8G: Hydrology Report – Maxville Winery (REV 1)

September 3, 2024

BACKGROUND

The subject site is located along Chiles-Pope Valley Rd, St Helena, CA, APNs 025-020-023, 027, and 028. The eastern portion of the site is located within the "Chiles Valley" USGS quadrangle and the western portion is within the "Saint Helena" USGS quadrangle. The property is also situated on a watershed divide where the far eastern portion drains into the Main Fork - Lake Hennessy watershed and the majority of the project area drains west into the Upper Reach of Maxwell Creek Watershed. Elevations within the proposed vineyard blocks range from about 900 ft to 1375 ft asl. Mapped bedrock units in the area are Lower Cretaceous marine rocks (Kl) comprised of siltstone-mudstone, with a minor component of sandstone.

Most vineyard blocks are within the Bressa-Dibble complex (113-114) with some lowland areas in the Haire Loam series(146) [1]; see Watershed Map for soil boundaries. The Napa County Soil Survey [5] describes site soils as follows:

- Bressa-Dibble complex (113-114) is described as moderately steep to steep soils on uplands and narrow ridgetops. The soils formed from weathered sandstone and shale. Bressa is the dominant soil type (65%-70%), then Dibble soils (20%), with minor components of other soils intermingled (10%-15% Contra-Costa, Lodo, Los Gatos, Maymen, Millsholm, Montara, and/or Sobrante). Areas with these soils are predominantly used for grazing, which is the case at the Maxville site. Plant cover is typically grassland and scattered oaks.
- The Haire series (146) consists of moderately well drained soils on old terraces and alluvial fans. These soils formed from alluvium derived from the upland soils. Vegetation is typically grasses and forbs.
- Maxwell Series (161) consists of somewhat poorly drained soils on old alluvial fans and basin rims. Slope is 2 to 9 percent. These soils formed in material derived from serpentinitic alluvium. Vegetation is a sparse growth of lupine, tarweed, wild oats, and other annuals.
- Tehama Series (180) consists of well drained soils on alluvial fans and terraces. Slope is 0 to 5 percent. These soils formed in alluvium from sandstone and shale. The plant cover is annual grasses, forbs, and scattered oak.

Soil data were obtained from the NRCS web soil survey, which notes that map data may not be valid the map scale for this project. The soils map was created at a scale of 1:24,000 or 1 in = 2,000 ft. Enlarged maps can cause misunderstandings of the accuracy of soil line placement. The NRCS Web Soil Survey lists the following soil properties:

Table 1 USDA NRCS Soil Types

Soil Type	Soils description	K	T	HSG
113	Bressa-Dibble complex, 15 to 30 percent slopes	0.43	3	C
114	Bressa-Dibble complex, 30 - 50 percent slopes	0.43	3	C
146	Haire loam, 2 to 9 percent slopes	0.32	4	D
161	Maxwell clay, 2 to 9 percent slopes	0.24	5	D
180	Tehama silt loam, 0 to 5 percent slopes	0.55	5	C

Average slope across vineyard blocks ranges from 5-37% with an average of about 20%.

Current groundcover is predominantly Wild Oat Grassland, with intermixed Blue Oak woodland and Coast Live Oak woodland. Please refer to Application Section 7: Photos for visual documentation of existing cover crop in each block. Post-cover conditions will establish an 80% cover crop throughout.

ANALYSIS

The proposed development parcels are located on the eastern side of Chiles Valley. The northern parcels lie within the upper reach of the Maxwell Creek watershed and the southeastern sections drain to Lake Hennessey by way of Chiles Creek. The proposed vineyard development area lies primarily on west-facing slopes on the east side of Chiles Valley. The biological assessment, prepared 09-10-2017 [1], identified the vineyard block areas as Wild Oat Grassland, Coast Live Oak Woodland, and Blue Oak Woodland.

