

SOIL LOSS ANALYSIS
CRUSH PARTNERS VINEYARD
NEW VINEYARD DEVELOPMENT
AND VINEYARD REPLANT
WOODEN VALLEY ROAD
NAPA, CA 95448
APN 033-020-040
JUNE 17, 2025



The following analysis evaluates the proposed development of approximately 18.3 acres of new and replanted vineyard (plus 0.3 acres of dirt road, to be managed as vineyard avenue) on the referenced, approximately 28-acre parcel east of St. Helena, California, to determine the project's potential to increase soil loss or sediment delivery from the site. This analysis was prepared by David Steiner, CPESC, CPSWQ, at the request and under the supervision of Mr. Mike Muelrath, PE, of Applied Civil Engineering. The analysis has adapted the Universal Soil Loss Equation (USLE) protocol developed by the Napa RCD, with guidance from the NRCS (SCS) Field Office Technical Guide, to requirements of the Napa County Engineering Division. Specifications of the Erosion Control Plan are also designed to assure adherence to the USDA soil loss tolerance "T." The transects modeled were drawn on the accompanying map, provided by Applied Civil Engineering. The accompanying Excel spreadsheet¹ incorporates USLE principles and formulas, as follows:

- The "R" (rainfall) value is derived from the median value of the predicted range of 2-year/6-hour storms for this site, according to NOAA Atlas 14. A printout of the NOAA Atlas 14 table for the site accompanies this analysis.
- The "K" (soil erosivity) and "T" (soil loss tolerance) values were taken from the Napa County Web Soil Survey.
- The "LS" (slope length) value is calculated per algorithms based on USDA empirical data, using plotted slope lengths and gradients, over four representative transects through the proposed vineyard areas.
- Pre-project "C": Cover values were assigned based on a site inspection on November 13, 2024, and examination of aerial photographic imagery (Google Earth and the Napa County GIS).
 - Transect 1N:
 - Segment 1: No Canopy; 85% cover: 60G, 40W
 $C = .010 \times .6 + .032 \times .4 = .0188$
 - Segment 2: No Canopy; 80% cover: 70G, 30W
 $C = .013 \times .7 + .043 \times .3 = .022$

¹ This Excel format segments modeled transects according to the most complex variable or USLE factor describing conditions along the transect. For example, a transect with five different types or levels of canopy or vegetative cover—but with uniform slope throughout—would nonetheless be assigned five separate slope entries (even though they were all the same), as the transect's segmentation (for all factors) would be based on cover, its most complex variable.

- Transect 1NE:
 - Segment 1: No Canopy; 80% cover: 60G, 40W
 $C = .013 \times .6 + .043 \times .4 = .0328$
 - Segment 2: No Canopy; 85% cover: 50G, 50W
 $C = .010 \times .5 + .032 \times .5 = .021$
- Transect 1SW:
 - Segment 1: No Canopy; 70% cover: 50G, 50W
 $C = .028 \times .5 + .067 \times .5 = .0475$
 - Segment 2: No Canopy; 70% cover: 50G, 50W
 $C = .028 \times .5 + .067 \times .5 = .0475$
- Transect 1S:
 - Segment 1: No Canopy; 70% cover: 40G, 60W
 - $C = .028 \times .4 + .067 \times .6 = .0514$ Segment 2:
 Segment 2: No Canopy; 70% cover: 50G, 50W
 $C = .028 \times .5 + .067 \times .5 = .0475$
 - Segment 3: Existing Vineyard: 65% alt-till
 $C = .073 \times .5 + .058 \times .5 = .0655$
 - Segment 4: Existing Vineyard: 65% alt-till
 $C = .073 \times .5 + .058 \times .5 = .0655$
 - Segment 5: Existing Vineyard: 65% alt-till
 $C = .073 \times .5 + .058 \times .5 = .0655$
- Transect 1SW:
 - Segment 1: Existing Vineyard: 65% alt-till
 $C = .073 \times .5 + .058 \times .5 = .0655$
 - Segment 2: Existing Vineyard: 65% alt-till
 $C = .073 \times .5 + .058 \times .5 = .0655$
- Transect 2:
 - Segment 1: Existing Vineyard: 65% alt-till
 $C = .073 \times .5 + .058 \times .5 = .0655$
 - Segment 2: Existing Vineyard: 65% alt-till
 $C = .073 \times .5 + .058 \times .5 = .0655$
 - Segment 3: Existing Vineyard: 65% alt-till
 $C = .073 \times .5 + .058 \times .5 = .0655$
- Transect 2N:
 - Segment 1: No Canopy; 70% cover: 40G, 60W
 $C = .028 \times .4 + .067 \times .6 = .0514$
 - Segment 2: No Canopy; 75% cover: 50G, 50W
 $C = .020 \times .5 + .055 \times .5 = .0375$
- Transect 3: No Canopy; 75% cover: 60G, 40W
 $C = .029 \times .6 + .055 \times .4 = .0348$
- **Post-project “C” values (.034)** are based on the cover specifications of the Erosion Control Plan, calling for 75% non-tilled cover. Specifications for cover maintenance on vineyard avenues are the same as those within vineyard blocks, whether or not the avenues are adjacent to the blocks. Supplementary practices such as annual applications

of seed and straw mulch may be necessary to compensate for ground disturbance related to tractor and equipment traffic.

