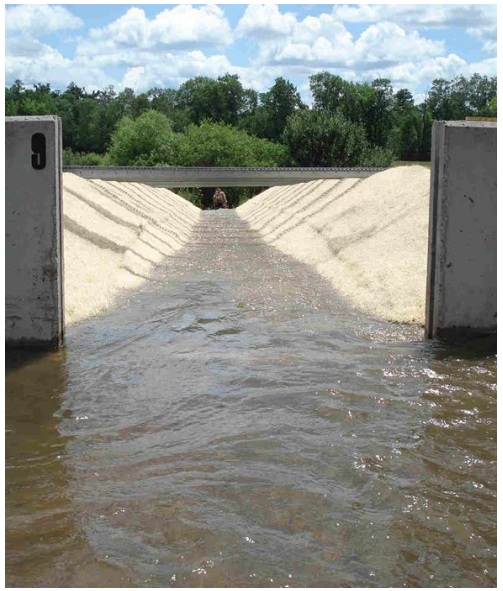


Evaluation of Rolled Erosion Control Product Fibers

Jeff King
Territory Manager
American Excelsior Company

American Excelsior Company®

What is an RECP
Rolled Erosion Control Product

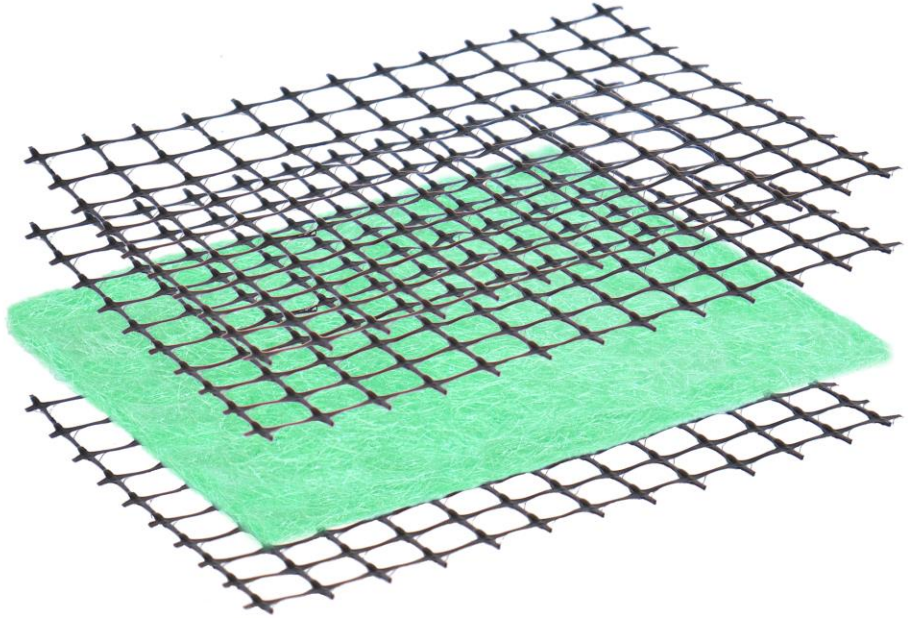
RECP involve the use of natural or synthetic materials to control soil erosion and to enhance the establishment and growth of vegetation. RECP material are temporarily or permanently designed products installed in areas that are vulnerable to erosion. These products include **erosion control blanket (ECB)** and **turf reinforcement mats (TRM)**

(ECB) Erosion Control Blankets

- Degradable or Bio-Degradable net Options
- One or Two Layers of Netting
- Natural Fiber Layer
  - Wood Fiber
  - Straw
  - Coconut
- Functional Longevities of 6-36+ Months

(TRM) Turf Reinforcement Mats

- Most Use 2-3 Layers of Netting
- Long Term Protection
- Fiber Layer
  - Natural Fiber
  - Synthetic Fiber
- Long Term Shear Stress Protection
- Long Term Vegetation Support



Fiber Types Utilized In RECP and TRMs
All Fibers Aren't the Same

Straw Fiber

Coconut Fiber

Straw/Coconut Blend

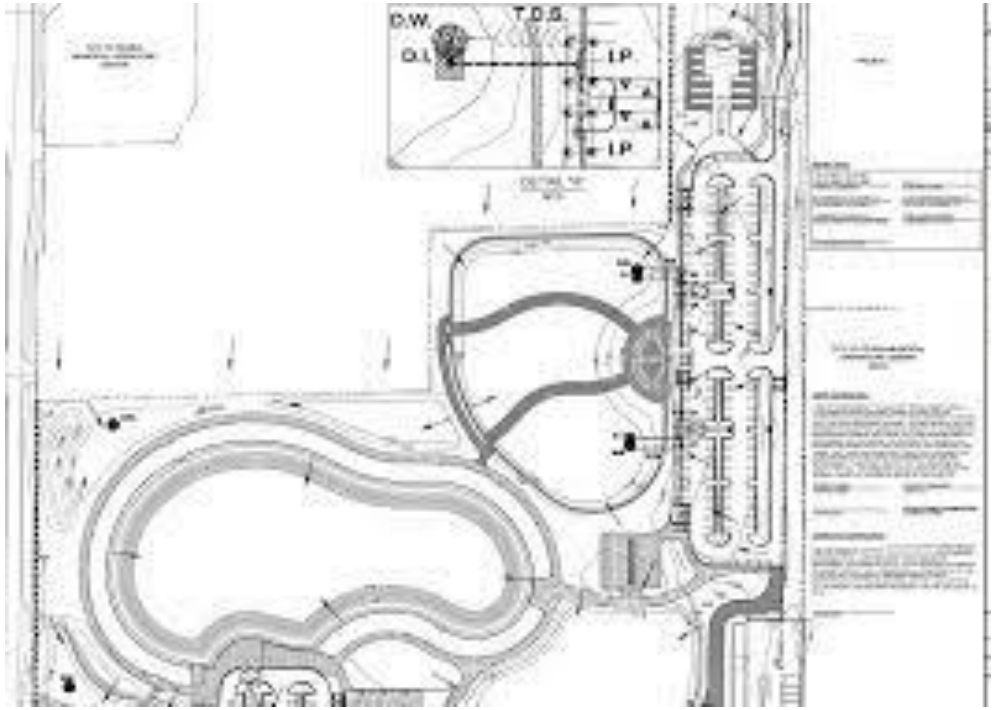
Wood Fiber

Synthetic Fibers

NATURAL FIBERS

Things to Consider When Choosing a Fiber Type

- Site Conditions
  - Shear Stress
  - Slope
    - Length
    - Steepness
  - Channel Application
  - Vegetation support needs
    - Long term - TRMs
    - Short term – Temporary Erosion Blankets
- Soil Type
- Specific Gravity of Fibers
- Does the Blanket Float



