Surface Mining and Reclamation Plan

Trinity Quarry

Revised 11/02/2018

585 TRINITY ROAD, GLEN ELLEN

APN 053-110-076

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Trinity Quarry – Minor Reclamation Plan Amendment

I. INTRODUCTION

Preface

This minor Reclamation Plan amendment is a modification of the 1998 Surface Mining and Reclamation Plan and the subsequent September 13, 2013 Surface Mining and Reclamation Plan. This minor Revised Reclamation Plan amendment does not include mining plans and is intended to be a final plan to restore the quarry to its natural state while allowing for future, agricultural and grazing uses. Upon completion of the reclamation activities, the owner plans to rezone the property removing the MR Surface Mining overlay zone. The base Land Intensive Agricultural (LIA) zone would remain, allowing for agricultural and grazing uses. The future planned use for the parcel is agricultural cultivation and open space with grazing while maintaining the sediment pond on the parcel. No future mining is planned on the parcel.

HISTORY

The Trinity Quarry has operated at the current location since 1919. The quarry traditionally produced road and construction materials including decorative rock. Immediately prior to 1981, work at the quarry included the production of a small volume of crushed and screened rock and a small volume of decorative flagstone. In 1981, a use-permit application and mining and reclamation plan were approved by the County of Sonoma. Under the 1981 Use Permit, an expansion of quarry activity was proposed including the reprocessing of fines produced by Nun's Canyon Quarry to the north.

Under the 1981 mining and reclamation plan, quarry reserves were anticipated to be depleted before 1995 and final reclamation to be completed in three phases terminating in 1995. The actual pace of mining was less than anticipated at the time of filing of the use permit application in 1981 with a peak level of production of about 200 tons of decorative rock per year. The crusher and screens were removed from the site and production consisted of the hand breaking of decorative rock. Considerable accessible and marketable rock remained at the proposed time of cessation of quarry

activity and a proposal to extend quarry activity was made in 1998. Following the request to extend quarry activity in 1998, the actual pace of mining again was less than anticipated, and considerable accessible and marketable rock remained at the expiration of the proposal. Through the 2010 Use Permit application (PLP10-0041) revision, the quarry was authorized to mine through November 17, 2018. A request to extend quarry activity was made on September 13, 2013.

The parcel and most of the structures burned in the October 2017 wildfires.

Site

The Trinity Quarry lies approximately 500 feet east of Highway 12 and adjacent to and north of Trinity Road (Appendix 10). The quarry is located on an approximately 25-acre parcel bounded on the south and east by Trinity Road (Appendix 10). On the north, it is by an unnamed tributary to the Calabazas Creek, which is a watercourse that flows seasonally near the quarry. The area around the quarry is developed with vineyards and other agricultural and permitted uses. Nun's Canyon Quarry is located to the north.

A service road that provides access to the quarry and a former turkey ranch to the west extends northerly along the westerly boundary of the quarry (Appendix 10). A second and older quarry access road is located east of the service road. This road extends from Trinity Road northerly into the main quarry work area (Appendix 10). The quarry also uses an access road (Weise Road) that extends from the northwest area of the quarry to Highway 12. This access is shared with Nun's Canyon Quarry.

There were several pre-existing structures located within the quarry parcel, as shown on the site plan provided in the September 13, 2013 Surface Mining and Reclamation Plan, that were destroyed by wildfire in October 2017. A pre-existing single-family residence located near Trinity Road, outside of the quarry work area was also destroyed by the fire There is a covered structure located near the quarry work area that was used in quarry production that survived the fires. There is a scale structure and an ADA-accessible restroom that were used in quarry production located to the west of the quarry work area,

which also survived the fire. Fuel tanks and a containment vessel located in the northwest corner of the parcel in a secured area also survived the fires.

The mining and support activities affected about 13 acres of the 25.16 parcel. The property may be divided into five areas; 1) three acres of equipment and tool storage, mining area, soil and mining debris storage, 2) four acres of access roads, 3) three acres of graded areas that have not been reclaimed, 4) approximately six acres of area impacted by previous quarry work that has been reclaimed, and 5) the remain 9.16 acres of the property that was not part of the mining operations.

Upon reclamation, the site will be used for agricultural cultivation purposes. The agricultural use permit area for the cultivation occupies approximately 8.30 acres of the site. There are two, approximately 10,000-gallon water tanks, located to the west of the quarry. These tanks are for agricultural and other permitted uses on the property, which will be removed with this reclamation.

The area remaining to be reclaimed is located primarily in the northeast portion of the parcel. This area has been returned to slopes of 10% to 15% and shows varying depth of surface soil and some rock debris.

A vegetated berm with an average height about six feet was constructed along the east side of the service road. The berm has a varying cross slope of from 15% to 40%. Several other berms constructed of soil and quarry fines are in the old quarry work areas. Numerous trees and shrubs are also located on these berms.

TRAFFIC

Historically, quarry traffic consisting of trucks carrying quarry products and materials and employee vehicles used either the quarry access road from Trinity Road or the access from Highway 12. Site distance for traffic exiting the quarry from the Highway 12 complied with California Department of Transportation requirements for a highway design speed of 55 miles per hour.

Site distance from the service road at Trinity Road is adequate with no known history of accidents or traffic problems. Average yearly quarry traffic was estimated to be between one and two trips per day. There is no current mining activity at this quarry and no related traffic.

SOILS AND GEOLOGY

Trinity Quarry is within an area identified on the Sonoma County Soils Survey, (USDA 1972), as Red Hill Series clay loam. This soil is moderately well drained and typically exists to depths of 30 to 60 inches. This native soil, mixed with quarry fines and rock, has been used in the reclamation work completed to date. A copy of a portion of the Soils Survey Map is Appendix 6 of this Plan.

The underlying rock unit that is currently mined at the site is a volcanic felsite porphyry (Fel), a banded and silicic flow that contains clear anhedral quartz, white subhedral, red-purple and reddish-brown phenocrysts, occurring in bands. Remaining rock reserves on the site are found in a north trending quarry face in the westerly portion of the quarry impoundment pond.

FLORA AND FAUNA

The lands of the Trinity Quarry may be classified as interior woodland chaparral. In the undisturbed condition this site would be classified as Woodland Group 1 and Wildlife Group 4 as described in the Sonoma County Soils Survey, (US Department of Agriculture, May 1972). Scattered and established oak, pine and fir trees exist in undisturbed areas of the site and previously-reclaimed areas. These areas also have naturally-regenerated madrone, manzanita-toyon, chaparral and coyote bush (baccharis bilularis).

Invasive acacia, (acacia melanoxylon) exists in many of the disturbed and previously-reclaimed areas. The acacia was planted as a part of previous quarry reclamation and has now extended into areas where agricultural and other permitted uses may be proposed. Although not listed on either List A or B of the California Exotic Pest Plants

Council, they are observed to dominate the understory area of established native trees and to disrupt the natural regeneration of native shrubs and trees.

A list of flora and fauna known to exist in and around the quarry site may be found in Appendix 4 of this Plan.

II. SURFACE MINING

HISTORIC OPERATIONS

Mining operations at Trinity Quarry historically commenced at the end of the rainy season in April and continued to the onset of seasonal rainfall in October. Hours of operation at the quarry were 8:00 am to 5:00 pm, Monday through Friday.

The remaining quarry reserves are within the west face and bottom of the sedimentation pond. This pond typically retains rain catchment waters beyond the proposed onset of mining operations, so the retained water is pumped from the pond to surface dispersal areas in a manner that prevents passage of water off of the property and does not allow sediment to reach any waterway or the unnamed tributary to Calabazas Creek.

The quarry produced a limited amount of hand cut and shaped architectural stone and hand split flagstone from the mining area which was removed from the quarry face by tracked dozer and was either pushed to the processing area adjacent to the shed or was carried by loader to the cutting site at the equipment and tool storage structure. Rock was stored on pallets for transport in the northwest area of the quarry.

Past peak production level was less than 140 tons per year and required the part time efforts of two quarry workers. The level of production and expansion of quarry products proposed in the 1981 Use Permit Application did not occur.

CURRENT OPERATIONS

There is no quarry activity since the mining operations have ceased. Reclamation activities are ongoing.

PREVIOUS IMPACTS OF QUARRY OPERATION

Visual

Quarry operations were shielded from view from Highway 12 by the vegetated berm lying along the Service Road and structures located on the parcel to the west. The view into the quarry parcel is screened through native vegetation and trees between the road and quarry work area.

Traffic

Volume from quarry activity was low and was not considered to be significant.

Noise

Past quarry operations did not generate significant levels of noise. Motorized quarry equipment was fitted with mufflers and hand activities were not considered loud enough to generate significant levels of noise. No blasting was proposed as a part of this mining plan.

Dust

The level of quarry activity was never likely to generate significant volumes of dust. Dust has not been a problem in the past. Water for dust control is available on site and a water truck for dust control purposes is available from Nun's Canyon Quarry located to the northwest by private road.

Erosion and Sedimentation

As discussed in other parts of this plan, runoff from past quarry areas is directed to the sediment impoundment pond located in the work area. Surface-runoff of reclaimed area and quarry storage areas that flows toward the unnamed tributary to the Calabazas Creek is filtered through natural vegetation adjacent to the creek. Sediment and water storage ponds proposed for construction near the creek in the 1981 mining proposal have not been constructed.

Final reclamation will result in mild ground slopes and sheet flow of surface runoff. On many slopes greater than 2:1, it has been determined by a Sonoma County Professional Geologist that the regrowth of natural vegetation should remain and that these particular slopes should not be re-graded due to their time-proven stability and the existence of natural vegetation.

The attached preliminary grading and drainage plans show existing topographic conditions and finished surfaces. The final reclamation will be subject to a Storm Water Pollution Prevention Plan. This design work and permit process will be completed in Spring of 2019.

III. RECLAMATION

OBJECTIVE OF RECLAMATION WORK

Reclamation of the Trinity Quarry lands shall be performed in accordance with pertinent requirements of the Surface Mining and Reclamation Act of 1975 and the standards listed in County Code Chapter 26 Article XI. The land shall be left in a geological stable state, graded and planted in a manner compatible with proposed future land uses. A 2.30-acre portion of the reclaimed land use is considered open space and is planned for future agricultural use, primarily for the grazing of animals, an activity that currently exists on adjacent, commonly owned parcels. Another portion of the property will be used for other permitted uses, subject to a pending use permit. The major change from the current Reclamation Plan is that the sediment pond will be retained and most of the site will be open space with grazing. Open space with grazing is defined as either forested canopy of greater than 50% or an established grassland. In this case, the reclaimed land would be grassland.

Areas within the quarry parcel that slope up to approximately 20% are considered to have potential for future vineyard or other agricultural uses. The water well will be utilized for initial irrigation for the reclaimed area and will remain in use by the adjacent vineyard for irrigation, fire protection and irrigation for potential other permitted uses after reclamation is complete. No additional tree planting is planned in this case and grassland would be established by applying a grass seed mix.

RECLAMATION WORK STATUS

Various reclamation work has been completed at Trinity Quarry. Two businesses operating on the site have ceased operation and structures unrelated to quarry activity have been removed from the site with the exception to the addition of ten, 2,000 square foot, temporary hoop houses that were added for commercial cultivation activities (to be removed at the end of the 2018 growing season). A

water supply well was constructed many years ago to facilitate quarry operation and reclamation work.

PROPOSED RECLAMATION

The mining and support activities affected about 13 acres of the parcel, which will or have been reclaimed. All abandoned roads will be ripped out to a depth of 8 inches and a mix of amended topsoil will be placed at a depth of 4 inches.

Approximately 2.5 tons of the abandoned equipment and scrap metal that existed on the site has been removed. Approximately 8.30 acres are planned for agriculture cultivation on the parcel and 5.30 acres of quarry lands will be graded to form a sedimentation pond and revegetated slopes. Most of the acacia removal will take place next to the cultivation area in the north west corner of the parcel (Appendix 11).

Reclamation will occur in two phases. The first phase will commence in Summer 2018 and will be completed by Spring 2019. This phase will include all areas outside and to the east of the fenced area of existing commercial cultivation, allowing for the cultivation during the Summer/Fall to continue uninterrupted. The second phase will occur starting in the Spring of 2019 and continuing through Spring of 2024, which includes the required 5-year monitoring program. The previous reclamation plan included the sediment pond with soil. This plan proposes to leave the pond with an approximately 9.46-acre feet of impounded water.

PHASE I RECLAMATION, ONGOING - FALL 2018

1. Removal of 2.5 tons of scrap metal.
2. Recontouring of unstable slopes (Appendix 6) to create a maximum slope of 2 horizontal to 1 vertical (2:1), excluding slopes determined stable due to being heavily vegetated (as assessed by a Sonoma County Government Professional Geologist during our site inspection of April 26, 2018). These were

recommended to be left as is. This work will be done with as little disruption to mature tree cover as possible.

3. Remove all invasive acacia. Removal of acacia should be directed toward stopping the spread of the plant by removal of seedlings and smaller plants in areas where they predominate. Acacia will be removed with an excavator to minimize seed bank distribution. As a result of the fire, much of the acacia, as well as native fir and oak vegetative cover was destroyed. The larger acacia trees screening adjacent roads and properties should be replaced with new plantings. Native tree replanting will be conducted to the south of the quarry, near Trinity Road, to replace the screening use of the acacias. The previously disturbed areas around the quarry are to be used as an expansion of existing pasture for the property's cow and calf operation. This area shall be replanted with a blend of seed such as Yarrow, California brome, Blue wild rye, Deerweed and Pine bluegrass, all suitable for grazing (Appendix 8). There will be no additional woody vegetation planted in the area used for grazing. Naturally occurring native plants within the areas cleared of acacia should be protected and preserved. All mature trees including oaks and conifers would remain.
4. Remove invasive plants and regrade back to their natural state, areas south of the sediment pond and east of the quarry access road where large amounts of tailings and historic mining operations left varying sharp cuts and sloped edges, and where the vegetation became inundated with dense patches of acacias.
5. Abandon and reclaim unused quarry access roads. Roads associated with ongoing property uses will remain.
6. Remove or demolish structures not required for ongoing property uses. Demolition permits to be obtained, unless exempt.
7. The owner or landscape management consultant will implement eradication measures for control of weed species as described in Appendix 9.

