HYDROLOGIC ANALYSIS, NIKOLAU VINEYARDS
PROPOSED NEW VINEYARD DEVELOPMENT
432 DUTCH HENRY CANYON ROAD
CALISTOGA, CA 94515
APN 018-050-072
JULY 31, 2021

The following analysis evaluates the proposed development of approximately 3.3 acres of new vineyard, on an approximately 60-acre parcel located on a knoll near the headwaters of the Dutch Henry/Biter Creek complex, in the Vaca Mountains, east of the City of Calistoga, California, to determine the proposal's potential to increase storm runoff or peak flow. This analysis was prepared by David Steiner, CPESC, CPSWQ, at the request of, and in consultation with, Mr. Mike Muelrath, PE, of Applied Civil Engineering. The knoll-top topography of this small site drains to three separate drainages, each of which is large enough (relative to its portion within the proposed vineyard) to buffer or mask the project's potential runoff increases from the drainage basins as a whole. For this reason, the analysis excludes those areas outside the proposed vineyard site, comparing pre- and post-project Runoff Curve Numbers (**CN**) within the proposed vineyard. This comparison uses the CN function of USDA Technical Release 55, as presented in Version 1.00.10 of WinTR55 "Small Watershed Hydrology", a Windows-based application. Factors influencing Curve Number determinations include land use, hydrologic condition, and hydrologic soil group. (Rainfall and Time of Concentration, the other factors in a full WinTR-55 model, would remain unchanged under pre- and post-project conditions.)

The pre-project Curve Number estimates are based on evaluations made during field visits on July 2 and 13, 2021. However these determination require extrapolation from the site's actual condition today, as the Camp Fire of 2020 burned virtually the entire understory, damaging all and killing many of the site's dominant trees, both timber and hardwood species. The two small outbuildings and their grounds (designated "farmstead") on the pre-project site map, were burned to the ground. The current hydrologic condition of the site, with less than the threshold 50% cover, and with significant areas apparently rendered hydrophobic, would be considered "poor", but is designated "fair" for purposes of this analysis. The existing dirt road to the northerly outbuilding (to be rebuilt) as well as the entire southerly farmstead area, will be incorporated into the proposal as vineyard or (grassed) avenue. Post-project, the proposed vineyard will be under non-tilled management, with 85% cover, i.e. in "good" hydrologic condition. As vineyards are not included among WinTR-55's land use alternatives, the application's "custom CN" field is used to enter selections from a California-specific table found in the NRCS Engineering Field Handbook.[1] This table's guidance calls for vineyard Curve Numbers equivalent to those of "annual grass."

[1] *Engineering Field Handbook, Part 650, Chapter 2, Supplement 1, USDA/NRCS, Oct 2008.*

Conclusion: As shown on the accompanying printouts of the pre- and post-project WinTR-55 CN analyses, weighted Curve Numbers for the site remain unchanged at CN 75, implying no increase in peak flow or runoff.

Search

Properties and Qualities Ratings

Open All | Close All

- Soil Chemical Properties
- Soil Erosion Factors
- Soil Health Properties
- **Soil Physical Properties**
  - Available Water Capacity
  - Available Water Storage
  - Available Water Supply, 0 to 100 cm
  - Available Water Supply, 0 to 150 cm
  - Available Water Supply, 0 to 25 cm
  - Available Water Supply, 0 to 50 cm
  - Bulk Density, One-Third Bar
  - Linear Extensibility
  - Liquid Limit
  - Organic Matter
  - Percent Clay
  - Percent Sand
  - Percent Silt
  - Plasticity Index
  - Saturated Hydraulic Conductivity (Ksat)
  - Saturated Hydraulic Conductivity (Ksat), Standard Classes
  - Surface Texture
  - Water Content, 15 Bar
  - Water Content, One-Third Bar
- **Soil Qualities and Features**
  - AASHTO Group Classification (Surface)
  - AASHTO Group Index
  - Depth to a Selected Soil Restrictive Layer
  - Depth to Any Soil Restrictive Layer
  - Drainage Class
  - Frost Action
  - Frost-Free Days
  - Hydrologic Soil Group

View Description | View Rating

View Options

Map ☑
Table ☑
Description of Rating ☑
Rating Options ☑
☐ Detailed Description

Advanced Options

Aggregation Method: Dominant Condition
Component Percent Cutoff:
Tie-break Rule: ○ Lower ◉ Higher

Map — Hydrologic Soil Group

Scale (not to scale)

