



VINEYARD DESIGN
EROSION CONTROL
WATER DEVELOPMENT
DRAINAGE
PERMITTING
GPS/GIS

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MEMORANDUM

Date: November 9, 2023

To: Raulton Haye, Napa County Planning, Building, and Environmental Services

From: Matthew S. Bueno, P.E.
Rachel L. Rosasco, E.I.T.

Re: Boisset Wappo Hill Track I ECP
APN 039-040-042
Soil Loss Analysis

This memo transmits the findings of a soil loss modeling analysis for the above-referenced Track I Erosion Control Plan (ECP). The Universal Soil Loss Equation (USLE) was used to predict pre-project and post-project soil loss from within the proposed vineyard development areas. A combination of topographic maps, aerial imagery, and a site visit were used to determine pre-project transect locations, slopes, and cover values. Pre-project and post-project cover values are consistent with the United States Department of Agriculture (USDA) – Natural Resource Conservation Service (NRCS) publication titled “The Universal Soil Loss Equation Special Applications for Napa County, California” (May 1994).

A site visit was conducted on September 27, 2023 by Matt Bueno of PPI Engineering to determine the pre-project cover values for each block and/or transect area. All proposed development areas were inspected, and the cover values used in this analysis represent existing conditions at the time of the site visit. Post-project cover values were calculated using the percent cover specified in the ECP. This analysis is limited to the proposed vineyard areas as well as vineyard avenues (16.7 gross acres).

The model, summarized on page 2 of the supporting documents (attached), predicts a net decrease of approximately 45.7 tons of soil loss per year for the project as a whole. The ECP has been designed to ensure compliance with Napa County policies requiring no-net-increase in soil loss for post-project conditions. Please see the following supporting documents that contain data tables, calculations, maps of transect locations, and results from the analysis.



Boisset Wappo Hill Tr I ECP
USLE Calculation Sheets

Boisset Wappo Hill Tr I ECP
 USLE Calculations
 PPI Engineering
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USLE Calculations - Block Summary Sheet

Proposed Block Transect	Proposed Development Acres	Pre-Project Soil Loss (tons/year)	Post-Project Soil Loss (tons/year)	Net Increase/Decrease (tons/year)
1A	1.24	5.54	2.07	3.47
1B	0.27	0.63	0.24	0.39
2	1.01	3.03	1.14	1.90
3	2.49	2.87	2.69	0.18
4	1.18	1.49	1.05	0.44
5	2.05	7.52	3.51	4.01
6	4.16	28.53	5.49	23.04
Ave. 6/7	0.07	0.10	0.03	0.07
7	0.34	1.58	0.45	1.13
8	1.06	6.59	1.27	5.32
9	2.36	7.99	2.72	5.27
Ave. 9/10	0.07	0.08	0.03	0.05
10	0.37	0.76	0.38	0.38
Totals	16.67	66.70	21.05	45.65

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USLE Calculations - Transect Summary Sheet

Proposed Block Transect	Proposed Development Acres	Pre-Project Soil Loss (tons/year)	Post-Project Soil Loss (tons/year)	Net Increase/Decrease (tons/year)
1A	1.24	5.54	2.07	3.47
1B	0.27	0.63	0.24	0.39
2	1.01	3.03	1.14	1.90
3	2.49	2.87	2.69	0.18
4A	0.63	0.94	0.67	0.27
4B	0.55	0.55	0.39	0.17
5A	0.79	3.14	1.47	1.66
5B	1.26	4.38	2.03	2.35
6A	1.77	11.18	2.15	9.03
6B	2.39	17.34	3.34	14.00
Ave. 6/7	0.07	0.10	0.03	0.07
7	0.34	1.58	0.45	1.13
8	1.06	6.59	1.27	5.32
9A	0.80	1.42	0.48	0.94
9B	0.73	2.16	0.73	1.43
9C	0.83	4.41	1.51	2.90
Ave. 9/10	0.07	0.08	0.03	0.05
10	0.37	0.76	0.38	0.38
Totals	16.67	66.70	21.05	45.65

Note: Individual estimates may not add to the totals due to rounding

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Pre-Project Transect 1A

Proposed Development Acres:	1.24
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	191
Number of Segments:	1
Individual Segment Lengths (ft):	191
Segment:	
Gradient (%):	36
m:	
Individual LS:	10.12
Factor:	
Product:	
LS, Length and Steepness:	10.12
Total Transect Average Gradient (%):	36
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	10%
Percent Weeds:	90%
C, Cover (Table 5) ¹ :	0.059
A, Soil Loss (tons/acre):	4.47
Soil Loss in Proposed Development (tons):	5.54

¹ Tables 5 & 6 - USLE Special Applications for Napa County

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Post-Project Transect 1A

Proposed Development Acres:	1.24
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	191
Number of Segments:	1
Individual Segment Lengths (ft):	191
Segment:	
Gradient (%):	36
m:	
Individual LS:	10.12
Factor:	
Product:	
LS, Length and Steepness:	10.12
Total Transect Average Gradient (%):	36
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4) ¹ :	0.022
A, Soil Loss (tons/acre):	1.67
Soil Loss in Proposed Development (tons):	2.07

¹ Tables 4 & 6 - USLE Special Applications for Napa County

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USLE Calculations Pre-Project
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Pre-Project Transect 1B

