Green Infrastructure
PLAN

CITY OF CAMBRIDGE, MARYLAND




MAKE CAMBRIDGE RESILIENT INITIATIVE

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CAMBRIDGE GREEN INFRASTRUCTURE PLAN

Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments. In conjunction with grey infrastructure, interconnected networks of green infrastructure can enhance community resiliency by increasing water supplies, reducing flooding, combatting urban heat island effect, and improving water quality.

Source: EPA Publication #8 3 2 F1 4 0 0 7

As part of the Make Cambridge Resilient Initiative, development of the Cambridge Green Infrastructure (GI) Plan was initiated to identify and plan both short and long-term green infrastructure opportunities and projects. Prior to completion of the GI plan, the Mill Street Nature Way project was initiated, and community design green infrastructure charrettes were held. In addition, public outreach including the "Soak Up the Rain" evening event and rain barrel give-away, with installation assistance provided. Thereafter, the development of a detailed Plan was undertaken to further identify, analyze, and implement high priority green infrastructure projects and policies. Funding for this planning project was provided by FEMA through their Hazard Mitigation Assistance Grant, Community Development Program.

Strategically planning and designing **Green Infrastructure** throughout the City of Cambridge with an emphasis on mitigating flooding by slowing and reducing stormwater runoff is an integral part of the Make Cambridge Resilient Initiative. As seen in recent years, more frequent and severe storm events with heavy precipitation have caused significant issues for those who live, work, and visit the City of Cambridge. As localized flooding has continued to plague the city, the installation of green infrastructure can assist with the absorption of water thereby reducing pooling or flooding in streets. This water absorption will also serve to reduce pollutants within the storm water system, which eventually outlets to Cambridge Creek, Choptank River and other waterways, improving water quality. A city-wide approach that includes social equity and prioritizes neighborhoods that experience stormwater issues and may lack open green space and recreation areas has been undertaken as part of this strategic planning process.

Benefits of Green Infrastructure

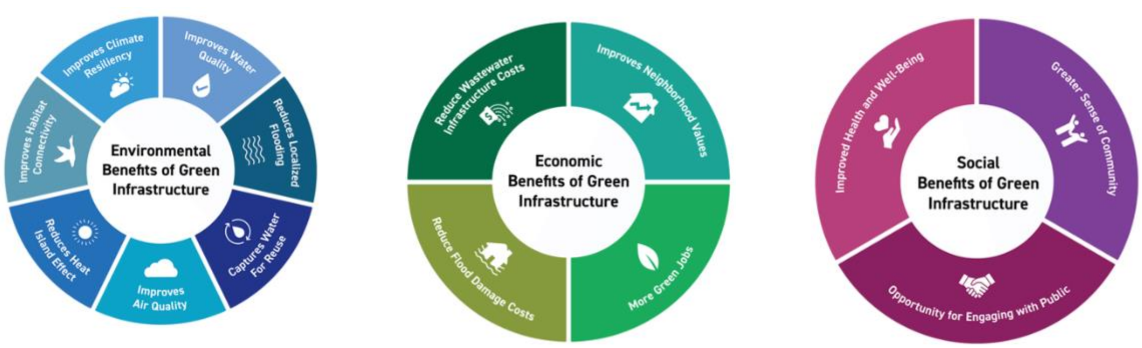
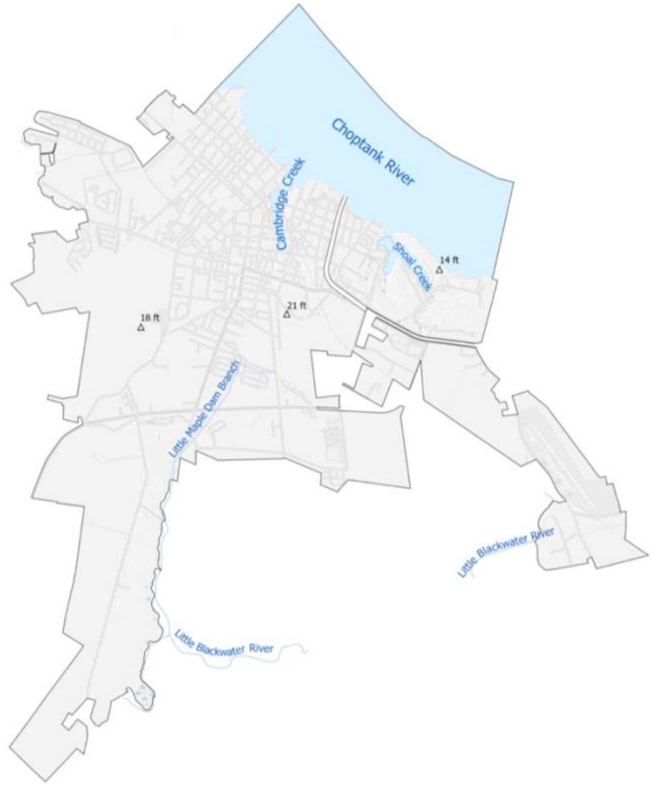


