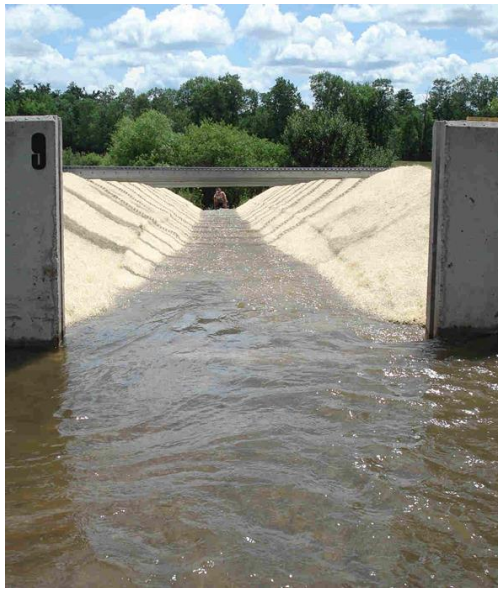


Evaluation of Rolled Erosion Control Product Fibers

Eric Marsal
Territory Manager
American Excelsior Corporation

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)**

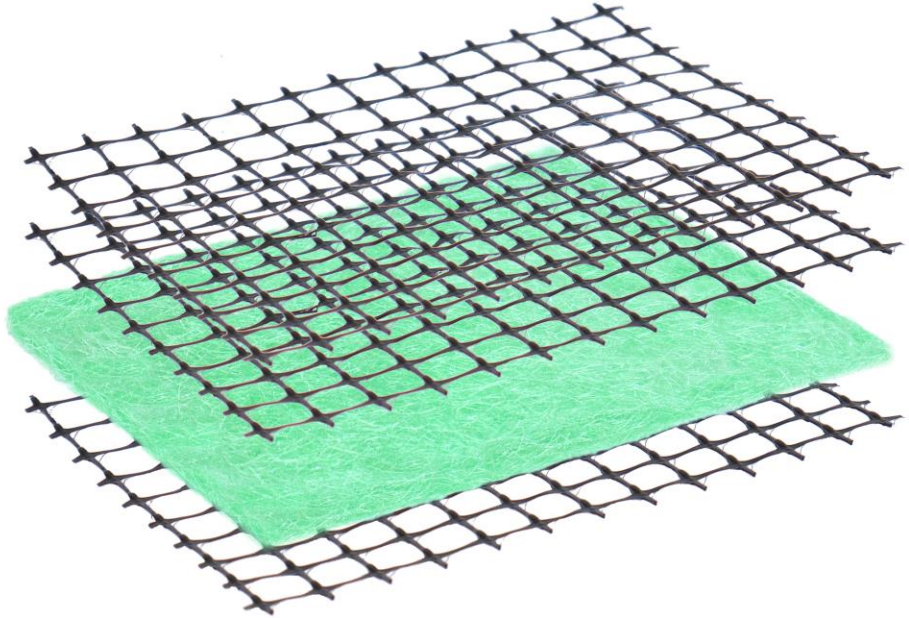
(ECB) Erosion Control Blankets

- Can be made of degradable or bio-degradable net
- One or Two layers of netting
- Natural Fiber layer
  - Wood Fiber
  - Straw
  - Coconut
- Typically provides short term shear stress support protection
  - 6 to 36 months
- Provides short term vegetation support

(TRM) Turf Reinforcement Mats

Typically made up of a long-term netting

- Two or three layers of netting
- Fiber layer
  - Natural Fiber
  - Synthetic Fiber
- Provide long term shear stress protection
- Provide 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

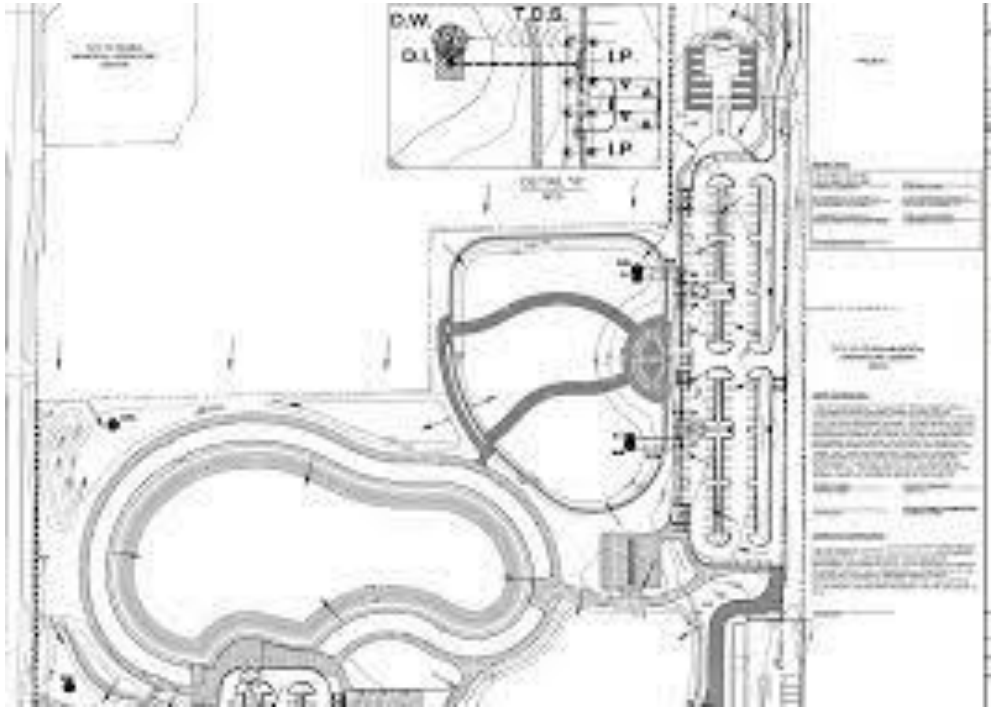
Polyester and Polypropylene Fiber

NATURAL FIBERS

SYNTHETIC 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 Fiber and Blanket