Fiber Types are Important

Fiber Characteristics to be Considered

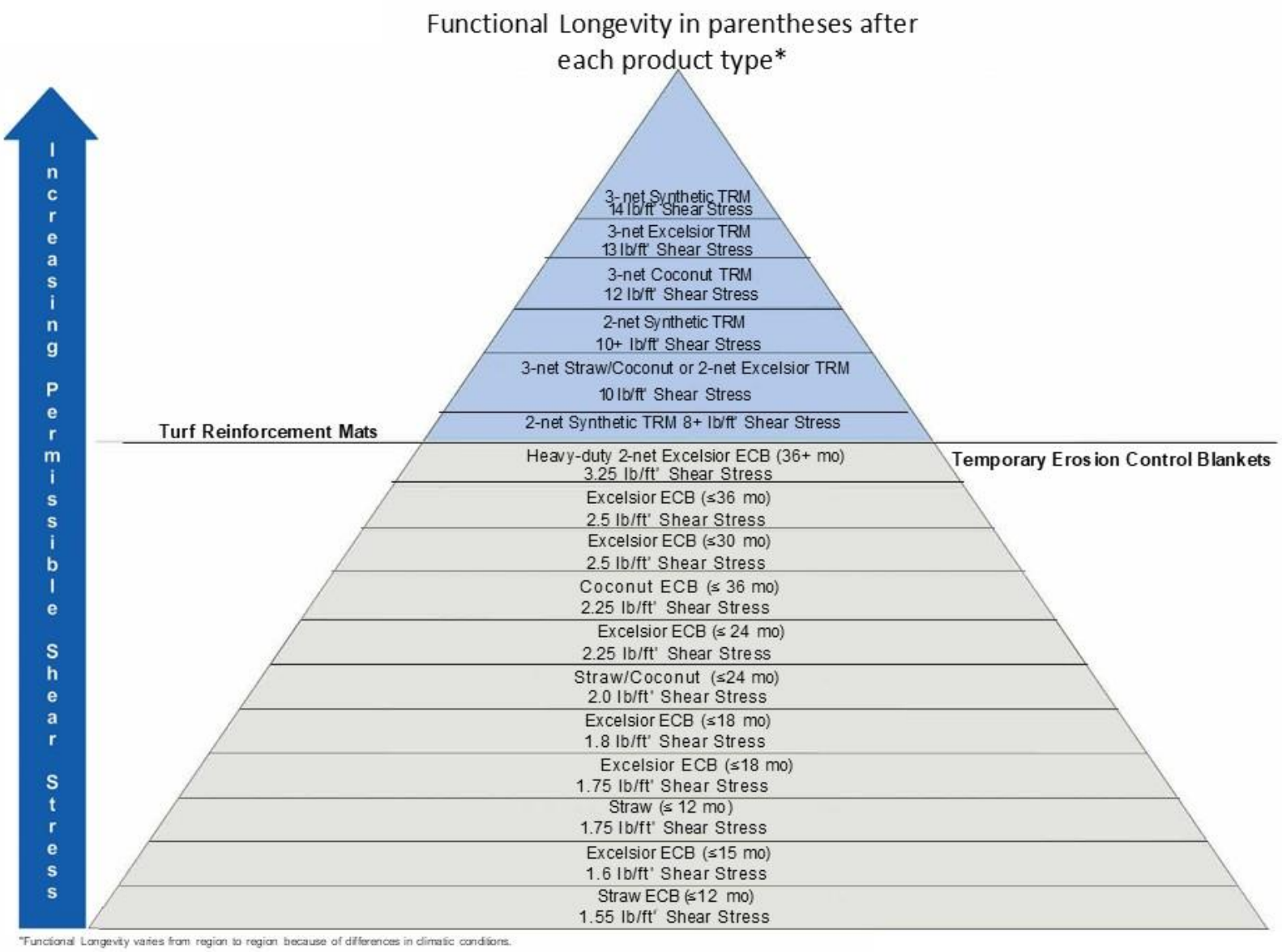
Specific Gravity

What is Specific Gravity

The ratio of the density of a substance to the density of a standard, usually water for a liquid or solid, and air for a gas.

Water has a specific gravity **equal to 1**. Materials with a specific gravity less than 1 are less dense than water and will float on the liquid; substances with a specific gravity more than 1 are denser than water and will sink.

Channel Application Guide Example

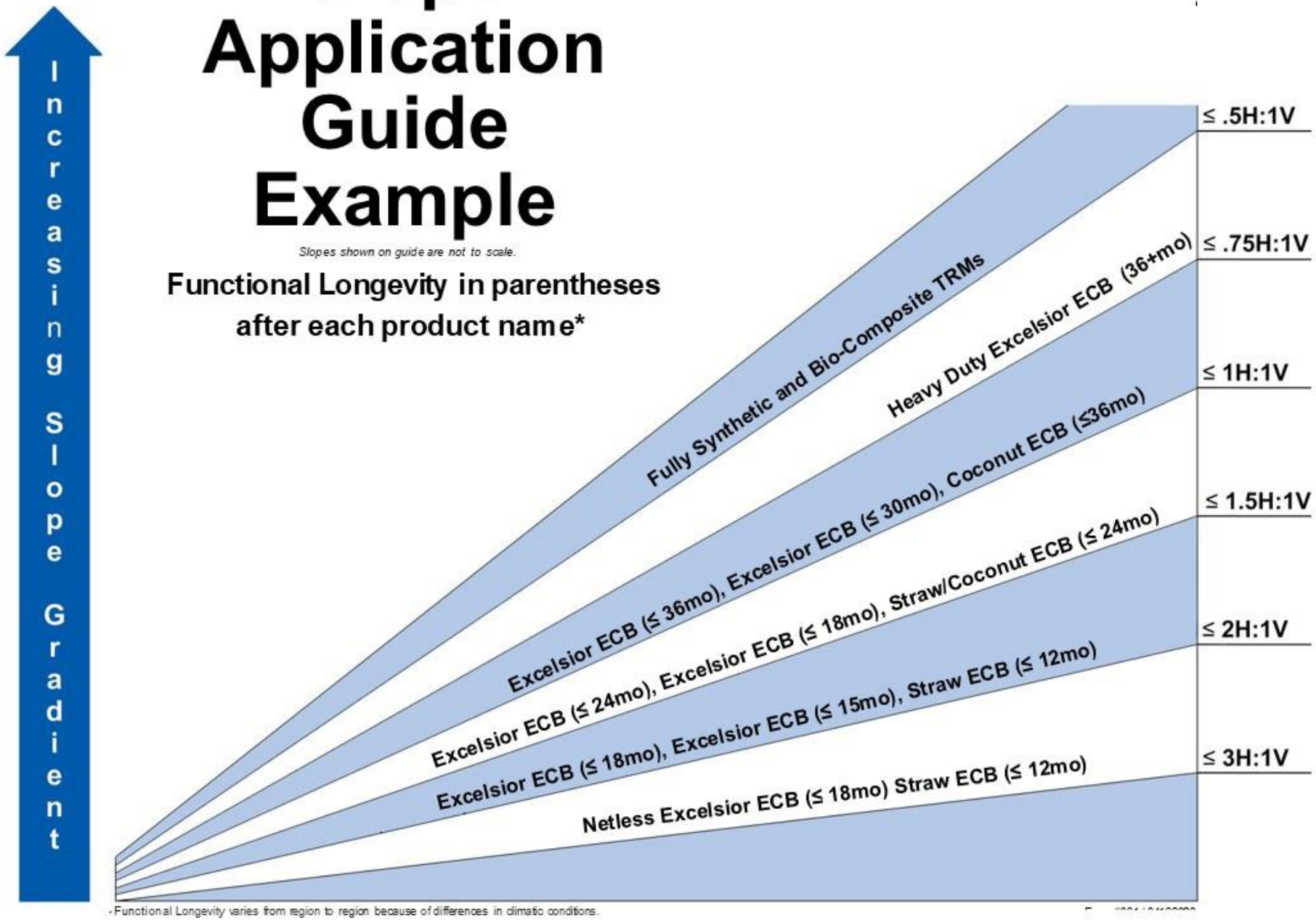


Channel Flow Examples

Slope Application Guide Example

Slopes shown on guide are not to scale.