Figure 1: EPA https://www.epa.gov/green-infrastructure/economic-benefits-green-infrastructure

Planning Area

The City of Cambridge, located along the Choptank River, is the seat of Dorchester County and the county's largest municipality. Originally, the Algonquian-speaking Choptank Indians resided along the river bearing their name. In 1684, English colonist settled the area, making Cambridge one of the oldest colonies cities in Maryland.[i] More than one hundred years after settlement, Cambridge was officially incorporated in 1793.



Map 1: Location Map, SP&D

Cambridge covers approximately ten square miles (6,575 acres).[ii] The landscape is relatively flat, ranging from near seal level to upper elevations reaching 20 feet above sea level. Moving southeast, the land is low, and a network of tidal streams scores the landscape. Many of these stream channels and natural drainage ways have long ago been lost to poor land management and urban development. A combination of high-water tables, soils that do not drain well, low elevations, subsidence and sea level rise creates a situation where rainwater and tides heavily influenced the landscape. Rain events during high tides and strong southerly winds lead to substantial flooding throughout parts of Cambridge. The Choptank River and Cambridge Creek are primary receiving waters for runoff of nutrients, bacteria, sediment, toxics, and metals from urban land. Cambridge influences the water quality of the Little Blackwater River, which is in the Fishing Bay watershed, and Fishing Creek, which is in Little Choptank River watershed.

The City of Cambridge has major risk from flooding. According to First Street, provider of climate risk data, this year 20.9% of properties in Cambridge have risk of flooding. There are 2,576 properties in Cambridge at risk of flooding over the next 30 years. This represents 33.7% of all properties in Cambridge.[iii] Through the Make Cambridge Resilient Initiative, planning and projects that reduce flooding, improve water quality, and enhance habitat are being undertaken, as evidenced by the completion of this plan.

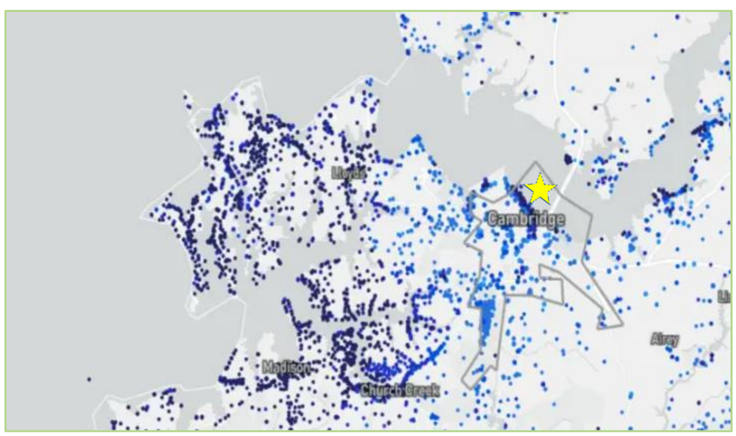


Figure 2: [First Street Cambridge Flood Map]

Stakeholder Group & Public Participation

The Make Cambridge Resilient Initiative has a broad and robust Stakeholder Group. Members of the group along with downloadable meeting notes are available on the project website. Green infrastructure (GI) projects and planning products are shared with this group periodically for review, discussion, and written comment.

