Erosion Control Blankets

The installation of protective mulch blankets or soil stabilization mats (turf reinforcement mats) to the prepared soil surface of a steep slope, channel or shoreline.

Erosion control blankets are used to temporarily stabilize and protect disturbed soil from raindrop impact and surface erosion, to increase infiltration, decrease compaction and soil crusting, and to conserve soil moisture. Mulching with erosion control blankets will increase the germination rates for grasses and legumes and promote vegetation establishment. Erosion control blankets also protect seeds from predators, reduce desiccation and evaporation by insulating the soil and seed environment. Erosion control blankets and mats can be used with biotechnical techniques such as grass plug planting, willow staking, fascines etc. **Refer to Manufacturer Directory - Erosion Control Blankets and Mats**

Conditions Where Practice Applies

Erosion control blankets are used on slopes and disturbed soils where mulch must be anchored and other methods such as crimping or tackifying are neither feasible nor adequate. Steep slopes, generally steeper than 3:1, and slopes where erosion hazard is high. Their use is especially appropriate for critical slopes adjacent to sensitive areas, such as streams and wetlands, and disturbed soil areas, where planting is likely to be slow in providing adequate protective cover.

Establishing vegetation in channels or on slopes may require additional measures beyond seeding and straw mulching.

The following chart shows recorded shear stress and velocities withstood by TRM's and ECB's.

Bank Material/Protection	**Shear**		**Velocity**			**Reference**
	lb/ft^2	**N/m^2**	**ft/s**	**m/s**		
Sandy Loam	0.0167		1.75	0.53	Design	Temple, 1980
Silt Loam	0.0218		2	0.61	Design	Temple, 1980
Alluvial silts	0.0218		2	0.61	Design	Temple, 1980
Ordinary firm loam	0.0341		2.5	0.76	Design	Temple, 1980
Very light loose sand, no vegetation or protection			1-1.5	.3-.46	Limit	Fortier & Scobey, 1926
Average sandy soil			2-2.5	.61-.76	Limit	Fortier & Scobey, 1926
Stiff clay, ordinary gravel soil			4-5	1.2-1.5	Limit	Fortier & Scobey, 1926
Flume trials, fabric reinforced vegetation – failed after 50 hours	5	244			Limit	Theisen, 1992
Flume trials, fabric reinforced vegetation – failed after 8 hours	8	391			Limit	Theisen, 1992
Turf reinforcement mat, permanent	8	392	20	6.1	Design	Rolanka product literature
Straw reinforcement mat, temporary	0.45	22.05	8	2.4	Design	Rolanka product literature
Jute mat	0.45	22.05			Design	HEC-15
Straw with net	1.45	71.05			Design	HEC-15
Curled wood net	1.55	75.95			Design	HEC-15

Synthetic mat	2	98			design	HEC-15

Materials

Erosion control blankets are generally a machine produced mat of organic, biodegradable mulch such as straw, curled wood fiber (excelsior), coconut fiber or a combination thereof, evenly distributed on or between photodegradable polypropylene or biodegradable natural fiber netting. Synthetic erosion control blankets are a machine produced mat of ultraviolet stabilized synthetic fibers and filaments. The netting and mulch material are stitched to ensure integrity and the blankets are provided in rolls for ease of handling and installation. **Refer to Manufacturer Directory - Erosion Control Blankets and Mats**

