

# Sheboygan County Erosion Control and Stormwater Training

February 8, 2006

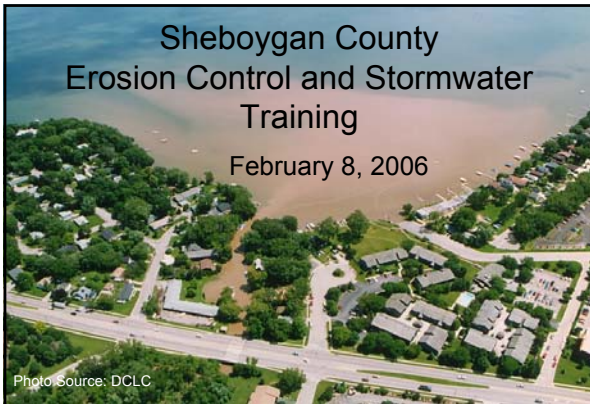


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## Introduction

- Background
- Ordinance Overview
- General Applicability
- Erosion Control
- Stormwater
- Review Process

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## Background

- State erosion control and stormwater standards are prescribed in NR 216/151
- Counties and municipalities above a certain population threshold are required to adopt erosion control and stormwater standards at least as stringent

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## Background (cont.)

- Sheboygan County obtained a cost-share grant to fund preparation of an erosion control and stormwater ordinance
- Erosion control and stormwater ordinance adopted on January 17, 2006

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## Ordinance Overview

- Chapter 75 of County ordinances
- Two subchapters
  - Subchapter A – Erosion Control
  - Subchapter B – Stormwater
- Example Sections
  - 75.03 – Definitions
  - 75.08 – Erosion Control Performance Criteria
  - 75.19 – Stormwater Performance Criteria

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## General Ordinance Applicability

The stormwater and erosion control ordinance ***IS...***

Designed to address the runoff impacts from new development.

Designed to protect agricultural land and existing development

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# General Ordinance Applicability

The stormwater and erosion control ordinance ***IS NOT***...

Designed to address runoff impacts from agricultural practices or existing development.



# Erosion Control

## What is Erosion Control?

- Erosion control are practices that are designed to control runoff and sediment from leaving the site during construction.

Examples of erosion control features



## Purpose of Construction-Time Erosion Control

- Minimize soil disturbance on the site
- Minimize soil loss from the site
- Minimize sediment runoff into rivers and lakes



## Erosion Control Applicability

- Sites that disturb greater than 1 acre of land (75.06(1)(a))
- EXEMPTIONS
  - Projects associated with construction of a building regulated under COMM 21.125 or COMM 61.115
  - See 75.06(1)(b) for additional exemptions

## Integration with State Review Process (Guidance Only)

- DNR may review erosion control for sites with disturbance exceeding 1 acre, except for commercial sites (may change soon)
- Commerce may review erosion control for sites associated with a 1- or 2-family dwelling units or a commercial building
  - Note: 1- and 2-family sites over one acre may go to both Commerce and DNR
- County may review erosion control for sites that are greater than one acre but not associated with a 1- or 2-family building or a commercial building



## Soil Erodibility Factor

- Varies significantly for different soil groups
- In general, silt loams are the most erosive

Map Symbol	Soil Series Name	Kf
Hu	Houghton	0.01
JuA	Juneau	0.37
K9A	Kendall	0.37
K9A	Kewaunee	0.43
K9B	Kewaunee	0.43
K9B2	Kewaunee	0.43
K9C2	Kewaunee	0.43
K9C2	Kewaunee	0.43
K9C3	Kewaunee	0.24
K9D3	Kewaunee	0.24
K9A	Kibbie	0.32
LDF	Landfill	0.32
Lmk	Lamartine	0.32
Lo	Loamy land	0.32
Ma	Made land	0.32
M9A	Manawa	0.37
M9A	Martinton	0.32
M9A	Matherton	0.32
Mp	Montgomery	0.37
M9A	Muskegon	0.28
Mz	Muskegon	0.01

## Land Cover Factor

Land Disturbing Activities	Land Cover Factor
Bare Ground	1.00
Seed and Mulch	0.12
Seeding	0.40
Sod	0.01

## Other USLE Input

- Slope (site specific)
- Slope Length (site specific)
- Need to potentially evaluate both existing and proposed grades
- Need to evaluate the area with the highest potential for erosion

## Examples of Reducing Soil Loss Rate

- Reducing construction schedule
  - Example: Restoring portions of the construction site and not leaving the whole site bare until the end.
- Limiting summer-time ground disturbance
  - Example: Moving construction schedule from July to September
- Providing appropriate perimeter controls
  - Example: Silt fence or straw bales

## Perimeter Control Soil Loss Reduction Credit

- Silt Fence – ~ 40%
- Vegetated buffer – ~ 70%
- Perimeter control credits do not add!
  - A portion of the sediment that the vegetated buffer would remove is the same sediment that the silt fence would remove.
  - If the silt fence and vegetated buffer are placed in series, reduction is approximately 70%.

