEET:
TYPICAL CULVERT INSTALLATION
INFIELD DROP INLET
INFIELD DITCH TYPICAL X–SECTION
ROCK APRON
ROCK ENERGY DISSIPATER
ROCK LEVEL SPREADER

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6–20–18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253–1806 FAX 707/253–1604

JOB NO: 11411911
DWG. NO: 11411901B

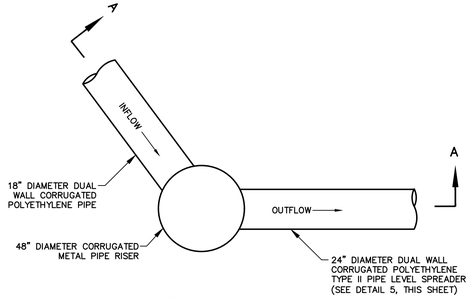
KJS INVESTMENT PROPERTIES & SORRENTO INC.

EROSION CONTROL PLAN

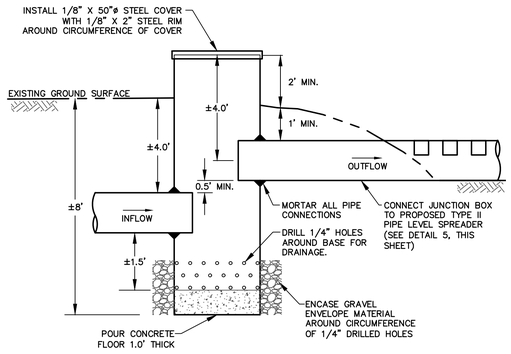
DETAILS

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6–20–18	14 OF: 19



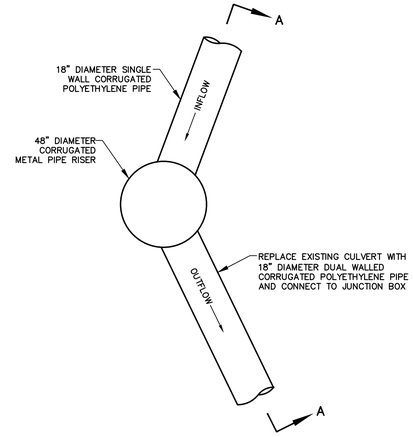
PLAN VIEW



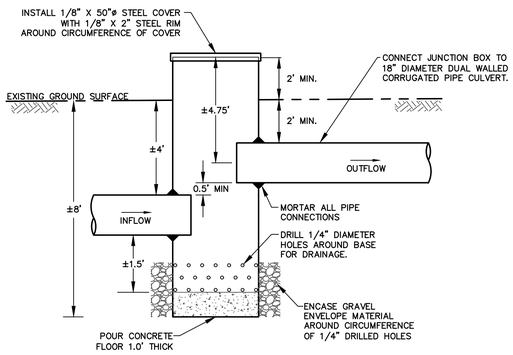
SECTION A–A

1/15 JUNCTION BOX – BLOCK 8 WEST

N.T.S.



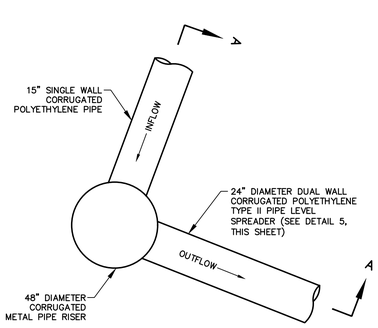
PLAN VIEW



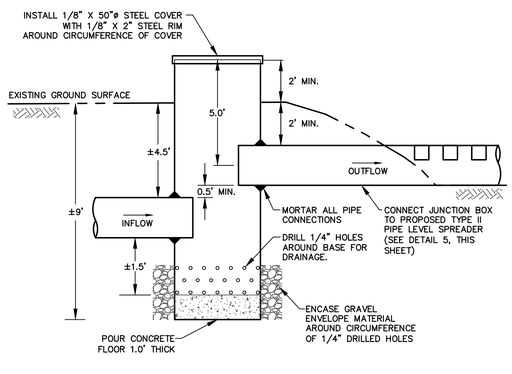
SECTION A–A

2/15 JUNCTION BOX – BLOCK 8 EAST

N.T.S.



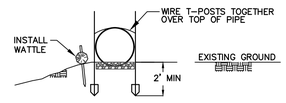
PLAN VIEW



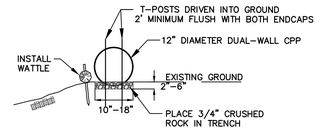
SECTION A–A

3/15 JUNCTION BOX – BLOCK 33E

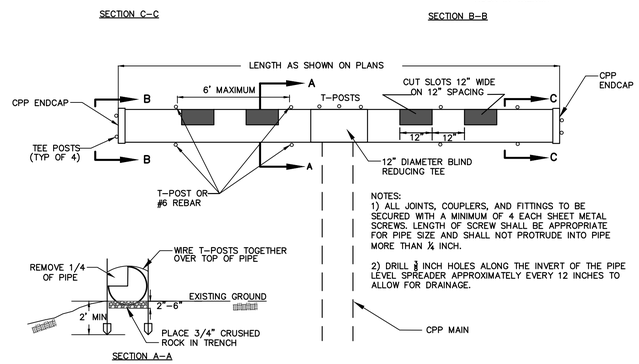
N.T.S.



SECTION C–C



SECTION B–B

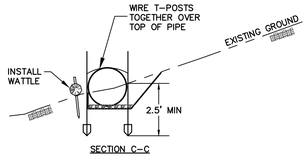


SECTION A–A

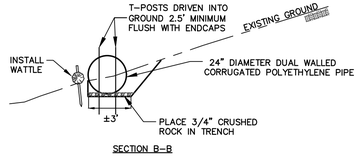
PLAN VIEW

4/15 PIPE LEVEL SPREADER TYPE I

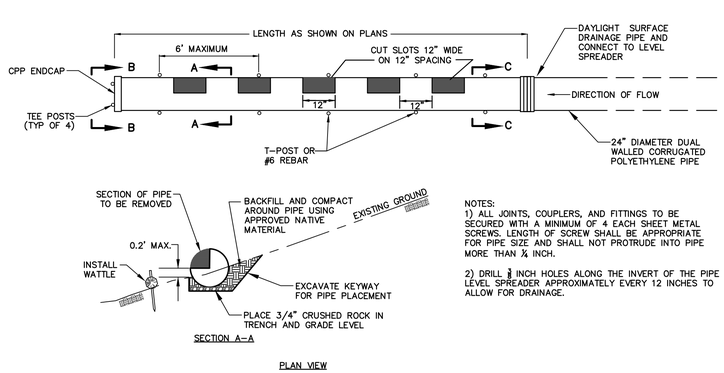
N.T.S.



SECTION C–C



SECTION B–B



SECTION A–A

PLAN VIEW

5/15 PIPE LEVEL SPREADER TYPE II

N.T.S.

DETAILS ON THIS SHEET:
JUNCTION BOX – BLOCK 8 WEST
JUNCTION BOX – BLOCK 8 EAST
JUNCTION BOX – BLOCK 33E
PIPE LEVEL SPREADER TYPE I
PIPE LEVEL SPREADER TYPE II

REGISTERED PROFESSIONAL ENGINEER
JAMES R. MAY
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6–20–18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

EROSION CONTROL PLAN

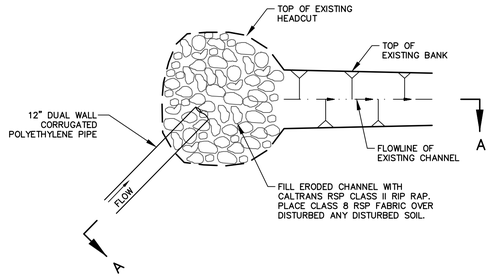
DETAILS

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

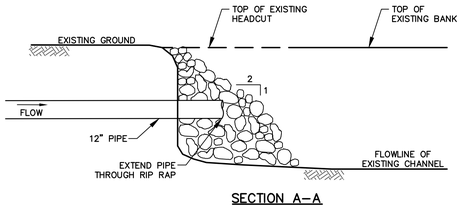
SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6–20–18	15 OF: 19

R:\SVARES\11411901 Tech\14CP Phase II\Documents\11411901B.dwg, 1:1011 1, 6/20/2018 2:30:... PM

1/16 OUTSLOPED BENCH
N.T.S.

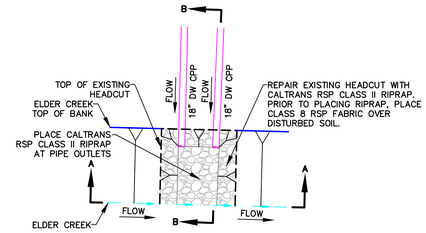


PLAN VIEW

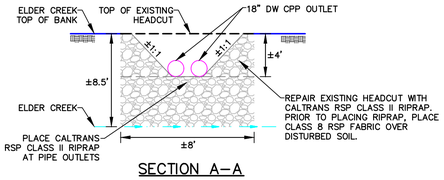


SECTION A–A

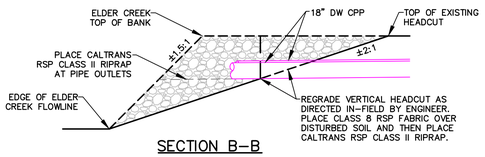
2/16 HEADCUT REPAIR
N.T.S.



PLAN VIEW



SECTION A–A



SECTION B–B

3/16 BLOCK 33A PIPE OUTLETS & HEADCUT REPAIR
N.T.S.

DETAILS ON THIS SHEET:
OUTSLOPED BENCH
HEADCUT REPAIR
BLOCK 33A PIPE OUTLETS & HEADCUT REPAIR

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6–20–18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

KJS INVESTMENT PROPERTIES & SORRENTO INC.

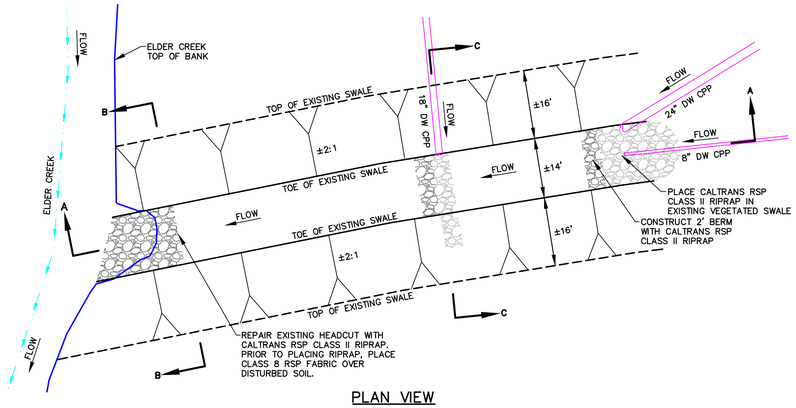
EROSION CONTROL PLAN

DETAILS

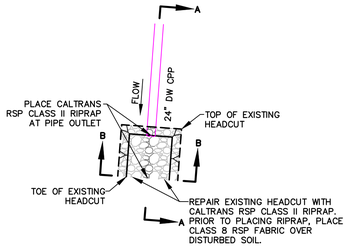
DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6–20–18	16 OF: 19

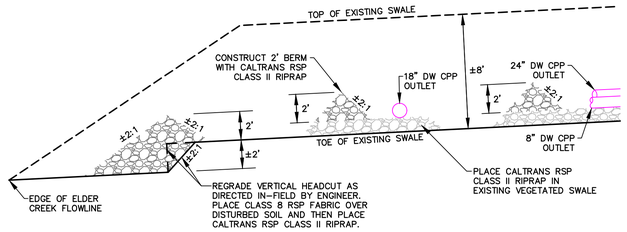
R:\SHARED\11411901 Tracks\14CP Phase II\Planning\11411901B.dwg 16:10:11 6/20/2018 2:32:4 PM



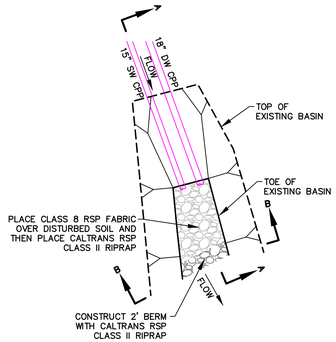
PLAN VIEW



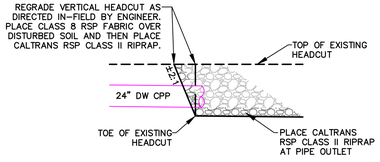
PLAN VIEW



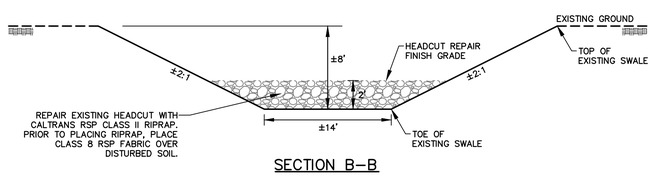
SECTION A–A



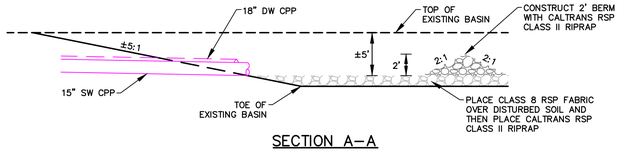
PLAN VIEW



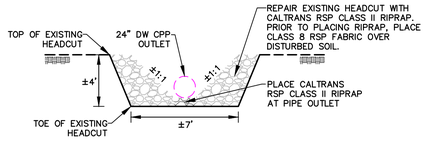
SECTION A–A



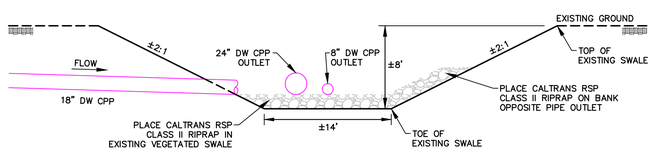
SECTION B–B



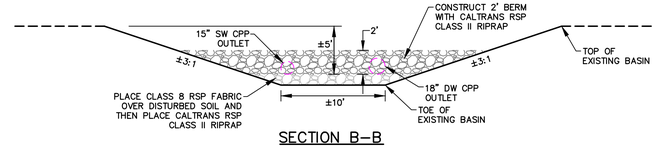
SECTION A–A



SECTION B–B



SECTION C–C



SECTION B–B

1/17 BLOCK 23A PIPE OUTLET & HEADCUT REPAIR
N.T.S.

2/17 BLOCK 23B PIPE OUTLETS & HEADCUT REPAIR
N.T.S.

3/17 BLOCK 24E NORTH PIPE OUTLETS
N.T.S.

R:\KJS\11411901\Dwg\11411901B.dwg, 1, DETAILS, 6/20/2018 2:14:13 PM, PDF

REGISTERED PROFESSIONAL ENGINEER
JAMES R. LAUFFER
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

DETAILS ON THIS SHEET:
BLOCK 23A PIPE OUTLET / HEADCUT REPAIR
BLOCK 23B PIPE OUTLETS / HEADCUT REPAIR
BLOCK 24E NORTH PIPE OUTLETS

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6-20-18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

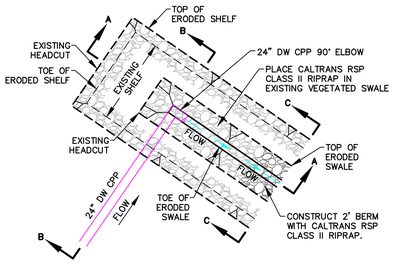
KJS INVESTMENT PROPERTIES & SORRENTO INC.

EROSION CONTROL PLAN

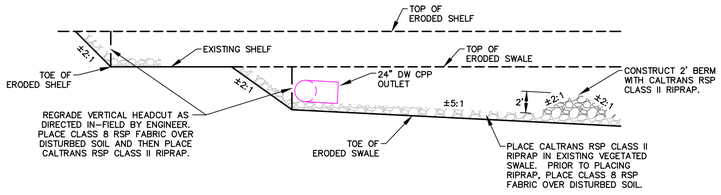
DETAILS

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

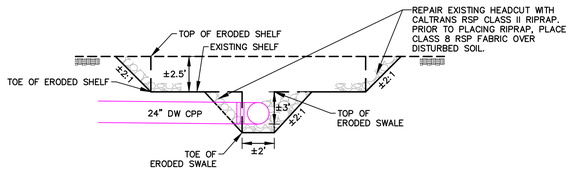
SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6-20-18	17 OF 19



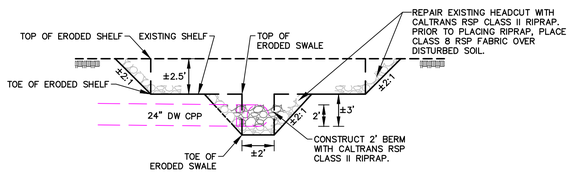
PLAN VIEW



SECTION A–A



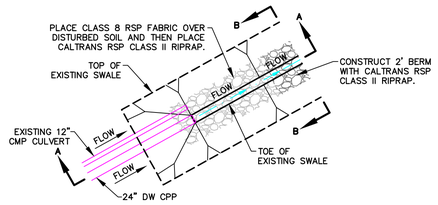
SECTION B–B



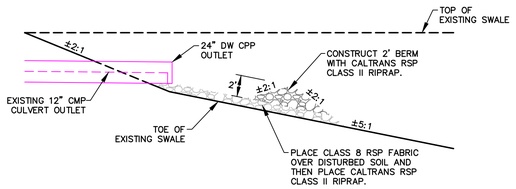
SECTION C–C

1/18 BLOCK 24A SOUTH PIPE OUTLET & HEADCUT REPAIR

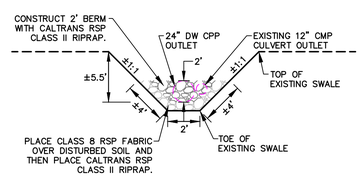
N.T.S.



PLAN VIEW



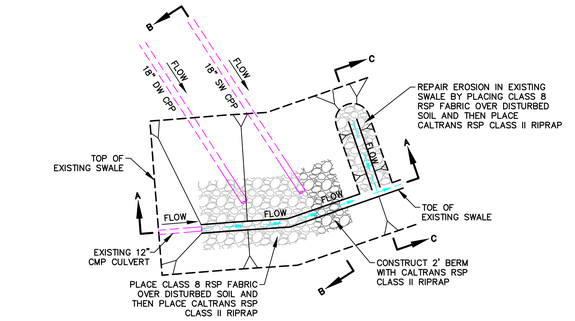
SECTION A–A



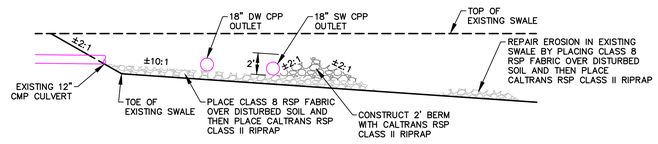
SECTION B–B

2/18 BLOCK 24A NORTH PIPE OUTLET

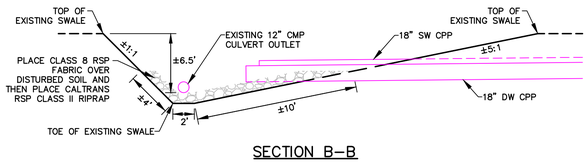
N.T.S.



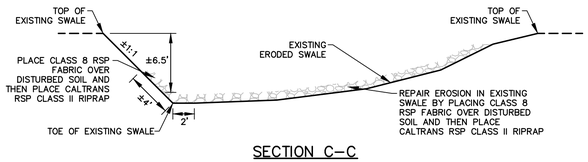
PLAN VIEW



SECTION A–A



SECTION B–B



SECTION C–C

3/18 BLOCK 24E SOUTH PIPE OUTLETS & EROSION REPAIR

N.T.S.

R:\SOMERS\11411901 Tract 1 ECV Phase II\Drawings\11411901B.dwg 18 TOT 1 8.5 6/20/2018 2:3 3 PM

REGISTERED PROFESSIONAL ENGINEER
JAMES R. BUENO
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

DETAILS ON THIS SHEET:
BLOCK 24A SOUTH PIPE OUTLET / HEADCUT REPAIR
BLOCK 24A NORTH PIPE OUTLET
BLOCK 24E SOUTH PIPE OUTLETS & EROSION REPAIR

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6-20-18

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

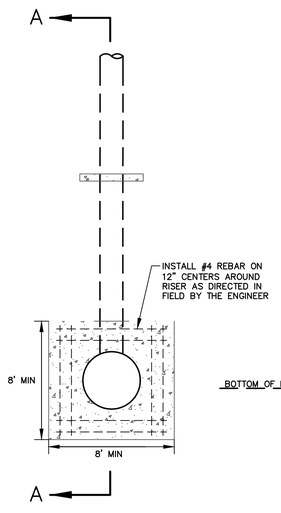
KJS INVESTMENT PROPERTIES & SORRENTO INC.

EROSION CONTROL PLAN

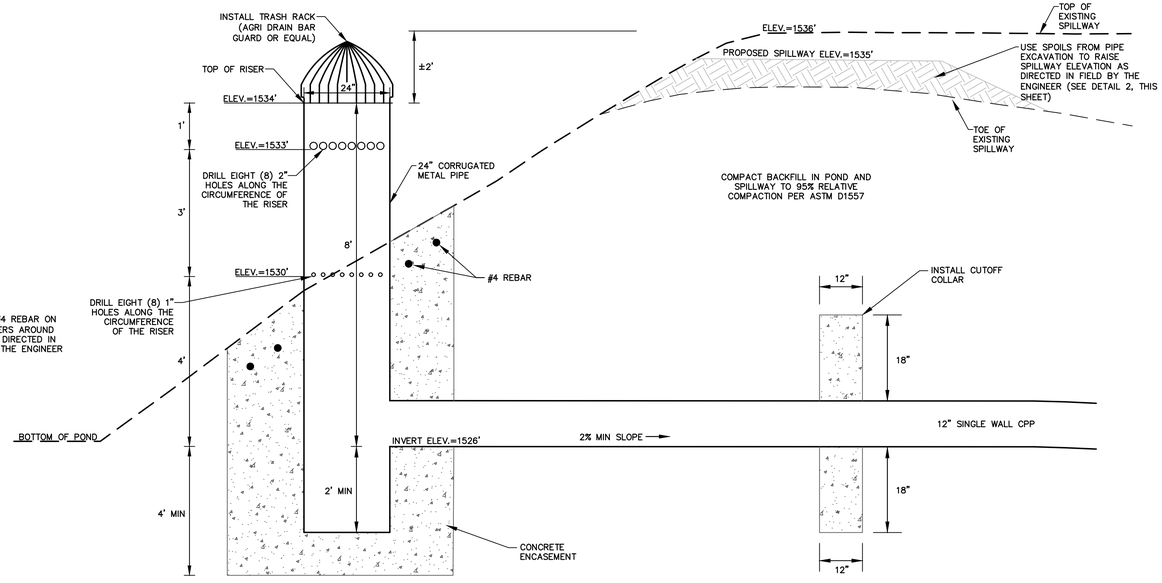
DETAILS

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6-20-18	18 OF: 19

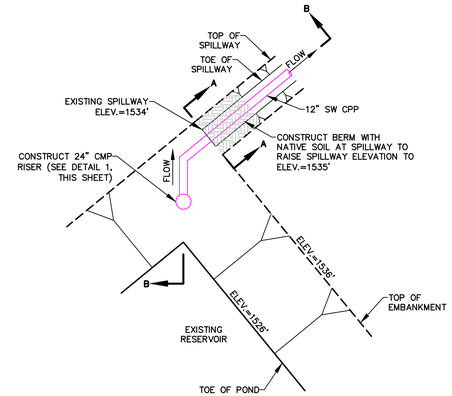


PLAN VIEW

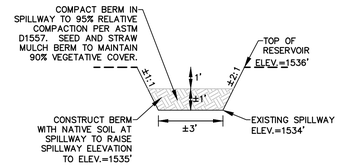


SECTION A–A

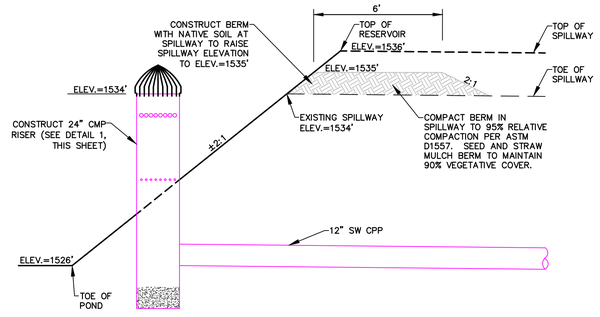
1/19 POND OVERFLOW STRUCTURE
N.T.S.



PLAN VIEW



SECTION A–A



SECTION B–B

2/19 SPILLWAY BERM
N.T.S.

REGISTERED PROFESSIONAL ENGINEER
JAMES R. WARD
No. 49931
EXPIRES: 9-30-18
Civil
STATE OF CALIFORNIA

DETAILS ON THIS SHEET:
POND OVERFLOW STRUCTURE
SPILLWAY BERM

REV. NO.	DESCRIPTION	BY	DATE
1	THIS DRAWING SUPERSEDES DRAWING 11411901A. INCORPORATED CHANGES RESULTING FROM COUNTY COMMENTS AND HYDROLOGIC MODELING.	JCJ	6–20–18

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

JOB NO: 11411911
DWG. NO: 11411901B

© 2018 PPI ENGINEERING, INC.

KJS INVESTMENT PROPERTIES & SORRENTO INC.

EROSION CONTROL PLAN

DETAILS

DESIGN ENGINEER: J BUSHEY, M BUENO, C CORSETTI

SCALE:	DRAWN BY:	DATE:	SHEET:
AS SHOWN	CC, RAL	6–20–18	19 OF: 19

R:\SOURCE\11411901 Tech\14CP Phase II\Drawings\11411901B.dwg 10/17/18 8:43:47 PM

RECEIVED

DEC 14 2017

Napa County Planning, Building & Environmental Services

Napa County
CONSERVATION, DEVELOPMENT & PLANNING COMMISSION

1195 Third Street, Room 210, Napa, California 94559
(707) 253-4416

BASIC APPLICATION FOR EROSION CONTROL PLAN REVIEW

FOR OFFICE USE ONLY **SUBMITTAL DATE:** _____

FILE #: _____ **APN #:** _____ **USGS QUAD:** _____

[ ] **STRUCTURAL** [ ] **AGRICULTURAL** **TOWNSHIP/RANGE:** _____

REQUEST: _____

PROJECT TYPE: Agriculture: New ____ Vineyard Replant (Process I: ____ II: ___) Other: _____

Non-Agriculture: Structure ___ Driveway ____ Road ____ Reservoir ____ Other _____

PERCENT SLOPE: Cropland: _____ Structure: _____ Pad: _____ Driveway: _____ Road: _____

OTHER PERMITS: Grading Permit ___ Use Permit: ___ Variance: ___ Septic System Permit: ___ Groundwater Permit: ___

REVIEW AGENCIES: CDPD: X County Consultant: ____ **OR** RCD: ____

FINAL APPROVAL: CDPD: X Date: _____

TO BE COMPLETED BY APPLICANT
(Please type or print legibly)

Applicant's Name: Sorrento Inc & KJS Investment Properties LLC, Attn: Craig Becker

Telephone #: (707) 967-8414 **Fax #:** (___) _____ **E-Mail:** _____

Mailing Address: 3450 Sage Canyon Road St. Helena CA 94574
No Street City State Zip

Status of Applicant's Interest in Property: Owner

Property Owner's Name: Sorrento Inc & KJS Investment Properties LLC

Telephone #: (707) 967-8414 **Fax #:** (___) _____ **E-Mail:** _____

Mailing Address: 3450 Sage Canyon Road St. Helena CA 94574
No Street City State Zip

Site Address/Location: 3370 Sage Canyon Road St. Helena
No Street City

Assessor's Parcel #: 025-270-022 & -025 **Existing Parcel Size:** 972.82 acres **Development Area Size:** 155.8 acres

Slope Range: 3 % to 28 % **Total Acreage ≥ 30%:** 7.2 acres **Estimated Total Amount of Cut & Fill:** 5,000 cubic yards

Land or Aerial Survey Prepared By American Aerial Mapping Inc. & PPI Engineering ***Date:*** 2011, 2014

(**NOTE**: Contour map/survey is required for all development areas with an estimated slope of 15% or greater and for all road/driveway projects, Contour map must include all areas within 100'of the cut and fill edges. Percent slope shall be calculated and presented as whole numbers.)

Source(s) of Water: Surface water

Related Permits Filed: ☐ **Water Rights** ☐ **Groundwater** ☐ **Well** ☐ **Sewage Disposal** ☐ **Use Permit/Variance?** ☐ **Timber Harvest** ☐ **Stream Alteration** ☐ **Others:** _____

I hereby certify that all the information contained in this application, including but not limited to, this application form, the supplemental information sheets, site plan, plot plan, cross sections/elevations, is complete and accurate to the best of my knowledge. I hereby authorize such investigations including access to County Assessor's Records as are deemed necessary by the County Planning Division for evaluation of this application and preparation of reports related thereto, including the right of access to the property involved.

CRAIG BECKER 12.13.2017 _____ 12-12-17
Signature of Applicant *Date* *Signature of Property Owner* *Date*

TO BE COMPLETED BY CONSERVATION, DEVELOPMENT AND PLANNING DEPARTMENT

$ _____ _____ _____
Estimated Fee *Receipt Number:* *Received By* *Date*

EROSION CONTROL PLAN SUPPLEMENTAL INFORMATION

Project/Construction Phasing Information

1. Project Description: To plant approximately 92.9 acres of vineyard. APN: 025-270-022 & -025

Parcel size: 972.82 acres Total land area disturbed: 155.8 acres
Agriculture: NEW plant acres: 92.9 Replant acres: 0
Structures: ☐ residence ☐ building ☐ driveway ☐ road ☐ other

2. Project Phases: ☐ one ☐ two or ☒ multiple
3. *Anticipated date to start construction (month/year):* April 1, 2018
4. Estimated date of completion of each phase: Phase 1: Sept 1; Phase 2: Sept 1; Phase __: Sept 1
5. Total construction time estimated: 5 months
6. Work scheduled between Oct. 1 and Apr. 1? ☐Yes ☐No **OR**
   between Sept. 1 and Apr. 1? ☐Yes ☒No (municipal watershed)
7. Winterization measures in the Erosion Control Plan See Narrative
8. Is a grading permit, a well permit, or a sewage disposal permit required? ☐Yes ☒No
   If yes has the Napa Co ☐ *Public Works and/or* ☐ *Environmental Management Departs. been notified?* ☐Yes ☐No

Slope Information

9. *Earth moving, grading or land clearing on slope(s) of:* 3 % to 28 %
10. Total acreage with slopes greater than or equal to 30%: 7.2 acres
11. Contour mapping source: American Aerial Mapping Inc. & PPI Engineering, Inc.

Water Deficient Area, Watershed Area, & Water Rights Diversion Permits

12. Water-deficient area: ☐Yes *(applicant must contact Co Env Mgmt Dept)* ☒No
13. Sub-Watershed Name: Elder Valley Creek Watershed

    Municipal Reservoir Watershed: ☒Yes ☐No

    If yes: ☐ Bell Canyon ☐ Kimball ☐ Milliken ☒ Lake Hennessey ☐ Rector

14. Have any other erosion control plans effecting this parcel been approved since 1991? ☒Yes ☐No
15. Coverage information (required for projects in <u>any</u> watershed):
    (a) Existing acres of tree canopy cover per parcel: 781 acres
    Proposed acres of canopy cover to be removed: 40 acres
    Percent of canopy cover to be retained per parcel: 95 %
    (b) Existing acres of shrub, brush, grass without tree canopy per parcel: 578 acres
    Proposed acres of shrub, brush, grass cover to be removed: 227 acres
    Percent of shrubs, brush, grass to be retained per parcel: 74 %
16. Is there a Water Rights permit associated with the project or parcel? ☒Yes ☐No
    a) Copy of permit from the State Dept of Water Resources attached? ☒Yes ☐No **OR**
    b) Date application for necessary permit submitted to this board:
    c) Copy of associated CEQA document attached? ☐Yes ☐No acre/feet

Streams, Watercourses, & Streambed Alteration Agreements

17. All streams and watercourses in vicinity of project area(s) shown and the required setback(s) indicated with the distance and slope? ☒ Yes ☐ No

18. Is there a State Dept of Fish & Game Streambed Alteration (1603) Permit associated with the project or parcel? ☐ Yes ☒ No

(a) Copy of State Dept of Fish & Game Permit attached? ☐ Yes **OR**

(b) Date application for necessary permit submitted to this agency: _____

(c) Copy of CEQA document prepared attached? ☐ Yes ☐ No

Environmental Setting

19. Is any portion of the project located on or within 500' of a landslide? ☐ Yes ☐ No

Cite source: Gilpin Geosciences

20. Is any portion of the project located in the vicinity of rare/endangered species, species of special concern (plant, animal), wetland (type), riparian habitat, critical habitat, etc.? ☐ Yes ☐ No

If yes, list: _____

Cite source/reference(s): _____

Specific study prepared: _____ by Vinnedge Environmental Consulting date: _____

21. Is any portion of the project located on or within 500' of an archeological or historic site? ☐ Yes ☐ No

Cite source: _____

Specific study prepared: _____ by Stevens Consulting date: _____

Grading Information

22. Are any new roads/driveways associated with the project? ☐ Yes ☒ No

23. Are any new vineyard avenues associated with the project? ☒ Yes ☐ No

24. Will the project involve any recontouring of the land? ☐ Yes ☒ No

25. Will there be any excavation or fill deeper than 12 inches? ☒ Yes ☐ No

26. Total cubic yards of cut & fill: 5,000

Cubic yards of cut: 5,000 fill: 5,000

Spoils location: on-site X off-site _____

27. Has a grading permit been filed with the Co Public Works Dept? ☐ Yes ☒ No

28. Will the project involve repair of a landslide? ☐ Yes ☒ No

Location _____ Size _____ Report _____

Timber Harvest/Timber Conversion Permits

29. Is there a Timber Harvest or Conversion permit associated with the project/parcel? ☐ Yes ☒ No

Number of Acres: _____

a) Copy of State Dept of Forestry Permit attached? ☐ Yes **OR**

b) Date application for necessary permit submitted to this agency: _____

c) Copy of associated CEQA document attached? ☐ Yes ☐ No

d) Date other County erosion control plan(s) submitted if different than the application date for this plan: _____

30. Is there a Timberland Conversion Exception associated with the project or parcel? ☐ Yes ☒ No

RECEIVED

DEC 14 2017

Napa County Planning, Building
& Environmental Services

INDEMNIFICATION AGREEMENT

Pursuant to Chapter 1.30 of the Napa County Code, as part of the application for a discretionary land use project approval for the project identified below, Applicant agrees to defend, indemnify, release and hold harmless Napa County, its agents, officers, attorneys, employees, departments, boards and commissions (hereafter collectively "County") from any claim, action or proceeding (hereafter collectively "proceeding") brought against County, the purpose of which is to attack, set aside, void or annul the discretionary project approval of the County, or an action relating to this project required by any such proceeding to be taken to comply with the California Environmental Quality Act by County, or both. This indemnification shall include, but not be limited to damages awarded against the County, if any, and cost of suit, attorneys' fees, and other liabilities and expenses incurred in connection with such proceeding that relate to this discretionary approval or an action related to this project taken to comply with CEQA whether incurred by the Applicant, the County, and/or the parties initiating or bringing such proceeding. Applicant further agrees to indemnify the County for all of County's costs, attorneys' fees, and damages, which the County incurs in enforcing this indemnification agreement.

Applicant further agrees, as a condition of project approval, to defend, indemnify and hold harmless the County for all costs incurred in additional investigation of or study of, or for supplementing, redrafting, revising, or amending any document (such as an EIR, negative declaration, specific plan, or general plan amendment) if made necessary by said proceeding and if the Applicant desires to pursue securing approvals which are conditioned on the approval of such documents.

In the event any such proceeding is brought, County shall promptly notify the Applicant of the proceeding, and County shall cooperate fully in the defense. If County fails to promptly notify the Applicant of the proceeding, or if County fails to cooperate fully in the defense, the Applicant shall not thereafter be responsible to defend, indemnify, or hold harmless the County. The County shall retain the right to participate in the defense of the proceeding if it bears its own attorneys' fees and costs, and defends the action in good faith. The Applicant shall not be required to pay or perform any settlement unless the settlement is approved by the Applicant.

CRAIG BECKER
Applicant

Property Owner (if other than Applicant)

12-12-17
Date

SORRENTO 2 LOTS.
Project Identification

SUPPLEMENTAL ENVIRONMENTAL INFORMATION (ECP)

To be provided by Property Owner: Sorrento LLC and KJS Investment Properties, LLC

RECEIVED
DEC 14 2017
Napa County Planning, Building & Environmental Services

Attach response sheets to this page.

A. GENERAL INFORMATION

1. Name, address, telephone number of property owner.
2. Address of project.
3. APN.
4. Name, Address and telephone number of person to be contacted concerning this project, if different than owner.
5. Indicate type or number of the permit application for the project to which this form pertains.
6. List and describe any other related permits and/or other public approvals required for this project or parcel, including those required by city, regional, state and federal agencies.
7. Existing zoning district.
8. Proposed use of entire site and/or parcel. List and describe any other projects or improvements with site locations anticipated within the next several years (1-3-5 years).

B. PROJECT DESCRIPTION

9. Parcel(s) size(s), acres per parcel.
10. Project(s) size(s), acres per project.
11. Attach plans.
12. Proposed scheduling.
13. Anticipated incremental or phased development.
14. If the project involves Napa County grading permit, use permit, variance or rezoning application, state this and indicate clearly why the application is required.

Discuss and check yes the following itemswhich are applicable to your project or its effects (attach additional sheets)

	YES	NO	
15.	☐	☒	Change in existing features of any watercourses, wetlands, tidelands, beaches, hills or alteration of ground contours.
16.	☐	☒	Change in scenic views or vistas from existing residential areas or public lands or roads.
17.	☐	☒	Change in the pattern, scale or character of general area of project.
18.	☐	☒	Change in bay, lake, stream or ground water quality or quantity, or alteration of existing drainage patterns.
19.	☒	☐	Site on filled land or on slopes of 5% or more.
20.	☐	☒	Substantial change in demand for Napa County services (police, fire, water, sewage, etc.)
21.	☐	☒	Relationship to a larger project or series of projects.

C. ENVIRONMENTAL SETTING

22. Describe the project site as it exists before the project, including information on topography, soil stability, plants and animals, wetlands (types), riparian habitat and any cultural, historical or scenic aspects. Describe any/all existing structures on the site, and the use of the structures. Attach photographs of the site, could include current aerial photo.

23. Describe the surrounding properties (approximately ¼ mile radius form parcel boundary), including information on plants and animals and any cultural, historical or scenic aspects. Indicate the type of land use (agriculture, residential, commercial, etc.), intensity of land use (vineyards, winery, one-family, multi-family, industry, etc.), and scale of development (acres, height, setback, yard, etc.). Attach photographs of the vicinity, could include current aerial photo.

D. CERTIFICATION

I hereby certify that the statements furnished responding to the above and in the attached sheets present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

12-12-17
Date

Signature of Property Owner

SUPPLEMENTAL ENVIRONMENTAL INFORMATION (ECP)

Provided by Property Owner: Sorrento LLC and KJS Investment Properties, LLC

1. Sorrento LLC and KJS Investment Properties, LLC 3450 Sage Canyon Road, Saint Helena Ca. 707.967.8414.
2. 3370 Sage Canyon Road Saint Helena, Ca.
3. 025-270-022 and 025.
4. Craig Becker 3450 Sage Canyon Road, Saint Helena Ca. 94574 707.967.8414
5. Erosion Control Plan, ECP
6. Place of Use and Water Storage approved by SFRWQCB.
7. Agricultural
8. Vineyards
9. See ECP
10. See ECP
11. See ECP
12. See ECP
13. See ECP
14. See ECP
22. See ECP
23. See ECP

RECEIVED
DEC 14 2017
Napa County Planning, Building & Environmental Services

Attachment A

SUPPLEMENTAL PROJECT INFORMATION

File #:__ __-__ __ __ Owner: Sorrento Inc & KJS Investment Properties Parcel #: 025-270-022 & -025

Vineyard Development Area Specifics

1. **Size of Area Disturbed:**	155.8	acres
2. **Size of Vineyard:**	92.9	acres
3. **Acres of Vines:**	92.9	acres
4. **Slopes of Area Disturbed:**	3 % to 28	%
5. **Amount of Total Acreage Equal to or Above 30% Slope:**	8.7	acres
6. **Total Number of Trees Removed**	TBD	trees
a) natives		trees
b) non-natives		trees

Vineyard Development Schedule

1. **Pre-Planting Stage:**
(i.e. land clearing, ripping, installation of drainage system., vineyard staking, installation of irrigation system., installation and maintenance of permanent and temporary erosion control measures, planting of cover crop, straw mulching)
Start Date: 4-1 End Date: 9-1 Duration: 153 days
Temporary Cover Crop Planted _____Yes _____No

2. **Planting Stage:**
(i.e planting of vines, seeding permanent cover crop, apply straw mulch, maintenance of erosion control measures)
Start Date: 4-1 End Date: 9-1 Duration: 153 days

3. **Operational Stage:**
(maintenance and adjustment as needed of permanent erosion control practices, implementation of annual vineyard and erosion control measures, commencement of annual harvests)
Start Date: 4-1

Vineyard Operations Information

1. **Farming Equipment:**

X	Track-laying	Percent of Use 60 %
	Rubber-tired	Percent of Use 20 %
X	ATV	Percent of Use 10 %
X	Hand/Manual	Percent of Use 10 %
	Other (describe) _____	Percent of Use ____ %

2. **Annual Pruning:**
Time of Year: JANUARY -MARCH Number of days: 90 Number of Workers: 25

3. **Annual Sulfuring:**
Time of Year: _____ Estimated applications/year: _____

4. **Weed Control:**

	Under Vines	***Between Rows***
Type of control	Chemical, Mechanical, Manual	Grazing and Mechanical
Method of application	Mechanical and Manual	Mechanical and Manual
Months:	April-August	April- August
Applications/year:	3	3
Number of Workers:	4	4

5. **Harvest (Crush):**
Length 60 days Number of Workers: 30

6. Frost Protection Method(s)

		Hours of Operation	Frequency (times/year)
____	Return-stack heaters		
X	Sprinklers	10pm to 8 am	8
____	Misters		
X	Wind Machines	10pm to 8 am	8
X	Late Pruning	7 am to 5 pm	1
____	Other _____		

7. Rodent Protection Method(s):

____ Rodenticides
X Traps
____ Fencing
X Raptors
____ Other _____

8. Bird Protection Method(s):

		Time of Year (months)	Time of Day	Duration of Use (days per year)
____	Netting			
____	Bird Cannons			
____	Visual Distracters *(Mylar strips, etc)*			
X	Raptor Perches	Veraison to harvest		
____	Other _____			

9. Proposed Nighttime Activities:

		Time of Night	Duration of Use (days per year)
____	Harvest		
X	Sulphur Application	2 am to 6 am	12
____	Pesticide/Herbicide Application		
____	Other _____		

10. Irrigation Methods

____ Sprinklers X Drip System ____ Other _____

11. Other Proposed Activities:

Traffic Characteristics Information

1. **Estimated size of grape trucks/truck & trailers to be used:** 20 tons
2. **Estimated number of truck trips per day:** during Crush: 10 annually: _____
3. **Estimated number of farmworkers/vehicle:** 3 Crush 3 Pruning
4. **Lunch provided on-site for farmworkers:** ____ Yes X No
5. **Proposed primary access:** Sage Canyon Road
6. **Proposed secondary access, if any:** N/A

Itemized Fertilizer and Pesticide Information

	Application Method (broadcast, spray, drip system, etc)	Application Amount (per acre)	Number of Applications per Year.	Annual Amount Used (per acre)	Total Annual Amount Used Overall.
1. Fertilizers					
15-15-15	Drip	10	2	20	
Boran	Spary	0.5	2	1	
Zinc	Spray	0.5	2	1	

2. Mildewcides

Sulfer DF	Spray	5 lb	4	20	
Luna Experience	Spray	0.25	4	1 gal	

3. Herbicides

Life Line	Spray	0.5	2	1	

4. Rodenticides

NA

5. Other Chemicals

NA

6. Proposed Storage, Mixing/Handling and Safety Measures:

Type of onsite chemical storage facility in use or proposed:
Existing registered chemical locked shed

Location of current or potential area(s) used for the mixing agricultural chemicals and the description of the facilities present thereat:
Existing mixing area at mechanics shop

Location of current or proposed area designated for the cleaning and washing of chemical application equipment:
NA

Water Source and Usage Information

Use Attachment D to calculate information requested

1. Current and/or Proposed Water Supply Source(s):

Agricultural Water Source(s):	***Percent of Total Agricultural Use:***
____ Well	_____%
_____ Spring	_____%
_____ Stream or Creek	_____%
X Reservoir(s)	100 %
_____ Other _____	_____%
	100%

Residential and Non-Agricultural Water Source(s): N/A	***Percent of Total Resid & Non-Ag***
____ Well	100%
_____ Spring	_____%
_____ Stream or Creek	_____%
_____ Other _____	_____%
	100%

2. Current and Future/Proposed Water Usage *(acre-foot per year = AF/yr)*: N/A

	Current Usage:	***Future Usage***:
Vineyard & other Agricultural. Uses:	_____AF/yr	_____AF/yr
Residential/Domestic Uses:	_____ AF/yr	_____AF/yr
Other Uses:	_____AF/yr	_____AF/yr
Total Usage:	_____AF/yr	_____AF/yr

3. Allowable Groundwater Allotment: N/A _____AF/yr

Rock/Spoils/Debris Disposal Information

1. Use/Disposal of Rock Generated (brought to the surface during the vineyard preparation ripping and raking process):

Proposed Use/Disposal Method:		***Percent of Total***	***Location***	
____	Road Base (crushed to aggregate size)	_____%	_____ on-site	_____ off-site
____	"Rock Mulch" (crushed to fist size and returned to fields)	_____%	_____ on-site	_____ off-site
X	Decorative Rock	10 %	X on-site	_____ off-site
____	Fill (buried)	_____%	_____ on-site	_____ off-site
____	Stacked In Pile	_____%	_____ on-site	_____ off-site
X	Other erosion control measures	90 %	X on-site	_____ off-site

2. Estimated Amount of Cut & Fill: 5,000 cubic yards (total)
5,000 cubic yards (cut) 5,000 cubic yards(fill)

3. If rock/spoils material is to be disposed of off-site, where, what for and how much:

Location of Disposal Site	***Use of Material***	***Quantity***
NA		_____ cubic yards
		_____ cubic yards
		_____ cubic yards

4. Debris Disposal (Location & Method):

____On-site_____ ____Off-site_____

Related Permits

1. Please indicate any other related or required permits associated with the proposed conversion plan:

County:

Grading: Yes ____ No X
Building: Yes ____ No X
Structural ECP: Yes ____ No X
Sewage Disposal: Yes ____ No X
Groundwater/Well Permit: Yes ____ No X
Use Permit: Yes ____ No X
Variance: Yes ____ No X
Other Not Listed: _____

State Dept of Forestry:

Timber Harvest Plan: Yes ____ No X
Timber Conversion Exemption: Yes ____ No X
Timber Conversion Permit: Yes ____ No X ____ acres
_____ acres

State Dept of Fish & Game:

Streambed Alteration Permit: Yes X No ____

State Division of Water Rights:

Appropriate Water Rights Permit: Yes X No ____

State Environmental Protection Agency:

Chemical Application Permit(s): Yes ____ No X

Other State & Federal Permits *(please list)*:

_____

2. Consultation with, or letter of agreement from:

Regional Water Quality Control Brd: Yes X No ____
National Marine Fisheries Service/NOAA: Yes ____ No X
Army Corps of Engineers: Yes X No ____
U.S. Fish and Wildlife Service: Yes ____ No X

RECEIVED
DEC 14 2017
Napa County Planning, Building
& Environmental Services

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

License for Diversion and Use of Water

APPLICATION 13943 PERMIT 9204 LICENSE 9125

THIS IS TO CERTIFY, *That* WILLIAM N. L. HUTCHINSON, JR. AND BONA COMEL DI SOCEBRAN HUTCHINSON DBA ELDER VALLEY RANCH COMPANY, A PARTNERSHIP 2520 DIVISADERO STREET, SAN FRANCISCO, CALIFORNIA 94115 (see over)

HAVE *made proof as of* MAY 7, 1969 *(the date of inspection) to the satisfaction of the State Water Resources Control Board of a right to the use of the water of* AN UNNAMED STREAM IN NAPA COUNTY

tributary to SAGE CREEK THENCE CONN CREEK THENCE NAPA RIVER

for the purpose of IRRIGATION, STOCKWATERING, RECREATIONAL AND FIRE PROTECTION USES *under Permit* 9204 *of the Board and that the right to the use of this water has been perfected in accordance with the laws of California, the Regulations of the Board and the permit terms; that the priority of this right dates from* SEPTEMBER 8, 1950 *and that the amount of water to which this right is entitled and hereby confirmed is limited to the amount actually beneficially used for the stated purposes and shall not exceed* NINETY (90) ACRE-FEET PER ANNUM, TO BE COLLECTED FROM ABOUT NOVEMBER 1 OF EACH YEAR TO ABOUT MAY 1 OF THE SUCCEEDING YEAR. THE MAXIMUM WITHDRAWAL IN ANY ONE YEAR SHALL NOT EXCEED 85 ACRE-FEET.

THE POINT OF DIVERSION OF SUCH WATER IS LOCATED:

NORTH 1,800 FEET AND EAST 1,900 FEET FROM SW CORNER OF PROJECTED SECTION 26, T8N, R4W, MDB&M, BEING WITHIN NE1/4 OF SW1/4 OF SAID SECTION 26.

A DESCRIPTION OF LANDS OR THE PLACE WHERE SUCH WATER IS PUT TO BENEFICIAL USE IS AS FOLLOWS:

STOCKWATERING, RECREATIONAL AND FIRE PROTECTION USES AT THE RESERVOIR WITHIN NE1/4 OF SW1/4 OF PROJECTED SECTION 26, T8N, R4W, MDB&M AND IRRIGATION AND STOCKWATERING AS FOLLOWS:

5 ACRES WITHIN SW1/4 OF SE1/4 OF PROJECTED SECTION 26, T8N, R4W, MDB&M
24 ACRES WITHIN SE1/4 OF SW1/4 OF PROJECTED SECTION 26, T8N, R4W, MDB&M
4 ACRES WITHIN NE1/4 OF SW1/4 OF PROJECTED SECTION 26, T8N, R4W, MDB&M

33 ACRES TOTAL

ISSUANCE OF THIS LICENSE SHALL NOT OPERATE TO THE PREJUDICE OF ANY PRIOR RIGHTS, INCLUDING RIGHTS INITIATED BY THE FILING BY THE CITY OF NAPA OF APPLICATION 10990.

31087-962 4-69 3M ⓪ OSP

Licensee shall allow representatives of the Board and other parties, as may be authorized from time to time by the Board, reasonable access to project works to determine compliance with the terms of this license.

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the Board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: FEB 9 1970

STATE WATER RESOURCES CONTROL BOARD

K. L. Woodward

Chief, Division of Water Rights

7-13-71 Assgd to David A. Garden
9-12-79 Assgd to Christina Vineyards, a Partnership

7

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

APPLICATION 13943 PERMIT 9204 LICENSE 9125

ORDER ALLOWING CHANGE IN THE PLACE OF USE

WHEREAS:

1. License 9125 was issued to William N. L. Hutchinson, Jr., and Bonna Comel Di Socebran Hutchinson DBS Elder Valley Ranch Company, A Partnership, and was recorded with the County Recorder of Napa County on February 10, 1970 in Volume 822, Page 410.

2. License 9125 was subsequently assigned to Christina Vineyards, A Partnership.

3. A petition for change in place of use has been filed with the State Water Resources Control Board and said Board has determined that good cause for such change has been shown.

4. The Board has determined that the petitioned changes do not constitute the initiation of a new right nor operate to the injury of any other lawful user of water.

NOW, THEREFORE, IT IS ORDERED THAT:

1. The place of use under this license shall be as follows:

10 acres within SW¼ of NW¼ Projected Section 26, T8N, R4W, MDB&M
3 acres within SE¼ of NW¼ Projected Section 26, T8N, R4W, MDB&M
5 acres within NE¼ of SW¼ Projected Section 26, T8N, R4W, MDB&M
12 acres within NW¼ of SW¼ Projected Section 26, T8N, R4W, MDB&M
10 acres within SW¼ of SW¼ Projected Section 26, T8N, R4W, MDB&M
20 acres within SE¼ of SW¼ Projected Section 26, T8N, R4W, MDB&M
60 Acres Total

Dated: SEPTEMBER 25 1981

Raymond Walsh

Raymond Walsh, Chief
Division of Water Rights

3

WRCB
133 (12-67)

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

ORDER

APPLICATION 13943 PERMIT 9204 LICENSE 9125

ORDER ALLOWING CHANGE IN PURPOSE OF USE,
PLACE OF USE AND AMENDING THE LICENSE

WHEREAS:

1. License 9125 was issued to William N. L. Hutchinson, Jr. and Bona Comel Di Socebran Hutchinson DBA Elder Valley Ranch Company, A Partnership and was recorded with the County Recorder of Napa County on February 10, 1970 in Volume 822, Page 410.

2. License 9125 was subsequently assigned to Christina Vineyards, A Partnership. An order allowing a change in the place of use was granted on September 25, 1981 and was filed with the County Recorder of Napa County.

3. A petition to change the purpose of use and place of use has been filed with the State Water Resources Control Board and said Board has determined that good cause for such change has been shown.

4. The Board has determined that the petitioned changes do not constitute the initiation of a new right nor operate to the injury of any other lawful user of water.

5. The license condition pertaining to the continuing authority of the Board should be updated to conform to Standard Term 12 as contained in Section 780(a), Title 23 of the California Code of Regulations.

NOW, THEREFORE, IT IS ORDERED THAT:

1. The condition of this license regarding purposes of use is amended to read as follows:

   Irrigation, Stockwatering, Recreational, Fire Protection and Frost Protection. (0000003)

2. The place of use under this license shall be as follows:

   15 acres within SW¼ of NW¼ projected Section 26, T8N, R4W, MDB&M
   13 acres within SE¼ of NW¼ projected Section 26, T8N, R4W, MDB&M
   7 acres within NE¼ of SW¼ projected Section 26, T8N, R4W, MDB&M
   11 acres within NW¼ of SW¼ projected Section 26, T8N, R4W, MDB&M
   2 acres within SW¼ of SW¼ projected Section 26, T8N, R4W, MDB&M
   27 acres within SE¼ of SW¼ projected Section 26, T8N, R4W, MDB&M
   10 acres within SW¼ of SE¼ projected Section 26, T8N, R4W, MDB&M
   85 acres total (0000004)

3. The continuing authority condition of this license shall be amended to read:

Pursuant to California Water Code Sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this license, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this license with a view to eliminating waste of water and to meeting the reasonable water requirements of licensee without unreasonable draft on the source. Licensee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this license and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the licensee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust.

(0000012)

Dated: NOVEMBER 14 1988

for Roy Johnson
Walter G. Pettit, Chief
Division of Water Rights

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

Application 26179 Permit 18282 License _____

ORDER APPROVING A NEW DEVELOPMENT SCHEDULE AND AMENDING THE PERMIT

WHEREAS:

1. Permit 18282 was issued to Christina Vineyards, A Partnership, on June 11, 1981, pursuant to Application 26179.

2. A petition for an extension of time within which to develop the project and apply the water to the proposed use has been filed with the State Water Resources Control Board.

3. The permittee has proceeded with diligence and good cause has been shown for said extension of time.

4. Permit Condition 10 pertaining to the continuing authority of the Board should be updated to conform to Section 780(a), Title 23 of the California Code of Regulations.

NOW, THEREFORE, IT IS ORDERED THAT:

1. Condition 7 of the permit be amended to read:

   COMPLETE APPLICATION OF THE WATER TO THE PROPOSED USE SHALL BE MADE ON OR BEFORE December 31, 2005 (0000009)

2. Condition 10 of the permit be amended to read:

   Pursuant to California Water Code Sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in

accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to eliminating waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust. (0000012)

Dated: MARCH 31 1995

Roger Johnson

for Edward C. Anton, Chief
Division of Water Rights

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

PERMIT FOR DIVERSION AND USE OF WATER

PERMIT 18282

Application 26179 of CHRISTINA VINEYARDS, A PARTNERSHIP

P. O. BOX 348, OAKVILLE, CALIFORNIA 94562

filed on JANUARY 22, 1980, has been approved by the State Water Resources Control Board SUBJECT TO VESTED RIGHTS and to the limitations and conditions of this Permit.

Permittee is hereby authorized to divert and use water as follows:

1. Source:	Tributary to:
UNNAMED STREAM (AKA ELDER CREEK)	SAGE CREEK THENCE
	CONN CREEK THENCE
	NAPA RIVER THENCE
	SAN PABLO BAY

2. Location of point of diversion:	40-acre subdivision of public land survey or projection thereof	Section	Township	Range	Base and Meridan
NORTH 1,800 FEET AND EAST 1,900 FEET FROM SW CORNER OF PROJECTED SECTION 26	NE1/4 OF SW1/4	26	8N	4W	MD

County of NAPA

3. Purpose of use:	4. Place of use:	Section	Township	Range	Base and Meridan	Acres
FROST PROTECTION	SW1/4 OF SW1/4	26	8N	4W	MD	10
	SE1/4 OF SW1/4	26	8N	4W	MD	20
	NE1/4 OF SW1/4	26	8N	4W	MD	3
	SW1/4 OF NW1/4	26	8N	4W	MD	10
	SE1/4 OF NW1/4	26	8N	4W	MD	3
	NE1/4 OF SW1/4	26	8N	4W	MD	2
	NW1/4 OF SW1/4	26	8N	4W	MD	12
					TOTAL	60

The place of use is shown on map filed with the State Water Resources Control Board.

© OSP

Application 26179 Permit 18282

5. The water appropriated shall be limited to the quantity which can be beneficially used and shall not exceed 3 CUBIC FEET PER SECOND TO BE DIVERTED FROM FEBRUARY 15 TO MAY 30 OF EACH YEAR. THE MAXIMUM AMOUNT DIVERTED UNDER THIS PERMIT SHALL NOT EXCEED 120 ACRE-FEET PER YEAR. (0000005)

6. The amount authorized for appropriation may be reduced in the license if investigation warrants. (0000006)

~~7. Actual construction work shall begin on or before two years from date of permit and shall thereafter be prosecuted with reasonable diligence, and if not so commenced and prosecuted, this permit may be revoked.~~

~~8. Said construction work shall be completed on or before~~

7. Complete application of the water to the proposed use shall be made on or before DECEMBER 1, 1991. (0000009)

8. Progress reports shall be submitted promptly by permittee when requested by the State Water Resources Control Board until license is issued. (0000010)

9. Permittee shall allow representatives of the State Water Resources Control Board and other parties, as may be authorized from time to time by said Board, reasonable access to project works to determine compliance with the terms of this permit. (0000011)

10. Pursuant to California Water Code Sections 100 and 275, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to minimizing waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement such programs as (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation. (0000012)

11. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Control Board if, after notice to the permittee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges. (0000013)

12. THE STATE WATER RESOURCES CONTROL BOARD RESERVES JURISDICTION OVER THIS PERMIT TO IMPOSE ANY APPROPRIATE CONDITIONS AT SOME FUTURE DATE TO CONFORM THE PERMIT TO BOARD POLICY ON USE OF WATER FOR FROST PROTECTION. ACTION BY THE BOARD WILL BE TAKEN ONLY AFTER NOTICE TO INTERESTED PARTIES AND OPPORTUNITY FOR HEARING. (0000020)

This permit is issued and permittee takes it subject to the following provisions of the Water Code.

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any permit granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any permittee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Dated: JUNE 11 1981

STATE WATER RESOURCES CONTROL BOARD

Raymond Walsh

CHIEF, DIVISION OF WATER RIGHTS

APPENDIX B

NOTICE OF PREPARATION, INITIAL STUDY AND COMMENTS RECEIVED AND APPLICATION

A Tradition of Stewardship
A Commitment to Service

COUNTY PLANNING

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

NOTICE IS HEREBY GIVEN BY THE NAPA COUNTY DEPARTMENT OF PLANNING, BUILDING & ENVIRONMENTAL SERVICES that the County will be the Lead Agency preparing an Environmental Impact Report (EIR) for the project identified below and is soliciting participation and comments in determining the scope and contents of the EIR:

KJS & SORRENTO, SAGE CANYON ROAD (ELDER VALLEY/WEST RANCH) EROSION CONTROL PLAN – ENVIRONMENTAL REVIEW on land disturbing activities on slopes greater than 5% associated with Erosion Control Plan #P17-00432-ECPA for a new agricultural development consisting of vineyard encompassing approximately 156.8 acres (±111.5 net acres) within a 972.8 acre holding situated in the Elder Valley Creek Drainage, that is located in the larger Lake Hennessey Domestic Water Supply Drainage. The project site is located within an Agricultural Watershed (AW) zoning district, approximately 10 miles east of the City of St. Helena, on the north side of Sage Canyon Rd approximately 1.25 miles east of its intersection with Lower Chiles Valley Road, Napa County California (3370 and 3380 Sage Canyon Road, St. Helena CA 94574, Assessor's Parcel #s 025-270-025 & 025-270-025).

CEQA STATUS: An Initial Study has been prepared, which concluded that the project may have a significant effect on the environment in the following areas: Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Noise, Transportation/Traffic, and Tribal Cultural Resources. An Environmental Impact Report is required.

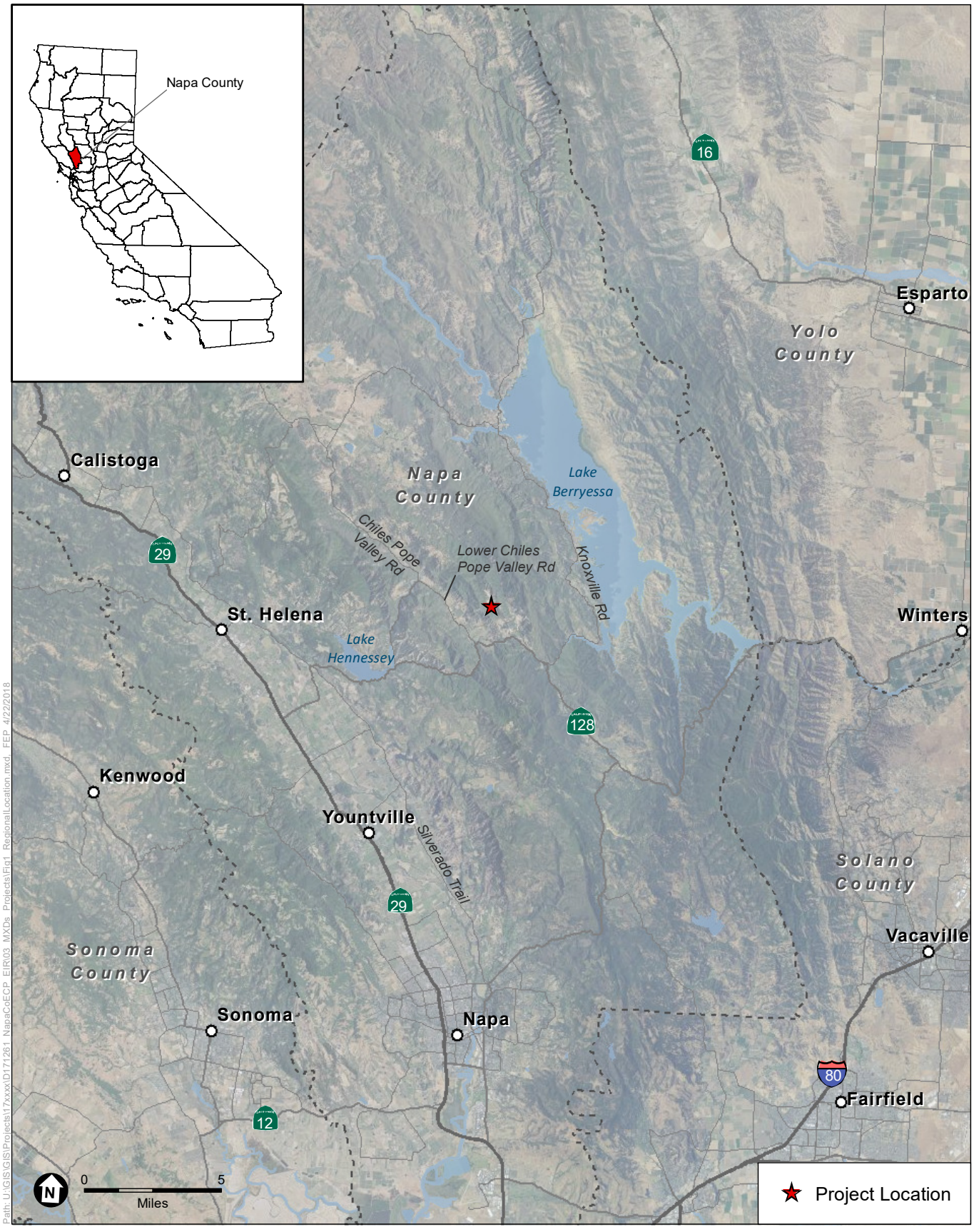
The Initial Study is available for inspection, along with copies of all documents which relate to the above described project, between the hours of 8:00 a.m. and 4:45 p.m. Monday through Friday, at the Napa County Department of Planning, Building and Environmental Services, 1195 Third Street, Suite 210, Napa, California or at https://www.countyofnapa.org/2295/KJS-Sorrento-ECPA

Written comments regarding the scope of the Environmental Impact Report are solicited. All such comments must be presented during the public review period, which runs from September 18, 2018 to October 18, 2018.

Comments should be directed to Donald Barrella, Napa County Department of Planning, Building and Environmental Services, 1195 Third Street, Suite 210, Napa, California or via email at donald.barrella@countyofnapa.org and must be received before **5:00 p.m. on October 18, 2018**.

DATED: September 18, 2018

BY THE ORDER OF THE NAPA COUNTY DEPARTMENT OF PLANNING, BUILDING AND ENVIRONMENTAL SERVICES
DAVID MORRISON, DIRECTOR



SOURCE: NAIP, 2016; ESRI, 2012; Napa County, 2018; ESA, 2018

KJS Sorrento Vineyard Conversion #P17-00432-ECPA

Figure 1
Regional Location

COUNTY OF NAPA
DEPARTMENT OF PLANNING, BUILDING AND ENVIRONMENTAL SERVICES
1195 THIRD STREET, 2nd Floor
NAPA, CA 94559
(707) 253-4416

Initial Study Checklist

(Reference Napa County's Procedures for Implementing CEQA, Appendix C)

1. **Project Title:** KJS and Sorrento Vineyard Conversion Erosion Control Plan Application #P17-00432-ECPA

2. **Property Owner:** KJS Investment Properties LLC and Sorrento Inc.

3. **Contact Person, Phone Number and Email:** Donald Barrella, Planner III, (707) 229-1338, Donald.Barrella@countyofnapa.org

4. **Project Location and APNs:** 3370 and 3380 Sage Canyon Road, St. Helena, CA; APNs 025-270-022 and 025-270-025 (Figures 1 and 2)

5. **Project Sponsor's Name and Address:** KJS Investment Properties LLC and Sorrento Inc.,
   3450 Sage Canyon Road
   St. Helena, CA 94574

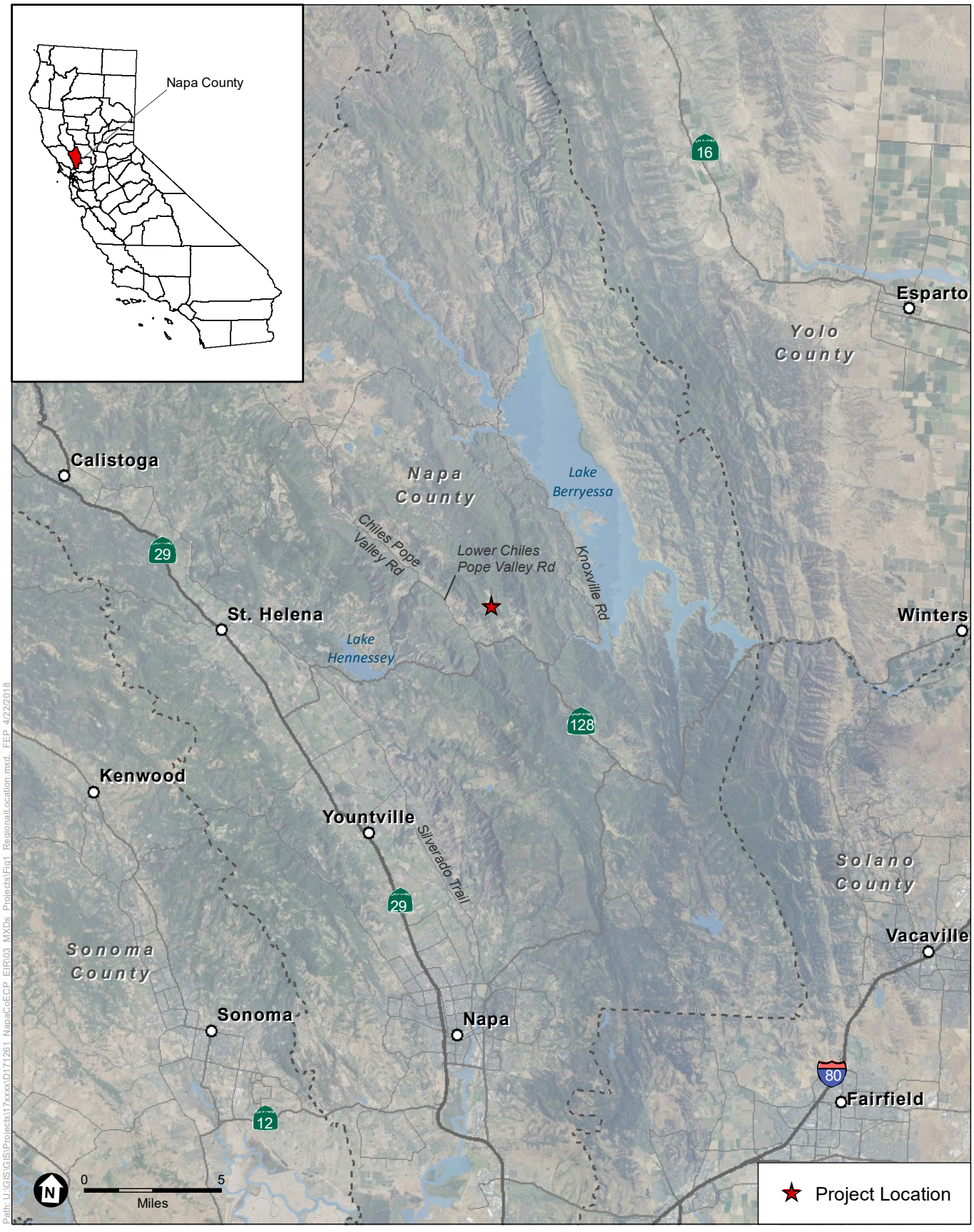
6. **General Plan Description:** Agricultural, Watershed and Open Space (AWOS)

7. **Zoning:** Agricultural Watershed (AW)

8. **Description of Project:**

   KJS Investment Properties and Sorrento Inc. (Applicant) filed Erosion Control Plan (ECP) Application (ECPA #P17-00432) with the Napa County Planning, Building and Environmental Services Department (County) on December 14, 2017 for proposed vegetation removal and earthmoving activities on slopes greater than five percent in connection with the development of 111.5 net acres of vineyard within 156.8 gross acres on the project site (Figure 3). Vineyard avenues would be constructed around each of the proposed vineyard blocks, and their acreage is included in the proposed clearing limits boundary.

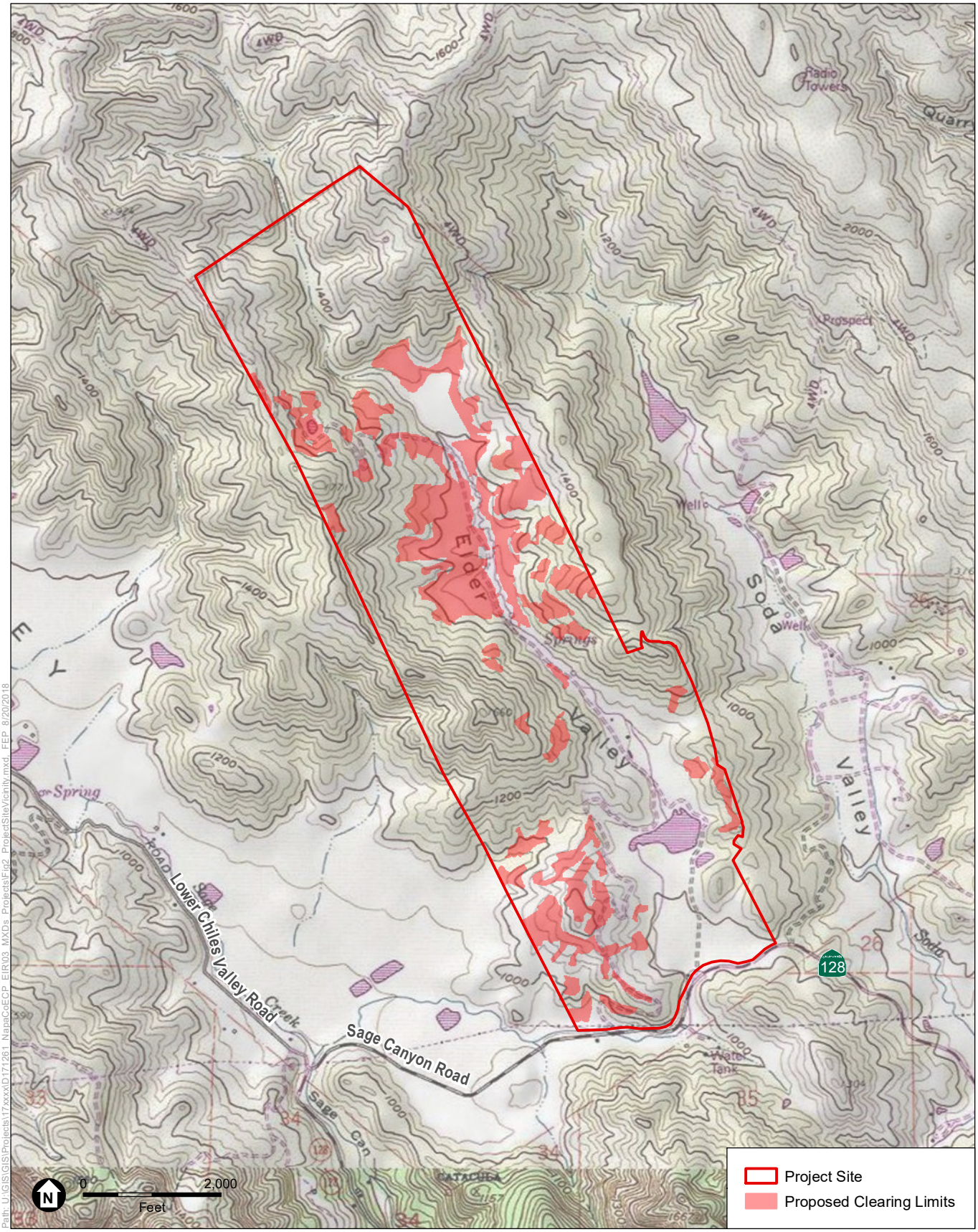
   A total of 33 vineyard blocks are proposed. The acres of the proposed vineyard blocks and their associated clearing limits are described in Table 1 below.



SOURCE: NAIP, 2016; ESRI, 2012; Napa County, 2018; ESA, 2018

KJS Sorrento Vineyard Conversion #P17-00432-ECPA

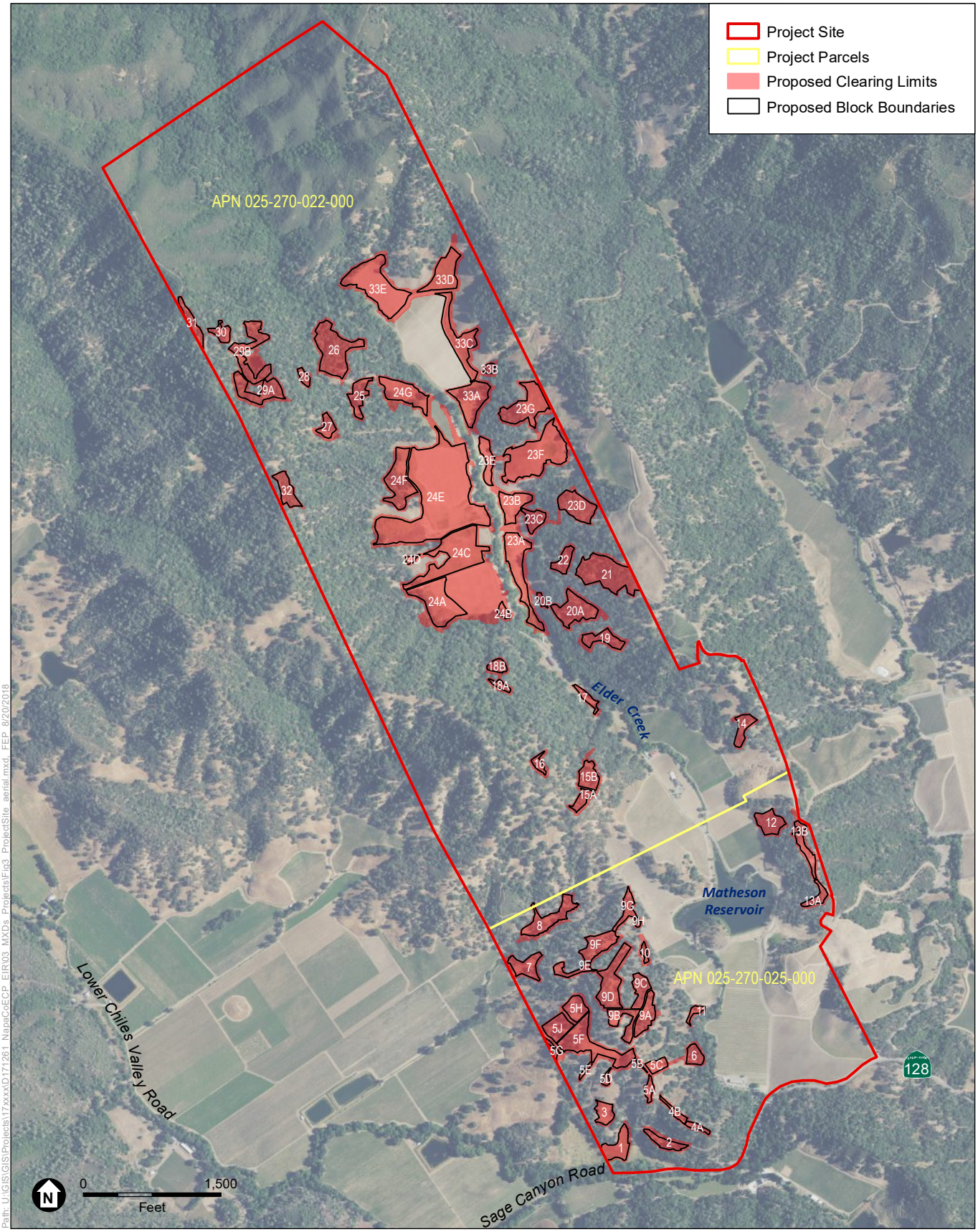
Figure 1
Regional Location



SOURCE: USGS 7.5' Topo Quad (Chiles Valley, 1958); PPI Engineering, 2018; ESA, 2018

KJS Sorrento Vineyard Conversion #P17-00432-ECPA

Figure 2
Project Site and Vicinity



SOURCE: USDA, 2016; Napa County, 2018; PPI Engeineering, 2018; ESA, 2018

KJS Sorrento Vineyard Conversion #P17-00432-ECPA

Figure 3
Project Site

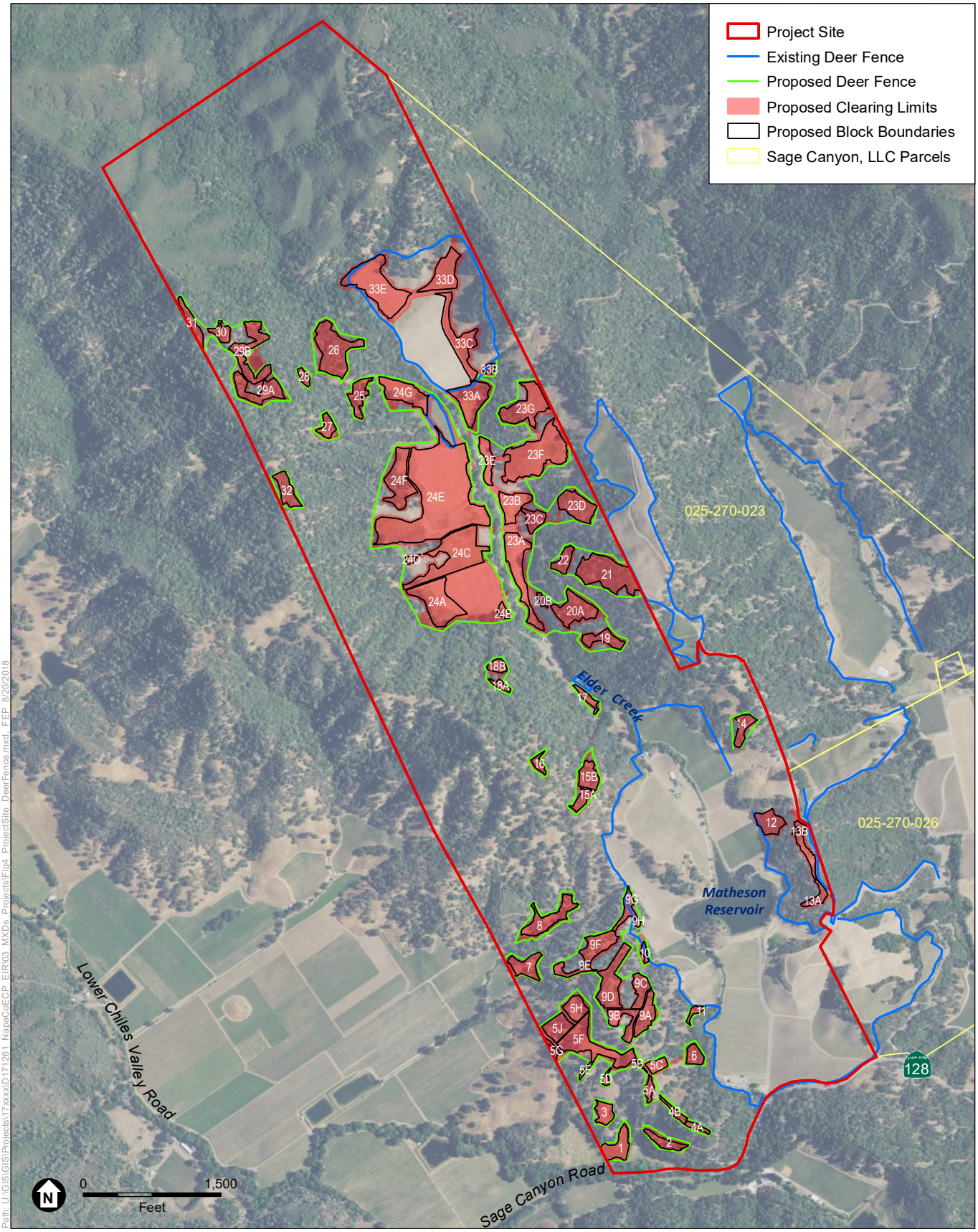
Table 1 – Acres of Proposed Vineyard Blocks

Block	Proposed Clearing Limits (Gross Acres)	Proposed Block Boundaries (Net Acres)	Block	Proposed Clearing Limits (Gross Acres)	Proposed Block Boundaries (Net Acres)
1	1.7	1.3	9G	1.0	0.8
2	1.3	0.8	9H	0.1	0.1
3	1.0	0.8	10	0.6	0.2
4A	0.4	0.3	11	0.4	0.3
4B	0.6	0.4	12	1.5	1.3
5A	0.5	0.4	13A	0.8	0.6
5B	0.2	0.06	13B	1.7	1.0
5C	0.7	0.6	14	1.1	0.9
5D	0.3	0.2	15A	1.0	0.6
5E	0.3	0.1	15B	1.6	1.1
5F	4.4	3.2	16	0.7	0.3
5G	0.5	0.2	17	0.7	0.4
5H	1.5	1.1	18A	0.6	0.3
5J	1.8	1.3	18B	0.8	0.5
6	1.1	0.7	19	1.8	1.1
7	1.7	1.3	20A	3.1	2.3
8	2.9	2.0	20B	0.3	0.2
9A	1.5	1.3	21	4.5	4.0
9B	1.5	1.2	22	1.1	0.8
9C	1.4	1.1	23A	4.5	3.0
9D	3.3	2.5	23B	2.5	1.6
9E	0.9	0.6	23C	1.3	0.9
9F	1.9	1.6	23D	2.4	2.1
23E	1.5	1.0	28	0.5	0.3
23F	6.7	5.4	29A	2.9	1.9
23G	3.9	2.8	29B	3.7	2.3
24A	4.7	3.5	30	0.8	0.6
24B	0.6	0.3	31	1.0	0.8
24C	6.3	4.9	32	1.4	1.2
24D	0.2	0.2	33A	3.3	2.5
24E	19.3	16.4	33B	0.4	0.2
24F	3.6	2.7	33C	3.7	2.5
24G	3.4	2.2	33D	3.2	2.2
25	1.6	1.2	33E	6.4	4.8
26	4.6	3.6	Reservoir Area	6.5	--
27	1.1	0.6			
			Total	156.8	111.5

Source: PPI Engineering 2018

The project also includes the ongoing maintenance of erosion control measures and operations of approximately 4.3 acres of existing vineyard, converted from grassland in 2015 without benefit of an ECPA. These vineyard areas are located within two larger vineyard blocks totaling 17.4 acres, all of which occur on lands with a slope of 5 percent or less and therefore, are not subject to an ECPA pursuant to Napa County Code (NCC) section 18.108.070(B), except for the aforementioned 4.3 acres occurring on slopes over 5 percent. Accordingly, the vineyard development area requiring ECPA coverage pursuant to NCC section 18.108.070(B) will be included in this project.

Proposed activities associated with vineyard development include removing pasture, hayfield, grassland, brush/shrubland, and trees and woodland within the proposed clearing limits, ripping, rock removal, soil cultivation, seeding a cover crop, mulching, trenching for irrigation pipelines, installing a trellis system and deer fence, laying out vine rows, and installing temporary and permanent erosion control measures. The location of proposed deer fence is shown in Figure 4; fencing would match the existing deer fence and would be 7 feet tall with smooth wire square mesh spacing of 4 inches by 4 inches. Irrigation pipelines would generally be located within existing roadways, vineyards and vineyard avenues, and/or within proposed clearing limits.



SOURCE: USDA, 2016; Napa County, 2018; PPI Entineering, 2018; ESA, 2018

KJS Sorrento Vineyard Conversion #P17-00432-ECPA

Figure 4
Deer Fence

There are approximately 12.6 miles of existing access roads on the project site that are used during ongoing vineyard operation and maintenance and grazing operations. There are 6.5 miles of year round (Level 1) roads that are surfaced with crushed rock and contain waterbars and rolling dips, and there are 6.1 miles of existing dirt (Level 2) roads on the project site.

Roads that provide primary access to the proposed vineyard blocks would be surfaced with crushed rock. Approximately 2.3 miles of Level 2 roads would be upgraded to Level 1 roads as part of the project. Level 2 roads would be used seasonally during dry periods of the year to provide secondary access to some vineyard blocks. Approximately 1.6 miles of existing dirt roads would be decommissioned by incorporating them into the proposed vineyard blocks. After implementation of the proposed project, there would be approximately 8.8 miles of Level 1 graveled roads and 2.2 miles of Level 2 dirt roads on the project site. An existing Level 1 road would provide access to all vineyard blocks from Sage Canyon Road/State Route 128.

In addition to the gravel and dirt roads on the project site, a network of vegetated vineyard avenues surrounds existing and proposed vineyard blocks and provide access for farming equipment and workers. These roads are used less frequently than the Level 1 and Level 2 roads and are reseeded as needed to ensure appropriate levels of vegetative cover, as required by the engineered ECPs that cover these avenues.

A Road Plan, describing operational road use and use restrictions, maintenance practices, and improvements is included as part of the project and ECPA.

Minimal rock would be generated as a result of the proposed project. All rock generated is expected to be used to construct erosion control features such as rock aprons and rock level spreaders. Rock staging areas would be located within the proposed clearing limits.

Elder Creek and tributaries in the project site that meet the Napa County definition of a stream have setbacks determined by slope, as outlined in Napa County Conservation Regulation 18.108.025. All waters of the U.S. not requiring a Napa County stream setback, and all wetlands, have been avoided and afforded a 50-foot buffer consisting of a 26-foot undisturbed area, and a 24-foot vegetated vineyard avenue. The 24-foot vegetated vineyard avenue portion of the buffer would be a seasonal buffer where primary use would occur between April 1 through September 15 for vineyard development and operations; from September 15 through April 1, the vineyard avenues would be limited to use necessary to maintain erosion control measures, as necessary, within the proposed vineyard conversion areas (i.e., project area or development areas).

The proposed vineyard would be served entirely by surface water; no groundwater would be used for irrigation and operation of the proposed vineyard. The proposed project includes Petitions for Change on Water Right License 9125 (Application 13943) and Permit 18459 (Application 26165, as amended June 20, 2018) and a Petition for Extension of Time on Permit 18459, which are pending review and processing with the State Water Resources Control Board, Division of Water Rights (State Water Board). The Petitions for Change were originally filed with the State Water Board on August 15, 2001 (several subsequent amendments were filed after 2001), and the Petition for Extension of Time on Permit 18459 was filed with the State Water Board on December 5, 2005. Additional detail about the petitions is provided below.

Petition for Change on Water Right License 9125

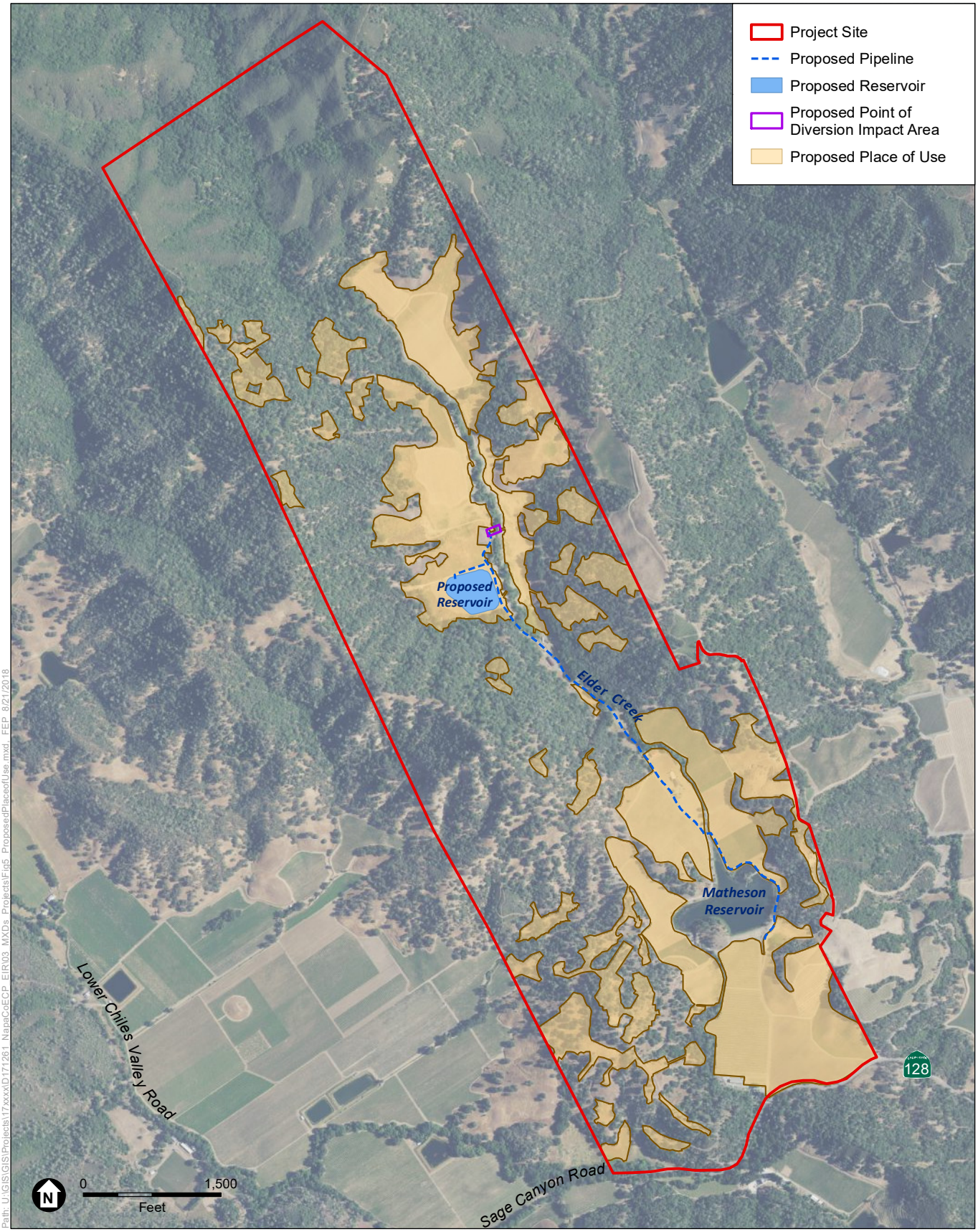
The Petition for Change on Water Right License 9125 pending with the State Water Board requests an expansion of the place of use to 280 acres, as detailed in Table 2 below and shown in Figure 5. This 280-acre place of use includes the existing vineyards on the project site as well as the proposed vineyards.

With the water right petition pending with the State Water Board, Matheson Reservoir (within the SW¼ of SE¼ of Projected Section 22, Township 8N, Range 4W, M.D.B&M) would be the point of diversion by collection to storage and a point of rediversion to an existing offstream pond just south of Matheson Reservoir, and the offstream pond (also within the SW¼ of SE¼ of Projected Section 22, Township 8N, Range 4W, M.D.B&M) would be a point of rediversion from Matheson Reservoir, allowing for the transfer of water between the points of diversion, reservoirs and pond.

Petition for Change on Water Right Permit 18459

The Petition for Change on Water Right Permit 18459 pending with the State Water Board requests an expansion of the place of use to the same 280 acres detailed in Table 2 and shown in Figure 5.

The petition also includes the construction of a new 48-acre-foot capacity offstream reservoir located within the proposed clearing limits of proposed Block 24 (within the SW¼ of SE¼ of Projected Section 22, Township 8N, Range 4W, M.D.B&M) that would serve as the place of storage for water diverted at Point of Diversion 1 in Elder Creek and Matheson Reservoir, instead of constructing an onstream reservoir previously authorized by the State Water Board with Permit 18459. A new diversion structure at Point of Diversion 1 in Elder Creek would serve as the point of diversion to offstream storage in the new reservoir and the existing offstream pond.



SOURCE: USDA, 2016; Napa County, 2018; PPI Entineering, 2018; ESA, 2018

KJS Sorrento Vineyard Conversion #P17-00432-ECPA

Figure 5
Proposed Place of Use

Table 2 – Proposed Place of Use, License 9125 (Application 13943) and Permit 18459 (Application 26165)

Use Within	Section	Township	Range	B.&M.	Acres	Cultivated
SW¼ of NW¼	22	8N	4W	M.D.	2.0	No
SE¼ of NW¼	22	8N	4W	M.D.	4.2	No
SW¼ of NE¼	22	8N	4W	M.D.	14.6	No
NW¼ of SW¼	22	8N	4W	M.D.	2.2	No
NE¼ of SW¼	22	8N	4W	M.D.	9.1	No
SE¼ of SW¼	22	8N	4W	M.D.	1.4	No
NW¼ of SE¼	22	8N	4W	M.D.	19.2	No
NE¼ of SE¼	22	8N	4W	M.D.	7.2	No
SW¼ of SE¼	22	8N	4W	M.D.	26.2	No
SE¼ of SE¼	22	8N	4W	M.D.	14.7	No
SW¼ of SW¼	23	8N	4W	M.D.	0.2	No
NW¼ of NW¼	26	8N	4W	M.D.	2.1	Yes
SW¼ of NW¼	26	8N	4W	M.D.	25.1	Yes
SE¼ of NW¼	26	8N	4W	M.D.	12.0	Yes
NW¼ of SW¼	26	8N	4W	M.D.	21.2	Yes
NE¼ of SW¼	26	8N	4W	M.D.	12.3	Yes
SW¼ of SW¼	26	8N	4W	M.D.	16.4	Partial
SE¼ of SW¼	26	8N	4W	M.D.	36.4	Yes
SW¼ of SE¼	26	8N	4W	M.D.	4.9	Yes
NW¼ of NE¼	27	8N	4W	M.D.	10.8	No
NE¼ of NE¼	27	8N	4W	M.D.	11.8	No
SE¼ of NE¼	27	8N	4W	M.D.	3.6	No
NE¼ of SE¼	27	8N	4W	M.D.	5.0	Yes
SE¼ of SE¼	27	8N	4W	M.D.	11.8	No
NE¼ of NE¼	34	8N	4W	M.D.	1.4	No
NW¼ of NW¼	35	8N	4W	M.D.	4.0	No
NE¼ of NW¼	35	8N	4W	M.D.	0.2	Yes
				Total	280.0	

Source: Wagner & Bonsignore 2018

The Petition for Extension of Time pending with the State Water Board on Permit 18459 anticipates that development and use of water is anticipated to occur within five years from the time the petitions are approved by the State Water Board.

Project Construction

Vineyard Development

Vineyard development would take place between April 1 and September 15 over three phases, with vineyard development complete after three years. The first phase of construction would include vegetation clearing, land preparation and installation of erosion control measures on approximately half of the vineyard area, as well as construction of the proposed offstream reservoir and associated diversions. No vineyard installation is anticipated to occur the first year of construction.

The maximum area disturbed during any phase would be 3 acres per day. Removed vegetation would be burned onsite following Bay Area Air Quality Management District regulations. No soil would be imported for the proposed project. Any spoils from vineyard development would be disposed of onsite within the approved clearing limits.

It is anticipated that ten truck trips would deliver heavy equipment during the first two weeks of the first phase. It is anticipated that ten truck trips would remove equipment over the last two months of the first phase. Approximately 12 passenger vehicles trips are expected daily during the first phase, 6 days per week, from April 1 to September 15. All equipment would be staged within the proposed clearing limits or within existing vineyard areas.

Work hours would typically be 7 A.M. to 5 P.M. Typical construction equipment and the estimated quantity of equipment needed for the proposed project are listed in Table 3. Each piece of equipment would operate an average of 7 hours per day during the construction season, and work would take place 6 days per week.

Table 3 – Anticipated Construction Equipment

Equipment	Estimated Quantity
Large Excavator	2
Medium Excavator	1
D9 Bulldozer	1
D8 Bulldozer	1
Haul Truck	2
Loader	2
Water Truck	1
Farm Tractor with Trailer	4

Source: PPI Engineering 2018

The second phase of vineyard construction would include vegetation clearing, land preparation and installation of erosion control measures on the remaining proposed vineyard acreage, as well as vineyard infrastructure installation and planting of vines in areas prepared the previous year. Typical construction equipment would remain the same as listed for the first phase (Table 3). Similar to first phase, approximately ten truck trips would deliver heavy equipment and infrastructure materials during the first two weeks of the second phase. It is anticipated that ten truck trips would remove equipment over the last two months of the second phase. Approximately 12 passenger vehicles trips are expected daily during the second phase, 6 days per week, from April 1 to September 15.

The third phase of vineyard construction would include installation of vineyard infrastructure and planting of vines in areas prepared the previous year. All areas would be planted at the end of the third phase. Typical equipment would include up to four farm tractors with trailers. Ten truck trips are anticipated for delivering infrastructure during the third phase. Additionally, approximately 12 passenger vehicles trips are expected per day, 6 days per week, from April 1 to September 15.

The average depth of ripping would be 24 inches, with maximum ripping depth up to 48 inches depending on site conditions. The proposed vine and row spacing would be 4 feet by 6 feet for tractor-farmed blocks and 4 feet by 5 feet for hand-farmed blocks. Vinerow would be increased as necessary in tractor-farmed blocks where side slope is 15 percent or greater.

Irrigation pipelines would generally be located within existing roadways, vineyards and vineyard avenues, and/or within proposed clearing limits.

The development area would be winterized, including seeding, straw mulch, and straw wattle installation, by September 15. All disturbed areas (including vineyard avenues) would be seeded with a permanent cover crop according to the ECP.

Erosion Control Measures

Temporary erosion control measures could include installing water bars, straw wattles, straw bale dikes, and other practices as needed.

Permanent erosion control measures include:

- Seeding a permanent cover crop with vegetative cover maintained according to the ECP.
- Surface drainage pipelines installed to collect surface runoff at low points throughout the development area and transport it to protected outlets.
- Cutoff collars installed on all solid pipelines with slopes greater than 5 percent.
- Standard drop inlets, non-standard drop inlets, and infield drop inlets installed at designated locations within the development area.
- Standard and non-standard diversion ditches constructed to convey surface water through and/or around proposed vineyard areas and direct it to a stable outlet or other stormwater conveyance infrastructure.
- Infield ditches and insloped avenues constructed in designated blocks to reduce the slope run length and intercept surface runoff.
- Grading performed in designated locations to form outsloped roads to provide a safe and stable road for vehicular travel.
- Culverts, rolling dips and a rocked water crossing installed in designated locations in the development area.
- Pipe level spreaders installed in designated locations at the outfall of conveyance infrastructure to return concentrated flows within the pipe to sheet flow.
- Rock level spreaders installed in designated locations at the outfall of conveyance infrastructure to uniformly spread water onto the ground surface.
- Rock aprons installed at the outlets of pipes and ditches to help disperse concentrated flow and to minimize erosion downstream of the outlet.
- Rock energy dissipaters installed to dissipate and reduce flow velocities at the outlet of diversion ditches.

- Junction boxes installed on the west side of proposed Block 8 and the west side of proposed Block 33E to transfer water from proposed surface drainage pipelines to proposed pipe level spreaders, and a junction box installed on the east side of proposed Block 8 to transfer water from a proposed surface drainage pipeline to an existing culvert.
- Outsloped benches constructed in designated locations to allow safe access for equipment.
- Repair of existing headcutting in proposed Blocks 23A, 23B, 24A, 24E, and 33A.
- Riprap berms constructed on the downhill sides of proposed surface drainage line outlets into existing swales in proposed Blocks 24A and 24E, and repair of erosion in the swale in proposed Block 24E.
- Riprap berm constructed on the downhill side of a proposed surface drainage line outlet into an existing natural basin in proposed Block 24E.
- Spillway berm and overflow structure constructed in an existing pond near proposed Block 29.

Reservoir and Point of Diversion Development

The proposed reservoir would have a surface area of approximately 4.5 acres, an average depth of approximately 10.7 feet, and a capacity of 48 acre-feet. The reservoir would be designed to have balanced cut and fill. The diversion structure in Elder Creek would have a construction footprint of approximately 0.2 acre. Pipelines would run within existing roads from the proposed diversion structure in Elder Creek to the proposed offstream reservoir and to Matheson Reservoir.

Vineyard Operations and Maintenance

Table 4 summarizes the operations and maintenance activities that would take place following construction of the vineyard.

Table 4 – Annual Operations Schedule

Months	Activity	Workers
January – March	Annual pruning of vines	Approximately 25
April – August	Chemical, mechanical and manual weed control Sulfur applications to protect against mildew	Approximately 5
September – October	Harvest Winterize vineyard, vineyard avenues and vineyard roads	Approximately 30
November – April	Monitor and maintain erosion control measures	Approximately 5

Source: PPI Engineering 2018

Nighttime activities would include:

- Frost protection. Methods would include sprinklers and wind machines operating approximately eight times per year between 10 P.M. and 8 A.M., and late pruning.
- Sulfur applications. Approximately 12 times per year between 2 A.M. and 6 A.M.

Permanent erosion control measures would be maintained regularly. Measures would be monitored throughout the rainy season and repairs and/or maintenance would be performed immediately. The permanent cover crop would be mowed only and not disked.

An Integrated Pest Management program would be implemented as part of the sustainable farming practices on the property. Chemicals would be stored and mixed at an existing barn as show in Figure 5 of the KJS Investment Properties and Sorrento Inc. Erosion Control Plan Application (ECPA #P17-00432).

An estimated 10 additional truck trips (20 tons each) and 30 one-way worker trips would occur during harvest. Grape-hauling trucks may travel approximately 1 mile internally on the property and approximately 35 miles offsite.

9. Description of the environmental setting and surrounding land uses.

Approximately 104 acres of vineyard exist on the project site. Water Right License 9125 and Permit 18459 authorize the diversion of 138 acre-feet of water to storage in existing Matheson Reservoir located on Elder Creek and a proposed offstream reservoir for irrigation, heat control, and frost protection of the existing vineyard, and stockwatering. The existing vineyard is also irrigated with groundwater.

Water Right License 9125 allows for the diversion of 90 acre-feet of water per year from Elder Creek at Matheson Reservoir, to storage in Matheson Reservoir, from November 1 to May 1. The maximum withdrawal in any one year is limited to 85 acre-feet. Water can be used for irrigation and frost protection of 85 acres, and stockwatering, recreational and fire protection uses at the reservoir. A small pond located just

southeast of Matheson Reservoir serves as a point of rediversion, storing water from Matheson Reservoir when water is used for frost protection.

Water Right Permit 18459 allows for the diversion of 48 acre-feet of water per year from Elder Creek at Point of Diversion 1 to storage in a proposed reservoir from November 1 to April 30. Water can be used for irrigation, frost protection and heat control of 97 acres, and stockwatering uses at the reservoir.

In addition to the above rights, Water Right Permit 18282 (Application 26179) allows for the diversion of 120 acre-feet of water per year from Elder Creek for frost protection of 60 acres. Riparian water from Elder Creek is also used for frost protection and dust control (Statements of Water Diversion and Use, S015231 and S015232).

Elevations in the development area range from approximately 940 to 1,680 feet above mean sea level. Ground slopes within the development area range from approximately 3 percent to 28 percent and average 19 percent. Smalls areas within the proposed vineyard blocks have ground slopes greater than or equal to 30 percent; approximately 7.3 acres would be developed on slopes greater than or equal to 30 percent. Soils within the development area include Bressa-Dibble Complex, Los Gatos Loam, Maymen-Millsholm-Lodo Association, Millsholm Loam and Pleasant Loam.

The dominant land cover types in the development area include oak woodlands, chaparral, grassland, riparian and vineyards. The project site is located in the Elder Valley Creek watershed and Elder Creek and numerous tributaries are located on the property. Elder Creek is tributary to Sage Creek, which flows into Lake Hennessey. Surface water exits the reservoir by way of Conn Creek, which is tributary to the Napa River thence San Pablo Bay. The entire property is currently grazed for fire protection purposes.

The project site is located within the Lake Hennessey Sensitive Domestic Water Supply Drainage, which is designated by Napa County as a Sensitive Domestic Water Supply Drainage. Napa County Code Chapter 19.108.027 Sensitive Domestic Water Supply Drainages outlines provisions applicable to sensitive domestic water supply drainages, including vegetation clearing limits and winter shut down requirements.

10. Other agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

Agency	Type of Approval
Federal Agencies	
U.S. Army Corps of Engineers	Clean Water Act Section 404 Permit
	National Historic Preservation Act Section 106 Compliance
U.S. Fish and Wildlife Service	Federal Endangered Species Act Compliance (Section 7)
State Agencies	
California Department of Fish and Wildlife	State Endangered Species Act Compliance (Section 2081)
	Section 1602 Streambed Alteration Agreement
State Water Resources Control Board, Division of Water Rights	Approval of Petitions for Change on Water Right License 9125 and Permit 18459
San Francisco Bay Regional Water Quality Control Board (Region 2)	National Pollutant Discharge Elimination System General Construction Storm Water Permit (Section 402)
	Clean Water Act Section 401 Water Quality Certification
State Historic Preservation Office	National Historic Preservation Act Section 106 Consultation
Local/Other Agencies	
Napa County Planning, Building and Environmental Services	CEQA Lead Agency, Agricultural Erosion Control Plan Approval, AB 52 Compliance, Grading and/or Building Permits

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, has consultation begun?

Consultation with California Native American tribes has begun. The Yocha Dehe Wintun Nation has requested formal consultation and consultation has begun.

ENVIRONMENTAL IMPACTS AND BASIS OF CONCLUSIONS

The conclusions and recommendations contained herein are professional opinions derived in accordance with current standards of professional practice. They are based on a review of the Napa County Environmental Resource Maps, the other sources of information listed in the file, and the comments received, conversations with knowledgeable individuals; the preparer's personal knowledge of the area; and visits to the project site. For further information, see the environmental background information contained in the permanent file on this project.

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

9-17-2018
Date

Donald Barrella
Printed Name

Napa County Planning, Building and Environmental Services

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1.	AESTHETICS. Would the project:				
	a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
	b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
	c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
	d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☐	☐	☒	☐

Discussion

a-b) The California Department of Transportation (Caltrans) manages the State Scenic Highway Program which is aimed at preserving and enhancing the natural beauty of California. The proposed project is not located in the vicinity of any designated state scenic highways (Caltrans 2018 - http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm).

The project site is located adjacent to State Route 128, which is designated as a scenic road by Napa County. The proposed project would largely be located within Elder Valley which is bordered by two ridgelines, although some proposed clearing areas would be visible from adjacent roadways including State Route 128 and Lower Chiles Valley Road. Only the clearing areas on the southern end of the proposed project would be near State Route 128, with some areas being within 500 feet of the road. The construction of the proposed project would occur over a period of approximately 5½ months during the three years of construction. The construction effects as they relate to aesthetics would involve views of construction equipment (e.g., trucks, excavation equipment, protective fencing, construction workers) in and around the project site. The presence of construction equipment, by itself, would not result in a significant effect as it is only temporary. The construction of the proposed project would result in changes to the existing viewshed along State Route 128 and Lower Chiles Valley Road; however, once the project is constructed, the proposed changes would be consistent with the surrounding area and consistent with the Napa County General Plan designation of AWOS. No new roads would be constructed as part of the proposed project. Rock generated during development of the proposed project is expected to be used to construct erosion control features and would not be stockpiled on the project site. Therefore, the proposed project would have a less than significant impact on scenic vistas and scenic resources. The Environmental Impact Report (EIR) will not analyze these issues.

c) The proposed project would result in the removal of existing vegetation within the proposed development area. Some proposed clearing areas would be located within 500 feet of State Route 128 resulting in changes to the existing scenic viewshed. The proposed project is consistent with the Napa County AWOS land use designation and with adjacent land uses, which include other vineyards. Therefore, the proposed project would have a less than significant impact on the existing visual character or quality of the site and its surroundings. The EIR will not analyze this issue.

d) Operation of the proposed project may require some nighttime activities as part of the annual harvest or other activities as required for upkeep of the vineyard. The proposed project would include nighttime activities such as frost protection (approximately eight times per year between 10 P.M. and 8 A.M), sulfur applications (approximately 12 times per year between 2 A.M and 6 A.M.), and continued grazing on the site (24-hour operation). Lighting for these activities would include headlights from vehicles and equipment. However, as discussed above, the proposed project would not significantly affect the existing viewshed. Therefore, the proposed project would have a less than significant impact on daytime or nighttime views in the area. The EIR will not analyze this issue.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
2.	AGRICULTURAL AND FOREST RESOURCES. Would the project:				
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☒	☐
c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Discussion

a-b) Agriculture and preservation of agricultural lands have been important to Napa County for nearly 50 years. The Napa County General Plan places an emphasis on agricultural preservation with the overarching goal to have agriculture as the primary land use in the county. Goals and policies in the Napa County General Plan are focused on preserving current agricultural land uses, promoting new agricultural land uses, and encourage active, sustainable forest management practices.

The project parcels have a General Plan designation of Agriculture, Watershed and Open Space (AWOS), and are zoned Agricultural Watershed (AW), therefore the establishment of vineyard is consistent with the property's land use and zoning designations.

A portion of the project site is mapped as Prime Farmland and Farmland of Local Importance under the Farmland Mapping and Monitoring Program (California Department of Conservation 2016). The project site is also under the following Williamson Act contracts: APN 025-270-022, Contract #01152-AGK, Instrument #2001-0042349, Recorded December 3, 2001; and APN 025-270-025, Contract #01153-AGK Instrument #2001-0042348, Recorded December 3, 2001. The proposed project includes agricultural development (the growing and raising of vines is defined as 'Agriculture' by the contract and is allowed under the terms of the contract) and the project site would not be converted to non-agricultural use with implementation of the project. Therefore, the proposed project would have a less than significant impact on agricultural resources, and would not conflict with the project site's land use or zoning designations, or the associated Williamson Act contracts. The EIR will not analyze these issues.

c-d) "Forest Land" is defined by in California Public Resource Code section 12220(g) as "land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits."

While the oak woodland within the project site meets the State's definition of "forest land," the proposed project would not conflict with current zoning for the project site, or cause rezoning. The oak woodland does not qualify as timberland under Public Resources Code section 4526, and the project site is not zoned as Timberland Production. Therefore, the proposed project would not have an impact on forest land or timberland. The Biological Resources section of the EIR will include an analysis of onsite vegetation communities and proposed tree removal.

e) The project does not include the construction of roadways or other infrastructure that would result in the conversion of existing farmland or forest land in the area to non-agricultural or forest land uses. Therefore, the proposed project would have a less than significant impact on agricultural or forest resources of Napa County. The EIR will not analyze these issues.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
3.	AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
d)	Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
e)	Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐

Discussion

a-c) The project site is located within the San Francisco Bay Air Basin and is within the jurisdiction of the Bay Area Air Quality Management District. Concentrations of criteria air pollutant are used as indicators of ambient air quality conditions. Criteria air pollutants of concern include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide and particulate matter. Potential short-term air quality impacts may result from construction activities. Construction-related emissions, which are temporary in nature, consist mainly of particulate matter generated from fugitive dust during grading or other earthmoving activities and other criteria pollutants generated through the exhaust from construction-related equipment and vehicular haul and worker trips. Potential long-term air quality impacts may result from ongoing activities associated with the operation and maintenance of the proposed vineyard. Operational-related emissions, which are seasonal in nature, are primarily generated from vehicular trips associated with workers going to and from the site (including grape haul trucks) and equipment necessary for ongoing vineyard maintenance.

The EIR will analyze the potential for the proposed project to conflict with or obstruct implementation of an air quality plan, violate an air quality standard, or result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment.

d-e) Some receptors are considered more sensitive than others to air pollution. Reasons for greater sensitivity include pre-existing health problems, proximity to emissions sources, or duration of exposure to air pollutants. Schools, hospitals and convalescent homes are considered relatively sensitive to poor air quality because infants and children, the elderly, and people with health afflictions, especially respiratory ailments, are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are also considered sensitive to air pollution because residents tend to be at home for extended periods of time.

Land uses surrounding the project site include agricultural areas, open space, and scattered residences. There are two residences onsite; one is inhabited full time and the second is inhabited part time. The EIR will analyze the potential for the proposed project to expose sensitive receptors to substantial pollutant concentrations or create objectionable odors affecting a substantial number of people.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
4. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion

a-e) Biological field surveys of the project site have included wildlife and botanical surveys (between 2014-2016 and 2018), a stream assessment, a wetland delineation, Valley elderberry longhorn beetle (VELB) and California red-legged frog (CRLF) focused surveys, and a survey to determine the presence or absence of special-status bryophytes (including mosses) and lichens on the project site. The EIR will provide a summary of findings from these surveys.

The project site contains upland annual grassland and forbs formation (including purple needlegrass grassland, beardless wildrye grassland, and blue wildrye grassland), mixed oak woodland (including blue oak alliance, coast live oak-blue oak [foothill pine] no formal description [NFD] Association, interior live oak-blue oak [foothill pine] NFD Association, mixed oak alliance, valley oak-[California bay-coast live oak-walnut-ash] riparian forest NFD Association), chaparral/scrub (scrub interior live oak-scrub oak mesic east county NFD super alliance), riverine, and urban or built up terrestrial communities.

The EIR will analyze the potential for the proposed project to have a substantial adverse effect on any species identified as a candidate, sensitive, or special-status in local or regional plans, policies or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service; any riparian habitat or other sensitive natural community; and federally protected wetlands as defined by Section 404 of the Clean Water Act. Potential direct and indirect species impacts such as through habitat fragmentation and habitat loss will be analyzed.

The EIR also will analyze the potential for the proposed project to interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. The EIR will analyze the potential for the proposed project to conflict with local policies or ordinances protecting biological resources, such as the County's Conservation Regulations, through activities such as tree removal as part of the proposed vineyard development.

f) There are no Habitat Conservation Plans, Natural Community Conservation Plans or other similar plans applicable to the project site; therefore, there would be no impact and the EIR will not analyze this issue.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
5. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☒	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐

Discussion

See Section 17 (Tribal Cultural Resources) for additional disclosure and details regarding tribal notification and consultation required pursuant to Assembly Bill 52 (Gatto).

a-d) Archaeological evidence indicates that human occupation of California began at least 11,000 years ago (Erlandson et al. 2007). Archaeological surveys conducted on lands in the area of the project site have identified numerous prehistoric sites ranging from temporary camps to larger permanent village sites (Origer 1999). Ethnographic literature indicates that at the time of European settlement, the project area was near the boundary between territory controlled by the Wappo and the Patwin (Barrett 1908; Johnson 1978; Sawyer 1978).

The earliest sustained settlement of the region by Euro-Americans began in 1823 with the establishment of the Mission San Francisco Solano, at Sonoma. The project area is within the Rancho Catacula land grant, located along Chiles Creek in the Chiles Valley. Rancho Catucula was granted to Joseph B. Chiles in 1844 and consisted of 8,545 acres of land (AES 2007).

Cultural resources field surveys of the project site occurred in 1981, 2007, 2014 and 2016. Based on the field surveys, records searches, literature review, and agency and Native American consultation, the EIR will analyze the potential for the proposed project to cause a substantial adverse change in the significance of a historical resource or archaeological resource as defined in State CEQA Guidelines section 15064.5 or disturb any human remains. The EIR also will analyze the potential for the proposed project to destroy a unique paleontological resource, site or unique geologic feature.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
6. GEOLOGY and SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☒	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

Discussion

a.i) Although a large number of faults have been mapped in Napa County, the project area is not located immediately adjacent to any historically active fault. The faults located closest to the project area are either pre-quaternary (older than 1.6 million years) or quaternary faults (age undifferentiated). The closest active fault (movement during the last 11,000 years) is the Green Valley Fault which is located approximately 12 miles to the southeast of the project area. According to the California Geological Survey (CGS), the project site is not located within an Earthquake Fault Zone as designated by the Alquist-Priolo Earthquake Fault Zoning Act (CGS 2018). No structures are included with the proposed project and therefore the proposed project would not subject new structures or people within them to seismic hazards. The proposed project would have a less than significant impact on people or structures as a result of fault rupture and the EIR will not analyze this issue.

a.ii) According to the map of Earthquake Shaking Potential for California, the project area lies within an area that will experience stronger earthquake shaking more frequently than other areas of the state (CGS 2016). Although the proposed project does not include structures, it could expose people to injury or death involving ground shaking. This impact is potentially significant and the EIR will analyze this issue.

a.iii) The project area is in an area characterized as having very low to moderate liquefaction susceptibility (Napa County 2009). Liquefaction occurs when water-saturated soil "liquefies" during an earthquake and buildings and other structures sink into the ground. Because the proposed project is agricultural in nature and does not include any structures or housing, the potential for liquefaction to result in adverse effects to people or structures would be less than significant. The EIR will not analyze this issue.

a.iv) Landslides are most common on steep slopes with unstable soils, and both ancient and relatively recent landslide activity has been found throughout Napa County. The project area consists of hillsides and areas known to be susceptible to landslides (U.S. Geological Survey 1997). Seismic activity can prompt landslides and as discussed previously, the project area is known to experience stronger ground shaking more frequently than other areas. Development of the proposed project on areas susceptible to landslides could expose people to risk. The EIR will analyze this issue.

b) Vegetation removal and earthmoving activities associated with development of the proposed project could lead to slope instability, which may result in increased erosion and loss of topsoil. In addition, development and operation of the vineyard could lead to changes to the existing erosion patterns. The implementation of both temporary and permanent erosion control measures could greatly reduce the potential for erosion. The EIR will discuss the potential for the proposed project to lead to potentially significant erosion and loss of topsoil and will evaluate proposed erosion control measures that could reduce these impacts.

c) As discussed previously, the project area is located in the hillsides of Napa County which are known to be prone to landslides. The project area is characterized as having low to moderate potential for liquefaction. The installation of temporary and permanent erosion control measures would improve management of runoff and erosion and lessen the potential for liquefaction. The EIR will analyze the potential for the clearing, grading, and earthmoving associated with the proposed project to lead to unstable soils.

d) Based on a review of known soil types in the project area, the area is not known to contain expansive soils. In addition, the absence of structures as part of the proposed project and the agricultural nature of the proposed project would reduce the risk to life or property. Therefore, the risk to life and property from expansive soils is less than significant. The EIR will not analyze this issue.

e) The proposed project does not include the construction of any septic tanks or wastewater disposal systems. Therefore, no impact would occur and the EIR will not analyze this issue.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
7. GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate a net increase in greenhouse gas emissions, either directly or indirectly, in excess of applicable thresholds adopted by the Bay Area Air Quality Management District or the California Air Resources Board which may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with a county-adopted climate action plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

Discussion

a-b) "Global warming" and "global climate change" are the terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century and its projected continuation. Natural processes and human actions have been identified as the causes of this warming. Increases in greenhouse gas (GHG) concentrations in the earth's atmosphere are thought to be the main cause of human-induced climate change. Certain gases in the atmosphere naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space. This is sometimes referred to as the "greenhouse effect" and the gases that cause it are called "greenhouse gases." Some GHGs occur naturally and are necessary for keeping the earth's surface habitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are the principal GHGs. When concentrations of these gases exceed natural concentrations in the atmosphere, the greenhouse effect may be intensified.

Construction emissions associated with vineyard development projects include the soil carbon stocks that are lost (or released) when site vegetation is removed and soil is ripped in preparation for vineyard development and planting and emissions associated with the energy used to develop and prepare the project site and plant vineyard, including construction equipment and worker vehicle trips. Operational emissions of the vineyard include any reduction in the amount of carbon sequestered by existing vegetation that is removed as part of the project and ongoing emissions from the energy used to maintain and farm the vineyard, including farm equipment and vehicles.

The EIR will analyze the potential for the proposed project to generate GHG emissions in excess of applicable thresholds adopted by the Bay Area Air Quality Management District or the California Air Resources Board which may have a significant impact on the environment or conflict with a county-adopted climate action plan, policy or regulation adopted for the purpose of reducing GHG emissions. The EIR will include an analysis of the change in annual sequestration and soil carbon storage as a result of woodland conversion associated with development of the proposed project.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
8. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h)	Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☒	☐	☐	☐

Discussion

a-b) Materials and waste may be considered hazardous if they are poisonous (toxicity), can be ignited by open flame (ignitability), corrode other materials (corrosivity), or react violently, explode or generate vapors when mixed with water (reactivity). The term "hazardous material" is defined in law as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment. In some cases, past industrial or commercial uses can result in spills or leaks of hazardous materials and petroleum to the ground, resulting in soil and groundwater contamination.

