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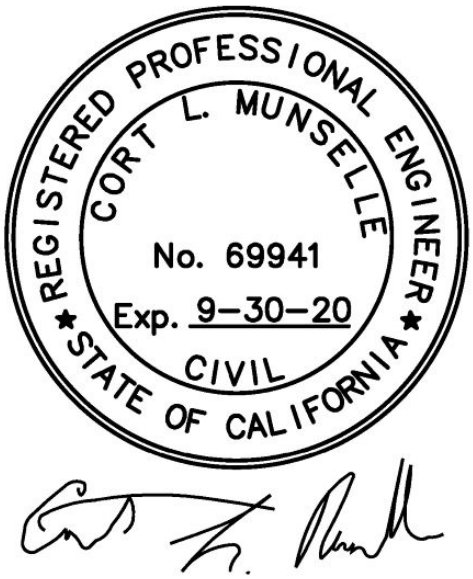
INITIAL SWLID SUBMITTAL

for

CHALK VISTA SUBDIVISION

1276 JENSEN LANE
WINDSOR, CA 94952
APN 162-020-007
& APN 162-020-066

DRAINAGE REVIEW APPROVED
Yoash Tilles
October 9, 2020
PERMIT SONOMA ENGINEERING



Prepared for:
Famiglia Liberata LLC
855 Bordeax Way #100
Napa, CA 94558

Prepared under the supervision of:
Cort L. Munselle
RCE #69941
License Expires 9/30/20

Report Date: January 13, 2020

HEALDSBURG OFFICE
513 Center St.
Healdsburg, CA 95448
Phone (707) 395-0968
cell (707) 280-0474
cort@munsellecivil.com
www.munsellecivil.com

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Project Description:

Project Type and Location

The 38.0 acre lot is located at 1276 Jensen Lane in Windsor (APN 162-020-066), approximately 1 mile east of Windsor. The project proposes to subdivide the 38.0 acre parcel into 3 bare lots and install a new private road to serve each parcel. The new road will create 71,477 sf of impervious area. There is a 30 foot wide nonexclusive, appurtenant easement for ingress, egress, access and utility over 1190 Jensen Lane (APN 162-020-007) as shown on Parcel Map No. MNS 02-0013 recorded in Book 682 of Maps at Pages 21-24. This easement will be used to construct a new road for the future three lots divided from 1276 Jensen Lane. There will be additional impervious area create when the homes are built, but the complete SWLID for each of those homes will be provided during the building permit phase. The project triggers post-construction storm water requirements by creating more than 10,000 square feet of impervious surface area.

Existing Conditions

A portion of the property has existing vineyards but the remainder of the property is currently undeveloped. The property's slopes and slope directions vary, but within the area proposed for road, the slopes are generally under 5-percent. The USDA-Sonoma County Soil Survey maps the project area as primarily Arbuckle gravelly loam (Hydrologic Soil Group C), Haire loam (Hydrologic Soil Group C), and Spreckels Loam (Hydrologic Soil Group D).

Environmentally Sensitive Features

There are two creeks that run through the project site that will be avoided with the proposed main road. There are numerous trees scattered throughout the site that will be avoided with the proposed main road design.

Level of Treatment and Volume Capture

The proposed design meets the design goal of 100% volume capture for the design storm as required by projects that create more than 1 acre of impervious area. The intent of these preliminary SWLID calculations is to provide an estimate of the storage volume to ensure there will be enough space for the selected BMPs. The selected BMP's will have overflow inlets with grates that outlet to nearby creeks and drainage features. Trash of all sizes will be captured within the BMP as the water infiltrates the BMP soil. In the event the BMP is at capacity, the grates over the overflow inlet will prevent trash from flowing off site.

Pollution Prevention Measures:

Tree Canopy

For purposes of this report, no interceptor trees were taken as credit to provide a conservative estimate of BMP sizes for preliminary design. Once final design is completed and tree placement is known, the tree canopy credit will be taken.

Groundwater

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For purposes of this report, groundwater is at or below 2' beneath the bottom of all BMP's. In the event that groundwater is discovered to be within 2' of the bottom of any BMP, the design will be altered to meet a minimum separation of 2'.

Selected BMPs:

P1-06 Swale with Bioretention

Six priority 1 swales with bioretention will be used to capture the 100 percent volume runoff from tributary areas 1, 2, 3, 4, 5 and 6. The proposed BMP was selected because it is easy to divert runoff by sheet flowing into swales that capture the runoff and direct it to the BMP. The bioretention storage is long enough for each tributary area and along with the available ponding to provide 100 percent volume capture using storage beneath the swale and ponding above the swale. All ponded water will drain within 72 hours using the worst case infiltration rates converted from percolation rates (see appendix for calculations) . The selected BMP is a similar to the priority 1 swale with bioretention shown in the LID manual. Instead of using structural soil, the selected BMP uses soil and class II drain rock as well as ponding to achieve 100 percent volume capture.

BMP Maintenance:

Vegetated Swale With Bioretention

1. Mow and irrigate during dry weather to the extent necessary to keep vegetation alive.
2. Where 6-inch high grasses are used, the grass height shall be at least 3 inches after mowing. Where mowed grasses are shown, the grass height shall be mowed when the height exceeds 3 inches.
3. Remove obstructions and trash from vegetated swale.
4. Pesticides and fertilizers shall not be used in the swale.
5. Vegetated Swales shall be inspected and maintained monthly during the rainy season to review:
    a. Obstructions and trash.
    b. Ponded flow is drained within 72 hours after a rainfall event.
    c. Condition of grasses.
    d. If ponding is observed, grading will be required to restore positive drainage.
6. Applicant must guarantee a minimum two-year post installation warranty on all plant material. Warranty must provide cost of plant material and installation for all plants that do not survive or are in a state of decline at the end of the warranty period.

BMP Funding Mechanism and Responsible Party:

The proposed development will have a recorded joint maintenance agreement, recorded on each parcel, between all 3 property owners will be used to fund the maintenance of the BMPs, monitor stormwater BMP's and ensure long term maintenance of the BMPs.

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Appendix A

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513 Center St.
Healdsburg, CA 95448

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BMP Selection Table

Project Name: 45-17 Chalk Vista Egan

	Best Management Practice (BMP)	Detail Sheet	Detail Title	**Can be used with...**	High Ground Water	Contamination	Slope Constraints	**Achieves...**	Treatment	Volume Capture	Runoff Reduction Measure	**BMP in priority selected?**	Yes	No	Unique Identifier of BMP per planes	Explanation of selection	Other notes:
Universal BMP- to be considered on all projects.	Living Roof	N/A	N/A		X	X	X		X	X				x			
	Rainwater Harvesting	N/A	N/A		X	X	X			X				x			
Runoff Reduction Measures	Interceptor Trees	N/A	N/A		X	X	X				X			x			
	Bovine Terrace	RRM-01	Bovine Terrace		X						X			x			
	Vegetated Buffer Strip	RRM-02	Vegetated Buffer Strip								X			x			
	Impervious Area Disconnection	N/A	N/A		X	X	X				X			x			
Priority 1- to be installed with no underdrains or liners. Must drain all stading water within 72 hours.	Bioretention	P1-02	Roadside Bioretention - no C & G						X	X				x			
	Vegetated Swale-with Bioretention	P1-06	Swale with Bioretention						X	X			x				
	Constructed Wetlands	N/A	N/A						X	X				x			
Priority 2 BMPs- with subsurface drains installed above the capture volume.	Bioretention	P2-02	Roadside Bioretinton - Flush Design Roadside						X	X				x			
		P2-03	Roadside Bioretenion-Contiguous SW						X	X				x			
		P2-04	Roadside Bioretenion-Curb Opening						X	X				x			
		P2-05	Roadside Bioretenion- No C & G						X	X				x			
	Constructed Wetlands	N/A	N/A						X	X				x			

Date: 02-22-2019

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Appendix B

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FOR OFFICE USE ONLY:
Does this project require permanent storm water BMP's?