Proposed Development Acres:	0.27
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	88
Number of Segments:	1
Individual Segment Lengths (ft):	88
Segment:	
Gradient (%):	29
m:	
Individual LS:	5.28
Factor:	
Product:	
LS, Length and Steepness:	5.28
Total Transect Average Gradient (%):	29
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	10%
Percent Weeds:	90%
C, Cover (Table 5) ¹ :	0.059
A, Soil Loss (tons/acre):	2.33
Soil Loss in Proposed Development (tons):	0.63

¹ Tables 5 & 6 - USLE Special Applications for Napa County

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USLE Calculations Post-Project
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Post-Project Transect 1B

Proposed Development Acres:	0.27
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	88
Number of Segments:	1
Individual Segment Lengths (ft):	88
Segment:	
Gradient (%):	29
m:	
Individual LS:	5.28
Factor:	
Product:	
LS, Length and Steepness:	5.28
Total Transect Average Gradient (%):	29
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4) ¹ :	0.022
A, Soil Loss (tons/acre):	0.87
Soil Loss in Proposed Development (tons):	0.24

¹ Tables 4 & 6 - USLE Special Applications for Napa County

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Pre-Project Transect 2

Proposed Development Acres:	1.01
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	160
Number of Segments:	1
Individual Segment Lengths (ft):	160
Segment:	
Gradient (%):	28
m:	
Individual LS:	6.81
Factor:	
Product:	
LS, Length and Steepness:	6.81
Total Transect Average Gradient (%):	28
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	10%
Percent Weeds:	90%
C, Cover (Table 5) ¹ :	0.059
A, Soil Loss (tons/acre):	3.00
Soil Loss in Proposed Development (tons):	3.03

¹ Tables 5 & 6 - USLE Special Applications for Napa County

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Post-Project Transect 2

Proposed Development Acres:	1.01
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	160
Number of Segments:	1
Individual Segment Lengths (ft):	160
Segment:	
Gradient (%):	28
m:	
Individual LS:	6.81
Factor:	
Product:	
LS, Length and Steepness:	6.81
Total Transect Average Gradient (%):	28
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4) ¹ :	0.022
A, Soil Loss (tons/acre):	1.12
Soil Loss in Proposed Development (tons):	1.14

¹ Tables 4 & 6 - USLE Special Applications for Napa County

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Pre-Project Transect 3

Proposed Development Acres:	2.49
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	310
Number of Segments:	1
Individual Segment Lengths (ft):	310
Segment:	
Gradient (%):	26
m:	
Individual LS:	8.63
Factor:	
Product:	
LS, Length and Steepness:	8.63
Total Transect Average Gradient (%):	26
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	80%
Percent Grass:	80%
Percent Weeds:	20%
C, Cover (Table 5) ¹ :	0.018
A, Soil Loss (tons/acre):	1.15
Soil Loss in Proposed Development (tons):	2.87

¹ Tables 5 & 6 - USLE Special Applications for Napa County

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Post-Project Transect 3

Proposed Development Acres:	2.49
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	310
Number of Segments:	1
Individual Segment Lengths (ft):	310
Segment:	
Gradient (%):	26
m:	
Individual LS:	8.63
Factor:	
Product:	
LS, Length and Steepness:	8.63
Total Transect Average Gradient (%):	26
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4) ¹ :	0.017
A, Soil Loss (tons/acre):	1.08
Soil Loss in Proposed Development (tons):	2.69

¹ Tables 4 & 6 - USLE Special Applications for Napa County

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Pre-Project Transect 4A

Proposed Development Acres:	0.63	
Soils Present:		
Soil Unit No. (100-182):	109	105
Soil Name:	Boomer	Bale
R, Rainfall:	50	
Total Transect Length (ft):	156	
Number of Segments:	2	
Individual Segment Lengths (ft):	78	
Segment:	1	2
Segment Soil:	109	105
K, Soil Erodibility:	0.15	0.2
T, Soil Loss Tolerance (tons/acre):	4	5
Gradient (%):	26	22
m:		
Individual LS:	6.12	4.93
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)*:	1.00	
C-Values		
Segment:	1	2
Vegetative Canopy:	No Canopy	No Canopy
Canopy Cover:	0%	0%
Ground Cover:	70%	70%
Percent Grass:	90%	90%
Percent Weeds:	10%	10%
C, Cover (Table 5) ¹ :	0.031	0.031
Factor:	0.35	0.65
Indiivudal C*K*(LS)*Factor:	0.01	0.02
Sum C*K*LS:	0.03	
A, Soil Loss (tons/acre):	1.49	
Soil Loss in Proposed Development (tons) ² :	0.94	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

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Post-Project Transect 4A

Proposed Development Acres:	0.63	
Soils Present:		
Soil Unit No. (100-182):	109	105
Soil Name:	Boomer	Bale
R, Rainfall:	50	
Total Transect Length (ft):	156	
Number of Segments:	2	
Individual Segment Lengths (ft):	78	
Segment:	1	2
Segment Soil:	109	105
K, Soil Erodibility:	0.15	0.2
T, Soil Loss Tolerance (tons/acre):	4	5
Gradient (%):	26	22
m:		
Individual LS:	6.12	4.93
Factor:	0.35	0.65
Individual K*(LS)*Factor:	0.32	0.64
Sum K*LS:	0.96	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) ¹ :	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	80%	
C, Cover (Table 4) ¹ :	0.022	
A, Soil Loss (tons/acre):	1.06	
Soil Loss in Proposed Development (tons) ² :	0.67	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