Construction and operation of the proposed project would involve the routine transport, use, storage, and/or disposal of materials generally regarded as hazardous materials that are used in construction and operational activities. It is anticipated that limited quantities of miscellaneous hazardous substances, such as gasoline, diesel fuel, hydraulic fluids, and other similarly related materials would be brought onto the project site, used, and stored during construction and operation. The improper use, storage, handling, transport or disposal of hazardous materials could result in accidental release of hazardous materials, thereby exposing construction workers, the public and the environment, including soil and/or ground or surface water, to hazardous materials contamination. Transportation of hazardous materials on area roadways is regulated by CHP and Caltrans, and use of these materials is regulated by Department of Toxic Substances Control (DTSC), as outlined in Title 22 of the CCR. Any project facilities that would use or store hazardous materials would be required to obtain permits and comply with appropriate regulatory agency standards designed to avoid hazardous waste releases. The EIR will analyze potential hazards to the public or the environment through the routine transport, use, storage, and/or disposal of hazardous materials.

c) The project site is not located within 0.25 mile of any existing or proposed schools. The closest school, Yountville Elementary School, is approximately 8 miles southwest of the project site. Therefore, no impact would occur and the EIR will not analyze this issue.

d) Information about hazardous materials sites in the project area was collected by conducting a review of the California Environmental Protection Agency's (Cal EPA) Cortese List Data Resources (Cortese List). The Cortese list includes the following data resources that provide information regarding the facilities or sites identified as meeting the Cortese list requirements: the list of Hazardous Waste and Substances sites from Department of Toxic Substances Control (DTSC) EnviroStor database; the list of Leaking Underground Storage Tank (LUST) sites from GeoTracker database; the list of solid waste disposal sites identified by Water Board; the list of active Cease and Desist Orders and Cleanup and Abatement Orders from Water Board; and the list of hazardous waste facilities subject to corrective action pursuant to Health and Safety Code section 25187.5 identified by DTSC. The Cortese List is a reporting document used by the state, local agencies, and developers to comply CEQA requirements in providing information about the location of hazardous materials release sites. The Cortese List is updated at least annually, in compliance with California regulations (California Code section 65964.6(a)(4)). The Cortese List includes federal superfund sites, state response sites, nonoperating hazardous waste sites, voluntary cleanup sites, and school cleanup sites. Review of the Cortese List revealed that no past or present hazardous materials contamination exists within the project area (DTSC 2018).

The project site is not located on a site which is known to be included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5. Therefore, no impact would occur and the EIR will not analyze this issue.

e-f) The project site is not located in the vicinity of a public or private airport, or within an airport land use plan. The nearest airport is the Moskowite Airport, which is more than 5 miles to the southeast of the project area. Therefore, the proposed project would not impair operations of any nearby airports and would not affect airport safety. The EIR will not analyze this issue.

g) The project site would be accessed during construction and operation by Sage Canyon Road/State Route 128. The Napa County General Plan classifies Sage Canyon Road/State Route 128 as a collector street. In rural areas of the County, there are many roadways that do not serve regional traffic and serve more as collectors, providing access between rural destinations and the regional roadway network (Napa County 2007). The proposed project would be developed off of Sage Canyon Road/State Route 128 and would have a less than significant impact on emergency response plans and evacuation plans. The EIR will not analyze this issue. The potential for the proposed project to interfere with emergency access will be analyzed in the Transportation and Traffic section of the EIR.

h) The project site is located in a rural and agricultural part of Napa County. The Napa County General Plan classifies the project area as moderate for fire hazard severity (Napa County 2009). Construction of the proposed project would include the use of heavy equipment and other activities within areas that could be subject to wildfires. This impact is considered potentially significant, and the EIR will analyze this issue.

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
9.	**HYDROLOGY AND WATER QUALITY. Would the project:**				
a)	Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☒	☐	☐	☐
d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☒	☐	☐	☐
e)	Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☐
f)	Otherwise substantially degrade water quality?	☒	☐	☐	☐
g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h)	Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☐	☒
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☒	☐	☐	☐
j)	Inundation by seiche, tsunami, or mudflow?	☒	☐	☐	☐

Discussion

a, c-f) The proposed project could have a potentially significant impact on water quality during construction and operation or potentially provide substantial additional sources of polluted runoff. Construction activities could impact water quality from earthmoving activities and use of hazardous materials. Erosion, sedimentation, and hazardous materials spills could significantly impact water quality. In addition, use of chemicals during operation of the proposed project could impair water quality. Elder Creek, which runs through the project site, is tributary

to Sage Creek, and Sage Creek and Chiles Creek drain to Hennessey Reservoir. The Lake Hennessey drainage is designated as a Sensitive Domestic Water Supply Drainage by Napa County. Earthmoving activities in designated sensitive domestic water supply watersheds are regulated by Chapter 18.108.127 of the Napa County zoning ordinance. Impacts to water quality are potentially significant and the EIR will analyze these issues.

The EIR also will analyze the potential for the proposed project to substantially alter the existing drainage pattern in a manner which would result in substantial erosion, siltation or flooding on or offsite, or increase the rate or amount of surface water runoff in a manner that would resulting in flooding on or offsite.

b) The proposed project does not include any groundwater extraction. The proposed vineyard would be served entirely by surface water, including water stored in a proposed offstream reservoir; no groundwater would be used for the proposed vineyard. The proposed project would have limited impermeable surfaces and as such would not significantly impede groundwater recharge. Therefore, the proposed project would have less than significant impact on groundwater supplies and recharge and the EIR will not analyze this issue.

g-h) The development area is not located within a 100-year flood hazard area. In addition, the proposed project does not include the construction of housing. Therefore, the proposed project would not place any housing or structures within a 100-year flood hazard area and would not impede or redirect flood flows. No impact would occur and the EIR will not analyze this issue.

i) The proposed project could result in increased peak water flows downstream of the development area. The increase in peak flows could result in flooding. This impact is considered potentially significant and the EIR will analyze this issue.

j) The project site is located over 40 miles from the Pacific Ocean and over 25 miles from San Pablo Bay. Therefore, the project site would not be susceptible to tsunami and this issue will not be discussed in the EIR.

The potential for seiche in Napa County exists from the proximity to San Pablo Bay, Lake Hennessey, and Lake Berryessa; however, the development area is located in the hillsides of Napa County and in an area that would not be affected by seiche. This issue will not be discussed in the EIR.

As discussed previously, the hillsides around the development area may be prone to landslides; mudslides may be possible in the development area and the EIR will analyze this issue.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
10. LAND USE AND LAND USE PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Discussion

a) The project site is not located within or near any established community. The proposed project is consistent with Napa County AWOS General Plan designation. Therefore, the proposed project would not physically divide an established community and no impact would occur. The EIR will not analyze this issue.

b) The Napa County General Plan describes the intent of the AWOS designation as follows:

> To provide areas where the predominant use is agriculturally oriented; where watersheds are protected and enhanced; where reservoirs, floodplain tributaries, geologic hazards, soil conditions, and other constraints make the land relatively unsuitable for urban development; where urban development would adversely impact all such uses; and where the protection of agriculture, watersheds, and floodplain tributaries from fire, pollution, and erosion is essential to the general health, safety, and welfare.

The Agricultural Preservation and Land Use Element contains goals and policies aimed at preserving existing agricultural land uses, planning for future agricultural uses, supporting the economic well-being of agriculture, and planning for adjacent land uses to be in locations compatible with agricultural land uses. General uses for the AWOS designation include processing of agricultural products and single-family dwellings.

The Conservation Element contains goals and policies related to the protection and preservation of agricultural land uses, conservation of special-status species, protection of habitat, minimization of impacts from discretionary projects, off-setting of discretionary project impacts, evaluation of biological resources for discretionary projects in areas containing or potentially containing special-status species, protection of groundwater, protection of surface water, and protection of wetlands.

The Napa County zoning ordinance describes the project site's AW zoning district as follows:

> The AW district classification is intended to be applied in those areas of the county where the predominant use is agriculturally oriented, where watershed areas, reservoirs and floodplain tributaries are located, where development would adversely impact on all such uses, and where the protection of agriculture, watersheds and floodplain tributaries from fire, pollution and erosion is essential to the general health, safety and welfare.

Agriculture is one of the uses allowed within AW districts without a use permit.

The Napa County Conservation Regulations contains general provisions for intermittent/perennial streams. The regulations state that the clearing of land for new agricultural uses is required to comply with designated stream setbacks which are based on slope, unless a use permit is obtained from Napa County, or unless an exemption in Section 18.108.050 applies. Setbacks are measured from the top of the bank on both sides of the stream as it exists at the time of replanting, redevelopment, or new agricultural activity.

The EIR will discuss the proposed project's compliance with applicable general plan policies, zoning ordinance requirements and other regulatory requirements. The Biological Resources section of the EIR will discuss any potential conflict with wildlife corridors and consistency with applicable federal, state and local plans and policies regarding wildlife and vegetation. Potential conflicts with applicable plans and policies regarding air quality and greenhouse gas emissions will be discussed and analyzed in the Air Quality and Greenhouse Gas Emissions sections of the EIR.

c) The project site is not located within an area with an applicable habitat conservation plan or natural community conservation plan. Therefore, no impact would occur and the EIR will not analyze this issue.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
11. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Discussion

a-b) The Napa County General Plan states that despite historic mining activities, the opportunities for future mineral extraction in Napa County are not well known. The CGS does not show any mineral resource zones (MRZ) within the project site (CGS 2013). There is currently one mine in Napa County designated as active by the State Department of Conservation, Office of Mine Reclamation: Napa Quarry (Syar Industries, Inc.) (California Department of Conservation 2018).

The Napa County General Plan contains conservation goals and policies to identify and protect mineral resources. The purpose of these goals and policies is to protect resources for future use and to promote the reasonable, safe, and orderly operation of mining and extraction and management activities. The Napa County General Plan does not identify any mineral resources of significance to the County, region or state within the project site (Napa County 2008).

The project site does not contain mineral resources and is not located in an area identified in the Napa County General Plan as containing mineral resources. The proposed project would not result in the loss of availability of known classified MRZ-2 by the State geologist that

would be of value to the region and the residents of the state. The Napa County General Plan does not identify any locally important mineral resources or recovery sites in the project area; the nearest mineral resource area in Napa County (Syar Industries, Inc.) is located over 15 miles south of the project site. Therefore, no impact would occur and the EIR will not analyze this issue.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
12. NOISE. Would the project result in:				
a) Exposure of persons to or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion

a-d) The noise environment in the area surrounding the project site is characterized by rural roadways, rural agricultural noise, and scattered residences. It includes low-volume traffic noise from tractors, large trucks, and other farm equipment, both on and off-road passenger vehicles, and traffic noise along Sage Canyon Road/State Route 128. Activities associated with the installation of the proposed vineyard includes earthmoving and operation of the proposed vineyard could generate noise levels above existing conditions.

The EIR will analyze the potential for the proposed project to expose people to or generate excessive groundborne vibration or noise levels in excess of standards. The EIR also will analyze the potential for the proposed project to result in a substantial temporary or permanent increase in ambient noise levels in the project vicinity.

e-f) The project site is not located within an airport land use plan or within 2 miles of a public airport or private air strip. Therefore, no impact would occur and the EIR will not analyze this issue.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
13. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion

a) The population of Napa County was approximately 140,973 in July of 2017 (U.S. Census Bureau 2017). Construction and operation of the proposed project would not require a substantial workforce and no new homes, businesses or new roads would be constructed. The

proposed project would not directly or indirectly induce substantial population growth. Therefore, this impact is less than significant and the EIR will not analyze this issue.

b-c) There are two residences located within the project site. However, construction of the proposed project would not result in the demolition of either residence. The proposed project would not displace substantial numbers of housing or people necessitating the construction of replacement housing elsewhere. No impact would occur and the EIR will not analyze these issues.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
14. PUBLIC SERVICES. Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
i) Fire protection?	☐	☐	☐	☒
ii) Police protection?	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

Discussion

a.i-v) The project site is located in an unincorporated area of Napa County. The Napa County Sheriff's Department provides law enforcement services for the project area. Fire protection in Napa County is provided by Napa County as well as volunteer fire stations, a contract with the California Department of Forestry and Fire Protection (CalFire) and auto aid agreements with surrounding departments. The Angwin Community Ambulance (ACA), Piner's Ambulance, REACH Air Medical Services, the California Highway Patrol Air Operations Unit (CHP) provides emergency medical services in Napa County. Schools in the project area are operated by the St. Helena Unified School District. The Napa County Regional Park and Open Space District manages the parks and open space resources within the county.

The proposed project would not result in the need for new governmental facilities or altered government facilities. As discussed previously, the proposed project would not directly or indirectly induce substantial population growth that would require government facilities. In addition, the proposed project would not generate any additional demands for additional public services that would require new or altered facilities, including police and fire protection. Therefore, the proposed project would not increase the demand for schools, parks, or other public facilities. As a result, no impacts would occur and the EIR will not analyze these issues.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
15. RECREATION:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion

a-b) There are no federal, State, regional or other parks located within the project site. The proposed project does not include the construction or expansion of recreational facilities, and it would not result in substantial population growth that would lead to the increased use of existing recreational facilities. Therefore, no impact would occur and the EIR will not analyze this issue.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
16. TRANSPORTATION/TRAFFIC. Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system and/or conflict with General Plan Policy CIR-16, which seeks to maintain an adequate Level of Service (LOS) at signalized and unsignalized intersections, or reduce the effectiveness of existing transit services or pedestrian/bicycle facilities?	☒	☐	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the Napa County Transportation and Planning Agency for designated roads or highways?	☒	☐	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☐
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐	☐	☐
e) Result in inadequate emergency access?	☒	☐	☐	☐
f) Conflict with General Plan Policy CIR-23, which requires new uses to meet their anticipated parking demand, but to avoid providing excess parking which could stimulate unnecessary vehicle trips or activity exceeding the site's capacity?	☐	☐	☐	☒
g) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

Discussion

a-b) The project site is accessed by Sage Canyon Road/State Route 128, a two-lane road that intersects with Capell Valley Road and Knoxville Road approximately 1.5 miles southeast of the project site and with Chiles Pope Valley Road approximately 1.25 miles west of the project site.

The EIR will analyze the potential for the proposed project to cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system and/or conflict with General Plan Policy CIR-16. The EIR also will analyze the potential for the proposed project to conflict with an applicable congestion management program.

c) The proposed project would not result in a change in air traffic patterns and therefore no impacts are anticipated on either air traffic patterns or air traffic safety. The EIR will not analyze this issue.

d-e) The proposed project would utilize existing site access for project development and operations. The EIR will analyze the potential for the proposed project to substantially increase hazards or result in inadequate emergency access.

f) The project would generate its largest demand for parking (approximately 40 vehicles) during the harvest period which lasts approximately 60 days. Current county ordinances do not require formal parking for agricultural projects. Parking along proposed vineyard avenues would satisfy parking demands of project installation and subsequent vineyard operations. Therefore, no parking impacts are anticipated and the EIR will not analyze this issue.

g) There are no adopted policies, plans, or programs supporting alternative transportation that applies to agricultural vineyard projects. Therefore, the project would have no impact in this area and the EIR will not analyze this issue.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
17. TRIBAL CULTURAL RESOURCES. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☒	☐	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☒	☐	☐	☐

Discussion

a-b) As defined in Public Resources Code section 21074, tribal cultural resources are sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a Tribe or Tribes. These resources may also be on, or eligible for, listing in the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHP), or be determined by the lead agency to be considered tribal cultural resources. Tribal cultural resources also include prehistoric archaeological sites and human remains, ethnographic sites, and historic-era landscapes and sites occupied, used, or spiritually and culturally valued by Native Americans.

On December 26, 2017, the County notified pursuant to Public Resources Code section 21074 (AB 52: Gatto) the Mishewal-Wappo Tribe of Alexander Valley and the Middletown Rancheria of the proposed project. On April 9, 2018, the County sent notification to these Tribes closing the consultation invitation because more than 30 days had elapsed since confirmed receipt of the County's December 2017 consultation invitation. On April 9, 2018, AB 52 notification was sent to the Yocha Dehe Wintun Nation, and on April 27, 2018, Yocha Dehe replied requesting initiation of formal consultation. Napa County has initiated tribal consultation with the Yocha Dehe Wintun Nation, which may result in the additional identification of potential tribal cultural resources in the project area. Based on this consultation and a review of primary and secondary sources, the EIR will analyze the potential for the proposed project to cause a substantial adverse change in the significance of a tribal cultural resource.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
18. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Discussion

a-b) The proposed project is located in an unincorporated area of Napa County that is not served by public water or wastewater services. The proposed project would not generate wastewater, exceed water treatment requirements, and would not result in the construction of new water or wastewater treatment facilities. Therefore, no impact would occur and the EIR will not analyze this issue.

c) The proposed project would not require or result in the construction of new stormwater drainage facilities or expansion of existing facilities. Temporary and permanent erosion control measures would be installed and the EIR will describe the effect of the proposed measures in the Biological Resources, Geology and Soils, and Hydrology and Water Quality sections. Elder Creek and tributaries in the project site that meet the Napa County definition of a stream have setbacks determined by slope, as outlined in Napa County Conservation Regulation 18.108.025. All waters of the U.S. not requiring a Napa County stream setback, and all wetlands, have been avoided with a minimum 50-foot buffer, which includes a 24-foot turnaround avenue and a 26-foot undisturbed filter strip. Therefore, no impact would occur and the EIR will not analyze this issue.

d) The proposed project would be served entirely by surface water and no groundwater would be used for the proposed vineyard. As discussed in the project description, the proposed project includes Petitions for Change on Water Right Licenses 9125 and Permit 18459 which are pending with the State Water Board; no new or expanded water entitlements are being requested. Therefore, the EIR will not analyze this issue. The Hydrology and Water Quality section of the EIR will include an analysis of water availability and water use.

e) The proposed project does not include or require a wastewater system. Therefore, no impact would occur and the EIR will not analyze this issue.

f-g) Construction and operation of the proposed project would result in the production of minimal amounts of solid waste. The amount of waste produced is not anticipated to adversely affect the landfill capacity of the Clover Flat Landfill, located closest to the project site, and which had over half of its remaining capacity available in 2012 and an expected closure date of January 2047 (CalRecycle 2018).

The California Integrated Waste Management Board is responsible for guaranteeing the proper storage and transportation of solid waste by providing standards for storage and transportation of solid waste containing toxic materials generated by urban and industrial users. The applicant/owner would be required to compliance with these regulations, to the extent that they apply to agricultural projects, which will ensure that the project would have no impact. The EIR will not analyze these issues.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
19. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to 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?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Discussion

a-c) The EIR will analyze the potential for the proposed project to impact the environment or human beings, both individually and on a cumulative basis when viewed in connection with the effects of past, current and probable future projects.

References

Analytical Environmental Services (AES). 2007 (June). Cultural Resources Study: Chapman-Sage Canyon Water Right Project. Sacramento, CA.

Barrett, S.A. 1908. The Ethnogeography of Pomo and Neighboring Indians. *Publications in American Archaeology and Ethnology* 6(1):1-332. University of California. Berkeley, CA.

California Department of Conservation. 2015. Napa County Williamson Act FY 2015/2016. Available at: ftp://ftp.consrv.ca.gov/pub/dlrp/wa/Napa_15_16_WA.pdf. Accessed August 14, 2018.

_____. 2016. California Important Farmland Finder. Available at: https://maps.conservation.ca.gov/DLRP/CIFF/. Accessed August 14, 2018.

_____. 2018. AB 3098 List – August 13, 2018. Available at: ftp://ftp.consrv.ca.gov/pub/omr/AB3098%20List/AB3908List.pdf. Accessed August 14, 2018.

California Department of Transportation (Caltrans). 2018. California Scenic Highway Mapping System – Napa County. Available at: http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/. Accessed August 14, 2018.

California Geological Survey (CGS). 2013. Update of Mineral Land Classification: Aggregate Materials in the North San Francisco Bay Production-Consumption Region, Sonoma, Napa, Marin, and Southwestern Solano Counties, California. Available at: ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sr/SR_205/SR%20205%20North%20Bay%20Report_Final.pdf. Accessed August 15, 2018.

_____. 2016. Earthquake Shaking Potential for California. Available at: ftp://ftp.conservation.ca.gov/pub/dmg/pubs/ms/048/MS_048_revised_2016.pdf. Accessed May 30, 2018.

_____. 2018. Fault Activity Map of California (2010). Available at: http://maps.conservation.ca.gov/cgs/fam/. Accessed May 30, 2018.

California Department of Toxic Substances Control (DTSC). 2018. DTSC's Hazardous Waste and Substances Site List – Site Cleanup (Cortese List). Available at: http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm. Accessed May 30, 2018.

CalRecycle. 2018. Facility/Site Summary Details: Clover flat Resource Recover park. Available at: http://www.calrecycle.ca.gov/SWFacilities/Directory/28-AA-0002/. Accessed August 14, 2018.

Erlandson, J.T., Rick, T., Jones, J., Porcasi. 2007. One if by Land, Two if by Sea: Who Were the First Californians? In *California Prehistory: Colonization, Culture, and Complexity*, ed. T. Jones and K. Klar, 53-62. AltaMira Press. Lanham, MD.

Johnson, P. 1978. Patwin. In *California*, ed. R. F. Heizer, 350-360. Handbook of North American Indians, Vol. 8. W.C. Sturtevant, General Editor. Smithsonian Institution. Washington, DC.

Napa County. 2007. Napa County General Plan Update Draft Environmental Impact Report. Available at: https://www.countyofnapa.org/DocumentCenter/View/7956/44-Transportation-GP-DEIR. Accessed August 15, 2018.

_____. 2008. Napa County General Plan. Available at: https://www.countyofnapa.org/1760/General-Plan. Accessed August 14, 2018.

_____. 2009. Napa County General Plan, Safety Element. Amended June 2009. Available at: https://www.countyofnapa.org/DocumentCenter/View/3326/Safety-Element-PDF. Accessed August 15, 2018.

Origer, T. 1999. An Investigation of Prehistoric Resources Along Sage and Elder Valley Creeks, Lower Chiles Valley, Napa County, California. Report on file, Northwest Information Center, Sonoma State University, Rohnert Park, CA.

PPI Engineering. 2018. ECPA Application P17-00432 and Erosion Control Plan. On file at Napa County Department of Planning, Building and Environmental Services.

Sawyer, J. 1978. Wappo. In *California*, ed. R.F. Heizer, 256-263. Handbook of North American Indians, Vol. 8, W. C. Sturtevart, General Editor. Smithsonian Institution. Washington, DC.

U.S. Census Bureau. 2017. Quick Facts – Napa County. Available at: https://www.census.gov/quickfacts/fact/table/napacountycalifornia/PST045217. Accessed August 14, 2018.

U.S. Geological Survey. 1997. San Francisco Bay Region Landslide Folio Part E (Debris Flow Source Maps). Available at: https://pubs.usgs.gov/of/1997/of97-745/na-df.pdf. Accessed May 30, 2018.

Wagner & Bonsignore. 2018 (June). License 9125 (Application 13943) and Permit 18459 (Application 26165) – Somerston Estate Amendment to Petitions for Change. On file at Napa County Department of Planning, Building and Environmental Services.

LIST OF FIGURES:

Figure 1 – Regional Location Map
Figure 2 – Project Site and Vicinity
Figure 3 – Aerial Map
Figure 4 – Deer Fence
Figure 5 – Proposed Place of Use

LIST OF TABLES:

Table 1 – Acres of Proposed Vineyard Blocks
Table 2 – Proposed Place of Use, License 9125 (Application 13943) and Permit 18459 (Application 26165)
Table 3 – Anticipated Construction Equipment
Table 4 – Annual Operations Schedule

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
OFFICE OF TRANSIT AND COMMUNITY PLANNING
P.O. BOX 23660, MS-10D
OAKLAND, CA 94623-0660
PHONE (510) 286-5528
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

RECEIVED
OCT 17 2018
Napa County Planning, Building & Environmental Services

Making Conservation a California Way of Life.

October 17, 2018

SCH # 2018092042
GTS # 04-NAP-2018-00139
GTS ID: 12690
PM: NAP – 128 – 17.149

Donald Barrella
Napa County Dept. of Planning, Building, and Environmental Services
1195 Third Street, Suite 210
Napa, CA 94559

KJS and Sorrento Vineyard Conversion Erosion Control Plan Application (ECPA) #P17-00432 – Notice of Preparation (NOP)

Dear Mr. Barrella:

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 to evaluate and mitigate impacts to the State Transportation Network (STN). Caltrans' *Strategic Management Plan 2015-2020* aims to reduce Vehicle Miles Traveled (VMT) in part, by tripling bicycle and doubling both pedestrian and transit travel by 2020. Our comments are based on the September 18, 2018 NOP.

Project Understanding

The project proposes vegetation removal and earthmoving activities on slopes greater than 5 % in connection with the development of 111.5 net acres of vineyard within 156.8 gross acres on a 972.8-acre project site. Proposed activities associated with vineyard development include removing vegetation within the proposed clearing limits, ripping, rock removal, soil cultivation, seeding a cover crop, mulching, trenching for irrigation pipelines, installing a trellis system and deer fence, laying out vine rows, and installing temporary and permanent erosion control measures. The proposed project includes Petitions for Change on Water Right License 9125 (Application 13943) and Permit 18459 (App 26165), which are pending review and processing with the State Water Resources Control Board (SWRCB), Division of Water Rights. The petitions request an expansion of the place of use to 280 acres (which includes the existing vineyards on the project site as well as the proposed vineyards); the construction of a new 48-acre-ft capacity offstream reservoir; and the construction of a new diversion structure in Elder Creek. Existing Matheson Reservoir would be the point of diversion by collection to storage and a point of rediversion to an existing offstream pond just south of Matheson Reservoir, and the offstream pond would be a point of rediversion from Matheson Reservoir, allowing for the

transfer of water between the points of diversion, reservoirs and pond. The project also includes the ongoing maintenance of erosion control measures and operations of approximately 4.3 acres of existing vineyards, converted from grassland in 2015 without benefit of an ECPA. These vineyard areas are located within two larger vineyard blocks totaling 17.4 acres, all of which occur on lands with a slope of 5% or less and therefore, are not subject to an ECPA pursuant to Napa County Code (NCC) section 18.108.070(B) except for the aforementioned 4.3 acres occurring on slopes over 5%. Accordingly, the vineyard development area requiring ECPA coverage pursuant to NCC Section 18.108.070(B) will be included in this project. The project is located adjacent to, and primarily accessible from State Route (SR) 128, designated Sage Canyon Road.

Travel Demand Analysis
Please clarify the impacts to State Route (SR) 128 during construction and operation. This should include a description of the quantity and type of truck and employee trips during construction and operations.

With respect to the local and regional roadway system, provide project-related trip generation, distribution, and assignment estimates. Potential queuing issues, as well as turning movements should be evaluated. In conducting these evaluations, it is necessary to use demand volumes rather than output volumes or constrained flow volume. Please evaluate for issues such as inadequate sight distance and inadequate vehicle storage, which could lead to speed differentials and turning movement conflicts. To ensure that queue formation does not create traffic conflicts, the project-generated trips should be added to the existing and future scenario traffic volumes for the SR 128 intersections listed below. CEQA does not exempt these types of operational concerns from evaluation.

- Capel Valley Road
- Knoxville Valley Road
- Chiles Pope Valley Road
- Project Driveway

Cultural Resources
The project location is extremely sensitive for archaeological deposits and multiple archaeological sites have been record within the area. As part of the environmental review for the proposed project, pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15064.5, we recommend that the County of Napa conduct a cultural resource technical study that at a minimum includes a records search at the Northwest Information Center of the California Historical Resources Information System (CHRIS), a field survey of the project area by a qualified archaeologist and a qualified architectural historian, and Native American consultation.

If an encroachment permit is needed for work within Caltrans right-of-way (ROW), we may require that cultural resource technical studies be prepared in compliance with CEQA, Public Resources Code (PRC) 5024, and the Caltrans Standard Environmental Reference (SER) Chapter 2 (http://www.dot.ca.gov/ser/vol2/vol2.htm). Should ground-disturbing activities take place

within Caltrans ROW and there is an inadvertent archaeological or burial discovery, in compliance with CEQA, PRC 5024.5, and the SER, all construction within 60 feet of the find shall cease and the Caltrans District 4 Office of Cultural Resource Studies (OCRS) shall be immediately contacted.

Multimodal Planning
Please identify any impacts that increased project traffic might have on bicyclists using the SR 128 corridor, i.e., modal conflicts. There is a project identified in the *Caltrans District 4 Bike Plan* (2018), as **Nap-128-C04**, which calls for corridor and shoulder improvements. The vineyard project should be conditioned to identify and prioritize improvements to sections of the corridor where they would most effectively mitigate potential modal conflicts, and allocate sufficient fair share contributions to their construction. Please provide Caltrans with a copy of the Conditions of Approval and Staff Report once finalized.

Transportation Permit
Project work that requires movement of oversized or excessive load vehicles on state roadways requires a transportation permit that is issued by the Department. 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: Office of Transportation Permits, California DOT Headquarters, P.O. Box 942874, Sacramento, CA 94274-0001. See the following website link for more information: http://www/dot.ca.gov/hq/traffops/permits/.

Encroachment Permit
Please be advised that any work or traffic control that encroaches onto the State ROW requires an encroachment permit that is issued by Caltrans. To obtain an encroachment permit, a completed encroachment permit application, environmental documentation, and six (6) sets of plans clearly indicating the State ROW, and six (6) copies of signed and stamped traffic control plans must be submitted to: Office of Encroachment Permits, California DOT, District 4, P.O. Box 23660, Oakland, CA 94623-0660. To download the permit application and obtain more information, visit http://www.dot.ca.gov/hq/traffops/developserv/permits/.

Lead Agency
As the Lead Agency, the County of Napa is responsible for all project mitigation, including any needed improvements to the STN. The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures.

Thank you again for including Caltrans in the environmental review process. Should you have any questions regarding this letter, please contact Jake Freedman at 510-286-5518 or jake.freedman@dot.ca.gov.

Sincerely,

[redacted]

PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

RECEIVED
SEP 27 2018
Napa County Planning, Building
& Environmental Services

September 25, 2018

Donald Barrella
Napa County
1195 Third Street, Room 210
Napa, CA 94559

RE: SCH# 2018092042 KJS and Sorrento Vineyard Conversion Erosion Control Plan Application (ECPA) #P17-00432, Napa County

Dear Mr. Barrella:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
    b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
    a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
    b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
    c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Sharaya.Souza@nahc.ca.gov.

Sincerely,

for

Sharaya Souza
Staff Services Analyst

cc: State Clearinghouse

RECEIVED
OCT 17 2018
Napa County Planning, Building
& Environmental Services

CITY OF NAPA

Utilities Department

October 12, 2018

County of Napa
Department of Planning, Building & Environmental Services
ATTN: Mr. Donald Barella
1195 Third Street, Suite 210
Napa, CA 94559-3092

Subject: KJS Investment & Sorrento, Inc. Vineyard Conversion P17-00432
Assessor's Parcel: 025-270-022 and -025 (3370 and 3380 Sage Canyon Road)

Dear Mr. Barella:

I have received an Initial Study Checklist dated September 2018 for the above-mentioned project.

As vineyard conversions occur within the watershed, the City will continue to monitor the reservoir's water quality and consider the ten percent cumulative impacts amidst continual data collection, analysis and reporting.

The owner shall be responsible for ensuring that all erosion control measures are maintained and remain intact to prevent exceedance of baseline natural runoff levels of sediment and nutrients, especially during intense rainfall events that produce the runoff that contributes to the municipal water reservoir.

Please contact me at 257-9521 if you have any questions or require additional information.

Respectfully,

M.J. Hether, P.E.
Senior Civil Engineer

cc: Scoop/File/Author

G:\Gis\PubWrks\Water\Megan\H Drive Files\City\County Permits\KJS Sorrento Vineyard Conversion\KJS Sorrento Vineyard Conversion P17-00432.docx

APPENDIX C
WATER RIGHTS LICENSE AND PERMITS

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

APPLICATION 13943 PERMIT 9204 LICENSE 9125

ORDER ALLOWING CHANGE IN THE PLACE OF USE

WHEREAS:

1. License 9125 was issued to William N. L. Hutchinson, Jr., and Bonna Comel Di Socebran Hutchinson DBS Elder Valley Ranch Company, A Partnership, and was recorded with the County Recorder of Napa County on February 10, 1970 in Volume 822, Page 410.

2. License 9125 was subsequently assigned to Christina Vineyards, A Partnership.

3. A petition for change in place of use has been filed with the State Water Resources Control Board and said Board has determined that good cause for such change has been shown.

4. The Board has determined that the petitioned changes do not constitute the initiation of a new right nor operate to the injury of any other lawful user of water.

NOW, THEREFORE, IT IS ORDERED THAT:

1. The place of use under this license shall be as follows:

10 acres within SW¼ of NW¼ Projected Section 26, T8N, R4W, MDB&M
3 acres within SE¼ of NW¼ Projected Section 26, T8N, R4W, MDB&M
5 acres within NE¼ of SW¼ Projected Section 26, T8N, R4W, MDB&M
12 acres within NW¼ of SW¼ Projected Section 26, T8N, R4W, MDB&M
10 acres within SW¼ of SW¼ Projected Section 26, T8N, R4W, MDB&M
20 acres within SE¼ of SW¼ Projected Section 26, T8N, R4W, MDB&M
60 Acres Total

Dated: SEPTEMBER 25 1981

Raymond Walsh

Raymond Walsh, Chief
Division of Water Rights

3

WRCB
133 (12-67)

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

APPLICATION 13943 PERMIT 9204 LICENSE 9125

ORDER ALLOWING CHANGE IN PURPOSE OF USE,
PLACE OF USE AND AMENDING THE LICENSE

WHEREAS:

1. License 9125 was issued to William N. L. Hutchinson, Jr. and Bona Comel Di Socebran Hutchinson DBA Elder Valley Ranch Company, A Partnership and was recorded with the County Recorder of Napa County on February 10, 1970 in Volume 822, Page 410.

2. License 9125 was subsequently assigned to Christina Vineyards, A Partnership. An order allowing a change in the place of use was granted on September 25, 1981 and was filed with the County Recorder of Napa County.

3. A petition to change the purpose of use and place of use has been filed with the State Water Resources Control Board and said Board has determined that good cause for such change has been shown.

4. The Board has determined that the petitioned changes do not constitute the initiation of a new right nor operate to the injury of any other lawful user of water.

5. The license condition pertaining to the continuing authority of the Board should be updated to conform to Standard Term 12 as contained in Section 780(a), Title 23 of the California Code of Regulations.

NOW, THEREFORE, IT IS ORDERED THAT:

1. The condition of this license regarding purposes of use is amended to read as follows:

   Irrigation, Stockwatering, Recreational, Fire Protection and Frost Protection. (0000003)

2. The place of use under this license shall be as follows:

   15 acres within SW¼ of NW¼ projected Section 26, T8N, R4W, MDB&M
   13 acres within SE¼ of NW¼ projected Section 26, T8N, R4W, MDB&M
   7 acres within NE¼ of SW¼ projected Section 26, T8N, R4W, MDB&M
   11 acres within NW¼ of SW¼ projected Section 26, T8N, R4W, MDB&M
   2 acres within SW¼ of SW¼ projected Section 26, T8N, R4W, MDB&M
   27 acres within SE¼ of SW¼ projected Section 26, T8N, R4W, MDB&M
   10 acres within SW¼ of SE¼ projected Section 26, T8N, R4W, MDB&M
   85 acres total (0000004)

4

3. The continuing authority condition of this license shall be amended to read:

Pursuant to California Water Code Sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this license, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this license with a view to eliminating waste of water and to meeting the reasonable water requirements of licensee without unreasonable draft on the source. Licensee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this license and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the licensee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust. (0000012)

Dated: NOVEMBER 14 1988

for Walter G. Pettit, Chief
Division of Water Rights

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

License for Diversion and Use of Water

APPLICATION 13943 PERMIT 9204 LICENSE 9185

THIS IS TO CERTIFY, *That* WILLIAM N. L. HUTCHINSON, JR. AND BONA COMEL DI SOCEBRAN HUTCHINSON DBA ELDER VALLEY RANCH COMPANY, A PARTNERSHIP 2520 DIVISADERO STREET, SAN FRANCISCO, CALIFORNIA 94115 (see over)

HAVE *made proof as of* MAY 7, 1969 *(the date of inspection) to the satisfaction of the State Water Resources Control Board of a right to the use of the water of* AN UNNAMED STREAM IN NAPA COUNTY

tributary to SAGE CREEK THENCE CONN CREEK THENCE NAPA RIVER

for the purpose of IRRIGATION, STOCKWATERING, RECREATIONAL AND FIRE PROTECTION USES *under Permit* 9204 *of the Board and that the right to the use of this water has been perfected in accordance with the laws of California, the Regulations of the Board and the permit terms; that the priority of this right dates from* SEPTEMBER 8, 1950 *and that the amount of water to which this right is entitled and hereby confirmed is limited to the amount actually beneficially used for the stated purposes and shall not exceed* NINETY (90) ACRE-FEET PER ANNUM, TO BE COLLECTED FROM ABOUT NOVEMBER 1 OF EACH YEAR TO ABOUT MAY 1 OF THE SUCCEEDING YEAR. THE MAXIMUM WITHDRAWAL IN ANY ONE YEAR SHALL NOT EXCEED 85 ACRE-FEET.

THE POINT OF DIVERSION OF SUCH WATER IS LOCATED:

NORTH 1,800 FEET AND EAST 1,900 FEET FROM SW CORNER OF PROJECTED SECTION 26, T8N, R4W, MDB&M, BEING WITHIN NE1/4 OF SW1/4 OF SAID SECTION 26.

A DESCRIPTION OF LANDS OR THE PLACE WHERE SUCH WATER IS PUT TO BENEFICIAL USE IS AS FOLLOWS:

STOCKWATERING, RECREATIONAL AND FIRE PROTECTION USES AT THE RESERVOIR WITHIN NE1/4 OF SW1/4 OF PROJECTED SECTION 26, T8N, R4W, MDB&M AND IRRIGATION AND STOCKWATERING AS FOLLOWS:

5 ACRES WITHIN SW1/4 OF SE1/4 OF PROJECTED SECTION 26, T8N, R4W, MDB&M
24 ACRES WITHIN SE1/4 OF SW1/4 OF PROJECTED SECTION 26, T8N, R4W, MDB&M
4 ACRES WITHIN NE1/4 OF SW1/4 OF PROJECTED SECTION 26, T8N, R4W, MDB&M

33 ACRES TOTAL

ISSUANCE OF THIS LICENSE SHALL NOT OPERATE TO THE PREJUDICE OF ANY PRIOR RIGHTS, INCLUDING RIGHTS INITIATED BY THE FILING BY THE CITY OF NAPA OF APPLICATION 10990.

31087-983 4-69 3M ② OSP

Licensee shall allow representatives of the Board and other parties, as may be authorized from time to time by the Board, reasonable access to project works to determine compliance with the terms of this license.

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the Board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: FEB 9 1970

STATE WATER RESOURCES CONTROL BOARD

K. L. Woodward

Chief, Division of Water Rights

7-13-77 assgd to David A. Garden
9-12-79 assgd to Christina Vineyards, a Partnership

7

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

Application 26179 Permit 18282 License _____

ORDER APPROVING A NEW DEVELOPMENT SCHEDULE AND AMENDING THE PERMIT

WHEREAS:

1. Permit 18282 was issued to Christina Vineyards, A Partnership, on June 11, 1981, pursuant to Application 26179.

2. A petition for an extension of time within which to develop the project and apply the water to the proposed use has been filed with the State Water Resources Control Board.

3. The permittee has proceeded with diligence and good cause has been shown for said extension of time.

4. Permit Condition 10 pertaining to the continuing authority of the Board should be updated to conform to Section 780(a), Title 23 of the California Code of Regulations.

NOW, THEREFORE, IT IS ORDERED THAT:

1. Condition 7 of the permit be amended to read:

   COMPLETE APPLICATION OF THE
   WATER TO THE PROPOSED USE
   SHALL BE MADE ON OR BEFORE December 31, 2005 (0000009)

2. Condition 10 of the permit be amended to read:

   Pursuant to California Water Code Sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in

accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to eliminating waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust. (0000012)

Dated: MARCH 31 1995

Roger Johnson

for Edward C. Anton, Chief
Division of Water Rights

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

PERMIT FOR DIVERSION AND USE OF WATER

PERMIT 18282

Application 26179 of CHRISTINA VINEYARDS, A PARTNERSHIP

P. O. BOX 348, OAKVILLE, CALIFORNIA 94562

filed on JANUARY 22, 1980, has been approved by the State Water Resources Control Board SUBJECT TO VESTED RIGHTS and to the limitations and conditions of this Permit.

Permittee is hereby authorized to divert and use water as follows:

1. Source:

UNNAMED STREAM (AKA ELDER CREEK)

Tributary to:

SAGE CREEK THENCE
CONN CREEK THENCE
NAPA RIVER THENCE
SAN PABLO BAY

2. Location of point of diversion:	40-acre subdivision of public land survey or projection thereof	Section	Township	Range	Base and Meridan
NORTH 1,800 FEET AND EAST 1,900 FEET FROM SW CORNER OF PROJECTED SECTION 26	NE1/4 OF SW1/4	26	8N	4W	MD

County of NAPA

3. Purpose of use:	4. Place of use:	Section	Township	Range	Base and Meridan	Acres
FROST PROTECTION	SW1/4 OF SW1/4	26	8N	4W	MD	10
	SE1/4 OF SW1/4	26	8N	4W	MD	20
	NE1/4 OF SW1/4	26	8N	4W	MD	3
	SW1/4 OF NW1/4	26	8N	4W	MD	10
	SE1/4 OF NW1/4	26	8N	4W	MD	3
	NE1/4 OF SW1/4	26	8N	4W	MD	2
	NW1/4 OF SW1/4	26	8N	4W	MD	12
					TOTAL	60

The place of use is shown on map filed with the State Water Resources Control Board.

① OSP

Application 26179 Permit 18282

5. The water appropriated shall be limited to the quantity which can be beneficially used and shall not exceed 3 CUBIC FEET PER SECOND TO BE DIVERTED FROM FEBRUARY 15 TO MAY 30 OF EACH YEAR. THE MAXIMUM AMOUNT DIVERTED UNDER THIS PERMIT SHALL NOT EXCEED 120 ACRE-FEET PER YEAR. (0000005)

6. The amount authorized for appropriation may be reduced in the license if investigation warrants. (0000006)

~~7. Actual construction work shall begin on or before two years from date of permit and shall thereafter be prosecuted with reasonable diligence, and if not so commenced and prosecuted, this permit may be revoked.~~

~~8. Said construction work shall be completed on or before~~

7. Complete application of the water to the proposed use shall be made on or before DECEMBER 1, 1991. (0000009)

8. Progress reports shall be submitted promptly by permittee when requested by the State Water Resources Control Board until license is issued. (0000010)

9. Permittee shall allow representatives of the State Water Resources Control Board and other parties, as may be authorized from time to time by said Board, reasonable access to project works to determine compliance with the terms of this permit. (0000011)

10. Pursuant to California Water Code Sections 100 and 275, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to minimizing waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement such programs as (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation. (0000012)

11. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Control Board if, after notice to the permittee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges. (0000013)

12. THE STATE WATER RESOURCES CONTROL BOARD RESERVES JURISDICTION OVER THIS PERMIT TO IMPOSE ANY APPROPRIATE CONDITIONS AT SOME FUTURE DATE TO CONFORM THE PERMIT TO BOARD POLICY ON USE OF WATER FOR FROST PROTECTION. ACTION BY THE BOARD WILL BE TAKEN ONLY AFTER NOTICE TO INTERESTED PARTIES AND OPPORTUNITY FOR HEARING. (0000020)

This permit is issued and permittee takes it subject to the following provisions of the Water Code.

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any permit granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any permittee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Dated: JUNE 11 1981

STATE WATER RESOURCES CONTROL BOARD

Raymond Walsh

CHIEF, DIVISION OF WATER RIGHTS

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

Application 26165 Permit 18459 License _____

ORDER APPROVING A NEW DEVELOPMENT SCHEDULE

WHEREAS:

1. Permit 18459 was issued to Christina Vineyards, A Partnership on March 26, 1982, pursuant to Application 26165.

2. A petition for an extension of time within which to develop the project and apply the water to the proposed use has been filed with the State Water Resources Control Board.

3. The permittee has proceeded with diligence and good cause has been shown for said extension of time.

NOW, THEREFORE, IT IS ORDERED THAT:

1. Condition 8 of the permit be amended to read:

CONSTRUCTION WORK SHALL BE COMPLETED ON OR BEFORE	December 31, 1998	(0000008)

2. Condition 9 of the permit be amended to read:

COMPLETE APPLICATION OF THE WATER TO THE PROPOSED USE SHALL BE MADE ON OR BEFORE	December 31, 2005	(0000009)

Dated: AUGUST 9 1995

for Edward C. Anton, Chief
Division of Water Rights

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

APPLICATION 26165 PERMIT 18459 LICENSE

ORDER APPROVING A NEW DEVELOPMENT SCHEDULE AND AMENDING THE PERMIT

WHEREAS:

1. Permit 18459 was issued to Christina Vineyards, a Partnership on March 26, 1982 pursuant to Application 26165.

2. A petition for an extension of time within which to develop the project and apply the water to the proposed use has been filed with the State Water Resources Control Board.

3. The permittee has proceeded with diligence and good cause has been shown for said extension of time.

4. Permit Condition 12 pertaining to the continuing authority of the Board should be updated to conform to Standard Permit Term 12 as contained in Section 780(a), Title 23 of the California Code of Regulations.

NOW, THEREFORE, IT IS ORDERED THAT:

1. Condition 8 of the permit be amended to read:

CONSTRUCTION WORK SHALL BE COMPLETED ON OR BEFORE	December 31, 1991	(0000008)

2. Condition 9 of the permit be amended to read:

COMPLETE APPLICATION OF THE WATER TO THE PROPOSED USE SHALL BE MADE ON OR BEFORE	December 31, 1992	(0000009)

3. Condition 12 of the permit be amended to read:

Pursuant to California Water Code Sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to eliminating waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing

evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust. (0000012)

Dated:
OCTOBER 25 1988

Walter G. Pettit, Chief
Division of Water Rights

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

PERMIT FOR DIVERSION AND USE OF WATER

PERMIT 18459

Application 26165 of Christina Vineyards, A Partnership

P.O. Box 348, Oakville, California 94562

filed on January 9, 1980, has been approved by the State Water Resources Control Board SUBJECT TO VESTED RIGHTS and to the limitations and conditions of this Permit.

Permittee is hereby authorized to divert and use water as follows:

1. Source:	Tributary to:
Unnamed Stream (aka Elder Creek)	Sage Creek thence
	Conn Creek thence
	Napa River thence
	San Pablo Bay

2. Location of point of diversion:	40-acre subdivision of public land survey or projection thereof	Section	Township	Range	Base and Meridan
North 410 feet and West 1,180 feet from SE corner of Projected Section 22	SE¼ of SE¼	22	8N	4W	MD

County of Napa

3. Purpose of use:	4. Place of use:	Section	Township	Range	Base and Meridan	Acres
Stockwatering	Lake Catacula S½ of SE¼	22	8N	4W	MD	
Heat Protection						
Frost Protection						
Irrigation	SW¼ of NE¼	22	8N	4W	MD	16
	SE¼	22	8N	4W	MD	68
	NE¼ of NE¼	27	8N	4W	MD	4
	NW¼ of NE¼	27	8N	4W	MD	9
					Total	97

The place of use is shown on map filed with the State Water Resources Control Board.

© OSP

5. The water appropriated shall be limited to the quantity which can be beneficially used and shall not exceed 48 acre-feet per annum to be collected from November 1 of each year to April 30 of the succeeding year.

This permit does not authorize collection of water to storage outside of the specified season to offset evaporation and seepage losses or for any other purpose. (0000005)

6. The amount authorized for appropriation may be reduced in the license if investigation warrants. (0000006)

7. Actual construction work shall begin on or before two years from date of permit and shall thereafter be prosecuted with reasonable diligence, and if not so commenced and prosecuted, this permit may be revoked. (0000007)

8. Said construction work shall be completed on or before December 1, 1985. (0000008)

9. Complete application of the water to the proposed use shall be made on or before December 1, 1986. (0000009)

10. Progress reports shall be submitted promptly by permittee when requested by the State Water Resources Control Board until license is issued. (0000010)

11. Permittee shall allow representatives of the State Water Resources Control Board and other parties as may be authorized from time to time by said Board, reasonable access to project works to determine compliance with the terms of this permit. (0000011)

12. Pursuant to California Water Code Sections 100 and 275, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable methods of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to minimizing waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement such programs as (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation. (0000012)

13. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Control Board if, after notice to the permittee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges. (0000013)

14. The State Water Resources Control Board reserves jurisdiction over this permit to impose any appropriate conditions at some future date to conform the permit to Board policy on use of water for frost protection. Action by the Board will be taken only after notice to interested parties and opportunity for hearing. (0000014)

5. The water appropriated shall be limited to the quantity which can be beneficially used and shall not exceed 40 acre-feet per annum to be collected from November 1 of each year to April 30 of the succeeding year.

This permit does not authorize collection of water to storage outside of the specified season to offset evaporation and seepage losses or for any other purpose.

6. The amount authorized for appropriation may be reduced in the license if investigation warrants.

7. Actual construction work shall begin on or before two years from date of permit and shall thereafter be prosecuted with reasonable diligence, and if not so commenced and prosecuted, this permit may be revoked.

8. Said construction work shall be completed on or before December 1, 1985.

9. Complete application of the water to the proposed use shall be made on or before December 1, 1988.

10. Progress reports shall be submitted promptly by permittee when requested by the State Water Resources Control Board until license is issued.

11. Permittee shall allow representatives of the State Water Resources Control Board and other parties as may be authorized from time to time by said Board, reasonable access to project works to determine compliance with the terms of this permit.

12. Pursuant to California Water Code Sections 100 and 275, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable methods of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to minimizing waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement such programs as (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

13. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Control Board if, after notice to the permittee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges.

14. The State Water Resources Control Board reserves jurisdiction over this permit to impose any appropriate conditions at some future date to conform the permit to Board policy on use of water for frost protection. Action by the Board will be taken only after notice to interested parties and opportunity for hearing.

15. Permittee shall install and maintain an outlet pipe of adequate capacity in his dam as near as practicable to the bottom of the natural stream channel, or provide other means satisfactory to the State Water Resources Control Board, in order that water entering the reservoir which is not authorized for appropriation under this permit may be released. (0050043)

16. Permittee shall install and maintain in his reservoir a staff gage meeting the approval of the State Water Resources Control Board for the purpose of determining waterlevels in the reservoir. Permittee shall supply the staff gage reading on or about October 1 of each year, verified by City of Napa or its designated representative, to the State Water Resources Control Board. (0070047 0100047)

In the event that City of Napa's prior rights are not satisfied by May 1 of any year, permittee shall, upon request by City of Napa or its designated representative, immediately release from its reservoir an amount of water necessary to satisfy City of Napa's prior right, up to the total amount of water which permittee has impounded in its reservoir since October 1 of that storage year. In no event shall permittee be obligated to release water below the previous October staff gage reading. If requested by permittee, City of Napa shall furnish release records and lake elevation records to prove that City of Napa's prior rights have not been satisfied by the previous May 1.

Permittee shall allow City of Napa or its designated representative reasonable access to the reservoir for the purpose of determining whether or not water should be released in accordance with this condition. (0000999)

This permit is issued and permittee takes it **subject to the following provisions of the Water Code:**

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any permit granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any permittee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Dated: MARCH 26 1982

STATE WATER RESOURCES CONTROL BOARD

Raymond Walsh

Chief, Division of Water Rights

67809-983 2-79 4M ◊ OSP

APPENDIX D
AIR QUALITY MODELING RESULTS

CONSTRUCTION DATA

Construction Schedule

Construction Phase	Start Date	End Date	Days/Week	Total Workdays
Phase 1 - 2021	4/1/2021	9/15/2021	6	144
Phase 2 - 2022	4/1/2022	9/15/2022	6	144
Phase 3 - 2023	4/1/2023	9/15/2023	6	144
				432

Project Construction Equipment

Phase 1 - 2021

Project Construction Equipment	Equivalent Equipment in CalEEMod	Number of Equipment	Workdays used in Phase	Hours per Workday	Average horsepower (hp)	Load Factor
Large Excavator	Excavators	2	144	9	400	0.38
Medium Excavator	Excavators	1	144	9	158	0.38
D9 Bulldozer	Rubber Tired Dozer	1	144	9	474	0.40
D8 Bulldozer	Rubber Tired Dozer	1	144	9	359	0.40
Haul Truck	Off-Highway Trucks	2	144	9	402	0.38
Loader	Rubber Tired Loaders	2	144	9	203	0.36
Water Truck	Off-Highway Trucks	1	144	9	402	0.38
Farm Tractor with Trailer	Off-Highway Tractors	4	144	9	124	0.44
Total Emissions						

Phase 2 - 2022

Project Construction Equipment	Equivalent Equipment in OFFROAD	Number of Equipment	Workdays used in Phase	Hours per Workday	Average horsepower (hp) from CalEEMod	Load Factor
Large Excavator	Excavators	2	144	9	400	0.38
Medium Excavator	Excavators	1	144	9	158	0.38
D9 Bulldozer	Rubber Tired Dozer	1	144	9	474	0.40
D8 Bulldozer	Rubber Tired Dozer	1	144	9	359	0.40
Haul Truck	Off-Highway Trucks	2	144	9	402	0.38
Loader	Rubber Tired Loaders	2	144	9	203	0.36
Water Truck	Off-Highway Trucks	1	144	9	402	0.38
Farm Tractor with Trailer	Off-Highway Tractors	4	144	9	124	0.44
Total Emissions						

Phase 3 - 2023

Project Construction Equipment	Equivalent Equipment in OFFROAD	Number of Equipment	Workdays used in Phase	Hours per Workday	Average horsepower (hp) from CalEEMod	Load Factor
Farm Tractor with Trailer	Off-Highway Tractors	4	144	9	124	0.44
Total Emissions						

On-road Truck and Worker Commute Trips dring Construction

Construction Phase	Ave. trips/day (round trips)	One way trips/day	One Way Trip length (miles)	Truck Trip miles per day
Phase 1 - 2021				
Truck trips to deliver and remove construction equipment	0.14	0.28	45	12.5
Worker commute trips	9	18	25	450
Worker commute trips	3	6	25	150
Phase 1 - Total				
Phase 2 - 2022				
Truck trips to deliver and remove construction equipment	0.14	0.28	45	12.5
Worker commute trips	9	18	25	450
Worker commute trips	3	6	25	150
Phase 2 - Total				
Phase 3 - 2023				
Material delivery truck trips	0.07	0.14	45	6.25
Worker commute trips	9	18	25	450
Worker commute trips	3	6	25	150
Phase 3 - Total				

EMISSIONS SUMMARIES - Napa County Vineyards

Construction Emissions - CAP - Uncontrolled

Construction Year	No. of Construction Workdays	Tons over Construction Period				Average Pounds per day			
		ROG	NOx	Exhaust PM-10	Exhaust PM-2.5	ROG	NOx	Exhaust PM-10	Exhaust PM-2.5
Phase 1 - 2021	144	0.6	6.0	0.2	0.2	8.5	82.9	3.4	3.2
Phase 2 - 2022	144	0.6	5.1	0.2	0.2	7.8	70.9	3.0	2.7
Phase 3 - 2023	144	0.1	0.6	0.0	0.0	1.0	8.3	0.4	0.3
Total	432	1.2	11.7	0.5	0.5	5.8	54.0	2.3	2.4

Construction Emissions - Criteria Air Pollutants - Mitigated with Tier 3 equipment with Level 3 Diesel Particulate Filters

Construction Year	No. of Construction Workdays	Tons over Construction Period				Average Pounds per day			
		ROG	NOx	Exhaust PM-10	Exhaust PM-2.5	ROG	NOx	Exhaust PM-10	Exhaust PM-2.5
Phase 1 - 2021	144	0.27	5.10	3.05E-02	3.05E-02	3.8	70.8	0.4	0.4
Phase 2 - 2022	144	0.27	5.09	3.05E-02	3.04E-02	3.8	70.7	0.4	0.4
Phase 3 - 2023	144	0.05	0.76	5.50E-03	5.48E-03	0.7	10.6	0.1	0.1
Total	432	0.60	10.95	6.65E-02	6.64E-02	2.8	50.7	0.3	0.3

Construction Emissions - GHG as CO_2e

Construction Year	CO_2	CH_4	N_2O	CO_2e
Phase 1 - 2021	978.4	0.303	0.00000	986
Phase 2 - 2022	977.5	0.303	0.00000	985
Phase 3 - 2023	176.4	0.044	0.00000	177
Total CO_2e (tons)				2148
Life of project (years)				30
Ave. annual emissions (tons/year)				71.6

OPERATIONAL ASSUMPTIONS

Calculation of workdays

Season	Start	End	No. of workdays
January - March	1-Jan	31-Mar	64
April	1-Apr	30-Apr	22
May - August	1-May	31-Aug	88
September - October	1-Sep	31-Oct	44
November - December	1-Nov	31-Dec	43

Calculation of annual on-road vehicle miles

Source	Workers/day	One way trips/day	Number of workdays
January - March			
Workers - Annual pruning of vines	25	50	64
Workers - Monitor and maintain erosion control measures	5	10	64
April			
Workers - Chemical, mechanical and manual weed control, sulfur applications to protect against mildew	5	10	22
Workers - Monitor and maintain erosion control measures	5	10	22
May - August			
Workers - Chemical, mechanical and manual weed control, sulfur applications to protect against mildew	5	10	88
September - October			
Workers - Harvest, winterize vineyard, vineyard avenues and vineyard roads	30	60	44
November - December			
Workers - Monitor and maintain erosion control measures	5	10	43
TOTAL ANNUAL		**8230**	**261**
Trips/workday		31.53	

OPERATIONAL EMISSIONS

Operational Emissions - CAP

Emissions Source	Tons per year				Pounds per day			
	ROG	NOx	Total PM-10	Total PM-2.5	ROG	NOx	Total PM-10	Total PM-2.5
Mobile - worker and truck trips	0.01	0.03	0.02	0.01	0.0	0.2	0.1	0.0
TOTAL	0.01	0.03	0.02	0.01	0.032	0.173	0.123	0.034

Operational Emissions - GHG as tons per year

Source	CO_2	CH_4	N_2O	CO_2e
Mobile - worker and truck trips	23.6203	8.80E-04	0	23.6

Water	5.4	0.001	0.000	5.5
TOTAL				29.1

GHG Emissions from Water Use during Operation

Based on Bloodlines LLC Soda Canyon Vineyard EIR

Outdoor Water Use	Acres of vineyard	gal/year	Mgal/year
Soda Canyon Example project	83.1	7887520	7.89
Project	111.5	10583135	10.58

From CalEEMod,

Electricity Intensity Factor to supply	2117	kWhr/Mgal
Electricity Intensity Factor to treat	111	kWhr/Mgal
Electricity Intensity Factor to distribute	1272	kWhr/Mgal
Total Electricity Intensity Factor for Water	3500	kWhr/Mgal

	CO_2	CH_4	N_2O
PG&E GHG emission factor (lb/MWhr)	294	0.029	0.006
PG&E GHG emission factor (lb/kWhr)	0.294	0.000029	0.000006
GW potential	1	25	298
GHG emissions from water use (tons /year)	= Mgal/year X kWhr/Mgal X lb/kWhr x 0.0005		
	5.4	0.001	0.0
GHG emissions from water use (tons of CO_2e/year)	5.4	0.013	0.033
Total tons of CO_2e/year	5.5		

CalEEMod Users Guide, Appendx A - Page 41

Napa County Vineyards - construction + operation

Napa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Recreational	1.00	User Defined Unit	158.80	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.6	**Precipitation Freq (Days)**	64
Climate Zone	4			**Operational Year**	2024
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	210	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - PG&E GHG emission factor based on <http://www.pgecorp.com/corp_responsibility/reports/2019/assets/PGE_CRSR_2019.pdf>

Land Use - Project data

Construction Phase - Project construction schedule

Off-road Equipment - Project does not include this phase

Off-road Equipment - Project does not include this phase

Off-road Equipment - Project does not include this phase

Off-road Equipment - Project does not include this phase

Off-road Equipment - Project data

Off-road Equipment - Projct data

Off-road Equipment - Project data

Off-road Equipment - Project does not include this phase

Trips and VMT - Project data

On-road Fugitive Dust - Project data

Grading - Project data

Architectural Coating - No building

Vehicle Trips - Project data

Area Coating - no buildings

Energy Use -

Water And Wastewater - Project water use

Construction Off-road Equipment Mitigation - Tier 3 engines with Level 3 DPF assumed for BACT compliance

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	200.00	0.00
tblConstructionPhase	NumDays	120.00	0.00
tblConstructionPhase	NumDays	310.00	144.00
tblConstructionPhase	NumDays	310.00	144.00
tblConstructionPhase	NumDays	220.00	0.00
tblConstructionPhase	NumDays	3,100.00	0.00
tblConstructionPhase	NumDays	310.00	144.00
tblConstructionPhase	NumDays	220.00	0.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	1/5/2022	3/31/2021
tblConstructionPhase	PhaseEndDate	6/22/2022	1/5/2022
tblConstructionPhase	PhaseEndDate	8/30/2023	9/15/2021
tblConstructionPhase	PhaseEndDate	11/6/2024	9/15/2022
tblConstructionPhase	PhaseEndDate	10/6/2038	12/2/2023
tblConstructionPhase	PhaseEndDate	12/2/2037	1/14/2023
tblConstructionPhase	PhaseEndDate	1/14/2026	9/15/2023
tblConstructionPhase	PhaseEndDate	8/10/2039	10/6/2023
tblConstructionPhase	PhaseStartDate	6/23/2022	4/1/2021
tblConstructionPhase	PhaseStartDate	8/31/2023	4/1/2022
tblConstructionPhase	PhaseStartDate	12/3/2037	12/3/2023
tblConstructionPhase	PhaseStartDate	1/15/2026	1/15/2023
tblConstructionPhase	PhaseStartDate	11/7/2024	4/1/2023
tblConstructionPhase	PhaseStartDate	10/7/2038	10/7/2023
tblGrading	AcresOfGrading	0.00	158.50
tblGrading	AcresOfGrading	0.00	158.50
tblGrading	AcresOfGrading	0.00	158.50
tblLandUse	LotAcreage	0.00	158.80
tblOffRoadEquipment	HorsePower	158.00	400.00
tblOffRoadEquipment	HorsePower	158.00	400.00
tblOffRoadEquipment	HorsePower	247.00	474.00
tblOffRoadEquipment	HorsePower	247.00	359.00
tblOffRoadEquipment	HorsePower	247.00	474.00
tblOffRoadEquipment	HorsePower	247.00	359.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Phase 1
tblOffRoadEquipment	PhaseName		Phase 2
tblOffRoadEquipment	PhaseName		Phase 3
tblOffRoadEquipment	PhaseName		Phase 1
tblOffRoadEquipment	PhaseName		Phase 2
tblOffRoadEquipment	PhaseName		Phase 1
tblOffRoadEquipment	PhaseName		Phase 2
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	9.00
tblOffRoadEquipment	UsageHours	8.00	9.00
tblOffRoadEquipment	UsageHours	8.00	9.00
tblOffRoadEquipment	UsageHours	8.00	9.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	9.00
tblOffRoadEquipment	UsageHours	8.00	9.00
tblOffRoadEquipment	UsageHours	8.00	9.00
tblOffRoadEquipment	UsageHours	8.00	9.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	210
tblTripsAndVMT	VendorTripLength	7.30	45.00
tblTripsAndVMT	VendorTripLength	7.30	45.00
tblTripsAndVMT	VendorTripLength	7.30	45.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00

tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripLength	10.80	25.00
tblTripsAndVMT	WorkerTripLength	10.80	25.00
tblTripsAndVMT	WorkerTripLength	10.80	25.00
tblTripsAndVMT	WorkerTripNumber	35.00	24.00
tblTripsAndVMT	WorkerTripNumber	35.00	24.00
tblTripsAndVMT	WorkerTripNumber	10.00	24.00
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	WD_TR	0.00	31.53

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.6124	5.9667	4.906	0.0111	0.6092	0.2466	0.8558	0.2873	0.2268	0.5141	0	978.3636	978.3636	0.303	0	985.9382
2022	0.5587	5.1034	4.7337	0.0111	0.6092	0.2125	0.8217	0.2873	0.1955	0.4828	0	977.5216	977.5216	0.303	0	985.0967
2023	0.0744	0.5948	1.0687	1.98E-03	0.1214	0.0269	0.1483	0.0192	0.0247	0.0439	0	176.3528	176.3528	0.0443	0	177.4594
Maximum	**0.6124**	**5.9667**	**4.906**	**0.0111**	**0.6092**	**0.2466**	**0.8558**	**0.2873**	**0.2268**	**0.5141**	**0**	**978.3636**	**978.3636**	**0.303**	**0**	**985.9382**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2746	5.0987	6.1892	0.0111	0.2947	0.0305	0.3252	0.1348	0.0305	0.1653	0	978.3625	978.3625	0.303	0	985.9371
2022	0.2736	5.0935	6.1804	0.0111	0.2947	0.0305	0.3252	0.1348	0.0304	0.1653	0	977.5205	977.5205	0.303	0	985.0956
2023	0.0492	0.7616	1.2423	1.98E-03	0.0752	5.50E-03	0.0807	0.0142	5.48E-03	0.0196	0	176.3526	176.3526	0.0443	0	177.4593
Maximum	**0.2746**	**5.0987**	**6.1892**	**0.0111**	**0.2947**	**0.0305**	**0.3252**	**0.1348**	**0.0305**	**0.1653**	**0**	**978.3625**	**978.3625**	**0.303**	**0**	**985.9371**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**52.04**	**6.10**	**-27.11**	**0.00**	**50.40**	**86.33**	**59.96**	**52.20**	**85.15**	**66.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-1-2021	6-30-2021	3.5622	2.9090
2	7-1-2021	9-30-2021	3.0141	2.4615
5	4-1-2022	6-30-2022	3.0656	2.9058
6	7-1-2022	9-30-2022	2.5940	2.4588
9	4-1-2023	6-30-2023	0.3615	0.4382
10	7-1-2023	9-30-2023	0.3059	0.3708
		Highest	3.5622	2.9090

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0	0	1.00E-05	0		0	0		0	0	0	2.00E-05	2.00E-05	0	0	2.00E-05
Energy	0	0	0	0		0	0		0	0	0	0	0	0	0	0
Mobile	5.90E-03	0.0315	0.0706	2.60E-04	0.0223	2.10E-04	0.0225	5.98E-03	1.90E-04	6.18E-03	0	23.6203	23.6203	8.80E-04	0	23.6423
Waste						0	0		0	0	0	0	0	0	0	0

Water						0	0		0	0	0	0	0	0	0	0
Total	**5.90E-03**	**0.0315**	**0.0706**	**2.60E-04**	**0.0223**	**2.10E-04**	**0.0225**	**5.98E-03**	**1.90E-04**	**6.18E-03**	**0**	**23.6203**	**23.6203**	**8.80E-04**	**0**	**23.6424**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	5.9000e-003	0.0315	0.0706	2.6000e-004	0.0223	2.1000e-004	0.0225	5.9800e-003	1.9000e-004	6.1800e-003	0.0000	23.6203	23.6203	8.8000e-004	0.0000	23.6423
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**5.9000e-003**	**0.0315**	**0.0706**	**2.6000e-004**	**0.0223**	**2.1000e-004**	**0.0225**	**5.9800e-003**	**1.9000e-004**	**6.1800e-003**	**0.0000**	**23.6203**	**23.6203**	**8.8000e-004**	**0.0000**	**23.6424**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2021	3/31/2021	5	0	
2	Site Preparation	Site Preparation	1/6/2022	1/5/2022	5	0	
3	Phase 1	Grading	4/1/2021	9/15/2021	6	144	
4	Phase 2	Grading	4/1/2022	9/15/2022	6	144	
5	Phase 3	Grading	4/1/2023	9/15/2023	6	144	
6	Building Construction	Building Construction	1/15/2023	1/14/2023	5	0	
7	Paving	Paving	12/3/2023	12/2/2023	5	0	
8	Architectural Coating	Architectural Coating	10/7/2023	10/6/2023	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition		0		158	0.38
Demolition		0		203	0.36
Demolition	Concrete/Industrial Saws	0	0.00	81	0.73
Demolition	Excavators	0	0.00	158	0.38
Demolition	Rubber Tired Dozers	0	0.00	247	0.40
Site Preparation	Rubber Tired Dozers	0	0.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Phase 1	Excavators	2	9.00	400	0.38
Phase 1	Excavators	1	9.00	158	0.38
Phase 1	Graders	0	0.00	187	0.41
Phase 1	Off-Highway Tractors	4	9.00	124	0.44
Phase 1	Off-Highway Trucks	3	9.00	402	0.38
Phase 1	Rubber Tired Dozers	1	9.00	474	0.40
Phase 1	Rubber Tired Dozers	1	9.00	359	0.40
Phase 1	Rubber Tired Loaders	2	9.00	203	0.36
Phase 1	Scrapers	0	0.00	367	0.48
Phase 1	Tractors/Loaders/Backhoes	0	0.00	97	0.37

Phase 2	Excavators	2	9.00	400	0.38
Phase 2	Excavators	1	9.00	158	0.38
Phase 2	Graders	0	0.00	187	0.41
Phase 2	Off-Highway Tractors	4	9.00	124	0.44
Phase 2	Off-Highway Trucks	3	9.00	402	0.38
Phase 2	Rubber Tired Dozers	1	9.00	474	0.40
Phase 2	Rubber Tired Dozers	1	9.00	359	0.40
Phase 2	Rubber Tired Loaders	2	9.00	203	0.36
Phase 2	Scrapers	0	0.00	367	0.48
Phase 2	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Paving	Pavers	0	0.00	130	0.42
Paving	Paving Equipment	0	0.00	132	0.36
Paving	Rollers	0	0.00	80	0.38
Building Construction	Cranes	0	0.00	231	0.29
Building Construction	Forklifts	0	0.00	89	0.20
Building Construction	Generator Sets	0	0.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Building Construction	Welders	0	0.00	46	0.45
Phase 3	Excavators	0	0.00	158	0.38
Phase 3	Graders	0	0.00	187	0.41
Phase 3	Off-Highway Tractors	4	9.00	124	0.44
Phase 3	Rubber Tired Dozers	0	0.00	247	0.40
Phase 3	Scrapers	0	0.00	367	0.48
Phase 3	Tractors/Loaders/Backhoes	0	0.00	97	0.37
Architectural Coating	Air Compressors	0	0.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1	14	24.00	2.00	0.00	25.00	45.00	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2	14	24.00	2.00	0.00	25.00	45.00	20.00	LD_Mix	HDT_Mix	HHDT
Paving	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Phase 3	4	24.00	2.00	0.00	25.00	45.00	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Phase 1 - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.5718	0.0000	0.5718	0.2772	0.0000	0.2772	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.5984	5.9055	4.7996	0.0106		0.2462	0.2462		0.2265	0.2265	0.0000	933.1685	933.1685	0.3018	0.0000	940.7136
Total	**0.5984**	**5.9055**	**4.7996**	**0.0106**	**0.5718**	**0.2462**	**0.8180**	**0.2772**	**0.2265**	**0.5037**	**0.0000**	**933.1685**	**933.1685**	**0.3018**	**0.0000**	**940.7136**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9500e-003	0.0519	0.0137	2.0000e-004	5.7900e-003	2.0000e-004	5.9900e-003	1.6700e-003	1.9000e-004	1.8600e-003	0.0000	19.2886	19.2886	5.5000e-004	0.0000	19.3023
Worker	0.0121	9.2200e-003	0.0927	2.9000e-004	0.0316	2.0000e-004	0.0318	8.4000e-003	1.8000e-004	8.5800e-003	0.0000	25.9066	25.9066	6.3000e-004	0.0000	25.9224
Total	**0.0140**	**0.0612**	**0.1064**	**4.9000e-004**	**0.0374**	**4.0000e-004**	**0.0378**	**0.0101**	**3.7000e-004**	**0.0104**	**0.0000**	**45.1951**	**45.1951**	**1.1800e-003**	**0.0000**	**45.2246**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2573	0.0000	0.2573	0.1247	0.0000	0.1247	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2606	5.0375	6.0828	0.0106		0.0301	0.0301		0.0301	0.0301	0.0000	933.1674	933.1674	0.3018	0.0000	940.7125
Total	**0.2606**	**5.0375**	**6.0828**	**0.0106**	**0.2573**	**0.0301**	**0.2874**	**0.1247**	**0.0301**	**0.1548**	**0.0000**	**933.1674**	**933.1674**	**0.3018**	**0.0000**	**940.7125**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9500e-003	0.0519	0.0137	2.0000e-004	5.7900e-003	2.0000e-004	5.9900e-003	1.6700e-003	1.9000e-004	1.8600e-003	0.0000	19.2886	19.2886	5.5000e-004	0.0000	19.3023
Worker	0.0121	9.2200e-003	0.0927	2.9000e-004	0.0316	2.0000e-004	0.0318	8.4000e-003	1.8000e-004	8.5800e-003	0.0000	25.9066	25.9066	6.3000e-004	0.0000	25.9224
Total	**0.0140**	**0.0612**	**0.1064**	**4.9000e-004**	**0.0374**	**4.0000e-004**	**0.0378**	**0.0101**	**3.7000e-004**	**0.0104**	**0.0000**	**45.1951**	**45.1951**	**1.1800e-003**	**0.0000**	**45.2246**

3.5 Phase 2 - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.5718	0.0000	0.5718	0.2772	0.0000	0.2772	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.5457	5.0475	4.6361	0.0106		0.2122	0.2122		0.1952	0.1952	0.0000	933.4672	933.4672	0.3019	0.0000	941.0148

Total	**0.5457**	**5.0475**	**4.6361**	**0.0106**	**0.5718**	**0.2122**	**0.7840**	**0.2772**	**0.1952**	**0.4724**	**0.0000**	**933.4672**	**933.4672**	**0.3019**	**0.0000**	**941.0148**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8200e-003	0.0477	0.0127	2.0000e-004	5.8000e-003	1.7000e-004	5.9700e-003	1.6700e-003	1.7000e-004	1.8400e-003	0.0000	19.0971	19.0971	5.4000e-004	0.0000	19.1106
Worker	0.0112	8.2600e-003	0.0849	2.8000e-004	0.0316	1.9000e-004	0.0318	8.4000e-003	1.8000e-004	8.5800e-003	0.0000	24.9572	24.9572	5.7000e-004	0.0000	24.9714
Total	**0.0131**	**0.0559**	**0.0976**	**4.8000e-004**	**0.0374**	**3.6000e-004**	**0.0378**	**0.0101**	**3.5000e-004**	**0.0104**	**0.0000**	**44.0544**	**44.0544**	**1.1100e-003**	**0.0000**	**44.0819**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2573	0.0000	0.2573	0.1247	0.0000	0.1247	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2606	5.0375	6.0828	0.0106		0.0301	0.0301		0.0301	0.0301	0.0000	933.4661	933.4661	0.3019	0.0000	941.0137
Total	**0.2606**	**5.0375**	**6.0828**	**0.0106**	**0.2573**	**0.0301**	**0.2874**	**0.1247**	**0.0301**	**0.1548**	**0.0000**	**933.4661**	**933.4661**	**0.3019**	**0.0000**	**941.0137**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.8200e-003	0.0477	0.0127	2.0000e-004	5.8000e-003	1.7000e-004	5.9700e-003	1.6700e-003	1.7000e-004	1.8400e-003	0.0000	19.0971	19.0971	5.4000e-004	0.0000	19.1106
Worker	0.0112	8.2600e-003	0.0849	2.8000e-004	0.0316	1.9000e-004	0.0318	8.4000e-003	1.8000e-004	8.5800e-003	0.0000	24.9572	24.9572	5.7000e-004	0.0000	24.9714
Total	**0.0131**	**0.0559**	**0.0976**	**4.8000e-004**	**0.0374**	**3.6000e-004**	**0.0378**	**0.0101**	**3.5000e-004**	**0.0104**	**0.0000**	**44.0544**	**44.0544**	**1.1100e-003**	**0.0000**	**44.0819**

3.6 Phase 3 - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0840	0.0000	0.0840	9.0700e-003	0.0000	9.0700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0627	0.5565	0.9800	1.5200e-003		0.0266	0.0266		0.0245	0.0245	0.0000	133.7818	133.7818	0.0433	0.0000	134.8635
Total	**0.0627**	**0.5565**	**0.9800**	**1.5200e-003**	**0.0840**	**0.0266**	**0.1107**	**9.0700e-003**	**0.0245**	**0.0336**	**0.0000**	**133.7818**	**133.7818**	**0.0433**	**0.0000**	**134.8635**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3100e-003	0.0309	0.0111	1.9000e-004	5.8000e-003	7.0000e-005	5.8700e-003	1.6700e-003	7.0000e-005	1.7400e-003	0.0000	18.5754	18.5754	5.0000e-004	0.0000	18.5878
Worker	0.0105	7.4000e-003	0.0776	2.7000e-004	0.0316	1.9000e-004	0.0318	8.4000e-003	1.7000e-004	8.5700e-003	0.0000	23.9956	23.9956	5.0000e-004	0.0000	24.0082
Total	**0.0118**	**0.0383**	**0.0887**	**4.6000e-004**	**0.0374**	**2.6000e-004**	**0.0376**	**0.0101**	**2.4000e-004**	**0.0103**	**0.0000**	**42.5710**	**42.5710**	**1.0000e-003**	**0.0000**	**42.5960**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.0378	0.0000	0.0378	4.0800e-003	0.0000	4.0800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0374	0.7233	1.1536	1.5200e-003		5.2400e-003	5.2400e-003		5.2400e-003	5.2400e-003	0.0000	133.7816	133.7816	0.0433	0.0000	134.8633
Total	**0.0374**	**0.7233**	**1.1536**	**1.5200e-003**	**0.0378**	**5.2400e-003**	**0.0431**	**4.0800e-003**	**5.2400e-003**	**9.3200e-003**	**0.0000**	**133.7816**	**133.7816**	**0.0433**	**0.0000**	**134.8633**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3100e-003	0.0309	0.0111	1.9000e-004	5.8000e-003	7.0000e-005	5.8700e-003	1.6700e-003	7.0000e-005	1.7400e-003	0.0000	18.5754	18.5754	5.0000e-004	0.0000	18.5878
Worker	0.0105	7.4000e-003	0.0776	2.7000e-004	0.0316	1.9000e-004	0.0318	8.4000e-003	1.7000e-004	8.5700e-003	0.0000	23.9956	23.9956	5.0000e-004	0.0000	24.0082
Total	**0.0118**	**0.0383**	**0.0887**	**4.6000e-004**	**0.0374**	**2.6000e-004**	**0.0376**	**0.0101**	**2.4000e-004**	**0.0103**	**0.0000**	**42.5710**	**42.5710**	**1.0000e-003**	**0.0000**	**42.5960**

3.7 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.8 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Paving	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Paving	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.9 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	5.9000e-003	0.0315	0.0706	2.6000e-004	0.0223	2.1000e-004	0.0225	5.9800e-003	1.9000e-004	6.1800e-003	0.0000	23.6203	23.6203	8.8000e-004	0.0000	23.6423
Unmitigated	5.9000e-003	0.0315	0.0706	2.6000e-004	0.0223	2.1000e-004	0.0225	5.9800e-003	1.9000e-004	6.1800e-003	0.0000	23.6203	23.6203	8.8000e-004	0.0000	23.6423

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Recreational	31.53	0.00	0.00	59,844	59,844
Total	31.53	0.00	0.00	59,844	59,844

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Recreational	9.50	7.30	7.30	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Recreational	0.593730	0.035302	0.167493	0.109091	0.021115	0.005747	0.017044	0.037455	0.003901	0.001761	0.005404	0.001027	0.000929

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Recreational	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Napa ECP Carbon Sequestration Analysis
Last updated 10/2/2018

Carbon Storage

Land Use Category	Value (MT C/acre)	Notes	Source	Alt. Value	Notes	Source
Wood/Trees						
Grasslands						
Blue Oak	12.5	Sacramento - Blue Oak	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 4		*see below for total*	
Coast Live Oak	22.3	Central Coast - Coast Oak	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 4		*see below for total*	
Interior Live Oak	18.6	Sacramento - Interior Oak	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 4		*see below for total*	
Mixed Oak	29.9	Sacramento - Mixed Oak	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 4		*see below for total*	
Valley Oak	10.1	Central Coast - Valley Oak	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 4		*see below for total*	
Scrublands		*see below for total from NAPA CAP*			*see below for total*	
Urban	0	assume no carbon			no alternative value	
Riverine	0	assume no carbon			no alternative value	
Pond / reservoir	0	assume no carbon			no alternative value	
Vineyard	1.2	Carbon by reservoir - Vineyards - Avg	Williams 2011, Assessment of carbon in woody plants and soil across a vineyard-woodland landscape, Table 1			
Soil						
Grasslands						
Blue Oak	11.3	soil organics	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Coast Live Oak	11.3	soil organics	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Interior Live Oak	11.3	soil organics	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Mixed Oak	11.3	soil organics	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Valley Oak	11.3	soil organics	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Scrublands		*see below for total from NAPA CAP*			*see below for total*	
Urban	0	assume no carbon			no alternative value	
Riverine	0	assume no carbon			no alternative value	
Pond / reservoir	0	assume no carbon			no alternative value	
Vineyard	34.0	Carbon by reservoir - Vineyards - Avg	Williams 2011, Assessment of carbon in woody plants and soil across a vineyard-woodla	84.1	Carbon by reservoir - Vineyards - Avg - Soil (Mg C/ha)	Table 1, Williams 2011
Litter/Duff/Understory						
Grasslands						
Blue Oak	23.1	understory + downed woody debris + duff/litter	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Coast Live Oak	25.9	understory + downed woody debris + duff/litter	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Interior Live Oak	20.6	understory + downed woody debris + duff/litter	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Mixed Oak	18.6	understory + downed woody debris + duff/litter	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Valley Oak	26.7	understory + downed woody debris + duff/litter	California Oak Foundation 2008, An Inventory of Carbon and California Oaks, Table 5		*see below for total*	
Scrublands		*see below for total from NAPA CAP*				
Urban	0	assume no carbon			no alternative value	
Riverine	0	assume no carbon			no alternative value	
Pond / reservoir	0	assume no carbon			no alternative value	
Vineyard		Williams includes in other values above (?)				
Total						
Grasslands	2.6	Carbon stored per acre (MT C/acre)	Napa CAP Appendix A Table 16			
Blue Oak	46.9			34.9	less conservative then Oaks value	Napa CAP, Appendix A, Technical Memo #1 - Greenhouse Gas Emissions Inventory and Forecasts, Table 16
Coast Live Oak	59.5			34.9	""	""
Interior Live Oak	50.6			34.9	""	""
Mixed Oak	59.9			34.9	""	""
Valley Oak	48.2			34.9	""	""
Scrublands	12.8	Carbon stored per acre (MT C/acre)	Napa CAP Appendix A Table 16			
Urban	0	assume no carbon				
Riverine	0.0					
Pond / reservoir	0	assume no carbon				
Vineyard	35.2			1.2	Carbon stored per acre (MT C/acre)	Napa CAP Appendix A Table 16

Carbon Sequestration

Land Use Category	Value (MT C/acre)	Notes	Source	Alt. Value	Notes	Source
Grasslands	0		Napa CAP Appendix A Table 16			
Blue Oak	2.017	Oak Woodlands - Annual Net Carbon Sequestration per a	Napa CAP Appendix A Table 16			
Coast Live Oak	2.017	""	""			
Interior Live Oak	2.017	""	""			
Mixed Oak	2.017	""	""			
Valley Oak	2.017	""	""			
Scrublands	0	Annual Net Carbon Sequestration per acre (MT C/acre/y	Napa CAP Appendix A Table 16			
Urban	0	assume no carbon				
Riverine	0	assume no carbon				
Pond / reservoir	0	assume no carbon				
Vineyard	0.016	Annual Net Carbon Sequestration per acre (MT C/acre/y	Napa CAP Appendix A Table 16		need value? Research	

Estimated Existing Project Site Carbon Stocks/Storage

Vegetation Type/Carbon Storage	Project Acreage	Carbon Storage/Stock per Acre (MT C/acre)	Total Carbon Storage (MT C)	Total Carbon Storage in MTCO2e	*Lookup Value for Tables above*
Upland Annual Grasslands and Forbs Formation	117.38	2.6	305.2	1,119.0	*Grasslands*
Purple Needlegrass Grassland	0.19	2.6	0.5	1.8	*Grasslands*
Beardless Wildrye Grassland	0.05	2.6	0.1	0.5	*Grasslands*
Blue Wildrye Grassland	0.08	2.6	0.2	0.8	*Grasslands*
Blue Oak Alliance	5.56	46.9	261.0	957.0	*Blue Oak*
Coast Live Oak-Blue Oak (Foothill Pine) NFD Associatio	6.54	59.5	389.1	1,426.5	*Coast Live Oak*
Interior Live Oak-Blue Oak (Foothill Pine) NFD Associat	20.71	50.6	1,047.6	3,841.3	*Interior Live Oak*
Mixed Oak Alliance	0.71	59.9	42.5	155.9	*Mixed Oak*
Scrub Interior Live Oak-Scrub Oak (California Bay-Flow	3.92	12.8	50.2	184.0	*Scrublands*
Valley Oak-(California Bay-Coast Live Oak-Walnut-Ash	0.06	48.2	2.9	10.6	*Valley Oak*
Urban or Built-Up	3.08	0.0	0.0	0.0	*Urban*
Riverine	0.02	0.0	0.0	0.0	*Riverine*
Unnamed Pond	0.005	0.0	0.0	0.0	*Pond / reservoir*
Total	**158.31**		**2,099.3**	**7,697.5**	

Estimated Existing Project Site Annual Carbon Sequestration

Vegetation Type/Carbon Storage	Project Acreage	Annual Carbon Sequestration per Acre (MT C/acre)	Total Annual Carbon Sequestration (MT C/year)	Total Annual Carbon Sequestration in MTCO2e	*Lookup Value for Tables above*
Upland Annual Grasslands and Forbs Formation	117.38	0.000	0.000	0.000	*Grasslands*
Purple Needlegrass Grassland	0.19	0.000	0.000	0.000	*Grasslands*
Beardless Wildrye Grassland	0.05	0.000	0.000	0.000	*Grasslands*
Blue Wildrye Grassland	0.08	0.000	0.000	0.000	*Grasslands*
Blue Oak Alliance	5.56	2.017	11.215	41.120	*Blue Oak*
Coast Live Oak-Blue Oak (Foothill Pine) NFD Associatio	6.54	2.017	13.191	48.368	*Coast Live Oak*
Interior Live Oak-Blue Oak (Foothill Pine) NFD Associat	20.71	2.017	41.772	153.164	*Interior Live Oak*
Mixed Oak Alliance	0.71	2.017	1.432	5.251	*Mixed Oak*
Scrub Interior Live Oak-Scrub Oak (California Bay-Flow	3.92	0.000	0.000	0.000	*Scrublands*
Valley Oak-(California Bay-Coast Live Oak-Walnut-Ash	0.06	2.017	0.121	0.444	*Valley Oak*
Urban or Built-Up	3.08	0.000	0.000	0.000	*Urban*
Riverine	0.02	0.000	0.000	0.000	*Riverine*
Unnamed Pond	0.005	0.000	0.000	0.000	*Pond / reservoir*
Total	**158.31**		**67.731**	**248.346**	

Estimated Project Carbon Stocks/Storage

Vegetation Type/Carbon Storage	Project Acreage	Carbon Storage/Stock per Acre (MT C/acre)	Total Carbon Storage (MT C)	Total Carbon Storage in MTCO2e	*Lookup Value for Tables above*
Vineyard	111.50	35.2	3,930.2	14,410.6	*Vineyard*
Reservoir	4.50	0.0	0.0	0.0	*Pond / reservoir*
Roads / other	40.80	0.0	0.0	0.0	*Urban*
Total	**156.80**		**3,930.17**	**14,410.63**	

Estimated Project Annual Carbon Sequestration

Vegetation Type/Carbon Storage	Project Acreage	Annual Carbon Sequestration per Acre (MT C/acre)	Total Annual Carbon Sequestration (MT C/year)	Total Annual Carbon Sequestration in MTCO2e	*Lookup Value for Tables above*
Vineyard	111.5	0.016	1.784	6.541	*Vineyard*
Reservoir	4.5	0.000	0.000	0.000	*Pond / reservoir*
Other	40.8	0.000	0.000	0.000	*Urban*
Total	**156.80**		**1.784**	**6.541**	

Estimated Overall Project-related GHG Emissions

Vegetation Type/Carbon Storage	MTCO2e
Carbon Loss - existing land use removal	
Carbon Storage	7,697.5
Carbon Sequestration (annual)	248.3
30-year lifetime emissions	15,147.8
Carbon Gains - new land use types	
Carbon Storage	-14,410.6
Carbon Sequestration (annual)	-6.5
30-year lifetime emissions	-14,606.9
Total Project Lifetime Emissions	**541.0**
Total Project Annual Emissions	**18.0**

Napa ECP Carbon Sequestration Analysis Research

Last updated 10/4/2018

Items to cover

carbon storage
carbon sequestration
above ground, litter, soils

Loss of carbon storage in existing land
Loss of carbon sequestration in existing land
Gain of carbon storage in vineyards
Gain of carbon sequestration in vineyards
Reservoir carbon storage?
Reservoir CH4 emissions?
Nitrogen Fertilizer Applications?

What will happen to existing biomass?
What will happen to below-ground carbon (soil)?
Vineyard management practices?
Tillage?
Fertilizer?

Mg C = metric ton C

156.8	cleared acres
111.5	new vineyard acres
4.5	new reservoir acres

Possible Metrics to use

Oak Woodlands - Blue Oaks

Carbon Storage

31	Metric Tons per Hectare of Oak Woodland and Forest Carbon Stored in Trees - Woodlands - Sacramento	Table 4: http://californiaoaks.org/wp-content/uploads/2016/04/CarbonResourcesFinal.pdf
	Non-tree Carbon Pools in Metric Tons per Hectare	Table 5: http://californiaoaks.org/wp-content/uploads/2016/04/CarbonResourcesFinal.pdf
15	Understory Shrubbery and Forbs	
12	Downed Woody Debris	
30	Duff and Litter Layers	
28	Soil Organics	
84	Total non-tree	
34.9	Oak Woodlands - Carbon stored per acre (MT C/acre)	Napa CAP Appendix A Table 16 - https://www.countyofnapa.org/DocumentCenter/View/297/Appendix-A-Rev

Carbon Sequestration

2.017	Oak Woodlands - Annual Net Carbon Sequestration per acre (MT C/acre/yr)	Napa CAP Appendix A Table 16
77.2	annual growth rate (MCF)	USDA 2005

Vineyards

Carbon Storage

84.1	Carbon by reservoir - Vineyards - Avg - Soil (Mg C/ha)	Table 1, Williams 2011
3.0	Carbon by reservoir - Vineyards - Avg - AG-Wood	Table 1, Williams 2011
87.1	Total	
1.2	Carbon stored per acre (MT C/acre)	Napa CAP Appendix A Table 16
3.0	Carbon Content of Land Cover - Horticulture/Vineyard - t C/ha	Brown 2004, as cited in Napa CAP Appendix A Table 16
1.2	Carbon Content of Land Cover - Horticulture/Vineyard - MT C/acre	Caculated value from Brown 2004

Carbon Sequestration

0.016	Annual Net Carbon Sequestration per acre (MT C/acre/yr)	Napa CAP Appendix A Table 16

Grassland

Carbon Storage

2.6	Carbon stored per acre (MT C/acre)	Napa CAP Appendix A Table 16

Carbon Sequestration

0	Annual Net Carbon Sequestration per acre (MT C/acre/yr)	Napa CAP Appendix A Table 16
4.31	Default annual CO2 accumulation per acre (MT CO2/ acre)	CAPCOA 7.1.2

Shrublands

Carbon Storage

12.8	Carbon stored per acre (MT C/acre)	Napa CAP Appendix A Table 16

Carbon Sequestration

0	Annual Net Carbon Sequestration per acre (MT C/acre/yr)	Napa CAP Appendix A Table 16

Riparian Woodland - Valley Oaks

Carbon Storage

24	Metric Tons per Hectare of Oak Woodland and Forest Carbon Stored in Trees - Woodlands - North Coast	Table 4: http://californiaoaks.org/wp-content/uploads/2016/04/CarbonResourcesFinal.pdf
	Non-tree Carbon Pools in Metric Tons per Hectare	Table 5: http://californiaoaks.org/wp-content/uploads/2016/04/CarbonResourcesFinal.pdf
21	Understory Shrubbery and Forbs	
14	Downed Woody Debris	
31	Duff and Litter Layers	
28	Soil Organics	
93	Total	
57	Riparian Woodlands - Carbon stored per acre (MT C/acre)	Napa CAP Appendix A Table 16

Carbon Sequestration

4.744	Riparian Woodlands - Annual Net Carbon Sequestration per acre (MT C/acre/yr)	Napa CAP Appendix A Table 16

APPENDIX E

BIOLOGICAL RESOURCES REPORT AND DOCUMENTS

KJS AND SORRENTO VINEYARD CONVERSION EROSION CONTROL PLAN APPLICATION

Biological Resources Reconnaissance Survey Report

Prepared for
Napa County

January 2019

ESA

KJS AND SORRENTO VINEYARD CONVERSION EROSION CONTROL PLAN APPLICATION

Biological Resources Reconnaissance Survey Report

Prepared for
Napa County

January 2019

2600 Capitol Avenue
Suite 200
Sacramento, CA 95816
916.564.4500
www.esassoc.com

ESA

Bend	Oakland	San Francisco
Camarillo	Orlando	Santa Monica
Delray Beach	Pasadena	Sarasota
Destin	Petaluma	Seattle
Irvine	Portland	Sunrise
Los Angeles	Sacramento	Tampa
Miami	San Diego	

171261

OUR COMMITMENT TO SUSTAINABILITY | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper. ESA saved the following resources:

TABLE OF CONTENTS

KJS and Sorrento Vineyard Conversion Erosion Control Plan Application Biological Resources Reconnaissance Survey Report

Page

Executive Summary **1**

Chapter 1 ..... **1-1**

Introduction **1-1**
- 1.1 Background and Purpose 1-1
- 1.2 Project Location 1-1
- 1.3 Project Description 1-1
- 1.4 Site Definitions 1-5
- 1.5 Regulatory Context 1-5

Chapter 2 ..... **2-1**

Survey Methodology **2-1**
- 2.1 Review of Background Information 2-1
- 2.2 Survey Dates and Surveying Personnel 2-1
- 2.3 Habitat and Vegetation Surveys 2-2
- 2.4 Wildlife Surveys 2-3
- 2.5 Study Area Boundaries and Routes 2-3

Chapter 3 ..... **3-1**

Results **3-1**
- 3.1 Biological Setting within the Evaluation Area 3-1
- 3.2 Terrestrial Biological Communities within the Study Area 3-2
- 3.3 Sensitive Natural Communities 3-8
- 3.4 Potential Waters of the U.S. 3-8
- 3.5 Wildlife Observed 3-8
- 3.6 Special-Status Species 3-9
- 3.7 Wildlife Movement Corridors 3-17
- 3.8 Critical Habitat for Listed Fish and Wildlife Species 3-18

Chapter 4 ..... **4-1**

Impact Assessment **4-1**
- 4.1 Proposed Project 4-1
- 4.2 Impacts and Mitigation Measures 4-2

Page

Chapter 5 5-1

References.....5-1

Figures

Figure 1 Regional Location.....1-2
Figure 2 Biological Communities within the Evaluation Area.....1-3
Figure 3 Biological Communities within the Study Area.....3-3
Figure 4 CNDDB Occurrences 3-11
Figure 5 Wildlife Movement Corridor 3-19

Tables

Table 1 Terrestrial Biological Communities by Acreages in the Development Area, Project Site, and Napa County.....3-5
Table 2 Project Impacts by Biological Community.....4-3

Appendices

A. Regulatory Context A-1
B. Agency Lists B-1
C. Plant Species Observed During Botanical Surveys.....C-1
D. Representative Photographs of the Study Area.....D-1
E. Regionally Occurring Special-Status Species..... E-1

EXECUTIVE SUMMARY

Environmental Science Associates (ESA) conducted botanical inventories and wildlife surveys within the KJS and Sorrento Vineyard Conversion Erosion Control Plan Application project area (study area), located in Napa County, California. The applicant proposes to develop vineyards and associated vineyard avenues within 156.8 acres of land with slopes above 5 percent, install a diversion structure along Elder Creek and develop an offstream reservoir on the 972.82-acre property. The purpose of this report is document biological communities and plants and wildlife observed within the study area to assess the suitability of the study area to support special-status species and sensitive habitat types, to document additional regulatory permitting or further biological resources analysis that may be required, and to identify potential biological impacts including impacts to special-status species and sensitive biological communities. The significant of impacts will be assessed and mitigated for (as necessary) in the Environmental Impact Report (EIR) that will be prepared for the project.

The following general biological communities would be impacted by the proposed project: mixed oak woodland, annual grassland, scrub/chaparral, and urban. The annual grassland includes purple needlegrass grassland, beardless wildrye grassland, and blue wildrye grassland, which are considered sensitive by the California Department of Fish and Wildlife (CDFW). Impacts to these sensitive habitat types will be assessed and mitigated for in the Environmental Impact Report (EIR) that will be prepared for the project.

Several oak trees within the mixed oak woodland and riparian woodland would be removed; these oak trees are protected by Napa County General Plan ordinances.

The applicant will be required to obtain permits from regulatory agencies (i.e., Section 404 Clean Water Act Nationwide permit, Section 401 Water Quality Certification, and Section 1600 Lake and Streambed Alteration Agreement) for impacts to Elder Creek and the surrounding riparian woodland associated with the installation of the diversion structure and to an unnamed pond from construction of a spillway berm and overflow structure.

The study area does not contain special-status plants. Therefore, no special-status plants would be impacted by the proposed project. The study area provides suitable nesting habitat for listed and non-listed migratory birds and other birds of prey, including Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), burrowing owl (*Athene cunicularia*) golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), purple martin (*Progne subis*), and bank swallow (*Riparia riparia*). In addition, special-status bats and western pond turtle (*Actinemys marmorata*) have the potential to occur within the study area.

This page intentionally left blank

CHAPTER 1
Introduction

1.1 Background and Purpose

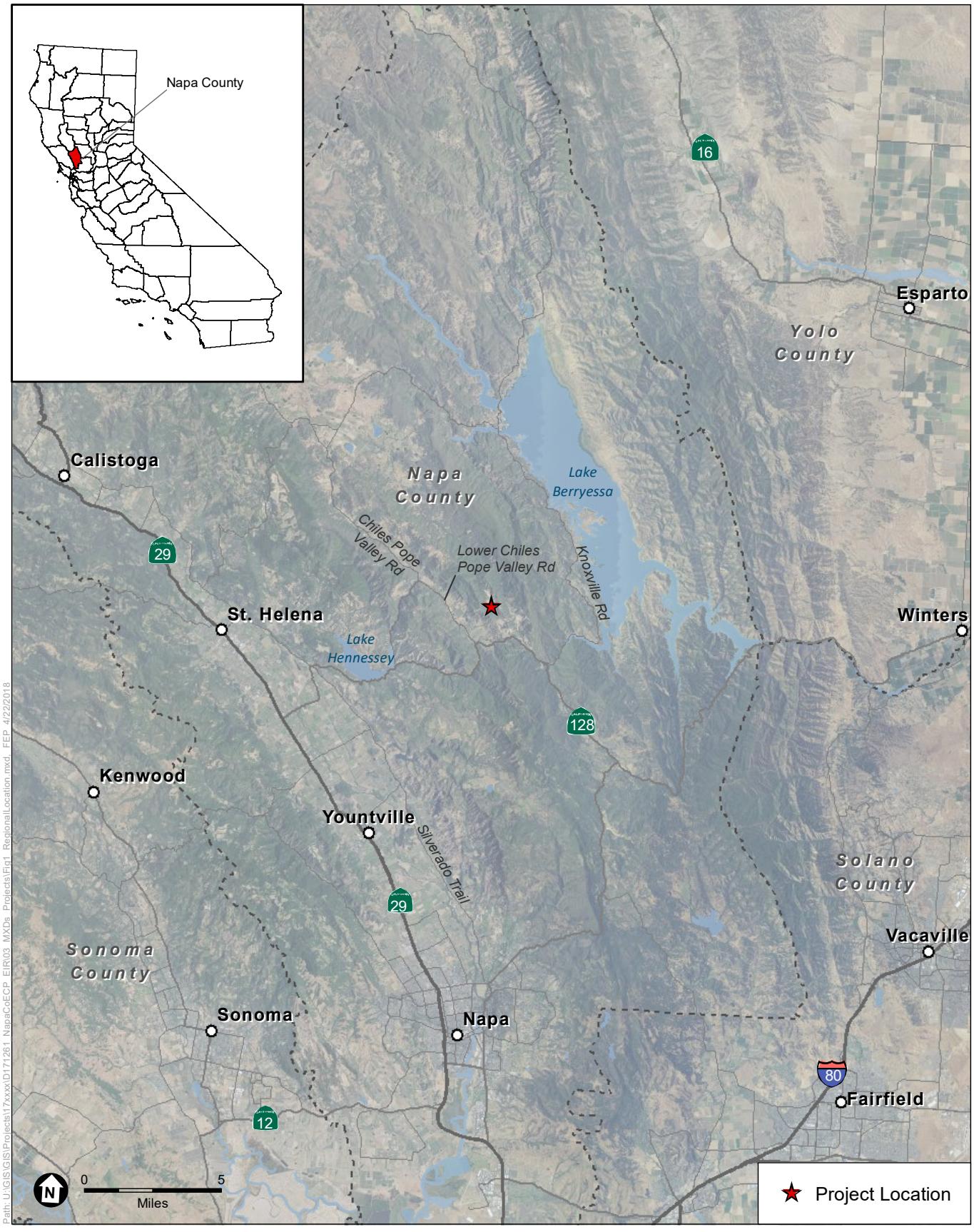
This Biological Resources Reconnaissance Survey Report (report) was prepared for the approximately 156.8-acre KJS and Sorrento Vineyard Conversion Erosion Control Plan (ECP) Application study area, located in Napa County, California. This report includes a description of the property location, project description, biological setting, survey methodology, survey results, impact assessment, discussion of significance, and mitigation measures, in accordance with the Guidelines for Preparing Biological Resources Reconnaissance Surveys (Napa County Planning, Building & Environmental Services, 2016a).

1.2 Project Location

The property is located at 3370 and 3380 Sage Canyon Road on the north side of California Highway 128 in Elder Valley, in an unincorporated area of Napa County, California (**Figure 1**). The 972.82-acre property includes Assessor's Parcel Numbers (APNs) 025-270-022 and 025-270-025. The property is located in an unsectioned area of Township 8 North, Range 4 West, of the Chiles Valley, California U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (USGS, 1958, revised 1993).

1.3 Project Description

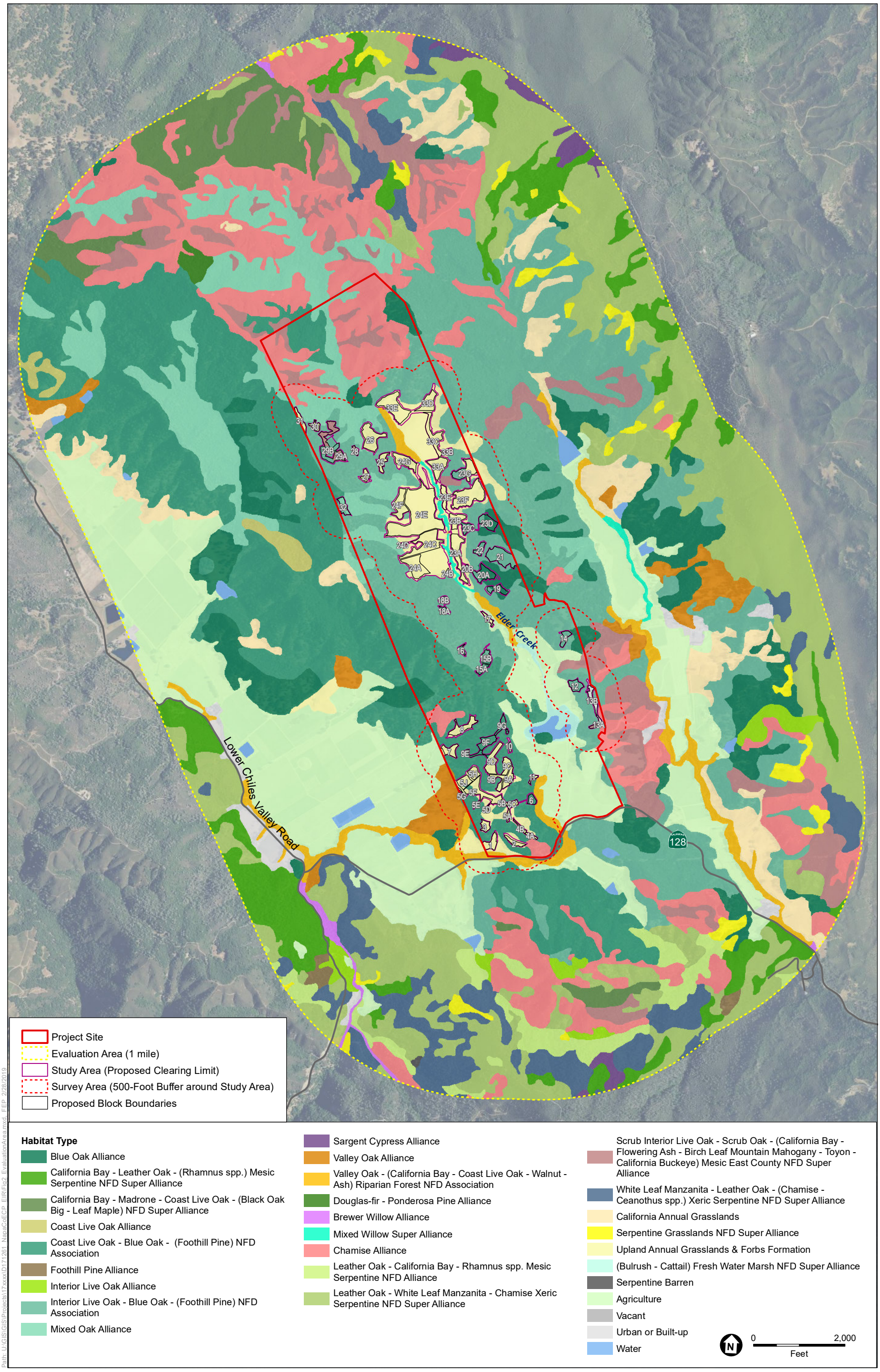
The applicant proposes to develop 111.5 acres of vineyard and associated vineyard avenues within 156.8 acres of gross acres on slopes above 5 percent. A total of 33 vineyard blocks are proposed. Development includes removing vegetation within the proposed clearing limits, ripping, rock removal, soil cultivation, seeding a cover crop, mulching, trenching for irrigation pipelines, installing a trellis system and deer fence, laying out vine rows, and installing temporary and permanent erosion control measures. Temporary erosion control measures could include installing water bars, straw wattles, straw bale dikes, and other practices as needed. Permanent erosion control measures include, but are not limited to, seeding a permanent cover crop with vegetation cover maintained according to the erosion control plan, installing surface drainage pipelines to collect surface runoff at low points throughout the development area, constructing a spillway berm and overflow structure in an existing pond adjacent to proposed vineyard Blocks 29B and 29C, installing riprap berms on the downhill sides of proposed surface drainage line outlets into existing erosional features in proposed Blocks 24A and 24E, repairing erosion in the erosional feature in proposed Block 24E, and constructing a riprap berm on the downhill side of a proposed surface drainage line outlet into an existing low spot in proposed Block 24E. The numbers of the proposed vineyard locations are shown on **Figure 2**.



SOURCE: NAIP, 2016; ESRI, 2012; Napa County, 2018; ESA, 2018

KJS Sorrento Vineyard Conversion #P17-00432-ECPA

Figure 1
Regional Location



SOURCE: NAIP, 2016; ESRI, 2012; CDFW; 2015; Napa County, 2018; ESA, 2019

KJS Investment Properties & Sorrento Inc. ECP Application

Figure 2
Biological Communities within the Evaluation Area

ESA

This page intentionally left blank

Existing access roads to the proposed vineyard blocks would be improved with the proposed project. The proposed project also includes Petitions for Change on Water Right License 9125 (Application 13943) and Permit 18459 (Application 26165, as amended June 20, 2018) and a Petition for Extension of Time on Permit 18459, which include an expansion of the place of use (POU) to 280 acres (or the existing vineyards and proposed vineyards on the project site), construction of an offstream 48-acre-foot capacity reservoir, installation of a diversion structure in Elder Creek with a construction footprint of approximately 0.02 acre, and installation of pipelines within existing roads between the new diversion structure, the new reservoir, and existing Matheson Reservoir.

Details of the proposed erosion control measures and of the proposed project are provided in the KJS Investment & Sorrento Vineyard Agricultural Erosion Control Plan # P17-00432-ECPA, dated June 20, 2018, prepared by James R. Bushey (Registered Professional Engineer #49931) of PPI Engineering, and supporting documentation.

1.4 Site Definitions

The following site definitions are used in this section:

- The study area (development area) is 156.8-acres and includes the 111.5 net acres of proposed vineyard blocks (vineyard area) and 45.3 acres of associated ground disturbance. The development area includes all of the proposed clearing limits.
- The survey area is approximately 822.5 acres and includes the 156.8-acre study area plus a 500-foot radius around the study area.
- The 972.8-acre project site includes Assessor's Parcel Numbers (APNs) 025-270-022 (approximately 729.4 acres) and 025-270-025 (approximately 243.4 acres).
- The evaluation area includes a 1-mile buffer around the 972.8-acre project site (**Figure 2**).

1.5 Regulatory Context

Biological resources in the study area may fall under the jurisdiction of various regulatory agencies and be subject to their regulations. In general, the greatest legal protections are provided for plant and wildlife species that are formally listed under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA). The following regulations are commonly associated with projects that have the potential to affect biological resources:

- Federal Endangered Species Act
- Migratory Bird Treaty Act
- Bald and Golden Eagle Protection Act
- Clean Water Act, Section 404
- California Endangered Species Act
- Fish and Game Code Section 3503

- Native Plant Protection Act
- Lake or Streambed Alteration Program
- Porter Cologne Water Quality Act
- CEQA Guidelines Section 15380
- Napa County General Plan Goals, Policies, and Code (Section 18.108)

These regulations are presented and discussed in full in **Appendix A**, *Regulatory Context.*

CHAPTER 2
Survey Methodology

2.1 Review of Background Information

ESA reviewed the following biological resources data and background information applicable to the study area prior to performing comprehensive wildlife surveys and botanical inventories:

- Chiles Valley USGS 7.5-minute quadrangle (USGS, 1958);
- Historic and current aerial imagery (Google Earth, 1993-2018);
- Soil maps from the National Resources Conservation Service (USDA NRCS, 2018);
- Napa County Baseline Data Report (Napa County, 2005);
- Fine-scale vegetation map for Napa County (CDFW, 2015);
- The draft biological resources assessment of the property (Vinnedge Environmental Consulting, 2017);
- The draft aquatic resources assessment for portions of the study area (Madrone Ecological Consulting, 2017);
- The report on surveys for the threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (Entomological Consulting Services Ltd., 2016);
- The California red-legged frog (*Rana draytonii*) focused surveys report (Wildlife Research Associates, 2015);
- The CDFW California Natural Diversity Database (CNDDB) list of plant and wildlife species documented on the Chiles Valley and 8 surrounding quadrangles (Aetna Springs, Walter Springs, Brooks, St. Helena, Chiles Valley, Lake Berryessa, Rutherford, Yountville, and Capell Valley) (CDFW, 2019) (**Appendix B**);
- The California Native Plant Society (CNPS) online database of plant species documented on the Chiles Valley and 8 surrounding quadrangles (CNPS, 2019) (**Appendix B**); and
- A U.S. Fish and Wildlife Service (USFWS) list of species that may occur in the vicinity of the study area (USFWS, 2019) (**Appendix B**).

2.2 Survey Dates and Surveying Personnel

ESA biologists/botanists Kelly Bayne, Rachel Brownsey, and Joe Sanders conducted botanical inventories over a combined 120 hours within the study area on April 4, 5, and 12, 2018 and June

19 and 20, 2018. Ms. Bayne conducted 42 person hours of wildlife surveys within the study area, in conjunction with the botanical inventories[1]. The botanical inventories and wildlife surveys expanded into the survey area, where feasible.

Ms. Brownsey and Ms. Bayne have over 13 years of experience conducting botanical surveys throughout California. Mr. Sanders has one year of experience conducting botanical surveys throughout California, and conducted the botanical surveys under the direct supervision of Ms. Bayne and Ms. Brownsey. The biologists/botanists have the following qualifications: experience with conducting floristic surveys; intimate knowledge of plant taxonomy and plant community ecology and classification; familiarity with the plants of the area, including all locally occurring special-status plants; familiarity with the appropriate State and federal statutes related to plants and plant collecting; Plant Voucher Collecting Permits for California Endangered, Threatened, and Candidate species, and experience with analyzing impacts of project activities on native plants and plant communities.

Ms. Bayne conducted the wildlife surveys concurrently with the botanical inventories. She has over 13 years of experience conducting wildlife surveys throughout California. Ms. Bayne has the following qualifications: experience in conducting a variety of wildlife surveys; knowledge of terrestrial and aquatic wildlife; familiarity and experience with conducting wildlife surveys in the area, including those that may be found there; experience with wildlife that are likely to be found based on commonly occurring habitat types in the area; familiarity with the appropriate State and federal statutes related to animal surveys; and experience in analyzing the impacts of development on native wildlife.

2.3 Habitat and Vegetation Surveys

The biologists/botanists conducted botanical inventories and evaluated vegetative communities in accordance with the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW, 2018), documenting habitat for special-status species with the potential to occur within the study area, and comparing the Napa County Baseline Data Report (Napa County, 2005) with those identified during the surveys. The Napa County Baseline Data Report was also compared against the fine-scale vegetation map for Napa County (CDFW, 2015). The vegetation classification system used conforms to A Manual of California Vegetation (Sawyer and Keeler-Wolf, 2009). Vegetation communities that did not match up with those in the Napa County Baseline Data Report (Napa, 2005) were revised to the existing conditions based on the visual inspection during the April 4, 5, and 12, 2018 and June 19 and 20, 2018 surveys.

The focused rare plant field surveys were conducted during the peak blooming periods for special-status species determined to have the potential to occur within the study area. CNDDB occurrences of listed plants with the potential to occur within the study area are on private land and inaccessible, so reference sites were not able to be visited prior to the surveys. All plants observed were identified to species, or subspecies/variety, as appropriate. Taxonomic

[1] County staff accompanied ESA biologists/botanists during the April 5, 2018, site inspection.

nomenclature is in accordance with The Jepson Manual; Vascular Plants of California, Second Edition, 2012. A comprehensive list of observed plant species is provided in **Appendix C**.

Vegetation communities and aquatic features were characterized and mapped in the field using aerial photography and Trimble Geo XT devices. Sensitive habitats were mapped as polygons. At the request of Napa County, point data for trees providing high quality wildlife habitat was taken for large oak trees greater than 30 inches in diameter at breast height and oaks and pines comprised of granaries. The boundaries of vegetation communities mapped on aerial photography were digitized and the polygon and point data were downloaded and projected using Geographic Information System (GIS) software in the State Plane coordinate system (NAD 83) with units as "survey feet."

2.4 Wildlife Surveys

Animals were identified in the field by their sight, sign, or call during the site inspections indicated in Section 2.2. Field techniques consisted of surveying the survey area with binoculars and walking throughout the study area. Aerial photographs were reviewed to analyze the habitat surrounding the site and the potential for wildlife movement, or wildlife corridors.

2.5 Study Area Boundaries and Routes

Pedestrian level surveys were conducted throughout the study area during the site inspections indicated in Section 2.2. Transects were walked in an east to west or north to south direction throughout the study area, depending on the topography. Transect spacing ranged from 20 feet to 50 feet, depending on vegetation density and variability. The biologists/botanists surveyed the 500-foot buffers where accessible by driving and/or using binoculars.

This page intentionally left blank

CHAPTER 3
Results

3.1 Biological Setting within the Evaluation Area

Elder Creek is a seasonal intermittent stream that traverses the length of the property from north to south, and is tributary to Sage Creek, which is tributary to Conn Creek, which is tributary to the Napa River. The Napa River watershed covers an area of approximately 426 square miles, and is bordered by mountains to the north, west, and east. The watershed is typical of the California coastal range, with northwest-southeast trending topography. The Napa River runs through the center of the watershed on the valley floor for 55 miles to the San Pablo Bay.

The evaluation area includes natural habitats within 1 mile of the property. Natural lands include oak woodland, shrubland (chaparral), annual grassland, and water. Valleys to the east and west of the study area have been developed with vineyards. Portions of the property have been developed with vineyards, houses, barns and associated agricultural infrastructure, and paved and graded roads. Soils within the property consist of the Bressa-Dibble-Sobrante, Fagan-Millsholm, and Tehama soil associations. The topography consists of flat to steeply rolling hills and elevation ranges from 1,000 to 1,400 feet above sea level. Natural habitats within the evaluation area are depicted in **Figure 2**. Vegetation alliances (Sawyer et al., 2009) associated with the natural lands within the evaluation area are below. Detailed descriptions of vegetation alliances within the study area are provided in Section 3.2 below.

Oak woodland is the predominant vegetation within the evaluation area. Vegetation alliances associated with this natural community include: blue oak alliance, California bay-leather oak (*Rhamnus* spp.) mesic serpentine no formal description (NFD) super alliance, California bay-madrone-coast live oak-(black oak big-leaf maple) NFD super alliance, coast live oak alliance, coast live oak-blue oak-(foothill pine) NFD association, interior live oak alliance, interior live oak-blue oak-(foothill pine) NFD association, mixed oak alliance, valley oak alliance, valley oak-(California bay-coast live oak-walnut-ash) riparian forest NFD association, leather oak-California bay-*Rhamnus* ssp. mesic serpentine NFD alliance, leather oak-white leaf manzanita, chamise xeric serpentine NFD super alliance, scrub interior live oak-scrub oak-(California bay-flowering ash-birch leaf mountain mahogany-toyon-California buckeye) mesic East County NFD super alliance, and white leaf manzanita-leather oak-(chamise-ceanothus spp.) xeric serpentine NFD super alliance.

Annual grassland occurs in scattered areas throughout the evaluation area. Vegetation alliances associated with this natural community include: California annual grasslands, serpentine grasslands NFD super alliance, and upland annual grasslands and forbs formation.

Other vegetation alliances within the evaluation area include: foothill pine alliance, sargent cypress alliance, douglas-fir-ponderosa pine alliance, Brewer willow alliance, mixed willow super alliance, chamise alliance, (bulrush-cattail) fresh water marsh NFD super alliance, serpentine barren, agriculture, vacant, and urban or built-up.

Water includes wetlands, drainages (streams), and aquatic habitat (reservoirs/lakes/marsh). Fresh water marsh is found along the shore of the freshwater reservoirs and small ponds.

Elder Creek bisects the study area. Vineyards are located between 25 feet and 50 feet from Elder Creek on both sides. Elder Creek extends from an access road crossing of the drainage at the inlet to Matheson Reservoir for approximately 1,700 feet upstream. Immediately upstream of the existing reservoir, the creek consists of a 4 to 6-foot channel with steep, one to 2-foot high banks. The channel also lacks any type of habitat complexity in the form of pools, woody debris, or instream cover. The banks of Elder Creek along the upper portion of the property are surrounded by densely vegetated Himalayan blackberry (*Rubus armeniacus*) interspersed with willow (*Salix* sp.) until approximately 1,500 feet north of Matheson Reservoir, where riparian vegetation stops and the banks are sparsely vegetation. Downstream of Matheson Reservoir, Elder Creek continues southward and drains to Sage Creek. This lower portion of Elder Creek lacks riparian vegetation along the banks. See **Figure 3** for the location of Elder Creek and other aquatic features.

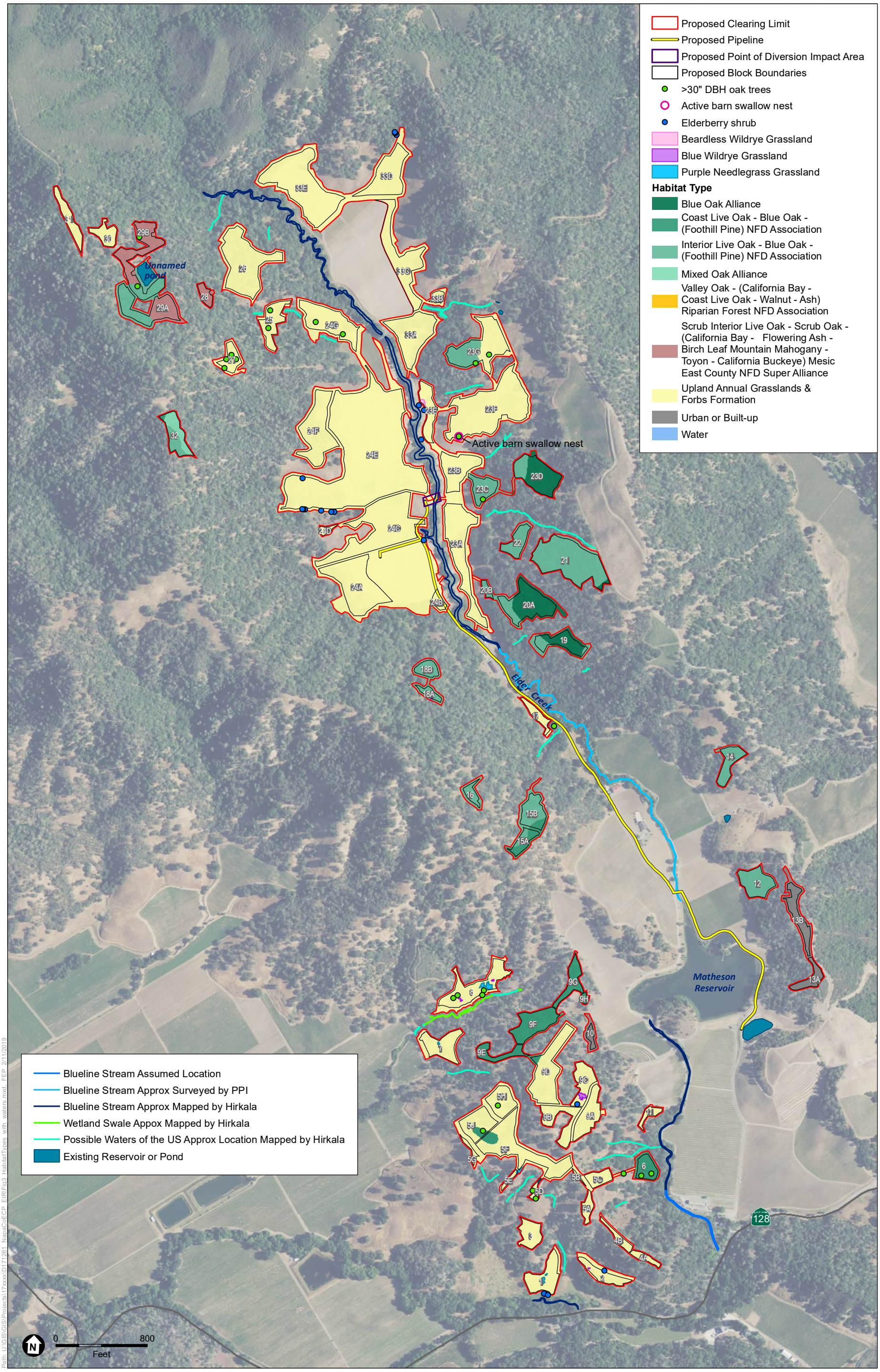
3.2 Terrestrial Biological Communities within the Study Area

Natural communities are assemblages of plant species that occur together in the same area and are defined by species composition and relative abundance. The natural community classification presented herein is based on field observations. The following general terrestrial biological communities occur within the study area: grassland, mixed oak woodland, chaparral/scrub, and urban. The general biological communities are further characterized into vegetation alliances. Dominant vegetation observed within the vegetation alliances is provided below. A complete list of plant species identified during the botanical surveys is provided in **Appendix C**. Biological communities in the survey area, project site, and evaluation area are shown in Figure 2. **Table 1** provides a summary of the terrestrial biological communities by acreages within the study area, Project Site, and Napa County. Aquatic biological communities are discussed under Section 3.4 (Potential Waters of the U.S.) and shown in **Figure 3**. Biological communities within the study area are shown in **Figures 2 and 3**: Representative photographs of the biological communities are provided in **Appendix D**.

3.2.1 Grassland

Upland Annual Grasslands and Forbs Formation

Upland annual grassland is the dominant biological community within the study area. Annual grassland is distinguished primarily by nonnative annual grasses and forbs.



