Storm Water control Education Items

Erosion:
Stream bank erosion is caused by many things. It is important to recognize that the meandering of a stream is a natural process. Streams are in constant motion and influence the shape of their surroundings. Streams do this through a process of erosion and deposition. As soil is eroded from the outside edges of bends, it is deposited farther downstream on the inside edges of bends. This process allows a stream to bend and meander in a constant state of change. Generally the rate of this change is slow enough so that we do not notice it; however there are times when rain events provide enough stream flow to cause dramatic changes which remind us of the dynamic nature of our waterways. In addition to natural events, storm water flows from development can cause increased stream flows which in turn can accelerate stream bank erosion.

Development:
Construction of buildings, houses, driveways, roads, and parking lots creates smoother, less porous surfaces than existed before development. Once a site surface is developed, the site has less natural surface area to absorb water and more developed surface area which sheds water. This means that most development increases the frequency at which storm water will run-off a site. Consequently, areas downstream of development usually experience more frequent storm water flows as areas upstream develop.

Storm Water Control:
Various regulations are used to control the rate and volume of storm water discharged from developed sites. Most storm water control systems are designed to store run-off and slowly discharge the run-off at a controlled rate over a long period of time. This method of control is intended to simulate the lower discharge rates typical of pre-development conditions. Although the rate of discharge can be controlled, it was noted earlier that development can cause more frequent storm water flows.

Erosion Control:
Confining a stream and not allowing its banks to change is an effort against the energy of the stream. Stream flows can be categorized in two ways:
Base flow - the flow seen in a waterway on a day to day basis.
Flood flow – flow resulting from a rain event.
Erosion protection measures can vary depending on the level or volume of stream flow, the soil conditions, and the velocity of the flow. Below is a diagram indicating general guidelines for protection measures. Specific erosion protection measures should be chosen by an experienced professional after evaluation of the site specific conditions.

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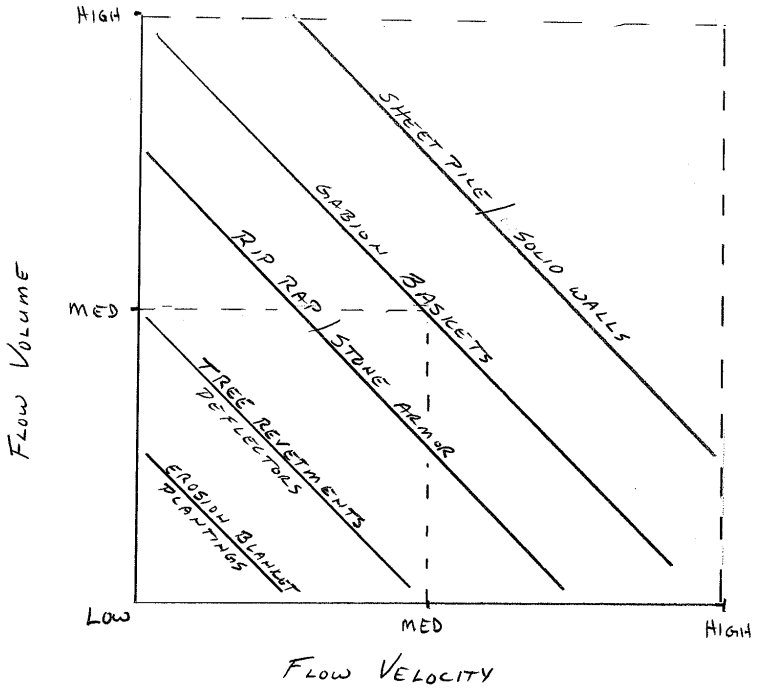

- Plantings – Placement of live bushes, groundcover, or live stakes into a stabilized embankment. The root mass of the plantings help anchor the soil.
- Erosion Blankets – Placement of straw mulch, natural fiber, or synthetic fiber blankets over seeded or planted embankment. Blankets protect exposed soil until plantings can establish root mass. The length of time that blankets remain effective depend on the blanket material.
- Tree Revetments – Brush bundles stacked in overlapping (shingle style) fashion from downstream end of embankment to upstream end. Tree revetments provide some deflection of flow energy and promote soil deposits among the branches of the revetment.
- Deflectors – Posts or vanes driven vertically into the stream bottom along the toe of an embankment from the downstream end to the upstream end of the embankment. Flow energy is directed away from an embankment, however, brush and logs floating downstream may become lodged in the deflectors.

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- Rip Rap and Stone Armor – Large angular rock or broken concrete pieces placed over a non-woven geotextile fabric. The fabric underlayment is critical for anchoring

- embankment material. Care must be taken to ensure that the channel bottom at the toe of the armoring is stabilized against erosion or sloughing and slope failure may occur.
- Gabion Baskets – Square, wire mesh baskets filled with medium sized rock. Baskets can be stacked and must be secured with posts and/or cables into the embankment.
- Sheeting/Walls – Driven sheet pile or solid concrete walls

For more detailed information on these and other Best Management Practices (BMP), refer to the Michigan Department of Environmental Quality BMP Guidebook for Michigan Watersheds.

http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3714-118554--,00.html