Construction Site Soil Loss & Sediment Discharge Calculation

Guidance Document & Calculation Tool

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GOAL: Establish a procedure that can be used to verify compliance with 5 tons/acre/year sediment discharge performance standard for construction sites (NR 151.11).
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Phil Purpuro, CW Purpuro
Dave Wolmutt, Smith Group JJR
Jeremy Balousek, Dane County
Chris Hitch, RA Smith National
Pat Kuehl, Robert E Lee
Amy Minser, DNR
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Pete Wood, DNR

BUREAU OF WATERSHED MANAGEMENT PROGRAM GUIDANCE

Storm Water Management Program
Construction Site Soil Loss and Sediment Discharge Calculation Guidance

Effective: (DRAFT Insert Date)
Guidance #: 3800-XXXX-XX

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APPROVED:
Pam Bielack, Director
Bureau of Watershed Management
# Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

**DRAFT VERSION 02-13-2015**

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
<th>End Date</th>
<th>Period</th>
<th>Annual R Factor</th>
<th>Sub Soil Texture</th>
<th>Soil Erodibility K Factor</th>
<th>Slope (%)</th>
<th>Slope Length (feet)</th>
<th>LS Factor</th>
<th>Land Cover C Factor</th>
<th>Soil loss A (tons/acre)</th>
<th>Sediment Control Practice</th>
<th>Sediment Discharge (tons/acre)</th>
</tr>
</thead>
<tbody>
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**Notes:**

See Help Page for further descriptions of variables and items in drop-down boxes.

The last land disturbing activity on each sheet must be "End." This is either 12 months from the start of construction or final stabilization.

For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

Recommended Permanent Seeding Dates:

- N/A
- N/A Turf, introduced grasses and legumes
- N/A Native Grasses, forbs, and legumes

---

**Designed By:**

**Date:**

---

**NOTE:** THIS TOOL ONLY ADDRESSES SOIL EROSION DUE TO SHEET FLOW. MEASURES TO CONTROL CHANNEL EROSION MAY ALSO BE REQUIRED TO MEET SEDIMENT DISCHARGE REQUIREMENTS.
Key Concepts

Soil Loss (USLE)

Soil Deposition

Sediment Control Practice

Sediment Discharge
Step 1

- Determine the location(s) where soil loss and sediment discharge calculations will be conducted
  - Determine representative worst case condition (calculation areas): Location where combination of soil loss and sediment control practice removal efficiency produces highest sediment discharge rate
  - Determine prescriptive compliance areas (non-calculation areas)
Prescriptive Compliance Areas

- Slopes > 20%
- Soil Stockpiles
- Utility Trench Excavations
- Channelized Flow (below design storm event flow)
- Small Areas (< 10% of site and < 1 acre)
- Interior Pond Slopes
Step 2

• Determine the compliance period(s)
  - Duration of land disturbance + time needed to establish vegetation during growing season (60 days after seeding)
Step 3

• Conduct soil loss calculations based on the location(s) selected in Step 1 and compliance period(s) determined in Step 2

  – Use spreadsheet tool
Universal Soil Loss Equation

\[ A = R \times K \times (LS) \times C \times P \]

Where:

- **A** = Average Annual Soil Loss
- **R** = Rainfall & Runoff Factor
- **K** = Soil Erodibility Factor
- **L** = Slope Length
- **S** = Steepness Factor
- **C** = Cover & Management Factor
- **P** = Support Practice Factor (1.0 for Construction)
Rainfall & Runoff Factor ($R$)

$$R = (\% \text{ of } R \text{ to date}) \times (\text{annual } R \text{ factor})$$

### Daily % R Contribution

![Graph showing daily % R contribution from 1-Jan to 27-Dec.](image-url)
Rainfall & Runoff Factor (R)

Select County
Enter Begin Dates
End Dates Based on Next Begin Date
Annual R Factor Based on County
Period % R Based on Dates

Guidance: Assume May 1st if start date unknown

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
<th>End Date</th>
<th>Period % R</th>
<th>Annual R Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Ground</td>
<td>05/01/2015</td>
<td>09/01/2015</td>
<td>11.0%</td>
<td>130</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>06/01/2015</td>
<td>09/01/2015</td>
<td>06.9%</td>
<td>130</td>
</tr>
<tr>
<td>Seed with Mulch or Erd</td>
<td>09/01/2015</td>
<td>11/01/2015</td>
<td>17.0%</td>
<td>130</td>
</tr>
<tr>
<td>End</td>
<td>11/01/2015</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Recommended Permanen Seeding Dates:
4/1-5/15 and 8/7-8/29 Turf, introduced grasses and legumes Native Grasses, forbs, and legumes

Recommended Seeding Dates Per NRCS and County Entered
Soil Erodibility Factor (K)

Subsoil texture is the texture of soil exposed to erosion
Soil Erodibility Factor (K)