Functional Longevity in parentheses after each product name*

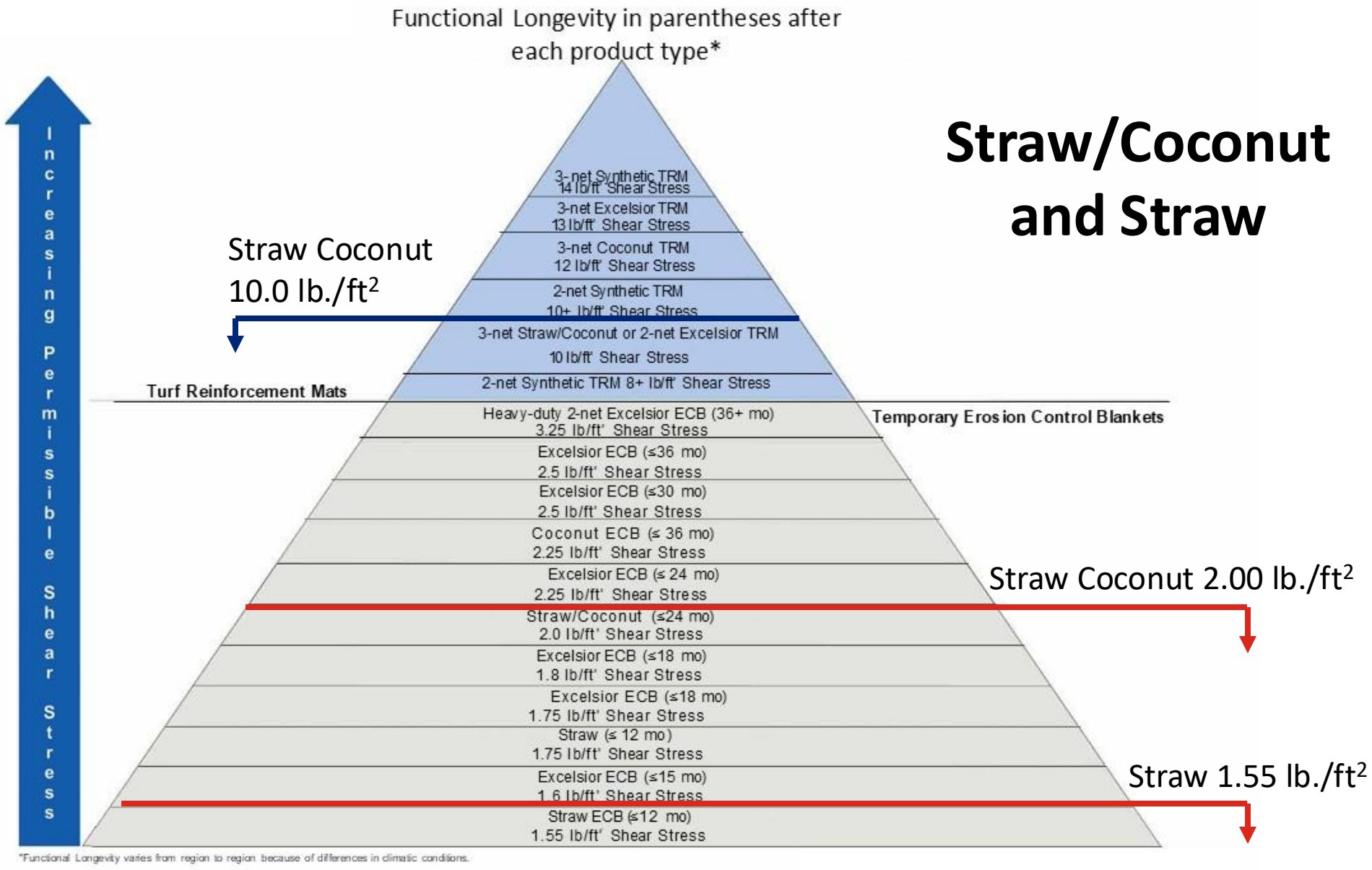


*Functional Longevity varies from region to region because of differences in climatic conditions.

Straw Fiber

- Agricultural Byproduct
  - Least Expensive Natural Fiber
  - Can Contain Weed Seed
- Hollow
- Floats
- Short term longevity
  - 6 – 9 months

