ACTIVITY: Landscaping and Vegetative Control Practices

NS – 02

Description

This non-structural best management practice is devoted to the use of permanent vegetation to ensure that water quality is not compromised after construction is completed. The preservation and planting of vegetation in and around stormwater management structures and BMPs can stabilize disturbed areas, enhance pollutant removal, and improve overall aesthetics. Landscaping of recently disturbed soil can greatly reduce erosion and sediment yield while providing some degree of dust control. Vegetative practices can also provide significant reductions in entrained pollutants through biological uptake, sediment trapping, filtering and infiltration.

Vegetation should also be controlled by a combination of proper mechanical and chemical (herbicides) means. Mechanical control measures include cutting vegetation less frequently, planting low-maintenance vegetation, such as vines and shrubs, collecting and properly disposing of clippings and cuttings, and education of the public and public works employees. The primary goal of this practice is to either establish temporary and/or permanent vegetative cover or preserve existing vegetation to lower runoff volumes and rates while greatly improving the water quality of urban stormwater runoff. Although a landscaping and vegetative control program is an integral part of any land development plan, it may be part of, but should not replace a stormwater management program. The reader is referenced to the *Tennessee Erosion and Sediment Control Handbook* for more information on these vegetative control practices.

Selection Criteria

Landscaping and vegetative control practices are applicable to all land uses, yet the selection of appropriate vegetation is dependant upon the soil, topography, and climate of the area. These factors also dictate what time of year the vegetation is planted or how often control measures need to be conducted. The following areas are important targets for landscaping and vegetative control practices:

- Steep slopes
- Drainage channels with natural cover
- Creeks
- Areas adjacent to catch basins
- Buffer zones
- BMP's such as detention/retention ponds, wetlands, swales and infiltration devices
- Construction sites. Temporary landscaping should be performed on areas such as construction sites, which will be denuded for several weeks.

- Permanent landscaping and control practices should be applied on all areas that have an established grade or require a long-term cover of vegetation such as filter strips, vegetated swales, steep slopes, stream banks, etc.

The main practices described herein include: buffer zones, disturbed area stabilization with mulch, disturbed area stabilization with permanent vegetation, disturbed area stabilization with sod, erosion control blanket/matting, and bioengineered stream bank stabilization.

In addition, components of a landscaping plan and the six zones of vegetative planting are discussed in this BMP.

Buffer Zones

A buffer zone is a strip of undisturbed vegetation, enhanced or restored vegetation, or the re-establishment of vegetation surrounding an area of disturbance or bordering streams, ponds, wetlands, or lakes. A buffer zone provides a filter for runoff and debris and a transitional refuge for small animals. There are two types of buffer zones: general buffers and vegetated riparian buffers. The former is a strip of undisturbed land adjacent to a site, while the latter borders a stream. To preserve natural vegetation, careful planning is required prior to construction such that contours and hydraulic characteristics are maintained wherever possible.

The important factors concerning the design of a buffer zone include slope, hydraulic characteristics, hydrology, and the width and vegetative structure of the zone.

It is important that the condition of the buffer is maintained. This includes monitoring the welfare of the vegetation with respect to climate and animals, such as beavers.

Disturbed Area Stabilization with Mulch

Mulching is the practice of covering a disturbed soil surface with biodegradable or other suitable materials for the purpose of stabilizing the soil surface. This practice is a common temporary stabilization technique, but is also effective as a permanent means. Some common permanent mulches include hardwood mulches and pine straw. This practice is simple and cost-effective.

Although mulches are best suited for flatter areas, they may be anchored to steeper areas with nets, mats, or tackifiers.

It is important to ensure proper coverage and depth of mulch to maximize its stabilization and moisture retaining effects. Inspect mulch after rainstorms and periods of high winds to check for movement. In addition, reapplication of mulch is necessary as the mulch degrades.

Disturbed Area Stabilization with Permanent Seeding

This practice involves the planting of perennial grasses for permanent stabilization. Vegetative cover is the most economical means of controlling erosion. Permanent seeding is used on exposed soils that will not be regraded, and where there is a proper

depth of topsoil. Permanent seeding is desirable on aesthetically critical areas.

Care should be taken to ensure development of permanent vegetation. Site conditions, such as soil types, exposure to wind and direct sunlight, and soil drainage must be considered when deciding types of vegetation. The earth on site should be properly prepared for vegetative growth. The top soil should have a minimum compacted depth of 2 inches on 3:1 slopes or greater, and 4 inches on all other slopes. Low maintenance local plant species should be used and mulching should be applied to slopes of 4:1 or greater. Fertilization and irrigation may be required, and should be provided in the design. Channelized flow should be directed away from the seeded areas and heavy clay or organic soils should be avoided as topsoil for all permanent vegetation. Newly vegetated areas should be inspected following each rain to ensure that seed has not been displaced. Also, the plants should be inspected frequently during the first year of planting to ensure uniform and dense stands.