☐ Y ☐ N

Date Submitted: _____

Print Form

File No:	Quadrant
Related Files:	
Set:	
Department Use Only	

2017 Storm Water LID Determination Worksheet

PURPOSE AND APPLICABILITY: This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.

Part 1: Project Information

Chalk Vista Subdivision	Famiglia Liberata LLC
Project Name	Applicant (owner or developer) Name
1276 Jensen Lane	855 Bordeax Way #100
Project Site Address	Applicant Mailing Address
Windsor CA	Napa CA 94558
Project City/State/Zip	Applicant City/State/Zip
Permit Number(s) - (if applicable)	Applicant Phone/Email/Fax
Munselle Civil Engineering	513 Center Street
Designer Name	Designer Mailing Address
Healdsburg CA 95448	707-395-0968
Designer City/State/Zip	Designer Phone/Email

Type of Application/Project:

☑ Subdivison ☐ Grading Permit ☐ Building Permit ☐ Hillside Development

☐ DesignReview ☐ Use Permit ☐ Encroachment ☐ Time Extensions ☐ Other :_____

PART 2: Project Exemptions

1. Is this a project that creates or replaces *less than* 10,000 square feet of impervious surface[1], including all project phases and off-site improvements?

   ☐ Yes ☑ No

1 Impervious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintenance activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacing, trenching and patching are defined as maintenance activities per section VI.D.2.b.

2. Is this project a routine maintenance activity[2] that is being conducted to maintain original line and grade, hydraulic capacity, and original purpose of facility such as resurfacing existing roads and parking lots?

☐ Yes ☑ No

3. Is this project a stand alone pedestrian pathway, trail or off-street bike lane?

☐ Yes ☑ No

4. **Did you answer "YES" to any of the questions in Part 2?**

☐ **YES:** This project will *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete the "Exemption Signature Section" on Page 4.**

☑ **NO:** Please complete the remainder of this worksheet.

Part 3: Project Triggers

Projects that Trigger Requirements:
Please answer the following questions to determine whether this project requires permanent Storm Water BMP's and the submittal of a SW LIDs as required by the NPDES MS4 Permit order No. R1-2015-0030.

1. Does this project create or replace a combined total of 10,000 square feet or more of impervious surface[1] including all project phases and off-site improvements?

☑ Yes ☐ No

2. Does this project create or replace a combined total or 10,000 square feet or more of impervious streets, roads, highways, or freeway construction or reconstruction[3]? ☐ Yes ☑ No

3. Does this project create or replace a combined total of 1.0 acre or more of impervious surface[1] including all project phases and off-site improvements? ☑ Yes ☐ No

4. **Did you answer "YES" to any of the above questions in Part 3?**

☑ **YES:** This project will need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete remainder of worksheet and sign the "Acknowledgement Signature Section" on Page 4.**

☐ **NO:** This project will *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 permit. **Please complete the "Exemption Signature Section" on Page 4.**

---

1 Imprevious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintence activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacint, trenching and patching are defined as maintenance activities per section VI.D.2.b.

2 "Rountine Maintenance Activity" includes activities such as overlays and/or resurfacing of existing roads or parking lots as well as trenching and patching activities and reroofing activities per section VI.D.2.b.

3 "Reconstruction" is defined as work that extends into the subgrade of a pavement per section VI.D.2.b.

Part 4: Project Description

1. Total Project area: 38.0 ○ square feet ◉ acres

2. Existing land use(s): (check all that apply)

☐ Commercial ☐ Industrial ☐ Residential ☐ Public ☑ Other

Description of buildings, significant site features (creeks, wetlands, heritage trees), etc.:

The site contains existing vineyards and two creeks.

3. Existing impervious surface area: 0 ◉ square feet ○ acres

4. Proposed Land Use(s): (check all that apply)

☐ Commercial ☐ Industrial ☑ Residential ☐ Public ☐ Other

Description of buildings, significant site features (creeks, wetlands, heritage trees), etc.:

New 12' road with 2' shoulders to serve three new residential lots. Three new future driveways to serve three single family residential homes. Three future single family homes assumed to be 2000 square feet.

5. New impervious surface area: 71,477 ◉ square feet ○ acres

Project Name

2017 Storm Water LID Determination Worksheet | Chalk Vista Subdivision

Acknowledgment Signature Section:

As the property owner or developer, I understand that this project is required to implement permanent Storm Water Best Management Practices and provide a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit Order No. R1-2015-0030. *Any unknown responses must be resolved to determine if the project is subject to these requirements.

Applicant Signature David I. Fraad

Date 10.29.18

Exemption Signature Section:

As the property owner or developer, I understand that this project as currently designed does not require permanent Storm Water BMP's nor the submittal of a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit*. I understand that redesign may require submittal of a new Determination Worksheet and may require permanent Storm Water BMP's.

Applicant Signature

Date

*** This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.**

Implementation Requirements: *All calculations shall be completed using the "Storm Water Calculator" available at: www.srcity.org/stormwaterLID*

Hydromodification Control/100% Volume Capture: Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

Treatment Requirement: Treatment of 100% of the flow calculated using the modified Rational Method and a known intensity of 0.20 inches per hour.

