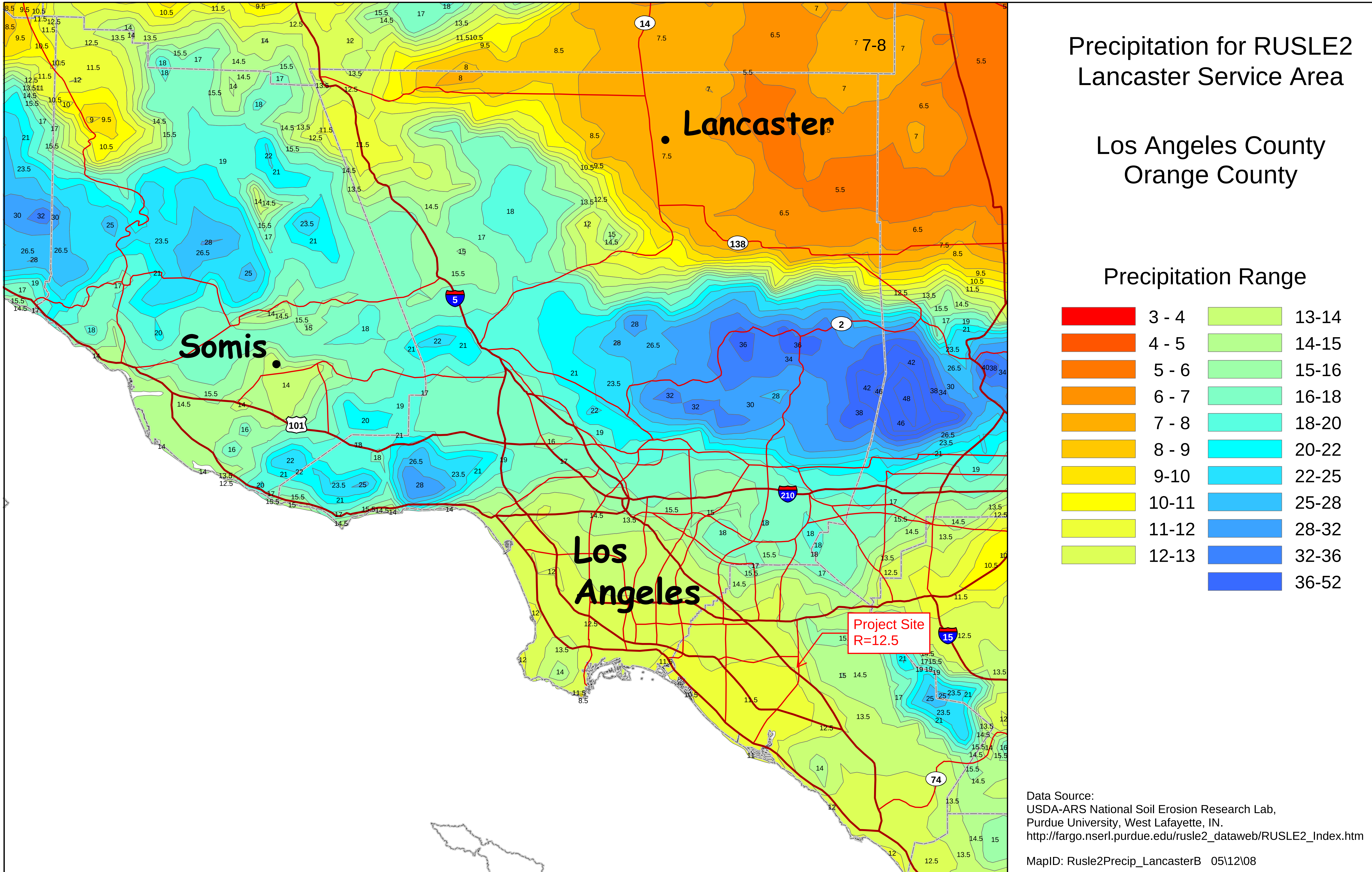