SOURCE: NAIP, 2016; ESRI, 2012; CDFW; 2015; Napa County, 2018; ESA, 2019

KJS Investment Properties & Sorrento Inc. ECP Application

Figure 3
Biological Communities within the Study Area

ESA

This page intentionally left blank

TABLE 1
TERRESTRIAL BIOLOGICAL COMMUNITIES BY ACREAGES IN THE DEVELOPMENT AREA, PROJECT SITE, AND NAPA COUNTY

Terrestrial Biological Community	Within Development Area Acreage[1]	Within Project Site[2] Acreage	Within Napa County[2] Acreage
Grassland			
Upland Annual Grasslands and Forbs Formation	117.38	166.62	12,153
Purple Needlegrass Grassland	0.19	Not quantified	Not quantified
Beardless Wildrye Grassland	0.05	Not quantified	Not quantified
Blue Wildrye Grassland	0.08	Not quantified	Not quantified
Grassland Total	***117.70***	***166.62***	***12,153***
Mixed Oak Woodland			
Blue Oak Alliance	5.56	35.43	44,104
Coast Live Oak-Blue Oak-(Foothill Pine) NFD Association	6.54	166.81	26,374
Interior Live Oak-Blue Oak (Foothill Pine) NFD Association	20.71	252.99	18,084
Mixed Oak Alliance	0.71	68.77	28,703
Valley Oak-(California Bay-Coast Live Oak-Walnut-Ash) Riparian Forest NFD Association	0.06	17.81	5,721
Mixed Oak Woodland Total	***33.58***	***541.81***	***122,986***
Chaparral/Scrub			
Scrub Interior Live Oak-Scrub Oak (California Bay-Flowering Ash-Birch Leaf Mountain Mahogany-Toyon-California Buckeye) Mesic East County NFD Super Alliance	4.35	23.52	11,037
Chaparral Scrub Total	***4.35***	***23.52***	***11,037***
Urban			
Urban or Built-Up	2.64	--	26,461
Urban Total	***2.64***	***--***	***26,461***
Terrestrial Biological Community Total	**158.27**	**731.95**	**172,637**

NOTES:
1 GIS calculations do not reflect exact acreage of development area due to rounding.
2 Source: Napa County 2005

Dominant nonnative grasses observed within this biological community during the April 2018 surveys include wild oat (*Avena fatua*), slender oat (*Avena barbata*), soft chess (*Bromus hordeaceus*), ripgut grass (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), hare barley (*Hordeum murinum* ssp. *leporinum*), and rattlesnake grass (*Briza maxima*). Dominant nonnative forbs include redstem filaree (*Erodium cicutarium*), blue-eyed grass (*Sisyrinchium bellum*), filaree (*Erodium botrys*), tall sock-destroyer (*Torilis arvensis*), geranium (*Geranium dissectum*), cranesbill (*Geranium molle*), rose clover (*Trifolium hirtum*), narrowleaf plantain (*Plantago lanceolata*), common burclover (*Medicago polymorpha*), yellow star thistle (*Centaurea solstitialis*), blue grass (*Poa bulbosa*), silver hair grass (*Aira caryophyllea*), harding

grass (*Festuca aquatica*), and Italian thistle (*Carduus pycnocephalus*). Native wildflowers observed within the annual grassland include California poppy (*Eschscholzia californica*), bicolored lupine (*Lupinus bicolor*), western buttercup (*Ranunculus occidentalis* var. *occidentalis*), blue dicks (*Dichelostemma capitatum*), soap plant (*Chlorogalum pomeridianum*), and narrow-leaved mule ears (*Wyethia angustifolia*).

The majority of the upland annual grassland within the northern portion of the development area is densely vegetated and is cultivated. Very few small mammal burrows occur within the annual grassland due to the dense vegetation. The annual grassland provides low quality foraging habitat for raptors given the lack of suitable rodent habitat present. These areas had been mowed or grazed prior to the June 2018 surveys and the majority of the herbaceous species were unidentifiable as a result.

Other areas of upland annual grasslands and forbs formation in the south had been mowed or grazed prior to the June 2018 surveys. The majority of the herbaceous species were unidentifiable as a result.

Isolated mature oak trees greater than 30 inches dbh occur within the grassland. The oak trees provide high quality nesting habitat for birds and raptors. In addition, proposed Block 5D contains granaries within a foothill pine (*Pinus sabiniana*).

Purple Needlegrass Grassland

Approximately 0.19 acre of purple needle grass (*Stipa pulchra*) grassland occurs within the study area. The purple needlegrass grassland is discussed in further detail in Section 3.3 Sensitive Natural Communities.

Blue Wildrye Grassland

Approximately 0.08 acre of blue wildrye (*Elymus glaucus*) grassland occurs within the study area. The blue wildrye grassland is discussed in further detail in Section 3.3 Sensitive Natural Communities.

Beardless Wildrye Grassland

Approximately 0.05 acre of beardless wildrye (*Elymus triticoides*) grassland occurs within the study area. The beardless wildrye grassland is discussed in further detail in Section 3.3 Sensitive Natural Communities.

3.2.2 Mixed Oak Woodland

Blue Oak Alliance

The Blue Oak Alliance is dominated primarily by blue oak (*Quercus douglasii*) with interior live oak (*Quercus wislizeni*) scattered throughout. Understory shrubs include common manzanita (*Arctostaphylos manzanita* ssp. *manzanita*), western poison oak (*Toxicodendron diversilobum*), and honeysuckle (*Lonicera hispidula*). Dominant understory herbaceous vegetation includes those identified under the upland annual grassland habitat. Isolated mature oak trees greater than

30 inches dbh occur within the blue oak alliance. These provide high quality habitat for wildlife species.

Coast Live Oak-Blue Oak NFD Association

Dominant overstory vegetation includes coast live oak (*Quercus agrifolia*) interspersed with blue oak, madrone (*Arbutus menziesii*), and foothill pine (*Pinus sabiniana*). Understory shrubs include honeysuckle, common manzanita, and western poison oak. Dominant understory herbaceous vegetation includes those identified under the upland annual grassland habitat.

Interior Live Oak-Blue Oak NFD Association

Dominant overstory vegetation includes interior live oak (*Quercus wislizenii*) and blue oak intermixed with madrone, California bay (*Umbellularia californica*), buckeye (*Aesculus californica*) and foothill pine. Dominant understory shrubs include western poison oak and California yerba santa (*Eriodictyon californicum*). Dominant understory herbaceous vegetation includes those identified under the upland annual grassland habitat. Isolated mature oak trees greater than 30 inches dbh occur within this biological community. These provide high quality habitat for wildlife species.

Mixed Oak Alliance

Mixed oak alliance occurs within the study area. Dominant overstory vegetation includes coast live oak, valley oak (*Quercus lobata*), blue oak, foothill pine, big-leaf maple (*Acer macrophyllum*), and black oak (*Quercus kelloggii*). Understory shrubs include western poison oak, common manzanita, and coyote brush (*Baccharis pilularis*). Dominant understory herbaceous vegetation includes those identified under the upland annual grassland habitat.

Valley Oak-(California Bay-Coast Live Oak-Walnut-Ash) Riparian Forest NFD Association

A small portion of riparian habitat occurs within the study area along banks of Elder Creek. Dominant overstory vegetation includes willow (*Salix* sp.), California bay (*Umbellularia californica*), and black oak. Dominant understory includes curly dock (*Rumex cripsus*) and annual beardgrass (*Polypogon monspeliensis*). This biological community is discussed in further detail in Section 3.3 Sensitive Natural Communities.

3.2.3 Chaparral/Scrub

Scrub Interior Live Oak-Scrub Oak- Mesic East County NFD Super Alliance

Scrub interior live oak-scrub oak- mesic east county NFD super alliance areas is densely vegetated. Dominant overstory vegetation includes California bay, scrub oak (*Quercus berberidifolia*), toyon (*Heteromeles arbutifolia*), foothill pine, western poison oak, Jim bush (*Ceanothus oliganthus* var. *sorediatus*), and common manzanita. Dominant understory includes slender wild oat, California-broom (*Acmispon glaber* var. *glaber*), medusa head (*Elymus caput-medusae*), and shepherd's purse (*Capsella bursa-pastoris*).

3.2.4 Urban or Build-Up

Urban includes disturbed land that had been graded or used for storage associated with the existing vineyard and ranching operations. Materials piles, compost piles, and agricultural equipment occur on the disturbed land. Minimal herbaceous vegetation has established within the disturbed land.

3.3 Sensitive Natural Communities

Sensitive habitats include those that are of special concern to resource agencies or those that are protected under California Environmental Quality Act (CEQA), Napa County, Section 1600 of the California Fish and Game Code, or Section 404 of the Clean Water Act. Sensitive natural communities within the study area include potential waters of the U.S. including 0.02 acre of Elder Creek and less than an estimated 0.005 acre of the unnamed pond, oak trees within the mixed oak woodland and annual grassland, 0.06 acre of riparian woodland, 0.05 acre of beardless wildrye grassland, 0.08 acre of blue wildrye grassland, and 0.19 acre of purple needlegrass grassland (Figure 3). Mixed oak woodland is protected via Policy CON-24 and riparian woodland is protected under Policy CON-28 of the Napa County General Plan (Napa County, 2005).

3.4 Potential Waters of the U.S.

Two delineations were previously prepared that encompass the study area: one by Gibson & Skordal (2014) and one by Madrone Ecological Consulting (2017). The U.S. Army Corps of Engineers (USACE) issued a preliminary jurisdictional determination (PJD) on June 19, 2016, (2015-00309N) and concurred with the presence of approximately 0.76 acre of potential waters of the U.S. within 194 acres of the property (Gibson & Skordal, 2014; USACE, 2016). The other delineation mapped 4.077 acres within an additional 312 acres of the property (Madrone Ecological Consulting, 2017). The delineations are considered preliminary until the USACE verifies the findings.

The study area includes a total of approximately 0.025 acre of potential waters of the U.S., which includes the 0.02 acre associated with the proposed intake structure along Elder Creek and less than an estimated 0.005 acre associated with the unnamed pond surrounding proposed Blocks 29B and 29C (Figure 3).

3.5 Wildlife Observed

The following birds were observed foraging during the 2018 surveys: red-winged blackbird (*Agelaius phoeniceus*), barn swallow (*Hirundo rustica*), mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), great blue heron (*Ardea herodias*), California quail (*Callipepla californica*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), mourning dove (*Zenaida macroura*), turkey vulture (*Cathartes aura*), Anna's hummingbird (*Calypte anna*), acorn woodpecker (*Melanerpes formicivorus*), northern flicker (*Colaptes auratus*), black phoebe (*Sayornis nigricans*), common raven (*Corvus corax*), steller's jay (*Cyanocitta stelleri*), western scrub jay (*Aphelocoma coerulescens*), northern mockingbird (*Mimus polyglottos*), song sparrow (*Melospiza melodia*), dark-eyed junco (*Junco hyemalis*), Brewer's blackbird (*Euphagus*

cyanocephalus), oak titmouse (*Baeolophus inornatus*), house finch (*Haemorhous mexicanus*), American goldfinch (*Spinus tristis*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), ruby-crowned kinglet (*Regulus calendula*), swan (*Cygnini* sp.), western bluebird (*Sialia mexicana*), and Canada goose (*Branta canadensis*). The following mammals were observed: western grey squirrel (*Sciurus griseus*), coyote (*Canis latrans*), wild boar (*Sus scrofa*), black-tailed deer (*Odocoileus hemionus*), and black-tailed jackrabbit (*Lepus californicus*).

An active barn swallow nest was observed in a cavity of a coast live oak during the June 2018 surveys (Figure 3).

The following reptiles and amphibians were observed within the study area: Sierran tree frog (*Pseudacris sierra*), California newt (*Taricha torosa*), western fence lizard (*Sceloporus occidentalis*), and American bullfrog (*Lithobates catesbeianus*).

3.6 Special-Status Species

Several species known to occur on or in the vicinity of study area are protected pursuant to federal and/or State endangered species laws, or have been designated as Species of Special Concern by CDFW. In addition, Section 15380(b) of the CEQA Guidelines provides a definition of rare, endangered, or threatened species that are not included in any listing.[2] Species recognized under these terms are collectively referred to as "special-status species."

Special-status species considered for this analysis are based on the CNDDB, CNPS, and USFWS lists. A comprehensive list of regionally occurring special-status plant and wildlife species that were considered in the analysis is provided in **Appendix E**. The list includes the common and scientific names for each species, regulatory status (federal, State, local, CNPS), habitat descriptions, and a discussion of the potential for occurrence within the study area based on suitable habitat presence. Special-status species determined to not have the potential to occur are based on the study area lacking suitable habitat or occurring outside of the known extant geographical or elevational ranges; these species are not discussed further in this section, except for a rationale as to why valley elderberry longhorn beetle (VELB; *Desmocerus californicus dimorphus*) does not have the potential to occur within the study area.

The CDFW (2019) and the USFWS (2019) lists do not identify VELB as occurring or potentially occurring within the Chiles Valley USGS quadrangle or surrounding 8 quadrangles. There are no CNDDB occurrences documented within 5 miles of the study area. The current range for VELB does not extend west of Lake Berryessa. The study area is located west of Lake Berryessa. While the study area contains habitat within the elderberry (*Sambucus nigra* ssp. *caerulea*) shrubs, the study area occurs outside of the known geographical range for this species. Further, surveys of the elderberry shrubs within the study area, as shown in **Figure 3**, observed non-listed adult male California elderberry longhorn beetles, not VELB (Entomological Consulting Services Ltd., 2016). Therefore, this species is not discussed further.

[2] For example, vascular plants listed as rare or endangered or as List 1 or 2 by the California Native Plant Society (CNPS) are considered to meet Section 15380(b) requirements.

Species that have the potential to occur are discussed further below, with one exception; potentially occurring special-status plants that were not observed during the botanical inventories conducted within their evident and identifiable blooming periods are not discussed individually by species under this section.

3.6.1 Special-Status Plants

None of the potentially occurring special-status plants identified in **Appendix E** are present within the study area. None were observed within the study area during the April 4, 5, 12, 2018 and June 19 and 20, 2018 botanical inventories that were conducted within the evident and identifiable blooming periods. Further, none were observed within the evident and identifiable blooming period during the previous May 2, 2014, April 10, 2015, June 17, 2015, and April 7, 2016 botanical surveys of the property (Vinnedge Environmental Consulting, 2017).

3.6.2 Special-Status Wildlife

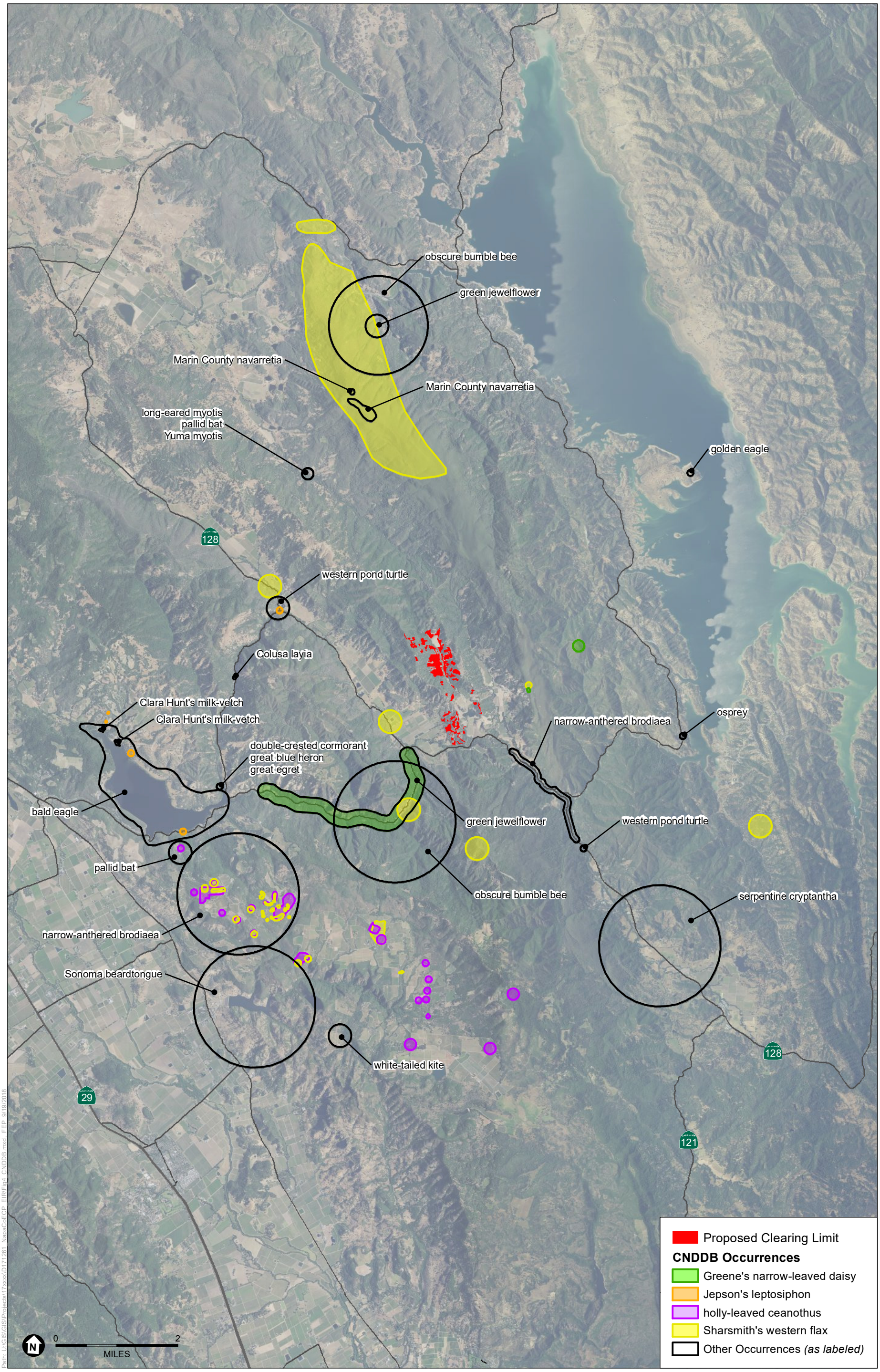
California Red-Legged Frog (*Rana draytonii*)

California red-legged frog (CRLF) is federally threatened species and a California species of special concern.

CRLF inhabits ponds, slow-moving creeks, and streams with deep pools that are lined with dense emergent marsh or shrubby riparian vegetation. Submerged root masses and undercut banks are important habitat features for this species. Breeding sites include pools and backwaters within streams and creeks, ponds, marshes, springs, sag ponds, dune ponds, lagoons, and artificial impoundments including stock ponds (USFWS, 2011). CRLF breed between November and March. Embryos hatch 6 to 14 days after fertilization and larvae require 3.5 to 7 months to attain metamorphosis. CRLF may have been extirpated from the floor of the Central Valley prior to the 1960s (USFWS, 2002). Aquatic habitat that supports stronger populations of nonnative predators associated with warm water habitats such as American bullfrogs (*Lithobates catesbeiana*), Centrarchid fish (pers. comm., Jennings 2013), bass (*Micropterus* sp.), and mosquitofish (*Gambusia affinis*) generally do not co-exist with CRLF (USFWS, 2017). CRLF are mostly found in seasonal aquatic habitat rather than in permanent waters because predators including bass, bullfrogs, and mosquitofish are unable to survive once the aquatic features dry up.

There are no CNDDB records for this species within 5 miles of the study area (**Figure 4**).[3] Although Matheson Reservoir, a lacustrine pond, and an unnamed pond in the vicinity of the study area provide marginal habitat, American bullfrogs and mosquitofish, which are predators of CRLF, were observed and heard within these aquatic features during the June 2018 surveys. In addition, focused protocol level CRLF surveys, authorized by the USFWS on May 11, 2015, were conducted at Matheson Reservoir between June 3 and 24, 2015 and on July 8, 2015 (Wildlife

[3] Although observations of species are not required to be documented within the CNDDB, the CNDDB is a tool used by biologists to aid in determining presence or potential. In addition to there not being CNDDB records for this species within 5 miles of the development area, there are no known species locations on file with the County or in the County's GIS.



SOURCE: NAIP, 2016; ESRI, 2012; Napa County, 2018; CDFW, 2018; ESA, 2018

KJS Investment Properties & Sorrento Inc. ECP Application

Figure 4
CNDDB Occurrences

ESA

This page intentionally left blank

Research Associates, 2015) according to the Revised Guidance on Site Assessments and Field Surveys for the California Red-Legged Frog (USFWS, 2005). No CRLF tadpoles or adults were heard or seen during the day and nighttime visual encounter surveys nor were any observed while dipnetting. The USFWS concurred with the negative findings in an email, dated September 9, 2015 and in a subsequent email, dated February 14, 2019 (Appendix F). The study area provides marginal habitat within Elder Creek given the highly scoured banks that either lack vegetation or are densely vegetated with Himalayan blackberries. However, the study area occurs outside of the known geographic range for this species and protocol surveys resulted in negative findings. This species is unlikely to occur within the study area.

Western Pond Turtle (*Actinemys marmorata*)

Western pond turtle is a California species of special concern.

Western pond turtles are found in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with suitable basking sites (Californiaherps, 2019). Western pond turtles nest and overwinter in sandy banks, if present, or in areas of sparse vegetation comprised of grassland and forbs with less than 10 percent slopes, and less than 492 feet (150 meters) from aquatic habitat (Rosenberg et al., 2009). Terrestrial nesting habitat use by western pond turtles average 92 feet on either side of creeks (Rathbun et al., 2002).

There is one CNDDB record for this species within 5 miles of the study area (**Figure 4**). Matheson Reservoir and an unnamed pond in the vicinity of the study area provide habitat for this species. Elder Creek within and in the vicinity of the study area provide aquatic habitat for this species. The annual grassland and grassy areas within the chaparral/scrub and mixed oak woodland on less than 10 percent slopes within 492 feet of Elder Creek, Matheson Reservoir, and unnamed pond. This species was not observed within the study area during the biological surveys. This species has the potential to occur within the study area.

Foothill Yellow-Legged Frog (*Rana boylii*)

Foothill yellow-legged frog (FYLF) is a candidate for state listing as threatened and a California species of special concern.

FYLF ranges from Oregon south through the Coast Ranges to the Transverse Mountains in Los Angeles County, California, and through the western slope of the Sierra Nevada from Oregon south to Kern County, California. FYLF inhabit partially shaded, rocky streams at low to moderate elevations in areas of chaparral, cismontane woodland, and broadleaf upland forest. FYLF require shallow, flowing water and prefer small- to moderate-sized streams that have cobble-sized substrate. FYLF breeds from March through May in pools within perennial streams and attaches its eggs to gravel or rocks at the edges or along the banks. FYLF are active all year in warmer locations, and may hibernate in colder areas. FYLF are rarely found outside of a permanent water source.

There are no CNDDB records for this species within 5 miles of the study area. While Elder Creek within and in the vicinity of the project site provide marginal habitat, the creek does not contain

water year round and lacks ponded areas for the FYLF to breed in. This species is not considered to occur within the study area.

Swainson's Hawk (*Buteo swainsoni*)

Swainson's hawk is a state listed threatened species.

The Swainson's hawk population that nests in the Central Valley winters primarily in Mexico, while the population that nests in the interior portions of North America winters in South America (Bradbury et al., in prep.). Swainson's hawks arrive in the Central Valley between March and early April to establish breeding territories. Breeding occurs from late March to late August, peaking in late May through July (CDFW 2018b). In the Central Valley, Swainson's hawks nest in isolated trees, small groves, or large woodlands next to open grasslands or agricultural fields. This species typically nests near riparian areas; however, it has been known to nest in urban areas as well. Nest locations are usually in close proximity to suitable foraging habitats, which include fallow fields, annual grasslands, irrigated pastures, alfalfa and other hay crops, and low-growing row crops. Swainson's hawks leave their breeding grounds to return to their wintering grounds in September or October (Nature Serve, 2019).

There are no CNDDB records for this species within 5 miles of the study area. There is one CNDDB record for this species between 5 and 10 miles of the study area. Occurrence number 2668 is from 2012 and is approximately 7.5 miles southwest of the study area. The record states that an active nest was observed along the east bank of the Napa River. The trees within the annual grassland and mixed oak woodland provide nesting habitat for this species. The annual grassland within the study area provides foraging habitat for this species. This species was not observed during the biological surveys. This species has the potential to nest and forage within the study area.

White-Tailed Kite (*Elanus leucurus*)

While not listed, the white-tailed kite is a state fully protected species under Fish and Game Code, meaning that this species "....may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected" species, although take may be authorized for necessary scientific research.

White-tailed kite is a medium sized raptor that is a yearlong resident in coastal and valley lowlands in California. White-tailed kite breed from February to October, peaking from May to August (CDFW, 2018b). This species nests near the top of dense oaks, willows, or other large trees.

There is one CNDDB record for this species within 5 miles of the study area (**Figure 4**). The trees within the annual grassland and mixed oak woodland provide nesting habitat for this species. One white-tailed kite was observed foraging within the study area during the June 2018 biological surveys. This species has the potential to nest within the study area.

Burrowing Owl (*Athene cunicularia*)

Burrowing owl is a California species of special concern.

Burrowing owl is a small ground-dwelling owl that occurs in western North America from Canada to Mexico and east to Texas and Louisiana. Although burrowing owls are migratory in certain areas of their range, these owls are predominantly non-migratory in California. Burrowing owls generally inhabit gently-sloping areas, characterized by low, sparse vegetation (Poulin et al., 2011). The breeding season for burrowing owls extends from March to August, peaking in April and May (CDFW, 2018b). Burrowing owls nest in burrows in the ground, often in old ground squirrel burrows. Burrowing owl also uses artificial burrows including pipes, culverts, and nest boxes.

There are no CNDDB records for this species within 5 miles of the study area. The annual grassland provides habitat for this species, however, very few potential burrow sites that could be utilized by burrowing owl are present within the study area. No burrowing owl or signs of burrowing owl were observed during the biological surveys. This species has the potential to nest or winter within the study area.

Golden Eagle (*Aquila chrysaetos*)

Golden eagle is a California fully protected species.

Golden eagles nest primarily on cliffs nearby open habitats such as grassland, oak savanna, and open shrubland (Grinnell and Miller, 1944). They build their nests on rock outcrops, cliff ledges, or in trees from 10 to 100 feet above the ground. They often occupy remote mountain ranges and upland areas. Wintering habitats in the western United States tend to include available perches and native shrub-steppe vegetation types.

There is one CNDDB record for this species within 5 miles of the study area (Figure 4). The isolated trees within the annual grassland and the trees within the oak woodland provide nesting habitat for this species. No golden eagles were observed during the 2018 surveys of the study area. This species has the potential to occur within the study area.

Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagle is California endangered and fully protected.

Bald eagles inhabit forested areas adjacent to large water bodies including lakes, reservoirs, rivers, estuaries, and the coastline. They build nests in large trees on rocky outcrops. These species winter in temperature areas below 500 meters.

There is one CNDDB record for this species within 5 miles of the study area (Figure 4). The isolated trees within the annual grassland and the trees within the mixed oak woodland provide nesting habitat for this species. No golden eagles were observed during the 2018 surveys of the study area. This species has the potential to occur within the study area.

Purple Martin (*Progne subis*)

Purple martin is a California species of special concern.

Purple martin nests in snags, tree cavities, crevices in rocks, and abandoned woodpecker holes in the vicinity of water. This species forages over fields, water, and marshes.

There are no CNDDB records for this species within 5 miles of the study area. The trees within the mixed oak woodland provide nesting habitat for this species. No purple martin were observed during the biological surveys. This species has the potential to occur within the study area.

Bank Swallow (*Riparia riparia*)

Bank swallow is California threatened.

Bank swallows nest in riverbanks and forages over riparian areas and adjacent uplands.

There are no CNDDB records for this species within 5 miles of the study area. Elder Creek within and in the vicinity of the study area provide nesting habitat for this species. No bank swallows were observed during the biological surveys. This species has the potential to occur within the study area.

Tricolored Blackbird (*Agelaius tricolor*)

Tricolored blackbird is a state candidate for listed as threatened and is a California species of special concern.

Tricolored blackbird is a colonial species that occurs in pastures, dry seasonal pools, and agricultural fields in the Central Valley and the surrounding foothills. This species usually nests within dense cattails (*Typha* sp.) or tules (*Scirpus* sp.) in emergent wetlands. Tricolored blackbird also nests in thickets of blackberry (*Rubus* sp.), wild rose (Rosa sp.), willows, and tall herbs. Nesting locations must be large enough to support a minimum colony of approximately 50 pairs (CDFW, 2018b).

There are no CNDDB records for this species within 5 miles of the study area. While no nesting habitat occurs within the study area, the riparian habitat surrounding Elder Creek and the tules within the unnamed pond in the vicinity of the study area provide nesting habitat, though these areas are not large enough to support a nesting colony. The annual grassland provides foraging habitat for this species. This species was not observed during the biological surveys of the study area. This species has the potential to forage within the study area. Foraging habitat is not protected under CEQA for this species.

Migratory Birds and Other Birds of Prey and Foraging Raptors

Nesting birds are protected under the Migratory Bird Treaty Act (MBTA) and §3503.5 of the Department of Fish and Game Code.

Migratory birds and other birds of prey are protected under 50 CFR 10 of the MBTA and/or Section §3503.5 of the California Fish and Game Code. Migratory birds and other birds of prey have the potential to nest within the annual grassland and within the trees within the nonnative grassland and the mixed oak woodland during the nesting season. An active barn swallow nest was observed within an isolated coast live oak tree during the June 2018 biological surveys. The generally accepted nesting season is from February 15 through August 31. Migratory birds and other birds of prey have the potential to nest within the study area.

Annual grassland in the vicinity of proposed Blocks 25, 26, 27, 30, and 31 provides high quality habitat since they are not cultivated, are connected to contiguous natural land to the north and west, and are situated in proximity to the unnamed pond. While the annual grassland to the south provides foraging habitat, the blocks are situated nearby existing vineyards, occur on steep slopes, lack small mammal burrows. The grassland within the northern portion of the development area is dense because it is cultivated, and dense vegetation reduces the ability for raptors to spot prey. Once the grassland is mowed, there is very little cover for small mammals to utilize for refuge and cover. The annual grassland provides higher quality foraging habitat during the period of the year when the vegetation is growing back following the grazing and mowing, but before the vegetation becomes dense and thick.

Pallid Bat (*Antrozous pallidus*), Townsend's Big-Eared Bat (*Corynorhinus townsendii*), and Western Red Bat (*Lasiurus blossevillii*)

These bats are California species of special concern.

Bats exhibit a wide range of habitat usage depending on the species, season, time of day, resource availability, level of disturbance, and other factors, but often exhibit a high site fidelity and specificity for roost selection. Roost sites consist of maternity (nursery colonies), bachelor, day, night, and feeding sites within caves, mines, cliffs, rock crevices, tree hollows, stumps, foliage, under exfoliating bark, and in manmade structures including buildings and bridges. Some species require a complex network of habitat characteristics that fulfill foraging, water intake, shelter, and thermoregulatory requirements that vary seasonally.

There are 4 CNDDB records of bats within 5 miles of the study area (Figure 4). The isolated trees within the upland grassland and the trees within the mixed oak woodland provide roosting habitat for these species. No bats were observed during the 2018 surveys of the study area. Special-status bats have the potential to roost within the study area.

3.7 Wildlife Movement Corridors

Wildlife movement corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or by areas of human disturbance or urban development. Topography and other natural factors in combination with urbanization can fragment or separate large open-space areas. The fragmentation of natural habitat can create isolated "islands" of vegetation and habitat that may not provide sufficient area to accommodate sustainable populations and can adversely impact genetic and species diversity. The retention of

wildlife movement corridors ameliorates the effects of such fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished. Such movement may also promote genetic exchange between separated populations.

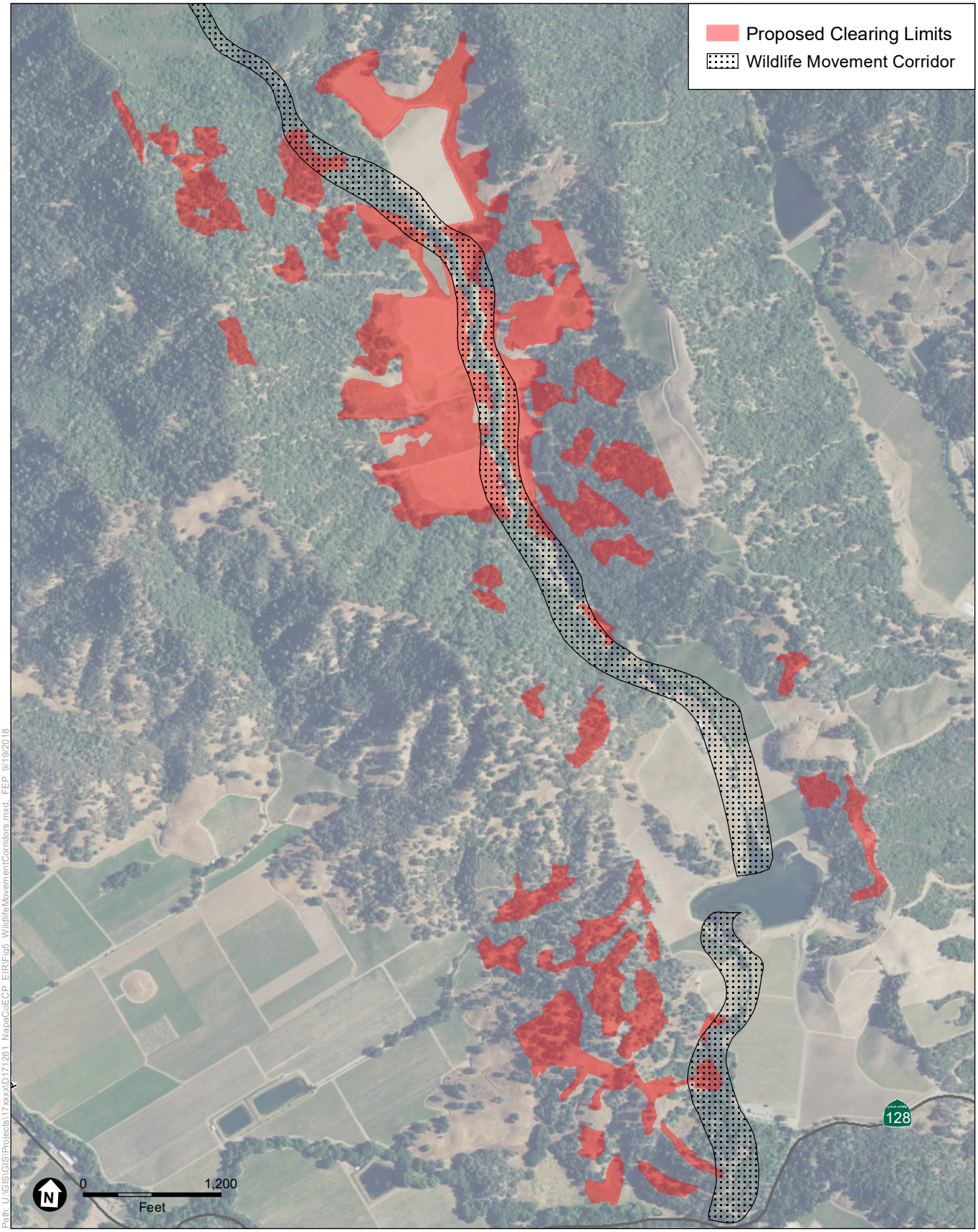
Native predators are more likely to use wide riparian corridors (greater than 100 feet wide and preferably at least 1,000 feet wide), and smaller native and non-native mammalian predators are more active in narrow (33 to 98 feet on each side of the creek) riparian corridors and denuded riparian corridors (Hilty and Merenlende, 2002 and 2004). Terrestrial nesting habitat use by western pond turtles average 92 feet on either side of creeks (Rathbun et al., 2002). Based on the wildlife corridor data, it is assumed that corridor widths should be at least 100 feet wide to provide adequate movement areas for some of the passage species and corridor dwellers present in the landscape.

The entire property in the vicinity of the study area provides hundreds of acres of intact habitat that may be used for wildlife movement. Some locations within the study area occur adjacent to deer fencing that surrounds existing vineyards within the property and may impede movement. However, the study area does not contain any other barriers that would preclude wildlife from moving throughout the property.

The riparian corridor that bisects the northern portion of the study area starting from approximately 1,500 feet north of Matheson Reservoir and continuing northward provides a natural north to south movement corridor through the developed footprint of the property (**Figure 5**). Though narrow at times, this corridor provides cover and connectivity through vineyard areas to Matheson Reservoir and riparian habitat to the south, east, and west. This corridor may be used for movement of species among habitat patches, allowing for gene flow and recolonization after local extirpation (Meffe and Carrol, 1994).

3.8 Critical Habitat for Listed Fish and Wildlife Species

The USFWS defines the term critical habitat in the federal Endangered Species Act as a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. The study area is not within designated critical habitat for any listed plant or wildlife species.



SOURCE: NAIP, 2016; ESRI, 2012; Napa County, 2018; ESA, 2018

KJS Investment Properties & Sorrento Inc. ECP Application

Figure 5
Wildlife Movement Corridor

This page intentionally left blank

CHAPTER 4
Impact Assessment

The following section describes the potential impacts to biological resources as a result of the proposed project. The term "impact area" refers to the maximum area of disturbance associated with the proposed clearing limits for the proposed project.

4.1 Proposed Project

Construction of the proposed project would result in both temporary (construction-related) impacts and permanent impacts. Temporary construction-related impacts are associated with project activities that temporarily remove one or more of the essential components of a habitat or natural community, but which can be restored to pre-project conditions of equal or greater habitat value as part of the site restoration process at the end of construction. In order for effects to be considered temporary, the habitat must be restored or must recover from the impact within 2 years. Temporary impacts associated with project construction for all biological resources include portions of the project area where contractors stage soil and equipment, access routes for construction vehicles, and areas within the vineyard areas where vegetation removal would occur.

Permanent impacts are associated with project activities that permanently remove one or more of the essential components of a habitat or natural community, which cannot be restored to pre-project conditions. Permanent impacts are considered a loss or conversion of the habitat or natural community. The permanent impacts associated with proposed project are limited to the conversion of existing protected biotic communities to vineyard and/or water storage. In addition, construction of the new water diversion structure could result in a direct and permanent impacts to riverine habitat.

The significance criteria used in this assessment are based in part on the CEQA Environmental Checklist (CEQA Guidelines Appendix G [Title 14 CCR, Section 15000-15387]). These criteria are used to determine the extent to which the proposed project could impact sensitive biological resources. The threshold of significance may vary for each species or habitat, and is determined by the lead agency.

The proposed project would result in a significant impact on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or the USFWS.

- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

4.2 Impacts and Mitigation Measures

The following discussion describes the potential effects to biological resources as a result of project development and operations. As indicated in the Executive Summary, the significance of impacts identified herein will be assessed and mitigation measures to avoid, minimize, or mitigate for impacts to these resources will be disclosed in the EIR that will be prepared for the project.

4.2.1 Biological Community Impacts

The proposed project would impact a total of approximately 158.31 acres within the study area (note that GIS calculations do not reflect the exact acreage of the study area due to rounding). **Table 2** summarizes the acreages of impacts by biological community within the study area, identifies the total acreage within the project site and Napa County, and provides the percent of the biological community that would be removed as a result of the proposed project.

TABLE 2
PROJECT IMPACTS BY BIOLOGICAL COMMUNITY

Biological Communities	Direct Impact within Development Area (Acreage[1])	Total Acreage within Project Site	Percent of Total Impacted within Project Site	Total Acreage within Napa County[2]	Percent of Total Impacted within Napa County
Upland Annual Grasslands and Forbs Formation	117.38	166.62	70.45	12,153	0.97
Purple Needlegrass Grassland	0.19	Not quantified	n/a	Not quantified	n/a
Beardless Wildrye Grassland	0.05	Not quantified	n/a	Not quantified	n/a
Blue Wildrye Grassland	0.08	Not quantified	n/a	Not quantified	n/a
Blue Oak Alliance	5.56	35.43	15.69	44,104	0.01
Coast Live Oak-Blue Oak (Foothill Pine) NFD Association	6.54	166.81	3.92	26,374	0.02
Interior Live Oak-Blue Oak (Foothill Pine) NFD Association	20.71	252.99	8.19	18,084	0.11
Mixed Oak Alliance	0.71	68.77	1.03	28,703	0.002
Scrub Interior Live Oak-Scrub Oak (California Bay-Flowering Ash-Birch Leaf Mountain Mahogany-Toyon-California Buckeye) Mesic East County NFD Super Alliance	4.35	23.52	18.49	11,037	0.04
Valley Oak-(California Bay-Coast Live Oak-Walnut-Ash) Riparian Forest NFD Association	0.06	17.81	0.34	5,721	0.001
Urban or Built-Up	2.64	Not quantified	n/a	26,461	0.01
Riverine	0.02	3.78	0.005	389	0.01
Unnamed Pond	0.005	Not quantified	n/a	n/a	n/a
Total	**158.30**	**735.73**		**173,026**	

NOTES:
1 GIS calculations do not reflect exact acreage of development area due to rounding.
2 Napa County 2005; ESA, 2018

4.2.2 Potential Waters of the U.S.

Approximately 0.02 acre of Elder Creek would be directly impacted by the proposed project from the installation of the water intake device and less than an estimated 0.005 acre of the unnamed pond would be directly impacted by the proposed project from the construction of a spillway berm and overflow structure. The proposed project would not directly impact any lacustrine habitat located at Matheson Reservoir. Vegetation clearing and grading activities associated with the proposed project could indirectly impact Matheson Reservoir, the unnamed pond, and Elder Creek outside of the study area from erosion. Direct and indirect impacts to wetlands and other waters of the U.S. are considered significant.

The applicant will be required to obtain permits (i.e., Section 404 Clean Water Act Nationwide permit, Section 401 Water Quality Certification, and Section 1600 Lake and Streambed Alteration Agreement) from regulatory agencies for the installation of the diversion structure along the bank of Elder Creek and the construction of a spillway berm and overflow structure

within the unnamed pond near proposed Block 29. The applicant shall comply with all conditions of the permits. The applicant shall ensure a no net loss of wetlands through, but not limited to, avoidance, compensatory mitigation through purchase of mitigation credits or by creating or restoring waters onsite at a minimum of 1:1 ratio. In addition, the applicant shall comply with the State's National Pollution Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Permit) issued by the Regional Water Quality Control Board (RWQCB). Impacts on all streams are anticipated to be avoided through buffers/setbacks according to the minimum County setbacks. Streams that meet the Napa County definition of a stream will comply with designated setbacks in accordance with the Napa County Conservation Regulations and Code 18.108.025. Streams that do not meet the definition set forth by Napa County as a designated stream will maintain a minimum buffer of 50 feet from the top of the bank. Streams and potential waters of the U.S. and associated Napa County stream setbacks are shown on the ECP design drawings.

4.2.3 Sensitive Natural Communities

Oak woodland (including riparian woodland) is considered sensitive habitat, and potential impacts are discussed in detail under Section 4.5. The proposed project would result in the removal of 0.05 acre of beardless wildrye grassland, 0.08 acre of blue wildrye grassland and 0.19 acre of purple needlegrass grassland, which are designated as native grassland habitat by the Napa County General Plan (Policies CON-17 and CON-24) (Napa County, 2005). Loss of sensitive grassland habitat conflicts with Napa Policy CON-17: Require no net loss of sensitive biotic communities and habitats of limited distribution through avoidance, restoration, or replacement where feasible. Therefore, this is considered a significant impact. It is recommended that any mitigation include avoidance of sensitive natural communities.

Special-Status Plants

No special-status plants would be impacted by the proposed project because none occur within the study area. Therefore, no mitigation is anticipated to be necessary.

Special-Status Amphibians and Reptiles

The proposed project would not result in impacts to special-status amphibians since none are expected to occur within the study area. Therefore, no mitigation is anticipated.

Special-Status Reptiles

Western Pond Turtle

California Red-Legged Frog and Western Pond Turtle

Daily operations associated with large vehicular traffic are limited to paved and graded roads at a speed less than 15 miles per hour. Because it is assumed that no western pond turtles would be nesting within the paved or graded roads and western pond turtles and CRLF could move out of the way due to the slow traffic requirements, operational impacts are not considered significant. The proposed project could impact western pond turtles and CRLF during construction activities associated with the installation of the water diversion structure, if they are present within Elder Creek; the installation of the spillway berm and overflow structure, if they are present within the

unnamed pond; during vegetation clearing associated with the installation of the vineyard blocks and the irrigation pipelines within the annual grassland; and during construction activities in the vicinity of Matheson Reservoir. Since western pond turtles nest and overwinter in areas less than 492 feet from aquatic habitat (Rosenberg et al. 2009), use of construction equipment could result in take of the species if present within 492 feet surrounding the suitable aquatic habitat. Based on the average distance from which western pond turtles are found from aquatic features, the permanent loss of upland nesting habitat within 100 feet from Elder Creek and the unnamed pond is considered significant. No permanent loss of habitat within Matheson Reservoir is anticipated. CRLF are also known to utilize similar upland habitat for overland movement and refuge. Impacts to these species would be considered significant. It is recommended that any mitigation include avoidance of habitat, buffers, preconstruction surveys, and worker education.

Special-Status Birds

Swainson's Hawk Foraging Habitat

The CDFW considers 5 or more vacant acres within 10 miles of an active nest within the last 5 years to be significant foraging habitat for Swainson's hawk, the conversion of which to urban uses is considered a significant indirect impact, in accordance with the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawk in the Central Valley of California* (CDFW, 1994; Staff Report). The Staff Report states that foraging habitat loss of 5 or more acres on projects located greater than 5 miles but less than 10 miles of an active nest tree documented within the last 5 years shall be mitigated at a 0.5:1 ratio. Although there is a record documented within 10 miles of the study area, it was not documented within the last 5 years. Therefore, no significant impact for loss of annual grassland would occur.

Swainson's Hawk Nesting Habitat

The trees within the study area provide nesting habitat for Swainson's hawk, including trees that may be removed as a result of project construction activities. Direct impacts to this species would be considered significant. It is recommended that any mitigation to avoid direct impacts includes preconstruction surveys and buffers from active nests.

Burrowing Owl

The proposed project could result in adverse impacts to burrowing owl if found nesting in the annual grassland proposed for removal. Impacts to this species would be considered significant. It is recommended that any mitigation to avoid direct impacts includes preconstruction surveys and buffers from active nests.

Nesting Migratory Birds and Other Birds of Prey including White-Tailed Kite, Purple Martin, Bank Swallow, Bald Eagle, and Golden Eagle

Potential nesting habitat is present within and in the vicinity of the development area for migratory bird species and other birds of prey including white-tailed kite, bald eagle, golden eagle, bank swallow, and purple martin. If active nests are present in these areas, vegetation clearing and tree removal activities associated with construction could result in impacts to these species. The nests and eggs of any bird are protected from take pursuant to California Fish and Game Code Section 3503. Direct impacts to nesting birds would be considered significant. It is

recommended that any mitigation to avoid and minimize direct impacts include at a minimum preconstruction surveys and buffers from active nests.

Special-Status Bats

Trees within the areas proposed for development have the potential to support day roosts or maternities for special-status bats. Impacts to this species would be considered significant. It is recommended that any mitigation include avoidance of suitable nest trees, preconstruction surveys, and installation of bat boxes.

Interfere with Migratory Fish or Wildlife Movement

Development and implementation of the proposed project could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Wildlife exclusion fencing is proposed for installation around individual proposed vineyard blocks and clusters of proposed vineyard blocks where appropriate (ECP Figure 4). Unfenced corridors between proposed vineyard blocks and the riparian corridor that bisects the northern portion of the development area could be used by wildlife within the project site. The installation of the diversion structure along Elder Creek would not inhibit movement within the corridor since the construction would be temporary. Based on wildlife corridor data, it is assumed that wildlife corridor widths should be at least 100 feet wide. The generally accepted width of wildlife corridors along streams is 100 feet. Although existing vineyards are as close as 25 to50 feet from Elder Creek, the proposed avoidance buffer for the proposed project ranges from 45 feet to 150 feet wide along the corridor. Proposed development within 100 feet of the corridor could interfere with wildlife movement and conflict with General Plan Policy CON-18. This is considered a significant impact. It is recommended that any mitigation include avoiding development within 100 feet of suitable aquatic habitat. Conflict with Local Ordinances and General Plan Policies.

Conversion of oak woodland habitat conflicts with Napa Policy CON-24: Maintain and improve oak woodland habitat to provide for slope stabilization, soil protection, species diversity, and wildlife habitat through appropriate measures including: c) provide replacement of lost oak woodlands or preservation of like habitat at a 2:1 ratio when retention of existing vegetation is found to be infeasible. Removal of riparian habitat conflicts with Napa Policy CON-14.

The property includes approximately 270 acres of oak woodland. The proposed project would directly impact approximately 33.52 acres of mixed oak woodland through the vegetation clearing associated with the installation of the vineyard blocks. This includes 5.56 acres of blue oak alliance, 6.54 acres of coast live oak-blue oak-(foothill pine) NFD association, 20.71 acres of interior live oak-blue oak (foothill pine) NFD association, and 0.71 acre of mixed oak alliance. Conversion of oak woodland conflicts with Policy CON-24 (Napa County, 2005). In addition, the proposed project would directly impact approximately 0.06 acre of riparian woodland (valley oak-California bay-coast live oak-walnut-ash) riparian forest NFD association) through the installation of the diversion structure in Elder Creek. Removal of riparian woodland conflicts with Policy CON-28 (Napa County, 2005). Therefore, this impact is considered significant. It is recommended that any mitigation include reduction of acreage of blocks with high value habitat.

Conflict with an Adopted or Approved Habitat Conservation Plan

The proposed project would not conflict with an adopted habitat conservation plan since none occur within Napa County. Therefore, implementation of the proposed project would have no impact on an adopted or approved habitat conservation plan.

This page intentionally left blank

CHAPTER 5
References

Baldwin, B., Goldman, D., Keil, D., Patterson, R., Rosatti, T., Wilken, D. The Jepson Manual: Vascular Plants of California. (Second Edition). University of California Press, Berkeley, CA. 2012.

Barr, C. B. 1991. The Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle: *Desmocerus californicus dimorphus*. U.S. Fish and Wildlife Service, Sacramento, California.

Berner, M., B. Grummer, R. Leong, M. Rippey. 2003. Breeding Birds of Napa County, California. Editor Ann Smith. Napa Solano Audubon Society. Vallejo, California.

Bloom, P. and D. Van De Water. 1994. Swainson's Hawk in Life on the Edge: A Guide to California's Endangered Natural Resources: Wildlife. BioSystems Books, Santa Cruz, California.

Bradbury, M., Estep, J.A., and D. Anderson. In Preparation. Migratory Patterns and Wintering Range of the Central Valley Swainson's Hawk.

Calflora. 2018. The Calflora Database: Information on California Plants for Education, Research, and Conservation. Berkeley, California. Available: http://www.calflora.org/. Accessed April 2, 2018.

California Department of Fish and Wildlife (CDFW). 2010. List of Vegetation Alliances and Associations. Vegetation Classification and Mapping Program, California Department of Fish and Game. Sacramento, CA. September 2010.

_____. 2012. Staff Report on Burrowing Owl Mitigation. State of California Natural Resources Agency Department of Fish and Game. March 7, 2012.

_____. 2015. Vegetation Datasets (GIS). Fine-Scale Vegetation Map for Napa County and Blue Ridge Berryessa.

_____. 2019. California Natural Diversity Database (CNDDB) search for the Chiles Valley U.S. Geological Survey 7.5-minute Rocklin topographic quadrangle and surrounding 8 quadrangles (Aetna Springs, Walter Springs, Brooks, St. Helena, Lake Berryessa, Rutherford, Yountville, and Capell Valley). Originally accessed on March 26, 2018. Updated June 3, 2018. Updated February 11, 2019.

_____. 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. State of California Natural Resources Agency Department of Fish and Wildlife. March 20, 2018.

Californiaherps. 2018. A Guide to the Amphibians and Reptiles of California. Available: http://californiaherps.com. Accessed April 2, 2018.

California Native Plant Society (CNPS). 2019. Inventory of Rare and Endangered Plants (online edition, v8-01a) query for the Chiles Valley U.S. Geological Survey 7.5-minute topographic quadrangle and surrounding 8 quadrangles (Aetna Springs, Walter Springs, Brooks, St. Helena, Lake Berryessa, Rutherford, Yountville, and Capell Valley). California Native Plant Society. Sacramento, California. Originally accessed on March 26, 2018. Updated June 3, 2018. Updated February 11, 2019.

Entomological Consulting Services, Ltd. 2016. Report on Surveys for the Threatened Valley Elderberry Longhorn Beetle at the Somerston Estate Near Rutherford (Napa County), California. Prepared by Richard A. Arnold, Ph.D. June 2016.

Gibson & Skordal. 2014. Delineation of the Study Area.

Google Earth, 2018. Aerial Imagery between 1993 and 2018.

Grinnell, J., and Miller, A. H. 1944. The Distribution of the Birds of California. Pac. Coast Avifauna 27.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California*,* California Department of Fish and Game, Sacramento, CA.

Jane Valerius Environmental Consulting. 2015. Draft Botanical Survey of the Somerston Estate West Ranch, Water Right Application 13943 and 26165, Napa County, California. July 29, 2015.

Jennings, Mark. Rana Resources. Personal Communication. September 18, 2013.

Jennings, M. R. and M. P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California*,* Final Report submitted to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California.

Johnsgard, P.A. 1990. Hawks, Eagles, and Falcons of North America: Biology and Natural History. Smithsonian Institution Press, Washington, DC.

Madrone Ecological Consulting. 2017. Draft Aquatic Resources Delineation of the Additional Somerston Estate Acreage, Napa County. January 2017.

Mayer, K.E. and W.F. Laudenslayer, ed. 1988. A Guide to Wildlife Habitats of California*,* California Department of Forestry and Fire Protections, Sacramento, CA, 165 pp.

Meffe, G.K. and C.R. Carroll. 1994. Principles of Conservation Biology. Sinauer Associates, Inc., Sunderland, Massachusetts. 600 pp.

Napa County. 2005. Napa County Baseline Data Report (NCBDR). Available: https://www.napawatersheds.org/app_pages/view/192. Accessed April 3, 2018.

_____. 2010. Napa County Voluntary Oak Woodland Management Plan, Appendix B, Oak Woodland Communities. September 1, 2010.

Napa County Department of Conservation, Development & Planning. 2008. Napa County General Plan. June 2008.

Napa County Planning, Building & Environmental Services. 2016a. Guidelines for Preparing Biological Resources Reconnaissance Surveys. August 2016.

_____. 2016b. Guidelines for Preparing Special-Status Plant Studies. August 2016.

Poulin, R., L. D. Todd, E. A. Haug, B. A. Millsap, and M. S. Martell. 2011. Burrowing Owl (Athene cunicularia). In Birds of North America Online (A. Poole, Editor). Cornell Lab of Ornithology, Ithaca, New York, NY, USA. Available: http://bna.birds.cornell.edu/bna/species/061. Accessed August 16, 2018.

PPI Engineering, Inc. 2018 (June). KJS Investment Properties & Sorrento, Inc. Erosion Control Plan.

Rosenberg, D., J. Gervais, and D. Vesely. 2009. Conservation Assessment of the Western Pond Turtle in Oregon (*Actinemys marmorata*). Version 1.0. November 2009. U.S.D.I. Bureau of Land Management and Fish and Wildlife Service. USDA. Forest Service Region 6. Oregon Department of Fish and Wildlife, City of Portland, OR.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society (CNPS), Sacramento. Available: http://www.dfg.ca.gov/biogeodata/vegcamp/veg_manual.asp. Accessed August 20, 2018.

Sherwin, R. 1998. Proceedings of the Western Bat Working Group workshop on Ecology, conservation and management of western bat species – species accounts, pallid bat (*Antrozous pallidus*). February 9-13, 1998, Reno, NV.

Shuford, W.D. and T.G. Gardali. Eds. 2008. California Bird Species of Special Concern. A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds No. 1. Western Field Ornithologists and California Department of Fish and Game. 450 pp.

Stebbins, R.C. 2003. A Field Guide to Western Reptiles and Amphibians. Third edition Houghton Mifflin Company, Boston, MA. 533 pp.

Swainson's Hawk Technical Advisory Committee. 2000. Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in the Central Valley.

Thorne, J.H., J.A. Kennedy, J.F. Quinn, M. Mccoy, T. Keeler-Wolf and J. Menke. 2004. A Vegetation Map of Napa County Using The Manual of California Vegetation Classification and It's Comparison to Other Digital Vegetation Maps. Madrono 51:4, (343-363).

U.S. Army Corps of Engineers. 2016. Preliminary Jurisdictional Determination Letter concurring with the acreage of wetlands and waters on the 195-acre area on the Somerston Estates. File No. 2015-00309N. June 19, 2016.

U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS). 2018. United States Department of Agriculture. Web Soil Survey. Available: http://websoilsurvey.nrcs.usda.gov/. Accessed August 21, 2018.

U.S. Fish and Wildlife Service (USFWS). 1984. Valley Elderberry Longhorn Beetle Recovery Plan. Portland, OR.

_____. 1997. Federal Listing for the California Red-legged Frog as Threatened, Federal Register Volume 61, Number 101, August 2005.

_____. 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. July 9, 1999. Sacramento, California.

_____. 2000. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants. Ventura Fish & Wildlife Office. January.

_____. 2002. Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*). U.S. Fish and Wildlife Service, Portland, Oregon. viii + 173 pp.

_____. 2005. Revised Guidance on Site Assessment and Field Surveys for California Red-legged Frogs, Sacramento, California, August 2005. 22 pp.

_____. 2010. Revised Designation of Critical Habitat for the California Red-Legged Frog; Final Rule, 75 FR 12816-12959, 2010.

_____. 2011. California Red-legged Frog (*Rana draytonii*). U.S. Fish and Wildlife Service: Arcata Fish and Wildlife Office, Pacific Southwest Region. Last updated on April 11, 2011.

_____. 2015. USFWS Representative Peter Byorn Erickson's Email to Wildlife Research Associates Trish Tatarian Authorizing the Need for Focused CRLF Surveys. May 13, 2015.

_____. 2017. California Red-Legged Frog (*Rana draytonii*). U.S. Fish and Wildlife Service. Sacramento Fish and Wildlife Service. Last updated on March 3, 2017. Available: https://www.fws.gov/sacramento/es_species/Accounts/Amphibians-Reptiles/es_ca-red-legged-frog.htm.

_____. 2019. List of Threatened and Endangered Species that may Occur in your Proposed Project Location, and/or may be Affected by your Proposed Project. Consultation Code: 08ESMF00-2018-SLI-01678. March 26, 2018. Updated February 11, 2019.

U.S. Geological Survey (USGS). 1958. Chiles Valley, California. 7.5 -minute series topographic quadrangle. Revised 1993. U.S. Department of the Interior. DMZ 1561 III SE-SERIES V895.

Vinnedge Environmental Consulting. 2017. Draft Biological Resources Assessment for the KJS Investment Properties and Sorrento Inc., West Ranch, Napa County. December 2017.

Western Bat Working Group (WBWG). 2005. Western Bat Working Group Species Accounts for all bats. Available: http://wbwg.org/western-bat-species/. Accessed September 19, 2018.

Wildlife Research Associates. 2015. California Red-Legged Frog Focused Surveys for the Somerston Estate Winery, Napa County, California. July 24, 2015.

Williams, D.F. 1986. Mammalian Species of Special Concern in California. Wildlife Management Division Administrative Report 86-1 (June 1986). California Department of Fish and Game. Sacramento, California.

Zeiner, D. C., W. F. Laudenslayer, Jr., and K. E. Mayer (compiling editors). 1988. California's wildlife. Volume I. Amphibians and reptiles. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, California.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1990a, California's Wildlife, Volume II, Birds, California Department of Fish and Game, Sacramento, California.

_____. 1990b, California's Wildlife, Volume III, Mammals, California Department of Fish and Game, Sacramento, California.

This page intentionally left blank

Appendix A
Regulatory Context

Federal

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) administers the Federal Endangered Species Act (FESA) (16 U.S. Code [USC] 153 et seq.), the Migratory Bird Treaty Act (MBTA) (16 USC 703–711), and the Bald and Golden Eagle Protection Act (16 USC 668). These regulations are described below.

Federal Endangered Species Act. Under the FESA, the Secretary of the Interior and the Secretary of Commerce have joint authority to list a species as threatened or endangered (16 USC § 1533(c)). Two federal agencies oversee the FESA: the USFWS has jurisdiction over plants, wildlife, and resident fish, while the National Marine Fisheries Service (NMFS) has jurisdiction over anadromous fish and marine fish and mammals. Section 7 of the FESA mandates that federal agencies consult with the USFWS and NMFS to ensure that federal agency actions do not jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat for listed species. The FESA prohibits the "take" of any fish or wildlife species listed as threatened or endangered, including the destruction of habitat that could hinder species recovery. Take is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct.

Section 10 requires the issuance of an "incidental take" permit before any public or private action may be taken that could take an endangered or threatened species. The permit requires preparation and implementation of a habitat conservation plan (HCP) that would offset the take of individuals that may occur, incidental to implementation of a proposed project, by providing for the protection of the affected species.

Pursuant to the requirements of the FESA, a federal agency reviewing a project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the project area and whether the proposed project will have a potentially significant impact on such species. In addition, the agency is required to determine whether the proposed action is likely to jeopardize the continued existence of any species proposed to be listed under FESA or result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC § 1536(3), (4)).

Critical Habitat. The USFWS designates critical habitat for listed species under FESA. Critical habitat designations are specific areas within the geographic region that are occupied by a listed species that are determined to be critical to its survival and recovery in accordance with FESA. Federal entities issuing permits or acting as a lead agency must show that their actions do not negatively affect the critical habitat to the extent that it impedes the recovery of the species.

Migratory Bird Treaty Act (MBTA). The MBTA (16 United States Code § 703 Supp. I, 1989) generally prohibits the killing, possessing, or trading of migratory birds, bird parts, eggs, and nests, except as provided by the statute.

Bald and Golden Eagle Protection Act. The Bald and Golden Eagle Protection Act, enforced by the USFWS, makes it illegal to import, export, take (which includes molest or disturb), sell,

purchase, or barter any bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*) or parts thereof.

U.S. Army Corps of Engineers

Clean Water Act, Section 404. The U.S. Army Corps of Engineers (USACE) administers Section 404 of the Clean Water Act (CWA). Section 404 regulates activities in wetlands and "other waters of the United States." Wetlands are a subset of "waters of the United States" that are defined in the Code of Federal Regulations (CFR) (33 CFR 328.3[a]; 40 CFR 230.3[s]) as:

1. All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide.

1. All interstate waters including interstate wetlands. (Wetlands are defined by the federal government [33 CFR 328.3(b), 1991] as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances support, a prevalence of vegetation typically adapted for life in saturated soil conditions).

2. All other waters—such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds—the use, degradation, or destruction of which could affect interstate or foreign commerce. This includes any waters with the following current or potential uses:
   - That are or could be used by interstate or foreign travelers for recreational or other purposes,
   - From which fish or shellfish are or could be taken and sold in interstate or foreign commerce, or
   - That are used or could be used for industrial purposes by industries in interstate commerce.

3. All impoundments of waters otherwise defined as waters of the United States under the definition.

4. Tributaries of waters identified in paragraphs (1) through (4).

5. Territorial seas.

6. Wetlands next to waters identified in paragraphs (1) through (6).

7. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding the Clean Water Act jurisdiction remains with the U. S. Environmental Protection Agency (328.3[a][8] added 58 CFR 45035, August 25, 1993).

State

California Department of Fish and Wildlife

Fish and Game Code Section 3503. California Fish and Game Code Section 3503.5 provides that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto. Construction activities that result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment and/or reproductive failure are considered a "take" by CDFW. Any loss of eggs, nests, or young or any activities resulting in nest abandonment would constitute a significant project impact.

California Endangered Species Act. The California Endangered Species Act (CESA) which prohibits the take of State-listed endangered and threatened species; although, habitat destruction is not included in the State's definition of take. Section 2090 requires State agencies to comply with endangered species protection and recovery and to promote conservation of these species. The CDFW administers the act and authorizes take through California Fish and Game Code Section 2081 agreements (except for designated "fully protected species," see below). Unlike its federal counterpart, CESA protections apply to candidate species that have been petitioned for listing.

The CESA defers to the California Native Plant Protection Act regarding listed rare and endangered plant species, (see below).

Native Plant Protection Act. California Fish and Game Code Section 1900–1913, also known as the Native Plant Protection Act, is intended to preserve, protect, and enhance endangered or rare native plants in California. The act directs CDFW to establish criteria for determining what native plants are rare or endangered. Under Section 1901, a species is endangered when its prospects for survival and reproduction are in immediate jeopardy from one or more cause. A species is rare when, although not threatened with immediate extinction, it is in such small numbers throughout its range that it may become endangered. The act also directs the California Fish and Game Commission to adopt regulations governing the taking, possessing, propagation, or sale of any endangered or rare native plant.

Vascular plants that are identified as rare by the CNPS, but which may have no designated status or protection under federal or State endangered species legislation, are defined as follows:

- **List 1A:** Plants Presumed Extinct.
- **List 1B:** Plants Rare, Threatened, or Endangered in California and elsewhere.
- **List 2:** Plants Rare, Threatened, or Endangered in California, but more numerous elsewhere.
- **List 3:** Plants about Which More Information is Needed – A Review List.
- **List 4:** Plants of Limited Distribution – A Watch List.

In general, plants appearing on CNPS California Rare Plant Rank (CRPR) List 1A, 1B, or 2 are considered to meet the criteria of CEQA Guidelines Section 15380 and effects to these species

are considered "significant". Additionally, plants listed on CNPS CRPR List 1A, 1B or 2 meet the definition of Section 1901, Chapter 10 (Native Plant Protection Act) and Sections 2062 and 2067 (California Endangered Species Act) of the California Fish and Game Code.

Lake or Streambed Alteration Program. The CDFW regulates activities that would interfere with the natural flow of, or substantially alter, the channel, bed, or bank of a lake, river, or stream. Section 1602 of the California Fish and Game Code requires notification of the CDFW for lake or stream alteration activities. If, after notification is complete, the CDFW determines that the activity may substantially adversely affect an existing fish and wildlife resource, the CDFW has authority to issue a Streambed Alteration Agreement under Section 1603 of the California Fish and Game Code. Requirements to protect the integrity of biological resources and water quality are often conditions of Streambed Alteration Agreements. These may include avoidance or minimization of heavy equipment use within stream zones, limitations on work periods to avoid impacts to wildlife and fisheries resources, and measures to restore degraded sites or compensate for permanent habitat losses.

Species of Special Concern. CDFW maintains lists for candidate-endangered species and candidate-threatened species. California candidate species are afforded the same level of protection as listed species. California also designates species of special concern, which are species of limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. These species do not have the same legal protection as listed species or fully protected species, but may be added to official lists in the future. CDFW intends the species of special concern list to be a management tool for consideration in future land use decisions.

State Water Resources Control Board

Porter Cologne Water Quality Act. The State Water Resources Control Board (SWRCB), through its nine Regional Water Quality Control Boards (RWQCB), regulates waters of the State through the California Clean Water Act (i.e., Porter-Cologne Act). If the USACE determines wetlands or other waters to be isolated waters and not subject to regulation under the federal CWA, the RWQCB may choose to exert jurisdiction over these waters under the Porter-Cologne Act as waters of the State.

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and State statutes, CEQA Guidelines Section 15380(b) provides that a species not listed on the federal or State list of protected species may be considered rare or endangered if the species can be shown to meet certain specific criteria. These criteria have been modeled after the definition of FESA and the section of Fish and Game Code discussing rare or endangered plants or animals. This section was included in the CEQA Guidelines primarily for situations in which a public agency is reviewing a project that may have a significant effect on a candidate species that has not yet been listed by CDFW or USFWS. CEQA provides the ability to protect species from potential project impacts until the respective agencies have the opportunity to designate the species protection.

CEQA also specifies the protection of other locally or regionally significant resources, including natural communities or habitats. Although natural communities do not presently have legal protection, CEQA requires an assessment of such communities and potential project impacts. Natural communities that are identified as sensitive in the CNDDB are considered by CDFW to be significant resources and fall under the CEQA Guidelines for addressing impacts. Local planning documents such as general and area plans often identify natural communities.

Federal

Napa County General Plan

The following goals and policies identified within the Napa County General Plan (Napa County, 2008) pertain to wetlands and biological resources.

Open Space Conservation Policies:

Policy CON-1: The County will preserve land for greenbelts, forest, recreation, flood control, adequate water supply, air quality improvement, habitat for fish, wildlife and wildlife movement, native vegetation, and natural beauty. The County will encourage management of these areas in ways that promote wildlife habitat renewal, diversification, and protection.

Policy CON-2: The County shall identify, improve, and conserve Napa County's agricultural land by:

c) Requiring existing significant vegetation be retained and incorporated into agricultural projects to reduce soil erosion and to retain wildlife habitat. When retention is found to be infeasible, replanting of native or non-invasive vegetation shall be required, and

f) Minimizing pesticide and herbicide use and encourage research and use of integrated pest control methods such as cultural practices, biological control, host resistance, and other factors.

Natural Resource Goals and Policies:

Goal CON 2: Maintain and enhance the existing level of biodiversity.

Goal CON-3: Protect the continued presence of special-status species, including special-status plants, special-status wildlife, and their habitats, and comply with all applicable state, federal, or local laws or regulations.

Goal CON-4: Conserve, protect, and improve plant, wildlife, and fishery habitats for all native species in Napa County.

Goal CON-5: Protect connectivity and continuous habitat areas for wildlife movement.

Policy CON-10: The County shall conserve and improve fisheries and wildlife habitat in cooperation with governmental agencies, private associations and individuals in Napa County.

Policy CON-11: The County shall maintain and improve fisheries habitat through a variety of appropriate measures, including:

m) Control sediment production from mines, roads, development projects, agricultural activities, and other potential sediment sources.

n) Implement road construction and maintenance practices to minimize bank failure and sediment delivery to streams.

Policy CON-13: The County shall require that all discretionary residential, commercial, industrial, recreational, agricultural, and water development projects consider and address impacts to wildlife habitat and avoid impacts to fisheries and habitat supporting special-status species to the extent feasible. Where impacts to wildlife and special-status species cannot be avoided, projects shall include effective mitigation measures and management plans including provisions to:

a) Maintain the following essentials for fish and wildlife resources:
    1) Sufficient dissolved oxygen in the water.
    2) Adequate amounts of proper food.
    3) Adequate amounts of feeding, escape, and nesting habitat.
    4) Proper temperature through maintenance and enhancement of streamside vegetation, volume of flows, and velocity of water.

c) Employ supplemental planting and maintenance of grasses, shrubs and trees of like quality and quantity to provide adequate vegetation cover to enhance water quality, minimize sedimentation and soil transport, and provide adequate shelter and food for wildlife and special-status species and maintain the watersheds, especially stream side areas, in good condition.

d) Provide protection for habitat supporting special-status species through buffering or other means.

e) Provide replacement habitat of like quantity and quality on- or off-site for special-status species to mitigate impacts to special-status species.

f) Enhance existing habitat values, particularly for special-status species, through restoration and replanting of native plant species as part of discretionary permit review and approval.

g) Require temporary or permanent buffers of adequate size (based on the requirements of the subject special-status species) to avoid nest abandonment by birds and raptors associated with construction and site development activities.

h) Demonstrate compliance with applicable provisions and regulations of recovery plans for federally listed species.

Policy CON-14: To offset possible losses of fishery and riparian habitat due to discretionary development projects, developers shall be responsible for mitigation when avoidance of impacts is determined to be infeasible. Such mitigation measures may include providing and permanently maintaining similar quality and quantity habitat within Napa County, enhancing existing riparian habitat, or paying in-kind funds to an approved fishery and riparian habitat improvement and acquisition fund. Replacement habitat may occur either on- site or at approved off-site locations, but preference shall be given to on-site replacement.

Policy CON-16: The County shall require a biological resources evaluation for discretionary projects in areas identified to contain or potentially contain special-status species based upon data provided in the Baseline Data Report (BDR), California Natural Diversity Database (CNDDB), or other technical materials. This evaluation shall be conducted prior to the approval of any earthmoving activities. The County shall also encourage the development of programs to protect special-status species and disseminate updated information to state and federal resource agencies.

Policy CON-17: Preserve and protect native grasslands, serpentine grasslands, mixed serpentine chaparral, and other sensitive biotic communities and habitats of limited distribution. The County, in its discretion, shall require mitigation that results in the following standards:

a) Prevent removal or disturbance of sensitive natural plant communities that contain special-status plant species or provide critical habitat to special-status animal species.

b) In other areas, avoid disturbances to or removal of sensitive natural plant communities and mitigate potentially significant impacts where avoidance is infeasible.

c) Promote protection from overgrazing and other destructive activities.

d) Encourage scientific study and require monitoring and active management where biotic communities and habitats of limited distribution or sensitive natural plant communities are threatened by the spread of invasive non-native species.

e) Require no net loss of sensitive biotic communities and habitats of limited distribution through avoidance, restoration, or replacement where feasible. Where avoidance, restoration, or replacement is not feasible, preserve like habitat at a 2:1 ratio or greater within Napa County to avoid significant cumulative loss of valuable habitats.

Policy CON-18: To reduce impacts on habitat conservation and connectivity:

a) In sensitive domestic water supply drainages where new development is required to retain between 40 and 60 percent of the existing (as of June 16, 1993) vegetation onsite, the vegetation selected for retention should be in areas designed to maximize habitat value and connectivity.

c) Preservation of habitat and connectivity of adequate size, quality, and configuration to support special-status species should be required within the project area. The size of habitat and connectivity to be preserved shall be determined based on the specific needs of the species.

d) The County shall require discretionary projects to retain movement corridors of adequate size and habitat quality to allow for continued wildlife use based on the needs of the species occupying the habitat.

e) The County shall require new vineyard development to be designed to minimize the reduction of wildlife movement to the maximum extent feasible. In the event the County concludes that such development will have a significant impact on wildlife movement, the County may require the applicant to relocate or remove existing perimeter fencing installed on or after February 16, 2007 to offset the impact caused by the new vineyard development.

h) Support public acquisition, conservation easements, in-lieu fees where on-site mitigation is infeasible, and/or other measures to ensure long-term protection of wildlife movement areas.

Policy CON-19: The County shall encourage the preservation of critical habitat areas and habitat connectivity through the use of conservation easements or other methods as well as through continued implementation of the Napa County Conservation Regulations associated with vegetation retention and setbacks from waterways.

Policy CON-22: The County shall encourage the protection and enhancement of natural habitats which provide ecological and other scientific purposes. As areas are identified, they should be delineated on environmental constraints maps so that appropriate steps can be taken to appropriately manage and protect them.

Policy CON-26: Consistent with Napa County's Conservation Regulations, natural vegetation retention areas along perennial and intermittent streams shall vary in width with steepness of the terrain, the nature of the undercover, and type of soil. The design and management of natural vegetation areas shall consider habitat and water quality needs, including the needs of native fish and special-status species and flood protection where appropriate. Site-specific setbacks shall be established in coordination with Regional Water Quality Control Boards, California Department of Fish and Wildlife (CDFW), USFWS, NOAA Fisheries, and other coordinating resource agencies that identify essential stream and stream reaches necessary for the health of populations of native fisheries and other sensitive aquatic organisms within the County's watersheds.

Where avoidance of impacts to riparian habitat is infeasible along stream reaches, appropriate measures will be undertaken to ensure that protection, restoration, and enhancement activities will occur within these identified stream reaches that support or could support native fisheries and other sensitive aquatic organisms to ensure a no net loss of aquatic habitat functions and values within the county's watersheds.

Policy CON-27: The County shall enforce compliance and continued implementation of the intermittent and perennial stream setback requirements set forth in existing stream setback regulations, provide education and information regarding the importance of stream setbacks and the active management and enhancement/restoration of native vegetation within setbacks, and develop incentives to encourage greater stream setbacks where appropriate. Incentives shall include streamlined permitting for certain vineyard proposals on slopes between 5 and 30 percent and flexibility regarding yard and road setbacks for other proposals.

Policy CON-28: To offset possible additional losses of riparian woodland due to discretionary development projects and conversions, developers shall provide and maintain similar quality and quantity of replacement habitat or in-kind funds to an approved riparian woodland habitat improvement and acquisition fund in Napa County. While on-site replacement is preferred where feasible, replacement habitat may be either on-site or off- site as approved by the County.

Policy CON-30: All public and private projects shall avoid impacts to wetlands to the extent feasible. If avoidance is not feasible, projects shall mitigate impacts to wetlands consistent with state and federal policies providing for no net loss of wetland function.

Oak Woodlands Goals and Policies:

Goal CON-6: Preserve, sustain, and restore forests, woodlands, and commercial timberland for their economic, environmental, recreation, and open space values.

Policy CON-24: Maintain and improve oak woodland habitat to provide for slope stabilization, soil protection, species diversity, and wildlife habitat through appropriate measures including one or more of the following:

a) Preserve, to the extent feasible, oak trees and other significant vegetation that occur near the heads of drainages or depressions to maintain diversity of vegetation type and wildlife habitat as part of agricultural projects.

b) Comply with the Oak Woodlands Preservation Act (PRC Section 21083.4) regarding oak woodland preservation to conserve the integrity and diversity of oak woodlands, and retain, to the maximum extent feasible, existing oak woodland and chaparral communities and other significant vegetation as part of residential, commercial, and industrial approvals.

c) Provide replacement of lost oak woodlands or preservation of like habitat at a 2:1 ratio when retention of existing vegetation is found to be infeasible. Removal of oak species limited in distribution shall be avoided to the maximum extent feasible.

d) Support hardwood cutting criteria that require retention of adequate stands of oak trees sufficient for wildlife, slope stabilization, soil protection, and soil production be left standing.

e) Maintain, to the extent feasible, a mixture of oak species which is needed to ensure acorn production. Black, canyon, live, and brewer oaks as well as blue, white, scrub, and live oaks are common associations.

f) Encourage and support the County Agricultural Commission's enforcement of state and federal regulations concerning Sudden Oak Death and similar future threats to woodlands.

Water Resources Policies:

Policy CON-6: The County shall impose conditions on discretionary projects, which limit development in environmentally sensitive areas such as those adjacent to rivers or streamside areas and physically hazardous areas such as floodplains, steep slopes, high fire risk areas and geologically hazardous areas.

Policy CON-41: The County will work to protect Napa County's watersheds and public and private water reservoirs to provide for the following purposes:

a) Clean drinking water for public health and safety;

b) Municipal uses, including commercial, industrial and domestic uses;

c) Support of the eco-systems;

d) Agricultural water supply;

e) Recreation and open space; and

f) Scenic beauty.

Policy CON-42: The County shall work to improve and maintain the vitality and health of its watersheds. Specifically, the County shall:

d) Support environmentally sustainable agricultural techniques and best management practices (BMPs) that protect surface water and groundwater quality and quantity (e.g., cover crop management, integrated pest management, informed surface water withdrawals and groundwater use).

Policy CON-45: Protect the County's domestic supply drainages through vegetation preservation and protective buffers to ensure clean and reliable drinking water consistent with state regulations and guidelines. Continue implementation of current Conservation Regulations relevant to these areas, such as vegetation retention requirements, consultation with water purveyors/system owners, implementation of erosion controls to minimize water pollution, and prohibition of detrimental recreational uses.

Policy CON-48: Proposed developments shall implement project-specific sediment and erosion control measures (e.g., erosion control plans and/or stormwater pollution prevention plans) that maintain predevelopment sediment erosion conditions or at minimum comply with state water quality pollution control (i.e., Basin Plan) requirements and are protective of the County's sensitive domestic supply watersheds. Technical reports and/or erosion control plans that recommend site-specific erosion control measures shall meet the requirements of the County Code and provide detailed information regarding site specific geologic, soil, and hydrologic conditions and how the proposed measure will function.

Sensitive Habitats and Communities:

As noted above, General Plan Policy CON-17 calls for the preservation and protection of sensitive natural communities. In implementing Policy CON-17, the Napa County General Plan defines three overlapping types of special-status, biotic communities. These include:

- Habitats/communities of limited distribution – Natural communities in the County that are considered sensitive due to the limited local distribution, encompass less than 500 acres of cover within the County, and are considered by local biological experts to be worthy of conservation. The following six communities are examples of the rarest biotic communities meeting the 500-acre threshold: native grassland (perennial grassland, bunch grass); tanbark oak alliance; Brewer willow alliance; ponderosa pine alliance; riverine, lacustrine, and tidal mudflats; and wet meadow grasses super alliance.

- Sensitive biotic communities – Natural plant communities that are designated sensitive by the CDFW and identified in the CNDDB and are significant because of their rarity, high biological diversity, and/or susceptibility to disturbance or destruction.

- Sensitive natural communities – Biotic communities in Napa County considered sensitive by the CDFW and designated in the CNDDB because of their rarity, high biological diversity, and/or susceptibility to disturbance or destruction. Twenty-five sensitive natural communities are currently known to exist in Napa County.

Chapter 4, Biological Resources, of the Napa County Background Data Report, identifies 25 sensitive natural communities in Napa County, although each community may exist in multiple locations. Of these, six are designated as priorities for conservation. Although not included as a

protected resource pursuant to General Plan Policy CON-17, oak woodlands are designated as a sensitive natural community by Napa County pursuant to Policy CON-24.

Napa County Code

Stream Setbacks: Napa County Code defines streams and provides setbacks for land clearing for agricultural development. Under Section 18.108.030, a "stream" means any of the following:

1. A watercourse designated by a solid line or dash and three dots symbol on the largest scale of the United State Geological Survey maps most recently published, or any replacement to that symbol;

2. Any watercourse which has a well-defined channel with a depth greater than four feet and banks steeper than 3:1 (horizontal to vertical bank ratio) and contains hydrophilic (i.e., water-adapted) vegetation, riparian vegetation or woody vegetation including tree species greater than ten feet in height; or

3. Those watercourses listed in Resolution No. 94-19 and incorporated herein by reference.

Erosion gullies and ravines being repaired with the technical assistance and/or under the direction of the Napa County Resource Conservation District/National Resource Conservation Service, "scour-holes", and other non-linear features are not considered streams.

Napa County Code 18.108.025 applies setbacks for agricultural development adjacent to streams. Setbacks included in the Code range from 35 to 150 feet measured from the top of bank and increase with the slope of the terrain parallel to the top of bank.

Vegetation Preservation and Replacement: Napa County Code 18.108.100 requires the following conditions when granting a discretionary permit for activities within an erosion hazard area (slopes greater than 5 percent):

a. Existing vegetation shall be preserved to the maximum extent consistent with the project. Vegetation shall not be removed if it is identified as being necessary for erosion control in the approved erosion control plan or if necessary for the preservation of threatened or endangered plant or animal habitats as designated by state or federal agencies with jurisdiction and identified on the County's environmental sensitivity maps.

b. Existing trees six inches in diameter or larger, measured at diameter breast height, (DBH), or tree stands of trees six inches DBH or larger located on a site for which either an administrative or discretionary permit is required shall not be removed until the required permits have been approved by the decision-making body and tree removal has been specifically authorized.

c. Trees to be retained or designated for retention shall be protected through the use of barricades or other appropriate methods to be placed and maintained at their outboard drip line during the construction phase. Where appropriate, the director may require an applicant to install and maintain construction fencing around the trees to ensure their protection during earthmoving activities.

d. Wherever removal of vegetation is necessitated or authorized, the director or designee may require the planting of replacement vegetation of an equivalent kind, quality and quantity.

Napa County Zoning Ordinance (Chapter 18.108)

Chapter 18.108 of the Napa County Zoning Ordinance outlines conservation regulations to protect natural resources in the County. Section 18.108.025 states that any grading, removal of vegetation, earthmoving activities, or clearing of land for new agricultural uses are prohibited within stream setback areas. Stream setbacks for intermittent and perennial streams are measured from the top of the bank on both sides of the stream and are based on the percent of the slopes adjacent to the stream. To conduct any of the prohibited activities within the stream setback zone of an intermittent or perennial stream, a permit must be obtained from the County Planning Department following a review of the proposed project and a public hearing to determine whether the proposed project would significantly impact erosion rates or sensitive biological resources (§18.108.040).

Section 18.108.070 states that "no otherwise permitted agricultural earthmoving activity, grading, or improvement, shall commence on slopes over five percent until an erosion control plan which complies with the requirements of Section 18.108.080 of the Napa County Zoning Ordinance has been submitted to and approved by the director or designee". Section 18.108.060 requires that "no construction, improvement, grading, earthmoving activity or vegetation removal associated with the development or use of land shall take place on those parcels or portions thereof having a slope of thirty percent or greater unless exempt under Section 18.108.050 or 18.108.055."

Appendix B
Agency Lists

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: March 26, 2018
Consultation Code: 08ESMF00-2018-SLI-1678
Event Code: 08ESMF00-2018-E-04849
Project Name: Napa County ECP Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2018-SLI-1678

Event Code: 08ESMF00-2018-E-04849

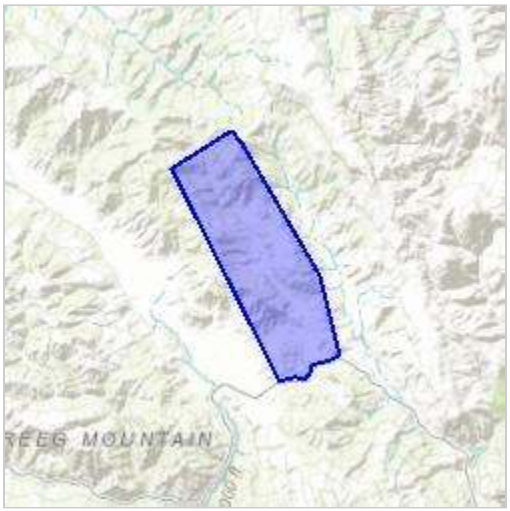
Project Name: Napa County ECP Project

Project Type: AGRICULTURE

Project Description: Erosion Control Plan for Vineyards

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/38.52427519531901N122.286914059697W



Counties: Napa, CA

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Northern Spotted Owl *Strix occidentalis caurina* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1123	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Crustaceans

NAME	STATUS
California Freshwater Shrimp *Syncaris pacifica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7903	Endangered

Flowering Plants

NAME	STATUS
Clara Hunt's Milk-vetch *Astragalus clarianus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3300	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

Query Summary:
Quad IS (Aetna Springs (3812264) OR Walter Springs (3812263) OR Brooks (3812262) OR St. Helena (3812254) OR Chiles Valley (3812253) OR Lake Berryessa (3812252) OR Rutherford (3812244) OR Yountville (3812243) OR Capell Valley (3812242))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	951	3	None	Candidate Endangered	G2G3	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Amorpha californica var. napensis	Napa false indigo	Dicots	PDFAB08012	69	15	None	None	G4T2	S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Broadleaved upland forest, Chaparral, Cismontane woodland
Amsinckia lunaris	bent-flowered fiddleneck	Dicots	PDBOR01070	86	2	None	None	G2G3	S2S3	1B.2	BLM_S-Sensitive	Cismontane woodland, Coastal bluff scrub, Valley & foothill grassland
Antrozous pallidus	pallid bat	Mammals	AMACC10010	411	8	None	None	G5	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley & foothill grassland
Aquila chrysaetos	golden eagle	Birds	ABNKC22010	312	2	None	None	G5	S3	null	BLM_S-Sensitive, CDF_S-Sensitive, CDFW_FP-Fully Protected, CDFW_WL-Watch List, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Cismontane woodland, Coastal prairie, Great Basin grassland, Great Basin scrub, Lower montane coniferous forest, Pinon & juniper woodlands, Upper montane coniferous forest, Valley & foothill grassland
Arctostaphylos stanfordiana ssp. decumbens	Rincon Ridge manzanita	Dicots	PDERI041G4	12	1	None	None	G3T1	S1	1B.1	null	Chaparral, Cismontane woodland
Ardea alba	great egret	Birds	ABNGA04040	41	1	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland

Ardea herodias	great blue heron	Birds	ABNGA04010	147	1	None	None	G5	S4	null	CDF_S-Sensitive, IUCN_LC-Least Concern	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland
Astragalus claranus	Clara Hunt's milk-vetch	Dicots	PDFAB0F240	6	4	Endangered	Threatened	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Valley & foothill grassland
Astragalus rattanii var. jepsonianus	Jepson's milk-vetch	Dicots	PDFAB0F7E1	51	1	None	None	G4T3	S3	1B.2	BLM_S-Sensitive	Cismontane woodland, Ultramafic, Valley & foothill grassland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1957	2	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Bombus caliginosus	obscure bumble bee	Insects	IIHYM24380	181	5	None	None	G4?	S1S2	null	IUCN_VU-Vulnerable	null
Brodiaea leptandra	narrow-anthered brodiaea	Monocots	PMLIL0C022	39	10	None	None	G3?	S3?	1B.2	null	Broadleaved upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley & foothill grassland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2460	1	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
Calystegia collina ssp. oxyphylla	Mt. Saint Helena morning-glory	Dicots	PDCON04032	9	1	None	None	G4T3	S3	4.2	null	Chaparral, Lower montane coniferous forest, Ultramafic, Valley & foothill grassland
Castilleja ambigua var. meadii	Mead's owls-clover	Dicots	PDSCR0D404	3	3	None	None	G4T1	S1	1B.1	null	Meadow & seep, Vernal pool, Wetland
Ceanothus confusus	Rincon Ridge ceanothus	Dicots	PDRHA04220	33	4	None	None	G1	S1	1B.1	BLM_S-Sensitive	Chaparral, Cismontane woodland, Closed-cone coniferous forest, Ultramafic
Ceanothus divergens	Calistoga ceanothus	Dicots	PDRHA04240	23	6	None	None	G2	S2	1B.2	BLM_S-Sensitive	Chaparral, Cismontane woodland, Ultramafic
Ceanothus purpureus	holly-leaved ceanothus	Dicots	PDRHA04160	43	19	None	None	G2	S2	1B.2	null	Chaparral, Cismontane woodland
Ceanothus sonomensis	Sonoma ceanothus	Dicots	PDRHA04420	30	11	None	None	G2	S2	1B.2	null	Chaparral, Ultramafic
Centromadia parryi ssp. parryi	pappose tarplant	Dicots	PDAST4R0P2	29	1	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chaparral, Coastal prairie, Marsh & swamp, Meadow & seep, Valley & foothill grassland
Corynorhinus townsendii	Townsend's big-eared bat	Mammals	AMACC08010	626	4	None	None	G3G4	S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive,	Broadleaved upland forest, Chaparral, Chenopod scrub, Great Basin grassland, Great Basin

											WBWG_H-High Priority	scrub, Joshua tree woodland, Lower montane coniferous forest, Meadow & seep, Mojavean desert scrub, Riparian forest, Riparian woodland, Sonoran desert scrub, Sonoran thorn woodland, Upper montane coniferous forest, Valley & foothill grassland
Cryptantha dissita	serpentine cryptantha	Dicots	PDBOR0A0H2	10	1	None	None	G2	S2	1B.2	BLM_S-Sensitive	Chaparral, Ultramafic
Cypseloides niger	black swift	Birds	ABNUA01010	46	1	None	None	G4	S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, NABCI_YWL-Yellow Watch List, USFWS_BCC-Birds of Conservation Concern	null
Dicamptodon ensatus	California giant salamander	Amphibians	AAAAH01020	232	3	None	None	G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Aquatic, Meadow & seep, North coast coniferous forest, Riparian forest
Downingia pusilla	dwarf downingia	Dicots	PDCAM060C0	126	3	None	None	GU	S2	2B.2	null	Valley & foothill grassland, Vernal pool, Wetland
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	165	2	None	None	G5	S3S4	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1322	11	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Erethizon dorsatum	North American porcupine	Mammals	AMAFJ01010	508	1	None	None	G5	S3	null	IUCN_LC-Least Concern	Broadleaved upland forest, Cismontane woodland, Closed-cone coniferous forest, Lower montane coniferous forest, North coast coniferous forest, Upper montane coniferous forest
Erigeron greenei	Greene's narrow-leaved daisy	Dicots	PDAST3M5G0	20	6	None	None	G3	S3	1B.2	null	Chaparral, Ultramafic

Eryngium jepsonii	Jepson's coyote-thistle	Dicots	PDAPI0Z130	19	5	None	None	G2	S2	1B.2	null	Valley & foothill grassland, Vernal pool
Falco mexicanus	prairie falcon	Birds	ABNKD06090	459	2	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Fritillaria pluriflora	adobe-lily	Monocots	PMLIL0V0F0	107	2	None	None	G2G3	S2S3	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Ultramafic, Valley & foothill grassland
Haliaeetus leucocephalus	bald eagle	Birds	ABNKC10010	327	4	Delisted	Endangered	G5	S3	null	BLM_S-Sensitive, CDF_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Lower montane coniferous forest, Oldgrowth
Harmonia hallii	Hall's harmonia	Dicots	PDAST650A0	19	2	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Ultramafic
Hesperolinon bicarpellatum	two-carpellate western flax	Dicots	PDLIN01020	22	4	None	None	G2	S2	1B.2	null	Chaparral, Ultramafic
Hesperolinon breweri	Brewer's western flax	Dicots	PDLIN01030	25	1	None	None	G2?	S2?	1B.2	BLM_S-Sensitive	Chaparral, Cismontane woodland, Ultramafic, Valley & foothill grassland
Hesperolinon sharsmithiae	Sharsmith's western flax	Dicots	PDLIN010E0	32	28	None	None	G2Q	S2	1B.2	BLM_S-Sensitive	Chaparral, Ultramafic
Juglans hindsii	Northern California black walnut	Dicots	PDJUG02040	5	1	None	None	G1	S1	1B.1	SB_USDA-US Dept of Agriculture	Riparian forest, Riparian woodland
Lasiurus blossevillii	western red bat	Mammals	AMACC05060	126	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority	Cismontane woodland, Lower montane coniferous forest, Riparian forest, Riparian woodland
Lasthenia conjugens	Contra Costa goldfields	Dicots	PDAST5L040	33	1	Endangered	None	G1	S1	1B.1	SB_UCBBG-UC Berkeley Botanical Garden	Alkali playa, Cismontane woodland, Valley & foothill grassland, Vernal pool, Wetland
Layia septentrionalis	Colusa layia	Dicots	PDAST5N0F0	57	8	None	None	G2	S2	1B.2	BLM_S-Sensitive	Chaparral, Cismontane woodland, Ultramafic, Valley & foothill grassland
Leptosiphon jepsonii	Jepson's leptosiphon	Dicots	PDPLM09140	39	15	None	None	G3	S3	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, SB_USDA-US Dept of Agriculture	Chaparral, Cismontane woodland, Ultramafic
Limnanthes vinculans	Sebastopol meadowfoam	Dicots	PDLIM02090	45	1	Endangered	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Lupinus sericatus	Cobb Mountain lupine	Dicots	PDFAB2B3J0	46	7	None	None	G2?	S2?	1B.2	BLM_S-Sensitive	Broadleaved upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Ultramafic

Myotis evotis	long-eared myotis	Mammals	AMACC01070	139	1	None	None	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, WBWG_M-Medium Priority	null
Myotis yumanensis	Yuma myotis	Mammals	AMACC01020	263	1	None	None	G5	S4	null	BLM_S-Sensitive, IUCN_LC-Least Concern, WBWG_LM-Low-Medium Priority	Lower montane coniferous forest, Riparian forest, Riparian woodland, Upper montane coniferous forest
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Dicots	PDPLM0C0E1	58	1	None	None	G4T2	S2	1B.1	BLM_S-Sensitive	Cismontane woodland, Lower montane coniferous forest, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Navarretia leucocephala ssp. pauciflora	few-flowered navarretia	Dicots	PDPLM0C0E4	10	2	Endangered	Threatened	G4T1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Vernal pool, Wetland
Navarretia paradoxinota	Porter's navarretia	Dicots	PDPLM0C160	8	5	None	None	G2	S2	1B.3	null	Meadow & seep, Ultramafic
Navarretia rosulata	Marin County navarretia	Dicots	PDPLM0C0Z0	15	3	None	None	G2	S2	1B.2	null	Chaparral, Closed-cone coniferous forest, Ultramafic
Northern Vernal Pool	Northern Vernal Pool	Herbaceous	CTT44100CA	20	5	None	None	G2	S2.1	null	null	Vernal pool, Wetland
Oncorhynchus mykiss irideus pop. 8	steelhead - central California coast DPS	Fish	AFCHA0209G	43	1	Threatened	None	G5T2T3Q	S2S3	null	AFS_TH-Threatened	Aquatic, Sacramento/San Joaquin flowing waters
Pandion haliaetus	osprey	Birds	ABNKC01010	502	3	None	None	G5	S4	null	CDF_S-Sensitive, CDFW_WL-Watch List, IUCN_LC-Least Concern	Riparian forest
Penstemon newberryi var. sonomensis	Sonoma beardtongue	Dicots	PDSCR1L483	11	2	None	None	G4T2	S2	1B.3	null	Chaparral
Phalacrocorax auritus	double-crested cormorant	Birds	ABNFD01020	38	1	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Progne subis	purple martin	Birds	ABPAU01010	71	3	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Broadleaved upland forest, Lower montane coniferous forest
Rana boylii	foothill yellow-legged frog	Amphibians	AAABH01050	1604	19	None	Candidate Threatened	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened, USFS_S-Sensitive	Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/North coast flowing waters, Lower montane coniferous forest, Meadow & seep, Riparian forest, Riparian woodland, Sacramento/San Joaquin flowing waters
Rana draytonii	California red-legged frog	Amphibians	AAABH01022	1471	3	Threatened	None	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable	Aquatic, Artificial flowing waters, Artificial standing waters, Freshwater marsh, Marsh & swamp, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters,

												Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Riparia riparia	bank swallow	Birds	ABPAU08010	297	1	None	Threatened	G5	S2	null	BLM_S-Sensitive, IUCN_LC-Least Concern	Riparian scrub, Riparian woodland
Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	108	1	None	None	G3	S3	1B.2	BLM_S-Sensitive	Marsh & swamp, Wetland
Serpentine Bunchgrass	Serpentine Bunchgrass	Herbaceous	CTT42130CA	22	1	None	None	G2	S2.2	null	null	Valley & foothill grassland
Sidalcea keckii	Keck's checkerbloom	Dicots	PDMAL110D0	16	1	Endangered	None	G2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Cismontane woodland, Ultramafic, Valley & foothill grassland
Sidalcea oregana ssp. hydrophila	marsh checkerbloom	Dicots	PDMAL110K2	35	1	None	None	G5T2	S2	1B.2	null	Meadow & seep, Riparian forest, Wetland
Streptanthus hesperidis	green jewelflower	Dicots	PDBRA2G510	19	9	None	None	G2	S2	1B.2	null	Chaparral, Cismontane woodland, Ultramafic
Streptanthus morrisonii ssp. elatus	Three Peaks jewelflower	Dicots	PDBRA2G0S1	7	5	None	None	G2T1	S1	1B.2	BLM_S-Sensitive	Chaparral, Ultramafic
Taricha rivularis	red-bellied newt	Amphibians	AAAAF02020	136	1	None	None	G4	S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Broadleaved upland forest, North coast coniferous forest, Redwood, Riparian forest, Riparian woodland
Trichostema ruygtii	Napa bluecurls	Dicots	PDLAM220H0	19	10	None	None	G1G2	S1S2	1B.2	null	Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley & foothill grassland, Vernal pool, Wetland
Vandykea tuberculata	serpentine cypress long-horned beetle	Insects	IICOLX7010	2	2	None	None	G1	S1	null	null	null
Wildflower Field	Wildflower Field	Herbaceous	CTT42300CA	5	1	None	None	G2	S2.2	null	null	Valley & foothill grassland

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

Plant List

69 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3812264, 3812263, 3812262, 3812254, 3812253, 3812252, 3812244 3812243 and 3812242;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Amorpha californica var. napensis	Napa false indigo	Fabaceae	perennial deciduous shrub	Apr-Jul	1B.2	S2	G4T2
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	Mar-Jun	1B.2	S2S3	G2G3
Antirrhinum virga	twig-like snapdragon	Plantaginaceae	perennial herb	Jun-Jul	4.3	S3?	G3?
Arctostaphylos stanfordiana ssp. decumbens	Rincon Ridge manzanita	Ericaceae	perennial evergreen shrub	Feb-Apr(May)	1B.1	S1	G3T1
Astragalus breweri	Brewer's milk-vetch	Fabaceae	annual herb	Apr-Jun	4.2	S3	G3
Astragalus claranus	Clara Hunt's milk-vetch	Fabaceae	annual herb	Mar-May	1B.1	S1	G1
Astragalus clevelandii	Cleveland's milk-vetch	Fabaceae	perennial herb	Jun-Sep	4.3	S4	G4
Astragalus rattanii var. jepsonianus	Jepson's milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S3	G4T3
Brodiaea leptandra	narrow-anthered brodiaea	Themidaceae	perennial bulbiferous herb	May-Jul	1B.2	S3?	G3?
Calamagrostis ophitidis	serpentine reed grass	Poaceae	perennial herb	Apr-Jul	4.3	S3	G3
Calycadenia micrantha	small-flowered calycadenia	Asteraceae	annual herb	Jun-Sep	1B.2	S2	G2
Calystegia collina ssp. oxyphylla	Mt. Saint Helena morning-glory	Convolvulaceae	perennial rhizomatous herb	Apr-Jun	4.2	S3	G4T3
Castilleja ambigua var. ambigua	johnny-nip	Orobanchaceae	annual herb (hemiparasitic)	Mar-Aug	4.2	S4	G4T5
Castilleja ambigua var. meadii	Mead's owl's-clover	Orobanchaceae	annual herb (hemiparasitic)	Apr-May	1B.1	S1	G4T1
Ceanothus confusus	Rincon Ridge ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Jun	1B.1	S1	G1
Ceanothus divergens	Calistoga ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Apr	1B.2	S2	G2
Ceanothus purpureus	holly-leaved ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Jun	1B.2	S2	G2

Ceanothus sonomensis	Sonoma ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Apr	1B.2	S2	G2
Centromadia parryi ssp. parryi	pappose tarplant	Asteraceae	annual herb	May-Nov	1B.2	S2	G3T2
Clarkia breweri	Brewer's clarkia	Onagraceae	annual herb	Apr-Jun	4.2	S4	G4
Clarkia gracilis ssp. tracyi	Tracy's clarkia	Onagraceae	annual herb	Apr-Jul	4.2	S3	G5T3
Collomia diversifolia	serpentine collomia	Polemoniaceae	annual herb	May-Jun	4.3	S4	G4
Cordylanthus tenuis ssp. brunneus	serpentine bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jul-Aug	4.3	S3	G4G5T3
Cryptantha dissita	serpentine cryptantha	Boraginaceae	annual herb	Apr-Jun	1B.2	S2	G2
Cypripedium montanum	mountain lady's-slipper	Orchidaceae	perennial rhizomatous herb	Mar-Aug	4.2	S4	G4
Delphinium uliginosum	swamp larkspur	Ranunculaceae	perennial herb	May-Jun	4.2	S3	G3
Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	Mar-May	2B.2	S2	GU
Erigeron biolettii	streamside daisy	Asteraceae	perennial herb	Jun-Oct	3	S3?	G3?
Erigeron greenei	Greene's narrow-leaved daisy	Asteraceae	perennial herb	May-Sep	1B.2	S3	G3
Eryngium jepsonii	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
Erythronium helenae	St. Helena fawn lily	Liliaceae	perennial bulbiferous herb	Mar-May	4.2	S3	G3
Fritillaria pluriflora	adobe-lily	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2S3	G2G3
Fritillaria purdyi	Purdy's fritillary	Liliaceae	perennial bulbiferous herb	Mar-Jun	4.3	S4	G4
Gilia capitata ssp. tomentosa	woolly-headed gilia	Polemoniaceae	annual herb	May-Jul	1B.1	S1	G5T1
Harmonia hallii	Hall's harmonia	Asteraceae	annual herb	Apr-Jun	1B.2	S2	G2
Harmonia nutans	nodding harmonia	Asteraceae	annual herb	Mar-May	4.3	S3	G3
Helianthus exilis	serpentine sunflower	Asteraceae	annual herb	Jun-Nov	4.2	S3	G3
Hesperolinon bicarpellatum	two-carpellate western flax	Linaceae	annual herb	May-Jul	1B.2	S2	G2
Hesperolinon breweri	Brewer's western flax	Linaceae	annual herb	May-Jul	1B.2	S2?	G2?
Hesperolinon sharsmithiae	Sharsmith’s western flax	Linaceae	annual herb	May-Jul	1B.2	S2	G2Q
Juglans hindsii	Northern California black walnut	Juglandaceae	perennial deciduous tree	Apr-May	1B.1	S1	G1
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	1B.1	S1	G1
Layia septentrionalis	Colusa layia	Asteraceae	annual herb	Apr-May	1B.2	S2	G2
Leptosiphon jepsonii	Jepson's leptosiphon	Polemoniaceae	annual herb	Mar-May	1B.2	S3	G3
Leptosiphon latisectus	broad-lobed leptosiphon	Polemoniaceae	annual herb	Apr-Jun	4.3	S4	G4
Lilium bolanderi	Bolander's lily	Liliaceae	perennial bulbiferous herb	Jun-Jul	4.2	S3	G4
Limnanthes vinculans	Sebastopol meadowfoam	Limnanthaceae	annual herb	Apr-May	1B.1	S1	G1

Lomatium repostum	Napa lomatium	Apiaceae	perennial herb	Mar-Jun	4.3	S3	G3
Lupinus sericatus	Cobb Mountain lupine	Fabaceae	perennial herb	Mar-Jun	1B.2	S2?	G2?
Malacothamnus helleri	Heller's bush-mallow	Malvaceae	perennial deciduous shrub	May-Jul	3.3	S3	G3Q
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	Mar-May	3.2	S3S4	G3G4
Monardella viridis	green monardella	Lamiaceae	perennial rhizomatous herb	Jun-Sep	4.3	S4	G4
Navarretia cotulifolia	cotula navarretia	Polemoniaceae	annual herb	May-Jun	4.2	S4	G4
Navarretia heterandra	Tehama navarretia	Polemoniaceae	annual herb	Apr-Jun	4.3	S4	G4
Navarretia jepsonii	Jepson's navarretia	Polemoniaceae	annual herb	Apr-Jun	4.3	S4	G4
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G4T2
Navarretia leucocephala ssp. pauciflora	few-flowered navarretia	Polemoniaceae	annual herb	May-Jun	1B.1	S1	G4T1
Navarretia paradoxinota	Porter’s navarretia	Polemoniaceae	annual herb	May-Jun(Jul)	1B.3	S2	G2
Navarretia rosulata	Marin County navarretia	Polemoniaceae	annual herb	May-Jul	1B.2	S2	G2
Penstemon newberryi var. sonomensis	Sonoma beardtongue	Plantaginaceae	perennial herb	Apr-Aug	1B.3	S2	G4T2
Ranunculus lobbii	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	Feb-May	4.2	S3	G4
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	1B.2	S3	G3
Senecio clevelandii var. clevelandii	Cleveland's ragwort	Asteraceae	perennial herb	Jun-Jul	4.3	S3	G4?T3Q
Sidalcea keckii	Keck's checkerbloom	Malvaceae	annual herb	Apr-May(Jun)	1B.1	S2	G2
Sidalcea oregana ssp. hydrophila	marsh checkerbloom	Malvaceae	perennial herb	(Jun)Jul-Aug	1B.2	S2	G5T2
Streptanthus hesperidis	green jewelflower	Brassicaceae	annual herb	May-Jul	1B.2	S2	G2
Streptanthus morrisonii ssp. elatus	Three Peaks jewelflower	Brassicaceae	perennial herb	Jun-Sep	1B.2	S1	G2T1
Toxicoscordion fontanum	marsh zigadenus	Melanthiaceae	perennial bulbiferous herb	Apr-Jul	4.2	S3	G3
Trichostema ruygtii	Napa bluecurls	Lamiaceae	annual herb	Jun-Oct	1B.2	S1S2	G1G2

Suggested Citation

California Native Plant Society, Rare Plant Program. 2018. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 26 March 2018].

Simple Search
Advanced Search
Glossary

About the Inventory
About the Rare Plant Program
CNPS Home Page
About CNPS
Join CNPS

The Calflora Database
The California Lichen Society
California Natural Diversity Database
The Jepson Flora Project
The Consortium of California Herbaria
CalPhotos

rareplants@cnps.org

© Copyright 2010-2018 California Native Plant Society. All rights reserved.

Appendix C

Plant Species Observed During Botanical Surveys

Family	Scientific Name	Common Name	Native/ Introduced
Agavaceae	*Chlorogalum angustifolium*	Narrow leaved soaproot	
Agavaceae	*Chlorogalum pomeridianum* var. *pomeridianum*	Soaproot	N
Anacardiaceae	*Toxicodendron diversilobum*	Western poison oak	N
Apiaceae	*Lomatium californicum*	Lomatium	N
Apiaceae	*Lomatium utriculatum*	Lomatium	N
Asteraceae	*Achillea millefolium*	Yarrow	N
Asteraceae	*Achyrachaena mollis*	Blow-wives	N
Asteraceae	*Agoseris heterophylla*	Agoseris	N
Asteraceae	*Agoseris retrorsa*	Agoseris	N
Asteraceae	*Baccharis pilularis*	Coyote brush	N
Asteraceae	*Centaurea calcitrapa*	Purple star-thistle	I
Asteraceae	*Centaurea solstitialis*	Yellow star-thistle	I
Asteraceae	*Cirsium vulgare*	Bull thistle	I
Asteraceae	*Eriophyllum lanatum* var. *achilleoides*	Common woolly sunflower	N
Asteraceae	*Filago gallica*	Filago	I
Asteraceae	*Grindelia camporum*	Gumplant	N
Asteraceae	*Helianthella californica* var. *nevadensis*	Helianthella	N
Asteraceae	*Hemizonia congesta* ssp. *luzulifolia*	Hayfield tarweed	N
Asteraceae	*Lactuca serriola*	Prickly lettuce	I
Asteraceae	*Madia gracilis*	Gumweed	N
Asteraceae	*Micropus californicus* var. *californicus*	Cottontop	N
Asteraceae	*Microseris douglasii* ssp. *douglasii*	Microseris	N
Asteraceae	*Pseudognaphalium luteoalbum*	Cudweed, everlasting	I
Asteraceae	*Psilocarphus tenellus*	Slender woolly-marbles	N
Asteraceae	*Senecio vulgaris*	Common groundsel	I
Asteraceae	*Silybum marianum*	Milk thistle	I
Asteraceae	*Sonchus oleraceus*	Common sow thistle	I
Asteraceae	*Tragopogon porrifolius*	Salsify, oyster plant	I
Asteraceae	*Uropappus lindleyi*	Silver puffs	N
Blechnaceae	*Woodwardia fimbriata*	Giant chain fern	N
Boraginaceae	*Amsinckia menziesii*	Common fiddleneck, small-flowered fiddleneck	N
Boraginaceae	*Nemophila heterophylla*	Nemophila	N
Boraginaceae	*Phacelia cicutaria* var. *cicutaria*	Phacelia	N
Boraginaceae	*Phacelia imbricata* ssp. *imbricata*	Phacelia	N
Boraginaceae	*Plagiobothrys nothofulvus*	Rusty popcornflower, foothill snowdrops	N
Brassicaceae	*Capsella bursa-pastoris*	Shepherd's purse	I
Brassicaceae	*Hirschfeldia incana*	Perennial, shortpot, or summer mustard	I
Brassicaceae	*Nasturtium officinale*	Water cress	N
Brassicaceae	*Raphanus sativus*	Radish	I
Brassicaceae	*Sisymbrium officinale*	Hedge mustard	I
Brassicaceae	*Thysanocarpus curvipes*	Lacepod, fringepod	N
Caprifoliaceae	*Lonicera hispidula*	Honeysuckle	N
Caprifoliaceae	*Symphoricarpos albus* var. *laevigatus*	Snowberry	N
Caryophyllaceae	*Cerastium glomeratum*	Sticky mouse-ear chickweed	I
Caryophyllaceae	*Spergularia rubra*	Red sand-spurrey	I

*outside of survey area

Convolvulaceae	*Convolvulus arvensis*	Bindweed, orchard morning-glory	I
Cucurbitaceae	*Marah fabacea*	California man-root	N
Ericaceae	*Arctostaphylos manzanita* ssp. *manzanita*	Manzanita	N
Euphorbiaceae	*Croton setigerus*	Turkey-mullein	N
Fabaceae	*Acmispon glaber* var. *glaber*	Deervetch, deerweed	N
Fabaceae	*Lathyrus vestitus* var. *vestitus*	Wild pea	N
Fabaceae	*Lotus corniculatus*	Bird's-foot trefoil	I
Fabaceae	*Lupinus albifrons* var. *albifrons*	Lupine	N
Fabaceae	*Lupinus bicolor*	Miniature lupine	N
Fabaceae	*Lupinus latifolius*	Bigleaf lupine	N
Fabaceae	*Trifolium bifidum*	Notch leaf clover	N
Fabaceae	*Trifolium depauparatum*	Cowbag Clover	N
Fabaceae	*Trifolium dubium*	Little hop clover	I
Fabaceae	*trifolium gracilentum*	Graceful clover	N
Fabaceae	*Trifolium hirtum*	Rose clover	I
Fabaceae	*Trifolium subterraneum*	Subterranean clover	I
Fabaceae	*Trifolium willdenovii*	Tomcat clover	N
Fabaceae	*Vicia benghalensis*	Purple vetch	I
Fabaceae	*Vicia sativa* ssp. *sativa*	Spring vetch	I
Fabaceae	*Vicia villosa* ssp. *villosa*	Hairy vetch, winter vetch	I
Fagaceae	*Quercus agrifolia*	Coast live oak, encina	N
Fagaceae	*Quercus berberidifolia*	Scrub oak	N
Fagaceae	*Quercus douglasii*	Blue oak	N
Fagaceae	*Quercus kelloggii*	California black oak	N
Fagaceae	*Quercus lobata*	Valley oak, roble	N
Fagaceae	*Quercus wislizeni*	Interior live oak	N
Gentianaceae	*Centaurium tenuiflorum*	Slender centaury	I
Gentianaceae	*Zeltnera venusta*	California centaury, charming centaury	N
Geraniaceae	*Geranium molle*	Cranesbill, geranium	I
Iridaceae	*Iris macrosiphon*	Iris	N
Iridaceae	*Sisyrinchium bellum*	Western blue-eyed-grass	N
Juncaceae	*Juncus effusus* ssp. *pacificus*	Pacific rush	N
Juncaceae	*Juncus patens*	Spreading rush	N
Lamiaceae	*Lamium amplexicaule*	Henbit dead-nettle	I
Lamiaceae	*Stachys ajugoides*	Hedge-nettle	N
Liliaceae	*Calochortus luteus*	Calochortus	N
Malvaceae	*Sidalcea diploscypha*	Fringed checkerbloom	N
Montiaceae	*Claytonia perfoliata* ssp. *perfoliata*	Miner's lettuce	N
Onagraceae	*Clarkia purpurea* ssp. *quadrivulnera*	Four-spot	N
Onagraceae	*Clarkia unguiculata*	Clarkia	N
Orobanchaceae	*Castilleja attenuata*	Valley tassels	N
Orobanchaceae	*Triphysaria versicolor* ssp. *faucibarbata*	Triphysaria	N
Papaveraceae	*Eschscholzia caespitosa*	Eschscholzia	N
Papaveraceae	*Eschscholzia californica*	California poppy	N
Pinaceae	*Pinus sabiniana*	Gray, ghost, or foothill pine	N
Plantaginaceae	*Collinsia heterophylla* var. *heterophylla*	Chinese-houses	N
Plantaginaceae	*Kickxia elatine*	Kickxia	I
Plantaginaceae	*Plantago lanceolata*	English plantain	I
Poaceae	*Agrostis pallens*	Dune bent grass	N
Poaceae	*Arundo donax*	Giant reed	I
Poaceae	*Avena barbata*	Slender wild oat	I
Poaceae	*Avena fatua*	Wild oat	I
Poaceae	*Brachypodium distachyon*	False brome	I

Poaceae	*Briza maxima*	Rattlesnake grass, large quaking grass	I
Poaceae	*Briza minor*	Annual quaking grass, small quaking grass	I
Poaceae	*Bromus carinatus* var. *carinatus*	California brome	N
Poaceae	*Bromus diandrus*	Ripgut grass	I
Poaceae	*Bromus hordeaceus*	Soft chess	I
Poaceae	*Bromus madritensis* ssp. *madritensis*	Foxtail chess, Madrid brome	I
Poaceae	*Cynosurus echinatus*	Bristly dogtail grass	I
Poaceae	*Elymus caput-medusae*	Medusa head	I
Poaceae	*Elymus glaucus* ssp. *glaucus*	Blue or western wild-rye	N
Poaceae	*Elymus triticoides*	Beardless wild rye	N
Poaceae	*Festuca bromoides*	Brome fescue	I
Poaceae	*Festuca californica*	California fescue	N
Poaceae	*Festuca myuros*	Rattail sixweeks grass	I
Poaceae	*Festuca perennis*	Rye grass	I
Poaceae	*Gastridium phleoides*	Nit grass	I
Poaceae	*Hordeum murinum* ssp. *leporinum*	Hare barley	I
Poaceae	*Melica californica*	California melic	N
Poaceae	*Melica imperfecta*	Little California melica	N
Poaceae	*Phalaris aquatica*	Harding grass	I
Poaceae	*Poa annua*	Annual blue grass	I
Poaceae	*Poa bulbosa*	Blue grass	I
Poaceae	*Poa secunda* ssp. *secunda*	One-sided blue grass	N
Poaceae	*Stipa pulchra*	Purple needle grass	N
Polemoniaceae	*Leptosiphon bicolor*	Leptosiphon	N
Polemoniaceae	*Leptosiphon parviflorus*	Leptosiphon	N
Polemoniaceae	*Navarretia pubescens*	Navarretia	N
Polygonaceae	*Rumex conglomeratus*	Dock	I
Pteridaceae	*Pentagramma triangularis* ssp. *triangularis*	Goldback fern	N
Ranunculaceae	*Ranunculus californicus* var. *californicus*	Buttercup	N
Ranunculaceae	*Ranunculus muricatus*	Buttercup	I
Rosaceae	*Cercocarpus betuloides* var. *betuloides*	Birch-leaf mountain-mahogany	N
Rosaceae	*Heteromeles arbutifolia*	Christmas berry, toyon	N
Rosaceae	*Fragaria californica*	California Strawberry	N
Rosaceae	*Rubus armeniacus*	Himalayan blackberry	I
Rubiaceae	*Galium porrigens* var. *tenue*	Climbing bedstraw	N
Themidaceae	*Brodiaea elegans* ssp. *elegans*	Harvest brodiaea	N
Themidaceae	*Triteleia laxa*	Ithuriel's spear, common triteleia	N
Valerianaceae	*Plectritis ciliosa*	Plectritis	N
Viscaceae	*Phoradendron serotinum ssp. Tomentosum*	Oak Mistletoe	N

Appendix D

Representative Photographs of the Study Area

Appendix D. Representative Photographs of the Study Area.

Photograph 1. View west of the annual grassland from the central portion of the study area (April 2018).

Photograph 2. View southwest of annual grassland with isolated oak trees from the northwestern portion of the study area (April 2018).

Photograph 3. View of scrub/chaparral habitat within the northwestern portion of the study area (June 2018).

Photograph 4. View north of annual grassland that had been mowed prior to the June 2018 surveys (June 2018).

Photograph 5. View of mixed oak woodland from southwestern portion of the study area (June 2018).

Photograph 6. View northwest of mixed oak woodland from the eastern portion of the study area (April 2018).

Photograph 7. View of disturbed area within the southwestern portion of the study area.

Appendix E

Regionally Occurring Special-Status Species

Regionally Occurring Special-Status Species

Special-Status Species	Regulatory Status (Federal/State/ Local/CNPS)	Habitat Requirements	Identification/Survey Period	Potential for Occurrence
Plants				
Amorpha californica var. *napensis* Napa false indigo	--/--/1B.2	Perennial deciduous shrub found in broadleafed upland forest, occasionally in openings, chaparral, and cismontane woodland from 120 to 2,000 meters.	April-July	Yes. Although the chaparral-scrub and mixed oak woodland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period.
Amsinckia lunaris Bent-flowered fiddleneck	--/--/1B.2	Annual herb found in coastal bluff scrub, cismontane woodland, and valley and foothill grassland from 3 to 500 meters.	March-June	Yes. Although the annual grassland provides habitat, this species was not observed during the April 4-6 botanical inventories conducted within the evident and identifiable blooming period.
Antirrhinum virga Twig-like snapdragon	--/--/4.3	Perennial herb found on rocky, openings, which are often serpentinite, in chaparral and lower montane coniferous forest from 100 to 2,015 meters.	June-July	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period.
Arctostaphylos stanfordiana var. *repens* Rincon Ridge manzanita	--/--/1B.1	Perennial evergreen shrub found occasionally in rhyolitic substrate in chaparral and cismontane woodland from 75 to 370 meters.	February-April (occasionally May)	Yes. Although the chaparral-scrub and mixed oak woodland provide habitat, this species was not observed during the April 4-6 botanical inventories conducted within the evident and identifiable blooming period.
Astragalus breweri Brewer's milk-vetch	--/--/4.2	Annual herb often found on serpentinite, volcanic substrate in chaparral, cismontane woodland, meadows and seeps, and valley and foothill grassland, which is occasionally open, often gravelly), from 90 to 730 meters.	April-June	Yes. Although the chaparral-scrub, mixed oak woodland, and annual grassland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period.
Astragalus claranus Clara Hunt's milk-vetch	FE/CT/1B	Annual herb found on serpentinite or volcanic, rock, clay substrate on chaparral, occasionally in openings, cismontane woodland, and valley and foothill grassland from 75 to 275 meters.	March-May	No. The study area does not contain suitable soils and occurs outside of the known extant elevation range for this species.
Astragalus clevelandii Cleveland's milk-vetch	--/--/4.3	Perennial herb found in serpentinite seeps in chaparral, cismontane woodland, and riparian forest from 200 to 1,500 meters.	June-September	No. The study area does not contain suitable soils for this species.
Astragalus rattanii var. *jepsonianus* Jepson's milk-vetch	--/--/1B.2	Annual herb often found on serpentinite substrate in chaparral, cismontane woodland, and valley and foothill grassland from 295 to 700 meters.	March-June	Yes. Although the chaparral-scrub, mixed oak woodland and annual grassland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period.
Brodiaea leptandra Narrow-anthered brodiaea	--/--/1B.2	Perennial bulbiferous herb found on volcanic substrate in broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland from 110 to 915 meters.	May-July	No. The study area does not contain suitable soils for this species.

Special-Status Species	Regulatory Status (Federal/State/ Local/CNPS)	Habitat Requirements	Identification/Survey Period	Potential for Occurrence
Calamagrostis ophitidis Serpentine reed grass	--/--/4.3	Perennial herb found on rocky, serpentinite substrate in chaparral, which is occasionally on open, north-facing slopes, lower montane coniferous forest, meadows and seeps, and valley and foothill grassland from 90 to 1,065 meters.	April-July	No. The study area does not contain suitable soils for this species.
Calycadenia micrantha Small-flowered calycadenia	--/--/1B.2	Annual herb found on roadsides, rocky, talus, scree, sometimes serpentinite, and sparsely vegetated areas in chaparral, meadows and seeps, which are occasionally volcanic, and valley and foothill grassland from 5 to 1,500 meters.	June-September	Yes. Although the chaparral-scrub and annual grassland provide habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period.
Calystegia collina ssp. *oxyphylla* Mt. Saint Helena morning-glory	--/--/4.2	Perennial rhizomatous herb found on serpentinite substrate in chaparral, lower montane coniferous forest, and valley and foothill grassland from 279 to 1,010 meters.	April-June	No. The study area does not contain suitable soils for this species.
Castilleja ambigua ssp. *ambigua* Johnny-nip	--/--/4.2	Annual hemiparasitic herb found in coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, and vernal pool margins from 0 to 435 meters.	March-August	Yes. Although the annual grassland provides habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period.
Castilleja ambigua var. *meadii* Mead's owl's-clover	--/--/1B.1	Annual hemiparasitic herb found on gravelly, volcanic, clay in meadows and seeps and vernal pools from 450 to 475 meters.	April-May	No. The study area does not contain suitable soils for this species.
Ceanothus confusus Rincon Ridge ceanothus	--/--/1B.1	Perennial evergreen shrub found on volcanic or serpentinite substrate in closed-cone coniferous forest, chaparral, and cismontane woodland from 75 to 1,065 meters.	February-June	No. The study area does not contain suitable soils for this species.
Ceanothus divergens Calistoga ceanothus	--/--/1B.2	Perennial evergreen shrub found in chaparral, which occasionally occurs on serpentinite or volcanic, rocky substrate, from 170 to 950 meters.	February-April	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the April 4-6 botanical inventories conducted within the evident and identifiable blooming period.
Ceanothus purpureus Holly-leaved ceanothus	--/--/1B.2	Perennial evergreen shrub found on volcanic, rocky substrate in chaparral and cismontane woodland from 120 to 640 meters.	February-June	No. The study area does not contain suitable soils for this species.
Ceanothus sonomensis Sonoma ceanothus	--/--/1B.2	Perennial evergreen shrub occasionally found on sandy, serpentinite, or volcanic substrate in chaparral from 215 to 800 meters.	February-April	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the April 4-6 botanical inventories conducted within the evident and identifiable blooming period.
Centromadia parryi ssp. *parryi* Pappose tarplant	--/--/1B.2	Annual herb often found on alkaline soils in chaparral, coastal prairie, meadows and seeps, marshes and swamps that are occasionally of coastal salt, and valley and foothill grassland that are occasionally vernally mesic from 0 to 420 meters.	May-November	Yes. Although the chaparral-scrub and annual grassland provide habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period.