Delta Volume Capture Requirement: Capture (infiltration and/or reuse) of the increase in volume of storm water due to development generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

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Appendix C

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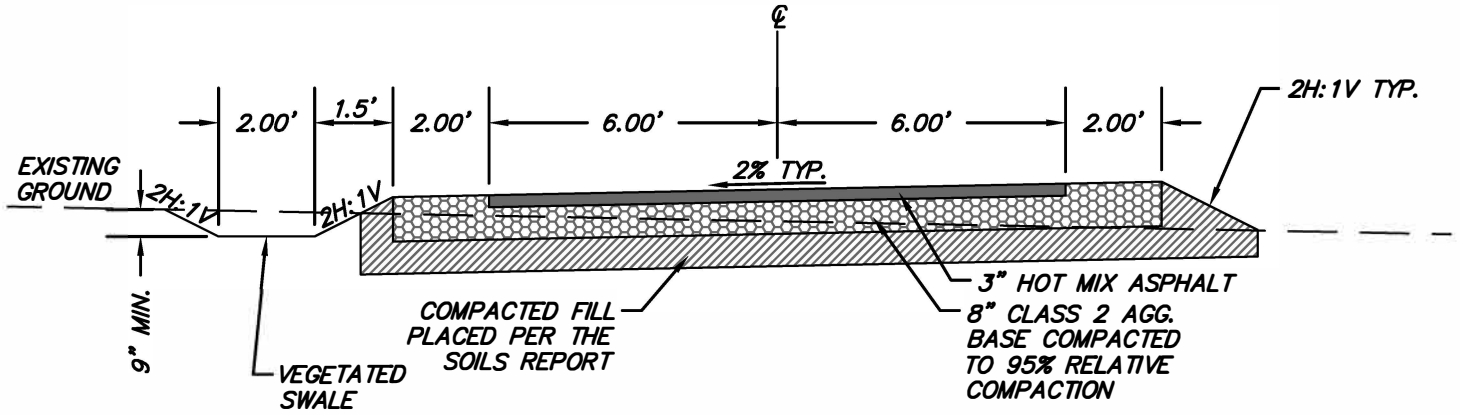
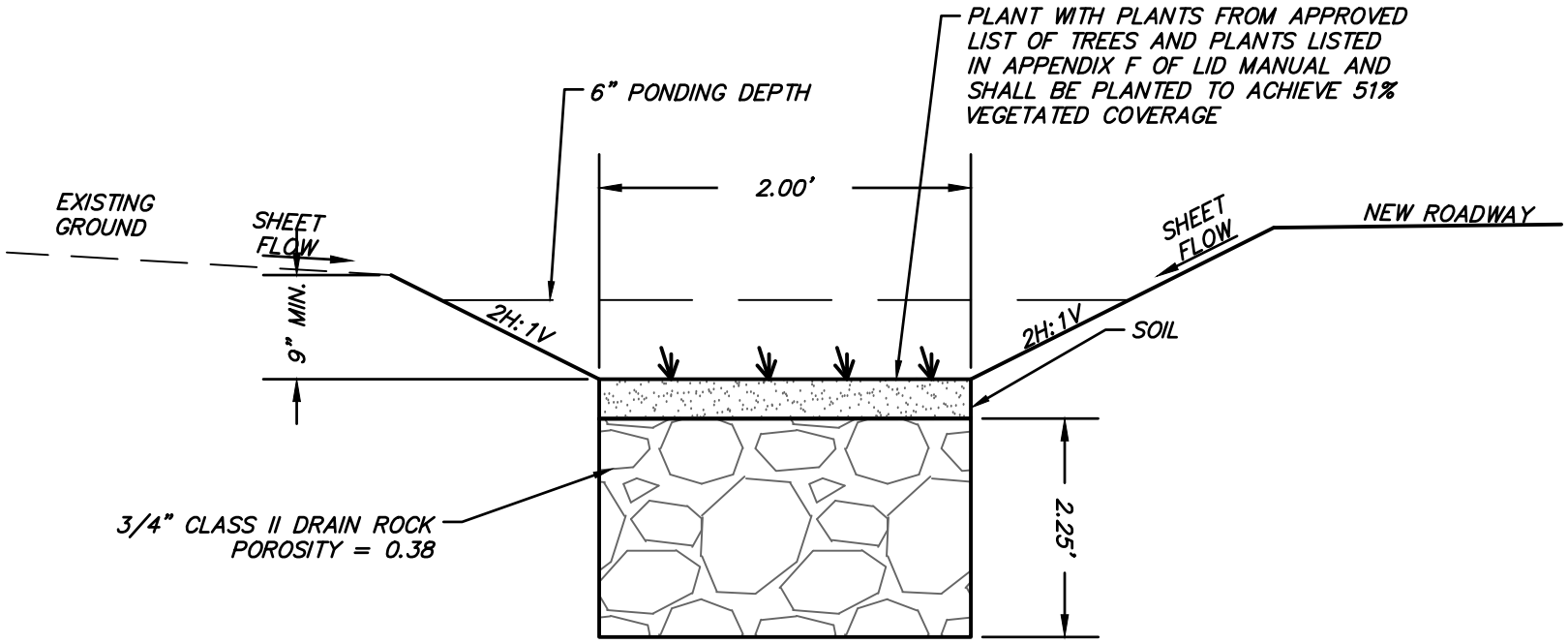


DRIVEWAY TYPICAL SECTION



P1-06 SWALE WITH BIORETENTION

Infiltration Rate Calculations

Date: 1/10/2020 Project: Chalk Vista Subdivision

Porchet Method:

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t(r+2H_{avg})}$$

ΔH = change in head over time interval, inches
Δt = time interval (final test interval), minutes
r = radius of test hole, inches
H_{avg} = avg. head over time interval, inches
I_t = tested infiltration rate, inches/hr
D_0 = initial depth to water (final test interval), inches
D_F = final depth to water (final test interval), inches
D_T = total depth of test hole, inches

Hole #	r	Δt	D_T	D_0	D_F	H_0	H_f	ΔH	H_{avg}	I_t
1	8	60	36	4 5/8	5 1/8	31.38	30.88	0.50	31.13	0.057
2	8	60	36	3 2/8	3 3/8	32.75	32.63	0.13	32.69	0.014
3	8	60	36	3 3/8	3 4/8	32.63	32.50	0.13	32.56	0.014
4	8	60	36	7 5/8	8 1/8	28.38	27.88	0.50	28.13	0.062
5	8	60	36	9 2/8	9 4/8	26.75	26.50	0.25	26.63	0.033
6	8	60	36	4 7/8	5 3/8	31.13	30.63	0.50	30.88	0.057
7	8	60	36	4 4/8	4 6/8	31.50	31.25	0.25	31.38	0.028
8	8	60	36	4 7/8	5 1/8	31.13	30.88	0.25	31.00	0.029
9	8	60	36	6 1/8	6 5/8	29.88	29.38	0.50	29.63	0.059
10	8	60	36	5 3/8	5 7/8	30.63	30.13	0.50	30.38	0.058
11	8	60	36	5 4/8	6	30.50	30.00	0.50	30.25	0.058
12	8	60	36	5 6/8	6 2/8	30.25	29.75	0.50	30.00	0.059
13	8	60	36	11	11	25.00	25.00	0.00	25.00	0.000
14	8	60	36	11	11	25.00	25.00	0.00	25.00	0.000
15	8	60	36	11	10 4/8	25.00	25.50	-0.50	25.25	-0.068
16	8	60	36	9 3/8	9 7/8	26.63	26.13	0.50	26.38	0.066
17	8	60	36	9 7/8	10 7/8	26.13	25.13	1.00	25.63	0.135
18	8	60	36	10 3/8	11 2/8	25.63	24.75	0.88	25.19	0.120

Lot 1 average (holes 4-6) =	**0.051**	in/hr
Lot 2 average (holes 7-12) =	**0.049**	in/hr
Lot 3 average (holes 13-18) =	**0.042**	in/hr

Design Handbook

for

Low Impact Development

Best Management Practices

Prepared by:

9/2011

Riverside County Flood Control and Water Conservation District

1995 Market Street

Riverside, CA 92501

2.3 - Percolation Tests

The ***percolation test*** is widely used for assessing the suitability of a soil for onsite wastewater disposal. Depending on the required depth of testing, there are two versions of the percolation test. For shallow depth testing (less than 10 feet), the procedure would be as shown in Figure 8 (Photo 6). For deep testing (10 feet to 40 feet), the procedure is as shown in Figure 9. For deep testing, special care must be taken to ensure that caving of the sidewalls does not occur.

