Green Infrastructure

As our population has grown, natural landscapes, prairies and forests have been replaced by agricultural land and sprawling cities. Stormwater, once easily absorbed into the ground, now flows as runoff across pavement and other hard surfaces. Stormwater runoff is comprised of water from rain or snowmelt that flows over hard, non-absorbent surfaces, also known as impervious surfaces, like driveways, roofs, sidewalks, and streets. Stormwater gains speed as it travels across these impervious surfaces. The increased speed and volume of runoff reaching the banks of a water body causes erosion. Stormwater picks up chemicals, nutrients, debris, sediment, and other pollutants as it travels across the pavement to the storm inlet. Heat from roadways and other impervious surfaces increases the temperature of stormwater, causing a rise in the temperature of streams, rivers, and lakes. Untreated stormwater runoff can be harmful to the water bodies we use for swimming, fishing, and as a source of drinking water.

To counter the effects of excessive stormwater runoff, we can manage stormwater with green infrastructure. Green Infrastructure involves the use of soils, plants, and land features that mimic natural processes to absorb the impact of stormwater where it first falls. This reduces the volume of runoff and pollutants entering our waterways. Using Green Infrastructure to manage stormwater, we can prevent untreated water from negatively impacting our environment. Common strategies include the collection and conveyance of stormwater runoff from roofs, driveways and other hard surfaces so that rain is absorbed into the ground through deep-rooted, drought-resistant native plants, or so it can be stored for re-use.

Incorporating Green Infrastructure into the landscape of your own property offers many benefits, including water conservation and aesthetic appeal.

Bioretention Systems

Description:

A bioretention system is a shallow depression with an infiltration cell comprised of a specific soil mix or compost-amended existing soils and an underdrain. In a bioretention system, stormwater is treated and managed by filtration through vegetation, infiltration through the soil and plant roots, and through evapotranspiration. Bioretention systems have an underdrain to help direct excess stormwater to the nearest outflow or channel. Bioretention systems with an underdrain are commonly used in locations with larger contributing areas or poor soils where infiltration does not occur easily. Bioretention systems, just like rain gardens, are designed to drain within 24 hours, which allows a broad range of plants to be used, and it limits issues associated with mosquitos and standing water. Cost effectiveness and multiple benefits associated with bioretention systems make them a very popular choice in managing stormwater runoff.

Considerations:

- During construction, limit traffic within the bioretention system to avoid soil compaction. Use low ground-contact pressure equipment, like excavators, to construct your bioretention system when possible. Use tilling or other measures to reduce compaction prior to completion.
- Bioretention systems should not be constructed until the entire contributing drainage area is permanently stabilized so sediment doesn't enter and clog the system.
- Use native or adapted plants with deep roots as they are well-suited to our midwestern climate. Over time their deep roots will improve infiltration into the soils.
- The amount of stormwater designed to be held by the bioretention system should drain within 24 hours by infiltration or through the underdrain.
- Typically, ponding depths range from 6-24 inches with most at 12 inches.
- A valve or other flow-control device should be installed after the infiltration cell to restrict the flow from the system, and maximize infiltration.
- Any geotextile fabric used in the infiltration cell should be arched and not flat in the profile, as it can restrict infiltration.
- Drainage aggregate should be washed and free of fines to prevent clogging of the underdrain.
- The contributing area for a bioretention system should be less than 4 acres. Multiple bioretention systems may be needed for larger contributing areas.
- Outflow points should have erosion control measures in place.

To learn more about this and other Green Infrastructure strategies, visit:

www.OmahaStormwater.org

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