Current groundcover ranges from 60% - 80%, which varies between the “poor”, “fair”, and “good” categories for rangeland. Typically, the “poor” and “fair” conditions correlate to grazing areas on the lower slopes of the hills and sometimes follows existing fence lines that control movement of cattle. Please refer to Application Section 7: Photos for visual documentation of existing cover crop in each block. Post-cover conditions will establish an 80% cover crop throughout, which qualifies as “good” hydrologic condition per the NRCS Engineering Field Handbook.

Currently, water generally sheets off the hillside into a branching network of ephemeral drainages [1] Biological Survey, Figure 2. Vineyard areas were designed with a 35-foot setback from ephemeral drainages (NCC 18.108.025.B.1) and a 50-foot setback from delineated wetlands (NCC 18.108.026).

The Napa County General Plan (June 23, 2009), Policy CON-50.c dictates that peak flows shall not increase above pre-development conditions. No drainage improvements are proposed and ground contours will no be significantly altered, therefore post-development condiditons are expected to follow existing flow patterns. There is no opportunity for change in time of concentration (Tc) in the vineyard areas, therefore an analysis that compares area-weighted cover factors (Cn values) was conducted.

For vineyard blocks east of Chiles-Pope Valley Rd, the watersheds are quite large (35 to 105 acres). For these blocks, the Cn analysis was revised to compare cover conditions within the vineyard block. The watersheds west of Chiles-Pope Valley Rd around vineyard blocks E and F are contained by the landscape and infrastructure to a smaller area (9-10 acres) so it was appropriate to evaluate the Cn analysis at the watershed scale.

RESULTS

Cn analysis results are detailed in **Table 1** and on the Watershed Analysis map that compares land cover properties before and after vineyard development. The proposed vineyard development will result in either no change or a reduction to the area-weighted average Cn for all analysis areas.

CONCLUSIONS

The proposed vineyard development will result in either no change or a reduction to the area-weighted average Cn for all watersheds.

References

1. Attachments B&C, *Biological Resource Assessment with Botanical Survey and Delineation of Waters of the U.S. for the Maxville Winery & Vineyard Project, APNs 025-020-002, 008, & 0.23 Napa, CA*, prepared by Northwest Biosurvey, December 30, 2022
2. *Custom Soil Reource Report for Napa County, California*, from USDA NRCS Web Soil Survey, January 2023
3. Lambert, G., et al., *Soil Survey of Napa County, California*, USDA in cooperation with UC Agricultural Experiment Station, August 1978
4. *Napa County General Plan: Conservation Element*, Napa County Department of Conservation, Development & Planning, June 23, 2009
5. *SCS Part 650 Engineering Field Handbook, Chapter 2 – Estimating Runoff*, Amend. 48, January 2012, Table 2-3b

Attachments

1. *Hydrology Map (Land Cover) – REV 1*

Table 1 Cn Analysis Results

VINEYARD BLOCK				A			B			C			D1			D2		
Evaluation Area				vineyard block			vineyard block			vineyard block			vineyard block			vineyard block		
Cover Type	**Condition**	**HSG**	**Cn**	**PRE**	**Δ**	**POST**	**PRE**	**Δ**	**POST**	**PRE**	**Δ**	**POST**	**PRE**	**Δ**	**POST**	**PRE**	**Δ**	**POST**
Ruderal		0	82	0.1	(0.1)	-	0.0	(0.0)	-	0.2	(0.2)	-	0.2	(0.2)	-	0.4	(0.4)	-
Vineyard	good	C	74	-	-	1.2	-	-	1.1	-	-	11.7	-	-	5.6	-	-	1.1
Vineyard	good	D	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Range	poor	C	86	0.1	(0.1)	-	0.3	(0.3)	-	11.0	(11.0)	-	-	-	-	-	-	-
Range	fair	C	79	-	-	-	-	-	-	-	-	-	4.5	(4.5)	-	0.7	(0.7)	-
Range	good	C	74	0.3	(0.3)	-	0.1	(0.1)	-	0.5	(0.5)	-	-	-	-	0.0	(0.0)	-
Range	poor	D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Range	fair	D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Range	good	D	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Woods-Grass Combo	poor	C	82	-	-	-	0.4	(0.4)	-	-	-	-	-	-	-	-	-	-
Woods-Grass Combo	fair	C	76	-	-	-	-	-	-	-	-	-	0.9	(0.9)	-	-	-	-
Woods-Grass Combo	good	C	72	0.7	(0.7)	-	0.3	(0.3)	-	0.1	(0.1)	-	-	-	-	-	-	-
Woods-Grass Combo	fair	D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Woods-Grass Combo	good	D	79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total Acres		**1.2**		**1.2**	**1.1**		**1.1**	**11.7**		**11.7**	**5.6**		**5.6**	**1.1**		**1.1**
		Weighted Cn		**74**		**74**	**80**		**74**	**85**		**74**	**79**		**74**	**80**		**74**