This test measures the length of time required for a quantity of water to infiltrate into the soil and is often called a "percolation rate". It should be noted that the percolation rate is related to, but not equal to, the infiltration rate. While an infiltration rate is a measure of the speed at which water progresses downward into the soil, the percolation rate measures not only the downward progression but the lateral progression through the soil as well. This reflects the fact that the surface area for infiltration testing would include only the horizontal surface while the percolation test includes both the bottom surface area and the sidewalls of the test hole. However, there is a relationship between the values obtained by a percolation test and infiltration rate. Based on the [1]"Porchet Method", the following equation may be used to convert percolation rates to the tested infiltration rate, I_t:

$$I_t = \frac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r^* = effective radius of test hole
H_{avg} = average head over the time interval, inches

An example of this procedure is provided on Page 26 based data form Table 5, *Sample Percolation Test Data*. Figure 11 provides a plot of the converted percolation test data.

*Where a rectangular test hole is used, an equivalent radius should be determined based on the actual area of the rectangular test hole. (i.e., $r = (A/\pi)^{0.5}$)

Note to the designer: The values obtained using this method may vary from those obtained from methods considered to be more accurate. The designer is encouraged to explore the derivation of these equations (Ritzema; Smedema)

Final Report - Ultimately, as discussed in Section 1.7, a final report shall be provided and, based on the test results, an infiltration rate shall be recommended.

[1]H.P. Ritzema, "Drainage Principles and Applications," International Institute for Land Reclamation and Improvement (ILRI), Publication 16, 2nd revised edition, 1994, Wageningen, The Netherlands.

Percolation Rate Conversion

Example:

The bottom of a proposed infiltration basin would be at 5.0 feet below natural grade. Percolation tests are performed within the boundaries of the proposed basin location with the depth of the test hole set at the infiltration surface level (bottom of the basin). The Percolation Test Data Sheet (Table 5) is prepared as the test is being performed. After the minimum required number of testing intervals, the test is complete. [1]**The data collected at the final interval is as follows:**

Time interval, Δt = 10 minutes
Initial Depth to Water, D_0 = 12.25 inches
Final Depth to Water, D_f = 13.75 inches
Total Depth of Test Hole, D_T = 60 inches
[2]Test Hole Radius, r = 4 inches

The conversion equation is used:

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t(r+2H_{avg})}$$

"H_o" is the initial height of water at the selected time interval.

$H_o = D_T - D_0 = 60 - 12.25 =$ **47.75 inches**

"H_f" is the final height of water at the selected time interval.

$H_f = D_T - D_0 = 60 - 13.75 =$ **46.25 inches**

"ΔH" is the change in height over the time interval.

$\Delta H = \Delta D = H_o - H_f = 47.75 - 46.25 =$ **1.5 inches**

"H_{avg}" is the average head height over the time interval.

$H_{avg} = (H_o - H_f)/2 = (47.75 - 46.25)/2 =$ **47.0 inches**

"I_t" is the tested infiltration rate.

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t(r+2H_{avg})} = \frac{(1.5\text{ in})(60\text{ min/hr})(4\text{ in})}{(10\text{ min})((4\text{ in}) + 2(47\text{ in}))} = \textbf{0.37 in/hr.}$$

Percolation Test Data Sheet

Project:	ACME SITE	Project No:	1106 B	Date:	2-18-09
Test Hole No:	3	Tested By:	CMD		
Depth of Test Hole, D_T:	60 IN.	USCS Soil Classification:	SM		
Test Hole Dimensions (inches)			Length	Width	
Diameter (if round)=	8	Sides (if rectangular)=			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	8:00	8:25	25	12.0	19.5	7.5	Y
2	8:30	8:55	25	12.0	18.75	6.75	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

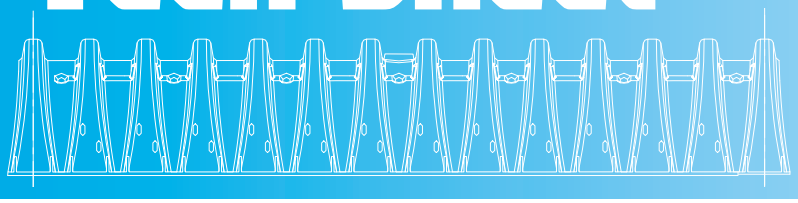
Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	9:00	9:10	10	12.0	14.25	2.25	4.4
2	9:10	9:20	10	11.5	13.5	2.0	5.0
3	9:20	9:30	10	12.0	14.0	2.0	5.0
4	9:30	9:40	10	11.75	13.5	1.75	5.7
5	9:40	9:50	10	12.0	13.5	1.5	6.7
6	9:50	10:00	10	12.25	13.75	1.5	6.7
7							
8							
9							
10							
11							
12							
13							
14							
15							

Data used for conversion to Infiltration rate.

COMMENTS: OVERCAST (62°F). GROUND DRY. FIRST (2) MEASUREMENTS MET SANDY SOIL CRITERIA.

Table 6 – Sample Percolation Test Data

Tech Sheet



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Detention • Retention • Water Quality
A division of ADS

Porosity of Structural Backfill

Tech Sheet # 1
November 2012

General:
StormTech advises that a porosity of 40% is appropriate to use for the storage capacity of structural aggregate used in the bedding and embedment zones around StormTech chambers. This memo provides technical support for the use of a porosity of 40%. The major points of the memo are:

- 40% porosity is appropriate for the clean, open graded, angular aggregate material StormTech recommends for foundation and embedment.
- Most of the porosity data available is based on a compacted condition. StormTech requires compaction of the foundation (bedding) and allows dumped aggregate embedment around the chambers.
- Test data indicates that the average porosity of all gradations of the *compacted* foundation is approximately 40%. The porosity of the *dumped* backfill in the embedment zone is typically greater than 40% and the calculated weighted average porosity therefore exceeds 40% for typical StormTech systems.
- Porosity is protected from soils migration by a non-woven geotextile that surrounds the entire system. For some exfiltration systems, a drainage net is substituted for the geotextile on the bottom of the bed.

Terms:
Porosity (n) is defined as the volume voids over the total volume expressed as a percent: $n = (V_v / V_t) \times 100\%$. Other terms commonly used to describe porosity include; "voids" and "void space". A related term that should not be confused with porosity is *void ratio* (e) which is the volume of voids over the volume of solids expressed as a decimal: $e = V_v / V_s$.

