

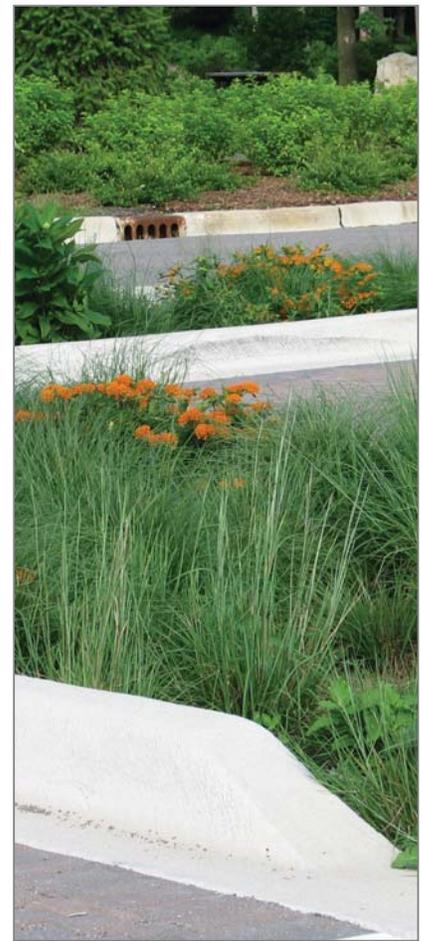
VI. Sustainable Strategies

One of the guiding principles for Rolling Hills Park is that it is envisioned to be a sustainable park. The word sustainable can have different meanings- in the case of Rolling Hills Park, it is meant to describe a park that is:

- Positive for the environment and ecology of the region
- Operated with regards to fiscal responsibility
- Developed and operated with materials and practices that are both durable and beautiful

This will result in a park that meets the needs of Washtenaw County residents now and long into the future. All of the park elements and facilities will be planned, designed, engineered, constructed, and operated according to sustainable practices. Many of these strategies are newly emerging in Southeast Michigan, and are being promoted and encouraged by various public agencies and organizations. While some have been in use for decades or longer, many are leading edge practices that continue to improve and become more cost effective as they become more widely used.

While these practices make common sense for the reasons listed, Rolling Hills Park also has the opportunity to serve as a demonstration of sustainable practices, and help to lead the region in this very essential area. The following provide an overview of sustainable strategies to be applied in Rolling Hills Park along with a few examples and illustrations.





Benefits

- Reduces runoff volumes (by up to 65% when used with bioretention and/or filter strips)
- Increases ability of landscape to remove nutrients (up to 70%), heavy metals (up to 80%), sediment, and other pollutants, especially when used with other stormwater practices
- Stabilizes and increases organic content of soils
- Reduces irrigation and fertilization requirements
- Reduces use of fossil fuels and air and noise pollution relative to turf landscapes that require regular mowing and maintenance
- Provides wildlife habitat for birds, butterflies, and insects
- Moderates temperature extremes and urban heat island effect
- Provides aesthetic benefits throughout the year



Maintenance Strategies

Natural landscaping requires less irrigation, mowing, fertilizers, and pesticides than conventional landscapes. Annual mowing or controlled burning are appropriate for natural landscapes, though burning may not always be appropriate. Initial watering and herbiciding may be necessary in the first 2-3 years after planting, but once established (3-4 years) these needs are greatly diminished.

Water Conservation Strategies

The site rainwater system will be developed in a way that replicates natural hydrology. Therefore, rainwater will be slowed, cooled, cleansed, and infiltrated, thus avoiding surface water runoff. Existing natural drainage patterns and features will be preserved and enhanced to the extent possible.

Rainwater that falls on the site will move (infiltrate) to the surface groundwater as long as nutrients are held in the surface soils. The native landscape helps by keeping nutrients and organic matter in the upper layers of the soil. This will then provide appropriate hydrology to sustain Spring Pond, and other natural aquatic and terrestrial landscapes both in the park and downstream.

The concentration or accumulation of rainfall in any particular spot should be minimized, especially in smaller, more frequent rain events. Point discharge to Spring Pond, MacCarthy Creek, wetlands, or any remnant or restored natural landscape should be avoided.