- **Pre-project “P”** values are assigned the default maximum (1.00), indicating no “practice” reduction in soil loss. **Post-project “P”** values are reduced in Transect 3, recognizing the proposed cross-slope row direction (for that transect) with non-tilled management.

Conclusion: With the assumption that the specified cover levels will be maintained, calculations predict that the net soil loss in each of the vineyard blocks will exceed neither pre-project levels nor the USDA soil loss tolerance. (Please see accompanying Excel printouts.)

Crush Partners
Pre-Project USLE
June 17, 2025
2/6 storm, inches

1.75

Transect Identification		Transect 1 SE, pre-project					
Acres		4	acres				
Total Slope Length		518	feet				
Number of Segments		2	segments				
		1	2	3	4	5	
R		55.74	55.74	55.74	55.74	55.74	
Factor (F)		0.35	0.65	0.00	0.00	0.00	
Slope Length		518	518				
Slope %		15.1	5.4				
LS		5.43	1.34	0.00	0.00	0.00	
K		0.43	0.43				
C		0.066	0.066				65/alt-till
P		1.00	1.00				
T		3.00	3.00	3.00	3.00	3.00	3.00
(F) (LS) (K) (C)		0.0538925	0.0247	0.0000	0.0000	0.0000	0.0786
A = (R) (F) (LS) (K) (C) (P)		3.00	1.38	0.00	0.00	0.00	4.38

tons/acre/year
17.52 tons/year

Transect Identification		Transect 1 S, pre-project					
Acres		5.8	acres				
Total Slope Length		940	feet				
Number of Segments		5	segments				
		1	2	3	4	5	
R		55.74	55.74	55.74	55.74	55.74	
Factor (F)		0.09	0.16	0.21	0.25	0.28	
Slope Length		940	940	940	940	940	
Slope %		8.0	17.6	20.7	8.0	1.6	
LS		3.03	8.99	11.16	3.03	0.33	
K		0.43	0.43	0.43	0.43	0.37	
C		0.051	0.048	0.066	0.066	0.066	/65 alt
P		1.00	1.00	1.00	1.00	1.00	
T		3.00	3.00	3.00	5.00	5.00	4.03
(F) (LS) (K) (C)		0.0060357	0.0294	0.0660	0.0214	0.0023	0.1251
A = (R) (F) (LS) (K) (C) (P)		0.34	1.64	3.68	1.19	0.13	6.97

tons/acre/year
40.43 tons/year

Page 1

Crush Partners
Post-Project USLE
June 17, 2025
2/6 storm, inches

1.75

Transect Identification		Transect 1 SE, post-project					
Acres		4	acres				
Total Slope Length		518	feet				
Number of Segments		2	segments				
		1	2	3	4	5	
R		55.74	55.74	55.74	55.74	55.74	
Factor (F)		0.35	0.65	0.00	0.00	0.00	
Slope Length		518	518				
Slope %		15.1	5.4				
LS		5.43	1.34	0.00	0.00	0.00	
K		0.43	0.43				
C		0.034	0.034				75NT
P		1.00	1.00				
T		3.00	3.00	3.00	3.00	3.00	3.00
(F) (LS) (K) (C)		0.02776281	0.0127	0.0000	0.0000	0.0000	0.0405
A = (R) (F) (LS) (K) (C) (P)		1.55	0.71	0.00	0.00	0.00	2.26

tons/acre/year
9.02 tons/year

Transect Identification		Transect 1 S, post-project					
Acres		5.8	acres				
Total Slope Length		940	feet				
Number of Segments		5	segments				
		1	2	3	4	5	
R		55.74	55.74	55.74	55.74	55.74	
Factor (F)		0.09	0.16	0.21	0.25	0.28	
Slope Length		940	940	940	940	940	
Slope %		21.4	25.2	4.6	3.1		
LS		11.66	14.43	1.48	0.58	0.11	
K		0.43	0.43	0.43	0.43	0.37	
C		0.034	0.034	0.034	0.034	0.034	75NT
P		1.00	1.00	1.00	1.00	1.00	
T		3.00	3.00	3.00	5.00	5.00	4.03
(F) (LS) (K) (C)		0.01534177	0.0337	0.0046	0.0021	0.0004	0.0561
A = (R) (F) (LS) (K) (C) (P)		0.86	1.88	0.25	0.12	0.02	3.13