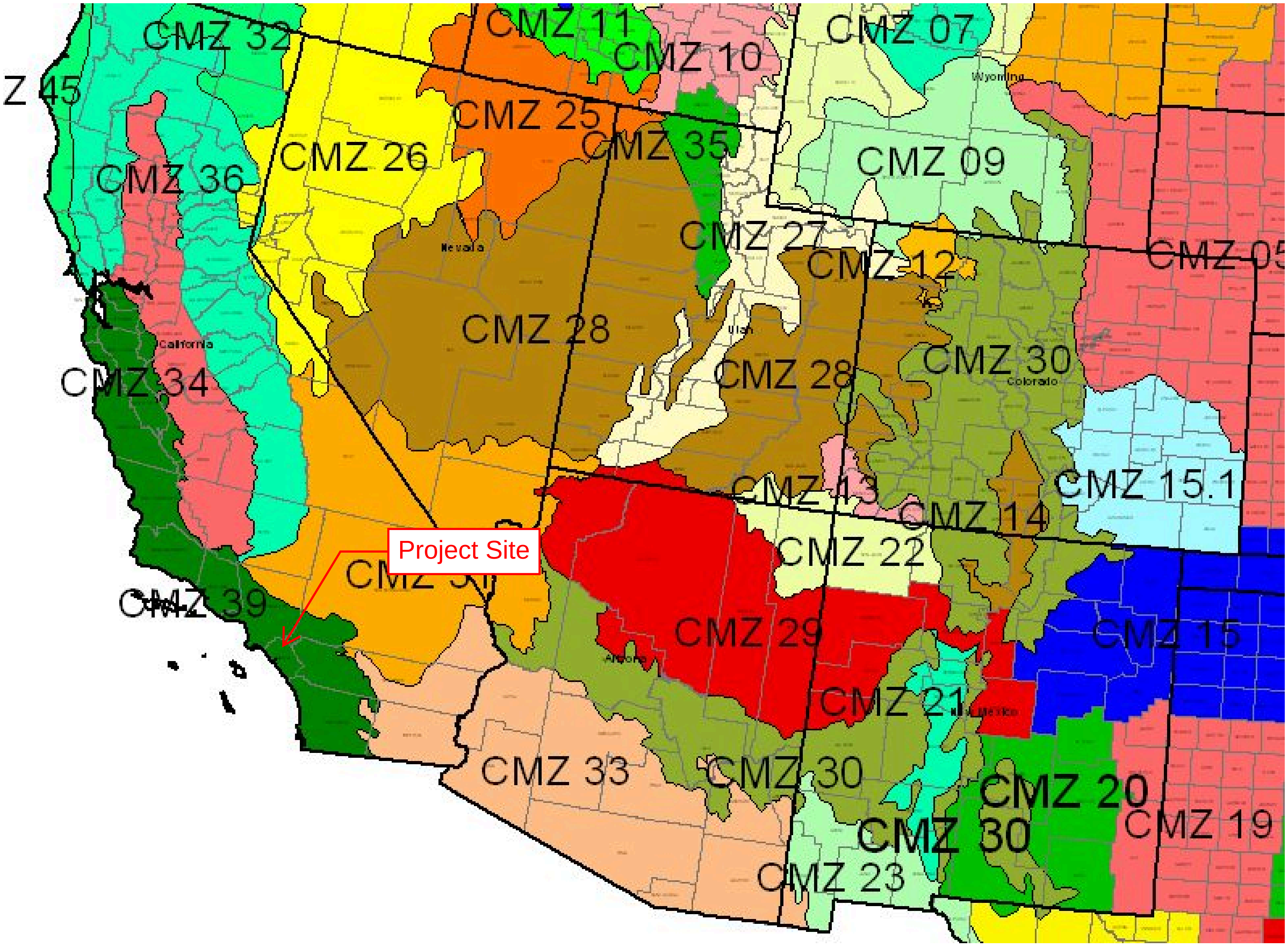
