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A Brief History of RUSLE2

1993	Development of RUSLE2 began as a join project with the United States Department of Agriculture (USDA) Agricultural Research Service (ARS), the USDA Natural Resources Conservation Service (NRCS), and the University of Tennessee.
2008	Version 2 was released and included some construction related inputs. This version is currently available at https://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm
2011	Caltrans released its RUSLE2 version "MOSES_08092011"
2012	Caltrans released an updated version "MOSES_02-10-2012"
2014	I gave a SWAW workshop demonstrating RUSLE2

Sometime between 2014 – 2025 the Caltrans RUSLE2 became instable and not useable

2025	Caltrans removed the RUSLE2 download from their website and has been working on a revision. Caltrans is anticipating making the new version available in October 2025.

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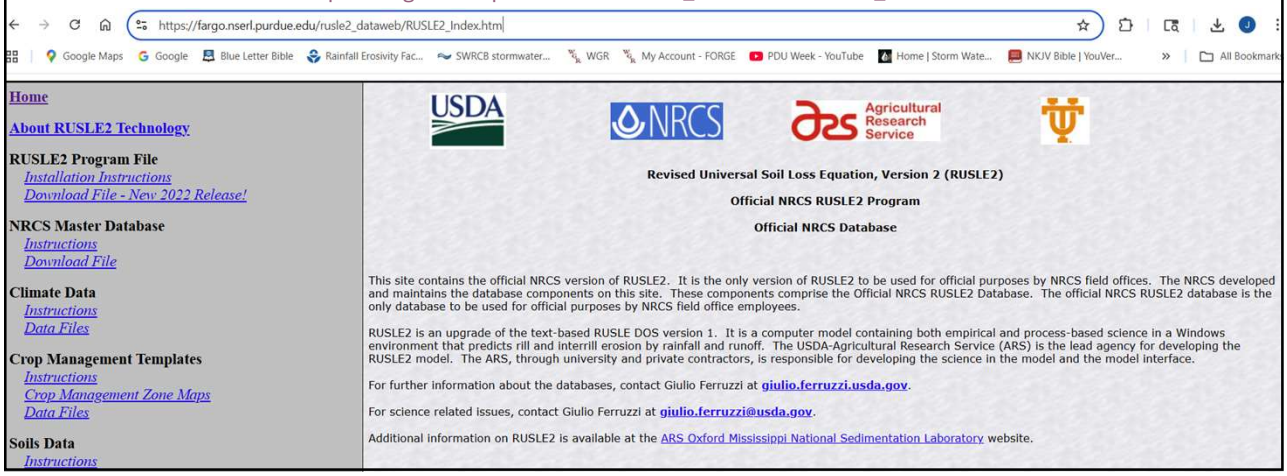
Where to download RUSLE2

USDA Version

https://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm



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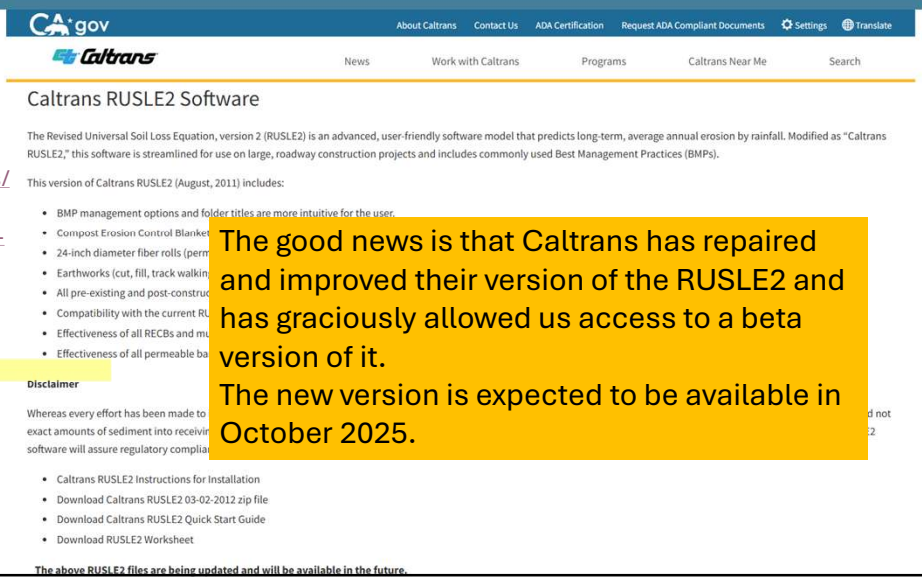
Where to download RUSLE2

