ONSITE WASTEWATER DISPOSAL FEASIBILITY STUDY

FOR THE

HARCROSS WINERY

LOCATED AT:
6402 Dry Creek Road
Napa, CA 94558
Napa County APN 027-530-006

PREPARED FOR:
Basin Enan
1765 Poppy Avenue
Menlo Park, CA 94025

PREPARED BY:

APPLIED CIVIL ENGINEERING INCORPORATED

2160 Jefferson Street, Suite 230
Napa, CA 94559
Telephone: (707) 320-4968
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Job Number: 19-140

Michael R. Muelrath

Michael R. Muelrath R.C.E. 67435 — 4/14/2023 Date

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INTRODUCTION

Basil Enan is applying for a Use Permit to construct and operate a new winery at the property located at 6402 Dry Creek Road in Napa County, California. The subject property is also known as Napa County Assessor's Parcel Number 027-530-006.

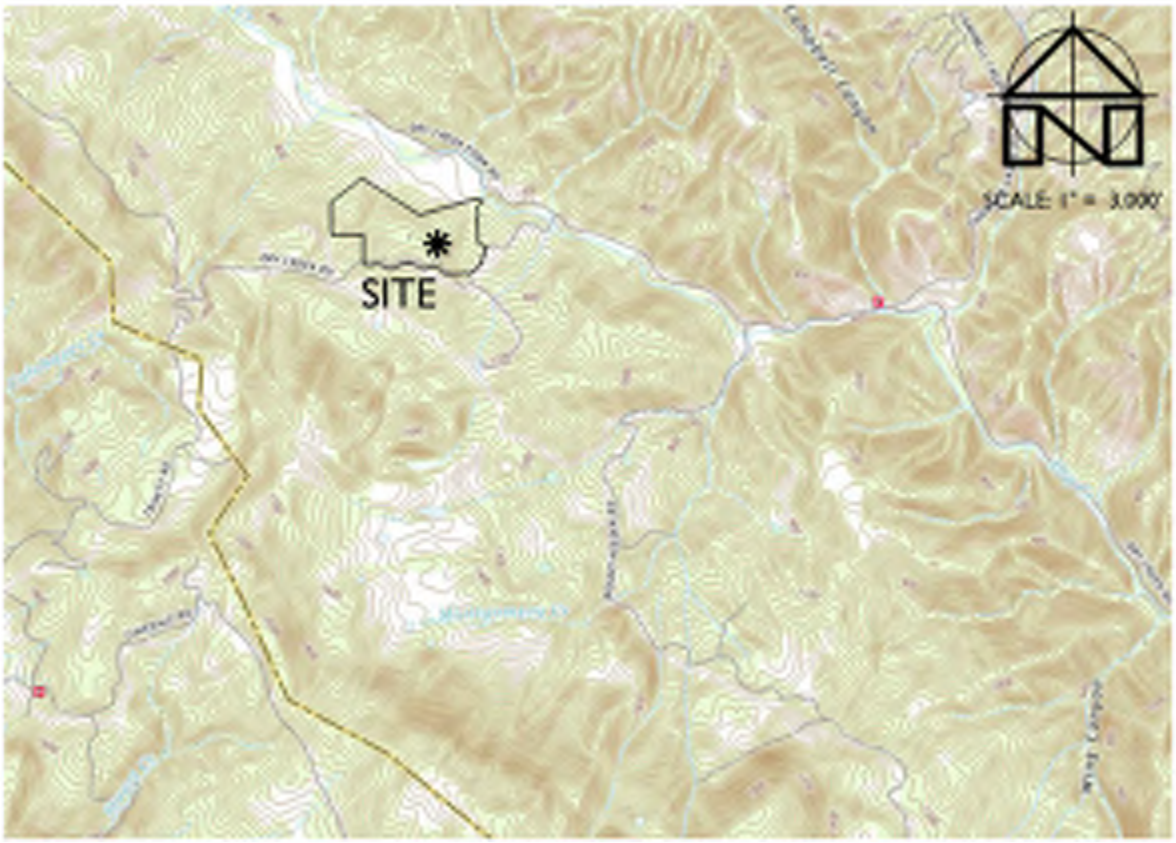


Figure 1: Location Map

The Use Permit application under consideration proposes the construction and operation of a new winery with the following characteristics:

- Wine Production:
  - 5,000 gallons of wine per year
  - Crushing, fermenting, aging and bottling

- Employees:
  - 4 full-time
  - 1 part-time

- Marketing Plan:
  - Daily Tours and Tastings by Appointment
    - 14 visitors per day maximum
  - Marketing Events Type #1

        - 10 per year
        - 24 guests maximum
        - Food prepared offsite by catering company or in onsite kitchen
    - Marketing Events Type #2
        - 1 per year
        - 50 guests maximum
        - Portable toilets used for restrooms

Existing development on the property includes a single family residence, a second single family residence that is under construction, two wells, a water storage tank and the related access and utility infrastructure typical of this type of residential and agricultural development. Water for the winery will be provided by a well located on the subject property. Please see the Harcross Winery Use Permit Conceptual Site Plans for approximate locations of existing and proposed features.

Basil Enan has requested that Applied Civil Engineering Incorporated (ACE) evaluate the feasibility of disposing of the winery process wastewater as well as the domestic sanitary wastewater that will be generated by the proposed winery via a new onsite wastewater disposal system. The remainder of this report describes the onsite soil conditions, the predicted winery process and sanitary wastewater flows and outlines conceptual designs for options to onsite wastewater treatment and disposal.

SOILS INFORMATION

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County shows the following soils types mapped on the parcel:

Felton gravelly loam, 30 to 50 percent slopes

Forward silt loam, 5 to 39 percent slopes

Perkins gravelly loam, 1 to 10 percent slopes

Sobrante loam, 5 to 30 percent slopes

A site-specific soils analysis was conducted during a site evaluation performed by Applied Civil Engineering on October 10, 2019 (E19-00560). The site evaluation consisted of the excavation and observation of seventeen test pits in the central portion of the property. The test pits generally revealed variable soil conditions consisting of clay and clay loam textures.

Please refer to the Site Evaluation Report in Appendix 4 for additional details regarding soil conditions.

PREDICTED WASTEWATER FLOW

The onsite wastewater disposal system(s) must be designed for the peak winery process wastewater flow and the peak sanitary wastewater flow from the proposed winery.

Winery Process Wastewater

We have used the generally accepted standard that six gallons of winery process wastewater are generated for each gallon of wine that is produced each year and that 1.5 gallons of wastewater are generated during the crush period for each gallon of wine that is produced. Based on the size of the winery and our understanding that both red and white wines will be produced we have assumed a 15 to 30 day crush period. Using these assumptions, the average and peak winery process wastewater flows are calculated as follows:

$$\text{Annual Winery Process Wastewater Flow} = \frac{5{,}000 \text{ gallons wine}}{\text{year}} \times \frac{6 \text{ gallons wastewater}}{1 \text{ gallon wine}}$$

Annual Winery Process Wastewater Flow = 30,000 gallons per year

$$\text{Average Daily Winery Process Wastewater Flow} = \frac{30{,}000 \text{ gallons}}{\text{year}} \times \frac{1 \text{ year}}{365 \text{ days}}$$

Average Daily Winery Process Wastewater Flow = 82 gallons per day (gpd)

$$\text{Peak Winery Process Wastewater Flow} = \frac{5{,}000 \text{ gallons wine}}{\text{year}} \times \frac{1.5 \text{ gallons wastewater}}{1 \text{ gallon wine}} \times \frac{1 \text{ year}}{15 \text{ crush days}}$$

Peak Winery Process Wastewater Flow = 500 gpd

Winery Sanitary Wastewater

The peak sanitary wastewater flow from the winery is calculated based on the number of winery employees, the number of daily visitors for tours and tastings and the number of guests attending private marketing events. In accordance with Table 4 of Napa County's "Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems" we have used a design flow rate of 15 gallons per day per employee and 3 gallons per day per visitor for tours and tastings. Table 4 does not specifically address design wastewater flows for guests at marketing events. For marketing events that will have catered meals that are prepared offsite we have conservatively estimated 5 gallons of wastewater per guest and for marketing events that will have meals prepared onsite we have assumed 15 gallons per guest, similar to a restaurant. Based on these assumptions, the peak winery sanitary wastewater flows are calculated as follows:

<u>Employees</u>

Peak Sanitary Wastewater Flow = 5 employees X 15 gpd per employee

Peak Sanitary Wastewater Flow = 75 gpd

<u>Daily Tours and Tastings</u>

Peak Sanitary Wastewater Flow = 14 visitors per day X 3 gallons per visitor

Peak Sanitary Wastewater Flow = 42 gpd

Marketing Events Type #1 with Meals Prepared Onsite:

Peak Sanitary Wastewater Flow = 24 guests X 15 gallons per guest

Peak Sanitary Wastewater Flow = 360 gpd

Marketing Events Type #2 with Catered Meals Prepared Offsite:

Peak Sanitary Wastewater Flow = 50 guests X 5 gallons per guest

Peak Sanitary Wastewater Flow = 250 gpd

Total Peak Winery Sanitary Wastewater Flow

Assuming that daily tours and tastings and a maximum of one marketing event may occur on the same day the worst case total peak winery sanitary wastewater flow is based on employees, daily tours and tastings and a marketing event for 24 people with a meal prepared onsite and is calculated as follows:

Total Peak Winery Sanitary Wastewater Flow = 75 gpd + 42 gpd + 360 gpd

Total Peak Winery Sanitary Wastewater Flow = 477 gpd

Combined Peak Winery Wastewater Flow

The combined peak winery wastewater flow is equal to the sum of the winery process wastewater peak flow plus the total peak winery sanitary wastewater flow and is calculated as follows:

Combined Peak Winery Wastewater Flow=500 gpd + 477 gpd

Combined Peak Winery Wastewater Flow= 977 gpd

RECOMMENDATIONS

Based on the anticipated wastewater flows, the proposed site layout and the onsite soil conditions it is our opinion that wastewater disposal can be accommodated onsite.

Sanitary Wastewater Subsurface Drip Disposal Field and Process Wastewater Treatment for Irrigation

In this scenario the sanitary wastewater would be disposed of in a subsurface drip type septic system and the winery process wastewater would be collected separately, pretreated, stored and dispersed of via a surface irrigation system.

Sanitary Wastewater Treatment and Disposal

Required Disposal Field Area

The required disposal field area is calculated as follows:

$$\text{Required Disposal Field Area} = \frac{\text{Peak Flow}}{\text{Soil Application Rate}}$$

$$\text{Require Disposal Field Area} = \frac{477 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

Required Disposal Field Area = 795 square feet, use 800 square feet

Available Disposal Field Area

There is enough area to install the required 800 square feet of subsurface drip disposal field in the vicinity of Test Pits #11 & #13.