VINEYARD BLOCK				E			F			G			H			I			J		
Evaluation Area				watershed			watershed			vineyard block			vineyard block			vineyard block			vineyard block		
Cover Type	**Condition**	**HSG**	**Cn**	**PRE**	**Δ**	**POST**	**PRE**	**Δ**	**POST**	**PRE**	**Δ**	**POST**	**PRE**	**Δ**	**POST**	**PRE**	**Δ**	**POST**	**PRE**	**Δ**	**POST**
Ruderal		0	82	2.0	(0.8)	1.2	3.4	(0.1)	3.2	0.9	(0.9)	-	-	-	-	1.3	(1.3)	-	-	-	-
Vineyard	good	C	74	-	-	3.8	-	1.9	1.9	-	-	7.5	-	-	1.7	-	-	3.5	-	-	0.7
Vineyard	good	D	80	-	-	-	-	0.4	0.4	-	-	-	-	-	-	-	-	13.0	-	-	3.0
Range	poor	C	86	-	-	-	-	-	-	0.6	(0.6)	-	-	-	-	-	-	-	-	-	-
Range	fair	C	79	-	-	-	0.0	-	0.0	0.9	(0.9)	-	0.5	(0.5)	-	2.0	(2.0)	-	0.6	(0.6)	-
Range	good	C	74	4.5	(1.7)	2.8	-	-	-	3.9	(3.9)	-	1.0	(1.0)	-	0.0	(0.0)	-	-	-	-
Range	poor	D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Range	fair	D	84	-	-	-	2.0	(0.1)	1.9	-	-	-	-	-	-	10.7	(10.7)	-	2.9	(2.9)	-
Range	good	D	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Woods-Grass Combo	poor	C	82	-	-	-	-	-	-	0.1	(0.1)	-	-	-	-	-	-	-	-	-	-
Woods-Grass Combo	fair	C	76	-	-	-	-	-	-	0.8	(0.8)	-	0.0	(0.0)	-	1.2	(1.2)	-	0.0	(0.0)	-
Woods-Grass Combo	good	C	72	1.9	(1.2)	0.7	3.1	(1.9)	1.2	0.2	(0.2)	-	0.2	(0.2)	-	-	-	-	-	-	-
Woods-Grass Combo	fair	D	82	-	-	-	0.2	(0.0)	0.2	-	-	-	-	-	-	1.3	(1.3)	-	0.1	(0.1)	-
Woods-Grass Combo	good	D	79	-	-	-	0.2	(0.2)	0.0	-	-	-	-	-	-	-	-	-	-	-	-
		Total Acres		**8.4**		**8.4**	**8.9**		**8.9**	**7.5**		**7.5**	**1.7**		**1.7**	**16.5**		**16.5**	**3.7**		**3.7**
		Weighted Cn		**75**		**75**	**79**		**79**	**77**		**74**	**75**		**74**	**82**		**79**	**83**		**79**