

# KEY NOTE



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SITE CIVIL IMPROVEMENT ↔ EROSION CONTROL ↔ SURFACE WATER QUALITY

Geopro® Learning Tool

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## Turf Reinforcement Mat Details

Healthy grass, reinforced with an appropriate Turf Reinforcement Mat [TRM], offers permanent protection against erosive forces in most ditch and channel storm-flow zones - and it does so at a fraction of the cost of riprap [see KeyNotes 'Soft Armor – Concentrated Storm Flows']. This combination of natural and synthetic materials is not only synergetic, but also symbiotic with regard to performance. Understanding these relationships is critical to properly selecting the correct TRM and grass mixes as well as preparing a specification that results in a properly performing system.

### Performance Synergy

TRMs provide at least two distinctly different functions within a mature grass stand, resulting in enhanced grass performance:

1. TRMs 'knit' discrete grass plants together into a massive structure which is capable of withstanding significantly higher erosive stresses than the individual plants. When individual or multiple plants dislodge from the underlying soil as a result of excessive hydraulic drag or 'pull' on the plant leaves and stems, a relatively rapid (acute) failure of the lining system occurs. TRMs reduce the potential for this failure mechanism.
2. The TRM 'structure', combined with the plant roots and stems, resist soil migration, movement and extraction caused by negative hydraulic pressure associated with high velocity flow. With continuing soil loss due to moving water, grasses lose their 'foundation' system and nutrient gathering microenvironment. As a result, plants become weaker and less stable – the chronic failure mechanism in vegetative lining systems.

Prior to grass germination, the TRM must provide all soil, seed and amendment protection from erosive stresses. During the plant establishment

period [a one to three year process, depending on species used], TRMs offer significant stress reduction and increasing reinforcement of grass plants as described previously. Therefore, as plants mature, the TRM purpose transforms from direct protection to grass structure reinforcement – with the resulting performance of the system, throughout its useful life, being substantially improved compared to either the TRM or grass alone. **Hence – Performance Synergy**



North American Green SC250 TRM

### Performance Symbiosis

All TRMs are made, in part or in whole, with synthetic components. Prolonged sunlight will cause all of these materials to decay – in strength and performance. Initially, it is the shading effect of the grass plants that prevent excessive UV rays from penetrating and destroying the synthetic molecular bonds. With time, mature grass develops thatch, effectively shielding the synthetic components from further UV degradation. Therefore, healthy grass stands assist TRMs in remaining viable members of the reinforced grass lining system.

Simply stated, if healthy grass does not develop, the entire reinforced grass system will fail. Grass seed germinates and grass plants develop/thrive when proper conditions exist.



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The mulching components [matrices] within TRMs can significantly modify soil moisture, wind desiccation effects and soil temperature fluctuations – critical attributes during seed germination and early plant development. Because construction site seeding is often completed as part of a sequencing schedule, with only minimal consideration for weather cycles or plant water requirements, the mulching attributes of TRMs are particularly important to grass development.

Therefore, with TRM assistance, healthy grass stands develop and, in turn, healthy grass protects the reinforcement fibers of TRMs. *Hence – Performance Symbiosis*



All TRMs provide both temporary erosion control prior to plant maturity and permanent reinforcement. The quality of erosion protection varies widely among products. Similarly, protection quality varies significantly with regard to which phase of development the lining system is in [pre-germination, plant development or mature]. For example, many TRMs are excellent as reinforcement frameworks within mature grass stands but offer little temporary protection prior to grass maturity. Often, such TRMs require augmentation with overlying erosion control blankets for proper seed and soil protection during early liner development phases. Proper product selection must include matching product capabilities with imposed erosive stresses during all three liner phases.

This matching process can be difficult for designers, project owners or contractors – as performance and test protocol standards are not universally adopted within the erosion control industry. Part of the reason for this lack of standardization results from an inability to quantify

performance based on material characteristics, i.e., the simple process of measuring and categorizing physical, mechanical and hydraulic material properties does not correlate to product performance. TRM performance, in terms of temporary erosion protection as well as permanent reinforcement, must be determined solely by empirical means – the product must be tested under controlled conditions, either in the field or in a laboratory, that simulate real-world applications. Manufacturers of quality products have done just that and their test protocols and resulting data are available for all to use. If the manufacturer cannot produce published performance standards [for all three system stages] from which product selection decisions can be made, do not include these products within a qualified products listing specification.

## North American Green – The Advantages

North American Green produces four TRMs – three within their Vmax<sup>3</sup>® product family and the venerable P300®. All have been fully tested for performance characteristics – ability to mulch (ability to protect the seed and soil prior to germination), ability to protect soil and immature plants, and ability of the TRM/mature plant system to withstand erosive forces. This critical design and product selection information is available at: [nagreen.com](http://nagreen.com)

Each North American Green TRM offers distinct advantages within the range of acceptable erosive stresses for which they are intended. The organic matrices of SC250® and C350® provide unparalleled mulching capability while the reinforcing nets of all Vmax<sup>3</sup> products offer significant strength to control erosion stresses from seed placement until the end of the lining system's useful life. If additional information is desired or needed with regard to how to use, design with or deploy the North American Green TRMs, contact your Price & Company Regional Representative.

SC250, C350, Vmax<sup>3</sup> & P300 are trademarks of North American Green



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