

Takoma Park Homeowner's Guide to Residential Drainage



When it rains or snow melts, the water either soaks into the ground or flows downhill towards lower-lying areas where it enters the storm drain or local waterways.

“Soft” or “permeable” surfaces such as lawns, gardens, and forests allow water to soak into the ground. The composition of the underlying soil determines how quickly water will infiltrate. A sandy soil will allow rapid infiltration of rain, whereas soils with a higher clay content have a much slower infiltration rate.

In more developed areas such as Takoma Park, there are fewer opportunities for the rain or snowmelt to soak into the ground. Natural landscapes get replaced by buildings, roads, parking lots, and other impermeable surfaces, leaving the water with fewer places to go. Land development converts permeable land to impermeable surfaces which increases stormwater runoff

In steep terrain, stormwater runoff can accumulate as runoff from upslope properties flows onto downslope properties.



Many older cities and towns, such as Takoma Park, were built in steep stream valleys. Streams are dynamic, natural systems that can regularly flood above the normal low-flow level, shifting their position over time as banks erode and sediments are deposited in new locations. The land area into which water flows when it overtops streambanks is called the “floodplain.”

Some natural streams in Takoma Park have been diverted into buried pipes to confine and convey the water flow. These are referred to as “piped streams.” Piped streams allow for land development in stream valleys; however, they have a more limited capacity than aboveground streams. These stormwater pipes can sometimes overflow during large rainstorms.

Management of Stormwater Runoff and Groundwater Flows



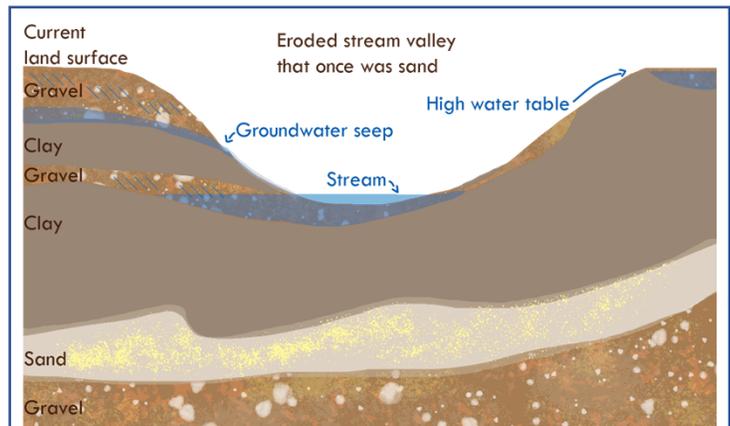
Public roadways are designed to manage stormwater. Curbs, gutters, storm drain inlets, and underground pipes consolidate runoff and convey water to treatment installations or natural waterbodies. Directing stormwater runoff from private properties to the road or public storm drain system is the most effective way to control residential flooding. Permission from the City of Takoma Park must be granted before tying private drainage into public stormwater infrastructure.

Groundwater travels through the soil similar to runoff traveling through a yard, but at a very slow rate. When groundwater is intersected by a drop in surface elevation water will emerge from the soil surface. Groundwater seeps are common in many parts of Takoma Park due to the high groundwater table and hilly terrain. Management of groundwater issues often involves the installation of underground pipes to redirect water. Conservation landscaping and other planting practices can help to manage high groundwater when it impacts yards.

Runoff and groundwater often flow from one property to another. Neighbors must work collaboratively to manage this runoff effectively. Collective employment of connected management techniques within and among properties will yield the best results.



The public storm drain system is designed to carry stormwater away from developed areas and prevent flooding.
Image Credit: MinnPost – www.minnpost.com



Groundwater movement underground is often affected by composition of underlying geology.
Image Credit: LID Center

Stormwater Runoff Management Techniques



Technique #1: Ensure that Positive Drainage is Maintained through Site Grading

Lawns and paved surfaces should be sloped or graded to maintain positive drainage. Surface runoff should be able to flow away from homes and other structures, preferably toward the public right-of-way. Maintaining positive drainage may require the use of techniques like swales to direct runoff. Care must be taken to avoid changes that cause runoff to flow to a neighboring property.



Grading can be used to maintain positive drainage without directing runoff to neighboring properties.

Image Credit: City of Edmonton, AB, Canada

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Technique #2: Direct and Reinforce Flow Path

Homeowners can manage overland flow by creating a swale for water to follow. A depressed path lined with erosion-resistant material such as stone will help to slow water and reduce erosion. Vegetation can be used to further stabilize paths and reduce flow velocity. Harder armoring may be necessary on steep slopes. Consult a professional landscape contractor to determine the best approach for your property.



Swales can be used to direct storm water flows and reduce erosion.

