Shoreland Restoration Techniques, Bio-engineered Projects & Monitoring

2014
Wisconsin Lakes Partnership Convention

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Talking Points

- Techniques
  - Possibilities
  - Materials Discussion
- Project Examples - Before / After
- Project Monitoring & Observations

Various Techniques or Combinations of Techniques

- Natural Shoreline
- Native Plantings
- Biolog w/ Plantings
- Branch Box Breakwater
- Brush Mattress
- Live Fascine
- Branch Packing
- Vegetated Geogrid
- Rock Riprap
- Rock Riprap w/ Live Stakes; “vegetated riprap”
- Demo/Experimental

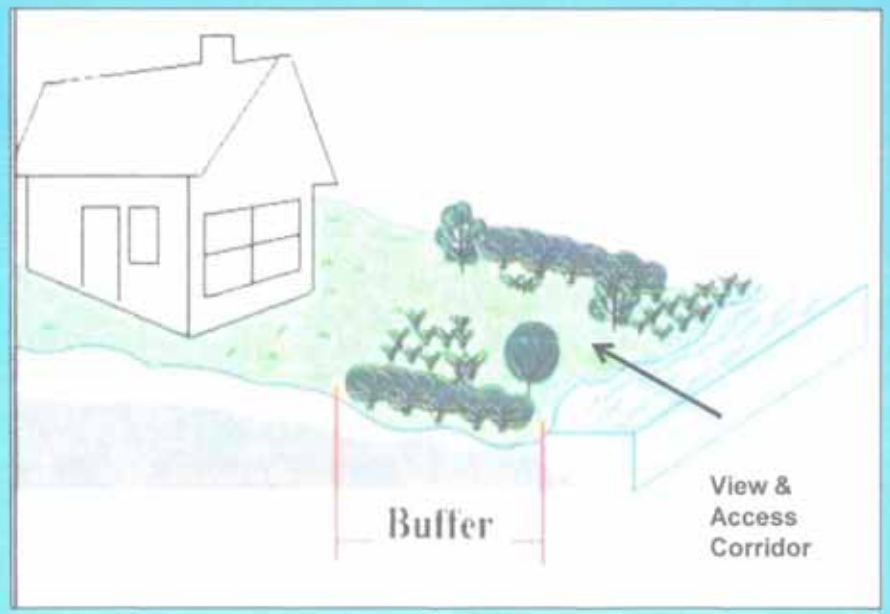
Techniques

Natural Shoreline

- Left natural
- Buffer of vegetation left intact, i.e.no mow
- May have access to water, i.e. path, dock, stairway, etc.
- Removal of invasive species
- Easiest to maintain

What is a Shoreland Buffer?

Area of protected vegetation along the water

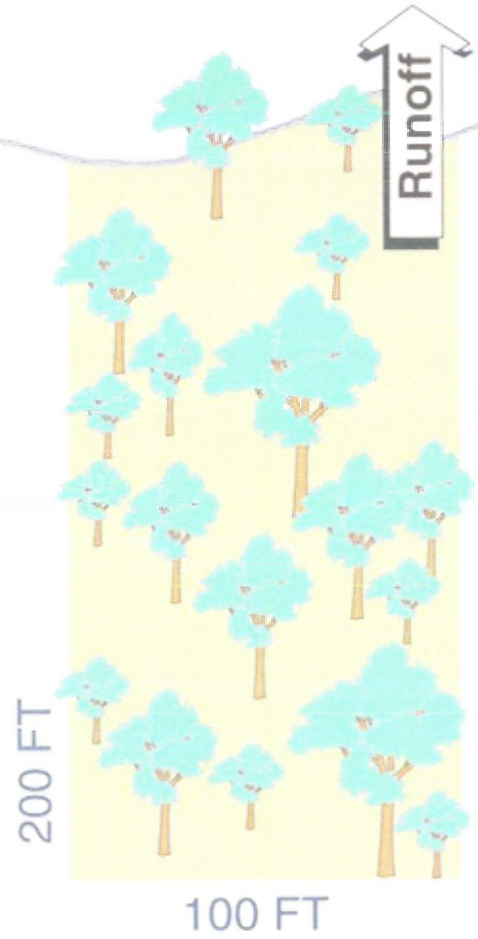


What is the Importance of maintaining a Shoreland Buffer?

- Erosion Prevention
- Fish & Wildlife Habitat Preservation
  - Protects spawning grounds
- Water Quality Protection & Improvement
  - Limits sedimentation and provides filtering of stormwater
- Natural Scenic Beauty
- Screening & Privacy from Boaters and Neighbors
- Increased Property Values

Undeveloped
Apr - Oct Phosphorus/Sediment Runoff Model

- maple-beech forest
- 6% slope to lake
- sandy loam soil

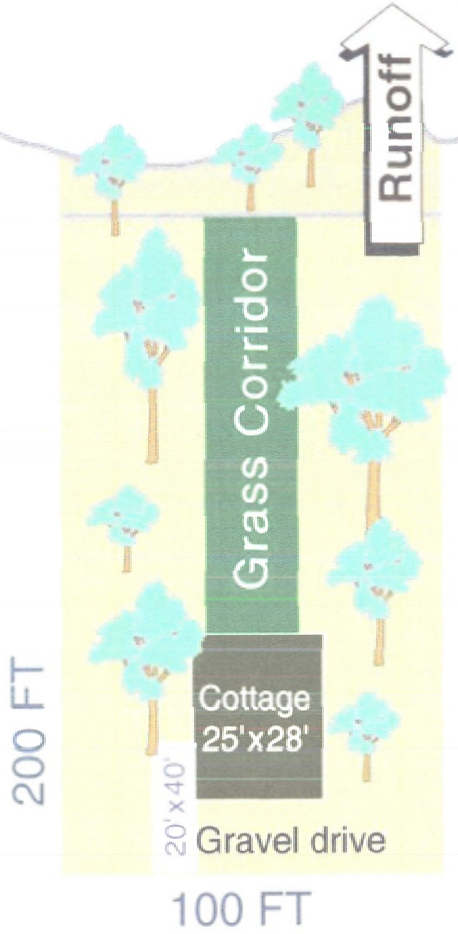


IMPACT
ON LAKE
(April - Oct.)

