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Lake Limerick Erosion Protection Ideas

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- Current Conditions
- Key Considerations
- Possible Alternatives
 - Vegetated GeoGrid
 - Articulating Concrete Blocks
 - Slopetime 2 Erosion Control System



Current Conditions (March 2018)

- **Bank has eroded and created steeper slope, reducing island surface area**
- **Erosion due to wave action from boats and wind, heavy foot traffic during summer months, and fluctuating water levels**
- **Access and slope stability both important due to high traffic in swimming breach area**
- **Sand bags previously deployed as interim measure are still present, but vandals and wave induced deterioration reduce effectiveness**

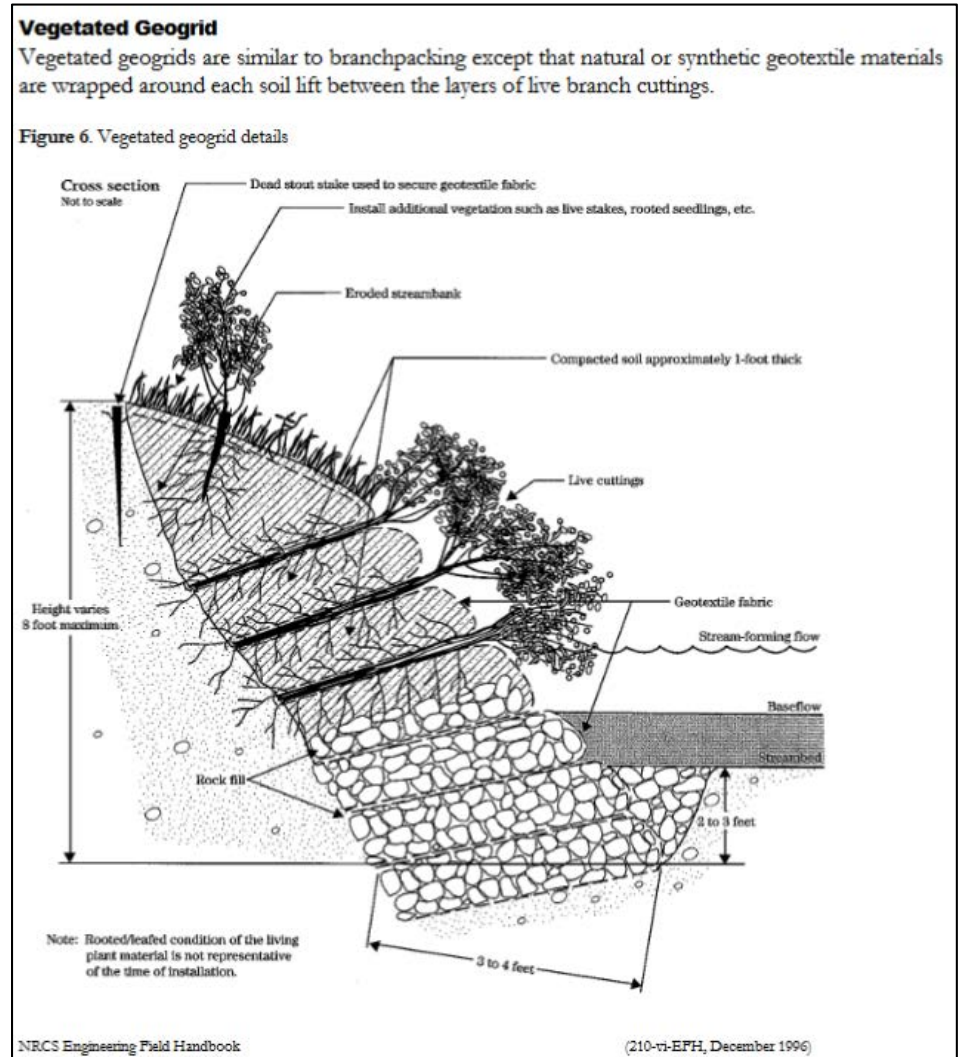


Key Considerations

- **Efficacy/Aesthetics**
 - How does the installation function under varying usage?
 - Appealing to association members?
- **Ability to Permit**
 - Identify stakeholders (Tribe, association members, etc), possible permitting agencies (Mason County, Department of Ecology, etc)
 - Natural methods are preferred for permitting
- **Constructability**
 - How/When best to install?
 - Site access for equipment?
- **Cost**
 - Balance between initial capital cost vs maintenance costs

Vegetated GeoGrid

- Utilizes “wraps” of geotextile fabric around soil or compacted gravel-borrow, vegetation between wraps
- Outer layer of wraps can be overlain with fabric and covered with turf or slope-reinforcing structure
- Estimated Material Costs: ~\$20-\$50/linear foot



Vegetated GeoGrid

PROs

- **Soil bioengineering approach allows vegetation to become established while also providing shoreline stability**
- **Roots of vegetation placed between the layers of the grid fabric provide additional slope stability**
- **Used in other projects around the area where water level moves up and down the bank (i.e. Riverview Road in Snohomish County)**