<table>
<thead>
<tr>
<th>End Date</th>
<th>Period % R</th>
<th>Annual R Factor</th>
<th>Sub Soil Texture</th>
<th>Soil Erodibility K Factor</th>
<th>Slope (°)</th>
<th>Slope Length (feet)</th>
<th>LS Factor</th>
<th>Land Cover C Factor</th>
<th>Soil loss A (tons/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>06/01/2015</td>
<td>11.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>6.0%</td>
<td>300</td>
<td>1.17</td>
<td>1.00</td>
<td>7.2</td>
</tr>
<tr>
<td>09/01/2015</td>
<td>60.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>3.0%</td>
<td>250</td>
<td>0.43</td>
<td>1.00</td>
<td>14.3</td>
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<tr>
<td>11/01/2015</td>
<td>17.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>3.0%</td>
<td>250</td>
<td>0.43</td>
<td>0.10</td>
<td>0.4</td>
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<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>3.0%</td>
<td>250</td>
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</tr>
</tbody>
</table>

Select Subsoil Texture

Soil Erodibility Factor Based on Subsoil Texture
Slope Length & Steepness Factor (LS)
Slope Length & Steepness Factor (LS)

**Slope Length (L)**

- **Existing Grade**
- **Proposed Grade**
- **Slope Interrupt Device**

Slope and **Slope Length** may vary over compliance period.
Cover and Management Factor (C)

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>C Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Ground</td>
<td>1</td>
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<tr>
<td>Directional Tracking or Tillage</td>
<td>0.9</td>
</tr>
<tr>
<td>Land Applied Polymer</td>
<td>0.5</td>
</tr>
<tr>
<td>Seeding</td>
<td>0.4</td>
</tr>
<tr>
<td>Mulch or Erosion Matting</td>
<td>0.2</td>
</tr>
<tr>
<td>Seeding with Mulch or Erosion Matting</td>
<td>0.1</td>
</tr>
<tr>
<td>Sod</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Final Stabilization or the end of a 12 month period is entered as ‘End’. 
**Cover and Management Factor (C)**

**Enter Land Disturbing Activities**

**C Factor Based on Land Disturbing Activity**

<table>
<thead>
<tr>
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<th>End Date</th>
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<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>5.0%</td>
<td>300</td>
<td>0.93</td>
<td>1.00</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>06/01/2015</td>
<td>09/01/2015</td>
<td>60.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>2.0%</td>
<td>250</td>
<td>0.26</td>
<td>1.00</td>
</tr>
<tr>
<td>Seed w/ Mulch or Er</td>
<td>09/01/2015</td>
<td>11/01/2015</td>
<td>17.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>2.0%</td>
<td>250</td>
<td>0.26</td>
<td>0.10</td>
</tr>
<tr>
<td>End</td>
<td>11/01/2015</td>
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</table>

Final Stabilization assumed 60 days after Seeding, or May 15\(^{th}\) of following spring if outside NRCS recommended dates.

Last Activity on Each Sheet MUST be End.
### Slope Length & Steepness Factor (LS)

#### Enter Existing Slope

1. **Enter Existing Slope Length**
2. **LS Factor Based on Slope and Slope Length**

#### Enter Proposed Slope

1. **Enter Proposed Slope Length**

---

<table>
<thead>
<tr>
<th>County:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waukesha</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
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<th>End Date</th>
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<th>Annual R Factor</th>
<th>Sub Soil Texture</th>
<th>Erodibility K Factor</th>
<th>Slope (%)</th>
<th>Slope Length (feet)</th>
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<td>300</td>
<td>0.93</td>
<td>1.00</td>
<td>5.7</td>
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<td>Bare Ground</td>
<td>06/01/2015</td>
<td>09/01/2015</td>
<td>60.0%</td>
<td>130</td>
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<td>0.43</td>
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<td>250</td>
<td>0.26</td>
<td>1.00</td>
<td>8.9</td>
</tr>
<tr>
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<td>09/01/2015</td>
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<td>0.26</td>
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<td>0.3</td>
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<tr>
<td>End</td>
<td>11/01/2015</td>
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<td>2.0%</td>
<td>250</td>
<td>0.26</td>
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Step 4

- Conduct sediment discharge calculations
  - Use spreadsheet tool
Soil Deposition

- Difference between RUSLE2 & USLE
- Varies by soil type, slope, and slope length
Soil Deposition-Clay
Sediment Control Practice

- Applied after Soil Deposition
## Sediment Control Practice

<table>
<thead>
<tr>
<th>Sedimentation Practices</th>
<th>Removal Efficiency*</th>
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<tbody>
<tr>
<td>Sediment Basin</td>
<td>80%</td>
</tr>
<tr>
<td>Sediment Trap</td>
<td>80%</td>
</tr>
<tr>
<td>Manufactured Perimeter Control</td>
<td>40%</td>
</tr>
<tr>
<td>Silt Fence</td>
<td>40%</td>
</tr>
<tr>
<td>Straw Bale Barrier</td>
<td>40%</td>
</tr>
<tr>
<td>Vegetative Buffer</td>
<td>40%</td>
</tr>
<tr>
<td>Ditch Check Sediment Trap</td>
<td>30%</td>
</tr>
<tr>
<td>Inlet Protection</td>
<td>30%</td>
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</tbody>
</table>