- 1,000 ft^3 runoff to lake
- 0.03 lbs. phos. to lake
- 5 lbs. sediment to lake

Developed with Shoreland Buffer – 1940s
Apr - Oct Phosphorus/Sediment Runoff Model

- maple-beech forest
- 6% slope to lake
- grass corridor 20'-wide
- cottage 700 ft^2 perimeter
- gravel drive 800 ft^2
- 35'-wide buffer strip



IMPACT ON LAKE
(April - Oct.)

- 1,000 ft^3 runoff to lake
- 0.03 lbs. phos. to lake
- 20 lbs. sediment to lake

Developed – 1990s
Apr - Oct Phosphorus/Sediment Runoff Model

- maintained lawn, soil graded
- 6% slope to lake
- home 3,350 ft^2 perimeter
- paved drive 770 ft^2

IMPACT ON LAKE
(April - Oct.)

- 5,000 ft^3 runoff to lake
- 0.20 lbs. phos. to lake
- 90 lbs. sediment to lake

Passive Restoration

- Effective only when the shoreline hasn't been altered to a great extent and the native ground covers and plants can re-generate on their own

Active Restoration Needed

Natural shoreline vegetation has been removed and replaced with sod. More difficult to establish native seed bank.

Why Plant Native Plants?

~ Adapted to Fluctuations in Wisconsin Weather

~ Disease and Pest Resistant

~ Less Maintenance (no fertilizers)

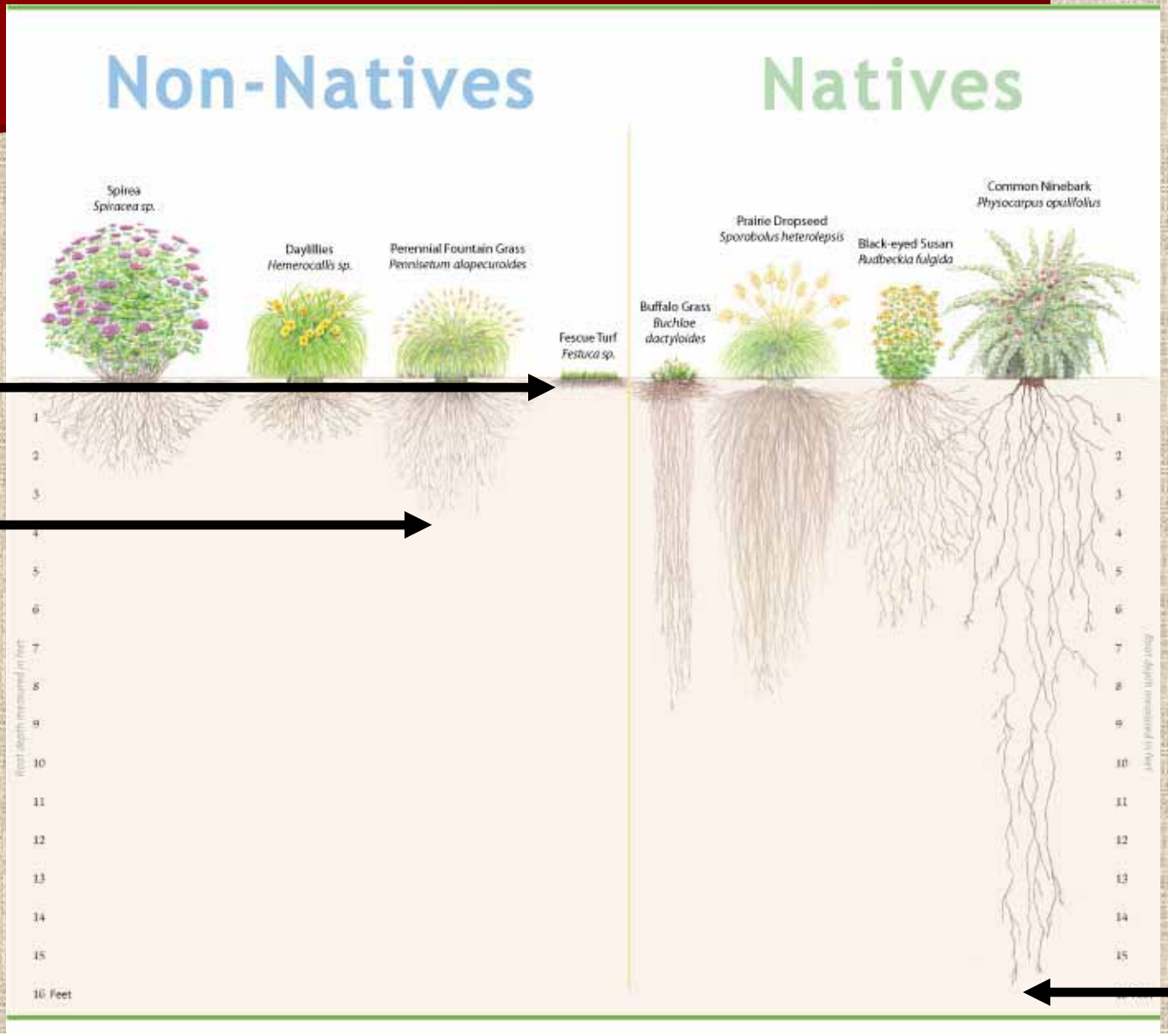
~ Provide Food and Habitat for Native Wildlife - Birds, Insects, Fish, Amphibians