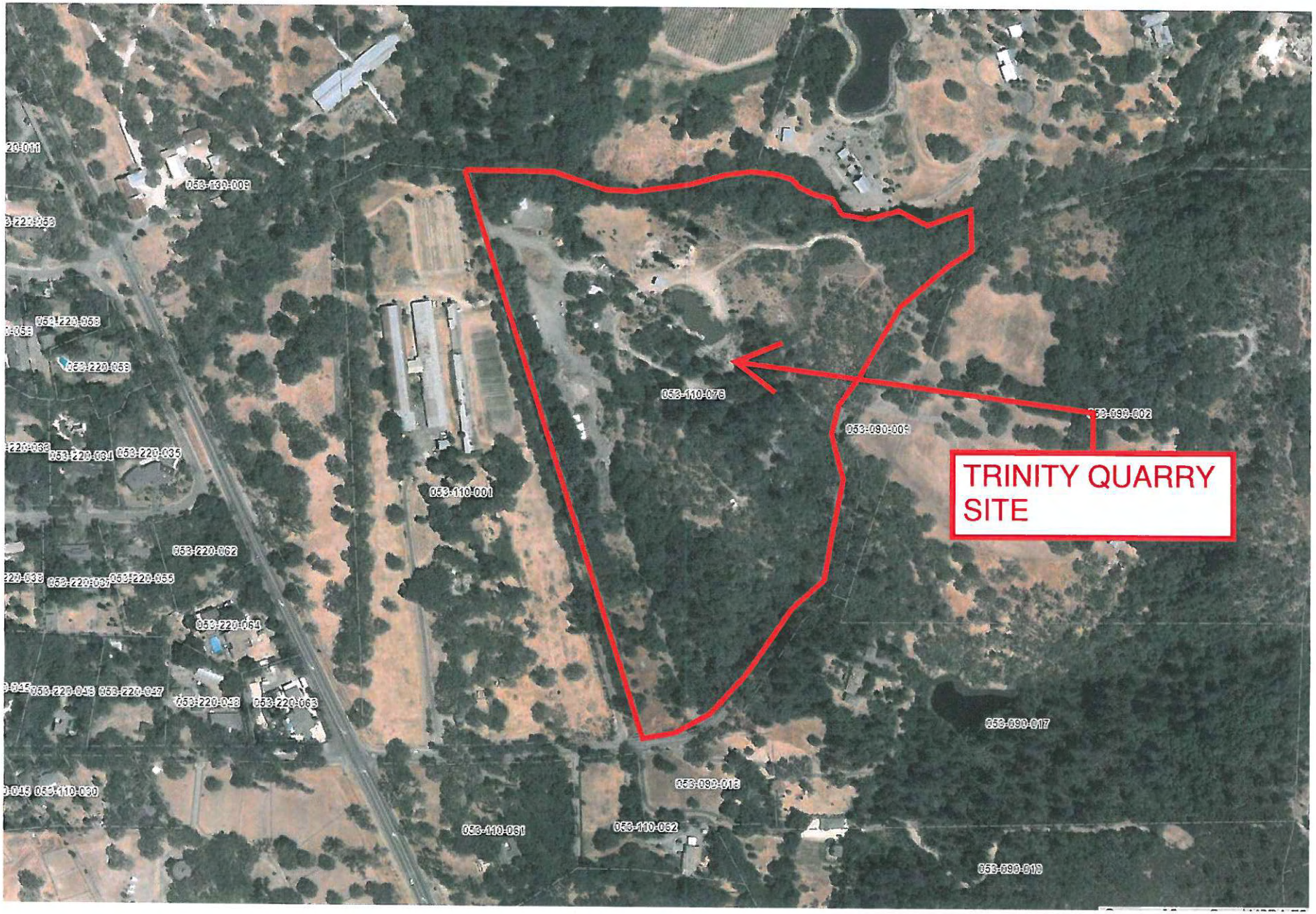
8. Prepare a Storm Water Pollution Prevention Plan for final grading and maintenance of the surface drainage to the unnamed tributary to the Calabazas Creek and the Service Roadside ditch.
9. Any spoils from annual quarry operations to be stockpiled and protected from erosion. Very little of these remain. Protection may include placement of straw waddles around fresh stockpile annually, prior to October 15. The stockpile site is located north of the quarry pit within the watershed of the sedimentation pond and will not convey sediment to McGinty Creek.
10. Any topsoil imported to the site for use in final reclamation will be stockpiled adjacent to the existing stockpile south of the product storage area. Stockpiles will be protected from erosion by tarping and placement of straw waddles around their perimeter.
11. Asphalt debris within the quarry will be removed and recycled or disposed of at an approved disposal facility, however most of this debris was removed as part of the post-fire cleanup by Army Corps of engineers.
12. Apply mulch and seed graded area according to the Erosion and Sediment Control and revegetation guidelines in Appendix 8 and 9.
13. Erosion and sediment control measures to be in place prior to October 15, 2018.

PHASE II RECLAMATION, SPRING 2019 - SPRING 2024

1. Continued grading and set surface soils aside for redistribution across the recontoured surface, where needed. Finish grade will result in a 9.46-acre foot pond that will collect rain water to an elevation of 385’. The grading of a 12-foot wide berm at the north end of the pond will provide 3 feet of freeboard and an outlet structure of the pond will be completed during this phase (Appendix 11). Any grading during the wet season will be performed with the utmost of care and consideration of erosion and sediment control. All slopes approaching 2:1

will be hydroseeded at a rate of 1,500 pounds per acre with a quick cover pit mix including a homogeneous slurry of tack, seed and fiber mulch.

2. Top soil and mulch is to be applied at a rate of 2 tons per acre, unless otherwise specified. The application process shall be done before the seasonal rainfall. Remaining reclamation area to be planted with a blend of seed such as Yarrow, Blue wild rye or Pine bluegrass for agricultural grazing.
3. All pasture areas will be hand broadcast seed application and topped with a non-seed-bearing certified straw. A dryland pasture mix will be used in grazing areas.
4. The owner or landscape consultant will evaluate the success of any areas of re-vegetation. Plantings from seed may be evaluated as an alternative to planting seedlings.


TRINITY QUARRY SITE
053-110-076
053-090-002
053-090-005
053-110-001
053-220-062
053-220-064
053-220-063
053-090-017
053-090-013
053-110-061
053-110-052

APPENDIX 1

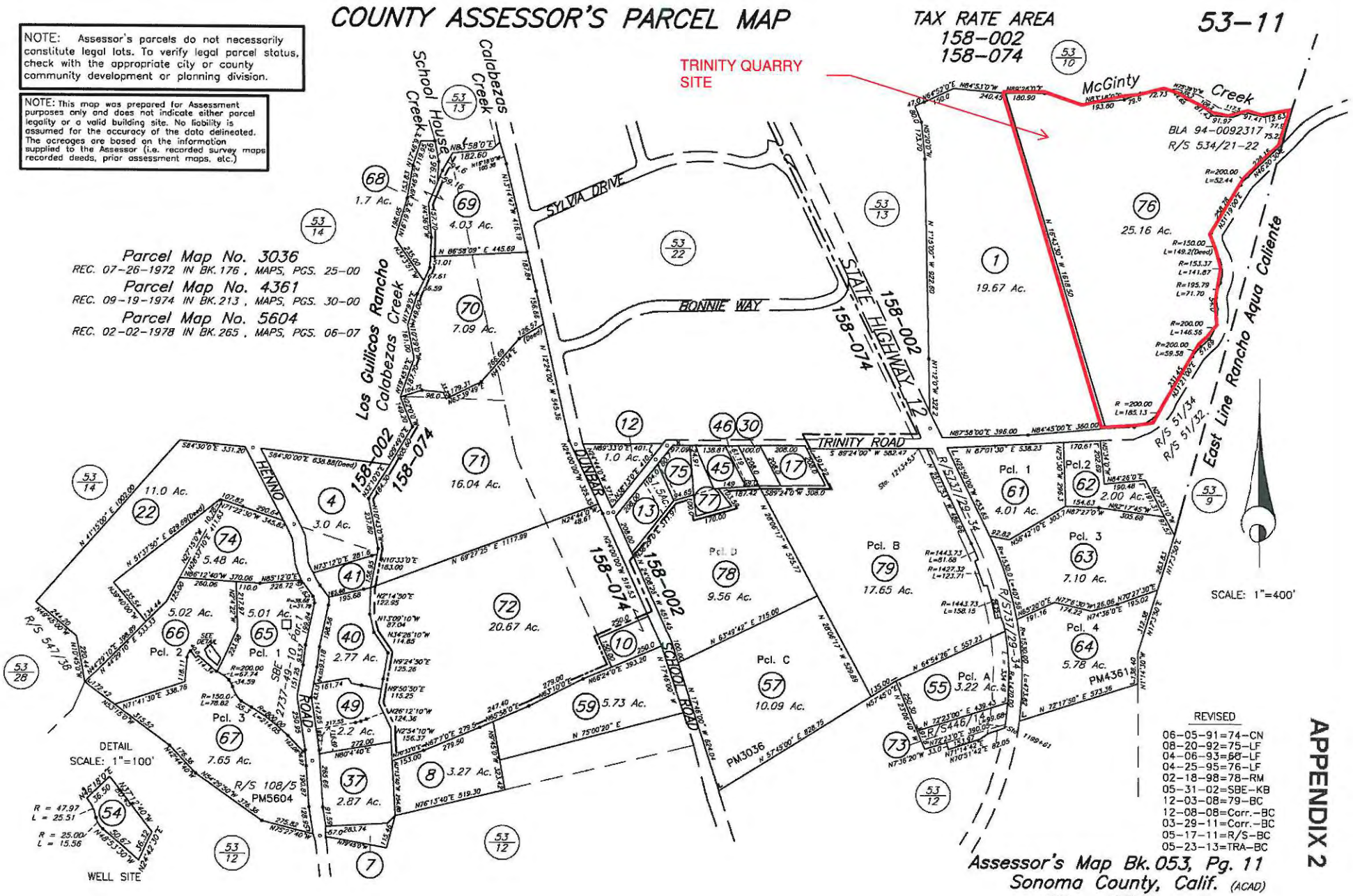

COUNTY ASSESSOR'S PARCEL MAP
TAX RATE AREA
158-002
158-074
53-11
NOTE: Assessor's parcels do not necessarily constitute legal lots. To verify legal parcel status, check with the appropriate city or county community development or planning division.
NOTE: This map was prepared for Assessment purposes only and does not indicate either parcel legality or a valid building site. No liability is assumed for the accuracy of the data delineated. The acreages are based on the information supplied to the Assessor (i.e. recorded survey maps recorded deeds, prior assessment maps, etc.)
TRINITY QUARRY SITE
Parcel Map No. 3036
REC. 07-26-1972 IN BK. 176 , MAPS, PGS. 25-00
Parcel Map No. 4361
REC. 09-19-1974 IN BK. 213 , MAPS, PGS. 30-00
Parcel Map No. 5604
REC. 02-02-1978 IN BK. 265 , MAPS, PGS. 06-07
School House Creek
Calabezas Creek
Los Guilicos Rancho Calabezas Creek
McGinty Creek
East Line Rancho Agua Caliente
SYLVIA DRIVE
BONNIE WAY
STATE HIGHWAY 12
158-002
158-074
TRINITY ROAD
DUNBAR ROAD
HENNO ROAD
SCHOOL ROAD
SBE 2737-49
R/S 534/21-22
BLA 94-0092317
R/S 51/34
R/S 51/32
R/S 547/36
R/S 108/5
R/S 537/29-34
PM5604
PM4361
PM3036
DETAIL
SCALE: 1"=100'
WELL SITE
SCALE: 1"=400'
REVISED
06-05-91=74-CN
08-20-92=75-LF
04-06-93=60-LF
04-25-95=76-LF
02-18-98=78-RM
05-31-02=SBE-KB
12-03-08=79-BC
12-08-08=Corr.-BC
03-29-11=Corr.-BC
05-17-11=R/S-BC
05-23-13=TRA-BC
Assessor's Map Bk. 053, Pg. 11
Sonoma County, Calif. (ACAD)
KEY 12/3/08 BC
APPENDIX 2

Exhibit "A"

LEGAL DESCRIPTION

A boundary line lying within the Agua Caliente Rancho, common to the Lands of Gordenker Turkey Farm, Inc. (hereafter "Gordenker"), described in Document Number 80-059811 recorded October 6, 1980 in Sonoma County Records; and the lands of Pastore Living Trust (hereafter "Pastore") described in Document Number 1992-0035017 recorded March 30, 1992 in Sonoma County Records; said line being more particularly described based on Official Records of Sonoma County cited herein and a survey performed by Peter J. Lescure, PE in August 1993 as follows:

Beginning at a point common to Gordenker's northerly boundary, and the westerly boundary of Pastore's Parcel One, also being the southeasterly corner of the lands of Gordenker Turkey Farm, as recorded July 29, 1963 in Book 1977 at Page 145;

THENCE to the centerline of McGinty Creek, being the southwesterly corner of Pastore's Parcel One, S 19° 24' 02" W, 40.10 feet more or less, said bearing being the prolongation of the fence line on the westerly line of Pastore's Parcel One;

THENCE along the centerline of McGinty Creek the following courses,

N 85° 27' 24" E	72.73 feet;	S 78° 51' 17" E	56.87 feet;
S 42° 51' 06" E	44.65 feet;	S 70° 51' 08" E	69.84 feet;
S 49° 26' 52" E	81.43 feet;	S 85° 45' 57" E	91.97 feet;
N 68° 41' 28" E	61.49 feet;	S 76° 49' 35" E	91.41 feet;

THENCE N 73° 49' 06" E 112.63 feet to Gordenker's northeasterly corner, which bears S 03° 11' 54" W, 30.02 feet from an iron pipe tagged RCE 28044, set as a witness monument at the southerly end of a low rock wall;

THENCE leaving McGinty Creek S 03° 11' 54" W, 77.90 feet to an iron pipe tagged RCE 28044 set in a fence line, also being 25 feet more or less from the physical centerline of Trinity Road;

THENCE to an angle point in Gordenker's easterly line S 11° 51' 28" W, 75.22 feet, being the terminus of the agreed boundary line. Said point is more or less coincident with the most southerly corner of Pastore's Parcel Two.

Basis of Bearings: S 18° 06' 44" W between two iron pipes tagged LS 3322, along the most westerly line of Lands of E&F Reed as indicated on the Record of Survey recorded in Book 134 at Page 22.

This document prepared by:

7/26/94

Peter J. Lescure, PE Date
RCE 28044

REGISTERED PROFESSIONAL ENGINEER
PETER J. LESCURE
No. 28044
Exp. 3-31-96
CIVIL
STATE OF CALIFORNIA

FLORA AND FAUNA

The following is a list of known or suspected animal and plant species for the area on and around the project site.

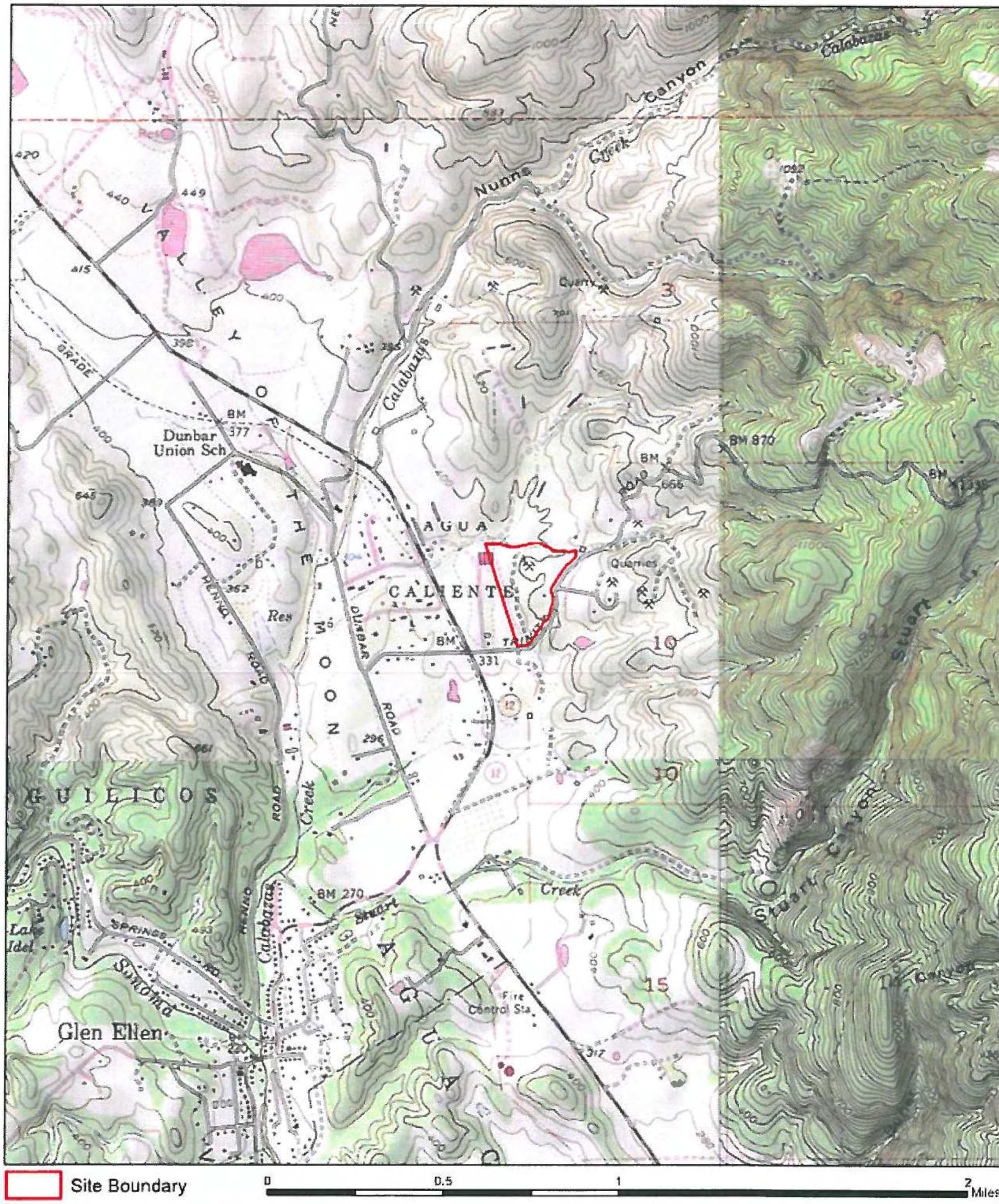
FLORA

Beargrass	Zerophyllum tenax
Bracken fern	Pteridium aquilinum
Yerba santa	Eriodiotyon californicum
Buckthorn	Rhamnus crocea
California coffeeberry	R. californica
Ceanothus	Ceanothus spp.
Chamise	Adenostoma fasiculatum
Chaparral pea	Pickeringia montana
Golden fleece	Haplopappus aborescens
Interior live oak	Quercus wislixenii frutescens
Manzanita	Arctostaphylos spp.
Mountain mahogany	Cercocarpus betuloides
Poison oak	Rhus diversiloba
Scrub oak	Quercus dumosa
Silk-tassel bush	Garrya spp.
Sonoma sage	Salvia sonomensis
Toyon	Heteromeles arbutifolia
Tree poppy	Dondromecon rigida
Chinquapin	Castanopsis chrysophylla
Knobcone pine	Pinus attenuata
Madrone	Arbutus menziesii