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

You have zoomed in beyond the scale at which the soil map for this area is intended to be used. Map scale. The soil surveys that comprise your AOI were mapped at 1:24,000. The design of map units a resulting soil map are dependent on that map scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of map placement. The maps do not show the small areas of contrasting soils that could have been shown a

Tables — Hydrologic Soil Group — Summary By Map Unit

Summary by Map Unit — Napa County, California (CA055)

Summary by Map Unit — Napa County, California (CA055)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
140	Forward silt loam, 12 to 57 percent slopes, MLRA 15	C	35.0	92.8%
177	Rock outcrop-Kidd complex, 50 to 75 percent slopes		0.1	0.2%
183	Water		2.7	7.1%
Totals for Area of Interest			**37.8**	**100.0%**

Description — Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

View Description	View Rating
Map Unit Name	
Parent Material Name	
Representative Slope	
Soil Slippage Potential	
Subsidence, Initial	
Subsidence, Total	
Unified Soil Classification (Surface)	
Water Features	

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options — Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

DAS

Nicholau, pre-project
CN only
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	Dirt (w/ right-of-way)		C	.10	87
	Woods	(fair)	C	2.6	73
	Farmsteads		C	0.6	82
	Total Area / Weighted Curve Number			3.3	75

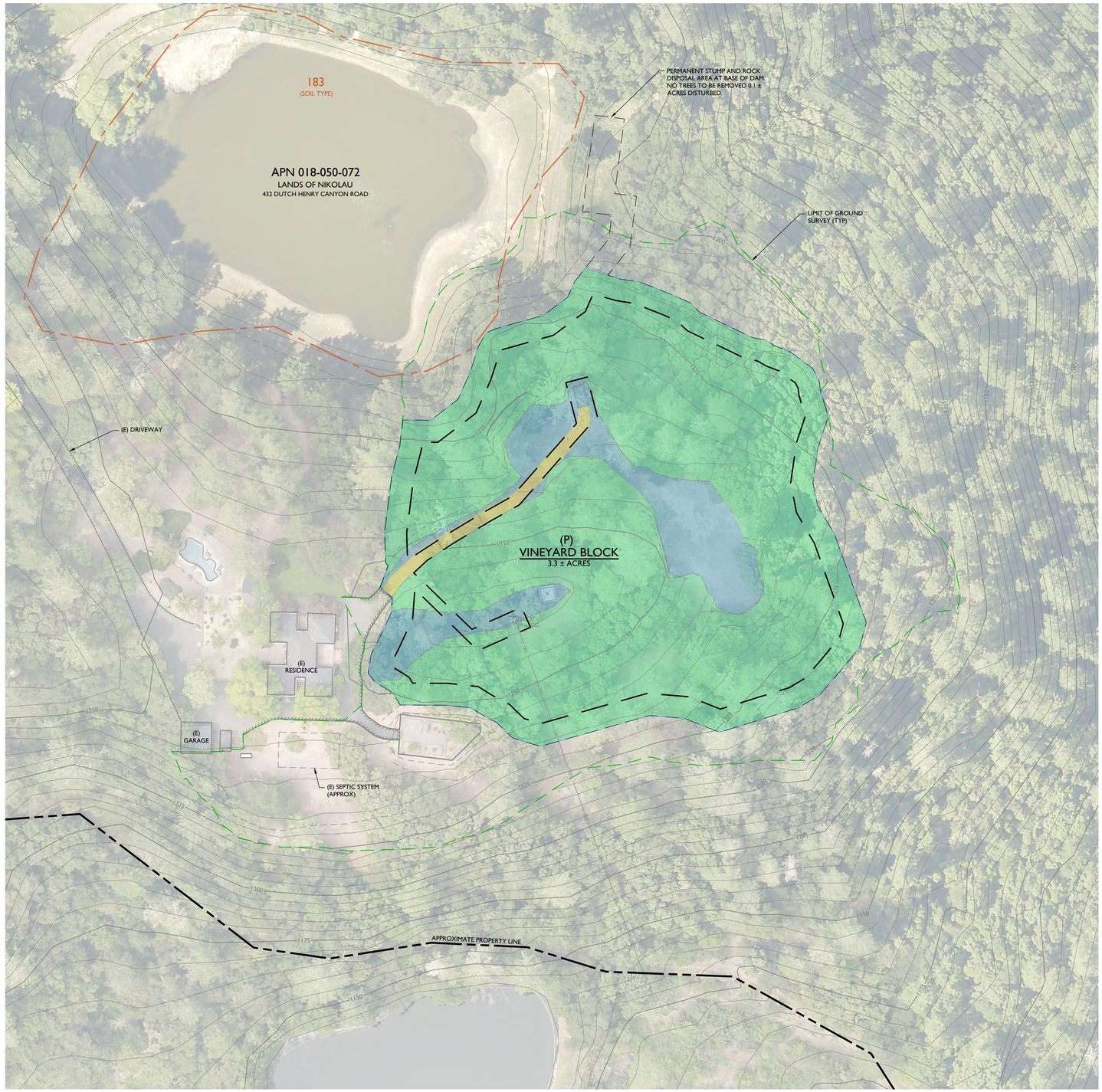
Nicholau, post-project
CN only
Napa County, California