Caltrans Version

https://dot.ca.gov/programs/design/hydraulics-stormwater/bsddd-erosion-prediction-with-rusle2



The good news is that Caltrans has repaired and improved their version of the RUSLE2 and has graciously allowed us access to a beta version of it.
The new version is expected to be available in October 2025.

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RUSLE2 Setup

Download the Caltrans Beta Version and watch the set-up videos.

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Why RUSLE2?

It is required by the California Construction General Permit to be used in the following circumstances:

As one of three options for demonstrating final stabilization

ii. **Revised Universal Soil Loss Equation (RUSLE or RUSLE2) method.** Computational proof required. Site conditions shall match values used in method computation. Photos of all site areas are required to verify pre-construction and post-construction conditions used in the computations; *Order, p. 22*

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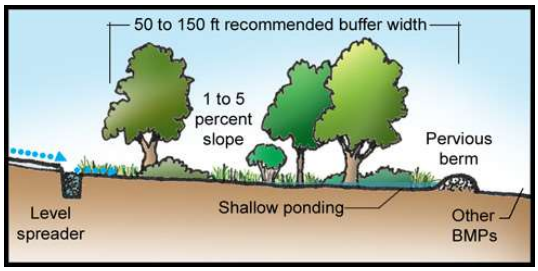
Why RUSLE2?

It is required by the California Construction General Permit to be used in the following circumstances:

To quantify sediment load when using BMPs for a natural buffer



Attachment D, p. D-7

II.G. Surface Water Buffer[5]

II.G.1. Dischargers shall provide and maintain natural buffers and/or equivalent erosion and sediment controls when a water of the U.S. is located within 50 feet of the site's earth disturbances, unless infeasible.

II.G.2. Dischargers shall comply with one of the following alternatives for any discharges to waters of the U.S. located within 50 feet of a site's earth disturbances:

a. Provide and maintain a 50-foot undisturbed natural buffer from the edge of the disturbed area to the top of bank;

b. Provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by erosion and sediment controls that achieve, in combination, the sediment load reduction equivalent to a 50-foot undisturbed natural buffer. The equivalent sediment load may be calculated using RUSLE2 or another method approved by the Regional Water Board; or

c. Implement erosion and sediment controls to achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer when infeasible to provide and maintain an undisturbed natural buffer of any size. The equivalent sediment load may be calculated using RUSLE2 or another method approved by the Regional Water Board.

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Why RUSLE2?

It is required by the California Construction General Permit to be used in the following circumstances:

To demonstrate compliance with TMDLs

Attachment H, for nutrients (I.D.2 required by Region 8), for sediment (I.E.2 required by Region 1), metals and toxics (I.G.2 required by Regions 4 and 8)

iii. Use RUSLE2 modeling to calculate the predicted soil losses and sediment delivery rates when selecting temporary BMPs and controls to be applied during each phase of the project. The RUSLE2 modeling included in the SWPPP shall include:

1. Appropriate climatic variables, soil types, and slope topography for the area disturbed; and
2. Calculated soil loss and sediment delivery rates for the selected BMPs and controls equal to, or less than, the soil loss and sediment delivery rates for pre-construction conditions during each phase of the construction project.