tons/acre/year
18.15 tons/year

Transect Identification		Transect 1 SW, pre-project				
Acres		0.9 acres				
Total Slope Length		162 feet				
Number of Segments		2 segments				
		1	2	3	4	5
R		55.74	55.74	55.74	55.74	55.74
Factor (F)		0.35	0.65	0.00	0.00	0.00
Slope Length		162	162			
Slope %		2.5	24.7			
LS		0.28	5.84	0.00	0.00	0.00
K		0.43	0.43			
C		0.048	0.048			
P		1.00	1.00	1.00	1.00	1.00
T		1.00	3.00		3.00	2.30
(F) (LS) (K) (C)		0.0019991	0.0775	0.0000	0.0000	0.0000
A = (R) (F) (LS) (K) (C) (P)		0.11	4.32	0.00	0.00	0.00

tons/acre/year

3.99 tons/year

Transect Identification		Transect 1 SW, post-project				
Acres		0.9 acres				
Total Slope Length		162 feet				
Number of Segments		2 segments				
		1	2	3	4	5
R		55.74	55.74	55.74	55.74	55.74
Factor (F)		0.35	0.65	0.00	0.00	0.00
Slope Length		162	162			
Slope %		2.5	24.7			
LS		0.28	5.84	0.00	0.00	0.00
K		0.43	0.43			
C		0.034	0.034			75NT
P		1.00	1.00			
T		3.00	3.00		3.00	3.00
(F) (LS) (K) (C)		0.00143092	0.0555	0.0000	0.0000	0.0000
A = (R) (F) (LS) (K) (C) (P)		0.08	3.09	0.00	0.00	0.00

tons/acre/year

2.85 tons/year

Transect Identification		Transect 1 N, pre-project				
Acres		1.5 acres				
Total Slope Length		224 feet				
Number of Segments		2 segments				
		1	2	3	4	5
R		55.74	55.74	55.74	55.74	55.74
Factor (F)		0.35	0.65	0.00	0.00	0.00
Slope Length		224	224			
Slope %		4.5	15.2			
LS		0.63	3.60	0.00	0.00	0.00
K		0.43	0.43			
C		0.019	0.022			
P		1.00	1.00	1.00	1.00	1.00
T		3.00	3.00		3.00	3.00
(F) (LS) (K) (C)		0.0017851	0.0221	0.0000	0.0000	0.0000
A = (R) (F) (LS) (K) (C) (P)		0.10	1.23	0.00	0.00	0.00

tons/acre/year

2.00 tons/year

Transect Identification		Transect 1 N, post-project				
Acres		1.5 acres				
Total Slope Length		224 feet				
Number of Segments		2 segments				
		1	2	3	4	5
R		55.74	55.74	55.74	55.74	55.74
Factor (F)		0.35	0.65	0.00	0.00	0.00
Slope Length		224	224			
Slope %		4.5	15.2			
LS		0.63	3.60	0.00	0.00	0.00
K		0.43	0.43			
C		0.034	0.034			75NT
P		1.00	1.00	1.00	1.00	1.00
T		3.00	3.00		3.00	3.00
(F) (LS) (K) (C)		0.00322838	0.0342	0.0000	0.0000	0.0000
A = (R) (F) (LS) (K) (C) (P)		0.18	1.91	0.00	0.00	0.00

tons/acre/year

3.13 tons/year

Transect Identification		Transect 1 NE, pre-project					
Acres		1.3	acres				
Total Slope Length		190	feet				
Number of Segments		2	segments				
		1	2	3	4	5	
R		55.74	55.74	55.74	55.74	55.74	
Factor (F)		0.35	0.65	0.00	0.00	0.00	
Slope Length		190	190				
Slope %		3.5	21.1				
LS		0.41	5.15	0.00	0.00	0.00	
K		0.43	0.43				
C		0.033	0.021				
P		1.00	1.00	1.00	1.00	1.00	
T		3.00	3.00			3.00	3.00
(F) (LS) (K) (C)		0.0020059	0.0302	0.0000	0.0000	0.0000	0.0322
A = (R) (F) (LS) (K) (C) (P)		0.11	1.68	0.00	0.00	0.00	1.80
							2.33
A = (R) (F) (LS) (K) (C) (P)		0.13	7.63	0.00	0.00	0.00	7.76
							15.52

tons/acre/year
tons/year
tons/acre/year
tons/year

Transect Identification		Transect 1 NE, post-project					
Acres		1.3	acres				
Total Slope Length		190	feet				
Number of Segments		2	segments				
		1	2	3	4	5	
R		55.74	55.74	55.74	55.74	55.74	
Factor (F)		0.35	0.65	0.00	0.00	0.00	
Slope Length		190	190				
Slope %		3.5	21.1				
LS		0.41	5.15	0.00	0.00	0.00	
K		0.43	0.43				
C		0.034	0.034				75NT
P		0.37	0.67	1.00	1.00	1.00	
T		3.00	3.00			3.00	3.00
(F) (LS) (K) (C)		0.00207928	0.0489	0.0000	0.0000	0.0000	0.0510
A = (R) (F) (LS) (K) (C) (P)		0.04	1.83	0.00	0.00	0.00	1.87
							2.43
A = (R) (F) (LS) (K) (C) (P)		0.05	13.40	0.00	0.00	0.00	13.45
							17.48