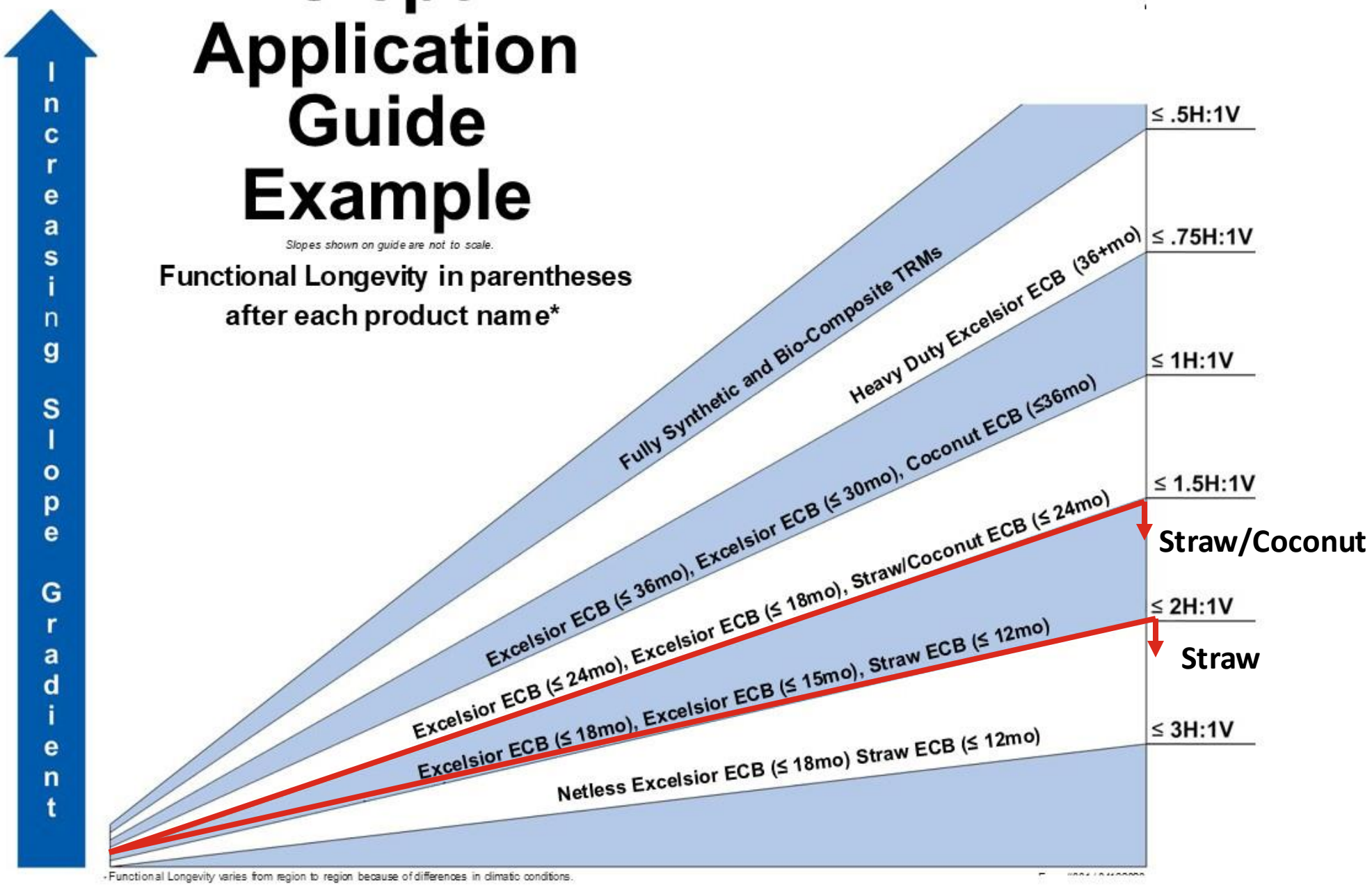
Channel Application Guide Example



Straw/Coconut and Straw

Straw in Swales

Slope Application Guide Example

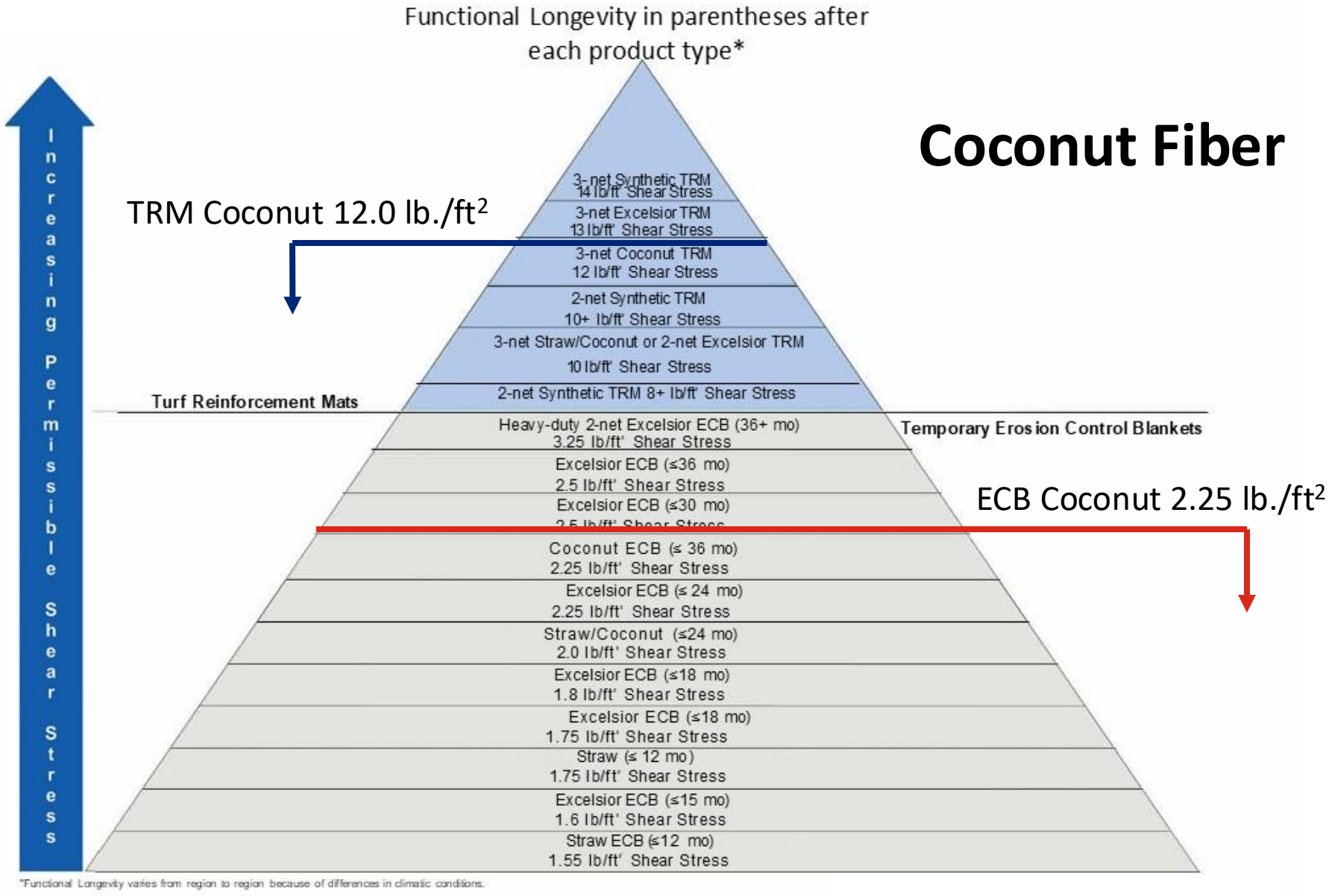


Straw Fiber on Slopes

Coconut Fibers

- Up to 36 Month Longevity
- Imported from Southern Asia
  - Poor carbon footprint
  - Non-native matrix
- Dark color
  - Can cause seed burn out before germination