* Removal efficiency assumes proper installation and maintenance
## Sediment Control Practice

<table>
<thead>
<tr>
<th>Soil loss A (tons/acre)</th>
<th>Sediment Control Practice</th>
<th>Sediment Discharge (tons/acre)</th>
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</thead>
<tbody>
<tr>
<td>5.7</td>
<td>Sediment Basin</td>
<td>1.1</td>
</tr>
<tr>
<td>8.9</td>
<td>Sediment Basin</td>
<td>1.6</td>
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<tr>
<td>0.3</td>
<td>Sediment Basin</td>
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<tr>
<td>14.8</td>
<td>TOTAL</td>
<td>2.7</td>
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</tbody>
</table>

**Enter Most Effective Sediment Control Practice**

**Sediment Discharge Listed for Each Activity**

**May be blank if Soil Loss is very small**

**If this is >5.0, then modify erosion and sediment control and/or schedule**
Step 5

• If necessary, modify the erosion and sediment control plan and recalculate
Step 6

• Document the results of soil loss and sediment discharge calculations
  – Identify input variables (spreadsheet tool)
  – Show locations on map (including prescriptive compliance areas)

• Develop construction schedule consistent with calculations and prescriptive compliance criteria
Example 1 – One Soil Type

Given
- Site Location: Waukesha County
- Initial Grading: 05/01/2015 to 06/01/2015, 300-ft slope @ 6%
- After Fill Slope Construction: 06/01/2015 to 9/01/2015, 250-ft slope @ 3%
- Seed & Mulch or Erosion Matting: 09/01/2015
- 60 Day Vegetation Establishment: 11/01/2015
- Soil Type: Silt loam
- Sediment Control Practice: Trial 1 – Silt Fence, Trial 2 – Sediment Basin

Compliance Verification Procedure
- Step 1 – Locations: Identify the county where construction will occur (Waukesha), representative worst case slope locations & conditions (300-ft @ 6%, 250-ft @ 3%) and dominant soil texture (silt loam). Identify prescriptive compliance measures on the erosion and sediment control plan for fill slopes exceeding 20% and the sediment basin.
- Step 2 – Compliance Period: Identify the anticipated construction schedules and durations.
- Step 3 – Soil Loss Calculations: Enter the locations and compliance periods in the spreadsheet tool to conduct the soil loss calculations.
- Step 4 – Sediment Discharge Calculations: For Trial 1, enter silt fence in the spreadsheet tool as the sediment control practice to conduct the sediment discharge calculations.
- Step 5 – Plan Modification and Re-calculation: Trial 1 (silt fence) exceeds 5 tons/acre/year. Modify the erosion and sediment control plan to replace rows of silt fence with a sediment basin. For Trial 2, enter a sediment basin in the spreadsheet tool as the sediment control practice and conduct the sediment discharge calculations. Compliance is verified by Trial 2. Develop the construction schedule for the erosion and sediment control plan based on Trial 2.
- Step 6 – Documentation: Provide screenshots of the Trial 1 and Trial 2 spreadsheets and a map identifying the locations of the input variables.
Example 1 – Silt Fence

Silt Fence
Existing Contour
Final Contour
Silt Loam Soils

Prescriptive Compliance Area
Representative Worst Case Slope – Initial Grading
Representative Worst Case Slope – After Fill Slope Established

Not to Scale
### Soil Loss & Sediment Discharge Calculation Tool

**for use on Construction Sites in the State of Wisconsin**

**DRAFT VERSION 02-18-2015**

**Developer:** Example 1  
**Project:** Trial 1 - Silt Fence - 50-ft spacing  
**Date:** 02/19/2015  
**County:** Waukesha

<table>
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<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
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<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>6.0%</td>
<td>50</td>
<td>0.48</td>
<td>1.00</td>
<td>2.9</td>
<td>Silt Fence</td>
<td>1.4</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>06/11/2015</td>
<td>09/11/2015</td>
<td>60.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>3.0%</td>
<td>50</td>
<td>0.22</td>
<td>1.00</td>
<td>7.5</td>
<td>Silt Fence</td>
<td>4.2</td>
</tr>
<tr>
<td>Seed with Mulch or Er</td>
<td>09/11/2015</td>
<td>11/30/2015</td>
<td>17.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>3.0%</td>
<td>50</td>
<td>0.22</td>
<td>0.10</td>
<td>0.2</td>
<td>Silt Fence</td>
<td>0.0</td>
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<tr>
<td>End</td>
<td>11/30/2015</td>
<td>11/30/2015</td>
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</tr>
</tbody>
</table>

**TOTAL** 10.7  
**% Reduction Required** 10%

**Recommended Permanent Seeding Dates:**  
4/1-5/15 and 8/7-3/29  
Thaw-6/30  
Turf, introduced grasses and legumes  
Native Grasses, forbs, and legumes

**NOTE:** THIS TOOL ONLY ADDRESSES SOIL EROSION DUE TO SHEET FLOW. MEASURES TO CONTROL CHANNEL EROSION MAY ALSO BE REQUIRED TO MEET SEDIMENT DISCHARGE REQUIREMENTS.