Techniques

Vegetation Holds Soil

Turf Grass

4.0 Ft



16 Ft

Techniques

Shrubs & Trees

Techniques

Biolog

3 YEAR OLD BIOLOG

Techniques

Brush Mattress

Techniques

Live Fascine

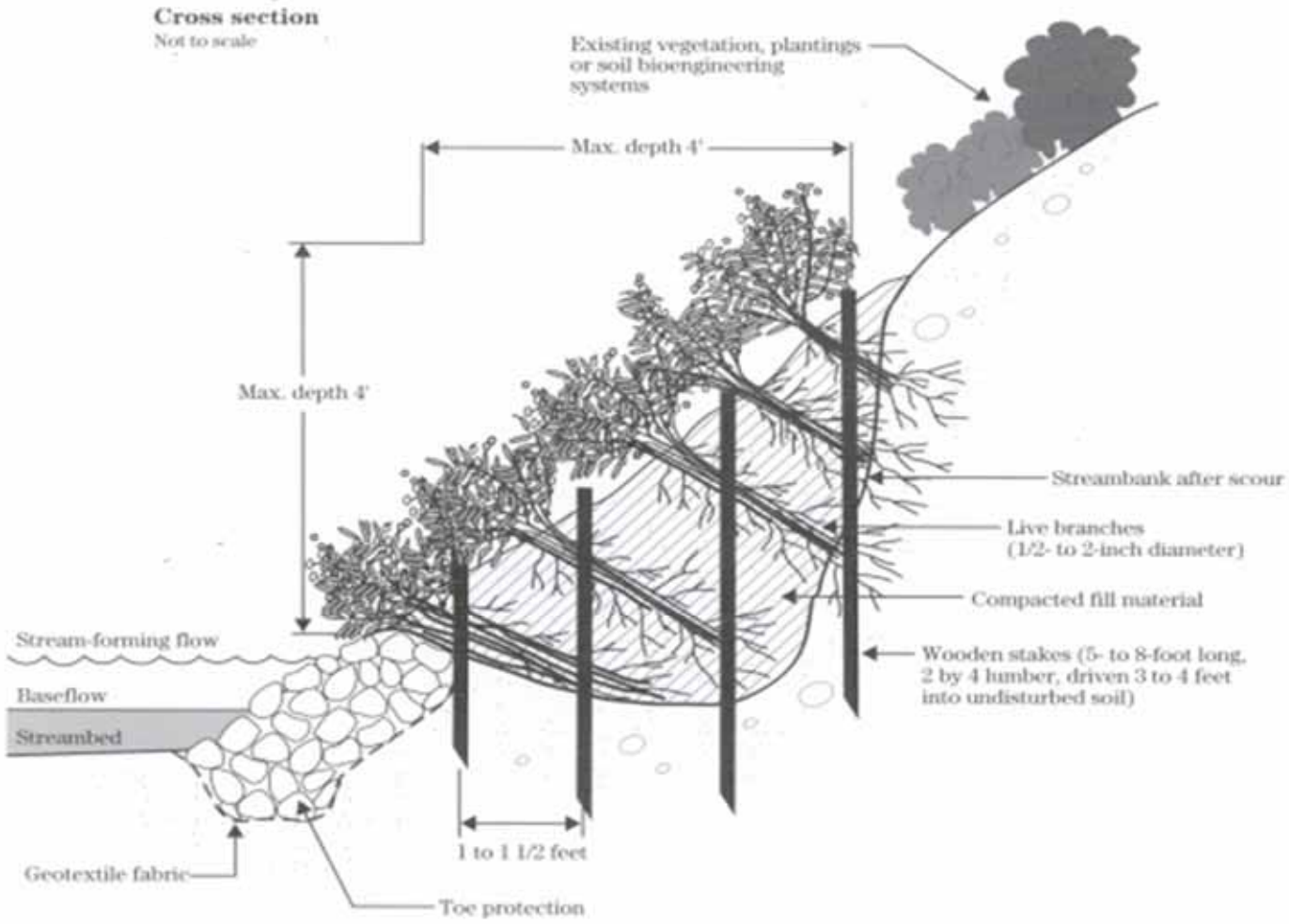
Techniques

Branchbox Breakwater

Techniques

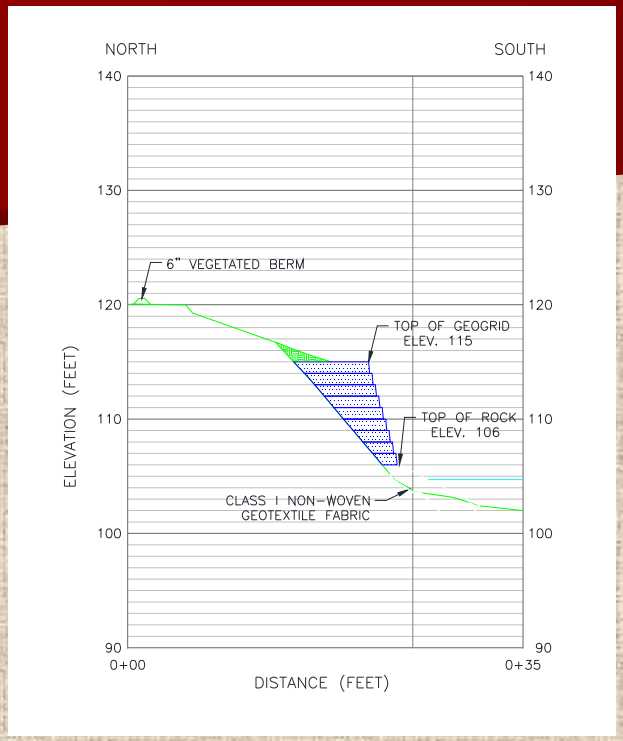
Branch Packing

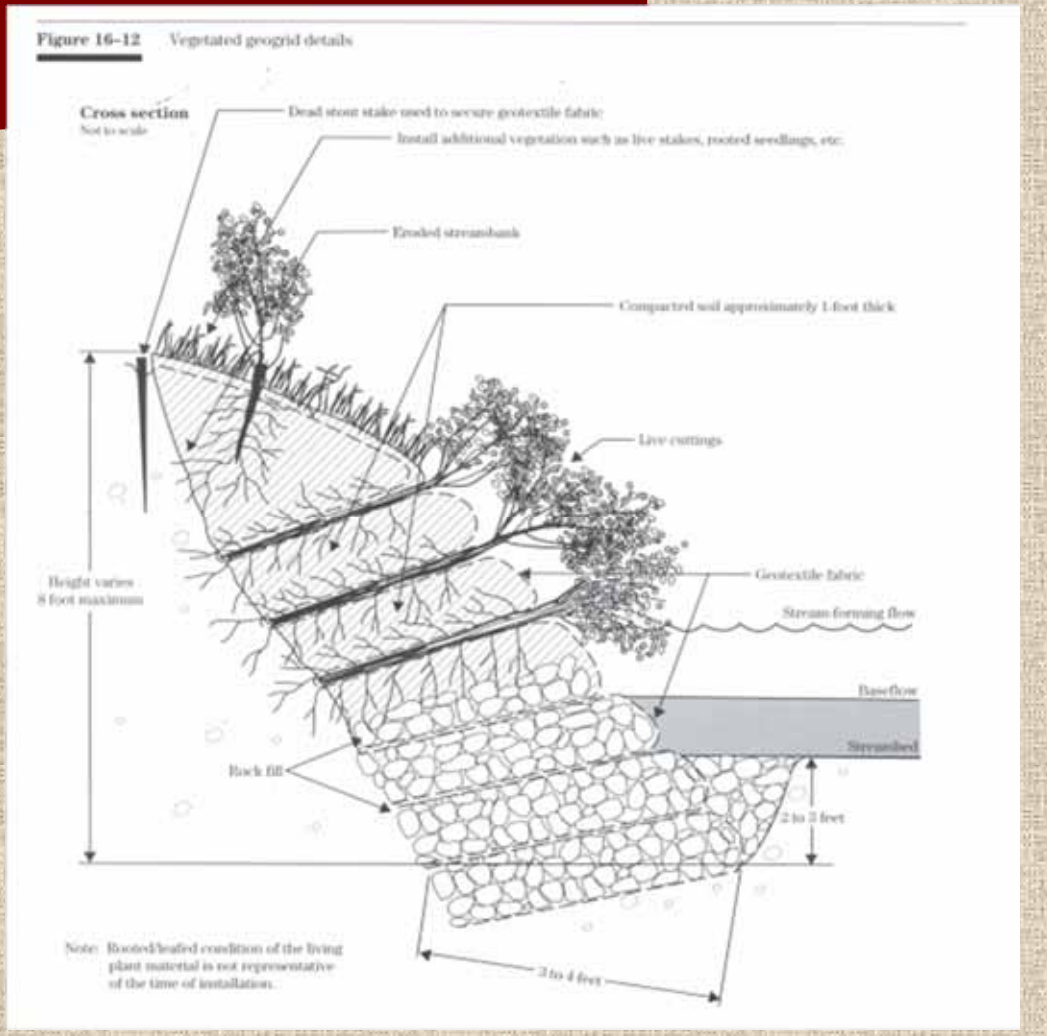
Figure 16–10 Branchpacking details



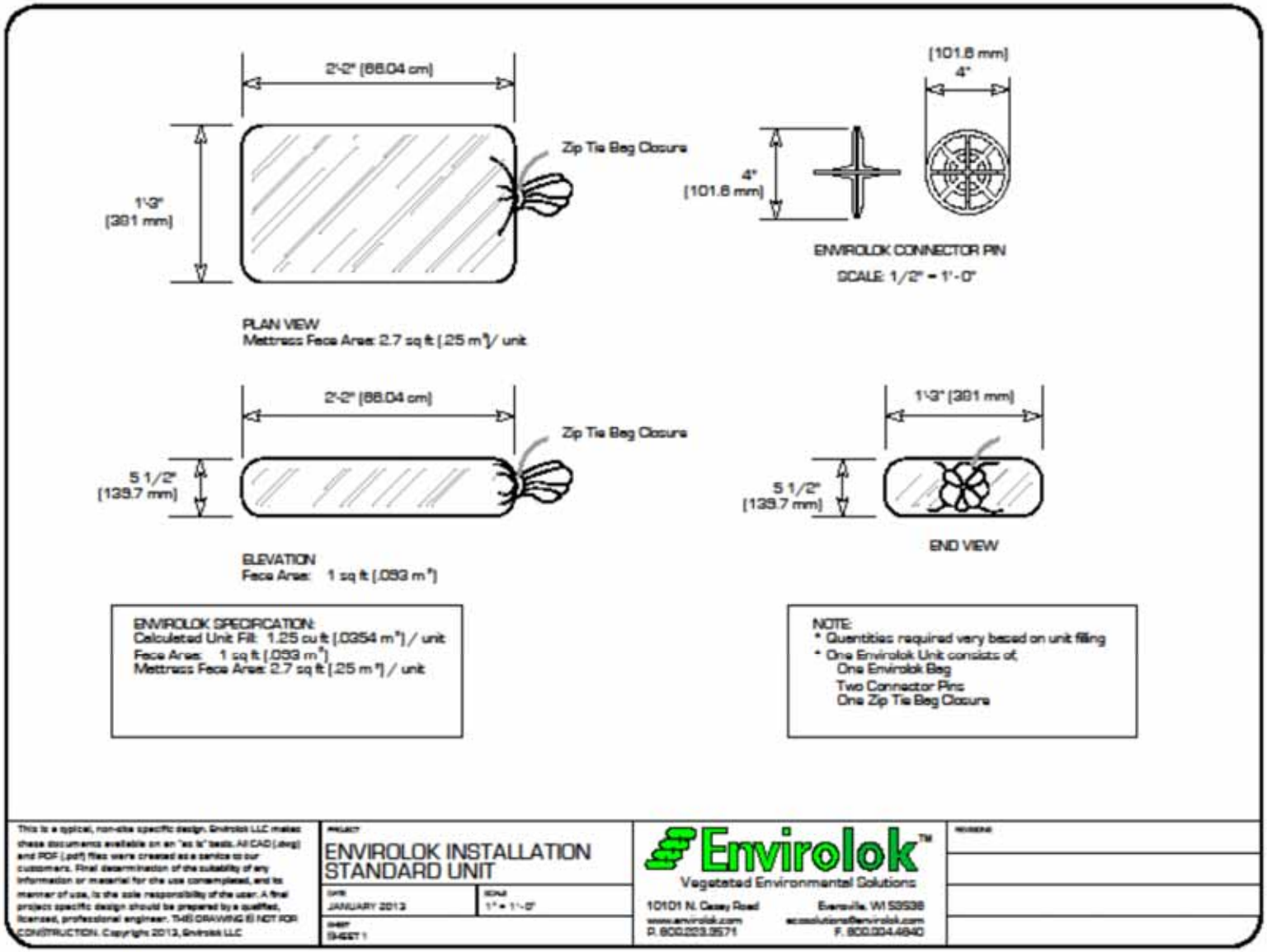
Techniques

Vegetated Geogrid





Geotextile Bag Wall



Deltalok GTX Bag

The Deltalok System evolves bag work construction practices by combining an innovative and patented interlocking method with a vegetation sustainable GTX soil bag.