tons/acre/year
tons/year
tons/acre/year
tons/year

Transect Identification		Transect 2, pre-project					
Acres		4.7	acres				
Total Slope Length		351	feet				
Number of Segments		3	segments				
		1	2	3	4	5	
R		55.74	55.74	55.74	55.74	55.74	
Factor (F)		0.19	0.35	0.46	0.00	0.00	
Slope Length		351	351	351			
Slope %		14.5	3.4	4.3			
LS		4.23	0.47	0.72	0.00	0.00	
K		0.43	0.37	0.37			
C		0.066	0.066	0.066			65 alt-till
P		1.00	1.00	1.00			
T		3.00	5.00	5.00			4.62
(F) (LS) (K) (C)		0.0227912	0.0041	0.0080	0.0000	0.0000	0.0349
A = (R) (F) (LS) (K) (C) (P)		1.27	0.23	0.45	0.00	0.00	1.94
							9.14

tons/acre/year
tons/year

Transect Identification		Transect 2, post-project					
Acres		4.7	acres				
Total Slope Length		351	feet				
Number of Segments		3	segments				
		1	2	3	4	5	
R		55.74	55.74	55.74	55.74	55.74	
Factor (F)		0.19	0.35	0.46	0.00	0.00	
Slope Length		351	351	351			
Slope %		14.5	3.4	4.3			
LS		4.23	0.47	0.72	0.00	0.00	
K		0.43	0.37	0.37			
C		0.034	0.034	0.034			75NT
P		1.00	1.00	1.00			
T		3.00	5.00	5.00			4.62
(F) (LS) (K) (C)		0.01174092	0.0021	0.0041	0.0000	0.0000	0.0180
A = (R) (F) (LS) (K) (C) (P)		0.65	0.12	0.23	0.00	0.00	1.00
							4.71

tons/acre/year
tons/year

Transect Identification		Transect 2N, pre-project				
Acres		0.7 acres				
Total Slope Length		192 feet				
Number of Segments		2 segments				
	1	2	3	4	5	
R	55.74	55.74	55.74	55.74	55.74	
Factor (F)	0.35	0.65	0.00	0.00	0.00	
Slope Length	192	192				
Slope %	26.0	17.7				
LS	6.79	4.09	0.00	0.00	0.00	
K	0.43	0.43				
C	0.051	0.038				
P	1.00	1.00				
T	3.00	3.00				3.00
(F) (LS) (K) (C)	0.0524979	0.0429	0.0000	0.0000	0.0000	0.0954
A = (R) (F) (LS) (K) (C) (P)	2.93	2.39	0.00	0.00	0.00	5.32

tons/acre/year

3.72 tons/year

Transect Identification		Transect 2N, post-project				
Acres		0.7 acres				
Total Slope Length		192 feet				
Number of Segments		2 segments				
	1	2	3	4	5	
R	55.74	55.74	55.74	55.74	55.74	
Factor (F)	0.35	0.65	0.00	0.00	0.00	
Slope Length	192	192				
Slope %	26.0	17.7				
LS	6.79	4.09	0.00	0.00	0.00	
K	0.43	0.43				
C	0.034	0.034				75NT
P	1.00	1.00				
T	3.00	3.00				3.00
(F) (LS) (K) (C)	0.03472622	0.0389	0.0000	0.0000	0.0000	0.0736
A = (R) (F) (LS) (K) (C) (P)	1.94	2.17	0.00	0.00	0.00	4.10

tons/acre/year

2.87 tons/year

Transect Identification		Transect 3, pre-project				
Acres		0.8 acres				
Total Slope Length		100 feet				
Number of Segments		1 segment				
	1	2	3	4	5	
R	55.74	55.74	55.74	55.74	55.74	
Factor (F)	1.00	0.00	0.00	0.00	0.00	
Slope Length	100					
Slope %	16.0					
LS	2.58	0.00	0.00	0.00	0.00	
K	0.43					
C	0.035					
P	1.00					
T	3.00					3.00
(F) (LS) (K) (C)	0.0385837	0.0000	0.0000	0.0000	0.0000	0.0386
A = (R) (F) (LS) (K) (C) (P)	2.15	0.00	0.00	0.00	0.00	2.15