**Designed By:**

**Date:**

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**Notes:**
See Help Page for further descriptions of variables and items in drop-down boxes.
The last land disturbing activity on each sheet must be 'End'. This is either 12 months from the start of construction or final stabilization.
For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.
Example 1 – Sediment Basin

- Runoff Diversions (Channel Flow)
- Existing Contour
- Final Contour
- Silt Loam Soils

- Prescriptive Compliance Area
- Representative Worst Case Slope – Initial Grading
- Representative Worst Case Slope – After Fill Slope Established

Not to Scale
**Soil Loss & Sediment Discharge Calculation Tool**

for use on Construction Sites in the State of Wisconsin

*DRAFT VERSION 02-18-2015*

**Developer:** Example 1

**Project:** Trial 2 - Sediment Basin

**Date:** 02/19/2015

**County:** Waukesha

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
<th>End Date</th>
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<th>Annual R Factor</th>
<th>Sub Soil Texture</th>
<th>Erodibility K Factor</th>
<th>Slope (%)</th>
<th>Slope Length (feet)</th>
<th>LS Factor</th>
<th>Land Cover C Factor</th>
<th>Soil Loss A (tons/acre)</th>
<th>Sediment Control Practice</th>
<th>Sediment Discharge (tons/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Ground</td>
<td>05/01/2015</td>
<td>06/01/2015</td>
<td>11.0%</td>
<td>130</td>
<td></td>
<td>Silt Loam</td>
<td>0.43</td>
<td>6.0%</td>
<td>300</td>
<td>1.17</td>
<td>1.00</td>
<td>7.2</td>
<td>Sediment Basin</td>
<td>1.3</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>06/01/2015</td>
<td>09/01/2015</td>
<td>60.0%</td>
<td>130</td>
<td></td>
<td>Silt Loam</td>
<td>0.43</td>
<td>3.0%</td>
<td>250</td>
<td>0.43</td>
<td>1.00</td>
<td>14.3</td>
<td>Sediment Basin</td>
<td>2.7</td>
</tr>
<tr>
<td>Seed with Mulch or Er</td>
<td>09/01/2015</td>
<td>11/01/2015</td>
<td>17.0%</td>
<td>130</td>
<td></td>
<td>Silt Loam</td>
<td>0.43</td>
<td>3.0%</td>
<td>250</td>
<td>0.43</td>
<td>0.10</td>
<td>0.4</td>
<td>Sediment Basin</td>
<td>0.0</td>
</tr>
<tr>
<td>End</td>
<td>11/01/2015</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td></td>
<td></td>
<td>----</td>
<td>3.0%</td>
<td>250</td>
<td>0.43</td>
<td>-----</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
See Help Page for further descriptions of variables and items in drop-down boxes.
The last land disturbing activity on each sheet must be "End." This is either 12 months from the start of construction or final stabilization. For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

**Recommended Permanent Seeding Dates:**
4/1-5/15 and 8/7-8/29  Turf, introduced grasses and legumes
Thaw-6/30                   Native Grasses, forbs, and legumes

**% Reduction Required:** NONE

**NOTE:** This tool only addressed soil erosion due to sheet flow. Measures to control channel erosion may also be required to meet sediment discharge requirements.

**Designed By:**

**Date:**
Given
• Site Location: Waukesha County
• Initial Grading: 05/01/2015 to 06/01/2015, 40-ft slope @3% (Silt Fence Drainage Area #1), 60-ft @3% (Silt Fence Drainage Area #2)
• After Fill Slope Construction: Silt Fence Drainage Area #1 - 06/01/2015 to 8/10/2015, 60-ft slope @3%, Silt Fence Drainage Area #2 – 06/01/2015 to 07/10/2015, 50-ft @7%
• Seed & Mulch or Erosion Matting: Silt Fence Drainage Area #1 - 08/10/2015, Silt Fence Drainage Area #2 – 07/10/2015
• 60 Day Vegetation Establishment: Silt Fence Drainage Area #1 - 10/10/2015, Silt Fence Drainage Area #2 – 09/10/2015
• Soil Type: Silt Fence Drainage Area #1 - Silt loam, Silt Fence Drainage Area #2 - Clay
• Sediment Control Practice: Silt Fence

