

CHEVY CHASE VIEW STORMWATER MANAGEMENT IDEAS AND SOLUTIONS



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Green Infrastructure along the Right of Way: Green Streets

Image Source: <https://montgomerycountymd.gov/DEP/Resources/Files/downloads/restoration/breewood/breewood-poster-project-photos.pdf>

What are Green Streets?

Green Streets are part of a County initiative to capture stormwater runoff in neighborhoods. They use Low Impact Development (LID) and are constructed within the street right-of-ways. LID consists of Green Infrastructure.

Bioretention Gardens: Seasonality

Bioretention gardens are planted with various salt tolerant flowers and grasses to help absorb rain water. These flowers bloom during different seasons giving a different look over the year.

Pictured: Breewood Manor Green Streets Bioretention garden at the end of Tenbrook Drive.



What is Green Infrastructure?

The range of measures that use plant or soil systems and permeable pavement to store, infiltrate, and reduce flows to sewer systems or to surface waters.

<https://www.ahpd.org/get-involved/environment-conservation/>



Habitat...

<https://www.montgomerycountymd.gov/water/rainscapes/garrett-park.html>



Infiltration...

<https://www.montgomerycountymd.gov/water/rainscapes/garrett-park.html>



Reducing flow...

Green Infrastructure for Private Property: Montgomery County Rainscapes

Image source:
<https://www.montgomerycountymd.gov/water/rainscapes/index.html>



Image source:
<https://www.montgomerycountymd.gov/water/rainscapes/garrett-park.html>



Driveway connection...

Image source:
<https://www.montgomerycountymd.gov/water/rainscapes/garrett-park.html>



Property Protection...

Image source:
<https://www.montgomerycountymd.gov/water/rainscapes/garrett-park.html>



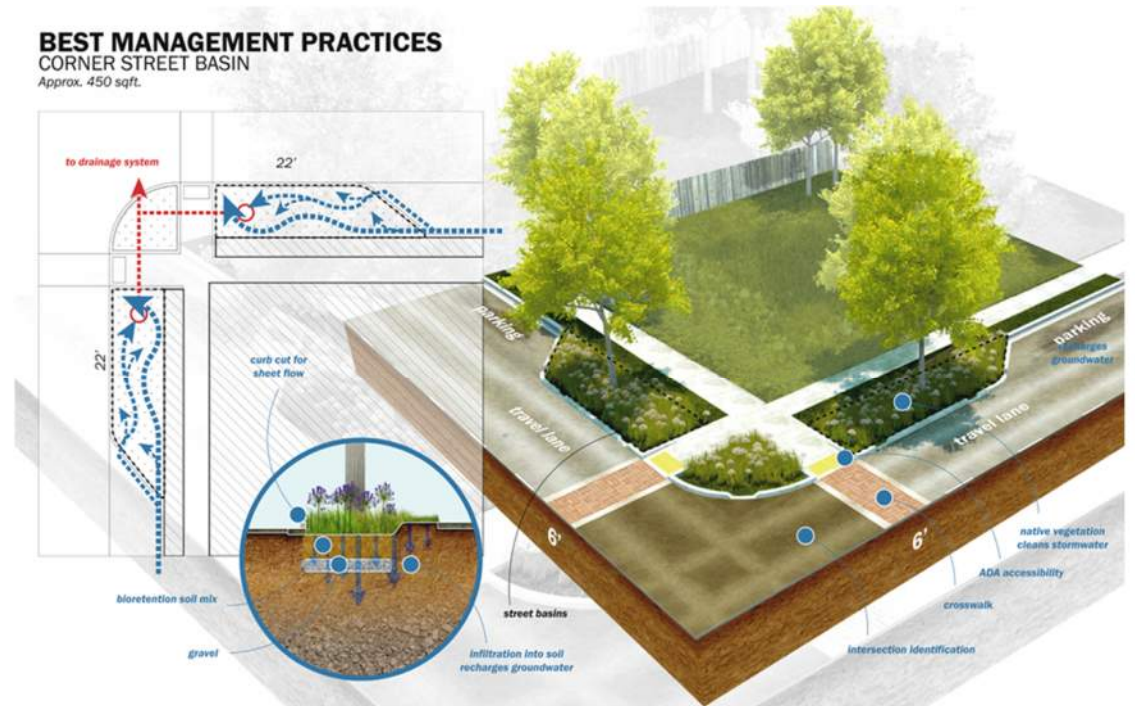
Beautification...