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Pre-Project Transect 4B

Proposed Development Acres:	0.55
Soil Unit No. (100-182):	105
Soil Name:	Bale
K, Soil Erodibility:	0.2
T, Soil Loss Tolerance (tons/acre):	5
R, Rainfall:	50
Total Transect Length (ft):	111
Number of Segments:	1
Individual Segment Lengths (ft):	111
Segment:	
Gradient (%):	18
m:	
Individual LS:	3.19
Factor:	
Product:	
LS, Length and Steepness:	3.19
Total Transect Average Gradient (%):	18
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Vegetative Canopy:	No Canopy
Canopy Cover:	0%
Ground Cover:	70%
Percent Grass:	90%
Percent Weeds:	10%
C, Cover (Table 5) ¹ :	0.031
A, Soil Loss (tons/acre):	1.00
Soil Loss in Proposed Development (tons):	0.55

¹ Tables 5 & 6 - USLE Special Applications for Napa County

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Post-Project Transect 4B

Proposed Development Acres:	0.55
Soil Unit No. (100-182):	105
Soil Name:	Bale
K, Soil Erodibility:	0.2
T, Soil Loss Tolerance (tons/acre):	5
R, Rainfall:	50
Total Transect Length (ft):	111
Number of Segments:	1
Individual Segment Lengths (ft):	111
Segment:	
Gradient (%):	18
m:	
Individual LS:	3.19
Factor:	
Product:	
LS, Length and Steepness:	3.19
Total Transect Average Gradient (%):	18
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	80%
C, Cover (Table 4) ¹ :	0.022
A, Soil Loss (tons/acre):	0.70
Soil Loss in Proposed Development (tons):	0.39

¹ Tables 4 & 6 - USLE Special Applications for Napa County

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Pre-Project Transect 5A

Proposed Development Acres:	0.79		
Soils Present:			
Soil Unit No. (100-182):	178		
Soil Name:	Sobranite		
R, Rainfall:	50		
Total Transect Length (ft):	256		
Number of Segments:	3		
Individual Segment Lengths (ft):	85		
Segment:	1	2	3
Segment Soil:	178	178	178
K, Soil Erodibility:	0.32	0.32	0.32
T, Soil Loss Tolerance (tons/acre):	2	2	2
Gradient (%):	9	18	24
m:	0.5		
Individual LS:	1.87	4.84	7.07
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)*:	1.00		
C-Values			
Segment:	1	2	3
Vegetative Canopy:	Trees 13' Tall	Trees 13' Tall	Trees 13' Tall
Canopy Cover:	75%	75%	25%
Ground Cover:	60%	60%	60%
Percent Grass:	80%	80%	90%
Percent Weeds:	20%	20%	10%
C, Cover (Table 5) ¹ :	0.048	0.048	0.046
Factor:	0.19	0.35	0.46
Indiivudal C*K*(LS)*Factor:	0.01	0.03	0.05
Sum C*K*LS:	0.08		
A, Soil Loss (tons/acre):	3.97		
Soil Loss in Proposed Development (tons) ² :	3.14		

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

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Post-Project Transect 5A

Proposed Development Acres: 0.79

Soils Present:

Soil Unit No. (100-182): 178
 Soil Name: Sobrante

R, Rainfall: 50

Total Transect Length (ft): 256

Number of Segments: 3

Individual Segment Lengths (ft): 85

Segment:	1	2	3
Segment Soil:	178	178	178
K, Soil Erodibility:	0.32	0.32	0.32
T, Soil Loss Tolerance (tons/acre):	2	2	2
Gradient (%):	9	18	24
m:	0.5		
Individual LS:	1.87	4.84	7.07
Factor:	0.19	0.35	0.46

Individual K*(LS)*Factor: 0.11 0.54 1.04

Sum K*LS: 1.70

Farming Practice: Up & Down Hill

P, Practice Factor (Table 6)¹: 1.00

Cover Strategy: Permanent

Age of Development: Over 3 Years

Ground Cover: 80%

C, Cover (Table 4)¹: 0.022

A, Soil Loss (tons/acre): 1.87

Soil Loss in Proposed Development (tons)²: 1.47

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

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Pre-Project Transect 5B

Proposed Development Acres:	1.26	
Soils Present:		
Soil Unit No. (100-182):	178	105
Soil Name:	Sobranite	Bale
R, Rainfall:	50	
Total Transect Length (ft):	137	
Number of Segments:	2	
Individual Segment Lengths (ft):	69	
Segment:	1	2
Segment Soil:	178	105
K, Soil Erodibility:	0.32	0.2
T, Soil Loss Tolerance (tons/acre):	2	5
Gradient (%):	25	29
m:		
Individual LS:	5.45	6.59
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)*:	1.00	
C-Values		
Segment:	1	2
Vegetative Canopy:	Trees 13' Tall	No Canopy
Canopy Cover:	75%	0%
Ground Cover:	60%	60%
Percent Grass:	80%	90%
Percent Weeds:	20%	10%
C, Cover (Table 5) ¹ :	0.048	0.047
Factor:	0.35	0.65
Indiivudal C*K*(LS)*Factor:	0.03	0.04
Sum C*K*LS:	0.07	
A, Soil Loss (tons/acre):	3.48	
Soil Loss in Proposed Development (tons) ² :	4.38	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