Reserve Area

The required reserve area is calculated as follows:

$$\text{Required Reserve Area} = 200\% \times \frac{\text{Peak Flow}}{\text{Soil Application Rate}}$$

$$\text{Require Reserve Field Area} = 200\% \times \frac{477 \text{ gpd}}{0.6 \text{ gpd per square foot}}$$

Required Reserve Area = 1,600 square feet

There is enough area to accommodate the required 1,600 square feet of reserve area in the vicinity of Test Pits #11 & #13.

Pretreatment and Septic Tank Capacity

Sanitary wastewater will need to be pretreated prior to delivery to the dispersal field to meet <30 mg/l BOD and <30 mg/l TSS requirements. The design of the pretreatment system will be selected in the building permit stage.

Process Wastewater Treatment

Based on the winery's planned production level we recommend that treatment be achieved through the use of a package plant type system or other treatment system designed to accept winery process wastewater that is capable of meeting the following general treatment requirements:

Parameter	Pre-treatment*	Post Treatment
pH	3 to 10	6 to 9
BOD_5	500 to 12,000 mg/l	<160 mg/l
TSS	40 to 800 mg/l	<80 mg/l
SS	25 to 100 mg/l	<1 mg/l

* Reference California Regional Water Quality Control Board Central Coast Region General Waste Discharge Requirements Order No. R3-2008-0018 for winery process wastewater characteristics

Process Wastewater Disposal

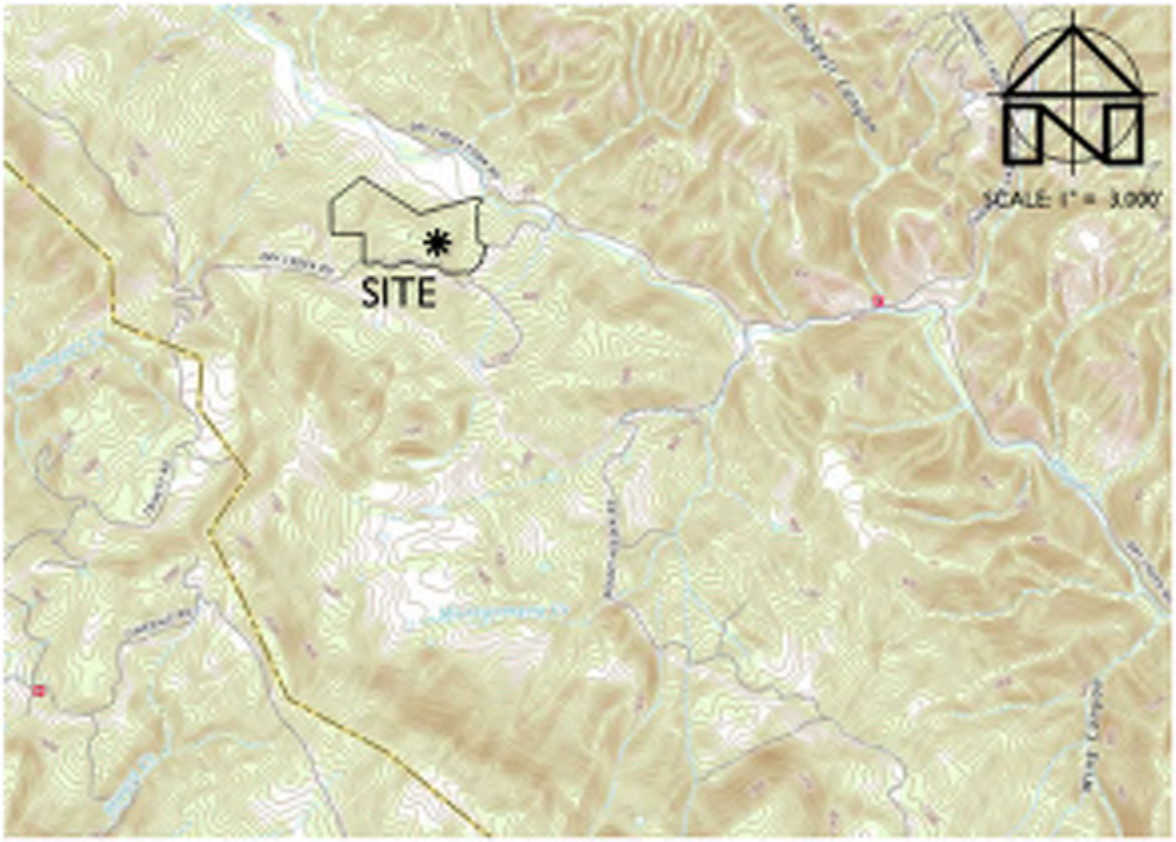
We have identified assumed that up to two acres of proposed vineyard that will be developed in conjunction with the winery will be used to dispose of the treated winery process wastewater via irrigation. This area could be expanded if desired by the Applicant as long as the land dispersal area is outside of all well, stream and other setbacks. We have conservatively assumed that the irrigation area will be limited to the two-acre dispersal area. All application of treated winery process wastewater must comply with the requirements of the Napa County Winery Process Wastewater Guidelines for Surface Drip Irrigation and State Water Resourced Control Board Statewide General Waste Discharge Requirements for Wineries.

In order to accommodate differences in the timing of wastewater generation, irrigation demand and prohibitions on applying water to the land during rainy periods a storage tank will be required. We have prepared a water balance calculation to size a tank that will temporarily store wastewater generated at the winery before it is applied to the land application area. The water balance calculation assumes a monthly wastewater generation rate and a monthly land application schedule based on our past experience with projects of this type. The water balance calculations show that the water generated by winery production operations in most months can be effectively managed after treatment by applying it to the identified area without the needs for extensive storage. However, we recommend a minimum storage tank capacity of 10,000 gallons to provide operational flexibility in timing of land applications (see Appendix 3).

CONCLUSION

It is our opinion that the wastewater from the proposed winery can be accommodated as previously described. Full design calculations and construction plans for the wastewater systems must be prepared in accordance with Napa County and State Water Resources Control Board standards at the time of building permit application.

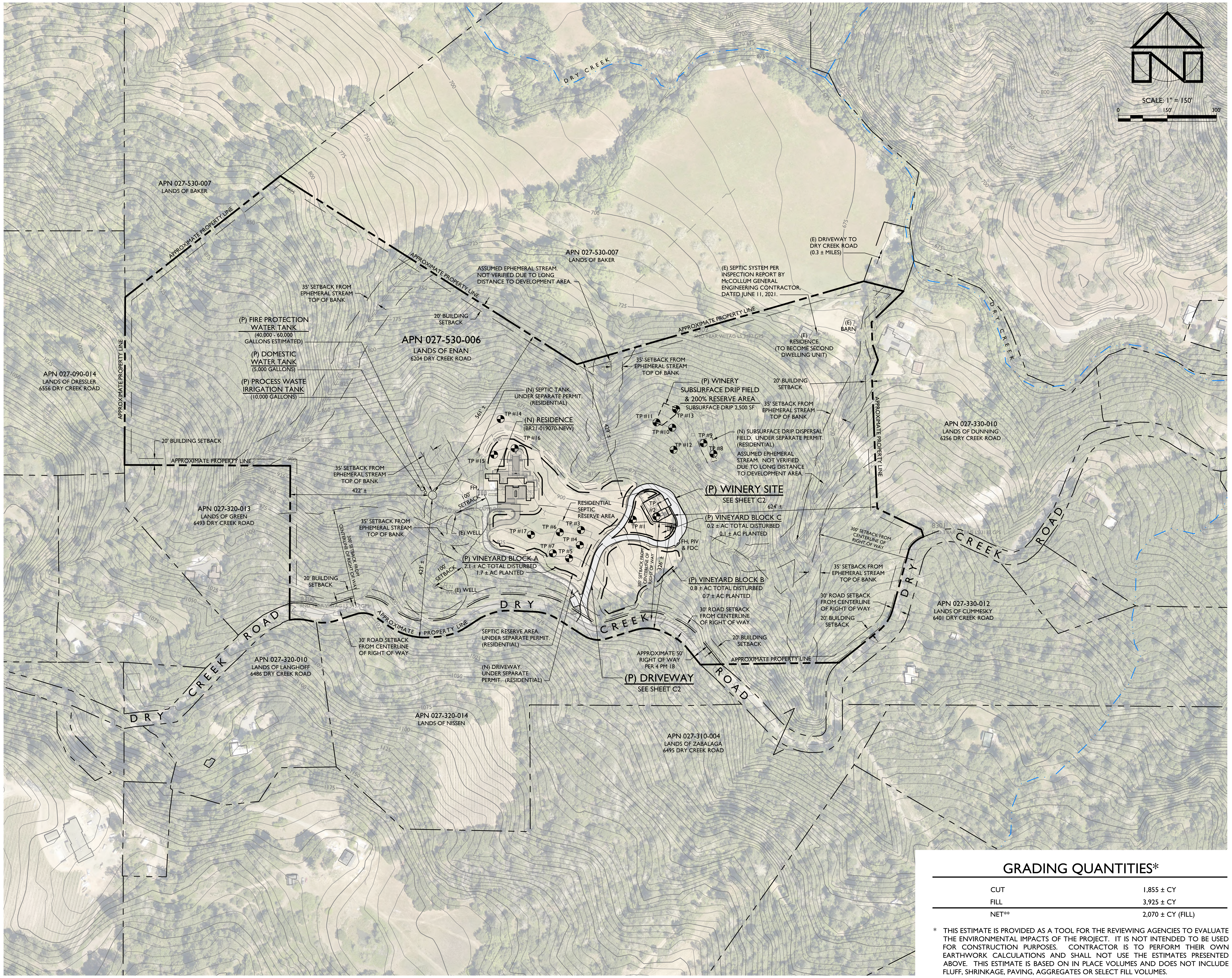
APPENDIX 1: Site Topography Map


SITE
SCALE: 1" = 3,000'