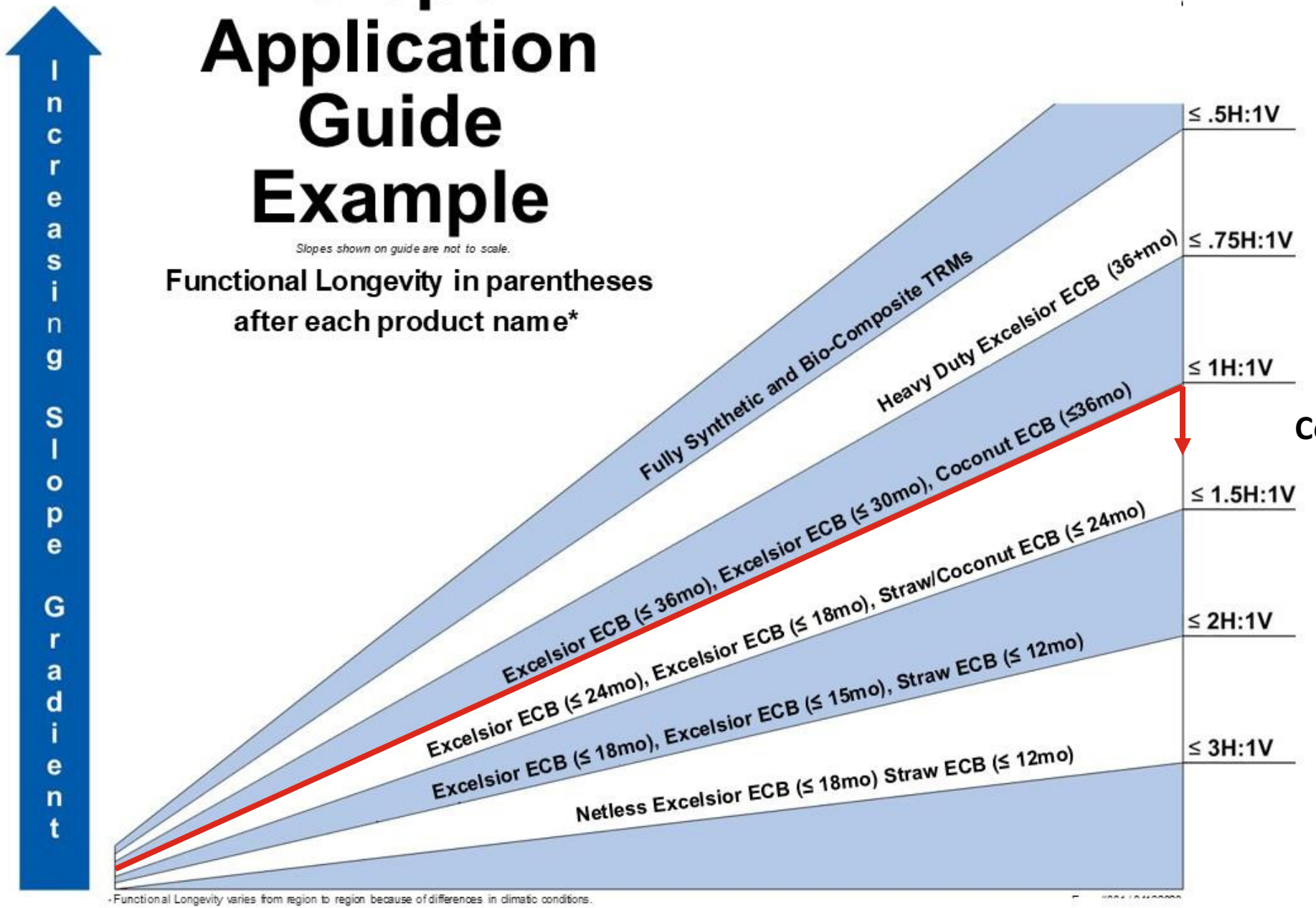
Channel Application Guide Example



Coconut Fiber

Coconut Swale

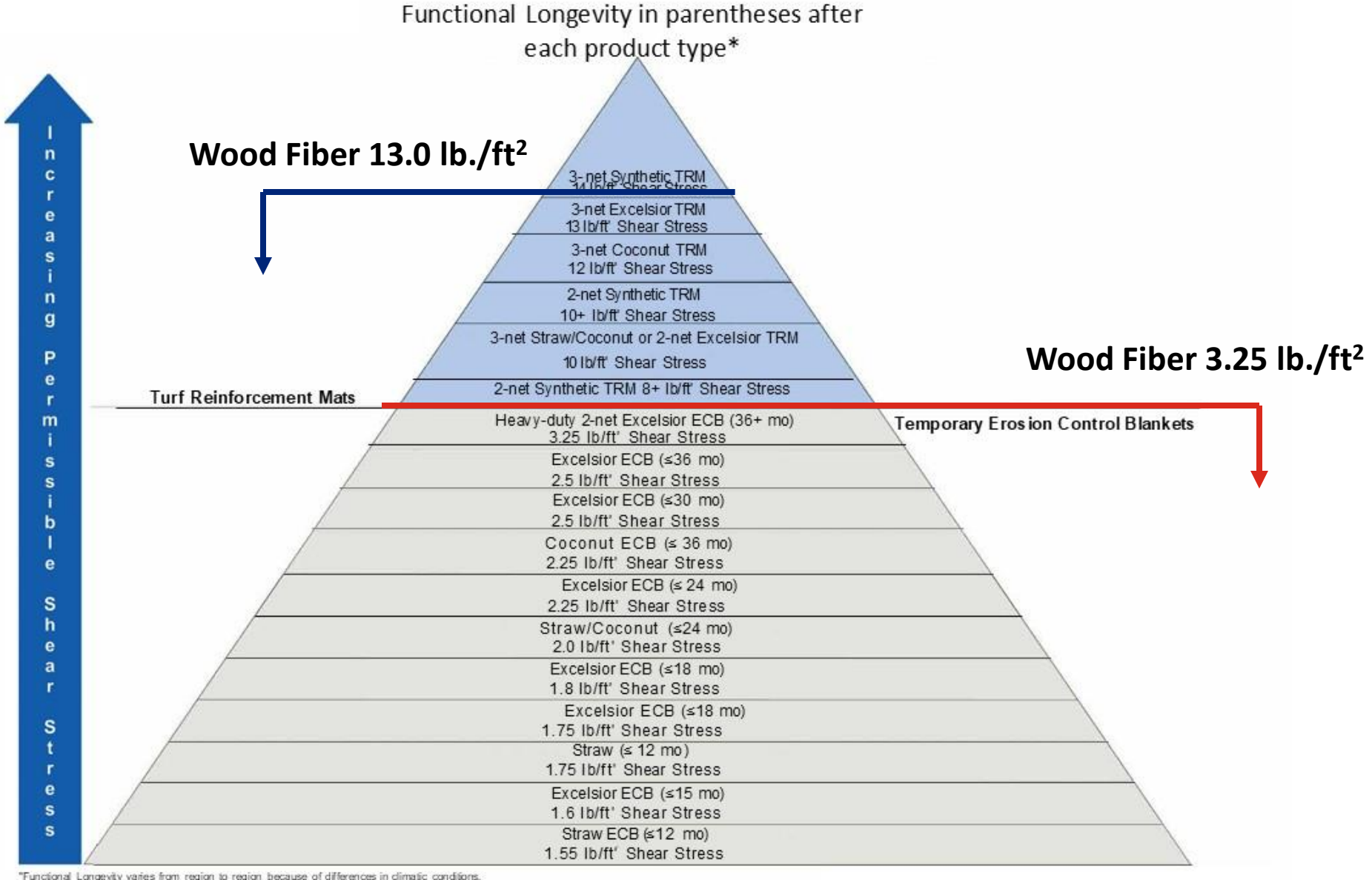
Slope Application Guide Example



Aspen Wood Fiber

- Naturally Seed Free
- Native Fibers
- Engineered Curls and Barbs
- Hastens Revegetation
- Some Wood Fiber Blanket System do not Float