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Post-Project Transect 5B

Proposed Development Acres:	1.26	
Soils Present:		
Soil Unit No. (100-182):	178	105
Soil Name:	Sobranite	Bale
R, Rainfall:	50	
Total Transect Length (ft):	137	
Number of Segments:	2	
Individual Segment Lengths (ft):	69	
Segment:	1	2
Segment Soil:	178	105
K, Soil Erodibility:	0.32	0.2
T, Soil Loss Tolerance (tons/acre):	2	5
Gradient (%):	25	29
m:		
Individual LS:	5.45	6.59
Factor:	0.35	0.65
Individual K*(LS)*Factor:	0.61	0.86
Sum K*LS:	1.47	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) ¹ :	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	80%	
C, Cover (Table 4) ¹ :	0.022	
A, Soil Loss (tons/acre):	1.61	
Soil Loss in Proposed Development (tons) ² :	2.03	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

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Pre-Project Transect 6A

Proposed Development Acres:	1.77	
Soils Present:		
Soil Unit No. (100-182):	179	105
Soil Name:	Sobranite	Bale
R, Rainfall:	50	
Total Transect Length (ft):	390	
Number of Segments:	2	
Individual Segment Lengths (ft):	195	
Segment:	1	2
Segment Soil:	179	105
K, Soil Erodibility:	0.32	0.2
T, Soil Loss Tolerance (tons/acre):	2	5
Gradient (%):	21	27
m:		
Individual LS:	7.33	10.16
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)*:	1.00	
C-Values		
Segment:	1	2
Vegetative Canopy:	Trees 13' Tall	Trees 13' Tall
Canopy Cover:	75%	75%
Ground Cover:	70%	70%
Percent Grass:	10%	10%
Percent Weeds:	90%	90%
C, Cover (Table 5) ¹ :	0.059	0.059
Factor:	0.35	0.65
Individual C*K*(LS)*Factor:	0.05	0.08
Sum C*K*LS:	0.13	
A, Soil Loss (tons/acre):	6.32	
Soil Loss in Proposed Development (tons) ² :	11.18	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

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Post-Project Transect 6A

Proposed Development Acres:	1.77	
Soils Present:		
Soil Unit No. (100-182):	179	105
Soil Name:	Sobranite	Bale
R, Rainfall:	50	
Total Transect Length (ft):	390	
Number of Segments:	2	
Individual Segment Lengths (ft):	195	
Segment:	1	2
Segment Soil:	179	105
K, Soil Erodibility:	0.32	0.2
T, Soil Loss Tolerance (tons/acre):	2	5
Gradient (%):	21	27
m:		
Individual LS:	7.33	10.16
Factor:	0.35	0.65
Individual K*(LS)*Factor:	0.82	1.32
Sum K*LS:	2.14	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) ¹ :	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	90%	
C, Cover (Table 4) ¹ :	0.011	
A, Soil Loss (tons/acre):	1.21	
Soil Loss in Proposed Development (tons) ² :	2.15	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

Boisset Wappo Hill Tr I ECP
 USLE Calculations Pre-Project
 PPI Engineering
 11/9/2023
 RR

Pre-Project Transect 6B

Proposed Development Acres:	2.39	
Soil Unit No. (100-182):	179	
Soil Name:	Sobranite	
K, Soil Erodibility:	0.32	
T, Soil Loss Tolerance (tons/acre):	2	
R, Rainfall:	50	
Total Transect Length (ft):	460	
Number of Segments:	2	
Individual Segment Lengths (ft):	230	
Segment:	1	2
Gradient (%):	25	18
m:		
Individual LS:	10.00	6.49
Factor:	0.35	0.65
Product:	3.50	4.22
LS, Length and Steepness:	7.71	
Total Transect Average Gradient (%):	22	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) ¹ :	1.00	
Vegetative Canopy:	Trees 13' Tall	
Canopy Cover:	75%	
Ground Cover:	70%	
Percent Grass:	10%	
Percent Weeds:	90%	
C, Cover (Table 5) ¹ :	0.059	
A, Soil Loss (tons/acre):	7.26	
Soil Loss in Proposed Development (tons):	17.34	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

Boisset Wappo Hill Tr I ECP
 USLE Calculations Post-Project
 PPI Engineering
 11/9/2023
 RR

Post-Project Transect 6B

Proposed Development Acres:	2.39	
Soil Unit No. (100-182):	179	
Soil Name:	Sobranite	
K, Soil Erodibility:	0.32	
T, Soil Loss Tolerance (tons/acre):	2	
R, Rainfall:	50	
Total Transect Length (ft):	460	
Number of Segments:	2	
Individual Segment Lengths (ft):	230	
Segment:	1	2
Gradient (%):	25	18
m:		
Individual LS:	10.00	6.49
Factor:	0.35	0.65
Product:	3.50	4.22
LS, Length and Steepness:	7.71	
Total Transect Average Gradient (%):	22	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) ¹ :	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	90%	
C, Cover (Table 4) ¹ :	0.011	
A, Soil Loss (tons/acre):	1.40	
Soil Loss in Proposed Development (tons):	3.34	