tons/acre/year

1.72 tons/year

Transect Identification		Transect 3, post-project				
Acres		0.8 acres				
Total Slope Length		100 feet				
Number of Segments		1 segment				
	1	2	3	4	5	
R	55.74	55.74	55.74	55.74	55.74	
Factor (F)	1.00	0.00	0.00	0.00	0.00	
Slope Length	100					
Slope %	16.0					
LS	2.58	0.00	0.00	0.00	0.00	
K	0.43					
C	0.034					75NT
P	0.60					cross/NT
T	3.00					3.00
(F) (LS) (K) (C)	0.03769669	0.0000	0.0000	0.0000	0.0000	0.0377
A = (R) (F) (LS) (K) (C) (P)	1.26	0.00	0.00	0.00	0.00	1.26

tons/acre/year

1.01 tons/year

Predicted Pre-project Soil Loss (Tons/Year) 84.90
Predicted Post-project Soil Loss (Tons/Year) 54.53
Predicted Post-project Soil Loss (Tons/Acre/Year) 2.98

[Home](#)[Site Map](#)[Organization](#)[Search](#)[NWS](#) [All NOAA](#) [Go](#)

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[Homepage](#)
[Progress Reports](#)
[FAQ](#)
[Glossary](#)

Precipitation Frequency

[Data Server](#)
[GIS Grids](#)
[Maps](#)
[Time Series](#)
[Temporals](#)
[Documents](#)

Probable Maximum Precipitation

[Documents](#)
[Miscellaneous](#)
[Publications](#)
[Storm Analysis](#)
[Record Precipitation](#)

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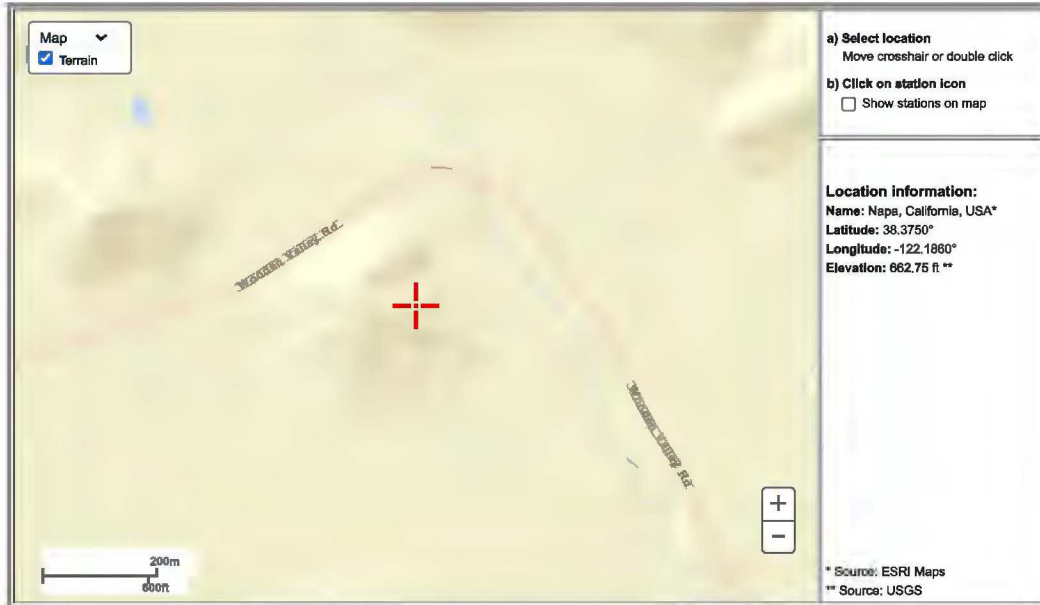
NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: CA

Data description

Data type: Precipitation depth Units: English Time series type: Partial duration

Select location

1) Manually:

a) By location (decimal degrees, use "-" for S and W): Latitude: Longitude: b) By station (list of CA stations): c) By address 2) Use map (if ESRI interactive map is not loading, try adding the host: <https://js.arcgis.com/> to the firewall, or contact us at hdsc.questions@noaa.gov):POINT PRECIPITATION FREQUENCY (PF) ESTIMATES
WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 6, Version 2[PF tabular](#)[PF graphical](#)[Supplementary information](#)[Print page](#)