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RUSLE2 Challenges

- Technical support is non-existent. You are on your own!
- The USDA version is very much like shoving a square peg in a round hole, the Caltrans version is better but more like putting an octagon peg in a round hole. Still not a perfect fit.
- BMP "management" selection options are limited and do not include many real-life tools.
- Like any modeling tool … "garbage in / garbage out"
- No real direction is provided by the California Water Board to define RUSLE2 inputs and parameters (such as time and geographical spatial data).
- Our experience shows that CGP requirements are not always attainable and that data can be forced to say what we want it to say.

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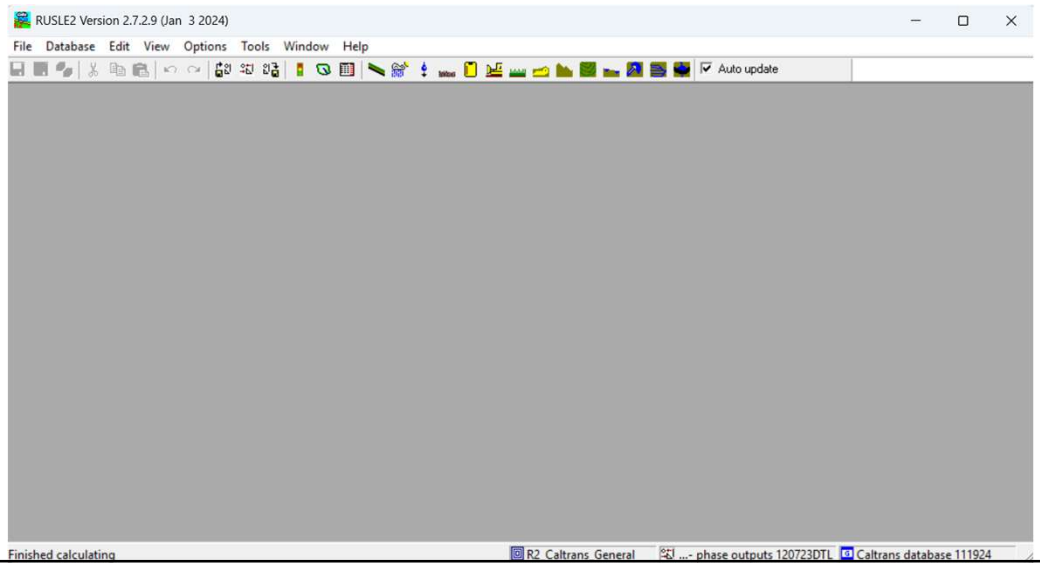
Let's Try Out a Project



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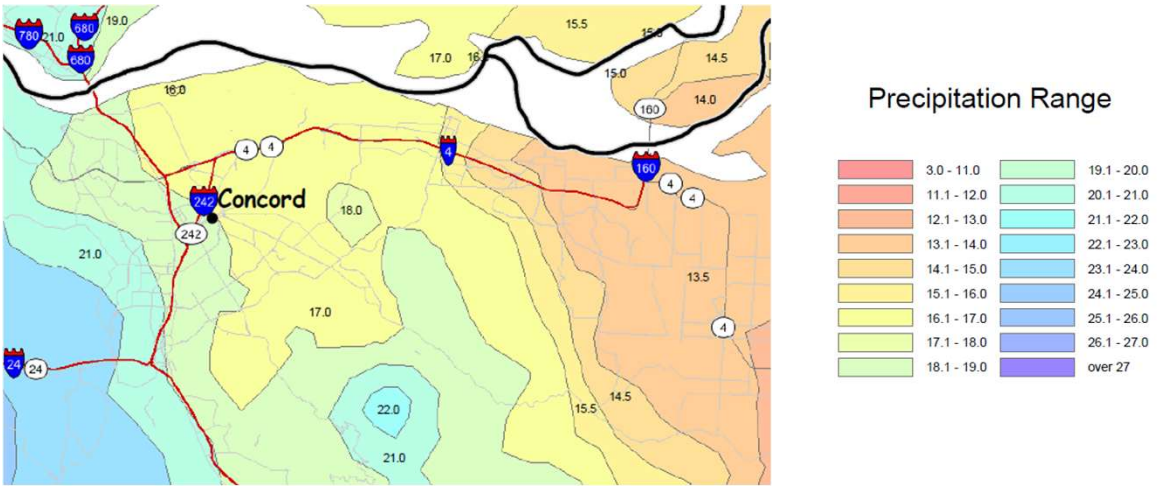
Select the climate data for the project location