APPENDIX 2: Harcross Winery Use Permit
Conceptual Site Plans

HARCROSS WINERY

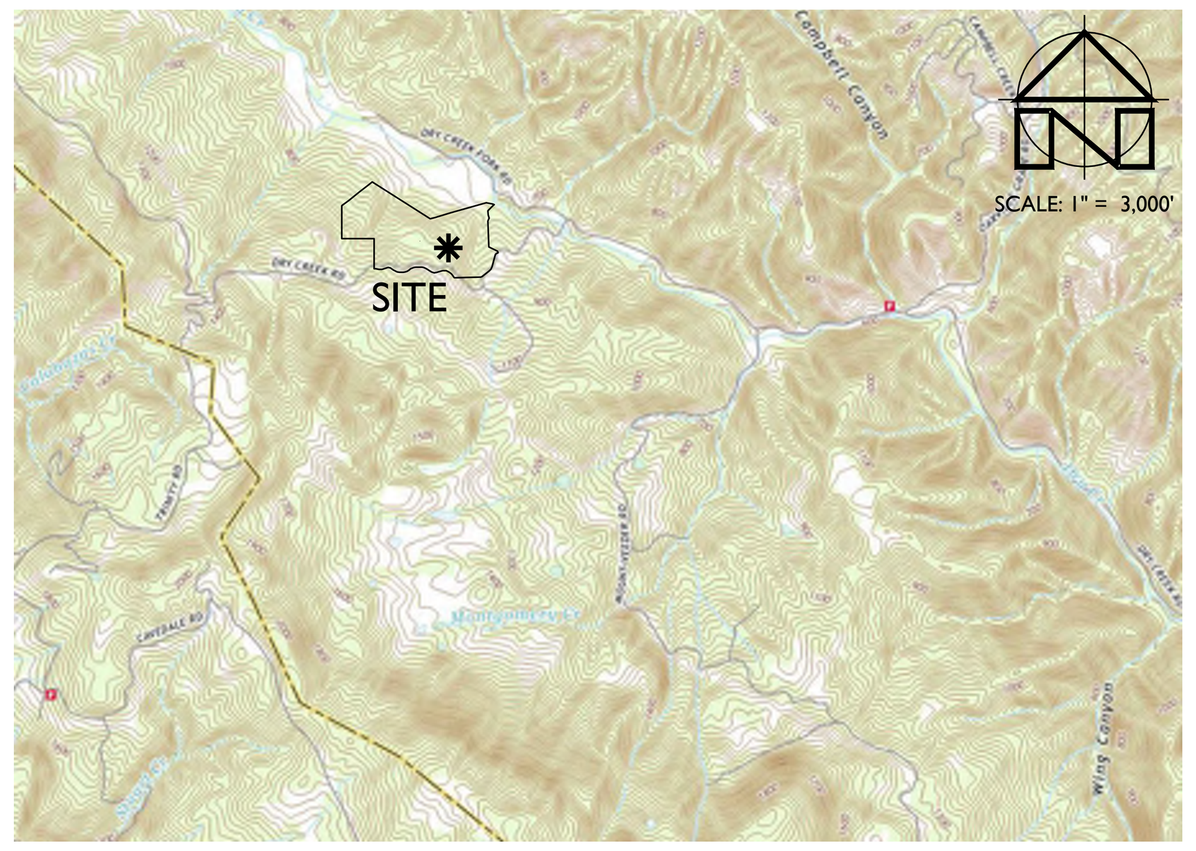
WINERY USE PERMIT CONCEPTUAL SITE PLANS



GRADING QUANTITIES*	
CUT	1,855 ± CY
FILL	3,925 ± CY
NET**	2,070 ± CY (FILL)

* THIS ESTIMATE IS PROVIDED AS A TOOL FOR THE REVIEWING AGENCIES TO EVALUATE THE ENVIRONMENTAL IMPACTS OF THE PROJECT. IT IS NOT INTENDED TO BE USED FOR CONSTRUCTION PURPOSES. CONTRACTOR IS TO PERFORM THEIR OWN EARTHWORK CALCULATIONS AND SHALL NOT USE THE ESTIMATES PRESENTED ABOVE. THIS ESTIMATE IS BASED ON IN PLACE VOLUMES AND DOES NOT INCLUDE FLUFF, SHRINKAGE, PAVING, AGGREGATES OR SELECT FILL VOLUMES.

OVERALL SITE PLAN
SCALE: 1" = 150'



LOCATION MAP
SCALE: 1" = 3,000'

PROJECT INFORMATION:

PROPERTY OWNER & APPLICANT:
BASIL AND ROBIN ENAN
1765 POPPY AVENUE
MENLO PARK, CA 94025

SITE ADDRESS:
6402 DRY CREEK ROAD
NAPA, CA 94558

ASSESSOR'S PARCEL NUMBER:
027-530-006

PARCEL SIZE:
51 ± ACRES

PROJECT SIZE:
1.0 ± ACRES (WINERY SITE)
3.0 ± ACRES (VINEYARD)

ZONING:
AGRICULTURAL WATERSHED (AW)

DOMESTIC WATER SOURCE:
PRIVATE WELL

FIRE PROTECTION WATER SOURCE:
STORAGE TANK

WASTEWATER DISPOSAL:
ONSITE TREATMENT AND DISPERSAL

SHEET INDEX:

PURPOSE STATEMENT:

THE PURPOSE OF THIS PROJECT IS TO SHOW THE CONCEPTUAL DESIGN OF THE SITE IMPROVEMENTS PROPOSED AS PART OF THE WINERY USE PERMIT APPLICATION.

FLOOD HAZARD NOTE:

ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 06055C0390E, EFFECTIVE SEPTEMBER 26, 2008, THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.

NOTES:

1. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION ON SHEET C1 WAS TAKEN FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATABASE. TOPOGRAPHIC INFORMATION ON OTHER SHEETS WAS TAKEN FROM THE "MAP OF TOPOGRAPHY OF A PORTION OF THE LANDS OF ENAN" PREPARED BY ALBION SURVEYS, INC., DATED JANUARY 30, 2020, UPDATED MARCH 22, 2022. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.
2. AERIAL PHOTOGRAPHS ARE NADIR IMAGES CAPTURED BY PICTOMETRY INTERNATIONAL DATED JULY 15, 2021 AND MAY NOT REPRESENT CURRENT CONDITIONS.
3. CONTOUR INTERVAL:
   SHEET C1: FIVE (5) FEET, HIGHLIGHTED EVERY TWENTY FIVE (25) FEET.
   OTHER SHEETS: ONE (1) FOOT, HIGHLIGHTED EVERY FIVE (5) FEET.
4. VERTICAL DATUM: NAVD 88
5. THE PROPERTY LINES SHOWN ON THESE PLANS DO NOT REPRESENT A BOUNDARY SURVEY. THEY ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

TEST PIT NOTE:

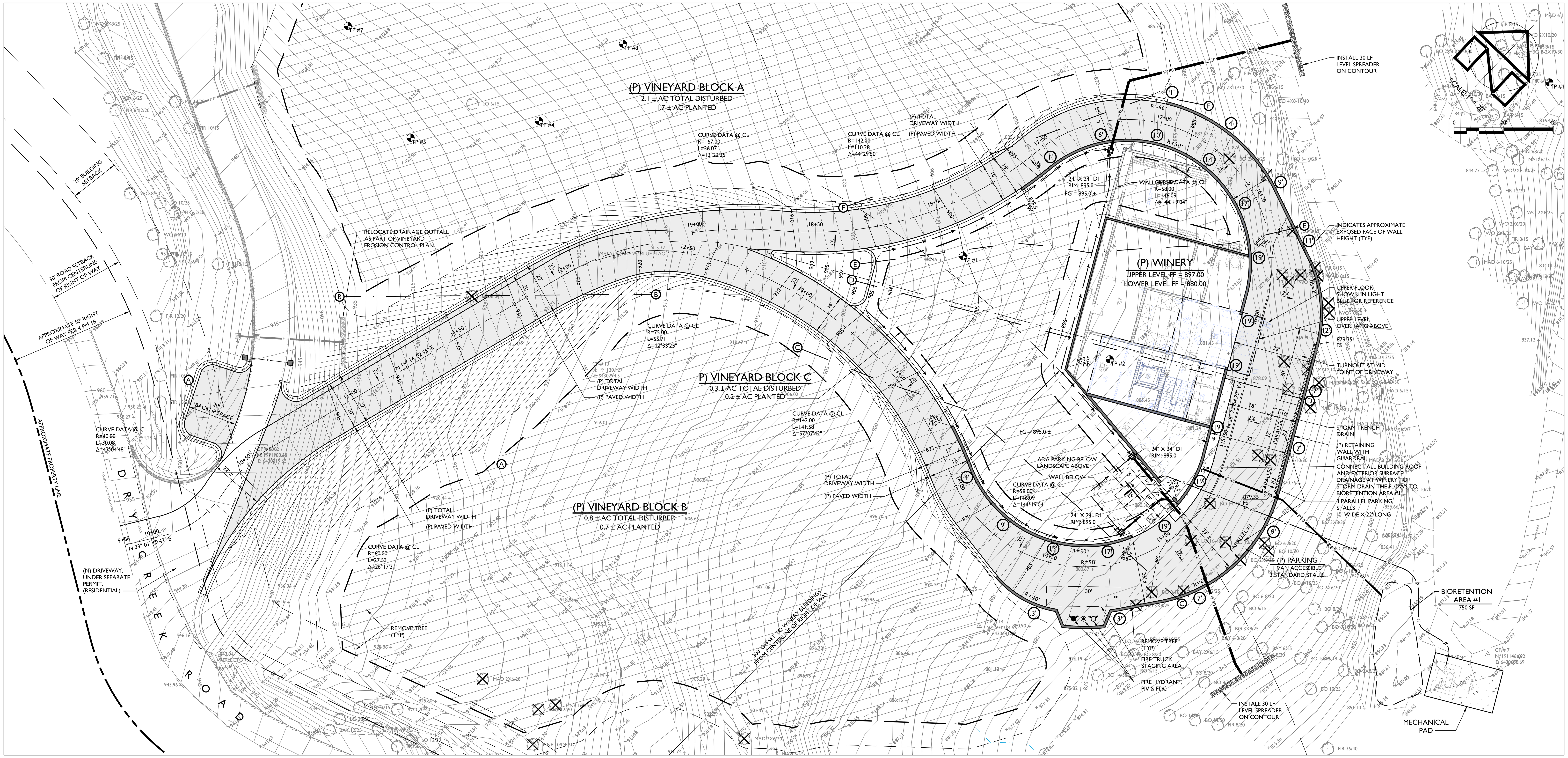
TEST PITS ONE THROUGH SEVENTEEN (TP #1 - TP #17 WERE EXCAVATED BY THE OWNER AND WERE WITNESSED BY MIKE MUELRATH OF APPLIED CIVIL ENGINEERING INCORPORATED AND THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION ON OCTOBER 10, 2019.