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.135 (0.121-0.154)	0.170 (0.151-0.193)	0.214 (0.190-0.244)	0.251 (0.221-0.289)	0.302 (0.255-0.360)	0.341 (0.281-0.417)	0.381 (0.306-0.480)	0.423 (0.329-0.550)	0.481 (0.357-0.747)	0.527 (0.376-0.747)
10-min	0.194 (0.173-0.220)	0.243 (0.216-0.276)	0.307 (0.272-0.350)	0.360 (0.316-0.414)	0.432 (0.365-0.517)	0.488 (0.403-0.598)	0.546 (0.438-0.687)	0.606 (0.471-0.788)	0.690 (0.511-0.940)	0.756 (0.539-1.07)
15-min	0.235 (0.209-0.266)	0.294 (0.261-0.334)	0.372 (0.329-0.423)	0.435 (0.383-0.501)	0.523 (0.442-0.625)	0.591 (0.487-0.723)	0.660 (0.530-0.831)	0.733 (0.570-0.953)	0.834 (0.618-1.14)	0.914 (0.652-1.30)
30-min	0.334 (0.298-0.379)	0.418 (0.372-0.475)	0.529 (0.469-0.602)	0.620 (0.544-0.713)	0.744 (0.629-0.889)	0.841 (0.694-1.03)	0.940 (0.754-1.18)	1.04 (0.811-1.36)	1.19 (0.880-1.62)	1.30 (0.927-1.84)
60-min	0.483 (0.430-0.547)	0.604 (0.537-0.686)	0.764 (0.677-0.870)	0.895 (0.786-1.03)	1.07 (0.908-1.28)	1.21 (1.00-1.49)	1.36 (1.09-1.71)	1.51 (1.17-1.96)	1.71 (1.27-2.34)	1.88 (1.34-2.66)
2-hr	0.728 (0.648-0.825)	0.908 (0.806-1.03)	1.14 (1.01-1.30)	1.34 (1.18-1.54)	1.60 (1.35-1.91)	1.80 (1.49-2.21)	2.01 (1.61-2.53)	2.22 (1.73-2.89)	2.52 (1.87-3.43)	2.75 (1.96-3.90)
3-hr	0.932 (0.830-1.06)	1.16 (1.03-1.32)	1.46 (1.30-1.67)	1.71 (1.50-1.97)	2.04 (1.73-2.44)	2.30 (1.90-2.81)	2.56 (2.05-3.22)	2.83 (2.20-3.68)	3.20 (2.37-4.36)	3.49 (2.49-4.94)
6-hr	1.39 (1.24-1.58)	1.75 (1.55-1.98)	2.20 (1.95-2.51)	2.57 (2.26-2.96)	3.07 (2.60-3.67)	3.45 (2.85-4.23)	3.84 (3.08-4.83)	4.23 (3.29-5.50)	4.77 (3.54-6.50)	5.19 (3.70-7.35)
12-hr	1.93 (1.72-2.19)	2.47 (2.20-2.81)	3.16 (2.81-3.60)	3.72 (3.27-4.28)	4.46 (3.77-5.33)	5.02 (4.14-6.14)	5.58 (4.48-7.02)	6.15 (4.78-8.00)	6.92 (5.13-9.43)	7.51 (5.36-10.6)
24-hr	2.69 (2.42-3.05)	3.51 (3.15-3.98)	4.55 (4.08-5.17)	5.38 (4.80-6.16)	6.49 (5.63-7.64)	7.32 (6.24-8.77)	8.15 (6.81-9.96)	9.00 (7.35-11.3)	10.1 (7.98-13.1)	11.0 (8.41-14.6)
2-day	3.52 (3.17-3.99)	4.57 (4.11-5.19)	5.92 (5.31-6.73)	6.99 (6.23-8.01)	8.43 (7.31-9.91)	9.51 (8.10-11.4)	10.6 (8.84-12.9)	11.7 (9.54-14.6)	13.2 (10.4-17.0)	14.3 (10.9-19.0)
3-day	4.14 (3.73-4.70)	5.37 (4.83-6.09)	6.92 (6.21-7.87)	8.17 (7.28-9.35)	9.83 (8.53-11.8)	11.1 (9.45-13.3)	12.3 (10.3-15.1)	13.6 (11.1-17.0)	15.3 (12.1-19.9)	16.7 (12.8-22.2)
4-day	4.61 (4.15-5.22)	5.97 (5.37-6.77)	7.69 (6.90-8.74)	9.06 (8.08-10.4)	10.9 (9.44-12.8)	12.3 (10.5-14.7)	13.6 (11.4-16.7)	15.0 (12.3-18.8)	16.9 (13.3-21.9)	18.3 (14.0-24.4)
7-day	5.68 (5.11-6.44)	7.40 (6.65-8.39)	9.54 (8.56-10.9)	11.2 (10.0-12.9)	13.4 (11.6-15.8)	15.1 (12.8-18.0)	16.7 (13.9-20.4)	18.3 (14.9-22.9)	20.4 (16.1-26.4)	22.1 (16.9-29.4)
10-day	6.38 (5.72-7.21)	8.31 (7.48-9.43)	10.7 (9.62-12.2)	12.6 (11.2-14.4)	15.0 (13.0-17.7)	16.8 (14.3-20.1)	18.5 (15.5-22.6)	20.2 (16.5-25.3)	22.5 (17.7-29.1)	24.2 (18.5-32.2)
20-day	8.29 (7.46-9.39)	10.9 (9.76-12.3)	14.0 (12.5-15.9)	16.3 (14.5-18.7)	19.3 (16.7-22.7)	21.4 (18.2-25.6)	23.4 (19.6-28.6)	25.4 (20.7-31.8)	28.0 (22.0-36.2)	29.8 (22.9-39.8)
30-day	10.1 (9.05-11.4)	13.1 (11.8-14.9)	16.8 (15.0-19.1)	19.5 (17.4-22.3)	22.9 (19.9-27.0)	25.3 (21.6-30.3)	27.6 (23.0-33.7)	29.8 (24.3-37.2)	32.6 (25.7-42.1)	34.6 (26.5-46.1)
45-day	12.3 (11.0-13.9)	15.9 (14.3-18.0)	20.1 (18.0-22.8)	23.2 (20.7-26.6)	27.1 (23.5-31.8)	29.7 (25.3-35.6)	32.2 (26.9-39.3)	34.6 (28.2-43.2)	37.5 (29.6-48.6)	39.7 (30.4-52.9)
60-day	14.7	18.8	23.6	27.1	31.4	34.3	37.0	39.5	42.7	45.0