¹ Tables 4 & 6 - USLE Special Applications for Napa County

Boisset Wappo Hill Tr I ECP
USLE Calculations Pre-Project
PPI Engineering
11/9/2023
RR

Pre-Project Avenue Transect 6/7

Proposed Development Acres:	0.07
Soil Unit No. (100-182):	105
Soil Name:	Bale
K, Soil Erodibility:	0.2
T, Soil Loss Tolerance (tons/acre):	5
R, Rainfall:	50
Total Transect Length (ft):	20
Number of Segments:	1
Individual Segment Lengths (ft):	20
Segment:	
Gradient (%):	29
m:	
Individual LS:	2.52
Factor:	
Product:	
LS, Length and Steepness:	2.52
Total Transect Average Gradient (%):	29
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	10%
Percent Weeds:	90%
C, Cover (Table 5) ¹ :	0.059
A, Soil Loss (tons/acre):	1.48
Soil Loss in Proposed Development (tons):	0.10

¹ Tables 5 & 6 - USLE Special Applications for Napa County

Boisset Wappo Hill Tr I ECP
USLE Calculations Post-Project
PPI Engineering
11/9/2023
RR

Post-Project Avenue Transect 6/7

Proposed Development Acres:	0.07
Soil Unit No. (100-182):	105
Soil Name:	Bale
K, Soil Erodibility:	0.2
T, Soil Loss Tolerance (tons/acre):	5
R, Rainfall:	50
Total Transect Length (ft):	20
Number of Segments:	1
Individual Segment Lengths (ft):	20
Segment:	
Gradient (%):	29
m:	
Individual LS:	2.52
Factor:	
Product:	
LS, Length and Steepness:	2.52
Total Transect Average Gradient (%):	29
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4) ¹ :	0.017
A, Soil Loss (tons/acre):	0.42
Soil Loss in Proposed Development (tons):	0.03

¹ Tables 4 & 6 - USLE Special Applications for Napa County

Boisset Wappo Hill Tr I ECP
USLE Calculations Pre-Project
PPI Engineering
11/9/2023
RR

Pre-Project Transect 7

Proposed Development Acres:	0.34
Soil Unit No. (100-182):	179
Soil Name:	Sobranite
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	2
R, Rainfall:	50
Total Transect Length (ft):	92
Number of Segments:	1
Individual Segment Lengths (ft):	92
Segment:	
Gradient (%):	27
m:	
Individual LS:	4.93
Factor:	
Product:	
LS, Length and Steepness:	4.93
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	10%
Percent Weeds:	90%
C, Cover (Table 5) ¹ :	0.059
A, Soil Loss (tons/acre):	4.64
Soil Loss in Proposed Development (tons):	1.58

¹ Tables 5 & 6 - USLE Special Applications for Napa County

Boisset Wappo Hill Tr I ECP
USLE Calculations Post-Project
PPI Engineering
11/9/2023
RR

Post-Project Transect 7

Proposed Development Acres:	0.34
Soil Unit No. (100-182):	179
Soil Name:	Sobranite
K, Soil Erodibility:	0.32
T, Soil Loss Tolerance (tons/acre):	2
R, Rainfall:	50
Total Transect Length (ft):	92
Number of Segments:	1
Individual Segment Lengths (ft):	92
Segment:	
Gradient (%):	27
m:	
Individual LS:	4.93
Factor:	
Product:	
LS, Length and Steepness:	4.93
Total Transect Average Gradient (%):	27
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	85%
C, Cover (Table 4) ¹ :	0.017
A, Soil Loss (tons/acre):	1.32
Soil Loss in Proposed Development (tons):	0.45

¹ Tables 4 & 6 - USLE Special Applications for Napa County

Boisset Wappo Hill Tr I ECP
 USLE Calculations Pre-Project
 PPI Engineering
 11/9/2023
 RR

Pre-Project Transect 8

Proposed Development Acres:	1.06	
Soils Present:		
Soil Unit No. (100-182):	179	105
Soil Name:	Sobranite	Bale
R, Rainfall:	50	
Total Transect Length (ft):	244	
Number of Segments:	2	
Individual Segment Lengths (ft):	122	
Segment:	1	2
Segment Soil:	179	105
K, Soil Erodibility:	0.32	0.2
T, Soil Loss Tolerance (tons/acre):	2	5
Gradient (%):	25	32
m:		
Individual LS:	7.28	9.93
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)*:	1.00	
C-Values		
Segment:	1	2
Vegetative Canopy:	Trees 13' Tall	Trees 13' Tall
Canopy Cover:	75%	75%
Ground Cover:	70%	70%
Percent Grass:	10%	10%
Percent Weeds:	90%	90%
C, Cover (Table 5) ¹ :	0.059	0.059
Factor:	0.35	0.65
Indiivudal C*K*(LS)*Factor:	0.05	0.08
Sum C*K*LS:	0.12	
A, Soil Loss (tons/acre):	6.21	
Soil Loss in Proposed Development (tons) ² :	6.59	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

Boisset Wappo Hill Tr I ECP
 USLE Calculations Post-Project
 PPI Engineering
 11/9/2023
 RR