Special-Status Species	Regulatory Status (Federal/State/ Local/CNPS)	Habitat Requirements	Identification/Survey Period	Potential for Occurrence
Clarkia breweri Brewer's clarkia	--/--/4.2	Annual herb often found on serpentinite substrate in chaparral, cismontane woodland, and coastal scrub from 215 to 1,115 meters.	April-June	No. The study area does not contain suitable soils for this species.
Clarkia gracilis ssp. *tracyi* Tracy's clarkia	--/--/4.2	Annual herb found in chaparral, occasionally in openings that are usually serpentinite, from 65 to 650 meters.	April-June	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Collomia diversifolia Serpentine collomia	--/--/4.3	Annual herb found on serpentinite, rocky or gravelly substrate, in chaparral and cismontane woodland from 200 to 600 meters.	May-June	No. The study area does not contain suitable soils for this species.
Cordylanthus tenuis ssp. *brunneus* Serpentine bird's-beak	--/--/4.3	Annual hemiparasitic herb found on serpentinite substrate in closed-cone coniferous forest, chaparral, and cismontane woodland from 305 to 915 meters.	July-August	No. The study area does not contain suitable soils for this species.
Cryptantha clevelandii var. *dissita* Serpentine cryptantha	--/--/1B.2	Annual herb found in chaparral, which is occasionally serpentinite, from 395 to 580 meters.	April-June	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Cypripedium montanum Mountain lady's slipper	--/--/4.2	Perennial rhizomatous herb found in broadleafed upland forest, cismontane woodland, lower montane coniferous forest, and North Coast coniferous forest from 185 to 2,225 meters.	March-August	Yes. Although the mixed oak woodland provides habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Delphinium uliginosum Swamp larkspur	--/--/4.2	Perennial herb found in serpentinite seeps in chaparral and valley and foothill grassland from 340 to 610 meters.	May-June	No. The study area does not contain suitable soils for this species.
Downingia pusilla Dwarf downingia	--/--/2B.2	Annual herb found occasionally in mesic areas within valley and foothill grassland and vernal pools from 1 to 445 meters.	March-May	Yes. Although the annual grassland provides habitat, this species was not observed during the April 4-6 botanical inventories conducted within the evident and identifiable blooming period for this species.
Erigeron bioletti Streamside daisy	--/--/3	Perennial herb found on rock, mesic substrate in broadleafed upland forest, cismontane woodland, and North Coast coniferous forest from 30 to 1,100 meters.	June-October	Yes. Although the mixed oak woodland provides habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Erigeron greenei Greene's narrow-leaved daisy	--/--/1B.2	Perennial herb found occasionally on serpentinite or volcanic substrate in chaparral from 80 to 1,005 meters.	May-September	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Eryngium jepsonii Jepson's coyote thistle	--/--/1B.2	Perennial herb found on clay substrate in valley and foothill grassland and vernal pools from 3 to 300 meters.	April-August	Yes. Although the annual grassland provides habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Erythronium helenae	--/--/4.2	Perennial bulbiferous herb found on volcanic or	March-May	No. The study area does not contain suitable soils for this

Special-Status Species	Regulatory Status (Federal/State/ Local/CNPS)	Habitat Requirements	Identification/Survey Period	Potential for Occurrence
St. Helena fawn lily		serpentinite substrate in chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland from 350 to 1,220 meters.		species.
Fritillaria pluriflora Adobe-lily	--/--/1B.2	Perennial bulbiferous herb found often on adobe substrate in chaparral, cismontane woodland, and valley and foothill grassland from 60 to 705 meters.	February-April	No. The study area does not contain suitable soils for this species.
Fritillaria purdyi Purdy's fritillary	--/--/4.3	Perennial bulbiferous herb usually found on serpentinite in chaparral, cismontane woodland, and lower montane coniferous forest from 175 to 2,255 meters.	March-June	Yes. Although the chaparral-scrub and mixed oak woodland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Gilia capitata ssp. *tomentosa* Woolly-headed gilia	--/--/1B.1	Annual herb found on serpentinite, rocky, outcrops in coastal bluff scrub and valley and foothill grassland from 10 to 220 meters.	May-July	No. The study area does not contain suitable soils and occurs outside of the known extant elevation range for this species.
Harmonia hallii *Hall's harmonia*	--/--/1B.2	Annual herb found occasionally on serpentinite substrate in chaparral from 305 to 987 meters.	April-June	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Harmonia nutans Nodding harmonia	--/--/4.3	Annual herb found on rocky or gravelly, volcanic substrate in chaparral and cismontane woodland from 75 to 975 meters.	March-May	No. The study area does not contain suitable soils for this species.
Helianthus exilis Serpentine sunflower	--/--/4.2	Annual herb found on serpentinite seeps in chaparral and cismontane woodland from 150 to 1,525 meters.	June-November	No. The study area does not contain suitable soils for this species.
Hesperolinon bicarpellatum Two-carpellate western flax	--/--/1B.2	Annual herb found in chaparral, which is usually on serpentinite substrate, from 60 to 1,005 meters.	May-July	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Hesperolinon brewerii Brewer's western flax	--/--/1B.2	Annual herb found usually on serpentinite soils in chaparral, cismontane woodland, and valley and foothill grassland from 30 to 945 meters.	May-July	Yes. Although the chaparral-scrub, mixed oak woodland, and annual grassland provide habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Hesperolinon sharsmithiae Sharsmith's western flax	--/--/1B.2	Annual herb found on serpentinite substrate in chaparral from 270 to 300 meters.	May-July	No. The study area does not contain suitable soils for this species.
Juglans hindsii Northern California black walnut	--/--/1B.2	Perennial deciduous tree found in riparian forest and riparian woodland from 0 to 440 meters.	April-May	No. This species was not observed within the study area.
Lasthenia conjugens Contra Costa goldfields	FE, CH/--/1B.1	Annual herb found on mesic soils in cismontane woodland, playas that are occasionally alkaline, valley and foothill grassland, and vernal pools from 0 to 470 meters.	March-June	Yes. Although the mixed oak woodland and annual grassland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Layia septentrionalis Colusa layia	--/--/1B.2	Annual herb found in chaparral, cismontane woodland, and valley and foothill grassland, which is occasionally on sandy, serpentine substrate, from 100	April-May	Yes. Although the chaparral-scrub, mixed oak woodland, and annual grassland provide habitat, this species was not observed during the April 4-6 botanical inventories conducted

Special-Status Species	Regulatory Status (Federal/State/ Local/CNPS)	Habitat Requirements	Identification/Survey Period	Potential for Occurrence
		to 1,095 meters.		within the evident and identifiable blooming period for this species.
Leptosiphon jepsonii Jepson's leptosiphon	--/--/1B.2	Annual herb found usually on volcanic substrate in chaparral, cismontane woodland, and valley and foothill grassland from 100 to 500 meters.	March-May	Yes. Although the chaparral-scrub, mixed oak woodland, and annual grassland provide habitat, this species was not observed during the April 4-6 botanical inventories conducted within the evident and identifiable blooming period for this species.
Leptosiphon latisectus Broad-lobed leptosiphon	--/--/4.3	Annual herb found in broadleafed upland forest and cismontane woodland from 170 to 1,500 meters.	April-June	Yes. Although the mixed oak woodland provides habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Lilium bolanderi Bolander's lily	--/--/4.2	Perennial bulbiferous herb found on serpentinite substrate in chaparral and lower montane coniferous forest from 30 to 1,600 meters.	June-July	No. The study area does not contain suitable soils for this species.
Limnanthes vinculans Sebastopol meadowfoam	FE/CE/1B.1	Annual herb found in vernally mesic substrate in meadows and seeps, valley and foothill grassland, and vernal pools from 15 to 305 meters.	April-May	Yes. Although the annual grassland provides habitat, this species was not observed during the April 4-6 botanical inventories conducted within the evident and identifiable blooming period for this species.
Lomatium repostum Napa lomatium	--/--/4.3	Perennial herb usually found on serpentinite substrate in chaparral and cismontane woodland from 90 to 830 meters.	March-June	Yes. Although the chaparral-scrub and mixed oak woodland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Lupinus sericatus Cobb Mountain lupine	--/--/1B.2	Perennial herb found in broadleafed upland forest, chaparral, cismontane woodland, and lower montane coniferous forest from 275 to 1,525 meters.	March-June	Yes. Although the chaparral-scrub and mixed oak woodland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Malacothamnus helleri Heller's bush-mallow	--/--/3.3	Perennial deciduous shrub found occasionally in sandstone in chaparral and occasionally in gravel in riparian woodland from 305 to 635 meters.	May-July	Yes. Although the chaparral-scrub and riparian woodland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Micropus amphibolus Mr. Diablo cottonweed	--/--/3.2	Annual herb found on rocky substrate in broadleafed upland forest, chaparral, cismontane woodland, and valley and foothill grassland from 45 to 825 meters.	March-May	Yes. Although the chaparral-scrub, mixed oak woodland, and annual grassland provide habitat, this species was not observed during the April 4-6 botanical inventories conducted within the evident and identifiable blooming period for this species.
Monardella viridis Green monardella	--/--/4.3	Perennial rhizomatous herb found in broadleafed upland forest, chaparral, and cismontane woodland from 100 to 1,010 meters.	June-September	Yes. Although the chaparral-scrub and mixed oak woodland provide habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Navarretia cotulifolia Cotula navarretia	--/--/4.2	Annual herb found on adobe substrate in chaparral, cismontane woodland, and valley and foothill grassland from 4 to 1,830 meters.	May-June	No. The study area does not contain suitable soils for this species.
Navarretia heterandra	--/--/4.3	Annual herb found in valley and foothill grassland,	April-June	Yes. Although the annual grassland provides habitat, this

Special-Status Species	Regulatory Status (Federal/State/ Local/CNPS)	Habitat Requirements	Identification/Survey Period	Potential for Occurrence
Tehama navarretia		which is occasionally mesic, and vernal pools from 30 to 1,010 meters.		species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Navarretia jepsonii Jepson's navarretia	--/--/4.3	Annual herb found on serpentinite substrate in chaparral, cismontane woodland, and valley and foothill grassland from 175 to 855 meters.	April-June	No. The study area does not contain suitable soils for this species.
Navarretia leucocephala ssp. *bakeri* Baker's navarretia	--/--/1B.1	Annual herb found in mesic areas of cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, and vernal pools from 5 to 1,740 meters.	April – July	Yes. Although the mixed oak woodland and annual grassland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Navarretia leucocephala ssp. *pauciflora* Few-flowered navarretia	FE/CT/1B.1	Annual herb found in vernal pools, occasionally on volcanic ash flow, from 400 to 855 meters.	May-June	No. The study area does not contain suitable soils for this species.
Navarretia paradoxinota Porter's navarretia	--/--/1B.3	Annual herb found on serpentinite, openings, vernally mesic, and often drainages in meadows and seeps from 165 to 840 meters.	May-June (occasionally July)	No. The study area does not contain suitable soils for this species.
Navarretia rosulata Marin County navarretia	--/--/1B.2	Annual herb found on serpentinite, rocky substrate in closed-cone coniferous forest and chaparral from 200 to 635 meters.	May-July	No. The study area does not contain suitable soils for this species.
Penstemon newberryi var. *sonomensis* Sonoma beardtongue	--/--/1B.3	Perennial herb found occasionally on rocky substrate in chaparral from 700 to 1,370 meters.	April-August	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Ranunculus lobbii Lobb's aquatic buttercup	--/--/4.2	Annual aquatic herb found on mesic substrate in cismontane woodland, North Coast coniferous forest, valley and foothill grassland, and vernal pools from 15 to 470 meters.	February-May	Yes. Although the mixed oak woodland and annual grassland provide habitat, this species was not observed during the April 4-6 botanical inventories conducted within the evident and identifiable blooming period for this species.
Sagittaria sanfordii Sanford's arrowhead	--/--/1B.2	Perennial rhizomatous emergent herb found in marshes and swamps, occasionally in assorted shallow freshwater, from 0 to 650 meters.	May-October (occasionally November)	No. The study area does not contain suitable soils for this species.
Senecio clevelandii var. *clevelandii* Cleveland's ragwort	--/--/4.3	Perennial herb found occasionally in serpentinite seeps in chaparral from 365 to 900 meters.	June-July	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Sidalcea keckii Keck's checkerbloom	--/--/1B.1	Annual herb found on serpentinite and clay substrate in cismontane woodland and valley and foothill grassland from 75 to 650 meters.	April-May (occasionally June)	Yes. Although the chaparral-scrub and annual grassland provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Sidalcea oregano ssp. *hydrophila* Marsh checkerbloom	--/--/1B.2	Perennial herb found on mesic substrate in meadows and seeps and riparian forest from 1,100 to 2,300 meters.	(occasionally June) July-August	No. The study area occurs outside of the known extant elevation range for this species.
Streptanthus hesperidis Green jewel-flower	--/--/1B.2	Annual herb found on serpentinite, rocky substrate in chaparral, which occur occasionally in openings, and cismontane woodland from 130 to 760 meters.	May-July	No. The study area does not contain suitable soils for this species.

Special-Status Species	Regulatory Status (Federal/State/ Local/CNPS)	Habitat Requirements	Identification/Survey Period	Potential for Occurrence
Streptanthus morrisonii var. *elatus* Three Peaks jewelflower	--/--/1B.2	Perennial herb found occasionally on serpentinite substrate in chaparral from 90 to 815 meters.	June-September	Yes. Although the chaparral-scrub provides habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Toxicoscordion fontanum Marsh zigadenus	--/--/4.2	Perennial bulbiferous herb found in vernally mesic, often serpentinite substrate in chaparral, cismontane woodland, lower montane coniferous forest, meadows and seeps, and marshes and swamps from 15 to 1,000 meters.	April-July	Yes. Although the mixed oak woodland and chaparral-scrub provide habitat, this species was not observed during the April 4-6 and June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Trichostema ruygtii Napa bluecurls	--/--/1B.2	Annual herb found in chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland, and vernal pools from 30 to 680 meters.	June-October.	Yes. Although the mixed oak woodland, annual grassland, and chaparral-scrub provide habitat, this species was not observed during the June 19-20 botanical inventories conducted within the evident and identifiable blooming period for this species.
Fish				
Hypomesus transpacificus Delta smelt	FT/CE/--	Found in shallow fresh or brackish water tributary to the Delta ecosystem/spawns in freshwater sloughs and channel edge waters.	Spawn December – July. Present year – round in the Delta.	No. The study area occurs outside of the known geographic range for this species.
Syncaris pacifica California freshwater shrimp	FE/--/--	Inhabit small, perennial coastal streams with low gradients below 116 meters. Found in tributary streams in the lower Russian River drainage that drain to the Pacific Ocean, coastal streams that drain to the Pacific Ocean, streams that drain to Tomales Bay, and streams that drain to San Pablo Bay.	Year round	No. The study area occurs outside of the known elevation range for this species.
Amphibians/Reptiles				
Dicamptodon ensatus California giant salamander	--/CSC/--	Nocturnal salamander that inhabits wet coastal forests in or near clear, cold permanent and semi-permanent streams and seepages from 0 to 94 meters (0 to 300 feet). Known from 3 isolated populations: from Mendocino County near Point Arena east into the coast rages into Lake and Glenn counties, south to Sonoma and Marin counties, continuing south of the San Francisco Bay from San Mateo County to southern Santa Cruz County. Does not occur east of the SF Bay.	Year round	No. The study area occurs outside of the known elevation and geographic ranges for this species.
Emys marmorata Western pond turtle	--/CSC/--	Found in agricultural wetlands and other wetlands such as irrigation and drainage canals, low gradient streams, marshes, ponds, sloughs, small lakes, and their associated uplands.	Active outside of dormancy period November – February	Yes. Ellis Creek within the study area provides marginal habitat for this species. Matheson Reservoir and an unnamed pond in the vicinity of the study area provide aquatic habitat for this species. The annual grassland surrounding these aquatic features provide upland overland movement for this species.
Rana boylii	--/CSC/--	Found in partially shaded, permanent, slow-moving streams or channels with rocky or muddy bottoms and	March – June	No. Ellis Creek within the study area provides marginal habitat for this species; the creek does not contain water year

Special-Status Species	Regulatory Status (Federal/State/ Local/CNPS)	Habitat Requirements	Identification/Survey Period	Potential for Occurrence
Foothill yellow-legged frog	Candidate	open, sunny banks within chaparral, open woodland, and forest.		round and lacks ponded areas for the FYLF to breed in.
Rana draytonii California red-legged frog	FT/--/--	Typically found in or within 91 meters (300 feet) of aquatic habitat. Breed in quiet, slow moving streams, ponds, or marsh communities with emergent vegetation or dense riparian vegetation. May disperse up to two miles between suitable aquatic habitat.	Aquatic surveys of breeding sites between January and September	No. Ellis Creek within the study area provides marginal habitat for this species given the highly scoured banks that either lack vegetation or are densely vegetated with Himalayan blackberries.
Taricha rivularis Red-bellied newt	--/CSC/--	Inhabits streams in coastal woodland and redwood forest. Occurs along the coast from near Bodega, Sonoma County, to near Honeydew, Humboldt County, and inland to Lower Lake and Kelsey Creek, Lake County.	Year round	No. The study area occurs outside of the known extant geographic range for this species.
Birds				
Agelaius tricolor Tricolored blackbird	--/CSC/-- Candidate (nesting colony)	Nests in dense blackberry, cattail, tules, bulrushes, sedges, willow, or wild rose within freshwater marshes. Nests in large colonies (up to thousands of individuals).	Year round	Yes. The annual grassland provides foraging habitat. No suitable nesting habitat occurs within the study area.
Aquila chrysaetos Golden eagle	--/CFP/-- (nesting and wintering)	Open and semi-open areas up to 12,000 feet in elevation. Builds stick nests on cliffs, in trees, or on man-made structures.	Year round	Yes. The oak woodland provides nesting habitat for this species.
Athene cunicularia Burrowing owl	--/CSC/-- (burrowing sites and some wintering sites)	Nests in burrows in the ground, often in old ground squirrel burrows or badger, within open dry grassland and desert habitat. The burrows are found in dry, level, open terrain, including prairie, plains, desert, and grassland with low height vegetation for foraging and available perches, such as fences, utility poles, posts, or raised rodent mounds.	Year round Breeding season surveys between March and August	Yes. The annual grassland provides breeding and wintering habitat for this species.
Buteo swainsoni Swainson's hawk	--/CT/--	Nest peripherally to valley riparian systems and within lone trees or groves of trees in agricultural fields. Valley oak, Fremont cottonwood, walnut, and large willow trees, ranging in height from 41 to 82 feet, are the most commonly used nest trees in the Central Valley. This species is known from Alameda, Butte, Colusa, Contra Costa, Fresno, Glenn, Inyo, Kern, Kings, Lassen, Los Angeles, Madera, Merced, Modoc, Mono, Napa, Placer, Plumas, Sacramento, San Bernardino, San Joaquin, San Luis Obispo, Siskiyou, Solano, Stanislaus, Sutter, Tehama, Tulare, Yolo, and Yuba counties.	March 1-September 15	Yes. The annual grassland provides foraging habitat and the isolated trees within the annual grassland and the trees in the oak woodland provide nesting habitat for this species.

Special-Status Species	Regulatory Status (Federal/State/ Local/CNPS)	Habitat Requirements	Identification/Survey Period	Potential for Occurrence
Cypseloides niger Black swift	--/CSC/--	Nests behind or next to waterfalls, steep cliffs, sea cliffs, and sea caves along rocky coasts or in mountainous forests.	March-September	No. The study area does not provide nesting habitat for this species.
Elanus leucurus White-tailed kite	--/CFP/-- (nesting)	Nests in isolated trees or woodland areas with suitable open foraging habitat.	February 15-August 31	Yes. This species was observed foraging within the study area. The isolated trees within the annual grassland and the trees in the oak woodland provide nesting habitat for this species.
Haliaeetus leucocephalus Bald eagle	FD/CFP, CE/--	Breeding habitat most commonly includes areas within 2.5 miles (4.0 kilometers) of coastal areas, bays, rivers, lakes, and reservoirs. Nests usually are in tall trees or on pinnacles or cliffs near water.	Winter	Yes. The oak woodland provides nesting habitat for this species.
Progne subis Purple martin	--/CSC/--	Often nests in tall, old trees near water in woodland and conifer habitats. Feeds in open areas near water and nest in tree cavities.	Year round	Yes. The oak woodland provides nesting habitat for this species.
Riparia riparia Bank swallow	--/CT/--	Nests in riverbanks and forages over riparian areas and adjacent uplands.	April – July	Yes. Ellis Creek within and in the vicinity of the study area provide nesting habitat for this species.
Strix occidentalis caurina Northern spotted owl	FE/--/--	Inhabits old growth forests or occasionally in younger forests with the following characteristics: moderate to high canopy closure; a multilayered, multispecies canopy dominated by large overstory trees; a high incidence of large trees with large cavities, broken tops, and other indications of decadence; numerous large snags; heavy accumulations of logs and other woody debris on the forest floor; and considerable open space within and beneath the canopy.	Year round during the night	No. The study area occurs outside of the known extant geographic range for this species.
Mammals				
Antrozous pallidus Pallid bat	--/CSC/--	Inhabits oak woodland, savannah, and riparian habitats. Roosts in crevices and hollows in trees, rocks, cliffs, bridges, and buildings.	Year round	Yes. The isolated trees within the annual grassland and the trees in the oak woodland provide roosting habitat for this species.
Corynorhinus townsendii Townsend's big-eared bat	--/CSC/--	Uses caves, buildings, and tree cavities for day roosts. Maternity and hibernation colonies typically are in caves and mine tunnels.	Year round	Yes. The isolated trees within the annual grassland and the trees in the oak woodland provide roosting habitat for this species.
Lasiurus blossevillii Western red bat	--/CSC/--	Found in cismontane woodland, lower montane coniferous forest, riparian forest, riparian woodland.	Year round	Yes. The isolated trees within the annual grassland and the trees in the oak woodland provide roosting habitat for this species.
Sensitive Natural Communities				
Northern Vernal Pool				No. This habitat does not occur within the study area.
Serpentine Bunchgrass				No. This habitat does not occur within the study area.
Wildflower Field				No. This habitat does not occur within the study area.

Sources: Nature Serve, 2018; CNPS, 2018; USFWS, 2018; CDFW, 2018.

RECOMMENDED TIMING AND METHODOLOGY FOR SWAINSON'S HAWK NESTING SURVEYS IN CALIFORNIA'S CENTRAL VALLEY

RECOMMENDED TIMING AND METHODOLOGY FOR SWAINSON'S HAWK NESTING SURVEYS IN CALIFORNIA'S CENTRAL VALLEY

Swainson's Hawk Technical Advisory Committee

May 31, 2000

This set of survey recommendations was developed by the Swainson's Hawk Technical Advisory Committee (TAC) to maximize the potential for locating nesting Swainson's hawks, and thus reducing the potential for nest failures as a result of project activities/disturbances. The combination of appropriate surveys, risk analysis, and monitoring has been determined to be very effective in reducing the potential for project-induced nest failures. As with most species, when the surveyor is in the right place at the right time, Swainson's hawks may be easy to observe; but some nest sites may be very difficult to locate, and even the most experienced surveyors have missed nests, nesting pairs, mis-identified a hawk in a nest, or believed incorrectly that a nest had failed. There is no substitute for specific Swainson's hawk survey experience and acquiring the correct search image.

METHODOLOGY

Surveys should be conducted in a manner that maximizes the potential to observe the adult Swainson's hawks, as well as the nest/chicks second. To meet the California Department of Fish and Game's (CDFG) recommendations for mitigation and protection of Swainson's hawks, surveys should be conducted for a ½ mile radius around all project activities, and if active nesting is identified within the ½ mile radius, consultation is required. In general, the TAC recommends this approach as well.

Minimum Equipment

Minimum survey equipment includes a high-quality pair of binoculars and a high quality spotting scope. Surveying even the smallest project area will take hours, and poor optics often result in eye-strain and difficulty distinguishing details in vegetation and subject birds. Other equipment includes good maps, GPS units, flagging, and notebooks.

Walking vs Driving

Driving (car or boat) or "windshield surveys" are usually preferred to walking if an adequate roadway is available through or around the project site. While driving, the observer can typically approach much closer to a hawk without causing it to fly. Although it might appear that a flying bird is more visible, they often fly away from the observer using trees as screens; and it is difficult to determine from where a flying bird came. Walking surveys are useful in locating a nest after a nest territory is identified, or when driving is not an option.

Angle and Distance to the Tree

Surveying subject trees from multiple angles will greatly increase the observer's chance of detecting a nest or hawk, especially after trees are fully leafed and when surveying multiple trees

in close proximity. When surveying from an access road, survey in both directions. Maintaining a distance of 50 meters to 200 meters from subject trees is optimal for observing perched and flying hawks without greatly reducing the chance of detecting a nest/young: Once a nesting territory is identified, a closer inspection may be required to locate the nest.

Speed
Travel at a speed that allows for a thorough inspection of a potential nest site. Survey speeds should not exceed 5 miles per hour to the greatest extent possible. If the surveyor must travel faster than 5 miles per hour, stop frequently to scan subject trees.

Visual and Aural Ques
Surveys will be focused on both observations and vocalizations. Observations of nests, perched adults, displaying adults, and chicks during the nesting season are all indicators of nesting Swainson's hawks. In addition, vocalizations are extremely helpful in locating nesting territories. Vocal communication between. hawks is frequent during territorial displays; during courtship and mating; through the nesting period as mates notify each other that food is available or that a threat exists; and as older chicks and fledglings beg for food.

Distractions
Minimize distractions while surveying. Although two pairs of eyes may be better than one pair at times, conversation may limit focus. Radios should be off, not only are they distracting, they may cover a hawk's call.

Notes and Species Observed
Take thorough field notes. Detailed notes and maps of the location of observed Swainson's hawk nests are essential for filling gaps in the Natural Diversity Data Base; please report all observed nest sites. Also document the occurrence of nesting great homed owls, red-tailed hawks, red-shouldered hawks and other potentially competitive species. These species will infrequently nest within 100 yards of each other, so the presence of one species will not necessarily exclude another.

TIMING

To meet **the minimum level** of protection for the species, surveys should be completed for **at least** the two survey periods immediately prior to a project's initiation. For example, if a project is scheduled to begin on June 20, you should complete 3 surveys in Period III and 3 surveys in Period V. However, it is always recommended that surveys be completed in Periods II, III and V. **Surveys should not be conducted in Period IV.**

The survey periods are defined by the timing of migration, courtship, and nesting in a "typical" year for the majority of Swainson's hawks from San Joaquin County to Northern Yolo County. Dates should be adjusted in consideration of early and late nesting seasons, and geographic differences (northern nesters tend to nest slightly later, etc). If you are not sure, contact a TAC member or CDFG biologist.

Survey dates **Justification and search image**	**Survey time**	**Number of Surveys**
I. *January-March 20 (recommended optional)*	*All day*	*1*

Prior to Swainson's hawks returning, it may be helpful to survey the project site to determine potential nest locations. Most nests are easily observed from relatively long distances, giving the surveyor the opportunity to identify potential nest sites, as well as becoming familiar with the project area. It also gives the surveyor the opportunity to locate and map competing species nest sites such as great homed owls from February on, and red-tailed hawks from March on. After March 1, surveyors are likely to observe Swainson's hawks staging in traditional nest territories.

II. *March 20 to April 5*	*Sunrise to 1000* *1600 to sunset*	*3*

Most Central Valley Swainson's hawks return by April 1, and immediately begin occupying their traditional nest territories. For those few that do not return by April 1, there are often hawks ("floaters") that act as place-holders in traditional nest sites; they are birds that do not have mates, but temporarily attach themselves to traditional territories and/or one of the site's "owners." Floaters are usually displaced by the territories' owner(s) if the owner returns.

Most trees are leafless and are relatively transparent; it is easy to observe old nests, staging birds, and competing species. The hawks are usually in their territories during the survey hours, but typically soaring and foraging in the mid-day hours. Swainson's hawks may often be observed involved in territorial and courtship displays, and circling the nest territory. Potential nest sites identified by the observation of staging Swainson's hawks will usually be active territories during that season, although the pair may not successfully nest/reproduce that year.

III. *April 5 to April 20*	*Sunrise to 1200* *1630 to Sunset*	*3*

Although trees are much less transparent at this time, 'activity at the nest site increases significantly. Both males and females are actively nest building, visiting their selected site frequently. Territorial and courtship displays are increased, as is copulation. The birds tend to vocalize often, and nest locations are most easily identified. This period may require a great deal of "sit and watch" surveying.

IV. *April 21 to June 10*	*Monitoring known nest sites only* ***Initiating Surveys is not recommended***	

Nests are extremely difficult to locate this time of year, and even the most experienced surveyor will miss them, especially if the previous surveys have not been done. During this phase of nesting, the female Swainson's hawk is in brood position, very low in the nest, laying eggs, incubating, or protecting the newly hatched and vulnerable chicks; her head may or may not be visible. Nests are often well-hidden, built into heavily vegetated sections of trees or in clumps of mistletoe, making them all but invisible. Trees are usually not viewable from all angles, which may make nest observation impossible.

Following the male to the nest may be the only method to locate it, and the male will spend hours away from the nest foraging, soaring, and will generally avoid drawing attention to the nest site. Even if the observer is fortunate enough to see a male returning with food for the female, if the female determines it is not safe she will not call the male in, and he will not approach the nest; this may happen if the observer, or others, are too close to the nest or if other threats, such as rival hawks, are apparent to the female or male.

V. ***June 10 to JuIy 30 (post-fledging)*** ***Sunrise to 1200*** ***3***
1600 to sunset

Young are active and visible, and relatively safe without parental protection. Both adults make numerous trips to the nest and are often soaring above, or perched near or on the nest tree. The location and construction of the nest may still limit visibility of the nest, young, ‘and adults.

DETERMINING A PROJECT'S POTENTIAL
FOR IMPACTING SWAINSON'S HAWKS

LEVEL OF RISK	REPRODUCTIVE SUCCESS (Individuals)	LONGTERM SURVIVABILITY (Population)	NORMAL SITE CHARACTERISTICS (Daily Average)	NEST MONI-TORING
HIGH	Direct physical contact with the nest tree while the birds are on eggs or protecting young. (Helicopters in close proximity)	Loss of available foraging area.	Little human-created noise, little human use: nest is well away from dwellings, equipment yards, human access areas, etc. *Do not include general cultivation practices in evaluation.*	MORE
		Loss of nest trees.		
	Loss of nest tree after nest building is begun prior to laying eggs.	Loss of potential nest trees.		
	Personnel within 50 yards of nest tree (out of vehicles) for extended periods while birds are on eggs or protecting young that are < 10 days old.	Cumulative: Multi-year, multi-site projects with substantial noise/personnel disturbance.		
	Initiating construction activities (machinery and personnel) within 200 yards of the nest after eggs are laid and before young are > 10 days old.	Cumulative: Single-season projects with substantial noise/personnel disturbance that is greater than or significantly different from the daily norm.		
	Heavy machinery only working within 50 yards of nest.			
	Initiating construction activities within 200 yards of nest before nest building begins or after young > 10 days old.		Substantial human-created noise and occurrence: nest is near roadways, well-used waterways, active airstrips, areas that have high human use. *Do not include general cultivation practices in evaluation.*	
LOW	All project activities (personnel and machinery) greater than 200 yards from nest.	Cumulative: Single-season projects with activities that "blend" well with site's "normal' activities.		LESS

STAFF REPORT ON BURROWING OWL MITIGATION

Staff Report on Burrowing Owl Mitigation

State of California

Natural Resources Agency

Department of Fish and Game

March 7, 2012[1]

[1] This document replaces the Department of Fish and Game 1995 Staff Report On Burrowing Owl Mitigation.

TABLE OF CONTENTS

INTRODUCTION AND PURPOSE 1

DEPARTMENT ROLE AND LEGAL AUTHORITIES 2

GUIDING PRINCIPLES FOR CONSERVATION 3

CONSERVATION GOALS FOR THE BURROWING OWL IN CALIFORNIA 4

ACTIVITIES WITH THE POTENTIAL TO TAKE OR IMPACT BURROWING OWLS 4

PROJECT IMPACT EVALUATIONS 5

MITIGATION METHODS 8

ACKNOWLEDGEMENTS 15

REFERENCES 15

Appendix A. Burrowing Owl Natural History and Threats 20

Appendix B. Definitions 24

Appendix C. Habitat Assessment and Reporting Details 26

Appendix D. Breeding and Non-breeding Season Survey and Reports 28

Appendix E. Draft Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans 31

Appendix F. Mitigation Management Plan and Vegetation Management Goals 33

INTRODUCTION AND PURPOSE

Maintaining California's rich biological diversity is dependent on the conservation of species and their habitats. The California Department of Fish and Game (Department) has designated certain species as "species of special concern" when their population viability and survival is adversely affected by risk factors such as precipitous declines or other vulnerability factors (Shuford and Gardali 2008). Preliminary analyses of regional patterns for breeding populations of burrowing owls (*Athene cunicularia*) have detected declines both locally in their central and southern coastal breeding areas, and statewide where the species has experienced modest breeding range retraction (Gervais et al. 2008). In California, threat factors affecting burrowing owl populations include habitat loss, degradation and modification, and eradication of ground squirrels resulting in a loss of suitable burrows required by burrowing owls for nesting, protection from predators, and shelter (See Appendix A).

The Department recognized the need for a comprehensive conservation and mitigation strategy for burrowing owls, and in 1995 directed staff to prepare a report describing mitigation and survey recommendations. This report, "1995 Staff Report on Burrowing Owl Mitigation," (Staff Report) (CDFG 1995), contained Department-recommended burrowing owl and burrow survey techniques and mitigation measures intended to offset the loss of habitat and slow or reverse further decline of this species. Notwithstanding these measures, over the past 15+ years, burrowing owls have continued to decline in portions of their range (DeSante et al. 2007, Wilkerson and Siegel, 2010). The Department has determined that reversing declining population and range trends for burrowing owls will require implementation of more effective conservation actions, and evaluating the efficacy of the Department's existing recommended avoidance, minimization and mitigation approaches for burrowing owls.

The Department has identified three main actions that together will facilitate a more viable, coordinated, and concerted approach to conservation and mitigation for burrowing owls in California. These include:

1. Incorporating burrowing owl comprehensive conservation strategies into landscape-based planning efforts such as Natural Community Conservation Plans (NCCPs) and multi-species Habitat Conservation Plans (HCPs) that specifically address burrowing owls.
2. Developing and implementing a statewide conservation strategy (Burkett and Johnson, 2007) and local or regional conservation strategies for burrowing owls, including the development and implementation of a statewide burrowing owl survey and monitoring plan.
3. Developing more rigorous burrowing owl survey methods, working to improve the adequacy of impacts assessments; developing clear and effective avoidance and minimization measures; and developing mitigation measures to ensure impacts to the species are effectively addressed at the project, local, and/or regional level (the focus of this document).

This Report sets forth the Department's recommendations for implementing the third approach identified above by revising the 1995 Staff Report, drawing from the most relevant and current knowledge and expertise, and incorporating the best scientific information

available pertaining to the species. It is designed to provide a compilation of the best available science for Department staff, biologists, planners, land managers, California Environmental Quality Act (CEQA) lead agencies, and the public to consider when assessing impacts of projects or other activities on burrowing owls.

This revised Staff Report takes into account the California Burrowing Owl Consortium's Survey Protocol and Mitigation Guidelines (CBOC 1993, 1997) and supersedes the survey, avoidance, minimization and mitigation recommendations in the 1995 Staff Report. Based on experiences gained from implementing the 1995 Staff Report, the Department believes revising that report is warranted. This document also includes general conservation goals and principles for developing mitigation measures for burrowing owls.

DEPARTMENT ROLE AND LEGAL AUTHORITIES

The mission of the Department is to manage California's diverse fish, wildlife and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. The Department has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitats necessary to maintain biologically sustainable populations of those species (Fish and Game Code (FGC) §1802). The Department, as trustee agency pursuant to CEQA (See CEQA Guidelines, §15386), has jurisdiction by law over natural resources, including fish and wildlife, affected by a project, as that term is defined in Section 21065 of the Public Resources Code. The Department exercises this authority by reviewing and commenting on environmental documents and making recommendations to avoid, minimize, and mitigate potential negative impacts to those resources held in trust for the people of California.

Field surveys designed to detect the presence of a particular species, habitat element, or natural community are one of the tools that can assist biologists in determining whether a species or habitat may be significantly impacted by land use changes or disturbance. The Department reviews field survey data as well as site-specific and regional information to evaluate whether a project's impacts may be significant. This document compiles the best available science for conducting habitat assessments and surveys, and includes considerations for developing measures to avoid impacts or mitigate unavoidable impacts.

CEQA

CEQA requires public agencies in California to analyze and disclose potential environmental impacts associated with a project that the agency will carry out, fund, or approve. Any potentially significant impact must be mitigated to the extent feasible. Project-specific CEQA mitigation is important for burrowing owls because most populations exist on privately owned parcels that, when proposed for development or other types of modification, may be subject to the environmental review requirements of CEQA.

Take

Take of individual burrowing owls and their nests is defined by FGC section 86, and prohibited by sections 3503, 3503.5 and 3513. Take is defined in FGC Section 86 as "hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture or kill."

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the United States and Canada, Japan, Mexico, and Russia for the protection of migratory birds, including the burrowing owl (50 C.F.R. § 10). The MBTA protects migratory bird nests from possession, sale, purchase, barter, transport, import and export, and collection. The other prohibitions of the MBTA - capture, pursue, hunt, and kill - are inapplicable to nests. The regulatory definition of take, as defined in Title 50 C.F.R. part 10.12, means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to hunt, shoot, wound, kill, trap, capture, or collect. Only the verb "collect" applies to nests. It is illegal to collect, possess, and by any means transfer possession of any migratory bird nest. The MBTA prohibits the destruction of a nest when it contains birds or eggs, and no possession shall occur during the destruction (see Fish and Wildlife Service, Migratory Bird Permit Memorandum, April 15, 2003). Certain exceptions to this prohibition are included in 50 C.F.R. section 21. Pursuant to Fish & Game Code section 3513, the Department enforces the Migratory Bird Treaty Act consistent with rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Treaty Act.

Regional Conservation Plans

Regional multiple species conservation plans offer long-term assurances for conservation of covered species at a landscape scale, in exchange for biologically appropriate levels of incidental take and/or habitat loss as defined in the approved plan. California's NCCP Act (FGC §2800 et seq.) governs such plans at the state level, and was designed to conserve species, natural communities, ecosystems, and ecological processes across a jurisdiction or a collection of jurisdictions. Complementary federal HCPs are governed by the Endangered Species Act (7 U.S.C. § 136, 16 U.S.C.§ 1531 et seq.) (ESA). Regional conservation plans (and certain other landscape-level conservation and management plans), may provide conservation for unlisted as well as listed species. Because the geographic scope of NCCPs and HCPs may span many hundreds of thousands of acres, these planning tools have the potential to play a significant role in conservation of burrowing owls, and grasslands and other habitats.

Fish and Game Commission Policies

There are a number of Fish and Game Commission policies (see FGC §2008) that can be applied to burrowing owl conservation. These include policies on: Raptors, Cooperation, Endangered and Threatened Species, Land Use Planning, Management and Utilization of Fish and Wildlife on Federal Lands, Management and Utilization of Fish and Wildlife on Private Lands, and Research.

GUIDING PRINCIPLES FOR CONSERVATION

Unless otherwise provided in a statewide, local, or regional conservation strategy, surveying and evaluating impacts to burrowing owls, as well as developing and implementing avoidance, minimization, and mitigation and conservation measures incorporate the following principles. These principles are a summary of Department staff expert opinion and were used to guide the preparation of this document.

1. Use the Precautionary Principle (Noss et al.1997), by which the alternative of increased conservation is deliberately chosen in order to buffer against incomplete knowledge of burrowing owl ecology and uncertainty about the consequences to burrowing owls of potential impacts, including those that are cumulative.
2. Employ basic conservation biology tenets and population-level approaches when determining what constitutes appropriate avoidance, minimization, and mitigation for impacts. Include mitigation effectiveness monitoring and reporting, and use an adaptive management loop to modify measures based on results.
3. Protect and conserve owls in wild, semi-natural, and agricultural habitats (conserve is defined at FGC §1802).
4. Protect and conserve natural nest burrows (or burrow surrogates) previously used by burrowing owls and sufficient foraging habitat and protect auxiliary "satellite" burrows that contribute to burrowing owl survivorship and natural behavior of owls.

CONSERVATION GOALS FOR THE BURROWING OWL IN CALIFORNIA

It is Department staff expert opinion that the following goals guide and contribute to the short and long-term conservation of burrowing owls in California:

1. Maintain size and distribution of extant burrowing owl populations (allowing for natural population fluctuations).
2. Increase geographic distribution of burrowing owls into formerly occupied historical range where burrowing owl habitat still exists, or where it can be created or enhanced, and where the reason for its local disappearance is no longer of concern.
3. Increase size of existing populations where possible and appropriate (for example, considering basic ecological principles such as carrying capacity, predator-prey relationships, and inter-specific relationships with other species at risk).
4. Protect and restore self-sustaining ecosystems or natural communities which can support burrowing owls at a landscape scale, and which will require minimal long-term management.
5. Minimize or prevent unnatural causes of burrowing owl population declines (e.g., nest burrow destruction, chemical control of rodent hosts and prey).
6. Augment/restore natural dynamics of burrowing owl populations including movement and genetic exchange among populations, such that the species does not require future listing and protection under the California Endangered Species Act (CESA) and/or the federal Endangered Species Act (ESA).
7. Engage stakeholders, including ranchers; farmers; military; tribes; local, state, and federal agencies; non-governmental organizations; and scientific research and education communities involved in burrowing owl protection and habitat management.

ACTIVITIES WITH THE POTENTIAL TO TAKE OR IMPACT BURROWING OWLS

The following activities are examples of activities that have the potential to take burrowing owls, their nests or eggs, or destroy or degrade burrowing owl habitat: grading, disking, cultivation, earthmoving, burrow blockage, heavy equipment compacting and crushing burrow tunnels, levee maintenance, flooding, burning and mowing (if burrows are impacted), and operating wind turbine collisions (collectively hereafter referred to as "projects" or "activities"

whether carried out pursuant to CEQA or not). In addition, the following activities may have impacts to burrowing owl populations: eradication of host burrowers; changes in vegetation management (i.e. grazing); use of pesticides and rodenticides; destruction, conversion or degradation of nesting, foraging, over-wintering or other habitats; destruction of natural burrows and burrow surrogates; and disturbance which may result in harassment of owls at occupied burrows.

PROJECT IMPACT EVALUATIONS

The following three progressive steps are effective in evaluating whether projects will result in impacts to burrowing owls. The information gained from these steps will inform any subsequent avoidance, minimization and mitigation measures. The steps for project impact evaluations are: 1) habitat assessment, 2) surveys, and 3) impact assessment. Habitat assessments are conducted to evaluate the likelihood that a site supports burrowing owl. Burrowing owl surveys provide information needed to determine the potential effects of proposed projects and activities on burrowing owls, and to avoid take in accordance with FGC sections 86, 3503, and 3503.5. Impact assessments evaluate the extent to which burrowing owls and their habitat may be impacted, directly or indirectly, on and within a reasonable distance of a proposed CEQA project activity or non-CEQA project. These three site evaluation steps are discussed in detail below.

Biologist Qualifications

The current scientific literature indicates that only individuals meeting the following minimum qualifications should perform burrowing owl habitat assessments, surveys, and impact assessments:

1. Familiarity with the species and its local ecology;
2. Experience conducting habitat assessments and non-breeding and breeding season surveys, or experience with these surveys conducted under the direction of an experienced surveyor;
3. Familiarity with the appropriate state and federal statutes related to burrowing owls, scientific research, and conservation;
4. Experience with analyzing impacts of development on burrowing owls and their habitat.

Habitat Assessment Data Collection and Reporting

A habitat assessment is the first step in the evaluation process and will assist investigators in determining whether or not occupancy surveys are needed. Refer to Appendix B for a definition of burrowing owl habitat. Compile the detailed information described in Appendix C when conducting project scoping, conducting a habitat assessment site visit and preparing a habitat assessment report.

Surveys

Burrowing owl surveys are the second step of the evaluation process and the best available scientific literature recommends that they be conducted whenever burrowing owl habitat or sign (see Appendix B) is encountered on or adjacent to (within 150 meters) a project site

(Thomsen 1971, Martin 1973). Occupancy of burrowing owl habitat is confirmed at a site when at least one burrowing owl, or its sign at or near a burrow entrance, is observed within the last three years (Rich 1984). Burrowing owls are more detectable during the breeding season with detection probabilities being highest during the nestling stage (Conway et al. 2008). In California, the burrowing owl breeding season extends from 1 February to 31 August (Haug et al. 1993, Thompsen 1971) with some variances by geographic location and climatic conditions. Several researchers suggest three or more survey visits during daylight hours (Haug and Diduik 1993, CBOC 1997, Conway and Simon 2003) and recommend each visit occur at least three weeks apart during the peak of the breeding season, commonly accepted in California as between 15 April and 15 July (CBOC 1997). Conway and Simon (2003) and Conway et al. (2008) recommended conducting surveys during the day when most burrowing owls in a local area are in the laying and incubation period (so as not to miss early breeding attempts), during the nesting period, and in the late nestling period when most owls are spending time above ground.

Non-breeding season (1 September to 31 January) surveys may provide information on burrowing owl occupancy, but do not substitute for breeding season surveys because results are typically inconclusive. Burrowing owls are more difficult to detect during the non-breeding season and their seasonal residency status is difficult to ascertain. Burrowing owls detected during non-breeding season surveys may be year-round residents, young from the previous breeding season, pre-breeding territorial adults, winter residents, dispersing juveniles, migrants, transients or new colonizers. In addition, the numbers of owls and their pattern of distribution may differ during winter and breeding seasons. However, on rare occasions, non-breeding season surveys may be warranted (i.e., if the site is believed to be a wintering site only based on negative breeding season results). Refer to Appendix D for information on breeding season and non-breeding season survey methodologies.

Survey Reports

Adequate information about burrowing owls present in and adjacent to an area that will be disturbed by a project or activity will enable the Department, reviewing agencies and the public to effectively assess potential impacts and will guide the development of avoidance, minimization, and mitigation measures. The survey report includes but is not limited to a description of the proposed project or proposed activity, including the proposed project start and end dates, as well as a description of disturbances or other activities occurring on-site or nearby. Refer to Appendix D for details included in a survey report.

Impact Assessment

The third step in the evaluation process is the impact assessment. When surveys confirm occupied burrowing owl habitat in or adjoining the project area, there are a number of ways to assess a project's potential significant impacts to burrowing owls and their habitat. Richardson and Miller (1997) recommended monitoring raptor behavior prior to developing management recommendations and buffers to determine the extent to which individuals have been sensitized to human disturbance. Monitoring results will also provide detail necessary for developing site-specific measures. Postovit and Postovit (1987) recommended an analytical approach to mitigation planning: define the problem (impact), set goals (to guide mitigation development), evaluate and select mitigation methods, and monitor the results.

Define the problem. The impact assessment evaluates all factors that could affect burrowing owls. Postovit and Postovit (1987) recommend evaluating the following in assessing impacts to raptors and planning mitigation: type and extent of disturbance, duration and timing of disturbance, visibility of disturbance, sensitivity and ability to habituate, and influence of environmental factors. They suggest identifying and addressing all potential direct and indirect impacts to burrowing owls, regardless of whether or not the impacts will occur during the breeding season. Several examples are given for each impact category below; however, examples are not intended to be used exclusively.

Type and extent of the disturbance. The impact assessment describes the nature (source) and extent (scale) of potential project impacts on occupied, satellite and unoccupied burrows including acreage to be lost (temporary or permanent), fragmentation/edge being created, increased distance to other nesting and foraging habitat, and habitat degradation. Discuss any project activities that impact either breeding and/or non-breeding habitat which could affect owl home range size and spatial configuration, negatively affect onsite and offsite burrowing owl presence, increase energetic costs, lower reproductive success, increase vulnerability to predation, and/or decrease the chance of procuring a mate.

Duration and timing of the impact. The impact assessment describes the amount of time the burrowing owl habitat will be unavailable to burrowing owls (temporary or permanent) on the site and the effect of that loss on essential behaviors or life history requirements of burrowing owls, the overlap of project activities with breeding and/or non-breeding seasons (timing of nesting and/or non-breeding activities may vary with latitude and climatic conditions, which should be considered with the timeline of the project or activity), and any variance of the project activities in intensity, scale and proximity relative to burrowing owl occurrences.

Visibility and sensitivity. Some individual burrowing owls or pairs are more sensitive than others to specific stimuli and may habituate to ongoing visual or audible disturbance. Site-specific monitoring may provide clues to the burrowing owl's sensitivities. This type of assessment addresses the sensitivity of burrowing owls within their nesting area to humans on foot, and vehicular traffic. Other variables are whether the site is primarily in a rural versus urban setting, and whether any prior disturbance (e.g., human development or recreation) is known at the site.

Environmental factors. The impact assessment discusses any environmental factors that could be influenced or changed by the proposed activities including nest site availability, predators, prey availability, burrowing mammal presence and abundance, and threats from other extrinsic factors such as human disturbance, urban interface, feral animals, invasive species, disease or pesticides.

Significance of impacts. The impact assessment evaluates the potential loss of nesting burrows, satellite burrows, foraging habitat, dispersal and migration habitat, wintering habitat, and habitat linkages, including habitat supporting prey and host burrowers and other essential habitat attributes. This assessment determines if impacts to the species will result in significant impacts to the species locally, regionally and range-wide per CEQA Guidelines §15382 and Appendix G. The significance of the impact to habitat depends on the extent of habitat disturbed and length of time the habitat is unavailable (for example: minor – several days, medium – several weeks to months, high - breeding season affecting juvenile survival,

or over winter affecting adult survival).

Cumulative effects. The cumulative effects assessment evaluates two consequences: 1) the project's proportional share of reasonably foreseeable impacts on burrowing owls and habitat caused by the project or in combination with other projects and local influences having impacts on burrowing owls and habitat, and 2) the effects on the regional owl population resulting from the project's impacts to burrowing owls and habitat.

Mitigation goals. Establishing goals will assist in planning mitigation and selecting measures that function at a desired level. Goals also provide a standard by which to measure mitigation success. Unless specifically provided for through other FGC Sections or through specific regulations, take, possession or destruction of individual burrowing owls, their nests and eggs is prohibited under FGC sections 3503, 3503.5 and 3513. Therefore, a required goal for all project activities is to avoid take of burrowing owls. Under CEQA, goals would consist of measures that would avoid, minimize and mitigate impacts to a less than significant level. For individual projects, mitigation must be roughly proportional to the level of impacts, including cumulative impacts, in accordance with the provisions of CEQA (CEQA Guidelines, §§ 15126.4(a)(4)(B), 15064, 15065, and 16355). In order for mitigation measures to be effective, they must be specific, enforceable, and feasible actions that will improve environmental conditions. As set forth in more detail in Appendix A, the current scientific literature supports the conclusion that mitigation for permanent habitat loss necessitates replacement with an equivalent or greater habitat area for breeding, foraging, wintering, dispersal, presence of burrows, burrow surrogates, presence of fossorial mammal dens, well drained soils, and abundant and available prey within close proximity to the burrow.

MITIGATION METHODS

The current scientific literature indicates that any site-specific avoidance or mitigation measures developed should incorporate the best practices presented below or other practices confirmed by experts and the Department. The Department is available to assist in the development of site-specific avoidance and mitigation measures.

Avoiding. A primary goal is to design and implement projects to seasonally and spatially avoid negative impacts and disturbances that could result in take of burrowing owls, nests, or eggs. Other avoidance measures may include but not be limited to:

- Avoid disturbing occupied burrows during the nesting period, from 1 February through 31 August.
- Avoid impacting burrows occupied during the non-breeding season by migratory or non-migratory resident burrowing owls.
- Avoid direct destruction of burrows through chaining (dragging a heavy chain over an area to remove shrubs), disking, cultivation, and urban, industrial, or agricultural development.
- Develop and implement a worker awareness program to increase the on-site worker's recognition of and commitment to burrowing owl protection.
- Place visible markers near burrows to ensure that farm equipment and other machinery does not collapse burrows.
- Do not fumigate, use treated bait or other means of poisoning nuisance animals in areas where burrowing owls are known or suspected to occur (e.g., sites observed with nesting

owls, designated use areas).
- Restrict the use of treated grain to poison mammals to the months of January and February.

Take avoidance (pre-construction) surveys. Take avoidance surveys are intended to detect the presence of burrowing owls on a project site at a fixed period in time and inform necessary take avoidance actions. Take avoidance surveys may detect changes in owl presence such as colonizing owls that have recently moved onto the site, migrating owls, resident burrowing owls changing burrow use, or young of the year that are still present and have not dispersed. Refer to Appendix D for take avoidance survey methodology.

Site surveillance. Burrowing owls may attempt to colonize or re-colonize an area that will be impacted; thus, the current scientific literature indicates a need for ongoing surveillance at the project site during project activities is recommended. The surveillance frequency/effort should be sufficient to detect burrowing owls if they return. Subsequent to their new occupancy or return to the site, take avoidance measures should assure with a high degree of certainty that take of owls will not occur.

Minimizing. If burrowing owls and their habitat can be protected in place on or adjacent to a project site, the use of buffer zones, visual screens or other measures while project activities are occurring can minimize disturbance impacts. Conduct site-specific monitoring to inform development of buffers (see Visibility and sensitivity above). The following general guidelines for implementing buffers should be adjusted to address site-specific conditions using the impact assessment approach described above. The CEQA lead agency and/or project proponent is encouraged to consult with the Department and other burrowing owl experts for assistance in developing site-specific buffer zones and visual screens.

Buffers. Holroyd et al. (2001) identified a need to standardize management and disturbance mitigation guidelines. For instance, guidelines for mitigating impacts by petroleum industries on burrowing owls and other prairie species (Scobie and Faminow, 2000) may be used as a template for future mitigation guidelines (Holroyd et al. 2001). Scobie and Faminow (2000) developed guidelines for activities around occupied burrowing owl nests recommending buffers around low, medium, and high disturbance activities, respectively (see below).

Recommended restricted activity dates and setback distances by level of disturbance for burrowing owls (Scobie and Faminow 2000).

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

* meters (m)

Based on existing vegetation, human development, and land uses in an area, resource managers may decide to allow human development or resource extraction closer to these area/sites than recommended above. However, if it is decided to allow activities closer than

the setback distances recommended, a broad-scale, long-term, scientifically-rigorous monitoring program ensures that burrowing owls are not detrimentally affected by alternative approaches.

Other minimization measures include eliminating actions that reduce burrowing owl forage and burrowing surrogates (e.g. ground squirrel), or introduce/facilitate burrowing owl predators. Actions that could influence these factors include reducing livestock grazing rates and/or changing the timing or duration of grazing or vegetation management that could result in less suitable habitat.

Burrow exclusion and closure. Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owls, or permanently exclude burrowing owls and close burrows after verifying burrows are empty by site monitoring and scoping. Exclusion in and of itself is not a take avoidance, minimization or mitigation method. Eviction of burrowing owls is a potentially significant impact under CEQA.

The long-term demographic consequences of these techniques have not been thoroughly evaluated, and the fate of evicted or excluded burrowing owls has not been systematically studied. Because burrowing owls are dependent on burrows at all times of the year for survival and/or reproduction, evicting them from nesting, roosting, and satellite burrows may lead to indirect impacts or take. Temporary or permanent closure of burrows may result in significant loss of burrows and habitat for reproduction and other life history requirements. Depending on the proximity and availability of alternate habitat, loss of access to burrows will likely result in varying levels of increased stress on burrowing owls and could depress reproduction, increase predation, increase energetic costs, and introduce risks posed by having to find and compete for available burrows. Therefore, exclusion and burrow closure are not recommended where they can be avoided. The current scientific literature indicates consideration of all possible avoidance and minimization measures before temporary or permanent exclusion and closure of burrows is implemented, in order to avoid take.

The results of a study by Trulio (1995) in California showed that burrowing owls passively displaced from their burrows were quickly attracted to adjacent artificial burrows at five of six passive relocation sites. The successful sites were all within 75 meters (m) of the destroyed burrow, a distance generally within a pair's territory. This researcher discouraged using passive relocation to artificial burrows as a mitigation measure for lost burrows without protection of adjacent foraging habitat. The study results indicated artificial burrows were used by evicted burrowing owls when they were approximately 50-100 m from the natural burrow (Thomsen 1971, Haug and Oliphant 1990). Locating artificial or natural burrows more than 100 m from the eviction burrow may greatly reduce the chances that new burrows will be used. Ideally, exclusion and burrow closure is employed only where there are adjacent natural burrows and non-impacted, sufficient habitat for burrowing owls to occupy with permanent protection mechanisms in place. Any new burrowing owl colonizing the project site after the CEQA document has been adopted may constitute changed circumstances that should be addressed in a re-circulated CEQA document.

The current scientific literature indicates that burrow exclusion should only be conducted by qualified biologists (meeting the Biologist's Qualifications above) during the non-breeding

season, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping. The literature also indicates that when temporary or permanent burrow exclusion and/or burrow closure is implemented, burrowing owls should not be excluded from burrows unless or until:

- A Burrowing Owl Exclusion Plan (see Appendix E) is developed and approved by the applicable local DFG office;
- Permanent loss of occupied burrow(s) and habitat is mitigated in accordance with the Mitigating Impacts sections below. Temporary exclusion is mitigated in accordance with the item #1 under Mitigating Impacts below.
- Site monitoring is conducted prior to, during, and after exclusion of burrowing owls from their burrows sufficient to ensure take is avoided. Conduct daily monitoring for one week to confirm young of the year have fledged if the exclusion will occur immediately after the end of the breeding season.
- Excluded burrowing owls are documented using artificial or natural burrows on an adjoining mitigation site (if able to confirm by band re-sight).

Translocation (Active relocation offsite >100 meters). At this time, there is little published information regarding the efficacy of translocating burrowing owls, and additional research is needed to determine subsequent survival and breeding success (Klute et al. 2003, Holroyd et al. 2001). Study results for translocation in Florida implied that hatching success may be decreased for populations of burrowing owls that undergo translocation (Nixon 2006). At this time, the Department is unable to authorize the capture and relocation of burrowing owls except within the context of scientific research (FGC §1002) or a NCCP conservation strategy.

Mitigating impacts. Habitat loss and degradation from rapid urbanization of farmland in the core areas of the Central and Imperial valleys is the greatest of many threats to burrowing owls in California (Shuford and Gardali, 2008). At a minimum, if burrowing owls have been documented to occupy burrows (see Definitions, Appendix B) at the project site in recent years, the current scientific literature supports the conclusion that the site should be considered occupied and mitigation should be required by the CEQA lead agency to address project-specific significant and cumulative impacts. Other site-specific and regionally significant and cumulative impacts may warrant mitigation. The current scientific literature indicates the following to be best practices. If these best practices cannot be implemented, the lead agency or lead investigator may consult with the Department to develop effective mitigation alternatives. The Department is also available to assist in the identification of suitable mitigation lands.

1. Where habitat will be temporarily disturbed, restore the disturbed area to pre-project condition including decompacting soil and revegetating. Permanent habitat protection may be warranted if there is the potential that the temporary impacts may render a nesting site (nesting burrow and satellite burrows) unsustainable or unavailable depending on the time frame, resulting in reduced survival or abandonment. For the latter potential impact, see the permanent impact measures below.
2. Mitigate for permanent impacts to nesting, occupied and satellite burrows and/or burrowing owl habitat such that the habitat acreage, number of burrows and burrowing owls impacted are replaced based on the information provided in Appendix A. Note: A

minimum habitat replacement recommendation is not provided here as it has been shown to serve as a default, replacing any site-specific analysis and discounting the wide variation in natal area, home range, foraging area, and other factors influencing burrowing owls and burrowing owl population persistence in a particular area.

3. Mitigate for permanent impacts to nesting, occupied and satellite burrows and burrowing owl habitat with (a) permanent conservation of similar vegetation communities (grassland, scrublands, desert, urban, and agriculture) to provide for burrowing owl nesting, foraging, wintering, and dispersal (i.e., during breeding and non-breeding seasons) comparable to or better than that of the impact area, and (b) sufficiently large acreage, and presence of fossorial mammals. The mitigation lands may require habitat enhancements including enhancement or expansion of burrows for breeding, shelter and dispersal opportunity, and removal or control of population stressors. If the mitigation lands are located adjacent to the impacted burrow site, ensure the nearest neighbor artificial or natural burrow clusters are at least within 210 meters (Fisher et al. 2007).
4. Permanently protect mitigation land through a conservation easement deeded to a non-profit conservation organization or public agency with a conservation mission, for the purpose of conserving burrowing owl habitat and prohibiting activities incompatible with burrowing owl use. If the project is located within the service area of a Department-approved burrowing owl conservation bank, the project proponent may purchase available burrowing owl conservation bank credits.
5. Develop and implement a mitigation land management plan to address long-term ecological sustainability and maintenance of the site for burrowing owls (see Management Plan and Artificial Burrow sections below, if applicable).
6. Fund the maintenance and management of mitigation land through the establishment of a long-term funding mechanism such as an endowment.
7. Habitat should not be altered or destroyed, and burrowing owls should not be excluded from burrows, until mitigation lands have been legally secured, are managed for the benefit of burrowing owls according to Department-approved management, monitoring and reporting plans, and the endowment or other long-term funding mechanism is in place or security is provided until these measures are completed.
8. Mitigation lands should be on, adjacent or proximate to the impact site where possible and where habitat is sufficient to support burrowing owls present.
9. Where there is insufficient habitat on, adjacent to, or near project sites where burrowing owls will be excluded, acquire mitigation lands with burrowing owl habitat away from the project site. The selection of mitigation lands should then focus on consolidating and enlarging conservation areas located outside of urban and planned growth areas, within foraging distance of other conserved lands. If mitigation lands are not available adjacent to other conserved lands, increase the mitigation land acreage requirement to ensure a selected site is of sufficient size. Offsite mitigation may not adequately offset the biological and habitat values impacted on a one to one basis. Consult with the Department when determining offsite mitigation acreages.
10. Evaluate and select suitable mitigation lands based on a comparison of the habitat attributes of the impacted and conserved lands, including but not limited to: type and structure of habitat being impacted or conserved; density of burrowing owls in impacted and conserved habitat; and significance of impacted or conserved habitat to the species range-wide. Mitigate for the highest quality burrowing owl habitat impacted first and foremost when identifying mitigation lands, even if a mitigation site is located outside of

a lead agency's jurisdictional boundary, particularly if the lead agency is a city or special district.

11. Select mitigation lands taking into account the potential human and wildlife conflicts or incompatibility, including but not limited to, human foot and vehicle traffic, and predation by cats, loose dogs and urban-adapted wildlife, and incompatible species management (i.e., snowy plover).
12. Where a burrowing owl population appears to be highly adapted to heavily altered habitats such as golf courses, airports, athletic fields, and business complexes, permanently protecting the land, augmenting the site with artificial burrows, and enhancing and maintaining those areas may enhance sustainability of the burrowing owl population onsite. Maintenance includes keeping lands grazed or mowed with weed-eaters or push mowers, free from trees and shrubs, and preventing excessive human and human-related disturbance (e.g., walking, jogging, off-road activity, dog-walking) and loose and feral pets (chasing and, presumably, preying upon owls) that make the environment uninhabitable for burrowing owls (Wesemann and Rowe 1985, Millsap and Bear 2000, Lincer and Bloom 2007). Items 4, 5 and 6 also still apply to this mitigation approach.
13. If there are no other feasible mitigation options available and a lead agency is willing to establish and oversee a Burrowing Owl Mitigation and Conservation Fund that funds on a competitive basis acquisition and permanent habitat conservation, the project proponent may participate in the lead agency's program.

Artificial burrows. Artificial burrows have been used to replace natural burrows either temporarily or long-term and their long-term success is unclear. Artificial burrows may be an effective addition to in-perpetuity habitat mitigation if they are augmenting natural burrows, the burrows are regularly maintained (i.e., no less than annual, with biennial maintenance recommended), and surrounding habitat patches are carefully maintained. There may be some circumstances, for example at airports, where squirrels will not be allowed to persist and create a dynamic burrow system, where artificial burrows may provide some support to an owl population.

Many variables may contribute to the successful use of artificial burrows by burrowing owls, including pre-existence of burrowing owls in the area, availability of food, predators, surrounding vegetation and proximity, number of natural burrows in proximity, type of materials used to build the burrow, size of the burrow and entrance, direction in which the burrow entrance is facing, slope of the entrance, number of burrow entrances per burrow, depth of the burrow, type and height of perches, and annual maintenance needs (Belthoff and King 2002, Smith et al. 2005, Barclay et al. 2011). Refer to Barclay (2008) and (2011) and to Johnson et al. 2010 (unpublished report) for guidance on installing artificial burrows including recommendations for placement, installation and maintenance.

Any long-term reliance on artificial burrows as natural burrow replacements must include semi-annual to annual cleaning and maintenance and/or replacement (Barclay et al. 2011, Smith and Conway 2005, Alexander et al. 2005) as an ongoing management practice. Alexander et al. (2005), in a study of the use of artificial burrows found that all of 20 artificial burrows needed some annual cleaning and maintenance. Burrows were either excavated by predators, blocked by soil or vegetation, or experienced substrate erosion forming a space beneath the tubing that prevented nestlings from re-entering the burrow.

Mitigation lands management plan. Develop a Mitigation Lands Management Plan for projects that require off-site or on-site mitigation habitat protection to ensure compliance with and effectiveness of identified management actions for the mitigation lands. A suggested outline and related vegetation management goals and monitoring success criteria can be found in Appendix E.

Mitigation Monitoring and Reporting

Verify the compliance with required mitigation measures, the accuracy of predictions, and ensure the effectiveness of all mitigation measures for burrowing owls by conducting follow-up monitoring, and implementing midcourse corrections, if necessary, to protect burrowing owls. Refer to CEQA Guidelines Section 15097 and the CEQA Guidelines for additional guidance on mitigation, monitoring and reporting. Monitoring is qualitatively different from site surveillance; monitoring normally has a specific purpose and its outputs and outcomes will usually allow a comparison with some baseline condition of the site before the mitigation (including avoidance and minimization) was undertaken. Ideally, monitoring should be based on the Before-After Control-Impact (BACI) principle (McDonald et al. 2000) that requires knowledge of the pre-mitigation state to provide a reference point for the state and change in state after the project and mitigation have been implemented.

ACKNOWLEDGEMENTS

We thank Jack Barclay, Jeff Lincer, David Plumpton, Jeff Kidd, Carol Roberts and other reviewers for their valuable comments on this report. We also want to acknowledge all the hard work of the Department team, especially T. Bartlett, K. Riesz, S. Wilson, D. Gifford, D. Mayer, J. Gan, L. Connolly, D. Mayer, A. Donlan, L. Bauer, L. Comrack, D. Lancaster, E. Burkett, B. Johnson, D. Johnston, A. Gonzales, S. Morey and K. Hunting.

REFERENCES

Alexander, A. K., M. R. Sackschewsky, and C. A. Duberstein. 2005. Use of artificial burrows by burrowing owls (athene cunicularia) at the HAMMER Facility on the U.S. Department of Energy Hanford Site. Pacific Northwest National Lab-15414. U.S. Department of Energy, DE-AC05-76RL01830, Richland, Washington, USA.

BIOS. California Department of Fish and Game. The Biogeographic Information Observation System (http://bios.dfg.ca.gov/)

Barclay, J. H. 2008. A simple artificial burrow design for burrowing owls. Journal of Raptor Research. 42: 53-57.

Barclay, J. H. 2012. Albion Environmental, Inc, personal communication.

Barclay, J. H., K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts, editors. 2007. Proceedings of the California Burrowing Owl Symposium, 11-12 November 2003, Sacramento, California, USA. Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc., Point Reyes Station, CA.

Barclay, J. H., N. Korfanta, and M. Kauffman. 2011. Long-term population dynamics of a managed burrowing owl colony. Journal of Wildlife Management 75: 1295–1306.

Belthoff, J R., R. A. King. 2002. Nest-site characteristics of burrowing owls (athene cunicularia) in the Snake River Birds of Prey National Conservation Area, Idaho, and applications to artificial burrow installation. Western North American Naturalist 62: 112-119.

Botelho, E. S. 1996. Behavioral ecology and parental care of breeding western burrowing owls (Speotyto cunicularia hupugaea) in southern New Mexico, USA. Dissertation, New Mexico State University, Las Cruces, New Mexico, USA.

Burkett, E. E., and B. S. Johnson. 2007. Development of a conservation strategy for burrowing owls in California. Pages 165-168 *in* J. H. Barclay, K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts, editors. Proceedings of the California Burrowing Owl Symposium, 11-12 November 2003, Sacramento, California, USA. Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc., Point Reyes Station, CA.

CBOC (California Burrowing Owl Consortium). 1997. Burrowing owl survey protocol and mitigation guidelines. Pages 171-177 *in* Lincer, J. L. and K. Steenhof (editors). 1997. The burrowing owl, its biology and management. Raptor Research Report Number 9.

CDFG (California Department of Fish and Game). 1995. Staff report on burrowing owl mitigation. Unpublished report. Sacramento, California, USA.

CNDDB. California Department of Fish and Game. The California Natural Diversity Database (CNDDB) (http://www.dfg.ca.gov/biogeodata/cnddb/), Sacramento, California, USA.

Catlin, D. H. 2004. Factors affecting within-season and between-season breeding dispersal of Burrowing Owls in California. Thesis, Oregon State University, Corvallis, Oregon, USA

Catlin, D. H., and D. K. Rosenberg. 2006. Nest destruction increases mortality and dispersal of Burrowing Owls in the Imperial Valley, California. Southwest Naturalist 51: 406–409.

Catlin, D. H., D. K. Rosenberg, and K. L. Haley. 2005. The effects of nesting success and mate fidelity on breeding dispersal in burrowing owls. Canadian Journal of Zoology 83:1574–1580.

Conway, C. J., and J. Simon. 2003. Comparison of detection probability associated with burrowing owl survey methods. Journal of Wildlife Management 67: 501-511.

Conway, C. J., V. Garcia, M. D., and K. Hughes. 2008. Factors affecting detection of burrowing owl nests during standardized surveys. Journal of Wildlife Management 72: 688-696.

Coulombe, H. N. 1971. Behavior and population ecology of the burrowing owl, Speotyto cunicularia, in the Imperial Valley of California. Condor 73: 162–176.

Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, P. A. Rabie, and B. R. Euliss. 2003. Effects of management practices on grassland birds: burrowing owl. Northern Prairie Wildlife Research Center, Jamestown, North Dakota. Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/literatr/grasbird/buow/buow.htm>.

DeSante, D. F., E. D Ruhlen, and R. Scalf. 2007. The distribution and relative abundance of burrowing owls in California during 1991–1993: Evidence for a declining population and thoughts on its conservation. Pages 1-41 *in* J. H. Barclay, K. W. Hunting, J. L. Lincer, J. Linthicum, and T. A. Roberts, editors. Proceedings of the California Burrowing Owl Symposium, 11-12 November 2003 Sacramento, California, USA. Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc., Point Reyes Station, CA.

Desmond, M. J., and J. A. Savidge. 1998. Burrowing Owl conservation in the Great Plains. Proceedings of the Second International Burrowing Owl Symposium, 29-30 September 1999, Ogden, Utah, USA.

Desmond, M. J., and J. A. Savidge. 1999. Satellite burrow use by burrowing owl chicks and its influence on nest fate. Pages 128-130 *in* P. D. Vickery and J. R. Herkert, editors. Ecology and conservation of grassland birds of the western hemisphere. Studies in Avian Biology 19.

Emlen, J. T. 1977. Estimating breeding season bird densities from transects counts. Auk 94: 455-468.

Fisher, J. B., L. A. Trulio, G. S. Biging, and D. Chromczack. 2007. An analysis of spatial clustering and implications for wildlife management: a burrowing owl example. Environmental Management 39: 403-11.

Gervais, J. A., D. K. Rosenberg, and L. A. Comrack. Burrowing Owl (Athene cunicularia) *in* Shuford, W.D. and T. Gardali, editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento, California, USA.

Gervais, J. A., D. K. Rosenberg, R. G. Anthony. 2003. Space use and pesticide exposure risk of male burrowing owls in an agricultural landscape. Journal of Wildlife Management 67: 155-164.

Green, G.A.; Anthony, R.G. 1989. Nesting success and habitat relationships of burrowing owls in the Columbia Basin, Oregon. The Condor 91: 347-354.

Haug, E. A. 1985. Observations on the breeding ecology of burrowing owls in Saskatchewan.

Thesis, University of Saskatchewan, Saskatoon, Saskatchewan, Canada.
Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. Burrowing owl (Speotyto cunicularia), *in* A. Poole and F. Gill, editors, The Birds of North America, The Academy of Natural Sciences, Philadelphia, Pennsylvania, and The American Ornithologists' Union, Washington, D.C., USA.
Haug, E. A., and L. W. Oliphant. 1990. Movements, activity patterns, and habitat use of burrowing owls in Saskatchewan. Journal of Wildlife Management 54: 27-35.
Holroyd, G. L., R. Rodriguez-Estrella, and S. R. Sheffield. 2001. Conservation of the burrowing owl in western North America: issues, challenges, and recommendations. Journal of Raptor Research 35: 399-407.
James, P. C., T. J. Ethier, and M. K. Toutloff. 1997. Parameters of a declining burrowing owl population in Saskatchewan. Pages 34-37. *in* J. L. Lincer, and K. Steenhof, editors. The burrowing owl, its biology and management: including the proceedings of the first international symposium. 13-14 November 1992, Bellevue, WA, USA. Raptor Research Report Number 9.
Johnson, D. H., D. C. Gillis, M. A. Gregg, J. L.Rebholz, J. L. Lincer, and J. R. Belthoff. 2010. Users guide to installation of artificial burrows for burrowing owls. Unpublished report. Tree Top Inc., Selah, Washington, USA.
Klute, D. S., A. W. Ayers, M. T. Green, W. H. Howe, S. L Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. Status assessment and conservation plan for the western burrowing owl in the United States. U.S. Department of the Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C, USA.
Koenig, W. D., D. D. Van Vuren, and P. N. Hooge. 1996. Detectability, philopatry, and the distribution of dispersal distances in vertebrates. Trends in Ecology and Evolution 11: 514–517.
LaFever, D. H., K. E. LaFever, D. H. Catlin, and D. K. Rosenberg. 2008. Diurnal time budget of burrowing owls in a resident population during the non-breeding season. Southwestern Naturalist 53: 29-33.
Lincer, J. L., and P. W. Bloom. 2007. The status of the burrowing owl (Athene cunicularia) in San Diego County, CA. Pages 90-102 *in* Proceedings of the California Burrowing Owl Symposium, 11-12 November 2003, Sacramento, California, USA. Bird Populations Monographs No. 1. The Institute for Bird Populations and Albion Environmental, Inc., Point Reyes Station, CA.
Lutz, R. S. and D. L. Plumpton. 1999. Philopatry and nest site reuse by burrowing owls: implications for management. Journal of Raptor Research 33: 149-153.
MacCracken, J. G., D. W. Uresk, and R. M. Hansen. 1985a. Vegetation and soils of burrowing owl nest sites in Conata Basin, South Dakota. Condor 87: 152-154.
Manning, J. A., and R. S. A. Kaler. 2011. Effects of survey methods on burrowing owl behaviors. Journal of Wildlife Management 75: 525-30.
McDonald, T. L., W. P. Erickson, and L. L. McDonald. 2000. Analysis of count data from before-after control-impact studies. Journal of Agricultural, Biological and Environmental Statistics 5: 262-279.
Millsap, B. A., and C. Bear. 2000. Density and reproduction of burrowing owls along an urban development gradient. Journal of Wildlife Management 64:33-41.
Nixon, P A. 2006. Effects of translocation on the Florida burrowing owl (Athene cunicularia floridana). Thesis. University of South Florida, Tampa, Florida, USA.
Noss, R. F., M. A. O'Connell, and D. D. Murphy. 1997. The science of conservation planning:

habitat conservation under the Endangered Species Act. Island Press, Washington D.C., USA.
Postovit, H. R., and B. C. Postovit. 1987. Impacts and mitigation techniques. Pages 183-213 in Raptor management techniques manual scientific technical series number 10, National Wildlife Federation, Washington, D. C., USA
Remsen, J. V., Jr. 1978. Bird species of special concern in California: An annotated list of declining or vulnerable bird species. California Department of Fish and Game, Nongame Wildlife. Investigations, Wildlife Management Branch Administrative Report 78-1, Sacramento, California, USA.
Rich, T. 1984. Monitoring burrowing owl populations: implications of burrow re-use. Wildlife Society Bulletin 12: 178-189.
Richardson, C. T. and C. K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. Wildlife Society Bulletin 25: 634-38.
Ronan, N. A. 2002. Habitat selection, reproductive success, and site fidelity of burrowing owls in a grassland ecosystem. Thesis, Oregon State University, Corvallis, Oregon, USA.
Rosenberg, D., 2009 Oregon State University, Corvallis, personal communication.
Rosenberg, D. K., J. A. Gervais, D. F. DeSante, and H. Ober. 2009. An updated adaptive management plan for the burrowing owl population at NAS Lemoore. The Oregon Wildlife Institute, Corvallis, OR and The Institute for Bird Populations, Point Reyes Station, CA. OWI Contribution No. 201 and IBP Contribution No. 375.
Rosenberg, D. K., J. A. Gervais, H. Ober, and D. F. DeSante. 1998. An adaptive management plan for the burrowing owl population at Naval Air Station Lemoore, California, USA. Publication 95, Institute for Bird Populations, P.O. Box 1346, Pt. Reyes Station, CA 94956.
Rosenberg, D. K., and K. L. Haley. 2004. The ecology of burrowing owls in the agroecosystem of the Imperial Valley, California. Studies in Avian Biology 27:120-135.
Rosenberg, D. K., L. A. Trulio, D. H. Catlin, D. Chromczack, J. A. Gervais, N. Ronan, and K. A. Haley. 2007. The ecology of the burrowing owl in California, unpublished report to Bureau of Land Management.
Rosier, J. R., N. A., Ronan, and D. K. Rosenberg. 2006. Post-breeding dispersal of burrowing owls in an extensive California grassland. American Midland Naturalist 155: 162–167.
Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A manual of California vegetation, Second edition. California Native Plant Society, Sacramento, California, USA.
Scobie, D., and C. Faminow. 2000. Development of standardized guidelines for petroleum industry activities that affect COSEWIC Prairie and Northern Region vertebrate species at risk. Environment Canada, Prairie and Northern Region, Edmonton, Alberta, Canada.
Shuford, W. D. and T. Gardali, editors. 2008. California Bird Species of Special Concern: a ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento. Gervais, J. A., D. K. Rosenberg, and L. Comrack. 2008. Burrowing Owl (Athene cunicularia).
Smith, M. D., C. J. Conway, and L. A. Ellis. 2005. Burrowing owl nesting productivity: a comparison between artificial and natural burrows on and off golf courses. Wildlife Society Bulletin 33: 454-462.
Thelander, C. G., K. S. Smallwood, and L. Rugge. 2003. Bird risk behaviors and fatalities at the Altamont Pass Wind Resource Area, period of performance: March 1998–

December 2000. U.S. Department of Energy, National Renewable Energy Laboratory, Golden, Colorado, USA.
Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal Airport. Condor 73: 177-192.
Thompson, C. D. 1984. Selected aspects of burrowing owl ecology in central Wyoming. Thesis, University of Wyoming, Laramie, Wyoming, USA.
Trulio, L. 1995. Passive relocation: A method to preserve burrowing owls on disturbed sites. Journal of Field Ornithology 66: 99–106.
U.S. Fish and Wildlife Service (USFWS). 2002. Birds of conservation concern 2002. U.S. Department of Interior, Division of Migratory Bird Management, Arlington, Virginia, USA.
U.S. Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. U.S. Department of Interior, Division of Migratory Bird Management, Arlington, Virginia, USA.
Wesemann, T. and M. Rowe. 1985. Factors influencing the distribution and abundance of burrowing owls in Cape Coral, Florida. Pages 129-137 *in* L. W. Adams and D. L. Leedy, editors. Integrating Man and Nature in the Metropolitan Environment. Proceedings National Symposium. on Urban Wildlife, 4-7 November 1986, Chevy Chase, Maryland, USA.
Wilkerson, R. L. and R. B. Siegel. 2010. Assessing changes in the distribution and abundance of burrowing owls in California, 1993-2007. Bird Populations 10: 1-36.
Zarn, M. 1974. Burrowing owl. U.S. Department of the Interior, Bureau of Land Management. Technical Note T-N-250, Denver, Colorado, USA.

Appendix A. Burrowing Owl Natural History and Threats

Diet

Burrowing owl diet includes arthropods, small rodents, birds, amphibians, reptiles, and carrion (Haug et al. 1993).

Breeding

In California, the breeding season for the burrowing owl typically occurs between 1 February and 31 August although breeding in December has been documented (Thompson 1971, Gervais et al. 2008); breeding behavior includes nest site selection by the male, pair formation, copulation, egg laying, hatching, fledging, and post-fledging care of young by the parents. The peak of the breeding season occurs between 15 April and 15 July and is the period when most burrowing owls have active nests (eggs or young). The incubation period lasts 29 days (Coulombe 1971) and young fledge after 44 days (Haug et al. 1993). Note that the timing of nesting activities may vary with latitude and climatic conditions. Burrowing owls may change burrows several times during the breeding season, starting when nestlings are about three weeks old (Haug et al. 1993).

Dispersal

The following discussion is an excerpt from Gervais et al (2008):

> "The burrowing owl is often considered a sedentary species (e.g., Thomsen 1971). A large proportion of adults show strong fidelity to their nest site from year to year, especially where resident, as in Florida (74% for females, 83% for males; Millsap and Bear 1997). In California, nest-site fidelity rates were 32%–50% in a large grassland and 57% in an agricultural environment (Ronan 2002, Catlin 2004, Catlin et al. 2005). Differences in these rates among sites may reflect differences in nest predation rates (Catlin 2004, Catlin et al. 2005). Despite the high nest fidelity rates, dispersal distances may be considerable for both juveniles (natal dispersal) and adults (postbreeding dispersal), but this also varied with location (Catlin 2004, Rosier et al. 2006). Distances of 53 km to roughly 150 km have been observed in California for adult and natal dispersal, respectively (D. K. Rosenberg and J. A. Gervais, unpublished data), despite the difficulty in detecting movements beyond the immediate study area (Koenig et al. 1996)."

Habitat

The burrowing owl is a small, long-legged, ground-dwelling bird species, well-adapted to open, relatively flat expanses. In California, preferred habitat is generally typified by short, sparse vegetation with few shrubs, level to gentle topography and well-drained soils (Haug et al. 1993). Grassland, shrub steppe, and desert are naturally occurring habitat types used by the species. In addition, burrowing owls may occur in some agricultural areas, ruderal grassy fields, vacant lots and pastures if the vegetation structure is suitable and there are useable burrows and foraging habitat in proximity (Gervais et al 2008). Unique amongst North

American raptors, the burrowing owl requires underground burrows or other cavities for nesting during the breeding season and for roosting and cover, year round. Burrows used by the owls are usually dug by other species termed host burrowers. In California, California ground squirrel (*Spermophilus beecheyi*) and round-tailed ground squirrel (*Citellus tereticaudus*) burrows are frequently used by burrowing owls but they may use dens or holes dug by other fossorial species including badger (*Taxidea taxus*), coyote (*Canis latrans*), and fox (e.g., San Joaquin kit fox, *Vulpes macrotis mutica*; Ronan 2002). In some instances, owls have been known to excavate their own burrows (Thompson 1971, Barclay 2007). Natural rock cavities, debris piles, culverts, and pipes also are used for nesting and roosting (Rosenberg et al. 1998). Burrowing owls have been documented using artificial burrows for nesting and cover (Smith and Belthoff, 2003).

Foraging habitat. Foraging habitat is essential to burrowing owls. The following discussion is an excerpt from Gervais et al. (2008):

> "Useful as a rough guide to evaluating project impacts and appropriate mitigation for burrowing owls, adult male burrowing owls home ranges have been documented (calculated by minimum convex polygon) to comprise anywhere from 280 acres in intensively irrigated agroecosystems in Imperial Valley (Rosenberg and Haley 2004) to 450 acres in mixed agricultural lands at Lemoore Naval Air Station, CA (Gervais et al. 2003), to 600 acres in pasture in Saskatchewan, Canada (Haug and Oliphant 1990). But owl home ranges may be much larger, perhaps by an order of magnitude, in non-irrigated grasslands such as at Carrizo Plain, California (Gervais et al. 2008), based on telemetry studies and distribution of nests. Foraging occurs primarily within 600 m of their nests (within approximately 300 acres, based on a circle with a 600 m radius) during the breeding season."

Importance of burrows and adjacent habitat. Burrows and the associated surrounding habitat are essential ecological requisites for burrowing owls throughout the year and especially during the breeding season. During the non-breeding season, burrowing owls remain closely associated with burrows, as they continue to use them as refuge from predators, shelter from weather and roost sites. Resident populations will remain near the previous season's nest burrow at least some of the time (Coulombe 1971, Thomsen 1971, Botelho 1996, LaFever et al. 2008).

In a study by Lutz and Plumpton (1999) adult males and females nested in formerly used sites at similar rates (75% and 63%, respectively) (Lutz and Plumpton 1999). Burrow fidelity has been reported in some areas; however, more frequently, burrowing owls reuse traditional nesting areas without necessarily using the same burrow (Haug et al. 1993, Dechant et al. 1999). Burrow and nest sites are re-used at a higher rate if the burrowing owl has reproduced successfully during the previous year (Haug et al. 1993) and if the number of burrows isn't limiting nesting opportunity.

Burrowing owls may use "satellite" or non-nesting burrows, moving young at 10-14 days, presumably to reduce risk of predation (Desmond and Savidge 1998) and possibly to avoid nest parasites (Dechant et al. 1999). Successful nests in Nebraska had more active satellite burrows within 75 m of the nest burrow than unsuccessful nests (Desmond and Savidge

1999). Several studies have documented the number of satellite burrows used by young and adult burrowing owls during the breeding season as between one and 11 burrows with an average use of approximately five burrows (Thompsen 1984, Haug 1985, Haug and Oliphant 1990). Supporting the notion of selecting for nest sites near potential satellite burrows, Ronan (2002) found burrowing owl families would move away from a nest site if their satellite burrows were experimentally removed through blocking their entrance.

Habitat adjacent to burrows has been documented to be important to burrowing owls. Gervais et al. (2003) found that home range sizes of male burrowing owls during the nesting season were highly variable within but not between years. Their results also suggested that owls concentrate foraging efforts within 600 meters of the nest burrow, as was observed in Canada (Haug and Oliphant 1990) and southern California (Rosenberg and Haley 2004). James et al. (1997), reported habitat modification factors causing local burrowing owl declines included habitat fragmentation and loss of connectivity.

In conclusion, the best available science indicates that essential habitat for the burrowing owl in California must include suitable year-round habitat, primarily for breeding, foraging, wintering and dispersal habitat consisting of short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey within close proximity to the burrow.

Threats to Burrowing Owls in California

Habitat loss. Habitat loss, degradation, and fragmentation are the greatest threats to burrowing owls in California. According to DeSante et al. (2007), "the vast majority of burrowing owls [now] occur in the wide, flat lowland valleys and basins of the Imperial Valley and Great Central Valley [where] for the most part,...the highest rates of residential and commercial development in California are occurring." Habitat loss from the State's long history of urbanization in coastal counties has already resulted in either extirpation or drastic reduction of burrowing owl populations there (Gervais et al. 2008). Further, loss of agricultural and other open lands (such as grazed landscapes) also negatively affect owl populations. Because of their need for open habitat with low vegetation, burrowing owls are unlikely to persist in agricultural lands dominated by vineyards and orchards (Gervais et al. 2008).

Control of burrowing rodents. According to Klute et al. (2003), the elimination of burrowing rodents through control programs is a primary factor in the recent and historical decline of burrowing owl populations nationwide. In California, ground squirrel burrows are most often used by burrowing owls for nesting and cover; thus, ground squirrel control programs may affect owl numbers in local areas by eliminating a necessary resource.

Direct mortality. Burrowing owls suffer direct losses from a number of sources. Vehicle collisions are a significant source of mortality especially in the urban interface and where owls nest alongside roads (Haug et al. 1993, Gervais et al. 2008). Road and ditch maintenance, modification of water conveyance structures (Imperial Valley) and discing to control weeds in fallow fields may destroy burrows (Rosenberg and Haley 2004, Catlin and Rosenberg 2006) which may trap or crush owls. Wind turbines at Altamont Pass Wind Resource Area are known to cause direct burrowing owl mortality (Thelander et al. 2003). Exposure to

pesticides may pose a threat to the species but is poorly understood (Klute et al. 2003, Gervais et al. 2008).

Appendix B. Definitions

Some key terms that appear in this document are defined below.

Adjacent habitat means burrowing owl habitat that abuts the area where habitat and burrows will be impacted and rendered non-suitable for occupancy.

Breeding (nesting) season begins as early as 1 February and continues through 31 August (Thomsen 1971, Zarn 1974). The timing of breeding activities may vary with latitude and climatic conditions. The breeding season includes pairing, egg-laying and incubation, and nestling and fledging stages.

Burrow exclusion is a technique of installing one-way doors in burrow openings during the non-breeding season to temporarily exclude burrowing owls or permanently exclude burrowing owls and excavate and close burrows after confirming burrows are empty.

Burrowing owl habitat generally includes, but is not limited to, short or sparse vegetation (at least at some time of year), presence of burrows, burrow surrogates or presence of fossorial mammal dens, well-drained soils, and abundant and available prey.

Burrow surrogates include culverts, piles of concrete rubble, piles of soil, burrows created along soft banks of ditches and canals, pipes, and similar structures.

Civil twilight - Morning civil twilight begins when the geometric center of the sun is 6 degrees below the horizon (civil dawn) and ends at sunrise. Evening civil twilight begins at sunset and ends when the geometric center of the sun reaches 6 degrees below the horizon (civil dusk). During this period there is enough light from the sun that artificial sources of light may not be needed to carry on outdoor activities. This concept is sometimes enshrined in laws, for example, when drivers of automobiles must turn on their headlights (called lighting-up time in the UK); when pilots may exercise the rights to fly aircraft. Civil twilight can also be described as the limit at which twilight illumination is sufficient, under clear weather conditions, for terrestrial objects to be clearly distinguished; at the beginning of morning civil twilight, or end of evening civil twilight, the horizon is clearly defined and the brightest stars are visible under clear atmospheric conditions.

Conservation for burrowing owls may include but may not be limited to protecting remaining breeding pairs or providing for population expansion, protecting and enhancing breeding and essential habitat, and amending or augmenting land use plans to stabilize populations and other specific actions to avoid the need to list the species pursuant to California or federal Endangered Species Acts.

Contiguous means connected together so as to form an uninterrupted expanse in space.

Essential habitat includes nesting, foraging, wintering, and dispersal habitat.

Foraging habitat is habitat within the estimated home range of an occupied burrow, supports suitable prey base, and allows for effective hunting.

Host burrowers include ground squirrels, badgers, foxes, coyotes, gophers etc.

Locally significant species is a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or occurring in a unique habitat type.

Non-breeding season is the period of time when nesting activity is not occurring, generally September 1 through January 31, but may vary with latitude and climatic conditions.

Occupied site or occupancy means a site that is assumed occupied if at least one burrowing owl has been observed occupying a burrow within the last three years (Rich 1984). Occupancy of suitable burrowing owl habitat may also be indicated by owl sign including its molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance or perch site.

Other impacting activities may include but may not be limited to agricultural practices, vegetation management and fire control, pest management, conversion of habitat from rangeland or natural lands to more intensive agricultural uses that could result in “take”. These impacting activities may not meet the definition of a project under CEQA.

Passive relocation is a technique of installing one-way doors in burrow openings to temporarily or permanently evict burrowing owls and prevent burrow re-occupation.

Peak of the breeding season is between 15 April and 15 July.

Sign includes its tracks, molted feathers, cast pellets (defined as 1-2” long brown to black regurgitated pellets consisting of non-digestible portions of the owls’ diet, such as fur, bones, claws, beetle elytra, or feathers), prey remains, egg shell fragments, owl white wash, nest burrow decoration materials (e.g., paper, foil, plastic items, livestock or other animal manure, etc.), possible owl perches, or other items.

Appendix C. Habitat Assessment and Reporting Details

Habitat Assessment Data Collection and Reporting

Current scientific literature indicates that it would be most effective to gather the data in the manner described below when conducting project scoping, conducting a habitat assessment site visit and preparing a habitat assessment report:

1. Conduct at least one visit covering the entire potential project/activity area including areas that will be directly or indirectly impacted by the project. Survey adjoining areas within 150 m (Thomsen 1971, Martin 1973), or more where direct or indirect effects could potentially extend offsite. If lawful access cannot be achieved to adjacent areas, surveys can be performed with a spotting scope or other methods.
2. Prior to the site visit, compile relevant biological information for the site and surrounding area to provide a local and regional context.
3. Check all available sources for burrowing owl occurrence information regionally prior to a field inspection. The CNDDB and BIOS (see References cited) may be consulted for known occurrences of burrowing owls. Other sources of information include, but are not limited to, the Proceedings of the California Burrowing Owl Symposium (Barclay et al. 2007), county bird atlas projects, Breeding Bird Survey records, eBIRD (http://ebird.org), Gervais et al. (2008), local reports or experts, museum records, and other site-specific relevant information.
4. Identify vegetation and habitat types potentially supporting burrowing owls in the project area and vicinity.
5. Record and report on the following information:
    a. A full description of the proposed project, including but not limited to, expected work periods, daily work schedules, equipment used, activities performed (such as drilling, construction, excavation, etc.) and whether the expected activities will vary in location or intensity over the project's timeline;
    b. A regional setting map, showing the general project location relative to major roads and other recognizable features;
    c. A detailed map (preferably a USGS topo 7.5' quad base map) of the site and proposed project, including the footprint of proposed land and/or vegetation-altering activities, base map source, identifying topography, landscape features, a north arrow, bar scale, and legend;
    d. A written description of the biological setting, including location (Section, Township, Range, baseline and meridian), acreage, topography, soils, geographic and hydrologic characteristics, land use and management history on and adjoining the site (i.e., whether it is urban, semi-urban or rural; whether there is any evidence of past or current livestock grazing, mowing, disking, or other vegetation management activities);
    e. An analysis of any relevant, historical information concerning burrowing owl use or occupancy (breeding, foraging, over-wintering) on site or in the assessment area;
    f. Vegetation type and structure (using Sawyer et al. 2009), vegetation height, habitat types and features in the surrounding area plus a reasonably sized (as supported with logical justification) assessment area; (Note: use caution in discounting habitat based on grass height as it can be a temporary condition variable by season and conditions (such as current grazing regime) or may be distributed as a mosaic).

g. The presence of burrowing owl individuals or pairs or sign (see Appendix B);
h. The presence of suitable burrows and/or burrow surrogates (>11 cm in diameter (height and width) and >150 cm in depth) (Johnson et al. 2010), regardless of a lack of any burrowing owl sign and/or burrow surrogates; and burrowing owls and/or their sign that have recently or historically (within the last 3 years) been identified on or adjacent to the site.

Appendix D. Breeding and Non-breeding Season Surveys and Reports

Current scientific literature indicates that it is most effective to conduct breeding and non-breeding season surveys and report in the manner that follows:

Breeding Season Surveys

Number of visits and timing. Conduct 4 survey visits: 1) at least one site visit between 15 February and 15 April, and 2) a minimum of three survey visits, at least three weeks apart, between 15 April and 15 July, with at least one visit after 15 June. Note: many burrowing owl migrants are still present in southwestern California during mid-March, therefore, exercise caution in assuming breeding occupancy early in the breeding season.

Survey method. Rosenberg et al. (2007) confirmed walking line transects were most effective in smaller habitat patches. Conduct surveys in all portions of the project site that were identified in the Habitat Assessment and fit the description of habitat in Appendix A. Conduct surveys by walking straight-line transects spaced 7 m to 20 m apart, adjusting for vegetation height and density (Rosenberg et al. 2007). At the start of each transect and, at least, every 100 m, scan the entire visible project area for burrowing owls using binoculars. During walking surveys, record all potential burrows used by burrowing owls as determined by the presence of one or more burrowing owls, pellets, prey remains, whitewash, or decoration. Some burrowing owls may be detected by their calls, so observers should also listen for burrowing owls while conducting the survey.

Care should be taken to minimize disturbance near occupied burrows during all seasons and not to "flush" burrowing owls especially if predators are present to reduce any potential for needless energy expenditure or burrowing owl mortality. Burrowing owls may flush if approached by pedestrians within 50 m (Conway et al. 2003). If raptors or other predators are present that may suppress burrowing owl activity, return at another time or later date for a follow-up survey.

Check all burrowing owls detected for bands and/or color bands and report band combinations to the Bird Banding Laboratory (BBL). Some site-specific variations to survey methods discussed below may be developed in coordination with species experts and Department staff.

Weather conditions. Poor weather may affect the surveyor's ability to detect burrowing owls, therefore, avoid conducting surveys when wind speed is >20 km/hr, and there is precipitation or dense fog. Surveys have greater detection probability if conducted when ambient temperatures are >20º C, <12 km/hr winds, and cloud cover is <75% (Conway et al. 2008).

Time of day. Daily timing of surveys varies according to the literature, latitude, and survey method. However, surveys between morning civil twilight and 10:00 AM and two hours before sunset until evening civil twilight provide the highest detection probabilities (Barclay pers. comm. 2012, Conway et al. 2008).

Alternate methods. If the project site is large enough to warrant an alternate method, consult current literature for generally accepted survey methods and consult with the Department on the proposed survey approach.

Additional breeding season site visits. Additional breeding season site visits may be necessary, especially if non-breeding season exclusion methods are contemplated. Detailed information, such as approximate home ranges of each individual or of family units, as well as foraging areas as related to the proposed project, will be important to document for evaluating impacts, planning avoidance measure implementation and for mitigation measure performance monitoring.

Adverse conditions may prevent investigators from determining presence or occupancy. Disease, predation, drought, high rainfall or site disturbance may preclude presence of burrowing owls in any given year. Any such conditions should be identified and discussed in the survey report. Visits to the site in more than one year may increase the likelihood of detection. Also, visits to adjacent known occupied habitat may help determine appropriate survey timing.

Given the high site fidelity shown by burrowing owls (see Appendix A, Importance of burrows), conducting surveys over several years may be necessary when project activities are ongoing, occur annually, or start and stop seasonally. (See Negative surveys).

Non-breeding Season Surveys

If conducting non-breeding season surveys, follow the methods described above for breeding season surveys, but conduct at least four (4) visits, spread evenly, throughout the non-breeding season. Burrowing owl experts and local Department staff are available to assist with interpreting results.

Negative Surveys

Adverse conditions may prevent investigators from documenting presence or occupancy. Disease, predation, drought, high rainfall or site disturbance may preclude presence of burrowing owl in any given year. Discuss such conditions in the Survey Report. Visits to the site in more than one year increase the likelihood of detection and failure to locate burrowing owls during one field season does not constitute evidence that the site is no longer occupied, particularly if adverse conditions influenced the survey results. Visits to other nearby known occupied sites can affirm whether the survey timing is appropriate.

Take Avoidance Surveys

Field experience from 1995 to present supports the conclusion that it would be effective to complete an initial take avoidance survey no less than 14 days prior to initiating ground disturbance activities using the recommended methods described in the Detection Surveys section above. Implementation of avoidance and minimization measures would be triggered by positive owl presence on the site where project activities will occur. The development of avoidance and minimization approaches would be informed by monitoring the burrowing owls.

Burrowing owls may re-colonize a site after only a few days. Time lapses between project activities trigger subsequent take avoidance surveys including but not limited to a final survey conducted within 24 hours prior to ground disturbance.

Survey Reports

Report on the survey methods used and results including the information described in the Summary Report and include the reports within the CEQA documentation:

1. Date, start and end time of surveys including weather conditions (ambient temperature, wind speed, percent cloud cover, precipitation and visibility);
2. Name(s) of surveyor(s) and qualifications;
3. A discussion of how the timing of the survey affected the comprehensiveness and detection probability;
4. A description of survey methods used including transect spacing, point count dispersal and duration, and any calls used;
5. A description and justification of the area surveyed relative to the project area;
6. A description that includes: number of owls or nesting pairs at each location (by nestlings, juveniles, adults, and those of an unknown age), number of burrows being used by owls, and burrowing owl sign at burrows. Include a description of individual markers, such as bands (numbers and colors), transmitters, or unique natural identifying features. If any owls are banded, request documentation from the BBL and bander to report on the details regarding the known history of the banded burrowing owl(s) (age, sex, origins, whether it was previously relocated) and provide with the report if available;
7. A description of the behavior of burrowing owls during the surveys, including feeding, resting, courtship, alarm, territorial defense, and those indicative of parents or juveniles;
8. A list of possible burrowing owl predators present and documentation of any evidence of predation of owls;
9. A detailed map (1:24,000 or closer to show details) showing locations of all burrowing owls, potential burrows, occupied burrows, areas of concentrated burrows, and burrowing owl sign. Locations documented by use of global positioning system (GPS) coordinates must include the datum in which they were collected. The map should include a title, north arrow, bar scale and legend;
10. Signed field forms, photos, etc., as appendices to the field survey report;
11. Recent color photographs of the proposed project or activity site; and
12. Original CNDDB Field Survey Forms should be sent directly to the Department's CNDDB office, and copies should be included in the environmental document as an appendix. (http://www.dfg.ca.gov/bdb/html/cnddb.html).

Appendix E. Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans

Whereas the Department does not recommend exclusion and burrow closure, current scientific literature and experience from 1995 to present, indicate that the following example components for burrowing owl artificial burrow and exclusion plans, combined with consultation with the Department to further develop these plans, would be effective.

Artificial Burrow Location

If a burrow is confirmed occupied on-site, artificial burrow locations should be appropriately located and their use should be documented taking into consideration:

1. A brief description of the project and project site pre-construction;
2. The mitigation measures that will be implemented;
3. Potential conflicting site uses or encumbrances;
4. A comparison of the occupied burrow site(s) and the artificial burrow site(s) (e.g., vegetation, habitat types, fossorial species use in the area, and other features);
5. Artificial burrow(s) proximity to the project activities, roads and drainages;
6. Artificial burrow(s) proximity to other burrows and entrance exposure;
7. Photographs of the site of the occupied burrow(s) and the artificial burrows;
8. Map of the project area that identifies the burrow(s) to be excluded as well as the proposed sites for the artificial burrows;
9. A brief description of the artificial burrow design;
10. Description of the monitoring that will take place during and after project implementation including information that will be provided in a monitoring report.
11. A description of the frequency and type of burrow maintenance.

Exclusion Plan

An Exclusion Plan addresses the following including but not limited to:

1. Confirm by site surveillance that the burrow(s) is empty of burrowing owls and other species preceding burrow scoping;
2. Type of scope and appropriate timing of scoping to avoid impacts;
3. Occupancy factors to look for and what will guide determination of vacancy and excavation timing (one-way doors should be left in place 48 hours to ensure burrowing owls have left the burrow before excavation, visited twice daily and monitored for evidence that owls are inside and can't escape i.e., look for sign immediately inside the door).
4. How the burrow(s) will be excavated. Excavation using hand tools with refilling to prevent reoccupation is preferable whenever possible (may include using piping to stabilize the burrow to prevent collapsing until the entire burrow has been excavated and it can be determined that no owls reside inside the burrow);
5. Removal of other potential owl burrow surrogates or refugia on site;
6. Photographing the excavation and closure of the burrow to demonstrate success and sufficiency;

7. Monitoring of the site to evaluate success and, if needed, to implement remedial measures to prevent subsequent owl use to avoid take;
8. How the impacted site will continually be made inhospitable to burrowing owls and fossorial mammals (e.g., by allowing vegetation to grow tall, heavy disking, or immediate and continuous grading) until development is complete.

Appendix F. Mitigation Management Plan and Vegetation Management Goals

Mitigation Management Plan

A mitigation site management plan will help ensure the appropriate implementation and maintenance for the mitigation site and persistence of the burrowing owls on the site. For an example to review, refer to Rosenberg et al. (2009). The current scientific literature and field experience from 1995 to present indicate that an effective management plan includes the following:

1. Mitigation objectives;
2. Site selection factors (including a comparison of the attributes of the impacted and conserved lands) and baseline assessment;
3. Enhancement of the conserved lands (enhancement of reproductive capacity, enhancement of breeding areas and dispersal opportunities, and removal or control of population stressors);
4. Site protection method and prohibited uses;
5. Site manager roles and responsibilities;
6. Habitat management goals and objectives:
    a. Vegetation management goals,
        i. Vegetation management tools:
            1. Grazing
            2. Mowing
            3. Burning
            4. Other
    b. Management of ground squirrels and other fossorial mammals,
    c. Semi-annual and annual artificial burrow cleaning and maintenance,
    d. Non-natives control – weeds and wildlife,
    e. Trash removal;
7. Financial assurances:
    a. Property analysis record or other financial analysis to determine long-term management funding,
    b. Funding schedule;
8. Performance standards and success criteria;
9. Monitoring, surveys and adaptive management;
10. Maps;
11. Annual reports.

Vegetation Management Goals

- Manage vegetation height and density (especially in immediate proximity to burrows). Suitable vegetation structure varies across sites and vegetation types, but should generally be at the average effective vegetation height of 4.7 cm (Green and Anthony 1989) and <13 cm average effective vegetation height (MacCracken et al. 1985*a)*.
- Employ experimental prescribed fires (controlled, at a small scale) to manage vegetation structure;

- Vegetation reduction or ground disturbance timing, extent, and configuration should avoid take. While local ordinances may require fire prevention through vegetation management, activities like disking, mowing, and grading during the breeding season can result in take of burrowing owls and collapse of burrows, causing nest destruction. Consult the take avoidance surveys section above for pre-management avoidance survey recommendations;
- Promote natural prey distribution and abundance, especially in proximity to occupied burrows; and
- Promote self-sustaining populations of host burrowers by limiting or prohibiting lethal rodent control measures and by ensuring food availability for host burrowers through vegetation management.

Refer to Rosenberg et al. (2009) for a good discussion of managing grasslands for burrowing owls.

Mitigation Site Success Criteria

In order to evaluate the success of mitigation and management strategies for burrowing owls, monitoring is required that is specific to the burrowing owl management plan. Given limited resources, Barclay et al. (2011) suggests managers focus on accurately estimating annual adult owl populations rather than devoting time to estimating reproduction, which shows high annual variation and is difficult to accurately estimate. Therefore, the key objective will be to determine accurately the number of adult burrowing owls and pairs, and if the numbers are maintained. A frequency of 5-10 years for surveys to estimate population size may suffice if there are no changes in the management of the nesting and foraging habitat of the owls.

Effective monitoring and evaluation of off-site and on-site mitigation management success for burrowing owls includes (Barclay, pers. comm.):

- Site tenacity;
- Number of adult owls present and reproducing;
- Colonization by burrowing owls from elsewhere (by band re-sight);
- Evidence and causes of mortality;
- Changes in distribution; and
- Trends in stressors.

APPENDIX F

CONFIDENTIAL: CULTURAL RESOURCES REPORT

APPENDIX G
NATIVE AMERICAN CORRESPONDENCE

A Tradition of Stewardship
A Commitment to Service

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa, CA 94559
www.countyofnapa.org

David Morrison
Director

Certified Mail

April 9, 2018

Stephanie L. Reyes
Tribal Historic Preservation Officer
Middletown Rancheria
P.O. Box 1035
Middletown, CA 95461

Re: Notification of Proposed Project Pursuant to Assembly Bill 52 (Gatto)
KJS Investment and Sorrento LLC., Sage Canyon Vineyard Conversion: File #P17-00432-ECPA
3380 and 3370 Sage Canyon Road: APNs 025-270-022 and -025

Dear Ms. Reyes,

On December 26, 2017, the Napa County Planning Division mailed you, via certified delivery, notification of an invitation to consult on a pending request for an Agricultural Erosion Control Plan (#P17-00432-ECPA) to develop an approximate 155.8-acre vineyard, located at 3380 and 3370 Sage Canyon Road, Napa.

More than 30 days have elapsed since your confirmed receipt of the Planning Division's letter of invitation to consult on this proposed project, and staff has not received from you a written response with a request for consultation. Therefore, the Planning Division has concluded that consultation proceedings with your organization will not be initiated for this proposal.

If you have any questions, please feel free to contact me by telephone at 707-299-1338 or via email at donald.barrella@countyofnapa.org.

Sincerely,

Donald Barrella
Planner III

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Stephanie L. Reyes
Tribal Historic Preservation Officer
Middletown Rancheria
PO BOX 1035
Middletown, CA 95461

9590 9402 3532 7275 4495 37

2. Article Number *(Transfer from service label)*
7015 3010 0000 1775 3059

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by *(Printed Name)* Brochton
C. Date of Delivery 9/11/18

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

D. Barrella (AO)

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☒ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

7015 3010 0000 1775 3059

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*

OFFICIAL USE

Certified Mail Fee
$

Extra Services & Fees *(check box, add fee as appropriate)*
☐ Return Receipt (hardcopy) $
☐ Return Receipt (electronic) $
☐ Certified Mail Restricted Delivery $
☐ Adult Signature Required $
☐ Adult Signature Restricted Delivery $

Postage
$

Total Postage and Fees
$

Sent To

Street and Apt. No., or PO Bo

City, State, ZIP+4®

PS Form 3800, April 2015

Postmark Here

D. Barrella (AO)

Stephanie L. Reyes
Tribal Historic Preservation Officer
Middletown Rancheria
PO BOX 1035
Middletown, CA 95461

A Tradition of Stewardship
A Commitment to Service

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa, CA 94559
www.countyofnapa.org

David Morrison
Director

Certified Mail

April 9, 2018

Vincent Salsedo
Tribal Council Member/Cultural Resources Manager
Mishewal Wappo Tribe of Alexander Valley
P.O. Box 1086
Santa Rosa, CA 95402

Re: Notification of Proposed Project Pursuant to Assembly Bill 52 (Gatto)
KJS Investment and Sorrento LLC., Sage Canyon Vineyard Conversion: File #P17-00432-ECPA
3380 and 3370 Sage Canyon Road: APNs 025-270-022 and -025

Dear Mr. Salsedo,

On December 26, 2017, the Napa County Planning Division mailed you, via certified delivery, notification of an invitation to consult on a pending request for an Agricultural Erosion Control Plan (#P17-00432-ECPA) to develop an approximate 155.8-acre vineyard, located at 3380 and 3370 Sage Canyon Road, Napa.

More than 30 days have elapsed since your confirmed receipt of the Planning Division's letter of invitation to consult on this proposed project, and staff has not received from you a written response with a request for consultation. Therefore, the Planning Division has concluded that consultation proceedings with your organization will not be initiated for this proposal.

If you have any questions, please feel free to contact me by telephone at 707-299-1338 or via email at donald.barrella@countyofnapa.org.

Sincerely,

Donald Barrella
Planner III

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

Vincent Salsedo
Tribal Council Member/ Cultural Resources Manager
Mishewal Wappo Tribe of Alexander Valley
P.O Box 1086
Santa Rosa, CA 95402

9590 9402 3532 7275 4495 44

2. Article Number *(Transfer from service label)*
7015 3010 0000 1775 3042

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Patricia L Pounds ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Patricia L Pounds
C. Date of Delivery 5/5/16

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

D. Barrela

3. Service Type
- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☒ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

7015 3010 0000 1775 3042

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee
$

Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage
$

Total Postage
$

Postmark Here

D. Barrela (Ato)

Sent To
Vincent Salsedo
Tribal Council Member/ Cultural Resources Manager
Street and A
Mishewal Wappo Tribe of Alexander Valley
City, State,
P.O Box 1086
Santa Rosa, CA 95402

PS Form 3

A Tradition of Stewardship
A Commitment to Service

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa, CA 94559
www.countyofnapa.org

David Morrison
Director

Certified Mail

April 9, 2018

Laverne Bill
Tribal Historic Preservation Officer
Yocha Dehe Wintun Nation
P.O. Box 18
Brooks, CA 95606

Re: Notification of Proposed Project Pursuant to Assembly Bill 52 (Gatto)
KJS Investment and Sorrento LLC., Sage Canyon Vineyard Conversion: File #P17-00432-ECPA
3380 and 3370 Sage Canyon Road: APNs 025-270-022 and -025

Dear Sir or Madam,

The Napa County Engineering and Conservation Division is processing a request for an Agricultural Erosion Control Plan (#P17-00432-ECPA) to develop an approximate 155.8-acre vineyard, located at 3380 and 3370 Sage Canyon Road, Napa. Additional information about the proposal can be viewed online at the Planning, Building and Environmental Services Department's current projects webpage: http://www.countyofnapa.org/PBES/CurrentProjects/

This letter serves as notification to the Middletown Rancheria that is traditionally and culturally affiliated with the geographic area of the proposed project pursuant to Public Resources Code 21080.3.1 (Assembly Bill 52). If your tribe wishes to consult on this project, please contact me in writing, within 30 days of receipt of this letter, to request consultation.

If you have any questions, please feel free to contact me by telephone at 707-299-1338 or via email at donald.barrella@countyofnapa.org.

Sincerely,

Donald Barrella
Planner III

Enclosure: Historical Resources Study (Disk)

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

Laverne Bill, Cultural Resources Manager
Yocha Dehe Wintun Nation
P.O. Box 18
Brooks, CA 95606

9590 9402 3195 7166 6355 54

2. Article Number *(Transfer from service label)*
7015 3010 0000 1775 3394

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Susan Lawson ☐ Agent ☑ Addressee

B. Received by *(Printed Name)* SUSAN Lawson C. Date of Delivery 9/11/18

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

D. Barrella

3. Service Type
- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☑ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

7015 3010 0000 1775 3394

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

Certified Mail Fee
$

Extra Services & Fees *(check box, add fee as appropriate)*
- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postmark Here (AO)
D. Barrella

Laverne Bill, Cultural Resources Manager
Yocha Dehe Wintun Nation
P.O. Box 18
Brooks, CA 95606

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

A Tradition of Stewardship
A Commitment to Service

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa, CA 94559
www.countyofnapa.org

David Morrison
Director

Certified Mail

December 26, 2017

Vincent Salsedo
Tribal Council Member/Cultural Resources Manager
Mishewal Wappo Tribe of Alexander Valley
P.O. Box 1086
Santa Rosa, CA 95402

Re: Notification of Proposed Project Pursuant to Assembly Bill 52 (Gatto)
KJS Investment and Sorrento LLC., Sage Canyon Vineyard Conversion: File #P17-00432-ECPA
3380 and 3370 Sage Canyon Road: APNs 025-270-022 and -025

Dear Mr. Salsedo,

The Napa County Engineering and Conservation Division is processing a request for an Agricultural Erosion Control Plan (#P17-00432-ECPA) to develop an approximate 155.8-acre vineyard, located at 3380 and 3370 Sage Canyon Road, Napa. Additional information about the proposal can be viewed online at the Planning, Building and Environmental Services Department's current projects webpage: http://www.countyofnapa.org/PBES/CurrentProjects/

This letter serves as notification to the Middletown Rancheria that is traditionally and culturally affiliated with the geographic area of the proposed project pursuant to Public Resources Code 21080.3.1 (Assembly Bill 52). If your tribe wishes to consult on this project, please contact me in writing, within 30 days of receipt of this letter, to request consultation.

If you have any questions, please feel free to contact me by telephone at 707-299-1338 or via email at donald.barrella@countyofnapa.org.

Sincerely,

Donald Barrella
Planner III

Enclosure: Historical Resources Study (Disk)

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Vincent Salsedo
Tribal Council Member/Cultural Resources Manager
Mishewal Wappo Tribe of Alexander Valley
PO Box 1086
Santa Rosa, CA 95402

9590 9402 3195 7166 6324 61

2. Article Number *(Transfer from service label)*
7017 0530 0000 3427 3215

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Patricia L Pounds ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Patricia L. Pounds C. Date of Delivery 2-3-18

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

RECEIVED
JAN 05 2018
Sonoma County Planning, Building & Environmental Services

Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☑ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
Restricted Delivery

☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

Domestic Return Receipt

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only
For delivery information, visit our website at www.usps.com®.
OFFICIAL USE

Certified Mail Fee
$
Extra Services & Fees *(check box, add fee as appropriate)*
☐ Return Receipt (hardcopy) $
☐ Return Receipt (electronic) $
☐ Certified Mail Restricted Delivery $
☐ Adult Signature Required $
☐ Adult Signature Restricted Delivery $
Postage
$
Total
$
Sent
Street
City,

Postmark Here

Vincent Salsedo
Tribal Council Member/Cultural Resources Manager
Mishewal Wappo Tribe of Alexander Valley
PO Box 1086
Santa Rosa, CA 95402

7017 0530 0000 3427 3215

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

A Tradition of Stewardship
A Commitment to Service

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa, CA 94559
www.countyofnapa.org

David Morrison
Director

Certified Mail

December 26, 2017

Stephanie L. Reyes
Tribal Historic Preservation Officer
Middletown Rancheria
P.O. Box 1035
Middletown, CA 95461

Re: Notification of Proposed Project Pursuant to Assembly Bill 52 (Gatto)
KJS Investment and Sorrento LLC., Sage Canyon Vineyard Conversion: File #P17-00432-ECPA
3380 and 3370 Sage Canyon Road: APNs 025-270-022 and -025

Dear Ms. Reyes,

The Napa County Engineering and Conservation Division is processing a request for an Agricultural Erosion Control Plan (#P17-00432-ECPA) to develop an approximate 155.8-acre vineyard, located at 3380 and 3370 Sage Canyon Road, Napa. Additional information about the proposal can be viewed online at the Planning, Building and Environmental Services Department's current projects webpage: http://www.countyofnapa.org/PBES/CurrentProjects/

This letter serves as notification to the Middletown Rancheria that is traditionally and culturally affiliated with the geographic area of the proposed project pursuant to Public Resources Code 21080.3.1 (Assembly Bill 52). If your tribe wishes to consult on this project, please contact me in writing, within 30 days of receipt of this letter, to request consultation.

If you have any questions, please feel free to contact me by telephone at 707-299-1338 or via email at donald.barrella@countyofnapa.org.

Sincerely,

Donald Barrella
Planner III

Enclosure: Historical Resources Study (Disk)

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Stephanie L Reyes
Tribal Historic Preservation Officer
Middletown Rancheria
PO Box 10356
Middletown, CA 95461

9590 9402 3195 7166 6324 85

2. Article Number *(Transfer from service label)*

7017 1450 0002 0329 4609

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X Bruce ☐ Agent ☐ Addressee

B. Received by *(Printed Name)* Bruce Tom C. Date of Delivery 12/29/17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

MIDDLETOWN CA DEC 29 2017 USPS

Don B (to)

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Insured Mail
- ☐ estricted Delivery
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Return Receipt for Merchandise
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

7017 1450 0002 0329 4609

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

OFFICIAL USE

Certified Mail Fee
$

Extra Services & Fees *(check box, add fee as appropriate)*

- ☐ Return Receipt (hardcopy) $
- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage
$

Total Postage and Fees
$

Postmark Here

Don B (to)

Sent To

Street and Apt. No., or P

City, State, ZIP+4®

Stephanie L Reyes
Tribal Historic Preservation Officer
Middletown Rancheria
PO Box 10356
Middletown, CA 95461

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

YOCHA DEHE
CULTURAL RESOURCES

April 27, 2018

Napa County
Attn: Donald Barrella, Planner III
1195 Third Street, Suite 210
Napa, CA 94559

RE: Sage Canyon Vineyard Conversion Project

Dear Mr. Barrella:

Thank you for your project notification letter dated, April 9, 2018, regarding cultural information on or near the proposed Sage Canyon Vineyard Conversion Project, Napa County. We appreciate your effort to contact us and wish to respond.

The Cultural Resources Department has reviewed the project and concluded that it is within the aboriginal territories of the Yocha Dehe Wintun Nation. Therefore, we have a cultural interest and authority in the proposed project area and would like to initiate a formal consultation with the lead agency. At the time of consultation, please provide our Cultural Resources Department with a project timeline, detailed project information and the latest cultural study for the proposed project.

Please contact Mr. Rouse at your earliest convenience to coordinate a date and time for the consultation meeting.

Reimann Rouse, GIS Analyst
Yocha Dehe Wintun Nation
Office: (530) 723-2805
Email: rrouse@yochadehe-nsn.gov

Please refer to identification number YD – 04242018-02 in any correspondence concerning this project.

Thank you for providing us the opportunity to comment.

Sincerely,

Marilyn Delgado
Director of Cultural Resources

YOCHA DEHE
CULTURAL RESOURCES

January 2, 2019

Napa County
Attn: Donald Barrella, Planner III
1195 Third Street, Suite 210
Napa, CA 94559

RE: Sage Canyon Vineyard Conversion Project

Dear Mr. Barrella:

Thank you for your project update regarding the proposed Sage Canyon Vineyard Conversion Project, Napa County. We appreciate your effort to contact us and wish to respond.

The Cultural Resources Department previously reviewed the project on April 27, 2018 and concluded that it is within the aboriginal territories of the Yocha Dehe Wintun Nation. Therefore, we have a cultural interest and authority in the proposed project area and would like to initiate a formal consultation with the lead agency. At the time of consultation, please provide our Cultural Resources Department with a project timeline, detailed project information and the latest cultural study for the proposed project.

Please contact the following individual to coordinate a date and time for the consultation meeting:

Kathleen Solorio, CRD Administrative Assistant
Yocha Dehe Wintun Nation
Office: (530) 796-2803
Email: ksolorio@yochadehe-nsn.gov

Please refer to identification number YD – 04242018-02 in any correspondence concerning this project.

Thank you for providing us the opportunity to comment.

Sincerely,

Leland Kinter
Tribal Historic Preservation Officer

RECEIVED
JAN 07 2019
Napa County Planning, Building
& Environmental Services

APPENDIX H
GEOTECHNICAL REPORT

Gilpin Geosciences, Inc
Earthquake & Engineering Geology

June 19, 2018
91620.03

Mr. Craig Becker
Somerston Wine Company
3450 Sage Canyon Road
St. Helena, CA 94574

Subject: Engineering Geologic Investigation
Somerston Vineyard Development
APN 025-270-022 & 025-270-025
3450 Sage Canyon Road
St Helena, California

Dear Mr. Becker:

We are pleased to present the results of our engineering geological and geotechnical investigation for the proposed Track I vineyard development at the Somerston Vineyards located at 3450 Sage Canyon Road near St. Helena, California (Figure 1).

We understand that you will use this investigation to supplement the Track I Erosion Control Plan (ECP) prepared by PPI Engineering, Inc, dated June 2018.

SCOPE OF SERVICES

Our investigation was performed in accordance with our proposal dated 28 November 2017. Our scope of services consisted of exploring the proposed vineyard blocks by performing reconnaissance geological mapping, aerial photographic review and excavating and logging test pits. We present our findings, conclusions, and recommendations in this report.

REGIONAL GEOLOGY

The site is located in the Coast Ranges geomorphic province, which is characterized by northwest-southeast trending valleys and ridges. These are controlled by folds and faults that resulted from the collision of the Farallon and North American plates and subsequent shearing along the San Andreas Fault. The bedrock in the site vicinity is mapped as sandstone, shale, and mudstone of the Great Valley Sequence and mudstone and siltstone of the oldest member of that Sequence, the Knoxville Formation (Fox and others, 1973) (Figure 2).