(13.3-16.7) (16.9-21.4) (21.2-26.8) (24.2-31.0) (27.2-36.9) (29.2-41.0) (30.9-45.2) (32.3-49.4) (33.7-55.3) (34.4-59.9)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parentheses are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in CSV format: Precipitation frequency estimates ▾

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2/2

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Properties and Qualities Ratings

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Soil Chemical Properties

Soil Erosion Factors

K Factor, Rock Free

K Factor, Whole Soil

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

Layer Options (Horizon Aggregation Method)

☒ Surface Layer (Not applicable)

☐ Depth Range (Weighted Average)

Top Depth

Bottom Depth

☐ Inches

☐ Centimeters

☐ All Layers (Weighted Average)

View Description View Rating

T Factor

Wind Erodibility Group

Wind Erodibility Index

Soil Health Properties

Soil Physical Properties

Soil Qualities and Features

Water Features

Map — K Factor, Whole Soil

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. Mapping of soils is done at a particular scale. The soil surveys that comprise your AOI were mapped at 1:24,000. The design of map units and the level of detail shown in the resulting soil map are dependent on that map 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.

Tables — K Factor, Whole Soil — Summary By Map Unit

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

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
112	Bressa-Dibble complex, 5 to 15 percent slopes	.43	24.3	9.8%
113	Bressa-Dibble complex, 15 to 30 percent slopes	.43	10.4	4.2%
117	Clear Lake clay, overwashed	.32	0.9	0.4%
118	Cole silt loam, 0 to 2 percent slopes, MLRA 14	.37	42.6	17.1%
132	Fagan clay loam, 15 to 30 percent slopes	.32	9.5	3.8%
133	Fagan clay loam, 30 to 50 percent slopes	.32	6.5	2.6%
146	Haire loam, 2 to 9 percent slopes	.32	15.1	6.1%
161	Maxwell clay, 2 to 9 percent slopes	.24	1.4	0.6%
170	Pleasanton loam, 0 to 2 percent slopes, MLRA 14	.43	138.0	55.5%
Totals for Area of Interest			248.8	100.0%

Description — K Factor, Whole Soil

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.
"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.
Factor K does not apply to organic horizons and is not reported for those layers.

Rating Options — K Factor, Whole Soil

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

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Natural Resources Conservation Service

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Soil Survey Status

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Properties and Qualities Ratings