Compliance Verification Procedure
• Step 1 – Locations: Identify the county where construction will occur (Waukesha), representative worst case slope locations & conditions and dominant soil texture (silt loam and clay).
• Step 2 – Compliance Period: Identify the anticipated construction schedules and durations.
• Step 3 – Soil Loss Calculations: Enter the locations and compliance periods in the spreadsheet tool to conduct the soil loss calculations.
• Step 4 - Sediment Discharge Calculations: Enter silt fence in the spreadsheet tool as the sediment control practice to conduct the sediment discharge calculations.
• Step 5 – Plan Modification and Re-calculation: Compliance is verified by initial evaluation (no plan modification and re-calculation required). Develop the construction schedule for the erosion and sediment control plan based on the Silt Fence Drainage Area #2 compliance period (worst case) or develop separate construction schedules for Silt Fence Drainage Area #1 and Silt Fence Drainage Area #2.
• Step 6 – Documentation: Provide screenshots of the Silt Fence Drainage Area #1 and Silt Fence Drainage Area #2 spreadsheets and a map identifying the locations of the input variables.
Example 2

Silt Fence

Existing Contour

Final Contour

Clay Soils

Silt Fence #1

Representative Worst Case Slope - Silt Fence #1 Initial

Representative Worst Case Slope - Silt Fence #1 Final

Silt Fence #2

Representative Worst Case Slope - Silt Fence #2 Initial

Representative Worst Case Slope - Silt Fence #2 Final

Not to Scale
**Soil Loss & Sediment Discharge Calculation Tool**

for use on Construction Sites in the State of Wisconsin

**DRAFT VERSION 02-18-2015**

**YEAR 1**

**Developer:** Example 2

**Project:** Silt Fence #1

**Date:** 02/26/2015

**County:** Waukesha

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
<th>End Date</th>
<th>Period % R</th>
<th>Annual R Factor</th>
<th>Sub Soil Texture</th>
<th>Soil Erosibility K Factor</th>
<th>Slope (%)</th>
<th>Slope Length (feet)</th>
<th>LS Factor</th>
<th>Land Cover C Factor</th>
<th>Soil loss A (tons/acre)</th>
<th>Sediment Control Practice</th>
<th>Sediment Discharge (tons/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Ground</td>
<td>05/01/2015</td>
<td>06/01/2015</td>
<td>11.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>3.0%</td>
<td>40</td>
<td>0.21</td>
<td>1.00</td>
<td>1.3</td>
<td>Silt Fence</td>
<td>-</td>
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<tr>
<td>Bare Ground</td>
<td>06/01/2015</td>
<td>08/10/2015</td>
<td>48.8%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>3.0%</td>
<td>60</td>
<td>0.24</td>
<td>1.00</td>
<td>6.6</td>
<td>Silt Fence</td>
<td>-</td>
</tr>
<tr>
<td>Seed with Mulch or Er</td>
<td>08/10/2015</td>
<td>10/10/2015</td>
<td>24.1%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>3.0%</td>
<td>60</td>
<td>0.24</td>
<td>0.10</td>
<td>0.3</td>
<td>Silt Fence</td>
<td>-</td>
</tr>
<tr>
<td>End</td>
<td>10/10/2015</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
</tbody>
</table>

**TOTAL** 8.2

**% Reduction Required** NONE

**NOTES:**
See Help Page for further descriptions of variables and items in drop-down boxes.

The last land disturbing activity on each sheet must be 'End'. This is either 12 months from the start of construction or final stabilization. For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

**Recommended Permanent Seeding Dates:**

4/1/15 and 8/7-8/29 Turf, introduced grasses and legumes

Thaw-8/30 Native Grasses, forbs, and legumes

NOTE: This tool only addressed soil erosion due to sheet flow. Measures to control channel erosion may also be required to meet sediment discharge requirements.

**Designed By:**

**Date:**
# Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

DRAFT VERSION 02-18-2015

## YEAR 1

**Developer:** Example 2  
**Project:** Sit Fence #2  
**Date:** 02/26/2015  
**County:** Waukesha

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
<th>End Date</th>
<th>Period % R</th>
<th>Annual R Factor</th>
<th>Sub Soil Texture</th>
<th>Soil Erodibility K Factor</th>
<th>Slope (%)</th>
<th>Slope Length (feet)</th>
<th>LS Factor</th>
<th>Land Cover C Factor</th>
<th>Soil Loss A (tons/acre)</th>
<th>Sediment Control Practice</th>
<th>Sediment Discharge (tons/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Ground</td>
<td>05/01/2015</td>
<td>06/01/2015</td>
<td>11.0%</td>
<td>130</td>
<td>Clay</td>
<td>0.32</td>
<td>3.0%</td>
<td>30</td>
<td>0.24</td>
<td>1.00</td>
<td>1.1</td>
<td>Silt Fence</td>
<td>0.6</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>06/01/2015</td>
<td>07/10/2015</td>
<td>27.4%</td>
<td>130</td>
<td>Clay</td>
<td>0.32</td>
<td>7.0%</td>
<td>50</td>
<td>0.58</td>
<td>1.00</td>
<td>6.7</td>
<td>Silt Fence</td>
<td>3.3</td>
</tr>
<tr>
<td>Seed with Mulch or Er</td>
<td>07/10/2015</td>
<td>09/10/2015</td>
<td>37.1%</td>
<td>130</td>
<td>Clay</td>
<td>0.32</td>
<td>7.0%</td>
<td>50</td>
<td>0.58</td>
<td>0.10</td>
<td>0.9</td>
<td>Silt Fence</td>
<td></td>
</tr>
<tr>
<td>End</td>
<td>09/10/2015</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>7.0%</td>
<td>50</td>
<td>0.58</td>
<td>---------</td>
<td>---------</td>
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<td>---</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>---------</td>
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<td>---------</td>
<td>---------</td>
<td>7.0%</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**  
See Help Page for further descriptions of variables and items in drop-down boxes.  
The last land disturbing activity on each sheet must be "End". This is other 12 months from the start of construction or final stabilization.  
For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

