Grand Island Stormwater

Guidance: Site Stabilization

Why BMPs are needed for erosion prevention and sediment control

Erosion is a natural process where soil is carried away by rain, wind, snow, and ice. Construction activities increase erosion by removing vegetation. When rain falls on exposed soil it carries soil, nutrients and other pollutants into streets, gutters and ditches; it then travels untreated to lakes and rivers. Polluted runoff causes excessive growth of weeds and algae in water bodies and reduces recreational opportunities like swimming and fishing. It is far less costly to prevent erosion than to try to clean up the aftermath.

Site stabilization

Site stabilization is the covering of exposed soils in an attempt to prevent erosion. This can be achieved with a combination of BMPs like mulch, sod, riprap, and erosion control blankets. Site stabilization does not include tossing seed onto the ground and walking away; mulch is required to stabilize the soil and water is required to help the vegetation get established.

Perimeter controls are not considered site stabilization because they do not prevent erosion; they are tools used to contain sediment after erosion has already occurred. These include silt fence, drainage swales, straw wattles, and similar BMPs.

The NPDES permit requires the following site stabilization measures:

- Phase construction activities to:
  - leave as much vegetation as possible on site for as long as possible
  - limit the amount of time soil is exposed by stabilizing areas as work progresses
- When working on steep slopes (greater than 15°) use BMPs designed for slopes including terracing, contouring, or temporary slope drains
- Prevent stormwater from entering your site by diverting the flow to vegetated areas
- As much as possible, provide areas for stormwater to soak in on site
- Direct runoff from the site to areas with established vegetation
- Slow runoff and minimize erosion by using check dams, sediment traps, or riprap along flow channels and at outlets
- Protect inlets and surface waters with 50 feet of undisturbed vegetative buffer; if space is tight, use multiple BMPs to provide water treatment equivalent to 50 feet of vegetation
- Initiate soil stabilization immediately on areas of the site where construction activity has stopped and will not resume for 14 days; immediate stabilization activities include:
  - starting to prep the soil for paving
  - starting to apply mulch or seed to the area to be stabilized
  - finalizing arrangements to have the stabilization product installed within 14 days

Site stabilization efforts can be temporary or permanent but they must start the day after soil disturbing activities have ended in an area, regardless of final grading. It is important to note that vehicle traffic and vertical building are not considered ‘land disturbing activity’; even if a building is being constructed, the surrounding soils that are not being actively worked must be stabilized within the permit timelines.

Best management practices

It can be difficult to choose the right BMP. Price can be an important consideration but the least expensive option may not be the most cost effective or the best choice for your site. Installing insufficient erosion controls may require you to repair an eroded slope or to replace a BMP over and over again. In the long run, choosing the right products and practices for your site will save you time and money.

Maintenance and inspection

The NPDES permit gives operators the choice of performing site inspections either every seven calendar days or every 14 calendar days and within 24 hours following a 0.25" precipitation event. All non-functioning BMPs must be replaced or repaired within 7 days of discovery and before the next precipitation event. Inspections, maintenance, and any changes to BMPs during construction should be recorded and kept onsite with the SWPPP.

Temporary stabilization

Mulch or similar material must cover exposed soils, including soil stockpiles. Site entrances and traffic routes must be stabilized to prevent sediment from being tracked offsite. Some common temporary stabilization methods include:

- Temporary vegetation – including annual grasses that sprout quickly such as annual rye, oats, or winter wheat. These protect exposed soil from rain, slow runoff, and act as a filter. They will not provide permanent cover. Be prepared to fertilize, water, or reseed to ensure the vegetative cover is maintained until permanent cover is installed.
- Mulching – straw, wood chips, wood fiber blanket, and so on. Mulch provides temporary cover to protect the soil from rain but it has to stay in place to be effective; crimping, netting, stakes, or chemical binders can be used to anchor some types of mulch. You will need to reinstall washed-out mulch until permanent cover is established. In the winter, mulch may be the only temporary stabilization option if seeding or sodding is not possible.
- Crushed rock or manufactured products for site entrances. The large, irregular shape of rocks help remove mud from tires leaving your site. Crushed rock entrances need to be re-rocked regularly.
- Tarps and liners may be used to protect small areas from erosion by keeping the rain from reaching the soil. These are generally used to protect building materials being stored on site but may be effective for small stockpiles.
- Downspout extenders may be used to protect your site from roof runoff by directing water from downspouts to paved or grassy areas. Check extenders regularly to insure proper performance. Remove extenders following permanent stabilization.