Advantages

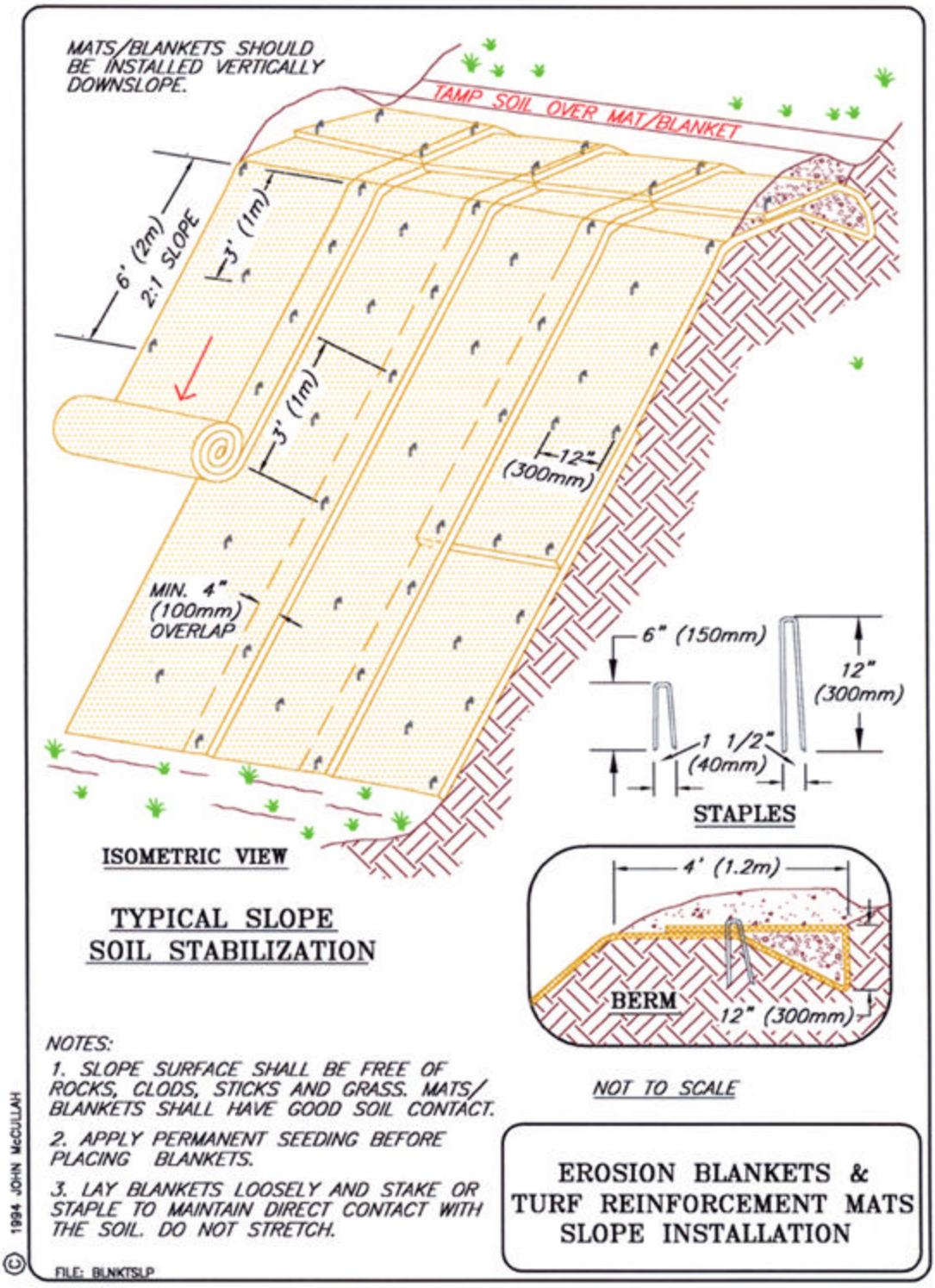
Erosion control blankets can be provide immediate soil surface stabilization. Even if herbaceous vegetation does not grow, the blankets will provide excellent protection for at least one season. Woody cuttings such as stakes, wattles and fascines may be used with erosion control blankets and geotextiles.

Disadvantages

The slopes must be uniform and relatively smooth before installation to ensure complete contact with the soil. The associated labor cost may be higher.

Implementation

Anchor blankets using live willow stakes, u-shaped wire staples or triangular wooden stakes. Willow wattles may be used to help anchor the blankets while the blanket will prevent erosion between the wattle rows.