Post-Project Transect 8

Proposed Development Acres:	1.06	
Soils Present:		
Soil Unit No. (100-182):	179	105
Soil Name:	Sobranite	Bale
R, Rainfall:	50	
Total Transect Length (ft):	244	
Number of Segments:	2	
Individual Segment Lengths (ft):	122	
Segment:	1	2
Segment Soil:	179	105
K, Soil Erodibility:	0.32	0.2
T, Soil Loss Tolerance (tons/acre):	2	5
Gradient (%):	25	32
m:		
Individual LS:	7.28	9.93
Factor:	0.35	0.65
Individual K*(LS)*Factor:	0.82	1.29
Sum K*LS:	2.11	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) ¹ :	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	90%	
C, Cover (Table 4) ¹ :	0.011	
A, Soil Loss (tons/acre):	1.19	
Soil Loss in Proposed Development (tons) ² :	1.27	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

Boisset Wappo Hill Tr I ECP
 USLE Calculations Pre-Project
 PPI Engineering
 11/9/2023
 RR

Pre-Project Transect 9A

Proposed Development Acres:	0.80		
Soils Present:			
Soil Unit No. (100-182):	109		
Soil Name:	Boomer		
R, Rainfall:	50		
Total Transect Length (ft):	335		
Number of Segments:	3		
Individual Segment Lengths (ft):	112		
Segment:	1	2	3
Segment Soil:	109	109	109
K, Soil Erodibility:	0.15	0.15	0.15
T, Soil Loss Tolerance (tons/acre):	4	4	4
Gradient (%):	26	20	21
m:			
Individual LS:	8.97	6.37	6.79
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6)*:	1.00		
C-Values			
Segment:	1	2	3
Vegetative Canopy:	Trees 13' Tall	Trees 13' Tall	Trees 13' Tall
Canopy Cover:	75%	75%	50%
Ground Cover:	70%	70%	70%
Percent Grass:	80%	80%	80%
Percent Weeds:	20%	20%	20%
C, Cover (Table 5) ¹ :	0.033	0.033	0.034
Factor:	0.19	0.35	0.46
Indiivudal C*K*(LS)*Factor:	0.01	0.01	0.02
Sum C*K*LS:	0.04		
A, Soil Loss (tons/acre):	1.77		
Soil Loss in Proposed Development (tons) ² :	1.42		

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

Boisset Wappo Hill Tr I ECP
 USLE Calculations Post-Project
 PPI Engineering
 11/9/2023
 RR

Post-Project Transect 9A

Proposed Development Acres:	0.80		
Soils Present:			
Soil Unit No. (100-182):	109		
Soil Name:	Boomer		
R, Rainfall:	50		
Total Transect Length (ft):	335		
Number of Segments:	3		
Individual Segment Lengths (ft):	112		
Segment:	1	2	3
Segment Soil:	109	109	109
K, Soil Erodibility:	0.15	0.15	0.15
T, Soil Loss Tolerance (tons/acre):	4	4	4
Gradient (%):	26	20	21
m:			
Individual LS:	8.97	6.37	6.79
Factor:	0.19	0.35	0.46
Individual K*(LS)*Factor:	0.26	0.33	0.47
Sum K*LS:	1.06		
Farming Practice:	Up & Down Hill		
P, Practice Factor (Table 6) ¹ :	1.00		
Cover Strategy:	Permanent		
Age of Development:	Over 3 Years		
Ground Cover:	90%		
C, Cover (Table 4) ¹ :	0.011		
A, Soil Loss (tons/acre):	0.60		
Soil Loss in Proposed Development (tons) ² :	0.48		

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

Boisset Wappo Hill Tr I ECP
 USLE Calculations Pre-Project
 PPI Engineering
 11/9/2023
 RR

Pre-Project Transect 9B

Proposed Development Acres:	0.73	
Soils Present:		
Soil Unit No. (100-182):	109	179
Soil Name:	Boomer	Sobranite
R, Rainfall:	50	
Total Transect Length (ft):	363	
Number of Segments:	2	
Individual Segment Lengths (ft):	182	
Segment:	1	2
Segment Soil:	109	179
K, Soil Erodibility:	0.15	0.32
T, Soil Loss Tolerance (tons/acre):	4	2
Gradient (%):	25	19
m:		
Individual LS:	8.88	6.19
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)*:	1.00	
C-Values		
Segment:	1	2
Vegetative Canopy:	Trees 13' Tall	Trees 13' Tall
Canopy Cover:	75%	50%
Ground Cover:	70%	70%
Percent Grass:	80%	80%
Percent Weeds:	20%	20%
C, Cover (Table 5) ¹ :	0.033	0.034
Factor:	0.35	0.65
Indiivudal C*K*(LS)*Factor:	0.02	0.04
Sum C*K*LS:	0.06	
A, Soil Loss (tons/acre):	2.96	
Soil Loss in Proposed Development (tons) ² :	2.16	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

Boisset Wappo Hill Tr I ECP
 USLE Calculations Post-Project
 PPI Engineering
 11/9/2023
 RR

Post-Project Transect 9B

Proposed Development Acres:	0.73	
Soils Present:		
Soil Unit No. (100-182):	109	179
Soil Name:	Boomer	Sobrante
R, Rainfall:	50	
Total Transect Length (ft):	363	
Number of Segments:	2	
Individual Segment Lengths (ft):	182	
Segment:	1	2
Segment Soil:	109	179
K, Soil Erodibility:	0.15	0.32
T, Soil Loss Tolerance (tons/acre):	4	2
Gradient (%):	25	19
m:		
Individual LS:	8.88	6.19
Factor:	0.35	0.65
Individual K*(LS)*Factor:	0.47	1.29
Sum K*LS:	1.75	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) ¹ :	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	90%	
C, Cover (Table 4) ¹ :	0.011	
A, Soil Loss (tons/acre):	0.99	
Soil Loss in Proposed Development (tons) ² :	0.73	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