APPLIED CIVIL ENGINEERING INCORPORATED
2160 Jefferson Street, Suite 230
Napa, CA 94559
(707) 320-4968 | www.appliedcivil.com

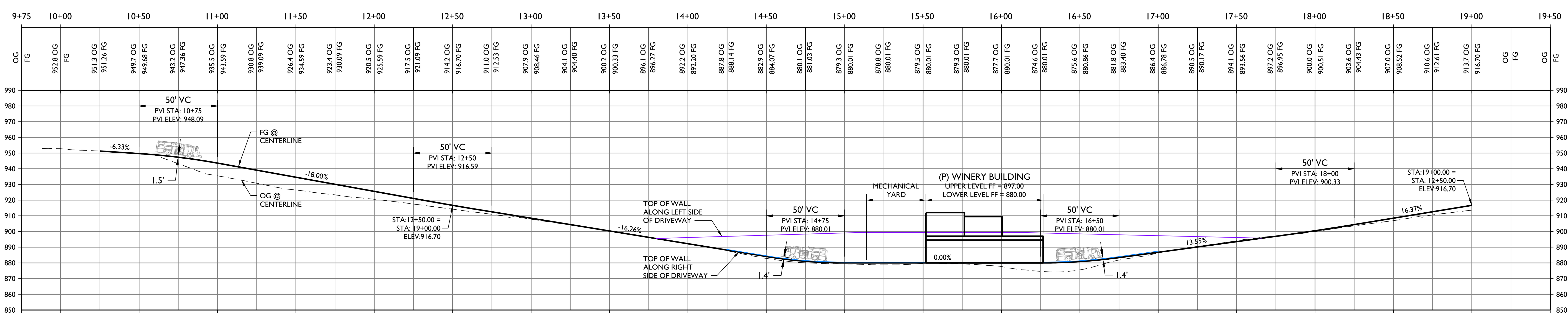
HARCROSS WINERY
WINERY USE PERMIT CONCEPTUAL SITE PLANS
OVERALL SITE PLAN

PREPARED UNDER THE DIRECTION OF:
REGISTERED PROFESSIONAL ENGINEER MICHAEL R. MUELRATH NO. 67415 Exp. 12/31/2024 4/14/2023 CIVIL STATE OF CALIFORNIA
FOR USE PERMIT REVIEW NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC
CHECKED BY: MRM
DATE: APRIL 14, 2023
REVISIONS: BY:
4/14/2023 PERMIT SUBMITTAL YMS
JOB NUMBER: 19-140
FILE: 19-140CONC-HW-OSP.DWG
ORIGINAL SIZE: 24" X 36"
SHEET NUMBER: C1 OF 5



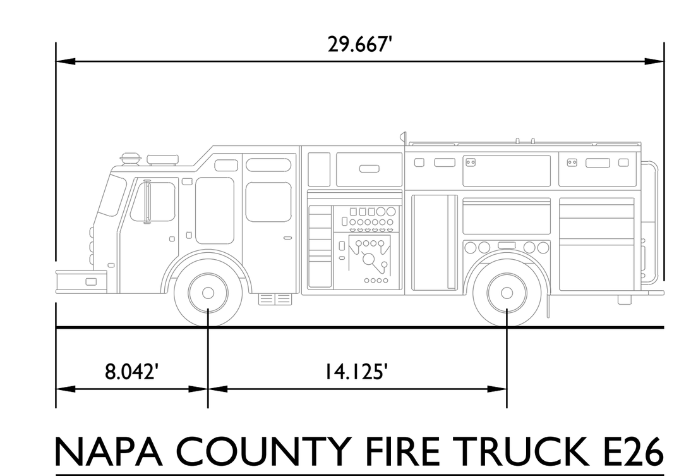
WINERY DRIVEWAY PLAN
STA 9+88 TO STA 19+00
SCALE: 1" = 20'



WINERY DRIVEWAY PROFILE
STA 9+75 TO STA 19+00
SCALE: 1" = 40'

SLOPE SECTIONS

A - A	21%
B - B	16%
C - C	18%
D - D	17%
E - E	20%
F - F	15%
AVERAGE	18%



NAPA COUNTY FIRE TRUCK E26

OVERALL LENGTH	29.667 FT
OVERALL WIDTH	8.000 FT
OVERALL BODY HEIGHT	10.609 FT
MIN BODY GROUND CLEARANCE	1.040 FT
TRACK WIDTH	9.015 FT
LOCK-TO-LOCK TIME	4.00 S
CURB TO CURB TURNING RADIUS	26.417 FT

FIRE TRUCK PROFILE
NOT TO SCALE

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HARCROSS WINERY

WINERY USE PERMIT CONCEPTUAL SITE PLANS
DRIVEWAY PLAN & PROFILE STA 9+75 TO STA 19+00

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. MUELRATH
NO. 67435
EXP. 12/31/2024
4/14/2023
CIVIL
STATE OF CALIFORNIA
FOR USE PERMIT REVIEW NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: APRIL 14, 2023

REVISIONS:	BY:
4/14/2023 PERMIT SUBMITTAL	YMS

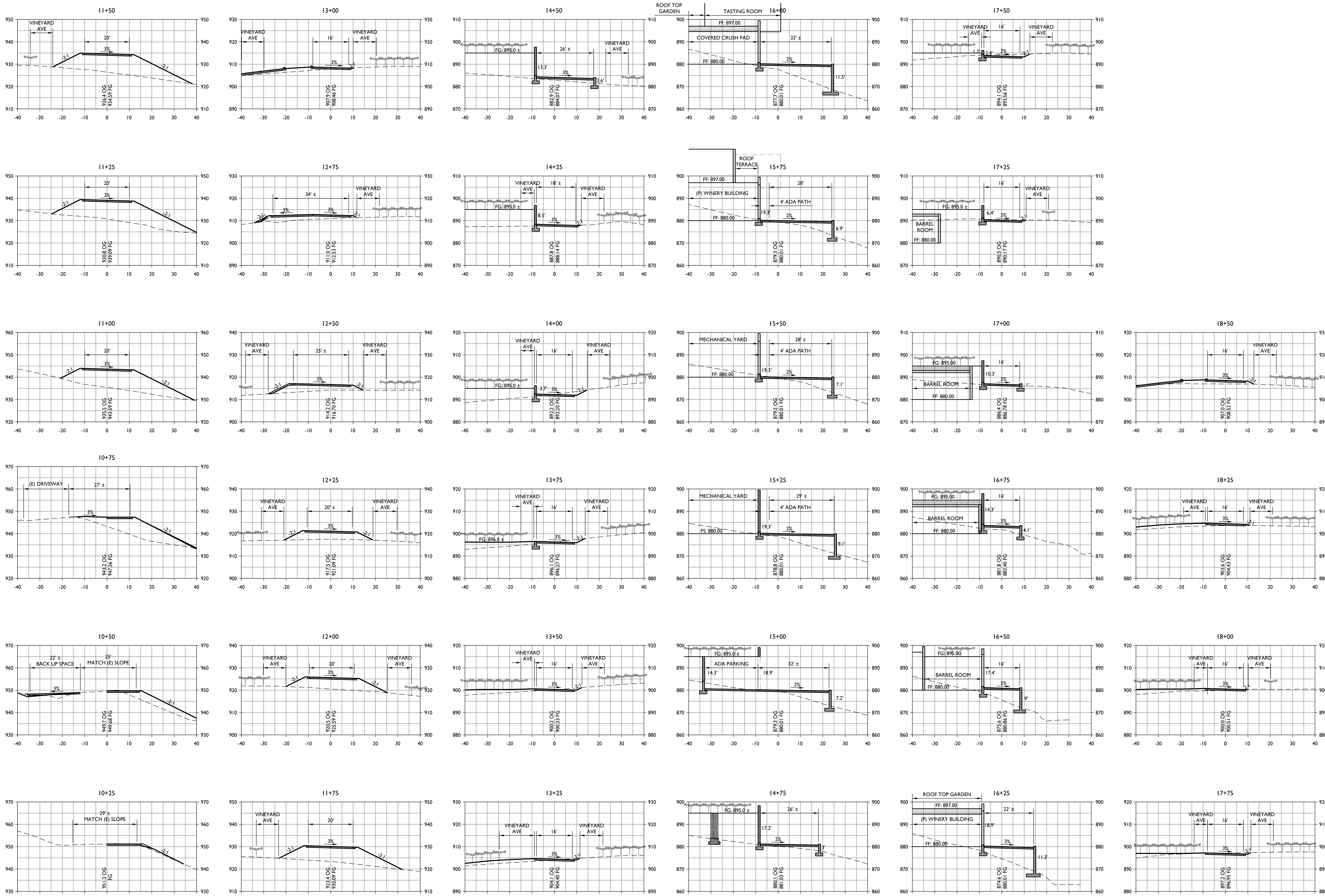
JOB NUMBER: 19-140

FILE: 19-140CONC-HW-DWY.DWG

ORIGINAL SIZE: 24" X 36"

SHEET NUMBER:

C2 OF 5



DRIVEWAY CROSS SECTIONS
STA 10+25 TO STA 18+50

SCALE: 1" = 20'

APPLIED
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INCORPORATED
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HARCROSS WINERY

WINERY USE PERMIT CONCEPTUAL SITE PLANS
DRIVEWAY CROSS SECTIONS STA 10+25 TO STA 18+50

PREPARED UNDER THE DIRECTION OF:

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: APRIL 14, 2023

REVISIONS:	BY:
4/14/2023 PERMIT SUBMITTAL	YMS

JOB NUMBER: 19-140

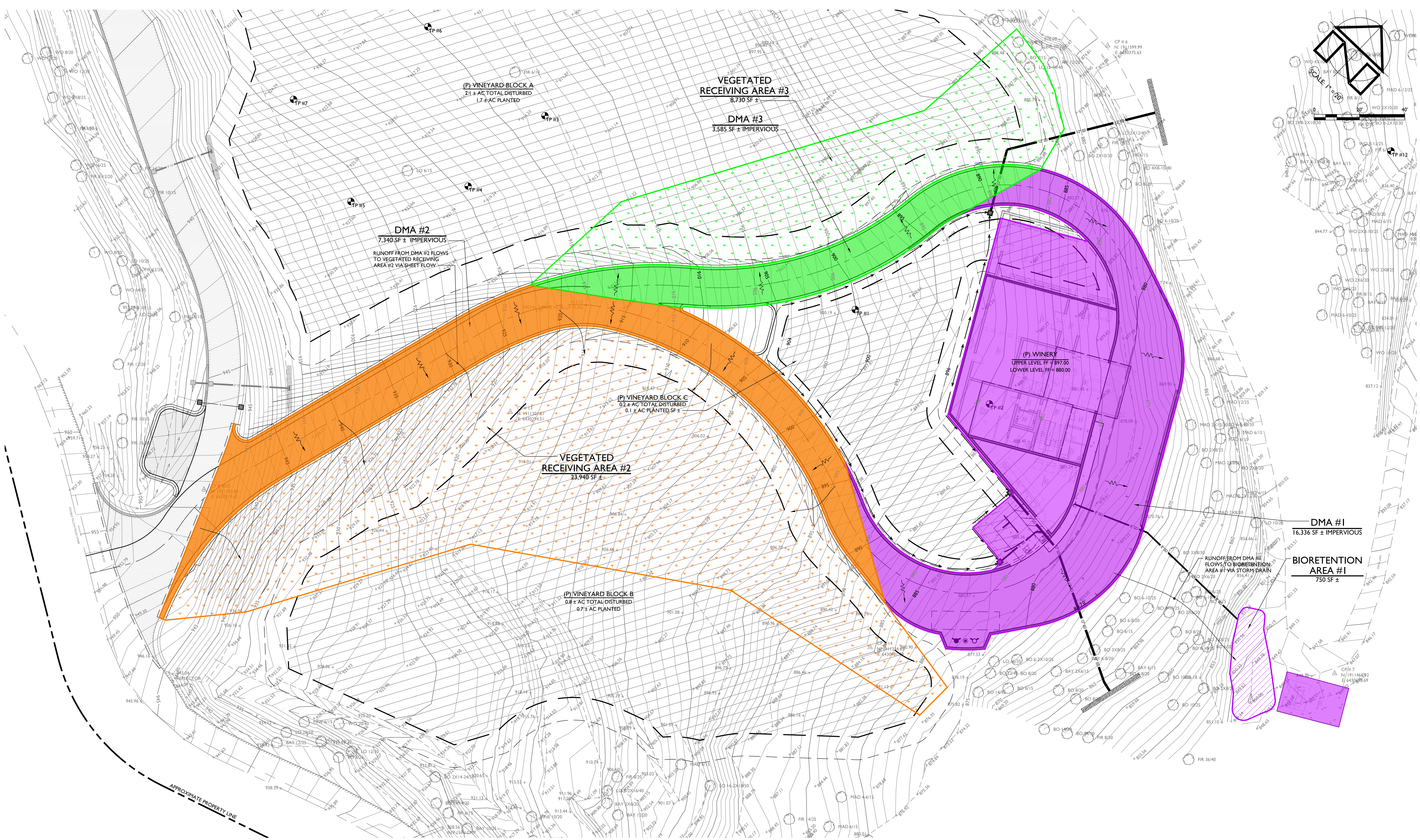
FILE: 19-140CONC-HW-DWY.DWG

ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: C3 OF 5

DMA LEGEND:

- SHEET FLOW DIRECTION
- IMPERVIOUS AREA (COLOR VARIES BY DMA)
- PERVIOUS AREA (COLOR VARIES BY DMA)
- VEGETATED RECEIVING AREA (COLOR VARIES BY DMA)
- BIORETENTION AREA (COLOR VARIES BY DMA)



STORMWATER CONTROL PLAN

SCALE: 1" = 20'

APPLIED CIVIL ENGINEERING INCORPORATED
2160 Jefferson Street, Suite 230
Napa, CA 94559
(707) 320-4968 | www.appliedcivil.com

HARCROSS WINERY

WINERY USE PERMIT CONCEPTUAL SITE PLANS
STORMWATER CONTROL PLAN

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER MICHAEL E. MUELRATH STATE OF CALIFORNIA
FOR USE PERMIT ONLY - NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: APRIL 14, 2023

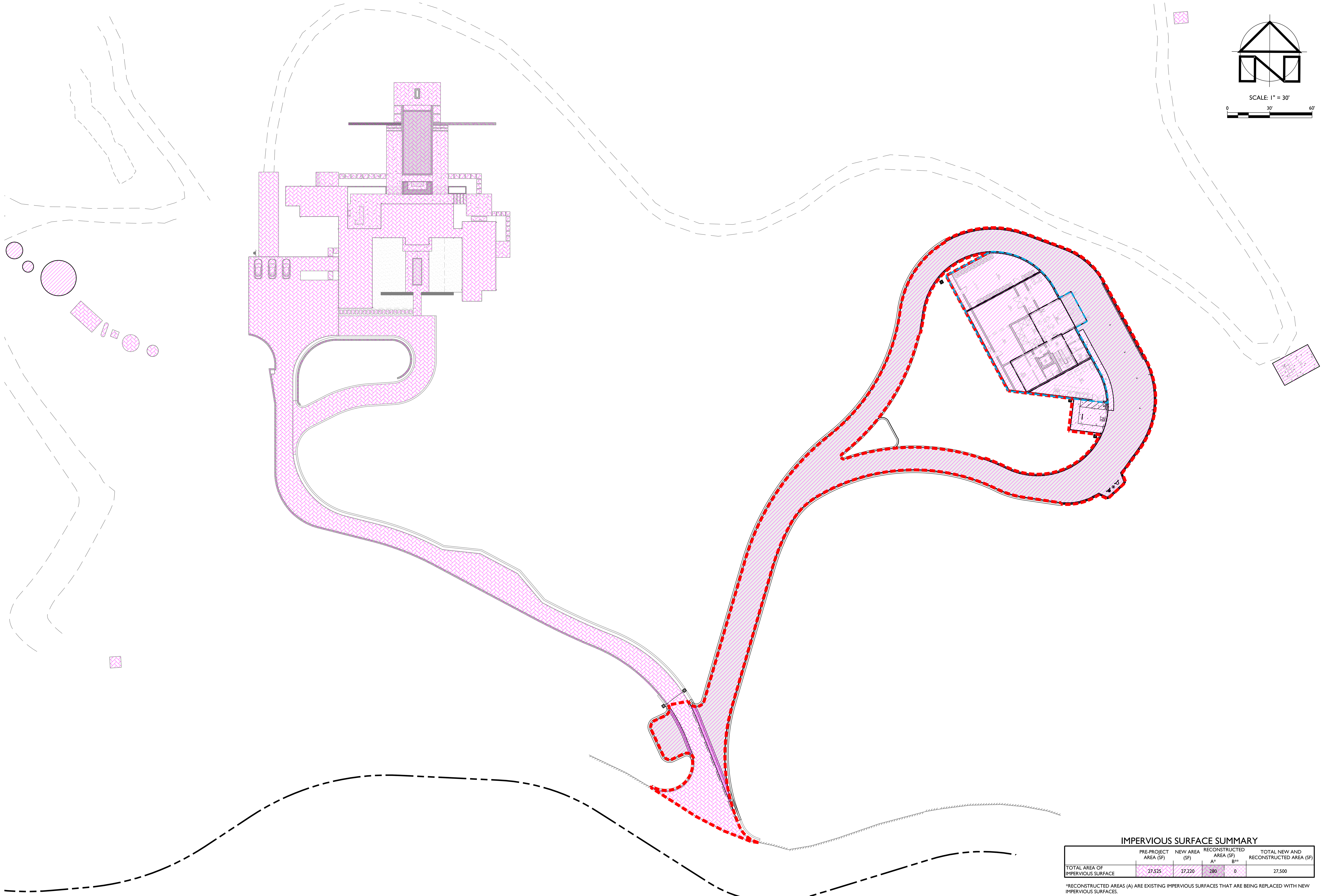
REVISIONS:	BY:
4/14/2023 PERMIT SUBMITTAL	YMS

JOB NUMBER: 19-140

FILE: 19-140CONC-HW-SCP.DWG

ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: C4 OF 5



IMPERVIOUS SURFACE EXHIBIT

SCALE: 1" = 30'

IMPERVIOUS SURFACE SUMMARY

	PRE-PROJECT AREA (SF)	NEW AREA (SF)	RECONSTRUCTED AREA (SF) A*	RECONSTRUCTED AREA (SF) B**	TOTAL NEW AND RECONSTRUCTED AREA (SF)
TOTAL AREA OF IMPERVIOUS SURFACE	27,525	27,220	280	0	27,500

*RECONSTRUCTED AREAS (A) ARE EXISTING IMPERVIOUS SURFACES THAT ARE BEING REPLACED WITH NEW IMPERVIOUS SURFACES.

**RECONSTRUCTED AREAS (B) ARE EXISTING IMPERVIOUS SURFACES THAT ARE BEING COMPLETELY REMOVED AND ARE NOT BEING REPLACED WITH NEW IMPERVIOUS SURFACES.

28,345 ± SF — WINERY COVERAGE AREA

7,125 ± SF — WINERY DEVELOPMENT AREA

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HARCROSS WINERY

WINERY USE PERMIT CONCEPTUAL SITE PLANS
IMPERVIOUS SURFACE EXHIBIT

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. MUELRATH — STATE OF CALIFORNIA — FOR USE PERMIT REVIEW NOT FOR CONSTRUCTION

DRAWN BY: PowerCAD LLC

CHECKED BY: MRM

DATE: APRIL 14, 2023

REVISIONS:	BY:
4/14/2023 PERMIT SUBMITTAL	YMS

JOB NUMBER: 19-140

FILE: 19-140CONC-HW-ISE.DWG

ORIGINAL SIZE: 24" X 36"

SHEET NUMBER: C5 OF 5

APPENDIX 3: Water Storage Tank Water Balance Calculations

Irrigation Storage Tank Water Balance

Month	Beginning Balance	Process Wastewater	Land Application Capacity	Ending Balance
January	0	1,500	43,444	0
February	0	1,500	43,444	0
March	0	1,500	43,444	0
April	0	1,500	43,444	0
May	0	1,500	43,444	0
June	0	1,500	43,444	0
July	0	1,500	43,444	0
August	0	1,500	43,444	0
September	0	7,500	43,444	0
October	0	7,500	43,444	0
November	0	1,500	43,444	0
December	0	1,500	43,444	0
		30,000	521,326	

Notes:

1. All values shown above for beginning balance, inflow, outflow and ending balance are in units of gallons.
2. See attached tables for detailed explanation of process wastewater and irrigation data presented in this table.
3. This water balance is based on the assumption that the tank is empy in August, just prior to crush.
4. Where irrigation demand exceeds availble treated wastewater availability additional irrigation water will be provided by another source.

Winery Process Wastewater Generation Analysis

Annual Wine Production	5,000	gallons
Wastewater Generation Rate	6	gallons per gallon of wine
Annual Wasewater Generation	30,000	gallons
Crush Season Length	15	days
Wastewater Generated During Crush	1.5	gallons per gallon of wine
Peak Wastewater Generation Rate	500	gallons per day

Winery Process Wastewater Generation Table			
Month	Percentage of Annual Total	Monthy Flow (gallons)	Average Flow (gpd)
January	5.0%	1,500	48
February	5.0%	1,500	54
March	5.0%	1,500	48
April	5.0%	1,500	50
May	5.0%	1,500	48
June	5.0%	1,500	50
July	5.0%	1,500	48
August	5.0%	1,500	48
September	25.0%	7,500	250
October	25.0%	7,500	242
November	5.0%	1,500	50
December	5.0%	1,500	48
Total	100.0%	30,000	

Notes:

1. Wastewater generation rates and monthly proportioning are based on our past experience with similar projects.

Land Application Schedule Analsysis

Total acres of land application area 2 acres

Application Rate 0.8 inches / month January through December

Land Application Schedule					
Month				Non-Seasonal Irrigation Application (gallons)	Total (gallons)
January				43,444	43,444
February				43,444	43,444
March				43,444	43,444
April				43,444	43,444
May				43,444	43,444
June				43,444	43,444
July				43,444	43,444
August				43,444	43,444
September				43,444	43,444
October				43,444	43,444
November				43,444	43,444
December				43,444	43,444
Total				521,326	521,326

Notes:

1. Analysis conservatively based on infiltration only.

2. Non-Irrigation Application is for managing tank levels and assumes a maximum of 5 operational days per month based on historic weather data (Summit Engineering NBRID Capacity Study, 1996) and a saturated soil infiltration rate of 0.1 gallons per square foot per day uniformly over the entire area.

APPENDIX 4: Site Evaluation Report and Test Pit Map

Napa County
Environmental Health Division

SITE EVALUATION REPORT

Please attach an 8.5" x 11" plot map showing the locations of all test pits triangulated from permanent landmarks or known property corners. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities.