Compilation of Known Test Data:

Sample	Data Source	Porosity	Bulk Density	Test / Description
AASHTO # 4	StormTech lab	39.9%	94.3 lbs/ft^3	dumped, corrected[1]
AASHTO # 57	StormTech lab	45.4%	87.2 lbs/ft^3	dumped, corrected[1]
AASHTO # 4	StormTech lab	37.4%	103.0 lbs/ft^3	jigged & tamped, corrected[1]
AASHTO # 57	StormTech lab	38.7%	97.7 lbs/ft^3	jigged & tamped, corrected[1]
AASHTO # 57	NTH lab	50 - 51%		tapped & agitated, dried[2]
AASHTO # 57	NTH lab	50 - 52 %		tapped & agitated, dried[2]
AASHTO # 3	NTH lab	53 - 54%		tapped & agitated, dried[2]
-1 ½"	Anderson Eng. Cons.	41.9%	96.8 lbs/ft^3	dry rodded, C29[3]
-1 ½"	Anderson Eng. Cons.	35.3%	101.7 lbs/ft^3	dry rodded, C29[3]
-1 ½"	Anderson Eng. Cons.	37.8%	98.6 lbs/ft^3	dry rodded, C29[3]
-1 ½"	Anderson Eng. Cons.	41.3%	93.6 lbs/ft^3	dry rodded, C29[3]
-1 ½"	Anderson Eng. Cons.	38.2%	98.7 lbs/ft^3	dry rodded, C29[3]
-3/4"	Anderson Eng. Cons.	38.5%	100.3 lbs/ft^3	dry rodded, C29[3]
-3/4"	Anderson Eng. Cons.	38.9%	97.9 bs/ft^3	dry rodded, C29[3]

We are specifying 3/4" drain rock and using a porosity of 38% (conservative) for total volume storage calculations

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Appendix D

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cell (707) 280-0474
cort@munsellecivil.com
www.munsellecivil.com

COMPOSITE C AND CN ANALYSIS

Date: 1/13/2020

Job Name: Chalk Vista Subdivision

Job # 45-17

Average Annual Precipitation:	40 "		k factor: 1.33

Surface Description		C-Value (Based on City of Santa Rosa Storm Water Calculator Table 6-1)	CN Value (Based on TR55 Table 2-2, Hydrologic Soil Group C and D)
Compacted Gravel Surface Area		0.7	89(C) AND 91 (D)
Asphalt (Paved area with open ditches)		0.7	92(C) AND 93 (D)
Vegetated Surface Area		0.1	74(C) AND 80 (D)
Roof Surface Area		0.7	98 (C + D)

Post-Development

Tributary ID	Compacted Grave Surface Area (sf) - (C)	Compacted Gravel Surface Area (sf) - (D)	Asphalt (sf) - (C)	Asphalt (sf) - (D)	Roof (sf)	Vegetated Surface Area (sf) - (C)	Vegetated Surface Area (sf) - (D)	Total Area (sf)	Total Area (ac.)	Composite C-Value	Composite CN Value
1	0	1816	0	5995	2000	0	3952	13763	0.316	0.53	90
2	1990	0	6528	0	2000	3709	0	14227	0.327	0.54	88
3	1028	227	3600	852	0	1110	300	7117	0.163	0.58	88
4	1599	0	5357	0	2000	3169	0	12125	0.278	0.54	88
5	2755	0	9686	0	0	8580	0	21021	0.483	0.46	84
6	4530	841	14706	3023	0	4571	767	28438	0.653	0.59	88

City of Santa Rosa WATER

STORM WATER CALCULATOR

LID BMP Summary Page & Site Global Values

Project Information:

Project Name:	Chalk Vista Subdivision
Address/Location:	1276 Jensen Lane, Windsor
Designer:	Munselle Civil Engineering
Date:	1/13/2020

Site Information:

Mean Seasonal Precipitation (MSP) of Project Site:	40.00	(inches)
K=MSP/3(K=	1.33	
Impervious area - pre development:	0.0	ft^2
Impervious area - post development:	70,533.0	ft^2

Based upon the pre and post development impervious area, the post construction BMP requirement is:

100% Capture & Treatment

Summary of Saved BMP Results:

		Tributary Area		Requirements		BMP Design Results						
							Hydromodification Control		Flow Base Treatment		Delta Volume Capture	
	BMP ID:	Tributary Area (ft^2.)	Runoff Reduction Measures (Y/N)	Type of Requirement Met	Type of BMP Design	Percent Achieved	Required $V_{Hydromod}$ (ft^3)	Achieved (ft^3)	Required Q Treatment (cfs)	Achieved (ft^3)	Required Vdelta (ft^3)	Achieved (ft^3)
1	1	13,763	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	100.7	637.2269	642.0000				
2	2	14,227	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	100.4	550.0158	552.1200				
3	3	7,117	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	100.3	275.1432	276.0600				
4	4	12,125	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	100.7	468.7525	471.8700				
5	5	21,021	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	100.5	556.0054	558.5400				
6	6	28,438	No	Hydromod Volume Capture	Priority 1: P1-06 Swale with Bioretention	100.7	1099.4131	1107.4500				
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
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28												
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30												

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Chalk Vista Subdivision**

BMP ID:	1
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	13,763.0 ft^2
Description/Notes:	Tributary 1

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = **637.23** ft^3

Post development hydrologic soil type within tributary area:	D: 0 - 0.05 in/hr infiltration (transmission) rate
Post development ground cover description:	Farmsteads - buildings, lanes, driveways, surrounding lots
CN_{POST} :	
User Composite post development CN:	90.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = **100.75** %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.38			
Depth below perforated pipe if present:	2.25	ft		
Depth:			0.50	ft
Width:	2.00	ft	3.00	ft
Length:	200.00	ft	200.00	ft
Area:	0.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Chalk Vista Subdivision**

BMP ID:	2
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	14,227.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 550.02 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Vineyard - Annual grass or Legume cover - Good
CN_{POST} :	
User Composite post development CN:	88.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.38 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.38			
Depth below perforated pipe if present:	2.25	ft		
Depth:			0.50	ft
Width:	2.00	ft	3.00	ft
Length:	172.00	ft	172.00	ft
Area:	0.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Chalk Vista Subdivision**

BMP ID:	3
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	7,117.0 ft^2
Description/Notes:	Tributary 3

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 275.14 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Vineyard - Annual grass or Legume cover - Good
CN_{POST} :	
User Composite post development CN:	88.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.33 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.38			
Depth below perforated pipe if present:	2.25	ft		
Depth:			0.50	ft
Width:	2.00	ft	3.00	ft
Length:	86.00	ft	86.00	ft
Area:	0.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Chalk Vista Subdivision**

BMP ID:	4
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	12,125.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 468.75 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Vineyard - Annual grass or Legume cover - Good
CN_{POST} :	
User Composite post development CN:	88.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.67 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.38			
Depth below perforated pipe if present:	2.25	ft		
Depth:			0.50	ft
Width:	2.00	ft	3.00	ft
Length:	147.00	ft	147.00	ft
Area:	0.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Chalk Vista Subdivision**