Sandstone of the Great Valley Group is usually massive to moderately bedded with thin interbeds of shale. The sedimentary bedding attitudes in the vicinity show a large syncline structure trending northwest roughly corresponding to the Elder Valley. We have mapped an anticline formed by divergent bedding inclinations on its flanks (Figure 3A). The anticline trends north-northwest with bedding inclined at 20-30 degrees to the east and west. A fault separating the Great Valley Sequence rocks from a large serpentinite body trends northwest approximately 0.75 miles east of the site.

Active faults have been mapped in the vicinity that could cause very strong to severe shaking at the site. The closest active fault to the site is the Hunting Creek-Berryessa Fault approximately 2.0 miles east of the site. The Hunting Creek-Berryessa fault is classified as a Type B fault by the UBC (ICBO, 1998) and is capable of generating a Moment Magnitude 6.9 earthquake. The next closest faults to the site are the West Napa, Concord/Green Valley, and the Great Valley faults approximately 8.5, 10.5, and 14.5 miles from the site, respectively. These faults are capable of generating earthquakes of Magnitude 6.5 to 6.7, and causing severe ground motion at the site.

The most recent earthquake to affect this part of the Northern Bay Area was the August 24th, 2014 Mw 6.0 South Napa Earthquake, approximately 20 miles south of the site, resulted in as much as 8 miles of surface rupture on the West Napa Fault Zone.

SITE CONDITIONS

We evaluated site conditions based on aerial photography review, geological reconnaissance mapping and subsurface exploration (Figures 3a & 3B). We visited the site on 18 and 22 December 2017 to perform reconnaissance geological mapping.

We reviewed 4 pairs of vertical stereographic photographs archived at Quantum Spatial in Novato, California. The time period spanned by the photographs was 1968 to 1999. We use standard aerial photograph analysis techniques to identify surface features indicative of slope instability, such as arcuate scarps, erosion channeling, breaks in topographic slope, and signs of excessive seepage. The photographs reviewed are listed in the references.

We supplemented our review with LIDAR mapping of the site vicinity. The LIDAR mapping is based on compiled imagery using Google Earth and Napa Watershed data available from Open Topography (http://www.opentopography.org/) as shown on Figure 5.

The new vineyard blocks lie on the floor and flanks of the northwest-trending Elder Valley. Elevations of the blocks vary from 1,099 feet in Block 17 on the western flank of the Elder Valley flood plain to 1,686 feet in Block 31 at the northwestern extent of the proposed vineyard development.

The site is characterized by moderate to steep valley flanks and gently sloping valley floor (Figures 3A, 3B, & 4). The vineyard blocks occupy a wide range of terrain from knife-edge rigelines with gently undulating upland surfaces to moderately steep east- and west-facing flanks of the upper valley slopes. Many of the vineyard blocks are proposed for broad gently sloping alluvial fans emanate from the steep drainages feeding the trunk creek on the valley floor.

We have compiled our aerial photographic review, site reconnaissance, and LIDAR mapping to evaluate the geologic setting of each of the proposed vineyard blocks. We have characterized and classified the landforms on which the vineyards are sited. For purposes of evaluating the slope stability of the proposed blocks, we have divided the blocks by the type of landform on which they sit. Table 1 shows the vineyard blocks characterized by landform type.

TABLE 1
Vineyard Block Landform Characterization

Ridgeline/ knoll top	Upland sidehill bench	Dormant landslide	Upland basin/ meadow	Valley floor alluvial fan
4,	2	16	15*	1
5a,b,c*,d,e,	5c, f, h, j	19?	23g	3*
6	7*	24g	26	7*
7*	9a*, c, g	25	29	8
9a*, b	10*	27*		17
10*	14			11*
11*	16			23a, b, e
12	18*			24a, b, e, f*
13a,b	19*			33a, c, d, e
15*	20			
18*	21			
23f	22			
24c, f*	25			
27*	28			
30				
31				
32				

* Block falls into 2 or more categories.

The ridgeline/knoll top sites are characterized by shallow bedrock and steep adjacent slopes. These proposed blocks are usually elongate-shaped and of smaller individual acreage than the valley floor blocks. Although they are sited on gently sloped areas on upland surfaces, these blocks are adjacent to steep tree-covered hillside areas. Surface runoff control is critical to mitigate any downslope concentrated runoff and elevated erosion. The vineyard block erosion control design offers the opportunity to direct existing, naturally erosive runoff to areas with greater erosion resistance.

Numerous vineyard blocks are sited on the prominent sidehill bedrock benches mapped during our geological reconnaissance. These are characterized by elliptical- to rectangular-shaped benches of near level or gently sloping hillside that at first observation shows topographic features usually associated with landslide deposits, but when mapped in detailed, and explored with backhoe test

pits we found they are underlain by shallow bedrock and lack evidence for significant landslide source areas and/or debris runout. We encountered bedrock structure in the test pit excavations indicating these benches are structurally controlled by prominent bedding or joint planes.

We mapped several larger eroded arcuate landslide scarp features in areas of Blocks 16, 24G, 25, and 27 that form a prominent amphitheater-shaped hillside upslope of landslide deposits of unknown depth. Our logs of test pits show disturbed bedrock interlayered with clayey gravels and organic debris to the full depth explored. Based on review of the available historic aerial photography and LIDAR mapping, we believe the subdued topographic expression and lack of evidence of slope movement indicate these are dormant, deep-seated deposits that do not pose a threat to slope stability in the proposed vineyard block developments. Considering the surface drainage improvements and controlled groundwater contributions by the proposed vineyard developments, we do not believe the vineyard development will impact the slope stability of these features

Several of the vineyard blocks (23F, 23G, 29A-D) are proposed for broad low-relief upland basin areas of the site that appear as broad upland meadows. These areas are characterized by gentle slopes that drain to one or more steep drainage courses on their periphery. Soil exposed in test pit excavations deepens towards the center of these large basin areas and consists of fine-grained colluvium to alluvium near downslope drainages. Past reservoir development has exploited the natural upland basin associated with Block 29A-D.

Most of the acreage included in the proposed vineyard development is sited on the broad alluvial fan landforms that emanate from the steep valley-side drainages. These are underlain by thick deposits of alluvial sediments composed of clay, silt, sand, and gravel. Test pits excavated along the margins of the valley floor or heads of these alluvial fans encountered weathered bedrock at shallow depths and highlights the youthful topography expressed by the hills flanking Elder Valley.

SUBSURFACE CONDITIONS

To explore the subsurface conditions at the proposed vineyard blocks, we logged test pits excavated by a Caterpillar rubber-tire backhoe and a Caterpillar 305.5E rubber-track mounted excavator, both with 36-inch-wide buckets. Our geologists logged 44 test pits on 30, 31 January and 1 February 2018 in order to characterize the subsurface materials and collect representative samples for further classification in our offices. The logs of test pits are contained in Appendix A, Figues A-1 through A-23. The subsurface materials were classified

according to the Soil Classification and Physical Criteria of Rock presented in Figures A-24 and A-25, respectively.

We describe the subsurface condtions based on test pit excavations our geologists logged. Because the geology of the site is reflected in the various types of landforms we have mapped, we have organized our discussion of subsurface condtions by the landsform classification in order to assist in our evaluation of the proposed vineyard sites (See Table 2).

TABLE 2
Vineyard Block Landform Classification
By Test Pit #

Ridgeline/ knoll top (test pit-block)	Upland sidehill bench (test pit-block)	Dormant landslide (test pit-block)	Upland basin/ meadow (test pit-block)	Valley floor alluvial fan (test pit-block)
14-5J	11-2	9-24G	35-26	1-24A
15-5J	21-21	10-24G/25	37-29B	2-24A
16-5D	22-20A	23-19?	38-29A	3-24A
17-5D	23-19	24-19?		4-24A
28-23F	24-19	30-25		5-24E
29-23F	40-14	36-27		6-24E
39-32	43-9G			7-24E
	44-10			8-24E
	45-9C			12-1
				13-3
				18-11
				19-7
				20-8
				25-23B
				26-23B
				27-23E
				32-33C
				33-33D
				34-33E
				42-8
				41-12

Ridgeline/ Knoll Tops

We logged test pits TP-14 -17, and TP-28-29, TP-39 on proposed vineyard block sites characterized by ridgelines or knoll tops. The proposed ridgeline or knoll top vineyard blocks lie predominantly on the western hillsides of the project site. They are characterized by sinuous ridgelines or oval-shaped level areas at the crest of spur ridges or local knolls. We would expect shallow depth to residual soils formed in-place on stable bedrock with thin veneers of colluvium. We encountered 0.75 to 4.5 feet of colluvium overlying bedrock. The colluvium is medium stiff and of low plasticity. The bedrock is friable to moderately strong, closely to intensely fractured, of low hardness and deeply weathered.

Upland Side Hill Benches

We logged test pits TP-11, TP-21-24, TP-40, TP-43-45 on proposed vineyard blocks characterized by sidehill bench landforms. The sidehill benches appear to have formed on erosion-resistant structurally-controlled features of the local bedrock. Therefore, we would expect shallow bedrock overlain by thin colluvial soil layers. We logged colluvium of 1 to 4 feet thick overlying residual soil formed in place from the underlying bedrock. The feature that distinguished the sidehill benches from old landslides is the lack of a well-defined source area and no landslide deposits extending downslope from the bench landform.

Dormant Landslides

We logged test pits TP-9-10. TP-30, and TP-36 on proposed vineyard blocks characterized by dormant landslide deposits with distinctive amphitheater-shaped head scarps, source areas, with a broad upper bench and subdued hummocky topography extending downslope. Cross sections B-B' and C-C' show interpretations of subsurface conditions through these landslide deposits. The test pits excavated in the landslides did not extend deep enough to encounter the basal slide planes.

The material encountered in the test pits is characterized by weathered and disorganized angular bedrock clasts consisting of shale, mudstone, or sandstone. We encounteredd shallow bedrock in test pit TP-10 that was excavated just outside the liimits of the mapped landslide deposit. Test pits TP-9, TP-30 and TP-36 are in what appears to be a nested landslide deposit. The deposit is characterized by fine sandstone and mudstone gravel up to 5 inches in diameter and cobble-sized clasts. In test pit TP-36, the highest excavation on the landslide complex, siltstone bedrock was encountered at 4 feet below the ground surface.

We believe the bedrock encountered in this test pit is likely a block floating in the landslide deposit.

We mapped a questionable ancient landslide on the hill slope occupied by the proposed vineyard Block 19. The landslide is queried based on very subtle (deeply weathered) surface features indicative of a deep-seated rotational landslide and questionable bedrock blocks identified in test pits TP 23 and TP-24. There are no identifiable surface features associated with recent or even old slope movement associated with this mapped feature.

Upland Basin / Meadow

We logged test pits TP-35 and TP-37-38 in the proposed vineyard Blocks 26 and 29 in a upland area we characterized as a basin/meadow landform. We logged unconsolidated soil 3 to 4.5 feet thick overlying bedrock at depths of 3 to 3.5 feet. TP-26 encountered a a conglomerate and mudstone unit whereas TP-37-38 encountered mudstone and siltstone. The conglomerate bedrock below Block 26 may have formed the erosion-resistent cap which controls the basin/meadow surface expression. The clay soil was medium stiff to stiff and of low plasticity.

Valley Floor Alluvial Fan

The alluvial fan deposits of the valley floor are the greatest acreages of proposed vineyard development. We logged TP-1-8, TP-12-13, TP-18-20, TP-25-27, TP-32-34, TP-41, and TP-42 on proposed vineyard blocks characterized by alluvial fan landforms.

Most of the test pits (TP-3-8, TP-20, TP-25, TP-27) encountered alluvium to the full depth explored. Alluvium consisted of a clay, sandy clay, and clayey gravel that is medium stiff to stiff or medium dense to dense, and of low plasticity. Where encountered, the gravel is weathered shale, mudstone or sandstone derived from the native bedrock. Some of the test pits near the periphery of the valley floor and alluvial fan surface encountered bedrock at shallow depths of 5 feet or less below the ground surface, with little or no alluvium overlying. The bedrock is often overlain by a residual soil derived from the bedrock weathering in place.

The bedrock is Great Valley Sequence or Knoxville Formation mudstone, shale or sandstone that is closely to intensly fractured, friable to moderately strong, of low hardness, and deeply weathered. Some of the mudstone and shale bedrock encountered is crushed with abundant clay-filled fractures.

CONCLUSIONS

Based on our aerial photgraph review, geological reconnaissance mapping, subsurface exploration, and landform analysis, we believe it is feasible to develop the proposed vineyard blocks. We do not believe the existing conditions will adversely impact the proposed development. Because the proposed vineyard development implements surface runoff controls with attention to limiting concentrated surface runoff in areas susceptible to erosion, we do not believe the proposed development will adversely impact the existing slope stability. Likewise, the proposed surface drainage improvements will reduce any potential impacts to both on and off site resources as a result of the project as compared to existing conditions. We present our recommendations for maintaining hillside stability in the proposed vineyard area in the following section.

RECOMMENDATIONS

The majority of the vineyards proposed for development lie on or slightly above the valley floor and are characterized by alluvial fan landforms. These vineyards pose the lowest category of potential slope instability.

Vineyard blocks proposed for the hillsides of the project site should avoid introducing concentrated surface runoff at drainages presently showing excessive erosion. The vineyard blocks proposed for sidehill bench and ridgeline/knoll top areas should control runoff with consideration for the abrupt change in slope inclination downslope of these features.

We have considered the activity of landslide deposits mapped on the site during our aerial photograph review, reconnaissance mapping and landform analysis. Based on our multiple year aerial photograph review spanning 1968 to 1999 combined with our search for any indications of recent ground surface movement associated with the landslides on the site, we believe the landslides are not active, and will not be adversely impacted by the proposed vineyard development; nor will the vineyard development be impacted by the dormant landslides. Surface runoff should not be concentrated and should outlet outside of the mapped landslide onto erosion-resistent surfaces. No grading should be attemped on the landslide deposits.

Ripping of the vineyard blocks is acceptable for all areas except the landslide deposits where it should be limited to a depth of 24 inches.

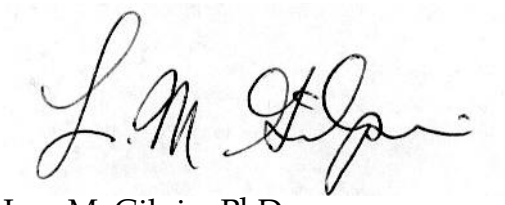
LIMITATIONS

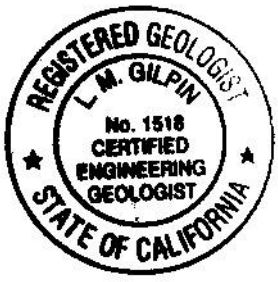
Our services have been performed in accordance with generally accepted principles and practices of the geological and geotechnical profession. This warranty is in lieu of all other warranties, either expressed or implied. In addition, the conclusions and recommendations presented in this report are professional opinions based on the indicated project criteria and data described in this report. They are intended only for the purpose, site location and project indicated.

We trust that this provides you with the information you need. If you have any questions, please call.

Sincerely,

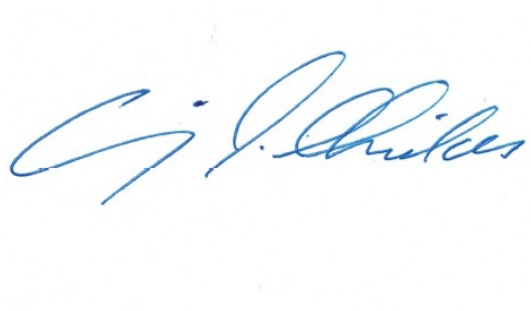
GILPIN GEOSCIENCES, INC.





Lou M. Gilpin, PhD
Engineering Geologist

ROCKRIDGE GEOTECHNICAL



Craig S. Shields
Geotechnical Engineer

Attachments: **References**

Figures

Figure 1	Site Location Map
Figure 2	Regional Geology Map
Figure 3A&B	Site Plan and Geology Map
Figure 4	Geologic Cross Sections A-A', B-B', C-C', D-D'
Figure 5	LIDAR Map

Attachments (continues):

Appendix A – Logs of Test Pits

Figures A-1
- A-23 Logs of Test Pits
Figure A-24 Soil Classification
Figure A-2 5 Criteria for Rock Classification

REFERENCES

Fox, K.T., Sims, J.D., Bartow, J.A., and Helley, E.J., 1973, Preliminary Geologic map of Eastern Sonoma County and western Napa County, California: U.S. Geological Survey Miscellaneous Field Studies MF-483, scale 1:62500.

International Conference of Building Officials, 1988, Maps of known active fault near-source zones in California and adjacent portions of Nevada: prepared by California Division of Conservation Division of Mines and Geology, p. 19, with maps.

PPI, Engineering, Inc., 2018, KJS Investment Properties & Sorrento Inc. 3370 Sage Canyon Road Erosion Control Plan: 1″=200′ scale.

U.S. Geological Survey, 1978, ChilesValley Quadrangle California 7.5 Minute Series (Topographic), scale 1;24,000.

Aerial Photographs

Date	Photo Number	Scale	Source
10/11/99	CIR 6323-15-20, 21,22	1:12,000	Quantum Spatial
9/4/75	AV 1215-08-03,04	1:54,000	Quantum Spatial
9/8/70	AV 965-07-04, 04	1:48,000	Quantum Spatial
4/10/68	AV 844-12-20, 01,02	1:30,000	Quantum Spatial

FIGURES

Reference: Google Maps (2017)

N

0 1 Mile

Approximate scale

SITE LOCATION MAP

Somerston ECP
3450 Sage Canyon Road
St. Helena, California

Date 6/19/18	Project No. 91620.03	Figure 1

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

EXPLANATION

Key

Fault - dashed where approximate, dotted where covered.

80 Strike of Bedding with direction and magnitude of dip in degrees.

Fold in bedded rock units

Geologic Units

af - Fill
Qal - Alluvium
Qls - Landslide Deposits

Great Valley Sequence
KJgvs - - sandstone
KJgvm - mudstone and siltstone

Jk - Knoxville Formation - siltstone

Franciscan Complex
KJfm - metagraywacke
Sp - Serpentinite

Base Map: Fox, and others, 1973

REGIONAL GEOLOGY MAP

SOMERSTON ECP
3450 Sage Canyon Road
St. Helena, California

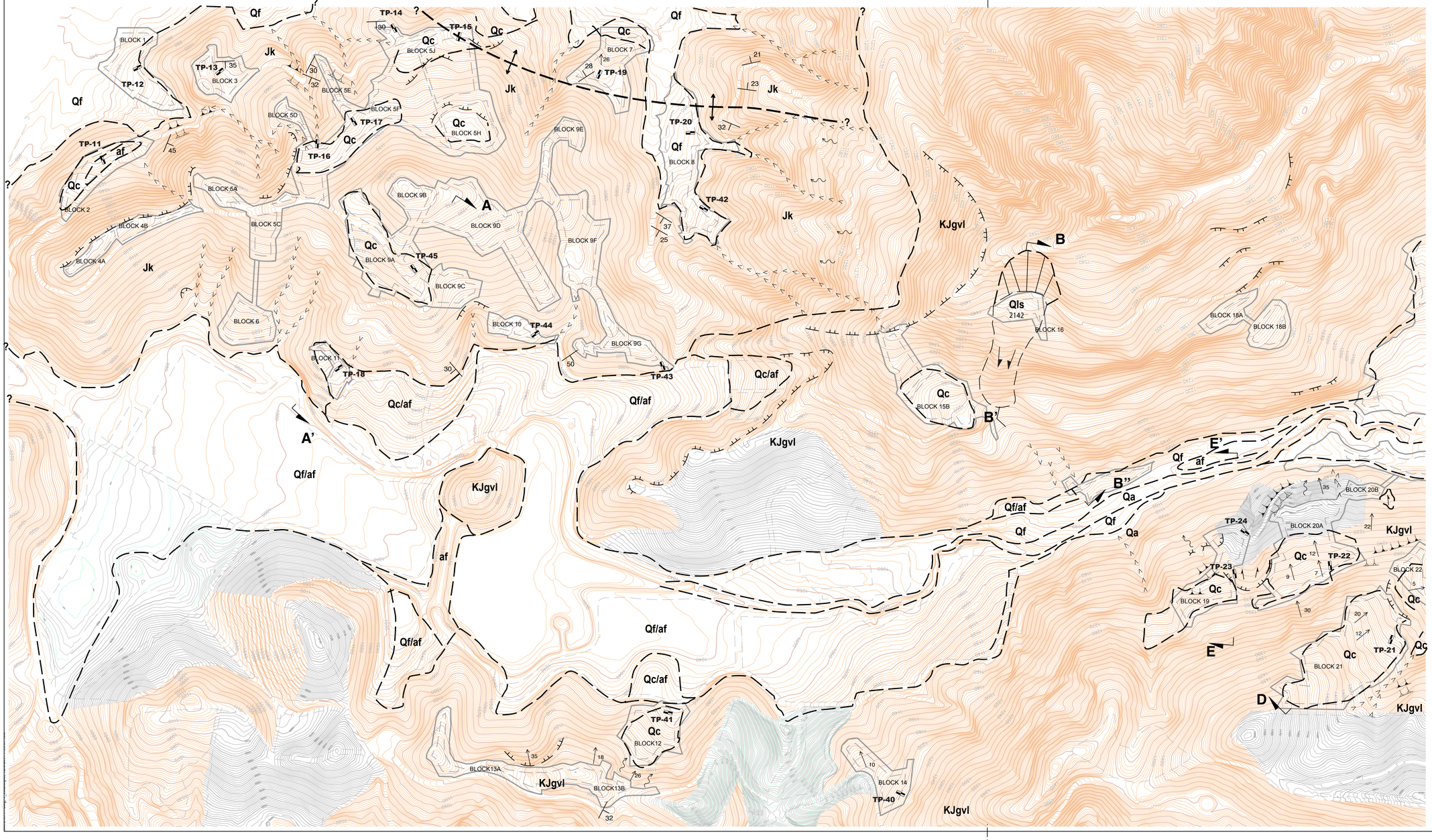
FIGURE
2

JOB NUMBER
91501.21

DATE
6/19/18

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

Match Line
See Sheet 2B



Key

- Geologic Contact
- Anticline queried where uncertain
- 25 — Slope inclination with angle in degrees
- 37 — Strike and dip of bedding
- 70 — Strike and dip of joint
- Break in slope
- Soil Creep, disturbed or hummocky surface
  Surficial sloughing
- 2-3 — Erosion Gully with depth in feet
- Road cut, hatchures pointed down slope
- Road fill, hatchures pointed down slope
- A — A' — Line of Cross Sections - See Figure 3 for Cross Sections
- TP-2 — Test Pit location - See Figure A1 through A46 for logs of Test Pits

Geologic Units

af	Artificial Fill (locally combined with Qf and Qc to designate graded surface; Qf/af or Qc/af)
Qa	Alluvium
Qf	Alluvial Fan Deposit
Qls	Landslide Deposit
Qc	Colluvium
KJgvl	Interbedded Sandstone and Shale (Great Valley Complex)
Jk	Mudstone and Shale with localized interbedded Sandstone (Knoxville Formation)

SLOPE STABILITY

Landslide, scarp area hachured, arrow in direction of downslope movement, compressional toe with debris pushing over the original ground surface by a dash and semi-circle symbol, number associated with mapped deposit described below

Qls — Landslide designation

1121

- Activity: 1 - active; 2 - dormant; 3 - ancient
- Type: 1 - debris slide; 2 - earth flow; 3 - slump; 4 - rotation; 5 - translation; 6 - topple
- Depth: 1 0 - 5 ft.; 2 5 - 10 ft.; 3 10 - 15 ft.; 4 15 - 20 ft.; 5 20+ ft.
- Certainty: 1 - certain; 2 - probable; 3 - questionable

0 — 200 Feet
Approximate scale

Match Line

Notes: 1. Standard tape and compass mapping techniques, feature locations are approximate.
2. See Figure 3 for geologic cross section.
3. Topographic Base by PPI Engineering, 3-31-2017.

SITE PLAN AND GEOLOGY MAP

Somerston ECP
3450 Sage Canyon Road
St. Helena, California

Date 6/19/18 | Project No. 91620.01 | Figure 3A

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

Match Line
See Sheet 2A

Match Line

Key

- Geologic Contact dotted where uncertain
- ? Anticline queried where uncertain
- 25 Slope inclination with angle in degrees
- 37 Strike and dip of bedding
- 70 Strike and dip of joint
- Break in slope
- Soil Creep, disturbed or hummocky surface
- Surficial sloughing
- 2-3 Erosion Gully with depth in feet
- Road cut, hatchures pointed down slope
- Road fill, hatchures pointed down slope
- A A' Line of Cross Sections - See Figure 3 for Cross Sections
- TP-2 Test Pit location - See Figure A1 through A46 for logs of Test Pits

Geologic Units

af	Artificial Fill (locally combined with Qf and Qc to designate graded surface; Qf/af or Qc/af)
Qa	Alluvium
Qf	Alluvial Fan Deposit
Qls	Landslide Deposit
Qc	Colluvium
KJgvl	Interbedded Sandstone and Shale (Great Valley Complex)
Jk	Mudstone and Shale with localized interbedded Sandstone (Knoxville Formation)

SLOPE STABILITY

Landslide, scarp area hachured, arrow in direction of downslope movement, compressional toe with debris pushing over the original ground surface by a dash and semi-circle symbol, number associated with mapped deposit described below

Qls 1121 — Landslide designation

- Activity: 1 - active; 2 - dormant; 3 - ancient
- Type: 1 - debris slide; 2 - earth flow; 3 - slump; 4 - rotation; 5 - translation; 6 - topple
- Depth: 1 0 - 5 ft.; 2 5 - 10 ft.; 3 10 - 15 ft.; 4 15 - 20 ft.; 5 20+ ft.
- Certainty: 1 - certain; 2 - probable; 3 - questionable

0 200 Feet
Approximate scale

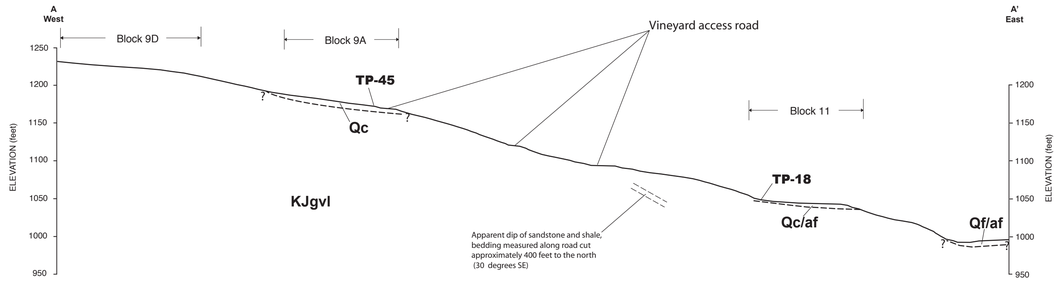
Notes: 1. Standard tape and compass mapping techniques, feature locations are approximate.
2. See Figure 3 for geologic cross section.
3. Topographic Base by PPI Engineering, 3-31-2017.

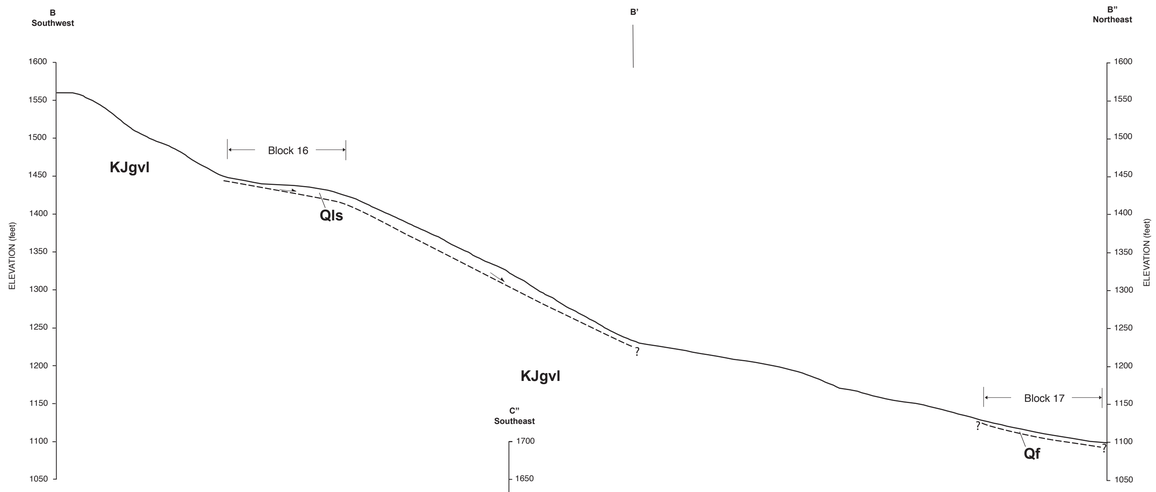
SITE PLAN AND GEOLOGY MAP

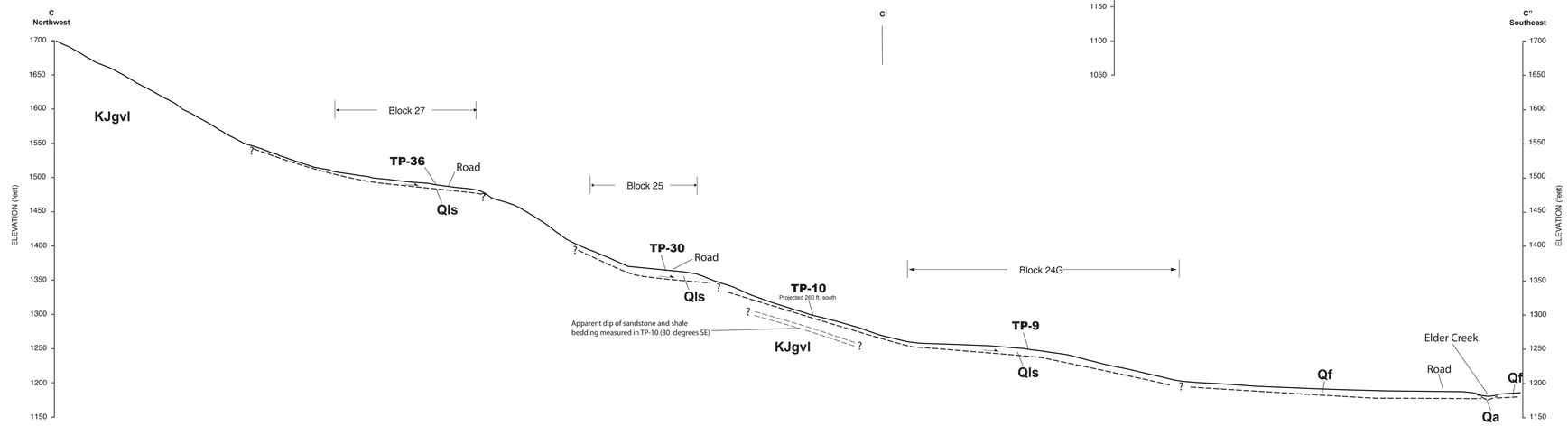
Somerston ECP
3450 Sage Canyon Road
St. Helena, California

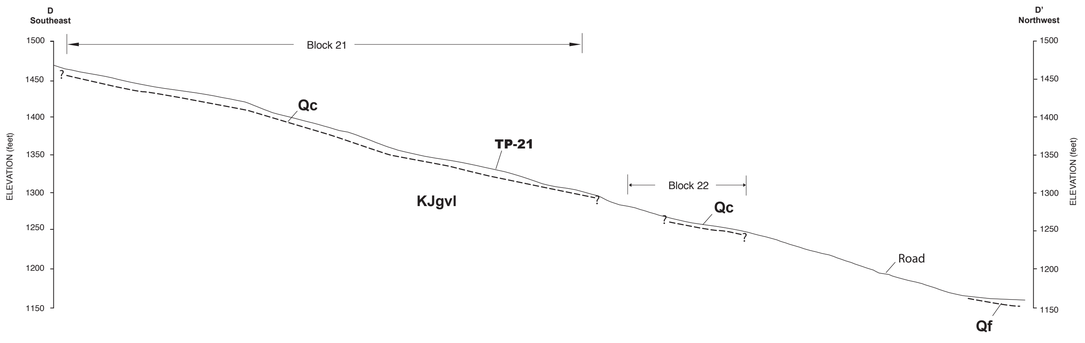
Date 6/19/18 | Project No. 91620.01 | Figure 3B

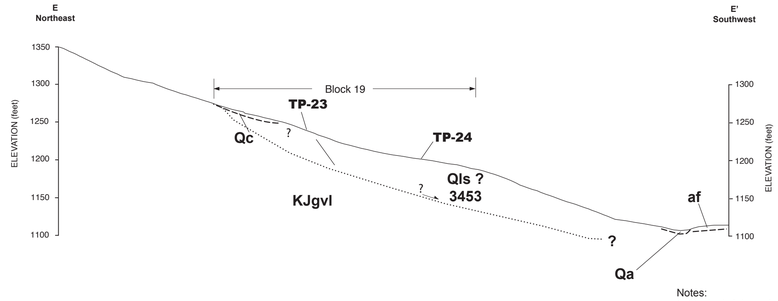
Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants











0 100 Feet
Approximate scale

Notes:
1. Geologic interpretation based on limited subsurface exploration, actual conditions may vary.
2. Line of section shown on Plan.
3. No vertical exaggeration (Horizontal=Vertical).
4. Existing Topography by PPI Engineering, June 2012.

EXPLANATION

Geologic Units

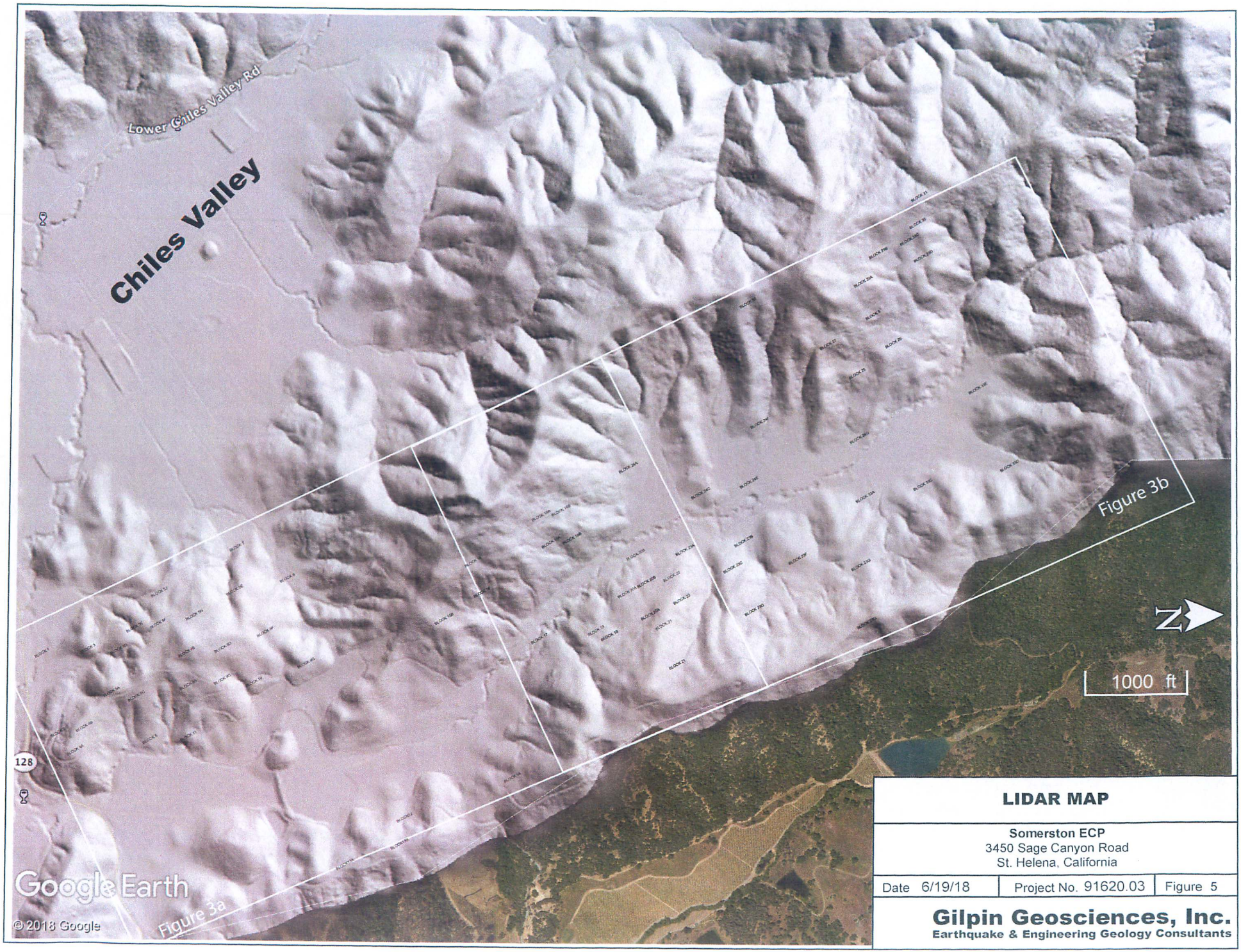
af	Artificial Fill (locally combined with Qf and Qc to designate graded surface; Qf/af or Qc/af)
Qa	Alluvium
Qf	Alluvial Fan Deposit
Qls	Landslide Deposit
Qc	Colluvium
KJgvl	Interbedded Sandstone and Shale (Great Valley Complex)
Jk	Mudstone and Shale with localized interbedded Sandstone (Knoxville Formation)

GEOLOGIC CROSS SECTIONS A-A', B-B", C-C", D-D' and E-E'

SOMERSTON VINEYARD
St. Helena, California

Date 6/19/18 | Project No. 91620.01 | Figure 4

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants



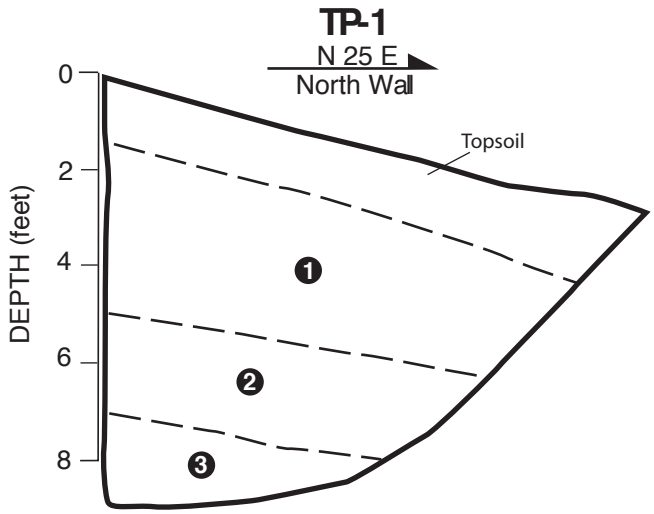
LIDAR MAP

Somerston ECP
3450 Sage Canyon Road
St. Helena, California

Date 6/19/18	Project No. 91620.03	Figure 5

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

APPENDIX A
Logs of Test Pits

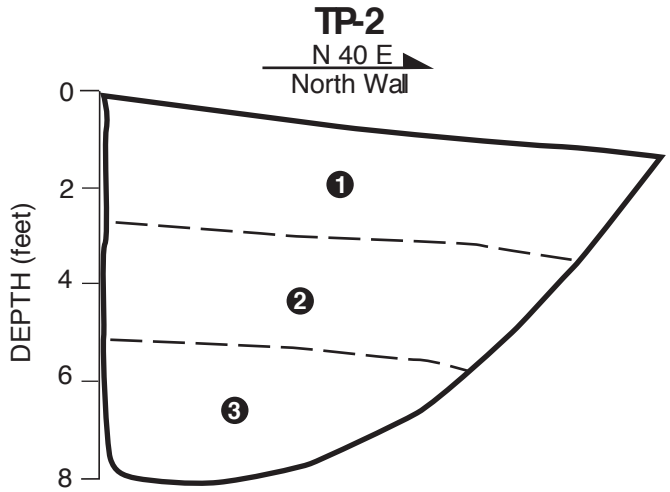


UNIT DESCRIPTIONS

1. SANDY CLAY (CL), brown, wet, medium stiff, with fine sandstone and shale fragments (Colluvium).

2. SANDY CLAY to CLAYEY GRAVEL (CL-GC), yellowish orange and brown, moist, medium stiff to stiff/medium dense, abundant angular mudstone and shale gravel, completely weathered shale (Residual Soil).

3. MUDSTONE/SHALE, yellowish brown, very thin-bedded, intensely fractured, low hardness, plastic to friable, deeply weathered (Great Valley Complex).



UNIT DESCRIPTIONS

1. SANDY CLAY (CL), reddish brown, wet, medium stiff, (Alluvial Fan Deposit).

2. SANDY CLAY (CL), yellowish brown to gray, wet, medium stiff to stiff (Residual Soil).

3. MUDSTONE/SHALE, yellowish brown, very thin-bedded, intensely fractured, low hardness, plastic to friable, deeply weathered (Great Valley Complex)

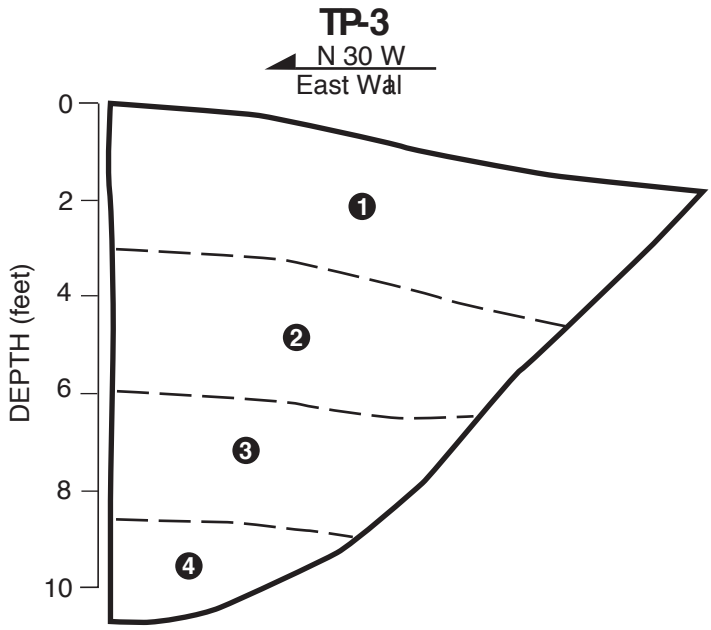
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Catepillar rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 1 & 2

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-1

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants



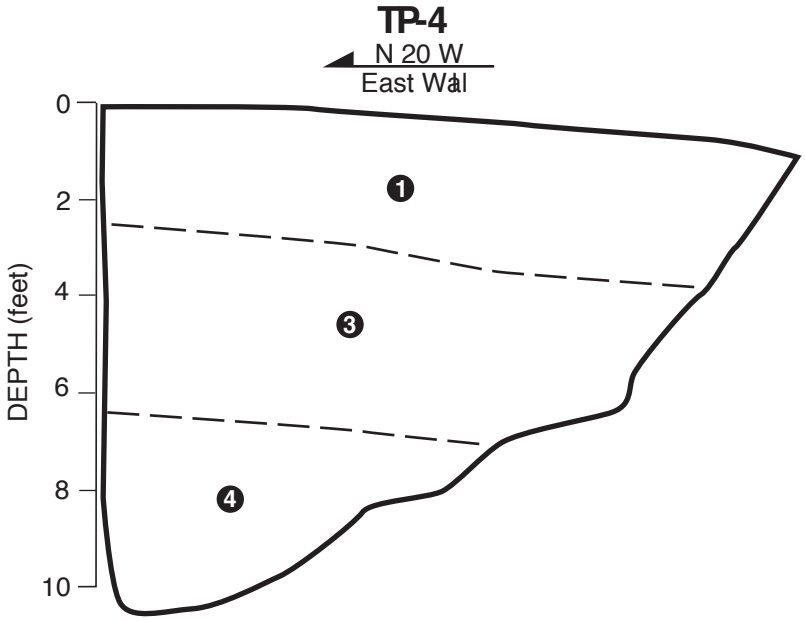
UNIT DESCRIPTIONS

❶ SANDY CLAY (CL), brown to yellowish orange, wet, medium stiff (Topsoil/Landslide Deposit).

❷ SANDY CLAY (CL), yellowish brown to gray mottled, moist, stiff to very stiff, occasional decomposed sandstone and shale gravel (Landslide Deposit).

❸ SANDY CLAY with GRAVEL (CL-GC), gray to grayish brown, moist, very stiff/medium dense, angular sandstone and shale gravel (Alluvial Fan Deposit).

❹ SANDY CLAY with GRAVEL (CL-GC), gray to olive brown, moist, stiff/medium dense, angular decomposed sandstone and shale gravel (Alluvial Fan or Residual Soil?).



SEE UNIT DESCRIPTIONS ABOVE

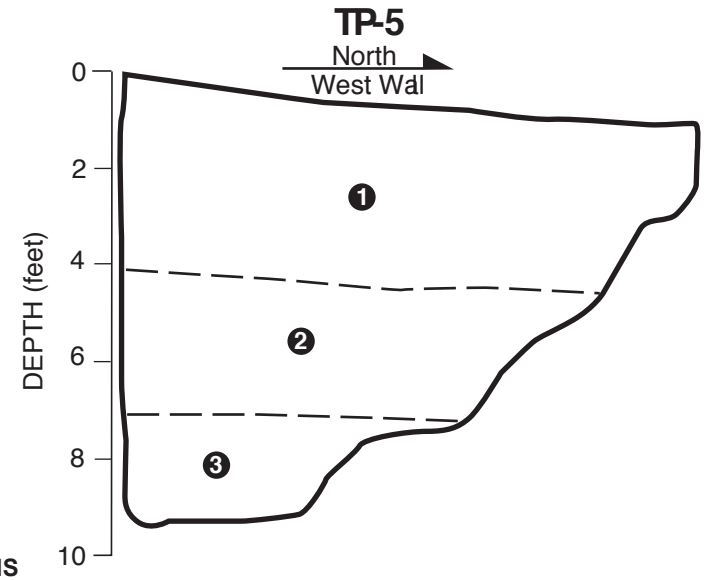
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Catepillar rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 3 & 4

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

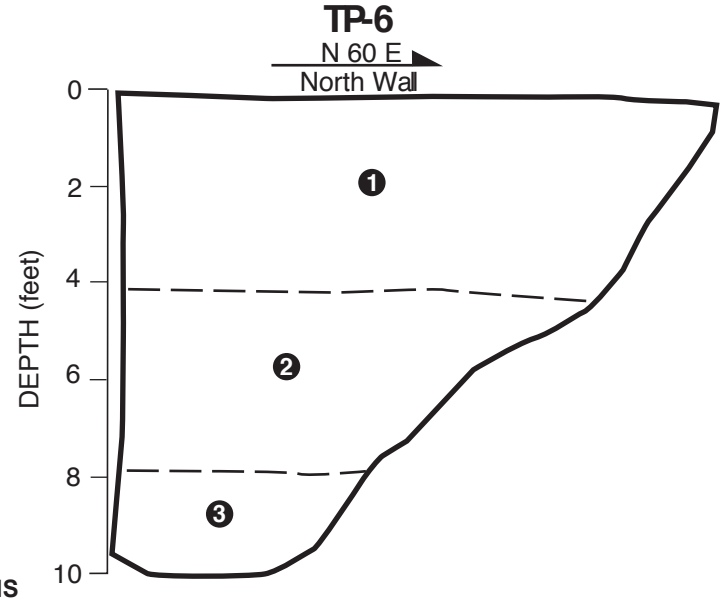
Date 2/26/18	Project No. 91620.03	Figure A-2

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants



UNIT DESCRIPTIONS

1. SANDY CLAY (CL), brown, wet, medium stiff (Alluvial Fan Deposit).
2. SANDY CLAY (CL), light to brown, slightly moist, stiff, (Alluvial Fan Deposit).
3. SANDY CLAY (CL), brown to reddish brown mottled, slightly moist, stiff, decomposed sandstone and shale fragments (Colluvium?).



UNIT DESCRIPTIONS

1. SANDY CLAY (CL), brown, moist to wet, medium stiff (Alluvial Fan Deposit).
2. SANDY CLAY (CL), brown, slightly moist, stiff, occasional highly decomposed reddish orange sandstone fragments (Alluvial Fan Deposit).
3. SANDY CLAY (CL), olive gray to brown, moist, stiff, occasional angular, highly decomposed mudstone fragments (Residual Soil).

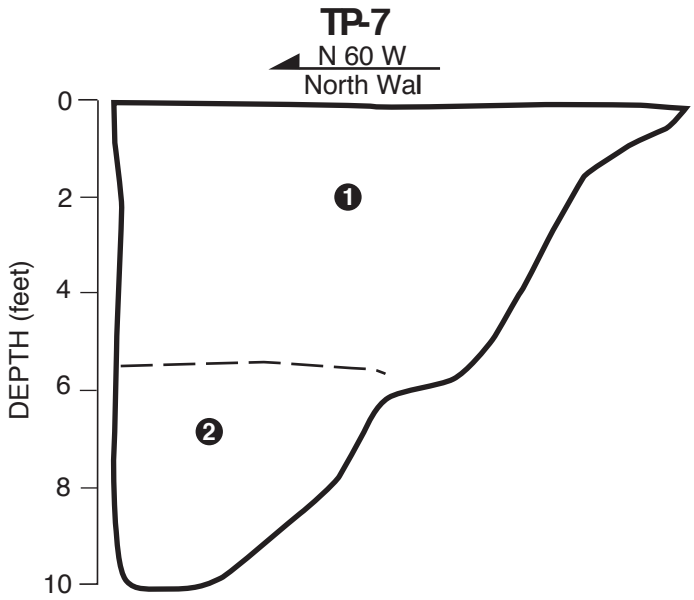
Notes:
1. See Figure 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Catepillar rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 5 & 6

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-3

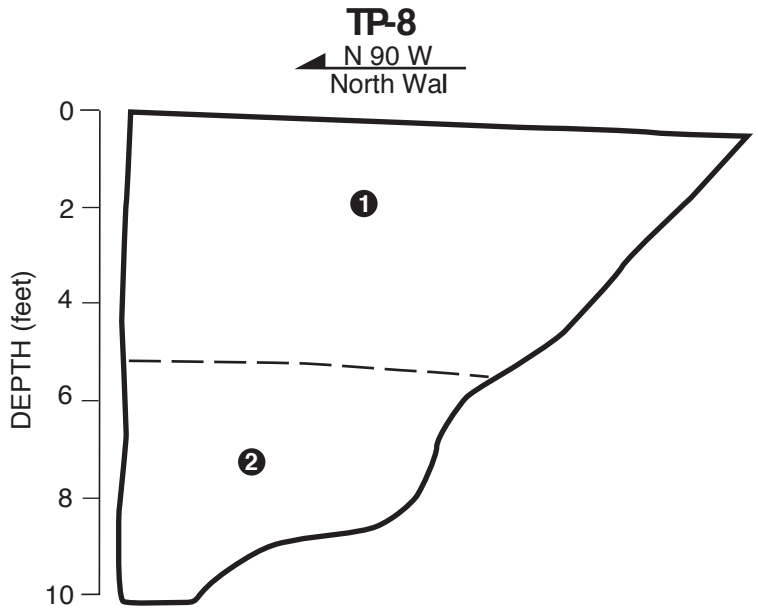
Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants



UNIT DESCRIPTIONS

1. SANDY CLAY (CL/CH), light brown, wet, medium stiff, occasional gravel, sand pockets, charcoal (Fill).

2. SANDY to SILTY CLAY (CL), gray, moist, stiff, (Old Topsoil/Alluvial Fan Deposit).



UNIT DESCRIPTIONS

1. SANDY CLAY (CL), brown, moist to wet, medium stiff occasional sandstone fragments (Alluvial Fan Deposit).

2. SANDY CLAY to CLAYEY GRAVEL (CL-GC), mottled brown, moist, stiff, occasional, resistant sandstone and shale gravel to boulder size (Alluvial Fan Deposit).

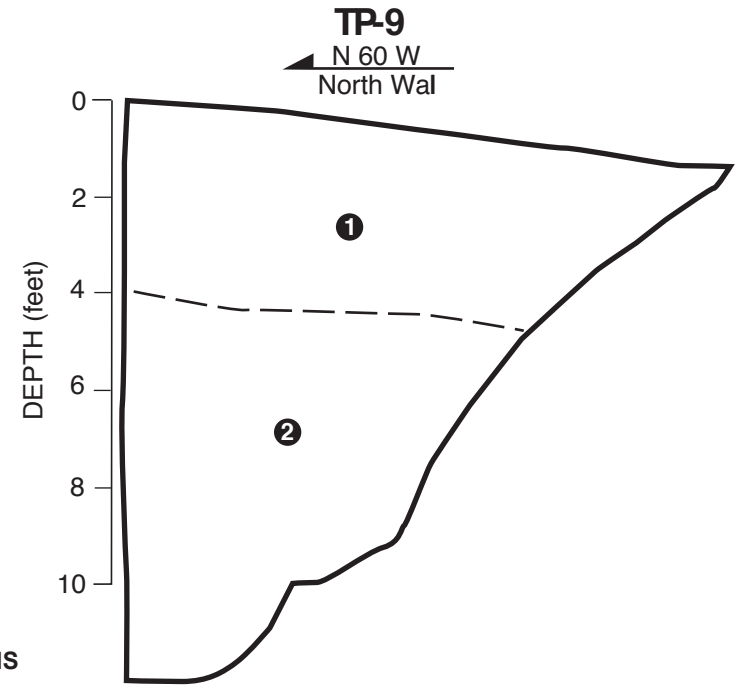
Notes:
1. See Figure 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Catepillar rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 7 & 8

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-4

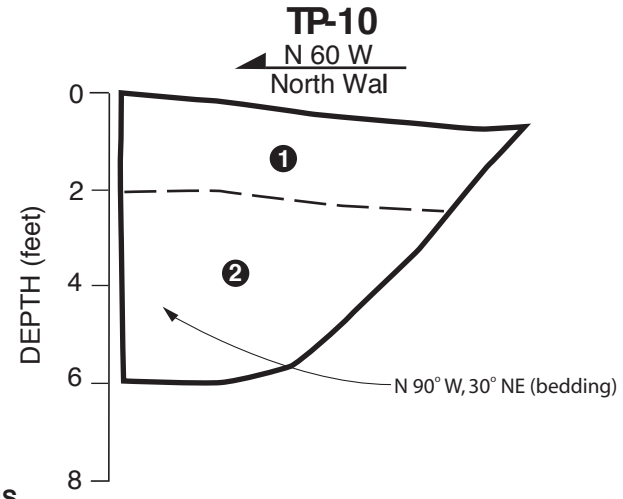
Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants



UNIT DESCRIPTIONS

❶ SANDY CLAY (CL), brown, moist to wet, medium stiff, occasional sub-rounded and deeply weathered sandstone clasts (Landslide Deposit).

❷ SANDY CLAY (CL), olive gray to brown, moist, medium stiff to stiff, fine angular sandstone and shale gravel increasing in content with depth and sub-rounded to angular at 8 feet (Landslide Deposit).



UNIT DESCRIPTIONS

❶ SANDY CLAY (CL), reddish brown, wet, medium stiff, abundant roots (Topsoil).

❷ MUDSTONE/SILTSTONE, reddish brown to olive, very thin-bedded, intensely fractured, low hardness, friable to weak, moderately weathered (Great Valley Complex).

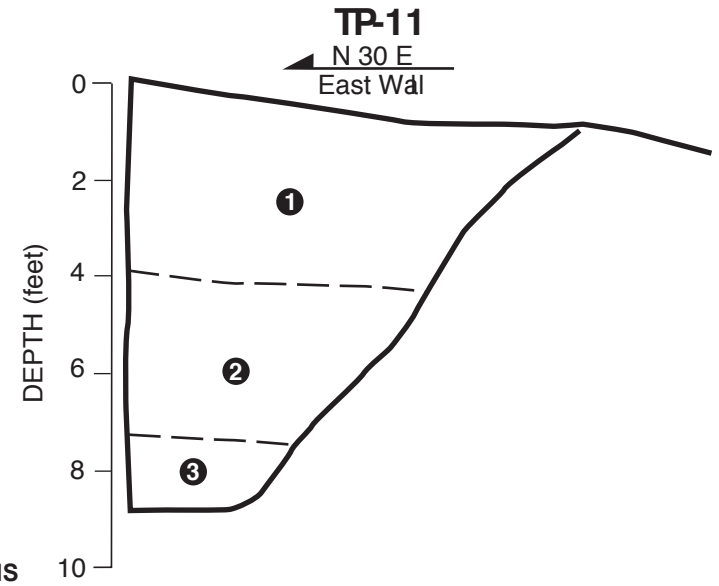
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Catepillar rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 9 & 10

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-5

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

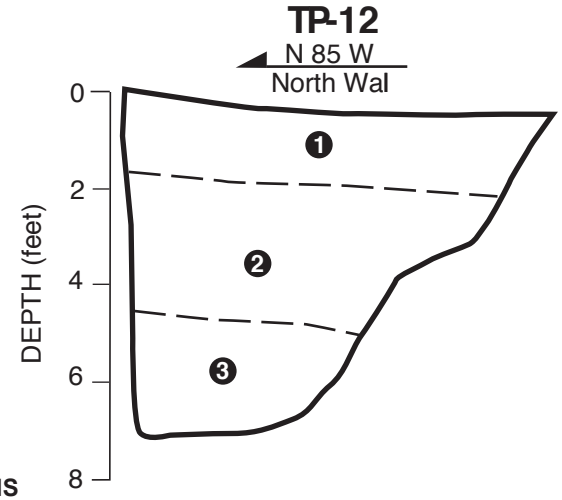


UNIT DESCRIPTIONS

❶ SANDY CLAY (CL), reddish brown, wet, medium stiff, occasional cobble to boulder-size mudstone and sandstone clasts (Topsoil/Fill).

❷ SANDY CLAY (CL), reddish brown and light brown mottled, moist, stiff, sandstone fragments increasing in content with depth (Residual Soil).

❸ MUDSTONE/SANDSTONE, reddish to yellowish brown, very thin-bedded, intensely fractured, low hardness, friable to weak, moderately weathered (Great Valley Complex).



UNIT DESCRIPTIONS

❶ SANDY CLAY (CL), brown, wet, medium stiff, shale gravel (Topsoil).

❷ SANDY CLAY to CLAYEY GRAVEL (CL-GC), gray to brown, wet, stiff/medium dense, mudstone fragments increasing in content with depth (Residual Soil).

❸ MUDSTONE/SHALE, gray to brown, laminated, closely to intensely fractured, low to moderate hardness, weak to moderately strong, deeply weathered (Knoxville Formation).

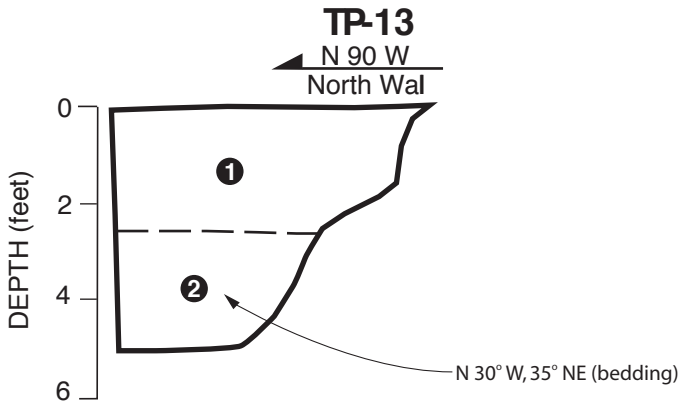
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Cat rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 11 & 12

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-6

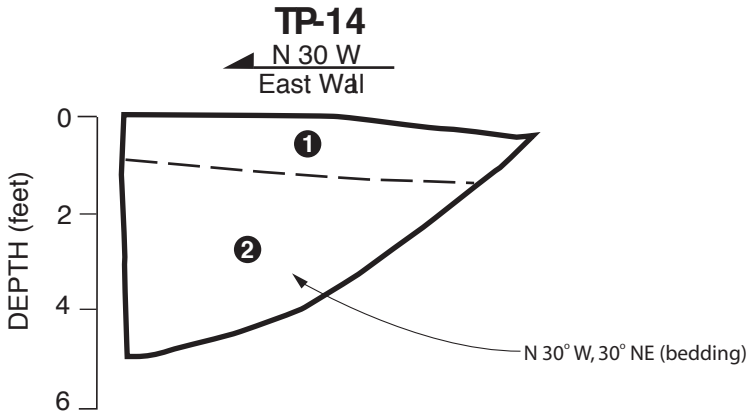
Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants



UNIT DESCRIPTIONS

1. SANDY CLAY (CL), brown, wet, medium stiff, gray clay (Topsoil/Residual Soil).

2. MUDSTONE/SHALE, dark gray to gray, very thinly-bedded, intensely fractured, low hardness, weak, moderately weathered (Knoxville Formation).



UNIT DESCRIPTIONS

1. SANDY CLAY (CL), brown, wet, medium stiff (Topsoil).

2. MUDSTONE/SHALE, gray to brown, very thinly-bedded, intensely fractured, low to moderate hardness, weak to moderately strong at 4 feet, moderately weathered (Knoxville Formation).

Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Catepillar rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 13 & 14

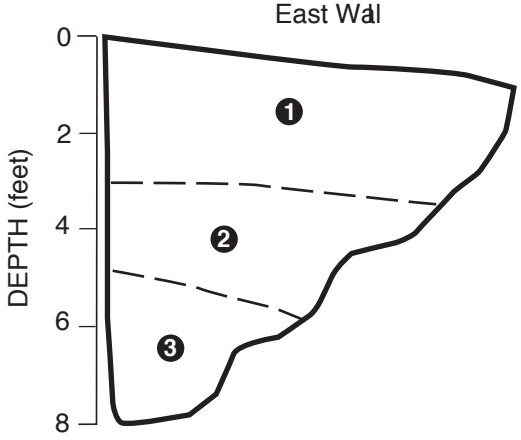
SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-7

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

TP-15

N 60 E
East Wall

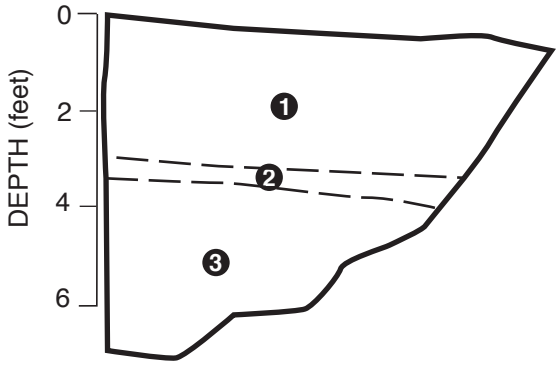


UNIT DESCRIPTIONS

1. SANDY/SILTY CLAY (CL), brown, wet, medium stiff, gray clay (Topsoil/Colluvium).
2. SANDY to SILTY CLAY (CL), light brown to reddish brown, slightly moist, stiff (Residual Soil).
3. MUDSTONE/SHALE, light brown to reddish brown, very thinly-bedded, crushed to intensely fractured, low hardness, friable to weak, deeply weathered with clay filled fractures (Knoxville Formation).

TP-16

N 30 W
West Wall



UNIT DESCRIPTIONS

1. SANDY/SILTY CLAY (CL), brown, wet, medium stiff (Topsoil/Colluvium).
2. CLAYEY GRAVEL (GC), light gray to olive, wet, medium dense, fine mudstone gravel (Residual Soil).
3. MUDSTONE/SHALE, light brown to gray, very thinly-bedded, crushed to intensely fractured, low hardness, friable to weak, deeply weathered with clay filled fractures (Knoxville Formation).

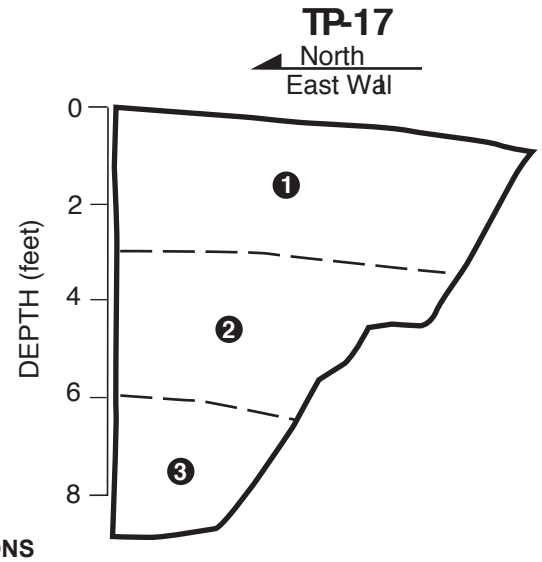
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Catepillar rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 15 & 16

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-8

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

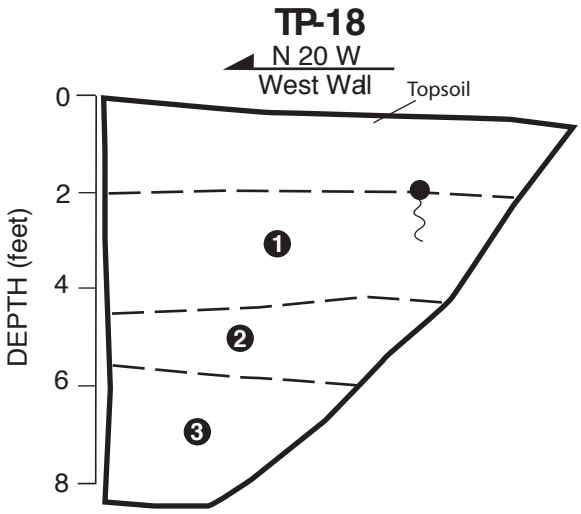


UNIT DESCRIPTIONS

1. SANDY CLAY (CL), brown, wet, medium stiff (Topsoil/Colluvium).

2. CLAY with GRAVEL (CL), brown to gray, moist, very stiff, fine shale/mudstone gravel (Residual Soil).

3. MUDSTONE/SHALE, gray to brown, very thinly-bedded, crushed/sheared, low hardness, friable to plastic, deeply weathered with clay filled fractures (Knoxville Formation).



UNIT DESCRIPTIONS

1. SANDY CLAY (CL/CH), gray and brown mottled, wet, very stiff (Colluvium).

2. CLAYEY GRAVEL (GC), gray, moist, stiff, medium dense, angular mudstone gravel (Residual Soil).

3. MUDSTONE/SHALE, reddish brown, very thinly-bedded, crushed to intensely fractured, low hardness, friable to weak, deeply weathered with clay filled fractures, becomes moderately hard at 4.5 feet (Great Valley Complex).

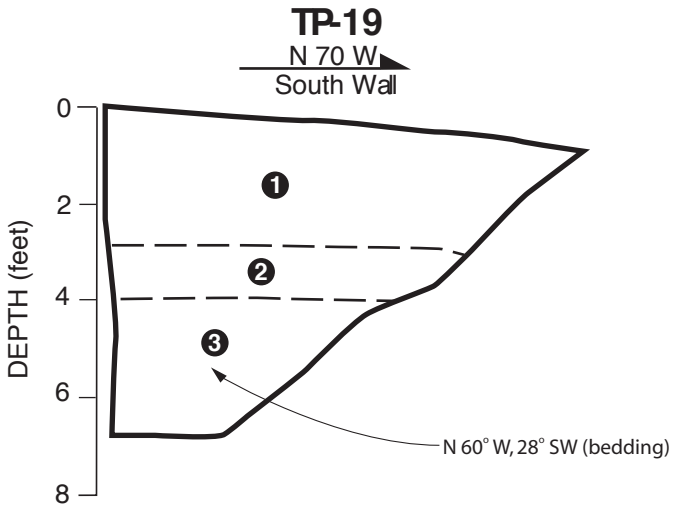
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Catepillar rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 17 & 18

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-9

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

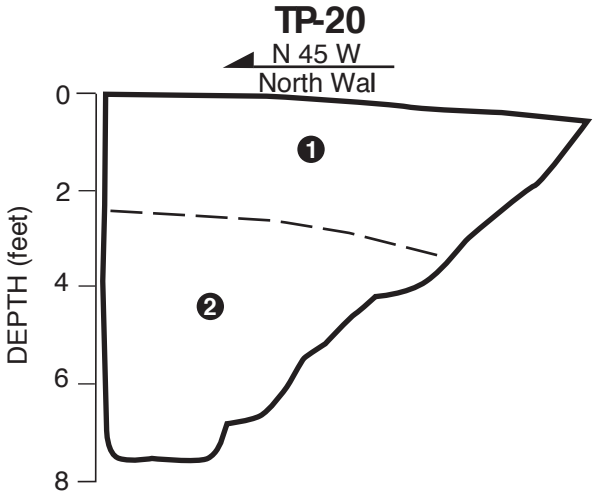


UNIT DESCRIPTIONS

❶ SANDY to SILTY CLAY (CL), brown, moist to wet, medium stiff, porous (Topsoil/Colluvium).

❷ SANDY CLAY with GRAVEL (CL), brown to gray mottled, moist, stiff, fine decomposed mudstone gravel (Residual Soil).

❸ MUDSTONE/SHALE, gray to brown, very thinly-bedded, intensely fractured, low hardness, friable to plastic, deeply weathered (Knoxville Formation).



UNIT DESCRIPTIONS

❶ SANDY CLAY (CL) to CLAYEY GRAVEL (GC), light brown mottled, wet, medium stiff, abundant sandstone gravel (Alluvial Fan Deposit).

❷ CLAYEY GRAVEL (GC), light brown, moist, medium dense, fine angular mudstone gravel to cobbles (Alluvial Fan Deposit).

Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by Catepillar rubber tire backhoe with 36-inch bucket

LOG OF TEST PITS 19 & 20

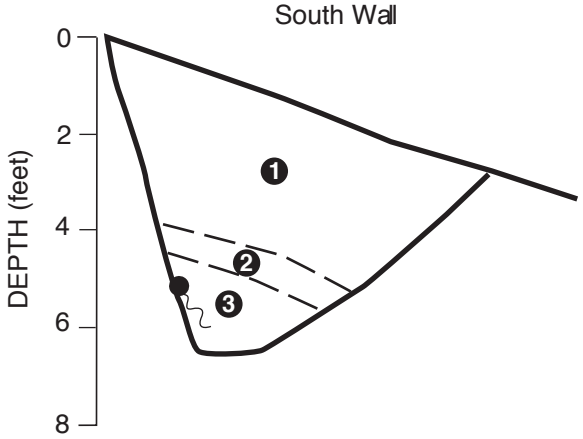
SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-10

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

TP-21

N 85 E
South Wall

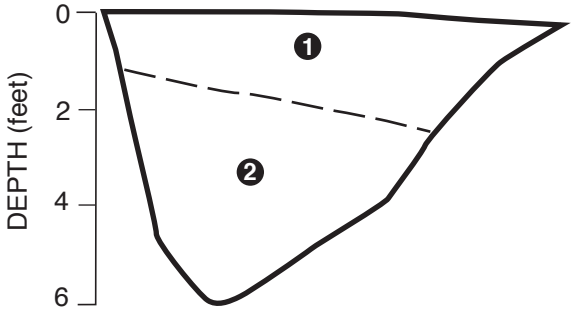


UNIT DESCRIPTIONS

1. SANDY to SILTY CLAY (CL), reddish brown, moist, medium stiff (Colluvium).
2. CLAY (CL), brown, moist to wet, stiff, seepage at 4.5 feet (Residual Soil).
3. SANDSTONE, brown, thinly-bedded, closely fractured, low to moderate hardness, weak to moderately strong, deeply weathered, with localized clay and shale partings (Great Valley Complex).

TP-22

N 45 W
North Wal



UNIT DESCRIPTIONS

1. CLAY (CL), dark brown, wet, medium stiff, abundant roots (Colluvium).
2. SILTSTONE with SANDSTONE clasts, brown, intensely fractured?, low hardness, friable, deeply weathered, porosity and roots decrease with depth (Great Valley Complex).

Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

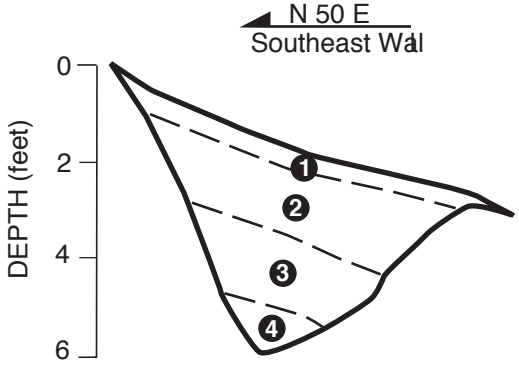
LOG OF TEST PITS 21 & 22

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-11

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

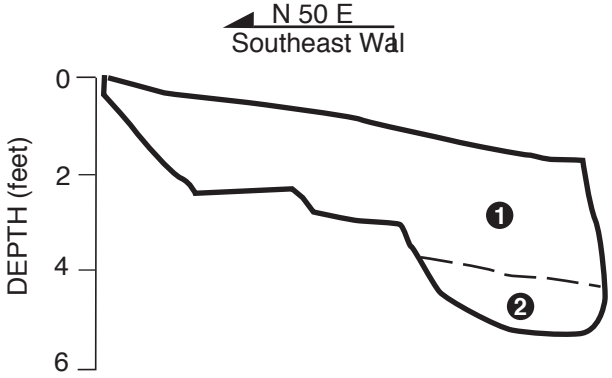
TP-23



UNIT DESCRIPTIONS

1. CLAY (CL), brown, wet, medium stiff (Topsoil/Colluvium).
2. CLAY with GRAVEL (CL), brown, moist, medium stiff (Colluvium).
3. GRAVEL (GP), brown, 3-inch sandstone and siltstone clasts, disrupted with pores and roots (Residual Soil/Old Landslide Blocks?)
4. SANDSTONE/SILTSTONE, brown, thinly-bedded, intensely fractured and disrupted, resistant blocks are low hardness, weak to moderately strong, deeply weathered (Old Landslide Blocks?).

TP-24



UNIT DESCRIPTIONS

1. CLAYEY GRAVEL with SAND (GC), brown, moist, dense, slabby siltstone and sandstone blocks to 6-inches thick (Colluvium).
2. Interbedded SANDSTONE and SILTSTONE, brown, intensely fractured and disturbed, resistant blocks are 6 to 8-inches thick, low to moderate hardness, weak to moderately strong, deeply weathered (Old Landslide Blocks?).

Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

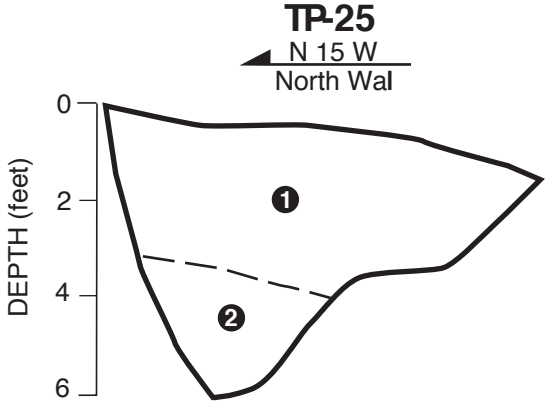
LOG OF TEST PITS 23 & 24

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-12

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

TP-25

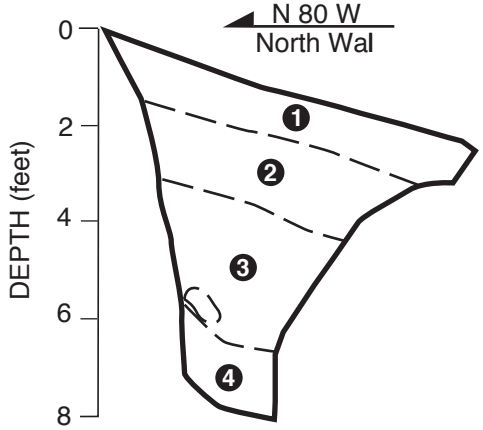


UNIT DESCRIPTIONS

1. CLAY (CL), dark brown, moist to wet, medium stiff, organic rich (Topsoil)

2. CLAY with GRAVEL (CL), dark brown mottled, moist, very stiff, fine sandstone and mudstone gravel to 3/8-inch diameter (Alluvium/Colluvium).

TP-26



UNIT DESCRIPTIONS

1. CLAY (CL), dark brown, moist to wet, medium stiff, roots to 1.5-inches in diameter (Topsoil)

2. CLAY (CL), brown, moist, stiff, few roots (Colluvium).

3. CLAYEY SAND (SC), light brown, slightly moist, stiff, occasional gravel to 1/4-inches in diameter, porous, 8-inch resistant sandstone cobble along basal contact (Colluvium)

4. SANDSTONE, medium gray, fine grained, closely fractured, hard, moderately strong, little weathered (Great Valley Complex).

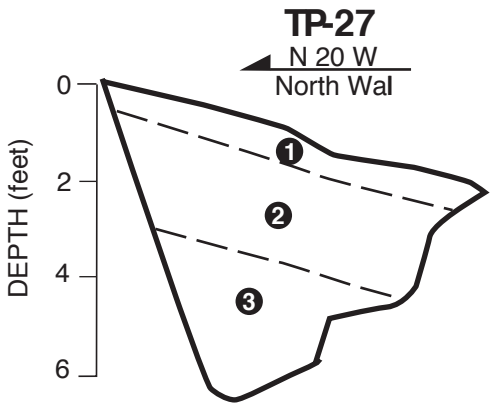
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

LOG OF TEST PITS 25 & 26

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-13

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

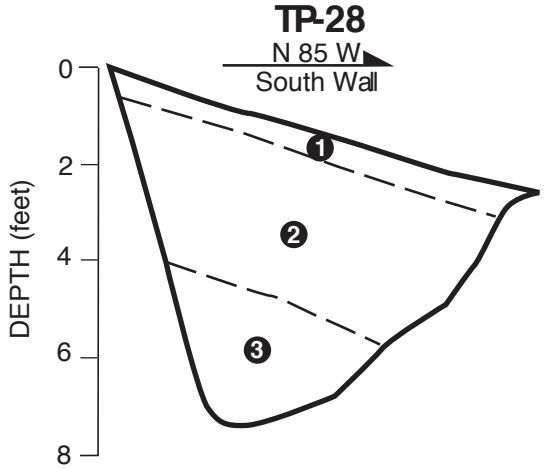


UNIT DESCRIPTIONS

❶ CLAY (CL), dark brown, moist, medium stiff, organic rich (Topsoil)

❷ CLAY (CL), brown, moist, stiff, roots (Alluvium/Colluvium).

❸ SANDY CLAY (CL), light brown, dry, very stiff, roots, B-Soil Horizon (Alluvium/Colluvium).



UNIT DESCRIPTIONS

❶ CLAY (CL), dark brown, moist to wet, medium stiff, organic rich, roots (Topsoil)

❷ CLAY (CL), brown, moist, medium stiff to stiff, roots at 2.5 and 3.5 feet (Colluvium).

❸ SILTSTONE, dark brown, closely to moderately fractured, low hardness, friable to weak, deeply weathered (Great Valley Complex).

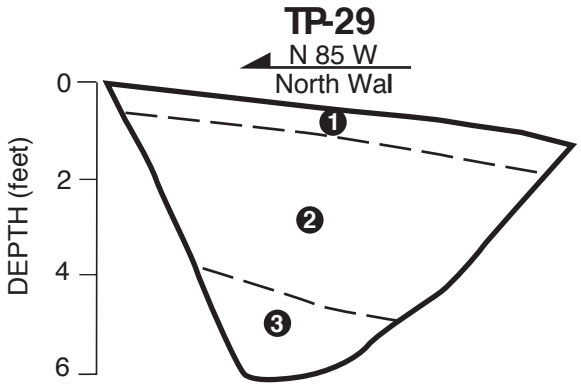
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

LOG OF TEST PITS 27 & 28

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-14

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

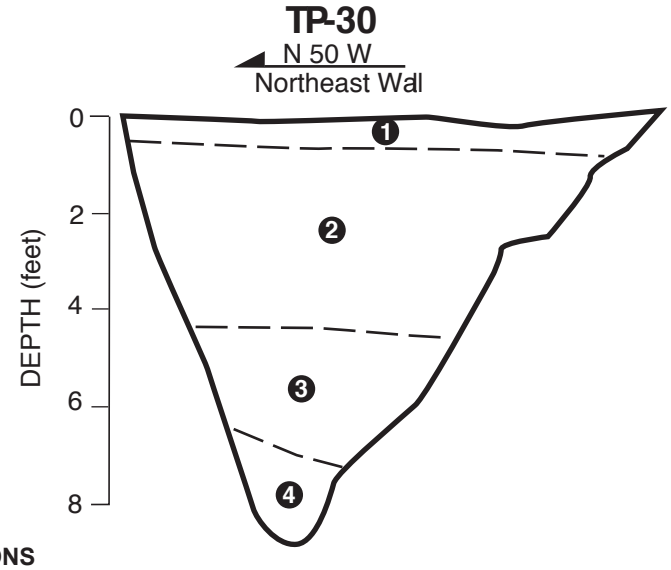


UNIT DESCRIPTIONS

❶ CLAY (CL), brown, moist wet, soft to medium stiff (Topsoil)

❷ CLAY with GRAVEL (CL), medium brown, wet, medium stiff, few cobbles to 5-inches in diameter (Colluvium).

❸ CLAYSTONE, intensely to closely fractured, low hardness, friable to weak, deeply to completely weathered (Great Valley Complex).



UNIT DESCRIPTIONS

❶ CLAY (CL), dark brown, wet, medium stiff, roots (Topsoil)

❷ CLAY with GRAVEL (CL), brown and light brown mottled, moist, stiff, roots (Colluvium).

❸ CLAYEY GRAVEL (GC), brown, slightly moist, medium dense, fine gravel to 1-inch diameter (Old Landslide Deposit).

❹ CLAYEY GRAVEL (GC), brown, dry, dense, sandstone cobbles to 5-inches diameter (Old Landslide Deposit).

Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

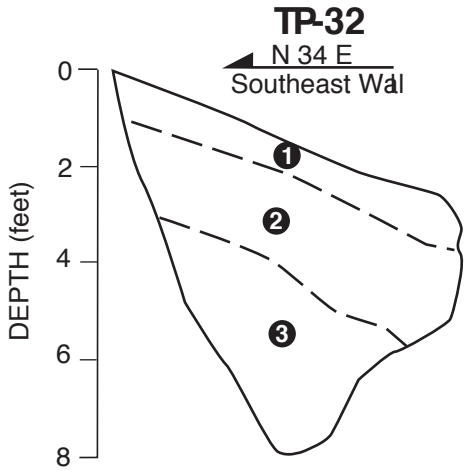
LOG OF TEST PITS 29 & 30

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-15

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

TP-31
NOT EXCAVATED



UNIT DESCRIPTIONS

❶ CLAY (CL), brown, moist, medium stiff, organic rich, roots (Topsoil)

❷ CLAY (CL), brown, slightly moist, medium stiff to stiff, B-Horizon (Colluvium).

❸ CLAYSTONE, brown, crushed to intensely fractured, low hardness, friable to weak, deeply weathered (Great Valley Complex).

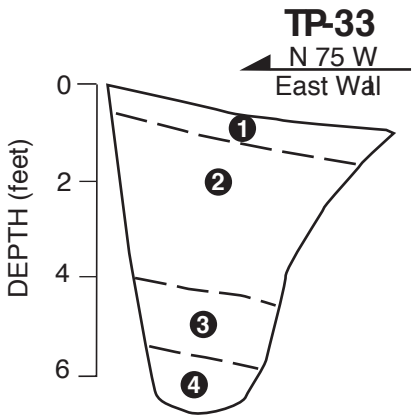
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

LOG OF TEST PIT 31 & 32

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

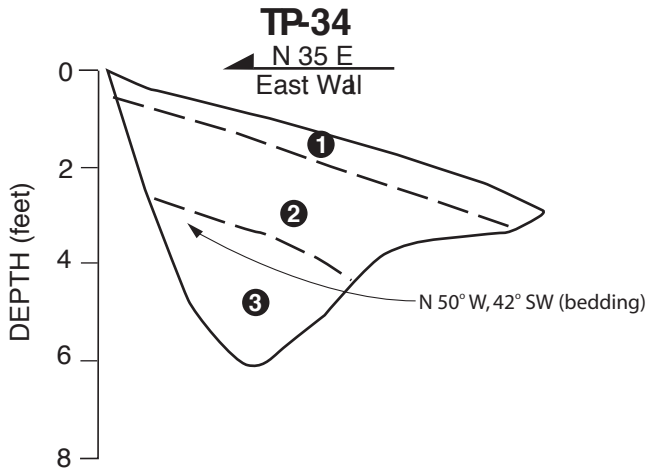
Date 2/26/18	Project No. 91620.03	Figure A-16

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants



UNIT DESCRIPTIONS

1. CLAY (CL), brown, wet, medium stiff (Topsoil)
2. CLAY (CL), medium brown, moist to wet, medium stiff, B-Horizon (Colluvium).
3. CLAY (CL), light brown, dry, stiff to very stiff, porous (Residual Soil)
4. CLAYSTONE, brown, intensely fractured, low hardness, friable to weak, deeply weathered (Great Valley Complex).



UNIT DESCRIPTIONS

1. SANDY CLAY (CL), brown, wet, medium stiff (Topsoil)
2. CLAYEY GRAVEL (GC), brown, moist to wet, medium dense (Colluvium).
3. SHALE, brown with dark gray partings, laminated to flaggy bedding, closely fractured, low hardness, weak, deeply weathered (Great Valley Complex).

Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

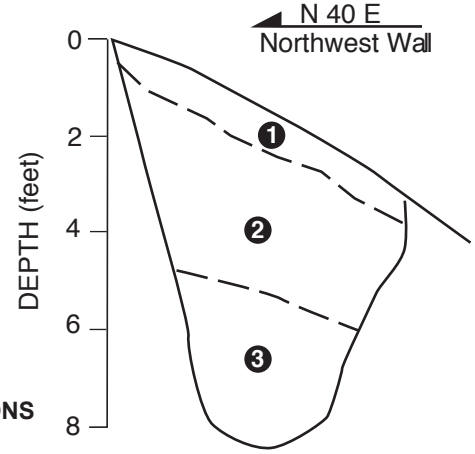
LOG OF TEST PITS 33 & 34

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-17

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

TP-35



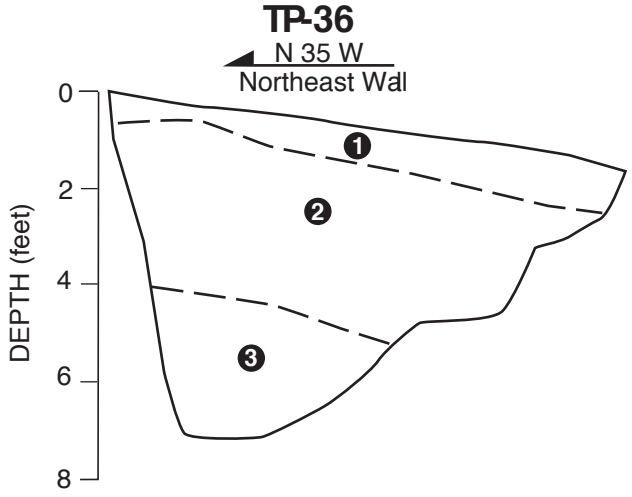
UNIT DESCRIPTIONS

❶ CLAY (CL), brown, wet, soft, abundant roots (Topsoil)

❷ CLAY (CL), light reddish brown, dry, medium stiff to stiff, porous with abundant roots (Landslide Deposit?).

❸ CONGLOMERATE/MUDSTONE, massive fracturing, low hardness, friable to weak, deeply weathered sandstone clasts to 1/2-inch in diameter (Great Valley Complex).

TP-36



UNIT DESCRIPTIONS

❶ CLAY (CL), dark gray, wet, medium stiff (Topsoil)

❷ CLAY (CH), medium gray, moist, medium stiff, with fine “Pea” gravel and few sandsone cobbles (Landslide deposit).

❸ SILTSTONE, reddish brown, with angular sandstone clasts to 1-inch, closely fractured, low hardness, friable to weak, deeply weathered (Landslide deposit).

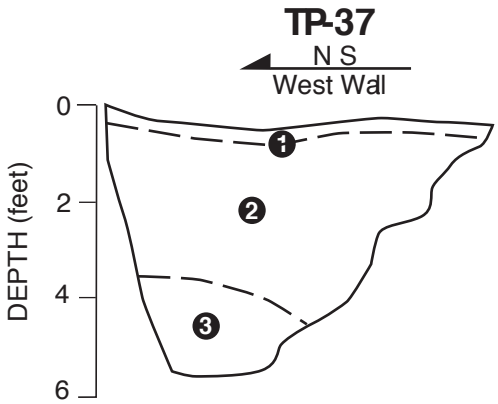
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

LOG OF TEST PITS 35 & 36

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-18

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

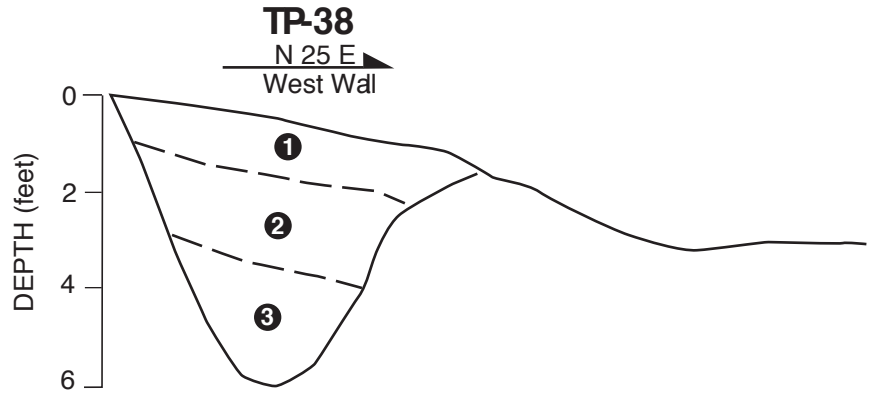


UNIT DESCRIPTIONS

❶ CLAY (CL), brown, wet, medium stiff, organics, abundant roots (Topsoil)

❷ CLAY (CL), medium brown, moist, medium stiff to stiff (Residual Soil).

❸ MUDSTONE, brown, moderately fractured, low hardness, weak, deeply weathered shale clasts to 1/4-inch in diameter (Great Valley Complex).



UNIT DESCRIPTIONS

❶ CLAY (CL), dark reddish brown, wet, soft (Topsoil)

❷ SILTY CLAY (CL), reddish brown, moist, medium stiff (Residual Soil).

❸ SILTSTONE, light reddish brown, intensely fractured, low hardness, friable to weak, deeply weathered, with manganese clasts to 1/8-inch (Great Valley Complex).

Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

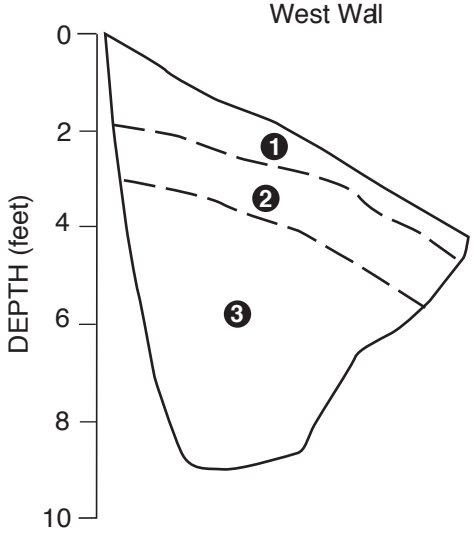
LOG OF TEST PITS 37 & 38

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-19

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

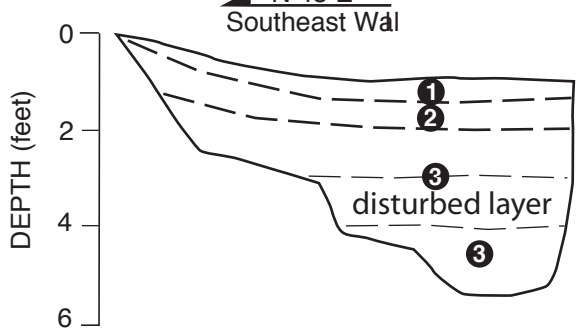
TP-39



UNIT DESCRIPTIONS

1. CLAY (CH), dark brown, wet, medium stiff (Topsoil)
2. CLAY (CL), light brown, dry, stiff, abundant shale fragments, B-Horizon (Residual Soil).
3. Interbedded SANDSTONE and SHALE, brown, crushed to intensely fractured and sheared, low hardness, friable to strong, deeply weathered shale clasts to 3-inch in diameter (Great Valley Complex).

TP-40



UNIT DESCRIPTIONS

1. CLAY (CL), reddish brown, wet, soft, organics (Topsoil)
2. CLAYEY SILT (ML), reddish brown, dry, stiff (Colluvium).
3. SILTSTONE, reddish brown, intensely fractured, low hardness, friable, deeply weathered, interformational disturbed layer from 3-4 feet, no shearing (Great Valley Complex).

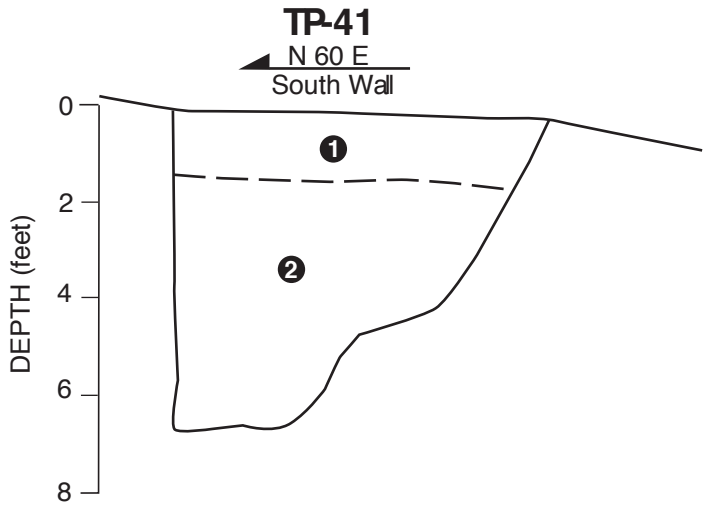
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

LOG OF TEST PITS 39 & 40

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-20

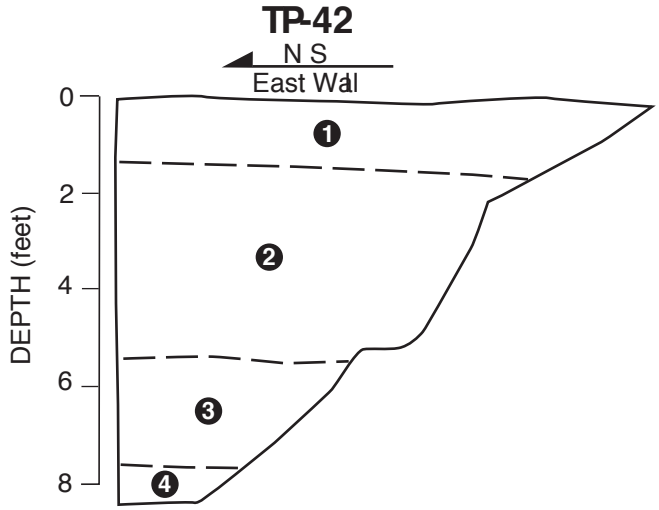
Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants



UNIT DESCRIPTIONS

❶ SANDY CLAY (CL), brown, moist to wet, medium stiff, porous (Topsoil/Alluvial Fan Deposit)

❷ SANDY CLAY (CL/CH), brown and gray mottled, moist, stiff, abundant roots to 3.5 feet, blocky texture, very stiff below 4 feet (Alluvial Fan Deposit).



UNIT DESCRIPTIONS

❶ SANDY to SILTY CLAY (CL), brown, moist to wet, medium stiff (Topsoil)

❷ CLAYEY GRAVEL (GC), brown, wet, medium dense, shale and mudstone gravel (Alluvial Fan Deposit).

❸ SANDY to SILTY CLAY (CL), brown, slightly moist, medium stiff to stiff (Residual Soil?)

❹ SHALE/MUDSTONE, gray, intensely fractured, low hardness, friable to weak, deeply weathered (Knoxville Formation).

Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

LOG OF TEST PITS 41 & 42

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-21

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

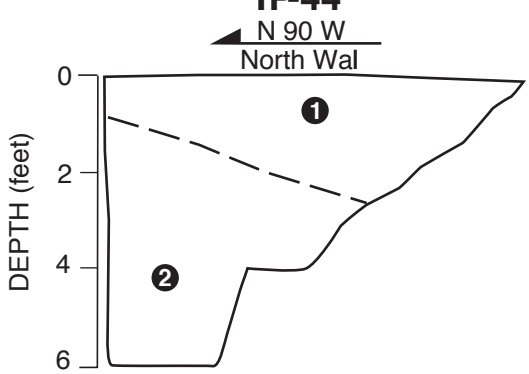
TP-43

Northeast facing cut slope above road

UNIT DESCRIPTIONS

❶ SHALE/MUDSTONE, grayish brown, intensely fractured to crushed, low hardness, friable, deeply weathered (Knoxville Formation).

TP-44



UNIT DESCRIPTIONS

❶ SANDY CLAY (CL/CH), reddish brown, wet, medium stiff (Topsoil)

❷ SHALE/MUDSTONE, red to light brown, intensely fractured, low hardness, friable to weak, deeply weathered (Great Valley Complex).

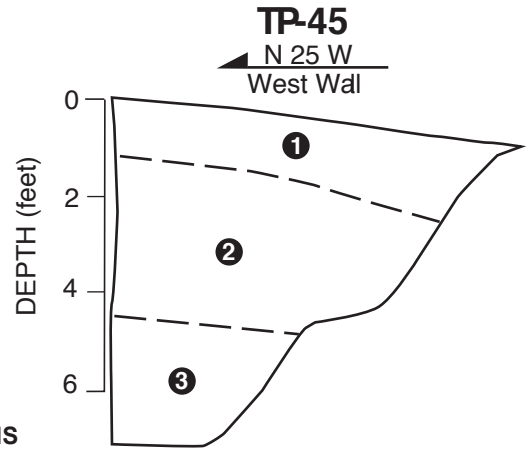
Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

LOG OF TEST PITS 43 & 44

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-22

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants



UNIT DESCRIPTIONS

1. SANDY to SILTY CLAY (CL), brown, wet, medium stiff (Topsoil/Colluvium)

2. SANDY CLAY (CL), brown, moist to wet, medium stiff, mudstone/shale gravel (Residual Soil)

3. SHALE/MUDSTONE, reddish brown, intensely fractured, low hardness, friable, deeply weathered red clay-filled fractures (Great Valley Complex).

Notes:
1. See Figures 3a & 3b for test pit locations.
2. Ground surface profiles constructed using hand level and tape.
3. Horizontal = Vertical Scale.
4. Excavated by a Catepillar 305.5E rubber-track mounted excavator with a 36-inch bucket.

LOG OF TEST PIT 45

SOMERSTON VINEYARDS
3450 Sage Canyon Road
St. Helena, California

Date 2/26/18	Project No. 91620.03	Figure A-23

Gilpin Geosciences, Inc.
Earthquake & Engineering Geology Consultants

APPENDIX I

INTEGRATED PEST MANAGEMENT PLAN

KJS Investment Properties & Sorrento Inc.

Integrated Pest Management Plan

KJS Investment Properties & Sorrento Inc. (KJS & Sorrento) will implement an Integrated Pest Management (IPM) program, an effective and environmentally sensitive approach to pest management. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, with the least possible hazard to people, property and the environment. KJS & Sorrento Estate will include IPM as a component of its sustainable farming practices. "Sustainability" is built on the premise that every decision incorporates the potential impacts on the environment, social responsibility, and economic viability.

All pesticide applications made by KJS & Sorrento Estate will follow the rule of California and U.S. laws outlined by the California Department of Pesticide Regulation (DPR) and the Environmental Protection Agency (EPA). The EPA classifies pesticides with the following scale based on potential hazards:

1. High Toxicity – Signal Word DANGER or DANGER & POISON
2. Moderate Toxicity – Signal Word WARNING
3. Low Toxicity – Signal Word CAUTION
4. Very Low Toxicity – no Signal Word or CAUTION

KJS & Sorrento Estate does not anticipate applying any products with a Signal Word with a higher potential hazard than CAUTION. All products applied at KJS & Sorrento Estate will be a Category 3 or 4, representing the lowest risk category of chemicals. The products KJS & Sorrento Estate plans on using represent the most sustainable options and the lowest risks to the applicator, workers, neighbors, and the environment.

Implementing a sustainable pesticide spray program using IPM methods will increase the time between sprays, ultimately limiting the number of sprays needed in a season. This will result in decreased product used, noise and impact on the environment. Other specific farming practices that KJS & Sorrento Estate will implement in efforts to farm as sustainably as possible are as follows:

- Petiole sample (leaf tissue) collection to determine specific and targeted fertilization program
- When needed, apply slow release nitrogen sources such as organic compost and fish emulsion
- Collect water stress data via weather stations, leaf water potentials, and soil moisture probes to dictate concise and efficient irrigation scheduling
- Install double poly lines to irrigate only stressed areas to decrease water use

- Decrease disease pressure and resulting reliance on pesticides with careful irrigation strategies and strict cultural controls including canopy management passes such as leafing, shoot positioning, and cluster thinning
- Design a spray schedule specific to the growing season, current disease pressures, and IPM guidelines
- If needed and where available, release beneficial insects as predators on vineyard pests
- Control dust to discourage nuisance and unwanted pests

KJS & Sorrento Estate is an active member of the Napa Valley Grapegrowers Association and is enrolled in the RCD Land Smart certification program. More information regarding sustainability and IPM strategies that KJS & Sorrento Estate will implement can be found in the following links:

What is IPM: http://www.ipm.ucdavis.edu/GENERAL/whatisipm.html
Fundamentals of Sustainability: https://attra.ncat.org/attra-pub/viewhtml.php?id=294
Applying the Principals: https://attra.ncat.org/attra-pub/viewhtml.php?id=295
Napa Valley Grapegrowers: http://www.napagrowers.org
RCD: http://naparcd.org/projects/landsmart/

APPENDIX J
HYDROLOGIC ANALYSIS

HYDROLOGIC ANALYSIS OF PROPOSED VINEYARD DEVELOPMENT

KJS INVESTMENT PROPERTIES & SORRENTO INC.

NAPA COUNTY, CALIFORNIA

Revised June 2018

PPI ENGINEERING

2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

TABLE OF CONTENTS

1.0 INTRODUCTION
- 1.1 Purpose and Background 2
- 1.2 Project Scope 2
- 1.3 Hydrologic Model Background & Overview 3

2.0 DISCUSSION OF MODELED CONDITIONS
- 2.1 Existing Land Use Conditions 3
- 2.2 Developed Land Use Conditions 3

3.0 HYDROLOGIC MODELING METHODOLOGY
- 3.1 Watershed Delineation 4
- 3.2 Precipitation Data 4
- 3.3 Soil Data 5
- 3.4 Land Use and Runoff Curve Number..... 5
- 3.5 Discussion of Proposed Land Use Changes within each Watershed 6
- 3.6 Channel Configurations and Roughness 11
- 3.7 Time of Concentration Development 11
- 3.8 Time of Concentration by Watershed 13
- 3.9 Reach Routing Methodology & Modeling 14

4.0 STORMWATER CONVEYANCE INFRASTRUCTURE MODELING
- 4.1 Discussion of Stormwater Conveyance Infrastructure 15
- 4.2 Overview of Modeling 15

5.0 HYDROLOGIC MODELING RESULTS
- 5.1 Model Input Data 18
- 5.2 Hydrologic Modeling Results 18
- 5.3 Discussion of Results 20

6.0 CONCLUSIONS & RECOMMENDATIONS..... 23

7.0 REFERENCES 25

APPENDICES

Appendix A – Figures

Appendix B – Existing Land Use By Watershed

Appendix C – Developed Land Use By Watershed

Appendix D – Peak Discharge

1.0 INTRODUCTION

1.1 Purpose and Background

This report summarizes the analysis and results of a hydrologic investigation performed by PPI Engineering for a proposed vineyard conversion project on the property owned by KJS Investment Properties and Sorrento Inc. (KJS/Sorrento). The report was prepared to support the Erosion Control Plan (ECP) application #P17-00432. The ECP proposes to convert approximately 156.8 gross acres of existing annual grassland, brush and trees to 111.5 net acres of vineyard. The project is located off Sage Canyon Road in Napa County, CA and is within the Lake Hennessey Watershed, a municipal water supply drainage. Please see **Figure 1** in **Appendix A** for the project location map.

The objective of this analysis is to model existing (pre-project) conditions as well as developed (post-project) conditions to predict present and future runoff values. The primary goal is to remain "flood neutral" or to have no-net-increase in peak runoff post-project. Increases in peak runoff could potentially cause negative effects in natural drainages such as hydro-modification or increased sedimentation.

The majority of watersheds within the project site flow to Lake Hennessey. A small section of proposed project area on the east side of the property drains to Lake Berryessa. See **Figures 2 & 3** in **Appendix A** for the mapped water courses and watershed delineation.

1.2 Project Scope

The scope for the analysis is as follows:

- Obtain topographic maps, aerial photographs, soil survey data, and precipitation data.
- Delineate watersheds and sub watersheds that flow through the project areas.
- Delineate land use polygons using aerial photographs and soil survey data.
- Conduct site visits to confirm land use delineation, existing cover conditions, and drainage patterns.
- Conduct site visits to locate, measure, and document representative stream channel cross sections.
- Develop a computer model for existing hydrologic conditions and run the model for the 2-, 10-, 50- and 100-year storm events.
- Develop a computer model for proposed hydrologic conditions and run the model for the 2-, 10-, 50- and 100-year storm events.
- Analyze and compare pre-project to post-project model results.
- Analyze the potential effects of proposed storm water conveyance infrastructure.
- Design and incorporate mitigation measures to neutralize any potential increases in runoff (if required).

1.3 Hydrologic Model Background & Overview

HydroCAD computer modeling software was used for the Hydrologic Analysis. The program utilizes the Natural Resource Conservation Service (NRCS) Curve Number methodology and procedures for analyzing storm runoff which are based on NRCS unit hydrograph theory. HydroCAD employs the TR-20 approach to runoff modeling along with standard routing and hydraulic procedures.

HydroCAD is a single-event rainfall-runoff, small watershed hydrologic model. The model generates hydrographs from both urban and agricultural areas and at selected points along the stream system. The technical reference for this program is the HydroCAD software owner's manual. Additional resources can be found in Part 630 of the NRCS - National Engineering Handbook (NEH) which provides detailed information on Hydrology and the NRCS curve number methodology.

For this analysis, numerous watersheds were delineated and evaluated for pre- and post-project runoff values. An additional 5 smaller "areas" were delineated and evaluated using a curve number analysis, which compares pre-project and post-project curve numbers. This comparison is used as an indication of potential changes in runoff. The curve number analysis is appropriate in some instances when the amount of project area being analyzed is relatively small. The majority of the delineated watersheds flow to Elder Creek and thence a licensed on-stream reservoir (Matheson Reservoir) that is located on the property (**Figures 2 & 3**). After the reservoir has reached capacity, an outlet weir structure releases the water back into the stream channel. Two additional watersheds drain to Elder Creek below Matheson Reservoir and one watershed drains west from the property into an unnamed drainage. Eventually all watersheds converge and flow to Sage Creek and thence Lake Hennessey. A small portion of the project is located in the Soda Valley Creek watershed which is part of the Putah Creek Watershed and flows to Lake Berryessa in eastern Napa County.

2.0 DISCUSSION OF MODELED CONDITIONS

2.1 Existing Land Use Conditions

The KJS/Sorrento property is comprised of multiple vegetation types, which include oak woodland, annual grassland, brush, chaparral, and existing vineyards. Adjacent properties in the vicinity of the proposed project consist of comparable native vegetation as well as existing vineyard. The terrain consists of rolling hills and slopes range from relatively flat to more moderate and steep. The property is currently and has historically been grazed for fire protection and land management. See **Figure 4** in **Appendix A** for existing land use conditions.

2.2 Developed Land Use Conditions

The developed, post-project condition would convert approximately 111.5 acres of the total property acreage of 972.8 acres to vineyard, and approximately 45.3 acres into avenues, a

reservoir, and associated erosion control infrastructure. See **Figure 5** in **Appendix A** for developed land use conditions.

3.0 HYDROLOGIC MODELING METHODOLOGY

3.1 Watershed Delineation

Watersheds for this project were delineated using a combination of four topographic mapping sources. American Aerial Mapping, Inc. provided 2-foot-contour-interval aerial mapping of the site. PPI Engineering provided supplemental 2-foot-contour-interval ground mapping in selected locations where dense vegetation interfered with the accuracy of the aerial mapping. Where watersheds extended past the limits of the aerial mapping, Napa County 5-foot LiDAR-generated contours were used to supplement. Lastly, there is a small portion of the northern-most watershed (located on a neighboring property) that was delineated using a USGS quadrangle map as this area extended past the limits of the Napa County LiDAR mapping.

Watersheds were drawn to encompass all proposed project areas. Several watersheds were delineated which exit the property at various points of interest. Additionally, 5 sub areas were delineated for small portions of the project (±0.1 to ±0.9 acres) that do not drain to any of the larger defined watersheds.

3.2 Precipitation Data

Precipitation data was obtained from the National Oceanic and Atmospheric Administration (NOAA) Precipitation-Frequency Atlas of the Western United States. The data for 24-hour storm durations for the given frequencies are summarized in **Table 1**.

Table 1 – Precipitation Data for KJS Investment Properties & Sorrento Inc.

Storm Event	24 Hour Precipitation (inches)
2-Year	3.84
10-Year	5.68
50-Year	7.53
100-Year	8.30

The meteorological data uses the NRCS Hypothetical storm. Given the project's location, it is characterized by a Type 1A Storm Distribution, which indicates relatively low intensity rainfall events that are typical in the Pacific maritime climate. 24-hour storm hydrographs were simulated for 2-, 10-, 50-, and 100-year storms (**Table 1**). The model utilizes the storage-indication plus translation method for routing flows through defined streams, proposed pipelines, proposed detention basins, and existing reservoirs.

3.3 Soil Data

The NRCS Web Soil Survey for Napa County was used to delineate soil boundaries within the project area and to determine their Hydrologic Soil Group (HSG). Hydrologic Soil Groups separate different soil types into categories based on their infiltration and runoff characteristics.

The soil survey delineates five different soil types on the property: Bressa-Dibble complex, Los Gatos loam, Maymen-Millsholm-Lodo association, Millsholm loam, and Pleasanton loam.

There are four HSGs defined in the NRCS National Engineering Handbook Chapter 7. HSG "A" is classified as having low runoff potential along with high infiltration rates. HSG "B" soils have moderately-low runoff potential and moderate infiltration rates. HSG "C" soils have moderately-high runoff potential with water transmission being somewhat restricted. Lastly, HSG "D" soils have high runoff potential with water movement through the soil being restricted to very restricted or any soil with a shallow depth (less than 20 inches) to an impermeable layer.

Approximately 55% of the study area modeled is mapped as HSG "C". Approximately 45% is mapped as HSG "D". See **Figure 6** in **Appendix A** for the HSG and soil boundary map.

3.4 Land Use and Runoff Curve Number

There are nine land use cover types within the watersheds as defined in the National Engineering Handbook Chapter 9. These are Vineyard (annual grass); Pasture/Grass; Brush; Woods-grass; Woods; Farmstead; Fallow/Bare; Dirt Road; and Gravel Road. Areas within each land use were delineated that have similar hydrologic condition ratings of either "Poor", "Fair" or "Good" and further subdivided by HSG. Runoff curve numbers (RCN) were then assigned to each soil-cover complex using the combination of HSG, hydrologic condition, and cover type. The RCN reflects the runoff potential for each complex; the larger the RCN, the greater the runoff potential.

Existing hydrologic conditions were verified during multiple field visits by Jim Bushey and Matt Bueno of PPI Engineering throughout 2017. An additional field visit to confirm the existing conditions took place on December 22, 2017 with Napa County Engineering Division staff. Maps showing the land use within each watershed are provided for existing conditions in **Figure 4** and for developed conditions in **Figure 5** in **Appendix A**.

Tables showing curve numbers for each land use within each soil type, hydrologic condition, and watershed, including calculated acreages, are provided in **Appendix B** for existing conditions and in **Appendix C** for developed conditions. After RCNs were established for each cover type within the watersheds, weighted average curve numbers were calculated to represent the collective areas and are shown in **Table 2** on the following page. The last column in this table shows the change in curve number for each watershed. An increase in RCN is an indication of reduced infiltration and generally associated with higher runoff potential while a decrease is an indication of increased infiltration and lower runoff potential.

Table 2 – Average Runoff Curve Numbers by Watershed / Area

Watershed Basin / Area	Watershed	Drainage Area (acres)	Runoff Curve Number		
			Existing	Developed	Change
Elder Creek / Matheson Reservoir Basin	0	414.5	74	74	0
	1	62.8	77	77	0
	2A*	66.0	74	74	0
	2B*		75	74	-1
	2C*		N/A	73	0
	3	50.0	77	76	-1
	4	36.8	76	75	-1
	5	54.2	75	74	-1
	6	51.7	77	76	-1
	7	71.9	75	74	-1
	8	60.6	76	76	0
	9	74.2	76	76	0
	10	14.9	79	79	0
	11	63.7	77	77	0
	M. Hill	1.6	81	81	0
	Direct Rain	11.7	98	98	0
Unnamed Tributary	12	77.3	80	80	0
Elder Creek below Matheson Reservoir	13	54.9	82	81	-1
	14	54.8	82	81	-1
Area A	A	3.5	73	73	0
Area B	B	5.1	76	76	0
Area C	C	1.2	83	83	0
Area D	D	26.4	79	79	0
Area E	E	7.2	80	80	0

* *Note that Watershed 2 was split into smaller sub-watersheds during the modeling process and direct CN comparison between pre-project and post-project sub-watersheds may not be applicable. Also note that 2C only appears in post-project modeling and the original area was included in pre-project 2A.*

In the table above, "M. Hill" refers to the watershed designated as Matheson Hill and "Direct Rain" refers to precipitation that is directly captured in Matheson Reservoir.

3.5 Discussion of Proposed Land Use Changes within each Watershed

General Discussion

During the vineyard development process, existing land use is modified and this directly affects the hydrologic characteristics of the site. A description of the proposed land-disturbing activities is provided in Section 1 of the Erosion Control Plan narrative, which states: "Activities to be accomplished include removal of pasture, hayfield, grass, brush and trees within the proposed clearing limits, ripping, rock removal, cultivating the soil to prepare for planting, seeding cover crop, mulching…". These activities that change the land use characteristics

inherently modify the runoff curve numbers. Grass and tree removal may have the potential to increase runoff when an equivalent vegetative cover is not planted nor any additional measures taken.

Elder Creek / Matheson Reservoir Basin

Watersheds 0 – 9 and 11 flow to the main stream channel located at the center of Elder Valley which is known as Elder Creek. Elder Creek eventually flows into Matheson Reservoir, also located on the property. Watershed 10 flows directly into Matheson Reservoir via an existing sediment basin and culvert located on the reservoir's west side. The Matheson Hill (M. Hill) Watershed contains contributing area south of the reservoir. Matheson Reservoir primarily serves the existing vineyards on the property for irrigation and frost protection (State Water Resources Control Board, License #9125). The entire Matheson Reservoir Basin encompasses approximately 1,020 acres, of which approximately 160 acres (15.7% of the basin) are proposed for vineyards, avenues, reservoirs, and other erosion control infrastructure.

Watershed 0

Watershed 0 is located at the northern-most part of the property and extends north to the headwaters of Elder Creek. The watershed encompasses approximately 415 acres of dense brush, chaparral, and woodland. There is no proposed project area that lies within Watershed 0, but it was incorporated into the model to fully assess all of the contributing watershed area and potential runoff that flows to Elder Creek and Matheson Reservoir. Since no changes are being proposed within this watershed, no change in runoff curve number will result from the proposed project.

Watershed 1

Watershed 1 is an approximately 63-acre area located in the northeastern portion of the property. Approximately 7.7 acres within this watershed are proposed for vineyard conversion. The RCN is not expected to change within Watershed 1 as a result of the proposed vineyard conversion. The same land use activities and modifications will take place that have been described in the *General Discussion* section above.

Watershed 2

Watershed 2 is located west of Watershed 1 and contains approximately 66 acres, of which approximately 12.2 acres are proposed for vineyard conversion. There is a small existing stock pond within Watershed 2 that will be modified and utilized as a detention structure for storm runoff. Watershed 2 exhibits no change in RCN after development. The same land use activities and modifications will take place that have been described in the *General Discussion* section above.

Watershed 3

Watershed 3 is located southeast of Watershed 1 and contains approximately 50 acres of existing woods, annual grasslands, and vineyard. Approximately 11.7 acres are proposed for

vineyard conversion. Watershed 3 is expected to have a small decrease in RCN post-project. The same land use activities and modifications will take place that have been described in the *General Discussion* section.

Watershed 4

Watershed 4 is located south of Watershed 2 and consists of approximately 36.8 acres. Approximately 11 acres are proposed for vineyard conversion. Watershed 4 will have a small decrease in RCN post-project. The proposed development within Watershed 4 will have the same land use activities and modifications that are described in the *General Discussion* section.

Watershed 5

Watershed 5 is directly south of Watershed 4 and encompasses an area of approximately 54.2 acres. Approximately 21 acres are proposed for vineyard conversion. There is a modest decrease in RCN post-project for this watershed. The proposed development within Watershed 5 will have the same land use activities and modifications that are described in the *General Discussion* section.

Watershed 6

Watershed 6 includes an area of approximately 51.7 acres and is located east of Watershed 5. Approximately 17.2 acres are proposed for vineyard conversion. There is expected to be a small decrease in RCN post-project for this watershed. The proposed development within Watershed 6 will have the same land use activities and modifications that are described in the *General Discussion* section.

Watershed 7

Watershed 7 is located south of Watershed 5 and contains an area of approximately 71.9 acres. Approximately 17.4 acres are proposed for development. Of the 17.4 acres, approximately 12.4 acres will be converted to vineyard and approximately 5 acres will be utilized for a new off-stream water storage reservoir. The model predicts no change in RCN post-project for this watershed. The proposed development within Watershed 7 will have the same land use activities and modifications that are described in the *General Discussion* section.

Watershed 8

Watershed 8 is located east of Watershed 7 and consists of approximately 60.6 acres. Approximately 14.2 acres are proposed for vineyard conversion. No change in RCN is predicted within this watershed post-project. The proposed development within Watershed 8 will have the same land use activities and modifications that are described in the *General Discussion* section.

Watershed 9

Watershed 9 is located south of Watershed 8 and includes approximately 74.2 acres. Approximately 4.5 acres are proposed for vineyard conversion. No change in RCN is predicted

within this watershed post-project. The proposed development within Watershed 9 will have the same land use activities and modifications that are described in the *General Discussion* section.

Watershed 10

Watershed 10 is located south of Watershed 9 and contains approximately 14.9 acres of existing vineyard and woodland. Approximately 0.5 acres are proposed for vineyard conversion. No change in RCN is expected within this watershed post-project. The proposed development within Watershed 10 will have the same land use activities and modifications that are described in the *General Discussion* section.

Watershed 11

Watershed 11 is located east of Watershed 9 and encompasses approximately 63.7 acres of existing vineyard, annual grassland and oak woodland. Approximately 4.1 acres are proposed for vineyard conversion. No change in RCN is expected within this watershed post-project. The proposed development within Watershed 11 will have the same land use activities and modifications that are described in the *General Discussion* section.

Matheson Hill & Direct Rain

Matheson Hill is located south of Matheson Reservoir and contains approximately 1.6 acres. There are no proposed changes within this watershed and as a result, no changes in RCN will result from the project. The Direct Rain watershed accounts for the amount of runoff due to rainfall directly on the reservoir water surface. No changes are proposed to the existing Matheson Reservoir.

Unnamed Tributary

Watershed 12

Watershed 12 is located on the west side of the property and contains approximately 77.3 acres of oak woodland, annual grassland, and brush. There is a small drainage that concentrates flow near the downstream end of the watershed and was mapped as a wetland swale. The drainage continues west of the property through neighboring vineyards. Eventually the drainage makes its way to Sage Creek and thence Lake Hennessey. Approximately 10.8 acres are proposed for vineyard conversion. No change in RCN is expected within this watershed. The proposed development within Watershed 12 will have the same land use activities and modifications that are described in the *General Discussion* section.

Elder Creek below Matheson Reservoir

Once Matheson Reservoir has reached full capacity, a concrete weir and rocked spillway outlet structure located on the southwest side of the reservoir allows water to flow into lower Elder Creek. Watershed 13 is located predominantly west of lower Elder Creek as it flows south toward State Route 128 (SR 128). The stream then crosses SR 128 and leaves the property for a

short distance then re-crosses SR 128 and re-enters the subject property within Watershed 14, which lies southwest of Watershed 13.

It should be noted that the modeling for this small section of lower Elder Creek does not include all areas contributing drainage to the reach. Watersheds 13 and 14 were delineated to encompass all of the contributing area along the west and north sides of lower Elder Creek respectively. This ensures the modeling captures impacts of the areas converted without including extraneous areas on the opposite side of the channel. As there will be no conversion in the areas excluded, their exclusion will not affect model results for the pre- and post-project comparison.

Watershed 13

Watershed 13 is located southwest of Matheson Reservoir and contains approximately 54.9 acres. Approximately 11 acres are proposed for vineyard conversion. No change in RCN is expected within this watershed post-project. The proposed development within Watershed 13 will have the same land use activities and modifications that are described in the *General Discussion* section.

Watershed 14

Watershed 14 is located southwest of Watershed 13 and contains approximately 54.8 acres. Approximately 10.8 acres are proposed for vineyard conversion. No change in RCN is expected within this watershed post-project. The proposed development within Watershed 14 will have the same land use activities and modifications that are described in the *General Discussion* section.

Curve Number Analysis for Areas A, B, C, D and E

There are five areas where very small portions of proposed vineyard are located outside the delineated watersheds described above. All but one of these areas contain less than half an acre of proposed vineyard, and the other contains less than one acre of proposed vineyard. Due to size of these areas the analysis focused on comparing pre-project versus post-project Runoff Curve Numbers. A change in curve number would result in a direct correlation to a change in runoff at this small scale. A higher post-project curve number indicates higher runoff potential. Each of the sub areas is located on a ridge top at or near the watershed break.

Area A

Area A is located west of Watershed 2 and contains approximately 3.5 acres. Approximately 0.4 acres are proposed for vineyard conversion. No change in runoff curve number is expected for this area.

Area B

Area B is located west of Watershed 5 and contains approximately 5.1 acres. Approximately 0.1 acres are proposed for vineyard conversion. No change in runoff curve number is expected for this area.

Area C

Area C is located northwest of Watershed 14 and contains approximately 1.2 acres. Approximately 0.2 acres are proposed for vineyard conversion. No change in runoff curve number is expected for this area.

Area D

Area D is located southeast of Watershed 11 and contains approximately 26.4 acres. Approximately 0.9 acres are proposed for vineyard conversion. No change in runoff curve number is expected for this area.

Area E

Area E is located south of Watershed 11 and contains approximately 7.2 acres. Approximately 0.2 acres are proposed for vineyard conversion. No change in runoff curve number is expected for this area.

3.6 Channel Configurations and Roughness

Measurements of the receiving channels were taken within certain watersheds to characterize typical channel cross-sections for use in the hydrologic model. In addition, channel roughness values (Manning's "n") were estimated using procedures outlined in the USGS Water-Supply Paper 2339. The HydroCAD software utilizes these cross-sections and roughness values when calculating total time of concentration for each watershed and also for reach-routing calculations. The locations of measured channels are shown in **Figure 7** in **Appendix A.**

3.7 Time of Concentration Development

The time of concentration is defined as the time required for runoff to travel from the hydrologically most distant location in a watershed to its outlet or point of interest. To include the effects of proposed infrastructure within each watershed, time of concentration flow paths were drawn to pass through proposed conveyance structures such as diversion ditches or pipelines where appropriate. The HydroCAD computer program calculates the total time consisting of three separate flow patterns: sheet flow, shallow concentrated flow, and open channel/pipe flow. Sheet flow is over plane surfaces and occurs at the most distant location in the watershed and is, by definition, less than 100 feet in length. Sheet flow lengths were calculated using the McCuen-Speiss equation based on limiting criteria for various cover types, Manning's n-values, and slope combinations.

McCuen-Spiess Maximium Sheet Flow Length:

$$L = \left(\frac{100 * \sqrt{S}}{n}\right)$$

Where:
L = Maximum Sheet Flow Length (ft)
S = Slope (ft/ft)
n = Manning's roughness coefficient

Shallow concentrated flow occurs after sheet flow has ended up to the point where open channel flow begins.