FAUNA

Anna's hummingbird	Fox sparrow
Bewick's wren	Golden-crowned sparrow
California quail	Wrentit
California thrasher	
Black-tailed hare	Dusky-footed woodrat
Black-tailed deer	Gray fox
Bobcat	Longtailed weasel
Brush mouse	Ringtail
Brush rabbit	Sonoma chipmunk
Coyote	Spotted skunk
Deer mouse	Striped skunk
Common kingsnake	Striped racer
Gopher snake	Western fence lizard
Southern alligator lizard	Western rattlesnake

APPENDIX 5


Nunns
Creek
Canyon
Calabazas
Quarry
VALLEY OF THE MOON
Dunbar
Union Sch
AGUA CALIENTE
Quarries
DUNBAR ROAD
HENNO ROAD
Res
GUILICOS
Creek
Calabazas
Stuart
Creek
Lake Idel
SPRINGS
Sonoma
Glen Ellen
Fire
Control Sta.
Stuart Canyon
BM 870
BM 270
BM 331
Site Boundary
0
0.5
1
2
Miles

United States Department of Agriculture

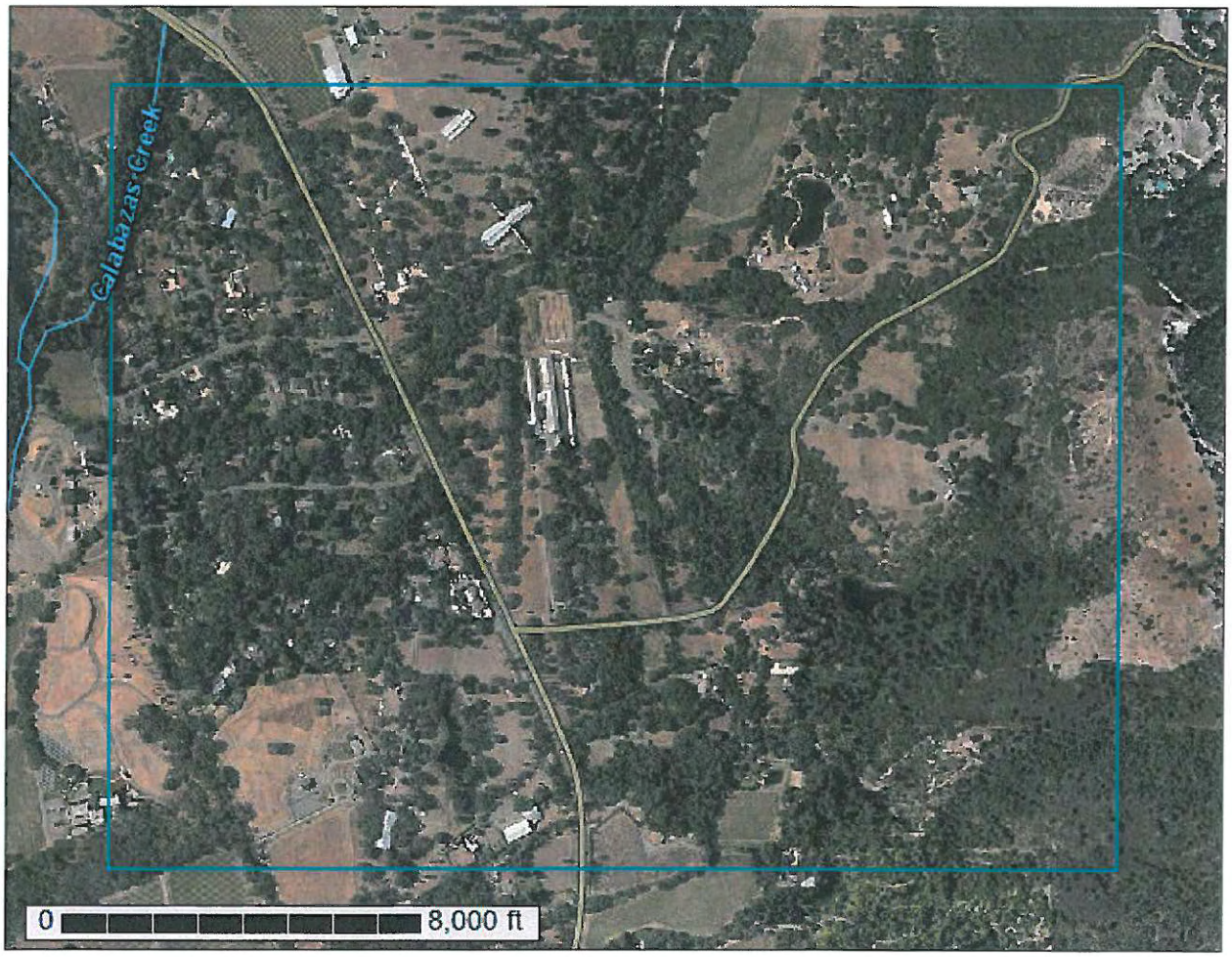
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Sonoma County, California

Trinity Quarry Soil Map



May 29, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

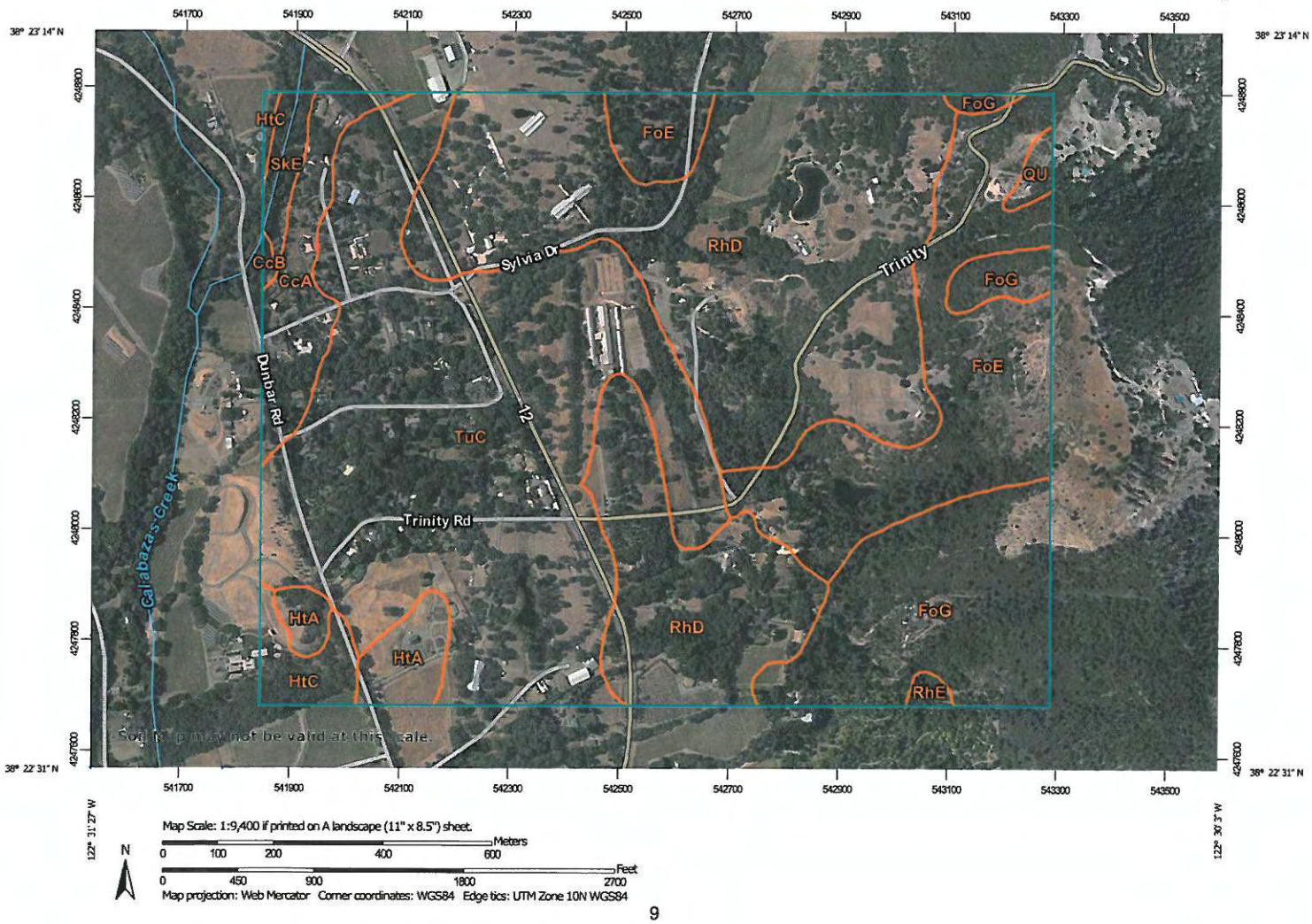
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 11, Sep 21, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 2, 2010—Jun 3, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CcA	Clear Lake clay loam, 0 to 2 percent slopes	14.0	3.5%
CcB	Clear Lake clay loam, 2 to 5 percent slopes	0.5	0.1%
FoE	Forward silt loam, 5 to 39 percent slopes, MLRA 15	54.9	13.8%
FoG	Forward silt loam, 12 to 57 percent slopes, MLRA 15	42.9	10.8%
HtA	Huichica loam, 0 to 2 percent slopes	8.5	2.2%
HtC	Huichica loam, 2 to 9 percent slopes	6.7	1.7%
QU	Quarries	1.8	0.4%
RhD	Red Hill clay loam, 2 to 15 percent slopes	136.5	34.4%
RhE	Red Hill clay loam, 15 to 30 percent slopes	1.0	0.2%
SkE	Spreckels loam, 15 to 30 percent slopes	3.9	1.0%
TuC	Tuscan cobbly clay loam, 0 to 9 percent slopes	125.8	31.7%
Totals for Area of Interest		**396.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a

particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Sonoma County, California

CcA—Clear Lake clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hfbh
Elevation: 20 to 1,500 feet
Mean annual precipitation: 10 to 35 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 225 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Clear lake and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clear Lake

Setting

Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 13 inches: clay loam
H2 - 13 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Hydric soil rating: Yes

Minor Components

Wright

Percent of map unit: 8 percent

Hydric soil rating: No

Huichica

Percent of map unit: 7 percent
Hydric soil rating: No

CcB—Clear Lake clay loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: hfbj
Elevation: 20 to 1,500 feet
Mean annual precipitation: 10 to 35 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 225 to 300 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Clear lake and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clear Lake

Setting

Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 13 inches: clay loam
H2 - 13 to 60 inches: clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: Yes

Minor Components

Whight

Percent of map unit: 8 percent
Hydric soil rating: No

Huichica

Percent of map unit: 7 percent
Hydric soil rating: No

FoE—Forward silt loam, 5 to 39 percent slopes, MLRA 15

Map Unit Setting

National map unit symbol: 2xc9x
Elevation: 110 to 2,080 feet
Mean annual precipitation: 27 to 45 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 281 to 344 days
Farmland classification: Not prime farmland

Map Unit Composition

Forward and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Forward

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Rhyolitic residuum weathered from volcanic rock

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 6 inches: silt loam
BA - 6 to 12 inches: silt loam
Bw1 - 12 to 19 inches: silt loam
Bw2 - 19 to 28 inches: silt loam
Bw3 - 28 to 37 inches: gravelly silt loam
Cr - 37 to 51 inches: bedrock

Properties and qualities

Slope: 5 to 39 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.2 to 0.5 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Aiken

Percent of map unit: 5 percent

Kidd

Percent of map unit: 5 percent

Boomer

Percent of map unit: 3 percent

Sobrante

Percent of map unit: 2 percent

FoG—Forward silt loam, 12 to 57 percent slopes, MLRA 15

Map Unit Setting

National map unit symbol: 2xc9y
Elevation: 310 to 2,370 feet
Mean annual precipitation: 33 to 56 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 260 to 338 days
Farmland classification: Not prime farmland

Map Unit Composition

Forward and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Forward

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Rhyolitic residuum weathered from volcanic rock

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 6 inches: silt loam
BA - 6 to 12 inches: silt loam
Bw1 - 12 to 19 inches: silt loam
Bw2 - 19 to 28 inches: silt loam
Bw3 - 28 to 37 inches: gravelly silt loam
Cr - 37 to 51 inches: bedrock

Properties and qualities

Slope: 12 to 57 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.2 to 0.5 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Aiken

Percent of map unit: 5 percent

Boomer

Percent of map unit: 5 percent

Kidd

Percent of map unit: 3 percent

Sobrante

Percent of map unit: 2 percent

HtA—Huichica loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hffk
Elevation: 100 to 300 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Huichica and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Huichica

Setting

Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 23 inches: sandy clay loam
H3 - 23 to 30 inches: clay
H4 - 30 to 57 inches: cemented

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: About 23 inches to abrupt textural change; 20 to 40 inches to duripan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Unnamed
Percent of map unit: 5 percent
Landform: Basin floors
Hydric soil rating: Yes

Haire
Percent of map unit: 3 percent
Hydric soil rating: No

Wright
Percent of map unit: 3 percent
Hydric soil rating: No

Clear lake
Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

Zamora
Percent of map unit: 2 percent
Hydric soil rating: No

HtC—Huichica loam, 2 to 9 percent slopes

Map Unit Setting
National map unit symbol: hffl
Elevation: 100 to 300 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Huichica and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Huichica

Setting
Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 23 inches: sandy clay loam
H3 - 23 to 30 inches: clay
H4 - 30 to 57 inches: cemented

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: About 23 inches to abrupt textural change; 20 to 40 inches to duripan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Haire

Percent of map unit: 10 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

QU—Quarries

Map Unit Composition

Quarry: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Quarry

Setting

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

RhD—Red Hill clay loam, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: hfj2
Elevation: 500 to 2,500 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 54 to 55 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Red hill and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Red Hill

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from andesite

Typical profile

H1 - 0 to 16 inches: clay loam
H2 - 16 to 48 inches: clay loam
H3 - 48 to 80 inches: clay
H4 - 80 to 87 inches: weathered bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 48 to 80 inches to paralithic bedrock
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Boomer

Percent of map unit: 10 percent
Hydric soil rating: No

Goulding

Percent of map unit: 5 percent
Hydric soil rating: No

RhE—Red Hill clay loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfj3
Elevation: 500 to 2,500 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 54 to 55 degrees F
Frost-free period: 240 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Red hill and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Red Hill

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from andesite

Typical profile

H1 - 0 to 16 inches: clay loam
H2 - 16 to 48 inches: clay loam
H3 - 48 to 80 inches: clay

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Boomer

Percent of map unit: 5 percent
Hydric soil rating: No

Goulding

Percent of map unit: 5 percent
Hydric soil rating: No

Josephine

Percent of map unit: 5 percent
Hydric soil rating: No

SkE—Spreckels loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfjr
Elevation: 100 to 800 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Spreckels and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Spreckels

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 18 inches: clay loam
H3 - 18 to 37 inches: clay
H4 - 37 to 60 inches: cemented

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: About 18 inches to abrupt textural change
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: CLAYPAN (R015XD115CA)
Hydric soil rating: No

Minor Components

Felta

Percent of map unit: 3 percent
Hydric soil rating: No

Laniger

Percent of map unit: 3 percent
Hydric soil rating: No

Suther

Percent of map unit: 3 percent
Hydric soil rating: No

Toomes

Percent of map unit: 3 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 3 percent
Hydric soil rating: No

TuC—Tuscan cobbly clay loam, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: hfkh
Elevation: 200 to 1,000 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 225 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Tuscan and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tuscan

Setting

Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from basic igneous rock

Typical profile

H1 - 0 to 9 inches: cobbly clay loam
H2 - 9 to 17 inches: very gravelly clay
H3 - 17 to 21 inches: indurated

Properties and qualities

Slope: 0 to 9 percent
Depth to restrictive feature: 10 to 20 inches to duripan
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: SHALLOW ROCKY (R015XD132CA)
Hydric soil rating: No

Minor Components

Clough

Percent of map unit: 4 percent
Hydric soil rating: No

Diablo

Percent of map unit: 4 percent
Hydric soil rating: No

Goulding

Percent of map unit: 4 percent
Hydric soil rating: No

Clear lake

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

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EROSION AND SEDIMENT CONTROL

A. SEEDING AND MULCHING

1. When required: Any ground disturbed by quarry activity but not a part of quarry operations protected by peripheral erosion control measures shall be seeded and mulched according to the following requirements.