**Recommended Permanent Seeding Dates:**  
4/1-5/15 and 8/7-8/29 Turf, introduced grasses and legumes  
Thaw-6/30 Native Grasses, forbs, and legumes

**TOTAL** 8.7  **TOTAL** 3.9  **% Reduction Required** NONE

**NOTE:** THIS TOOL ONLY ADDRESSED SOIL EROSION DUE TO SHEET FLOW. MEASURES TO CONTROL CHANNEL EROSION MAY ALSO BE REQUIRED TO MEET SEDIMENT DISCHARGE REQUIREMENTS.

**Designed By:**

**Date:**
Example 3 – Two Sediment Control Practices & Seeding After Growing Season

Given
- Site Location: Waukesha County
- Initial Grading: Silt Fence Drainage Area - 05/16/2015 to 06/15/2015, 50-ft slope @2%, Sediment Basin Drainage Area – 05/16/2015 to 06/15/2015, 200-ft @2%
- Fill Slope Construction: Silt Fence Drainage Area - 06/15/2015 to 07/15/2015, 50-ft slope @3%, 07/15/2015 to 10/15/2015, 50-ft @5%, Sediment Basin Drainage Area – 06/15/2015 to 10/15/2015, 150-ft @7%
- Seed & Mulch or Erosion Matting: 10/15/2015
- 60 Day Vegetation Establishment: Seeding After Growing Season - Extend to 05/15/2016 per Appendix B
- Soil Type: Silty clay
- Sediment Control Practices: Silt Fence and sediment basin

Compliance Verification Procedure
- Step 1 – Locations: Identify the county where construction will occur (Waukesha), representative worst case slope locations & conditions and dominant soil texture (silty clay). Identify prescriptive compliance measures on the erosion and sediment control plan for the topsoil stockpile and the sediment basin.
- Step 2 – Compliance Period: Identify the anticipated construction schedules and durations.
- Step 3 – Soil Loss Calculations: Enter the locations and compliance periods in the spreadsheet tool to conduct the soil loss calculations.
- Step 4 - Sediment Discharge Calculations: Enter silt fence and sediment basin as the sediment control practices to conduct the sediment discharge calculations.
- Step 5 – Plan Modification and Re-calculation: Compliance is verified by initial evaluation (no plan modification and re-calculation required). Develop the construction schedule for the erosion and sediment control plan based on the silt fence and sediment basin compliance periods.
- Step 6 – Documentation: Provide screenshots of the Silt Fence and Sediment Basin spreadsheets and a map identifying the locations of the input variables.
# Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

**DRAFT VERSION 02-18-2015**

## Example 3

### Silt Fence

**Date:** 02/19/2015  
**County:** Waukesha

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
<th>End Date</th>
<th>Period R Factor</th>
<th>Sub Soil Texture</th>
<th>Soil Erosibility K Factor</th>
<th>Slope (%)</th>
<th>Slope Length (feet)</th>
<th>LS Factor</th>
<th>Land Cover C Factor</th>
<th>Soil loss A (tons/acre)</th>
<th>Sediment Control Practice</th>
<th>Sediment Discharge (tons/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Ground</td>
<td>05/16/2015</td>
<td>06/15/2015</td>
<td>13.6%</td>
<td>130</td>
<td>Silty Clay</td>
<td>2.0%</td>
<td>50</td>
<td>0.16</td>
<td>1.00</td>
<td>0.8</td>
<td>Silt Fence</td>
<td>0.3</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>06/15/2015</td>
<td>07/15/2015</td>
<td>24.0%</td>
<td>130</td>
<td>Silty Clay</td>
<td>3.0%</td>
<td>50</td>
<td>0.22</td>
<td>1.00</td>
<td>2.0</td>
<td>Silt Fence</td>
<td>0.9</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>07/15/2015</td>
<td>10/15/2015</td>
<td>42.0%</td>
<td>130</td>
<td>Silty Clay</td>
<td>5.0%</td>
<td>50</td>
<td>0.38</td>
<td>1.00</td>
<td>5.8</td>
<td>Silt Fence</td>
<td>3.4</td>
</tr>
<tr>
<td>Seed with Mulch or Er</td>
<td>10/15/2015</td>
<td>05/15/2016</td>
<td>20.4%</td>
<td>130</td>
<td>Silty Clay</td>
<td>5.0%</td>
<td>50</td>
<td>0.33</td>
<td>0.10</td>
<td>0.3</td>
<td>Silt Fence</td>
<td>0.1</td>
</tr>
<tr>
<td>End</td>
<td>05/15/2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| TOTAL                    | 8.8        |          |                 |                 |                         |           |                    |           |                   |                          |                             |                             |
| TOTAL                    | 4.8        |          |                 |                 |                         |           |                    |           |                   |                          |                             |                             |

**% Reduction Required:** NONE

---

**Notes:**

See Help Page for further descriptions of variables and items in drop-down boxes.