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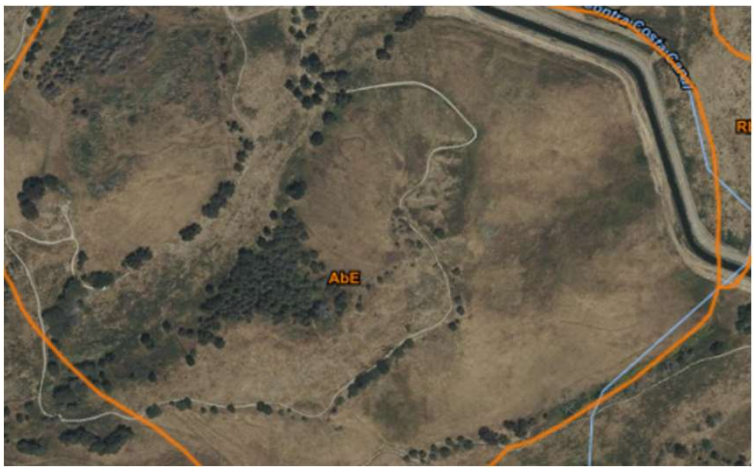
Select the soil type for the project location
AbE Altamont clay, 15 to 30% slopes



Contra Costa County, California

AbE—Altamont clay, 15 to 30 percent slopes, MLRA 15

Map Unit Setting
National map unit symbol: 2w626
Elevation: 10 to 1,730 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 58 to 62 degrees F
Frost-free period: 320 to 360 days
Farmland classification: Not prime farmland

Map Unit Composition
Altamont and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Altamont

Setting
Landform: Mountain slopes, hillslopes
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile
A - 0 to 14 inches: clay
Bss - 14 to 26 inches: clay
Bkss - 26 to 39 inches: clay
Bk - 39 to 48 inches: silty clay
Cr - 48 to 58 inches:

Properties and qualities
Slope: 15 to 30 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Moderate (about 7.3 inches)

Interpretive groups
Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R015XD001CA - CLAYEY

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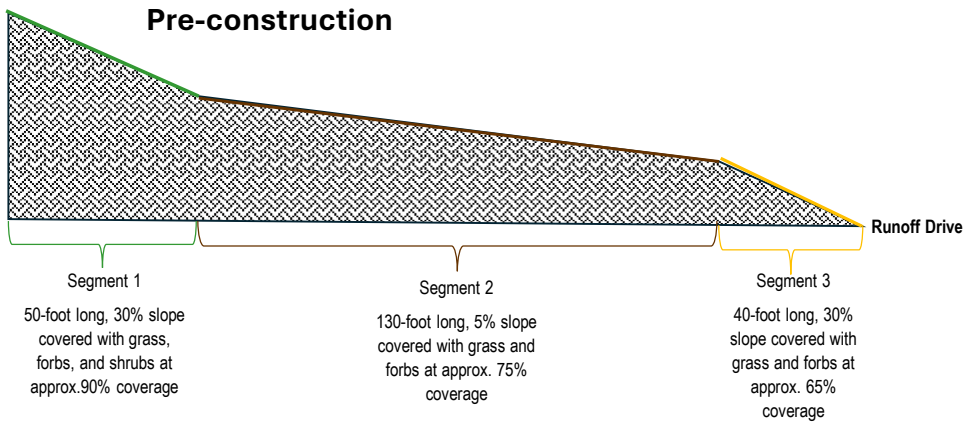
Set up the First Scenario Topography