## Examples of Other Required Erosion Control BMP's

- Stone or gravel construction entrance
- Measures to minimize rill erosion
  - “Ditch checks” made of stone or hay bales in swales (silt fence not adequate)
  - Slope breaks on excessively long and/or steep slopes (can use silt fence)
- Restoration Plan
  - Ground cover is part of erosion control
- See 75.08(3)(d) for full list

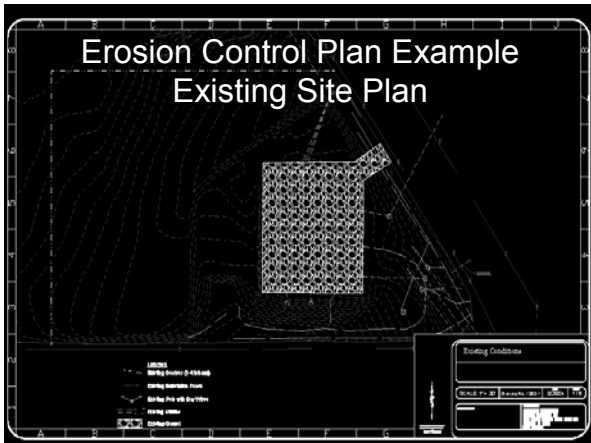
## Erosion Procedural Review

- County Submittal Requirements (75.10)
- Review Timeline (75.09(3))
  - 30 days to review
  - If the County does not respond in 30 days, Applicant may proceed as if plan has been approved
  - Additional information may be requested, at which time the “30 day clock” restarts
- Permit Requirements (75.09(5))
- Application Checklist

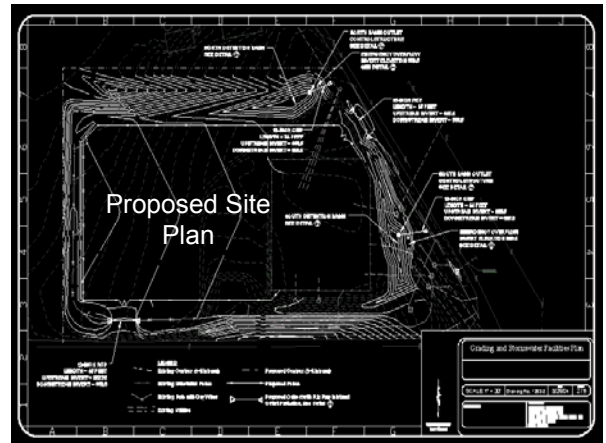
## General Design Guidance

- Is the proposed schedule reasonable?
- Are the proposed construction limits reasonable?
- Is there a special natural resource within or adjacent to the site, such as a river or wetland?
- Is restoration proposed between November and April (non-growing season)?
- Are erosion control measures proposed to protect the infiltration basins during construction?

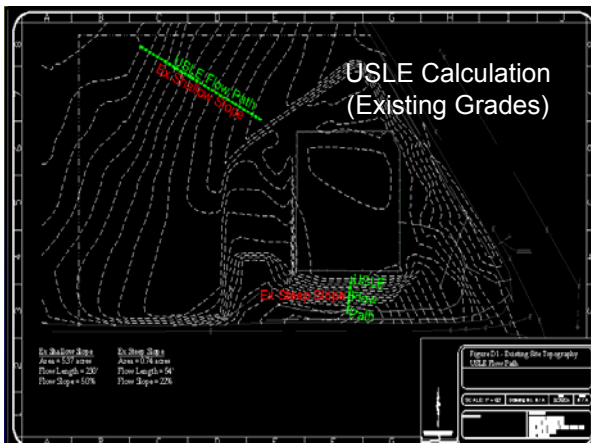
### Erosion Control Plan Example Existing Site Plan