Channel Application Guide Example

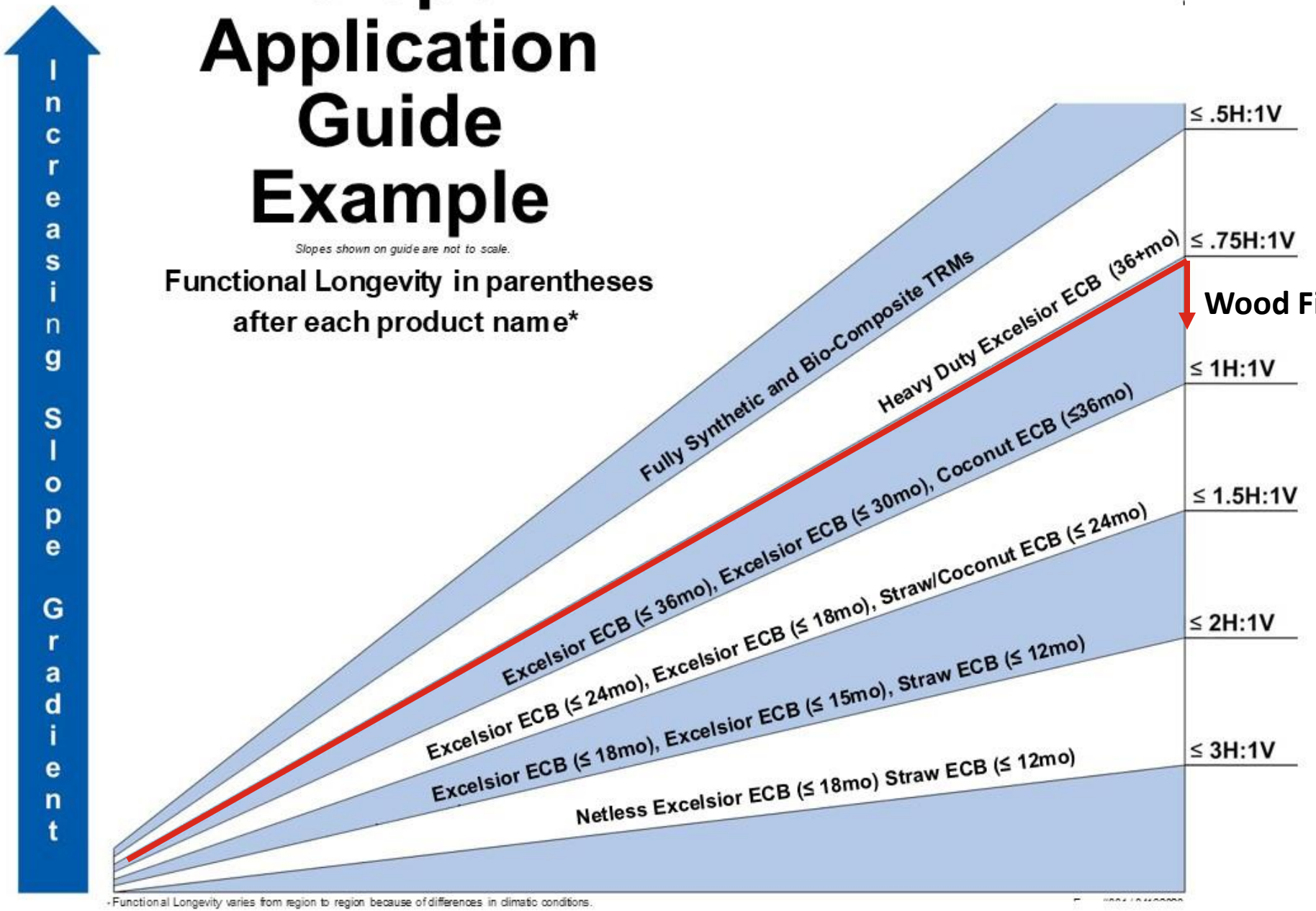


Wood Fiber Swale

Slope Application Guide Example

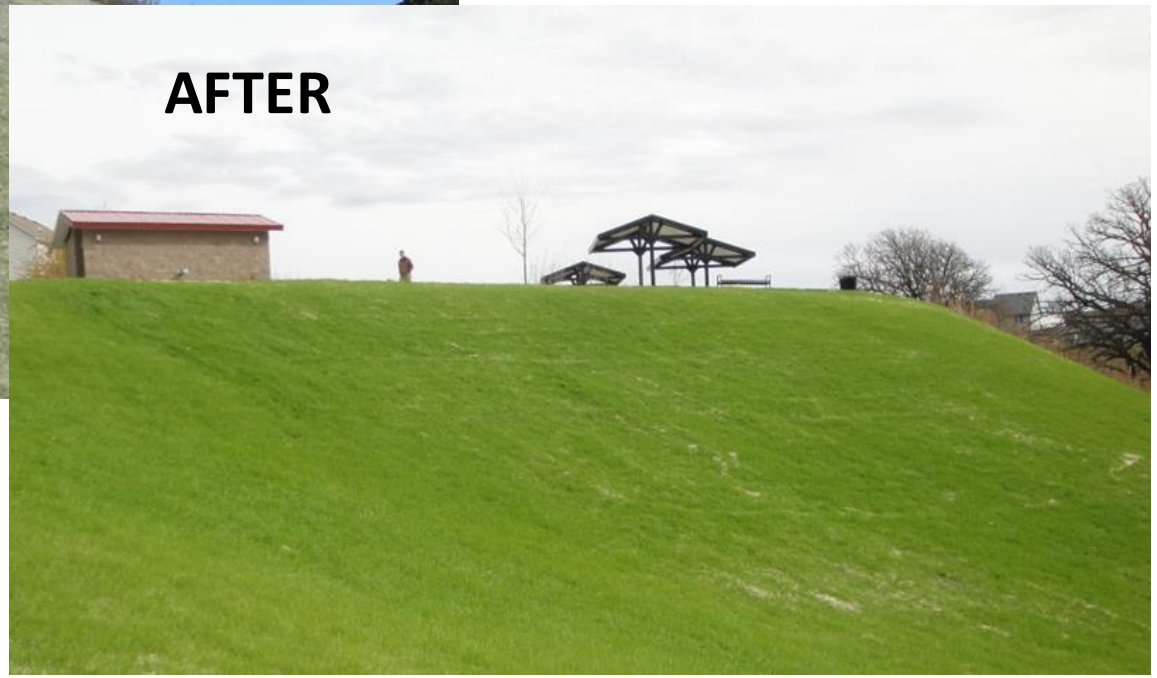
Slopes shown on guide are not to scale.

Functional Longevity in parentheses after each product name*



*Functional Longevity varies from region to region because of differences in climatic conditions.

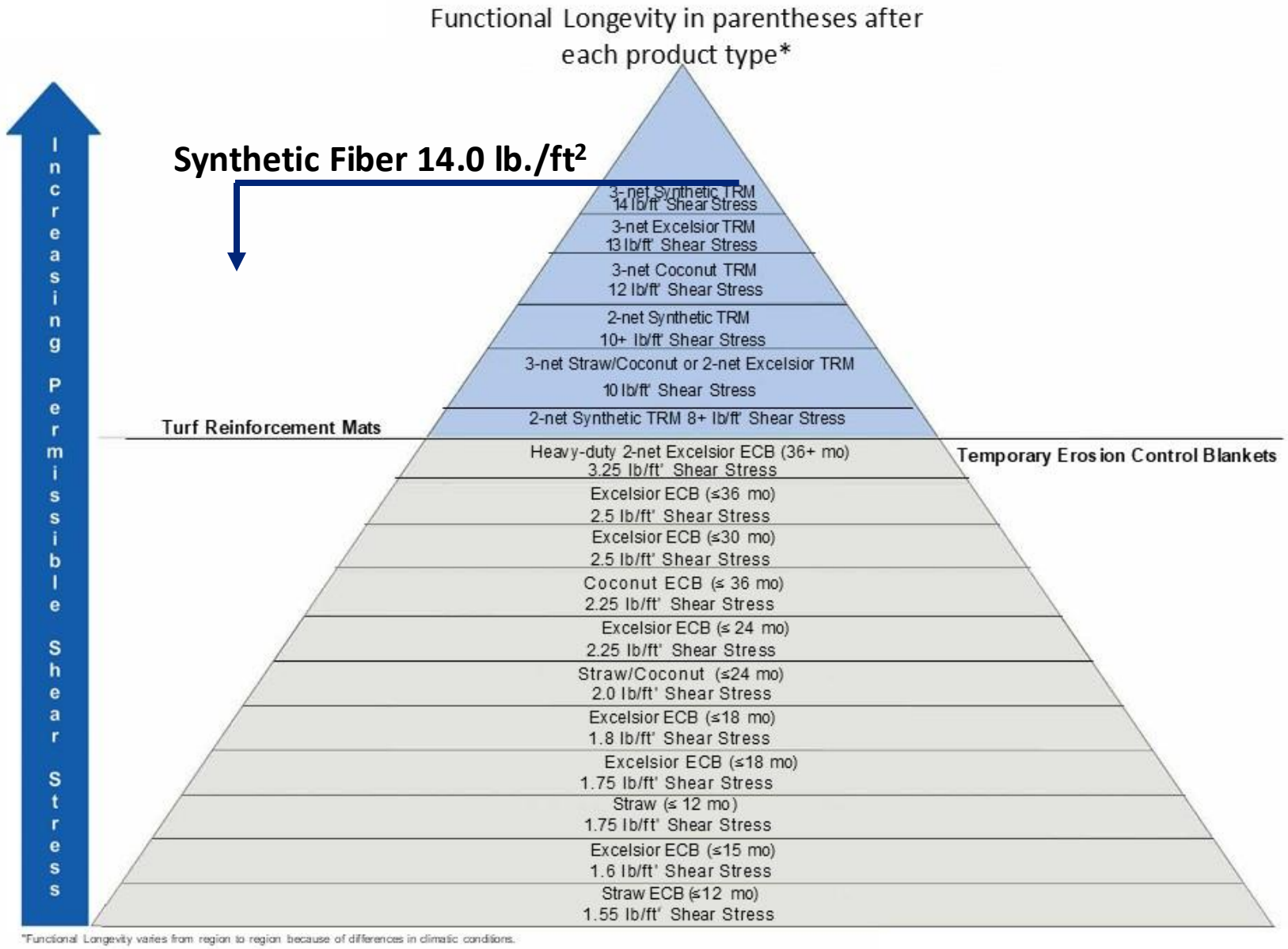
Wood Fiber Slope



Synthetic Fiber

- Used When Long Term Vegetation Support
- High Shear Stress Applications
- Some have Specific Gravity Less than 1
  - Those Float
- Some Have Specific gravity Greater than 1
  - Those do NOT Float