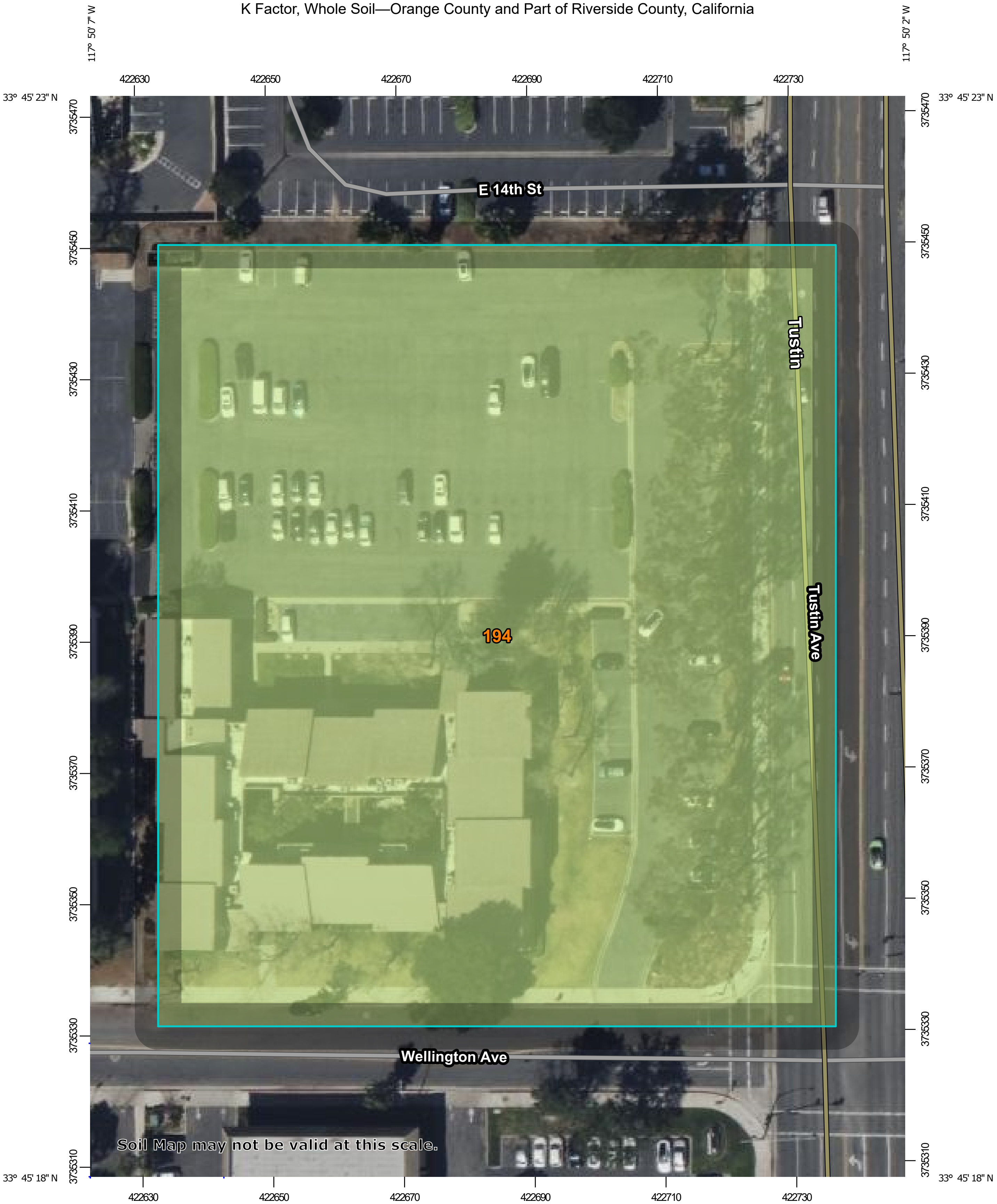