The Manning's equation was used in conjunction with the Continuity equation to calculate average channel velocities (open channel flow) based on typical cross sections measured in the field. Channel lengths and average channel slopes were measured from existing topographic maps.

Manning's Equation:

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Where:
Q = Discharge (cfs)
n = Manning's Roughness Coefficient
A = Cross Sectional Area (ft^2)
R = Hydraulic Radius (ft) = A/P
P = Wetted Perimeter (ft)
S = Channel Slope (ft/ft)

Continuity Equation:

$$V = Q/A$$

Where:
V = Velocity (fps)
Q = Discharge (cfs)
A = Cross Sectional Area (ft^2)

The total time of concentration (T_c) is the sum of the time durations from all three flow patterns.

Typical channel characteristics that impact time of concentration calculations are summarized in **Table 3**. The velocities were computed in the model using these measured representative cross sections within each watershed.

Table 3 – Typical Channel Characteristics

Typical X-Section by Watershed	Bottom Width (ft)	Bank Height (ft)	Side Slope 1 (H:V)	Side Slope 2 (H:V)	Area (ft^2)	Mannings "n"
1, 2, 3 & 4	9	5	1.5:1	1.5:1	82.5	0.063
5, 6, & 7	7	8	2:1	2:1	184	0.07
8	8	7	1.5:1	1.5:1	129.5	0.072
9	8	8	1:1	4:1	224	0.075
13	6	6	2:1	2:1	108	0.065
14	8	6	2:1	2:1	120	0.066

3.8 Time of Concentration by Watershed

Table 4 on the following page shows a summary of T_c for each watershed that was analyzed. There are a total of 18 watersheds modeled in this analysis that contain T_c values greater than zero. Of these 18 watersheds, 8 show predicted post-project increases in T_c, 3 show predicted decreases, and 6 did not change. Watershed 2C did not have a pre-project T_c from which to draw a comparison due to the necessity of reconfiguring this watershed for vineyard infrastructure. The direct rainfall watersheds that account for runoff contribution due to rain falling directly onto a water surface do not have a T_c associated with them because runoff is assumed to be instantaneous. The increases in T_c are mainly attributed to the proposed infrastructure where water outlets through level spreaders and rock aprons which disperse concentrated flow and return it to sheet flow. Slight decreases in T_c were caused by proposed water conveyance infrastructure. See **Figures 8A** and **8B** in **Appendix A** for the locations of the time of concentration flow paths.

Table 4 – Time of Concentration by Watershed

Watershed Basin	Watershed	T_c Existing minutes	T_c Developed minutes	Net Change
Elder Creek / Matheson Reservoir Basin	0	21.7	21.7	0.0
	1	18.9	20.3	1.4
	2A*	18.6	18.6	0.0
	2B*	10.0	12.1	2.1
	2C*	N/A	9.1	N/A
	3	14.8	10.0	-4.8
	4	11.8	12.2	0.4
	5	15.0	15.0	0.0
	6	15.2	21.6	6.4
	7	14.3	13.4	-0.9
	8	22.1	18.1	-4.0
	9	18.1	22.9	4.8
	10	7.7	7.7	0.0
	11	6.5	10.6	4.1
	M. Hill	6.7	6.7	0.0
Unnamed Tributary	12	9.6	14.0	4.4
Elder Creek below Matheson	13	19.6	19.6	0.0
	14	10.6	14.5	3.9

* *Note that Watershed 2 was split into smaller sub-watersheds during the modeling process. Also note that 2C only appears in post-project modeling and the original area was included in pre-project 2A.*

3.9 Reach Routing Methodology & Modeling

A reach is a length of stream or valley used as a unit of study. In HydroCAD, a reach is used to perform an independent hydrograph routing through an open channel or through a pipe flowing under open-channel conditions. Elder Creek was divided into 8 separate reaches in the Matheson Reservoir Basin Model. Inflows from watersheds and upstream reaches were routed through each segment using the storage-indication plus translation method.

4.0 STORMWATER CONVEYANCE INFRASTRUCTURE MODELING

4.1 Discussion of Stormwater Conveyance Infrastructure

Proposed stormwater conveyance infrastructure such as diversion ditches, inlets, and pipelines have the potential to change runoff characteristics within a site. As previously mentioned in *Section 3.7*, the model takes this into account in the time-of-concentration (T_c) calculations where it is incorporated into the longest flow path through the watershed. If proposed infrastructure is not along the longest flow path, it is not accounted for in the overall watershed model because, by definition, the peak runoff at the point of interest cannot occur until water from the most hydrologically distant point in the watershed has reached the outlet. This project proposes to install various surface drainage facilities that are not along the T_c flowpath for the overall watershed model in a number of blocks. While potential increases from this infrastructure will be attenuated at the Point of Interest because they are not on the T_c flowpath, a separate analysis of stormwater conveyance infrastructure was performed. This analysis modeled numerous points of interest that are located within the overall watersheds and, due to the complexity of splitting watersheds for the infrastructure analysis, direct comparison between the overall model and the pipe analysis models is not possible in all cases.

4.2 Overview of Modeling

All proposed stormwater conveyance infrastructure was modeled to ensure that there were no local increases in peak runoff at points of discharge. All proposed pipes, inlets, diversion ditches, junction boxes, and level spreaders were designed to handle the 100-year storm event as required per Napa County Code Section 18.108 ("Conservation Regulations"). HydroCAD software was utilized to model watersheds with a point of interest at the proposed point of discharge of every pipe. Similar to the overall basin model, a pre-project and post-project analysis at the infrastructure's outfall determined if there was a potential for increased runoff. The same methodology for deriving runoff curve numbers, times of concentration, and for performing reach routing calculation was used for infrastructure modeling as was discussed in the preceding sections. **Table 5** on the following page compares pre-project and post-project pipe watershed areas and runoff curve numbers. In order to properly route flows through proposed conveyance infrastructure, each post-project watershed was split into multiple sub-watersheds. Please see **Figures 9 - 14** in **Appendix A** for maps that show pre-project and post-project infrastructure modeling watersheds, land use, time of concentrations and defined reaches.

Due to the large number of pipelines proposed for this project, the body of this report focuses primarily on pipelines that are directly discharging to or in the vicinity of watercourses that were mapped in the ECP. Modeling was performed and completed for all proposed project infrastructure even if not presented herein, and results can be found in **Appendix D**.

Table 5 – Pipe Watershed Areas & Runoff Curve Numbers

Overall Watershed	Pre-Project			Post-Project		
	Pipe Watershed	Drainage Area (acres)	Runoff CN	Pipe Watershed	Drainage Area (acres)	Runoff CN
2	2.2	10.23	75	2.2A	1.49	76
				2.2B	2.74	74
				2.2C	3.55	74
				2.2D	1.23	75
				2.2E	0.95	75
				2.2F	2.13	73
				2.2G	0.27	75
3	3.1	5.57	75	3.1A1	2.63	75
				3.1A2	2.94	74
				3.1B	12.82	77
				3.1C	7.18	76
				3.1D	13.40	77
	3.2	50.08	78	3.2A	14.78	78
4	4.1	35.85	75	4.1A	6.10	77
				4.1B	2.90	75
				4.1C	0.76	73
				4.1D	4.34	75
				4.1E	0.97	76
				4.1F	9.52	74
				4.1G	3.02	73
				4.1H	2.76	75
	4.2	12.23	74	4.2A	5.48	74
5	5.1	48.53	75	5.1A	12.61	75
				5.1B	3.43	74
				5.1C	11.91	73
				5.1D	5.71	75
				5.1E	1.46	75
				5.1F	13.73	74
6	6.1	48.66	77	6.1A	4.90	75
				6.1B	1.27	77
				6.1C	0.69	75
				6.1D	1.10	75
				6.1E	27.38	77
				6.1F	3.82	76
				6.1G	9.51	75

Table 5 – Pipe Watershed Areas & Runoff Curve Numbers (Continued)

Overall Watershed	Pre-Project			Post-Project		
	Pipe Watershed	Drainage Area (acres)	Runoff CN	Pipe Watershed	Drainage Area (acres)	Runoff CN
7	7.1	15.07	76	7.1A	2.42	87
				7.1B	3.63	75
				7.1C	8.45	73
	7.2	39.13	74	7.2A	3.83	76
				7.2B	0.54	77
				7.2C	11.97	74
				7.2D	14.51	73
				7.2E	7.08	73
8	8.1	35.02	77	8.1A	3.31	76
				8.1B	1.23	76
				8.1C	1.20	75
				8.1D	2.93	76
				8.1E	2.77	76
				8.1F	1.23	76
				8.1G	1.51	77
				8.1H	0.95	76
				8.1I	19.92	77

The pre-project and post-project watersheds were delineated using proposed pipe outlet locations as points of interest. The pipe network design looked carefully at how much contributing area and runoff has historically flown to points of interest and every effort was made to maintain the same watershed drainage area post-project. Post-project pipe watersheds were then divided as needed to analyze the potential effect of the proposed infrastructure. A comparison of pre-project and post-project time of concentration is not appropriate for this modeling because the watersheds are not the same for pre- and post-project models. Potential increases due to infrastructure were analyzed by including the ditch or pipe network into the time of concentration calculation as well as using the proposed pipelines for direct reach routing in the HydroCAD model.

5.0 HYDROLOGIC MODELING RESULTS

5.1 Model Input Data

The peak discharge for each designated watershed in the overall basin model as well as the stormwater conveyance infrastructure modeling was computed using the HydroCAD computer software. Reaches were used where applicable to route inflows and outflow from each watershed into stream or pipe networks.

Input data for the basin models consisted of the following:

- Surface areas for pre-project and post-project land use
- 24-Hr. rainfall data for each modeled storm
- Rainfall Distribution - Type 1A
- Watershed time of concentration
- Reach data
- Detention basin data (if required)
- Reservoir or pond Storage Data (if applicable)

See **Figure 7** in **Appendix A** for the locations of reaches used for stream routing. See **Figures 9** and **10** in **Appendix A** for the locations of pipe reaches used for infrastructure modeling.

5.2 Hydrologic Modeling Results

The full results for the modeling of all storm events for each watershed are provided in **Appendix D**. The results in this section will focus on the 100-year storm discharges for each overall watershed and infrastructure model.

The baseline condition, labeled as “existing”, is for land use conditions and drainage patterns that existed at the time of this study. The developed condition consists of the incorporation of the proposed vineyard blocks and infrastructure as previously described in this report and within the ECP. Hydrologic model results for the evaluation of peak discharges are shown in **Table 6** and results from the stormwater conveyance infrastructure modeling are shown in **Table 7**.

Table 6 – Existing & Developed Peak Runoff for 100-Year Storm

Watershed Basin Area	Watershed / Reach	Existing Peak Runoff (cfs)	Developed Peak Runoff (cfs)	Net (cfs)	Percent Change
Elder Creek / Matheson Reservoir Basin	0	501.71	501.71	0.00	0
	1	84.45	83.53	-0.92	-1.1%
	2	71.38	66.45	-4.93	-6.9%
	3	69.25	68.93	-0.32	-0.5%
	4	50.42	48.96	-1.46	-2.9%
	5	71.12	69.13	-1.99	-2.8%
	6	71.41	66.18	-5.23	-7.3%
	7	94.61	88.70	-5.91	-6.2%
	8	77.40	79.85	2.45	3.2%
	9	97.79	94.00	-3.79	-3.9%
	10	22.23	22.23	0.00	0.0%
	11	90.83	89.93	-0.90	-1.0%
	M. Hill	2.51	2.51	0.00	0.0%
	Direct Rainfall	23.44	23.44	0.00	0.0%
	Reach 0 - In	501.71	501.71	0.00	0.0%
	Reach 0 - Out	489.44	489.44	0.00	0.0%
	Reach 1 - In	620.11	616.55	-3.56	-0.6%
	Reach 1 - Out	619.69	616.14	-3.55	-0.6%
	Reach 2 - In	670.43	657.96	-12.47	-1.9%
	Reach 2 - Out	670.21	657.69	-12.52	-1.9%
	Reach 3 - In	703.08	689.53	-13.55	-1.9%
	Reach 3 - Out	701.85	688.38	-13.47	-1.9%
	Reach 4 - In	750.57	734.95	-15.62	-2.1%
	Reach 4 - Out	750.41	734.84	-15.57	-2.1%
	Reach 5 - In	799.83	790.45	-9.38	-1.2%
	Reach 5 - Out	798.82	789.54	-9.28	-1.2%
	Reach 6 - In	859.60	844.26	-15.34	-1.8%
	Reach 6 - Out	848.00	833.32	-14.68	-1.7%
	Reach 7 - In	898.53	878.27	-20.26	-2.3%
	Reach 7 - Out	887.88	868.04	-19.84	-2.2%
	M. Reservoir - In	989.26	973.31	-15.95	-1.6%
	M. Reservoir - Out	**883.09**	**869.96**	**-13.13**	**-1.5%**
Unnamed Tributary	12	117.88	115.87	-2.01	-1.7%
Elder Creek below Matheson Reservoir	13	82.83	80.98	-1.85	-2.2%
	14	86.96	83.71	-3.25	-3.7%

Table 7 – Conveyance Infrastructure Existing & Developed Peak Runoff for 100-Year Storm

Watershed	Pipe Watershed	Existing Peak Runoff (cfs)	Developed Peak Runoff (cfs)	Net (cfs)	Percent Change
2	2.2	8.92	4.99	-3.93	-44%
3	3.1	7.45	53.99	46.54	N/A*
	3.2	70.21	21.20	-49.01	N/A
			3.1 & 3.2 Net	-2.47	N/A
4	4.1	47.87	47.51	-0.36	-1%
	4.2	15.85	7.15	-8.70	-55%
5	5.1	63.70	63.50	-0.20	0%
6	6.1	68.21	66.90	-1.31	-2%
7	7.1	20.79	20.24	-0.55	-3%
	7.2	50.58	48.97	-1.61	-3%
8	8.1	48.62	49.03	0.41	1%

*****_Percent change calculations are not shown in this table for Watershed 3 as pre-and post-project watersheds differ significantly and a direct comparison is not applicable._

5.3 Discussion of Modeling Results

Elder Creek / Matheson Reservoir Basin

Modeling results for the Elder Creek / Matheson Reservoir Basin predict modest decreases for the majority of watersheds analyzed. Reductions in peak runoff from individual watersheds range from 0.5% to 7.3% for the 100-year event. Most of the reductions can be attributed to either a decrease in RCN after development or an increase in time of concentration after development. Watersheds 3, 4, 5, 6, & 7 predict reductions in RCN post-project while the remaining watersheds exhibited no change. Time of concentration increased in Watersheds 1, 4, 6, 9, & 11 while decreasing in Watersheds 3, 7, & 8. The remaining watersheds did not experience a change in time of concentrations from pre- to post-project.

The section of Elder Creek above Matheson Reservoir is defined in the analysis as Reaches 0 – 7. Reach 0 flow rates did not experience any changes because there is no proposed project area within Watershed 0. All subsequent reaches predict modest decreases in peak runoff when compared to the existing conditions that range from 0.6% to 2.3% for the 100-year event.

Watershed 1. Watershed 1 model results estimate a decrease in peak runoff after project development. This decrease ranges from 0.3 cfs to 0.9 cfs for the 2-year and 100-year storm events. The decrease in this watershed can be attributed to a small increase in time of concentration after development.

Watershed 2. Watershed 2 results initially predicted a slight increase in peak runoff post-project. There was also a potential increase in runoff within the watershed due to a series of proposed diversion ditches and pipelines that outlet to an existing pond (Pipe Watershed 2.2). The model was updated to utilize the existing stockpond within this watershed as a detention

basin which reduced developed peak flows to below existing conditions. Watershed 2 was split into additional subwatersheds in order to accurately model the existing stockpond and proposed modifications to the outlet structure and spillway. The existing pond outlet is essentially an overflow spillway that allows the pond to discharge excess runoff after it has reached capacity. The proposed modifications would repair and upgrade the existing spillway and also install a new outlet structure to attenuate the predicted increases in runoff (see the ECP for details).

Watershed 3. A slight decrease in runoff was predicted for the overall basin model in Watershed 3 which flows directly into Reach 2 of Elder Creek. Pipe watershed analyses 3.1 and 3.2 include the effects of the proposed drainage infrastructure. The existing condition shows that the majority of Watershed 3 enters Elder Creek via an existing diversion ditch that directs water around an existing vineyard block. The ECP proposes to construct multiple new diversion ditches that will re-route the water into a series of proposed drop inlets and pipelines. These pipelines will then outlet into Elder Creek approximately 500 feet downstream of the existing diversion ditch outlet location. There is a substantial change in peak flow for Watershed 3.1 and 3.2 because a large portion of the contributing area in pre-project Watershed 3.2 was moved into the post-project 3.1 watershed. The large runoff reduction in pipe Watershed 3.2 will offset the increase in runoff predicted for pipe Watershed 3.1. This decrease in runoff occurs upstream of the increase so there will be a net decrease in peak runoff into the stream channel.

Watershed 4. The Watershed 4 model predicts decreases in peak runoff that range from 0.9 cfs to 1.5 cfs for the 2-year and 100-year storms respectively. Similarly, pipe watershed model 4.1 exhibited a slight decrease that ranges from 0.2 cfs to 0.4 cfs for the 2-year and 100-year storm events. The pipe Watershed 4.2 model predicts a 55% reduction in peak flow (100-year storm) for water entering a small drainage near Block 24G. The substantial decrease in peak flow for pipe Watershed 4.2 is because most of the contributing watershed that originally flowed to the small drainage is being intercepted by proposed inlets and pipes that re-route the runoff around the drainage and directly to the Watershed 4 outlet. The pipe Watershed 4.3 model shows a slight increase in runoff that is less than 0.05 cfs for all storm events analyzed. This slight increase is due to a small decrease in time of concentration after development. However, the magnitude of this increase is so slight that it is within the statistical variability of the model and is essentially zero. Furthermore, the pipe outlet analyzed is approximately 1500 feet upstream of the nearest mapped “waters” and the slight increase, if in fact real, will be attenuated prior to reaching the receiving waters by the rock apron used for energy dissipation as well as natural variability in the landscape.

Watershed 5. The Watershed 5 outlet is located in an old earthen keyway that appears to have been excavated many years ago. The model predicts reductions in peak flow rates that range from 1.2 cfs to 2.0 cfs for the 2-year and 100-year storms. Pipe Watershed 5.1 also demonstrated similar reductions that range from 0.5 cfs to 0.2 cfs for the 2-year and 100-year events.

Watershed 6. Watershed 6 model results yielded small reductions in peak runoff for all storms analyzed. The modeled 2-year storm event displayed a 2.2 cfs decrease in peak runoff when compared to the existing model. The 100-year event model results followed suit with a 5.2 cfs decrease in peak runoff. Pipe Watershed 6.1 which outlets to the same keyway as the Watershed 5 outlet but from the east side of Elder Creek. Within this pipe watershed, the model estimates decreases in peak runoff post-project that range from 0.8 cfs to 1.3 cfs for the 2-year and 100-year storm events.

Watershed 7. The Watershed 7 model predicts decreases in peak runoff that vary from 2.3 cfs to 6.0 cfs for the 2-year and 100-year storm events. This reduction can be attributed mostly to a reduction in RCN post-project but is also related to the proposed water storage reservoir within this watershed. The proposed reservoir is off-stream and will not greatly impact the runoff characteristics of this watershed, but it does provide some detention for rainfall that is directly falling onto the reservoir water surface. Pipe Watersheds 7.1 and 7.2 also experienced small decreases in peak flow for all storm events analyzed.

Watershed 8. Watershed 8 model results yielded a slight increase in peak runoff as a result of the project. This increase was due to a reduction in the modeled time of concentration after development. The modest increases from Watershed 8 range from 0.8 cfs to 2.4 cfs for the 2-year and 100-year storm events. Watershed 8 outlets to Elder Creek at Reach 7 in the analysis. The model results predict a decreased inflow into Reach 7 that ranges from 3.8 cfs to 20.3 cfs for the same 2-year and 100-year storm events, due to moderate runoff reductions in upstream watersheds. The upstream decreases in Reach 7 will offset the predicted increase from Watershed 8 and resultant flow in Reach 7 will still be below pre-project levels. The Pipe Watershed 8.1 analysis shows a similar small increase in peak runoff after development. This will be attenuated as it enters Reach 7 for the same reasons stated above and no impacts to the reach are expected to occur.

Watershed 9. The Watershed 9 model predicts decreases in peak runoff that range from 1.1 cfs to 3.8 cfs for the 2-year and 100-year storms respectively. These minor decreases are associated with an increase in time of concentration after development.

Watershed 10. Watershed 10 results predict no change in runoff after development for all storm frequencies analyzed. This is because the amount of proposed project area within this watershed is small and there is no proposed infrastructure that would change the time of concentration.

Watershed 11. Watershed 11 results yielded small decreases in peak flow rates for each storm event. These decreases ranged from 0.4 cfs to 0.9 cfs for the 2-year and 100-year event. These decreases are attributed to a small increase in time of concentration.

Matheson Hill and Matheson Reservoir. There are no proposed changes within the Matheson Hill or the Direct Rainfall watersheds and as a result, no change in peak runoff is anticipated.

Matheson Reservoir is the point of convergence for Watersheds 0 through 11 and the Matheson Hill watershed. Pre-project modeling predicts a peak inflow rate of 989.3 cfs and an

outflow rate of 883.1 cfs for the 100-year storm event. The post-project model anticipates a peak inflow rate of 973.3 cfs and an outflow rate of 870.0 cfs for the 100-year storm event. This produces a net decrease in runoff of approximately 13.1 cfs at the Matheson Reservoir outlet.

Unnamed Tributary

Watershed 12 modeling results predict a small decrease in peak runoff that ranges from 0.9 cfs to 2.0 cfs for the 2-year and 100-year events. This decrease in peak runoff is due to an increase in time of concentration after development.

Elder Creek below Matheson Reservoir

Watershed 13 modeling results predict a decrease in runoff for all storm events analyzed. These decreases range from 1.4 cfs to 1.9 cfs for the 2-year and 100-year events. The expected decrease is from a reduction in RCN after development.

Watershed 14 modeling results yield reductions in peak flow that are slightly larger than Watershed 13. The decreases range from 2.0 cfs to 3.3 cfs for the 2-year and 100-year events. Similarly, this anticipated decrease is due to a reduction in RCN after development and an increased time of concentration.

Areas A, B, C, D and E

As discussed in *Section 3.5* above, a composite curve number analysis was utilized to analyze potential changes in runoff in Areas A – E due to the very small size of the project areas within these drainage areas. A change in curve number would result in a direct correlation to a change in runoff at this small scale since no infrastructure is proposed in these areas. A higher post-project curve number indicates higher runoff potential. As discussed further above, no change in runoff curve number is shown for Areas A – E and therefore no increases in peak runoff in post-project conditions are expected.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Hydrologic modeling results for the proposed vineyard conversion predict net decreases in peak flow rates for almost all watersheds in the overall basin model, with Watershed 8 being the only watershed that predicts a slight increase in peak runoff. This predicted increase will be offset where it enters Elder Creek due to a decrease in runoff that occurs in the upstream watersheds and reaches. These upstream decreases will attenuate the apparent Watershed 8 increase into Elder Creek to below pre-project levels.

Proposed stormwater conveyance infrastructure was also modeled at points of discharge throughout the project site. The majority of these models predict either a small decrease or no change in runoff post-project. The analyses specifically show that there are no net increases in peak flow where infrastructure outlets directly into a stream or mapped water course. Similar

to the overall basin model, Pipe Watershed 8.1 predicted a small increase in peak runoff post-project. This increase will be offset by upstream decreases in the same way as described in the paragraph above and is not expected to create any adverse effects. Additionally, there was a negligible increase in peak runoff predicted in Pipe Watershed 4.3. It is anticipated that this increase of less than 0.05 cfs for all modeled storm events will be attenuated to pre-project levels as it flows into and through the rock apron outlet structure which will help to disperse concentrated flow and provide a small amount of detention.

There are several proposed pipelines that outlet directly to Elder Creek. The locations of these outlets were chosen by identifying the natural drainage patterns and points of concentration of the sites. During field review, each location was observed to have some level of existing erosion or natural degradation caused by concentrated flow. By selecting these sites as proposed points of discharge for project infrastructure, the existing erosion sites will be repaired and improved from their existing condition (see ECP for additional detail regarding repairs). These improvements are expected to reduce sediment delivery into the watercourses which will improve overall water quality both on- and off-site.

Based on this analysis, there are no predicted increases in net runoff and no negative hydrologic impacts are expected as a result of this project.

7.0 REFERENCES

1. HydroCAD Stormwater Modeling System, Owner's Manual, Version 10

2. PPI Engineering, Inc. KJS Investments & Sorrento Inc. Erosion Control Plan, Revised June 2018

3. United States Department of Agriculture, Natural Resources Conservation Service, *TR-55, Urban Hydrology for Small Watershed*, January 1975, updated 2003.

4. United States Department of Agriculture, Soil Conservation Service, *Soil Survey of Napa County, California*, 1978.

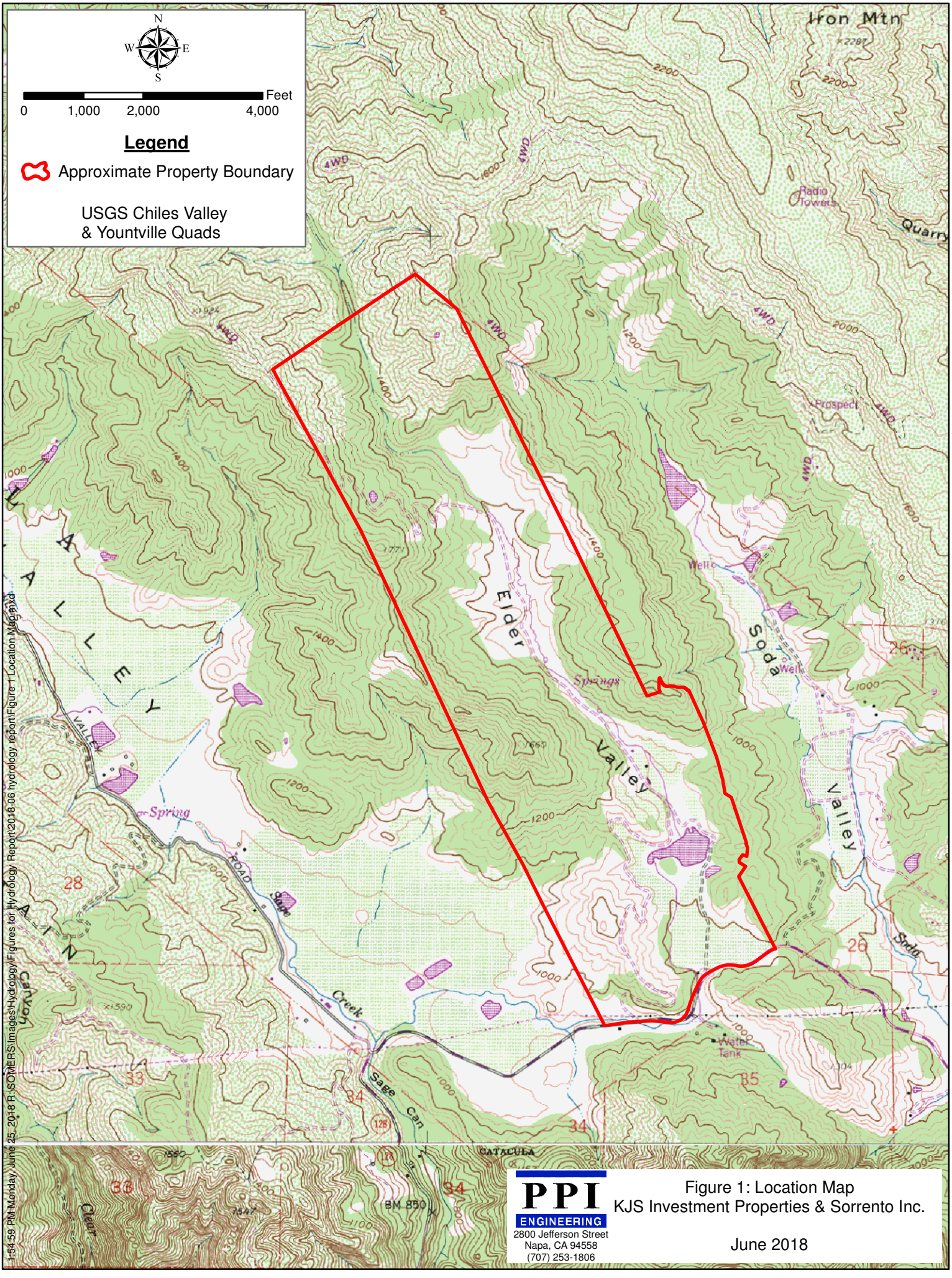
5. United States Department of Commerce, National Oceanic and Atmospheric Administration, *Precipitation-Frequency Atlas of the Western United States*, Volume XI- California, 1973.

6. United States Department of Agriculture, Natural Resources Conservation Service, *National Engineering Handbook Part 630, Chapters 7-9*, updated 2002-2009.

7. United States Geological Survey *Water-Supply Paper 2339*, 1989.

Appendix A

Figures



PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

Figure 1: Location Map
KJS Investment Properties & Sorrento Inc.

June 2018

N
W E
S

0 400 800 1,600 Feet

Legend

- Existing Reservoir or Pond
- U.S.G.S. Blue Line Stream (Approximate) Mapped by Hirkala
- U.S.G.S. Blue Line Stream (Approximate) Surveyed by PPI Engineering
- U.S.G.S. Blue Line Stream, Assumed Location
- Possible Waters of U.S. (Approximate) Mapped by Hirkala
- Wetland Swale (Approximate) Mapped by Hirkala
- Approximate Property Boundary

2014 Napa County Aerial Imagery

Elder Creek

Matheson Reservoir

Lower Elder Creek

1:57:01 PM Monday, June 25, 2018 R:\SOMERS\Images\Hydrology\Figures for Hydrology Report\2018-06 hydrology report\Figure 2 Property Boundary and Waters.mxd

PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

Figure 2: Property Boundary & Waters
KJS Investment Properties & Sorrento Inc.

June 2018

N
W E
S

0 550 1,100 2,200 Feet

Legend

- Watershed Boundaries
- Proposed Clearing Limits
- Proposed Block Boundaries
- 2014 Napa County Aerial Imagery

Watershed 0
Watershed 1
Watershed 2A
Watershed 2B
Watershed 3
Watershed 4
Watershed 5
Watershed 6
Watershed 7
Watershed 8
Watershed 9
Watershed 10
Watershed 11
Watershed 12
Watershed 13
Watershed 14
Area A
Area B
Area C
Area D
Area E
Matheson Reservoir
Matheson Hill

31 30 29B 29A 26 28 25 24G 27 32 33E 33D 33C 33B 33A 23G 23E 23F 24F 24E 23B 23C 23D 24D 24C 22 21 23A 20B 20A 24A 24B 19 18B 18A 17 14 16 15B 15A 12 13B 13A 8 9G 9H 9F 10 7 9E 9D 9C 5H 9B 9A 11 5J 5F 5G 6 5B 5C 5E 5D 5A 3 4B 4A 2 1

Figure 3: Watersheds and
Proposed Vineyard Block Locations
KJS Investment Properties & Sorrento Inc.

June 2018

PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

1:59:05 PM Monday, June 25, 2018 R:\SOMERS\Images\Hydrology\Figures for Hydrology Report\2018-06 hydrology report\Figure 3 Sub-watersheds and Proposed Vineyard Block Locations.mxd

N
W E
S

0 550 1,100 2,200 Feet

Legend

- Brush (good)
- Brush (fair)
- Water
- Annual Grass/Vineyard (fair)
- Farmstead
- Road (dirt)
- Road (gravel)
- Pasture (fair)
- Woods (good)
- Woods (fair)
- Woods/Grass Combination (fair)
- Watershed Boundaries
- Property Boundary

Napa County 2014 Aerial Imagery

Watershed 0
Watershed 1
Area A
Watershed 2A
Watershed 2B
Watershed 3
Watershed 4
Watershed 6
Area B
Watershed 5
Watershed 8
Watershed 7
Watershed 11
Watershed 9
Area D
Watershed 10
Watershed 12
Matheson Hill
Area E
Watershed 13
Area C
Watershed 14

2:06:08 PM Monday, June 25, 2018 R:\SOMERS\Images\Hydrology\Figures for Hydrology Report\2018-06 hydrology report\Figure 4 Existing Land Use.mxd

PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

Figure 4: Existing Land Use
KJS Investment Properties & Sorrento Inc.

June 2018

N
W E
S

0 550 1,100 2,200 Feet

Legend

- Vineyard (Good)
- Brush (good)
- Brush (fair)
- Water
- Annual Grass/Vineyard (fair)
- Farmstead
- Road (dirt)
- Road (gravel)
- Pasture (fair)
- Woods (good)
- Woods (fair)
- Woods/Grass Combination (fair)
- Watershed Boundaries
- Property Boundary

Napa County 2014 Aerial Imagery

Watershed 0
Watershed 1
Area A
Watershed 2A
Watershed 2B
Watershed 3
Watershed 4
Watershed 6
Area B
Watershed 5
Watershed 8
Watershed 7
Watershed 11
Watershed 9
Area D
Watershed 10
Watershed 12
Matheson Hill
Area E
Watershed 13
Area C
Watershed 14

2:07:57 PM Monday, June 25, 2018,R:\SOMERS\Images\Hydrology\Figures for Hydrology Report\2018-06 hydrology report\Figure 5 Developed Land Use.mxd

PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

Figure 5: Developed Land Use
KJS Investment Properties & Sorrento Inc.

June 2018

N
W E
S

0 550 1,100 2,200 Feet

Legend

- Hydrologic Soil Group C
- Hydrologic Soil Group D
- Watershed Boundaries
- Property Boundary
- Web Soil Survey

112: Bressa-Dibble Complex, 5-15% Slopes
113: Bressa-Dibble Complex, 15-30% Slopes
114: Bressa-Dibble Complex, 30-50% Slopes
158: Los Gatos Loam, 5-30% Slopes
159:Los Gatos Loam, 30-50% Slopes
161: Maxwell Clay, 2-9% Slopes
163: Maymen-Millsholm-Lodo Association, 30-75% Slopes
165: Millsholm Loam, 30-75% Slopes
166: Montara Clay Loam, 5-30% Slopes
167: Montara Clay Loam, 30-50% Slopes
170: Pleasanton Loam, 0-2% Slopes
171: Pleasanton Loam, 2-5% Slopes
180: Tehama Silt Loam, 0-5% Slopes
182: Yolo Loam, 2-5% Slopes
183: Water

Napa County 2014 Aerial Imagery

Watershed 0
Watershed 1
Watershed 2A
Watershed 2B
Watershed 3
Watershed 4
Watershed 5
Watershed 6
Watershed 7
Watershed 8
Watershed 9
Watershed 10
Watershed 11
Watershed 12
Watershed 13
Watershed 14
Area A
Area B
Area C
Area D
Area E
Matheson Hill

2:03:02 PM Monday, June 25, 2018 R:\SOMERS\Images\Hydrology\Figures for Hydrology Report\2018-06 hydrology report\Figure 6 Watersheds, Soil Types and Hydrologic Soil Groups.mxd

PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

Figure 6: Watersheds, Soil Types and Hydrologic Soil Groups
KJS Investment Properties & Sorrento Inc.

June 2018

N
W E
S

Feet
0 550 1,100 2,200

Legend

- Basin Point of Interest
- Watershed Channel Reaches
- Break in Reach
- Reach Cross Section
- U.S.G.S. Blue Line Stream (Approximate) Mapped by Hirkala
- Existing Reservoir or Pond
- U.S.G.S. Blue Line Stream, Assumed Location
- U.S.G.S. Blue Line Stream (Approximate) Surveyed by PPI Engineering
- Possible Waters of U.S. (Approximate) Mapped by Hirkala
- Wetland Swale (Approximate) Mapped by Hirkala
- Watershed Boundaries
- American Aerial 10' Index Contours
- PPI 10' Index Contours
- PPI 5' Index Contours
- Napa County Index Contours

Napa County 2014 Aerial Imagery

Watershed 0
Watershed 1
Watershed 2A
Watershed 2B
Watershed 3
Watershed 4
Watershed 5
Watershed 6
Watershed 7
Watershed 8
Watershed 9
Watershed 10
Watershed 11
Watershed 12
Watershed 13
Watershed 14
Area A
Area B
Area C
Area D
Area E
Reach 0
Reach 1
Reach 2
Reach 3
Reach 4
Reach 5
Reach 6
Reach 7
Matheson Reservoir
Matheson Hill

2:04:47 PM Monday, June 25, 2018 R:\SOMERS\Images\Hydrology\Figures for Hydrology Report\2018-06 hydrology report\Figure 7 Subwatershed Channel Reaches.mxd

PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

Figure 7: Watershed Channel Reaches
KJS Investment Properties & Sorrento Inc.

June 2018

N
W E
S

Feet
0 550 1,100 2,200

Legend

- Pre-Project Channel Flow
- Pre-Project Shallow Concentrated Flow
- Pre-Project Sheet Flow
- Break in Tc
- Proposed Reservoir
- Existing Reservoir or Pond
- Watershed Boundaries
- American Aerial 10' Index Contours
- PPI 10' Index Contours
- PPI 5' Index Contours
- Napa County Index Contours

Napa County 2014 Aerial Imagery

Watershed 0
Watershed 1
Area A
Watershed 2A
Watershed 2B
Watershed 3
Watershed 4
Watershed 5
Watershed 6
Area B
Watershed 7
Watershed 8
Watershed 9
Watershed 11
Area D
Watershed 10
Matheson Reservoir
Matheson Hill
Area E
Watershed 12
Watershed 13
Area C
Watershed 14

2:10:09 PM Monday, June 25, 2018,R:\SOMERS\Images\Hydrology\Figures for Hydrology Report\2018-06 hydrology report\Figure 8A Pre-Project Time of Concentration Flow Paths.mxd

PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

Figure 8A: Pre-Project Time of Concentration Flow Paths
KJS Investment Properties & Sorrento Inc.

June 2018

N
W E
S

Feet
0 550 1,100 2,200

Legend

- Post-Project Sheet Flow
- Post-Project Shallow Concentrated Flow
- Post-Project Channel Flow
- Break in Tc
- Proposed Reservoir
- Existing Reservoir or Pond
- Watershed Boundaries
- American Aerial 10' Index Contours
- PPI 10' Index Contours
- PPI 5' Index Contours
- Napa County Index Contours

Napa County 2014 Aerial Imagery

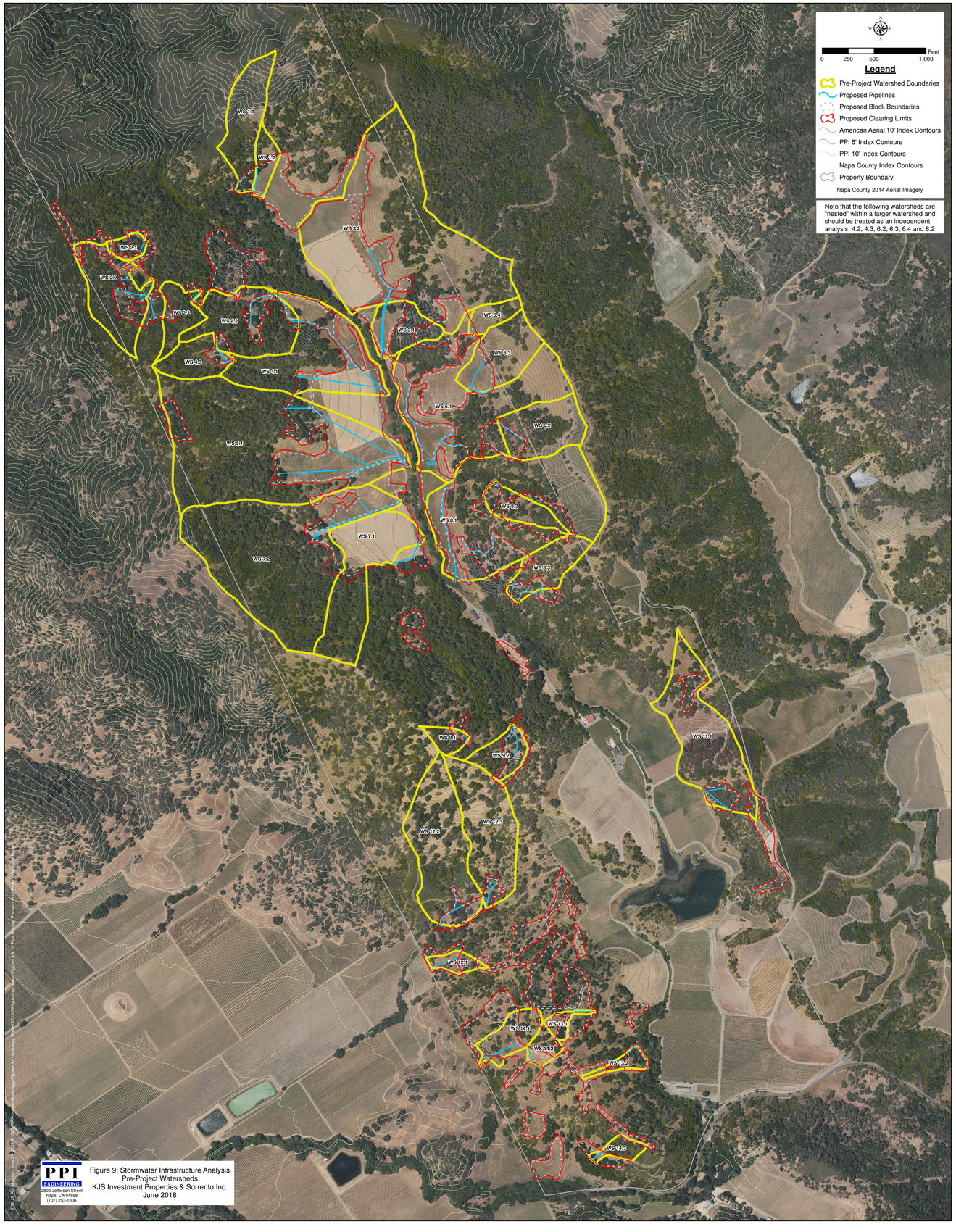
Watershed 0
Watershed 1
Area A
Watershed 2A
Watershed 2B
Watershed 3
Watershed 4
Watershed 5
Area B
Watershed 6
Watershed 7
Watershed 8
Watershed 9
Watershed 10
Watershed 11
Watershed 12
Watershed 13
Watershed 14
Area C
Area D
Area E
Matheson Reservoir
Matheson Hill

3:19:55 PM Monday, June 25, 2018,R:\SOMERS\Images\Hydrology\Figures for Hydrology Report\2018-06 hydrology report\Figure 8B Post-Project Time of Concentration Flow Paths.mxd

PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

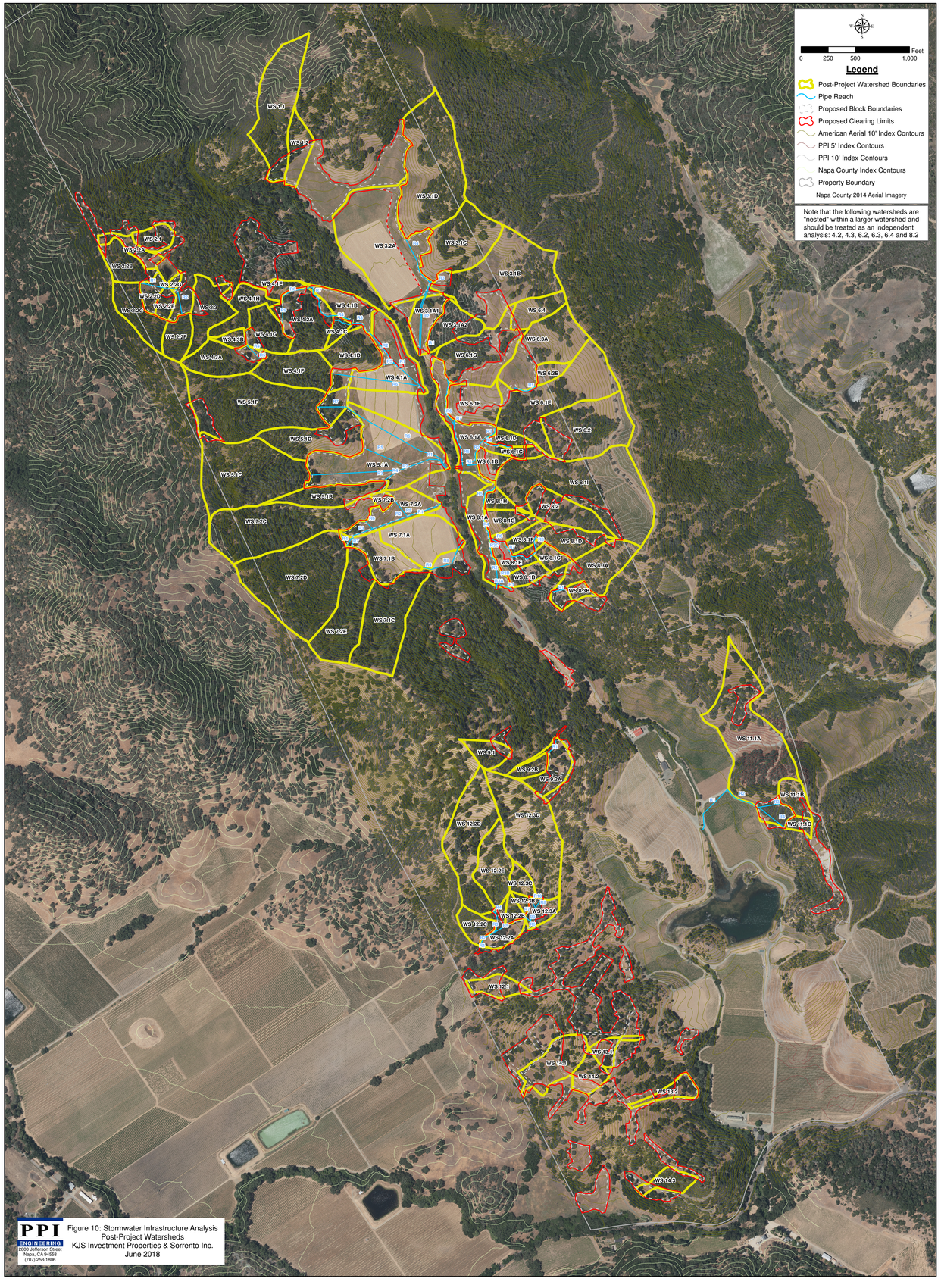
Figure 8B: Post-Project Time of Concentration Flow Paths
KJS Investment Properties & Sorrento Inc.

June 2018



PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

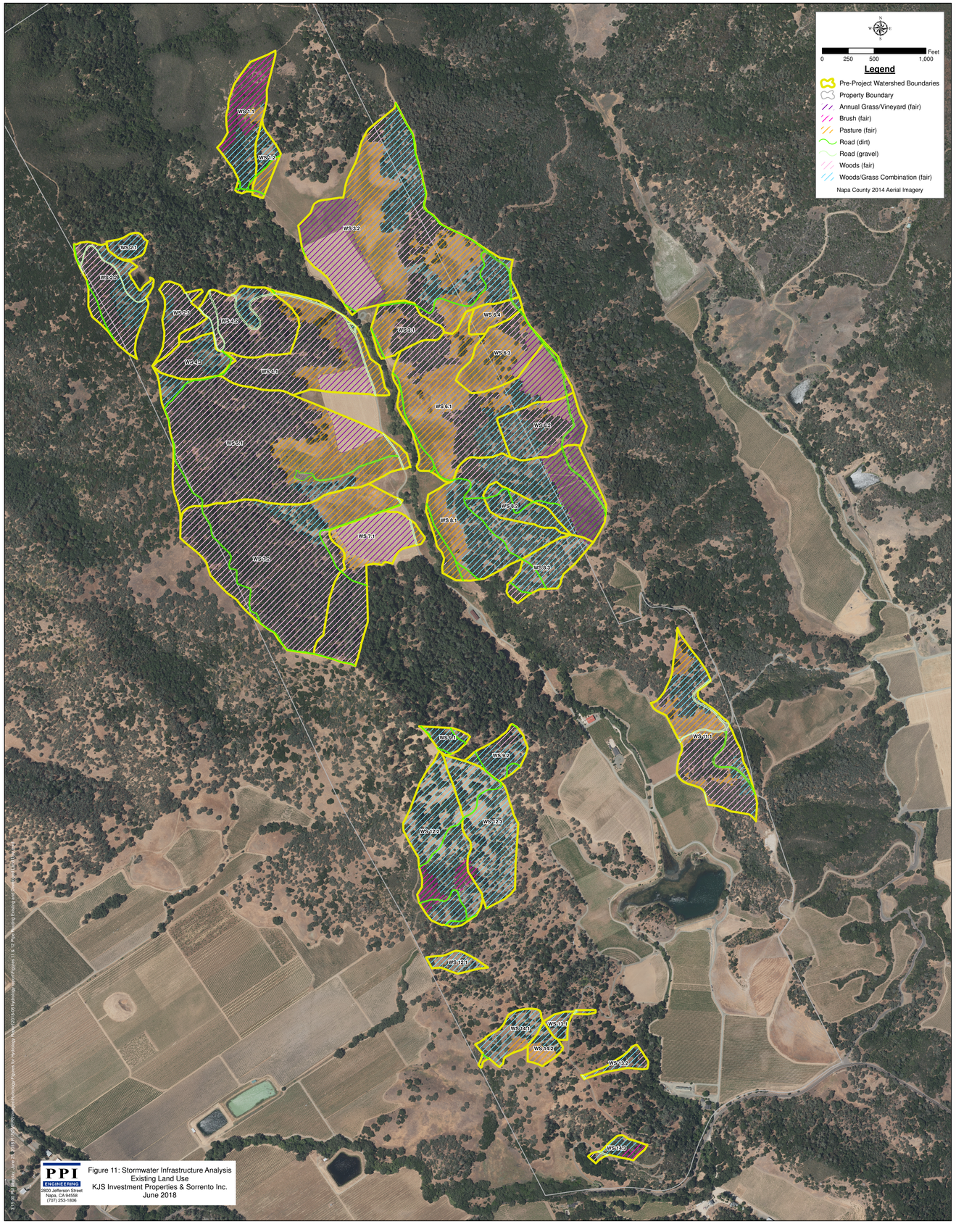
Figure 9: Stormwater Infrastructure Analysis
Pre-Project Watersheds
KJS Investment Properties & Sorrento Inc.
June 2018



PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

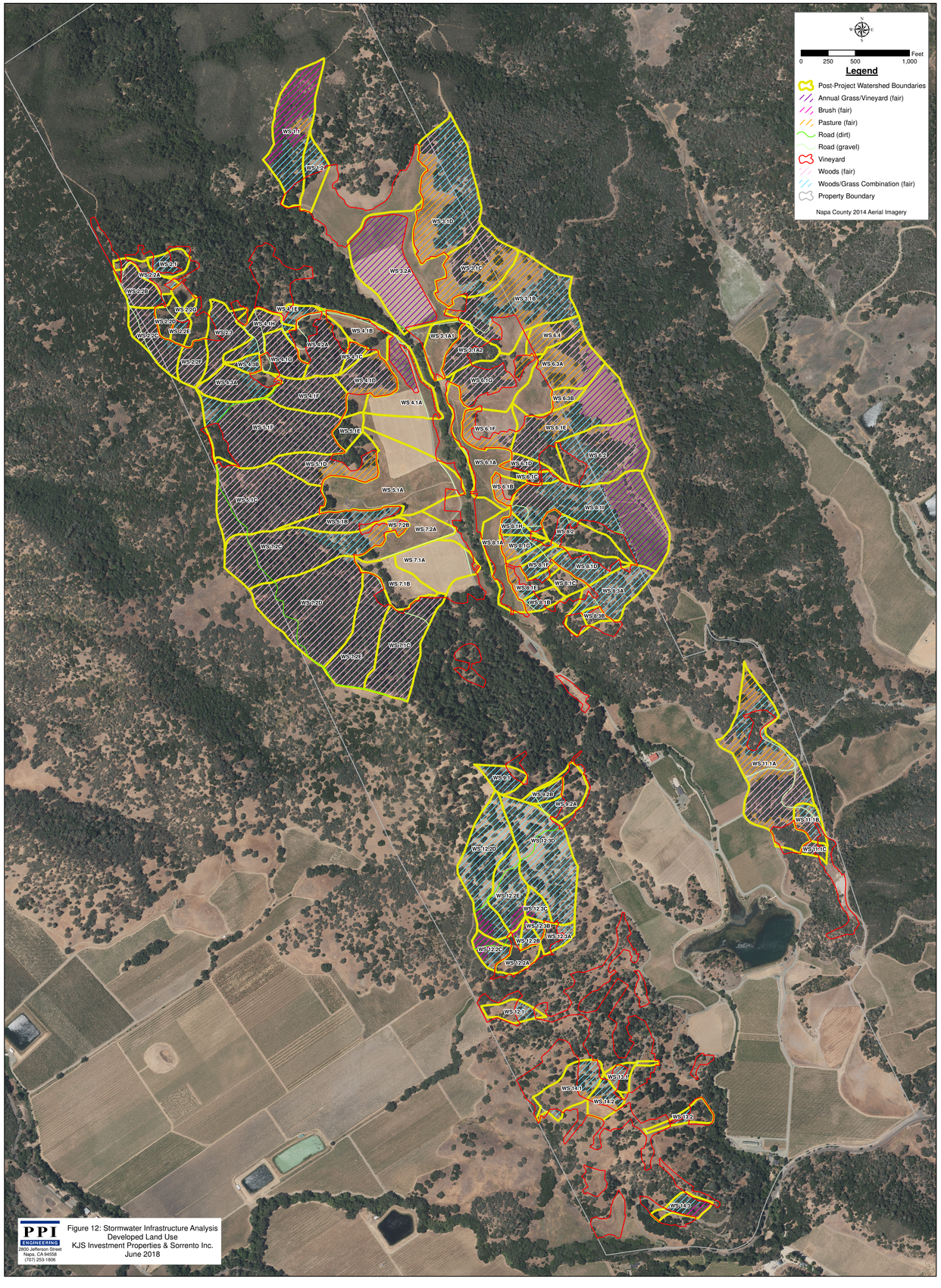
Figure 10: Stormwater Infrastructure Analysis
Post-Project Watersheds
KJS Investment Properties & Sorrento Inc.
June 2018

Z:\Projects\2016\16-0158\Drawings\Figures\16-0158 Figures.dwg, Pre-Project, Jun 27, 2018 - 3:39pm, Jeff Dodd



PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

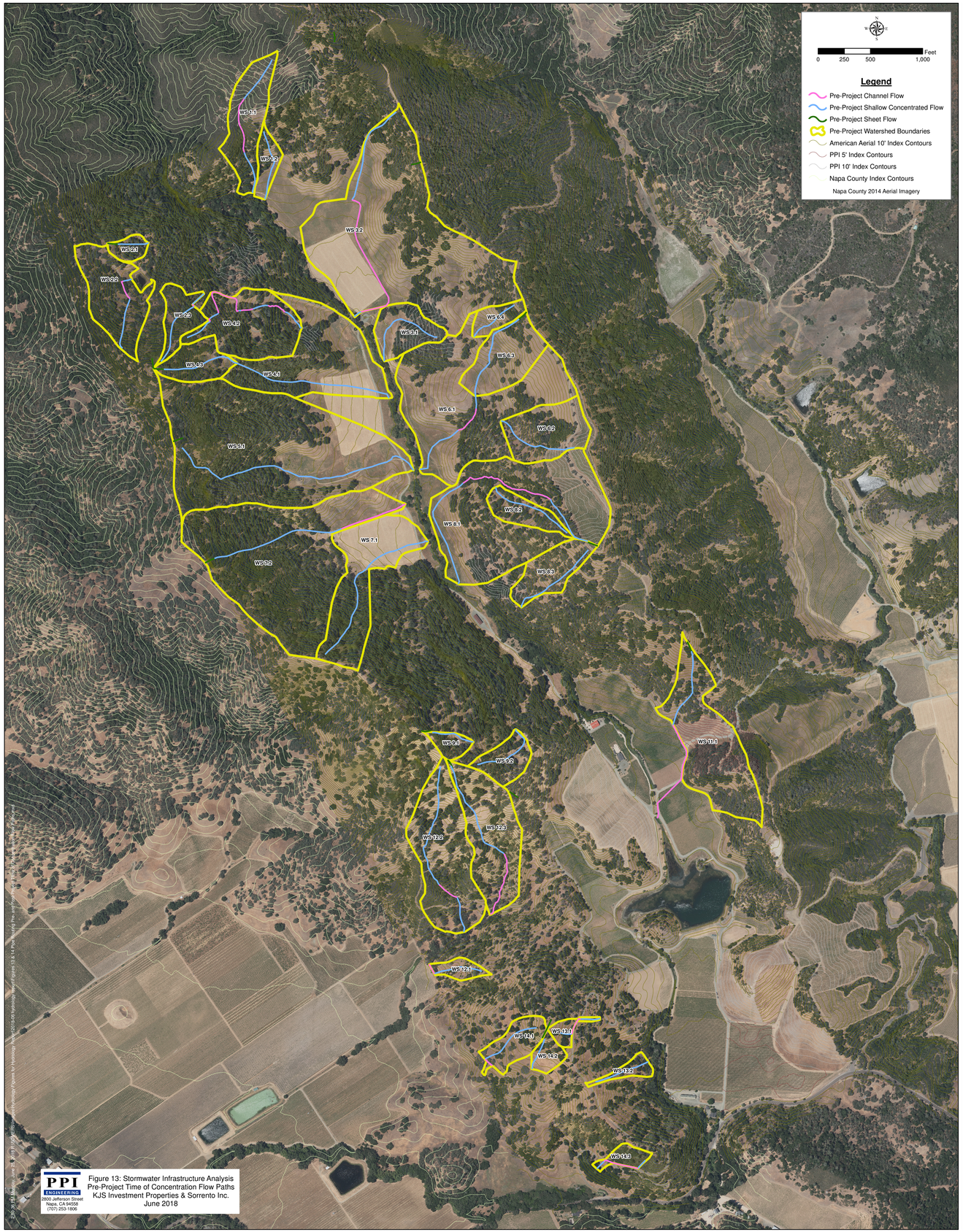
Figure 11: Stormwater Infrastructure Analysis
Existing Land Use
KJS Investment Properties & Sorrento Inc.
June 2018



PPI ENGINEERING
2800 Jefferson Street
Napa, CA 94558
(707) 253-1806

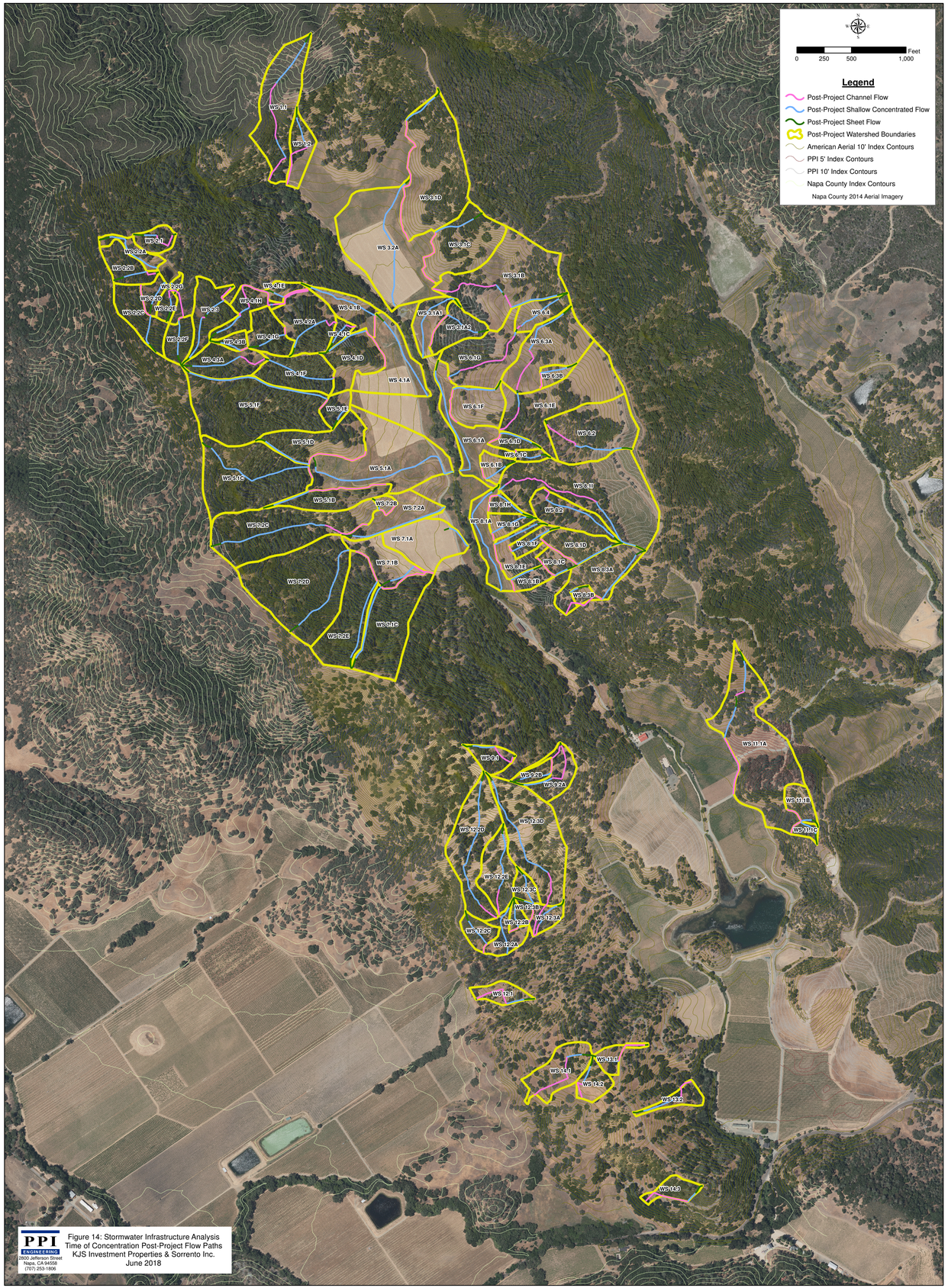
Figure 12: Stormwater Infrastructure Analysis
Developed Land Use
KJS Investment Properties & Sorrento Inc.
June 2018

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



PPI ENGINEERING
2600 Jefferson Street
Napa, CA 94558
(707) 253-1806

Figure 13: Stormwater Infrastructure Analysis
Pre-Project Time of Concentration Flow Paths
KJS Investment Properties & Sorrento Inc.
June 2018



PPI ENGINEERING
2600 Jefferson Street
Napa, CA 94558
(707) 253-1806

Figure 14: Stormwater Infrastructure Analysis
Time of Concentration Post-Project Flow Paths
KJS Investment Properties & Sorrento Inc.
June 2018

Appendix B

Existing Land Use By Watershed

&

Existing Land Use By Pipe Watershed

EXISTING LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area A	Woods, Fair	C	73	3.461
	Woods, Fair	D	79	0.082
				3.54

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area B	Dirt roads	C	87	0.055
	Woods/grass comb., Fair	C	76	5.017
				5.07

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area C	Dirt roads	D	89	0.023
	Pasture/grassland/range, Fair	D	84	0.741
	Woods/grass comb., Fair	D	82	0.435
				1.20

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area D	Dirt roads	C	87	0.210
	Dirt roads	D	89	0.590
	Woods, Fair	C	73	0.324
	Woods, Fair	D	79	24.750
	Woods/grass comb., Fair	C	76	0.176
	Woods/grass comb., Fair	D	82	0.339
				26.389

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area E	Dirt roads	C	87	0.157
	Dirt roads	D	89	0.468
	Gravel roads	C	89	0.036
	Pasture/grassland/range, Fair	C	79	0.887
	Pasture/grassland/range, Fair	D	84	0.8
	Vineyard, Fair	C	79	0.826
	Vineyard, Fair	D	84	0.272
	Woods/grass comb., Fair	C	76	2.765
	Woods/grass comb., Fair	D	82	0.971
				7.182

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 0	Brush, Fair	D	77	1.926
	Brush, Good	C	65	10.043
	Brush, Good	D	73	230.632
	Dirt roads	C	87	0.557
	Dirt roads	D	89	0.084
	Woods, Good	C	70	43.358
	Woods, Good	D	77	127.798
	Woods/grass comb., Fair	C	76	0.095
	Woods/grass comb., Fair	D	82	0.020
				414.513

EXISTING LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 1	Brush, Fair	C	70	0.067
	Brush, Fair	D	77	10.519
	Dirt roads	C	87	1.246
	Dirt roads	D	89	0.063
	Pasture/grassland/range, Fair	C	79	8.891
	Pasture/grassland/range, Fair	D	84	0.469
	Vineyard, Fair	C	79	7.424
	Woods, Fair	C	73	6.790
	Woods/grass comb., Fair	C	76	24.771
	Woods/grass comb., Fair	D	82	2.538
				62.778

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Pond	Water Surface	C	98	0.227
WS 2A	Brush, Fair	D	77	3.965
	Dirt roads	C	87	0.309
	Dirt roads	D	89	0.075
	Gravel roads	C	89	0.191
	Woods, Fair	C	73	41.571
	Woods, Fair	D	79	2.943
	Woods/grass comb., Fair	C	76	6.505
WS 2B	Dirt roads	C	87	0.159
	Gravel roads	C	89	0.191
	Woods, Fair	C	73	5.811
	Woods/grass comb., Fair	C	76	4.076
				66.023

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 3	Dirt roads	C	87	0.360
	Gravel roads	C	89	0.664
	Pasture/grassland/range, Fair	C	79	20.387
	Vineyard, Fair	C	79	4.906
	Woods, Fair	C	73	9.909
	Woods/grass comb., Fair	C	76	13.770
				49.997

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 4	Dirt roads	C	87	0.073
	Gravel roads	C	89	0.976
	Pasture/grassland/range, Fair	C	79	6.510
	Vineyard, Fair	C	79	4.036
	Woods, Fair	C	73	21.164
	Woods/grass comb., Fair	C	76	4.045
				36.803

EXISTING LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 5	Dirt roads	C	87	0.734
	Gravel roads	C	89	0.211
	Pasture/grassland/range, Fair	C	79	12.839
	Vineyard, Fair	C	79	5.460
	Woods, Fair	C	73	31.992
	Woods/grass comb., Fair	C	76	2.983
				54.219

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 6	Dirt roads	C	87	0.314
	Gravel roads	C	89	0.434
	Pasture/grassland/range, Fair	C	79	23.838
	Vineyard, Fair	C	79	7.615
	Woods, Fair	C	73	12.125
	Woods/grass comb., Fair	C	76	7.360
				51.686

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 7	Dirt roads	C	87	0.795
	Gravel roads	C	89	0.461
	Pasture/grassland/range, Fair	C	79	8.412
	Vineyard, Fair	C	79	6.766
	Woods, Fair	C	73	52.271
	Woods/grass comb., Fair	C	76	3.201
				71.906

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 8	Dirt roads	C	87	0.901
	Gravel roads	C	89	0.240
	Pasture/grassland/range, Fair	C	79	5.614
	Vineyard, Fair	C	79	9.210
	Woods, Fair	C	73	13.114
	Woods/grass comb., Fair	C	76	31.534
				60.613

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 9	Dirt roads	C	87	1.258
	Farmsteads	C	82	1.440
	Gravel roads	C	89	1.543
	Pasture/grassland/range, Fair	C	79	5.281
	Vineyard, Fair	C	79	15.116
	Woods, Fair	C	73	36.021
	Woods/grass comb., Fair	C	76	13.571
				74.229

EXISTING LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 10	Dirt roads	C	87	0.115
	Gravel roads	C	89	0.250
	Gravel roads	D	91	0.112
	Pasture/grassland/range, Fair	C	79	0.095
	Vineyard, Fair	C	79	5.035
	Vineyard, Fair	D	84	1.401
	Woods/grass comb., Fair	C	76	6.537
	Woods/grass comb., Fair	D	82	1.311
				14.857

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 11	Dirt roads	C	87	0.332
	Dirt roads	D	89	0.139
	Gravel roads	C	89	1.958
	Gravel roads	D	91	0.060
	Pasture/grassland/range, Fair	C	79	7.777
	Pasture/grassland/range, Fair	D	84	0.124
	Vineyard, Fair	C	79	18.358
	Woods, Fair	C	73	17.331
	Woods, Fair	D	79	0.869
	Woods/grass comb., Fair	C	76	15.939
	Woods/grass comb., Fair	D	82	0.787
				63.674

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Matheson Hill	Gravel roads	C	89	0.066
	Gravel roads	D	91	0.000
	Pasture/grassland/range, Fair	C	79	0.136
	Pasture/grassland/range, Fair	D	84	0.009
	Woods/grass comb., Fair	C	76	0.203
	Woods/grass comb., Fair	D	82	1.185
				1.599

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 12	Brush, Fair	C	70	0.288
	Brush, Fair	D	77	5.199
	Dirt roads	C	87	0.822
	Dirt roads	D	89	0.696
	Gravel roads	C	89	0.015
	Gravel roads	D	91	0.010
	Pasture/grassland/range, Fair	C	79	0.572
	Pasture/grassland/range, Fair	D	84	1.341
	Vineyard, Fair	C	79	1.937
	Vineyard, Fair	D	84	0.131
	Woods, Fair	C	73	0.193
	Woods/grass comb., Fair	C	76	24.604
	Woods/grass comb., Fair	D	82	41.515
				77.323

EXISTING LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 13	Dirt roads	D	89	0.063
	Farmsteads	C	82	0.198
	Farmsteads	D	86	0.004
	Gravel roads	C	89	0.321
	Gravel roads	D	91	1.594
	Pasture/grassland/range, Fair	D	84	0.037
	Vineyard, Fair	C	79	1.824
	Vineyard, Fair	D	84	5.965
	Woods, Fair	C	73	1.700
	Woods, Fair	D	79	8.834
	Woods/grass comb., Fair	C	76	0.026
	Woods/grass comb., Fair	D	82	34.303
				54.869

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 14	Brush, Fair	D	77	1.138
	Dirt roads	C	87	0.041
	Dirt roads	D	89	0.305
	Gravel roads	C	89	0.643
	Gravel roads	D	91	0.456
	Pasture/grassland/range, Fair	C	79	2.856
	Pasture/grassland/range, Fair	D	84	13.645
	Vineyard, Fair	C	79	0.660
	Woods, Fair	C	73	4.021
	Woods, Fair	D	79	2.286
	Woods/grass comb., Fair	C	76	0.489
	Woods/grass comb., Fair	D	82	28.209
				54.751

PIPE WATERSHED EXISTING LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 1.1	Brush, Fair	C	70	0.000
	Brush, Fair	D	77	5.107
	Dirt roads	C	87	0.077
	Pasture/grassland/range, Fair	C	79	0.087
	Pasture/grassland/range, Fair	D	84	0.469
	Woods, Fair	C	73	0.117
	Woods/grass comb., Fair	C	76	2.121
	Woods/grass comb., Fair	D	82	0.731
PWS 1.2	Dirt roads	C	87	0.107
	Pasture/grassland/range, Fair	C	79	0.918
	Woods, Fair	C	73	0.011
	Woods/grass comb., Fair	C	76	1.466
				11.210

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Pond Rainfall	Water Surface	C	98	0.227
PWS 2.1	Woods, Fair	C	73	0.000
	Woods/grass comb., Fair	C	76	1.610
PWS 2.2	Dirt roads	C	87	0.140
	Gravel roads	C	89	0.210
	Woods, Fair	C	73	5.811
	Woods/grass comb., Fair	C	76	4.076
PWS 2.3	Gravel roads	C	89	0.019
	Woods, Fair	C	73	3.533
	Woods/grass comb., Fair	C	76	0.556
				16.182

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 3.1	Dirt roads	C	87	0.119
	Pasture/grassland/range, Fair	C	79	1.856
	Woods, Fair	C	73	3.594
PWS 3.2	Dirt roads	C	87	0.688
	Pasture/grassland/range, Fair	C	79	18.012
	Vineyard, Fair	C	79	11.712
	Woods, Fair	C	73	5.896
	Woods/grass comb., Fair	C	76	13.770
				55.646

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 4.1	Dirt roads	C	87	0.073
	Gravel roads	C	89	0.948
	Pasture/grassland/range, Fair	C	79	6.125
	Vineyard, Fair	C	79	4.035
	Woods, Fair	C	73	20.619
	Woods/grass comb., Fair	C	76	4.045
				35.845

PIPE WATERSHED EXISTING LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 4.2	Dirt roads	C	87	0.003
	Gravel roads	C	89	0.503
	Pasture/grassland/range, Fair	C	79	0.546
	Woods, Fair	C	73	9.380
	Woods/grass comb., Fair	C	76	1.799
PWS 4.3	Dirt roads	C	87	0.034
	Gravel roads	C	89	0.000
	Woods, Fair	C	73	2.624
	Woods/grass comb., Fair	C	76	2.149
				17.039

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 5.1	Dirt roads	C	87	0.734
	Gravel roads	C	89	0.107
	Pasture/grassland/range, Fair	C	79	11.193
	Vineyard, Fair	C	79	2.431
	Woods, Fair	C	73	31.085
	Woods/grass comb., Fair	C	76	2.983
				48.532

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 6.1	Dirt roads	C	87	0.417
	Gravel roads	C	89	0.434
	Pasture/grassland/range, Fair	C	79	21.929
	Vineyard, Fair	C	79	7.615
	Woods, Fair	C	73	11.078
	Woods/grass comb., Fair	C	76	7.187
				48.660

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 6.2	Gravel roads	C	89	0.152
	Pasture/grassland/range, Fair	C	79	0.219
	Vineyard, Fair	C	79	2.562
	Woods, Fair	C	73	2.250
	Woods/grass comb., Fair	C	76	3.347
PWS 6.3	Dirt roads	C	87	0.018
	Gravel roads	C	89	0.088
	Pasture/grassland/range, Fair	C	79	5.841
	Vineyard, Fair	C	79	1.246
	Woods, Fair	C	73	1.118
	Woods/grass comb., Fair	C	76	0.019
PWS 6.4	Gravel roads	C	89	0.038
	Pasture/grassland/range, Fair	C	79	1.489
	Woods, Fair	C	73	0.702
	Woods/grass comb., Fair	C	76	0.157
				19.246

PIPE WATERSHED EXISTING LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 7.1	Dirt roads	C	87	0.100
	Gravel roads	C	89	0.069
	Pasture/grassland/range, Fair	C	79	1.274
	Vineyard, Fair	C	79	6.048
	Woods, Fair	C	73	7.581
PWS 7.2	Dirt roads	C	87	0.492
	Gravel roads	C	89	0.180
	Pasture/grassland/range, Fair	C	79	4.707
	Woods, Fair	C	73	30.545
	Woods/grass comb., Fair	C	76	3.201
				54.197

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 8.1	Dirt roads	C	87	0.637
	Gravel roads	C	89	0.214
	Pasture/grassland/range, Fair	C	79	4.427
	Vineyard, Fair	C	79	7.067
	Woods, Fair	C	73	1.366
	Woods/grass comb., Fair	C	76	21.311
				35.021

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 9.1	Dirt roads	C	87	0.093
	Woods, Fair	C	73	0.088
	Woods/grass comb., Fair	C	76	1.575
PWS 9.2	Dirt roads	C	87	0.079
	Woods, Fair	C	73	0.531
	Woods/grass comb., Fair	C	76	3.282
				5.646

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 11.1	Dirt roads	C	87	0.021
	Dirt roads	D	89	0.084
	Gravel roads	C	89	0.442
	Gravel roads	D	91	0.060
	Pasture/grassland/range, Fair	C	79	5.252
	Pasture/grassland/range, Fair	D	84	0.012
	Woods, Fair	C	73	6.262
	Woods, Fair	D	79	0.846
	Woods/grass comb., Fair	C	76	4.004
	Woods/grass comb., Fair	D	82	0.678
				17.662

PIPE WATERSHED EXISTING LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 12.1	Woods/grass comb., Fair	C	76	0.175
	Woods/grass comb., Fair	D	82	1.552
PWS 12.2	Brush, Fair	C	70	0.002
	Brush, Fair	D	77	2.308
	Dirt roads	C	87	0.110
	Dirt roads	D	89	0.203
	Woods/grass comb., Fair	C	76	9.254
	Woods/grass comb., Fair	D	82	5.105
PWS 12.3	Brush, Fair	D	77	0.254
	Dirt roads	C	87	0.108
	Dirt roads	D	89	0.001
	Woods/grass comb., Fair	C	76	8.328
	Woods/grass comb., Fair	D	82	5.124
				32.525

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 13.1	Gravel roads	D	91	0.012
	Woods/grass comb., Fair	D	82	1.286
PWS 13.2	Gravel roads	D	91	0.012
	Woods, Fair	D	79	0.263
	Woods/grass comb., Fair	D	82	1.241
				2.813

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 14.1	Dirt roads	D	89	0.012
	Pasture/grassland/range, Fair	D	84	0.511
	Woods/grass comb., Fair	D	82	3.803
PWS 14.2	Pasture/grassland/range, Fair	D	84	1.025
	Woods/grass comb., Fair	D	82	0.900
PWS 14.3	Brush, Fair	D	77	0.453
	Gravel roads	D	91	0.026
	Woods, Fair	D	79	0.095
	Woods/grass comb., Fair	D	82	1.123
				7.947

Appendix C

Developed Land Use By Watershed

&

Developed Land Use By Pipe Watershed

DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area A	Vineyard, Good	C	75	0.381
	Vineyard, Good	D	81	0.046
	Woods, Fair	C	73	3.080
	Woods, Fair	D	79	0.036
				3.54

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area B	Dirt roads	C	87	0.006
	Vineyard, Good	C	75	0.132
	Woods/grass comb., Fair	C	76	4.935
				5.072

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area C	Pasture/grassland/range, Fair	D	84	0.741
	Vineyard, Good	D	81	0.244
	Woods/grass comb., Fair	D	82	0.213
				1.20

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area D	Dirt roads	C	87	0.003
	Dirt roads	D	89	0.006
	Gravel roads	C	89	0.033
	Gravel roads	D	91	0.253
	Vineyard, Good	C	75	0.466
	Vineyard, Good	D	81	0.481
	Woods, Fair	C	73	0.189
	Woods, Fair	D	79	24.744
	Woods/grass comb., Fair	C	76	0.019
	Woods/grass comb., Fair	D	82	0.194
				26.389

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Area E	Dirt roads	C	87	0.157
	Dirt roads	D	89	0.468
	Gravel roads	C	89	0.036
	Pasture/grassland/range, Fair	C	79	0.887
	Pasture/grassland/range, Fair	D	84	0.800
	Vineyard, Fair	C	79	0.826
	Vineyard, Fair	D	84	0.272
	Vineyard, Good	C	75	0.145
	Vineyard, Good	D	81	0.029
	Woods/grass comb., Fair	C	76	2.620
	Woods/grass comb., Fair	D	82	0.943
				7.181

DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 0	Brush, Fair	D	77	1.926
	Brush, Good	C	65	10.043
	Brush, Good	D	73	230.632
	Dirt roads	C	87	0.557
	Dirt roads	D	89	0.084
	Woods, Good	C	70	43.358
	Woods, Good	D	77	127.798
	Woods/grass comb., Fair	C	76	0.095
	Woods/grass comb., Fair	D	82	0.020
				414.513

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 1	Brush, Fair	C	70	0.067
	Brush, Fair	D	77	10.519
	Dirt roads	C	87	0.792
	Dirt roads	D	89	0.063
	Pasture/grassland/range, Fair	C	79	2.852
	Pasture/grassland/range, Fair	D	84	0.469
	Vineyard, Fair	C	79	7.083
	Vineyard, Good	C	75	7.709
	Woods, Fair	C	73	6.614
	Woods/grass comb., Fair	C	76	24.071
	Woods/grass comb., Fair	D	82	2.538
				62.778

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Pond	Water Surface	C	98	0.227
WS 2A	Brush, Fair	D	77	3.965
	Dirt roads	C	87	0.222
	Dirt roads	D	89	0.063
	Gravel roads	C	89	0.187
	Vineyard, Good	C	75	8.734
	Vineyard, Good	D	81	0.078
	Water Surface	C	98	0.227
	Woods, Fair	C	73	35.077
	Woods, Fair	D	79	2.878
	Woods/grass comb., Fair	C	76	2.229
WS 2B	Dirt roads	C	87	0.013
	Gravel roads	C	89	0.249
	Vineyard, Good	C	75	3.401
	Woods, Fair	C	73	5.057
	Woods/grass comb., Fair	C	76	1.025
	Vineyard, Good	C	75	0.023
	Woods, Fair	C	73	2.331
	Woods/grass comb., Fair	C	76	0.266
WS 2C	Vineyard, Good	C	75	0.023
	Woods, Fair	C	73	2.331
	Woods/grass comb., Fair	C	76	0.266
				68.870

DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 3	Dirt roads	C	87	0.308
	Gravel roads	C	89	0.664
	Pasture/grassland/range, Fair	C	79	11.746
	Vineyard, Fair	C	79	4.009
	Vineyard, Good	C	75	11.457
	Woods, Fair	C	73	8.042
	Woods/grass comb., Fair	C	76	13.770
				49.997

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 4	Dirt roads	C	87	0.049
	Gravel roads	C	89	0.616
	Pasture/grassland/range, Fair	C	79	2.046
	Vineyard, Fair	C	79	1.347
	Vineyard, Good	C	75	10.803
	Woods, Fair	C	73	19.073
	Woods/grass comb., Fair	C	76	2.869
				36.803

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 5	Dirt roads	C	87	0.244
	Gravel roads	C	89	0.211
	Pasture/grassland/range, Fair	C	79	2.668
	Vineyard, Good	C	75	20.709
	Woods, Fair	C	73	27.968
	Woods/grass comb., Fair	C	76	2.420
				54.219

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 6	Dirt roads	C	87	0.039
	Gravel roads	C	89	0.434
	Pasture/grassland/range, Fair	C	79	10.678
	Vineyard, Fair	C	79	7.615
	Vineyard, Good	C	75	17.140
	Woods, Fair	C	73	10.765
	Woods/grass comb., Fair	C	76	5.015
				51.686

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 7	Water Surface	B	98	3.304
	Dirt roads	C	87	0.525
	Gravel roads	C	89	0.633
	Pasture/grassland/range, Fair	C	79	2.39
	Paved roads w/curbs & sewers	C	98	1.256
	Vineyard, Good	C	75	12.373
	Woods, Fair	C	73	49.006
	Woods/grass comb., Fair	C	76	2.418
				71.905

DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 8	Dirt roads	C	87	0.157
	Gravel roads	C	89	0.508
	Pasture/grassland/range, Fair	C	79	2.577
	Vineyard, Fair	C	79	9.210
	Vineyard, Good	C	75	14.107
	Woods, Fair	C	73	12.488
	Woods/grass comb., Fair	C	76	21.565
				60.613

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 9	Dirt roads	C	87	0.822
	Farmsteads	C	82	1.440
	Gravel roads	C	89	1.805
	Pasture/grassland/range, Fair	C	79	4.743
	Vineyard, Fair	C	79	15.116
	Vineyard, Good	C	75	4.511
	Woods, Fair	C	73	34.508
	Woods/grass comb., Fair	C	76	11.285
				74.229

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 10	Dirt roads	C	87	0.115
	Gravel roads	C	89	0.250
	Gravel roads	D	91	0.112
	Pasture/grassland/range, Fair	C	79	0.095
	Vineyard, Fair	C	79	5.035
	Vineyard, Fair	D	84	1.401
	Vineyard, Good	C	75	0.007
	Vineyard, Good	D	81	0.484
	Woods/grass comb., Fair	C	76	6.530
	Woods/grass comb., Fair	D	82	0.827
				14.857

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 11	Dirt roads	C	87	0.042
	Gravel roads	C	89	1.979
	Gravel roads	D	91	0.144
	Pasture/grassland/range, Fair	C	79	7.634
	Pasture/grassland/range, Fair	D	84	0.019
	Vineyard, Fair	C	79	18.358
	Vineyard, Good	C	75	3.789
	Vineyard, Good	D	81	0.277
	Woods, Fair	C	73	15.666
	Woods, Fair	D	79	0.858
	Woods/grass comb., Fair	C	76	14.227
	Woods/grass comb., Fair	D	82	0.680
				63.674

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
	Gravel roads	C	89	0.066

Matheson Hill	Gravel roads	D	91	0.000
	Pasture/grassland/range, Fair	C	79	0.136
	Pasture/grassland/range, Fair	D	84	0.009
	Woods/grass comb., Fair	C	76	0.203
	Woods/grass comb., Fair	D	82	1.185
				1.599

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 12	Brush, Fair	C	70	0.288
	Brush, Fair	D	77	5.187
	Dirt roads	C	87	0.682
	Dirt roads	D	89	0.244
	Gravel roads	C	89	0.065
	Gravel roads	D	91	0.316
	Pasture/grassland/range, Fair	C	79	0.572
	Pasture/grassland/range, Fair	D	84	1.283
	Vineyard, Fair	C	79	1.937
	Vineyard, Fair	D	84	0.131
	Vineyard, Good	C	75	0.441
	Vineyard, Good	D	81	10.277
	Woods, Fair	C	73	0.193
	Woods/grass comb., Fair	C	76	24.254
	Woods/grass comb., Fair	D	82	31.455
				77.323

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 13	Dirt roads	D	89	0.000
	Farmsteads	C	82	0.198
	Farmsteads	D	86	0.004
	Gravel roads	C	89	0.321
	Gravel roads	D	91	1.576
	Pasture/grassland/range, Fair	D	84	0.037
	Vineyard, Fair	C	79	1.824
	Vineyard, Fair	D	84	5.965
	Vineyard, Good	D	81	10.639
	Woods, Fair	C	73	1.700
	Woods, Fair	D	79	8.513
	Woods/grass comb., Fair	C	76	0.026
	Woods/grass comb., Fair	D	82	24.064
				54.869

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
WS 14	Brush, Fair	D	77	1.095
	Dirt roads	C	87	0.041
	Dirt roads	D	89	0.017
	Gravel roads	C	89	0.643
	Gravel roads	D	91	0.699
	Pasture/grassland/range, Fair	C	79	2.498
	Pasture/grassland/range, Fair	D	84	9.551
	Vineyard, Fair	C	79	0.660
	Vineyard, Good	C	75	0.360
	Vineyard, Good	D	81	10.435

DEVELOPED LAND USE AND CURVE NUMBERS

Woods, Fair	C	73	4.020
Woods, Fair	D	79	1.789
Woods/grass comb., Fair	C	76	0.489
Woods/grass comb., Fair	D	82	22.454
			54.751

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 1.1	Brush, Fair	C	70	0.000
	Brush, Fair	D	77	5.107
	Pasture/grassland/range, Fair	D	84	0.469
	Vineyard, Good	C	75	0.716
	Woods/grass comb., Fair	C	76	1.686
	Woods/grass comb., Fair	D	82	0.731
PWS 1.2	Vineyard, Good	C	75	1.271
	Woods/grass comb., Fair	C	76	1.231
				11.210

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
1S	Water Surface	C	98	0.227
PWS 2.1	Vineyard, Good	C	75	0.896
	Woods, Fair	C	73	0.000
	Woods/grass comb., Fair	C	76	0.713
PWS 2.2A	Gravel roads	C	89	0.090
	Vineyard, Good	C	75	0.961
	Woods, Fair	C	73	0.150
	Woods/grass comb., Fair	C	76	0.291
PWS 2.2B	Dirt roads	C	87	0.024
	Gravel roads	C	89	0.059
	Vineyard, Good	C	75	0.295
	Woods, Fair	C	73	2.230
	Woods/grass comb., Fair	C	76	0.131
PWS 2.2C	Dirt roads	C	87	0.100
	Vineyard, Good	C	75	0.034
	Woods, Fair	C	73	3.098
	Woods/grass comb., Fair	C	76	0.322
PWS 2.2D	Vineyard, Good	C	75	1.213
	Woods/grass comb., Fair	C	76	0.021
PWS 2.2E	Vineyard, Good	C	75	0.666
	Woods/grass comb., Fair	C	76	0.281
PWS 2.2F	Vineyard, Good	C	75	0.017
	Woods, Fair	C	73	1.907
	Woods/grass comb., Fair	C	76	0.203
PWS 2.2G	Vineyard, Good	C	75	0.224
	Woods, Fair	C	73	0.003
	Woods/grass comb., Fair	C	76	0.044
PW S2.3	Gravel roads	C	89	0.019
	Vineyard, Good	C	75	0.541
	Woods, Fair	C	73	3.184
	Woods/grass comb., Fair	C	76	0.200
				18.146

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 3.1A1	Dirt roads	C	87	0.027
	Pasture/grassland/range, Fair	C	79	0.115
	Vineyard, Good	C	75	2.422
	Woods, Fair	C	73	0.062
PWS 3.1A2	Pasture/grassland/range, Fair	C	79	0.036
	Vineyard, Good	C	75	0.913
	Woods, Fair	C	73	1.995
PWS 3.1B	Dirt roads	C	87	0.406
	Pasture/grassland/range, Fair	C	79	3.643
	Vineyard, Good	C	75	1.913
	Woods, Fair	C	73	1.327
	Woods/grass comb., Fair	C	76	5.531
PWS 3.1C	Dirt roads	C	87	0.056
	Pasture/grassland/range, Fair	C	79	3.589
	Vineyard, Good	C	75	0.106
	Woods, Fair	C	73	2.867
	Woods/grass comb., Fair	C	76	0.556
PWS 3.1D	Dirt roads	C	87	0.149
	Pasture/grassland/range, Fair	C	79	4.073
	Vineyard, Good	C	75	0.155
	Woods, Fair	C	73	1.334
	Woods/grass comb., Fair	C	76	7.684
PWS 3.2A	Dirt roads	C	87	0.029
	Pasture/grassland/range, Fair	C	79	0.035
	Vineyard, Fair	C	79	10.525
	Vineyard, Good	C	75	4.124
	Woods, Fair	C	73	0.062
				53.733

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 4.1A	Gravel roads	C	89	0.269
	Pasture/grassland/range, Fair	C	79	0.497
	Vineyard, Fair	C	79	1.339
	Vineyard, Good	C	75	3.940
	Woods, Fair	C	73	0.028
	Woods/grass comb., Fair	C	76	0.030
PWS 4.1B	Dirt roads	C	87	0.008
	Gravel roads	C	89	0.050
	Pasture/grassland/range, Fair	C	79	0.102
	Vineyard, Fair	C	79	0.008
	Vineyard, Good	C	75	2.565
	Woods, Fair	C	73	0.152
	Woods/grass comb., Fair	C	76	0.014
PWS 4.1C	Vineyard, Good	C	75	0.038
	Woods, Fair	C	73	0.718
PWS 4.1D	Pasture/grassland/range, Fair	C	79	0.858
	Vineyard, Good	C	75	0.836
	Woods, Fair	C	73	2.643
PWS 4.1E	Gravel roads	C	89	0.031
	Vineyard, Good	C	75	0.173
	Woods, Fair	C	73	0.105
	Woods/grass comb., Fair	C	76	0.665
PWS 4.1F	Dirt roads	C	87	0.042
	Pasture/grassland/range, Fair	C	79	0.066
	Vineyard, Good	C	75	0.623
	Woods, Fair	C	73	7.139
	Woods/grass comb., Fair	C	76	1.651
PWS 4.1G	Gravel roads	C	89	0.005
	Vineyard, Good	C	75	0.512
	Woods, Fair	C	73	2.494
	Woods/grass comb., Fair	C	76	0.006
PWS 4.1H	Gravel roads	C	89	0.184
	Vineyard, Good	C	75	0.004
	Woods, Fair	C	73	2.146
	Woods/grass comb., Fair	C	76	0.427
PWS 4.2A	Gravel roads	C	89	0.048
	Pasture/grassland/range, Fair	C	79	0.151
	Vineyard, Good	C	75	2.099
	Woods, Fair	C	73	3.104
	Woods/grass comb., Fair	C	76	0.076
				35.845

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 4.3A	Dirt roads	C	87	0.014
	Vineyard, Good	C	75	0.565
	Woods, Fair	C	73	2.474
	Woods/grass comb., Fair	C	76	0.944
PWS 4.3B	Vineyard, Good	C	75	0.009
	Woods, Fair	C	73	0.119
	Woods/grass comb., Fair	C	76	0.684
				4.808

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 5.1A	Gravel roads	C	89	0.107
	Pasture/grassland/range, Fair	C	79	0.251
	Vineyard, Good	C	75	12.249
	Woods, Fair	C	73	0.001
PWS 5.1B	Pasture/grassland/range, Fair	C	79	0.023
	Vineyard, Good	C	75	0.335
	Woods, Fair	C	73	1.878
	Woods/grass comb., Fair	C	76	1.191
PWS 5.1C	Dirt roads	C	87	0.149
	Vineyard, Good	C	75	0.206
	Woods, Fair	C	73	11.556
PWS 5.1D	Pasture/grassland/range, Fair	C	79	1.741
	Vineyard, Good	C	75	1.558
	Woods, Fair	C	73	2.409
	Woods/grass comb., Fair	C	76	0.003
PWS 5.1E	Vineyard, Good	C	75	1.462
PWS 5.1F	Dirt roads	C	87	0.095
	Vineyard, Good	C	75	1.128
	Woods, Fair	C	73	11.282
	Woods/grass comb., Fair	C	76	1.226
				48.850

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 6.1A	Dirt roads	C	87	0.023
	Pasture/grassland/range, Fair	C	79	0.299
	Vineyard, Good	C	75	4.576
PWS 6.1B	Pasture/grassland/range, Fair	C	79	0.543
	Vineyard, Good	C	75	0.717
	Woods, Fair	C	73	0.011
PWS 6.1C	Vineyard, Good	C	75	0.140
	Woods, Fair	C	73	0.167
	Woods/grass comb., Fair	C	76	0.379
PWS 6.1D	Pasture/grassland/range, Fair	C	79	0.129
	Vineyard, Good	C	75	0.209
	Woods, Fair	C	73	0.610
	Woods/grass comb., Fair	C	76	0.156
PWS 6.1E	Dirt roads	C	87	0.172
	Gravel roads	C	89	0.396
	Pasture/grassland/range, Fair	C	79	4.793
	Vineyard, Fair	C	79	7.615
	Vineyard, Good	C	75	4.987
	Woods, Fair	C	73	5.262
	Woods/grass comb., Fair	C	76	4.151
PWS 6.1F	Pasture/grassland/range, Fair	C	79	1.501
	Vineyard, Good	C	75	1.994
	Woods, Fair	C	73	0.321
PWS 6.1G	Gravel roads	C	89	0.038
	Pasture/grassland/range, Fair	C	79	2.483
	Vineyard, Good	C	75	3.484
	Woods, Fair	C	73	3.347
	Woods/grass comb., Fair	C	76	0.157
				48.660

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 6.2	Gravel roads	C	89	0.152
	Pasture/grassland/range, Fair	C	79	0.219
	Vineyard, Fair	C	79	2.562
	Vineyard, Good	C	75	1.126
	Woods, Fair	C	73	2.250
	Woods/grass comb., Fair	C	76	2.222
PWS 6.3A	Dirt roads	C	87	0.018
	Gravel roads	C	89	0.088
	Pasture/grassland/range, Fair	C	79	2.762
	Vineyard, Fair	C	79	0.996
	Vineyard, Good	C	75	2.376
	Woods, Fair	C	73	1.098
	Woods/grass comb., Fair	C	76	0.019
PWS 6.3B	Pasture/grassland/range, Fair	C	79	0.708
	Vineyard, Fair	C	79	0.250
	Vineyard, Good	C	75	0.014
PWS 6.4	Gravel roads	C	89	0.038
	Pasture/grassland/range, Fair	C	79	1.342
	Vineyard, Good	C	75	0.147
	Woods, Fair	C	73	0.702
	Woods/grass comb., Fair	C	76	0.157
				19.246

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
Direct	Water Surface	B	98	3.000
PWS 7.1A	Pasture/grassland/range, Fair	C	79	0.118
	Paved roads w/curbs & sewers	C	98	1.204
	Vineyard, Good	C	75	1.097
	Woods, Fair	C	73	0.000
PWS 7.1B	Pasture/grassland/range, Fair	C	79	0.040
	Paved roads w/curbs & sewers	C	98	0.005
	Vineyard, Fair	C	79	0.007
	Vineyard, Good	C	75	3.581
PWS 7.1C	Dirt roads	C	87	0.048
	Gravel roads	C	89	0.049
	Pasture/grassland/range, Fair	C	79	0.014
	Vineyard, Good	C	75	0.143
	Woods, Fair	C	73	8.192
PWS 7.2A	Gravel roads	C	89	0.180
	Vineyard, Good	C	75	3.654
	Woods, Fair	C	73	3.26E-08
PWS 7.2B	Pasture/grassland/range, Fair	C	79	0.303
	Vineyard, Good	C	75	0.233
PWS 7.2C	Dirt roads	C	87	0.108
	Pasture/grassland/range, Fair	C	79	0.653
	Vineyard, Good	C	75	0.227
	Woods, Fair	C	73	8.807
	Woods/grass comb., Fair	C	76	2.170
PWS 7.2D	Dirt roads	C	87	0.206
	Vineyard, Good	C	75	0.024
	Woods, Fair	C	73	14.090
	Woods/grass comb., Fair	C	76	0.191
PWS 7.2E	Dirt roads	C	87	0.103
	Vineyard, Good	C	75	0.326
	Woods, Fair	C	73	6.595
	Woods/grass comb., Fair	C	76	0.057
				55.425

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 8.1A	Gravel roads	C	89	0.045
	Pasture/grassland/range, Fair	C	79	0.341
	Vineyard, Good	C	75	2.841
	Woods, Fair	C	73	0.078
PWS 8.1B	Gravel roads	C	89	0.031
	Pasture/grassland/range, Fair	C	79	0.083
	Vineyard, Good	C	75	0.692
	Woods, Fair	C	73	0.032
	Woods/grass comb., Fair	C	76	0.387
PWS 8.1C	Vineyard, Good	C	75	1.195
PWS 8.1D	Vineyard, Good	C	75	0.821
	Woods/grass comb., Fair	C	76	2.106
PWS 8.1E	Dirt roads	C	87	0.015
	Gravel roads	C	89	0.014
	Pasture/grassland/range, Fair	C	79	0.572
	Vineyard, Good	C	75	1.003
	Woods/grass comb., Fair	C	76	1.167
PWS 8.1F	Dirt roads	C	87	0.018
	Pasture/grassland/range, Fair	C	79	0.004
	Vineyard, Good	C	75	0.091
	Woods/grass comb., Fair	C	76	1.113
PWS 8.1G	Dirt roads	C	87	0.029
	Pasture/grassland/range, Fair	C	79	0.412
	Vineyard, Good	C	75	0.184
	Woods/grass comb., Fair	C	76	0.883
PWS 8.1H	Dirt roads	C	87	0.016
	Gravel roads	C	89	0.016
	Pasture/grassland/range, Fair	C	79	0.032
	Vineyard, Good	C	75	0.076
	Woods/grass comb., Fair	C	76	0.810
PWS 8.1I	Dirt roads	C	87	0.049
	Gravel roads	C	89	0.296
	Pasture/grassland/range, Fair	C	79	0.071
	Vineyard, Fair	C	79	7.067
	Vineyard, Good	C	75	4.623
	Woods, Fair	C	73	1.209
	Woods/grass comb., Fair	C	76	6.601
				35.021

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 9.1	Dirt roads	C	87	0.053
	Vineyard, Good	C	75	0.324
	Woods, Fair	C	73	0.002
	Woods/grass comb., Fair	C	76	1.376
PWS 9.2A	Gravel roads	C	89	0.014
	Vineyard, Good	C	75	0.011
	Woods, Fair	C	73	0.098
	Woods/grass comb., Fair	C	76	0.935
PWS 9.2B	Gravel roads	C	89	0.013
	Vineyard, Good	C	75	1.946
	Woods, Fair	C	73	0.124
	Woods/grass comb., Fair	C	76	0.749
				5.646

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 11.1A	Gravel roads	C	89	0.438
	Gravel roads	D	91	0.060
	Pasture/grassland/range, Fair	C	79	4.945
	Pasture/grassland/range, Fair	D	84	0.011
	Vineyard, Good	C	75	2.520
	Woods, Fair	C	73	4.002
	Woods, Fair	D	79	0.846
	Woods/grass comb., Fair	C	76	2.279
	Woods/grass comb., Fair	D	82	0.176
PWS 11.1B	Gravel roads	C	89	0.025
	Gravel roads	D	91	0.084
	Pasture/grassland/range, Fair	C	79	0.182
	Pasture/grassland/range, Fair	D	84	0.001
	Vineyard, Good	C	75	0.242
	Vineyard, Good	D	81	0.017
	Woods, Fair	C	73	0.358
	Woods/grass comb., Fair	C	76	0.311
	Woods/grass comb., Fair	D	82	0.485
PWS 11.1C	Vineyard, Good	C	75	0.301
	Woods, Fair	C	73	0.378
				17.662

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 12.1	Vineyard, Good	C	75	0.175
	Vineyard, Good	D	81	0.941
	Woods/grass comb., Fair	D	82	0.611
PWS 12.2A	Brush, Fair	D	77	0.210
	Dirt roads	D	89	0.033
	Vineyard, Good	D	81	1.646
	Woods/grass comb., Fair	D	82	0.234
PWS 12.2B	Brush, Fair	D	77	0.129
	Vineyard, Good	D	81	0.014
	Woods/grass comb., Fair	D	82	0.571
PWS 12.2C	Brush, Fair	D	77	0.865
	Dirt roads	D	89	0.054
	Vineyard, Good	D	81	0.021
	Woods/grass comb., Fair	D	82	0.715
PWS 12.2D	Brush, Fair	C	70	0.002
	Brush, Fair	D	77	0.600
	Dirt roads	C	87	0.027
	Dirt roads	D	89	0.010
	Vineyard, Good	D	81	0.008
	Woods/grass comb., Fair	C	76	6.837
	Woods/grass comb., Fair	D	82	0.875
PWS 12.2E	Brush, Fair	D	77	0.007
	Dirt roads	C	87	0.068
	Vineyard, Good	D	81	0.000
	Woods/grass comb., Fair	C	76	1.742
	Woods/grass comb., Fair	D	82	0.708
PWS 12.3A	Vineyard, Good	D	81	0.813
	Woods/grass comb., Fair	D	82	0.644
PWS 12.3B	Brush, Fair	D	77	0.074
	Vineyard, Good	D	81	0.013
	Woods/grass comb., Fair	D	82	0.322
PWS 12.3C	Brush, Fair	D	77	0.180
	Vineyard, Good	D	81	0.014
	Woods/grass comb., Fair	C	76	0.009
	Woods/grass comb., Fair	D	82	0.981
PWS 12.3D	Dirt roads	C	87	0.090
	Gravel roads	C	89	0.017
	Vineyard, Good	D	81	0.019
	Woods/grass comb., Fair	C	76	8.319
	Woods/grass comb., Fair	D	82	2.318
				30.917

PIPE WATERSHED DEVELOPED LAND USE AND CURVE NUMBERS

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 13.1	Gravel roads	D	91	0.012
	Vineyard, Good	D	81	0.814
	Woods/grass comb., Fair	D	82	0.471
PWS 13.2	Gravel roads	D	91	0.012
	Vineyard, Good	D	81	1.181
	Woods/grass comb., Fair	D	82	0.323
				2.813

Watershed	Land Use, Condition	Soil Group	Curve Number	Area (acres)
PWS 14.1	Gravel roads	D	91	0.012
	Pasture/grassland/range, Fair	D	84	0.121
	Vineyard, Good	D	81	2.707
	Woods/grass comb., Fair	D	82	1.487
PWS 14.2	Pasture/grassland/range, Fair	D	84	0.395
	Vineyard, Good	D	81	0.744
	Woods/grass comb., Fair	D	82	0.785
PWS 14.3	Brush, Fair	D	77	0.433
	Gravel roads	D	91	0.026
	Vineyard, Good	D	81	0.393
	Woods/grass comb., Fair	D	82	0.844
				7.947

Appendix D

Overall Watershed Peak Discharge

&

Stormwater Conveyance Infrastructure Peak Discharge

OVERALL WATERSHED PEAK DISCHARGE

Watershed Basin Area	Subwatershed/ Reach	2-yr Peak Discharge (cfs)		
		Existing	Developed	Net
Elder Creek/ Matheson Reservoir Basin	**0**	115.3	115.3	0.0
	1	22.0	21.7	-0.3
	2	16.0	15.3	-0.7
	3	18.2	17.6	-0.5
	4	12.8	12.0	-0.9
	5	17.3	16.1	-1.2
	6	18.7	16.5	-2.2
	7	23.0	20.7	-2.3
	8	19.3	20.1	0.8
	9	24.6	23.5	-1.1
	10	6.3	6.3	0.0
	11	24.2	23.8	-0.4
	M. Hill	0.8	0.8	0.0
	Direct Rainfall	10.7	10.7	0.0
	Reach 0-Inflow	115.3	115.3	0.0
	Reach 0-Outflow	108.9	108.9	0.0
	Reach 1-Inflow	136.3	136.3	0.0
	Reach 1-Outflow	136.2	136.1	0.0
	Reach 2-Inflow	147.3	145.5	-1.8
	Reach 2-Outflow	147.2	145.4	-1.8
	Reach 3-Inflow	154.3	151.6	-2.7
	Reach 3-Outflow	153.7	151.6	-2.2
	Reach 4-Inflow	163.4	160.6	-2.8
	Reach 4-Outflow	163.3	160.5	-2.8
	Reach 5-Inflow	173.5	171.5	-2.0
	Reach 5-Outflow	173.1	171.0	-2.1
	Reach 6-Inflow	184.7	181.5	-3.3
	Reach 6-Outflow	181.8	178.3	-3.5
	Reach 7-Inflow	192.1	188.3	-3.8
	Reach 7-Outflow	189.2	185.0	-4.2
	Reservoir Outlet	165.4	161.5	-3.9
Unnamed Tributary	**12**	34.6	33.7	-0.9
Elder Creek Below Matheson	**13**	25.6	24.2	-1.4
	14	27.1	25.2	-2.0

OVERALL WATERSHED PEAK DISCHARGE

Watershed Basin Area	Subwatershed/ Reach	10-yr Peak Discharge (cfs)		
		Existing	Developed	Net
Elder Creek/ Matheson Reservoir Basin	**0**	262.8	262.8	0.0
	1	46.3	45.8	-0.5
	2	36.8	34.8	-1.9
	3	38.1	37.5	-0.5
	4	27.4	26.3	-1.2
	5	38.0	36.4	-1.6
	6	39.3	35.8	-3.5
	7	50.6	46.8	-3.8
	8	41.8	43.2	1.5
	9	53.0	50.7	-2.2
	10	12.6	12.6	0.0
	11	50.1	49.6	-0.5
	M. Hill	1.5	1.5	0.0
	Direct Rainfall	16.0	16.0	0.0
	Reach 0-Inflow	262.8	262.8	0.0
	Reach 0-Outflow	253.7	253.7	0.0
	Reach 1-Inflow	319.3	318.5	-0.8
	Reach 1-Outflow	319.1	318.2	-0.8
	Reach 2-Inflow	344.9	339.8	-5.1
	Reach 2-Outflow	344.8	339.6	-5.1
	Reach 3-Inflow	361.3	355.5	-5.8
	Reach 3-Outflow	360.5	354.7	-5.8
	Reach 4-Inflow	384.3	377.2	-7.1
	Reach 4-Outflow	384.2	377.1	-7.1
	Reach 5-Inflow	408.6	404.1	-4.5
	Reach 5-Outflow	407.9	403.4	-4.5
	Reach 6-Inflow	437.0	429.4	-7.6
	Reach 6-Outflow	431.2	423.6	-7.6
	Reach 7-Inflow	455.4	445.5	-10.0
	Reach 7-Outflow	449.4	439.5	-9.9
	Reservoir Outlet	425.8	418.3	-7.4
Unnamed Tributary	**12**	67.6	66.4	-1.3
Elder Creek Below Matheson	**13**	48.5	46.8	-1.7
	14	51.2	48.5	-2.6

OVERALL WATERSHED PEAK DISCHARGE

Watershed Basin Area	Subwatershed/ Reach	50-yr Peak Discharge (cfs)		
		Existing	Developed	Net
Elder Creek/ Matheson Reservoir Basin	**0**	501.7	501.7	0.0
	1	73.0	72.2	-0.8
	2	60.9	56.9	-4.0
	3	59.9	59.5	-0.4
	4	43.5	42.1	-1.4
	5	61.1	59.2	-1.9
	6	61.8	57.0	-4.8
	7	81.4	76.0	-5.3
	8	66.7	68.8	2.1
	9	84.3	81.0	-3.3
	10	19.4	19.4	0.0
	11	78.6	77.8	-0.8
	M. Hill	2.2	2.2	0.0
	Direct Rainfall	21.3	21.3	0.0
	Reach 0-Inflow	429.5	429.5	0.0
	Reach 0-Outflow	418.0	418.0	0.0
	Reach 1-Inflow	528.8	526.1	-2.7
	Reach 1-Outflow	528.4	525.8	-2.6
	Reach 2-Inflow	571.5	561.4	-10.2
	Reach 2-Outflow	571.4	561.2	-10.2
	Reach 3-Inflow	599.2	588.1	-11.1
	Reach 3-Outflow	598.1	587.0	-11.1
	Reach 4-Inflow	639.1	626.1	-13.0
	Reach 4-Outflow	638.9	626.0	-13.0
	Reach 5-Inflow	680.6	672.7	-7.9
	Reach 5-Outflow	679.7	671.9	-7.8
	Reach 6-Inflow	730.5	717.5	-13.1
	Reach 6-Outflow	721.2	708.7	-12.5
	Reach 7-Inflow	763.7	746.5	-17.2
	Reach 7-Outflow	754.3	739.5	-14.8
	Reservoir Outlet	742.0	730.7	-11.3
Unnamed Tributary	**12**	102.9	101.2	-1.8
Elder Creek Below Matheson	**13**	72.7	70.8	-1.8
	14	76.4	73.3	-3.1

OVERALL WATERSHED PEAK DISCHARGE

Watershed Basin Area	Subwatershed/ Reach	100-yr Peak Discharge (cfs)		
		Existing	Developed	Net
Elder Creek/ Matheson Reservoir Basin	**0**	501.7	501.7	0.0
	1	84.5	83.5	-0.9
	2	71.4	66.5	-4.9
	3	69.3	68.9	-0.3
	4	50.4	49.0	-1.5
	5	71.1	69.1	-2.0
	6	71.4	66.2	-5.2
	7	94.6	88.7	-6.0
	8	77.4	79.9	2.4
	9	97.8	94.0	-3.8
	10	22.2	22.2	0.0
	11	90.8	89.9	-0.9
	M. Hill	2.5	2.5	0.0
	Direct Rainfall	23.4	23.4	0.0
	Reach 0-Inflow	501.7	501.7	0.0
	Reach 0-Outflow	489.4	489.4	0.0
	Reach 1-Inflow	620.1	616.6	-3.6
	Reach 1-Outflow	619.7	616.1	-3.6
	Reach 2-Inflow	670.4	658.0	-12.5
	Reach 2-Outflow	670.2	657.7	-12.5
	Reach 3-Inflow	703.1	689.5	-13.6
	Reach 3-Outflow	701.9	688.4	-13.5
	Reach 4-Inflow	750.6	735.0	-15.6
	Reach 4-Outflow	750.4	734.8	-15.6
	Reach 5-Inflow	799.8	790.5	-9.4
	Reach 5-Outflow	798.8	789.5	-9.3
	Reach 6-Inflow	859.6	844.3	-15.3
	Reach 6-Outflow	848.0	833.3	-14.7
	Reach 7-Inflow	898.5	878.3	-20.3
	Reach 7-Outflow	887.9	868.0	-19.8
	Reservoir Outlet	883.1	870.0	-13.1
Unnamed Tributary	**12**	117.9	115.9	-2.0
Elder Creek Below Matheson	**13**	82.8	81.0	-1.8
	14	87.0	83.7	-3.3

STORMWATER INFRASTRUCTURE ANALYSIS PEAK DISCHARGE

Watershed Basin Area	Pipe Watershed	2-yr Peak Discharge (cfs)		
		Existing	Developed	Net
Elder Creek/ Matheson Reservoir Basin	**1.1**	3.5	3.3	-0.2
	1.2	1.0	0.8	-0.2
	2.1	0.6	0.5	0.0
	2.2	1.6	0.6	-1.1
	2.3	1.2	1.2	0.0
	3.1	1.8	14.0	12.1
	3.2	19.0	5.8	-13.2
	4.1	11.7	11.5	-0.2
	4.2	3.7	1.7	-2.0
	4.3	1.5	1.5	0.0
	5.1	15.5	15.0	-0.5
	6.1	17.9	17.1	-0.8
	6.2	3.0	3.0	0.0
	6.3	3.3	3.1	-0.2
	6.4	0.9	0.9	0.0
	7.1	5.3	5.2	-0.1
	7.2	11.9	11.4	-0.5
	8.1	12.8	12.8	0.1
	8.2	1.4	1.3	-0.1
	8.3	2.1	2.1	0.0
	9.1	0.6	0.6	0.0
	9.2	1.4	1.3	-0.1
	11.1	6.7	6.6	-0.1
Unnamed Tributary	**12.1**	0.8	0.8	0.0
	12.2	6.8	6.2	-0.6
	12.3	5.5	5.5	0.0
Elder Creek Below Matheson	**13.1**	0.7	0.6	0.0
	13.2	0.8	0.7	0.0
	14.1	2.2	2.1	-0.1
	14.2	1.0	1.0	0.0
	14.3	0.8	0.8	0.0

STORMWATER INFRASTRUCTURE ANALYSIS PEAK DISCHARGE

Watershed Basin Area	Subwatershed/ Reach	10-yr Peak Discharge (cfs)		
		Existing	Developed	Net
Elder Creek/ Matheson Reservoir Basin	**1.1**	7.1	6.8	-0.3
	1.2	2.0	1.8	-0.2
	2.1	1.2	1.2	-0.1
	2.2	4.3	1.7	-2.6
	2.3	2.7	2.7	0.0
	3.1	4.0	29.5	25.5
	3.2	39.1	11.9	-27.3
	4.1	25.7	25.4	-0.3
	4.2	8.4	3.8	-4.6
	4.3	3.3	3.4	0.0
	5.1	34.1	33.6	-0.5
	6.1	37.6	36.5	-1.1
	6.2	6.4	6.4	0.0
	6.3	6.8	6.5	-0.2
	6.4	1.9	1.9	0.0
	7.1	11.3	11.0	-0.3
	7.2	26.7	25.8	-0.9
	8.1	26.8	26.9	0.1
	8.2	3.0	2.9	-0.1
	8.3	4.5	4.4	0.0
	9.1	1.3	1.3	0.0
	9.2	2.9	2.8	-0.1
	11.1	13.9	13.7	-0.2
Unnamed Tributary	**12.1**	1.6	1.6	0.0
	12.2	13.8	12.6	-1.2
	12.3	11.2	11.2	-0.1
Elder Creek Below Matheson	**13.1**	1.2	1.2	-0.1
	13.2	1.4	1.4	-0.1
	14.1	4.1	4.0	-0.1
	14.2	1.9	1.8	-0.1
	14.3	1.5	1.5	0.0

STORMWATER INFRASTRUCTURE ANALYSIS PEAK DISCHARGE

Watershed Basin Area	Subwatershed/ Reach	50-yr Peak Discharge (cfs)		
		Existing	Developed	Net
Elder Creek/ Matheson Reservoir Basin	**1.1**	10.9	10.6	-0.3
	1.2	3.2	2.9	-0.3
	2.1	1.9	1.9	-0.1
	2.2	7.5	3.5	-3.9
	2.3	4.5	4.3	-0.1
	3.1	6.4	46.7	40.3
	3.2	60.9	18.4	-42.5
	4.1	41.2	40.8	-0.3
	4.2	13.6	6.1	-7.5
	4.3	5.4	5.4	0.0
	5.1	54.8	54.5	-0.3
	6.1	59.0	57.8	-1.3
	6.2	10.2	10.1	-0.1
	6.3	10.5	10.2	-0.3
	6.4	2.9	2.9	0.0
	7.1	18.0	17.5	-0.5
	7.2	43.4	42.0	-1.4
	8.1	42.1	42.4	0.3
	8.2	4.7	4.6	-0.1
	8.3	7.1	7.1	0.0
	9.1	2.1	2.1	0.0
	9.2	4.6	4.5	-0.1
	11.1	21.7	21.5	-0.3
Unnamed Tributary	**12.1**	2.4	2.4	0.0
	12.2	21.4	19.4	-2.0
	12.3	17.4	17.4	-0.1
Elder Creek Below Matheson	**13.1**	1.8	1.2	-0.7
	13.2	2.1	2.1	-0.1
	14.1	6.1	6.0	-0.1
	14.2	2.8	2.7	0.0
	14.3	2.3	2.3	0.0

STORMWATER INFRASTRUCTURE ANALYSIS PEAK DISCHARGE

Watershed Basin Area	Subwatershed/ Reach	100-yr Peak Discharge (cfs)		
		Existing	Developed	Net
Elder Creek/ Matheson Reservoir Basin	**1.1**	12.6	12.3	-0.3
	1.2	3.6	3.4	-0.3
	2.1	2.2	2.2	-0.1
	2.2	8.9	5.0	-3.9
	2.3	5.2	5.1	-0.1
	3.1	7.5	54.0	46.5
	3.2	70.2	21.2	-49.0
	4.1	47.9	47.5	-0.4
	4.2	15.9	7.2	-8.7
	4.3	6.3	6.3	0.0
	5.1	63.7	63.5	-0.2
	6.1	68.2	66.9	-1.3
	6.2	11.8	11.8	-0.1
	6.3	12.1	11.8	-0.3
	6.4	3.4	3.4	0.0
	7.1	20.8	20.2	-0.6
	7.2	50.6	49.0	-1.6
	8.1	48.6	49.0	0.4
	8.2	5.5	5.4	-0.1
	8.3	8.2	8.2	0.0
	9.1	2.4	2.4	0.0
	9.2	5.4	5.3	-0.1
	11.1	25.1	24.8	-0.3
Unnamed Tributary	**12.1**	2.7	2.7	0.0
	12.2	24.6	22.4	-2.3
	12.3	20.1	20.0	-0.1
Elder Creek Below Matheson	**13.1**	2.1	2.0	-0.1
	13.2	2.4	2.4	-0.1
	14.1	6.9	6.8	-0.1
	14.2	3.2	3.1	-0.1
	14.3	2.7	2.7	0.0

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation

Nicholas F. Bonsignore, P.E.
Robert C. Wagner, P.E.
Paula J. Whealen
David H. Peterson, CEG, CHG
David P. Lounsbury, P.E.
Vincent Maples, P.E.
Patrick W. Ervin, P.E.
Martin Berber, P.E.
Ryan E. Stolfus

James C. Hanson, P.E.
Henry S. Matsunaga

MEMORANDUM

TO: Donald Barrella, County of Napa

FROM: Nicholas F. Bonsignore, P.E. and Vincent Maples, P.E.

DATE: February 19, 2020

RE: **KJS Investment Properties LLC and Sorrento Inc. Hydrologic Analysis for Petitions for Change and Extension of Time for Permit 18459 (Application 26165), Napa County**

1.0 INTRODUCTION

This hydrologic analysis was prepared to support Petitions for Change and Extension of Time (as amended) filed with the State Water Resources Control Board Division of Water Rights (State Water Board) for water right Permit 18459 (A026165). Additionally, the analysis was prepared to provide information for the preparation of an environmental document by Napa County as lead agency under the provisions of the California Environmental Quality Act (CEQA) for a proposed vineyard development project.[1] Approval of the water right Petitions by the State Water Board would allow for the construction of new water diversion, conveyance, and storage facilities, as well as development of additional vineyard lands (the place of use), relative to current conditions. For purposes of this memorandum, the term "project" refers only to the diversion of water in accordance with Permit 18459, as modified by the Petitions and amendments thereto. Potential impacts associated with the development of new facilities and the place of use will be addressed by others in connection with preparation of the CEQA document.

Permit 18459 was issued by the State Water Board in 1982 and allowed for the construction of an on-stream dam on Elder Creek impounding a 48-acre-foot reservoir. The on-stream dam project was never constructed, and no water has been diverted and used under the permit. The original Petition for Change (Petition) was filed in 2001 and publicly noticed by the State Water Board in May 2002. The Petition was protested by the California Department of Fish and Game (DFG) in July 2002.[2] The Petition has since been amended several times with the most recent amendment

[1] KJS and Sorrento Vineyard Conversion Erosion Control Plan Application #P17-00432-ECPA.

[2] California Department of Fish and Game is now called California Department of Fish and Wildlife.

filed in 2018. Details of the current amended Petition are provided in Section 2.0 of this memorandum. A notable change from the original Petition filed in 2001 is that the proposed project now entails the construction of an off-stream reservoir rather than an on-stream reservoir on Elder Creek.

The 2002 DFG protest listed several proposed conditions that might be required for resolution of the protest depending upon the outcome of environmental studies. Among these potential conditions are a minimum bypass flow, limitation on the cumulative rate of diversion, and a limitation on the cumulative annual amount of water diverted in the watersheds of interest. This analysis evaluates diversions under Permit 18459 using minimum bypass flow and maximum diversion rate restrictions listed in the DFG protest. It also quantifies seasonal cumulative diversion under the permit and senior rights. The analysis was prepared consistent with the following procedures and assumptions:

- Diversions under the subject permit and under senior water rights were evaluated for impacts on flows at points of interest (POI) at or below the points of diversion (POD) named in the permit.
- Diversions under Permit 18459 were assumed to occur only when flows at the PODs were above the calculated February Median Flow (FMF).
- The cumulative maximum rates of diversion at the PODs in Permit 18459 were set equal to 15% of the calculated 20% winter exceedence flow. The combined simultaneous rate of diversion to off-stream storage under both PODs would not exceed the computed maximum instantaneous rate for the most downstream POD, i.e. POD 2.
- The subject permit was evaluated for diversion of a maximum of 48 acre-feet per year during the permitted diversion season of November 1 through April 30.
- Based on historical operations, frost protection (under other rights held by the Permittee) may occur for up to 6 hours per day for up to 40 hours per season during the period of March 15 through March 31. In this analysis, water demand for frost protection was calculated based on an application rate of 55 gpm per acre over 87.5 acres. Frost protection demand was assumed to be met by direct diversions under the Permittee's other existing and claimed rights. It was assumed that starting March 15 no water would be diverted to off-stream storage under Permit 18459 unless the computed rate of frost protection demand and the FMF bypass flow discussed above were being met at the permit PODs.
- The analysis assumes that water is not diverted under Permit 18459 to off-stream storage from POD 2 until the Permittee's senior rights attaching to POD 2, and coinciding with all or part of the diversion season authorized in Permit 18459, are fulfilled.

2.0 PROJECT DESCRIPTION

As discussed in Section 1.0, for the purpose of this memorandum, the project is defined as the diversion of water under Permit 18459, as modified by petitions and amendments. The project site is located approximately 22 miles northeast of Napa, CA, in Napa County. Permit 18459 was originally granted by the State Water Board in 1982 and allowed for diversion of up to 48 acre-feet in an on-stream reservoir to be constructed on Elder Creek upstream of the Permittee's existing Lake Matheson. Lake Matheson is impounded by an on-stream dam authorized for storage under License 9125 (A013943), and the dam is a point of direct diversion under Permit 18282 (A026179). The Permittee also claims a riparian right at Lake Matheson under Statement of Water Diversion and Use (Statement) S015232.

Pursuant to a Petition for Change filed for Permit 18459 in August 2001 and amendments to the petition filed on April 26, 2002, June 12, 2007, and June 20, 2018, the petition now proposes the construction of a 48 acre-foot off-stream reservoir (the KJS Pond) to be filled by diversions to off-stream storage from Elder Creek at POD 1 (the original POD named in the permit) and from POD 2 (dam at Lake Matheson). In addition, the petition identifies a small existing off-stream pond (the PITA Pond), located immediately south of Lake Matheson as a point of rediversion.[3] The proposed diversion season is November 1 to April 30 as allowed by the permit. The petition also proposes to increase the place of use for irrigation, frost protection, and heat protection to 280 acres. Stockwatering at the KJS Pond remains a proposed purpose of use.