The last land disturbing activity on each sheet must be 'End'. This is either 12 months from the start of construction or final stabilization. For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

**Recommended Permanent Seeding Dates:**

4/1-5/15 and 8/7-6/29 Turf, introduced grasses and legumes

Thaw-6/30 Native Grasses, forbs, and legumes

**Desired By:**

**Date:**
# Soil Loss & Sediment Discharge Calculation Tool

**for use on Construction Sites in the State of Wisconsin**

**DRAFT VERSION 02-18-2015**

**YEAR 1**

**Developer:** Example 3  
**Project:** Sediment Basin  
**Date:** 02/19/2015  
**County:** Waukesha

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
<th>End Date</th>
<th>Period % R</th>
<th>Annual R Factor</th>
<th>Sub Soil Texture</th>
<th>Soil Erodibility K Factor</th>
<th>Slope (%)</th>
<th>Slope Length (feet)</th>
<th>L.S Factor</th>
<th>Land Cover C Factor</th>
<th>Soil Loss A (tons/acre)</th>
<th>Sediment Control Practice</th>
<th>Sediment Discharge (tons/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Ground</td>
<td>05/16/2015</td>
<td>06/15/2015</td>
<td>13.6%</td>
<td>130</td>
<td>Silty Clay</td>
<td>0.28</td>
<td>2.0%</td>
<td>200</td>
<td>0.25</td>
<td>1.00</td>
<td>1.2</td>
<td>Sediment Basin</td>
<td>0.2</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>05/16/2015</td>
<td>06/15/2015</td>
<td>66.0%</td>
<td>130</td>
<td>Silty Clay</td>
<td>0.28</td>
<td>7.0%</td>
<td>150</td>
<td>1.01</td>
<td>1.00</td>
<td>24.3</td>
<td>Sediment Basin</td>
<td>3.3</td>
</tr>
<tr>
<td>Seed with Mulch or Er</td>
<td>10/15/2015</td>
<td>05/15/2016</td>
<td>20.4%</td>
<td>130</td>
<td>Silty Clay</td>
<td>0.28</td>
<td>7.0%</td>
<td>150</td>
<td>1.01</td>
<td>0.10</td>
<td>0.8</td>
<td>Sediment Basin</td>
<td></td>
</tr>
</tbody>
</table>

**End**  
05/16/2016  

**Notes:**
See Help Page for further descriptions of variables and items in drop-down boxes.  
The last land disturbing activity on each sheet must be 'End'. This is either 12 months from the start of construction or final stabilization. For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

**Recommended Permanent Seeding Dates:**
4/1-5/15 and 8/7-8/29  
Thaw-6/30  
Turf, introduced grasses and legumes  
Native Grasses, forbs, and legumes

**PRINT**  
**HELP PAGE**

**TOTAL:** 26.3  
**TOTAL:** 3.5  
**% Reduction Required:** NONE

**NOTE:** This tool only addresses soil erosion due to sheetflow. Measures to control channel erosion may also be required to meet sediment discharge requirements.

**Designed By**  
**Date**
**Example 4 – Construction > 12 Months**

**Given**
- Site Location: Waukesha County
- Initial Grading: 05/01/2015 to 07/01/2015, 300-ft slope @5%
- After Fill Slope Construction: 07/01/2015 to 8/30/2016, 250-ft slope @ 2%
- Seed & Mulch or Erosion Matting: 08/30/2016
- 60 Day Vegetation Establishment: 10/30/2016
- Soil Type: Silt loam
- Sediment Control Practice: Sediment Basin

**Compliance Verification Procedure**
- Step 1 – Locations: Identify the county where construction will occur (Waukesha), representative worst case slope locations & conditions (300-ft @ 5%, 250-ft @ 2%) and dominant soil texture (silt loam). Identify prescriptive compliance measures on the erosion and sediment control plan for fill slopes exceeding 20% and the sediment basin.
- Step 2 – Compliance Period: Identify the anticipated construction schedules and durations. For Year 1 spreadsheet, use the first 12 months of construction (05/01/2015 to 04/30/2015). For Year 2 spreadsheet, use the 12 months prior to the 60 day vegetation establishment date (11/01/2015 to 10/30/2016).
- Step 3 – Soil Loss Calculations: Enter the locations and compliance periods in the spreadsheet tool to conduct the soil loss calculations.
- Step 4 - Sediment Discharge Calculations: Enter a sediment basin in the spreadsheet tool as the sediment control practice to conduct the sediment discharge calculations.
- Step 5 – Plan Modification and Re-calculation: Compliance is verified by initial evaluation (no plan modification and re-calculation required). Develop the construction schedule for the erosion and sediment control plan based on the specified compliance periods.
- Step 6 – Documentation: Provide screenshots of the Year 1 and Year 2 spreadsheets and a map identifying the locations of the input variables.
Example 4