Fiber Types are Important

Fiber Characteristics to be Considered

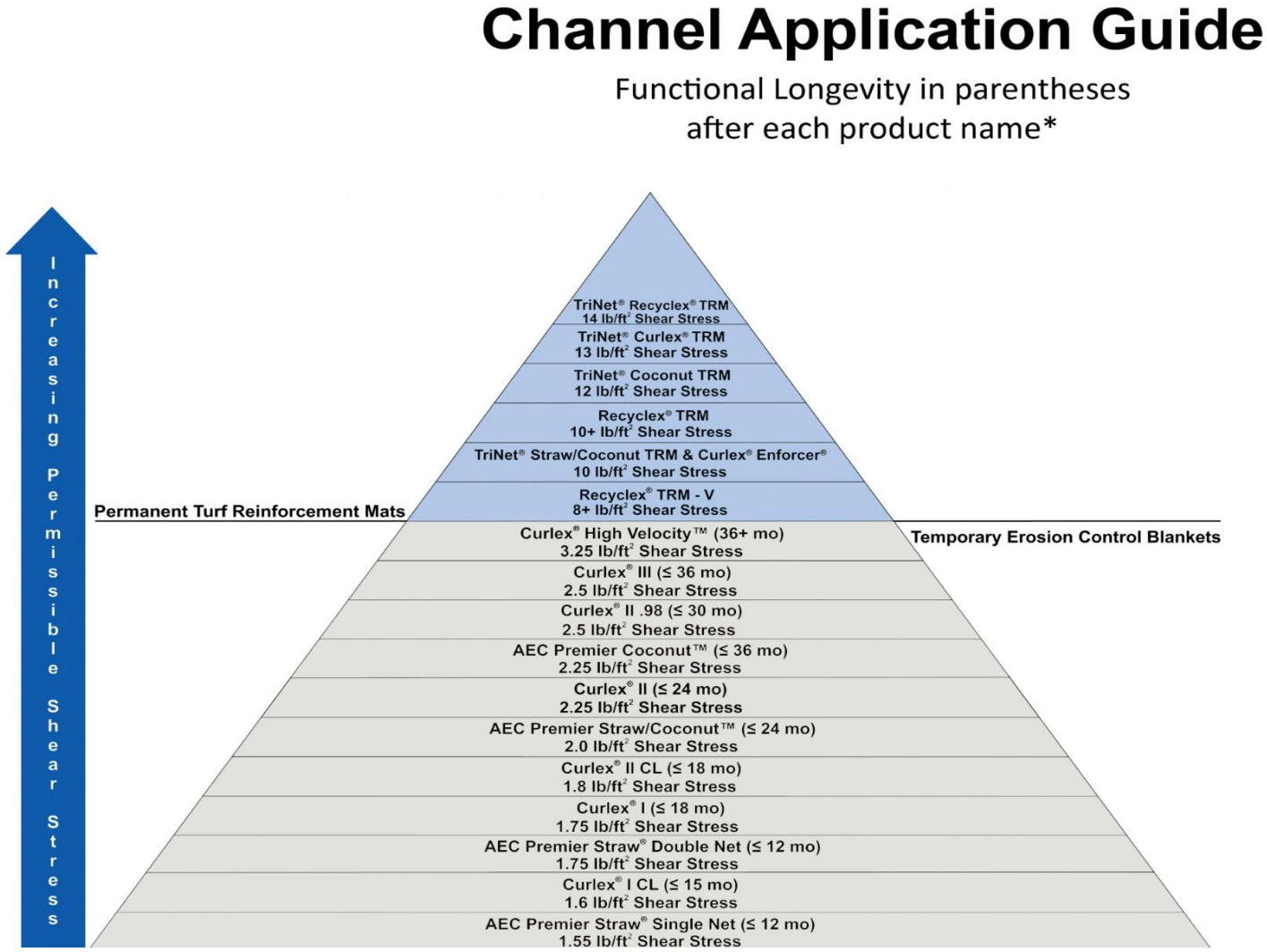
Specific Gravity

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.

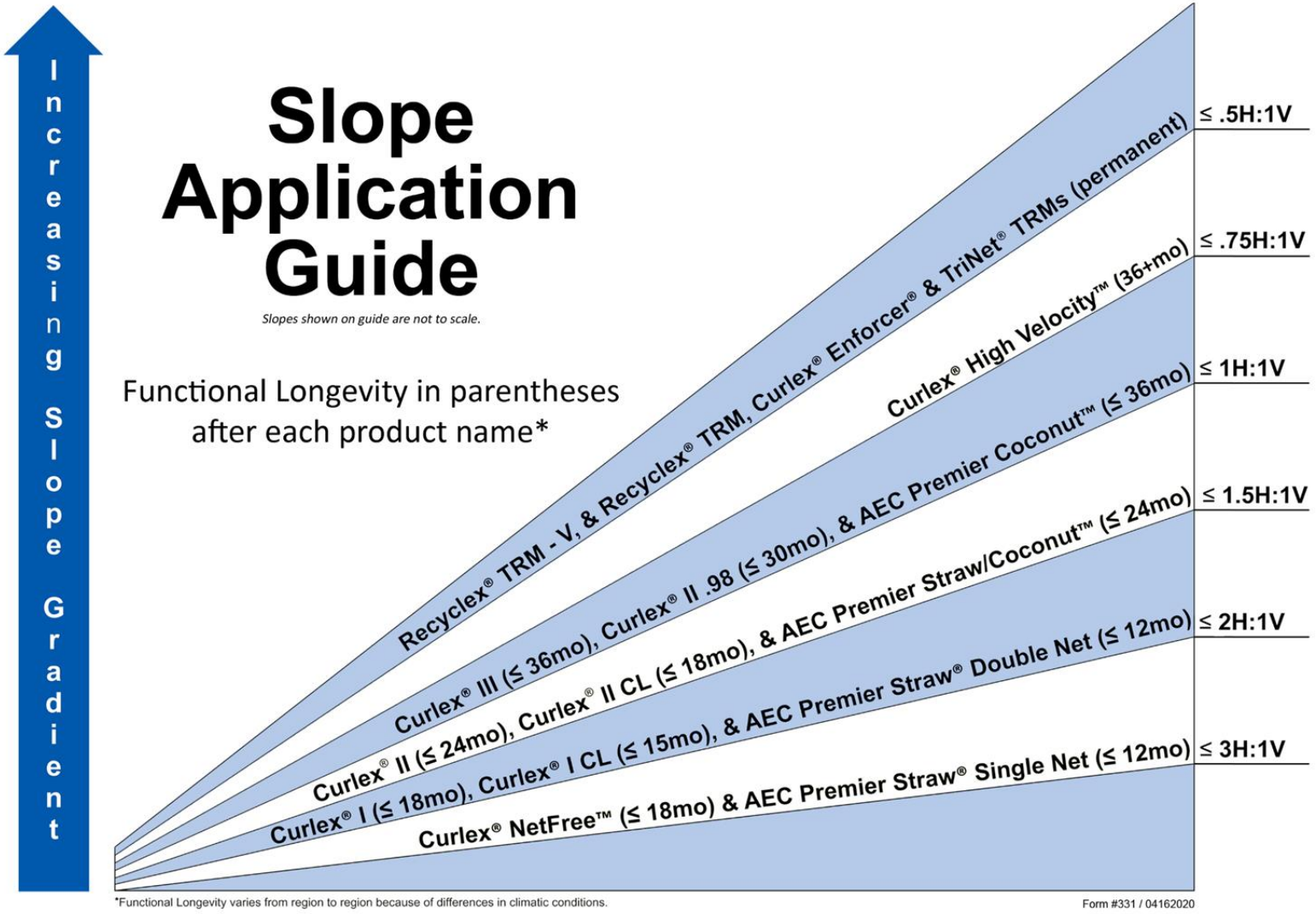
Water has a specific gravity **equal to 1**. Materials with a specific gravity less than 1 are less dense than water and will float on the liquid; substances with a specific gravity more than 1 are denser than water and will sink.