2. Seed mixture:

Common Name	Scientific Name	Pounds PLS
Yarrow	Achillea millefolium	2 PLS per acre
California brome	Bromus carinatus	10 PLS per acre
Blue wild rye	Elymus glaucus	5 PLS per acre
Creeping wild rye	Leymus triticoides	4 PLS per acre
Deerweed	Lotus scoparius	2 PLS per acre
Pine bluegrass	Poa secunda	4 PLS per acre
Three-weeks fescue	Vulpia microstachys	5 PLS per acre

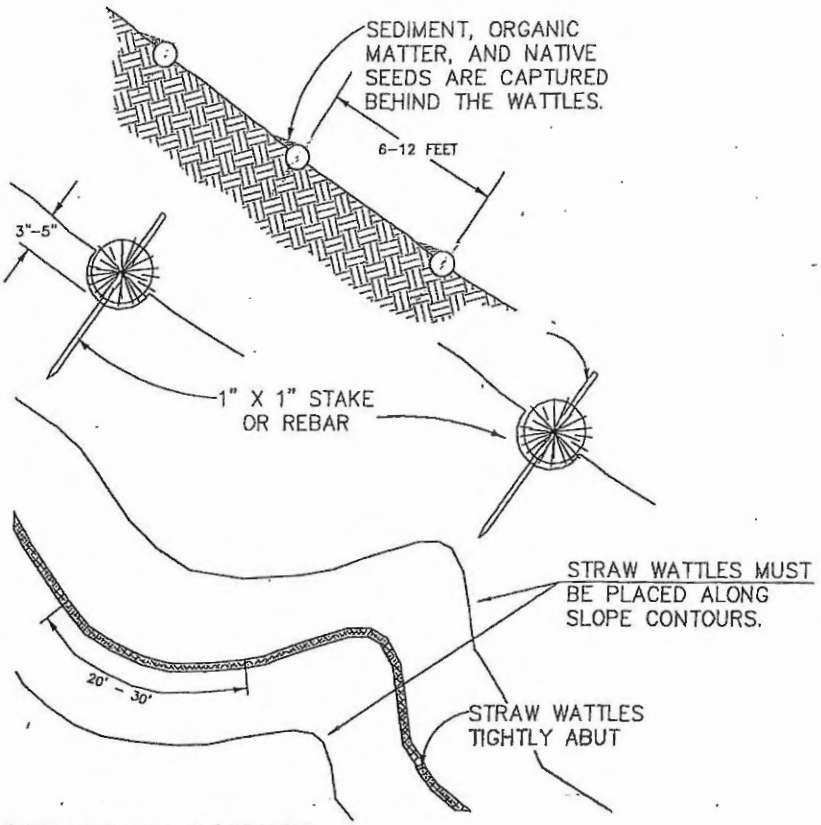
3. Mulch: Use clean and weed free straw.*

4. Mulch application rate: 2 tons per acre unless specified otherwise

5. Timing of application: Seeding and mulch application should be done and completed before the onset of seasonal rainfall. Irrigation of sprouted seeds may be required if rainfall is insufficient to support vegetation growth. All erosion and sediment control work must be completed prior to October 15th.

*As an alternate, composted acacia may be used for mulch. The acacia plants should be chipped and mulched at a temperature sufficient to sterilize the compost. Alternate methods of sterilization may be used if the result is adequate to prevent propagation of additional acacia.

AP 9 SECTION 2/3



ATTLES ARE TUBES MADE FROM STRAW BOUND W/ PLASTIC
THEY ARE APPROX. 8" DIA. AND 20 – 30 FT. LONG.
ATTLES TRAP SEDIMENT AND REDUCE SHEET & RILL EROSION
CING SLOPE GRADIENT, INCREASING INFILTRATION RATES
PRODUCING A FAVORABLE ENVIRONMENT FOR PLANT
MENT.
ATTLE INSTALLATION REQUIRES THE PLACEMENT AND SECURE
OF THE WATTLE IN A TRENCH, 3" – 5" DEEP, DUG ON
RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR
WATTLE.

STRAW WATTLE CHECK DAM

NTS

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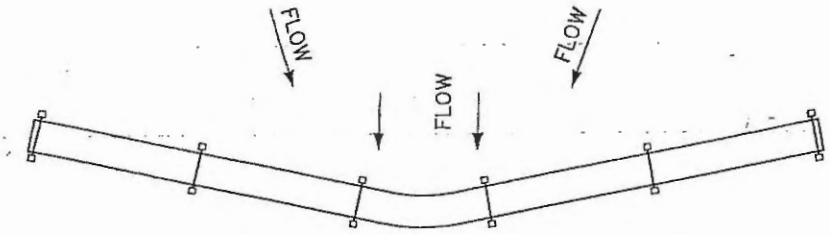
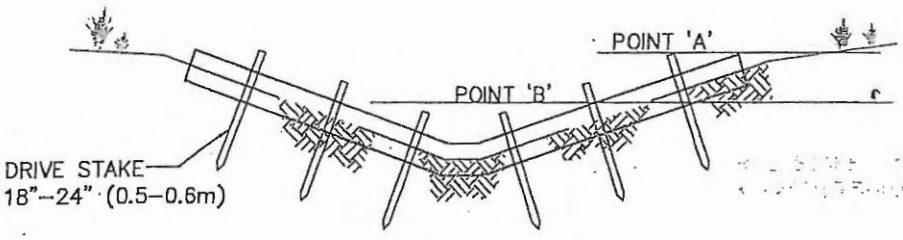
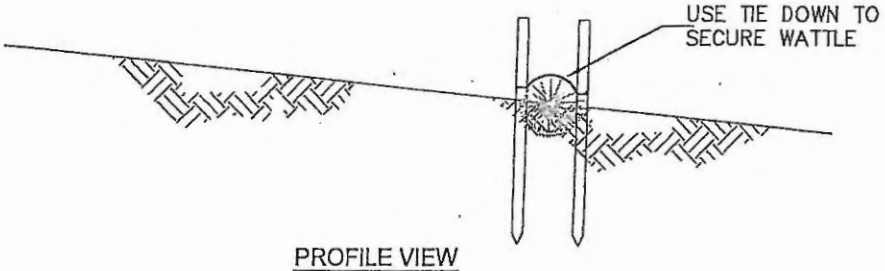
AP 9 SECTION . 0/3



PLAN



VIEW LOOKING UPSTREAM



PROFILE VIEW

NOTES:

1. EMBED WATTLES 4" (100mm) INTO THE SOIL AND 'KEY' WATTLES INTO THE SWALE BANKS.
2. POINT 'A' MUST BE HIGHER THAN POINT 'B'. (SPILLWAY HEIGHT)
3. PLACE WATTLES PERPENDICULAR TO THE FLOW WITH ENDS TIGHTLY ABUTTING.
4. INSPECT AFTER EACH SIGNIFICANT STORM, MAINTAIN AND REPAIR PROMPTLY.

STRAW WATTLE CHECK DAM

NTS

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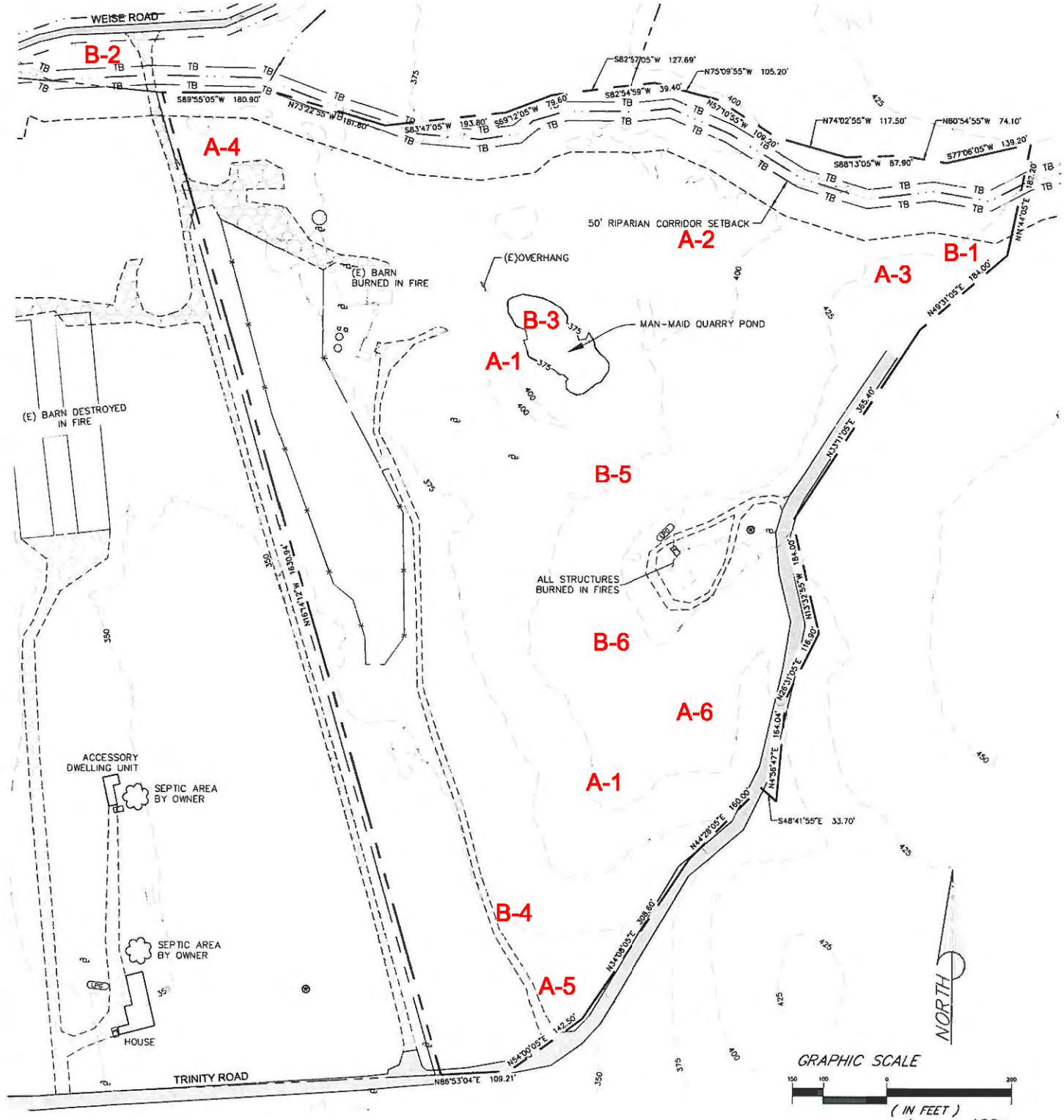
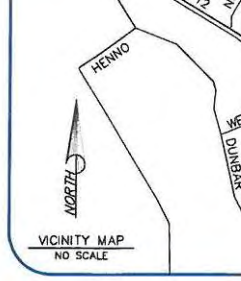


OVERALL SITE PLAN

SCALE: 1"=100'



PROJECT INFORMATION

PROJECT STATEMENT:
THIS PLAN WAS PREPARED TO FACILITATE THE REVISION AND MODIFICATI
RECLAMATION PLAN.

PROPERTY OWNERS:
GORDENKER TURKEY FARMS INC
SYLVIA BERNARD
PO BOX 341, GLEN ELLEN CA, 95442
(415) 486-0036

DESIGNER INFORMATION:
HOGAN LAND SERVICES-CIVIL
1702 4TH STREET
SANTA ROSA, CA 95404
(707) 544-2104

TOPOGRAPHIC INFORMATION PROVIDED BY:
AERIAL TOPOGRAPHIC SURVEY - 2014
HOGAN LAND SERVICES - 2014 - PRESENT

PROJECT DATUM & BENCHMARK:

1) THIS MAP DOES NOT CONSTITUTE A BOUNDARY SURVEY. BOUNDARY LINE
SHOULD ONLY BE USED FOR THE PLANNING PROCESS

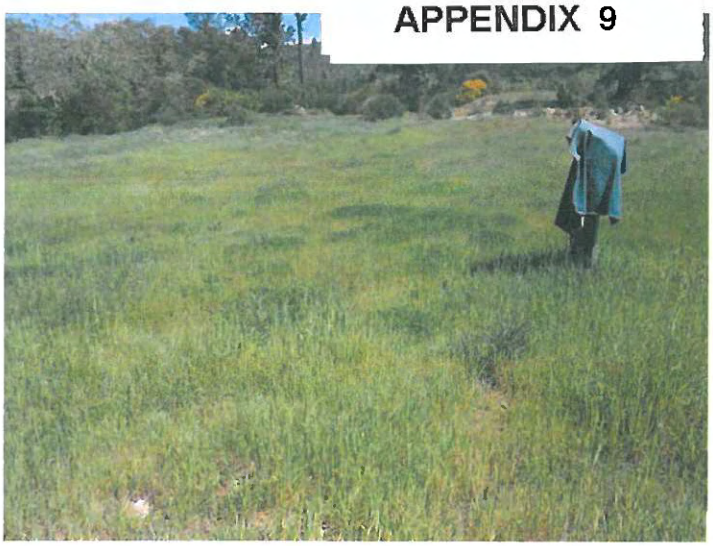
2) HORIZONTAL CONTROL:
BASED ON GPS NORTH

3) VERTICAL CONTROL:
BASED ON CONTOUR DATA PROVIDED BY SONOMA COUNTY.

4) CONTOUR DATA IS PROVIDED BY SONOMA COUNTY VEG-MAP: L
ORTHOPHOTOGRAPHY WERE PROVIDED BY THE UNIVERSITY OF MA
NNX13AP69G FROM NASA'S CARBON MONITORING SYSTEM (DR. R
GEORGE HURTT,PRINCIPAL INVESTIGATORS). THIS GRANT ALSO FU
DERIVED FOREST COVER AND LAND COVER INFORMATION, INCLUDI
AND CARBON MAP, A CANOPY COVER MAP, AND DEMS. THE SON
MAPPING AND LIDAR PROGRAM FUNDED LIDAR DERIVED PRODUCT
PLANE COORDINATE SYSTEM, SUCH AS DEMS, HILLSHADES, BUILD
CONTOURS, AND OTHER DERIVED LAYERS. THE ENTIRETY OF THI
FOR UNRESTRICTED PUBLIC USE, UNLESS OTHERWISE NOTED. ANY
INCLUDING VALUE-ADDED PRODUCTS, WITHIN REPORTS, PAPERS,
ACKNOWLEDGE NASA GRANT NNX13AP69G, THE UNIVERSITY OF M
VEGETATION MAPPING AND LIDAR PROGRAM AS THEIR SOURCES.<

5) THIS PARCEL IS LOCATED WITH IN THE SCENIC RESOURCE AREA

A-1: Looking west annual grassland NE of quarry pond.