Permit #: E19-00560

APN: 027-530-006

(County Use Only)
Reviewed by: Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner Evan M Wilson Trust	X New Construction ☐ Addition ☐ Remodel ☐ Relocation ☐ Other:
Property Owner Mailing Address 6204 Dry Creek Road	X Residential - # of Bedrooms: 6-8 Design Flow : 720-960 gpd
City State Zip Napa CA 94558	☐ Commercial – Type: Sanitary Waste: gpd Process Waste: gpd
Site Address/Location 6204 Dry Creek Road Napa, CA 94558	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name Applied Civil Engineering Incorporated	Evaluator's Name Michael R. Muelrath, R.C.E. 67435	Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist) *Michael R. Muelrath*
Mailing Address: 2074 West Lincoln Avenue		Telephone Number (707) 320-4968
City State Zip Napa CA 94558		Date Evaluation Conducted October 10, 2019

REGISTERED PROFESSIONAL ENGINEER MICHAEL R. MUELRATH NO. 67435 Exp. 12/31/2020 CIVIL STATE OF CALIFORNIA

Primary Area

Acceptable Soil Depth: 36 inches Test pit #'s: 8 & 9

Soil Application Rate (gal. /sq. ft. /day): 0.6

System Type(s) Recommended: Pre-treatment & subsurface drip

Slope: <20% Distance to nearest water source: 100' +

Hydrometer test performed? No ☐ Yes X (attach results)

Bulk Density test performed? No X Yes ☐ (attach results)

Percolation test performed? No X Yes ☐ (attach results)

Groundwater Monitoring Performed? No ☐ Yes X (attach results)

Expansion Area

Acceptable Soil Depth: 24 to 32 inches Test pit #'s: 3-7

Soil Application Rate (gal. /sq. ft. /day): 0.2

System Type(s) Recommended: Pre-treatment & subsurface drip

Slope: 5%-15% Distance to nearest water source: 100' +

Hydrometer test performed? No ☐ Yes X (attach results)

Bulk Density test performed? No X Yes ☐ (attach results)

Percolation test performed? No X Yes ☐ (attach results)

Groundwater Monitoring Performed? No X Yes ☐ (attach results)

Site constraints/Recommendations:

This site evaluation was performed to determine the feasibility of accommodating a new septic system in the areas tested to accommodate a new residence.

Given the shallow acceptable soil depths and limited area available we recommend a pre-treatment and shallow subsurface drip type septic system in the area of Test Pits 8 & 9. An uphill cutoff will be required if the reserve area is developed in the future (both surface and subsurface).

A sample was taken from Test Pit #3 to be representative of the topsoil in the area of Test Pits #3 - #7. A second sample was taken from Test Pits #8 to be representative of Test Pits #8 - #9. These two samples were analyzed by RGH Consultants laboratory for sand/silt/clay percentages. See attached lab test results.

Test Pit #1 ***PLEASE PRINT OR TYPE ALL INFORMATION***

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-12	C	0-15	C	MSB	SH	FRB	SS	FF	FF/FM	NONE
12-30		>50%								

Acceptable soil depth =12 ”

Test Pit #2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-4	C	0-15	C	MSB	SH	FRB	SS	FF	FF/FM	NONE
4-30		>50%								

Acceptable soil depth =4”

Test Pit #3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-25	C	0-15	C	MSB	SH	FRB	SS	FF/FM	CF	NONE
25-30	C	0-15	C	MSB	SH	FRB	SS	FF/FM	FF	CMD
30-42		0-15	C	WSB	H	F	S	FF	FF	CMD

Acceptable soil depth = 25”

Test Pit #4

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	C	0-15	C	MSB	SH	F	SS	FF	FF	NONE
24-34		30-<50	C	MSB	SH	F	SS	FF	FF	CMD

Acceptable soil depth = 24”

Test Pit #5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-32	C	0-15	C	MSB	SH	F	SS	CF/FM	FF/FM	NONE
32-48		0-15	C	MSB	SH	F	SS	FF	FF	CMD

Acceptable soil depth = 32”

Test Pit #6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-27	C	0-15	C	MSB	SH	F	SS	FF	FF	NONE
27-40		0-15	C	MSB	SH	F	SS	FF	FF	CMD

Acceptable soil depth = 27”

Test Pit #7

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-26	C	0-15	C	MSB	SH	F	SS	FF/FM	FF/FM	NONE
26-45	C	0-15	C	MSB	SH	F	SS	FF	FF	CMD

Acceptable soil depth = 26”

Test Pit #8

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	C	0-15	CL	MSB	SH	FRB	SS	CF/CM	CF/FM	NONE
36-48		0-15	C	WSB	H	F	S	FF	FF	CMD

Acceptable soil depth = 36”

Test Pit #9

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	C	0-15	CL	MSB	SH	FRB	SS	CF/CM	CF/FM	NONE
36-48		0-15	C	WSB	H	F	S	FF	FF	CMD

Acceptable soil depth = 36”

Test Pit #10

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-16	C	0-15	CL	MSB	SH	FRB	SS	CF/CM	CF/FM	NONE
16+		>50								

Acceptable soil depth = 36”

Test Pit #11

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	C	0-15	CL	MSB	SH	FRB	SS	CF/CM	CF/FM	NONE
36-48		0-15	C	WSB	H	F	S	FF	FF	CMD

Acceptable soil depth = 36”

Test Pit #12

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-16	C	0-15	CL	MSB	SH	FRB	SS	CF/CM	CF/FM	NONE
12+		0-15	C	WSB	H	F	S	FF	FF	CMD

Acceptable soil depth = 16”

Test Pit #13

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-38	C	0-15	CL	MSB	SH	FRB	SS	CF/CM	CF/FM	NONE
38-48		0-15	CL	MSB	SH	FRB	SS	FF/FM	FF/FM	CMD

Acceptable soil depth = 38”

Test Pit #14

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	C	0-15	C	MSB	SH	FRB	SS	FF/FM	CF	NONE
24-30		>50								

Acceptable soil depth = 24”

Test Pit #15

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-27	C	15-30	C	MSB	SH	FRB	SS	CF/FM	FF/FM	NONE
27-40		>50								

Acceptable soil depth = 27”

Test Pit #16

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-20	C	0-15	C	MSB	SH	FRB	SS	FF	FF	NONE
20-36		0-15	C	WSB	H	F	S	FF	FF	CMD

Acceptable soil depth = 20”

Test Pit #17

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-6	C	0-15	C	MSB	SH	FRB	SS	CF/FM	FF	NONE
6+		0-15	C	MSB	SH	FRB	SS	CF/FM	FF	NONE

Acceptable soil depth = 6”

LEGEND

Boundary	Texture	Structure	Consistence			Pores	Roots	Mottling
			Side Wall	Ped	Wet			
A=Abrupt <1” **C**=Clear 1”-2.5” **G**=Gradual 2.5”-5” **D**=Difuse >5”	**S**=Sand **LS**=Loamy Sand **SL**=Sandy Loam **SCL**=Sandy Clay Loam **SC**=Sandy Clay **CL**=Clay Loam **L**=Loam **C**=Clay **SiC**=Silty Clay **SiCL**=Silty Clay Loam **SiL**=Silt Loam **Si**=Silt	**W**=Weak **M**=Moderate **S**=Strong **G**=Granular **Pl**=Platy **Pr**=Prismatic **C**=Columnar **B**=Blocky **AB**=Angular Blocky **SB**=Subangular Blocky **M**=Massive **SG**=Single Grain **CEM**=Cemented	**L**=Loose **S**=Soft **SH**=Slightly Hard **H**=Hard **VH**=Very Hard **ExH**=Extremely Hard	**L**=Loose **VFRB**=Very Friable **FRB**=Friable **F**=Firm **VF**=Very Firm **ExF**=Extremely Firm	**NS**=NonSticky **SS**=Slightly Sticky **S**=Sticky **VS**=Very Sticky **NP**=NonPlastic **SP**=Slightly Plastic **P**=Plastic **VP**=Very Plastic	**Quantity:** **F**=Few **C**=Common **M**=Many **Size:** **VF**=Very Fine **F**=Fine **M**=Medium **C**=Coarse **VC**=Very Coarse	**Quantity:** **F**=Few **C**=Common **M**=Many **Size:** **F**=Fine **M**=Medium **C**=Coarse **VC**=Very Coarse **ExC**=Extremely Coarse	**Quantity:** **F**=Few **C**=Common **M**=Many **Size:** **F**=Fine **M**=Medium **C**=Coarse **Contrast:** **Ft**=Faint **D**=Distinct **P**=Prominent

Notes:
Structure is recorded as Modifier then Structure - for example, Moderate (M) Subangular Blocky (SB) is recorded as MSB
Pores and Roots are recorded as Quantity then Size – for example Few (F) Coarse (C) is recorded as FC
Mottling is recorded as Quantity then Size then Contrast – for example Few (F) Coarse (C) Distinct (D) is recorded as FCD

Experience is the difference

November 8, 2019

Mr. Mike Muelrath
Applied Civil Engineering
2074 West Lincoln Ave.
Napa, CA 94558

Client:	**Applied Civil Engineering**	**Sampled: Not Stated**
Project:	**Not Stated**	**Received: 11/7/2019**
Project #:	**9260.48**	**Reported: 11/8/2019**
Client Project #:	**19-140**	

Dear Mr. Muelrath:

This letter transmits the results of our laboratory testing performed for the subject project. We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	**TP-3 @ 0-24”**
+ #10 Sieve	1.9 %
Sand	21.6 %
Clay	61.4 %
Silt	17.0 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