Helpful Guides



Channel Flow Examples

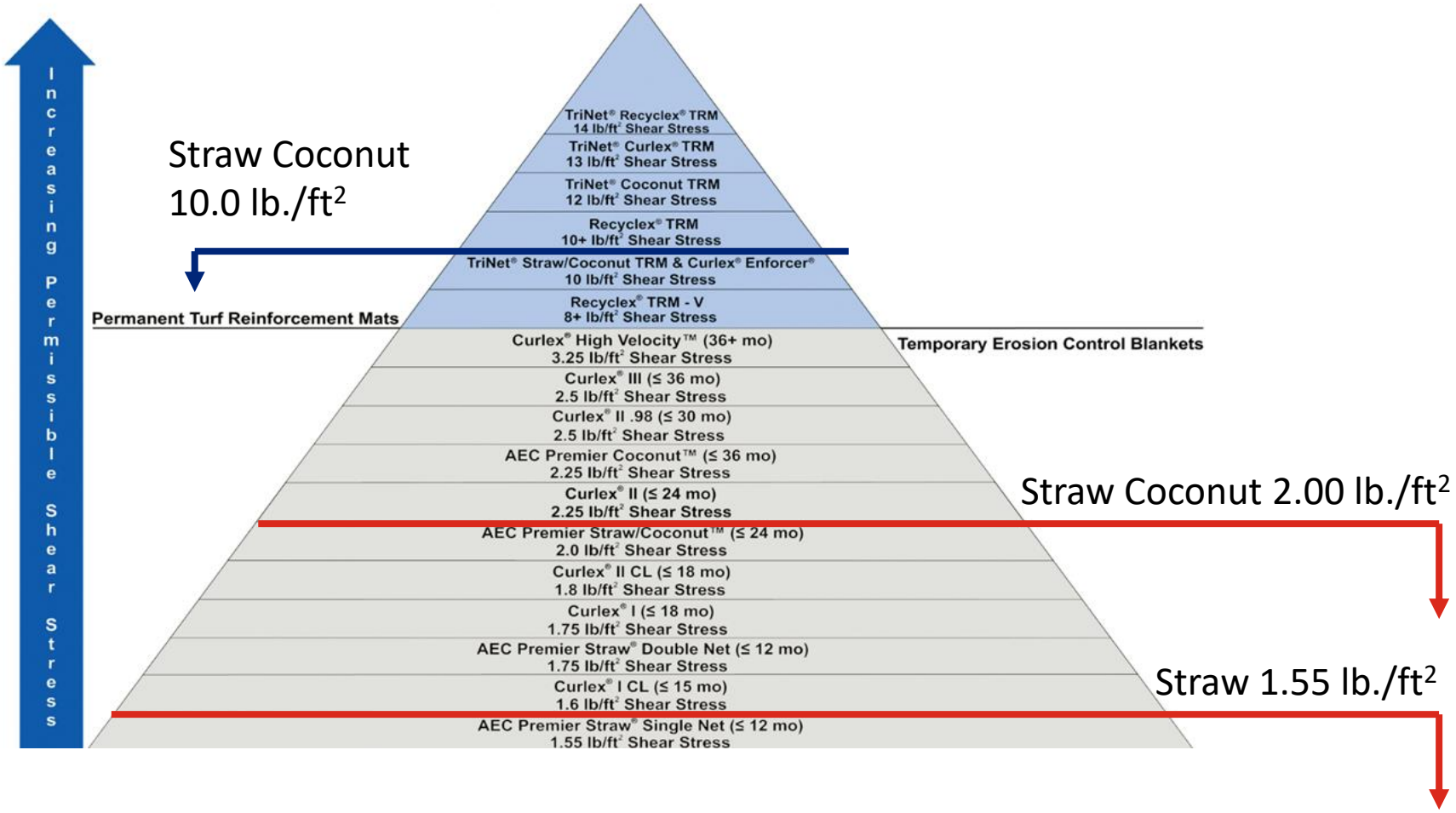
Helpful Guides



Straw Fiber

- **Byproduct of Agricultural Activities**
  - Least expensive of the fiber types
  - Can contains some residual seed
- **Hollow**
- **Specific Gravity less than 1 Floats/Buoyant**
- **Short term longevity**
  - 6 – 9 months