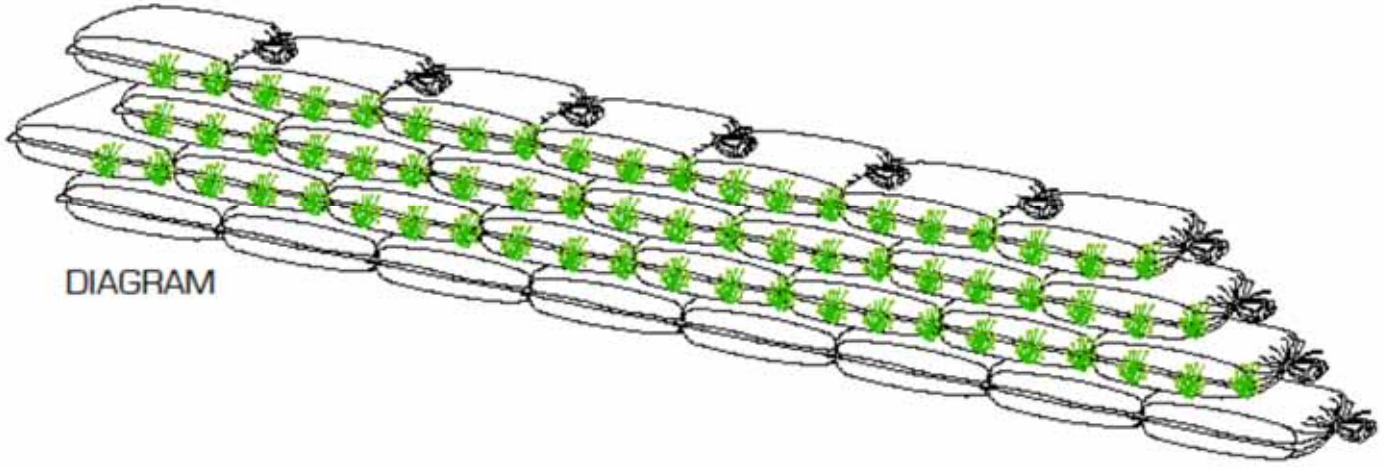
Deltalok
Standard Connector

The Deltalok Connector is placed between sand/soil filled Deltalok GTX bags to dramatically increase the sheer strength of the bag structure. The result is an interlocking soil mass that promotes and sustains vegetation.

Deltalok
Engineered Connector

The connector also provides a positive mechanical connection to geogrid in the construction of steep slopes and retaining wall structures where needed.

Geotextile Bag Wall



DIAGRAM

NOTE;
Live Plant Material Planted Between Envirolok Courses
Do Not Rupture Envirolok Units
Recommended Density; Three Plants per Envirolok Unit

This is a typical, non-site specific design. Envirolok LLC makes these documents available on an "as is" basis. All CAD (.dwg) and PDF (.pdf) files were created as a service to our customers. Final determination of the suitability of any information or material for the use contemplated, and its manner of use, is the sole responsibility of the user. A final project specific design should be prepared by a qualified, licensed, professional engineer. THIS DRAWING IS NOT FOR CONSTRUCTION. Copyright 2013, Envirolok LLC

ENVIROLOK INSTALLATION
LIVE PLANTING DIAGRAM

JANUARY 2013 | 1/2" = 1'-0"