The Make Cambridge Resilient Initiative project website includes a page dedicated to Green Infrastructure. Updates to the page are made periodically. Public outreach events, planning charettes, and GI project information are uploaded to the website. Examples of GI public participation include:

- **Soak Up the Rain** public outreach event held on May 7, 2024. This event was cohosted by the City of Cambridge - Make Cambridge Resilient Initiative and ShoreRivers. Ideas for soaking up the rain on residential property were presented. Participants were also provided rain barrels.
- A targeted meeting for property owners in the Mill Street Nature Way area was held in September 2023. The purpose of the meeting was to obtain comments from affected property on the initial concept design for the **Mill Street Nature Way Extended** GI project. The Mill Street Nature Way Extended project was an opportunity for a GI project on private property. At that time, initial property owner letters of support were gathered and subsequently a project grant application was submitted in December 2023. The Mill Street Nature Way grant application was awarded in 2024. Two design charrettes were held in October of that same tear, resulting in a final community concept design.

Green Infrastructure & Social Equity

Green infrastructure can help to reduce the disproportionate impacts of stormwater and flooding underserved communities especially in the era of climate change.

Green infrastructure can also provide additional benefits to communities:

- Increased access to green space.
- Cooling and relief from the sun.
- Traffic-calming.
- Community gathering spaces and natural beauty.

Using green infrastructure practices can help to remedy inequities in access to these amenities that exist between neighborhoods or between demographic groups.[iv] As part of this plan development and assessment, planning areas (election wards) have been assessed to identify existing green infrastructure and those planning areas that are lacking green infrastructure. Planning areas that were identified as lacking green infrastructure, including green spaces and community recreation areas, have been prioritized and existing community parks within each election ward have been identified.

House Bill 503: Natural Resources – Greenspace Equity Program – Establishment
Natural Resources to provide grants to eligible applicants for enhancing the public health and livability of overburdened communities and underserved communities by implementing projects to preserve, create, and enhance community greenspace; requiring the Department to submit certain grant applications to the Maryland State Clearinghouse for Intergovernmental Assistance; establishing that certain grant applications are subject to approval by the Board of Public Works; establishing the Greenspace Equity Advisory Board in the Department to serve as a consultant to the Department in the implementation and administration of the Program; and generally relating to the Greenspace Equity Program.

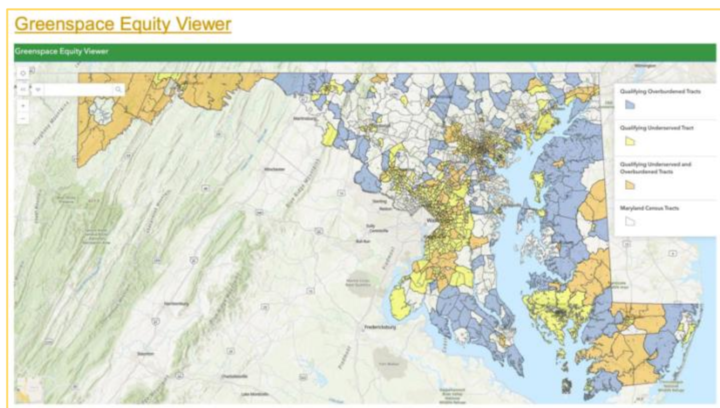
“Overburdened community” means any census tract for which three or more of the following environmental health indicators are above the 75th percentile statewide:

- Particulate matter (PM) 2.5;
- Ozone;
- National Air Toxics Assessment (NATA) diesel PM;
- NATA cancer risk;

- NATA respiratory hazard index;
- Traffic proximity;
- Lead paint indicator;
- National Priorities List Superfund site proximity;
- Risk Management Plan facility proximity;
- Hazardous waste proximity;
- Wastewater discharge indicator;
- Proximity to a Concentrated Animal Feeding Operation (CAFO);
- Percent of the population lacking broadband coverage;
- Asthma emergency room discharges;
- Myocardial infarction discharges;
- Low–birth–weight infants;
- Proximity to emitting power plants;
- Proximity to a Toxic Release Inventory (TRI) facility;
- Proximity to a brownfields site;
- Proximity to mining operations; and
- Proximity to a hazardous waste landfill.