Stormwater Runoff Management Techniques



Technique #3: Install Downspout Leader Pipes

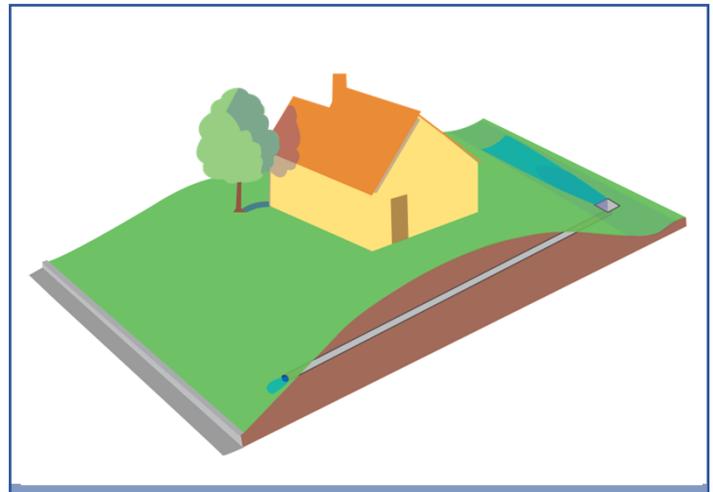
Downspout leader pipes are extensions that can be attached to existing downspouts to carry roof runoff further away from building foundations. They can be buried underground, and with permission of Takoma Park DPW, may discharge into the road gutter. Discharging water in this manner helps to prevent runoff from flowing downhill into a neighbor's yard or around your foundation.



Leader pipes can be used to extend downspouts beyond building foundations.
Image Credit: LID Center

Technique #4: Install a Private Storm Drain System

Installation of a private storm drain system may be valuable in situations where large volumes of runoff need to be drained from a property, or where water is trapped by topography. Private storm drain systems typically consist of an inlet and an underground pipe which carries water to the public right of way. To solve larger drainage issues across many properties, the private storm drain system may need to span several lots and involve multiple inlet points. Installation should be coordinated between property owners, and a professional contractor should be consulted. Private drainage should be connected to a public storm drain pipe when possible but can also outlet at the curb. All connections to public infrastructure require permission from the Takoma Park DPW.



Private storm drain systems can be used to direct water when grading cannot.
Image Credit: LID Center

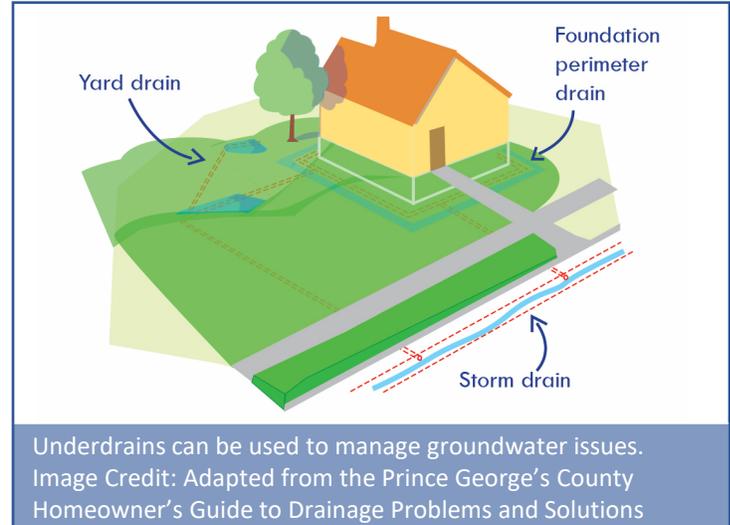
Groundwater Management Techniques



Technique #1: Install Underdrains

Installation of underdrains is a common method for managing groundwater issues on your property.

Underdrain systems typically consist of a perforated pipe set in a gravel trench. The groundwater level around the pipe is reduced as water that enters is carried to a location where it can drain away. A sump pump may be necessary to move the water, depending on the topography of the land. The underdrain should connect to a public storm drain pipe if possible. Where such a connection cannot be made, it can outlet to the road gutter, but this is not ideal as it may create consistently wet conditions on the street. As with all stormwater management, any connection to public stormwater infrastructure must be approved by Takoma Park DPW.



Underdrains can be used to manage groundwater issues. Image Credit: Adapted from the Prince George's County Homeowner's Guide to Drainage Problems and Solutions

Technique #2: Protect Building Foundations with Exterior Waterproofing

The application of waterproof membranes to the exterior of a building's foundation can prevent water from seeping into basement walls. Several waterproofing options are available to homeowners including wraps, painted coatings, and chemical soil injections. Consult a waterproofing expert for advice on membrane materials and installation.