As a water conservation strategy, rainwater can be harvested, stored, and re-used to provide water for landscape irrigation, ornamental water features, toilet flushing, and other such uses. This will minimize the use of potable water for such actions.

Green Building and Infrastructure Strategies

Green practices will be deployed to serve multiple functions, in addition to the facilitation of rainwater into the groundwater table. Roads, paths, parking areas, bridges, and other built elements will be designed and built to help manage stormwater as well as provide appropriate, durable and beautiful walking and driving surfaces.

All buildings and other structures will be designed, built, and operated according to green practice- energy and water efficient, replete with natural light and healthy materials, either durable or rapidly renewable, and beautiful.

Surplus water, wastewater, and landscape waste will be recycled and reused on-site, using ecological design and engineering techniques, including constructed wetlands, composting, and other sustainable practices.

Rainwater running over impervious surfaces (rooftops, streets, parking lots, and sidewalks) picks up urban pollutants such as sediment, heavy metals, and excess nutrients. The temperature of rainwater also changes, typically warming as it flows across the landscape. At Rolling Hills Park, this rainwater and pollutants concentrate in drainage ditches and ultimately discharge off-site to the east and south, including into MacCarthy Creek. These aquatic resources support fish and other aquatic species that are sensitive to environmental (i.e., water quality) conditions. This Green Infrastructure Toolbox identifies strategies for reducing the volume and improving the quality of rainwater entering the pond and creek on-site and beyond.

The tools presented in this section are multi-dimensional practices that meet traditional water quality and quantity standards outlined in many stormwater ordinances, as well as achieving planning, park design, and landscaping objectives. The practices are designed to address both the quantity and quality of runoff from new and existing developed sites and should be understood by local authorities, planners, designers, and engineers involved with the project. These measures can be designed and implemented in new park features as well as retrofitted into existing features in cost effective ways. The practices discussed here include bio-retention, green roofs, pervious pavement, native landscape systems, and rainwater harvesting and reuse.

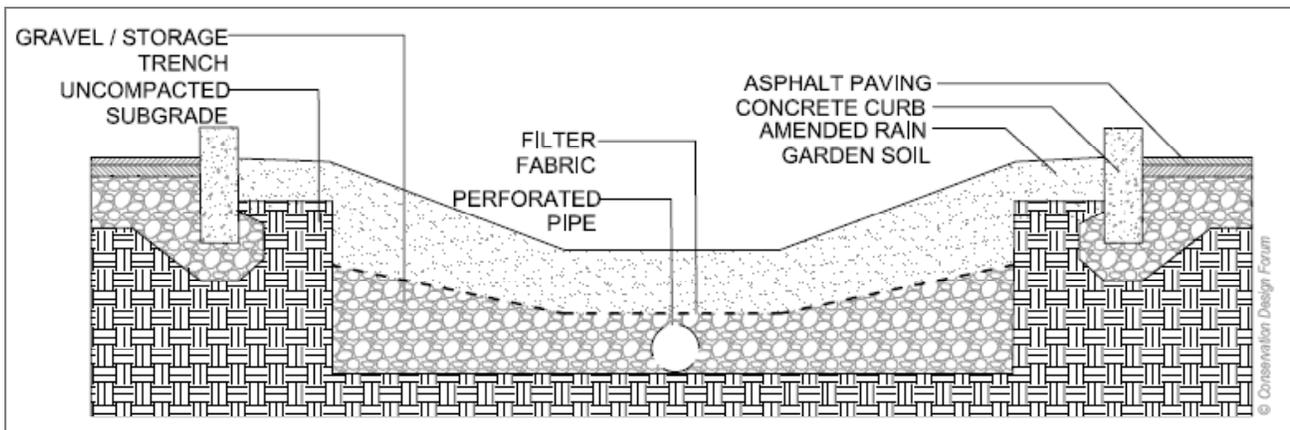
BIORETENTION

Defintion

Parkway rain gardens, tree wells, and planter boxes can be designed as vegetated stormwater bioretention features that convey, retain, cool, and cleanse stormwater before being discharged to streams. They are installed in parkways, medians, and parking lot islands, and along the sides of buildings to capture roof runoff. These practices are typically designed to allow stormwater to pond slightly and be absorbed and evaporated into the atmosphere by vegetation. Excess water is collected by a drain and discharged to storm sewers.