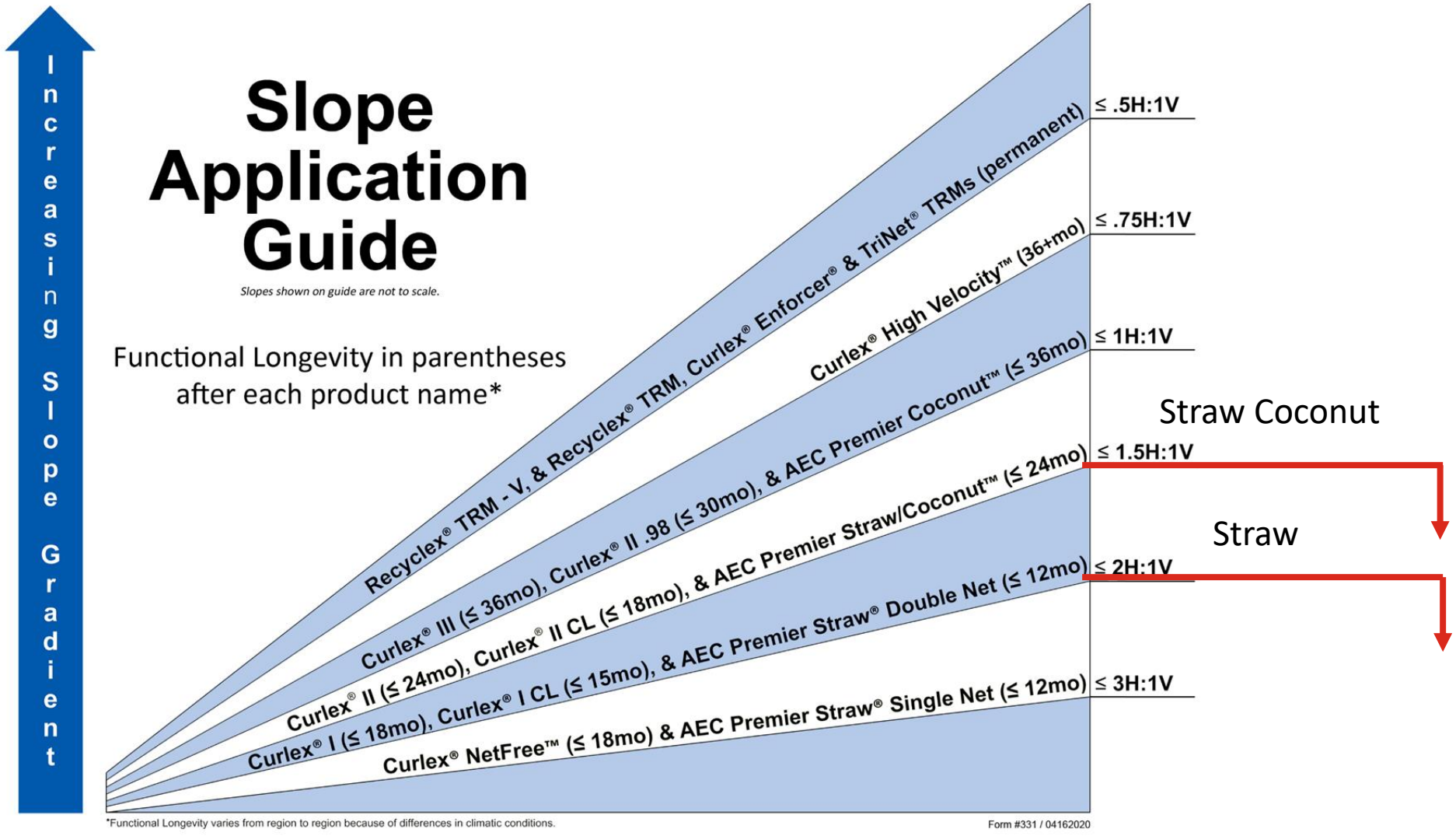
Straw/Straw Coconut Fiber Shear Stress



Channel Application Guide

Straw in Swales

Straw/Straw Coconut Fiber Slope

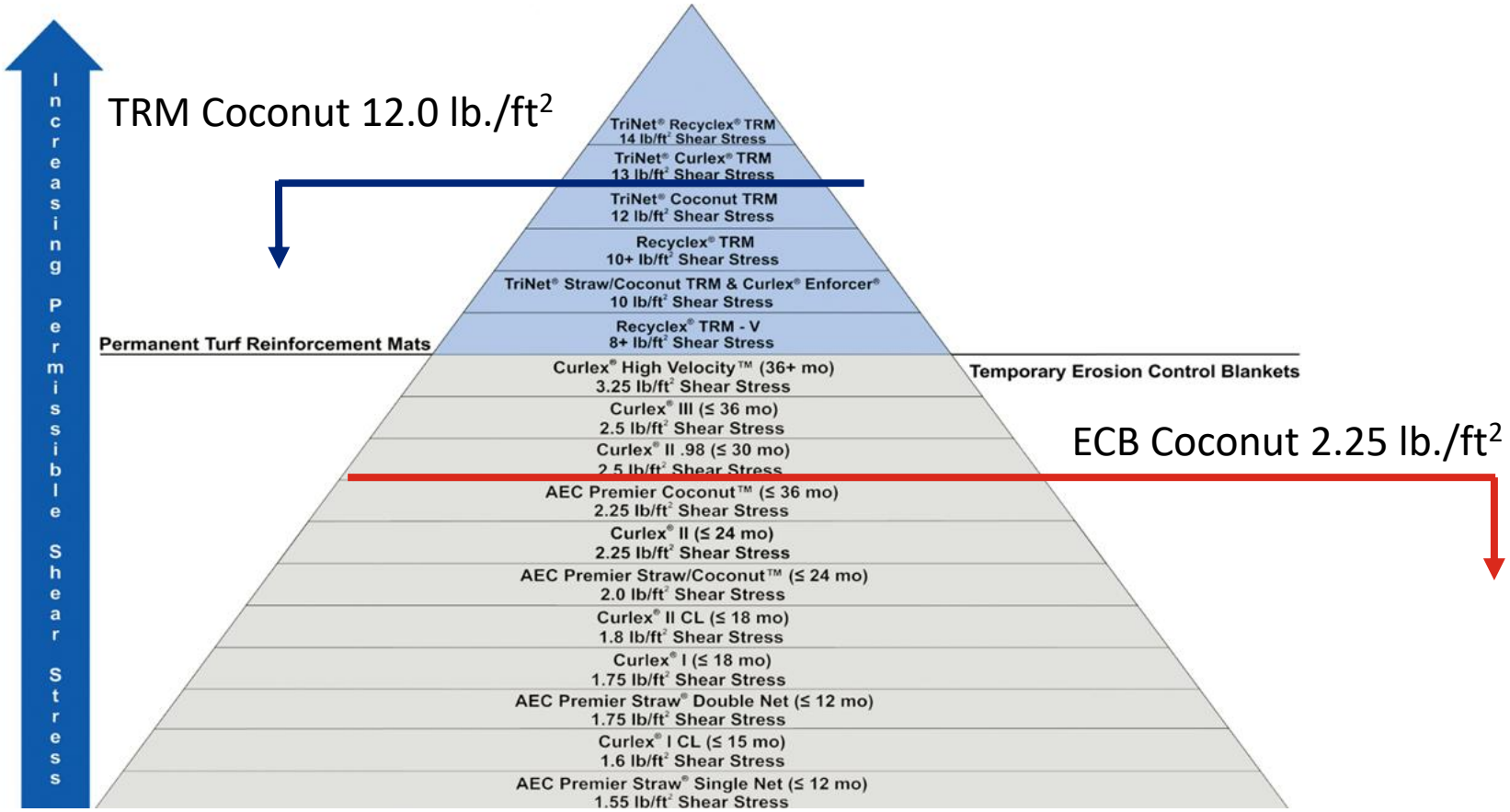


Straw Fiber on Slopes

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
- Specific gravity less than 1 and will float