BMP ID:	5
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	21,021.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 556.01 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Vineyard - Annual grass or Legume cover - Good
CN_{POST} :	
User Composite post development CN:	84.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.46 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.38			
Depth below perforated pipe if present:	2.25	ft		
Depth:			0.50	ft
Width:	2.00	ft	3.00	ft
Length:	174.00	ft	174.00	ft
Area:	0.00	ft^2	0.00	ft^2

STORM WATER CALCULATOR

BMP Tributary Parameters

Project Name: **Chalk Vista Subdivision**

BMP ID:	6
BMP Design Criteria:	100% Capture & Treatment
Type of BMP Design:	Priority 1: P1-06 Swale with Bioretention
BMP's Physical Tributary Area:	28,438.0 ft^2
Description/Notes:	

Hydromodification Requirement: 100% Volume Capture; $V_{HYDROMOD}$

$V_{HYDROMOD}$ = 1,099.41 ft^3

Post development hydrologic soil type within tributary area:	C: 0.05 - 0.15 in/hr infiltration (transmission) rate
Post development ground cover description:	Vineyard - Annual grass or Legume cover - Good
CN_{POST} :	
User Composite post development CN:	88.0

BMP Sizing Tool: Hydromodification Requirement

Percent of Goal Achieved = 100.73 %

	BMP Volume Below Ground		Ponded Water Above Ground	
Porosity:	0.38			
Depth below perforated pipe if present:	2.25	ft		
Depth:			0.50	ft
Width:	2.00	ft	3.00	ft
Length:	345.00	ft	345.00	ft
Area:	0.00	ft^2	0.00	ft^2

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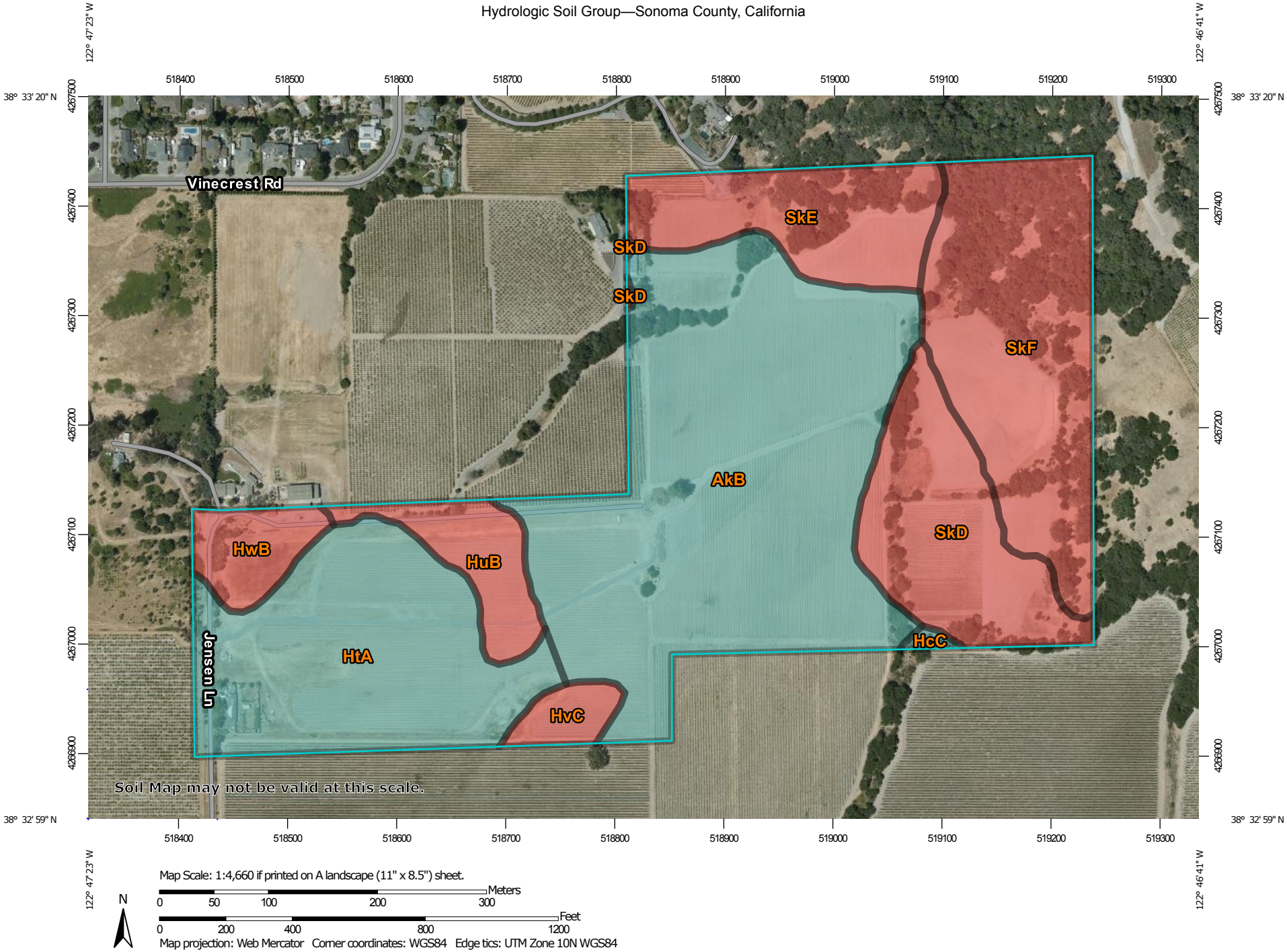

122° 47' 23" W
122° 46' 41" W
38° 33' 20" N
38° 32' 59" N
518400
518500
518600
518700
518800
518900
519000
519100
519200
519300
4267500
4267400
4267300
4267200
4267100
4267000
4266900
Vinecrest Rd
Jensen Ln
SkE
SkD
SkD
SkF
AkB
SkD
HwB
HuB
HtA
HcC
HvC
Soil Map may not be valid at this scale.
Map Scale: 1:4,660 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 50 100 200 300
Feet
0 200 400 800 1200
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this 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.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sonoma County, California
Survey Area Data: Version 12, Sep 13, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 1, 2018—Jul 31, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AkB	Arbuckle gravelly loam, 0 to 5 percent slopes	C	25.9	37.0%
HcC	Haire clay loam, 0 to 9 percent slopes	C	0.2	0.3%
HtA	Huichica loam, 0 to 2 percent slopes	C	12.5	17.9%
HuB	Huichica loam, ponded, 0 to 5 percent slopes	D	2.8	4.0%
HvC	Huichica loam, shallow, 0 to 9 percent slopes	D	1.1	1.6%
HwB	Huichica loam, shallow, ponded, 0 to 5 percent slopes	D	2.1	3.0%
SkD	Spreckels loam, 9 to 15 percent slopes	D	7.3	10.5%
SkE	Spreckels loam, 15 to 30 percent slopes	D	6.0	8.6%
SkF	Spreckels loam, 30 to 50 percent slopes	D	12.1	17.3%
Totals for Area of Interest			**70.0**	**100.0%**

Description

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.