A-2: Annual grassland with riparian woodland in background.

A-3: Near NE portion of site showing ruderal (disturbed) habitat.

A-4: Looking south showing proposed cultivation area.

A-5: Former access road and mixed forest habitat at SE corner.

A-6: Typical view of annual grassland and mixed forest habitats.

Quarry Parcel
585 Trinity Road
Glen Ellen, CA
PHOTO PLATE A

B-1: Riparian woodland habitat at NE corner of site.

B-2: Perennial drainage just off-site to the west of the site.

B-3: View of quarry pond and mixed forest in background.

B-4: Access road to south end of quarry showing mixed forest..

B-5: View of west edge of site and off-site road after fire.

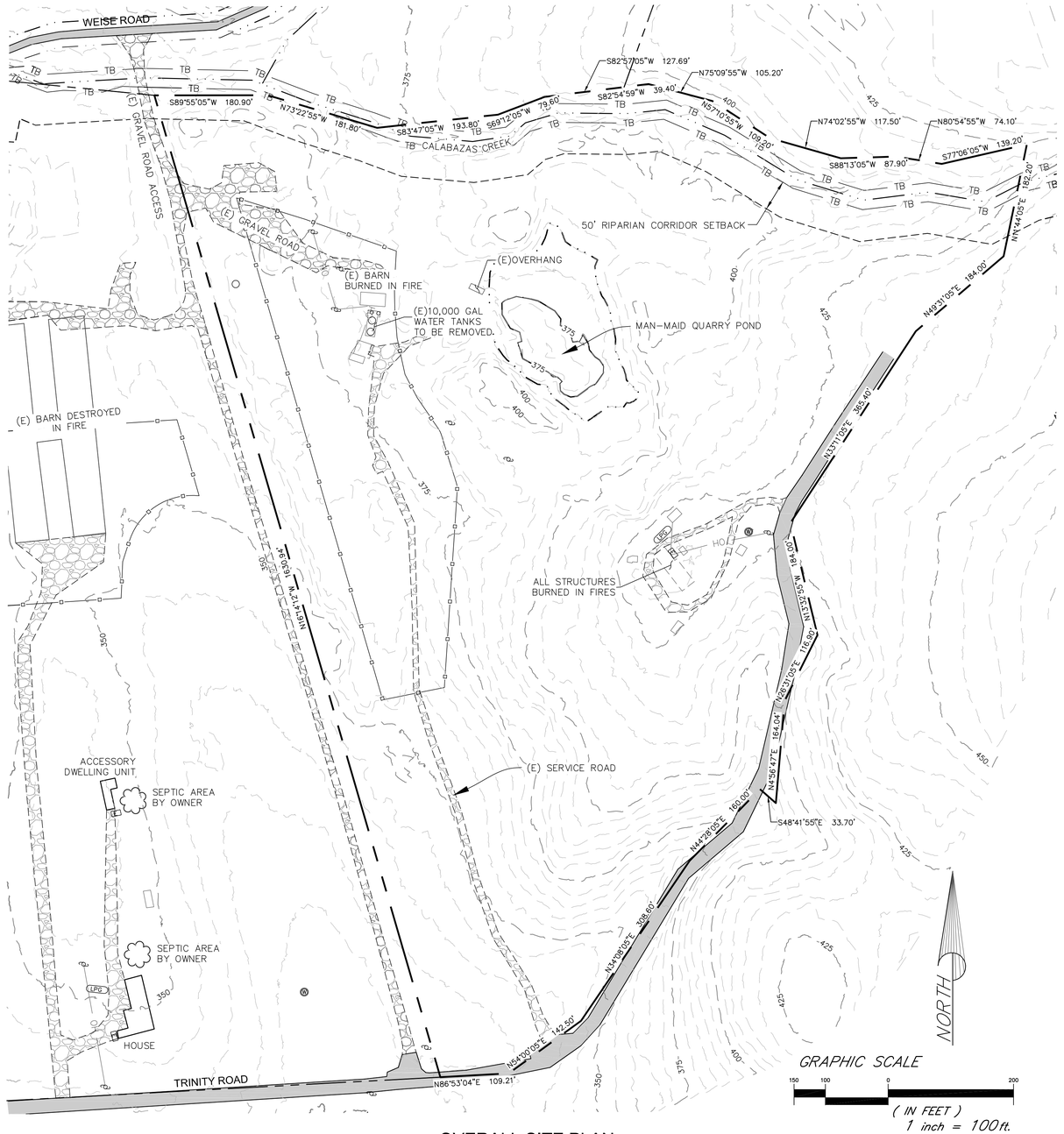
B-6: View of fire cleanup at northwest corner of site.

Quarry Parcel
585 Trinity Road
Glen Ellen, CA
PHOTO PLATE B

TRINITY QUARRY SITE, GRAZING & RECLAMATION PLAN

585 TRINITY ROAD, GLEN ELLEN

APN: 053-110-076



OVERALL SITE PLAN

SCALE: 1"=100'

LEGEND

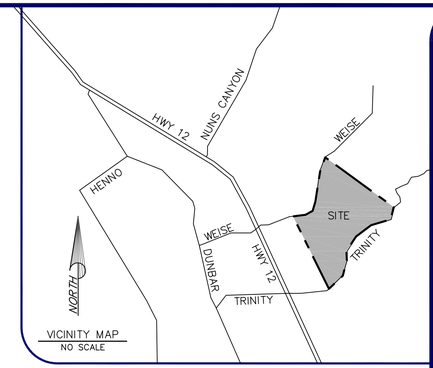
- RECORD BOUNDARY LINE
- RECORD ADJOINING BOUNDARY LINE
- RECORD EASEMENT LINE
- (E) FLOWLINE
- EDGE OF GRAVEL ROAD
- WOOD FENCE
- WIRE FENCE
- TB — TOP OF BANK
- OH — OVERHEAD WIRE
- FIBER ROLL BARRIER
- EXISTING MINOR CONTOUR
- 100 — EXISTING MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 176-100 — PROPOSED MAJOR CONTOUR
- 12" CMP — (P) CULVERT/STORMDRAIN W/SIZE & TYPE
- (E) ASPHALT CONCRETE SURFACE
- (E) CONCRETE SURFACE
- (E) GRAVEL SURFACE

SYMBOLS

- LPG — LIQUID PROPANE GAS TANK
- POWER POLE W/ GUY ANCHOR
- E — ELECTRIC METER
- W — WELL
- FIRE HYDRANT

ABBREVIATIONS

AC	ASPHALT CONCRETE
DI	DRAIN INLET
(E)	EXISTING
EG	EXISTING GRADE
EL	EASEMENT LINE
FG	FINISHED GRADE
FS	FINISHED SURFACE
IG	INVERT GRADE
INV	INVERT
MAX	MAXIMUM
MIN	MINIMUM
NTS	NOT TO SCALE
O/	OVER
(P)	PROPOSED
TBR	TO BE REMOVED
TG	TOP OF GRATE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
USP	UNDER SEPARATE PERMIT
VIF	VERIFY IN FIELD
WL	WATER LEVEL



VICINITY MAP
NO SCALE

PROJECT INFORMATION

PROJECT STATEMENT:
THIS PLAN WAS PREPARED TO FACILITATE THE REVISION AND MODIFICATION TO THE EXISTING QUARRY RECLAMATION PLAN.

PROPERTY OWNERS:
GORDENKER TURKEY FARMS INC
SYLVIA BERNARD
PO BOX 341, GLEN ELLEN CA, 95442
(415) 486-0036

DESIGNER INFORMATION:
HOGAN LAND SERVICES-CIVIL
1702 4TH STREET
SANTA ROSA, CA 95404
(707) 544-2104

TOPOGRAPHIC INFORMATION PROVIDED BY:
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HOGAN LAND SERVICES - 2014 - PRESENT

PROJECT DATUM & BENCHMARK:

1) THIS MAP DOES NOT CONSTITUTE A BOUNDARY SURVEY. BOUNDARY LINES ARE APPROXIMATE AND SHOULD ONLY BE USED FOR THE PLANNING PROCESS

2) HORIZONTAL CONTROL:
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5) THIS PARCEL IS LOCATED WITH IN THE SCENIC RESOURCE AREA

SHEET INDEX

EARTHWORK QUANTITIES TOTAL

(P) EARTHWORK UNDER THIS PERMIT

(P) CUT = 11,530 C.Y.
(P) FILL = 11,500 C.Y.

NET = 30 C.Y. CUT

DISTURBED AREA = 5.27 ACRES

NOTE: APPROXIMATE EARTH QUANTITY PROVIDED FOR PERMIT VALUATION. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING ALL MATERIAL TAKEOFFS.

REGISTERED PROFESSIONAL ENGINEER · KENNETH E. CARR · No. 21184 Exp. 6-30-19 · CIVIL · STATE OF CALIFORNIA

THIS MAP WAS PREPARED BY ME OR UNDER MY DIRECTION AT THE REQUEST OF GORDENKER TURKEY FARMS IN MARCH,2018

KENNETH E. CARR R.C.E. 21184

DRN:	AIS	CHK:	ASR	
PM:	ASR	DATE:	5-25-18	
JOB #:	2584			

HOGAN LAND SERVICES
A CALIFORNIA CORPORATION
1702 4TH STREET
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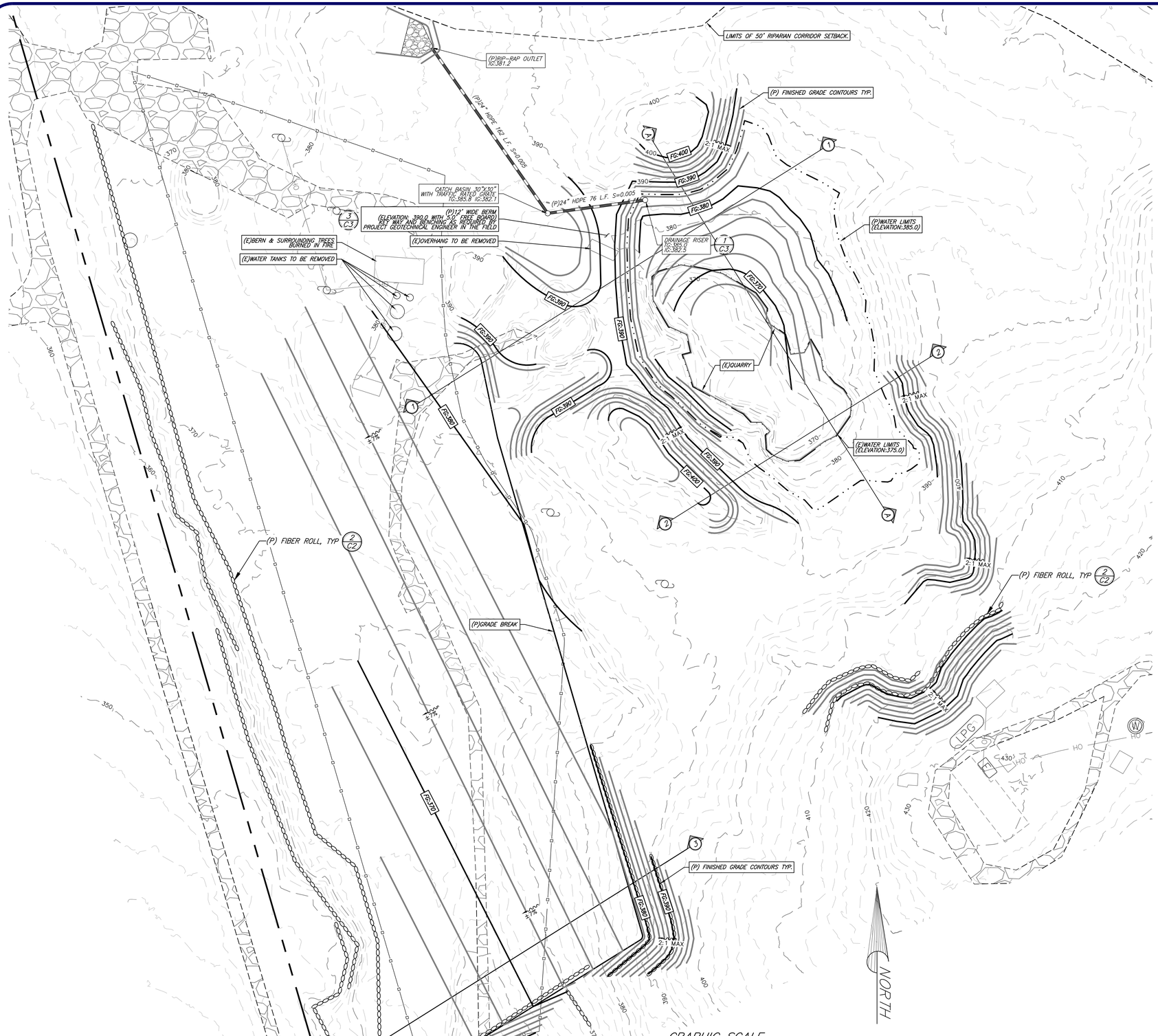
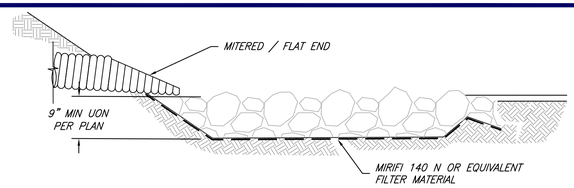
Tel (707) 544-2104
Fax (707) 522-2105
www.hoganls.com

TITLE SHEET/SITE PLAN

TRINITY QUARRY SITE
GRAZING & RECLAMATION PLAN
585 TRINITY ROAD
GLEN ELLEN, CALIFORNIA
APN: 053-110-076

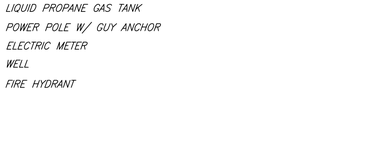




NOTES:
1. "D" = PIPE DIAMETER.
2. "La" = LENGTH OF APRON.
2. APRON SHALL BE SET AT A ZERO GRADE AND ALIGNED STRAIGHT.
3. FILTER MATERIAL SHALL BE MIRIFI 140N OR EQUAL FILTER FABRIC.

1 RIP-RAP OUTLET DETAIL

NTS



2 FIBER ROLL BARRIER

NOTE: INSTALL FIBER ROLL ON CONTOUR.