Typical drawing: Erosion Control Blankets for soil slope stabilization

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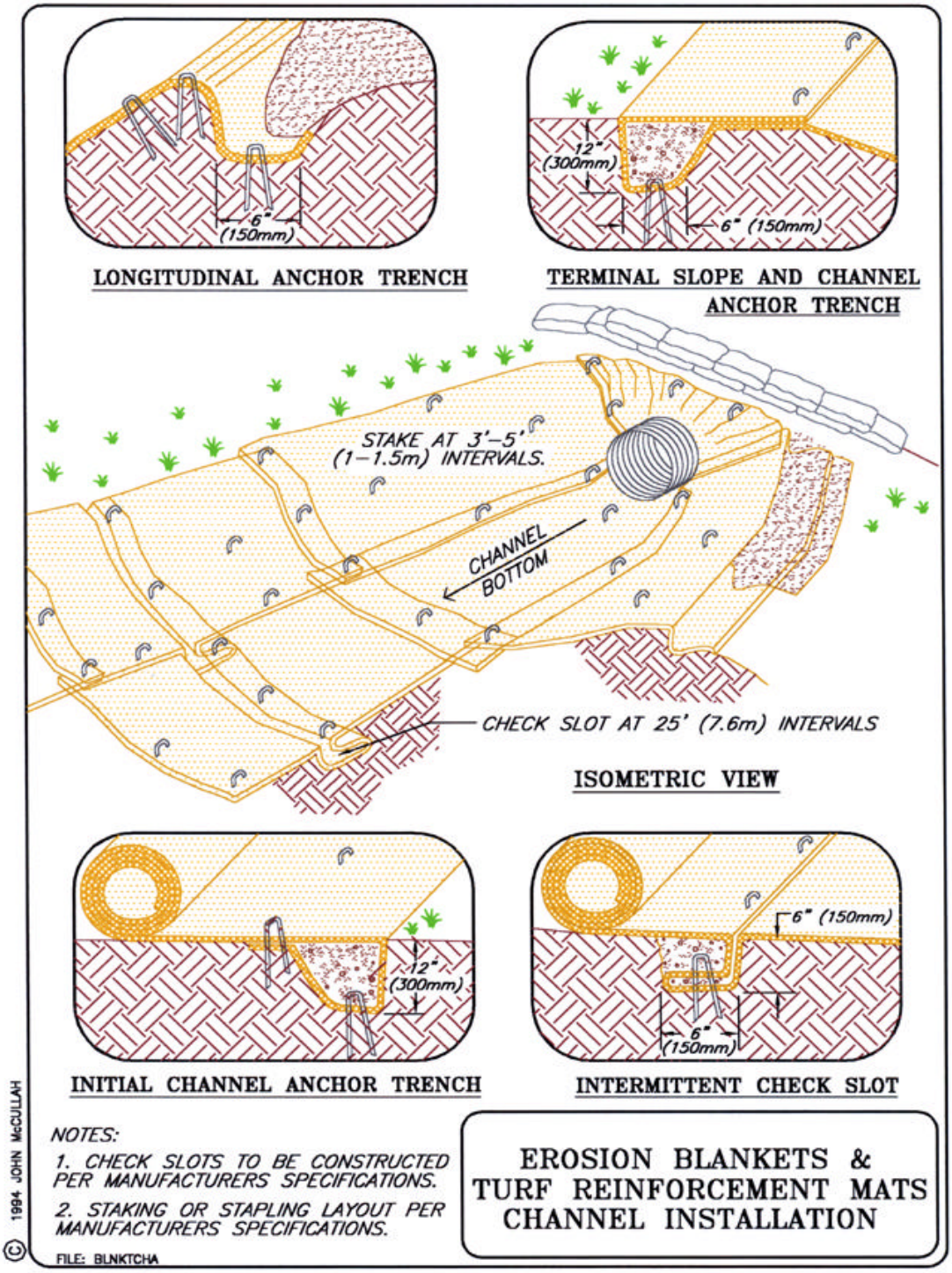

Typical drawing: Erosion Control Blankets for Channel Installation

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Sample Manufacturer's Installation Specifications: NA Green Slope Installation, NA Green Drainage Channel Installation, NA Green Shoreline Installation, Belton Geojute

Installation, Greenfix Blanket Installation, SI Landlock Installation, RoLanka Blanket Slope Installation, RoLanka Blanket Channel Installation

Cost

Relatively high compared to other BMPs. Biodegradable materials: \$0.50 - \$0.57/yd^2. Permanent materials: \$3.00 - \$4.50/yd^2. Staples: \$0.04 - \$0.05/staple (CASQA, 2003). Approximate costs for installed materials are shown below:

Rolled Erosion Control Products		**Installed Cost per Acre**
Biodegradable	Jute Mesh	\$6,500
	Curled Wood Fiber	\$10,500
	Straw	\$8,900
	Wood Fiber	\$8,900
	Coconut Fiber	\$13,000
	Coconut Fiber Mesh	\$31,200
	Straw Coconut Fiber	\$10,900
Non-Biodegradable	Plastic Netting	\$2,000
	Plastic Mesh	\$3,200
	Synthetic Fiber with Netting	\$34,800
	Bonded Synthetic Fibers	\$50,000
	Combination with Biodegradable	\$32,000

* Taken from Caltrans (1999).

References

California Stormwater Quality Association (CASQA). 2003. California Stormwater BMP Handbook - Construction. www.cabmphandbooks.com

Fortier & Scobey 1926. Permissible Canal Velocities, *ASCE Transactions*, Vol 89, Paper No. 1588, pp 940-984

State of California Department of Transportation (Caltrans) (1999). Guidance Document: Soil Stabilization for Temporary Slopes, November 1999.

Temple, D.M. (1980). Tractive force design of vegetated channels. *Transactions of the ASAE, 23*:884-890.

Theisen, 1992. Evaluation of Biotechnical Composites under High Velocity and Shear Conditions. *Proceedings of the XXIII Annual IECA Conf.,* Orlando, FL, pp 285-305