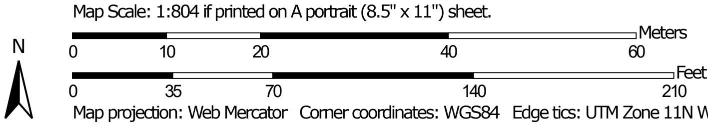
Precipitation for RUSLE2
Lancaster Service Area
Los Angeles County
Orange County
Precipitation Range
3 - 4
4 - 5
5 - 6
6 - 7
7 - 8
8 - 9
9-10
10-11
11-12
12-13
13-14
14-15
15-16
16-18
18-20
20-22
22-25
25-28
28-32
32-36
36-52
Lancaster
Somis
Los Angeles
Project Site
R=12.5
7-8
Data Source:
USDA-ARS National Soil Erosion Research Lab,
Purdue University, West Lafayette, IN.
http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm
MapID: Rusle2Precip_LancasterB 05\12\08

Crop Management Zone (CMZ)





Map Scale: 1:804 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator   Corner coordinates: WGS84   Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Lines

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

Soil Rating Points

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
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 1:24,000.

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: Orange County and Part of Riverside County, California
Survey Area Data: Version 18, Aug 30, 2024

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

Date(s) aerial images were photographed: Mar 14, 2022—Mar 17, 2022

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.

K Factor, Whole Soil

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
194	San Emigdio fine sandy loam, 0 to 2 percent slopes	.24	3.1	100.0%
Totals for Area of Interest			**3.1**	**100.0%**

Description

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Factor K does not apply to organic horizons and is not reported for those layers.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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

VA RUSLE2 Profile Printout w/ Details

PRECONSTRUCTION DA A-1

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name): TAIT
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.35 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.17** **Avg. annual slope STIR: 0.15**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 250 ft
- Avg. slope steepness: 0.70 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
1/1/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: default

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 0.70 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Preconstruction DA A-1

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
1/1/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.35 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.35 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.17

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.15 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of “typical” fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)

Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

PRECONSTRUCTION DA A-2

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.47 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.16** **Avg. annual slope STIR: 0.15**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 150 ft
- Avg. slope steepness: 1.0 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
1/1/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: default

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 1.0 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Preconstruction DA A-2

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
1/1/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.47 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.47 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.16

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.15 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs

A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)

Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of "typical" fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)

Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

PRECONSTRUCTION DA A-3

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.30 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.18** **Avg. annual slope STIR: 0.15**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 280 ft
- Avg. slope steepness: 0.60 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
1/1/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: default

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 0.60 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Preconstruction DA A-3

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
1/1/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.30 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.30 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.18

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.15 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of "typical" fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)
Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

PRECONSTRUCTION DA A-4

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.49 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.16** **Avg. annual slope STIR: 0.15**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 200 ft
- Avg. slope steepness: 1.0 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
1/1/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: default

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 1.0 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Preconstruction DA A-4

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
1/1/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.49 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.49 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.16

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.15 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of "typical" fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)

Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

PRECONSTRUCTION DA A-5

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS Headquarters
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.16 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.19** **Avg. annual slope STIR: 0.15**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 42 ft
- Avg. slope steepness: 0.30 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
1/1/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: default

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 0.30 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Preconstruction DA A-5

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
1/1/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.16 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.16 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.19

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.15 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of “typical” fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)
Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

PRECONSTRUCTION DA A-6

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 2.5 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.0032** **Avg. annual slope STIR: 0.15**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 40 ft
- Avg. slope steepness: 8.0 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
1/1/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: default

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 8.0 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Preconstruction DA A-6

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
1/1/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 2.5 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 2.5 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.0032

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.15 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of "typical" fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)

Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

PRECONSTRUCTION DA B-1

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 1.4 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.089** **Avg. annual slope STIR: 0.15**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 44 ft
- Avg. slope steepness: 4.0 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
1/1/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: default

<u>5. SUPPORT PRACTICES (P FACTOR)</u>

- Contouring: default (Actual row grade: 4.0 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

<u>6. RUSLE2 SOFTWARE DETAILS</u>

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Preconstruction DA B-1

III. RUSLE2 Profile Output & Definitions

<u>1. SURFACE RESIDUE COVER ESTIMATES:</u>

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
1/1/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 1.4 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 1.4 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.089

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.15 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of "typical" fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)

Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

GRADING DA A-1

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.35 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.17** **Avg. annual slope STIR: 0.90**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 360 ft
- Avg. slope steepness: 0.70 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*
vegetations\default	Bushels	200

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
2/15/0	default				
3/15/0	default				
8/15/0	default				
9/1/0	default	default	200		
9/2/0	default			default	2000
9/3/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: CMZ 39\d.Construction Site Templates\Construction site

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 0.70 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Grading DA A-1

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
2/15/0	default		0
3/15/0	default		0
8/15/0	default		0
9/1/0	default		0
9/2/0	default		0
9/3/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.35 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.35 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.17

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.90 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of “typical” fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were

created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)

Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

GRADING DA A-2

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.35 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.17** **Avg. annual slope STIR: 0.90**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 310 ft
- Avg. slope steepness: 0.70 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*
vegetations\default	Bushels	200