SHEET
SHEET 27

Envirolok™
Vegetated Environmental Solutions

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www.envirolok.com | ecosolutions@envirolok.com
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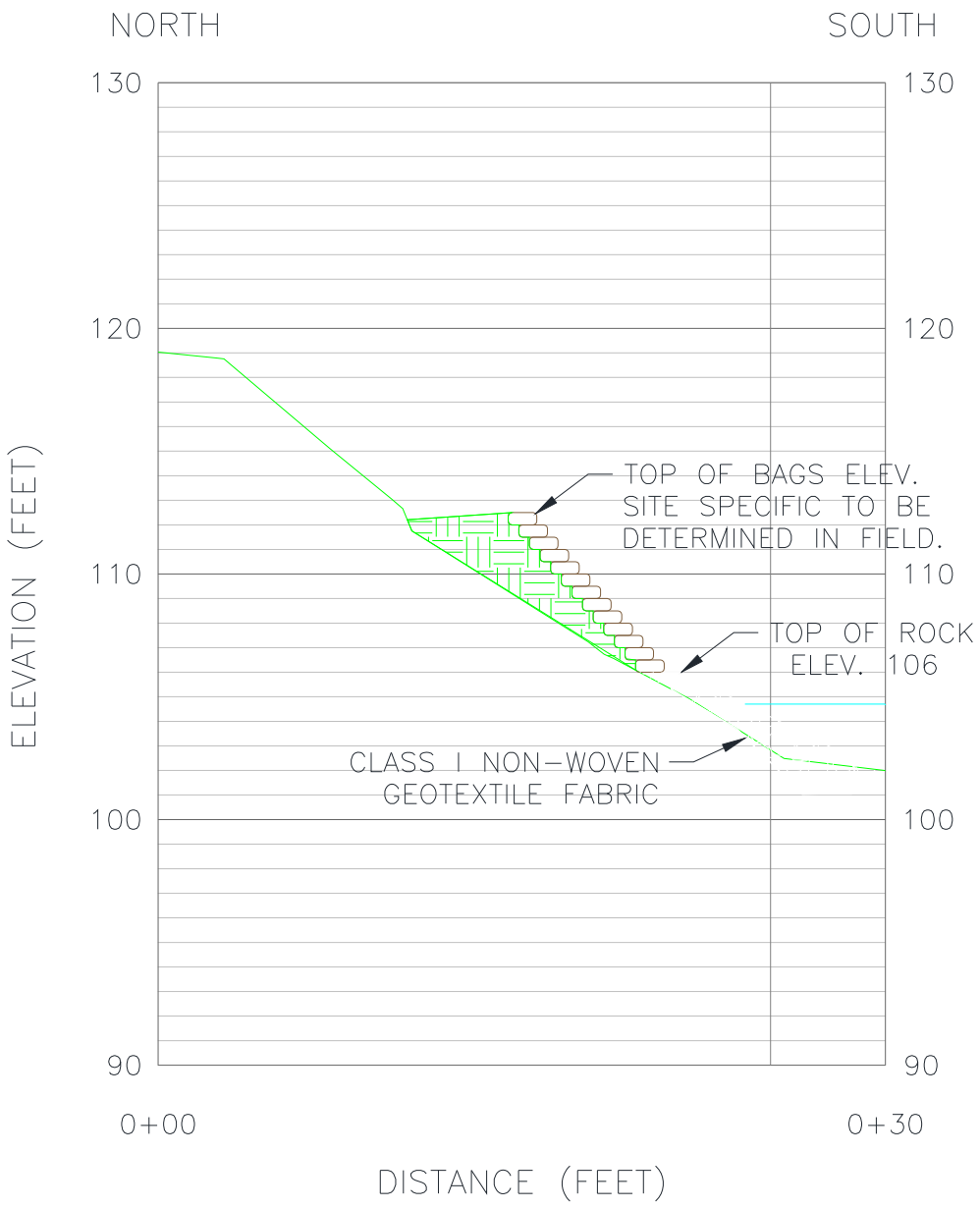
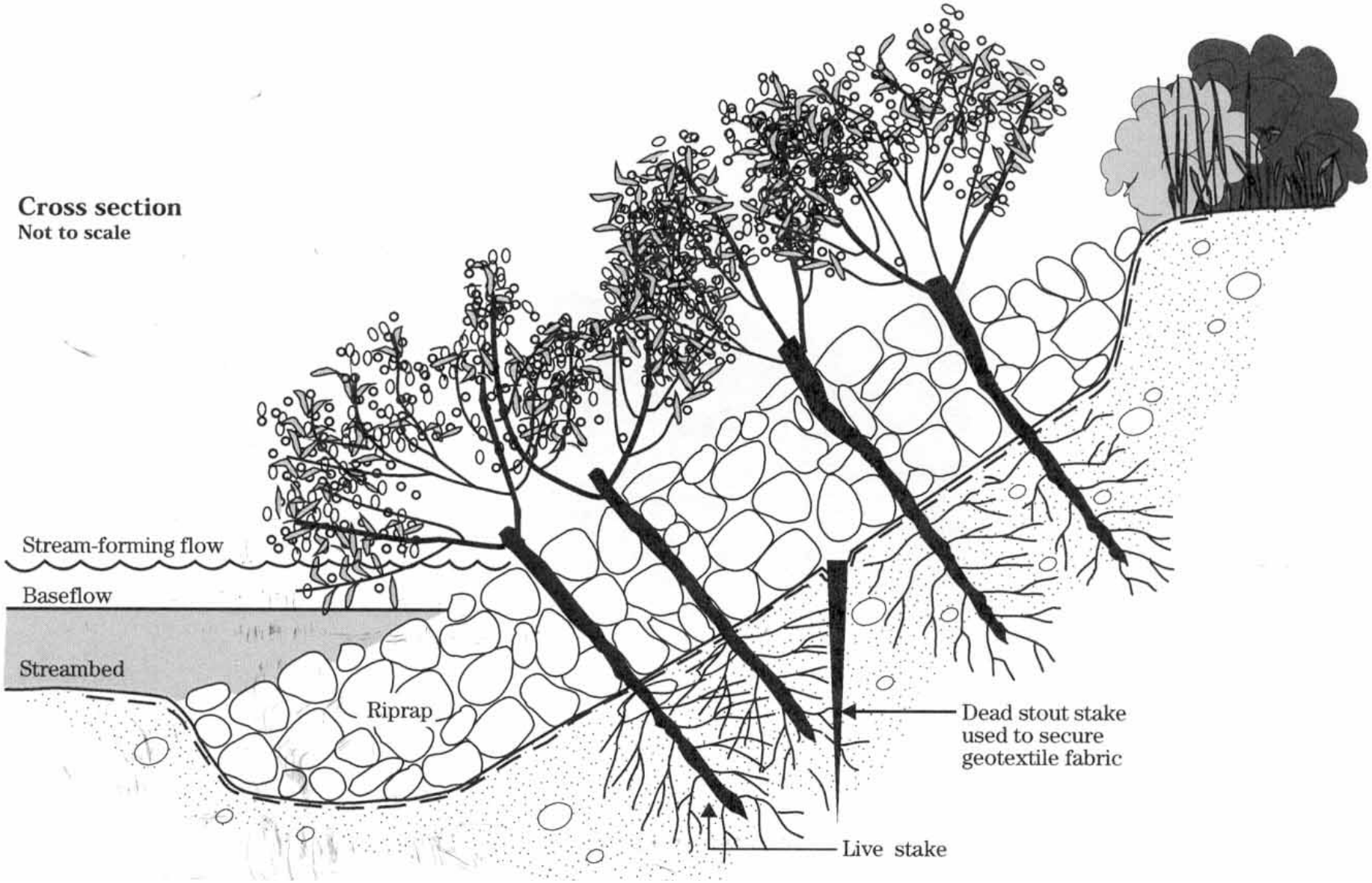
Geotextile Bag Wall

