Napa De Oro
1228 Hagen Road - Hydrology Study

Prepared by Napa Valley Vineyard Engineering, Inc
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INTRODUCTION

Napa De Oro seeks approval of approximately 1.25 gross acres of proposed vineyard. The project lies within APN 049-200-003, a parcel totaling about 6.10 acres, located at 1228 Hagen Road, Napa.

This hydrology study is to determine the anticipated affect the proposed vineyard development project will have on local hydrology and runoff patterns in areas A thru B. Hydrologic modeling of existing and proposed conditions was performed using HydroCad, Urban Hydrology for Small Watersheds with the CA-1 rainfall distribution curve. Following is a summary of the data used to complete the hydrologic analysis and the results of this analysis.

RAINFALL DATA

Rainfall depths for the project site were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 6, Version 2, Precipitation Frequency Data for California, which uses the latitude and longitude of the Napa De Oro project are estimated to be 38.3259 N, -122.2612 W, based on information obtained from (NOAA) Atlas 14 site.

The following rainfall data from the NOAA website was used in the analysis:

2 year, 24 hour	3.36 inches
100 year, 24 hour	8.83 inches

Rainfall data for the interim storm events were interpolated as:

5 year, 24 hour	4.49 inches
10 year, 24 hour	5.41 inches
25 year, 24 hour	6.75 inches
50 year, 24 hour	7.77 inches

WATERSHED AREAS

The two project sites drain towards a blue line stream (Sarco Creek) and lies in the Spencer Creek watershed. The points of interest for this analysis are points along Sarco Creek and an unnamed stream. The watershed for Area A is approximately 4.184 acres and Area B 2.374 acres and was delineated based on topographic data from the Napa County GIS Data Base website. The maps included in Appendix A, depict the watershed, the existing land uses, and the proposed vineyard project.

PRE-PROJECT WATERSHED CONDITIONS

Soil Types

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County, August 1978, maps the following soil types within the watershed:

SCS #123, Coombs gravelly loam 2 to 5% slopes
(Hydrologic Soil Group (HSG) C)

Land Use

Land use within the subject watersheds was analyzed based on the 2020 aerial photograph obtained from the Google GIS website. Area A consists of 2.217 acres of tree canopy, 0.951 acres of grasslands, 0.330 acres of developed area, 0.096 acres of landscape, 0.019 acres of water surface, and 0.572 acres of existing vineyard. Area B consists of 0.819 acres of tree canopy, 1.063 acres grasslands, 0.217 acres of developed area, 0.065 acres of landscape, and 0.209 acres of existing vineyard. Areas inside the watershed that are considered to be in "fair" condition are stated above, all other areas are considered to be in "good" condition. A detailed breakdown of land use by area and hydrologic soil group is included in the HydroCad Reports, Appendix A.

Time of Concentration

The time of concentration represents the time it takes for rainfall in the most hydraulically remote portion of the watershed to reach the point of interest. The time of concentration was estimated assuming sheet flow for 100 feet in the uppermost reaches of the watershed. A shallow concentrated flow regime was used to model the runoff down to the point of interest as well as stream flow. Mannings coefficients were selected to represent the respective surface conditions. A detailed breakdown of the time of concentration parameters is included in the HydroCad Reports, Appendix A and are shown on the Drainage Area Map.

POST PROJECT WATERSHED CONDITIONS

Soil Types

The proposed vineyard development occurs within the areas mapped as

SCS #123, Coombs gravelly loam 2 to 5% slopes ((HSG) C)

Land Use

The proposed project will convert 0.208 acres of tree canopy and 1.043 acres of grassland. The project proposes to abandon 0.323 acres of existing vineyard and covert it to good grassland, this area though is modeled as good grassland as that was what was existing before the vineyard was planted. The project proposes a no till cover crop with spot spray, which is considered a “good" hydrologic condition. Proposed vineyard avenues/turnspaces will be maintained in a no-till cover and are modeled as part of the vineyard. All other areas within the watershed are assumed to remain unchanged including the all-weather access road to the house in the project area. A detailed breakdown of land uses by area and hydrologic soil group is included in the HydroCad Reports, Appendix A.

Time of Concentration

Time of concentration under post-project conditions will not increase in the watersheds. The erosion control measures provided within the project area include. The time of concentration is estimated assuming sheet flow for 100 feet in the uppermost reaches of each watershed area, shallow concentrated flows down the hillside to the point of interest, stream flow was used as well. A detailed breakdown of the time of concentration parameters is included in the HydroCad Report. Manning’s coefficients were selected to represent the respective surface conditions. A detailed breakdown of the time of concentration parameters is included in the HydroCad Reports, Appendix A and are shown on the Land Use Maps.

CALCULATED RUNOFF RATE

Using the rainfall data, watershed area, land use and time of concentration parameters described above and included in Appendix A, the following runoff rates were calculated:

HydroCad Calculated Peak Runoff Rate (cfs)

24 hr. storm event	2 yr.		5 yr.		10 yr.		25 yr.		50 yr.		100 yr.	
Project Condition	pre	post	pre	post	pre	post	pre	post	pre	post	pre	post
Watershed A	0.91	0.91	1.56	1.56	2.12	2.12	2.97	2.97	3.63	3.63	4.32	4.32
Watershed B	0.44	0.44	0.77	0.77	1.04	1.04	1.46	1.46	1.78	1.78	2.12	2.12

CONCLUSION

The hydrologic analysis presented above and supporting information in the Appendix, demonstrate that the proposed vineyard development with appropriate mitigation measures will not increase the peak runoff rate in the affected watersheds.