Benefits

- Reduces impervious surface runoff volumes (up to 15%) and rates (50% or more)
- Reduces sediments and metals (30 to 70%), nutrients (10 to 30%), and other pollutants from runoff
- Provides stormwater detention, depending on the thickness of the gravel layer
- Provides limited habitat for birds, butterflies, and beneficial insects such as dragonflies, which eat mosquitoes
- Can increase aesthetic value of properties



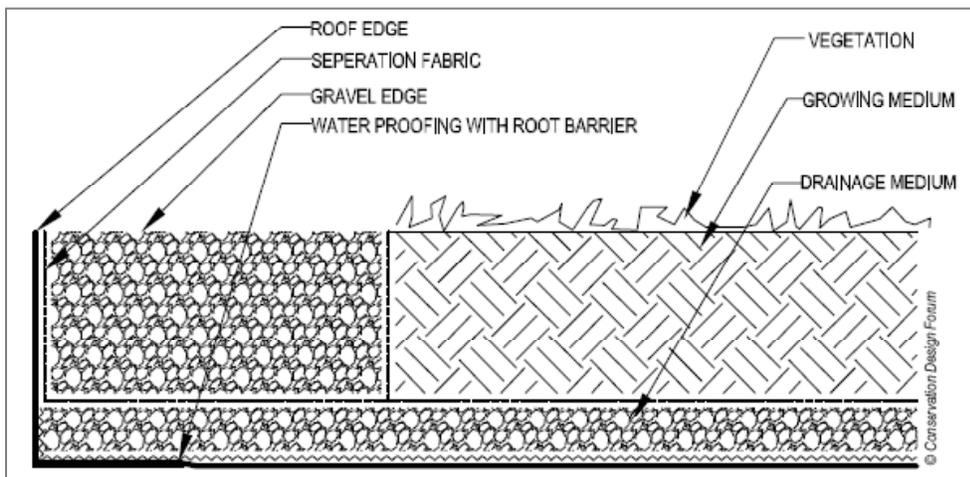
GREEN ROOFS

Definition

Vegetated roof system designed to retain, slow, cool, and cleanse rainwater runoff on the top of buildings. Green roofs are generally planted with drought tolerant vegetation. The soil and vegetation evaporate and transpire precipitation to the atmosphere.

Benefits

- Significantly reduces runoff volumes and rates (50 - 90% reduction in annual runoff) as well as thermal loading of runoff
- Extend the life of roofs two to three times (20 years or more) by protecting the roofing system from inclement weather and solar radiation
- Can help meet detention requirements
- Reduces the urban heat island effect
- Can reduce heating and cooling energy requirements
- Creates opportunities for outdoor space as roof top gardens
- Creates habitat and preserves biodiversity in an otherwise sterile urban landscape



PERMEABLE PAVEMENT

Definition

Permeable or perforated paving materials or pavers with spaces between pavers allow transmission of water to an aggregate base, reducing runoff volume and improving water quality. Runoff is temporarily stored in the base and slowly evaporated and released to storm sewers. Paving blocks and grids, the most common and available type of permeable pavement, are modular systems containing openings filled with gravel or rock chips. Porous pavement, concrete, and asphalt contain larger than typical aggregates and pore space to allow water percolation, but are less common with greater design concerns. Variations on gravel are a third type of permeable practice.



Benefits

- Reduces stormwater runoff volumes by 20% or more depending on depth of the aggregate base
- Reduces stormwater runoff rates, by up to 95%
- Filters sediments, hydrocarbons, nutrients, and other urban pollutants from runoff and reduces runoff temperatures
- Can help meet detention requirements and reduce stormwater conveyance and detention infrastructure needs (detention storage can be provided within the gravel base below the surface)
- Reduces need for deicing salt and salt impacts to water quality
- Less ponding of water on the driving or parking surface reduces skidding, hydroplaning, and ice buildup



RAINWATER HARVESTING AND REUSE

Definition

Downspouts from roof runoff can be directed into a vessel specially designed to capture and temporarily store rainwater for various uses, including greywater reuse and landscape irrigation.

Benefits

- Reduces runoff volumes from small to moderate rain events and prevents flow into the combined sewer system
- Conserves water for reuse (e.g. irrigation of lawns and gardens)