A Petition for Extension of Time for Permit 18459 was filed by a prior permittee in 2005. The Permittee's amendment of June 20, 2018 requests that the full beneficial use date for the permit be extended to the year 2025.

Plate I shows the PODs named in the 2018 amendment to the Petition for Change of Permit 18459, PODs named in senior water rights upstream of the Points of Interest (POIs), PODs named in other water rights held by the Permittee at or upstream of POI 2, and the off-stream reservoirs named in the Petition for Change as amended.

3.0 POINTS OF INTEREST

In a memorandum dated February 8, 2006, DFG identified 12 POIs for hydrologic analysis. POIs 1 through 6 are located upstream of Lake Hennessey within the Sage Creek watershed (see **Plate I**). POIs 7 through 12 are located on Conn Creek downstream of Conn Dam (Lake Hennessey), which is owned and operated by the City of Napa. Flows in Conn Creek below Conn Dam are controlled by the City's operation of Lake Hennessey, which has a capacity of about 31,000 acre-feet and is a complete barrier to anadromous fish. Consequently, an analysis of flow downstream

[3] The addition of the PITA Pond as a point of rediversion was done at the direction of State Water Board staff. Pursuant to Item 4 of an April 5, 2002 Agreement with the State Water Board, the previous property owner agreed to operate the PITA pond only as a regulatory off-stream pond during the frost protection season. The current Permittee intends to comply with the Agreement.

of Conn Dam is not warranted, and POIs 7 through 12 are not considered herein. POIs 1 through 6 are located as follows:

POI	Location
1	The point on Elder Creek immediately below proposed POD 1 of Permit 18459 (A026165).
2	The point on Elder Creek immediately below the requested location of POD 2 of Permit 18459 (A026165), which is also the POD named in License 9125 (A013943), Permit 18282 (A026179), and Statement S015232.
3	The point on Elder Creek immediately above the confluence with Sage Creek.
4	The point on Sage Creek immediately below the confluence with Elder Creek.
5	The point on Sage Creek immediately above the confluence with Clear Creek.
6	The point on Sage Creek immediately below the confluence with Clear Creek.

4.0 WATER RIGHTS EVALUATED

The requested POD 2 of Permit 18459, located immediately upstream of POI 2, shares its location with PODs named in the Permittee's License 9125 (A013943), Permit 18282 (A026179), and Statement S015232. The POD named in License 10130 (A022073) is located on the flow path downstream of POI 2 and upstream of POI 3. PODs for License 12112 (A025813), Statement S001108, and Statement S028220 (none of which are on the flow path downstream of the PODs requested for Permit 18459) are located upstream of POI 4 on Sage Creek and unnamed tributaries to Sage Creek. **Plate I** shows the locations of these PODs. Senior water rights of record with diversion seasons outside of the diversion season authorized by Permit 18459 are not part of this analysis and are not shown on **Plate I**. Except for the Permittee's Permit 18282, junior rights within the POI watersheds are not considered in this analysis.

5.0 ESTIMATED SEASONAL UNIMPAIRED FLOW

Average unimpaired stream flows at PODs and POIs were estimated based on reference to a local USGS stream gage record.

5.1 Gage Data for USGS #11456500 Conn Creek Near Oakville, CA (Conn Creek gage)

The Conn Creek gage was used as the reference for estimating flows at the POIs and PODs. The gage location and drainage area are shown on **Plate I**. This gage was selected as a reference gage because the watersheds of interest are within the watershed of the gage. Historical daily flow data is available for the Conn Creek gage for October 1, 1929 to September 30, 1959, and October 1, 1971 through September 30, 1975. Construction of Conn Dam was completed in 1946. Gage flow data for October 1, 1929 to September 30, 1945 was used in this analysis, as it is assumed to represent the unimpaired flow condition before the occurrence of substantial upstream diversions, particularly diversions occurring at Conn Dam after its construction, which significantly altered

natural Conn Creek flow measured at the gage. We are not aware of any other gage flow records within the Sage Creek watershed above Lake Hennessey that would be representative of unimpaired flow conditions.[4]

To the extent that diversions occurred within the gaged watershed during the period of record, the gaged flow underestimates unimpaired flow. Accordingly, reliance on gaged data likely underestimates unimpaired flow for other watersheds, which provides for a conservative analysis of available water.

5.2 Proration of Gage Flow to Points of Interest and Points of Diversion

Average seasonal unimpaired stream flows at the POIs and PODs were estimated by adjusting the Conn Creek gaged flow data for differences in drainage area and mean annual precipitation (MAP), using the following formula:

$$Q_2 = Q_1 \times (A_2/A_1) \times (MAP_2/MAP_1) \qquad \textit{Equation 1}$$

Where:

Q_2 = Flow at POI or POD;
Q_1 = Estimated unimpaired flow at gage;
A_2 = Watershed area above POI or POD;
A_1 = Watershed area above gage;
MAP_2 = Weighted mean annual precipitation for watershed above POI;
MAP_1 = Weighted mean annual precipitation for watershed above gage.

Watershed boundaries and MAP isohyets are shown on **Plate I**. Watershed boundaries were delineated on electronic versions of USGS 7.5-minute quad maps, and watershed areas were determined using AutoCAD. Isohyets were obtained from the map entitled Mean Annual Precipitation in the California Region, by S.E. Rantz, 1972. Drainage areas, MAPs, and the resulting gage adjustment factors for each POD and POI are summarized in **Attachment A**.

6.0 CUMULATIVE MAXIMUM INSTANTANEOUS RATE OF DIVERSION

The cumulative maximum instantaneous diversion rate from POD 1 includes only diversions from POD 1, as there are no other diversions of record upstream of POD 1. The Permittee is proposing that diversion from POD 2 under Permit 18459 (A026165) will only occur when diversions under other rights at POD 2 are not occurring. For diversion to occur from POD 2 under Permit 18459, Lake Matheson must first be full and a minimum bypass flow (discussed in a later section) must

[4] While the City of Napa operates a stream gage on Sage Creek immediately above Lake Hennessey, the flow data collected is not representative of unimpaired conditions due to diversions by the Permittee and other diverters within the watershed.

be flowing by POD 2. The cumulative maximum instantaneous diversion reckoned at POD 2 consists of diversions at POD 2 occurring simultaneously with diversions at POD 1 under Permit 18459.

This analysis assumes cumulative maximum instantaneous rates of diversion to off-stream storage from each POD of Permit 18459 (A026165) equivalent to 15 percent of the 20 percent winter exceedence flow reckoned at the respective PODs.

The winter exceedence flow calculation was performed for POI 1, located immediately downstream of POD 1 of Permit 18459, and POI 2, located immediately downstream of POD 2 of Permit 18459, by ranking winter mean daily flows (December 15 through March 31) for the Conn Creek gage from largest to smallest for the period of analysis for the gage. Ranked flows were associated with a percent exceedence and plotted over a range of values (from approximately 13 to 25 percent) closely represented by a second order polynomial equation (see **Figure 1**). The 20 percent exceedence value for the gage was taken from the equation of the line closely fitting the plotted values, and cumulative maximum instantaneous diversion rate calculated as 15 percent of the 20 percent exceedence value. This flow value was then adjusted based on drainage area and MAP (per *Equation 1*, see previous section) to calculate cumulative maximum instantaneous rates of diversion for POD 1 and POD 2 of Permit 18459. These rates were computed to be 0.29 cfs for POD 1 and 0.41 cfs for POD 2.

7.0 MINIMUM BYPASS FLOW

For Permit 18459, this analysis assumes a minimum required bypass flow equal to the FMF during the November 1 through April 30 diversion season. The FMF is equal to the median of the recorded mean daily flow values occurring in the month of February at a given point on a stream. The FMF was calculated at each POD of Permit 18459 as the median of the mean daily values measured at the Conn Creek gage during February for the years 1930 through 1945, proportionally adjusted for differences in drainage area and MAP (per *Equation 1*). The FMF values for PODs 1 and 2 of Permit 18459 are calculated to be approximately 0.6 cfs and 0.9 cfs, respectively.

8.0 AVERAGE ANNUAL FLOW IMPAIRMENT

DFG's 2002 protest indicated a possible requirement that the "total amount of water diverted from all basis of rights does not exceed 10 percent of the average annual water production from the watershed." We interpret "annual water production from the watershed" to mean unimpaired flow conditions, i.e. natural condition with no diversions under any basis of right. Annual unimpaired flow at POIs 1 through 6 was computed for each water year (1930 to 1945) based on the daily Conn Creek gage data, adjusted to the respective POIs as discussed in Section 5.2 herein, summarized in **Tables 1 through 6**.

A daily operational study was conducted to evaluate impaired conditions. Two operational scenarios were evaluated: 1) diversions under senior rights (baseline)[5,6] and 2) diversions under senior rights plus Permit 18459 (baseline plus project). Annual impaired flow was computed for each water year at each POI by deducting daily diversions within the watershed of the POI (in accordance with the water rights) from the computed daily unimpaired flow, and, in the case of Permit 18459, after allowing for the FMF bypass and maximum rates of diversion discussed previously herein. **Tables 1 through 6** also show the annual amounts diverted under senior rights, the annual amounts diverted under senior rights plus Permit 18459 (the project), and the incremental annual amounts diverted attributable to the project. The average annual flow impairment, expressed as a percentage, was calculated for each condition at each POI as the average annual impaired flow divided by the average annual unimpaired flow.

The table below summarizes the results of the average annual impaired flow calculations. For POIs 2 through 4, the average annual impairment from senior diversions (baseline condition) is above 10 percent without considering the effects of the diversion under Permit 18459. The average annual impairment values including the effects of the project are incrementally higher at these POIs, but are relatively small, ranging from about 1.4 to about 4.4 percent. The percentage impairments from senior diversions at POIs 1, 5 and 6 are less than 10 percent. When diversion under Permit 18459 is included impairment at these POIs increases but does not exceed 10 percent. For all six POIs, the percentage incremental impairment as a result of the project decreases from upstream to downstream.

POI	Average Annual Senior Impairment	Average Annual Senior Plus Project Impairment	Incremental Impairment due to Project
1	0%	4.67%	4.67%
2	16.24%	20.63%	4.39%
3	10.19%	12.50%	2.31%
4	11.95%	13.30%	1.35%
5	6.45%	7.18%	0.73%
6	5.13%	5.71%	0.58%

9.0 ESTIMATED PROJECT YIELD

The daily operational analysis discussed in Section 8.0 was used to estimate the annual yield of Permit 18459. The yield is the amount of runoff that could be diverted after considering diversions under the other water rights, the FMF bypass flow, and the calculated cumulative maximum

[5] Permit 18282, also held by the Permittee, which allows direct diversions for frost protection, is not senior to Permit 18459, but it is treated as senior for purposes of the analysis, as its diversions will preempt diversions under Permit 18459.

[6] For POI 1, there are no upstream senior water rights, so the flow impairment was calculated based on upstream Permit 18459 diversions only.

instantaneous rate of diversion. Estimated annual yield amounts for PODs 1 and 2 of Permit 18459 are shown on **Tables 7 and 8**, respectively. The total annual yield from both PODs combined is shown on **Table 9**. For the 16-year study period, the total annual yield averaged 28.4 acre-feet. The maximum amount of water allowed under Permit 18459 (48 acre-feet) was obtainable in 5 of the 16 years. These yield results include consideration of the minimum bypass flow and a rate-of-diversion limitations that were indicated to be potential protest dismissal conditions in CDFW's protest of the Petition for Change. It is noted that the estimated yield at each of the two PODs may be affected by diversions at the other POD. Absent diversions made at POD 1, the estimated yield at POD 2 would be greater; absent diversions made at POD 2, the estimated yield at POD 1 would be greater.

* * * * *

TABLE 1
Petitions for Change and Extension of Time for Permit 18459 (A026165)
Annual Flow Impairment from Daily Flow Analysis
POI 1
Amounts in Acre-Feet

	POI 1			
Water Year	**Unimpaired Flow**	**Senior Diversion**	**Senior & Project Diversion**	**Increase Due to Project**
1930	311	0	28	28
1931	20	0	1	1
1932	292	0	20	20
1933	82	0	6	6
1934	104	0	8	8
1935	440	0	37	37
1936	467	0	23	23
1937	354	0	25	25
1938	1,116	0	35	35
1939	25	0	1	1
1940	846	0	36	36
1941	1,417	0	35	35
1942	1,005	0	36	36
1943	433	0	26	26
1944	196	0	12	12
1945	282	0	17	17
Average	**462**	**0**	**22**	**22**
Average Annual Flow Impairment	**---**	**0.00%**	**4.67%**	**4.67%**

TABLE 2
Petitions for Change and Extension of Time for Permit 18459 (A026165)
Annual Flow Impairment from Daily Flow Analysis
POI 2
Amounts in Acre-Feet

Water Year	POI 2			
	Unimpaired Flow	Senior Diversion	Senior & Project Diversion	Increase Due to Project
1930	436	118	154	37
1931	29	28	29	1
1932	409	96	122	26
1933	116	95	101	6
1934	146	95	104	9
1935	617	125	173	48
1936	655	108	139	30
1937	497	125	159	34
1938	1,565	125	173	48
1939	36	35	36	1
1940	1,187	125	173	48
1941	1,987	125	173	48
1942	1,410	125	173	48
1943	607	125	160	34
1944	275	105	120	15
1945	395	125	147	22
Average	**648**	**105**	**134**	**28**
Average Annual Flow Impairment	**---**	**16.24%**	**20.63%**	**4.39%**

TABLE 3
Petitions for Change and Extension of Time for Permit 18459 (A026165)
Annual Flow Impairment from Daily Flow Analysis
POI 3
Amounts in Acre-Feet

Water Year	POI 3			
	Unimpaired Flow	Senior Diversion	Senior & Project Diversion	Increase Due to Project
1930	828	138	174	37
1931	54	48	49	1
1932	776	116	142	26
1933	219	115	121	6
1934	276	115	124	9
1935	1,170	145	193	48
1936	1,242	128	159	30
1937	942	145	179	34
1938	2,969	145	193	48
1939	68	55	56	1
1940	2,251	145	193	48
1941	3,769	145	193	48
1942	2,675	145	193	48
1943	1,152	145	180	34
1944	521	125	140	15
1945	749	145	167	22
Average	**1,229**	**125**	**154**	**28**
Average Annual Flow Impairment	**---**	**10.19%**	**12.50%**	**2.31%**

TABLE 4
Petitions for Change and Extension of Time for Permit 18459 (A026165)
Annual Flow Impairment from Daily Flow Analysis
POI 4
Amounts in Acre-Feet

	POI 4			
Water Year	**Unimpaired Flow**	**Senior Diversion**	**Senior & Project Diversion**	**Increase Due to Project**
1930	1,416	273	309	37
1931	93	67	67	1
1932	1,327	227	253	26
1933	375	167	172	6
1934	473	174	183	9
1935	2,001	327	375	48
1936	2,125	258	288	30
1937	1,612	271	304	34
1938	5,079	342	390	48
1939	116	80	81	1
1940	3,852	323	371	48
1941	6,448	375	423	48
1942	4,576	372	420	48
1943	1,971	281	315	34
1944	892	213	228	15
1945	1,282	274	296	22
Average	**2,102**	**251**	**280**	**28**
Average Annual Flow Impairment	**---**	**11.95%**	**13.30%**	**1.35%**

TABLE 5
Petitions for Change and Extension of Time for Permit 18459 (A026165)
Annual Flow Impairment from Daily Flow Analysis
POI 5
Amounts in Acre-Feet

	POI 5			
Water Year	**Unimpaired Flow**	**Senior Diversion**	**Senior & Project Diversion**	**Increase Due to Project**
1930	2,626	273	309	37
1931	172	67	67	1
1932	2,461	227	253	26
1933	696	167	172	6
1934	876	174	183	9
1935	3,710	327	375	48
1936	3,940	258	288	30
1937	2,989	271	304	34
1938	9,417	342	390	48
1939	215	80	81	1
1940	7,142	323	371	48
1941	11,956	375	423	48
1942	8,484	372	420	48
1943	3,655	281	315	34
1944	1,654	213	228	15
1945	2,376	274	296	22
Average	**3,898**	**251**	**280**	**28**
Average Annual Flow Impairment	**---**	**6.45%**	**7.18%**	**0.73%**

TABLE 6
Petitions for Change and Extension of Time for Permit 18459 (A026165)
Annual Flow Impairment from Daily Flow Analysis
POI 6
Amounts in Acre-Feet

		POI 6		
Water Year	**Unimpaired Flow**	**Senior Diversion**	**Senior & Project Diversion**	**Increase Due to Project**
1930	3,300	273	309	37
1931	217	67	67	1
1932	3,092	227	253	26
1933	874	167	172	6
1934	1,101	174	183	9
1935	4,663	327	375	48
1936	4,952	258	288	30
1937	3,757	271	304	34
1938	11,835	342	390	48
1939	270	80	81	1
1940	8,975	323	371	48
1941	15,025	375	423	48
1942	10,662	372	420	48
1943	4,593	281	315	34
1944	2,079	213	228	15
1945	2,986	274	296	22
Average	**4,899**	**251**	**280**	**28**
Average Annual Flow Impairment	**---**	**5.13%**	**5.71%**	**0.58%**

TABLE 7
Permit 18459 (A026165) - Point of Diversion 1
Estimated Annual Yield
Assumed November 1 to April 30 Diversion Season

Water Year	Annual Yield (ac-ft)
1930	28.1
1931	0.6
1932	19.6
1933	5.9
1934	7.8
1935	36.9
1936	23.4
1937	24.8
1938	34.7
1939	1.0
1940	36.2
1941	34.9
1942	35.8
1943	26.5
1944	12.1
1945	17.2
Average	**21.6**
Minimum	**0.6**
Maximum	**36.9**

TABLE 8
Permit 18459 (A026165) - Point of Diversion 2
Estimated Annual Yield
Assumed November 1 to April 30 Diversion Season

Water Year	Annual Yield (ac-ft)
1930	8.4
1931	0.0
1932	6.7
1933	0.0
1934	1.2
1935	11.1
1936	7.0
1937	8.8
1938	13.3
1939	0.0
1940	11.8
1941	13.1
1942	12.2
1943	7.8
1944	2.9
1945	4.8
Average	**6.8**
Minimum	**0.0**
Maximum	**13.3**

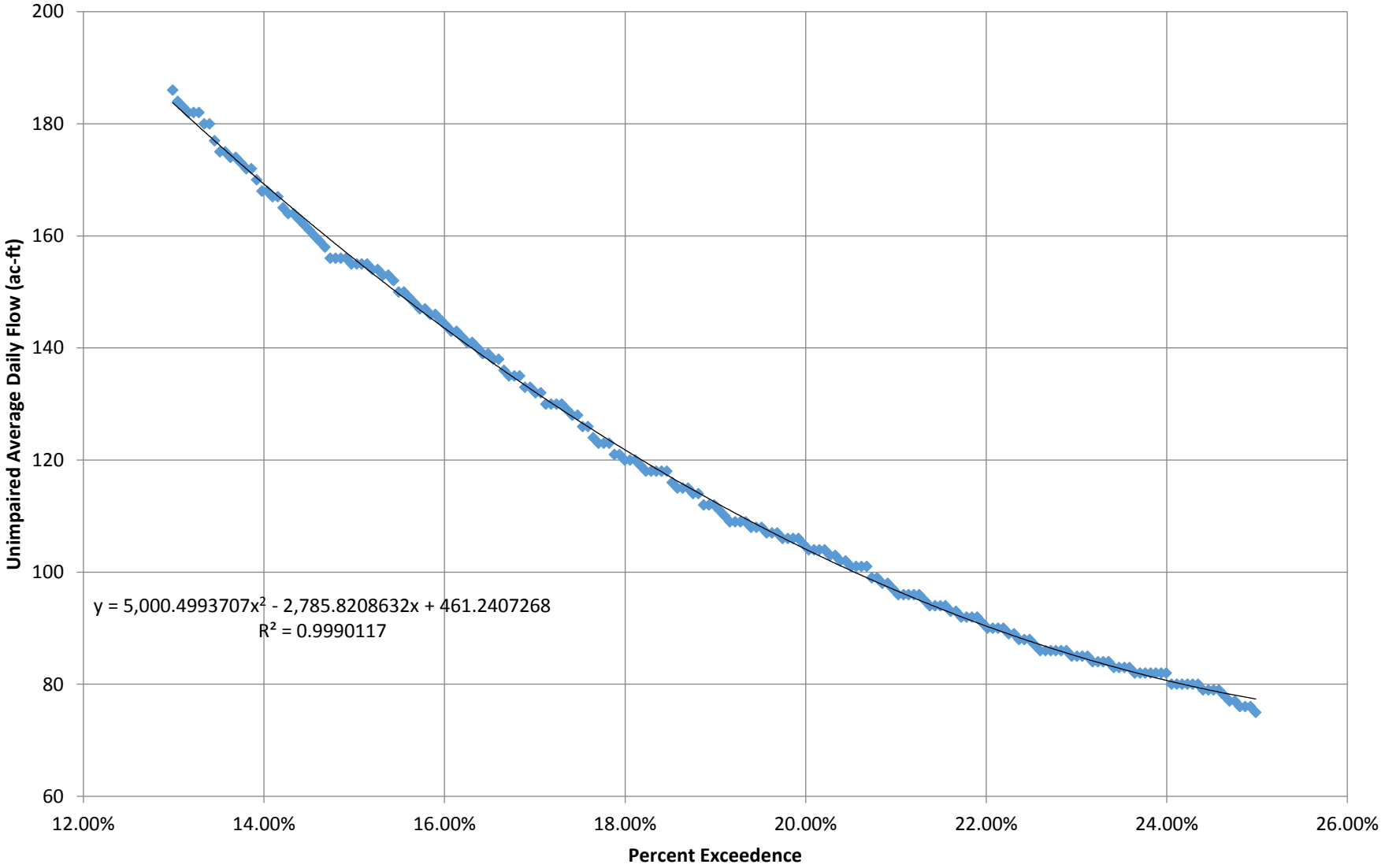
TABLE 9
Permit 18459 (A026165)
Estimated Total Annual Yield
Assumed November 1 to April 30 Diversion Season

Water Year	Annual Yield (ac-ft)
1930	36.6
1931	0.6
1932	26.4
1933	5.9
1934	9.0
1935	48.0
1936	30.4
1937	33.6
1938	48.0
1939	1.0
1940	48.0
1941	48.0
1942	48.0
1943	34.2
1944	15.0
1945	22.0
Average	**28.4**
Minimum	**0.6**
Maximum	**48.0**

FIGURE 1

Conn Creek Gage - Winter Exceedence Flows for WY 1930 - 1945

(showing only the range of approximately 13%-25% exceedence)



Petition for Change of Permit 18459 (A026165)

Watershed Gage Adjustment Factors

Watershed	Area (ac)	Mean Annual Precipitation [1] (inches)	Percent of Gage (%)
USGS #11465600 Conn Creek near Oakville, CA	35,164	34.84	-
POI 1, A026165 POD 1	730	31.56	1.88%
POI 2, A026165 POD 2, A013943, A026179, S015232	1,024	31.56	2.64%
POI 3	1,932	31.72	5.00%
POI 4	3,261	32.15	8.56%
POI 5	6,090	31.92	15.86%
POI 6	7,569	32.27	19.94%
A022073	1,756	31.66	4.54%
A025813 POD 1	196	33.26	0.53%
A025813 POD 2	140	33.23	0.38%
A025813 POD 3	14	32.89	0.04%
S001108	696	32.98	1.87%
S028220	1,323	32.77	3.54%

Notes:

(1) Precipitation calculated per map of Mean annual rainfall isohyetals per *Mean Annual Precipitation in the California Region, Compiled by S.E. Ra*
Values computed using AutoCAD.

R6W R5W | R5W R4W | R4W R3W

T8N T9N | T7N T8N

40" | 50" | 60" | 30" | 25"

A025813 (POD 1)
A025813 (POD 3)
A025813 (POD 2)
POI 1
A026165 (POD 1)
KJS Pond (Off-Stream)
Lake Matheson
S001108
PITA Pond (Off-Stream)
POI 3
POI 2
A026165 (POD 2)
A013943
A026179
S015232
S028220
A022073
POI 4
POI 5
POI 6
USGS Gage #11456500
Conn Creek near Oakville, CA

N
0' 1,500' 3,000' 6,000'

LEGEND

- Watershed Boundary
- 40" Mean Annual Precipitation Isohyetal
- Point of Diversion / Point of Interest
- U.S.G.S. Gaging Station
- Flow Path

PLATE I

KJS Investment Properties LLC and Sorrento Inc.
Water Right Permit 18459 (A026165)

Map Showing Watersheds of Interest
with
Lines of Equal Mean Annual Precipitation

Napa County, California

Wagner Bonsignore
CIVIL ENGINEERS · LAND PLANNERS · SURVEYORS

Base map per USGS 7.5 Minute Quad maps for Calistoga, Capell Valley, Chiles Valley, Kenwood, Lake Berryessa, Rutherford, St. Helena, and Yountville.

Q:\Drawings\Somerston Vineyards\CAD\Hydrologic Analysis Map (Jan 2020).dwg

January 2020

APPENDIX K
SOIL LOSS ANALYSIS

PPI ENGINEERING
VINEYARD DESIGN
EROSION CONTROL
WATER DEVELOPMENT
DRAINAGE
PERMITTING
GPS/GIS

2800 Jefferson Street
Napa, California 94558
707-253-1806
www.ppiengineering.com

MEMORANDUM

Date: June 25, 2018

To: Patrick Ryan, Napa County Planning, Building and Environmental Services

From: James R. Bushey, P.E.
Cody J. Corsetti, P.E.

Cc: Brian Bordona, Napa County Planning, Building and Environmental Services

Re: Track I ECP #P17-00432-ECPA
KJS Investment Properties & Sorrento Inc.
Soil Loss Analysis

This memo transmits the findings of a soil loss modeling analysis for the above-referenced Track I Erosion Control Plan (ECP). The Universal Soil Loss Equation (USLE) was used to predict pre- and post-project soil loss from within the proposed vineyard development areas. A combination of topographic maps, aerial imagery and site visits were used to determine pre-project transect locations, slopes, and cover values. Pre- and post-project cover values are consistent with the United States Department of Agriculture (USDA) – Natural Resource Conservation Service (NRCS) publication titled "The Universal Soil Loss Equation Special Applications for Napa County, California" (May 1994).

A site visit was conducted on December 22, 2017 with Patrick Ryan and Neil VoPham of the Napa County Planning, Building and Environmental Services Department and Matt Bueno of PPI Engineering to determine the pre-project cover values for each block and/or transect area. Not all proposed development areas were inspected during this site visit due to limited access and time constraints, however, areas representative of all cover types on the property (as interpreted from aerial imagery) were inspected. These included Blocks 1, 4, 5, 6, 8, 9, 19, 20, 21, 23, 24, 26, 27, 28, 29, 30, 31 & 33. The cover values assigned to these blocks were used in this analysis and served as a template for determining the cover values in blocks that were not visited during the site inspection. It was agreed by all in attendance that by utilizing the recent aerial imagery of the site, it was acceptable to extrapolate the observed cover values to areas that contain similar vegetative communities throughout the site. All cover values used in this analysis should accurately represent existing conditions at the time of the site visit. Post-project cover values for

the proposed vineyard development areas were calculated using the percent cover specified in the ECP.

The revised model, summarized on pages 2-4 of the supporting documents, predicts a net decrease of approximately 377 tons of soil loss per year for the project as a whole. All individual transects show a decrease in post-project soil loss at a local level. Concluding, the KJS Investment Properties & Sorrento Inc. ECP #P17-00432-ECPA has been designed to ensure compliance with Napa County policies requiring no-net-increase in soil loss in post-project conditions. Please see the following supporting documents that contain data tables, calculations, maps of transect locations, and results from the analysis.

SUPPORTING DOCUMENTS

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
Soil Loss Analysis Summary

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

USLE Calculations Block Summary Sheet

Proposed Block	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Pre-Project Soil Loss (tons/year)	Post-Project Soil Loss (tons/year)	Net Increase/Decrease (tons/year)
1	1.69	1.35	0.33	1.97	1.62	0.35
2	1.34	0.77	0.57	5.30	4.94	0.36
3	1.02	0.85	0.17	2.74	2.25	0.48
4A	0.41	0.30	0.12	0.32	0.26	0.06
4B	0.57	0.36	0.20	0.49	0.44	0.06
5A	0.53	0.38	0.15	1.22	0.74	0.49
5B	0.23	0.06	0.17	0.37	0.30	0.07
5C	0.71	0.56	0.15	3.23	1.81	1.42
5D	0.26	0.17	0.10	0.80	0.75	0.06
5E	0.25	0.14	0.11	1.63	0.74	0.89
5F	4.37	3.19	1.18	24.31	11.95	12.36
5G	0.41	0.17	0.24	0.79	0.73	0.05
5H	1.48	1.09	0.39	6.55	3.95	2.60
5J	1.80	1.31	0.48	9.92	3.08	6.84
AVENUE 6	0.09	0.00	0.09	0.72	0.33	0.39
6	1.01	0.71	0.30	6.09	2.78	3.31
7	1.73	1.27	0.47	9.14	4.06	5.08
8	2.88	2.00	0.88	7.59	7.07	0.52
9A	1.46	1.28	0.18	10.83	4.81	6.02
9B	1.53	1.15	0.38	8.59	2.60	5.99
9C	1.35	1.06	0.29	10.51	4.67	5.84
9D	3.35	2.50	0.85	28.57	12.70	15.87
9E	0.88	0.64	0.24	5.13	2.28	2.85
9F	1.88	1.58	0.31	7.70	3.42	4.28
9G	1.03	0.79	0.24	4.07	3.69	0.38
9H	0.15	0.09	0.06	0.43	0.39	0.04
10	0.56	0.21	0.35	1.48	1.35	0.14

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

USLE Calculations Block Summary Sheet

Proposed Block	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Pre-Project Soil Loss (tons/year)	Post-Project Soil Loss (tons/year)	Net Increase/Decrease (tons/year)
11	0.43	0.29	0.14	1.40	0.62	0.78
12	1.53	1.28	0.26	7.54	5.83	1.71
13A	0.77	0.58	0.19	1.90	0.95	0.95
13B	1.74	0.95	0.79	4.69	2.66	2.04
14	1.14	0.89	0.25	7.58	2.87	4.71
15A	0.97	0.60	0.37	11.68	4.43	7.26
15B	1.61	1.12	0.49	9.42	4.71	4.71
16	0.71	0.34	0.37	8.19	3.10	5.09
17	0.67	0.46	0.21	1.48	0.83	0.65
18A	0.58	0.29	0.29	3.83	1.21	2.62
18B	0.78	0.51	0.28	4.80	1.51	3.29
19	1.79	1.09	0.70	21.85	8.34	13.51
20A	3.12	2.25	0.87	33.30	11.89	21.42
AVENUE 20B	0.04	0.00	0.04	0.17	0.10	0.07
20B	0.30	0.18	0.12	1.58	0.96	0.62
21	4.54	3.99	0.55	74.02	30.31	43.71
22	1.10	0.81	0.28	8.87	5.62	3.26
23A	4.59	3.01	1.59	3.35	2.68	0.67
23B	2.46	1.59	0.86	2.23	1.78	0.45
23C	1.27	0.87	0.41	18.17	6.88	11.29
AVENUE 23D	0.13	0.00	0.13	1.08	0.54	0.54
23D	2.36	2.05	0.31	31.12	10.43	20.70
23E	1.42	1.03	0.39	1.55	1.24	0.31
23F	6.72	5.40	1.32	36.19	21.93	14.26
23G	3.88	2.85	1.03	25.53	15.35	10.18
24A	4.84	3.48	1.35	30.55	17.92	12.63
RESERVOIR	6.42	0.00	3.36	3.82	2.97	0.85

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

USLE Calculations Block Summary Sheet

Proposed Block	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Pre-Project Soil Loss (tons/year)	Post-Project Soil Loss (tons/year)	Net Increase/Decrease (tons/year)
24B	0.55	0.30	0.24	1.88	0.84	1.05
24C	6.19	4.90	1.29	39.71	30.21	9.49
24D	0.26	0.17	0.10	0.57	0.49	0.07
24E	19.33	16.46	2.87	85.28	74.01	11.27
24F	3.63	2.74	0.89	24.74	12.77	11.97
24G	3.35	2.23	1.12	31.56	17.72	13.84
25	1.56	1.16	0.40	12.82	7.52	5.30
26	4.64	3.60	1.04	42.75	25.08	17.67
27	1.10	0.64	0.46	6.37	4.85	1.52
28	0.48	0.35	0.13	3.46	2.60	0.85
29A	2.88	1.90	0.98	17.45	9.60	7.85
29B	3.65	2.33	0.89	20.03	10.96	9.07
30	0.82	0.65	0.17	8.55	4.21	4.34
31	1.05	0.80	0.25	5.22	3.97	1.25
32	1.41	1.18	0.23	1.79	1.35	0.44
33A	3.33	2.49	0.84	3.90	3.12	0.78
33B	0.45	0.22	0.23	0.95	0.76	0.19
33C	3.55	2.56	0.99	22.57	13.23	9.34
33D	3.33	2.17	1.17	8.57	6.85	1.71
33E	6.38	4.80	1.58	17.79	14.23	3.56
Totals	156.82	111.54	41.79	872.36	495.74	376.61

Note: Individual estimates may not add to the totals due to rounding

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

USLE Calculations Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Pre-Project Soil Loss (tons/year)	Post-Project Soil Loss (tons/year)	Net Increase/Decrease (tons/year)
1A	0.70	0.61	0.09	0.92	0.76	0.16
1B	0.99	0.75	0.24	1.06	0.87	0.19
2A	0.64	0.32	0.31	2.29	2.14	0.16
2B	0.71	0.45	0.26	3.01	2.80	0.21
3	1.02	0.85	0.17	2.74	2.25	0.48
4A	0.41	0.30	0.12	0.32	0.26	0.06
4B	0.57	0.36	0.20	0.49	0.44	0.06
5A	0.53	0.38	0.15	1.22	0.74	0.49
5B	0.23	0.06	0.17	0.37	0.30	0.07
5C	0.71	0.56	0.15	3.23	1.81	1.42
5D	0.26	0.17	0.10	0.80	0.75	0.06
5E	0.25	0.14	0.11	1.63	0.74	0.89
5F1	1.95	1.58	0.37	13.95	6.37	7.58
5F2	1.16	0.77	0.38	2.31	1.90	0.41
5F3	1.26	0.84	0.43	8.04	3.67	4.37
5G	0.41	0.17	0.24	0.79	0.73	0.05
5H	1.48	1.09	0.39	6.55	3.95	2.60
5J	1.80	1.31	0.48	9.92	3.08	6.84
AVENUE 6	0.09	0.00	0.09	0.72	0.33	0.39
6	1.01	0.71	0.30	6.09	2.78	3.31
7	1.73	1.27	0.47	9.14	4.06	5.08
8A	1.81	1.25	0.56	4.00	3.73	0.27
8B	1.07	0.74	0.32	3.59	3.35	0.25
9A	1.46	1.28	0.18	10.83	4.81	6.02
9B1	1.03	0.79	0.24	7.69	2.32	5.37
9B2	0.50	0.36	0.14	0.90	0.27	0.63
9C	1.35	1.06	0.29	10.51	4.67	5.84

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

USLE Calculations Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Pre-Project Soil Loss (tons/year)	Post-Project Soil Loss (tons/year)	Net Increase/Decrease (tons/year)
9D1	0.35	0.22	0.14	1.34	0.60	0.75
9D2	2.99	2.28	0.71	27.22	12.10	15.12
9E1	0.54	0.40	0.14	3.24	1.44	1.80
9E2	0.34	0.24	0.10	1.88	0.84	1.05
9F1	1.18	1.05	0.13	5.64	2.51	3.13
9F2	0.71	0.53	0.18	2.06	0.92	1.15
9G	1.03	0.79	0.24	4.07	3.69	0.38
9H	0.15	0.09	0.06	0.43	0.39	0.04
10	0.56	0.21	0.35	1.48	1.35	0.14
11	0.43	0.29	0.14	1.40	0.62	0.78
12	1.53	1.28	0.26	7.54	5.83	1.71
13A	0.77	0.58	0.19	1.90	0.95	0.95
13B1	0.89	0.46	0.43	3.66	1.83	1.83
13B2	0.85	0.50	0.36	1.04	0.83	0.21
14	1.14	0.89	0.25	7.58	2.87	4.71
15A	0.97	0.60	0.37	11.68	4.43	7.26
15B	1.61	1.12	0.49	9.42	4.71	4.71
16	0.71	0.34	0.37	8.19	3.10	5.09
17	0.67	0.46	0.21	1.48	0.83	0.65
18A	0.58	0.29	0.29	3.83	1.21	2.62
18B	0.78	0.51	0.28	4.80	1.51	3.29
19	1.79	1.09	0.70	21.85	8.34	13.51
20A	3.12	2.25	0.87	33.30	11.89	21.42
AVENUE 20B	0.04	0.00	0.04	0.17	0.10	0.07
20B	0.30	0.18	0.12	1.58	0.96	0.62
21	4.54	3.99	0.55	74.02	30.31	43.71
22	1.10	0.81	0.28	8.87	5.62	3.26

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

USLE Calculations Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Pre-Project Soil Loss (tons/year)	Post-Project Soil Loss (tons/year)	Net Increase/Decrease (tons/year)
23A1	3.32	2.32	0.99	2.86	2.29	0.57
23A2	1.28	0.68	0.59	0.50	0.40	0.10
23B	2.46	1.59	0.86	2.23	1.78	0.45
23C	1.27	0.87	0.41	18.17	6.88	11.29
AVENUE 23D	0.13	0.00	0.13	1.08	0.54	0.54
23D	2.36	2.05	0.31	31.12	10.43	20.70
23E	1.42	1.03	0.39	1.55	1.24	0.31
23F1	0.56	0.33	0.23	3.42	2.07	1.35
23F2	1.90	1.54	0.36	6.94	4.21	2.73
23F3	2.42	2.00	0.42	15.36	9.31	6.05
23F4	1.84	1.53	0.31	10.47	6.35	4.13
23G1	1.15	0.86	0.30	5.98	4.78	1.20
23G2	0.54	0.32	0.22	2.64	2.11	0.53
23G3	1.23	1.03	0.20	9.81	4.90	4.90
23G4	0.97	0.65	0.31	7.10	3.55	3.55
24A	4.84	3.48	1.35	30.55	17.92	12.63
RESERVOIR NORTH	4.16	0.00	1.96	1.61	0.90	0.71
RESERVOIR SOUTH	2.26	0.00	1.40	2.21	2.06	0.15
24B	0.55	0.30	0.24	1.88	0.84	1.05
24C1	1.49	1.25	0.24	7.41	6.43	0.98
24C2	2.82	2.34	0.49	20.06	17.41	2.65
24C3	1.87	1.31	0.56	12.23	6.37	5.86
24D	0.26	0.17	0.10	0.57	0.49	0.07
24E1	8.53	7.14	1.39	36.00	31.25	4.76
24E2	10.79	9.32	1.48	49.28	42.77	6.51
24F1	1.54	1.14	0.40	7.45	2.62	4.82
24F2	2.09	1.60	0.49	17.30	10.15	7.15

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

USLE Calculations Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Pre-Project Soil Loss (tons/year)	Post-Project Soil Loss (tons/year)	Net Increase/Decrease (tons/year)
24G	3.35	2.23	1.12	31.56	17.72	13.84
25	1.56	1.16	0.40	12.82	7.52	5.30
26A	2.50	1.95	0.55	20.48	12.01	8.46
26B	2.15	1.65	0.49	22.27	13.07	9.21
27	1.10	0.64	0.46	6.37	4.85	1.52
28	0.48	0.35	0.13	3.46	2.60	0.85
29A1	1.14	0.73	0.40	9.22	5.07	4.15
29A2	1.75	1.17	0.58	8.23	4.53	3.70
29B1	1.34	1.05	0.29	10.81	5.95	4.86
29B2	1.46	0.88	0.37	6.96	3.77	3.19
29B3	0.85	0.39	0.22	2.25	1.24	1.01
30	0.82	0.65	0.17	8.55	4.21	4.34
31A	0.43	0.33	0.10	3.38	2.57	0.81
31B	0.62	0.47	0.15	1.84	1.40	0.44
32	1.41	1.18	0.23	1.79	1.35	0.44
33A	3.33	2.49	0.84	3.90	3.12	0.78
33B	0.45	0.22	0.23	0.95	0.76	0.19
33C	3.55	2.56	0.99	22.57	13.23	9.34
33D	3.33	2.17	1.17	8.57	6.85	1.71
33E	6.38	4.80	1.58	17.79	14.23	3.56
Totals	156.82	111.54	41.79	872.36	495.74	376.61

Note: Individual estimates may not add to the totals due to rounding

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
Pre-Project Summary

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Pre-Project Block Summary Sheet

Proposed Block	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
1	1.69	1.35	0.33	1.60	0.38	1.97
2	1.34	0.77	0.57	3.07	2.24	5.30
3	1.02	0.85	0.17	2.28	0.46	2.74
4A	0.41	0.30	0.12	0.23	0.09	0.32
4B	0.57	0.36	0.20	0.32	0.18	0.49
5A	0.53	0.38	0.15	0.87	0.35	1.22
5B	0.23	0.06	0.17	0.10	0.27	0.37
5C	0.71	0.56	0.15	2.54	0.69	3.23
5D	0.26	0.17	0.10	0.50	0.30	0.80
5E	0.25	0.14	0.11	0.90	0.72	1.63
5F	4.37	3.19	1.18	18.18	6.12	24.31
5G	0.41	0.17	0.24	0.32	0.46	0.79
5H	1.48	1.09	0.39	4.82	1.73	6.55
5J	1.80	1.31	0.48	7.26	2.67	9.92
AVENUE 6	0.09	0.00	0.09	0.00	0.72	0.72
6	1.01	0.71	0.30	4.28	1.80	6.09
7	1.73	1.27	0.47	6.68	2.46	9.14
8	2.88	2.00	0.88	5.27	2.33	7.59
9A	1.46	1.28	0.18	9.50	1.32	10.83
9B	1.53	1.15	0.38	6.57	2.02	8.59
9C	1.35	1.06	0.29	8.27	2.24	10.51
9D	3.35	2.50	0.85	21.57	7.00	28.57
9E	0.88	0.64	0.24	3.73	1.40	5.13
9F	1.88	1.58	0.31	6.56	1.14	7.70
9G	1.03	0.79	0.24	3.12	0.95	4.07
9H	0.15	0.09	0.06	0.26	0.17	0.43
10	0.56	0.21	0.35	0.56	0.92	1.48

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Pre-Project Block Summary Sheet

Proposed Block	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
11	0.43	0.29	0.14	0.95	0.45	1.40
12	1.53	1.28	0.26	6.29	1.26	7.54
13A	0.77	0.58	0.19	1.44	0.47	1.90
13B	1.74	0.95	0.79	2.47	2.22	4.69
14	1.14	0.89	0.25	5.95	1.64	7.58
15A	0.97	0.60	0.37	7.21	4.48	11.68
15B	1.61	1.12	0.49	6.55	2.87	9.42
16	0.71	0.34	0.37	3.92	4.26	8.19
17	0.67	0.46	0.21	1.02	0.45	1.48
18A	0.58	0.29	0.29	1.90	1.92	3.83
18B	0.78	0.51	0.28	3.10	1.70	4.80
19	1.79	1.09	0.70	13.32	8.53	21.85
20A	3.12	2.25	0.87	24.06	9.24	33.30
AVENUE 20B	0.04	0.00	0.04	0.00	0.17	0.17
20B	0.30	0.18	0.12	0.95	0.63	1.58
21	4.54	3.99	0.55	65.09	8.93	74.02
22	1.10	0.81	0.28	6.57	2.30	8.87
23A	4.59	3.01	1.59	2.27	1.09	3.35
23B	2.46	1.59	0.86	1.44	0.78	2.23
23C	1.27	0.87	0.41	12.35	5.82	18.17
AVENUE 23D	0.13	0.00	0.13	0.00	1.08	1.08
23D	2.36	2.05	0.31	27.05	4.08	31.12
23E	1.42	1.03	0.39	1.13	0.43	1.55
23F	6.72	5.40	1.32	29.04	7.15	36.19
23G	3.88	2.85	1.03	19.00	6.53	25.53
24A	4.84	3.48	1.35	22.00	8.56	30.55
RESERVOIR	6.42	0.00	3.36	0.00	3.82	3.82

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Pre-Project Block Summary Sheet

Proposed Block	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
24B	0.55	0.30	0.24	1.04	0.84	1.88
24C	6.19	4.90	1.29	31.37	8.33	39.71
24D	0.26	0.17	0.10	0.36	0.21	0.57
24E	19.33	16.46	2.87	72.66	12.62	85.28
24F	3.63	2.74	0.89	18.77	5.98	24.74
24G	3.35	2.23	1.12	20.99	10.56	31.56
25	1.56	1.16	0.40	9.54	3.28	12.82
26	4.64	3.60	1.04	33.12	9.63	42.75
27	1.10	0.64	0.46	3.72	2.65	6.37
28	0.48	0.35	0.13	2.52	0.94	3.46
29A	2.88	1.90	0.98	11.46	5.99	17.45
29B	3.65	2.33	0.89	14.77	5.25	20.03
30	0.82	0.65	0.17	6.76	1.78	8.55
31	1.05	0.80	0.25	4.01	1.21	5.22
32	1.41	1.18	0.23	1.50	0.29	1.79
33A	3.33	2.49	0.84	2.92	0.98	3.90
33B	0.45	0.22	0.23	0.46	0.48	0.95
33C	3.55	2.56	0.99	16.28	6.29	22.57
33D	3.33	2.17	1.17	5.57	2.99	8.57
33E	6.38	4.80	1.58	13.39	4.40	17.79
Totals	156.82	111.54	41.79	655.65	216.70	872.36

Note: Individual estimates may not add to the totals due to rounding

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Pre-Project Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss (tons/acre/year)	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
1A	0.70	0.61	0.09	1.31	0.80	0.12	0.92
1B	0.99	0.75	0.24	1.07	0.80	0.26	1.06
2A	0.64	0.32	0.31	3.61	1.17	1.13	2.29
2B	0.71	0.45	0.26	4.26	1.90	1.11	3.01
3	1.02	0.85	0.17	2.69	2.28	0.46	2.74
4A	0.41	0.30	0.12	0.77	0.23	0.09	0.32
4B	0.57	0.36	0.20	0.87	0.32	0.18	0.49
5A	0.53	0.38	0.15	2.30	0.87	0.35	1.22
5B	0.23	0.06	0.17	1.58	0.10	0.27	0.37
5C	0.71	0.56	0.15	4.53	2.54	0.69	3.23
5D	0.26	0.17	0.10	3.04	0.50	0.30	0.80
5E	0.25	0.14	0.11	6.61	0.90	0.72	1.63
5F1	1.95	1.58	0.37	7.17	11.32	2.63	13.95
5F2	1.16	0.77	0.38	2.00	1.55	0.77	2.31
5F3	1.26	0.84	0.43	6.36	5.31	2.73	8.04
5G	0.41	0.17	0.24	1.90	0.32	0.46	0.79
5H	1.48	1.09	0.39	4.43	4.82	1.73	6.55
5J	1.80	1.31	0.48	5.53	7.26	2.67	9.92
AVENUE 6	0.09	0.00	0.09	7.67	0.00	0.72	0.72
6	1.01	0.71	0.30	6.03	4.28	1.80	6.09
7	1.73	1.27	0.47	5.28	6.68	2.46	9.14
8A	1.81	1.25	0.56	2.21	2.76	1.24	4.00
8B	1.07	0.74	0.32	3.36	2.50	1.09	3.59
9A	1.46	1.28	0.18	7.40	9.50	1.32	10.83
9B1	1.03	0.79	0.24	7.47	5.92	1.77	7.69
9B2	0.50	0.36	0.14	1.81	0.65	0.25	0.90
9C	1.35	1.06	0.29	7.77	8.27	2.24	10.51

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Pre-Project Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss (tons/acre/year)	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
9D1	0.35	0.22	0.14	3.80	0.82	0.52	1.34
9D2	2.99	2.28	0.71	9.10	20.75	6.48	27.22
9E1	0.54	0.40	0.14	5.96	2.41	0.83	3.24
9E2	0.34	0.24	0.10	5.60	1.32	0.57	1.88
9F1	1.18	1.05	0.13	4.78	5.02	0.62	5.64
9F2	0.71	0.53	0.18	2.93	1.54	0.52	2.06
9G	1.03	0.79	0.24	3.97	3.12	0.95	4.07
9H	0.15	0.09	0.06	2.87	0.26	0.17	0.43
10	0.56	0.21	0.35	2.65	0.56	0.92	1.48
11	0.43	0.29	0.14	3.23	0.95	0.45	1.40
12	1.53	1.28	0.26	4.92	6.29	1.26	7.54
13A	0.77	0.58	0.19	2.47	1.44	0.47	1.90
13B1	0.89	0.46	0.43	4.12	1.87	1.79	3.66
13B2	0.85	0.50	0.36	1.21	0.60	0.43	1.04
14	1.14	0.89	0.25	6.67	5.95	1.64	7.58
15A	0.97	0.60	0.37	12.08	7.21	4.48	11.68
15B	1.61	1.12	0.49	5.86	6.55	2.87	9.42
16	0.71	0.34	0.37	11.47	3.92	4.26	8.19
17	0.67	0.46	0.21	2.21	1.02	0.45	1.48
18A	0.58	0.29	0.29	6.63	1.90	1.92	3.83
18B	0.78	0.51	0.28	6.13	3.10	1.70	4.80
19	1.79	1.09	0.70	12.18	13.32	8.53	21.85
20A	3.12	2.25	0.87	10.67	24.06	9.24	33.30
AVENUE 20B	0.04	0.00	0.04	4.43	0.00	0.17	0.17
20B	0.30	0.18	0.12	5.22	0.95	0.63	1.58
21	4.54	3.99	0.55	16.30	65.09	8.93	74.02
22	1.10	0.81	0.28	8.08	6.57	2.30	8.87

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Pre-Project Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss (tons/acre/year)	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
23A1	3.32	2.32	0.99	0.86	2.00	0.86	2.86
23A2	1.28	0.68	0.59	0.39	0.27	0.23	0.50
23B	2.46	1.59	0.86	0.91	1.44	0.78	2.23
23C	1.27	0.87	0.41	14.25	12.35	5.82	18.17
AVENUE 23D	0.13	0.00	0.13	8.56	0.00	1.08	1.08
23D	2.36	2.05	0.31	13.19	27.05	4.08	31.12
23E	1.42	1.03	0.39	1.09	1.13	0.43	1.55
23F1	0.56	0.33	0.23	6.14	2.00	1.42	3.42
23F2	1.90	1.54	0.36	3.65	5.63	1.31	6.94
23F3	2.42	2.00	0.42	6.35	12.72	2.64	15.36
23F4	1.84	1.53	0.31	5.69	8.69	1.79	10.47
23G1	1.15	0.86	0.30	5.19	4.44	1.54	5.98
23G2	0.54	0.32	0.22	4.93	1.57	1.08	2.64
23G3	1.23	1.03	0.20	7.99	8.20	1.61	9.81
23G4	0.97	0.65	0.31	7.34	4.80	2.30	7.10
24A	4.84	3.48	1.35	6.32	22.00	8.56	30.55
RESERVOIR NORTH	4.16	0.00	1.96	0.82	0.00	1.61	1.61
RESERVOIR SOUTH	2.26	0.00	1.40	1.58	0.00	2.21	2.21
24B	0.55	0.30	0.24	3.45	1.04	0.84	1.88
24C1	1.49	1.25	0.24	4.97	6.21	1.20	7.41
24C2	2.82	2.34	0.49	7.10	16.60	3.46	20.06
24C3	1.87	1.31	0.56	6.54	8.56	3.67	12.23
24D	0.26	0.17	0.10	2.16	0.36	0.21	0.57
24E1	8.53	7.14	1.39	4.22	30.13	5.88	36.00
24E2	10.79	9.32	1.48	4.57	42.53	6.75	49.28
24F1	1.54	1.14	0.40	4.84	5.52	1.93	7.45
24F2	2.09	1.60	0.49	8.29	13.25	4.05	17.30

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Pre-Project Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss (tons/acre/year)	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
24G	3.35	2.23	1.12	9.42	20.99	10.56	31.56
25	1.56	1.16	0.40	8.23	9.54	3.28	12.82
26A	2.50	1.95	0.55	8.20	15.98	4.50	20.48
26B	2.15	1.65	0.49	10.38	17.15	5.13	22.27
27	1.10	0.64	0.46	5.79	3.72	2.65	6.37
28	0.48	0.35	0.13	7.20	2.52	0.94	3.46
29A1	1.14	0.73	0.40	8.12	5.95	3.27	9.22
29A2	1.75	1.17	0.58	4.71	5.51	2.72	8.23
29B1	1.34	1.05	0.29	8.05	8.44	2.37	10.81
29B2	1.46	0.88	0.37	5.54	4.89	2.07	6.96
29B3	0.85	0.39	0.22	3.66	1.44	0.81	2.25
30	0.82	0.65	0.17	10.48	6.76	1.78	8.55
31A	0.43	0.33	0.10	7.91	2.61	0.77	3.38
31B	0.62	0.47	0.15	2.97	1.40	0.44	1.84
32	1.41	1.18	0.23	1.27	1.50	0.29	1.79
33A	3.33	2.49	0.84	1.17	2.92	0.98	3.90
33B	0.45	0.22	0.23	2.09	0.46	0.48	0.95
33C	3.55	2.56	0.99	6.35	16.28	6.29	22.57
33D	3.33	2.17	1.17	2.57	5.57	2.99	8.57
33E	6.38	4.80	1.58	2.79	13.39	4.40	17.79
Totals	156.82	111.54	41.79		655.65	216.70	872.36

Note: Individual estimates may not add to the totals due to rounding

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
Post-Project Summary

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Post-Project Block Summary Sheet

Proposed Block	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
1	1.69	1.35	0.33	1.31	0.31	1.62
2	1.34	0.77	0.57	2.86	2.08	4.94
3	1.02	0.85	0.17	1.88	0.38	2.25
4A	0.41	0.30	0.12	0.19	0.08	0.26
4B	0.57	0.36	0.20	0.28	0.16	0.44
5A	0.53	0.38	0.15	0.53	0.21	0.74
5B	0.23	0.06	0.17	0.08	0.22	0.30
5C	0.71	0.56	0.15	1.42	0.39	1.81
5D	0.26	0.17	0.10	0.47	0.28	0.75
5E	0.25	0.14	0.11	0.41	0.33	0.74
5F	4.37	3.19	1.18	8.87	3.08	11.95
5G	0.41	0.17	0.24	0.30	0.43	0.73
5H	1.48	1.09	0.39	2.90	1.04	3.95
5J	1.80	1.31	0.48	2.25	0.83	3.08
AVENUE 6	0.09	0.00	0.09	0.00	0.33	0.33
6	1.01	0.71	0.30	1.96	0.82	2.78
7	1.73	1.27	0.47	2.97	1.09	4.06
8	2.88	2.00	0.88	4.91	2.17	7.07
9A	1.46	1.28	0.18	4.22	0.59	4.81
9B	1.53	1.15	0.38	1.98	0.61	2.60
9C	1.35	1.06	0.29	3.68	0.99	4.67
9D	3.35	2.50	0.85	9.59	3.11	12.70
9E	0.88	0.64	0.24	1.66	0.62	2.28
9F	1.88	1.58	0.31	2.91	0.51	3.42
9G	1.03	0.79	0.24	2.83	0.86	3.69
9H	0.15	0.09	0.06	0.24	0.15	0.39
10	0.56	0.21	0.35	0.51	0.84	1.35

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Post-Project Block Summary Sheet

Proposed Block	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
11	0.43	0.29	0.14	0.42	0.20	0.62
12	1.53	1.28	0.26	4.86	0.97	5.83
13A	0.77	0.58	0.19	0.72	0.23	0.95
13B	1.74	0.95	0.79	1.42	1.24	2.66
14	1.14	0.89	0.25	2.25	0.62	2.87
15A	0.97	0.60	0.37	2.73	1.70	4.43
15B	1.61	1.12	0.49	3.28	1.43	4.71
16	0.71	0.34	0.37	1.49	1.61	3.10
17	0.67	0.46	0.21	0.57	0.25	0.83
18A	0.58	0.29	0.29	0.60	0.61	1.21
18B	0.78	0.51	0.28	0.98	0.54	1.51
19	1.79	1.09	0.70	5.08	3.26	8.34
20A	3.12	2.25	0.87	8.59	3.30	11.89
AVENUE 20B	0.04	0.00	0.04	0.00	0.10	0.10
20B	0.30	0.18	0.12	0.58	0.38	0.96
21	4.54	3.99	0.55	26.65	3.66	30.31
22	1.10	0.81	0.28	4.16	1.46	5.62
23A	4.59	3.01	1.59	1.81	0.87	2.68
23B	2.46	1.59	0.86	1.16	0.62	1.78
23C	1.27	0.87	0.41	4.68	2.20	6.88
AVENUE 23D	0.13	0.00	0.13	0.00	0.54	0.54
23D	2.36	2.05	0.31	9.06	1.37	10.43
23E	1.42	1.03	0.39	0.90	0.34	1.24
23F	6.72	5.40	1.32	17.60	4.34	21.93
23G	3.88	2.85	1.03	11.30	4.05	15.35
24A	4.84	3.48	1.35	12.91	5.02	17.92
RESERVOIR	6.42	0.00	3.36	0.00	2.97	2.97

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Post-Project Block Summary Sheet

Proposed Block	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
24B	0.55	0.30	0.24	0.46	0.37	0.84
24C	6.19	4.90	1.29	24.26	5.96	30.21
24D	0.26	0.17	0.10	0.31	0.18	0.49
24E	19.33	16.46	2.87	63.06	10.95	74.01
24F	3.63	2.74	0.89	9.72	3.05	12.77
24G	3.35	2.23	1.12	11.79	5.93	17.72
25	1.56	1.16	0.40	5.60	1.92	7.52
26	4.64	3.60	1.04	19.43	5.65	25.08
27	1.10	0.64	0.46	2.83	2.01	4.85
28	0.48	0.35	0.13	1.90	0.71	2.60
29A	2.88	1.90	0.98	6.30	3.30	9.60
29B	3.65	2.33	0.89	8.09	2.87	10.96
30	0.82	0.65	0.17	3.33	0.88	4.21
31	1.05	0.80	0.25	3.05	0.92	3.97
32	1.41	1.18	0.23	1.13	0.22	1.35
33A	3.33	2.49	0.84	2.34	0.79	3.12
33B	0.45	0.22	0.23	0.37	0.39	0.76
33C	3.55	2.56	0.99	9.54	3.69	13.23
33D	3.33	2.17	1.17	4.46	2.40	6.85
33E	6.38	4.80	1.58	10.71	3.52	14.23
Totals	156.82	111.54	41.79	373.65	122.09	495.74

Note: Individual estimates may not add to the totals due to rounding

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Post-Project Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss (tons/acre/year)	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
1A	0.70	0.61	0.09	1.08	0.66	0.10	0.76
1B	0.99	0.75	0.24	0.88	0.66	0.21	0.87
2A	0.64	0.32	0.31	3.36	1.09	1.05	2.14
2B	0.71	0.45	0.26	3.97	1.77	1.03	2.80
3	1.02	0.85	0.17	2.21	1.88	0.38	2.25
4A	0.41	0.30	0.12	0.64	0.19	0.08	0.26
4B	0.57	0.36	0.20	0.77	0.28	0.16	0.44
5A	0.53	0.38	0.15	1.39	0.53	0.21	0.74
5B	0.23	0.06	0.17	1.30	0.08	0.22	0.30
5C	0.71	0.56	0.15	2.54	1.42	0.39	1.81
5D	0.26	0.17	0.10	2.83	0.47	0.28	0.75
5E	0.25	0.14	0.11	3.02	0.41	0.33	0.74
5F1	1.95	1.58	0.37	3.27	5.17	1.20	6.37
5F2	1.16	0.77	0.38	1.65	1.27	0.63	1.90
5F3	1.26	0.84	0.43	2.90	2.43	1.24	3.67
5G	0.41	0.17	0.24	1.77	0.30	0.43	0.73
5H	1.48	1.09	0.39	2.67	2.90	1.04	3.95
5J	1.80	1.31	0.48	1.72	2.25	0.83	3.08
AVENUE 6	0.09	0.00	0.09	3.50	0.00	0.33	0.33
6	1.01	0.71	0.30	2.76	1.96	0.82	2.78
7	1.73	1.27	0.47	2.34	2.97	1.09	4.06
8A	1.81	1.25	0.56	2.06	2.57	1.15	3.73
8B	1.07	0.74	0.32	3.13	2.33	1.01	3.35
9A	1.46	1.28	0.18	3.29	4.22	0.59	4.81
9B1	1.03	0.79	0.24	2.26	1.79	0.54	2.32
9B2	0.50	0.36	0.14	0.55	0.20	0.08	0.27
9C	1.35	1.06	0.29	3.45	3.68	0.99	4.67

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Post-Project Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss (tons/acre/year)	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
9D1	0.35	0.22	0.14	1.69	0.36	0.23	0.60
9D2	2.99	2.28	0.71	4.04	9.22	2.88	12.10
9E1	0.54	0.40	0.14	2.65	1.07	0.37	1.44
9E2	0.34	0.24	0.10	2.49	0.58	0.25	0.84
9F1	1.18	1.05	0.13	2.13	2.23	0.28	2.51
9F2	0.71	0.53	0.18	1.30	0.68	0.23	0.92
9G	1.03	0.79	0.24	3.60	2.83	0.86	3.69
9H	0.15	0.09	0.06	2.60	0.24	0.15	0.39
10	0.56	0.21	0.35	2.40	0.51	0.84	1.35
11	0.43	0.29	0.14	1.44	0.42	0.20	0.62
12	1.53	1.28	0.26	3.80	4.86	0.97	5.83
13A	0.77	0.58	0.19	1.23	0.72	0.23	0.95
13B1	0.89	0.46	0.43	2.06	0.94	0.89	1.83
13B2	0.85	0.50	0.36	0.97	0.48	0.35	0.83
14	1.14	0.89	0.25	2.53	2.25	0.62	2.87
15A	0.97	0.60	0.37	4.58	2.73	1.70	4.43
15B	1.61	1.12	0.49	2.93	3.28	1.43	4.71
16	0.71	0.34	0.37	4.35	1.49	1.61	3.10
17	0.67	0.46	0.21	1.24	0.57	0.25	0.83
18A	0.58	0.29	0.29	2.09	0.60	0.61	1.21
18B	0.78	0.51	0.28	1.93	0.98	0.54	1.51
19	1.79	1.09	0.70	4.65	5.08	3.26	8.34
20A	3.12	2.25	0.87	3.81	8.59	3.30	11.89
AVENUE 20B	0.04	0.00	0.04	2.69	0.00	0.10	0.10
20B	0.30	0.18	0.12	3.16	0.58	0.38	0.96
21	4.54	3.99	0.55	6.67	26.65	3.66	30.31
22	1.10	0.81	0.28	5.11	4.16	1.46	5.62

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Post-Project Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss (tons/acre/year)	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
23A1	3.32	2.32	0.99	0.69	1.60	0.69	2.29
23A2	1.28	0.68	0.59	0.31	0.21	0.18	0.40
23B	2.46	1.59	0.86	0.72	1.16	0.62	1.78
23C	1.27	0.87	0.41	5.40	4.68	2.20	6.88
AVENUE 23D	0.13	0.00	0.13	4.28	0.00	0.54	0.54
23D	2.36	2.05	0.31	4.42	9.06	1.37	10.43
23E	1.42	1.03	0.39	0.87	0.90	0.34	1.24
23F1	0.56	0.33	0.23	3.72	1.21	0.86	2.07
23F2	1.90	1.54	0.36	2.21	3.41	0.79	4.21
23F3	2.42	2.00	0.42	3.85	7.71	1.60	9.31
23F4	1.84	1.53	0.31	3.45	5.26	1.08	6.35
23G1	1.15	0.86	0.30	4.15	3.55	1.23	4.78
23G2	0.54	0.32	0.22	3.95	1.25	0.86	2.11
23G3	1.23	1.03	0.20	4.00	4.10	0.81	4.90
23G4	0.97	0.65	0.31	3.67	2.40	1.15	3.55
24A	4.84	3.48	1.35	3.71	12.91	5.02	17.92
RESERVOIR NORTH	4.16	0.00	1.96	0.46	0.00	0.90	0.90
RESERVOIR SOUTH	2.26	0.00	1.40	1.48	0.00	2.06	2.06
24B	0.55	0.30	0.24	1.53	0.46	0.37	0.84
24C1	1.49	1.25	0.24	4.32	5.39	1.04	6.43
24C2	2.82	2.34	0.49	6.16	14.41	3.00	17.41
24C3	1.87	1.31	0.56	3.40	4.46	1.91	6.37
24D	0.26	0.17	0.10	1.88	0.31	0.18	0.49
24E1	8.53	7.14	1.39	3.66	26.15	5.10	31.25
24E2	10.79	9.32	1.48	3.96	36.91	5.86	42.77
24F1	1.54	1.14	0.40	1.70	1.94	0.68	2.62
24F2	2.09	1.60	0.49	4.86	7.77	2.37	10.15

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Post-Project Transect Summary Sheet

Proposed Block Transect	Proposed Vineyard Development Acres	Proposed Vineyard Block Acres	Proposed Vineyard Avenue Acres	Soil Loss (tons/acre/year)	Soil Loss in Proposed Vineyard Block (tons/year)	Soil Loss in Proposed Vineyard Avenue (tons/year)	Total (tons/year)
24G	3.35	2.23	1.12	5.29	11.79	5.93	17.72
25	1.56	1.16	0.40	4.83	5.60	1.92	7.52
26A	2.50	1.95	0.55	4.81	9.37	2.64	12.01
26B	2.15	1.65	0.49	6.09	10.06	3.01	13.07
27	1.10	0.64	0.46	4.40	2.83	2.01	4.85
28	0.48	0.35	0.13	5.42	1.90	0.71	2.60
29A1	1.14	0.73	0.40	4.47	3.27	1.80	5.07
29A2	1.75	1.17	0.58	2.59	3.03	1.50	4.53
29B1	1.34	1.05	0.29	4.43	4.64	1.30	5.95
29B2	1.46	0.88	0.37	3.00	2.65	1.12	3.77
29B3	0.85	0.39	0.22	2.01	0.79	0.45	1.24
30	0.82	0.65	0.17	5.16	3.33	0.88	4.21
31A	0.43	0.33	0.10	6.02	1.98	0.59	2.57
31B	0.62	0.47	0.15	2.26	1.07	0.33	1.40
32	1.41	1.18	0.23	0.96	1.13	0.22	1.35
33A	3.33	2.49	0.84	0.94	2.34	0.79	3.12
33B	0.45	0.22	0.23	1.67	0.37	0.39	0.76
33C	3.55	2.56	0.99	3.73	9.54	3.69	13.23
33D	3.33	2.17	1.17	2.05	4.46	2.40	6.85
33E	6.38	4.80	1.58	2.23	10.71	3.52	14.23
Totals	156.82	111.54	41.79		373.65	122.09	495.74

Note: Individual estimates may not add to the totals due to rounding

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
Soil Loss Analysis Calculation Sheets

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 1A

Gross Acres:	0.70
Vineyard Block Acres:	0.61
Vineyard Avenue Acres:	0.09
Soil Unit No. (100-182):	171
Soil Name:	Pleasanton
K, Soil Erodibility:	0.28
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	85
Total Transect Length (ft):	196
Number of Segments:	1
Individual Segment Lengths (ft):	196
Segment:	
Gradient (%):	13
m:	
Individual LS:	2.72
Factor:	
Product:	
LS, Length and Steepness:	2.72
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	75%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.020
A, Soil Loss (tons/acre):	1.31
Soil Loss in Vineyard Block (tons):	0.80
Soil Loss in Vineyard Avenue (tons):	0.12

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 1A

Gross Acres:	0.70
Vineyard Block Acres:	0.61
Vineyard Avenue Acres:	0.09
Soil Unit No. (100-182):	171
Soil Name:	Pleasanton
K, Soil Erodibility:	0.28
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	85
Total Transect Length (ft):	196
Number of Segments:	1
Individual Segment Lengths (ft):	196
Segment:	
Gradient (%):	13
m:	
Individual LS:	2.72
Factor:	
Product:	
LS, Length and Steepness:	2.72
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	1.08
Soil Loss in Vineyard Block (tons):	0.66
Soil Loss in Vineyard Avenue (tons):	0.10

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 1B

Gross Acres:	0.99	
Vineyard Block Acres:	0.75	
Vineyard Avenue Acres:	0.24	
Soil Unit No. (100-182):	171	
Soil Name:	Pleasanton	
K, Soil Erodibility:	0.28	
T, Soil Loss Tolerance (tons/acre):	4	
R, Rainfall:	85	
Total Transect Length (ft):	393	
Number of Segments:	2	
Individual Segment Lengths (ft):	197	
Segment:	1	2
Gradient (%):	10	8
m:		0.5
Individual LS:	2.69	1.96
Factor:	0.35	0.65
Product:	0.94	1.28
LS, Length and Steepness:	2.22	
Total Transect Average Gradient (%):	9	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Vegetatvie Canopy:	No Canopy	
Canopy Cover:	0%	
Ground Cover:	75%	
Percent Grass:	100%	
Percent Weeds:	0%	
C, Cover (Table 5)[1]:	0.020	
A, Soil Loss (tons/acre):	1.07	
Soil Loss in Vineyard Block (tons):	0.80	
Soil Loss in Vineyard Avenue (tons):	0.26	

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 1B

Gross Acres:	0.99	
Vineyard Block Acres:	0.75	
Vineyard Avenue Acres:	0.24	
Soil Unit No. (100-182):	171	
Soil Name:	Pleasanton	
K, Soil Erodibility:	0.28	
T, Soil Loss Tolerance (tons/acre):	4	
R, Rainfall:	85	
Total Transect Length (ft):	393	
Number of Segments:	2	
Individual Segment Lengths (ft):	197	
Segment:	1	2
Gradient (%):	10	8
m:		0.5
Individual LS:	2.69	1.96
Factor:	0.35	0.65
Product:	0.94	1.28
LS, Length and Steepness:	2.22	
Total Transect Average Gradient (%):	9	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	85%	
C, Cover (Table 4)[1]:	0.017	
A, Soil Loss (tons/acre):	0.88	
Soil Loss in Vineyard Block (tons):	0.66	
Soil Loss in Vineyard Avenue (tons):	0.21	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 2A

Gross Acres:	0.64
Vineyard Block Acres:	0.32
Vineyard Avenue Acres:	0.31
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	236
Number of Segments:	1
Individual Segment Lengths (ft):	236
Segment:	
Gradient (%):	15
m:	
Individual LS:	3.63
Factor:	
Product:	
LS, Length and Steepness:	3.63
Total Transect Average Gradient (%):	15
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	3.61
Soil Loss in Vineyard Block (tons):	1.17
Soil Loss in Vineyard Avenue (tons):	1.13

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 2A

Gross Acres:	0.64
Vineyard Block Acres:	0.32
Vineyard Avenue Acres:	0.31
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	236
Number of Segments:	1
Individual Segment Lengths (ft):	236
Segment:	
Gradient (%):	15
m:	
Individual LS:	3.63
Factor:	
Product:	
LS, Length and Steepness:	3.63
Total Transect Average Gradient (%):	15
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	3.36
Soil Loss in Vineyard Block (tons):	1.09
Soil Loss in Vineyard Avenue (tons):	1.05

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 2B

Gross Acres:	0.71
Vineyard Block Acres:	0.45
Vineyard Avenue Acres:	0.26
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	235
Number of Segments:	1
Individual Segment Lengths (ft):	235
Segment:	
Gradient (%):	17
m:	
Individual LS:	4.29
Factor:	
Product:	
LS, Length and Steepness:	4.29
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	4.26
Soil Loss in Vineyard Block (tons):	1.90
Soil Loss in Vineyard Avenue (tons):	1.11

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 2B

Gross Acres:	0.71
Vineyard Block Acres:	0.45
Vineyard Avenue Acres:	0.26
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	235
Number of Segments:	1
Individual Segment Lengths (ft):	235
Segment:	
Gradient (%):	17
m:	
Individual LS:	4.29
Factor:	
Product:	
LS, Length and Steepness:	4.29
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	3.97
Soil Loss in Vineyard Block (tons):	1.77
Soil Loss in Vineyard Avenue (tons):	1.03

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 3

Gross Acres:	1.02
Vineyard Block Acres:	0.85
Vineyard Avenue Acres:	0.17
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	225
Number of Segments:	1
Individual Segment Lengths (ft):	225
Segment:	
Gradient (%):	19
m:	
Individual LS:	4.88
Factor:	
Product:	
LS, Length and Steepness:	4.88
Total Transect Average Gradient (%):	19
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	75%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.020
A, Soil Loss (tons/acre):	2.69
Soil Loss in Vineyard Block (tons):	2.28
Soil Loss in Vineyard Avenue (tons):	0.46

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 3

Gross Acres:	1.02
Vineyard Block Acres:	0.85
Vineyard Avenue Acres:	0.17
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	225
Number of Segments:	1
Individual Segment Lengths (ft):	225
Segment:	
Gradient (%):	19
m:	
Individual LS:	4.88
Factor:	
Product:	
LS, Length and Steepness:	4.88
Total Transect Average Gradient (%):	19
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.21
Soil Loss in Vineyard Block (tons):	1.88
Soil Loss in Vineyard Avenue (tons):	0.38

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 4A

Gross Acres:	0.41
Vineyard Block Acres:	0.30
Vineyard Avenue Acres:	0.12
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	107
Number of Segments:	1
Individual Segment Lengths (ft):	107
Segment:	
Gradient (%):	10
m:	
Individual LS:	1.40
Factor:	
Product:	
LS, Length and Steepness:	1.40
Total Transect Average Gradient (%):	10
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	75%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.020
A, Soil Loss (tons/acre):	0.77
Soil Loss in Vineyard Block (tons):	0.23
Soil Loss in Vineyard Avenue (tons):	0.09

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 4A

Gross Acres:	0.41
Vineyard Block Acres:	0.30
Vineyard Avenue Acres:	0.12
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	107
Number of Segments:	1
Individual Segment Lengths (ft):	107
Segment:	
Gradient (%):	10
m:	
Individual LS:	1.40
Factor:	
Product:	
LS, Length and Steepness:	1.40
Total Transect Average Gradient (%):	10
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	0.64
Soil Loss in Vineyard Block (tons):	0.19
Soil Loss in Vineyard Avenue (tons):	0.08

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 4B

Gross Acres:	0.57
Vineyard Block Acres:	0.36
Vineyard Avenue Acres:	0.20
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	105
Number of Segments:	1
Individual Segment Lengths (ft):	105
Segment:	
Gradient (%):	11
m:	
Individual LS:	1.58
Factor:	
Product:	
LS, Length and Steepness:	1.58
Total Transect Average Gradient (%):	11
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	75%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.020
A, Soil Loss (tons/acre):	0.87
Soil Loss in Vineyard Block (tons):	0.32
Soil Loss in Vineyard Avenue (tons):	0.18

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 4B

Gross Acres:	0.57
Vineyard Block Acres:	0.36
Vineyard Avenue Acres:	0.20
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	122
Number of Segments:	1
Individual Segment Lengths (ft):	122
Segment:	
Gradient (%):	11
m:	
Individual LS:	1.71
Factor:	
Product:	
LS, Length and Steepness:	1.71
Total Transect Average Gradient (%):	11
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	0.77
Soil Loss in Vineyard Block (tons):	0.28
Soil Loss in Vineyard Avenue (tons):	0.16

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5A

Gross Acres:	0.53	
Vineyard Block Acres:	0.38	
Vineyard Avenue Acres:	0.15	
Soil Unit No. (100-182):	165	
Soil Name:	Millsholm	
K, Soil Erodibility:	0.32	
T, Soil Loss Tolerance (tons/acre):	1	
R, Rainfall:	85	
Total Transect Length (ft):	288	
Number of Segments:	2	
Individual Segment Lengths (ft):	144	
Segment:	1	2
Gradient (%):	6	12
m:	0.5	
Individual LS:	1.14	2.96
Factor:	0.35	0.65
Product:	0.40	1.92
LS, Length and Steepness:	2.32	
Total Transect Average Gradient (%):	9	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Vegetatvie Canopy:	Trees 13' Tall	
Canopy Cover:	50%	
Ground Cover:	75%	
Percent Grass:	50%	
Percent Weeds:	50%	
C, Cover (Table 5)[1]:	0.037	
A, Soil Loss (tons/acre):	2.30	
Soil Loss in Vineyard Block (tons):	0.87	
Soil Loss in Vineyard Avenue (tons):	0.35	

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5A

Gross Acres:	0.53	
Vineyard Block Acres:	0.38	
Vineyard Avenue Acres:	0.15	
Soil Unit No. (100-182):	165	
Soil Name:	Millsholm	
K, Soil Erodibility:	0.32	
T, Soil Loss Tolerance (tons/acre):	1	
R, Rainfall:	85	
Total Transect Length (ft):	288	
Number of Segments:	2	
Individual Segment Lengths (ft):	144	
Segment:	1	2
Gradient (%):	6	12
m:	0.5	
Individual LS:	1.14	2.96
Factor:	0.35	0.65
Product:	0.40	1.92
LS, Length and Steepness:	2.32	
Total Transect Average Gradient (%):	9	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	80%	
C, Cover (Table 4)[1]:	0.022	
A, Soil Loss (tons/acre):	1.39	
Soil Loss in Vineyard Block (tons):	0.53	
Soil Loss in Vineyard Avenue (tons):	0.21	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5B

Gross Acres:	0.23
Vineyard Block Acres:	0.06
Vineyard Avenue Acres:	0.17
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	123
Number of Segments:	1
Individual Segment Lengths (ft):	123
Segment:	
Gradient (%):	16
m:	
Individual LS:	2.86
Factor:	
Product:	
LS, Length and Steepness:	2.86
Total Transect Average Gradient (%):	16
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	75%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.020
A, Soil Loss (tons/acre):	1.58
Soil Loss in Vineyard Block (tons):	0.10
Soil Loss in Vineyard Avenue (tons):	0.27

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5B

Gross Acres:	0.23
Vineyard Block Acres:	0.06
Vineyard Avenue Acres:	0.17
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	123
Number of Segments:	1
Individual Segment Lengths (ft):	123
Segment:	
Gradient (%):	16
m:	
Individual LS:	2.86
Factor:	
Product:	
LS, Length and Steepness:	2.86
Total Transect Average Gradient (%):	16
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	1.30
Soil Loss in Vineyard Block (tons):	0.08
Soil Loss in Vineyard Avenue (tons):	0.22

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5C

Gross Acres:	0.71
Vineyard Block Acres:	0.56
Vineyard Avenue Acres:	0.15
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	256
Number of Segments:	1
Individual Segment Lengths (ft):	256
Segment:	
Gradient (%):	27
m:	
Individual LS:	8.23
Factor:	
Product:	
LS, Length and Steepness:	8.23
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	75%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.020
A, Soil Loss (tons/acre):	4.53
Soil Loss in Vineyard Block (tons):	2.54
Soil Loss in Vineyard Avenue (tons):	0.69

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5C

Gross Acres:	0.71
Vineyard Block Acres:	0.56
Vineyard Avenue Acres:	0.15
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	256
Number of Segments:	1
Individual Segment Lengths (ft):	256
Segment:	
Gradient (%):	27
m:	
Individual LS:	8.23
Factor:	
Product:	
LS, Length and Steepness:	8.23
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4)[1]:	0.011
A, Soil Loss (tons/acre):	2.54
Soil Loss in Vineyard Block (tons):	1.42
Soil Loss in Vineyard Avenue (tons):	0.39

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5D

Gross Acres:	0.26
Vineyard Block Acres:	0.17
Vineyard Avenue Acres:	0.10
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	168
Number of Segments:	1
Individual Segment Lengths (ft):	168
Segment:	
Gradient (%):	15
m:	
Individual LS:	3.06
Factor:	
Product:	
LS, Length and Steepness:	3.06
Total Transect Average Gradient (%):	15
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	3.04
Soil Loss in Vineyard Block (tons):	0.50
Soil Loss in Vineyard Avenue (tons):	0.30

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5D

Gross Acres:	0.26
Vineyard Block Acres:	0.17
Vineyard Avenue Acres:	0.10
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	168
Number of Segments:	1
Individual Segment Lengths (ft):	168
Segment:	
Gradient (%):	15
m:	
Individual LS:	3.06
Factor:	
Product:	
LS, Length and Steepness:	3.06
Total Transect Average Gradient (%):	15
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	2.83
Soil Loss in Vineyard Block (tons):	0.47
Soil Loss in Vineyard Avenue (tons):	0.28

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5E

Gross Acres:	0.25
Vineyard Block Acres:	0.14
Vineyard Avenue Acres:	0.11
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	253
Number of Segments:	1
Individual Segment Lengths (ft):	253
Segment:	
Gradient (%):	23
m:	
Individual LS:	6.65
Factor:	
Product:	
LS, Length and Steepness:	6.65
Total Transect Average Gradient (%):	23
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	6.61
Soil Loss in Vineyard Block (tons):	0.90
Soil Loss in Vineyard Avenue (tons):	0.72

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5E

Gross Acres:	0.25
Vineyard Block Acres:	0.14
Vineyard Avenue Acres:	0.11
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	253
Number of Segments:	1
Individual Segment Lengths (ft):	253
Segment:	
Gradient (%):	23
m:	
Individual LS:	6.65
Factor:	
Product:	
LS, Length and Steepness:	6.65
Total Transect Average Gradient (%):	23
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.02
Soil Loss in Vineyard Block (tons):	0.41
Soil Loss in Vineyard Avenue (tons):	0.33

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5F1

Gross Acres:	1.95			
Vineyard Block Acres:	1.58			
Vineyard Avenue Acres:	0.37			
Soil Unit No. (100-182):	163			
Soil Name:	Maymen-Millsholm-Lodo			
K, Soil Erodibility:	0.32			
T, Soil Loss Tolerance (tons/acre):	1			
R, Rainfall:	85			
Total Transect Length (ft):	535			
Number of Segments:	4			
Individual Segment Lengths (ft):	134			
Segment:	1	2	3	4
Gradient (%):	20	18	25	12
m:				
Individual LS:	8.05	6.99	10.78	4.03
Factor:	0.12	0.23	0.30	0.35
Product:	0.97	1.61	3.23	1.41
LS, Length and Steepness:	7.22			
Total Transect Average Gradient (%):	19			
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6)[1]:	1.00			
Vegetatvie Canopy:	Trees 13' Tall			
Canopy Cover:	50%			
Ground Cover:	75%			
Percent Grass:	50%			
Percent Weeds:	50%			
C, Cover (Table 5)[1]:	0.037			
A, Soil Loss (tons/acre):	7.17			
Soil Loss in Vineyard Block (tons):	11.32			
Soil Loss in Vineyard Avenue (tons):	2.63			

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5F1

Gross Acres:	1.95			
Vineyard Block Acres:	1.58			
Vineyard Avenue Acres:	0.37			
Soil Unit No. (100-182):	163			
Soil Name:	Maymen-Millsholm-Lodo			
K, Soil Erodibility:	0.32			
T, Soil Loss Tolerance (tons/acre):	1			
R, Rainfall:	85			
Total Transect Length (ft):	535			
Number of Segments:	4			
Individual Segment Lengths (ft):	134			
Segment:	1	2	3	4
Gradient (%):	20	18	25	12
m:				
Individual LS:	8.05	6.99	10.78	4.03
Factor:	0.12	0.23	0.30	0.35
Product:	0.97	1.61	3.23	1.41
LS, Length and Steepness:	7.22			
Total Transect Average Gradient (%):	19			
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6)[1]:	1.00			
Cover Strategy:	Permanent			
Age of Development:	Over 3 Years			
Ground Cover:	85%			
C, Cover (Table 4)[1]:	0.017			
A, Soil Loss (tons/acre):	3.27			
Soil Loss in Vineyard Block (tons):	5.17			
Soil Loss in Vineyard Avenue (tons):	1.20			

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5F2

Gross Acres:	1.16
Vineyard Block Acres:	0.77
Vineyard Avenue Acres:	0.38
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	236
Number of Segments:	1
Individual Segment Lengths (ft):	236
Segment:	
Gradient (%):	15
m:	
Individual LS:	3.63
Factor:	
Product:	
LS, Length and Steepness:	3.63
Total Transect Average Gradient (%):	15
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	75%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.020
A, Soil Loss (tons/acre):	2.00
Soil Loss in Vineyard Block (tons):	1.55
Soil Loss in Vineyard Avenue (tons):	0.77

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5F2

Gross Acres:	1.16
Vineyard Block Acres:	0.77
Vineyard Avenue Acres:	0.38
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	236
Number of Segments:	1
Individual Segment Lengths (ft):	236
Segment:	
Gradient (%):	15
m:	
Individual LS:	3.63
Factor:	
Product:	
LS, Length and Steepness:	3.63
Total Transect Average Gradient (%):	15
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	1.65
Soil Loss in Vineyard Block (tons):	1.27
Soil Loss in Vineyard Avenue (tons):	0.63

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5F3

Gross Acres:	1.26
Vineyard Block Acres:	0.84
Vineyard Avenue Acres:	0.43
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	339
Number of Segments:	1
Individual Segment Lengths (ft):	339
Segment:	
Gradient (%):	20
m:	
Individual LS:	6.41
Factor:	
Product:	
LS, Length and Steepness:	6.41
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	6.36
Soil Loss in Vineyard Block (tons):	5.31
Soil Loss in Vineyard Avenue (tons):	2.73

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5F3

Gross Acres:	1.26
Vineyard Block Acres:	0.84
Vineyard Avenue Acres:	0.43
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	339
Number of Segments:	1
Individual Segment Lengths (ft):	339
Segment:	
Gradient (%):	20
m:	
Individual LS:	6.41
Factor:	
Product:	
LS, Length and Steepness:	6.41
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.90
Soil Loss in Vineyard Block (tons):	2.43
Soil Loss in Vineyard Avenue (tons):	1.24

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5G

Gross Acres:	0.41
Vineyard Block Acres:	0.17
Vineyard Avenue Acres:	0.24
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	97
Number of Segments:	1
Individual Segment Lengths (ft):	97
Segment:	
Gradient (%):	13
m:	
Individual LS:	1.92
Factor:	
Product:	
LS, Length and Steepness:	1.92
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	1.90
Soil Loss in Vineyard Block (tons):	0.32
Soil Loss in Vineyard Avenue (tons):	0.46

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5G

Gross Acres:	0.41
Vineyard Block Acres:	0.17
Vineyard Avenue Acres:	0.24
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	97
Number of Segments:	1
Individual Segment Lengths (ft):	97
Segment:	
Gradient (%):	13
m:	
Individual LS:	1.92
Factor:	
Product:	
LS, Length and Steepness:	1.92
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	1.77
Soil Loss in Vineyard Block (tons):	0.30
Soil Loss in Vineyard Avenue (tons):	0.43

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5H

Gross Acres:	1.48		
Vineyard Block Acres:	1.09		
Vineyard Avenue Acres:	0.39		
Soil Unit No. (100-182):	165		
Soil Name:	Millsholm		
K, Soil Erodibility:	0.32		
T, Soil Loss Tolerance (tons/acre):	1		
R, Rainfall:	85		
Total Transect Length (ft):	294		
Number of Segments:	3		
Individual Segment Lengths (ft):	98		
Segment:	1	2	3
Gradient (%):	20	6	21
m:		0.5	
Individual LS:	5.97	1.15	6.37
Factor:	0.19	0.35	0.46
Product:	1.13	0.40	2.93
LS, Length and Steepness:	4.46		
Total Transect Average Gradient (%):	16		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	50%		
Ground Cover:	75%		
Percent Grass:	50%		
Percent Weeds:	50%		
C, Cover (Table 5)[1]:	0.037		
A, Soil Loss (tons/acre):	4.43		
Soil Loss in Vineyard Block (tons):	4.82		
Soil Loss in Vineyard Avenue (tons):	1.73		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5H

Gross Acres:	1.48		
Vineyard Block Acres:	1.09		
Vineyard Avenue Acres:	0.39		
Soil Unit No. (100-182):	165		
Soil Name:	Millsholm		
K, Soil Erodibility:	0.32		
T, Soil Loss Tolerance (tons/acre):	1		
R, Rainfall:	85		
Total Transect Length (ft):	294		
Number of Segments:	3		
Individual Segment Lengths (ft):	98		
Segment:	1	2	3
Gradient (%):	20	6	21
m:		0.5	
Individual LS:	5.97	1.15	6.37
Factor:	0.19	0.35	0.46
Product:	1.13	0.40	2.93
LS, Length and Steepness:	4.46		
Total Transect Average Gradient (%):	16		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	2.67		
Soil Loss in Vineyard Block (tons):	2.90		
Soil Loss in Vineyard Avenue (tons):	1.04		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 5J

Gross Acres:	1.80		
Vineyard Block Acres:	1.31		
Vineyard Avenue Acres:	0.48		
Soil Unit No. (100-182):	163		
Soil Name:	Maymen-Millsholm-Lodo		
K, Soil Erodibility:	0.32		
T, Soil Loss Tolerance (tons/acre):	1		
R, Rainfall:	85		
Total Transect Length (ft):	434		
Number of Segments:	3		
Individual Segment Lengths (ft):	145		
Segment:	1	2	3
Gradient (%):	22	21	10
m:			
Individual LS:	8.22	7.73	2.82
Factor:	0.19	0.35	0.46
Product:	1.56	2.71	1.30
LS, Length and Steepness:	5.57		
Total Transect Average Gradient (%):	18		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	50%		
Ground Cover:	75%		
Percent Grass:	50%		
Percent Weeds:	50%		
C, Cover (Table 5)[1]:	0.037		
A, Soil Loss (tons/acre):	5.53		
Soil Loss in Vineyard Block (tons):	7.26		
Soil Loss in Vineyard Avenue (tons):	2.67		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 5J

Gross Acres:	1.80		
Vineyard Block Acres:	1.31		
Vineyard Avenue Acres:	0.48		
Soil Unit No. (100-182):	163		
Soil Name:	Maymen-Millsholm-Lodo		
K, Soil Erodibility:	0.32		
T, Soil Loss Tolerance (tons/acre):	1		
R, Rainfall:	85		
Total Transect Length (ft):	434		
Number of Segments:	3		
Individual Segment Lengths (ft):	145		
Segment:	1	2	3
Gradient (%):	22	21	10
m:			
Individual LS:	8.22	7.73	2.82
Factor:	0.19	0.35	0.46
Product:	1.56	2.71	1.30
LS, Length and Steepness:	5.57		
Total Transect Average Gradient (%):	18		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	90%		
C, Cover (Table 4)[1]:	0.011		
A, Soil Loss (tons/acre):	1.72		
Soil Loss in Vineyard Block (tons):	2.25		
Soil Loss in Vineyard Avenue (tons):	0.83		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect Avenue 6

Gross Acres:	0.09
Vineyard Block Acres:	0.00
Vineyard Avenue Acres:	0.09
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	206
Number of Segments:	1
Individual Segment Lengths (ft):	206
Segment:	
Gradient (%):	28
m:	
Individual LS:	7.73
Factor:	
Product:	
LS, Length and Steepness:	7.73
Total Transect Average Gradient (%):	28
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	7.67
Soil Loss in Vineyard Block (tons):	0.00
Soil Loss in Vineyard Avenue (tons):	0.72

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect Avenue 6

Gross Acres:	0.09
Vineyard Block Acres:	0.00
Vineyard Avenue Acres:	0.09
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	206
Number of Segments:	1
Individual Segment Lengths (ft):	206
Segment:	
Gradient (%):	28
m:	
Individual LS:	7.73
Factor:	
Product:	
LS, Length and Steepness:	7.73
Total Transect Average Gradient (%):	28
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.50
Soil Loss in Vineyard Block (tons):	0.00
Soil Loss in Vineyard Avenue (tons):	0.33

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 6

Gross Acres:	1.01
Vineyard Block Acres:	0.71
Vineyard Avenue Acres:	0.30
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	189
Number of Segments:	1
Individual Segment Lengths (ft):	189
Segment:	
Gradient (%):	24
m:	
Individual LS:	6.08
Factor:	
Product:	
LS, Length and Steepness:	6.08
Total Transect Average Gradient (%):	24
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	6.03
Soil Loss in Vineyard Block (tons):	4.28
Soil Loss in Vineyard Avenue (tons):	1.80

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 6

Gross Acres:	1.01
Vineyard Block Acres:	0.71
Vineyard Avenue Acres:	0.30
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	189
Number of Segments:	1
Individual Segment Lengths (ft):	189
Segment:	
Gradient (%):	24
m:	
Individual LS:	6.08
Factor:	
Product:	
LS, Length and Steepness:	6.08
Total Transect Average Gradient (%):	24
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.76
Soil Loss in Vineyard Block (tons):	1.96
Soil Loss in Vineyard Avenue (tons):	0.82

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 7

Gross Acres:	1.73		
Vineyard Block Acres:	1.27		
Vineyard Avenue Acres:	0.47		
Soil Unit No. (100-182):	165		
Soil Name:	Millsholm		
K, Soil Erodibility:	0.32		
T, Soil Loss Tolerance (tons/acre):	1		
R, Rainfall:	85		
Total Transect Length (ft):	319		
Number of Segments:	3		
Individual Segment Lengths (ft):	106		
Segment:	1	2	3
Gradient (%):	5	21	19
m:	0.5		
Individual LS:	0.95	6.63	5.81
Factor:	0.19	0.35	0.46
Product:	0.18	2.32	2.67
LS, Length and Steepness:	5.17		
Total Transect Average Gradient (%):	15		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	50%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.038		
A, Soil Loss (tons/acre):	5.28		
Soil Loss in Vineyard Block (tons):	6.68		
Soil Loss in Vineyard Avenue (tons):	2.46		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 7

Gross Acres:	1.73		
Vineyard Block Acres:	1.27		
Vineyard Avenue Acres:	0.47		
Soil Unit No. (100-182):	165		
Soil Name:	Millsholm		
K, Soil Erodibility:	0.32		
T, Soil Loss Tolerance (tons/acre):	1		
R, Rainfall:	85		
Total Transect Length (ft):	319		
Number of Segments:	3		
Individual Segment Lengths (ft):	106		
Segment:	1	2	3
Gradient (%):	5	21	19
m:	0.5		
Individual LS:	0.95	6.63	5.81
Factor:	0.19	0.35	0.46
Product:	0.18	2.32	2.67
LS, Length and Steepness:	5.17		
Total Transect Average Gradient (%):	15		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	85%		
C, Cover (Table 4)[1]:	0.017		
A, Soil Loss (tons/acre):	2.34		
Soil Loss in Vineyard Block (tons):	2.97		
Soil Loss in Vineyard Avenue (tons):	1.09		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 8A

Gross Acres:	1.81
Vineyard Block Acres:	1.25
Vineyard Avenue Acres:	0.56
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	361
Number of Segments:	1
Individual Segment Lengths (ft):	361
Segment:	
Gradient (%):	9
m:	0.5
Individual LS:	2.22
Factor:	
Product:	
LS, Length and Steepness:	2.22
Total Transect Average Gradient (%):	9
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	2.21
Soil Loss in Vineyard Block (tons):	2.76
Soil Loss in Vineyard Avenue (tons):	1.24

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 8A

Gross Acres:	1.81
Vineyard Block Acres:	1.25
Vineyard Avenue Acres:	0.56
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	361
Number of Segments:	1
Individual Segment Lengths (ft):	361
Segment:	
Gradient (%):	9
m:	0.5
Individual LS:	2.22
Factor:	
Product:	
LS, Length and Steepness:	2.22
Total Transect Average Gradient (%):	9
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	2.06
Soil Loss in Vineyard Block (tons):	2.57
Soil Loss in Vineyard Avenue (tons):	1.15

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 8B

Gross Acres:	1.07
Vineyard Block Acres:	0.74
Vineyard Avenue Acres:	0.32
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	303
Number of Segments:	1
Individual Segment Lengths (ft):	303
Segment:	
Gradient (%):	13
m:	
Individual LS:	3.39
Factor:	
Product:	
LS, Length and Steepness:	3.39
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	75%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.037
A, Soil Loss (tons/acre):	3.36
Soil Loss in Vineyard Block (tons):	2.50
Soil Loss in Vineyard Avenue (tons):	1.09

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 8B

Gross Acres:	1.07
Vineyard Block Acres:	0.74
Vineyard Avenue Acres:	0.32
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	303
Number of Segments:	1
Individual Segment Lengths (ft):	303
Segment:	
Gradient (%):	13
m:	
Individual LS:	3.39
Factor:	
Product:	
LS, Length and Steepness:	3.39
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	3.13
Soil Loss in Vineyard Block (tons):	2.33
Soil Loss in Vineyard Avenue (tons):	1.01

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9A

Gross Acres:	1.46
Vineyard Block Acres:	1.28
Vineyard Avenue Acres:	0.18
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	199
Number of Segments:	1
Individual Segment Lengths (ft):	199
Segment:	
Gradient (%):	27
m:	
Individual LS:	7.25
Factor:	
Product:	
LS, Length and Steepness:	7.25
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	7.40
Soil Loss in Vineyard Block (tons):	9.50
Soil Loss in Vineyard Avenue (tons):	1.32

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9A

Gross Acres:	1.46
Vineyard Block Acres:	1.28
Vineyard Avenue Acres:	0.18
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	199
Number of Segments:	1
Individual Segment Lengths (ft):	199
Segment:	
Gradient (%):	27
m:	
Individual LS:	7.25
Factor:	
Product:	
LS, Length and Steepness:	7.25
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.29
Soil Loss in Vineyard Block (tons):	4.22
Soil Loss in Vineyard Avenue (tons):	0.59

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9B1

Gross Acres:	1.03
Vineyard Block Acres:	0.79
Vineyard Avenue Acres:	0.24
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	344
Number of Segments:	1
Individual Segment Lengths (ft):	344
Segment:	
Gradient (%):	22
m:	
Individual LS:	7.32
Factor:	
Product:	
LS, Length and Steepness:	7.32
Total Transect Average Gradient (%):	22
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	7.47
Soil Loss in Vineyard Block (tons):	5.92
Soil Loss in Vineyard Avenue (tons):	1.77

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9B1

Gross Acres:	1.03
Vineyard Block Acres:	0.79
Vineyard Avenue Acres:	0.24
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	344
Number of Segments:	1
Individual Segment Lengths (ft):	344
Segment:	
Gradient (%):	22
m:	
Individual LS:	7.32
Factor:	
Product:	
LS, Length and Steepness:	7.32
Total Transect Average Gradient (%):	22
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4)[1]:	0.011
A, Soil Loss (tons/acre):	2.26
Soil Loss in Vineyard Block (tons):	1.79
Soil Loss in Vineyard Avenue (tons):	0.54

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9B2

Gross Acres:	0.50
Vineyard Block Acres:	0.36
Vineyard Avenue Acres:	0.14
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	131
Number of Segments:	1
Individual Segment Lengths (ft):	131
Segment:	
Gradient (%):	11
m:	
Individual LS:	1.77
Factor:	
Product:	
LS, Length and Steepness:	1.77
Total Transect Average Gradient (%):	11
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	1.81
Soil Loss in Vineyard Block (tons):	0.65
Soil Loss in Vineyard Avenue (tons):	0.25

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9B2

Gross Acres:	0.50
Vineyard Block Acres:	0.36
Vineyard Avenue Acres:	0.14
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	131
Number of Segments:	1
Individual Segment Lengths (ft):	131
Segment:	
Gradient (%):	11
m:	
Individual LS:	1.77
Factor:	
Product:	
LS, Length and Steepness:	1.77
Total Transect Average Gradient (%):	11
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4)[1]:	0.011
A, Soil Loss (tons/acre):	0.55
Soil Loss in Vineyard Block (tons):	0.20
Soil Loss in Vineyard Avenue (tons):	0.08

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9C

Gross Acres:	1.35
Vineyard Block Acres:	1.06
Vineyard Avenue Acres:	0.29
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	421
Number of Segments:	1
Individual Segment Lengths (ft):	421
Segment:	
Gradient (%):	21
m:	
Individual LS:	7.62
Factor:	
Product:	
LS, Length and Steepness:	7.62
Total Transect Average Gradient (%):	21
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	7.77
Soil Loss in Vineyard Block (tons):	8.27
Soil Loss in Vineyard Avenue (tons):	2.24

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9C

Gross Acres:	1.35
Vineyard Block Acres:	1.06
Vineyard Avenue Acres:	0.29
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	421
Number of Segments:	1
Individual Segment Lengths (ft):	421
Segment:	
Gradient (%):	21
m:	
Individual LS:	7.62
Factor:	
Product:	
LS, Length and Steepness:	7.62
Total Transect Average Gradient (%):	21
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.45
Soil Loss in Vineyard Block (tons):	3.68
Soil Loss in Vineyard Avenue (tons):	0.99

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9D1

Gross Acres:	0.35
Vineyard Block Acres:	0.22
Vineyard Avenue Acres:	0.14
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	208
Number of Segments:	1
Individual Segment Lengths (ft):	208
Segment:	
Gradient (%):	16
m:	
Individual LS:	3.72
Factor:	
Product:	
LS, Length and Steepness:	3.72
Total Transect Average Gradient (%):	16
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	3.80
Soil Loss in Vineyard Block (tons):	0.82
Soil Loss in Vineyard Avenue (tons):	0.52

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9D1

Gross Acres:	0.35
Vineyard Block Acres:	0.22
Vineyard Avenue Acres:	0.14
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	208
Number of Segments:	1
Individual Segment Lengths (ft):	208
Segment:	
Gradient (%):	16
m:	
Individual LS:	3.72
Factor:	
Product:	
LS, Length and Steepness:	3.72
Total Transect Average Gradient (%):	16
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	1.69
Soil Loss in Vineyard Block (tons):	0.36
Soil Loss in Vineyard Avenue (tons):	0.23

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9D2

Gross Acres:	2.99		
Vineyard Block Acres:	2.28		
Vineyard Avenue Acres:	0.71		
Soil Unit No. (100-182):	163		
Soil Name:	Maymen-Millsholm-Lodo		
K, Soil Erodibility:	0.32		
T, Soil Loss Tolerance (tons/acre):	1		
R, Rainfall:	85		
Total Transect Length (ft):	744		
Number of Segments:	3		
Individual Segment Lengths (ft):	248		
Segment:	1	2	3
Gradient (%):	13	21	20
m:			
Individual LS:	5.31	10.13	9.49
Factor:	0.19	0.35	0.46
Product:	1.01	3.54	4.37
LS, Length and Steepness:	8.92		
Total Transect Average Gradient (%):	18		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	50%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.038		
A, Soil Loss (tons/acre):	9.10		
Soil Loss in Vineyard Block (tons):	20.75		
Soil Loss in Vineyard Avenue (tons):	6.48		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9D2

Gross Acres:	2.99		
Vineyard Block Acres:	2.28		
Vineyard Avenue Acres:	0.71		
Soil Unit No. (100-182):	163		
Soil Name:	Maymen-Millsholm-Lodo		
K, Soil Erodibility:	0.32		
T, Soil Loss Tolerance (tons/acre):	1		
R, Rainfall:	85		
Total Transect Length (ft):	744		
Number of Segments:	3		
Individual Segment Lengths (ft):	248		
Segment:	1	2	3
Gradient (%):	13	21	20
m:			
Individual LS:	5.31	10.13	9.49
Factor:	0.19	0.35	0.46
Product:	1.01	3.54	4.37
LS, Length and Steepness:	8.92		
Total Transect Average Gradient (%):	18		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	85%		
C, Cover (Table 4)[1]:	0.017		
A, Soil Loss (tons/acre):	4.04		
Soil Loss in Vineyard Block (tons):	9.22		
Soil Loss in Vineyard Avenue (tons):	2.88		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9E1

Gross Acres:	0.54
Vineyard Block Acres:	0.40
Vineyard Avenue Acres:	0.14
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	248
Number of Segments:	1
Individual Segment Lengths (ft):	248
Segment:	
Gradient (%):	21
m:	
Individual LS:	5.85
Factor:	
Product:	
LS, Length and Steepness:	5.85
Total Transect Average Gradient (%):	21
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	5.96
Soil Loss in Vineyard Block (tons):	2.41
Soil Loss in Vineyard Avenue (tons):	0.83

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9E1

Gross Acres:	0.54
Vineyard Block Acres:	0.40
Vineyard Avenue Acres:	0.14
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	248
Number of Segments:	1
Individual Segment Lengths (ft):	248
Segment:	
Gradient (%):	21
m:	
Individual LS:	5.85
Factor:	
Product:	
LS, Length and Steepness:	5.85
Total Transect Average Gradient (%):	21
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.65
Soil Loss in Vineyard Block (tons):	1.07
Soil Loss in Vineyard Avenue (tons):	0.37

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9E2

Gross Acres:	0.34
Vineyard Block Acres:	0.24
Vineyard Avenue Acres:	0.10
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	172
Number of Segments:	1
Individual Segment Lengths (ft):	172
Segment:	
Gradient (%):	23
m:	
Individual LS:	5.49
Factor:	
Product:	
LS, Length and Steepness:	5.49
Total Transect Average Gradient (%):	23
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	5.60
Soil Loss in Vineyard Block (tons):	1.32
Soil Loss in Vineyard Avenue (tons):	0.57

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9E2

Gross Acres:	0.34
Vineyard Block Acres:	0.24
Vineyard Avenue Acres:	0.10
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	172
Number of Segments:	1
Individual Segment Lengths (ft):	172
Segment:	
Gradient (%):	23
m:	
Individual LS:	5.49
Factor:	
Product:	
LS, Length and Steepness:	5.49
Total Transect Average Gradient (%):	23
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.49
Soil Loss in Vineyard Block (tons):	0.58
Soil Loss in Vineyard Avenue (tons):	0.25

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9F1

Gross Acres:	1.18
Vineyard Block Acres:	1.05
Vineyard Avenue Acres:	0.13
Soil Unit No. (100-182):	157
Soil Name:	Lodo-Maymen-Felton
K, Soil Erodibility:	0.24
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	200
Number of Segments:	1
Individual Segment Lengths (ft):	200
Segment:	
Gradient (%):	24
m:	
Individual LS:	6.25
Factor:	
Product:	
LS, Length and Steepness:	6.25
Total Transect Average Gradient (%):	24
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	4.78
Soil Loss in Vineyard Block (tons):	5.02
Soil Loss in Vineyard Avenue (tons):	0.62

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9F1

Gross Acres:	1.18
Vineyard Block Acres:	1.05
Vineyard Avenue Acres:	0.13
Soil Unit No. (100-182):	157
Soil Name:	Lodo-Maymen-Felton
K, Soil Erodibility:	0.24
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	200
Number of Segments:	1
Individual Segment Lengths (ft):	200
Segment:	
Gradient (%):	24
m:	
Individual LS:	6.25
Factor:	
Product:	
LS, Length and Steepness:	6.25
Total Transect Average Gradient (%):	24
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.13
Soil Loss in Vineyard Block (tons):	2.23
Soil Loss in Vineyard Avenue (tons):	0.28

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9F2

Gross Acres:	0.71			
Vineyard Block Acres:	0.53			
Vineyard Avenue Acres:	0.18			
Soil Unit No. (100-182):	157			
Soil Name:	Lodo-Maymen-Felton			
K, Soil Erodibility:	0.24			
T, Soil Loss Tolerance (tons/acre):	1			
R, Rainfall:	85			
Total Transect Length (ft):	447			
Number of Segments:	4			
Individual Segment Lengths (ft):	112			
Segment:	1	2	3	4
Gradient (%):	22	16	6	11
m:			0.5	
Individual LS:	8.34	5.46	1.42	3.27
Factor:	0.12	0.23	0.30	0.35
Product:	1.00	1.25	0.43	1.14
LS, Length and Steepness:	3.83			
Total Transect Average Gradient (%):	14			
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6)[1]:	1.00			
Vegetatvie Canopy:	Trees 13' Tall			
Canopy Cover:	50%			
Ground Cover:	65%			
Percent Grass:	90%			
Percent Weeds:	10%			
C, Cover (Table 5)[1]:	0.038			
A, Soil Loss (tons/acre):	2.93			
Soil Loss in Vineyard Block (tons):	1.54			
Soil Loss in Vineyard Avenue (tons):	0.52			

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9F2

Gross Acres:	0.71			
Vineyard Block Acres:	0.53			
Vineyard Avenue Acres:	0.18			
Soil Unit No. (100-182):	157			
Soil Name:	Lodo-Maymen-Felton			
K, Soil Erodibility:	0.24			
T, Soil Loss Tolerance (tons/acre):	1			
R, Rainfall:	85			
Total Transect Length (ft):	447			
Number of Segments:	4			
Individual Segment Lengths (ft):	112			
Segment:	1	2	3	4
Gradient (%):	22	16	6	11
m:			0.5	
Individual LS:	8.34	5.46	1.42	3.27
Factor:	0.12	0.23	0.30	0.35
Product:	1.00	1.25	0.43	1.14
LS, Length and Steepness:	3.83			
Total Transect Average Gradient (%):	14			
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6)[1]:	1.00			
Cover Strategy:	Permanent			
Age of Development:	Over 3 Years			
Ground Cover:	85%			
C, Cover (Table 4)[1]:	0.017			
A, Soil Loss (tons/acre):	1.30			
Soil Loss in Vineyard Block (tons):	0.68			
Soil Loss in Vineyard Avenue (tons):	0.23			

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9G

Gross Acres:	1.03
Vineyard Block Acres:	0.79
Vineyard Avenue Acres:	0.24
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	227
Number of Segments:	1
Individual Segment Lengths (ft):	227
Segment:	
Gradient (%):	16
m:	
Individual LS:	3.89
Factor:	
Product:	
LS, Length and Steepness:	3.89
Total Transect Average Gradient (%):	16
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	3.97
Soil Loss in Vineyard Block (tons):	3.12
Soil Loss in Vineyard Avenue (tons):	0.95

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9G

Gross Acres:	1.03
Vineyard Block Acres:	0.79
Vineyard Avenue Acres:	0.24
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	227
Number of Segments:	1
Individual Segment Lengths (ft):	227
Segment:	
Gradient (%):	16
m:	
Individual LS:	3.89
Factor:	
Product:	
LS, Length and Steepness:	3.89
Total Transect Average Gradient (%):	16
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	3.60
Soil Loss in Vineyard Block (tons):	2.83
Soil Loss in Vineyard Avenue (tons):	0.86

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 9H

Gross Acres:	0.15
Vineyard Block Acres:	0.09
Vineyard Avenue Acres:	0.06
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	101
Number of Segments:	1
Individual Segment Lengths (ft):	101
Segment:	
Gradient (%):	17
m:	
Individual LS:	2.81
Factor:	
Product:	
LS, Length and Steepness:	2.81
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	2.87
Soil Loss in Vineyard Block (tons):	0.26
Soil Loss in Vineyard Avenue (tons):	0.17

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 9H

Gross Acres:	0.15
Vineyard Block Acres:	0.09
Vineyard Avenue Acres:	0.06
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	101
Number of Segments:	1
Individual Segment Lengths (ft):	101
Segment:	
Gradient (%):	17
m:	
Individual LS:	2.81
Factor:	
Product:	
LS, Length and Steepness:	2.81
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	2.60
Soil Loss in Vineyard Block (tons):	0.24
Soil Loss in Vineyard Avenue (tons):	0.15

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 10

Gross Acres:	0.56	
Vineyard Block Acres:	0.21	
Vineyard Avenue Acres:	0.35	
Soil Unit No. (100-182):	165	
Soil Name:	Millsholm	
K, Soil Erodibility:	0.32	
T, Soil Loss Tolerance (tons/acre):	1	
R, Rainfall:	85	
Total Transect Length (ft):	243	
Number of Segments:	2	
Individual Segment Lengths (ft):	122	
Segment:	1	2
Gradient (%):	16	9
m:		0.5
Individual LS:	4.02	1.82
Factor:	0.35	0.65
Product:	1.41	1.19
LS, Length and Steepness:	2.59	
Total Transect Average Gradient (%):	13	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Vegetatvie Canopy:	Trees 13' Tall	
Canopy Cover:	50%	
Ground Cover:	65%	
Percent Grass:	90%	
Percent Weeds:	10%	
C, Cover (Table 5)[1]:	0.038	
A, Soil Loss (tons/acre):	2.65	
Soil Loss in Vineyard Block (tons):	0.56	
Soil Loss in Vineyard Avenue (tons):	0.92	

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 10

Gross Acres:	0.56	
Vineyard Block Acres:	0.21	
Vineyard Avenue Acres:	0.35	
Soil Unit No. (100-182):	165	
Soil Name:	Millsholm	
K, Soil Erodibility:	0.32	
T, Soil Loss Tolerance (tons/acre):	1	
R, Rainfall:	85	
Total Transect Length (ft):	243	
Number of Segments:	2	
Individual Segment Lengths (ft):	122	
Segment:	1	2
Gradient (%):	16	9
m:		0.5
Individual LS:	4.02	1.82
Factor:	0.35	0.65
Product:	1.41	1.19
LS, Length and Steepness:	2.59	
Total Transect Average Gradient (%):	13	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	75%	
C, Cover (Table 4)[1]:	0.034	
A, Soil Loss (tons/acre):	2.40	
Soil Loss in Vineyard Block (tons):	0.51	
Soil Loss in Vineyard Avenue (tons):	0.84	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 11

Gross Acres:	0.43
Vineyard Block Acres:	0.29
Vineyard Avenue Acres:	0.14
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	217
Number of Segments:	1
Individual Segment Lengths (ft):	217
Segment:	
Gradient (%):	14
m:	
Individual LS:	3.17
Factor:	
Product:	
LS, Length and Steepness:	3.17
Total Transect Average Gradient (%):	14
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	3.23
Soil Loss in Vineyard Block (tons):	0.95
Soil Loss in Vineyard Avenue (tons):	0.45

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 11

Gross Acres:	0.43
Vineyard Block Acres:	0.29
Vineyard Avenue Acres:	0.14
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	217
Number of Segments:	1
Individual Segment Lengths (ft):	217
Segment:	
Gradient (%):	14
m:	
Individual LS:	3.17
Factor:	
Product:	
LS, Length and Steepness:	3.17
Total Transect Average Gradient (%):	14
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	1.44
Soil Loss in Vineyard Block (tons):	0.42
Soil Loss in Vineyard Avenue (tons):	0.20

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 12

Gross Acres:	1.53
Vineyard Block Acres:	1.28
Vineyard Avenue Acres:	0.26
Soil Unit No. (100-182):	159
Soil Name:	Los Gatos
K, Soil Erodibility:	0.28
T, Soil Loss Tolerance (tons/acre):	2
R, Rainfall:	75
Total Transect Length (ft):	361
Number of Segments:	1
Individual Segment Lengths (ft):	361
Segment:	
Gradient (%):	17
m:	
Individual LS:	5.32
Factor:	
Product:	
LS, Length and Steepness:	5.32
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.044
A, Soil Loss (tons/acre):	4.92
Soil Loss in Vineyard Block (tons):	6.29
Soil Loss in Vineyard Avenue (tons):	1.26

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 12

Gross Acres:	1.53
Vineyard Block Acres:	1.28
Vineyard Avenue Acres:	0.26
Soil Unit No. (100-182):	159
Soil Name:	Los Gatos
K, Soil Erodibility:	0.28
T, Soil Loss Tolerance (tons/acre):	2
R, Rainfall:	75
Total Transect Length (ft):	361
Number of Segments:	1
Individual Segment Lengths (ft):	361
Segment:	
Gradient (%):	17
m:	
Individual LS:	5.32
Factor:	
Product:	
LS, Length and Steepness:	5.32
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	3.80
Soil Loss in Vineyard Block (tons):	4.86
Soil Loss in Vineyard Avenue (tons):	0.97

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 13A

Gross Acres:	0.77
Vineyard Block Acres:	0.58
Vineyard Avenue Acres:	0.19
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	75
Total Transect Length (ft):	82
Number of Segments:	1
Individual Segment Lengths (ft):	82
Segment:	
Gradient (%):	16
m:	
Individual LS:	2.34
Factor:	
Product:	
LS, Length and Steepness:	2.34
Total Transect Average Gradient (%):	16
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.044
A, Soil Loss (tons/acre):	2.47
Soil Loss in Vineyard Block (tons):	1.44
Soil Loss in Vineyard Avenue (tons):	0.47

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 13A

Gross Acres:	0.77
Vineyard Block Acres:	0.58
Vineyard Avenue Acres:	0.19
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	75
Total Transect Length (ft):	82
Number of Segments:	1
Individual Segment Lengths (ft):	82
Segment:	
Gradient (%):	16
m:	
Individual LS:	2.34
Factor:	
Product:	
LS, Length and Steepness:	2.34
Total Transect Average Gradient (%):	16
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	1.23
Soil Loss in Vineyard Block (tons):	0.72
Soil Loss in Vineyard Avenue (tons):	0.23

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 13B1

Gross Acres:	0.89	
Vineyard Block Acres:	0.46	
Vineyard Avenue Acres:	0.43	
Soil Unit No. (100-182):	159	
Soil Name:	Los Gatos	
K, Soil Erodibility:	0.28	
T, Soil Loss Tolerance (tons/acre):	2	
R, Rainfall:	75	
Total Transect Length (ft):	249	
Number of Segments:	2	
Individual Segment Lengths (ft):	125	
Segment:	1	2
Gradient (%):	9	21
m:	0.5	
Individual LS:	1.85	5.86
Factor:	0.35	0.65
Product:	0.65	3.81
LS, Length and Steepness:	4.45	
Total Transect Average Gradient (%):	15	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Vegetatvie Canopy:	Trees 13' Tall	
Canopy Cover:	75%	
Ground Cover:	70%	
Percent Grass:	50%	
Percent Weeds:	50%	
C, Cover (Table 5)[1]:	0.044	
A, Soil Loss (tons/acre):	4.12	
Soil Loss in Vineyard Block (tons):	1.87	
Soil Loss in Vineyard Avenue (tons):	1.79	

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 13B1

Gross Acres:	0.89	
Vineyard Block Acres:	0.46	
Vineyard Avenue Acres:	0.43	
Soil Unit No. (100-182):	159	
Soil Name:	Los Gatos	
K, Soil Erodibility:	0.28	
T, Soil Loss Tolerance (tons/acre):	2	
R, Rainfall:	75	
Total Transect Length (ft):	249	
Number of Segments:	2	
Individual Segment Lengths (ft):	125	
Segment:	1	2
Gradient (%):	9	21
m:	0.5	
Individual LS:	1.85	5.86
Factor:	0.35	0.65
Product:	0.65	3.81
LS, Length and Steepness:	4.45	
Total Transect Average Gradient (%):	15	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	80%	
C, Cover (Table 4)[1]:	0.022	
A, Soil Loss (tons/acre):	2.06	
Soil Loss in Vineyard Block (tons):	0.94	
Soil Loss in Vineyard Avenue (tons):	0.89	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 13B2

Gross Acres:	0.85
Vineyard Block Acres:	0.50
Vineyard Avenue Acres:	0.36
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	75
Total Transect Length (ft):	184
Number of Segments:	1
Individual Segment Lengths (ft):	184
Segment:	
Gradient (%):	10
m:	
Individual LS:	1.84
Factor:	
Product:	
LS, Length and Steepness:	1.84
Total Transect Average Gradient (%):	10
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	1.21
Soil Loss in Vineyard Block (tons):	0.60
Soil Loss in Vineyard Avenue (tons):	0.43

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 13B2

Gross Acres:	0.85
Vineyard Block Acres:	0.50
Vineyard Avenue Acres:	0.36
Soil Unit No. (100-182):	165
Soil Name:	Millsholm
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	75
Total Transect Length (ft):	184
Number of Segments:	1
Individual Segment Lengths (ft):	184
Segment:	
Gradient (%):	10
m:	
Individual LS:	1.84
Factor:	
Product:	
LS, Length and Steepness:	1.84
Total Transect Average Gradient (%):	10
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	0.97
Soil Loss in Vineyard Block (tons):	0.48
Soil Loss in Vineyard Avenue (tons):	0.35

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 14

Gross Acres:	1.14
Vineyard Block Acres:	0.89
Vineyard Avenue Acres:	0.25
Soil Unit No. (100-182):	159
Soil Name:	Los Gatos
K, Soil Erodibility:	0.28
T, Soil Loss Tolerance (tons/acre):	2
R, Rainfall:	75
Total Transect Length (ft):	378
Number of Segments:	1
Individual Segment Lengths (ft):	378
Segment:	
Gradient (%):	21
m:	
Individual LS:	7.22
Factor:	
Product:	
LS, Length and Steepness:	7.22
Total Transect Average Gradient (%):	21
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.044
A, Soil Loss (tons/acre):	6.67
Soil Loss in Vineyard Block (tons):	5.95
Soil Loss in Vineyard Avenue (tons):	1.64

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 14

Gross Acres:	1.14
Vineyard Block Acres:	0.89
Vineyard Avenue Acres:	0.25
Soil Unit No. (100-182):	159
Soil Name:	Los Gatos
K, Soil Erodibility:	0.28
T, Soil Loss Tolerance (tons/acre):	2
R, Rainfall:	75
Total Transect Length (ft):	378
Number of Segments:	1
Individual Segment Lengths (ft):	378
Segment:	
Gradient (%):	21
m:	
Individual LS:	7.22
Factor:	
Product:	
LS, Length and Steepness:	7.22
Total Transect Average Gradient (%):	21
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.53
Soil Loss in Vineyard Block (tons):	2.25
Soil Loss in Vineyard Avenue (tons):	0.62

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 15A

Gross Acres:	0.97		
Vineyard Block Acres:	0.60		
Vineyard Avenue Acres:	0.37		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	388		
Number of Segments:	3		
Individual Segment Lengths (ft):	129		
Segment:	1	2	3
Gradient (%):	17	19	25
m:			
Individual LS:	5.52	6.40	9.18
Factor:	0.19	0.35	0.46
Product:	1.05	2.24	4.22
LS, Length and Steepness:	7.51		
Total Transect Average Gradient (%):	20		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	75%		
Ground Cover:	70%		
Percent Grass:	50%		
Percent Weeds:	50%		
C, Cover (Table 5)[1]:	0.044		
A, Soil Loss (tons/acre):	12.08		
Soil Loss in Vineyard Block (tons):	7.21		
Soil Loss in Vineyard Avenue (tons):	4.48		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 15A

Gross Acres:	0.97		
Vineyard Block Acres:	0.60		
Vineyard Avenue Acres:	0.37		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	388		
Number of Segments:	3		
Individual Segment Lengths (ft):	129		
Segment:	1	2	3
Gradient (%):	17	19	25
m:			
Individual LS:	5.52	6.40	9.18
Factor:	0.19	0.35	0.46
Product:	1.05	2.24	4.22
LS, Length and Steepness:	7.51		
Total Transect Average Gradient (%):	20		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	85%		
C, Cover (Table 4)[1]:	0.017		
A, Soil Loss (tons/acre):	4.58		
Soil Loss in Vineyard Block (tons):	2.73		
Soil Loss in Vineyard Avenue (tons):	1.70		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 15B

Gross Acres:	1.61
Vineyard Block Acres:	1.12
Vineyard Avenue Acres:	0.49
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	351
Number of Segments:	1
Individual Segment Lengths (ft):	351
Segment:	
Gradient (%):	13
m:	
Individual LS:	3.64
Factor:	
Product:	
LS, Length and Steepness:	3.64
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.044
A, Soil Loss (tons/acre):	5.86
Soil Loss in Vineyard Block (tons):	6.55
Soil Loss in Vineyard Avenue (tons):	2.87

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 15B

Gross Acres:	1.61
Vineyard Block Acres:	1.12
Vineyard Avenue Acres:	0.49
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	351
Number of Segments:	1
Individual Segment Lengths (ft):	351
Segment:	
Gradient (%):	13
m:	
Individual LS:	3.64
Factor:	
Product:	
LS, Length and Steepness:	3.64
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	2.93
Soil Loss in Vineyard Block (tons):	3.28
Soil Loss in Vineyard Avenue (tons):	1.43

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 16

Gross Acres:	0.71		
Vineyard Block Acres:	0.34		
Vineyard Avenue Acres:	0.37		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	228		
Number of Segments:	3		
Individual Segment Lengths (ft):	76		
Segment:	1	2	3
Gradient (%):	17	26	28
m:			
Individual LS:	4.23	7.40	8.13
Factor:	0.19	0.35	0.46
Product:	0.80	2.59	3.74
LS, Length and Steepness:	7.13		
Total Transect Average Gradient (%):	24		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	75%		
Ground Cover:	70%		
Percent Grass:	50%		
Percent Weeds:	50%		
C, Cover (Table 5)[1]:	0.044		
A, Soil Loss (tons/acre):	11.47		
Soil Loss in Vineyard Block (tons):	3.92		
Soil Loss in Vineyard Avenue (tons):	4.26		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 16