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

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 2-2a Runoff curve numbers for urban areas [1/]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2/]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3/]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4/]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5/]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

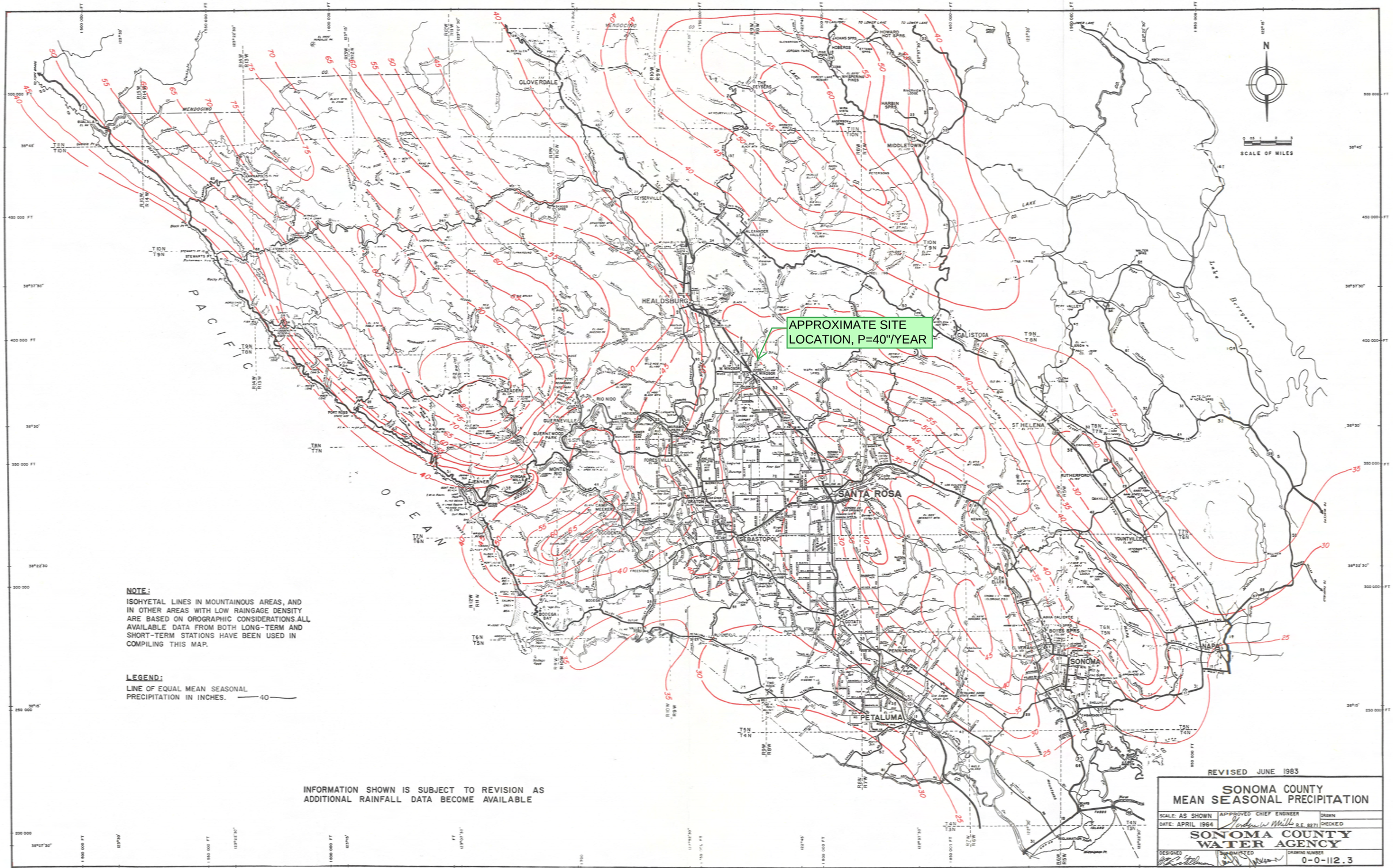
[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.



NOTE:
ISOHYETAL LINES IN MOUNTAINOUS AREAS, AND IN OTHER AREAS WITH LOW RAINGAGE DENSITY ARE BASED ON OROGRAPHIC CONSIDERATIONS. ALL AVAILABLE DATA FROM BOTH LONG-TERM AND SHORT-TERM STATIONS HAVE BEEN USED IN COMPILING THIS MAP.

LEGEND:
LINE OF EQUAL MEAN SEASONAL PRECIPITATION IN INCHES. ——40——

INFORMATION SHOWN IS SUBJECT TO REVISION AS ADDITIONAL RAINFALL DATA BECOME AVAILABLE

REVISED JUNE 1983

SONOMA COUNTY MEAN SEASONAL PRECIPITATION

SCALE: AS SHOWN	APPROVED CHIEF ENGINEER	DRAWN
DATE: APRIL 1964	Jodson W. Mills R.E. 8271	CHECKED
SONOMA COUNTY WATER AGENCY		
DESIGNED	SUBMITTED	DRAWING NUMBER 0-0-112.3