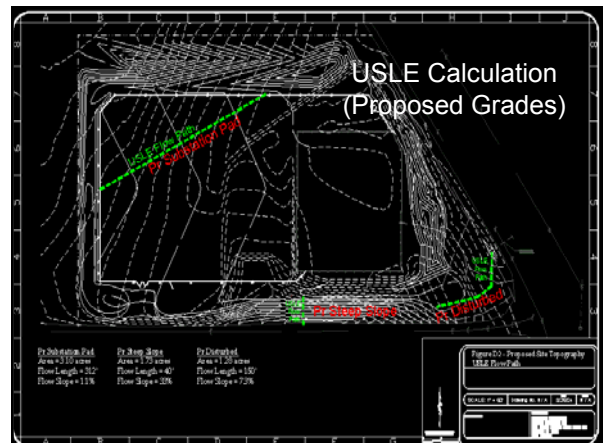
### Proposed Site Plan



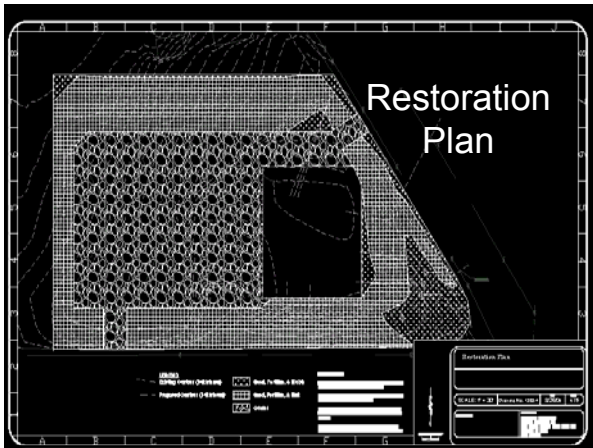
### USLE Calculation (Existing Grades)



### USLE Calculation (Proposed Grades)







- ## Erosion Control References
- Sheboygan County Erosion Control and Stormwater Manual (in draft form)
  - DNR Erosion Control Requirements
    - NR 151 / 216
  - Commerce Erosion Control Requirements
    - COMM 21.125 (1- & 2-dwelling units)
    - COMM 61.115 (commercial)
    - Potential updates coming soon
  - DNR Erosion Control BMP Standards
    - <http://dnr.wi.gov/org/water/wm/nps/stormwater>
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Questions?

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Break

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# Stormwater Management

## What is Long-Term Stormwater Management?

- Stormwater management are practices that are designed to control runoff for the life of the development.

Examples of stormwater management features



## Why can development cause flooding?

- Impervious area increases runoff
- Swales and culverts concentrate runoff



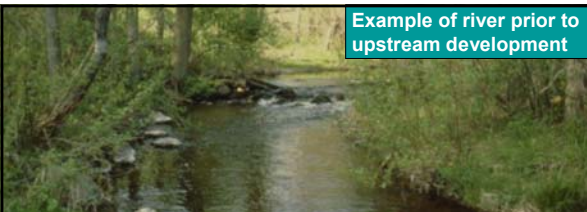
Example of agricultural drainage swale prior to upstream development



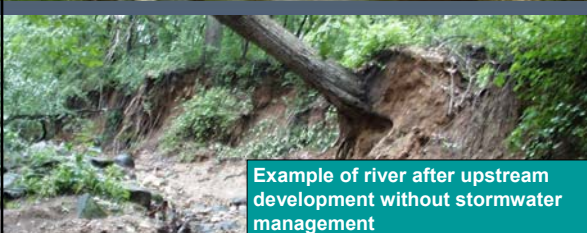
Example of agricultural drainage swale after upstream development



Example of river prior to upstream development



Example of river after upstream development without stormwater management



Example of fish population prior to upstream development



Example of fish population after upstream development without stormwater management



## Purpose of Long-Term Stormwater Management



- Minimize risk of flooding
- Minimize downstream erosion
- Improve water quality

## Stormwater Applicability (75.17(1))

- Disturb greater than 1 acre of land (including projects associated with a building)
- EXEMPTIONS (See 75.17(1)(b) for full list)
  - Re-development with no increase in impervious area
  - Sites with less than 10 percent connected impervious area provided the total impervious area is still less than 1 acre

## Integration with State Review Process (Guidance Only)

- DNR may review stormwater for sites with disturbance exceeding 1 acre not associated with a commercial site
- Commerce may review stormwater for sites associated with construction of a pipe
- County may review stormwater for sites that are greater than one acre

## Stormwater Performance Criteria

- Peak Discharge Control 75.19(3)(b) – The post-development peak runoff rate shall not exceed the pre-development peak discharge rate for the 2-, 10-, and 100-year events
  - 2-year rainfall depth: 2.5 inches
  - 10-year rainfall depth: 3.8 inches
  - 100-year rainfall depth: 5.4 inches

## Stormwater Performance Criteria

- Conveyance Requirements (75.19(3)(b)(2))
  - Storm Sewer – 10-year with no surcharge in the manhole
  - Open Channel / Swale / Ditch – 25-year with one foot of freeboard
  - Detention Basins – 100-year with one foot of freeboard

## Stormwater Performance Criteria (cont.)

- Water Quality Improvement 75.19(3)(a)
  - New Development: Remove 80% total suspended solids on an average annual basis (new development only)
  - Re-development (40% reduction)
  - In-fill development under 5 acres prior to October 1, 2012 (40% reduction)
  - In-fill development over 5 acres (80% reduction)
  - In-fill development after October 1, 2012 (80% reduction)

## Stormwater Performance Criteria (cont.)

- Infiltration 75.19(3)(c)
  - Residential (90% of pre-development or 25% of 2-year storm subject to 1% of project site cap)
  - Non-residential (60% of pre-development or 10% of 2-year, 24-hour storm subject to 2% of impervious area cap)
  - Pre-treatment requirements in 75(3)(c)3.
  - Exclusions
    - Clay soils or high groundwater
    - Full list in 75(3)(c)4.