“Underserved community” means any census tract in which, according to the most recent U.S. Census Bureau Survey:
- At least 25% of the residents qualify as low–income;
- At least 50% of the residents identify as nonwhite; or
- At least 15% of the residents have limited English proficiency.

The Greenspace Equity Program is designed to provide and administer grants to eligible applicants for enhancing the public health and livability of overburdened communities and underserved communities by implementing projects to preserve, create, and enhance community greenspace.
- Makes conservation more equitable
- Meets community needs for greenspace
- Supports on the ground partners



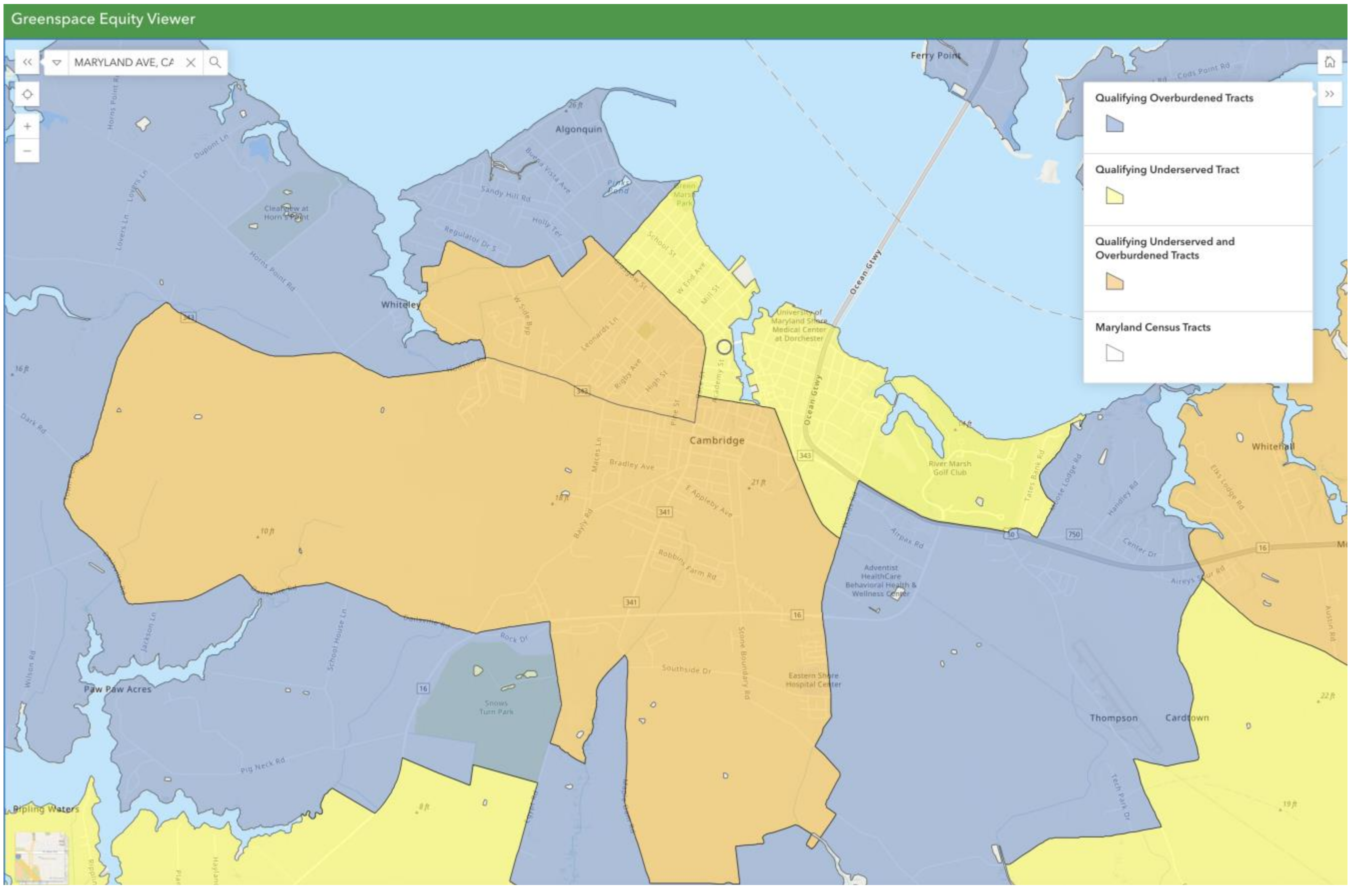
To visualize greenspace equity programs census track information, a greenspace equity viewer was developed.