Chevy Chase View Stormwater Management Solutions

Image Source: <https://www.georgetownclimate.org/adaptation/toolkits/green-infrastructure-toolkit/getting-started-pilot-projects.html?chapter>



Image Source: <https://www.georgetownclimate.org/adaptation/toolkits/green-infrastructure-toolkit/getting-started-pilot-projects.html?chapter>



A Tiered Approach to Stormwater Management

Image Source: <https://vaunitedlandtrusts.org/member-news/nrlt-receives-grant-to-build-rain-garden-at-school/>



Focused Solution (small scale). Impact is limited to a specific property and may not address larger, systemic issues.

Image Source: <https://montgomerycomd.blogspot.com/2020/10/montgomery-countys-glenmont-forest-and.html/>



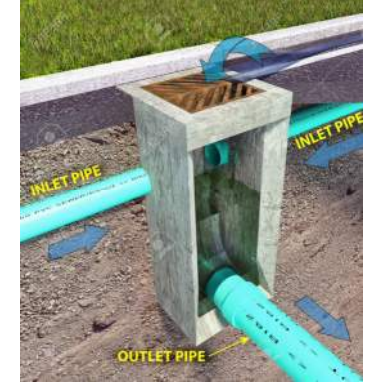
Systemic (medium scale): Impact extends through multiple properties

Image Source: <https://www.salisburypost.com/2023/03/10/stormwater-funds-used-to-replace-pipe-in-salisbury/>



Global (large scale). Impact

Image Source: <https://www.jolinpavingandexcavating.com/what-is-a-catch-basin-and-why-do-they-need-to-be-maintained/>



Solutions: Area of Concern #2 4101 Dresden St/10105 Summit Ave

Image Source: author



Problem: Flooding occurs near this inlet, obscured by vegetation.

Image Source: author



Problem: During intense rain events, owner reports storm water floods his basement.

<https://www.anokaswcd.org/blog/what-we-wish-we-knew-lessons-for-rain-garden-implementation.html>



Solution: Install raingarden/conservation and replace inlet.

Pros: Cost effective and beautifies an otherwise weedy area

Cons: Owner may reject the idea due to maintenance concerns.

<https://www.angi.com/articles/what-average-cost-add-exitwalk-out-my-finished-basement.htm>



Solution: Install a concrete sidewalk adjacent to the stairs with the cross slope facing away from the house.

Pros: This grey infrastructure solution requires no maintenance once installed.

Cons: Will increase impervious surface and potentially increase runoff elsewhere.

<https://www.alconcretelevelingnashville.com/additional-services/nashville-drainage-swales/>



Solution: Install drainage swale along garage that directs water away from the basement.

Pros: inexpensive solution that will not add impervious surface.

Cons: Existing, buried infrastructure may pose a problem to regrading.

Solutions: Area of Concern #3 4217 Dresden Street

Image Source: author



Problem: Flooding originates from an adjacent athletic court, flooding the backyard of 4212 Dresden St

Image Source: author



Problem: Flooding also stems from a second athletic court, causing flooding the backyard of 4212 Dresden St.

Image source: <https://www.montgomerycountymd.gov/water/rainscapes/garr ett-park.html>



Focused...