Open All

Close All

Soil Chemical Properties

Soil Erosion Factors

K Factor, Rock Free

K Factor, Whole Soil

T Factor

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

Interpret Nulls as Zero

Yes

No

View Description

View Rating

Wind Erodibility Group

Wind Erodibility Index

Soil Health Properties

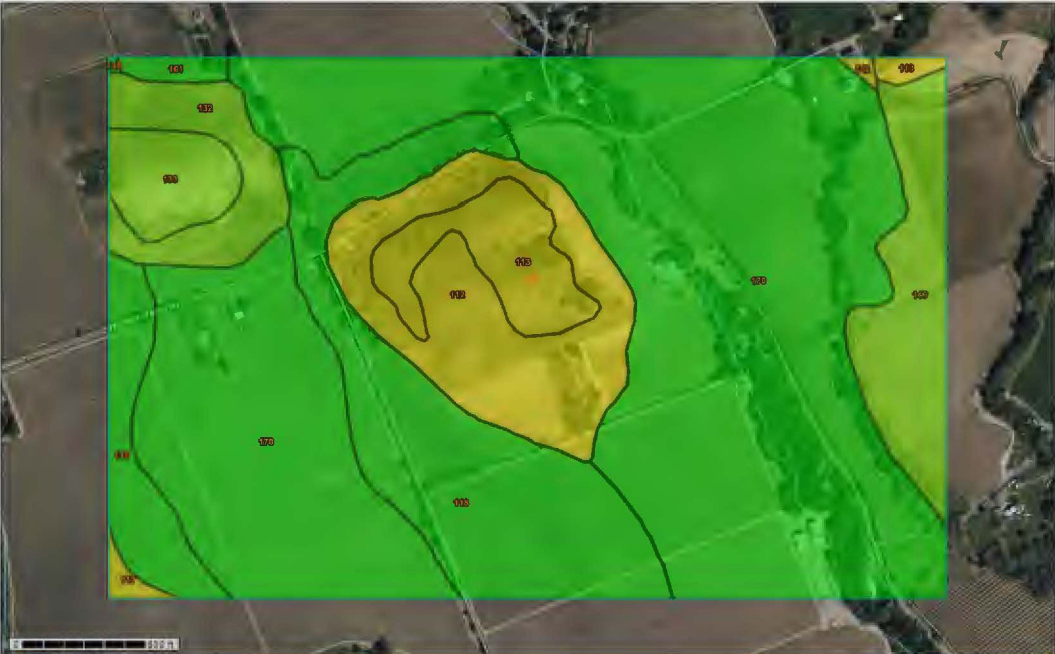
Soil Physical Properties

Soil Qualities and Features

Water Features

Map — T Factor

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. Mapping of soils is done at a particular scale. The soil surveys that comprise your AOI were mapped at 1:24,000. The design of map units and the level of detail shown in the resulting soil map are dependent on that map 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.

Tables — T Factor — Summary By Map Unit

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

Map unit symbol	Map unit name	Rating (tons per acre per year)	Acres in AOI	Percent of AOI
112	Bressa-Dibble complex, 5 to 15 percent slopes	3	24.3	9.8%
113	Bressa-Dibble complex, 15 to 30 percent slopes	3	10.4	4.2%
117	Clear Lake clay, overwashed	3	0.9	0.4%
118	Cole silt loam, 0 to 2 percent slopes, MLRA 14	5	42.6	17.1%
132	Fagan clay loam, 15 to 30 percent slopes	4	9.5	3.8%
133	Fagan clay loam, 30 to 50 percent slopes	4	6.5	2.6%
146	Haire loam, 2 to 9 percent slopes	4	15.1	6.1%
161	Maxwell clay, 2 to 9 percent slopes	5	1.4	0.6%
170	Pleasanton loam, 0 to 2 percent slopes, MLRA 14	5	138.0	55.5%
Totals for Area of Interest			248.8	100.0%

Description — T Factor

The T factor is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Rating Options — T Factor

Units of Measure: tons per acre per year

Aggregation Method: Dominant Condition

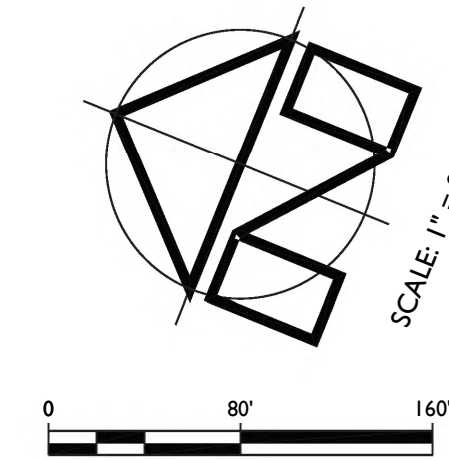
Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

1/1



ASSESSOR'S PARCEL NUMBER:
033-020-040

1. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES. TOPOGRAPHIC INFORMATION WAS TAKEN FROM THE NAPA COUNTY GEOGRAPHIC INFORMATION SYSTEM DATABASE. 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: FIVE (5) FEET, HIGHLIGHTED EVERY TWENTY FIVE (25) FEET
4. BENCHMARK: 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.

ACCORDING TO THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) MAP NUMBER 06095C0125E AND 06095C0230E, EFFECTIVE MAY 4, 2009, THE PROJECT SITE IS NOT LOCATED IN A SPECIAL FLOOD HAZARD AREA.

112	BRESSA-DIBBLE COMPLEX, 5 TO 15 PERCENT SLOPES
113	BRESSA-DIBBLE COMPLEX, 15 TO 30 PERCENT SLOPES
118	COLE SILT LOAM, 0 TO 2 PERCENT SLOPES
170	PLEASANTON LOAM, 0 TO 2 PERCENT SLOPES

 APPROXIMATE PROPERTY LINE
 SOIL TYPE BOUNDARY
 EPHEMERAL STREAM
 PROPOSED VINEYARD AVENUE / LIMIT OF GRADING
 PROPOSED VINEYARD BLOCK / LIMIT OF RIPPING
 ROW
 VINE ROWS / VINE ROW DIRECTION
 TRANSECT SEGMENTS