Perimeter controls, while not site stabilization, should be discussed here. Devices like silt fence, inlet protection, sediment traps, berms, and straw wattles are used to slow runoff and allow sediment to settle out before water leaves a site. Proper installation and maintenance of sediment control devices is essential for their performance. Reinstall or replace ripped, collapsed, or undermined controls. Clean out devices when sediment reaches 1/2 of the device height. Remove temporary sediment control devices after permanent stabilization is established.

Final stabilization

Final stabilization is achieved when all soil disturbing activity is completed and all exposed soils have been stabilized by vegetative cover with a uniform density of at least 70% over an entire area. This can be accomplished through a combination of perennial vegetation, pavement, riprap, rooftops, etc. Any permanent stormwater infrastructure on site must be cleaned out, stabilized, and functioning. All temporary BMPs must be removed. Establish permanent vegetation or ground cover as soon as possible.

- Leave an unmowed buffer strip of thick vegetation along stream banks and lakeshores
- Schedule landscaping projects for dry weather
- Plant fast-growing annual and perennial grasses
- Water new seed or sod lightly, every day or two, for two weeks to keep soil moist
- Phase construction activities to allow final stabilization of areas where work is complete

Additional considerations

Consider the following as you make your landscaping decisions:

- Mark buffer areas and areas that are not to be disturbed with snow fence or prominent signage
- Keep and protect existing native trees, bushes and plants on your site
- Plant plenty of trees and shrubs to reduce runoff
- Use well adapted native plants that reduce runoff and require little maintenance
- Plant lawn alternatives like rain gardens, prairie plants, or no mow lawn mixes
- Use crushed rocks, grow-through pavers or other pavement alternatives that allow rainwater to seep into the ground

The following are examples of additional erosion control techniques that could be incorporated into a project:

Construction site phasing is the development of a construction work schedule that strategically coordinates the timing of land disturbing activities to minimize soil exposure and plans for the timely installation of all erosion and sediment control practices. The goal of construction site phasing is to disturb a smaller portion of an overall site, substantially finish grading and other construction activities and achieve temporary or permanent stabilization in the area before disturbing the next portion of the overall site. Soil exposure time is decreased, soil and erosion control practices are more manageable, and permit violations can be easily avoided.

Lot benching is often utilized in subdivision developments. Lots are strategically graded to direct the runoff from each lot to a stable outlet rather than to an adjacent lot. Lot benching can result in reduced slope lengths and steepness, decreasing the potential for soil erosion. Lot benching establishes drainage patterns early in the construction process for each lot therefore avoiding potential drainage problems in the future when home construction begins.

Surface roughening involves roughening the surface of the soil on slopes in a horizontally grooved pattern. This is often accomplished by tracking, stair-step grading or ripping and grooving. The roughened surface reduces erosion by decreasing runoff velocity, increasing infiltration, and aiding in the establishment of temporary or permanent vegetation and cover.

Low impact development (LID) is a stormwater management approach that attempts to keep stormwater where it falls and reducing or even eliminating stormwater runoff from a site. LID integrates stormwater management practices into the planned or existing infrastructure in a way that mimics the predevelopment hydrology of the site. The techniques provide the filtering of sediment, nutrients, heavy metals and other pollutants from the runoff and result in decreased erosion, increased infiltration, and improved water quality. LID techniques such as protecting natural and existing vegetation, avoiding steep slopes, protecting infiltration areas and minimizing soil compaction can be utilized to prevent unnecessary erosion and sediment pollution problems.