

---

**PRECISION SOIL MAP AND  
SOIL INTERPRETATIONS**

Casey Property  
13250 NE Kinney Road  
Newberg, Oregon  
Dundee Hills AVA

**October 24, 2018**

**By: Andy Gallagher, Red Hill Soils  
Corvallis, Oregon**

Andy Gallagher, Soil Scientist PO Box 2233 Corvallis, OR 97333

*Red Hill Soils*  
541-745-7878 avg@redhillsoil.com

## **INTRODUCTION**

This project was done to provide soil profile information, classification and baseline soil interpretations for viticulture on approximately 64 acres in the Dundee Hills. Soil borings were made in the area where the terrain is suitable for winegrowing. Soil borings were made in transect of different components of the landscape. Soil profile descriptions were made in order to classify soils and to record soil drainage characteristics, soil depth to bedrock, surface thickness, soil texture of the surface and the subsoil. Boring locations were recorded with a global positioning system (GPS).

## **BACKGROUND AND METHODS**

### **Project Area**

The site is currently in cropland, Douglas fir and pine plantations and hardwood groves. The parcel has a couple low hills and slopes that fall away in all directions from strongly sloping to extremely steep slopes. The cropland in the northeast is moderately rolling with a long drainage swale in the base that drains to the northeast.

The Soil Survey of Yamhill County Area (Figure 1) delineated moderately well drained Pengra in the cropland, well drained Goodin and Melbourne on the forested hill slopes, Carlton along the west side in the fir and pine plantation, Panther in the northwest corner. Smaller areas of volcanic soils like Jory were mapped in the northwest uplands, small areas of somewhat poorly drained Chehalem along the southwest corner and a small area of Panther-Witham in the southeast part.

The geology of the site is Marine Sediments on the uplands and old clayey alluvium and colluvial deposits on the lower slopes. Missoula flood silts are from one to five feet deep on top of the older sediments, and they are generally thicker on the lower slopes and benches. Elevation on the hill summit is a little over 400 feet and the same in the southeast corner and the lower elevation is around 235 feet along the west line and 320 feet in the northeast corner drainage outlet (Figure 2).

## NRCS Soil Map Legend

Map symbol	Map Unit
2214A	Chehalem
2304C	Carlton
2711D	Jory
2750C	Pengra
2770C, 2770D, 2770E, 2770F	Melbourne-Goodin complex
2776D	Panther-Witham complex
2778D	Panther
2780C	Jory-Gelderman complex



Figure 1. NRCS soil survey of the parcel



**Figure 2. Topographic map of parcel (25 ft contours)**

## RESULTS

Data from 17 soil borings are presented in Table 1. Revised soils are shown in Figure 3 and 4 and areas not suitable for vineyards are shaded gray in Figure 4.

There are about 48 acres of soils that are suited to vineyard Table 3. There will be less actual planted vineyard acres because of block boundaries and lanes between blocks and overall slope configuration. Of these about 17 acres need artificial drainage, and there was communication that the farmer had already tile drained. While most of this acreage is suited to dry farming there are about nine acres of Steiwer and Chehulpum that may benefit from irrigation as they tend to be droughty.

Areas that are unsuitable or poorly suitable include seven acres that are poorly drained or on concave slope positions and drainageways, and six acres that are too steep, and about 2 acres of homestead including house and outbuildings Table 4. Soil Boring locations are given as latitude and longitude Table 4.

Vineyard soils on the upland hillslopes are Windygap, Goodin and Willakenzie. The Windygap is about 40 inches or more to siltstone and sandstone. This soil is reddish brown clayey subsoil similar but deeper than Bellpine. Goodin is moderately deep and similar to Bellpine and Willakenzie but Goodin is not as weathered as Bellpine and has more clay than Willakenzie. The vineyard soils on the south slopes and lower benches are silty sediments over weathered

siltstone and include the shallow Chehulpum and moderately deep Steiwer. All of these aforementioned soils are well drained

Soils in the field on the low benches and Missoula sediments are moderately well drained with somewhat poorly drained soils in the lower drainageway. Vineyard soils; Wellsdale has Missoula sediments in the upper part overlying a paleosol formed in sedimentary rock and Helvetia soils have Missoula silts in the upper part and older clayey alluvium in the lower part of the profile.