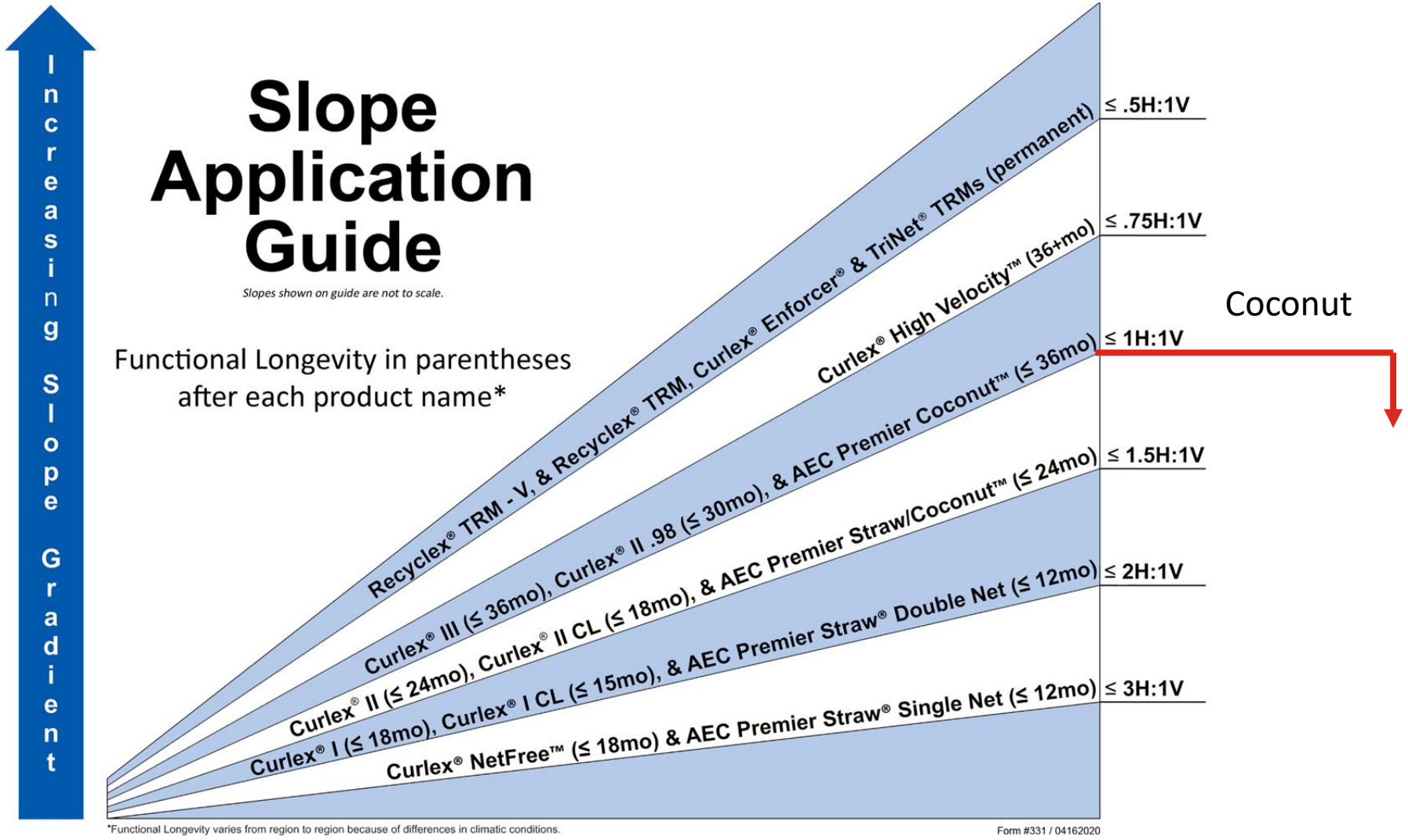
Coconut Fiber Shear Stress



Channel Application Guide

Coconut Swale

Coconut Fiber Slope

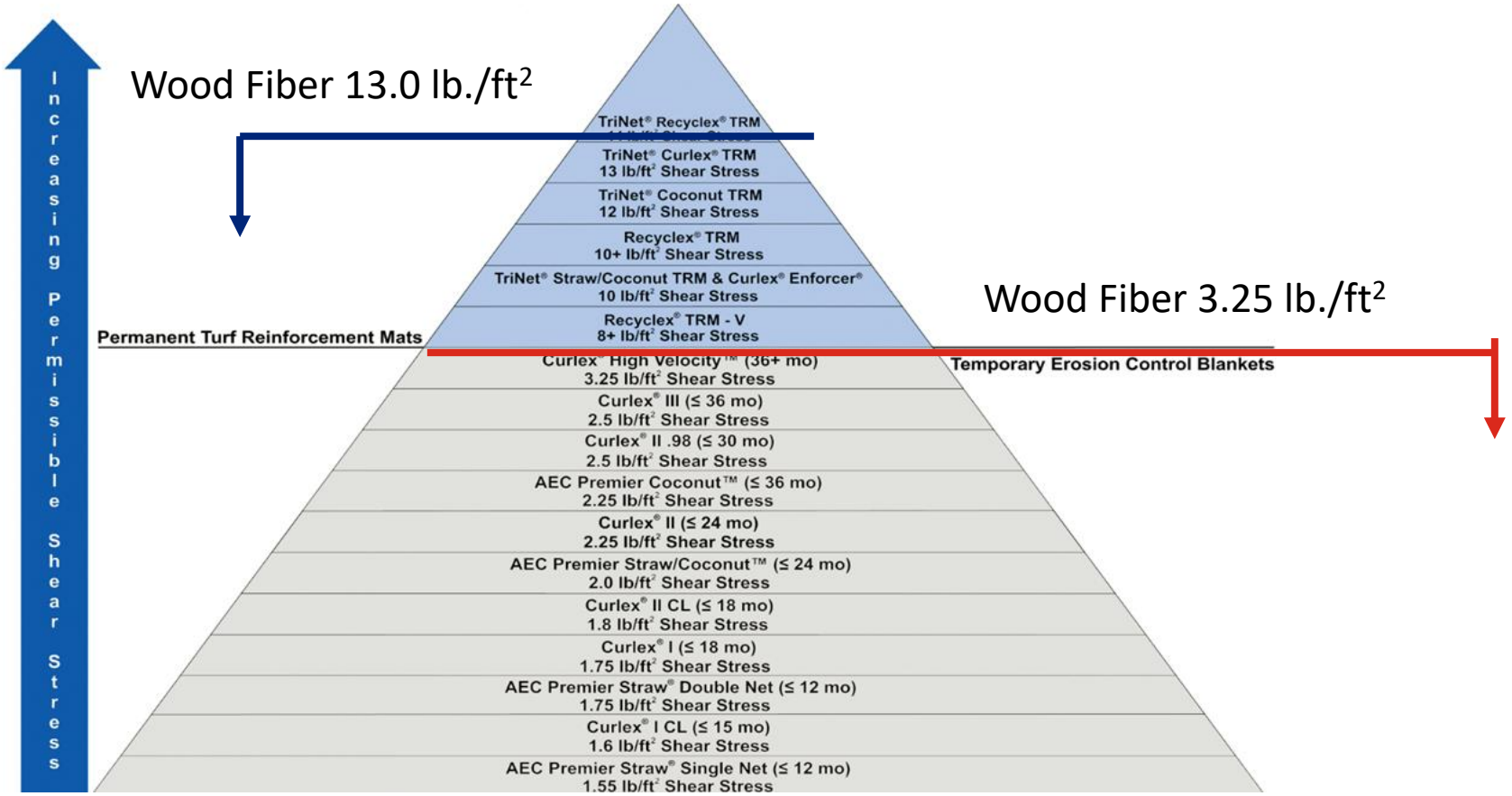


Aspen Wood Fiber

- Naturally seed free
- Native Fibers
- Engineered Curls and Barbs
- Hastens Revegetation
- Wood Fiber Blanket system does not float