NTS

LEGEND

- RECORD BOUNDARY LINE
- RECORD ADJOINING BOUNDARY LINE
- RECORD EASEMENT LINE
- (E) FLOWLINE
- EDGE OF GRAVEL ROAD
- WOOD FENCE
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- TB TOP OF BANK
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- EXISTING MINOR CONTOUR
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INV	INVERT
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MIN	MINIMUM
NTS	NOT TO SCALE
O/	OVER
(P)	PROPOSED
TBR	TO BE REMOVED
TG	TOP OF GRATE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
USP	UNDER SEPARATE PERMIT
VIF	VERIFY IN FIELD
WL	WATER LEVEL

REGISTERED PROFESSIONAL ENGINEER · KENNETH E. CARR · No. 21184 Exp. 6-30-19 · CIVIL · STATE OF CALIFORNIA

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DRN:	AIS	CHK:	ASR	
PM:	ASR	DATE:	5-25-18	
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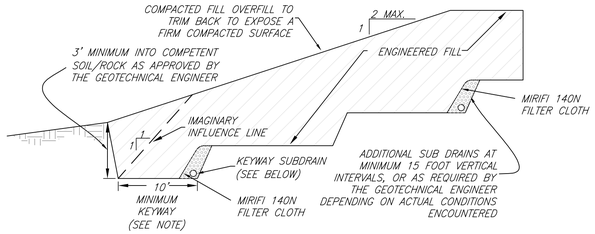
GRADING PLAN/EROSION CONTROL PLAN
TRINITY QUARRY SITE
GRAZING & RECLAMATION PLAN

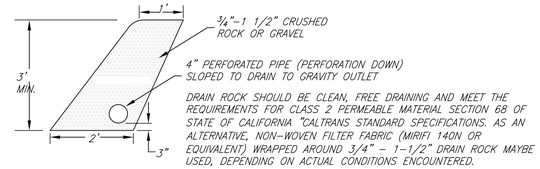
585 TRINITY ROAD
GLEN ELLEN, CALIFORNIA

APN: 053-110-076

NOTES:

1. KEYWAY EXCAVATION AND SUB DRAIN INSTALLATION SHOULD BE OBSERVED BY THE GEOTECHNICAL ENGINEER.
2. WHERE EXISTING SLOPE EXCEEDS 5:1 EXCAVATE SERIES OF BENCHES IN COMPETENT SOIL/ROCK.
3. ALL SUB DRAINS SHOULD HAVE CLEANOUTS AT A MINIMUM OF 400 FOOT INTERVALS AND AT UPSLOPE END. UNLESS OTHERWISE NOTED BY GEOTECH.

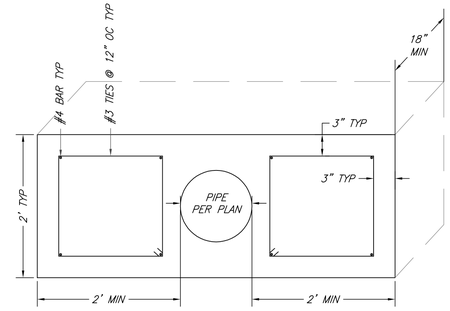




DRAIN ROCK SHOULD BE CLEAN, FREE DRAINING AND MEET THE REQUIREMENTS FOR CLASS 2 PERMEABLE MATERIAL SECTION 68 OF STATE OF CALIFORNIA "CALTRANS STANDARD SPECIFICATIONS. AS AN ALTERNATIVE, NON-WOVEN FILTER FABRIC (MIRIFI 140N OR EQUIVALENT) WRAPPED AROUND 3/4" - 1-1/2" DRAIN ROCK MAYBE USED, DEPENDING ON ACTUAL CONDITIONS ENCOUNTERED.

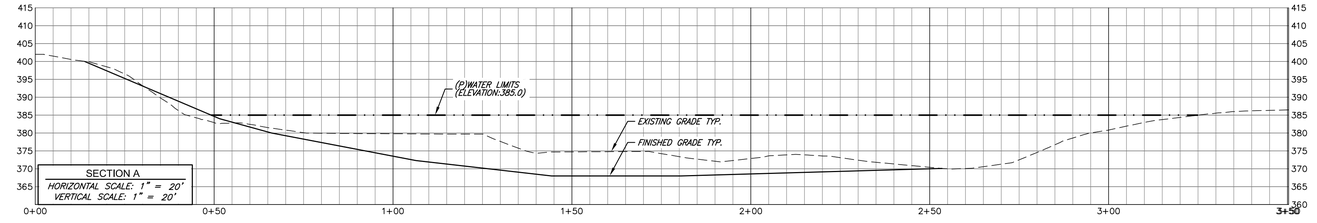
3 KEY-WAY AND BENCHING DETAIL

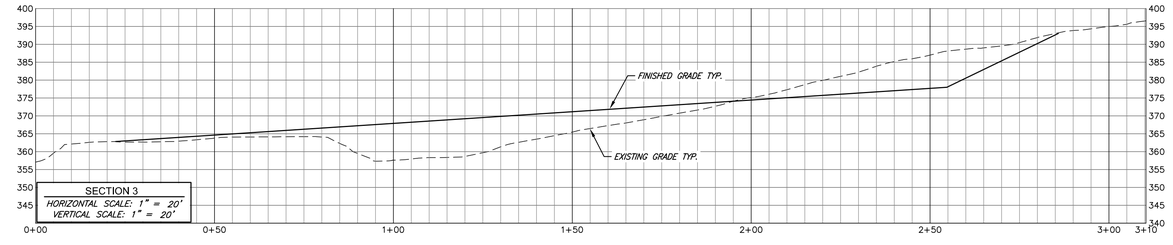
N.T.S

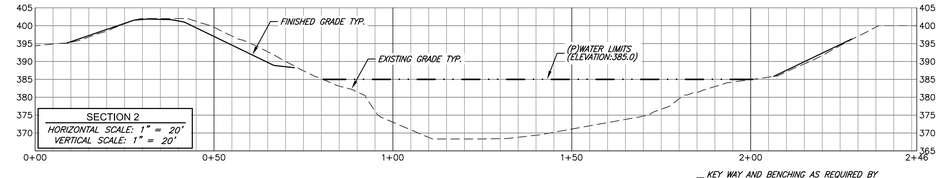


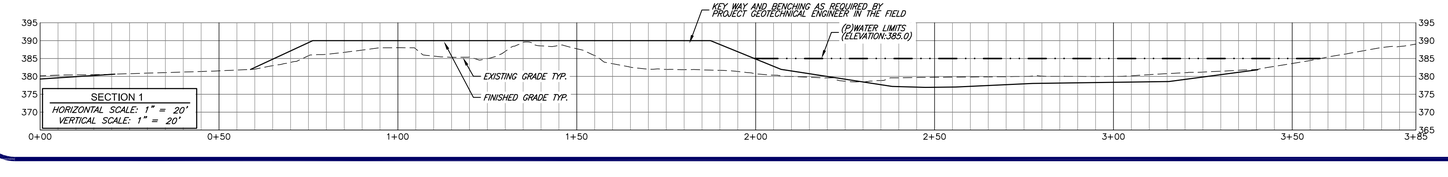
2 PIPE CONCRETE COLLAR

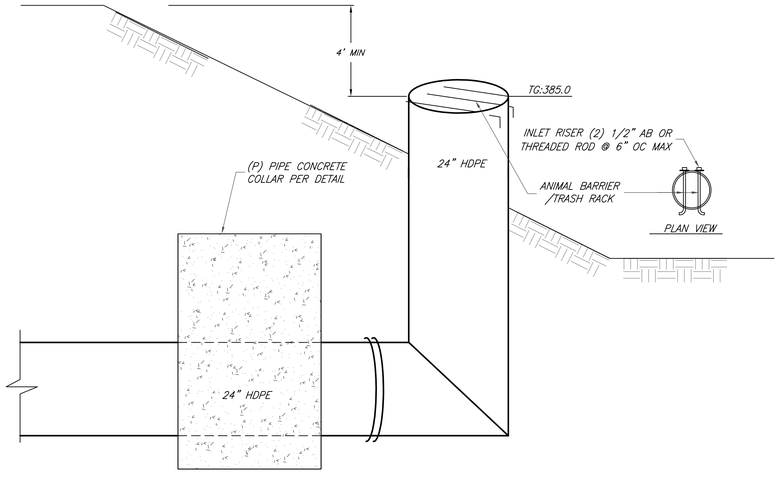
NTS











1 DRAIN RISER DETAIL

NTS

REGISTERED PROFESSIONAL ENGINEER
KENNETH E. CARR
No. 21184
Exp. 6-30-19
CIVIL
STATE OF CALIFORNIA

THIS MAP WAS PREPARED BY ME OR UNDER MY DIRECTION AT THE REQUEST OF GORDENKER TURKEY FARMS IN MARCH,2018

KENNETH E. CARR R.C.E. 21184

DRN:	AIS	CHK:	ASR	PM: ASR
DATE:	5-25-18	JOB #:	2584	

HOGAN LAND SERVICES
A CALIFORNIA CORPORATION
1702 4TH STREET
SANTA ROSA, CA 95404
Tel (707) 544-2104
Fax (707) 522-2105
www.hoganls.com

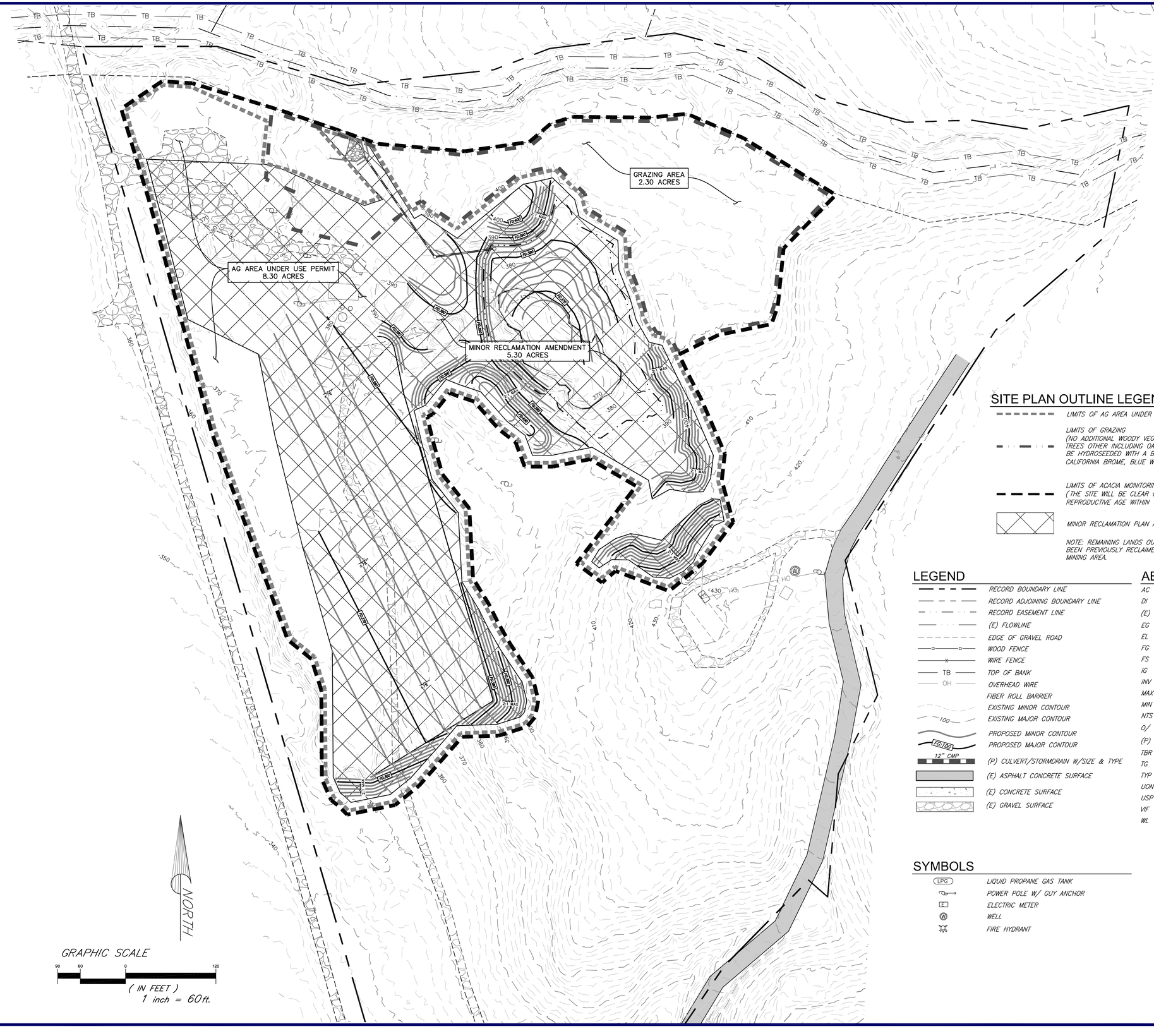
CROSS SECTIONS/DETAILS

TRINITY QUARRY SITE

GRAZING & RECLAMATION PLAN

585 TRINITY ROAD
GLEN ELLEN, CALIFORNIA

APN: 053-110-076



SITE PLAN OUTLINE LEGEND

- LIMITS OF AG AREA UNDER USE PERMIT
- LIMITS OF GRAZING (NO ADDITIONAL WOODY VEGETATION WILL BE PLANTED. ALL MATURE TREES OTHER INCLUDING OAKS AND CONIFERS WILL BE LEFT. AREAS TO BE HYDROSEEDED WITH A BLEND OF SEED SUCH AS YARROW, CALIFORNIA BROME, BLUE WILD RYE, DEER WEED AND PINE BLUE GRASS)
- LIMITS OF ACACIA MONITORING (THE SITE WILL BE CLEAR OF ALL MATURE ACACIA OF REPRODUCTIVE AGE WITHIN THESE LIMITS)
- MINOR RECLAMATION PLAN AMENDMENT

NOTE: REMAINING LANDS OUTSIDE OF ACACIA MONITORING AREA HAVE BEEN PREVIOUSLY RECLAIMED OR WERE NOT PREVIOUSLY APART OF MINING AREA.

LEGEND

	RECORD BOUNDARY LINE
	RECORD ADJOINING BOUNDARY LINE
	RECORD EASEMENT LINE
	(E) FLOWLINE
	EDGE OF GRAVEL ROAD
	WOOD FENCE
	WIRE FENCE
TB	TOP OF BANK
OH	OVERHEAD WIRE
	FIBER ROLL BARRIER
	EXISTING MINOR CONTOUR
100	EXISTING MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
FG-100	PROPOSED MAJOR CONTOUR
12" CMP	(P) CULVERT/STORMDRAIN W/SIZE & TYPE
	(E) ASPHALT CONCRETE SURFACE
	(E) CONCRETE SURFACE
	(E) GRAVEL SURFACE

ABBREVIATIONS

AC	ASPHALT CONCRETE
DI	DRAIN INLET
(E)	EXISTING
EG	EXISTING GRADE
EL	EASEMENT LINE
FG	FINISHED GRADE
FS	FINISHED SURFACE
IG	INVERT GRADE
INV	INVERT
MAX	MAXIMUM
MIN	MINIMUM
NTS	NOT TO SCALE
O/	OVER
(P)	PROPOSED
TBR	TO BE REMOVED
TG	TOP OF GRATE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
USP	UNDER SEPARATE PERMIT
VIF	VERIFY IN FIELD
WL	WATER LEVEL

SYMBOLS

LPG	LIQUID PROPANE GAS TANK
	POWER POLE W/ GUY ANCHOR
E	ELECTRIC METER
W	WELL
	FIRE HYDRANT

REGISTERED PROFESSIONAL ENGINEER · KENNETH E. CARR · No. 21184 Exp. 6-30-19 · CIVIL · STATE OF CALIFORNIA

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KENNETH E. CARR R.C.E. 21184

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PROJECT LIMITS SITE PLAN

TRINITY QUARRY SITE
GRAZING & RECLAMATION PLAN

585 TRINITY ROAD
GLEN ELLEN, CALIFORNIA

APN: 053-110-076

HOGAN LAND SERVICES
A CALIFORNIA CORPORATION

Drainage Calculations – Q_{100} Sizing
Quarry Reclamation Plan

Prepared May 30, 2018
Revised October 29, 2018

Site:
585 Trinity Road
Glen Ellen, California
APN: 053-110-076
HLS Project # 2584

Analysis Prepared by:
Hogan Land Services, Inc.
1702 4th Street
Santa Rosa, CA 95404
Jim Conklin, EIT
jconklin@hoganls.com
707-544-2104

DESIGN CRITERIA & ASSUMPTIONS:

This evaluation is based on the policies and procedures detailed in Flood Control Design Criteria, Revised August 1983, issued by the Sonoma County Water Agency. The hydraulic design of the individual drainage improvements is based on the rational formula (Q = C i A K) and is based on the 100-year, 15-minute initial time of concentration storm. A mean annual precipitation of 30 was used resulting in a K factor of 1.0. Rational Formula calculations for the 100-year storm are included based on the composite runoff coefficients for each tributary for sizing of the individual drainage improvements. The calculation spreadsheets are attached with this submittal.