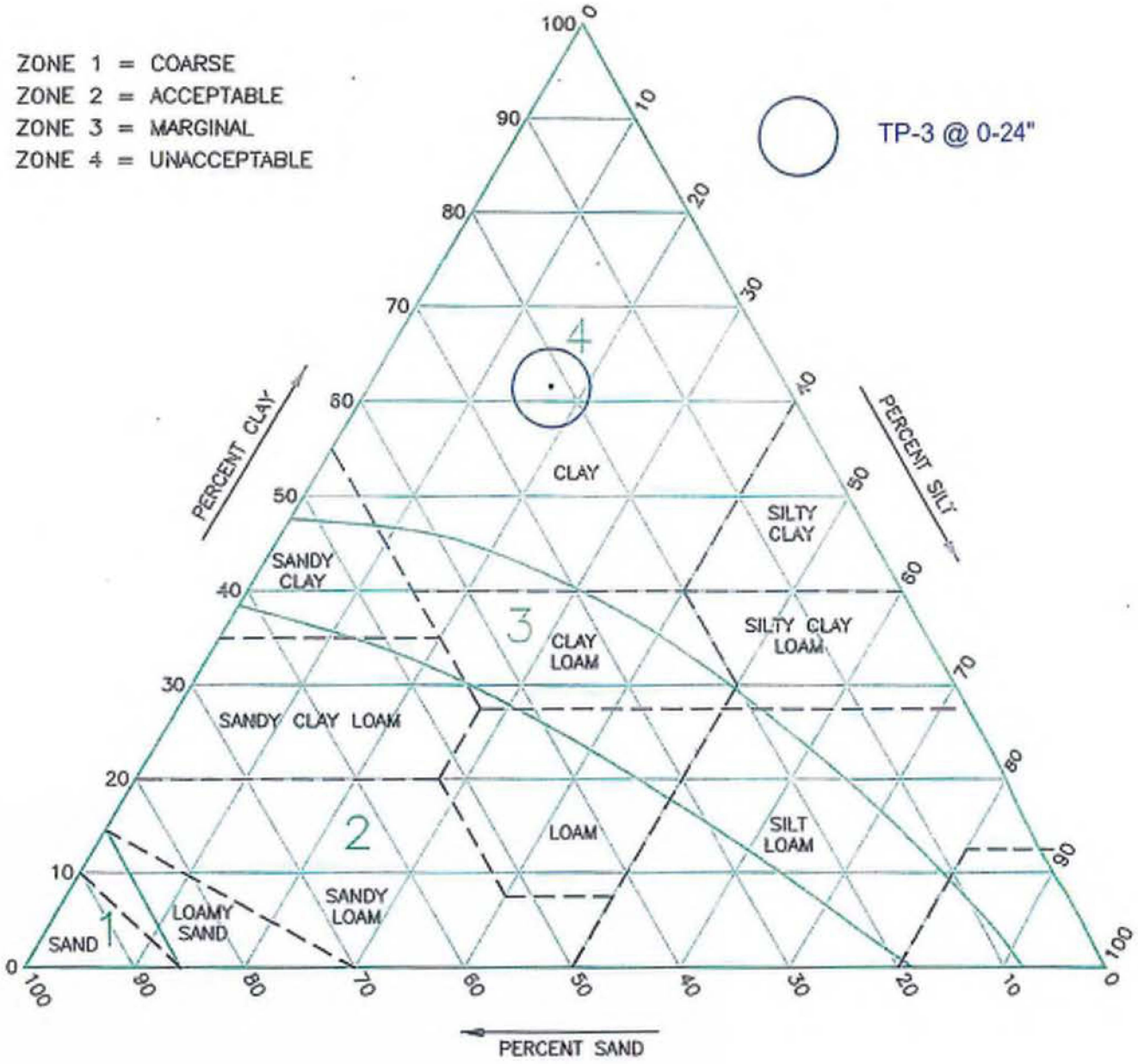
Regards,

RGH GEOTECHNICAL

Sean Flinn
Quality Control Manager

SOIL PERCOLATION SUITABILITY CHART

ZONE 1 = COARSE
ZONE 2 = ACCEPTABLE
ZONE 3 = MARGINAL
ZONE 4 = UNACCEPTABLE



Instructions:

1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the clay direction an additional 15% for soils having a bulk-density greater than 1.7 gm/cc.

Note:

For soils falling in sand, loamy sand or sandy loam classification bulk density analysis will generally not affect suitability and analysis not neccesary.

RGH CONSULTANTS

Experience is the difference

August 11, 2021

Mr. Mike Muelrath
Applied Civil Engineering
2074 West Lincoln Ave.
Napa, CA 94558

Client:	**Applied Civil Engineering**	**Sampled: Not Stated**
Project:	**Not Stated**	**Received: 8/6/2021**
Project #:	**9260.56**	**Reported: 8/11/2021**
Client Project #:	**19-140**	

Dear Mr. Muelrath:

This letter transmits the results of our laboratory testing performed for the subject project. We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	TP-9 @ 0”-24”
+ #10 Sieve	15.8 %
Sand	28.2 %
Clay	38.6 %
Silt	33.2 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Regards,

RGH GEOTECHNICAL

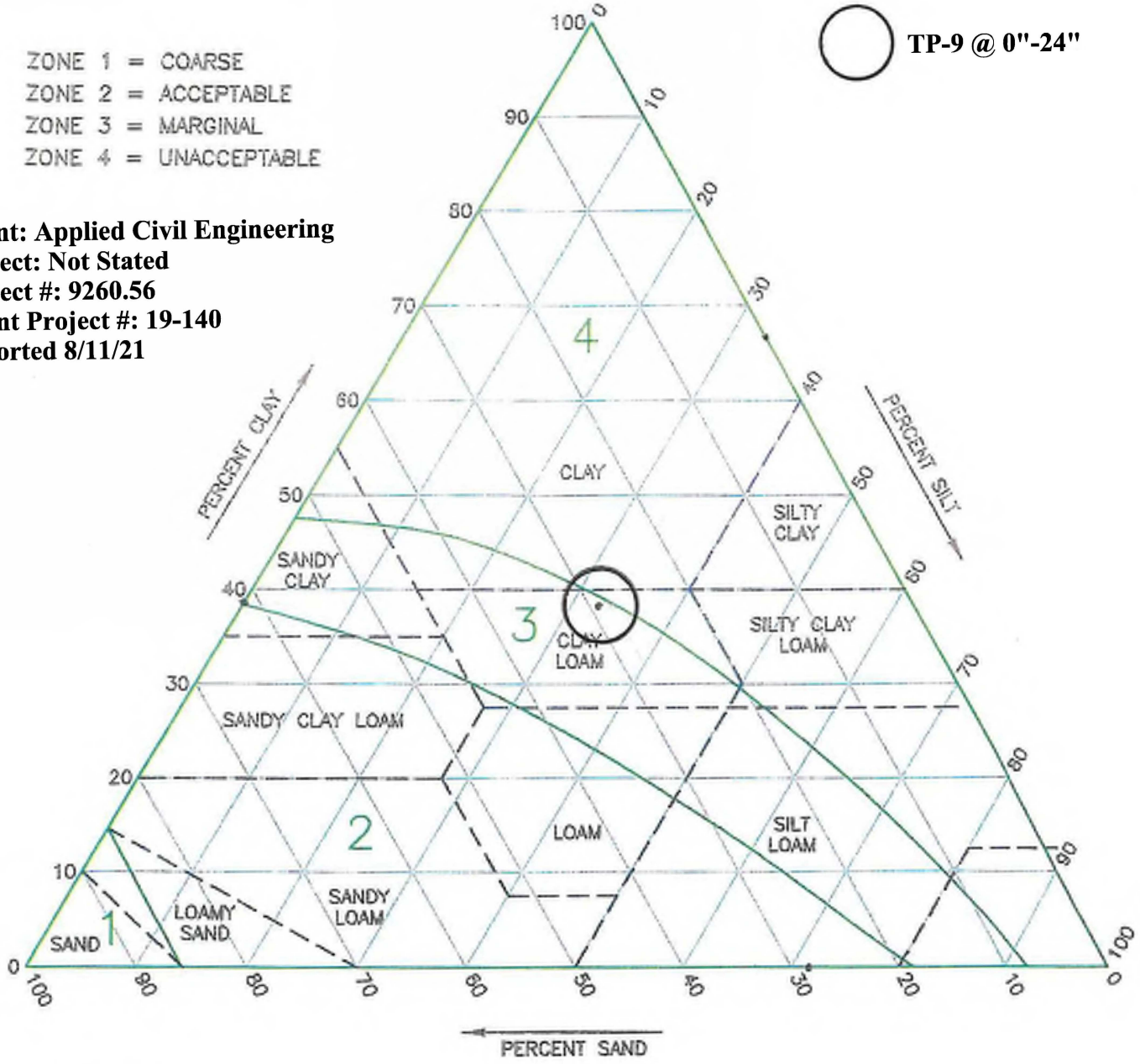
Sean Flinn
Laboratory Manager

SOIL PERCOLATION SUITABILITY CHART

ZONE 1 = COARSE
ZONE 2 = ACCEPTABLE
ZONE 3 = MARGINAL
ZONE 4 = UNACCEPTABLE

TP-9 @ 0"-24"

Client: Applied Civil Engineering
Project: Not Stated
Project #: 9260.56
Client Project #: 19-140
Reported 8/11/21

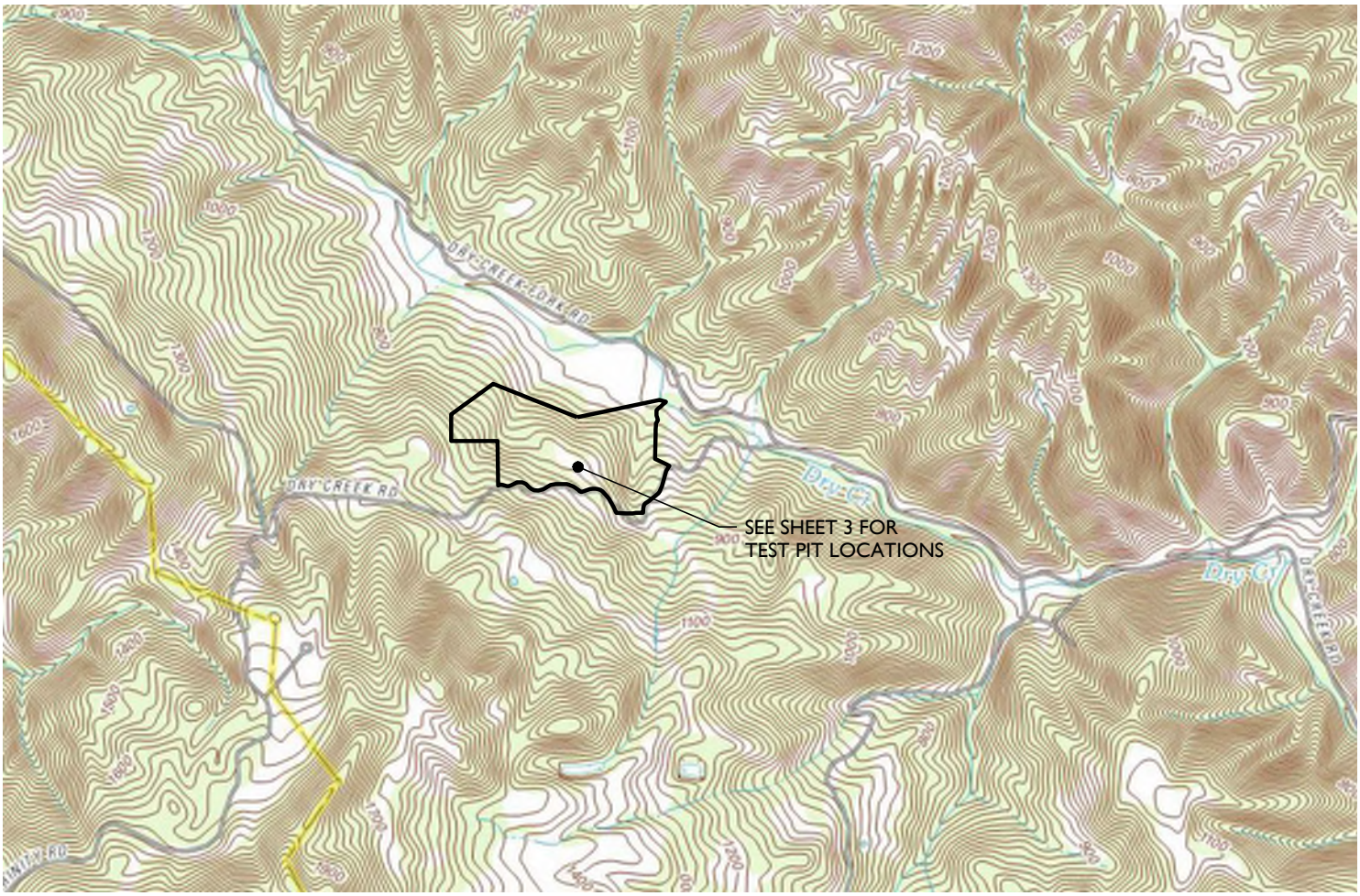


Instructions:

1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the clay direction an additional 15% for soils having a bulk-density greater than 1.7 gm/cc.