Bare Soil

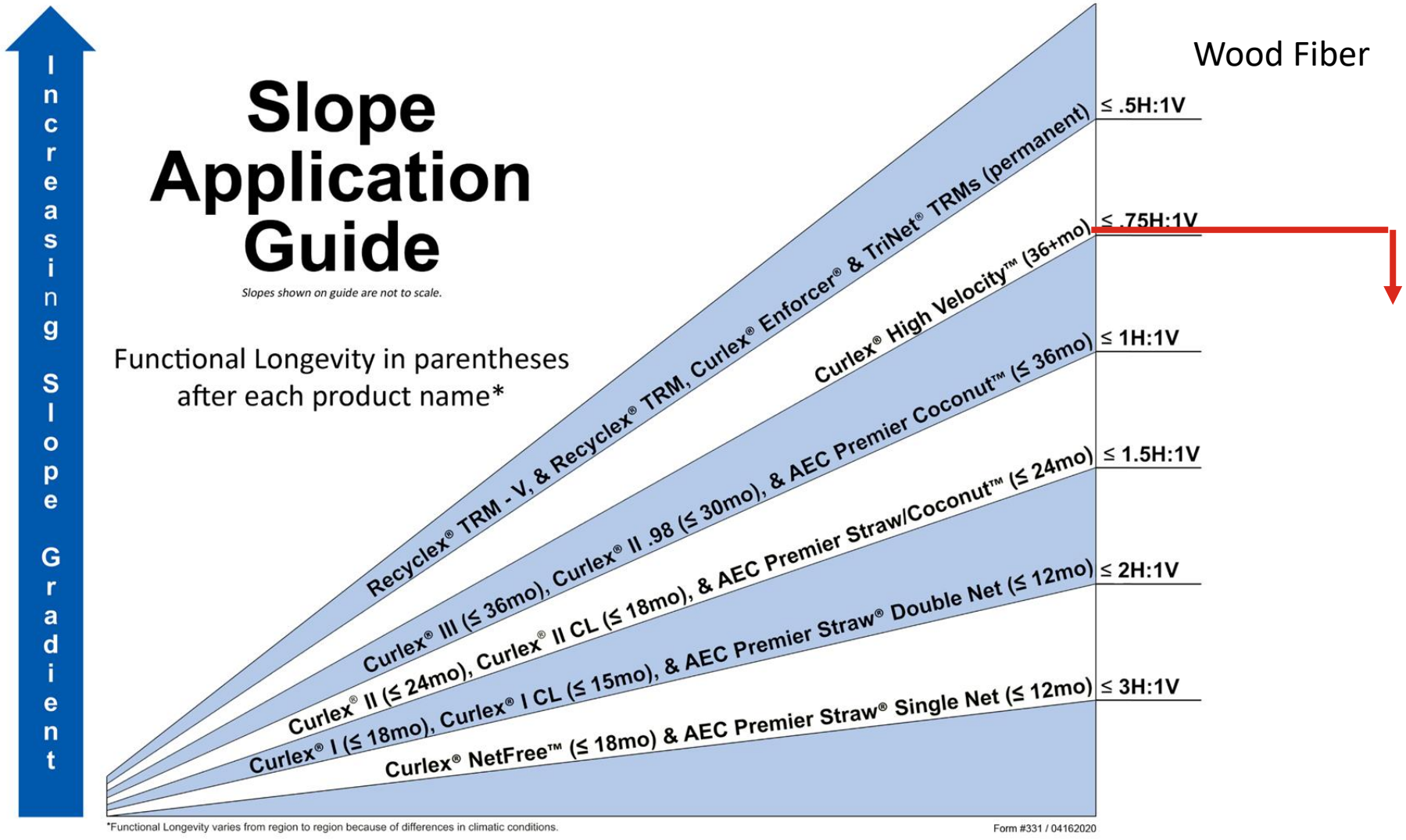
Wood Fiber Shear Stress



Channel Application Guide

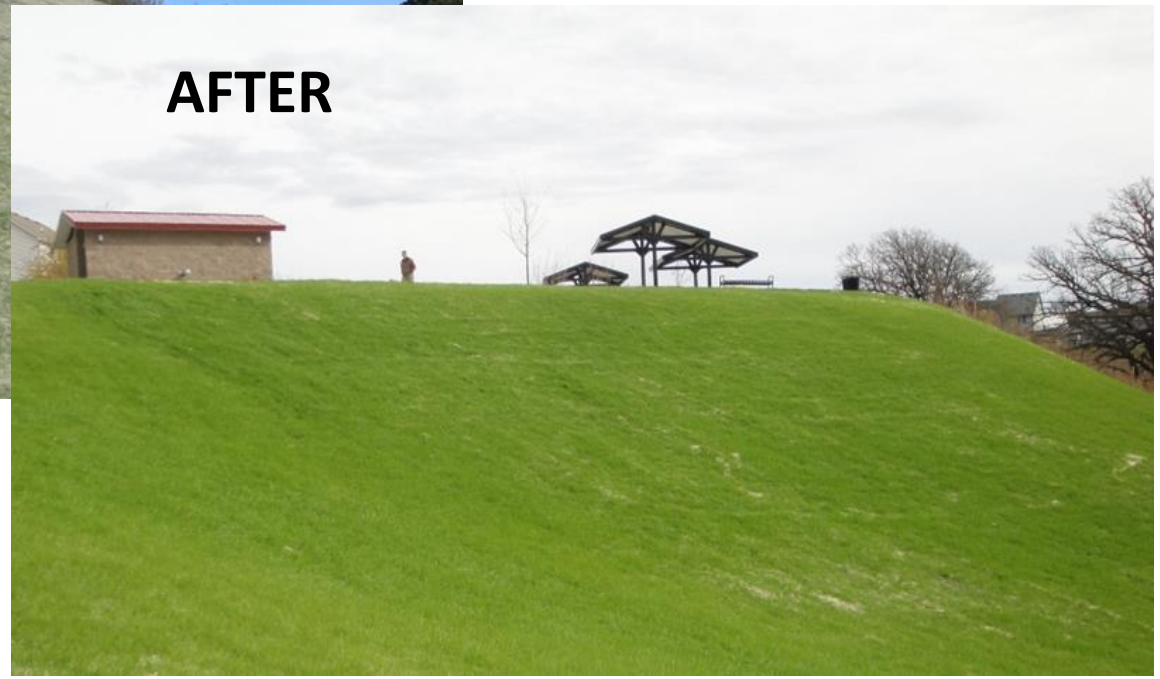
Wood Fiber Swale

Wood Fiber Slope



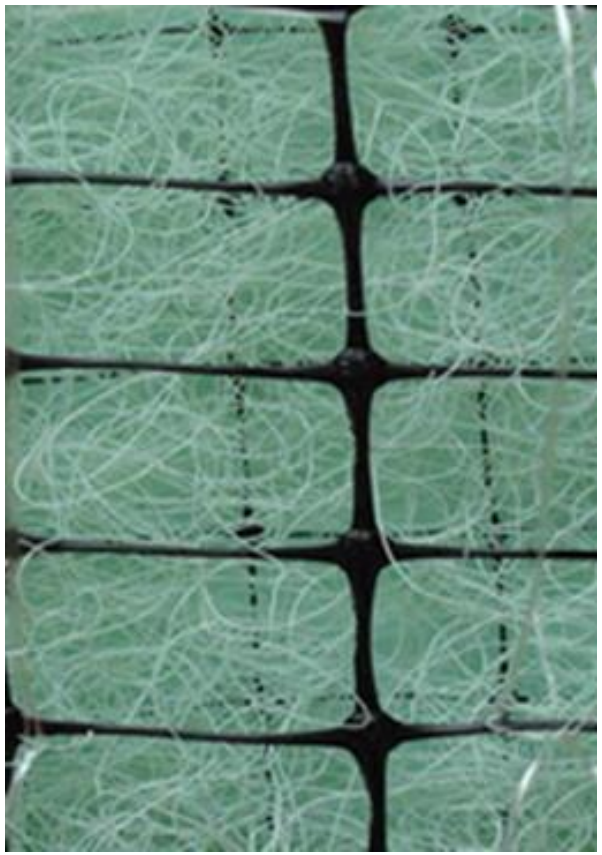
Wood Fiber

Wood Fiber Slope

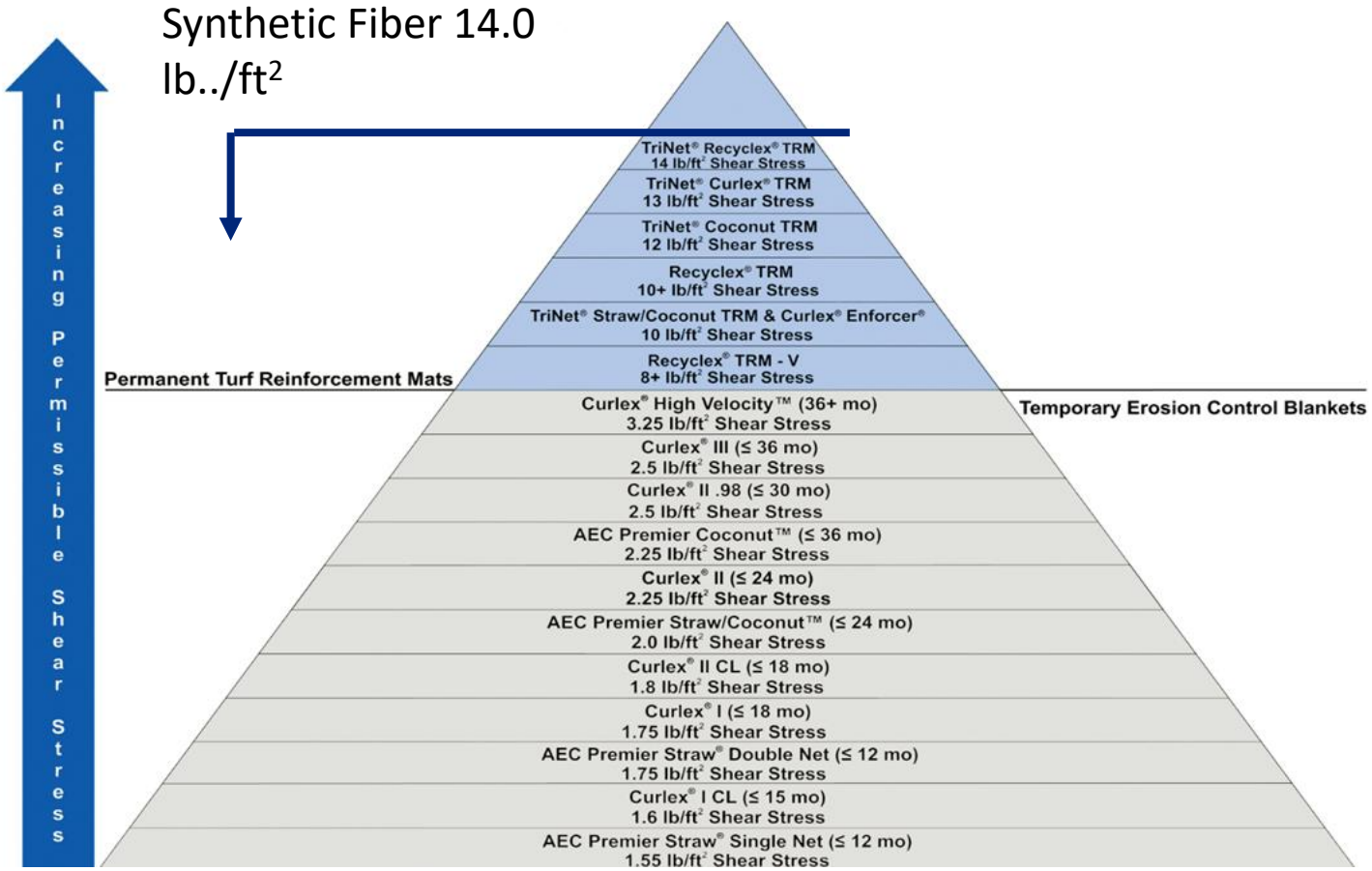


Synthetic Fiber

- Used when long-term vegetation support is needed
- High shear stress applications
- Two types of fiber sources
  - Polyester – recycled soda bottles
    - Specific gravity greater than 1
  - Polypropylene – virgin plastics
    - Specific gravity less than 1