Witham soils in the upper drainageway and Chehalem soils in the lower part of the drainageway have silty clay loam surface layer over very slowly permeable smectitic clays in the subsoil and these are not very well suited to vineyards because of low lying topography and soil wetness.

The Carlton soils are on the footslope in the fir and pine plantation along the west property line. These soils have deep silt and silty clay loam over clayey sediments and are moderately well drained. The very steep slopes west of the house are greater than 30 percent slopes in places and this is too steep for safe tractor operation and these steep soils are very highly erodible so slopes this steep are considered unsuitable.

Table 1. Summary Soil Boring Data

Boring Number	Soil Series	Depth to Very Gravelly or Stony Layer*	Depth to Bedrock*	Depth to Clay (Mineralogy)	Depth to Seasonally High Water Table	Available Water Holding Capacity
		(IN)	(IN)	(IN)	(IN)	(IN)
1	Windygap	--	>48	-	well	9
2	Windygap	--	40	-	40	8
3	Goodin	--	30	-	36	6
4	Pengra	--	>50	36 (smectite)	20	8
5	Helvetia	--	>60	54 (mixed)	27	10
6	Chehalem	--	>60	40 (smectite)	12	9
7	Wellsdale	--	>60	36 (mixed)	36	9
8	Chehulpum	--	16	--	well	3
9	Windygap	--	40	9 (mixed)	40	8
10	Witham	--	>42	18 (smectite)	18	8
11	Steiwer	18	24	--	well	5
12	Dug pond	--	--	--	--	--
13	Steiwer	--	24	--	well	5
14	Very shallow	--	6(R)	--	well	<1
15	Carlton	--	>60	24 (mixed)	24	9
16	Panther (mod deep)	--	32	3 (smectite)	3	8
17	Willakenzie	--	33	--	well	6