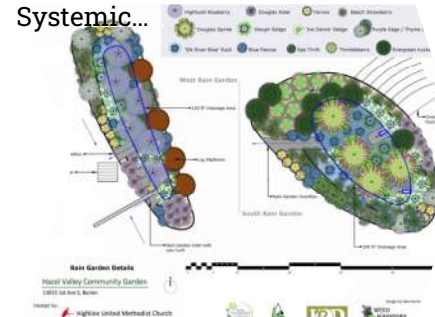
Solution: Install raingarden along fence to intercept stormwater flow from athletic facilities.

Pros: Cost effective and beautifies an otherwise vacant area.

Cons: May mitigate, but not completely solve the problem, especially during intense rain events..

<https://www.naturestewardswa.org/rain-garden-designs/>

Systemic...



Solution: Installing three rain gardens, one on the affected property and one for each adjacent property will provide better performance than one rain garden.

Pros: Increased stormwater infiltration.

Cons: Requires two property owners to solve a problem that is not their own.

Image source: <https://www.snyder-associates.com/projects/stormwater-drainage-improvements/>



Global...

Solution: Pipe water to Connecticut Avenue.

Pros: Removes flooding from this area of the Neighborhood.

Cons: Very expensive, and Does not treat stormwater. shifts problem "downstream".

Solutions: Area of concern #4: 4012 Dresden Street

Image Source: author



Problem: Water Floods the backyard via driveway.

Image source: <https://drainagekits.com/drainage-for-driveways/>



Solution: Install Trench drain along driveway and pipe to lower point.

Pros: Cost-effective and Small scale. Can be easily installed.

Cons: Solution may only mitigate flooding, but not prevent it entirely. Moves the problem to another property potentially.

Image source: <https://www.montgomerycountymd.gov/water/restoration/green-streets.html>



Solution: Install bioswales along right of way.

Pros: Infiltrates stormwater from the street and adds beautification.

Cons: Limits walkability. May impact existing utilities

Image source: <https://www.snyder-associates.com/projects/cost-saving-method-street-rehabilitation/>



Solution: Regrade road and install concrete aprons per town codes.

Pros: significantly reduces flooding.

Cons: Large disturbance and high cost.

Solutions: Area of Concern #6: St, 4001 Everett St, 4005 Everett & St, 4009 Everett St

Image Source: author



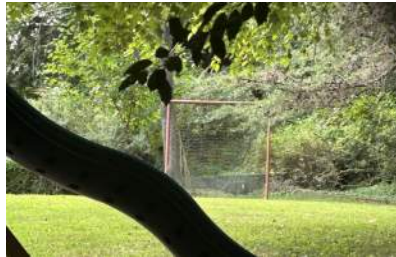
Problem: 4001 Everett St. flooding occurs from an inadequately sized pipe and inlet.

Image Source: author



Problem: 4005 Everett St. Stormwater runs in a heavy flow through the backyard.

Image Source: author



Problem: The Backyard of 4009 Everett Street floods during rain storms..

Image Source: author



Problem: 4017 Everett St. is ground zero for flooding due to recent development that directs flow to other properties

<https://inhabitect.com/solutions/rain-gardens/>



Solution: Each property may benefit from installing or extending a rain garden.

Pros: Inexpensive to install.

Cons: Rain gardens may not adequately treat stormwater runoff originating from ground zero during more intense rain events.

<https://fknursery.com/rain-gardens-and-bioswales/>



Solution: Create a treatment Train that integrates bioswales and raingardens Starting from 4017 Everett St.

Pros: Creates a continuous Treatment that can handle more intense rain events. A grass swale is also a suitable alternative.

Cons: Requires coordination among neighbors.

Image source: <https://www.snyder-associates.com/projects/stormwater-drainage-improvements/>



Solution: Pipe water to Connecticut Avenue system through the church parking lot system.

Pros: Removes flooding from this area of the Neighborhood.

Cons: Very expensive, and Does not treat stormwater. shifts problem "downstream".

Solutions: Area of Concern #7: 4016 Everett St and 4004 Everett St.