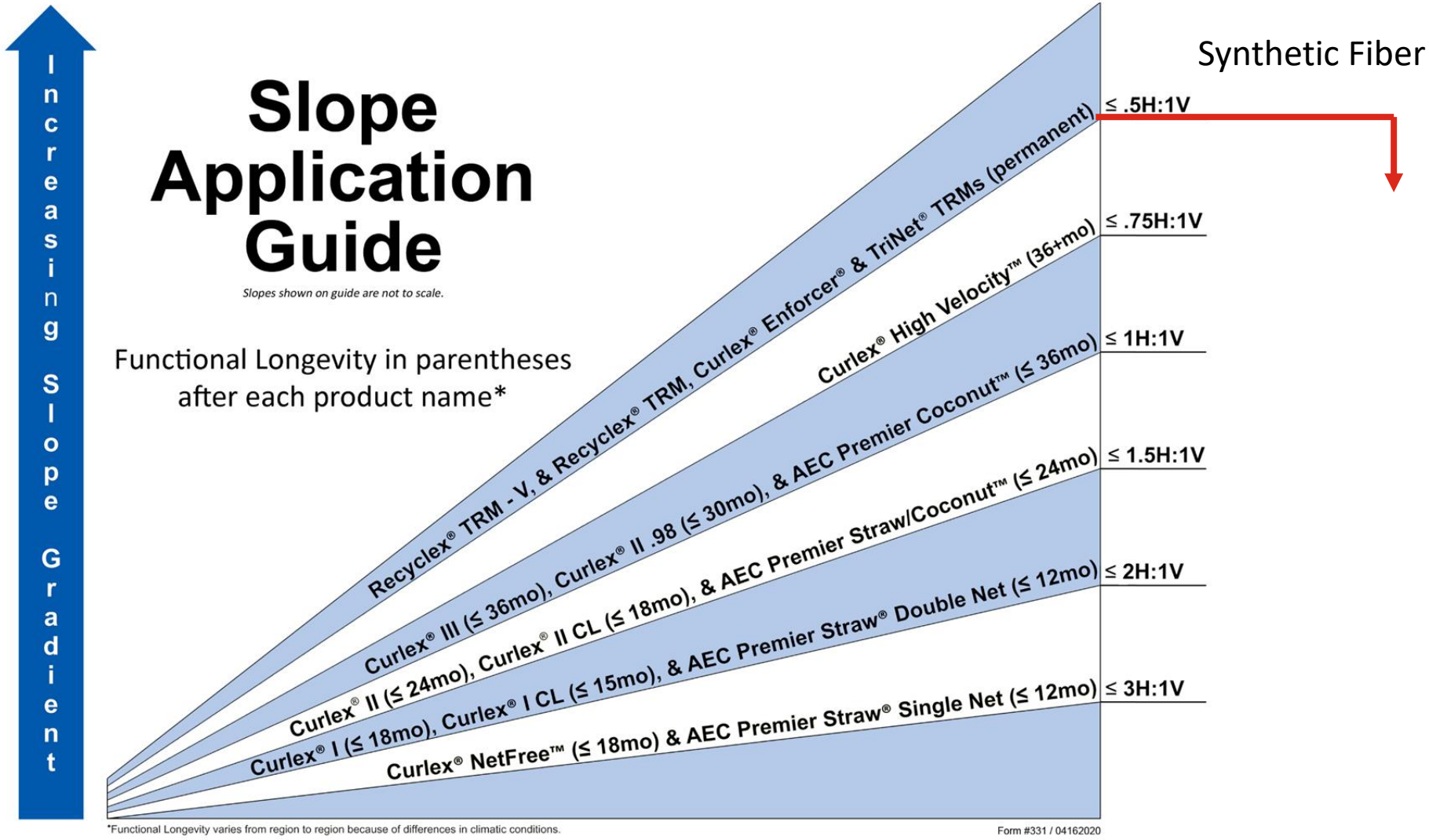
Synthetic Fiber Shear Stress



Channel Application Guide

Synthetic Fiber Swales

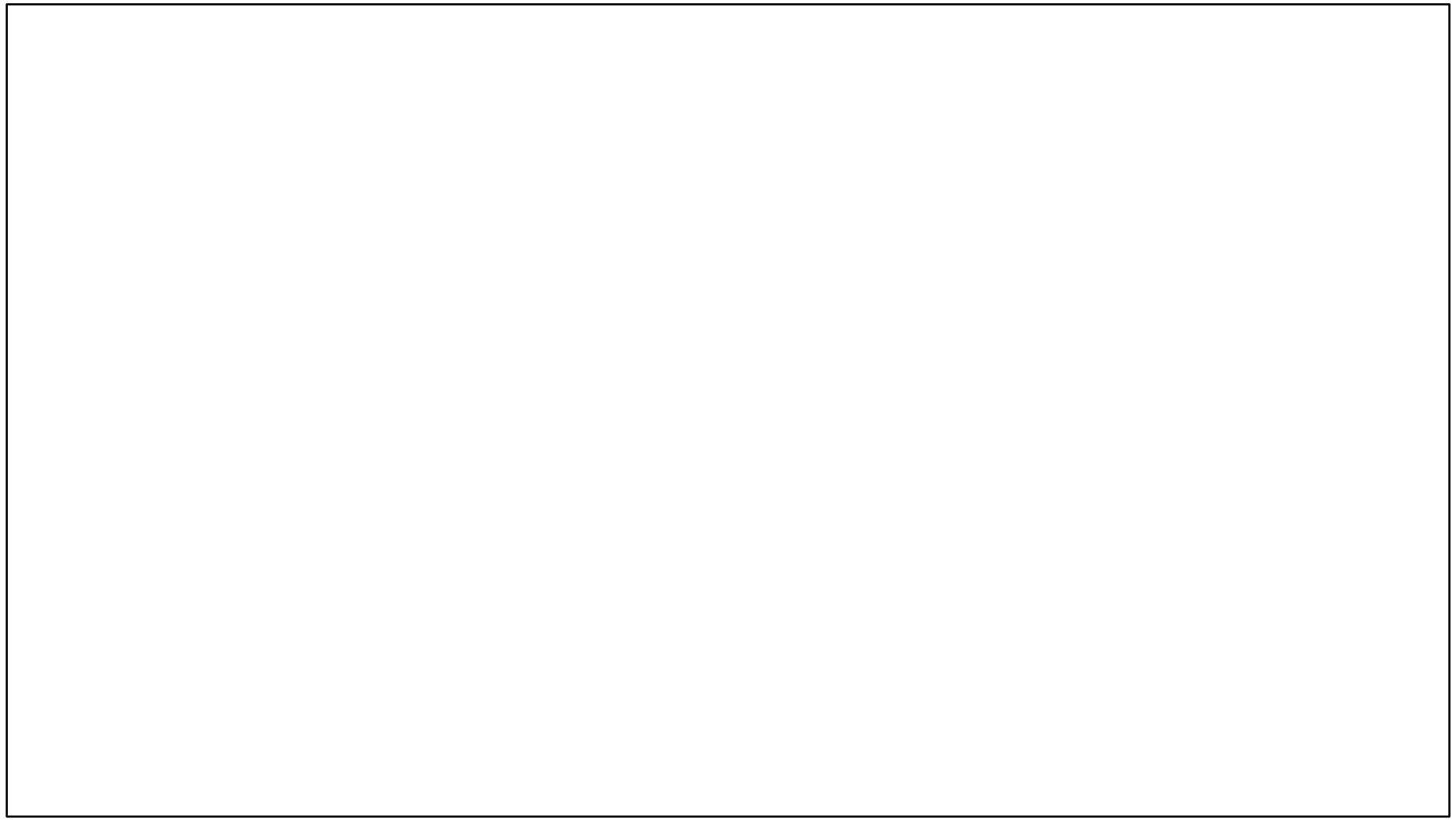
Synthetic Fiber Slope



Synthetic Fiber

What Happens When Fiber Floats

Fibers Type Impacts TRM Performance



Fiber Types are Important
Which Ones Float?