Boisset Wappo Hill Tr I ECP
 USLE Calculations Pre-Project
 PPI Engineering
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 RR

Pre-Project Transect 9C

Proposed Development Acres:	0.83			
Soils Present:				
Soil Unit No. (100-182):	109		179	
Soil Name:	Boomer		Sobranite	
R, Rainfall:	50			
Total Transect Length (ft):	445			
Number of Segments:	4			
Individual Segment Lengths (ft):	111			
Segment:	1	2	3	4
Segment Soil:	109	179	179	179
K, Soil Erodibility:	0.15	0.32	0.32	0.32
T, Soil Loss Tolerance (tons/acre):	4	2	2	2
Gradient (%):	16	19	32	29
m:				
Individual LS:	5.44	6.86	13.41	11.87
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6)*:	1.00			
C-Values				
Segment:	1	2	3	4
Vegetative Canopy:	Trees 13' Tall	Trees 13' Tall	Trees 13' Tall	Trees 13' Tall
Canopy Cover:	75%	75%	75%	75%
Ground Cover:	70%	70%	70%	70%
Percent Grass:	80%	80%	80%	80%
Percent Weeds:	20%	20%	20%	20%
C, Cover (Table 5) ¹ :	0.033	0.033	0.033	0.033
Factor:	0.12	0.23	0.30	0.35
Indiivudal C*K*(LS)*Factor:	0.003	0.02	0.04	0.04
Sum C*K*LS:	0.11			
A, Soil Loss (tons/acre):	5.31			
Soil Loss in Proposed Development (tons) ² :	4.41			

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

Boisset Wappo Hill Tr I ECP
 USLE Calculations Post-Project
 PPI Engineering
 11/9/2023
 RR

Post-Project Transect 9C

Proposed Development Acres:	0.83			
Soils Present:				
Soil Unit No. (100-182):	109	179		
Soil Name:	Boomer	Sobranite		
R, Rainfall:	50			
Total Transect Length (ft):	445			
Number of Segments:	4			
Individual Segment Lengths (ft):	111			
Segment:	1	2	3	4
Segment Soil:	109	179	179	179
K, Soil Erodibility:	0.15	0.32	0.32	0.32
T, Soil Loss Tolerance (tons/acre):	4	2	2	2
Gradient (%):	16	19	32	29
m:				
Individual LS:	5.44	6.86	13.41	11.87
Factor:	0.12	0.23	0.30	0.35
Individual K*(LS)*Factor:	0.10	0.50	1.29	1.33
Sum K*LS:	3.22			
Farming Practice:	Up & Down Hill			
P, Practice Factor (Table 6) ¹ :	1.00			
Cover Strategy:	Permanent			
Age of Development:	Over 3 Years			
Ground Cover:	90%			
C, Cover (Table 4) ¹ :	0.011			
A, Soil Loss (tons/acre):	1.82			
Soil Loss in Proposed Development (tons) ² :	1.51			

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

Boisset Wappo Hill Tr I ECP
USLE Calculations Pre-Project
PPI Engineering
11/9/2023
RR

Pre-Project Avenue Transect 9/10

Proposed Development Acres:	0.07
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	86
Number of Segments:	1
Individual Segment Lengths (ft):	86
Segment:	
Gradient (%):	26
m:	
Individual LS:	4.55
Factor:	
Product:	
LS, Length and Steepness:	4.55
Total Transect Average Gradient (%):	26
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Vegetative Canopy:	Trees 13' Tall
Canopy Cover:	75%
Ground Cover:	70%
Percent Grass:	80%
Percent Weeds:	20%
C, Cover (Table 5) ¹ :	0.033
A, Soil Loss (tons/acre):	1.12
Soil Loss in Proposed Development (tons):	0.08

¹ Tables 5 & 6 - USLE Special Applications for Napa County

Boisset Wappo Hill Tr I ECP
USLE Calculations Post-Project
PPI Engineering
11/9/2023
RR

Post-Project Avenue Transect 9/10

Proposed Development Acres:	0.07
Soil Unit No. (100-182):	109
Soil Name:	Boomer
K, Soil Erodibility:	0.15
T, Soil Loss Tolerance (tons/acre):	4
R, Rainfall:	50
Total Transect Length (ft):	86
Number of Segments:	1
Individual Segment Lengths (ft):	86
Segment:	
Gradient (%):	26
m:	
Individual LS:	4.55
Factor:	
Product:	
LS, Length and Steepness:	4.55
Total Transect Average Gradient (%):	26
Farming Practice:	Up & Down Hill
P, Practice Factor (Table 6) ¹ :	1.00
Cover Strategy:	Permanent
Age of Development:	Over 3 Years
Ground Cover:	90%
C, Cover (Table 4) ¹ :	0.011
A, Soil Loss (tons/acre):	0.39
Soil Loss in Proposed Development (tons):	0.03