PLATE No. B-3

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cort@munsellecivil.com
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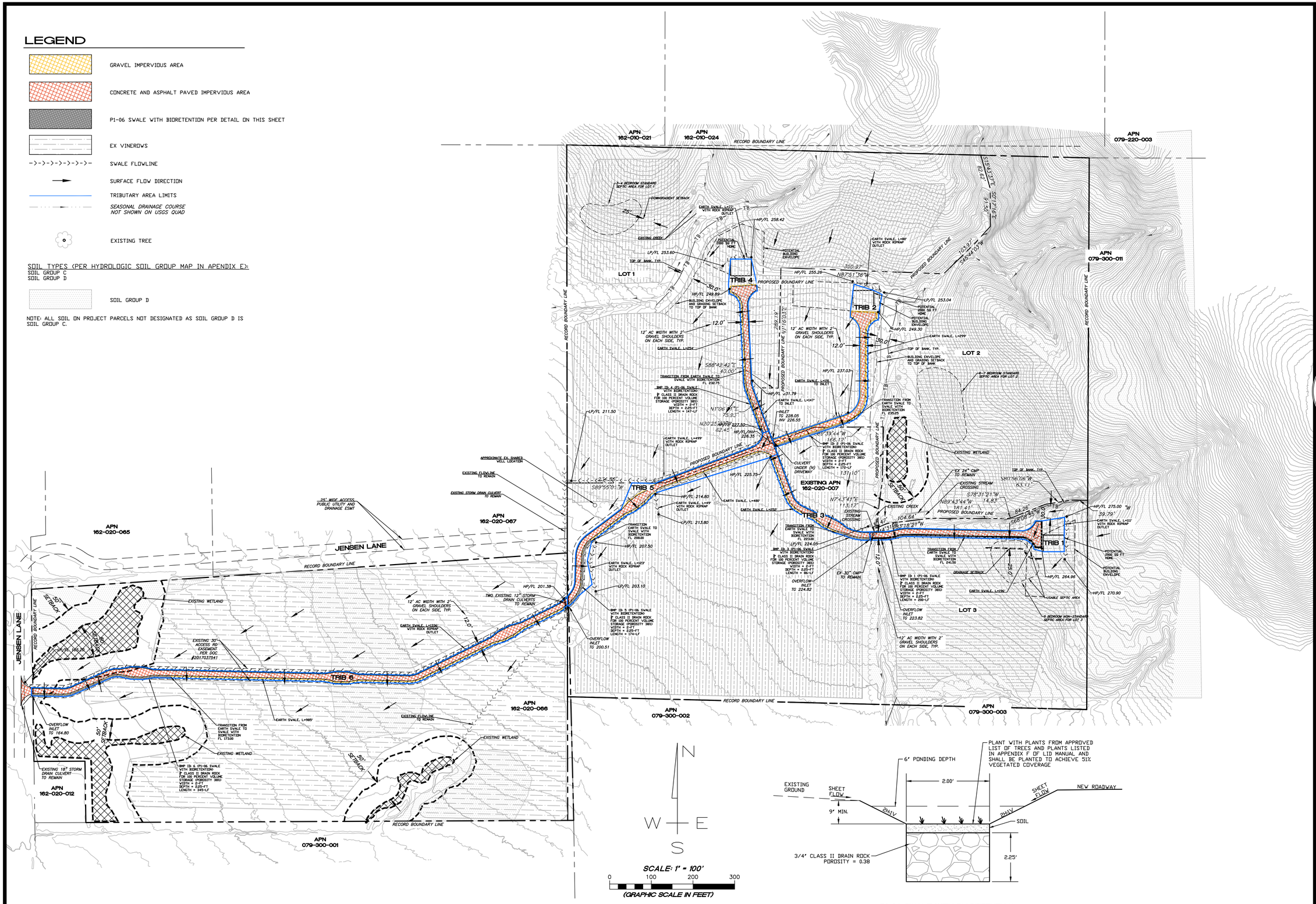
LEGEND

- GRAVEL IMPERVIOUS AREA
- CONCRETE AND ASPHALT PAVED IMPERVIOUS AREA
- P1-06 SWALE WITH BIORETENTION PER DETAIL ON THIS SHEET
- EX VINEROWS
- SWALE FLOWLINE
- SURFACE FLOW DIRECTION
- TRIBUTARY AREA LIMITS
- *SEASONAL DRAINAGE COURSE NOT SHOWN ON USGS QUAD*
- EXISTING TREE

SOIL TYPES (PER HYDROLOGIC SOIL GROUP MAP IN APENDIX E):
SOIL GROUP C
SOIL GROUP D

- SOIL GROUP D

NOTE: ALL SOIL ON PROJECT PARCELS NOT DESIGNATED AS SOIL GROUP D IS SOIL GROUP C.



P1-06 SWALE WITH BIORETENTION

REVISION	DESCRIPTION	BY	DATE

MUNSELLE CIVIL ENGINEERING
CIVIL ENGINEERING • LAND PLANNING
513 CENTER STREET
HEALDSBURG, CA 95448
(707) 395-0968

PROFESSIONAL ENGINEER • CORT L. MUNSELLE • No. 69941 Exp. 8-30-20 • REGISTERED CIVIL ENGINEER • STATE OF CALIFORNIA

CORT L. MUNSELLE DATE
RCE 69941

CHALK VISTA SUBDIVISION
SWLID PROPOSED CONDITIONS EXHIBIT
APN 162-020-007 AND APN 162-020-066
1276 JENSEN LANE
WINDSOR, CA

JANUARY 13, 2020

JOB NO.
45-17

SHEET NO.
H1
OF 2 SHEETS

P:\MCE JOBS\2017\45-17 CHALK VISTA -EGAN RANCH\DWGS\45-17 HYDRO.DWG 1/13/2020 1:46 PM

LEGEND

EXISTING TREE

EX VINEROWS

SOIL TYPES (PER HYDROLOGIC SOIL GROUP MAP IN APENDIX E):
SOIL GROUP C
SOIL GROUP D

SOIL GROUP D

NOTE:
1. ALL SOIL ON PROJECT PARCELS NOT DESIGNATED AS SOIL GROUP D IS SOIL GROUP C.
2. FOR EXACT SOIL TYPES SEE WEB SOIL SURVEY MAP IN APPENDIX E.

N
W E
S

SCALE: 1" = 100'
0 100 200 300
(GRAPHIC SCALE IN FEET)

APN 162-010-021
APN 162-010-024
RECORD BOUNDARY LINE
APN 079-220-003
S15°43'37"E 92.82'
S22°17'16"E 91.50'
104'
154'
LOT 1
PROPOSED BOUNDARY LINE
234'
65'
390.97'
N87°51'36"W
103.97'
S45°48'03"W
APN 079-300-011
RECORD BOUNDARY LINE
PROPOSED BOUNDARY LINE N1°16'03"E 292.14'
LOT 2
S86°42'42"E 40.00'
N1°06'01"E 75.93'
N20°25'02"W 62.45'
LO 20
LO 20
LO 12
LO 18
LO
S89°39'44"W 166.12'
S69°34'52"W 113.37'
PROPOSED BOUNDARY LINE
EXISTING WETLAND
APPROXIMATE EX SHARED WELL LOCATION
EXISTING FLOWLINE TO REMAIN
EXISTING STORM DRAIN CULVERT TO REMAIN
234.86'
S89°55'00"E
FM 36
RM 72
N1°17'18"E 131.10'
EXISTING APN 162-020-007
PROPOSED BOUNDARY LINE
EX 24" CMP TO REMAIN
EXISTING STREAM CROSSING
S80°36'06"W 63.11'
20'
S78°31'21"W
N89°43'44"W 14.83'
187.41'
PROPOSED BOUNDARY LINE
84.26'
S68°08'35"W
N89°44'27"W 39.79'
N7°43'41"E 113.17'
EXISTING STREAM CROSSING
EXISTING CREEK
104.64'
S6°44'31"E
S3°18'21"W
63'
EX 30" CMP TO REMAIN
APN 162-020-065
JENSEN LANE
RECORD BOUNDARY LINE
25' WIDE ACCESS, PUBLIC UTILITY AND DRAINAGE ESMT
APN 162-020-067
TWO EXISTING 12" STORM DRAIN CULVERTS TO REMAIN
OAK 12
LO 14
LO 16
LOT 3
EXISTING WETLAND
EXISTING 30' ACCESS TO EASEMENT PER DOC. #2017037541
VO 18 27
OAK 14
APN 162-020-066
EXISTING FLOWLINE TO REMAIN
EXISTING WETLAND
EXISTING 18" STORM DRAIN CULVERT TO REMAIN
APN 162-020-012
RECORD BOUNDARY LINE
APN 079-300-001
APN 079-300-002
RECORD BOUNDARY LINE
APN 079-300-003

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