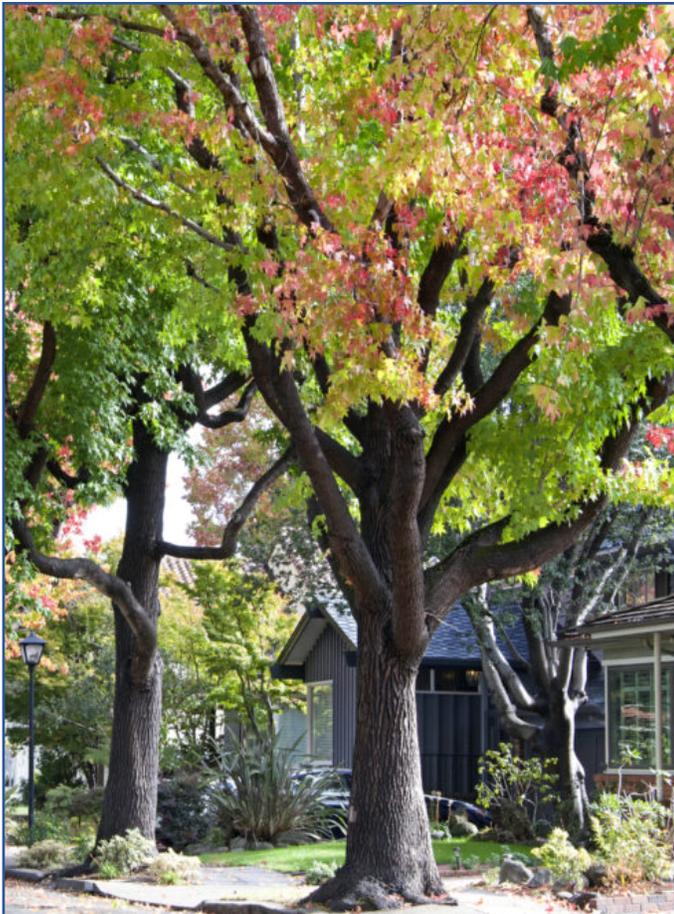
Exterior waterproofing membranes protect a home's foundation from groundwater intrusion.

Groundwater Management Techniques



Technique #3: Plant Trees

Planting trees is a simple and natural way to address groundwater issues, with many added benefits. Along with groundwater uptake, trees stabilize and improve soils, produce oxygen, sequester carbon, cool urban areas, and support biodiversity. Be sure to plant trees that can thrive in the conditions on your property.



As they grow, trees uptake large amounts of groundwater.
Image credit: Courtesy of southkingmedia.com

Technique #4: Install Conservation Landscaping

Conservation landscaping is the practice of working with natural ecological systems to establish plantings of native species. By planting species that are adapted to the ecological conditions of a site, homeowners can create gardens of thriving plants that will utilize groundwater and reduce ponding.

Conservation landscaping is an accessible technique that can be readily applied by almost any property owner. For areas that experience prolonged inundation or are consistently saturated, plants that are adapted to wet soils should be selected. In areas that receive high intensity runoff, reinforced flow paths can be used in conjunction with plantings.



Conservation landscaping can be employed to absorb groundwater and mitigate saturated conditions.
Image Credit: LID Center

Green Infrastructure Best Management Practices



The term “green infrastructure” applies to installations that utilize natural ecological processes to slow and filter stormwater runoff. Small-scale green infrastructure best management practices (BMPs) can be very effective in reducing runoff volumes, minimizing erosion, and improving water quality, especially when installed on multiple properties throughout a watershed.

BMP #1: Pavement Removal

Pavement removal reverses the impact of impervious surface installation. When pavement is removed, rain can once again soak into the soil, reducing a property’s contribution to stormwater runoff. Montgomery County accepts and recycles concrete and other paving materials at the Shady Grove Processing Facility and Transfer Station.



Pavement removal before (left) and after (right).
Image credit: Chesapeake Bay Trust

BMP #2: Permeable pavement

When selecting the surface materials for landscape features such as driveways, paths, and patios, consider using permeable pavement. A variety of options are commercially available, including interlocking pavers that provide gaps for water to reach the ground underneath, porous pavers, and grided modules that allow grass to grow within the paving framework. All of these provide a stable, reinforced surface for parking, walking, or gathering, while simultaneously allowing infiltration.



Permeable paving systems allow infiltration of water.
Image credit: Landscape East and West

Green Infrastructure Best Management Practices



BMP #3: Rainwater Harvesting

Rainwater harvesting is a practice that is suitable for almost any residential property. By temporarily storing rain that falls on rooftops in rain barrels (small capacity) or cisterns (large capacity), stormwater runoff is reduced; water can be released into the soil between storms. Harvested water is non-chlorinated and can be used to irrigate plantings and supply water features such as fountains or ponds. Cisterns and rain barrels need to be drained between storm events to provide storage for the next storm. If water is not being used for other applications, low-flow outflows can be used for passive drainage between storms. Tanks must include an overflow outlet, which can be directed to the curb with permission from the Takoma Park DPW.



Cisterns can be used to harvest and utilize rainwater.
Image credit: Innovative Water Solutions – watercache.com

BMP #4: Rain Gardens

The first inch of runoff, referred to as “the first flush,” carries around 80%-90% of the pollutants from the land. Rain gardens are slight depressions positioned in the landscape to receive and filter the first flush of runoff from a given drainage area. A common practice is to locate raingardens so that roof downspouts can flow into them.

Raingardens may not be appropriate in areas with groundwater problems because they promote infiltration of stormwater runoff. Before installing a rain garden or similar practice you should have your property evaluated by a stormwater professional.



Raingardens capture and filter stormwater runoff.
Image credit: Jason Johnson, Natural Resource Conservation Service, USDA