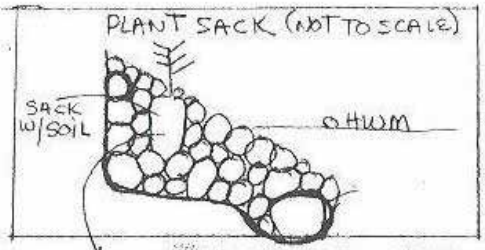


Techniques

Vegetated Riprap



NOESGES PHASE II
TYPICAL CROSS SECTION STATIONS 0+80 — 2+00



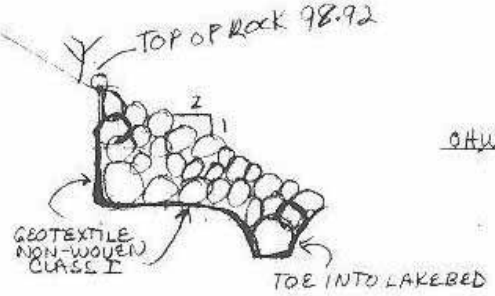
ROCK GRADATION

% PASSING	SIZE OF STONE (IN.)
100	10-12.5
85	8-10
50	5-7.5
15	1.5-2.5

1+06
1+04
1+02
1+00
0+98
0+96
0+94
0

NOTES

1. TOE INTO LAKEBED 1'X 1'
2. NON-WOVEN CLASS I GEOTEXTILE PLACED UNDER ROCK
3. WRAP GEOTEXTILE ONE FOOT ON ENDS
4. ROCK – d50 5 inch
5. ROCK RIPRAP TO HAVE A FINISHED SLOPE OF 2:1
6. TBM – LAST PERMANENT STEP OF WOOD DECKING – NE CORNER – ELEVATION 100.00