Image Source: author



Problem: Stormwater floods backyard from uphill, saturates the soil, and forms a rivulet at the low point.

Image Source: author



Problem: During intense rain events, owner reports 20 foot wide stream running through his property.

<https://extension.okstate.edu/fact-sheets/sustainable-landscapes-designing-a-rain-garden-for-residential-property.html>



Focused...

Solution: Install raingarden on both properties to increase infiltration rate.

Pros: Cost effective and will likely solve the problem completely

Cons: Owners may reject the idea due to maintenance concerns

<https://www.pgh2o.com/news-events/news/newsletter/2021-06-29-stormwater-tip-how-are-bioswales-and-rain-gardens-different>



System.

Solution: Install bioswale along both properties and properties in between to create a "treatment" train.

Pros: Benefits multiple properties. If a bioswale is too costly to install/maintain or aesthetically undesirable, a grass swale is another alternative.

Cons: Requires cooperation and coordination between neighbors, who may not agree that this is a solution they want to support.

Image source: <https://www.snyder-associates.com/projects/storm-water-drainage-improvements/>



Global.

Solution: Pipe water to Connecticut Avenue.

Pros: Removes flooding from this area of the Neighborhood.

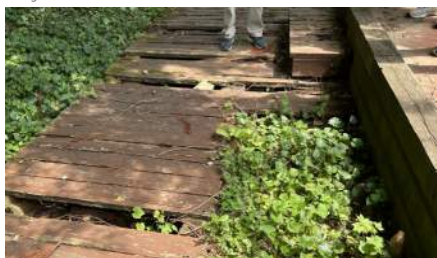
Cons: Very expensive, and Does not treat stormwater. shifts problem "downstream". Invasive to numerous homeowners' properties

Solutions: Area of Concern #8: 4013 Glenrose Road

Image Source: author



Image Source: author



Problem: Stormwater floods backyard from uphill and from adjacent properties to the west, turning it into a stream. The space becomes unusable.

Image Source: <https://www.pdgardendesigns.co.uk/gallery/>



Solution: Install rain garden to increase infiltration rate.

Pros: Can incorporate an elevated structure to turn an unused space into an amenity space.

Cons: Will require the removal of two specimen bald cypress trees.

Image Source: <https://www.pdgardendesigns.co.uk/gallery/>



Solution: Install bioswale along upstream properties to create a "treatment" train.

Pros: Benefits multiple properties. If a bioswale is too costly to install/maintain or aesthetically undesirable, a grass swale is another alternative.

Cons: Requires cooperation and coordination between neighbors.

Image source: <https://www.snyder-associates.com/projects/stormwater-drainage-improvements/>



Solution: Pipe water to Connecticut Avenue.

Pros: Removes flooding from this area of the Neighborhood.

Cons: Very expensive, and Does not treat stormwater. shifts problem "downstream".

Solutions: Area of concern #10: 4011 Glenridge Street

Image Source: author



Problem: Water from the roadway and adjacent properties floods the backyard by running off the driveway

Image source: <https://www.montgomerycountymd.gov/water/raiscapes/garrett-park.html>



Solution: Driveway strip pavement removal.

Pros: cost-effective, minimal disturbance Beautification.

Cons: Property owner may Reject idea, might not solve flooding problem

Image source: <https://www.cityofpaloalto.org/Departments/Public-Works/Watershed-Protection/>



Solution: Construct planters along the road.

Pros: Infiltrates more Stormwater, benefits more Homeowners, beautification.

Cons: More expensive, reduces/removes on street Parking.

Image source: <https://www.snyder-associates.com/projects/stormwater-drainage-improvements/>



Solution: Pipe water to Connecticut avenue.

Pros: Removes flooding from this area of the Neighborhood.