CONs

- **Toe requires armoring using rock and/or logs (though could use combination of larger rock under pea gravel)**
- **May require a season for plantings to root and take hold for truly effective slope stability**
- **Costs can vary depending on the type/amounts of materials used**

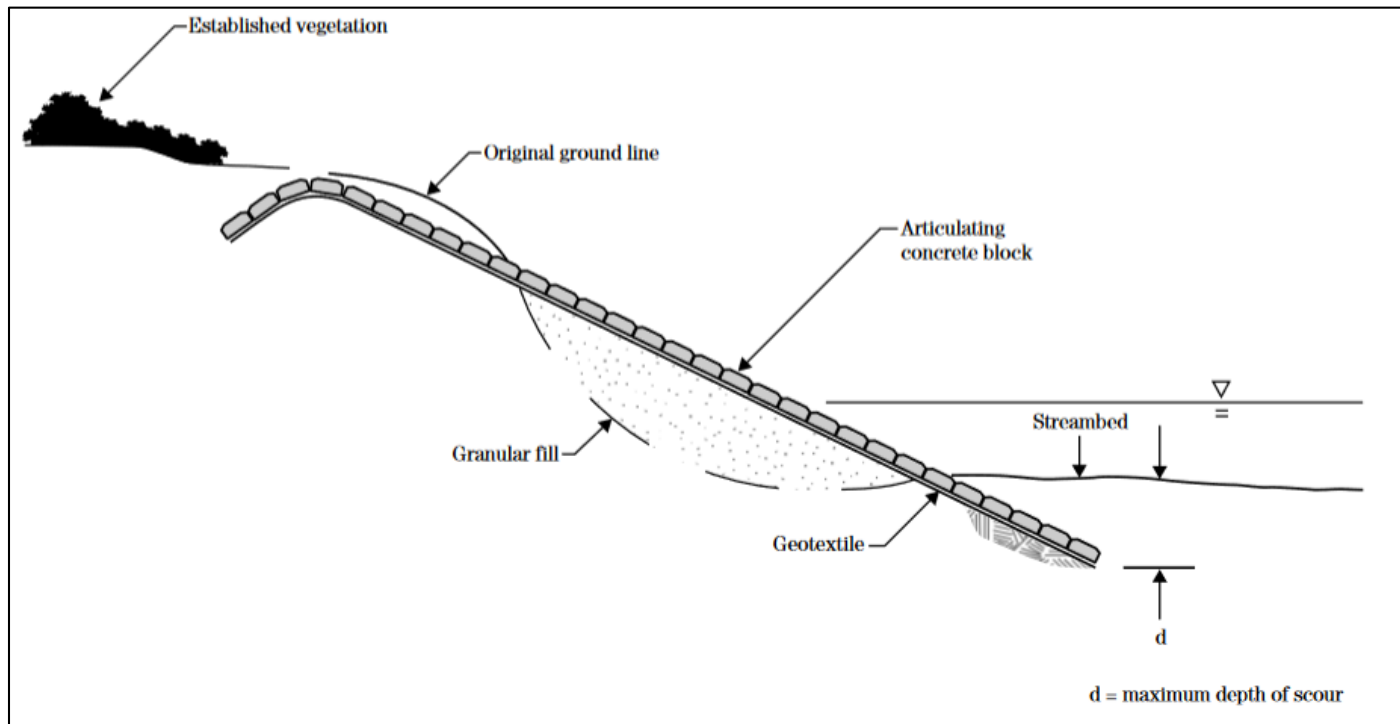
Vegetated GeoGrid

Example Photos (FEMA)



Articulating Concrete Blocks (ACB)

- Utilizes small concrete blocks connected by cabling
- Blocks are overlain on a geotextile fabric and granular filter to retain soil but still allow porewater to pass through
- Estimated Material Costs: ~\$10-\$20/square foot



Articulating Concrete Blocks (ACB)

PROs

- Provides durable bank protection with low maintenance
- Vegetation (preferably grasses) can be installed between blocks for stability
- Good, resilient option for heavy-use areas

CONs

- Proper design specs are critical to ensure that liquification beneath ACBs does not occur
- May require a season for plantings to root and take hold for truly effective slope stability
- Less of a “natural shoreline” option than other alternatives

Articulating Concrete Blocks (ACB)

Example Photos (NEH)



Slopetame² Erosion Control System

- Erosion control blanket that utilizes plastic rings and geotextile fabric to stabilize banks and provide erosion protection along slopes
- Vegetation can be planted inside the rings allowing the roots to anchor in to the soil
- This option could be used by itself or in conjunction with other methods
- Pros/Cons very similar to Vegetated GeoGrid



References

- [Streambank and Shoreline Stabilization](#) – Georgia DNR
- [Engineering with Nature](#) – FEMA
- [Use of Articulating Concrete Block Revetment Systems for Stream Restoration and Stabilization Projects](#) – National Engineering Handbook (NEH)
- [Structural, Non-structural, and Hybrid Options for Shoreline Protection](#) – University of Minnesota
- [Slopetame2 Erosion Control System](#) – Invisible Structures, Inc.