Specific Gravity < 1

Straw Fiber

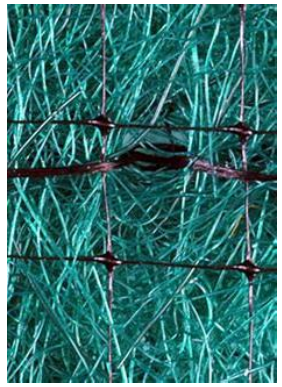
Will Float

Coconut Fiber

Will Float

Straw - Coconut Blend

Will Float



Polypropylene Synthetic Fiber

Will Float

Aspen Wood Fiber Blanket System

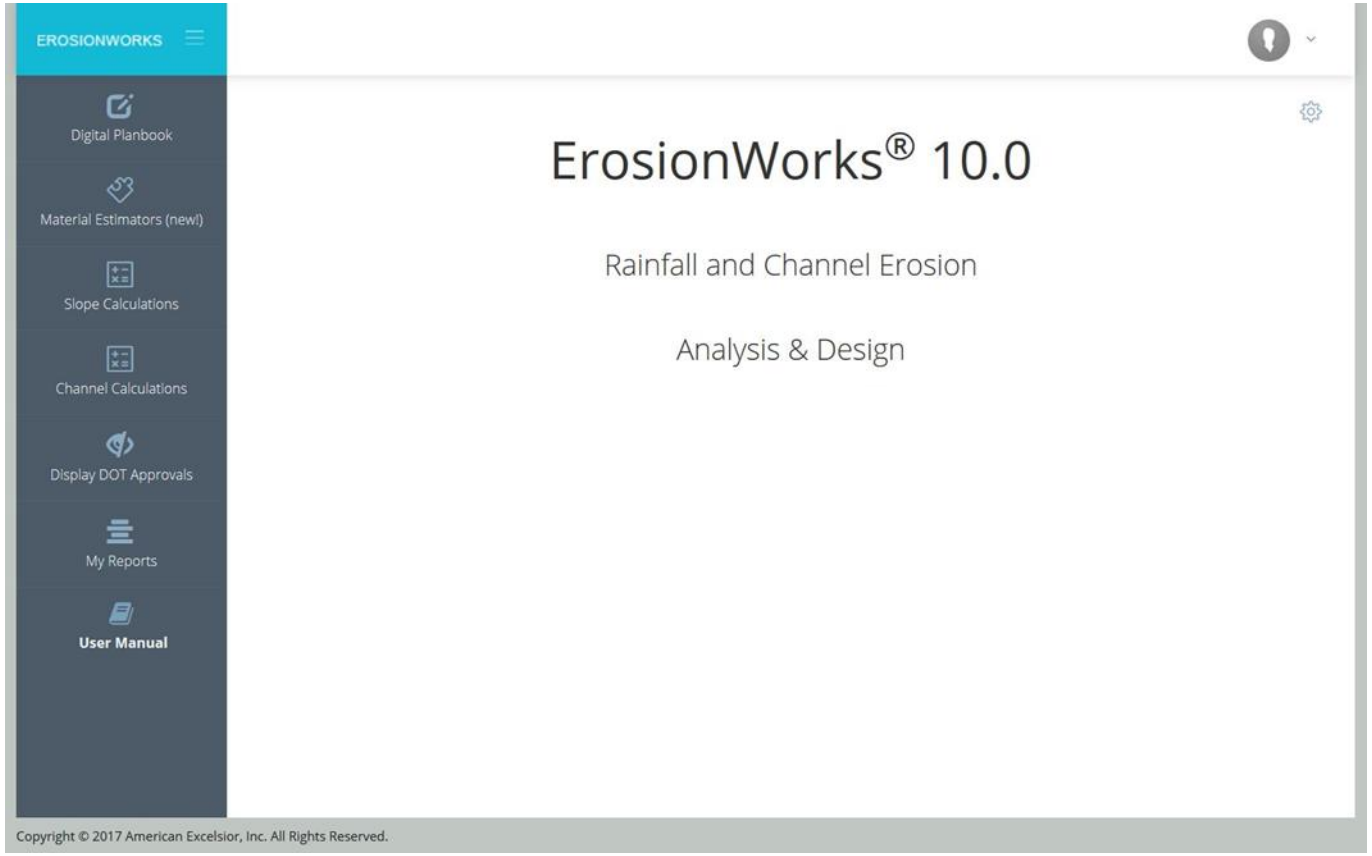
Doesn't Float

Specific Gravity > 1

Polyester Synthetic Fiber

Doesn't Float

Design Software



Parabolic Channel Analysis

Project Info

American Excelsior Company®
Earth Science Division

User Input

Channel Top Width (T) [ft]: 15

Channel Bed Slope (So) [ft/ft]: 0.05

Manning's n-Value: 0.038

Design Discharge (Q) [ft³/sec]: 45

Bend Coefficient (Kb): 1

Hydraulic Conditions

Depth [ft]: 0.794

Velocity [ft/sec]: 5.67

Froude: 1.37

Shear [lb/ft²]: 2.48

Project Information

Designers Name: Eric Marsal

Designers Title: cpesc

Designers Organization: AEC

Project Name: ALDOT

Project Number: 01

Project Location (City, State): Florence, Alabama

Project Segment: Unlimited

Applications(s): Channel Shear

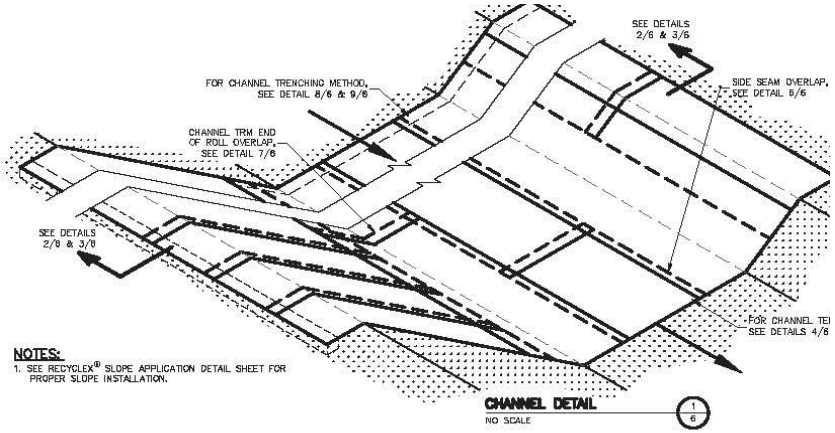
Project Description: Divided highway channel stabalization

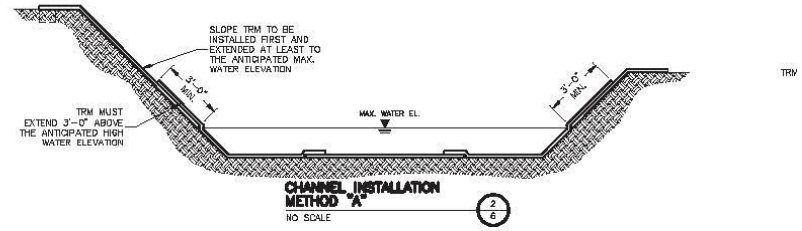
Project Bid Date: 2024-5-25

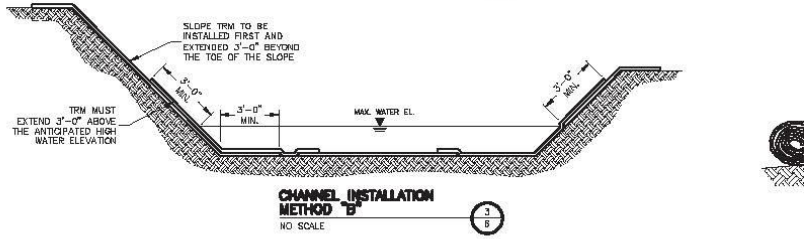
Project Start Date: 2024-9-10

Rolled Erosion Control Products	Velocity	Shear Stress	Functional Longevity (months)	DOT Approved (for channels)
AEC Premier Coconut	1.27	0.907	up to 36	Yes
AEC Premier Straw DN QM (White Net)	1.12	0.706	up to 3	Yes
AEC Premier Straw Double Net	1.12	0.706	up to 12	Yes
AEC Premier Straw Single Net	1.05	0.63	up to 12	N/A
AEC Premier Straw SN QM (White Net)	1.05	0.63	up to 3	N/A
AEC Premier Straw/Coconut	1.19	0.806	up to 24	Yes
Curlex Enforcer (Unvegetated)	1.52	1.31	Permanent	Yes
Curlex Enforcer (Vegetated)	2.67	4.03	Permanent	Yes
Curlex High Velocity (HV)	1.52	1.31	36+	N/A
Curlex I	1.12	0.706	up to 18	Yes
Curlex I CL	1.07	0.645	up to 15	Yes
Curlex I CL QuickMow (White Net)	1.07	0.645	up to 3	Yes
Curlex I QuickMow (White Net)	1.12	0.706	up to 3	Yes
Curlex II	1.27	0.907	up to 24	Yes
Curlex II .98	1.33	1.01	up to 30	N/A
Curlex II CL	1.13	0.726	up to 18	Yes
Curlex II CL QuickMow (White Net)	1.13	0.726	up to 3	Yes
Curlex II QuickMow (White Net)	1.27	0.907	up to 3	Yes
Curlex III	1.33	1.01	up to 36	Yes
Curlex NetFree	0.844	0.403	up to 18	Yes
Recyclex TRM (Unvegetated)	1.55	1.36	Permanent	Yes
Recyclex TRM (Vegetated)	2.8	4.44	Permanent	Yes
Recyclex TRM-V (Unvegetated)	1.54	1.34	Permanent	Yes
Recyclex TRM-V (Vegetated)	2.39	3.23	Permanent	Yes
TriNet Coconut (Unvegetated)	1.51	1.29	Permanent	Yes
TriNet Coconut (Vegetated)	2.92	4.84	Permanent	Yes
TriNet Curlex (Unvegetated)	1.51	1.29	Permanent	Yes
TriNet Curlex (Vegetated)	3.04	5.24	Permanent	Yes
TriNet Recyclex (Unvegetated)	1.51	1.29	Premanent	Yes
TriNet Recyclex (Vegetated)	3.16	5.65	Permanent	Yes
TriNet Straw/Coconut (Unvegetated)	1.51	1.29	Permanent	Yes
TriNet Straw/Coconut (Vegetated)	2.67	4.03	Permanent	Yes

ErosionWorks







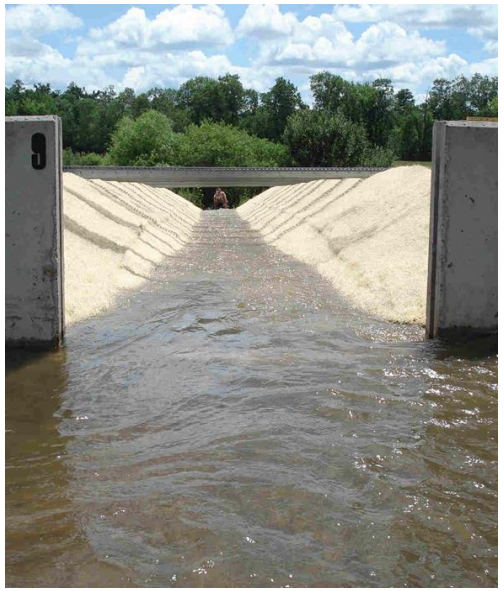
Recyclex® TRM Staple Pattern Guide

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 applications
- Several design tools available to assist in a successful installation



Thank You

Contact Information
Eric Marsal
Territory Manager
emarsal@americanexcelsior.com
Mobile: 770-231-5914

American Excelsior Company®

Hydromulch Failures

American Excelsior Company®