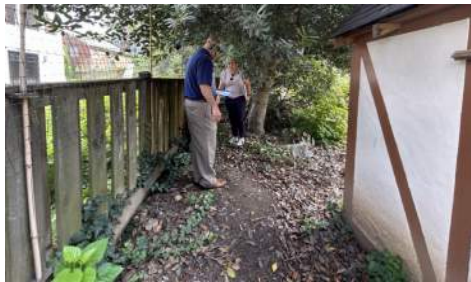
Cons: Very expensive, Does not treat stormwater shifts problem "downstream"

Solutions: Area of Concern #11 4405 Saul Road

Image Source: author

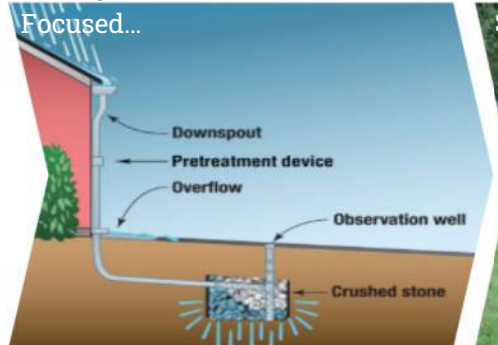


Image Source: author



Problem: Stormwater floods backyard from adjacent property, causing water damage to the owner's shed.

Image source: <https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/fact-sheets/Buried-Dry-Well-Maintenance.pdf>



Solution: Dry well
Collects water from roof

Pros: Cost-effective and Small scale. Treats Stormwater.

Cons: Only treats stormwater from roof.

Image source: <https://www.montgomerycountymd.gov/water/rainscapes/garrett-park.html>



Solution: Plant raingarden on both sides of the fence, improving drainage for both properties

Pros: Benefits both property owners and should not be costly to install.

Cons: Solution dependent on property owner's choice.

Image source: <https://www.snyder-associates.com/projects/storm-water-drainage-improvements/>



Solution: Pipe water to Cedar Lane.

Pros: Removes flooding from this area of the Neighborhood.

Cons: Very expensive, and Does not treat stormwater. shifts problem "downstream".

Solutions: Area of concern #12: 4217 Dresden Street

Image Source: author



Image Source: author



Problem: Neighbor's front yard is flooded from the road and an adjacent neighbor's property.

Image source: <https://www.stormwater.com/home/article/21114356/project-profile-greening-the-streets-of-queens>



Solution: Replace asphalt apron with bioretention.

Pros: Provides infiltration and beautification as well as habitat. In the right of way.

Cons: There may be conflict with underground utilities.

Image source: <https://www.montgomerycountymd.gov/water/rainscapes/communities.html>



Solution: Plant bioretention on neighbor's steep hill.

Pros: Benefits both property owners and should not be costly to install.

Cons: Solution dependent on property owner's choice.

Image source: <https://www.snyder-associates.com/projects/stormwater-drainage-improvements/>



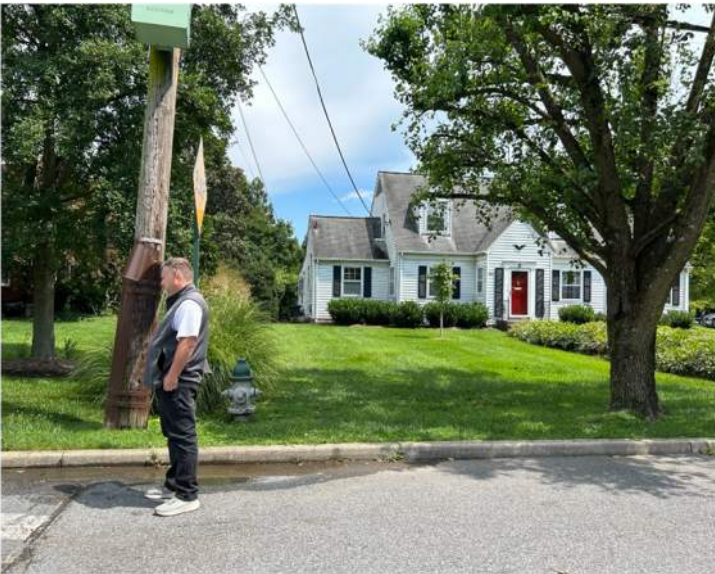
Solution: Pipe water to Cedar Lane.