METHODS:

For all watersheds, design discharge shall be determined by the use of the rational formula: Q = C I A K

In which:

Q = design discharge, cubic feet per second

C = runoff coefficient

I = intensity of rainfall, inches per hour

A = tributary watershed area, acres

K = K factor

Time of concentration shall be based on an initial time of 7 minutes for commercial or similar areas, 10 minutes for lots smaller than ½ and 15 minutes for lots of ½ acre and larger.

Storm Frequency	10	Precipitation	30												
Post-Development - Tributary 1						**Time of Concentration**		**Intensity**	**K-Factor**	**Runnoff Coefficient**		**Total Area**			**Flow**
Tributary	Point of Conc	Area (ac.)	Avg. Slope %	Length	Velocity fps	Travel Time (sec.)	Total Time	I	K	C_comp	ΔA	A	KΔAC	∑KΔAC	Q (cfs)
1A	POC 1A	0.53				INITIAL	15	1.72	1.00	0.50	0.53	0.53	0.26	0.26	0.46
1B	POC 1	7.40	10	240	0.79	304.4	20.1	1.47	1.00	0.50	7.40	7.93	3.70	3.96	5.84 Total Flow CFS

Storm Frequency	100	Precipitation	30												
Post-Development - Tributary 1						**Time of Concentration**		**Intensity**	**K-Factor**	**Runnoff Coefficient**		**Total Area**			**Flow**
Tributary	Point of Conc	Area (ac.)	Avg. Slope %	Length	Velocity fps	Travel Time (sec.)	Total Time	I	K	C_comp	ΔA	A	KΔAC	∑KΔAC	Q (cfs)
1A	POC 1A	0.53				INITIAL	15	2.41	1.00	0.50	0.53	0.53	0.26	0.26	0.64
1B	POC 1	7.40	10	240	0.79	304.4	20.1	2.07	1.00	0.50	7.40	7.93	3.70	3.96	8.19 Total Flow CFS

Weir Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Oct 29 2018

(P) 24 INCH STAND PIPE - POC 1

Rectangular Weir

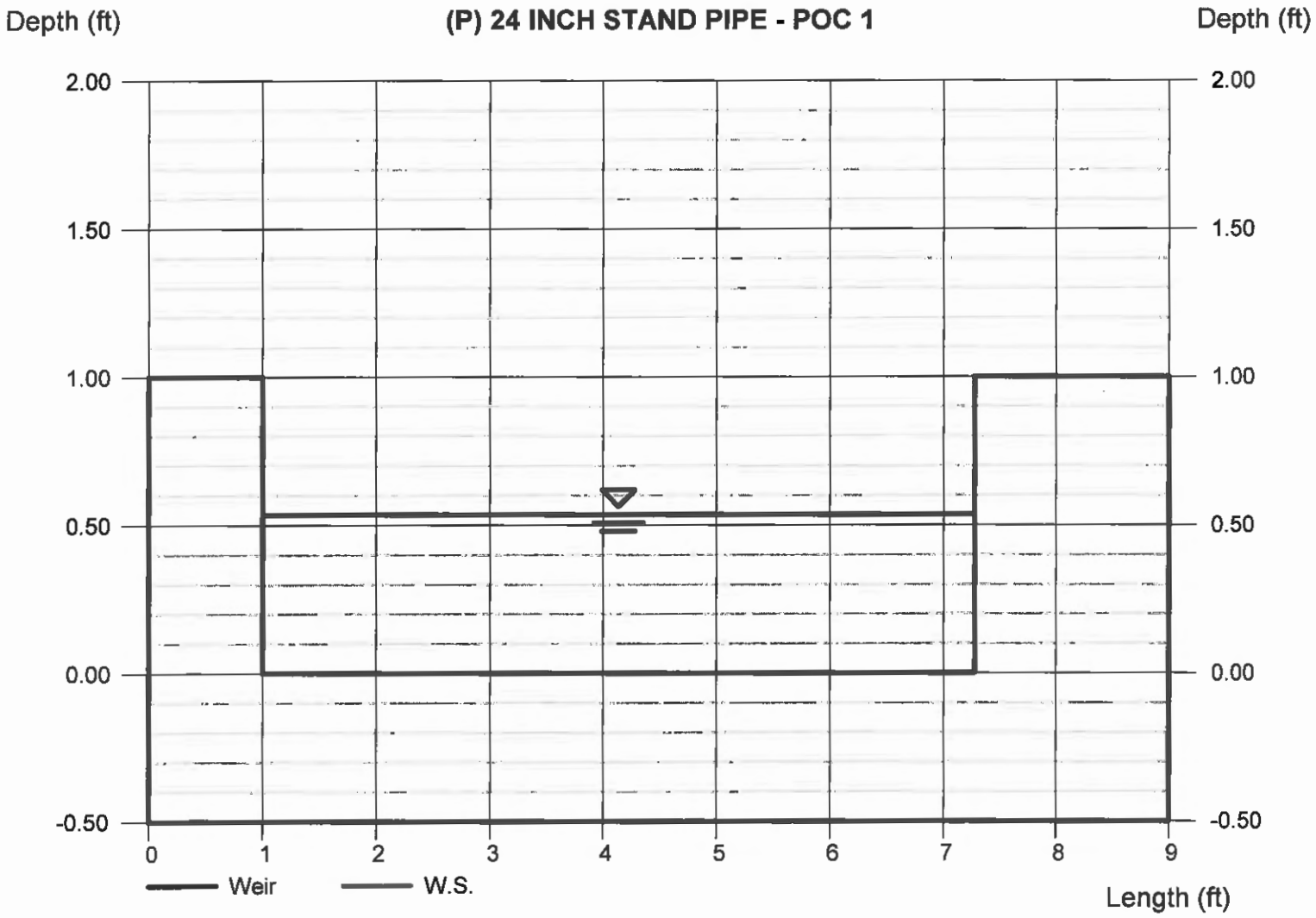
Crest	= Sharp
Bottom Length (ft)	= 6.28
Total Depth (ft)	= 1.00

Calculations

Weir Coeff. Cw	= 3.33
Compute by:	Known Q
Known Q (cfs)	= 8.19

Highlighted

Depth (ft)	= 0.54
Q (cfs)	= 8.190
Area (sqft)	= 3.36
Velocity (ft/s)	= 2.44
Top Width (ft)	= 6.28



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Monday, Oct 29 2018

(P) 24 INCH HDPE - POC 1

Circular

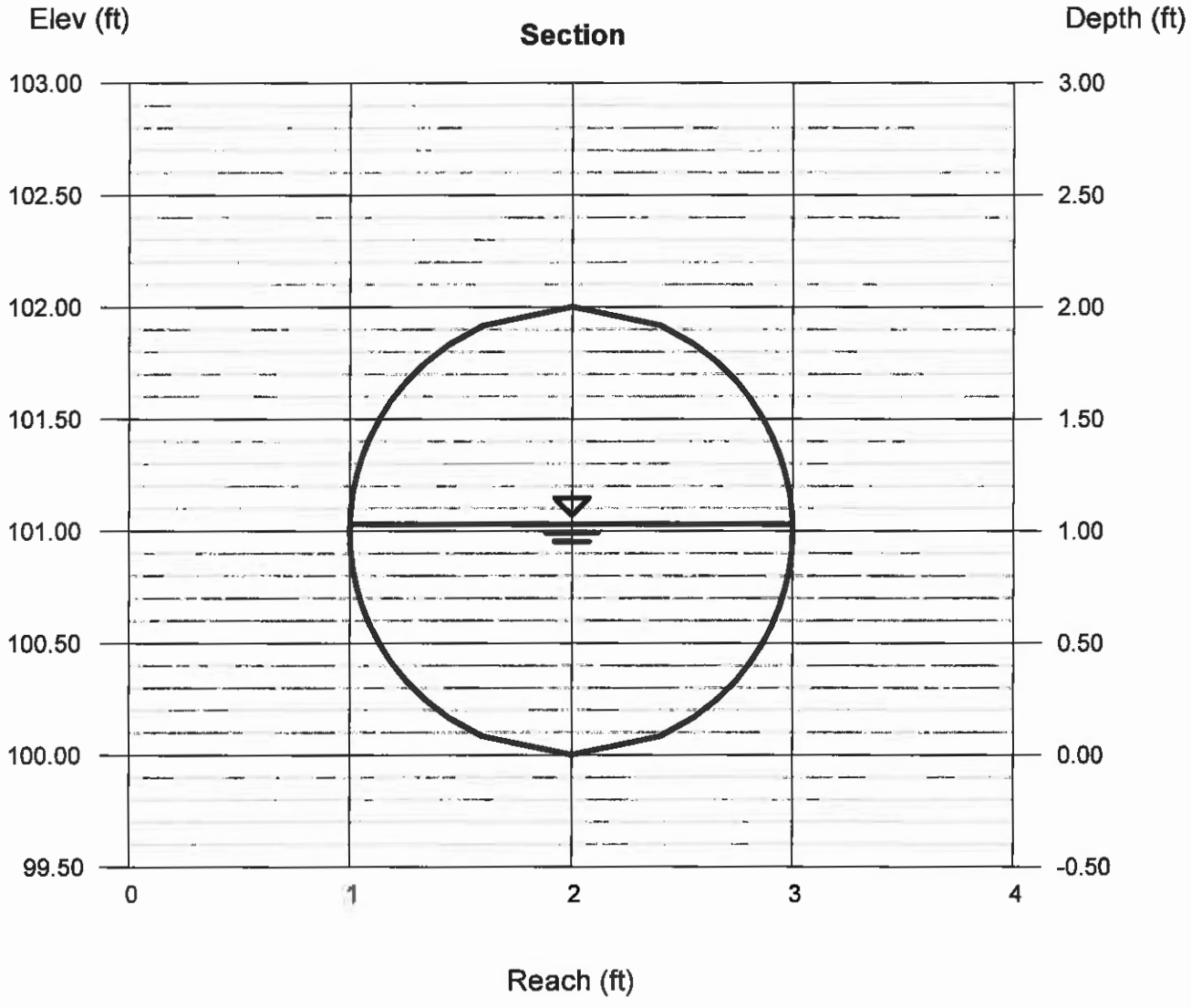
Diameter (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 0.40
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.19

Highlighted

Depth (ft)	= 1.03
Q (cfs)	= 8.190
Area (sqft)	= 1.64
Velocity (ft/s)	= 5.00
Wetted Perim (ft)	= 3.21
Crit Depth, Yc (ft)	= 1.02
Top Width (ft)	= 2.00
EGL (ft)	= 1.42



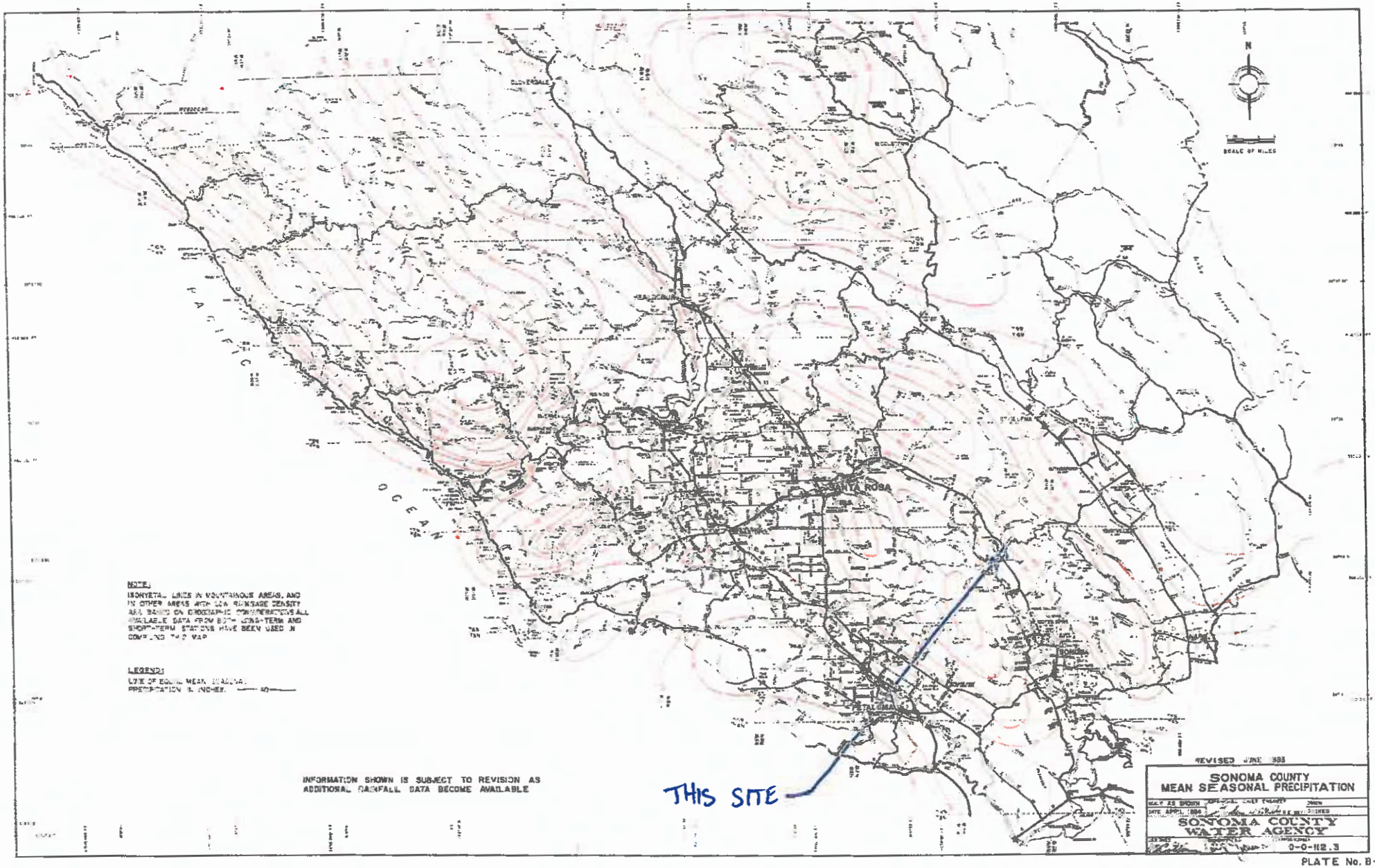

N
SCALE OF MILES
PACIFIC
OCEAN
SANTA ROSA
NOTE:
LEGEND:
INFORMATION SHOWN IS SUBJECT TO REVISION AS ADDITIONAL RAINFALL DATA BECOME AVAILABLE
THIS SITE
REVISED JUNE 1993
SONOMA COUNTY
MEAN SEASONAL PRECIPITATION
SONOMA COUNTY
WATER AGENCY