OHWM 97.89

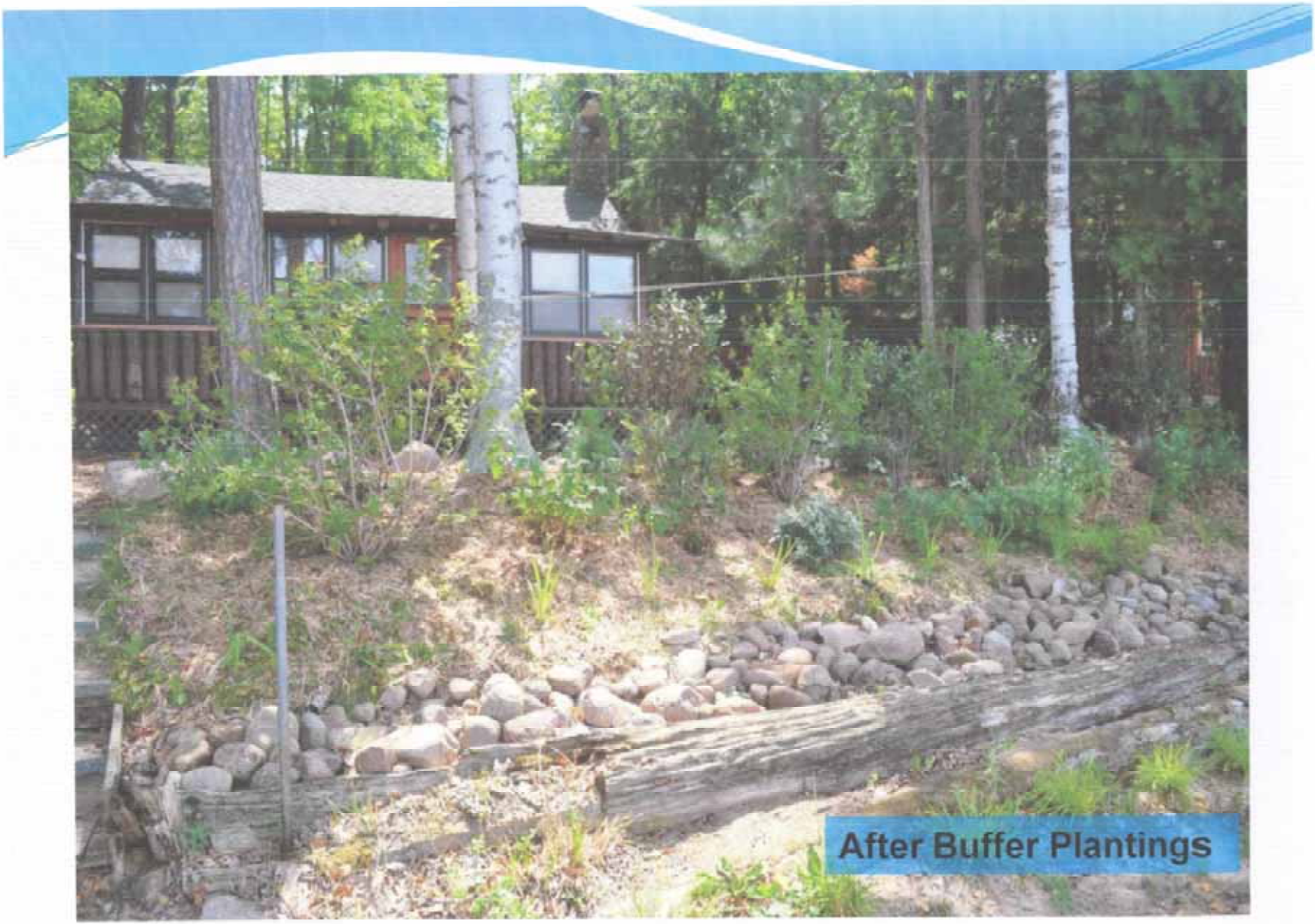
Shrubs for sacks

Meadowsweet	*Spirea alba*
Sweet Gale	*Myrica gale*
Speckled alder	*Alnus incana*

Vertical Geotextile Bag Photo

Project Examples
Before / After


15 foot Building Envelope Around Home
Before Buffer Plantings

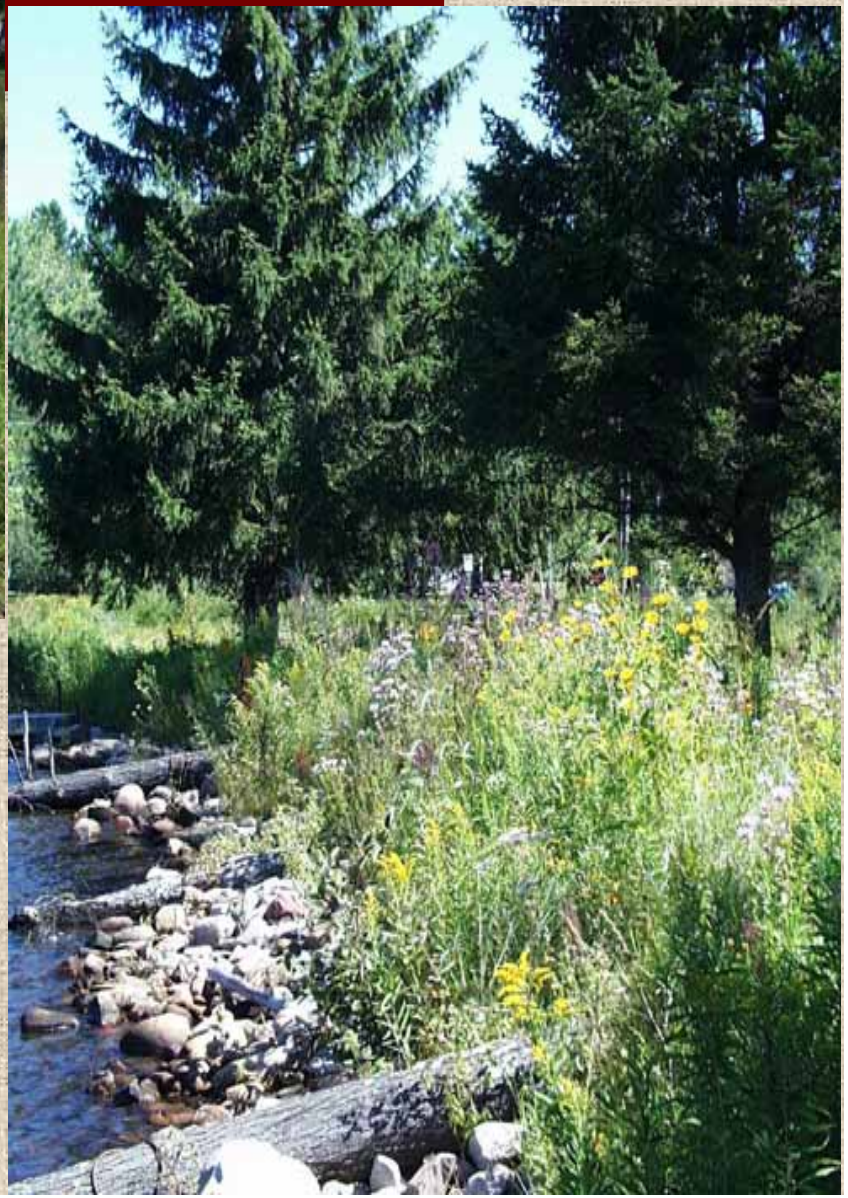

After Buffer Plantings

AMNICON LAKE


BEFORE
Seawall Re
Rock Riprap
AFTER

BEFORE

AFTER




09/06/2012


09/06/2012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JUN 19 2009
APR 25 2008


NOV 2 200

Before – Oct 2009

After - Oct 2012

After 5 months of growth (May 2010 to Oct 2010)

Vegetated Retaining Walls - Geotextile Bags (Install)

Vegetated Retaining Walls - Geotextile Bags (After)

One growing season later – Summer 2012

(left side of stairs)

- Native plants are growing successfully
- Bags are camouflaged and will break down in time (biodegradable)


June 2010 Before


June 2011


June 2012
06/27/2012 13:44

After After

ShoreMax Product

After After


Not Advised!

Questions?

Thank you for your interest in Shoreland Restoration and Bioengineering Techniques!