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
2/15/0	default				
3/15/0	default				
8/15/0	default				
9/1/0	default	default	200		
9/2/0	default			default	2000
9/3/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: CMZ 39\d.Construction Site Templates\Construction site

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 0.70 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Grading DA A-2

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
2/15/0	default		0
3/15/0	default		0
8/15/0	default		0
9/1/0	default		0
9/2/0	default		0
9/3/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.35 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.35 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.17

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):
  - Avg. annual slope STIR: 0.90 (averaged across all years in the rotation)
  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of "typical" fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were

created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)

Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

GRADING DA A-3

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.48 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.16** **Avg. annual slope STIR: 0.90**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 190 ft
- Avg. slope steepness: 1.0 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*
vegetations\default	Bushels	200

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
2/15/0	default				
3/15/0	default				
8/15/0	default				
9/1/0	default	default	200		
9/2/0	default			default	2000
9/3/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: CMZ 39\d.Construction Site Templates\Construction site

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 1.0 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Grading DA A-3

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
2/15/0	default		0
3/15/0	default		0
8/15/0	default		0
9/1/0	default		0
9/2/0	default		0
9/3/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.48 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.48 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.16

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.90 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of “typical” fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were

created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)
Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

GRADING DA A-4

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.54 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.15** **Avg. annual slope STIR: 0.90**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 240 ft
- Avg. slope steepness: 1.1 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*
vegetations\default	Bushels	200

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
2/15/0	default				
3/15/0	default				
8/15/0	default				
9/1/0	default	default	200		
9/2/0	default			default	2000
9/3/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: CMZ 39\d.Construction Site Templates\Construction site

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 1.1 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Grading DA A-4

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
2/15/0	default		0
3/15/0	default		0
8/15/0	default		0
9/1/0	default		0
9/2/0	default		0
9/3/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **<u>only</u>** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **<u>not</u>** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

<u>2. SOIL LOSS ESTIMATES:</u>

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.54 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.54 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

<u>3. SOIL QUALITY SCORES:</u>

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.15

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):
  - Avg. annual slope STIR: 0.90 (averaged across all years in the rotation)
  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of “typical” fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were

created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)
Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

GRADING DA A-5

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	**Soil Quality**
Soil loss for cons. plan: 0.47 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.16** **Avg. annual slope STIR: 0.90**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 130 ft
- Avg. slope steepness: 1.0 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*
vegetations\default	Bushels	200

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
2/15/0	default				
3/15/0	default				
8/15/0	default				
9/1/0	default	default	200		
9/2/0	default			default	2000
9/3/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: CMZ 39\d.Construction Site Templates\Construction site

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 1.0 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Grading DA A-5

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
2/15/0	default		0
3/15/0	default		0
8/15/0	default		0
9/1/0	default		0
9/2/0	default		0
9/3/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.47 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.47 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.16

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.90 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of “typical” fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were

created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)
Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

GRADING DA A-6

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.45 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.16** **Avg. annual slope STIR: 0.90**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 88 ft
- Avg. slope steepness: 1.0 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*
vegetations\default	Bushels	200

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
2/15/0	default				
3/15/0	default				
8/15/0	default				
9/1/0	default	default	200		
9/2/0	default			default	2000
9/3/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: CMZ 39\d.Construction Site Templates\Construction site

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 1.0 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Grading DA A-6

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
2/15/0	default		0
3/15/0	default		0
8/15/0	default		0
9/1/0	default		0
9/2/0	default		0
9/3/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.45 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.45 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.16

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):

  - Avg. annual slope STIR: 0.90 (averaged across all years in the rotation)

  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of “typical” fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were

created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)

Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

VA RUSLE2 Profile Printout w/ Details

GRADING DA A-7

Detailed printout of RUSLE2 calculation for one field, one management alternative

I. Client/Field ID & Summary

Client/Owner name: OCERS
Project name: OCERS Headquarters
Tract #:
Location: USA\California\Orange County\CA_Orange_R13

Printout date: June 9, 2025
Prepared by (name):
USDA Service Center/Location:

Narrative description of profile, field, and/or management:
Info:

Notes on collection of input data, field visits, etc.:

Summary of RUSLE2 output:

Soil Loss	Soil Quality
Soil loss for cons. plan: 0.36 t/ac/yr **T value: 5.0 t/ac/yr**	**Soil conditioning index (SCI): 0.17** **Avg. annual slope STIR: 0.90**

Recommendations / Comments:

II. RUSLE2 Profile Input

1. CLIMATE (R FACTOR)

- Climate Location: USA\California\Orange County\CA_Orange_R13 (R Factor: 44 US)

2. SOIL (K FACTOR)

- Predominant Soil: SSURGO\Orange County and Part of Riverside County, California\194 San Emigdio fine sandy loam, 0 to 2 percent slopes\San Emigdio Fine sandy loam 85% (Erodibility: 0.24 US)
- T value: 5.0 t/ac/yr

3. TOPOGRAPHY (LS FACTOR)

- RUSLE Slope length (along slope): 460 ft
- Avg. slope steepness: 0.70 %

4. CROP MANAGEMENT (C FACTOR)

- Crop management narrative description / background info:

Info:

- Rotation Duration: 1 yr

- Crops / vegetations in rotation and long-term yield averages:

Vegetation	*Yield units*	*# yield units, #/ac*
vegetations\default	Bushels	200

- Field operation dates and descriptions, manure application rates, etc.:

Date	*Operation*	*Vegetation*	*Yield (harv. units)*	*Type of cover material*	*Cover matl add/remove, lb/ac*
2/15/0	default				
3/15/0	default				
8/15/0	default				
9/1/0	default	default	200		
9/2/0	default			default	2000
9/3/0	default				

External residue (i.e., manure) application rates in RUSLE2 are expressed in lbs of "effective" dry matter per acre. For liquid, slurry, poultry, and semi-solid manures, "effective" dry matter in = 50% of actual dry matter

- Additional RUSLE2 crop management info:
  - Rock cover: 0 %
  - Adjust res. burial level: Normal res. burial
  - RUSLE2 management file name: Base management: CMZ 39\d.Construction Site Templates\Construction site

5. SUPPORT PRACTICES (P FACTOR)

- Contouring: default (Actual row grade: 0.70 %)

- Strips/barriers: (none)

- Diversion/terrace, sediment basin: (none)

- Subsurface drainage: (none)

6. RUSLE2 SOFTWARE DETAILS

- Program version: Jun 7 2022
- Database name: CA climate120303
- Profile file name: profiles\ME0460 Grading DA A-7

III. RUSLE2 Profile Output & Definitions

1. SURFACE RESIDUE COVER ESTIMATES:

Long-term average predicted surface residue cover after each field operation:

Date	*Operation*	*Vegetation*	*Surf. res. cov. after op, %*
2/15/0	default		0
3/15/0	default		0
8/15/0	default		0
9/1/0	default		0
9/2/0	default		0
9/3/0	default		0

One way to verify whether RUSLE2 is properly modeling a situation is to check these long-term average surface residue results. An unexpectedly high or low surface residue cover value after a particular operation indicates that the choice of operation or some other input in the calculation (such as vegetation or yield) should be reviewed.

RUSLE2 counts as surface residue **only** material laying flat on the soil surface (automatically adjusted for overlap). RUSLE2 does **not** count the following as surface residue cover: (a) above-ground or standing material (including live canopy cover and standing dead residue) or (b) buried material (including live roots and dead plant residue). RUSLE2 does account for the erosion control value of standing and buried material when calculating soil loss.

Therefore, these surface residue numbers are most useful for analyzing annual cropping systems in which field operations routinely bury and/or flatten most residue and in which surface residue plays a leading role in erosion prevention. When analyzing results for cropping systems involving perennials and/or no-till planting into large amounts of standing residue (such as a chemically killed cover crop), also consult RUSLE2 canopy cover estimates (available in the VA Basic User Template 2007 Profile Screen).