Channel Application Guide Example

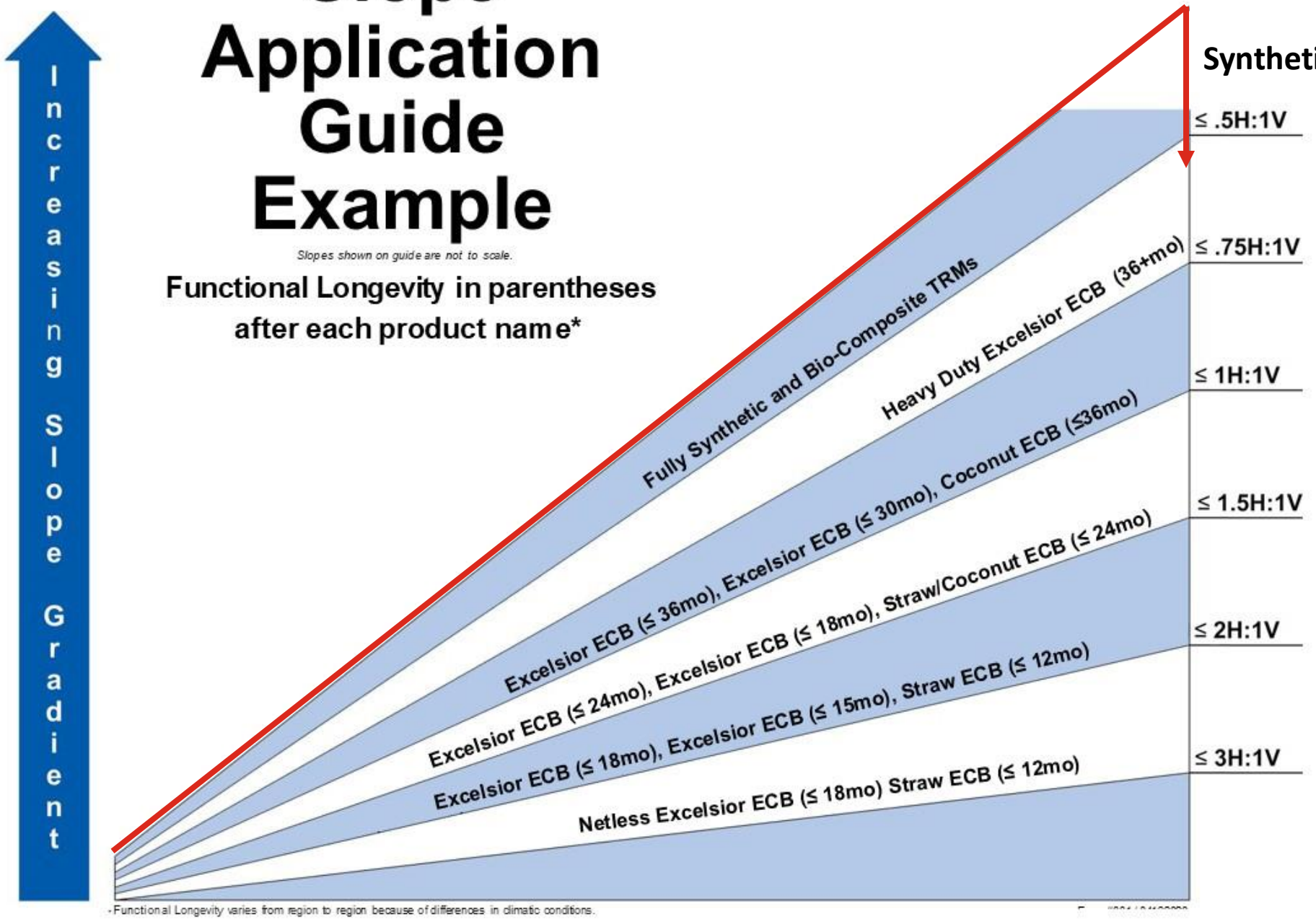


Synthetic Fiber Swales

Slope Application Guide Example

Slopes shown on guide are not to scale.

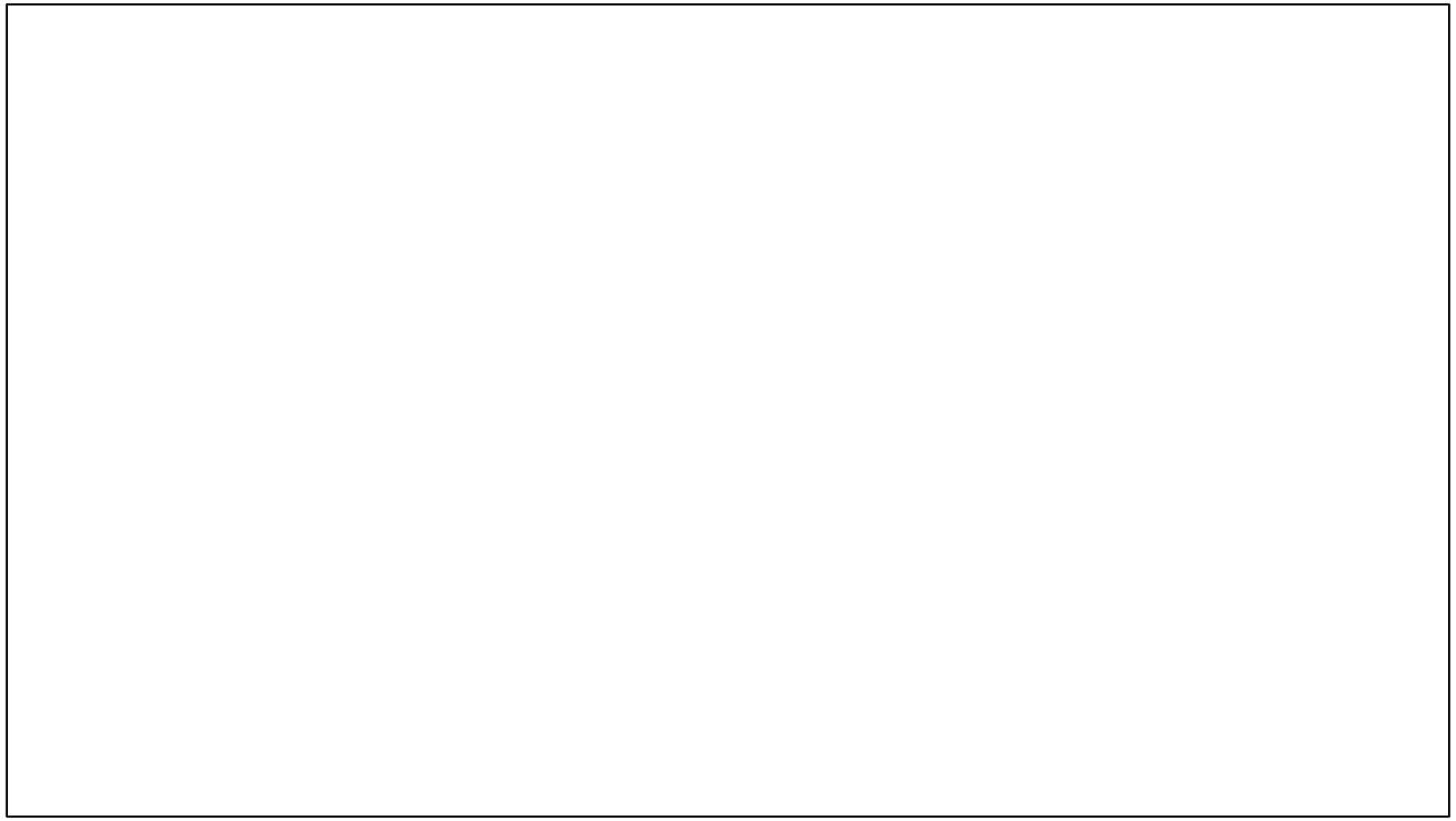
Functional Longevity in parentheses after each product name*



*Functional Longevity varies from region to region because of differences in climatic conditions.

What Happens When Fiber Floats

Fibers Type Impacts TRM Performance



Fiber Types are Important
Which Ones Float?