PLATE No. B-3

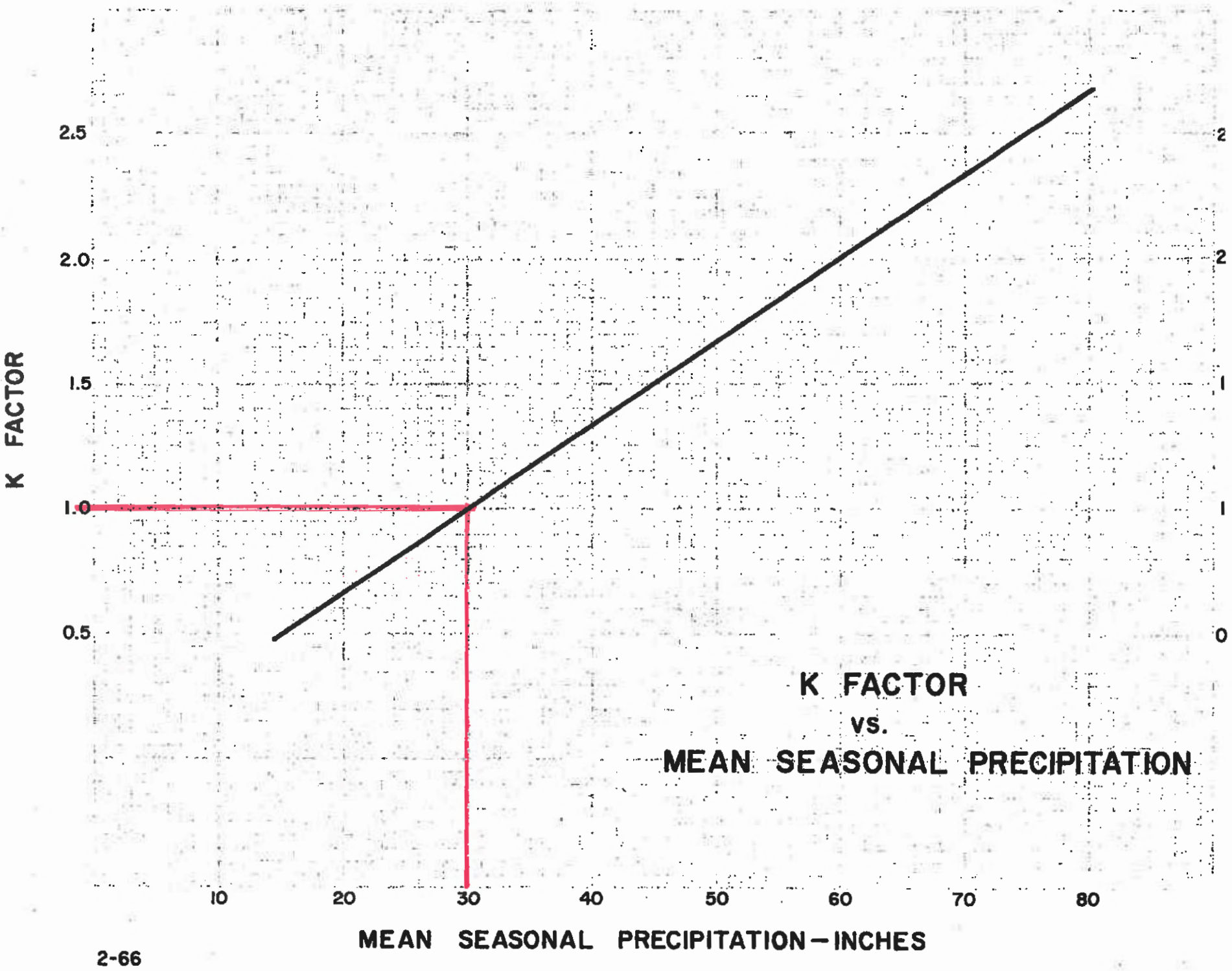


PLATE No. B-4

2-66

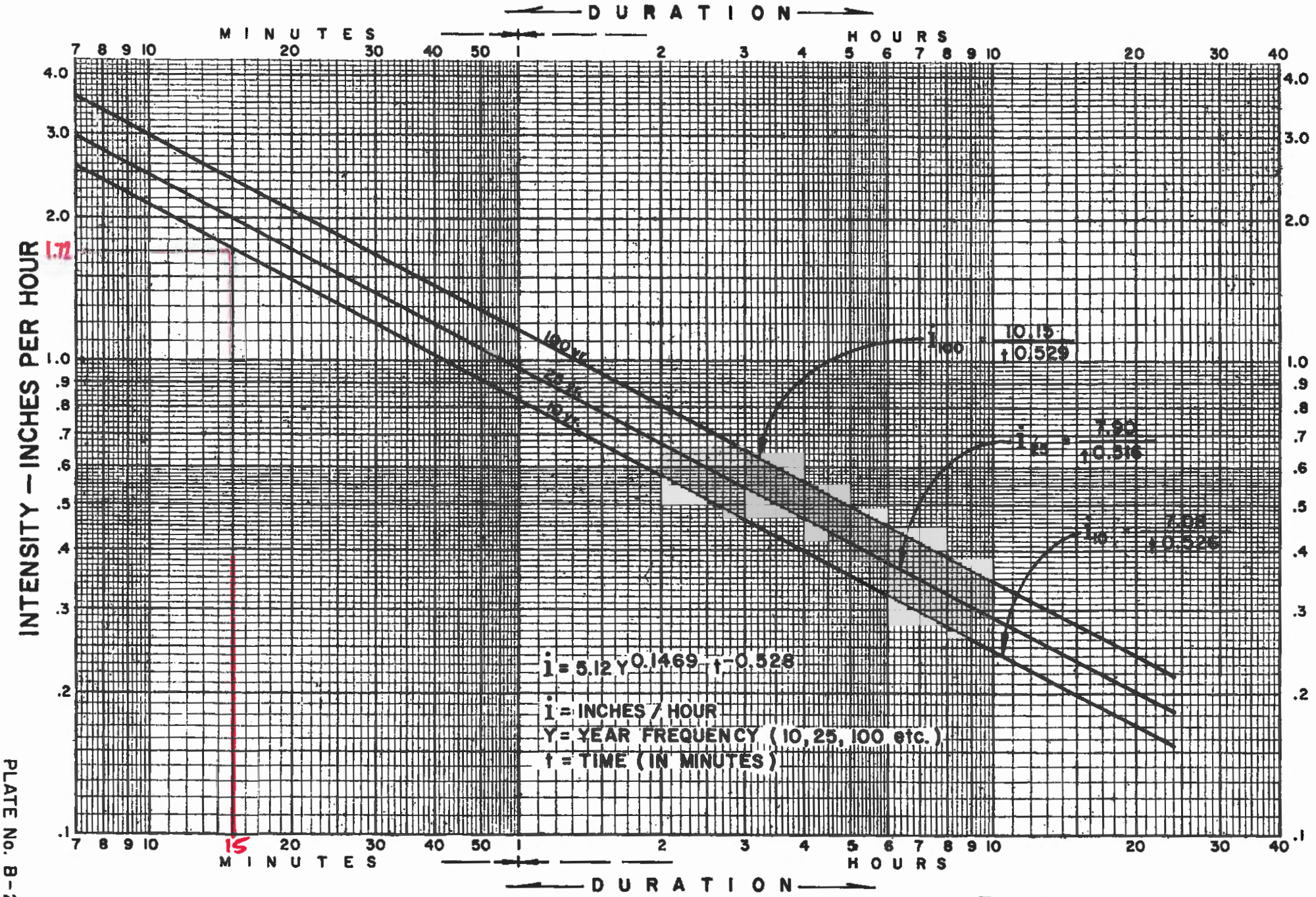
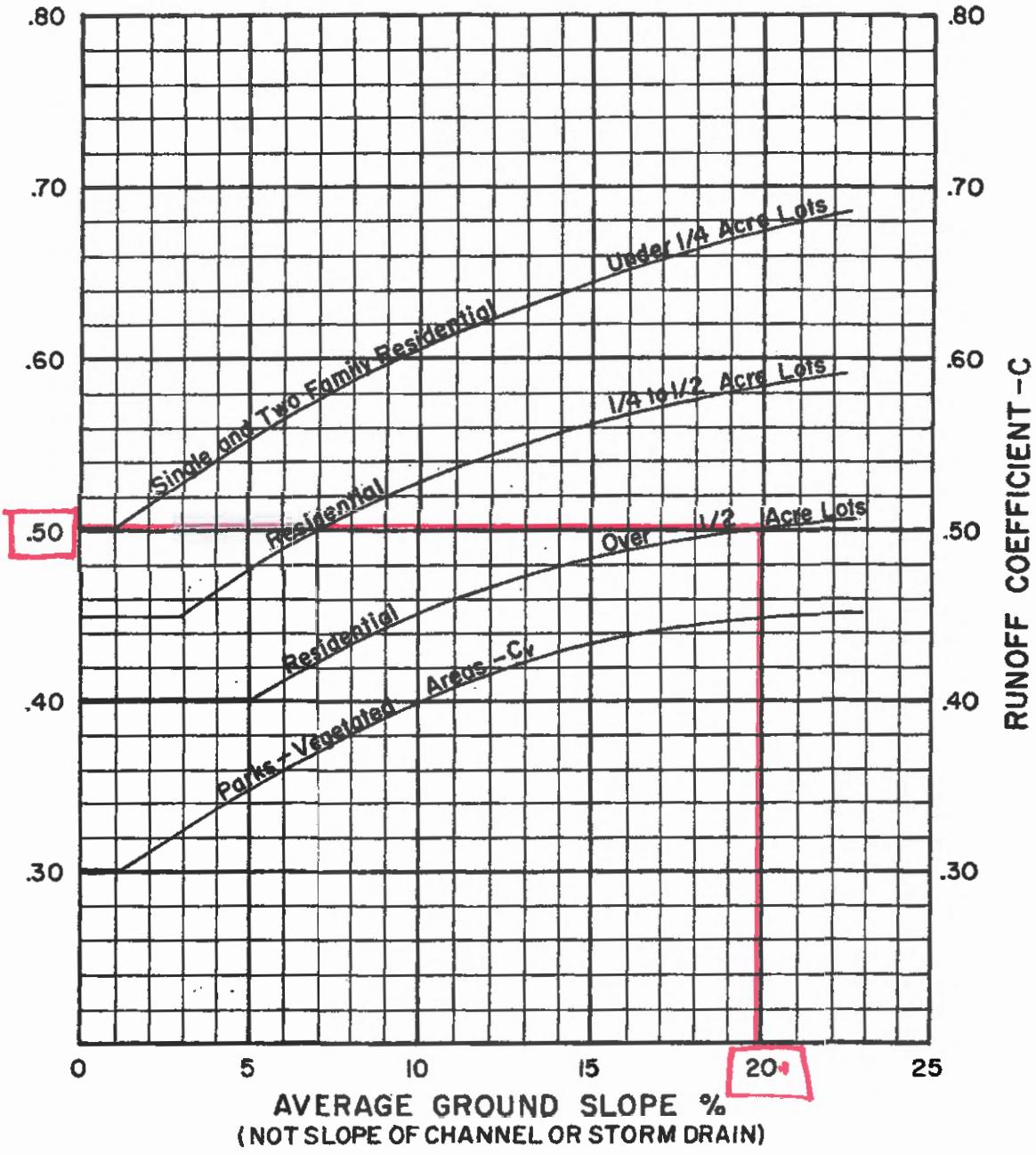


PLATE No. B-2

NOTE: THE INFORMATION SHOWN IS SUBJECT TO ANNUAL REVISION AS ADDITIONAL RAINFALL DATA BECOMES AVAILABLE

RAINFALL INTENSITY vs DURATION

RUNOFF COEFFICIENTS FOR RATIONAL FORMULA



NOTE: Commercial, Industrial & Multiple Residential Areas

C_p = 0.9 (Based on paving, roofs, etc.)

When vegetated area exceeds 20% of total, C_v from vegetated curve may be used to reduce above C_p as follows:

$$C_T = C_v \frac{A_v}{A_T} + C_p \frac{A_p}{A_T}$$

SONOMA COUNTY WATER AGENCY

118-2
7/84

PLATE No. B-1

RECLAMATION PLAN

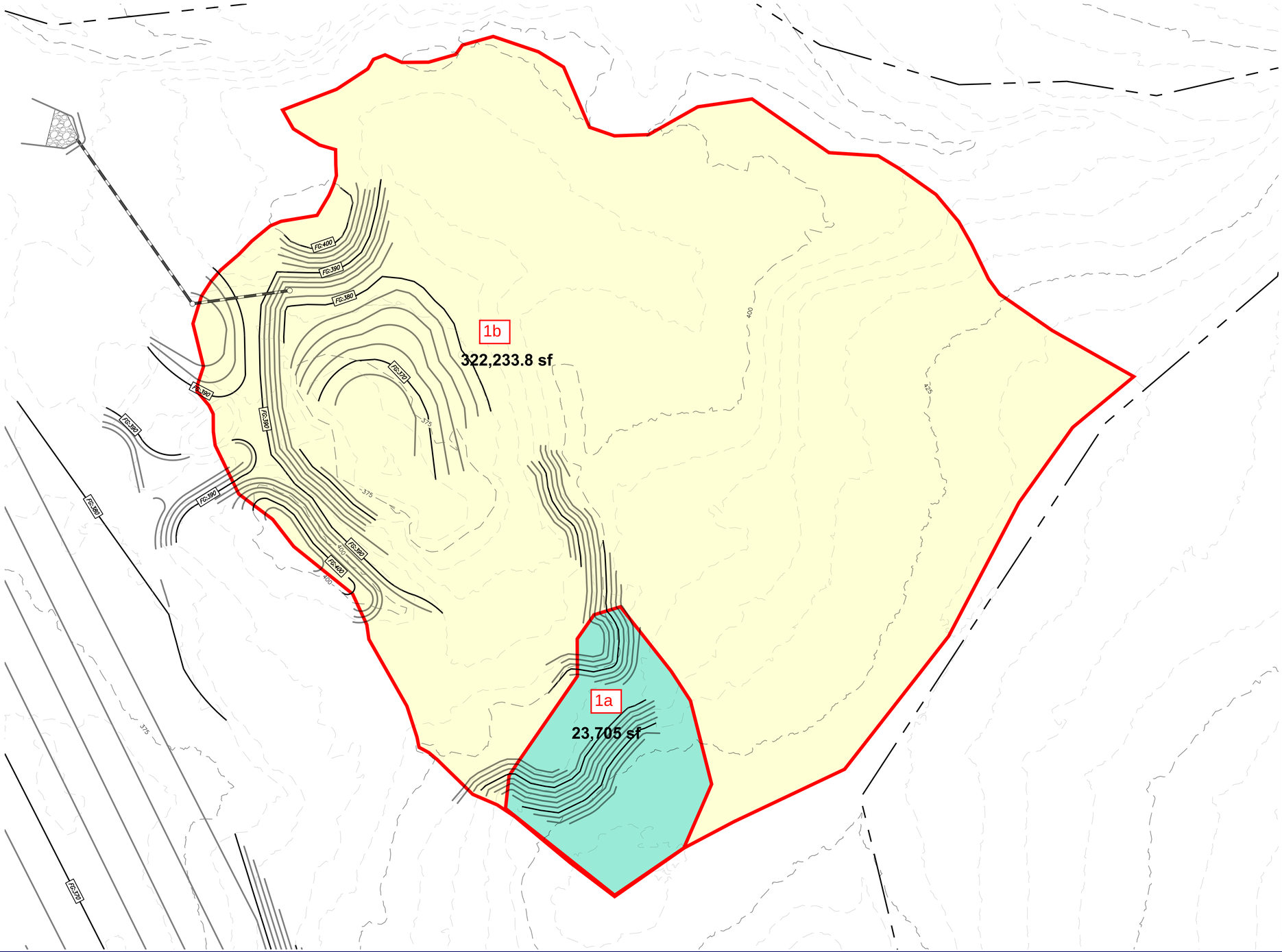
HYDROLOGY MAP-10 YEAR STORM EVENT

585 TRINITY ROAD, GLEN ELLEN

APN: 053-110-076

LEGEND

- RECORD BOUNDARY LINE
- (E) FLOWLINE
- (P) FLOWLINE
- EDGE OF GRAVEL ROAD
- LIMITS OF TRIBUTARY
- DSL — DRAINAGE SETBACK LINE
- EXISTING MINOR CONTOUR
- 100 — EXISTING MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- FG-100 — PROPOSED MAJOR CONTOUR
- 12" CMP — (E) CULVERT/STORMDRAIN W/SIZE & TYPE
- 12" CMP — (P) CULVERT/STORMDRAIN W/SIZE & TYPE
- (E) ASPHALT CONCRETE SURFACE
- (P) ASPHALT CONCRETE SURFACE
- (E) GRAVEL SURFACE
- (P) GRAVEL SURFACE
- (E) CONCRETE SURFACE
- (P) CONCRETE SURFACE
- 100 YEAR OVERLAND RELEASE ROUTE



REGISTERED PROFESSIONAL ENGINEER KENNETH E. CARR No. 21184 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

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KENNETH E. CARR R.C.E. 21184

DRN:	JC
CHK:	DB3
PM:	ASR
DATE:	10/29/18
JOB #:	2584

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1702 4TH STREET
SANTA ROSA, CA 95404

RECLAMATION PLAN
HYDROLOGY MAP-10 YEAR STORM
585 TRINITY ROAD
GLEN ELLEN, CALIFORNIA
APN:053-110-076

H1 OF 1