\*Cr-horizon unless otherwise noted

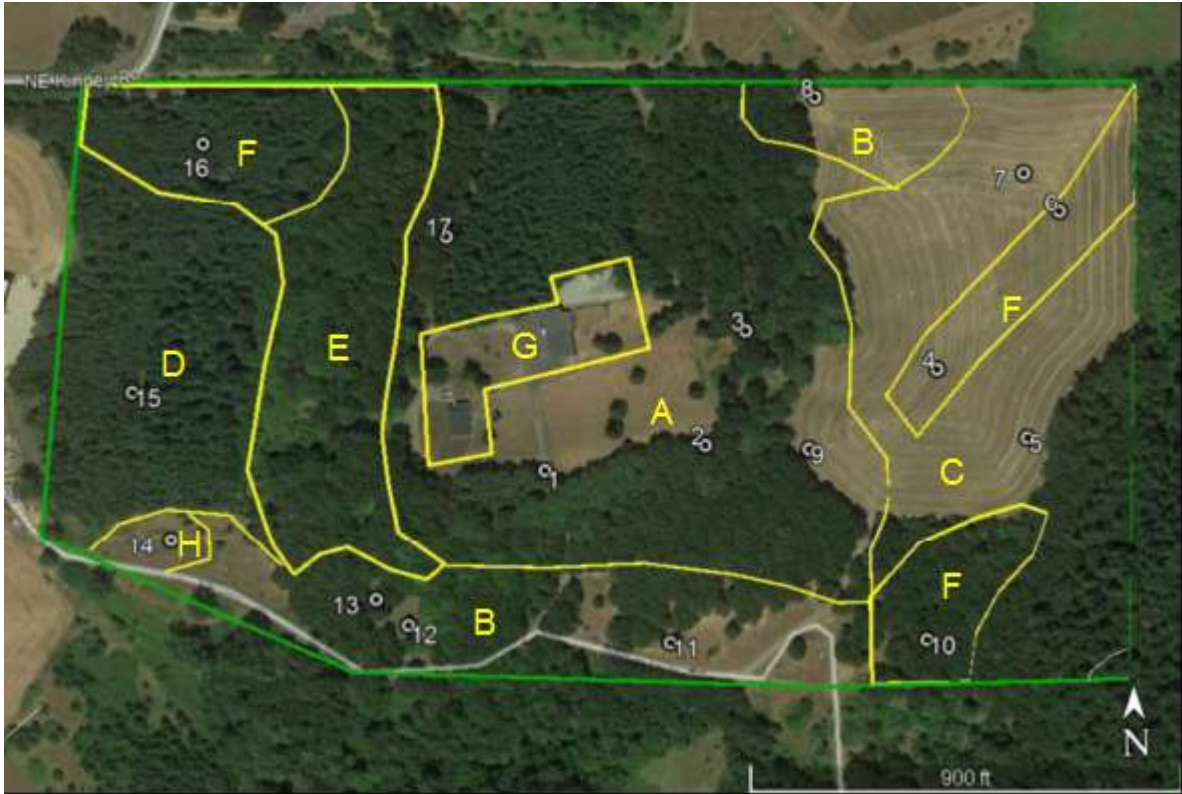


Figure 3. Revised soil map.

**Table 2. Acres of suitable soils and terrain**

Map unit	Soil Series	Drainage Class		Acres
A	Willakenzie, Goodin, Windygap	Well drained	Mod deep to deep	22
B	Steiwer and Chehulpum	Well drained	Shallow to mod deep	9
C	Wellsdale, Helvetia	Well drained	Deep	11
D	Carlton	Mod well	Deep	6
<b>Total</b>				<b>48</b>

**Table 3. Acres of unsuitable soils and terrain**

Map unit	Soil Series	Drainage Class	Depth to bedrock	Acres
E	Very steep 30 percent slopes	--	--	6.0
F	Poorly drained and drainageways	Somewhat poor to poor	Deep	7.0
G	Home, out buildings, yard	--	--	2.2
H	Very shallow	well	Very shallow	0.5
<b>Total</b>				<b>15.7</b>



**Figure 4. Soils that are suitable are not shaded and those that are unsuitable are shaded gray.**

### Depth

Soils on this land range from shallow Chehulpum soil to very deep Carlton soils. Soil depth is one of the soil properties driving soil variability and is strongly related to available water holding capacity and vine vigor potential in the winegrapes.

Chehulpum soils are 12 to 20 inches to sedimentary rocks. Steiwer, Willakenzie and Goodin soils are moderately deep. Windygap soils are deep to siltstone. In most cases the bedrock is soft siltstone and silty sandstone. There are a couple areas where the bedrock is more consolidated and harder as in the areas around boring 8. There is one small area around boring 14 where the soil seems to have been scraped and hard sandstone and siltstone are at 6 inches depth

Panther, Pengra and Carlton are very deep or more than 60 inches to rock.

### Drainage

The soils in map unit C and D are moderately well drained and should be artificially drained prior to planting if the soils are not already. These soils have a seasonally high water table at depth of 24 to 36 inches in the winter rainy season and some years into spring.

The soils in map unit F are either poorly or somewhat poorly drained or situated in a drainageway where soils are saturated at or near the surface in the winter rainy season. The poorly drained Panther soils in the northwest corner are considered to be too wet for winegrapes and are also difficult to adequately drain with drain tile because of the slow permeability in the clay substratum. The Witham soils have the smectitic clay layer a bit deeper and are slightly better drained but are often situated in swales where soils remain wet into the growing season and where there is concentrated flow which can cause high erosion, so these soils are often unsuitable for winegrapes.

### Available Water Holding Capacity

This site ranges from very low to high available water holding capacity. The very shallow soil and Chehulpum soils have very low to low AWHC. The moderately deep Steiwer and Willakenzie have moderately low to moderate AWHC and the deep Windygap and clayey Pengra soils have moderately high AWHC. The very deep Helvetia has high water holding capacity. Vine spacing, drought resistant rootstock and drip irrigation will need to be used to overcome the low AWHC on shallow soils.

Table 4. Boring Locations

Boring	Latitude	Longitude
1	45.309630	-123.083091
2	45.309770	-123.081789
3	45.310418	-123.081457
4	45.310197	-123.079904
5	45.309808	-123.079174
6	45.311093	-123.078904
7	45.311322	-123.079192
8	45.311757	-123.080887
9	45.309707	-123.081994
10	45.308648	-123.081994
11	45.308635	-123.082079
12	45.308738	-123.084202
13	45.308887	-123.084464
14	45.309235	-123.086127
15	45.310078	-123.086442
16	45.311502	-123.085862
17	45.310957	-123.083887