## Stormwater Performance Criteria (cont.)

- Buffers required – 75.19(3)(d)
- Gas stations – 75.19(3)(e)
- Transportation facilities – 75.19(3)(f)
  - Less stringent criteria

## Comparison to NR 151

- Peak Discharge Control – Only 2-year
  - Only mandated to provide water quality
- Water Quality – Same
- Infiltration – Same
- Buffers – Same

## Analysis Methods

- Peak Discharge Control
  - TR-55 / WinTR-55
  - SWMM / XP-SWMM / PC-SWMM
  - HydroCAD
  - StormCAD
  - Others
- Need to use SCS Methodology (Curve Numbers and Times of Concentration)

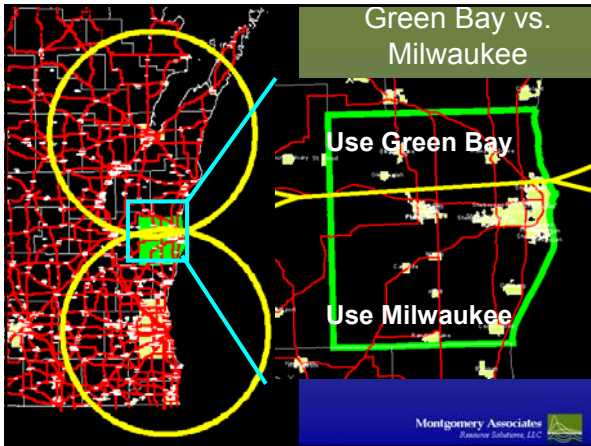
## Maximum Pre-Development CN

Table 1 – Maximum Pre-development Runoff Curve Numbers for Cropland Areas

Hydrologic Soil Group	A	B	C	D
Runoff Curve Number	56	70	79	83

## Analysis Methods

- Water Quality
  - SLAMM
  - P8
  - Other reasonable approaches
- Average annual basis
  - Means a calendar year of precipitation data, excluding snow, which is considered typical of rainfall conditions in the County.
  - Green Bay, 1969 (Mar. 29 - Nov. 25) OR Milwaukee, 1969 (Mar. 28 - Dec. 6). The location that shall be used shall be based on which location is closer to the site.



### Analysis Methods

- Infiltration
  - RECARGA
  - SLAMM
  - Other reasonable approaches

### Stormwater Procedural Review

- County Submittal Requirements (75.21)
- Review Process (75.20(3))
  - 30 days to review
  - If the County does not respond in 30 days, Applicant may proceed as if plan has been approved
  - Additional information may be requested, at which time the “30 day clock” restarts
- Permit Requirements (75.20(4))
- Application Checklist

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### Stormwater Maintenance Agreement (75.22)

- Maintenance is key to long-term functioning stormwater management features (detention and infiltration basins)
  - Example: Detention basins need to be cleaned out every 10-25 years.
- Responsible Entity
  - In most cases, the responsible entity will be the owner / homeowner’s association.

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### General Design Guidance

- Does the site drain to a closed depression?
  - May need to think about different criteria

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### General Design Guidance

- Depths of infiltration basins and raingardens?
  - Maximum – 1 foot
  - Preferable – 6 inches
- Are there measures to minimize or mitigate for compaction, especially in infiltration basins?
- Is there an adequate separation between groundwater and the infiltration basin bottom?

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## General Design Guidance

- “Average” Curve Numbers
  - Residential 0.33-acre lots, HSG B (CN=72)
  - Maximum Farmland CN, HSG B (CN=70)
  - However, a more appropriate analysis divides the impervious and pervious areas
- Will outlets from basins be subject to clogging?
  - Orifice outlets less than 12” in diameter need some sort of “filter”
- Are there defined conveyance features (swales or storm sewers) downstream of basin outlets?

## Stormwater References

- Sheboygan County Erosion Control and Stormwater Manual (in draft form)
- DNR Stormwater Requirements
  - NR 151 / 216
- DNR Stormwater BMP Standards
  - <http://dnr.wi.gov/org/water/wm/nps/stormwater/techstds.htm>
- Commerce
  - Potential updates in February 2006
- SLAMM
  - <http://www.winslamm.com>
- RECARGA
  - <http://dnr.wi.gov/org/water/wm/nps/stormwater/technote.htm>

Prevent  
this...



Goal of Storm  
Water Ordinance



...and maintain this.

Questions?