¹ Tables 4 & 6 - USLE Special Applications for Napa County

Boisset Wappo Hill Tr I ECP
 USLE Calculations Pre-Project
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Pre-Project Transect 10

Proposed Development Acres:	0.37	
Soils Present:		
Soil Unit No. (100-182):	109	179
Soil Name:	Boomer	Sobrante
R, Rainfall:	50	
Total Transect Length (ft):	95	
Number of Segments:	2	
Individual Segment Lengths (ft):	48	
Segment:	1	2
Segment Soil:	109	179
K, Soil Erodibility:	0.15	0.32
T, Soil Loss Tolerance (tons/acre):	4	2
Gradient (%):	26	26
m:		
Individual LS:	4.78	4.78
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6)*:	1.00	
C-Values		
Segment:	1	2
Vegetative Canopy:	Trees 13' Tall	Trees 13' Tall
Canopy Cover:	50%	75%
Ground Cover:	70%	70%
Percent Grass:	80%	80%
Percent Weeds:	20%	20%
C, Cover (Table 5) ¹ :	0.034	0.033
Factor:	0.35	0.65
Indiivudal C*K*(LS)*Factor:	0.01	0.03
Sum C*K*LS:	0.04	
A, Soil Loss (tons/acre):	2.07	
Soil Loss in Proposed Development (tons) ² :	0.76	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding

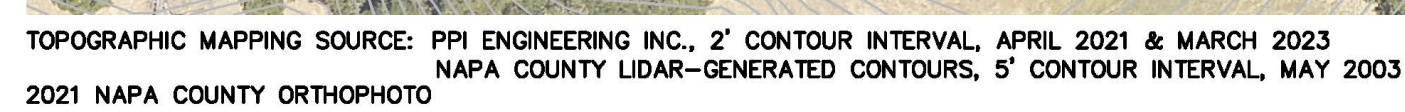
Boisset Wappo Hill Tr I ECP
 USLE Calculations Post-Project
 PPI Engineering
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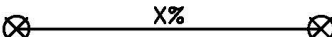
Post-Project Transect 10

Proposed Development Acres:	0.37	
Soils Present:		
Soil Unit No. (100-182):	109	179
Soil Name:	Boomer	Sobrante
R, Rainfall:	50	
Total Transect Length (ft):	95	
Number of Segments:	2	
Individual Segment Lengths (ft):	48	
Segment:	1	2
Segment Soil:	109	179
K, Soil Erodibility:	0.15	0.32
T, Soil Loss Tolerance (tons/acre):	4	2
Gradient (%):	26	26
m:		
Individual LS:	4.78	4.78
Factor:	0.35	0.65
Individual K*(LS)*Factor:	0.25	0.99
Sum K*LS:	1.24	
Farming Practice:	Up & Down Hill	
P, Practice Factor (Table 6) ¹ :	1.00	
Cover Strategy:	Permanent	
Age of Development:	Over 3 Years	
Ground Cover:	85%	
C, Cover (Table 4) ¹ :	0.017	
A, Soil Loss (tons/acre):	1.04	
Soil Loss in Proposed Development (tons) ² :	0.38	

¹ Tables 5 & 6 - USLE Special Applications for Napa County

² Estimates may vary slightly due to rounding



- | | |
|---|--|
|  | APPROXIMATE PROPERTY LINE LOCATION |
|  | PPI ENGINEERING 10' INDEX CONTOUR |
|  | PPI ENGINEERING 2' INTERMEDIATE CONTOUR |
|  | NAPA COUNTY 25' INDEX CONTOUR |
|  | NAPA COUNTY 5' INTERMEDIATE CONTOUR |
|  | POTENTIAL WATERS OF THE U.S. |
|  | EXISTING RESERVOIR |
|  | EXISTING VINEYARD AREA |
|  | EXISTING ROAD |
|  | EXISTING BUILDING |
|  | EXISTING CULVERT, APPROXIMATE LOCATION |
|  | EXISTING DITCH, APPROXIMATE LOCATION |
|  | PROPOSED VINEYARD DEVELOPMENT AREA BY TRANSECT |
|  | PROPOSED VINEYARD BLOCK BOUNDARY |
|  | PROPOSED DROP INLET |
|  | PROPOSED SURFACE DRAINAGE LINE |
|  | PROPOSED ROCK FILLED AVENUE |
|  | PROPOSED PIPE LEVEL SPREADER |
|  | USLE TRANSECT SEGMENT WITH SLOPE |
|  | PROPOSED VINEROW DIRECTION |
|  | SOIL TYPE BOUNDARY |

USDA SOIL CLASSIFICATIONS:

- | | |
|-----|---|
| 105 | BALE CLAY LOAM, 2 TO 5 PERCENT SLOPES |
| 109 | BOOMER GRAVELLY LOAM, VOLCANIC BEDROCK, 14 TO 60 PERCENT SLOPES |
| 178 | SOBRANTE LOAM, 5 TO 30 PERCENT SLOPES |
| 179 | SOBRANTE LOAM, 30 TO 50 PERCENT SLOPES |

BOISSET COLLECTION
WAPPO HILL

EROSION CONTROL PLAN

SOIL LOSS ANALYSIS

DESIGN ENGINEER:

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JOB NO: 12110201

SCALE:

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	SCALE:

DRAWN BY:

DATE: _____

11-9-23	OF: 1
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