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Main	User defined urban (Click button or	C	3.29	75
	Farmsteads	C	.01	82
	Total Area / Weighted Curve Number		3.3	75

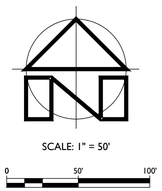
NIKOLAU VINEYARDS

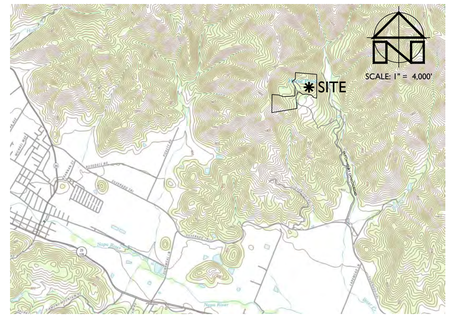
HYDROLOGY EXHIBIT



HYDROLOGY EXHIBIT - EXISTING CONDITIONS

SCALE: 1" = 50'





LOCATION MAP

SCALE: 1" = 4,000'

PROJECT INFORMATION:

PROPERTY OWNER & APPLICANT:
PAUL AND JOYCE NIKOLAU
3382 GILBERT DRIVE
HUNTINGTON BEACH, CA 92649

SITE ADDRESS:
432 DUTCH HENRY CANYON ROAD
CALISTOGA, CA 94515

ASSESSOR'S PARCEL NUMBER:
018-050-072

PARCEL SIZE:
60 ± ACRES

PROJECT SIZE
3.4 ± ACRES TOTAL DISTURBED AREA
2.5 ± ACRES PLANTED

ZONING:
AGRICULTURAL WATERSHED (AW)

DOMESTIC AND IRRIGATION WATER SOURCE:
PRIVATE WELL

SHEET INDEX:

FLOOD HAZARD NOTE:

ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 06055C0235E, EFFECTIVE SEPTEMBER 26, 2008, THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.

LEGEND:

- APPROXIMATE PROPERTY LINE
- PROPOSED VINEYARD AVENUE
- PROPOSED VINEYARD BLOCK
- SOIL TYPE BOUNDARY

SOIL TYPE LEGEND:

109	BOOMER GRAVELLY LOAM, 30 TO 50 PERCENT SLOPES
140	FORWARD GRAVELLY LOAM, 30 TO 75 PERCENT SLOPES
177	ROCK OUTCROP-KIDD COMPLEX, 50 TO 75 PERCENT SLOPES
183	WATER

SOIL TYPE BOUNDARIES SHOWN ON THIS MAP ARE BASED ON THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATA AND SHOULD BE CONSIDERED APPROXIMATE.

HYDROLOGY AREA SUMMARY

PLAN SYMBOL	LAND USE DESCRIPTION	HYDROLOGIC CONDITION	HYDROLOGIC SOIL GROUP	CURVE NUMBER (CN)	PRE-PROJECT (ACRES)	REMOVED (ACRES)	POST-PROJECT
FARM-C	FARMSTEAD	N/A	C	82	0.6 ± AC	0.59 ± AC	0.01 ± AC
WDS-FAIR-C	WOODS	FAIR	C	73	2.6 ± AC	2.6 ± AC	0
RD-DIRT-C	ROAD - DIRT	N/A	C	87	0.1 ± AC	0.1 ± AC	0
VAG-GOOD-C	VINEYARD - ANNUAL GRASS (POST)	GOOD	C	75	-	-	3.29 ± AC
				TOTAL	3.3 ± AC	3.3 ± AC	3.3 ± AC

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

NIKOLAU VINEYARDS

HYDROLOGY EXHIBIT

HYDROLOGY EXHIBIT - EXISTING CONDITIONS

PREPARED UNDER THE DIRECTION OF:

REGISTERED PROFESSIONAL ENGINEER
MICHAEL R. MUELRATH
MRM
NO. 67435
Exp. 12/31/2022
7/31/2021
CIVIL
STATE OF CALIFORNIA

DRAWN BY:
PowerCAD LLC

CHECKED BY:
MRM

DATE:
JULY 31, 2021

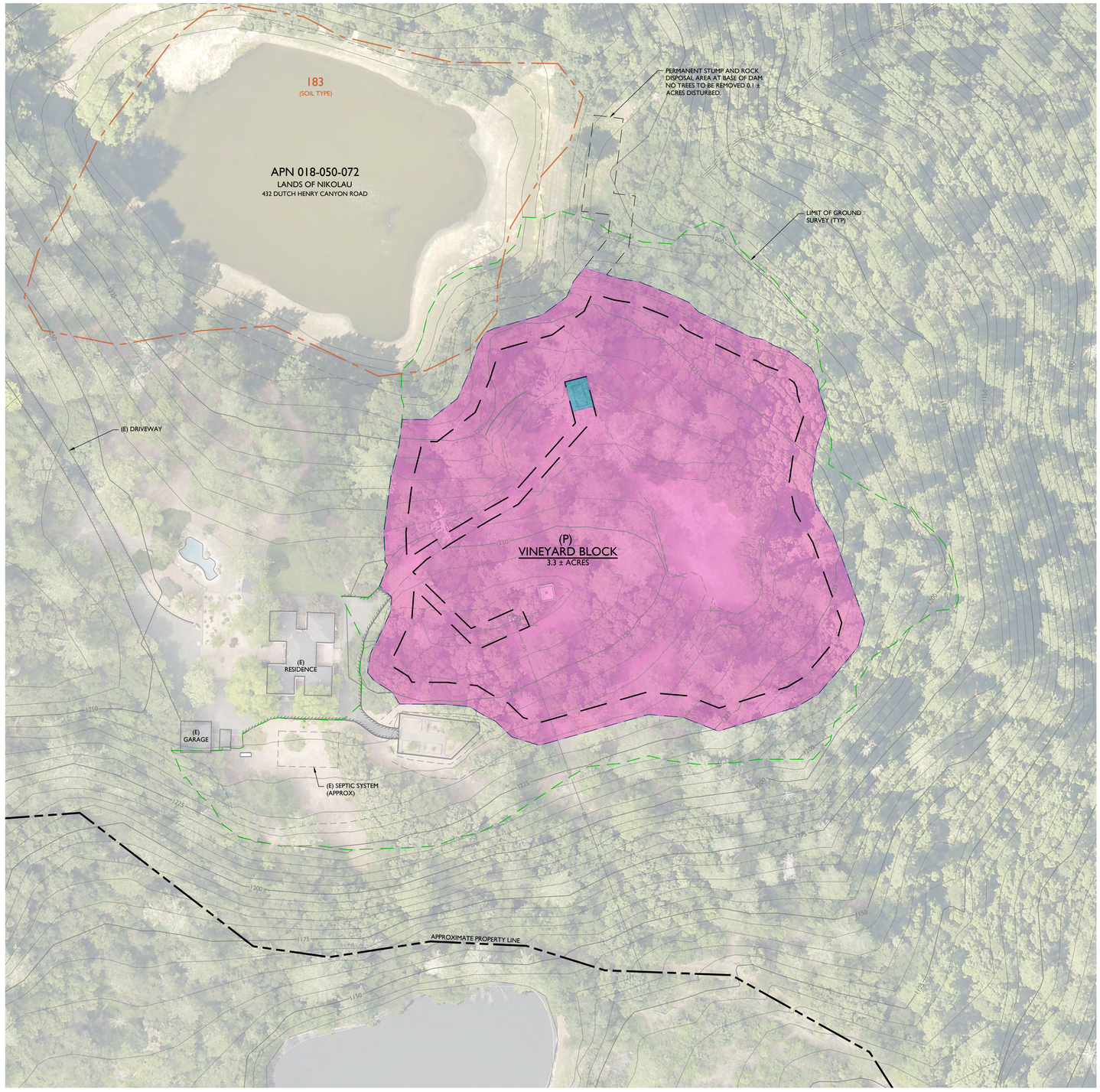
REVISIONS:	BY:
7/31/2021	YMS
PERMIT SUBMITTAL	

JOB NUMBER:
20-138

FILE:
20-138EXH-HYDRO-TBLK.DWG

ORIGINAL SIZE:
24" X 36"

SHEET NUMBER:
1
OF
2



SCALE: 1" = 50'

0 50' 100'

HYDROLOGY EXHIBIT - PROPOSED CONDITIONS

SCALE: 1" = 50'

LEGEND:

- APPROXIMATE PROPERTY LINE
- PROPOSED VINEYARD AVENUE
- PROPOSED VINEYARD BLOCK
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HYDROLOGY EXHIBIT

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