Pros: Removes flooding from this area of the Neighborhood.

Cons: Very expensive, and Does not treat stormwater. shifts problem "downstream".

Solutions: Area of concern #13: 9905 Summit Avenue

Image Source: author



Problem: Standing water by ornamental grass due to flat slopes of road and poor onsite grading

Image source: <https://www.montgomerycountymd.gov/water/restoration/forest-estates.html>



Focused...

Solution: Rain garden
Infiltrates stormwater.

Pros: Cost-effective and Small scale.
Beautification.

Cons: Solution is targeted and does not address the street holistically.
Requires construction on private properties

Image source: <https://www.chesapeakebay.net/news/blog/green-infrastructure-benefits-extend-beyond-stormwater>



Systemic...

Solution: Extend curb 5 feet
And plant street trees,

Pros: Addresses the entire street. Provides shade and beautification.

Cons: Solution is more expensive and will limit On-street parking.

Image source: <https://www.snyder-associates.com/projects/stormwater-drainage-improvements/>



Global...

Solution: Pipe water to Cedar lane.

Pros: Removes flooding from this area of the Summit Avenue.

Cons: Very expensive, Does not treat stormwater. shifts problem "downstream".

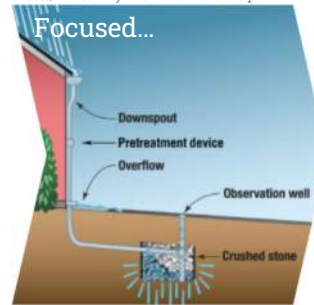
Solutions: Area of concern #14: 4205 Saul Road

Image Source: author



Poor Grading leads to water flooding this backyard

Image source: <https://www.montgomerycountymd.gov/DEP/Resources/Files/downloads/stormwater/factsheets/Buried-Dry-Well-Maintenance.pdf>



Solution: Dry well
Collects water from roof

Pros: Cost-effective and Small scale. Treats Stormwater.

Cons: Only treats stormwater from roof.

Image source: <https://ecobrooklyn.com/garden/bioswale-basics/>



Solution: Regrade and plant property to slow runoff

Pros: Treats a wider area of Stormwater. Beautification and low impact.

Cons: May disturb Infrastructure underground.

Image source: <https://www.snyder-associates.com/projects/stormwater-drainage-improvements/>



Solution: Pipe water to existing public utilities.

Pros: Removes flooding from this area of the Neighborhood.

Cons: Very expensive, Does not treat stormwater. shifts problem "downstream".

Solutions: Area of concern #15: 4012 Cleveland Street

Image Source: author



Image source: <https://www.montgomerycountymd.gov/water/rainscapes/index.html>



Image source: https://www.monmouth.edu/uci/wp-content/uploads/sites/58/2020/10/obropta_am.pdf



Image source: <https://www.snyder-associates.com/projects/stormwater-drainage-improvements/>



Image Source: Google Street View



Problem: Standing water by the hedge on the right. Water from culvert floods backyard.

Solution: Rain garden in lieu of shrub boarder.

Pros: Provides infiltration and beautification as well as habitat. Not as costly as other solutions.

Cons: May result in tree removal in order to regrade the area.

Solution: Reduce 25 foot road install planters along curb.

Pros: Addresses the larger scale issue of stormwater flooding from the right of way.

Cons: Expensive and does not solve the issue of standing water beneath the hedge. Reduces on-street parking.

Solution: Pipe water to Cedar Lane.

Pros: Removes flooding from this area of the Neighborhood.

Cons: Very expensive, and Does not treat stormwater. shifts problem "downstream".