Note:

For soils falling in sand, loamy sand or sandy loam classification bulk density analysis will generally not affect suitability and analysis not neccesary.



LOCATION MAP

SCALE: 1" = 2,000'

NOTES:

1. TEST PITS ONE THROUGH SEVENTEEN (TP #1 - TP #17) WERE EXCAVATED BY THE OWNER AND WERE WITNESSED BY MIKE MUELRATH OF APPLIED CIVIL ENGINEERING INCORPORATED AND THE NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES DEPARTMENT - ENVIRONMENTAL HEALTH DIVISION ON OCTOBER 10, 2019.

2. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION ON SHEET 2 WAS TAKEN FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATABASE. TOPOGRAPHIC INFORMATION ON SHEET 3 WAS OBTAINED FROM THE "THE MAP OF TOPOGRAPHY OF A PORTION OF THE LANDS OF ENAN" PREPARED BY ALBION SURVEYS, INC., DATED JANUARY 30, 2020, UPDATED MARCH 16, 2020. APPLIED CIVIL ENGINEERING INCORPORATED ASSUMES NO LIABILITY REGARDING THE ACCURACY OR COMPLETENESS OF THE TOPOGRAPHIC INFORMATION.

3. CONTOUR INTERVAL:

   SHEET 2: FIVE (5) FEET, HIGHLIGHTED EVERY TWENTY FIVE (25) FEET.
   SHEET 3: ONE (1) FOOT, HIGHLIGHTED EVERY FIVE (5) FEET.

4. BENCHMARK: NAVD 88

5. AERIAL PHOTOGRAPHS WERE OBTAINED FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS) DATABASE, TAKEN APRIL TO JUNE 2018 AND MAY NOT REPRESENT CURRENT CONDITIONS.

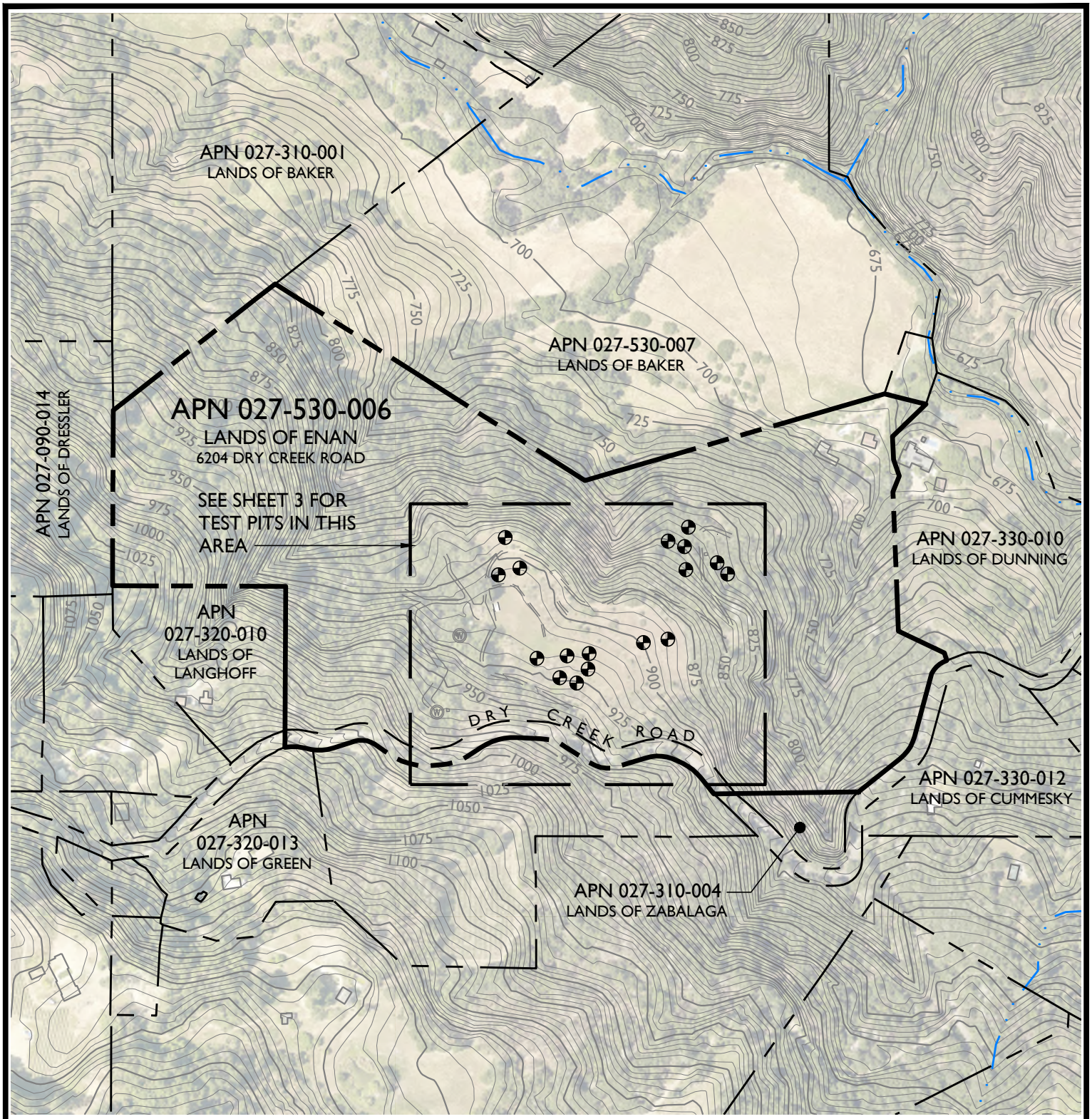
6. ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 06055C0390E, EFFECTIVE SEPTEMBER 26, 2008, THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.

APPLIED CIVIL ENGINEERING INCORPORATED
2074 West Lincoln Avenue
Napa, CA 94558
(707) 320-4968 (707) 320-2395 Fax
www.appliedcivil.com

ENAN RESIDENCE

6204 DRY CREEK ROAD
NAPA, CA 94558
APN 027-530-006

SCALE: 1" = 2,000'



OVERALL SITE PLAN

SCALE: 1" = 400'

APPLIED
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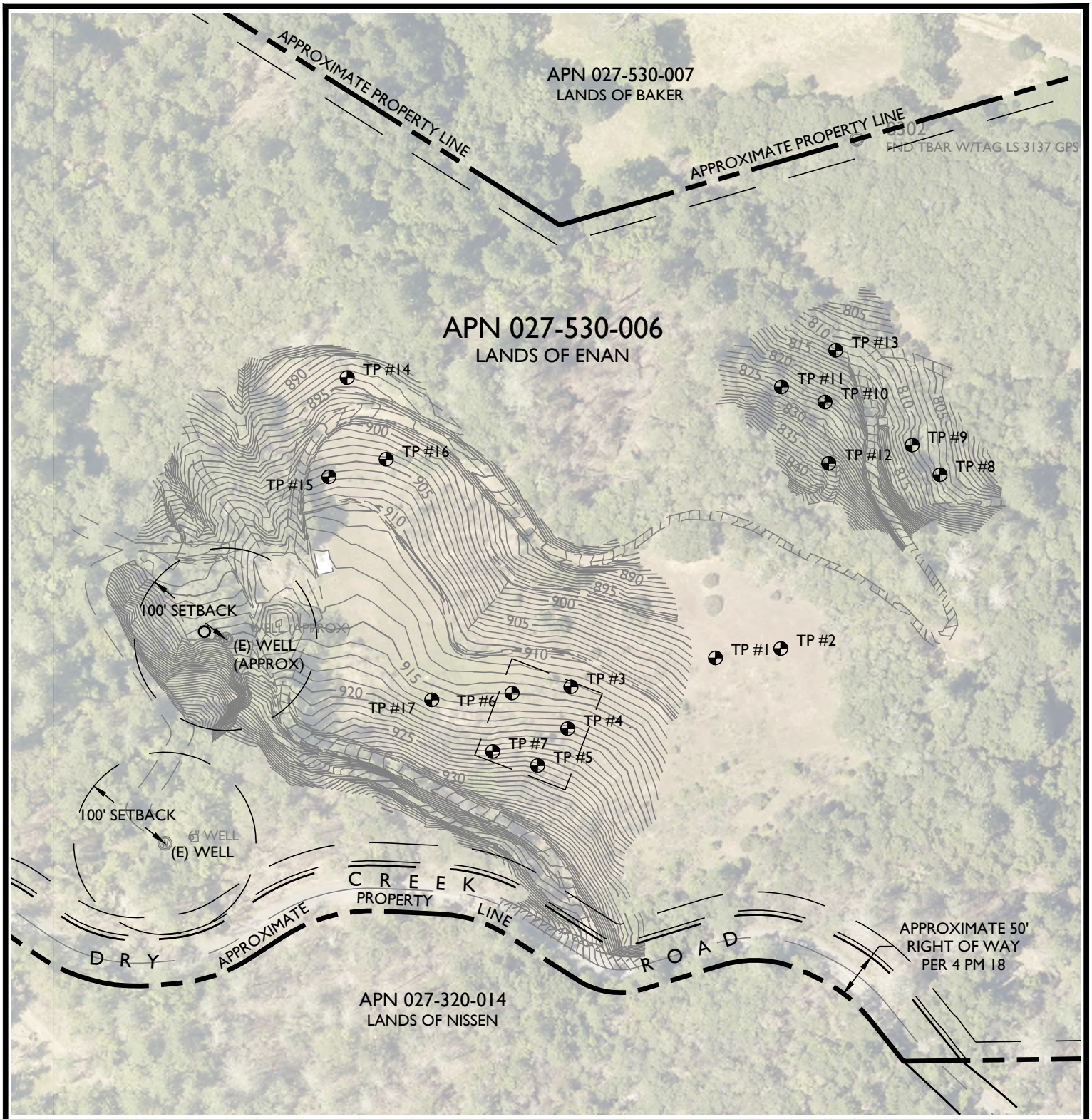

TEST PIT MAP

SCALE: 1" = 150'

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ENAN RESIDENCE

6204 DRY CREEK ROAD
NAPA, CA 94558
APN 027-530-006

SCALE: 1" = 150'

JOB NO. 19-140

OCTOBER 2019