Sediment Basin

Runoff Diversions (Channel Flow)
Existing Contour
Final Contour
Silt Loam Soils

Prescriptive Compliance Area
Representative Worst Case Slope – Initial Grading
Representative Worst Case Slope – After Fill Slope Established

Not to Scale
## Soil Loss & Sediment Discharge Calculation Tool
for use on Construction Sites in the State of Wisconsin

**DRAFT VERSION 02-18-2015**

**Developer:** Example 4  
**Project:** Sediment Basin  
**Date:** 02/19/2015  
**County:** Waukesha

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
<th>End Date</th>
<th>Period % R</th>
<th>Annual R Factor</th>
<th>Sub Soil Texture</th>
<th>Soil Erodibility K Factor</th>
<th>Slope (%)</th>
<th>Slope Length (feet)</th>
<th>LS Factor</th>
<th>Land Cover C Factor</th>
<th>Soil Loss A (tons/acre)</th>
<th>Sediment Control Practice</th>
<th>Sediment Discharge (tons/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Ground</td>
<td>05/01/2015</td>
<td>07/01/2015</td>
<td>30.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>5.0%</td>
<td>300</td>
<td>0.93</td>
<td>1.00</td>
<td>15.6</td>
<td>Sediment Basin</td>
<td>2.9</td>
</tr>
<tr>
<td>Bare Ground</td>
<td>07/01/2015</td>
<td>04/30/2016</td>
<td>70.0%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>2.0%</td>
<td>250</td>
<td>0.26</td>
<td>1.00</td>
<td>10.3</td>
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<tr>
<td>End</td>
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<td>---------</td>
<td>---------</td>
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<td>2.0%</td>
<td>250</td>
<td>0.26</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>Sediment Basin</td>
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</tbody>
</table>

**Notes:**
See Help Page for further descriptions of variables and items in drop-down boxes.
The last land disturbing activity on each sheet must be 'End'. This is either 12 months from the start of construction or final stabilization. For periods of construction that exceed 12 months, please demonstrate that 5 tons/acre/year is not exceeded in any given 12 month period.

**Recommended Permanent Seeding Dates:**
- 4/1-5/15 and 8/7-8/29 Turf, introduced grasses and legumes
- Thaw-6/30 Native Grasses, forbs, and legumes

**% Reduction Required:** NONE

**Note:** This tool only addressed soil erosion due to sheet flow. Measures to control channel erosion may also be required to meet sediment discharge requirements.

**Designed By:**  
**Date:**
# Soil Loss & Sediment Discharge Calculation Tool

for use on Construction Sites in the State of Wisconsin

**DRAFT VERSION 02-18-2015**

**Developer:** Example 4  
**Project:** Sediment Basin  
**Date:** 02/19/2015  
**County:** Waukesha

<table>
<thead>
<tr>
<th>Land Disturbing Activity</th>
<th>Begin Date</th>
<th>End Date</th>
<th>Period % R</th>
<th>Annual R Factor</th>
<th>Sub Soil Texture</th>
<th>Soil Erodibility K Factor</th>
<th>Slope (%)</th>
<th>Slope Length (feet)</th>
<th>LS Factor</th>
<th>Land Cover C Factor</th>
<th>Soil loss A (tons/acre)</th>
<th>Sediment Control Practice</th>
<th>Sediment Discharge (tons/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Ground</td>
<td>11/01/2015</td>
<td>08/30/2015</td>
<td>82.5%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>2.0%</td>
<td>250</td>
<td>0.26</td>
<td>1.00</td>
<td>12.2</td>
<td>Sediment Basin</td>
<td>2.3</td>
</tr>
<tr>
<td>Seed with Mulch or Er</td>
<td>08/30/2016</td>
<td>10/30/2016</td>
<td>17.3%</td>
<td>130</td>
<td>Silt Loam</td>
<td>0.43</td>
<td>2.0%</td>
<td>250</td>
<td>0.26</td>
<td>0.10</td>
<td>0.3</td>
<td>Sediment Basin</td>
<td>0.0</td>
</tr>
<tr>
<td>End</td>
<td>10/30/2016</td>
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</tbody>
</table>

**TOTAL**                     | 12.4        | **TOTAL** | 23.0        |  

**Notes:**
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**Recommended Permanent Seeding Dates:**
- 4/1-5/15 and 8/7-8/29 Turf, introduced grasses and legumes
- Thaw-6/30 Native Grasses, forbs, and legumes

**Designed By:**
**Date:**

**NOTE:** THIS TOOL ONLY ADDRESSED SOIL EROSION DUE TO SHEET FLOW. MEASURES TO CONTROL CHANNEL EROSION MAY ALSO BE REQUIRED TO MEET SEDIMENT DISCHARGE REQUIREMENTS.