Disturbed Area Stabilization with Trees, Shrubs, Vines, and Ground Cover

This practice involves the planting of Trees, shrubs, vines and ground cover for permanent stabilization, erosion control, reduced runoff, and enhanced aesthetics and wildlife habitat.

This vegetation is applicable for areas where grass does not grow well, such as steep slopes, shady areas and rough terrain. In addition, sites that are difficult to maintain grass, and where shade and screening are desired are often ideal areas for trees, shrubs, vines, and ground cover.

Selection of a species is based on site characteristics, such as amount of sunlight, drainage, and soil types. Low maintenance local plant species with a proven track record should be used, and mulching should be applied on slopes of 4:1 or greater. Often, the site can be altered to accommodate the desired plant type. In either case, it is necessary to ensure proper installation, including fertilization and appropriate planting depth. Fertilization and irrigation may be required, and should be provided in the design. Before performing work, the contractor should furnish proof that a nursery dealer's certificate has been secured with each shipment of plants.

Top soil with low amounts of heavy clays and organic matter should be spread to a minimum compacted depth of 2 inches on 3:1 slopes or greater, and 4 inches on all other slopes. Channelized flow should be directed away from the seeded areas.

Maintenance of the vegetation is just as important; irrigation, fertilization, and mulching should be provided for the plants. Different plant varieties require different maintenance, so care must be taken to yield optimum growth. Newly vegetated areas should be inspected following each rain to ensure that seed has not been displaced. Also, the plants should be inspected frequently during the first year of planting to ensure uniform and dense stands.

Sodding

This practice involves the import of sod to a site as a means of providing a quick, protective ground cover. It is used in areas susceptible to erosion, such as steep slopes, and drainage ways, at sites where immediate permanent ground cover is warranted, and

in areas where the season is not favorable for proper seed establishment. Adequate preparation measures must be taken for sodding operations. This includes proper soil preparation and provisions for watering the freshly laid sod at the required intervals. The type and depth of top soil and maintenance provisions are similar to that

of permanent seeding. In addition, the sod must be certified by the State Department of Agriculture prior to removal for sale or movement. See the *Tennessee Erosion and Sediment Control Handbook* for more information. It is important that sod is laid properly and is properly staked when laid on slopes.

Erosion Control Matting

This is the practice of placing a non-degradable protective matting to assist in the establishment of permanent vegetation on slopes, channels or other critical areas. Normally, the main objective of erosion control matting is to provide a stable seedbed for one or more growing seasons.

The areas where the mats are used need to be previously shaped, fertilized, and seeded, as directed by the engineer. The mats need to be installed correctly, using approved materials and techniques. In addition, the mat must be appropriate for the site conditions.

The mats should be inspected regularly for movement and condition of the matting, topsoil, and mulch. If washout, breakage, or erosion occurs, repair the surface and vegetate. Continue inspections until vegetation is firmly established.

Biotechnical Stream Bank Stabilization

As the title suggests, this process entails the use of mechanical elements (or structures) in combination with biological elements (or plants) to prevent slope failures and erosion, trap sediment, provide wildlife habitat, and enhance aesthetics.

Successful implementation of biotechnical stream bank stabilization involves the employment of various BMPs listed in this manual and the *Tennessee Erosion and Sediment Control Handbook* as well as competent knowledge of engineering and horticulture. Also, proper permitting from such regulating agencies as the NRCS, Tennessee Division of Water Pollution Control, and/or the United States Army Corps of Engineers may be required. For more information, see http://www.state.tn.us/environment/permits/arap.htm.

Once installed, the system should be inspected for proper vegetation growth and structural stability. Any deficiencies of the system should be repaired immediately.