2. SOIL LOSS ESTIMATES:

- Soil loss for conservation planning:
  - Soil loss for cons. plan: 0.36 t/ac/yr
  - T value: 5.0 t/ac/yr

Estimate of average annual rainfall-induced soil loss (detachment of soil particles & transport downhill) over the length of the modeled slope. It is critical to understand that this value represents a long-term (20- to 30-year) average, not a prediction of actual soil loss in any single year. This is the number to use for conservation planning and to compare with the field's "T" soil loss tolerance value. This number is a measure of the likelihood of degradation by erosion of the soil resource in upslope (steeper) areas of the field. Very little credit is given for any sediment deposition that may occur towards the bottom of the modeled slope (for example, due to an end-of-slope filter strip), because upslope areas are still being degraded.

- Sediment Delivery:
  - Sediment delivery: 0.36 t/ac/yr

Estimate of the amount of sediment delivered by runoff to the end of the modeled slope. This is RUSLE2's best estimate of long-term average "edge of field" soil loss. Full credit is given for any sediment deposition that occurs anywhere on the modeled slope due to reductions in slope grade, filter strips, terraces, etc. This number is not used for conservation planning, but may be used for other environmental applications (e.g., P-Index). In many cases, RUSLE2 users will model slopes as uniform with no structural practices, vegetative features (filter strips), or breaks in topography that result in sediment deposition. In this typical situation, results for sediment delivery and soil loss for conservation planning will be identical.

3. SOIL QUALITY SCORES:

- Soil Conditioning Index:
  - Soil conditioning index (SCI): 0.17

Soil organic matter (SOM) or soil carbon (C) trend score. If SCI is negative (less than zero), SOM and soil C and soil quality are predicted to decline over time on the modeled slope under the modeled management system. If SCI is positive (greater than zero), SOM and soil C and soil quality are predicted to stay the same or to increase over time. SCI scores usually range from -1 to +1 in typical VA situations, although more extreme values are possible. SCI is an index score (no units) designed solely for comparing the relative impact of different management alternatives on long-term soil quality trends. When calculating SCI, RUSLE2 considers three key factors: (1) amount of surface and subsurface biomass returned to the soil; (2) tillage-induced oxidation of soil carbon; and (3) predicted sheet & rill erosion. Climate and soil type inputs are also considered due to the influence of these factors on soil C oxidation trends.

- Soil Tillage Intensity Rating (STIR):
  - Avg. annual slope STIR: 0.90 (averaged across all years in the rotation)
  - STIR value for each individual crop (or vegetation record) in the rotation:

Veg.	*STIR value*	*Start date*	*End date, m/d/y*

Measure of intensity of tillage or soil disturbance. STIR is an index (no units) designed solely for comparing the relative impact of different management alternatives on soil disturbance. STIR increases with increasing tillage and can range from 0 to 200+. Average annual STIR values reflect the total amount of soil disturbance that occurs during the overall rotation, averaged across the number of years in the rotation. STIR values can also be calculated for individual crops. The STIR for an individual crop represents the sum of all soil disturbance associated with establishing and harvesting that crop. Both types of STIR values are shown above. STIR values in the 5 to 20 range are typical of no-till crops and/or continuous no-till or low soil disturbance cropping systems. In long rotations with a mix of tilled and no-till and/or perennial crops, the average annual STIR for the overall rotation may be relatively low even if significant tillage occurs in individual years and STIR values for one or more crops in the rotation are relatively high.

4. FUEL USAGE & COST ESTIMATES:

- Fuel Type & Unit Cost Inputs:
  - Fuel type for entire run: (none) ()

- Fuel Usage & Cost Outputs (adjusted for soil texture):
  - Equiv. diesel use for entire simulation: 0 gal/ac
  - Fuel cost for entire simulation: 0 US$/ac

Fuel Type & Unit Cost Inputs
A fuel type can be selected by the user for each management alternative modeled in RUSLE2. When selecting fuel type, the user can also enter a unit cost ($/gallon) for that fuel to match local conditions. In order to make a valid overall fuel cost comparison between management alternatives, a fuel type and unit fuel cost should be selected for each alternative under consideration.

Equiv. diesel use for entire simulation (gal/ac)
Estimate of the total quantity of diesel fuel consumed by all field operations over the full duration of the modeled crop rotation. Results are expressed as total fuel used over the rotation (i.e., gal/ac), **not** average annual fuel use (i.e., gal/ac/yr). Therefore, be very careful when using these values to compare relative fuel efficiency of two crop rotations that differ in duration!