Gross Acres:	0.71		
Vineyard Block Acres:	0.34		
Vineyard Avenue Acres:	0.37		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	228		
Number of Segments:	3		
Individual Segment Lengths (ft):	76		
Segment:	1	2	3
Gradient (%):	17	26	28
m:			
Individual LS:	4.23	7.40	8.13
Factor:	0.19	0.35	0.46
Product:	0.80	2.59	3.74
LS, Length and Steepness:	7.13		
Total Transect Average Gradient (%):	24		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	85%		
C, Cover (Table 4)[1]:	0.017		
A, Soil Loss (tons/acre):	4.35		
Soil Loss in Vineyard Block (tons):	1.49		
Soil Loss in Vineyard Avenue (tons):	1.61		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 17

Gross Acres:	0.67
Vineyard Block Acres:	0.46
Vineyard Avenue Acres:	0.21
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	152
Number of Segments:	1
Individual Segment Lengths (ft):	152
Segment:	
Gradient (%):	19
m:	
Individual LS:	4.01
Factor:	
Product:	
LS, Length and Steepness:	4.01
Total Transect Average Gradient (%):	19
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	75%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.020
A, Soil Loss (tons/acre):	2.21
Soil Loss in Vineyard Block (tons):	1.02
Soil Loss in Vineyard Avenue (tons):	0.45

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 17

Gross Acres:	0.67
Vineyard Block Acres:	0.46
Vineyard Avenue Acres:	0.21
Soil Unit No. (100-182):	163
Soil Name:	Maymen-Millsholm-Lodo
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	1
R, Rainfall:	85
Total Transect Length (ft):	152
Number of Segments:	1
Individual Segment Lengths (ft):	152
Segment:	
Gradient (%):	19
m:	
Individual LS:	4.01
Factor:	
Product:	
LS, Length and Steepness:	4.01
Total Transect Average Gradient (%):	19
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4)[1]:	0.011
A, Soil Loss (tons/acre):	1.24
Soil Loss in Vineyard Block (tons):	0.57
Soil Loss in Vineyard Avenue (tons):	0.25

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 18A

Gross Acres:	0.58
Vineyard Block Acres:	0.29
Vineyard Avenue Acres:	0.29
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	117
Number of Segments:	1
Individual Segment Lengths (ft):	117
Segment:	
Gradient (%):	25
m:	
Individual LS:	5.04
Factor:	
Product:	
LS, Length and Steepness:	5.04
Total Transect Average Gradient (%):	25
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	70%
Percent Grass:	75%
Percent Weeds:	25%
C, Cover (Table 5)[1]:	0.036
A, Soil Loss (tons/acre):	6.63
Soil Loss in Vineyard Block (tons):	1.90
Soil Loss in Vineyard Avenue (tons):	1.92

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 18A

Gross Acres:	0.58
Vineyard Block Acres:	0.29
Vineyard Avenue Acres:	0.29
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	117
Number of Segments:	1
Individual Segment Lengths (ft):	117
Segment:	
Gradient (%):	25
m:	
Individual LS:	5.04
Factor:	
Product:	
LS, Length and Steepness:	5.04
Total Transect Average Gradient (%):	25
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4)[1]:	0.011
A, Soil Loss (tons/acre):	2.09
Soil Loss in Vineyard Block (tons):	0.60
Soil Loss in Vineyard Avenue (tons):	0.61

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 18B

Gross Acres:	0.78
Vineyard Block Acres:	0.51
Vineyard Avenue Acres:	0.28
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	179
Number of Segments:	1
Individual Segment Lengths (ft):	179
Segment:	
Gradient (%):	20
m:	
Individual LS:	4.66
Factor:	
Product:	
LS, Length and Steepness:	4.66
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	70%
Percent Grass:	75%
Percent Weeds:	25%
C, Cover (Table 5)[1]:	0.036
A, Soil Loss (tons/acre):	6.13
Soil Loss in Vineyard Block (tons):	3.10
Soil Loss in Vineyard Avenue (tons):	1.70

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 18B

Gross Acres:	0.78
Vineyard Block Acres:	0.51
Vineyard Avenue Acres:	0.28
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	179
Number of Segments:	1
Individual Segment Lengths (ft):	179
Segment:	
Gradient (%):	20
m:	
Individual LS:	4.66
Factor:	
Product:	
LS, Length and Steepness:	4.66
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4)[1]:	0.011
A, Soil Loss (tons/acre):	1.93
Soil Loss in Vineyard Block (tons):	0.98
Soil Loss in Vineyard Avenue (tons):	0.54

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 19

Gross Acres:	1.79
Vineyard Block Acres:	1.09
Vineyard Avenue Acres:	0.70
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	357
Number of Segments:	1
Individual Segment Lengths (ft):	357
Segment:	
Gradient (%):	26
m:	
Individual LS:	9.26
Factor:	
Product:	
LS, Length and Steepness:	9.26
Total Transect Average Gradient (%):	26
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	70%
Percent Grass:	75%
Percent Weeds:	25%
C, Cover (Table 5)[1]:	0.036
A, Soil Loss (tons/acre):	12.18
Soil Loss in Vineyard Block (tons):	13.32
Soil Loss in Vineyard Avenue (tons):	8.53

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 19

Gross Acres:	1.79
Vineyard Block Acres:	1.09
Vineyard Avenue Acres:	0.70
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	184
Number of Segments:	1
Individual Segment Lengths (ft):	184
Segment:	
Gradient (%):	29
m:	
Individual LS:	7.63
Factor:	
Product:	
LS, Length and Steepness:	7.63
Total Transect Average Gradient (%):	29
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	4.65
Soil Loss in Vineyard Block (tons):	5.08
Soil Loss in Vineyard Avenue (tons):	3.26

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 20A

Gross Acres:	3.12
Vineyard Block Acres:	2.25
Vineyard Avenue Acres:	0.87
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	376
Number of Segments:	1
Individual Segment Lengths (ft):	376
Segment:	
Gradient (%):	23
m:	
Individual LS:	8.11
Factor:	
Product:	
LS, Length and Steepness:	8.11
Total Transect Average Gradient (%):	23
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	70%
Percent Grass:	75%
Percent Weeds:	25%
C, Cover (Table 5)[1]:	0.036
A, Soil Loss (tons/acre):	10.67
Soil Loss in Vineyard Block (tons):	24.06
Soil Loss in Vineyard Avenue (tons):	9.24

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 20A

Gross Acres:	3.12
Vineyard Block Acres:	2.25
Vineyard Avenue Acres:	0.87
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	200
Number of Segments:	1
Individual Segment Lengths (ft):	200
Segment:	
Gradient (%):	24
m:	
Individual LS:	6.25
Factor:	
Product:	
LS, Length and Steepness:	6.25
Total Transect Average Gradient (%):	24
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.81
Soil Loss in Vineyard Block (tons):	8.59
Soil Loss in Vineyard Avenue (tons):	3.30

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect Avenue 20B

Gross Acres:	0.04
Vineyard Block Acres:	0.00
Vineyard Avenue Acres:	0.04
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	52
Number of Segments:	1
Individual Segment Lengths (ft):	52
Segment:	
Gradient (%):	31
m:	
Individual LS:	4.41
Factor:	
Product:	
LS, Length and Steepness:	4.41
Total Transect Average Gradient (%):	31
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	4.43
Soil Loss in Vineyard Block (tons):	0.00
Soil Loss in Vineyard Avenue (tons):	0.17

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect Avenue 20B

Gross Acres:	0.04
Vineyard Block Acres:	0.00
Vineyard Avenue Acres:	0.04
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	52
Number of Segments:	1
Individual Segment Lengths (ft):	52
Segment:	
Gradient (%):	31
m:	
Individual LS:	4.41
Factor:	
Product:	
LS, Length and Steepness:	4.41
Total Transect Average Gradient (%):	31
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.69
Soil Loss in Vineyard Block (tons):	0.00
Soil Loss in Vineyard Avenue (tons):	0.10

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 20B

Gross Acres:	0.30
Vineyard Block Acres:	0.18
Vineyard Avenue Acres:	0.12
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	93
Number of Segments:	1
Individual Segment Lengths (ft):	93
Segment:	
Gradient (%):	28
m:	
Individual LS:	5.19
Factor:	
Product:	
LS, Length and Steepness:	5.19
Total Transect Average Gradient (%):	28
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	5.22
Soil Loss in Vineyard Block (tons):	0.95
Soil Loss in Vineyard Avenue (tons):	0.63

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 20B

Gross Acres:	0.30
Vineyard Block Acres:	0.18
Vineyard Avenue Acres:	0.12
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	93
Number of Segments:	1
Individual Segment Lengths (ft):	93
Segment:	
Gradient (%):	28
m:	
Individual LS:	5.19
Factor:	
Product:	
LS, Length and Steepness:	5.19
Total Transect Average Gradient (%):	28
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.16
Soil Loss in Vineyard Block (tons):	0.58
Soil Loss in Vineyard Avenue (tons):	0.38

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 21

Gross Acres:	4.54		
Vineyard Block Acres:	3.99		
Vineyard Avenue Acres:	0.55		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	690		
Number of Segments:	3		
Individual Segment Lengths (ft):	230		
Segment:	1	2	3
Gradient (%):	20	27	26
m:			
Individual LS:	9.14	13.51	12.87
Factor:	0.19	0.35	0.46
Product:	1.74	4.73	5.92
LS, Length and Steepness:	12.39		
Total Transect Average Gradient (%):	24		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	50%		
Ground Cover:	70%		
Percent Grass:	75%		
Percent Weeds:	25%		
C, Cover (Table 5)[1]:	0.036		
A, Soil Loss (tons/acre):	16.30		
Soil Loss in Vineyard Block (tons):	65.09		
Soil Loss in Vineyard Avenue (tons):	8.93		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 21

Gross Acres:	4.54		
Vineyard Block Acres:	3.99		
Vineyard Avenue Acres:	0.55		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	690		
Number of Segments:	3		
Individual Segment Lengths (ft):	230		
Segment:	1	2	3
Gradient (%):	20	27	26
m:			
Individual LS:	9.14	13.51	12.87
Factor:	0.19	0.35	0.46
Product:	1.74	4.73	5.92
LS, Length and Steepness:	12.39		
Total Transect Average Gradient (%):	24		
Farming Practice:	Cross Slope With Strips		
P, Practice Factor (Table 6)[1]:	0.67		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	6.67		
Soil Loss in Vineyard Block (tons):	26.65		
Soil Loss in Vineyard Avenue (tons):	3.66		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 22

Gross Acres:	1.10
Vineyard Block Acres:	0.81
Vineyard Avenue Acres:	0.28
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	193
Number of Segments:	1
Individual Segment Lengths (ft):	193
Segment:	
Gradient (%):	24
m:	
Individual LS:	6.14
Factor:	
Product:	
LS, Length and Steepness:	6.14
Total Transect Average Gradient (%):	24
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	70%
Percent Grass:	75%
Percent Weeds:	25%
C, Cover (Table 5)[1]:	0.036
A, Soil Loss (tons/acre):	8.08
Soil Loss in Vineyard Block (tons):	6.57
Soil Loss in Vineyard Avenue (tons):	2.30

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 22

Gross Acres:	1.10
Vineyard Block Acres:	0.81
Vineyard Avenue Acres:	0.28
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	193
Number of Segments:	1
Individual Segment Lengths (ft):	193
Segment:	
Gradient (%):	24
m:	
Individual LS:	6.14
Factor:	
Product:	
LS, Length and Steepness:	6.14
Total Transect Average Gradient (%):	24
Farming Practice:	Cross Slope With Strips
P, Practice Factor (Table 6)[1]:	0.67
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	5.11
Soil Loss in Vineyard Block (tons):	4.16
Soil Loss in Vineyard Avenue (tons):	1.46

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23A1

Gross Acres:	3.32	
Vineyard Block Acres:	2.32	
Vineyard Avenue Acres:	0.99	
Soil Unit No. (100-182):	171	
Soil Name:	Pleasanton	
K, Soil Erodibility:	0.28	
T, Soil Loss Tolerance (tons/acre):	4	
R, Rainfall:	85	
Total Transect Length (ft):	431	
Number of Segments:	2	
Individual Segment Lengths (ft):	216	
Segment:	1	2
Gradient (%):	9	4
m:	0.5	0.4
Individual LS:	2.43	0.72
Factor:	0.35	0.65
Product:	0.85	0.47
LS, Length and Steepness:	1.32	
Total Transect Average Gradient (%):	7	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Vegetatvie Canopy:	No Canopy	
Canopy Cover:	0%	
Ground Cover:	70%	
Percent Grass:	100%	
Percent Weeds:	0%	
C, Cover (Table 5)[1]:	0.028	
A, Soil Loss (tons/acre):	0.86	
Soil Loss in Vineyard Block (tons):	2.00	
Soil Loss in Vineyard Avenue (tons):	0.86	

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23A1

Gross Acres:	3.32	
Vineyard Block Acres:	2.32	
Vineyard Avenue Acres:	0.99	
Soil Unit No. (100-182):	171	
Soil Name:	Pleasanton	
K, Soil Erodibility:	0.28	
T, Soil Loss Tolerance (tons/acre):	4	
R, Rainfall:	85	
Total Transect Length (ft):	431	
Number of Segments:	2	
Individual Segment Lengths (ft):	216	
Segment:	1	2
Gradient (%):	9	4
m:	0.5	0.4
Individual LS:	2.43	0.72
Factor:	0.35	0.65
Product:	0.85	0.47
LS, Length and Steepness:	1.32	
Total Transect Average Gradient (%):	7	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	80%	
C, Cover (Table 4)[1]:	0.022	
A, Soil Loss (tons/acre):	0.69	
Soil Loss in Vineyard Block (tons):	1.60	
Soil Loss in Vineyard Avenue (tons):	0.69	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23A2

Gross Acres:	1.28		
Vineyard Block Acres:	0.68		
Vineyard Avenue Acres:	0.59		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	360		
Number of Segments:	3		
Individual Segment Lengths (ft):	120		
Segment:	1	2	3
Gradient (%):	7	2	3
m:	0.5	0.3	0.3
Individual LS:	1.56	0.29	0.42
Factor:	0.19	0.35	0.46
Product:	0.30	0.10	0.19
LS, Length and Steepness:	0.59		
Total Transect Average Gradient (%):	4		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	70%		
Percent Grass:	100%		
Percent Weeds:	0%		
C, Cover (Table 5)[1]:	0.028		
A, Soil Loss (tons/acre):	0.39		
Soil Loss in Vineyard Block (tons):	0.27		
Soil Loss in Vineyard Avenue (tons):	0.23		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23A2

Gross Acres:	1.28		
Vineyard Block Acres:	0.68		
Vineyard Avenue Acres:	0.59		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	360		
Number of Segments:	3		
Individual Segment Lengths (ft):	120		
Segment:	1	2	3
Gradient (%):	7	2	3
m:	0.5	0.3	0.3
Individual LS:	1.56	0.29	0.42
Factor:	0.19	0.35	0.46
Product:	0.30	0.10	0.19
LS, Length and Steepness:	0.59		
Total Transect Average Gradient (%):	4		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	0.31		
Soil Loss in Vineyard Block (tons):	0.21		
Soil Loss in Vineyard Avenue (tons):	0.18		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23B

Gross Acres:	2.46		
Vineyard Block Acres:	1.59		
Vineyard Avenue Acres:	0.86		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	470		
Number of Segments:	3		
Individual Segment Lengths (ft):	157		
Segment:	1	2	3
Gradient (%):	11	5	4
m:		0.5	0.4
Individual LS:	3.35	1.16	0.74
Factor:	0.19	0.35	0.46
Product:	0.64	0.41	0.34
LS, Length and Steepness:	1.38		
Total Transect Average Gradient (%):	7		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	70%		
Percent Grass:	100%		
Percent Weeds:	0%		
C, Cover (Table 5)[1]:	0.028		
A, Soil Loss (tons/acre):	0.91		
Soil Loss in Vineyard Block (tons):	1.44		
Soil Loss in Vineyard Avenue (tons):	0.78		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23B

Gross Acres:	2.46		
Vineyard Block Acres:	1.59		
Vineyard Avenue Acres:	0.86		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	470		
Number of Segments:	3		
Individual Segment Lengths (ft):	157		
Segment:	1	2	3
Gradient (%):	11	5	4
m:		0.5	0.4
Individual LS:	3.35	1.16	0.74
Factor:	0.19	0.35	0.46
Product:	0.64	0.41	0.34
LS, Length and Steepness:	1.38		
Total Transect Average Gradient (%):	7		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	0.72		
Soil Loss in Vineyard Block (tons):	1.16		
Soil Loss in Vineyard Avenue (tons):	0.62		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23C

Gross Acres:	1.27
Vineyard Block Acres:	0.87
Vineyard Avenue Acres:	0.41
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	297
Number of Segments:	1
Individual Segment Lengths (ft):	297
Segment:	
Gradient (%):	27
m:	
Individual LS:	8.86
Factor:	
Product:	
LS, Length and Steepness:	8.86
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.044
A, Soil Loss (tons/acre):	14.25
Soil Loss in Vineyard Block (tons):	12.35
Soil Loss in Vineyard Avenue (tons):	5.82

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23C

Gross Acres:	1.27
Vineyard Block Acres:	0.87
Vineyard Avenue Acres:	0.41
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	297
Number of Segments:	1
Individual Segment Lengths (ft):	297
Segment:	
Gradient (%):	27
m:	
Individual LS:	8.86
Factor:	
Product:	
LS, Length and Steepness:	8.86
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	5.40
Soil Loss in Vineyard Block (tons):	4.68
Soil Loss in Vineyard Avenue (tons):	2.20

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect Avenue 23D

Gross Acres:	0.13
Vineyard Block Acres:	0.00
Vineyard Avenue Acres:	0.13
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	107
Number of Segments:	1
Individual Segment Lengths (ft):	107
Segment:	
Gradient (%):	27
m:	
Individual LS:	5.32
Factor:	
Product:	
LS, Length and Steepness:	5.32
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.044
A, Soil Loss (tons/acre):	8.56
Soil Loss in Vineyard Block (tons):	0.00
Soil Loss in Vineyard Avenue (tons):	1.08

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect Avenue 23D

Gross Acres:	0.13
Vineyard Block Acres:	0.00
Vineyard Avenue Acres:	0.13
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	107
Number of Segments:	1
Individual Segment Lengths (ft):	107
Segment:	
Gradient (%):	27
m:	
Individual LS:	5.32
Factor:	
Product:	
LS, Length and Steepness:	5.32
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	4.28
Soil Loss in Vineyard Block (tons):	0.00
Soil Loss in Vineyard Avenue (tons):	0.54

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23D

Gross Acres:	2.36			
Vineyard Block Acres:	2.05			
Vineyard Avenue Acres:	0.31			
Soil Unit No. (100-182):	114			
Soil Name:	Bressa-Dibble			
K, Soil Erodibility:	0.43			
T, Soil Loss Tolerance (tons/acre):	3			
R, Rainfall:	85			
Total Transect Length (ft):	467			
Number of Segments:	4			
Individual Segment Lengths (ft):	117			
Segment:	1	2	3	4
Gradient (%):	11	18	21	27
m:				
Individual LS:	3.34	6.53	8.02	11.11
Factor:	0.12	0.23	0.30	0.35
Product:	0.40	1.50	2.41	3.89
LS, Length and Steepness:	8.20			
Total Transect Average Gradient (%):	19			
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6)[1]:	1.00			
Vegetatvie Canopy:	Trees 13' Tall			
Canopy Cover:	75%			
Ground Cover:	70%			
Percent Grass:	50%			
Percent Weeds:	50%			
C, Cover (Table 5)[1]:	0.044			
A, Soil Loss (tons/acre):	13.19			
Soil Loss in Vineyard Block (tons):	27.05			
Soil Loss in Vineyard Avenue (tons):	4.08			

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23D

Gross Acres:	2.36			
Vineyard Block Acres:	2.05			
Vineyard Avenue Acres:	0.31			
Soil Unit No. (100-182):	114			
Soil Name:	Bressa-Dibble			
K, Soil Erodibility:	0.43			
T, Soil Loss Tolerance (tons/acre):	3			
R, Rainfall:	85			
Total Transect Length (ft):	467			
Number of Segments:	4			
Individual Segment Lengths (ft):	117			
Segment:	1	2	3	4
Gradient (%):	11	18	21	27
m:				
Individual LS:	3.34	6.53	8.02	11.11
Factor:	0.12	0.23	0.30	0.35
Product:	0.40	1.50	2.41	3.89
LS, Length and Steepness:	8.20			
Total Transect Average Gradient (%):	19			
Farming Practice:	Cross Slope With Strips			
P, Practice Factor (Table 6)[1]:	0.67			
Cover Strategy:	Permanent			
Age of Development:	Over 3 Years			
Ground Cover:	80%			
C, Cover (Table 4)[1]:	0.022			
A, Soil Loss (tons/acre):	4.42			
Soil Loss in Vineyard Block (tons):	9.06			
Soil Loss in Vineyard Avenue (tons):	1.37			

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23E

Gross Acres:	1.42
Vineyard Block Acres:	1.03
Vineyard Avenue Acres:	0.39
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	413
Number of Segments:	1
Individual Segment Lengths (ft):	413
Segment:	
Gradient (%):	5
m:	0.5
Individual LS:	1.09
Factor:	
Product:	
LS, Length and Steepness:	1.09
Total Transect Average Gradient (%):	5
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	1.09
Soil Loss in Vineyard Block (tons):	1.13
Soil Loss in Vineyard Avenue (tons):	0.43

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23E

Gross Acres:	1.42
Vineyard Block Acres:	1.03
Vineyard Avenue Acres:	0.39
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	413
Number of Segments:	1
Individual Segment Lengths (ft):	413
Segment:	
Gradient (%):	5
m:	0.5
Individual LS:	1.09
Factor:	
Product:	
LS, Length and Steepness:	1.09
Total Transect Average Gradient (%):	5
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	0.87
Soil Loss in Vineyard Block (tons):	0.90
Soil Loss in Vineyard Avenue (tons):	0.34

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23F1

Gross Acres:	0.56
Vineyard Block Acres:	0.33
Vineyard Avenue Acres:	0.23
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	308
Number of Segments:	1
Individual Segment Lengths (ft):	308
Segment:	
Gradient (%):	20
m:	
Individual LS:	6.11
Factor:	
Product:	
LS, Length and Steepness:	6.11
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	6.14
Soil Loss in Vineyard Block (tons):	2.00
Soil Loss in Vineyard Avenue (tons):	1.42

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23F1

Gross Acres:	0.56
Vineyard Block Acres:	0.33
Vineyard Avenue Acres:	0.23
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	308
Number of Segments:	1
Individual Segment Lengths (ft):	308
Segment:	
Gradient (%):	20
m:	
Individual LS:	6.11
Factor:	
Product:	
LS, Length and Steepness:	6.11
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.72
Soil Loss in Vineyard Block (tons):	1.21
Soil Loss in Vineyard Avenue (tons):	0.86

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23F2

Gross Acres:	1.90
Vineyard Block Acres:	1.54
Vineyard Avenue Acres:	0.36
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	349
Number of Segments:	1
Individual Segment Lengths (ft):	349
Segment:	
Gradient (%):	13
m:	
Individual LS:	3.63
Factor:	
Product:	
LS, Length and Steepness:	3.63
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	3.65
Soil Loss in Vineyard Block (tons):	5.63
Soil Loss in Vineyard Avenue (tons):	1.31

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23F2

Gross Acres:	1.90
Vineyard Block Acres:	1.54
Vineyard Avenue Acres:	0.36
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	349
Number of Segments:	1
Individual Segment Lengths (ft):	349
Segment:	
Gradient (%):	13
m:	
Individual LS:	3.63
Factor:	
Product:	
LS, Length and Steepness:	3.63
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.21
Soil Loss in Vineyard Block (tons):	3.41
Soil Loss in Vineyard Avenue (tons):	0.79

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23F3

Gross Acres:	2.42
Vineyard Block Acres:	2.00
Vineyard Avenue Acres:	0.42
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	330
Number of Segments:	1
Individual Segment Lengths (ft):	330
Segment:	
Gradient (%):	20
m:	
Individual LS:	6.32
Factor:	
Product:	
LS, Length and Steepness:	6.32
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	6.35
Soil Loss in Vineyard Block (tons):	12.72
Soil Loss in Vineyard Avenue (tons):	2.64

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23F3

Gross Acres:	2.42
Vineyard Block Acres:	2.00
Vineyard Avenue Acres:	0.42
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	330
Number of Segments:	1
Individual Segment Lengths (ft):	330
Segment:	
Gradient (%):	20
m:	
Individual LS:	6.32
Factor:	
Product:	
LS, Length and Steepness:	6.32
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.85
Soil Loss in Vineyard Block (tons):	7.71
Soil Loss in Vineyard Avenue (tons):	1.60

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23F4

Gross Acres:	1.84
Vineyard Block Acres:	1.53
Vineyard Avenue Acres:	0.31
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	350
Number of Segments:	1
Individual Segment Lengths (ft):	350
Segment:	
Gradient (%):	18
m:	
Individual LS:	5.66
Factor:	
Product:	
LS, Length and Steepness:	5.66
Total Transect Average Gradient (%):	18
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	5.69
Soil Loss in Vineyard Block (tons):	8.69
Soil Loss in Vineyard Avenue (tons):	1.79

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23F4

Gross Acres:	1.84
Vineyard Block Acres:	1.53
Vineyard Avenue Acres:	0.31
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	350
Number of Segments:	1
Individual Segment Lengths (ft):	350
Segment:	
Gradient (%):	18
m:	
Individual LS:	5.66
Factor:	
Product:	
LS, Length and Steepness:	5.66
Total Transect Average Gradient (%):	18
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.45
Soil Loss in Vineyard Block (tons):	5.26
Soil Loss in Vineyard Avenue (tons):	1.08

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23G1

Gross Acres:	1.15
Vineyard Block Acres:	0.86
Vineyard Avenue Acres:	0.30
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	220
Number of Segments:	1
Individual Segment Lengths (ft):	220
Segment:	
Gradient (%):	20
m:	
Individual LS:	5.16
Factor:	
Product:	
LS, Length and Steepness:	5.16
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	5.19
Soil Loss in Vineyard Block (tons):	4.44
Soil Loss in Vineyard Avenue (tons):	1.54

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23G1

Gross Acres:	1.15
Vineyard Block Acres:	0.86
Vineyard Avenue Acres:	0.30
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	220
Number of Segments:	1
Individual Segment Lengths (ft):	220
Segment:	
Gradient (%):	20
m:	
Individual LS:	5.16
Factor:	
Product:	
LS, Length and Steepness:	5.16
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	4.15
Soil Loss in Vineyard Block (tons):	3.55
Soil Loss in Vineyard Avenue (tons):	1.23

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23G2

Gross Acres:	0.54
Vineyard Block Acres:	0.32
Vineyard Avenue Acres:	0.22
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	199
Number of Segments:	1
Individual Segment Lengths (ft):	199
Segment:	
Gradient (%):	20
m:	
Individual LS:	4.91
Factor:	
Product:	
LS, Length and Steepness:	4.91
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	4.93
Soil Loss in Vineyard Block (tons):	1.57
Soil Loss in Vineyard Avenue (tons):	1.08

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23G2

Gross Acres:	0.54
Vineyard Block Acres:	0.32
Vineyard Avenue Acres:	0.22
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	199
Number of Segments:	1
Individual Segment Lengths (ft):	199
Segment:	
Gradient (%):	20
m:	
Individual LS:	4.91
Factor:	
Product:	
LS, Length and Steepness:	4.91
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	3.95
Soil Loss in Vineyard Block (tons):	1.25
Soil Loss in Vineyard Avenue (tons):	0.86

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23G3

Gross Acres:	1.23
Vineyard Block Acres:	1.03
Vineyard Avenue Acres:	0.20
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	270
Number of Segments:	1
Individual Segment Lengths (ft):	270
Segment:	
Gradient (%):	18
m:	
Individual LS:	4.97
Factor:	
Product:	
LS, Length and Steepness:	4.97
Total Transect Average Gradient (%):	18
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.044
A, Soil Loss (tons/acre):	7.99
Soil Loss in Vineyard Block (tons):	8.20
Soil Loss in Vineyard Avenue (tons):	1.61

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23G3

Gross Acres:	1.23
Vineyard Block Acres:	1.03
Vineyard Avenue Acres:	0.20
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	270
Number of Segments:	1
Individual Segment Lengths (ft):	270
Segment:	
Gradient (%):	18
m:	
Individual LS:	4.97
Factor:	
Product:	
LS, Length and Steepness:	4.97
Total Transect Average Gradient (%):	18
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	4.00
Soil Loss in Vineyard Block (tons):	4.10
Soil Loss in Vineyard Avenue (tons):	0.81

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 23G4

Gross Acres:	0.97
Vineyard Block Acres:	0.65
Vineyard Avenue Acres:	0.31
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	228
Number of Segments:	1
Individual Segment Lengths (ft):	228
Segment:	
Gradient (%):	18
m:	
Individual LS:	4.57
Factor:	
Product:	
LS, Length and Steepness:	4.57
Total Transect Average Gradient (%):	18
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	50%
Percent Weeds:	50%
C, Cover (Table 5)[1]:	0.044
A, Soil Loss (tons/acre):	7.34
Soil Loss in Vineyard Block (tons):	4.80
Soil Loss in Vineyard Avenue (tons):	2.30

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 23G4

Gross Acres:	0.97
Vineyard Block Acres:	0.65
Vineyard Avenue Acres:	0.31
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	228
Number of Segments:	1
Individual Segment Lengths (ft):	228
Segment:	
Gradient (%):	18
m:	
Individual LS:	4.57
Factor:	
Product:	
LS, Length and Steepness:	4.57
Total Transect Average Gradient (%):	18
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	3.67
Soil Loss in Vineyard Block (tons):	2.40
Soil Loss in Vineyard Avenue (tons):	1.15

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24A

Gross Acres:	4.84		
Vineyard Block Acres:	3.48		
Vineyard Avenue Acres:	1.35		
Soil Unit No. (100-182):	112		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	385		
Number of Segments:	3		
Individual Segment Lengths (ft):	128		
Segment:	1	2	3
Gradient (%):	17	15	14
m:			
Individual LS:	5.49	4.64	4.22
Factor:	0.19	0.35	0.46
Product:	1.04	1.62	1.94
LS, Length and Steepness:	4.61		
Total Transect Average Gradient (%):	15		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	50%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.038		
A, Soil Loss (tons/acre):	6.32		
Soil Loss in Vineyard Block (tons):	22.00		
Soil Loss in Vineyard Avenue (tons):	8.56		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24A

Gross Acres:	4.84		
Vineyard Block Acres:	3.48		
Vineyard Avenue Acres:	1.35		
Soil Unit No. (100-182):	112		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	385		
Number of Segments:	3		
Individual Segment Lengths (ft):	128		
Segment:	1	2	3
Gradient (%):	17	15	14
m:			
Individual LS:	5.49	4.64	4.22
Factor:	0.19	0.35	0.46
Product:	1.04	1.62	1.94
LS, Length and Steepness:	4.61		
Total Transect Average Gradient (%):	15		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	3.71		
Soil Loss in Vineyard Block (tons):	12.91		
Soil Loss in Vineyard Avenue (tons):	5.02		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect Reservoir North

Gross Acres:	4.16		
Vineyard Block Acres:	0		
Vineyard Avenue Acres:	1.96		
Reservoir Water Surface Acres:	2.20		
(**Note:** Water Surface Acreage not used in USLE Soil Loss Modeling Calculations)			
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	672		
Number of Segments:	3		
Individual Segment Lengths (ft):	224		
Segment:	1	2	3
Gradient (%):	4	5	3
m:	0.4	0.5	0.3
Individual LS:	0.86	1.39	0.51
Factor:	0.19	0.35	0.46
Product:	0.16	0.49	0.23
LS, Length and Steepness:	0.88		
Total Transect Average Gradient (%):	4		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.039		
A, Soil Loss (tons/acre):	0.82		
Soil Loss in Vineyard Block (tons):	0.00		
Soil Loss in Vineyard Avenue (tons):	1.61		

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect Reservoir North

Gross Acres:	4.16		
Vineyard Block Acres:	0		
Vineyard Avenue Acres:	1.96		
Reservoir Water Surface Acres:	2.20		
(**Note:** Water Surface Acreage not used in USLE Soil Loss Modeling Calculations)			
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	672		
Number of Segments:	3		
Individual Segment Lengths (ft):	224		
Segment:	1	2	3
Gradient (%):	4	5	3
m:	0.4	0.5	0.3
Individual LS:	0.86	1.39	0.51
Factor:	0.19	0.35	0.46
Product:	0.16	0.49	0.23
LS, Length and Steepness:	0.88		
Total Transect Average Gradient (%):	4		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	0.46		
Soil Loss in Vineyard Block (tons):	0.00		
Soil Loss in Vineyard Avenue (tons):	0.90		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect Reservoir South

Gross Acres:	2.26		
Vineyard Block Acres:	0		
Vineyard Avenue Acres:	1.40		
Reservoir Water Surface Acres:	0.86		
(**Note:** Water Surface Acreage not used in USLE Soil Loss Modeling Calculations)			
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	422		
Number of Segments:	3		
Individual Segment Lengths (ft):	141		
Segment:	1	2	3
Gradient (%):	10	4	4
m:		0.4	0.4
Individual LS:	2.79	0.71	0.71
Factor:	0.19	0.35	0.46
Product:	0.53	0.25	0.33
LS, Length and Steepness:	1.11		
Total Transect Average Gradient (%):	6		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.039		
A, Soil Loss (tons/acre):	1.58		
Soil Loss in Vineyard Block (tons):	0.00		
Soil Loss in Vineyard Avenue (tons):	2.21		

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect Reservoir South

Gross Acres:	2.26	
Vineyard Block Acres:	0	
Vineyard Avenue Acres:	1.40	
Reservoir Water Surface Acres:	0.86	
(**Note:** Water Surface Acreage not used in USLE Soil Loss Modeling Calculations)		
Soil Unit No. (100-182):	114	
Soil Name:	Bressa-Dibble	
K, Soil Erodibility:	0.43	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	306	
Number of Segments:	2	
Individual Segment Lengths (ft):	153	
Segment:	1	2
Gradient (%):	7	9
m:	0.5	0.5
Individual LS:	1.44	2.05
Factor:	0.35	0.65
Product:	0.50	1.33
LS, Length and Steepness:	1.83	
Total Transect Average Gradient (%):	8	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	80%	
C, Cover (Table 4)[1]:	0.022	
A, Soil Loss (tons/acre):	1.48	
Soil Loss in Vineyard Block (tons):	0.00	
Soil Loss in Vineyard Avenue (tons):	2.06	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24B

Gross Acres:	0.55
Vineyard Block Acres:	0.30
Vineyard Avenue Acres:	0.24
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	137
Number of Segments:	1
Individual Segment Lengths (ft):	137
Segment:	
Gradient (%):	14
m:	
Individual LS:	2.52
Factor:	
Product:	
LS, Length and Steepness:	2.52
Total Transect Average Gradient (%):	14
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	3.45
Soil Loss in Vineyard Block (tons):	1.04
Soil Loss in Vineyard Avenue (tons):	0.84

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24B

Gross Acres:	0.55
Vineyard Block Acres:	0.30
Vineyard Avenue Acres:	0.24
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	137
Number of Segments:	1
Individual Segment Lengths (ft):	137
Segment:	
Gradient (%):	14
m:	
Individual LS:	2.52
Factor:	
Product:	
LS, Length and Steepness:	2.52
Total Transect Average Gradient (%):	14
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	1.53
Soil Loss in Vineyard Block (tons):	0.46
Soil Loss in Vineyard Avenue (tons):	0.37

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24C1

Gross Acres:	1.49			
Vineyard Block Acres:	1.25			
Vineyard Avenue Acres:	0.24			
Soil Unit No. (100-182):	112			
Soil Name:	Bressa-Dibble			
K, Soil Erodibility:	0.43			
T, Soil Loss Tolerance (tons/acre):	3			
R, Rainfall:	85			
Total Transect Length (ft):	353			
Number of Segments:	4			
Individual Segment Lengths (ft):	88			
Segment:	1	2	3	4
Gradient (%):	20	11	17	6
m:				0.5
Individual LS:	6.54	2.91	5.26	1.26
Factor:	0.12	0.23	0.30	0.35
Product:	0.78	0.67	1.58	0.44
LS, Length and Steepness:	3.47			
Total Transect Average Gradient (%):	14			
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6)[1]:	1.00			
Vegetatvie Canopy:	No Canopy			
Canopy Cover:	0%			
Ground Cover:	65%			
Percent Grass:	90%			
Percent Weeds:	10%			
C, Cover (Table 5)[1]:	0.039			
A, Soil Loss (tons/acre):	4.97			
Soil Loss in Vineyard Block (tons):	6.21			
Soil Loss in Vineyard Avenue (tons):	1.20			

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24C1

Gross Acres:	1.49			
Vineyard Block Acres:	1.25			
Vineyard Avenue Acres:	0.24			
Soil Unit No. (100-182):	112			
Soil Name:	Bressa-Dibble			
K, Soil Erodibility:	0.43			
T, Soil Loss Tolerance (tons/acre):	3			
R, Rainfall:	85			
Total Transect Length (ft):	353			
Number of Segments:	4			
Individual Segment Lengths (ft):	88			
Segment:	1	2	3	4
Gradient (%):	20	11	17	6
m:				0.5
Individual LS:	6.54	2.91	5.26	1.26
Factor:	0.12	0.23	0.30	0.35
Product:	0.78	0.67	1.58	0.44
LS, Length and Steepness:	3.47			
Total Transect Average Gradient (%):	14			
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6)[1]:	1.00			
Cover Strategy:	Permanent			
Age of Development:	Over 3 Years			
Ground Cover:	75%			
C, Cover (Table 4)[1]:	0.034			
A, Soil Loss (tons/acre):	4.32			
Soil Loss in Vineyard Block (tons):	5.39			
Soil Loss in Vineyard Avenue (tons):	1.04			

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24C2

Gross Acres:	2.82		
Vineyard Block Acres:	2.34		
Vineyard Avenue Acres:	0.49		
Soil Unit No. (100-182):	112		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	403		
Number of Segments:	3		
Individual Segment Lengths (ft):	134		
Segment:	1	2	3
Gradient (%):	4	20	16
m:	0.4		
Individual LS:	0.70	6.99	5.18
Factor:	0.19	0.35	0.46
Product:	0.13	2.45	2.38
LS, Length and Steepness:	4.96		
Total Transect Average Gradient (%):	13		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.039		
A, Soil Loss (tons/acre):	7.10		
Soil Loss in Vineyard Block (tons):	16.60		
Soil Loss in Vineyard Avenue (tons):	3.46		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24C2

Gross Acres:	2.82		
Vineyard Block Acres:	2.34		
Vineyard Avenue Acres:	0.49		
Soil Unit No. (100-182):	112		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	403		
Number of Segments:	3		
Individual Segment Lengths (ft):	134		
Segment:	1	2	3
Gradient (%):	4	20	16
m:	0.4		
Individual LS:	0.70	6.99	5.18
Factor:	0.19	0.35	0.46
Product:	0.13	2.45	2.38
LS, Length and Steepness:	4.96		
Total Transect Average Gradient (%):	13		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	75%		
C, Cover (Table 4)[1]:	0.034		
A, Soil Loss (tons/acre):	6.16		
Soil Loss in Vineyard Block (tons):	14.41		
Soil Loss in Vineyard Avenue (tons):	3.00		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24C3

Gross Acres:	1.87
Vineyard Block Acres:	1.31
Vineyard Avenue Acres:	0.56
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	228
Number of Segments:	1
Individual Segment Lengths (ft):	228
Segment:	
Gradient (%):	18
m:	
Individual LS:	4.57
Factor:	
Product:	
LS, Length and Steepness:	4.57
Total Transect Average Gradient (%):	18
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.039
A, Soil Loss (tons/acre):	6.54
Soil Loss in Vineyard Block (tons):	8.56
Soil Loss in Vineyard Avenue (tons):	3.67

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24C3

Gross Acres:	1.87
Vineyard Block Acres:	1.31
Vineyard Avenue Acres:	0.56
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	228
Number of Segments:	1
Individual Segment Lengths (ft):	228
Segment:	
Gradient (%):	18
m:	
Individual LS:	4.57
Factor:	
Product:	
LS, Length and Steepness:	4.57
Total Transect Average Gradient (%):	18
Farming Practice:	Cross Slope With Strips
P, Practice Factor (Table 6)[1]:	0.60
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	3.40
Soil Loss in Vineyard Block (tons):	4.46
Soil Loss in Vineyard Avenue (tons):	1.91

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24D

Gross Acres:	0.26
Vineyard Block Acres:	0.17
Vineyard Avenue Acres:	0.10
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	124
Number of Segments:	1
Individual Segment Lengths (ft):	124
Segment:	
Gradient (%):	10
m:	
Individual LS:	1.51
Factor:	
Product:	
LS, Length and Steepness:	1.51
Total Transect Average Gradient (%):	10
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.039
A, Soil Loss (tons/acre):	2.16
Soil Loss in Vineyard Block (tons):	0.36
Soil Loss in Vineyard Avenue (tons):	0.21

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24D

Gross Acres:	0.26
Vineyard Block Acres:	0.17
Vineyard Avenue Acres:	0.10
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	124
Number of Segments:	1
Individual Segment Lengths (ft):	124
Segment:	
Gradient (%):	10
m:	
Individual LS:	1.51
Factor:	
Product:	
LS, Length and Steepness:	1.51
Total Transect Average Gradient (%):	10
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	1.88
Soil Loss in Vineyard Block (tons):	0.31
Soil Loss in Vineyard Avenue (tons):	0.18

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24E1

Gross Acres:	8.53		
Vineyard Block Acres:	7.14		
Vineyard Avenue Acres:	1.39		
Soil Unit No. (100-182):	118		
Soil Name:	Cole		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	5		
R, Rainfall:	85		
Total Transect Length (ft):	699		
Number of Segments:	3		
Individual Segment Lengths (ft):	233		
Segment:	1	2	3
Gradient (%):	12	10	6
m:			0.5
Individual LS:	4.61	3.58	1.78
Factor:	0.19	0.35	0.46
Product:	0.88	1.25	0.82
LS, Length and Steepness:	2.95		
Total Transect Average Gradient (%):	9		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.039		
A, Soil Loss (tons/acre):	4.22		
Soil Loss in Vineyard Block (tons):	30.13		
Soil Loss in Vineyard Avenue (tons):	5.88		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24E1

Gross Acres:	8.53		
Vineyard Block Acres:	7.14		
Vineyard Avenue Acres:	1.39		
Soil Unit No. (100-182):	118		
Soil Name:	Cole		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	5		
R, Rainfall:	85		
Total Transect Length (ft):	699		
Number of Segments:	3		
Individual Segment Lengths (ft):	233		
Segment:	1	2	3
Gradient (%):	12	10	6
m:			0.5
Individual LS:	4.61	3.58	1.78
Factor:	0.19	0.35	0.46
Product:	0.88	1.25	0.82
LS, Length and Steepness:	2.95		
Total Transect Average Gradient (%):	9		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	75%		
C, Cover (Table 4)[1]:	0.034		
A, Soil Loss (tons/acre):	3.66		
Soil Loss in Vineyard Block (tons):	26.15		
Soil Loss in Vineyard Avenue (tons):	5.10		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24E2

Gross Acres:	10.79				
Vineyard Block Acres:	9.32				
Vineyard Avenue Acres:	1.48				
Soil Unit No. (100-182):	118				
Soil Name:	Cole				
K, Soil Erodibility:	0.43				
T, Soil Loss Tolerance (tons/acre):	5				
R, Rainfall:	85				
Total Transect Length (ft):	1332				
Number of Segments:	5				
Individual Segment Lengths (ft):	266				
Segment:	1	2	3	4	5
Gradient (%):	8	11	7	5	7
m:	0.5		0.5	0.5	0.5
Individual LS:	3.61	5.64	3.00	1.95	3.00
Factor:	0.09	0.16	0.21	0.25	0.28
Product:	0.33	0.90	0.63	0.49	0.84
LS, Length and Steepness:	3.19				
Total Transect Average Gradient (%):	8				
Farming Practice:	Up & Down Hill				
P, Practice Factor (Table 6)[1]:	1.00				
Vegetatvie Canopy:	No Canopy				
Canopy Cover:	0%				
Ground Cover:	65%				
Percent Grass:	90%				
Percent Weeds:	10%				
C, Cover (Table 5)[1]:	0.039				
A, Soil Loss (tons/acre):	4.57				
Soil Loss in Vineyard Block (tons):	42.53				
Soil Loss in Vineyard Avenue (tons):	6.75				

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24E2

Gross Acres:	10.79				
Vineyard Block Acres:	9.32				
Vineyard Avenue Acres:	1.48				
Soil Unit No. (100-182):	118				
Soil Name:	Cole				
K, Soil Erodibility:	0.43				
T, Soil Loss Tolerance (tons/acre):	5				
R, Rainfall:	85				
Total Transect Length (ft):	1332				
Number of Segments:	5				
Individual Segment Lengths (ft):	266				
Segment:	1	2	3	4	5
Gradient (%):	8	11	7	5	7
m:	0.5		0.5	0.5	0.5
Individual LS:	3.61	5.64	3.00	1.95	3.00
Factor:	0.09	0.16	0.21	0.25	0.28
Product:	0.33	0.90	0.63	0.49	0.84
LS, Length and Steepness:	3.19				
Total Transect Average Gradient (%):	8				
Farming Practice:	Up & Down Hill				
P, Practice Factor (Table 6)[1]:	1.00				
Cover Strategy:	Permanent				
Age of Development:	Over 3 Years				
Ground Cover:	75%				
C, Cover (Table 4)[1]:	0.034				
A, Soil Loss (tons/acre):	3.96				
Soil Loss in Vineyard Block (tons):	36.91				
Soil Loss in Vineyard Avenue (tons):	5.86				

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24F1

Gross Acres:	1.54
Vineyard Block Acres:	1.14
Vineyard Avenue Acres:	0.40
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	223
Number of Segments:	1
Individual Segment Lengths (ft):	223
Segment:	
Gradient (%):	15
m:	
Individual LS:	3.53
Factor:	
Product:	
LS, Length and Steepness:	3.53
Total Transect Average Gradient (%):	15
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	65%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.038
A, Soil Loss (tons/acre):	4.84
Soil Loss in Vineyard Block (tons):	5.52
Soil Loss in Vineyard Avenue (tons):	1.93

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24F1

Gross Acres:	1.54
Vineyard Block Acres:	1.14
Vineyard Avenue Acres:	0.40
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	223
Number of Segments:	1
Individual Segment Lengths (ft):	223
Segment:	
Gradient (%):	15
m:	
Individual LS:	3.53
Factor:	
Product:	
LS, Length and Steepness:	3.53
Total Transect Average Gradient (%):	15
Farming Practice:	Cross Slope With Strips
P, Practice Factor (Table 6)[1]:	0.60
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	1.70
Soil Loss in Vineyard Block (tons):	1.94
Soil Loss in Vineyard Avenue (tons):	0.68

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24F2

Gross Acres:	2.09	
Vineyard Block Acres:	1.60	
Vineyard Avenue Acres:	0.49	
Soil Unit No. (100-182):	114	
Soil Name:	Bressa-Dibble	
K, Soil Erodibility:	0.43	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	396	
Number of Segments:	2	
Individual Segment Lengths (ft):	198	
Segment:	1	2
Gradient (%):	20	17
m:		
Individual LS:	6.93	5.57
Factor:	0.35	0.65
Product:	2.42	3.62
LS, Length and Steepness:	6.05	
Total Transect Average Gradient (%):	19	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Vegetatvie Canopy:	Trees 13' Tall	
Canopy Cover:	50%	
Ground Cover:	65%	
Percent Grass:	90%	
Percent Weeds:	10%	
C, Cover (Table 5)[1]:	0.038	
A, Soil Loss (tons/acre):	8.29	
Soil Loss in Vineyard Block (tons):	13.25	
Soil Loss in Vineyard Avenue (tons):	4.05	

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24F2

Gross Acres:	2.09	
Vineyard Block Acres:	1.60	
Vineyard Avenue Acres:	0.49	
Soil Unit No. (100-182):	114	
Soil Name:	Bressa-Dibble	
K, Soil Erodibility:	0.43	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	396	
Number of Segments:	2	
Individual Segment Lengths (ft):	198	
Segment:	1	2
Gradient (%):	20	17
m:		
Individual LS:	6.93	5.57
Factor:	0.35	0.65
Product:	2.42	3.62
LS, Length and Steepness:	6.05	
Total Transect Average Gradient (%):	19	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	80%	
C, Cover (Table 4)[1]:	0.022	
A, Soil Loss (tons/acre):	4.86	
Soil Loss in Vineyard Block (tons):	7.77	
Soil Loss in Vineyard Avenue (tons):	2.37	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 24G

Gross Acres:	3.35		
Vineyard Block Acres:	2.23		
Vineyard Avenue Acres:	1.12		
Soil Unit No. (100-182):	112		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	619		
Number of Segments:	3		
Individual Segment Lengths (ft):	206		
Segment:	1	2	3
Gradient (%):	22	16	14
m:			
Individual LS:	9.82	6.42	5.35
Factor:	0.19	0.35	0.46
Product:	1.87	2.25	2.46
LS, Length and Steepness:	6.58		
Total Transect Average Gradient (%):	17		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.039		
A, Soil Loss (tons/acre):	9.42		
Soil Loss in Vineyard Block (tons):	20.99		
Soil Loss in Vineyard Avenue (tons):	10.56		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 24G

Gross Acres:	3.35		
Vineyard Block Acres:	2.23		
Vineyard Avenue Acres:	1.12		
Soil Unit No. (100-182):	112		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	619		
Number of Segments:	3		
Individual Segment Lengths (ft):	206		
Segment:	1	2	3
Gradient (%):	22	16	14
m:			
Individual LS:	9.82	6.42	5.35
Factor:	0.19	0.35	0.46
Product:	1.87	2.25	2.46
LS, Length and Steepness:	6.58		
Total Transect Average Gradient (%):	17		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	5.29		
Soil Loss in Vineyard Block (tons):	11.79		
Soil Loss in Vineyard Avenue (tons):	5.93		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 25

Gross Acres:	1.56	
Vineyard Block Acres:	1.16	
Vineyard Avenue Acres:	0.40	
Soil Unit No. (100-182):	114	
Soil Name:	Bressa-Dibble	
K, Soil Erodibility:	0.43	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	287	
Number of Segments:	2	
Individual Segment Lengths (ft):	144	
Segment:	1	2
Gradient (%):	17	22
m:		
Individual LS:	4.74	6.69
Factor:	0.35	0.65
Product:	1.66	4.35
LS, Length and Steepness:	6.01	
Total Transect Average Gradient (%):	20	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Vegetatvie Canopy:	Trees 13' Tall	
Canopy Cover:	50%	
Ground Cover:	65%	
Percent Grass:	90%	
Percent Weeds:	10%	
C, Cover (Table 5)[1]:	0.038	
A, Soil Loss (tons/acre):	8.23	
Soil Loss in Vineyard Block (tons):	9.54	
Soil Loss in Vineyard Avenue (tons):	3.28	

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 25

Gross Acres:	1.56	
Vineyard Block Acres:	1.16	
Vineyard Avenue Acres:	0.40	
Soil Unit No. (100-182):	114	
Soil Name:	Bressa-Dibble	
K, Soil Erodibility:	0.43	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	287	
Number of Segments:	2	
Individual Segment Lengths (ft):	144	
Segment:	1	2
Gradient (%):	17	22
m:		
Individual LS:	4.74	6.69
Factor:	0.35	0.65
Product:	1.66	4.35
LS, Length and Steepness:	6.01	
Total Transect Average Gradient (%):	20	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	80%	
C, Cover (Table 4)[1]:	0.022	
A, Soil Loss (tons/acre):	4.83	
Soil Loss in Vineyard Block (tons):	5.60	
Soil Loss in Vineyard Avenue (tons):	1.92	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 26A

Gross Acres:	2.50		
Vineyard Block Acres:	1.95		
Vineyard Avenue Acres:	0.55		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	619		
Number of Segments:	3		
Individual Segment Lengths (ft):	206		
Segment:	1	2	3
Gradient (%):	20	14	14
m:			
Individual LS:	8.66	5.35	5.35
Factor:	0.19	0.35	0.46
Product:	1.65	1.87	2.46
LS, Length and Steepness:	5.98		
Total Transect Average Gradient (%):	16		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	50%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.038		
A, Soil Loss (tons/acre):	8.20		
Soil Loss in Vineyard Block (tons):	15.98		
Soil Loss in Vineyard Avenue (tons):	4.50		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 26A

Gross Acres:	2.50		
Vineyard Block Acres:	1.95		
Vineyard Avenue Acres:	0.55		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	619		
Number of Segments:	3		
Individual Segment Lengths (ft):	206		
Segment:	1	2	3
Gradient (%):	20	14	14
m:			
Individual LS:	8.66	5.35	5.35
Factor:	0.19	0.35	0.46
Product:	1.65	1.87	2.46
LS, Length and Steepness:	5.98		
Total Transect Average Gradient (%):	16		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	4.81		
Soil Loss in Vineyard Block (tons):	9.37		
Soil Loss in Vineyard Avenue (tons):	2.64		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 26B

Gross Acres:	2.15		
Vineyard Block Acres:	1.65		
Vineyard Avenue Acres:	0.49		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	613		
Number of Segments:	3		
Individual Segment Lengths (ft):	204		
Segment:	1	2	3
Gradient (%):	15	20	18
m:			
Individual LS:	5.85	8.62	7.49
Factor:	0.19	0.35	0.46
Product:	1.11	3.02	3.44
LS, Length and Steepness:	7.57		
Total Transect Average Gradient (%):	18		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	50%		
Ground Cover:	65%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.038		
A, Soil Loss (tons/acre):	10.38		
Soil Loss in Vineyard Block (tons):	17.15		
Soil Loss in Vineyard Avenue (tons):	5.13		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 26B

Gross Acres:	2.15		
Vineyard Block Acres:	1.65		
Vineyard Avenue Acres:	0.49		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	613		
Number of Segments:	3		
Individual Segment Lengths (ft):	204		
Segment:	1	2	3
Gradient (%):	15	20	18
m:			
Individual LS:	5.85	8.62	7.49
Factor:	0.19	0.35	0.46
Product:	1.11	3.02	3.44
LS, Length and Steepness:	7.57		
Total Transect Average Gradient (%):	18		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	6.09		
Soil Loss in Vineyard Block (tons):	10.06		
Soil Loss in Vineyard Avenue (tons):	3.01		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 27

Gross Acres:	1.10
Vineyard Block Acres:	0.64
Vineyard Avenue Acres:	0.46
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	271
Number of Segments:	1
Individual Segment Lengths (ft):	271
Segment:	
Gradient (%):	14
m:	
Individual LS:	3.54
Factor:	
Product:	
LS, Length and Steepness:	3.54
Total Transect Average Gradient (%):	14
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	60%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.045
A, Soil Loss (tons/acre):	5.79
Soil Loss in Vineyard Block (tons):	3.72
Soil Loss in Vineyard Avenue (tons):	2.65

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 27

Gross Acres:	1.10
Vineyard Block Acres:	0.64
Vineyard Avenue Acres:	0.46
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	271
Number of Segments:	1
Individual Segment Lengths (ft):	271
Segment:	
Gradient (%):	14
m:	
Individual LS:	3.54
Factor:	
Product:	
LS, Length and Steepness:	3.54
Total Transect Average Gradient (%):	14
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	4.40
Soil Loss in Vineyard Block (tons):	2.83
Soil Loss in Vineyard Avenue (tons):	2.01

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 28

Gross Acres:	0.48
Vineyard Block Acres:	0.35
Vineyard Avenue Acres:	0.13
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	132
Number of Segments:	1
Individual Segment Lengths (ft):	132
Segment:	
Gradient (%):	30
m:	
Individual LS:	6.75
Factor:	
Product:	
LS, Length and Steepness:	6.75
Total Transect Average Gradient (%):	30
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.029
A, Soil Loss (tons/acre):	7.20
Soil Loss in Vineyard Block (tons):	2.52
Soil Loss in Vineyard Avenue (tons):	0.94

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 28

Gross Acres:	0.48
Vineyard Block Acres:	0.35
Vineyard Avenue Acres:	0.13
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	132
Number of Segments:	1
Individual Segment Lengths (ft):	132
Segment:	
Gradient (%):	30
m:	
Individual LS:	6.75
Factor:	
Product:	
LS, Length and Steepness:	6.75
Total Transect Average Gradient (%):	30
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	5.42
Soil Loss in Vineyard Block (tons):	1.90
Soil Loss in Vineyard Avenue (tons):	0.71

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 29A1

Gross Acres:	1.14
Vineyard Block Acres:	0.73
Vineyard Avenue Acres:	0.40
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	224
Number of Segments:	1
Individual Segment Lengths (ft):	224
Segment:	
Gradient (%):	26
m:	
Individual LS:	7.34
Factor:	
Product:	
LS, Length and Steepness:	7.34
Total Transect Average Gradient (%):	26
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	70%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.030
A, Soil Loss (tons/acre):	8.12
Soil Loss in Vineyard Block (tons):	5.95
Soil Loss in Vineyard Avenue (tons):	3.27

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 29A1

Gross Acres:	1.14
Vineyard Block Acres:	0.73
Vineyard Avenue Acres:	0.40
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	224
Number of Segments:	1
Individual Segment Lengths (ft):	224
Segment:	
Gradient (%):	26
m:	
Individual LS:	7.34
Factor:	
Product:	
LS, Length and Steepness:	7.34
Total Transect Average Gradient (%):	26
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	4.47
Soil Loss in Vineyard Block (tons):	3.27
Soil Loss in Vineyard Avenue (tons):	1.80

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 29A2

Gross Acres:	1.75
Vineyard Block Acres:	1.17
Vineyard Avenue Acres:	0.58
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	231
Number of Segments:	1
Individual Segment Lengths (ft):	231
Segment:	
Gradient (%):	17
m:	
Individual LS:	4.26
Factor:	
Product:	
LS, Length and Steepness:	4.26
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	70%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.030
A, Soil Loss (tons/acre):	4.71
Soil Loss in Vineyard Block (tons):	5.51
Soil Loss in Vineyard Avenue (tons):	2.72

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 29A2

Gross Acres:	1.75
Vineyard Block Acres:	1.17
Vineyard Avenue Acres:	0.58
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	231
Number of Segments:	1
Individual Segment Lengths (ft):	231
Segment:	
Gradient (%):	17
m:	
Individual LS:	4.26
Factor:	
Product:	
LS, Length and Steepness:	4.26
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.59
Soil Loss in Vineyard Block (tons):	3.03
Soil Loss in Vineyard Avenue (tons):	1.50

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 29B1

Gross Acres:	1.34		
Vineyard Block Acres:	1.05		
Vineyard Avenue Acres:	0.29		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	352		
Number of Segments:	3		
Individual Segment Lengths (ft):	117		
Segment:	1	2	3
Gradient (%):	15	26	21
m:			
Individual LS:	4.44	9.20	6.96
Factor:	0.19	0.35	0.46
Product:	0.84	3.22	3.20
LS, Length and Steepness:	7.26		
Total Transect Average Gradient (%):	21		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	Trees 13' Tall		
Canopy Cover:	50%		
Ground Cover:	70%		
Percent Grass:	90%		
Percent Weeds:	10%		
C, Cover (Table 5)[1]:	0.030		
A, Soil Loss (tons/acre):	8.05		
Soil Loss in Vineyard Block (tons):	8.44		
Soil Loss in Vineyard Avenue (tons):	2.37		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 29B1

Gross Acres:	1.34		
Vineyard Block Acres:	1.05		
Vineyard Avenue Acres:	0.29		
Soil Unit No. (100-182):	114		
Soil Name:	Bressa-Dibble		
K, Soil Erodibility:	0.43		
T, Soil Loss Tolerance (tons/acre):	3		
R, Rainfall:	85		
Total Transect Length (ft):	352		
Number of Segments:	3		
Individual Segment Lengths (ft):	117		
Segment:	1	2	3
Gradient (%):	15	26	21
m:			
Individual LS:	4.44	9.20	6.96
Factor:	0.19	0.35	0.46
Product:	0.84	3.22	3.20
LS, Length and Steepness:	7.26		
Total Transect Average Gradient (%):	21		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	85%		
C, Cover (Table 4)[1]:	0.017		
A, Soil Loss (tons/acre):	4.43		
Soil Loss in Vineyard Block (tons):	4.64		
Soil Loss in Vineyard Avenue (tons):	1.30		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 29B2

Gross Acres:	1.46	
Vineyard Block Acres:	0.88	
Vineyard Avenue Acres:	0.37	
Reservoir Water Surface Acres:	0.20	
(**Note:** Water Surface Acreage not used in USLE Soil Loss Modeling Calculations)		
Soil Unit No. (100-182):	114	
Soil Name:	Bressa-Dibble	
K, Soil Erodibility:	0.43	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	285	
Number of Segments:	2	
Individual Segment Lengths (ft):	143	
Segment:	1	2
Gradient (%):	22	15
m:		
Individual LS:	6.66	3.99
Factor:	0.35	0.65
Product:	2.33	2.59
LS, Length and Steepness:	4.93	
Total Transect Average Gradient (%):	19	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Segmented C-Value		
Segment:	1	2
Vegetatvie Canopy:	Trees 13' Tall	No Canopy
Canopy Cover:	50%	0%
Ground Cover:	70%	70%
Percent Grass:	90%	90%
Percent Weeds:	10%	10%
C, Cover (Table 5)[1]:	0.030	0.031
Segment Factor:	0.35	0.65
Segmented C:	0.031	
A, Soil Loss (tons/acre):	5.54	
Soil Loss in Vineyard Block (tons):	4.89	
Soil Loss in Vineyard Avenue (tons):	2.07	

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 29B2

Gross Acres:	1.46	
Vineyard Block Acres:	0.88	
Vineyard Avenue Acres:	0.37	
Reservoir Water Surface Acres:	0.20	
(**Note:** Water Surface Acreage not used in USLE Soil Loss Modeling Calculations)		
Soil Unit No. (100-182):	114	
Soil Name:	Bressa-Dibble	
K, Soil Erodibility:	0.43	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	285	
Number of Segments:	2	
Individual Segment Lengths (ft):	143	
Segment:	1	2
Gradient (%):	22	15
m:		
Individual LS:	6.66	3.99
Factor:	0.35	0.65
Product:	2.33	2.59
LS, Length and Steepness:	4.93	
Total Transect Average Gradient (%):	19	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	85%	
C, Cover (Table 4)[1]:	0.017	
A, Soil Loss (tons/acre):	3.00	
Soil Loss in Vineyard Block (tons):	2.65	
Soil Loss in Vineyard Avenue (tons):	1.12	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 29B3

Gross Acres:	0.85
Vineyard Block Acres:	0.39
Vineyard Avenue Acres:	0.22
Reservoir Water Surface Acres:	0.23

(**Note:** Water Surface Acreage not used in USLE Soil Loss Modeling Calculations)

Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	139
Number of Segments:	1
Individual Segment Lengths (ft):	139
Segment:	
Gradient (%):	17
m:	
Individual LS:	3.30
Factor:	
Product:	
LS, Length and Steepness:	3.30
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	70%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.030
A, Soil Loss (tons/acre):	3.66
Soil Loss in Vineyard Block (tons):	1.44
Soil Loss in Vineyard Avenue (tons):	0.81

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 29B3

Gross Acres:	0.85
Vineyard Block Acres:	0.39
Vineyard Avenue Acres:	0.22
Reservoir Water Surface Acres:	0.23

(**Note:** Water Surface Acreage not used in USLE Soil Loss Modeling Calculations)

Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	139
Number of Segments:	1
Individual Segment Lengths (ft):	139
Segment:	
Gradient (%):	17
m:	
Individual LS:	3.30
Factor:	
Product:	
LS, Length and Steepness:	3.30
Total Transect Average Gradient (%):	17
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	2.01
Soil Loss in Vineyard Block (tons):	0.79
Soil Loss in Vineyard Avenue (tons):	0.45

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 30

Gross Acres:	0.82	
Vineyard Block Acres:	0.65	
Vineyard Avenue Acres:	0.17	
Soil Unit No. (100-182):	114	
Soil Name:	Bressa-Dibble	
K, Soil Erodibility:	0.43	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	228	
Number of Segments:	2	
Individual Segment Lengths (ft):	114	
Segment:	1	2
Gradient (%):	20	25
m:		
Individual LS:	5.25	7.04
Factor:	0.35	0.65
Product:	1.84	4.57
LS, Length and Steepness:	6.41	
Total Transect Average Gradient (%):	23	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Vegetatvie Canopy:	Trees 13' Tall	
Canopy Cover:	50%	
Ground Cover:	60%	
Percent Grass:	90%	
Percent Weeds:	10%	
C, Cover (Table 5)[1]:	0.045	
A, Soil Loss (tons/acre):	10.48	
Soil Loss in Vineyard Block (tons):	6.76	
Soil Loss in Vineyard Avenue (tons):	1.78	

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 30

Gross Acres:	0.82	
Vineyard Block Acres:	0.65	
Vineyard Avenue Acres:	0.17	
Soil Unit No. (100-182):	114	
Soil Name:	Bressa-Dibble	
K, Soil Erodibility:	0.43	
T, Soil Loss Tolerance (tons/acre):	3	
R, Rainfall:	85	
Total Transect Length (ft):	228	
Number of Segments:	2	
Individual Segment Lengths (ft):	114	
Segment:	1	2
Gradient (%):	20	25
m:		
Individual LS:	5.25	7.04
Factor:	0.35	0.65
Product:	1.84	4.57
LS, Length and Steepness:	6.41	
Total Transect Average Gradient (%):	23	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)[1]:	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	80%	
C, Cover (Table 4)[1]:	0.022	
A, Soil Loss (tons/acre):	5.16	
Soil Loss in Vineyard Block (tons):	3.33	
Soil Loss in Vineyard Avenue (tons):	0.88	

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 31A

Gross Acres:	0.43
Vineyard Block Acres:	0.33
Vineyard Avenue Acres:	0.10
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	108
Number of Segments:	1
Individual Segment Lengths (ft):	108
Segment:	
Gradient (%):	25
m:	
Individual LS:	4.84
Factor:	
Product:	
LS, Length and Steepness:	4.84
Total Transect Average Gradient (%):	25
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	60%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.045
A, Soil Loss (tons/acre):	7.91
Soil Loss in Vineyard Block (tons):	2.61
Soil Loss in Vineyard Avenue (tons):	0.77

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 31A

Gross Acres:	0.43
Vineyard Block Acres:	0.33
Vineyard Avenue Acres:	0.10
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	108
Number of Segments:	1
Individual Segment Lengths (ft):	108
Segment:	
Gradient (%):	25
m:	
Individual LS:	4.84
Factor:	
Product:	
LS, Length and Steepness:	4.84
Total Transect Average Gradient (%):	25
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	6.02
Soil Loss in Vineyard Block (tons):	1.98
Soil Loss in Vineyard Avenue (tons):	0.59

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 31B

Gross Acres:	0.62
Vineyard Block Acres:	0.47
Vineyard Avenue Acres:	0.15
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	109
Number of Segments:	1
Individual Segment Lengths (ft):	109
Segment:	
Gradient (%):	12
m:	
Individual LS:	1.82
Factor:	
Product:	
LS, Length and Steepness:	1.82
Total Transect Average Gradient (%):	12
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	50%
Ground Cover:	60%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.045
A, Soil Loss (tons/acre):	2.97
Soil Loss in Vineyard Block (tons):	1.40
Soil Loss in Vineyard Avenue (tons):	0.44

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 31B

Gross Acres:	0.62
Vineyard Block Acres:	0.47
Vineyard Avenue Acres:	0.15
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	109
Number of Segments:	1
Individual Segment Lengths (ft):	109
Segment:	
Gradient (%):	12
m:	
Individual LS:	1.82
Factor:	
Product:	
LS, Length and Steepness:	1.82
Total Transect Average Gradient (%):	12
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	75%
C, Cover (Table 4)[1]:	0.034
A, Soil Loss (tons/acre):	2.26
Soil Loss in Vineyard Block (tons):	1.07
Soil Loss in Vineyard Avenue (tons):	0.33

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 32

Gross Acres:	1.41
Vineyard Block Acres:	1.18
Vineyard Avenue Acres:	0.23
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	145
Number of Segments:	1
Individual Segment Lengths (ft):	145
Segment:	
Gradient (%):	8
m:	0.5
Individual LS:	1.19
Factor:	
Product:	
LS, Length and Steepness:	1.19
Total Transect Average Gradient (%):	8
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5)[1]:	0.029
A, Soil Loss (tons/acre):	1.27
Soil Loss in Vineyard Block (tons):	1.50
Soil Loss in Vineyard Avenue (tons):	0.29

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 32

Gross Acres:	1.41
Vineyard Block Acres:	1.18
Vineyard Avenue Acres:	0.23
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	145
Number of Segments:	1
Individual Segment Lengths (ft):	145
Segment:	
Gradient (%):	8
m:	0.5
Individual LS:	1.19
Factor:	
Product:	
LS, Length and Steepness:	1.19
Total Transect Average Gradient (%):	8
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	0.96
Soil Loss in Vineyard Block (tons):	1.13
Soil Loss in Vineyard Avenue (tons):	0.22

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 33A

Gross Acres:	3.33		
Vineyard Block Acres:	2.49		
Vineyard Avenue Acres:	0.84		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	556		
Number of Segments:	3		
Individual Segment Lengths (ft):	185		
Segment:	1	2	3
Gradient (%):	13	6	4
m:		0.5	0.4
Individual LS:	4.59	1.58	0.79
Factor:	0.19	0.35	0.46
Product:	0.87	0.55	0.37
LS, Length and Steepness:	1.79		
Total Transect Average Gradient (%):	8		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	70%		
Percent Grass:	100%		
Percent Weeds:	0%		
C, Cover (Table 5)[1]:	0.028		
A, Soil Loss (tons/acre):	1.17		
Soil Loss in Vineyard Block (tons):	2.92		
Soil Loss in Vineyard Avenue (tons):	0.98		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 33A

Gross Acres:	3.33		
Vineyard Block Acres:	2.49		
Vineyard Avenue Acres:	0.84		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	556		
Number of Segments:	3		
Individual Segment Lengths (ft):	185		
Segment:	1	2	3
Gradient (%):	13	6	4
m:		0.5	0.4
Individual LS:	4.59	1.58	0.79
Factor:	0.19	0.35	0.46
Product:	0.87	0.55	0.37
LS, Length and Steepness:	1.79		
Total Transect Average Gradient (%):	8		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	0.94		
Soil Loss in Vineyard Block (tons):	2.34		
Soil Loss in Vineyard Avenue (tons):	0.79		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 33B

Gross Acres:	0.45
Vineyard Block Acres:	0.22
Vineyard Avenue Acres:	0.23
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	114
Number of Segments:	1
Individual Segment Lengths (ft):	114
Segment:	
Gradient (%):	13
m:	
Individual LS:	2.08
Factor:	
Product:	
LS, Length and Steepness:	2.08
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	2.09
Soil Loss in Vineyard Block (tons):	0.46
Soil Loss in Vineyard Avenue (tons):	0.48

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 33B

Gross Acres:	0.45
Vineyard Block Acres:	0.22
Vineyard Avenue Acres:	0.23
Soil Unit No. (100-182):	114
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	114
Number of Segments:	1
Individual Segment Lengths (ft):	114
Segment:	
Gradient (%):	13
m:	
Individual LS:	2.08
Factor:	
Product:	
LS, Length and Steepness:	2.08
Total Transect Average Gradient (%):	13
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4)[1]:	0.022
A, Soil Loss (tons/acre):	1.67
Soil Loss in Vineyard Block (tons):	0.37
Soil Loss in Vineyard Avenue (tons):	0.39

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 33C

Gross Acres:	3.55
Vineyard Block Acres:	2.56
Vineyard Avenue Acres:	0.99
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	330
Number of Segments:	1
Individual Segment Lengths (ft):	330
Segment:	
Gradient (%):	20
m:	
Individual LS:	6.32
Factor:	
Product:	
LS, Length and Steepness:	6.32
Total Transect Average Gradient (%):	20
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Vegetatvie Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	100%
Percent Weeds:	0%
C, Cover (Table 5)[1]:	0.028
A, Soil Loss (tons/acre):	6.35
Soil Loss in Vineyard Block (tons):	16.28
Soil Loss in Vineyard Avenue (tons):	6.29

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 33C

Gross Acres:	3.55
Vineyard Block Acres:	2.56
Vineyard Avenue Acres:	0.99
Soil Unit No. (100-182):	112
Soil Name:	Bressa-Dibble
K, Soil Erodibility:	0.43
T, Soil Loss Tolerance (tons/acre):	3
R, Rainfall:	85
Total Transect Length (ft):	354
Number of Segments:	1
Individual Segment Lengths (ft):	354
Segment:	
Gradient (%):	19
m:	
Individual LS:	6.12
Factor:	
Product:	
LS, Length and Steepness:	6.12
Total Transect Average Gradient (%):	19
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6)[1]:	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4)[1]:	0.017
A, Soil Loss (tons/acre):	3.73
Soil Loss in Vineyard Block (tons):	9.54
Soil Loss in Vineyard Avenue (tons):	3.69

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 33D

Gross Acres:	3.33		
Vineyard Block Acres:	2.17		
Vineyard Avenue Acres:	1.17		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	659		
Number of Segments:	3		
Individual Segment Lengths (ft):	220		
Segment:	1	2	3
Gradient (%):	15	11	9
m:			0.5
Individual LS:	6.07	3.97	3.00
Factor:	0.19	0.35	0.46
Product:	1.15	1.39	1.38
LS, Length and Steepness:	3.92		
Total Transect Average Gradient (%):	12		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	70%		
Percent Grass:	100%		
Percent Weeds:	0%		
C, Cover (Table 5)[1]:	0.028		
A, Soil Loss (tons/acre):	2.57		
Soil Loss in Vineyard Block (tons):	5.57		
Soil Loss in Vineyard Avenue (tons):	2.99		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 33D

Gross Acres:	3.33		
Vineyard Block Acres:	2.17		
Vineyard Avenue Acres:	1.17		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	659		
Number of Segments:	3		
Individual Segment Lengths (ft):	220		
Segment:	1	2	3
Gradient (%):	15	11	9
m:			0.5
Individual LS:	6.07	3.97	3.00
Factor:	0.19	0.35	0.46
Product:	1.15	1.39	1.38
LS, Length and Steepness:	3.92		
Total Transect Average Gradient (%):	12		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	2.05		
Soil Loss in Vineyard Block (tons):	4.46		
Soil Loss in Vineyard Avenue (tons):	2.40		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Pre-Project
PPI Engineering
6/25/2018
CC

Transect 33E

Gross Acres:	6.38		
Vineyard Block Acres:	4.80		
Vineyard Avenue Acres:	1.58		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	618		
Number of Segments:	3		
Individual Segment Lengths (ft):	206		
Segment:	1	2	3
Gradient (%):	14	13	10
m:			
Individual LS:	5.35	4.84	3.37
Factor:	0.19	0.35	0.46
Product:	1.02	1.69	1.55
LS, Length and Steepness:	4.26		
Total Transect Average Gradient (%):	12		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Vegetatvie Canopy:	No Canopy		
Canopy Cover:	0%		
Ground Cover:	70%		
Percent Grass:	100%		
Percent Weeds:	0%		
C, Cover (Table 5)[1]:	0.028		
A, Soil Loss (tons/acre):	2.79		
Soil Loss in Vineyard Block (tons):	13.39		
Soil Loss in Vineyard Avenue (tons):	4.40		

[1] Tables 5 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations Post-Project
PPI Engineering
6/25/2018
CC

Transect 33E

Gross Acres:	6.38		
Vineyard Block Acres:	4.80		
Vineyard Avenue Acres:	1.58		
Soil Unit No. (100-182):	171		
Soil Name:	Pleasanton		
K, Soil Erodibility:	0.28		
T, Soil Loss Tolerance (tons/acre):	4		
R, Rainfall:	85		
Total Transect Length (ft):	618		
Number of Segments:	3		
Individual Segment Lengths (ft):	206		
Segment:	1	2	3
Gradient (%):	14	13	10
m:			
Individual LS:	5.35	4.84	3.37
Factor:	0.19	0.35	0.46
Product:	1.02	1.69	1.55
LS, Length and Steepness:	4.26		
Total Transect Average Gradient (%):	12		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)[1]:	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	80%		
C, Cover (Table 4)[1]:	0.022		
A, Soil Loss (tons/acre):	2.23		
Soil Loss in Vineyard Block (tons):	10.71		
Soil Loss in Vineyard Avenue (tons):	3.52		

[1] Tables 4 & 6 - USLE Special Applications for Napa County

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

SCS MAPPING UNIT

#	K	T	SOIL NAME
100	0.24	3	Aiken
101	0.24	3	Aiken
102	0.24	3	Aiken
103	0.24	5	Bale
104	0.2	5	Bale
105	0.2	5	Bale
106	0.24	5	Bale
107	0.32	4	Boomer
108	0.15	4	Boomer
109	0.15	4	Boomer
110	0.28	4	Boomer-Forward-Felta
111	0.28	4	Boomer-Forward-Felta
112	0.43	3	Bressa-Dibble
113	0.43	3	Bressa-Dibble
114	0.43	3	Bressa-Dibble
115	0.43	3	Bressa-Dibble
116	0.17	5	Clear Lake
117	0.32	3	Clear Lake
118	0.43	5	Cole
119	0.43	5	Cole
120	0.37	3	Contra Costa
121	0.24	2	Contra Costa
122	0.2	4	Coombs
123	0.2	4	Coombs
124	0.15	2	Cortina
125	0.1	5	Cortina
126	0.2	5	Diablo
127	0.2	5	Diablo
128	0.2	5	Diablo
129	0.24	5	Diablo
130	0.32	5	Egbert
131	0.32	4	Fagan
132	0.32	4	Fagan
133	0.32	4	Fagan
134	0.32	4	Fagan
135	0.15	3	Felton
136	0.15	3	Felton

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

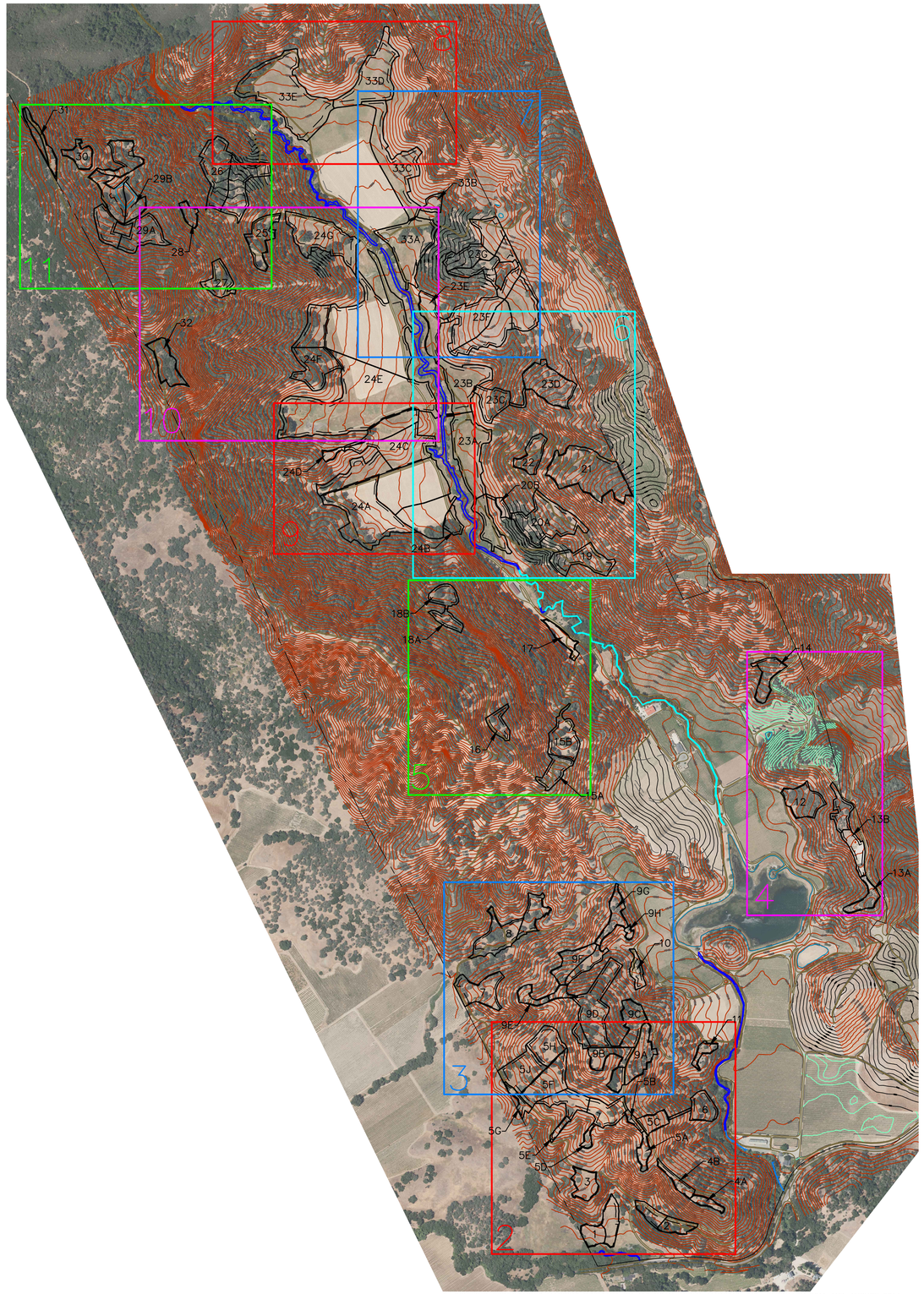
SCS MAPPING UNIT

#	K	T	SOIL NAME
137	0.15	3	Felton
138	0.2	3	Forward
139	0.17	3	Forward
140	0.17	3	Forward
141	0.17	3	Forward-Kidd
142	0.37	2	Guenoc
143	0.37	2	Guenoc-Rock Outcrop
144	0.37	2	Guenoc-Rock Outcrop
145	0.32	4	Haire
146	0.32	4	Haire
147	0.28	4	Haire
148	0.28	4	Haire
149	0.28	4	Haire
150	0.28	4	Haire
151	0.1	1	Hambright-Rock Outcrop
152	0.1	1	Hambright-Rock Outcrop
153	0.1	1	Henneke
154	0.1	1	Henneke
155	0.28	2	Kidd
156	0.28	2	Kidd
157	0.24	1	Lodo-Maymen-Felton
158	0.28	2	Los Gatos
159	0.28	2	Los Gatos
160	0.28	2	Los Gatos
161	0.24	5	Maxwell
162	0.17	1	Maymen-Los Gatos
163	0.32	1	Maymen-Millsholm-Lodo
164	0.32	1	Millsholm
165	0.32	1	Millsholm
166	0.28	1	Montara
167	0.28	1	Montara
168	0.15	5	Perkins
169	0.15	5	Perkins
170	0.43	5	Pleasanton
171	0.28	4	Pleasanton
172	0.28	5	Reyes
173	0.28	5	Reyes

KJS Investment Properties & Sorrento Inc. Erosion Control Plan
USLE Calculations
PPI Engineering
6/25/2018
CC

SCS MAPPING UNIT

#	K	T	SOIL NAME
174	0.05	5	Riverwash
175		1	Rock Outcrop
176	0.1	1	Rock Outcrop-Hambright
177	0.28	1	Rock Outcrop-Kidd
178	0.32	2	Sobrante
179	0.32	2	Sobrante
180	0.55	5	Tehama
181	0.43	5	Yolo
182	0.43	5	Yolo



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.
INTERMEDIATE CONTOURS NOT SHOWN FOR CLARITY.
2014 NAPA COUNTY AERIAL PHOTO.

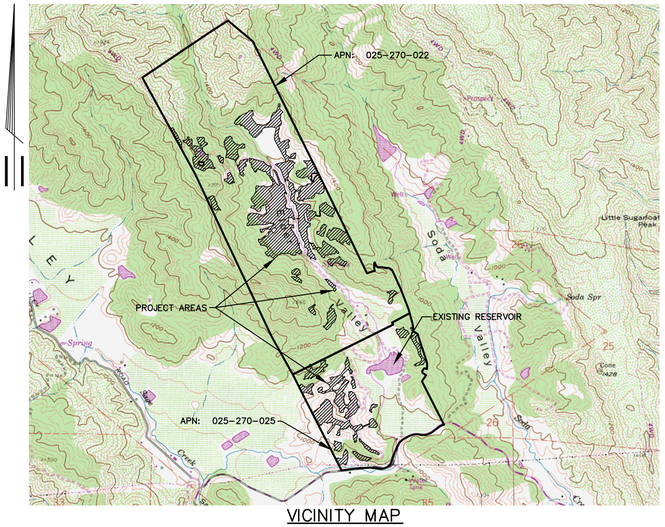
GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)
1 inch = 500 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 5' INDEX CONTOUR
- APPROXIMATE PROPERTY LINE LOCATION
- EXISTING RESERVOIR OR POND
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) SURVEYED BY PPI ENGINEERING
- U.S.G.S. BLUE LINE STREAM, ASSUMED LOCATION
- EXISTING ROAD
- EXISTING VINEYARD AREA
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY



VICINITY MAP

USGS CHILES VALLEY QUADRANGLE
TOWNSHIP 8 N., RANGE 4 W.
SCALE: 1" = ±2000'

© 2018 PPI ENGINEERING, INC.

KJS INVESTMENT PROPERTIES & SORRENTO INC.

SOIL LOSS ANALYSIS

SITE PLAN

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO: 11771901	SCALE: AS SHOWN	DRAWN BY: ALB, CC	DATE: 6-25-18	SHEET: 1 OF: 11
DWG. NO: 11411901USLE				

U:\Land Copy\11411901USLE\6.25.18.dwg 1_SITE PLAN, 6/25/2018 9:51:59 AM

2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
2014 NAPA COUNTY AERIAL PHOTO.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- U.S.G.S. BLUE LINE STREAM, ASSUMED LOCATION
- EXISTING ROAD
- EXISTING VINEYARD
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% — USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED OUTSLOPED ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED INSLOPED AVENUE
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED ROLLING DIP
- PROPOSED PIPE LEVEL SPREADER
- PROPOSED ROCK LEVEL SPREADER
- PROPOSED ROCK APRON
- PROPOSED VINEROW DIRECTION
- 165 / 171 — USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 165 — MILLSHOLM LOAM, 30–75% SLOPE
- 171 — PLEASANTON LOAM, 2–5% SLOPE

© 2018 PPI ENGINEERING, INC.

KJS INVESTMENT PROPERTIES & SORRENTO INC.

SOIL LOSS ANALYSIS

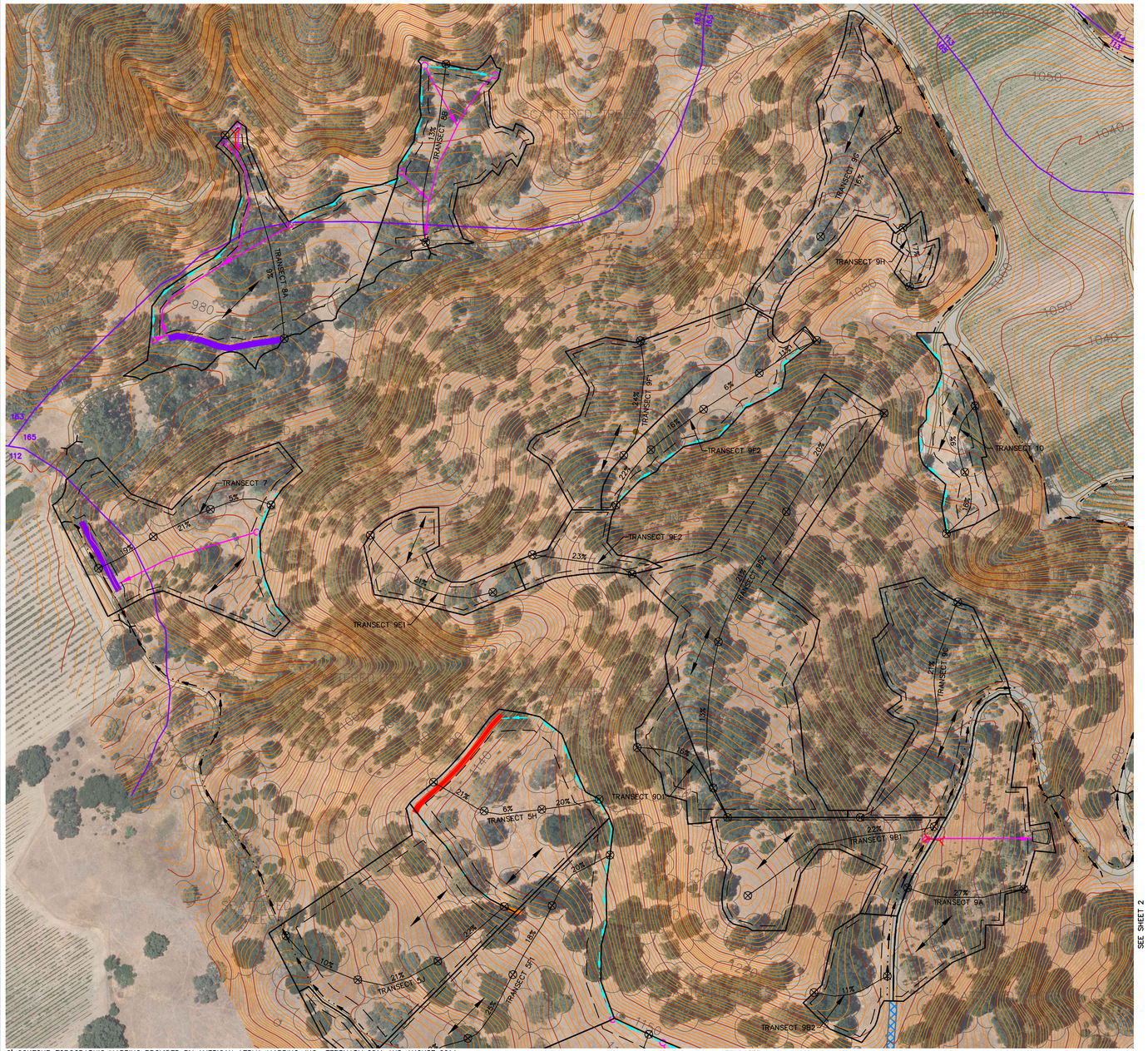
BLOCKS 1–6 & 11

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO: 11771901	SCALE: AS SHOWN	DRAWN BY: ALB, CC	DATE: 6-25-18	SHEET: 2 OF: 11
DWG. NO: 11411901USLE				

U:\Land Copy 10\11411901\SLE\6.25.18.dwg, 2_1-4 11, 6/25/2018 9:53:49 AM



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
2014 NAPA COUNTY AERIAL PHOTO.

SEE SHEET 2

SEE SHEET 2

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- EXISTING ROAD
- EXISTING VINEYARD
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% — USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED OUTSLOPED ROAD
- PROPOSED DIVERSION DITCH
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED ROLLING DIP
- PROPOSED PIPE LEVEL SPREADER
- PROPOSED ROCK LEVEL SPREADER
- PROPOSED ROCK APRON
- PROPOSED VINEROW DIRECTION
- 165 / 112 — USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 112 — BRESSA–DIBBLE COMPLEX, 5–15% SLOPE
- 113 — BRESSA–DIBBLE COMPLEX, 15–30% SLOPE
- 163 — MAYMEN–MILLSHOLM–LODO ASSOCIATION, 30–75% SLOPE
- 165 — MILLSHOLM LOAM, 30–75% SLOPE

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

KJS INVESTMENT PROPERTIES & SORRENTO INC.

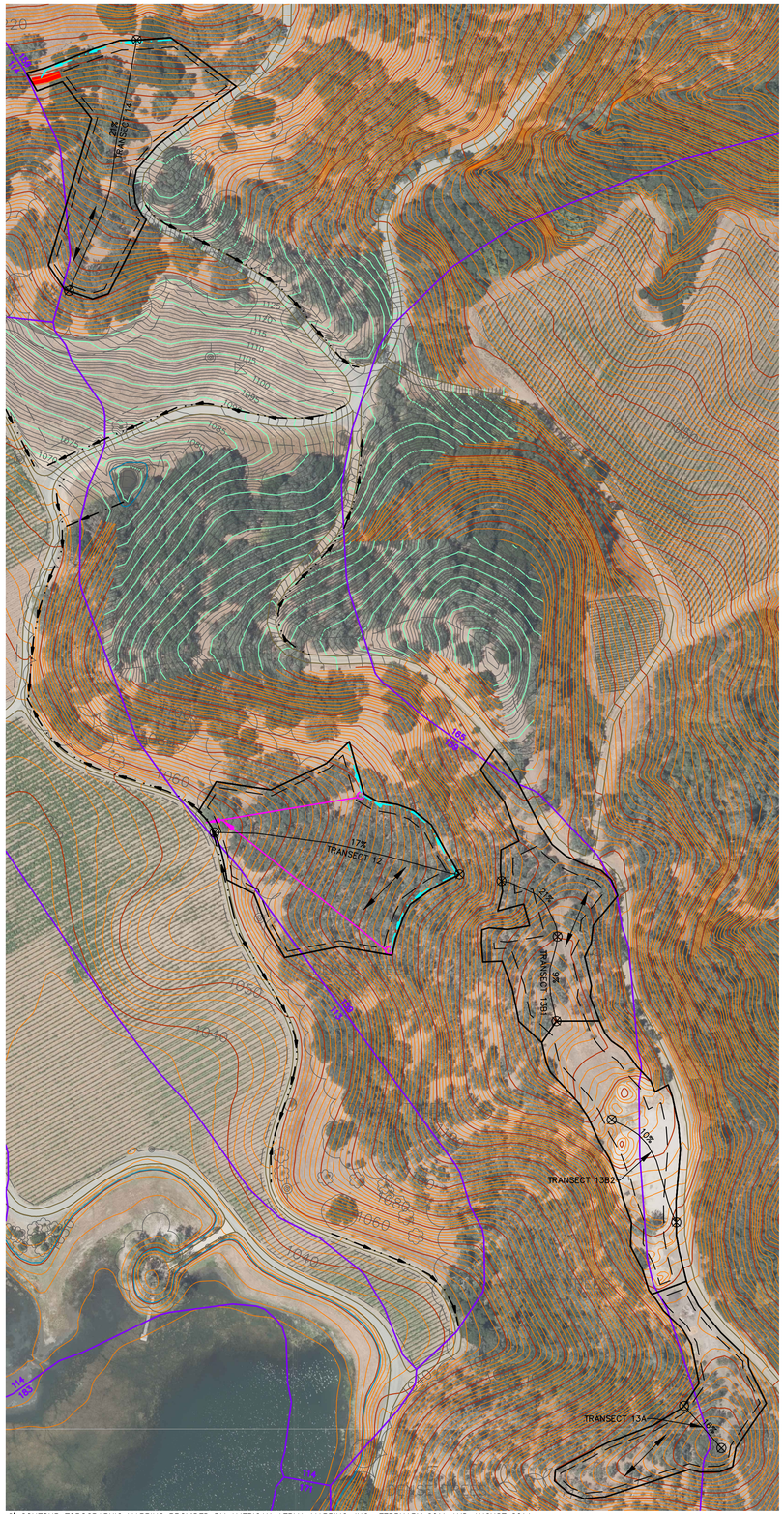
SOIL LOSS ANALYSIS

BLOCKS 7–10

DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO:	SCALE:	DRAWN BY:	DATE:	SHEET:
11771901	AS SHOWN	ALB, CC	6-25-18	3 OF: 11
DWG. NO: 11411901USLE				

U:\Land Copy\11411901USLE\6-25-18.dwg, 3_7-10, 6/25/2018 9:55:09 AM



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.
2014 NAPA COUNTY AERIAL PHOTO.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 5' INDEX CONTOUR
- PPI ENGINEERING 1' INTERMEDIATE CONTOUR
- EXISTING RESERVOIR OR POND
- EXISTING ROAD
- EXISTING VINEYARD
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% — USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED DIVERSION DITCH
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED ROCK LEVEL SPREADER
- 159 / 113 — USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

113	BRESSA–DIBBLE COMPLEX, 15–30% SLOPE
114	BRESSA–DIBBLE COMPLEX, 30–50% SLOPE
159	LOS GATOS LOAM, 30–50% SLOPE
165	MILLSHOLM LOAM, 30–75% SLOPE
171	PLEASANTON LOAM, 2–5% SLOPE
183	WATER

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

KJS INVESTMENT PROPERTIES & SORRENTO INC.

SOIL LOSS ANALYSIS

BLOCKS 12–14

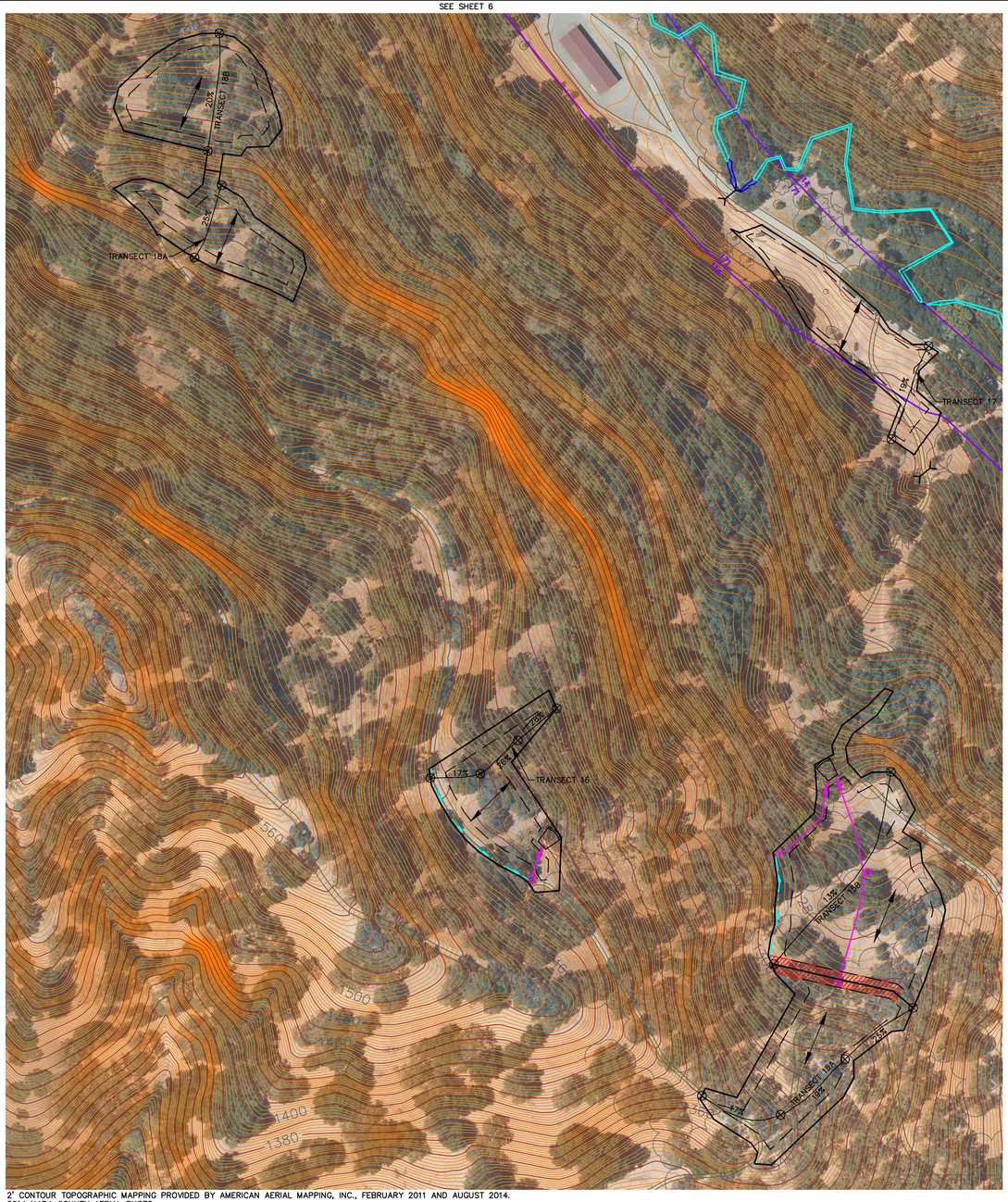
DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO:	SCALE:	DRAWN BY:	DATE:	SHEET:
11771901	AS SHOWN	ALB, CC	6–25–18	4 OF: 11

DWG. NO: 11411901USLE

L:\Land Comp\11411901\USLE 6-25-18.dwg, 4-12-14, 6/25/2018 8:56:12 AM

SEE SHEET 6



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
2014 NAPA COUNTY AERIAL PHOTO.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) SURVEYED BY PPI ENGINEERING
- EXISTING ROAD
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% — USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED DIVERSION DITCH
- PROPOSED INSLOPED AVENUE
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED ROCK APRON
- PROPOSED VINEROW DIRECTION
- 114 / 171 — USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 — BRESSA-DIBBLE COMPLEX, 30-50% SLOPE
- 171 — PLEASANTON LOAM, 2-5% SLOPE

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

KJS INVESTMENT PROPERTIES & SORRENTO INC.

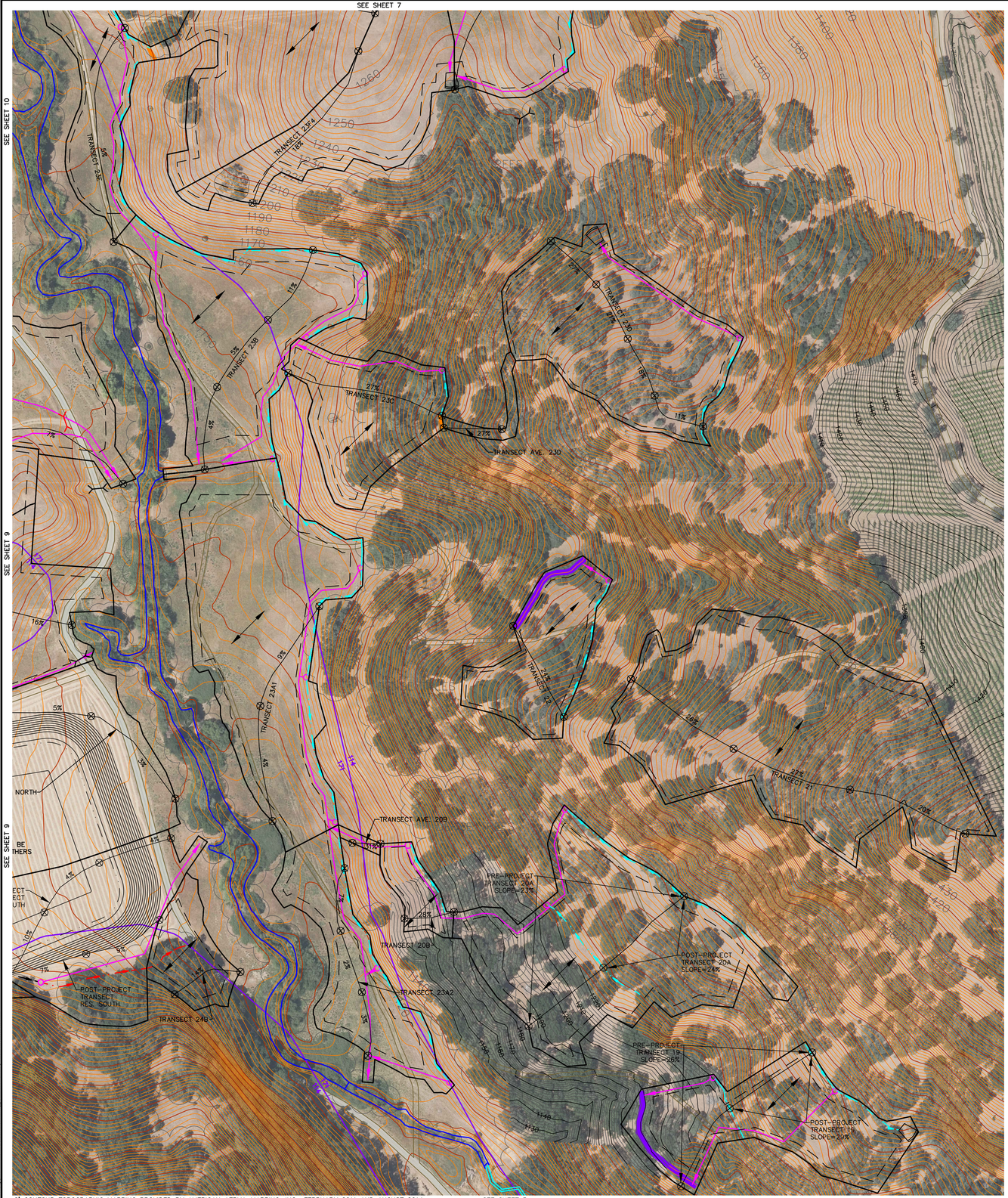
SOIL LOSS ANALYSIS

BLOCKS 15-18

DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO: 11771901	SCALE: AS SHOWN	DRAWN BY: ALB, CC	DATE: 6-25-18	SHEET: 5 OF: 11
DWG. NO: 11411901USLE				

U:\Land Corp 18\11411901\ISLE 6.25.18.dwg, 5.15.18, 6/25/2018 9:57:25 AM



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.
2014 NAPA COUNTY AERIAL PHOTO.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) SURVEYED BY PPI ENGINEERING
- EXISTING ROAD
- EXISTING VINEYARD
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED DIVERSION DITCH
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED ROCK APRON
- PROPOSED ROLLING DIP
- PROPOSED PIPE LEVEL SPREADER
- PROPOSED VINEROW DIRECTION
- 171 / 114 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

114	BRESSA-DIBBLE COMPLEX, 30-50% SLOPE
171	PLEASANTON LOAM, 2-5% SLOPE

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

KJS INVESTMENT PROPERTIES & SORRENTO INC.

SOIL LOSS ANALYSIS

BLOCKS 19-22, 23A-23D

DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO:	SCALE:	DRAWN BY:	DATE:	SHEET:
11771901	AS SHOWN	ALB, CC	6-25-18	6 OF: 11
DWG. NO: 11411901USLE				

L:\Proj\11411901\USLE\24x36\Rev 6 (6-25-18)\6-25-2018 10:00:34 AM

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- EXISTING ROAD
- EXISTING VINEYARD
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% — USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED DIVERSION DITCH
- PROPOSED CULVERT
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED ROCK APRON
- PROPOSED ROLLING DIP
- PROPOSED VINEROW DIRECTION
- 114 / 171 — USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 — BRESSA-DIBBLE COMPLEX, 30-50% SLOPE
- 171 — PLEASANTON LOAM, 2-5% SLOPE

2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.
2014 NAPA COUNTY AERIAL PHOTO.

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

KJS INVESTMENT PROPERTIES & SORRENTO INC.

SOIL LOSS ANALYSIS

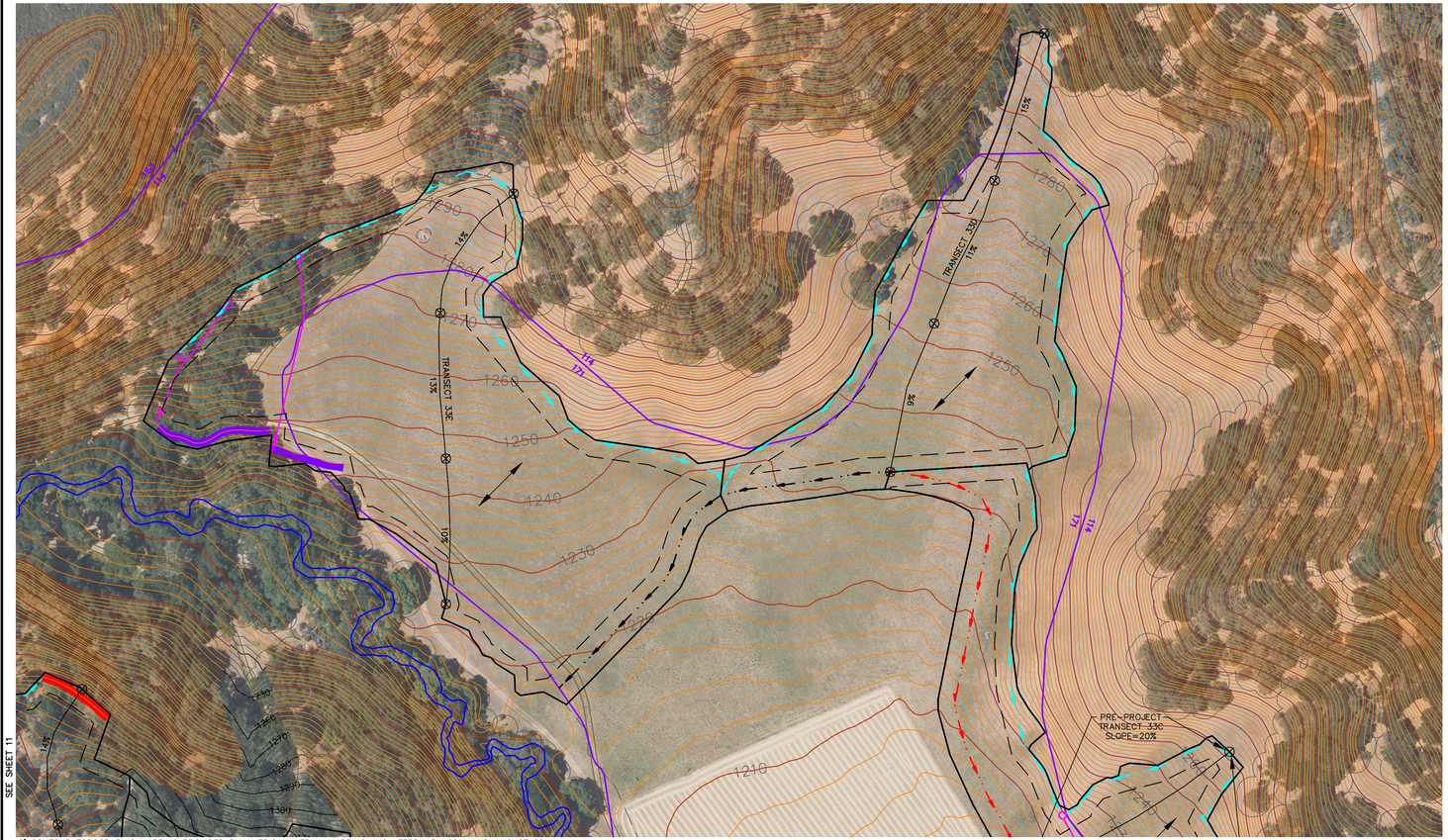
BLOCKS 23E-23G & 33A-33C

DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO:	SCALE:	DRAWN BY:	DATE:	SHEET:
11771901	AS SHOWN	ALB, CC	6-25-18	7 OF: 11

DWG. NO: 11411901USLE

J:\Wind Conv\18141100\USLE\8.5x14 Dwg 7 23E-23G&33A-33C 6-25-2018 10:01:47 AM



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.
2014 NAPA COUNTY AERIAL PHOTO.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- EXISTING ROAD
- EXISTING VINEYARD
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED DIVERSION DITCH
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED PIPE LEVEL SPREADER
- PROPOSED ROCK LEVEL SPREADER
- PROPOSED VINEROW DIRECTION
- 114 / 171 USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

114	BRESSA–DIBBLE COMPLEX, 30–50% SLOPE
163	MAYMEN–MILLSHOLM–LODO ASSOCIATION, 30–75% SLOPE
171	PLEASANTON LOAM, 2–5% SLOPE

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

KJS INVESTMENT PROPERTIES & SORRENTO INC.

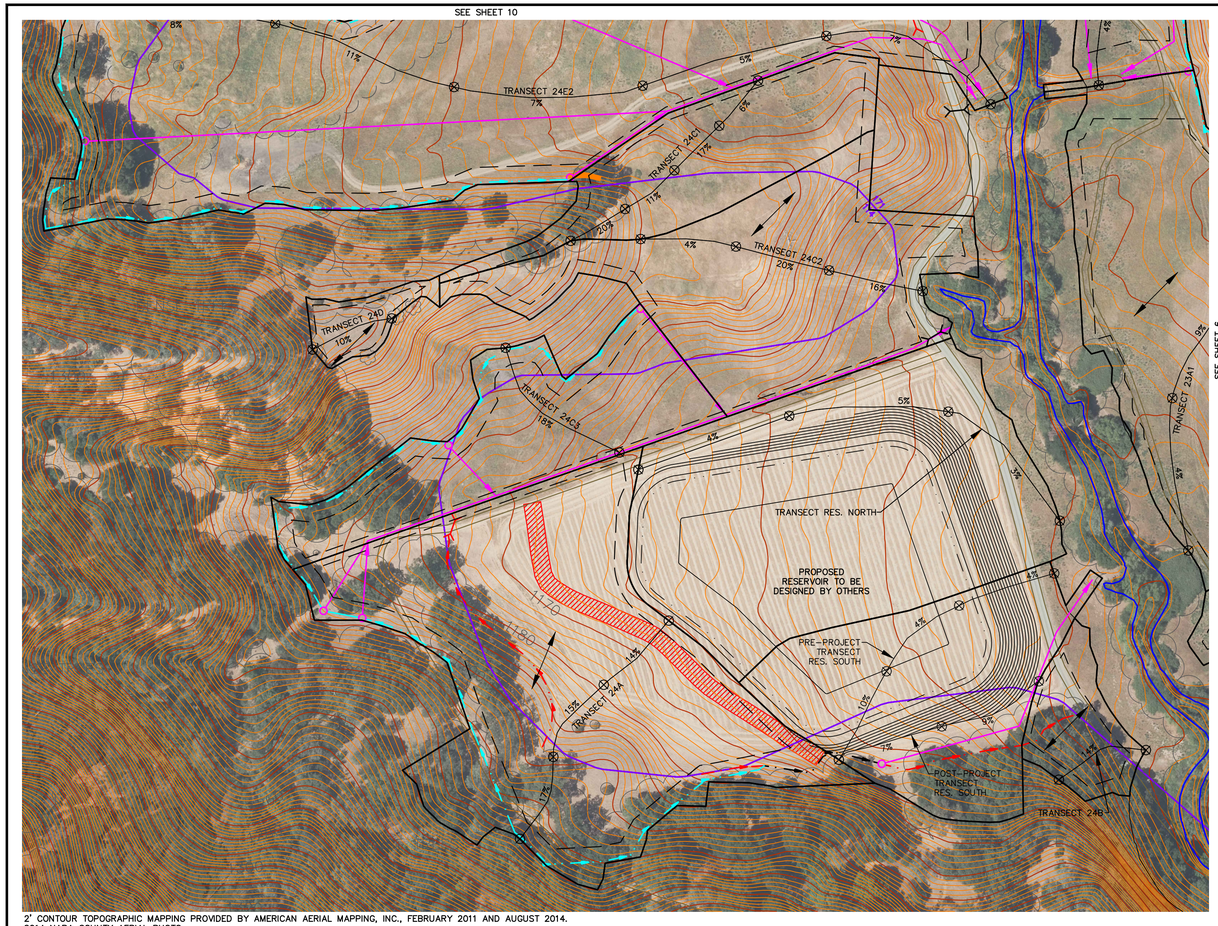
SOIL LOSS ANALYSIS

BLOCKS 33D & 33E

DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO:	SCALE:	DRAWN BY:	DATE:	SHEET:
11771901	AS SHOWN	ALB, CC	6-25-18	8 OF: 11
DWG. NO: 11411901USLE				

L:\Proj\Corp\11411901\SLE\25x18\Misc & 33D,E 6-25-2018 10:03:16 AM



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
2014 NAPA COUNTY AERIAL PHOTO.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- EXISTING ROAD
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% — USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED DIVERSION DITCH
- PROPOSED INSLOPED AVENUE
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED ROLLING DIP
- PROPOSED VINEROW DIRECTION
- 171 / 114 — USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 — BRESSA-DIBBLE COMPLEX, 30-50% SLOPE
- 171 — PLEASANTON LOAM, 2-5% SLOPE

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

KJS INVESTMENT PROPERTIES & SORRENTO INC.

SOIL LOSS ANALYSIS

BLOCKS 24A-24D

DESIGN ENGINEER: J BUSHEY, C CORSETTI				
JOB NO: 11771901	SCALE: AS SHOWN	DRAWN BY: ALB, CC	DATE: 6-25-18	SHEET: 9 OF: 11
DWG. NO: 11411901USLE				

I:\Proj\Corp\11411901\SLA\11411901USLE 6-25-18.dwg, 9 24A-D, 6/25/2018 10:03:41 AM

SEE SHEET 11

SEE SHEET 7

SEE SHEET 6

SEE SHEET 9

TRANSECT 28

TRANSECT 28A2

TRANSECT 25

TRANSECT 27

TRANSECT 24G

TRANSECT 23M

TRANSECT 24E1

TRANSECT 24H1

TRANSECT 24H2

TRANSECT 24E2

TRANSECT 24H1

TRANSECT 23E

TRANSECT 32

1260

1240

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- U.S.G.S. BLUE LINE STREAM (APPROXIMATE) MAPPED BY HIRKALA
- EXISTING ROAD
- EXISTING VINEYARD
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% — USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED DIVERSION DITCH
- PROPOSED INSLOPED AVENUE
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED ROCK APRON
- PROPOSED ROLLING DIP
- PROPOSED VINEROW DIRECTION
- 114 / 171 — USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

- 114 — BRESSA–DIBBLE COMPLEX, 30–50% SLOPE
- 171 — PLEASANTON LOAM, 2–5% SLOPE

2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.
2014 NAPA COUNTY AERIAL PHOTO.

© 2018 PPI ENGINEERING, INC.

KJS INVESTMENT PROPERTIES & SORRENTO INC.

SOIL LOSS ANALYSIS

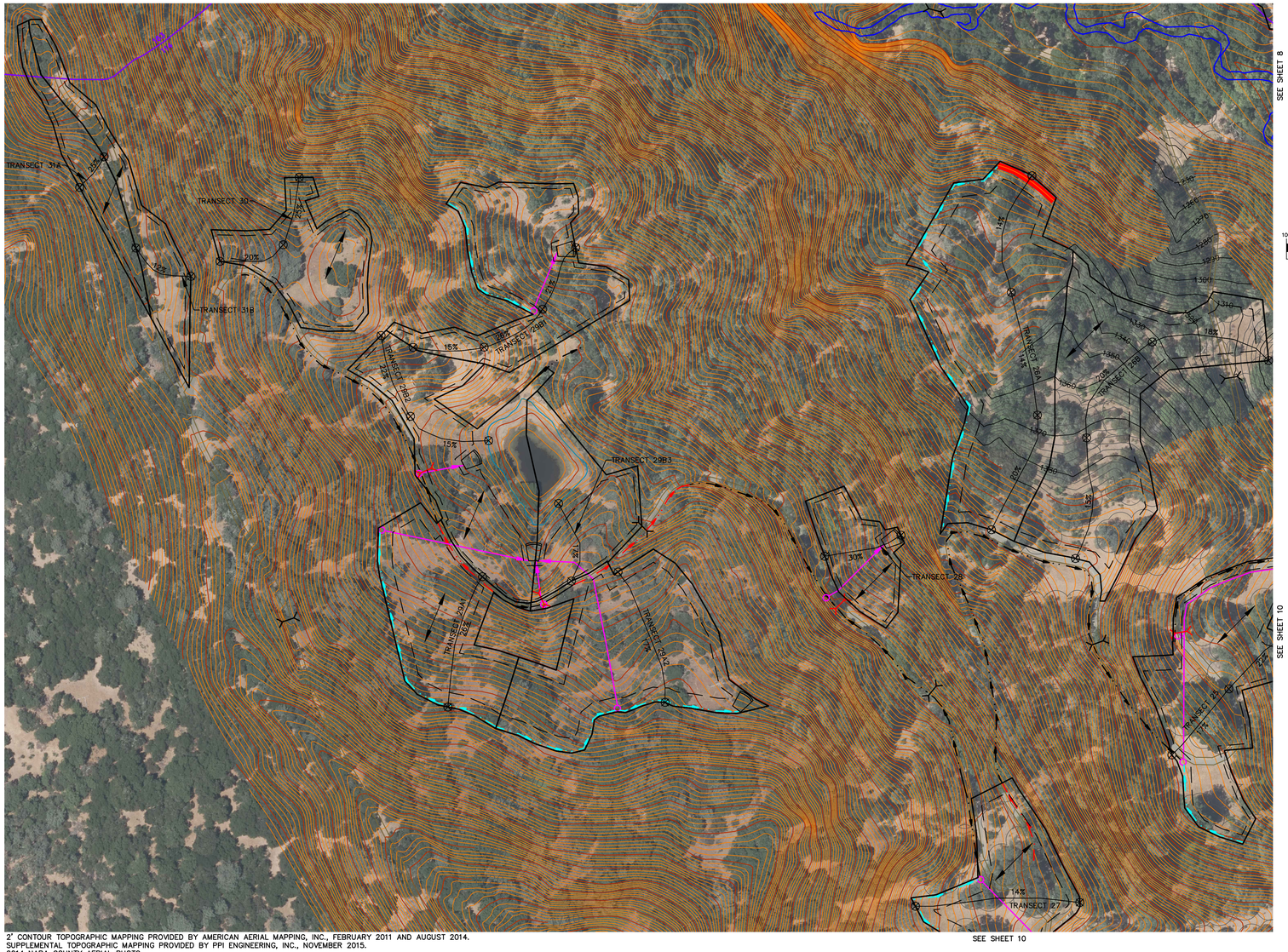
BLOCKS 24E–24G, 25, 27 & 32

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO: 11771901	SCALE: AS SHOWN	DRAWN BY: ALB, CC	DATE: 6-25-18	SHEET: 10 OF: 11
DWG. NO: 11411901USLE				

I:\Land Comp\11411901\SLE\24-25-27-32-6252018 10:05:29 AM



2' CONTOUR TOPOGRAPHIC MAPPING PROVIDED BY AMERICAN AERIAL MAPPING, INC., FEBRUARY 2011 AND AUGUST 2014.
SUPPLEMENTAL TOPOGRAPHIC MAPPING PROVIDED BY PPI ENGINEERING, INC., NOVEMBER 2015.
2014 NAPA COUNTY AERIAL PHOTO.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

LEGEND

- AMERICAN AERIAL 10' INDEX CONTOUR
- AMERICAN AERIAL 2' INTERMEDIATE CONTOUR
- PPI ENGINEERING 10' INDEX CONTOUR
- PPI ENGINEERING 2' INTERMEDIATE CONTOUR
- EXISTING RESERVOIR OR POND
- EXISTING ROAD
- EXISTING DITCH TO BE REPAIRED & MAINTAINED AS NEEDED
- EXISTING DITCH TO BE REMOVED
- EXISTING CULVERT TO BE REPAIRED, MAINTAINED OR REPLACED AS NEEDED
- EXISTING CULVERT TO BE REMOVED
- PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT
- PROPOSED VINEYARD BLOCK BOUNDARY
- X% — USLE TRANSECT SEGMENT WITH SLOPE
- PROPOSED DIVERSION DITCH
- PROPOSED DROP INLET
- PROPOSED SURFACE DRAINAGE LINE
- PROPOSED ROCK LEVEL SPREADER
- PROPOSED ROCK APRON
- PROPOSED VINEROW DIRECTION
- 163 / 114 — USDA SOIL TYPE BOUNDARY

USDA SOIL CLASSIFICATIONS:

114 BRESSA–DIBBLE COMPLEX, 30–50% SLOPE

163 MAYMEN–MILLSHOLM–LODO ASSOCIATION, 30–75% SLOPE

© 2018 PPI ENGINEERING, INC.

PPI ENGINEERING
2800 JEFFERSON STREET
NAPA, CA 94558
707/253-1806 FAX 707/253-1604

KJS INVESTMENT PROPERTIES & SORRENTO INC.

SOIL LOSS ANALYSIS

BLOCKS 26 & 28–31

DESIGN ENGINEER: J BUSHEY, C CORSETTI

JOB NO:	SCALE:	DRAWN BY:	DATE:	SHEET:
11771901	AS SHOWN	ALB, CC	6–25–18	11 OF: 11

DWG. NO: 11411901USLE

I:\Proj\Comp\11411901\SLA\6-25-18.dwg, 11" by 28-31, 6/25/2018 10:06:12 AM