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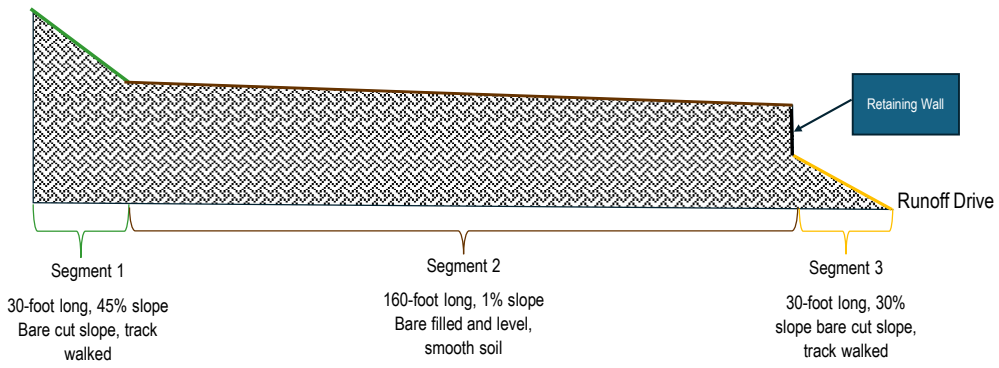
Set up the First Scenario Topography

During-construction



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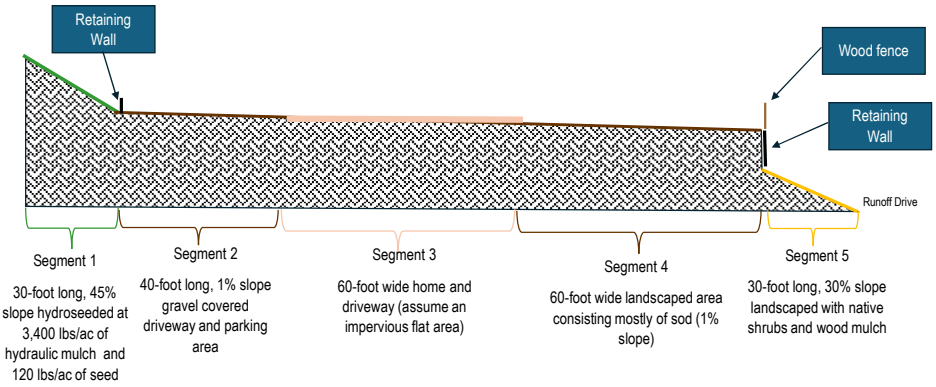
Set up the First Scenario Topography

Post-construction



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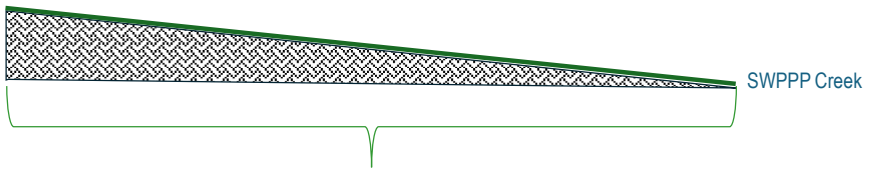
Set up the Second Scenario Topography

Natural Condition



Segment 1

50-foot long, 5% slope, mixed grasses and shrubs
95% cover

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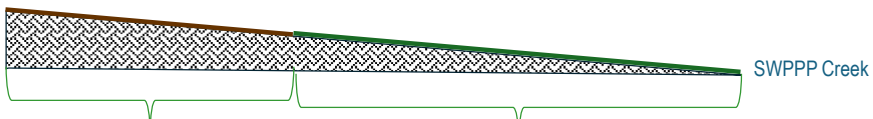
Set up the Second Scenario Topography

Disturbed Condition



Segment 1

20-foot long, 5% slope, bare soil, smooth

Segment 2

30-foot long, 5% slope, mixed grasses and shrubs
95% cover

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