Specific Gravity < 1

Straw Fiber

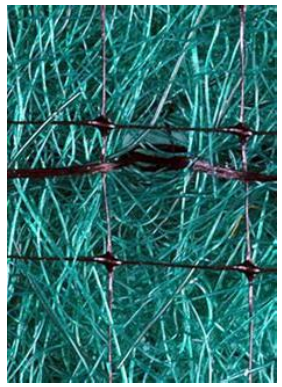
Will Float

Coconut Fiber

Will Float

Straw - Coconut Blend

Will Float



Synthetic Fiber with Specific Gravity ≤

Will Float

Aspen Wood Fiber Blanket System

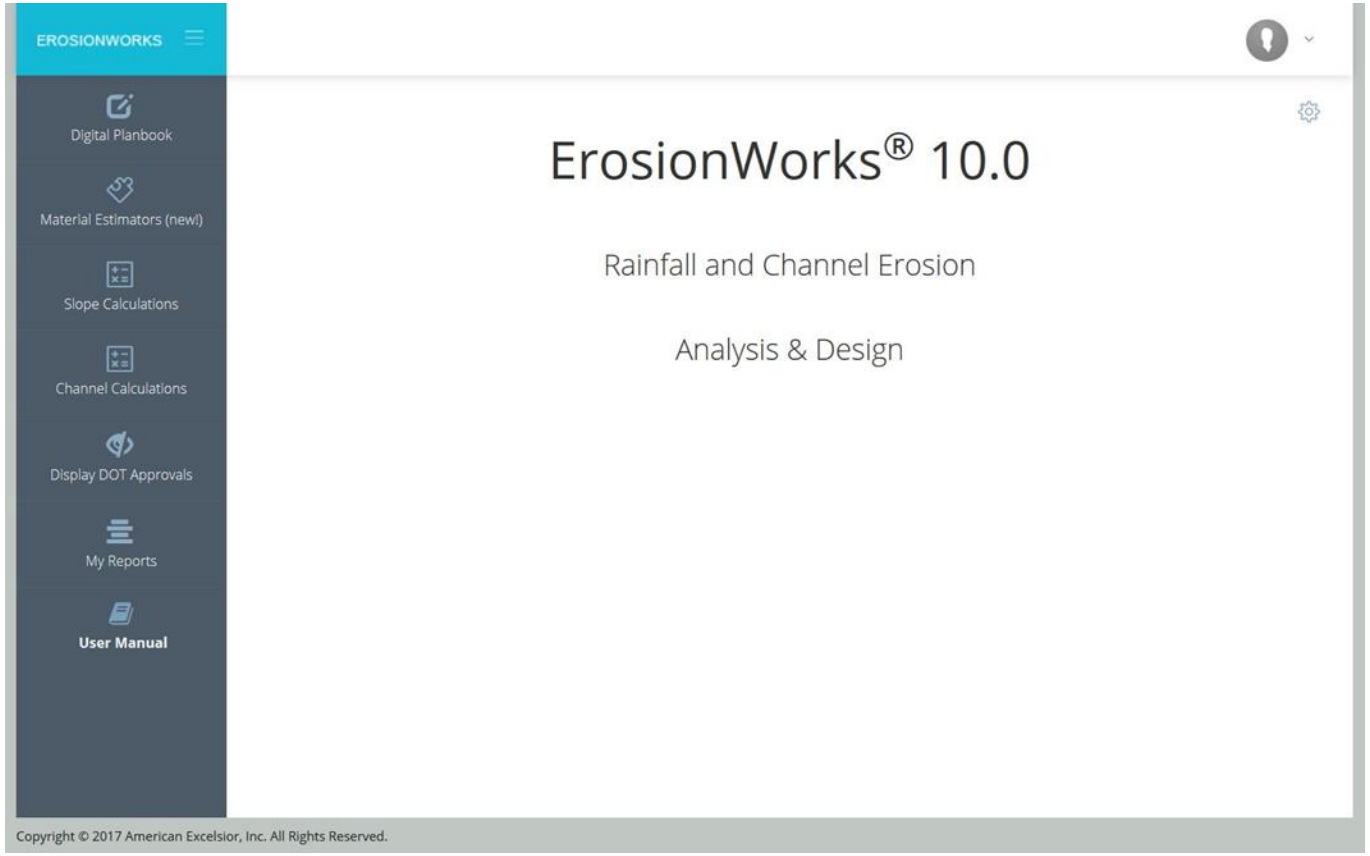
Doesn't Float

Specific Gravity > 1

Synthetic Fiber with Specific Gravity ≥ 1

Doesn't Float

Design Software



ErosionWorks

Trapezoidal Channel Analysis

Project Info

User Input

Bed Manning's n-Value (Nc): 0.038

Left Manning's n-Value (Nl): 0.038

Right Manning's n-Value (Nr): 0.038

Right-Side Slope (Zr) [1I:1V]: 3

Left-Side Slope (Zl) [H:1V]: 3

Bed Slope (S) [ft/ft]: 0.05

Bottom Width (B) [ft]: 3

Design Discharge (Q) [ft³/sec]: 45

Bend Coefficient (Kb): 1

Hydraulic Results

Depth [ft]: 1.07

Velocity [ft/sec]: 6.77

Froude: 1.42

Shear [lb/ft²]: 3.34

Project Information

Designers Name: Michael Nelson

Designers Title: cpswq

Designers Organization: N/A

Project Name:

Project Number:

Project Location (City, State): Canton, Illinois

Project Segment:

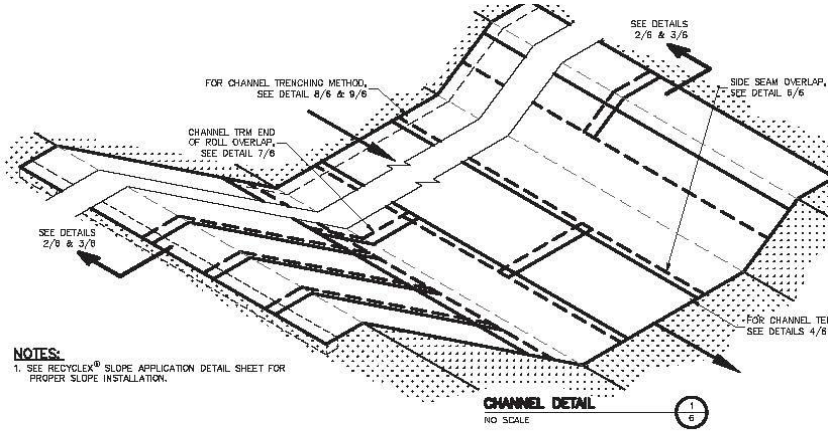
Applications(s):

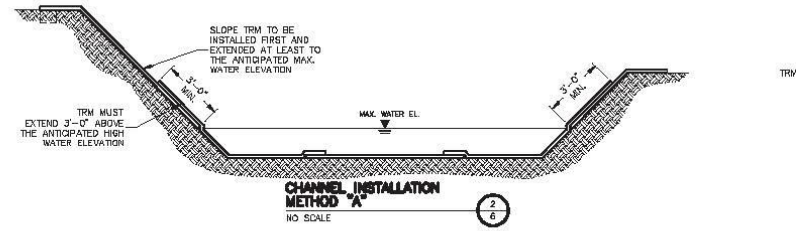
Project Description:

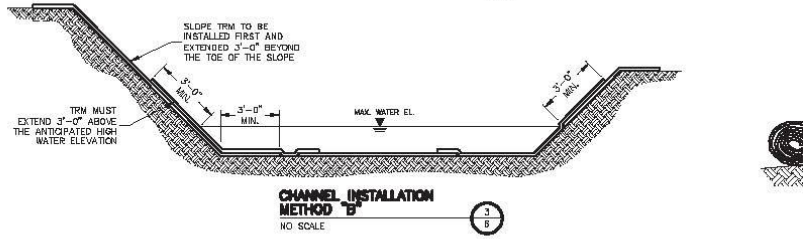
Project Bid Date: --

Project Start Date: --

ErosionWorks







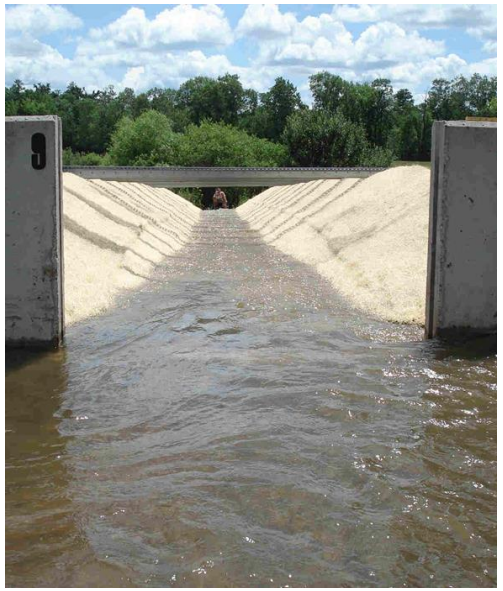
Recyclex® TRM Staple Pattern Guide

Application	Channel	
	≤ 2.3 lb/ft² (110 Pa) Shear Stress ≤ 10.0 ft/sec (3.0 m/sec) Velocity	≤ 10.0+ lb/ft² (480+ Pa) Shear Stress ≤ 17.0+ ft/sec (5.2+ m/sec) Velocity
Staple Pattern	B	C

Summary

- Fiber type selection is critical to a successful RECP/TRM installation
- Specific gravity is key in swale and slope solutions
- Several design tools available to assist in a successful installation



Thank You

Contact Information
Jeff King
Territory Manager
jking@americanexcelsior.com
Mobile: 940-367-0940

American Excelsior Company®