Fuel usage results are derived from built-in estimates of “typical” fuel needs for each field operation in the RUSLE2 database. When interpreting these results, remember that most RUSLE2 management files were

created with the goal of modeling operations and processes that impact soil loss. Therefore, some fuel-consuming operations with no impact on soil loss may not be listed in management files (e.g., post-emergence pesticide applications, hay tedding and raking, etc.). If you wish to improve the accuracy of fuel usage estimates and comparisons, make sure that all field operations (including those with no soil loss impact) are included in the relevant RUSLE2 management files.

RUSLE2 fuel usage estimates also reflect an adjustment based on soil type (i.e., finer texture requires more energy to till). RUSLE2 makes this soil type adjustment to fuel usage for every operation, including operations that do not disturb soil. Therefore, keeping soil type constant for all management alternatives under consideration will help ensure a valid fuel usage comparison.

Fuel cost for entire simulation (US$/ac)
Estimate of total cost of fuel consumed by all field operations over the full duration of the modeled crop rotation. RUSLE2 calculates this value using the Equivalent Diesel Use (gal/ac) result and the user-selected fuel type and cost ($/gal). See Equiv. diesel use discussion above for precautions on properly interpreting and comparing RUSLE2 fuel usage outputs.

Project: OCERS Headquarters					
Climate		**Soil**			
Rainfall Erosivity (R):	13	Soil type:	194 - San Emigdio fine sandy loam, 0 to 2 percent slopes		
		Soil Erodibility (K):	0.24		
RUSLE2 Input				**RUSLE2 Output**	
Phase	**Slope Length (ft)**	**Slope Steepness (%)**	**Controls**	**Soil Loss (tons/ac/yr)**	**Sediment Delivery (tons/ac/yr)**
Pre-Construction (DA A-1)	250	0.7	No Controls	0.35	0.35
Pre-Construction (DA A-2)	150	1	No Controls	0.47	0.47
Pre-Construction (DA A-3)	280	0.6	No Controls	0.3	0.3
Pre-Construction (DA A-4)	200	1	No Controls	0.49	0.49
Pre-Construction (DA A-5)	42	0.3	No Controls	0.16	0.16
Pre-Construction (DA A-6)	40	8	No Controls	2.5	2.5
Pre-Construction (DA B-1)	44	4	No Controls	1.4	1.4
			Total	**5.7**	**5.7**
Grading and Land Development (DA A-1)	360	0.7	Construction Site	0.35	0.35
Grading and Land Development (DA A-2)	310	0.7	Construction Site	0.35	0.35
Grading and Land Development (DA A-3)	190	1	Construction Site	0.48	0.48
Grading and Land Development (DA A-4)	240	1.1	Construction Site	0.54	0.54
Grading and Land Development (DA A-5)	130	1	Construction Site	0.47	0.47
Grading and Land Development (DA A-6)	88	1	Construction Site	0.45	0.45
Grading and Land Development (DA A-7)	460	0.7	Construction Site	0.36	0.36
			Total	**3**	**3**
Streets and Utilities (DA A-1)	360	0.7	Construction Site	0.35	0.35
Streets and Utilities (DA A-2)	310	0.7	Construction Site	0.35	0.35
Streets and Utilities (DA A-3)	190	1	Construction Site	0.48	0.48
Streets and Utilities (DA A-4)	240	1.1	Construction Site	0.54	0.54
Streets and Utilities (DA A-5)	130	1	Construction Site	0.47	0.47
Streets and Utilities (DA A-6)	88	1	Construction Site	0.45	0.45
Streets and Utilities (DA A-7)	460	0.7	Construction Site	0.36	0.36
			Total	**3**	**3.00**
Vertical Construction (DA A-1)	360	0.7	Construction Site	0.35	0.35
Vertical Construction (DA A-2)	310	0.7	Construction Site	0.35	0.35
Vertical Construction (DA A-3)	190	1	Construction Site	0.48	0.48
Vertical Construction (DA A-4)	240	1.1	Construction Site	0.54	0.54
Vertical Construction (DA A-5)	130	1	Construction Site	0.47	0.47
Vertical Construction (DA A-6)	88	1	Construction Site	0.45	0.45
Vertical Construction (DA A-7)	460	0.7	Construction Site	0.36	0.36
			Total	**3**	**3**