The Landscaping Plan

The landscaping plan depends upon the BMP being applied, but the following are some key components that can assure success to any landscape plan:

- Proper plant species selection
- Transport and storage of plant material
- Sequence of construction

- Installation of plant material
- Contractor responsibilities
- Maintenance

Planting Zones

For landscaping of BMPs such as detention/retention ponds and constructed wetlands various planting zones exist within the structure representing a different soil moisture and inundation frequency. These zones are illustrated in Figure NS-02-1. The various planting zones can be classified as follows:

- Zone1: Deep Water Zone - This zone is typically only found in retention ponds, wetlands, and extended detention ponds due to a submergence of 18 inches to 6 feet. Submerged aquatic vegetation such as pondweed and wild celery can flourish here and actively remove metals and nutrients from the water.
- Zone 2: Shallow Water Areas - This zone is 0 to 18 inches below normal depth and divided into low marsh (6" to 18"deep) and high marsh (0 to 6" deep) sub-zones. The vegetation in this zone can enhance nutrient uptake, reduce flow velocity, reduce resuspension of bottom sediment, provides habitat, reduces shoreline erosion, and improves aesthetics.
- Zone 3: Shoreline Fringe: - This zone is routinely inundated during runoff producing events and may remain saturated by proximity of normal pool. Because of dry weather periods, the plants of this zone must be tolerant of periodic drying. For retention ponds and wetlands this zone extends 1 foot above the normal pool level and for extended detention ponds, it continues up to the elevation of maximum volume. The Zone 3 vegetation consists mostly of the herbaceous variety such as pickerelweed, and rice cutgrass but can also include trees such a willows and shrubs (although trees and shrubs should not be planted on embankments). Zone 3 landscaping stabilizes the shoreline, improves aesthetics, limits shoreline access be people and animals, provides food, cover and nesting for wildlife.
- Zone 4: Riparian Fringe - This is the lower basin areas of detention ponds and the upper storage areas of extended detention ponds and is only briefly inundated during storms. Vegetation in this zone include willows, river birch, red chokeberry and can reduce resuspension of deposited sediment, prevent erosion and provide habitat and food for wildlife.
- Zone 5: Floodplain Terrace - This zone is only inundated during large storms and is generally between the 2-year and 100-year water surface elevations. Plant species in this zone should be native to floodplains and should be able to provide erosion control on steep slopes, survive periodic mowing, require minimal maintenance, and be able to withstand exposure and compacted soil.

- Zone 6: Upland Slopes - This zone seldom, if ever, experiences inundation and typically includes any required buffer areas. The plant species in this zone depend upon local soil conditions and the intended secondary uses of the area.

Timely and properly landscaping of disturbed areas and applying vegetative control practices to existing plant life can many positive water quality and quantity impacts on a watershed. The water quantity advantages include reduction of runoff volume through enhanced interception and infiltration and peak flow reduction by reducing stormwater velocities. The positive impacts of landscaping and vegetative controls on water quality include, but are not limited to, erosion and dust control, streambank and slope stabilization, and enhanced removal of urban pollutants. In addition to these water quantity and quality amenities, landscaping and vegetative control practices improve aesthetics of a watershed, can provide habitat for wildlife, and can cost effectively enhance the performance of structural BMPs. Under no circumstance, however, should trees or other deep rooting vegetation be planted on detention dam embankments that could negatively affect the stability of the structures or hinder inspection and maintenance.

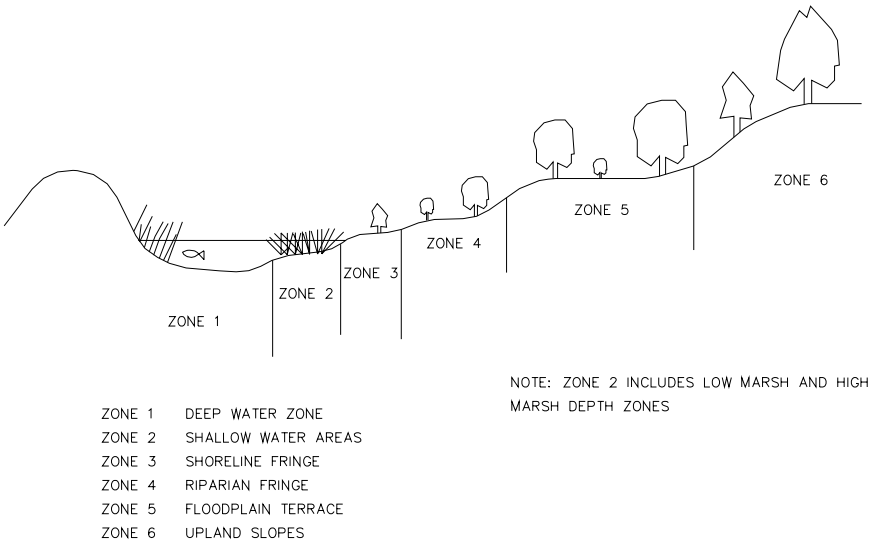

Figure NS-02-1 – Planting Zones

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