Eligible applicants for the Greenspace Equity Program includes both county and municipal governments, and a land trust or nongovernmental organization located or working in an overburdened community or an underserved community where a project is proposed to be implemented. Greenspace Equity is a reimbursable grant program. DNR will reimburse the applicant for approved project costs when proper documentation is provided with the reimbursement request.

Types of eligible projects include:
- Acquisition of land in fee simple or the acquisition of a perpetual conservation easement to create a new community greenspace.
- Activities to develop a property for public use and improve the conservation value of a property including development of a community greenspace (Stewardship as defined in legislation).

“Stewardship” means activities undertaken develop a property for public use; and improve the conservation value of the property.

The Greenspace Equity Viewer displaying the City of Cambridge indicates that the shoreline area is a **qualifying underserved census tract**, while the remaining two census tracts are orange, indicating **both qualifying underserved and overburdened census tracts**.



Green Infrastructure Best Practices

The first step in the Cambridge Green Infrastructure (GI) Plan process was the development of the Cambridge, MD Preferred Practices for Green Infrastructure Appendix. The guidance provides a review of various handbooks, manuals, and best management practices. Applicable best management practices that could be implemented specific to the City of Cambridge were identified and detailed therein.

The appendix assisted in guiding the analysis, review, and prioritization of suitable locations and associated green infrastructure practices included within this plan, which was developed to complement this analysis as a next step.

Existing & Planned Green Infrastructure Projects

Several green infrastructure projects have been completed within the City of Cambridge over the past decade.

- Bioretention cells installed and porous pavers in the parking areas along Maryland Avenue were constructed in the fall of 2014. This project was funded by the Chesapeake Bay Trust, Green Streets, Green Jobs, and Green Towns Partnership (G3).
- Green infrastructure installation in Long Wharf Park, fronting the Choptank River included bioretention cells and porous pavers in Long Wharf Park. This project was funded by the Chesapeake Bay Trust, Green Streets, Green Jobs, and Green Towns Partnership (G3).
- Private developer installation of bioretention facility and porous pavers at the Phillip's Packing House.

In addition, there are several green infrastructure projects in the planning and/or design phase within the City of Cambridge. These projects are slated for installation within the next few years.

- Peachblossom Creek Stream Restoration Project – Peachblossom Creek is s a stream that discharges into Cambridge Creek at Cedar Street which is a source of flooding affecting Ceder Street during high tides and major storms. The City has developed a project that would include restoration of 805 linear feet of Peachblossom Creek and the replacement of the culverts under Cedar Street. It is critical that the City complete the design and construction of this project in concert with the Cedar Street flood mitigation project to mitigate the impacts of flooding on Cedar Street. Based on initial cost information developed for the original design in 2017, adjusted for inflation, the estimated cost for the stream restoration is ~$900K and the culvert replacement is ~$300k for a total construction cost of ~$1,200K. Cost to update the design is ~ $100K.
- Mill Street Nature Way will be installed behind the old Mill Street School that is planned for residential redevelopment.
- Wetland restoration during the development of the new Leonard Lane Park. A grant application was submitted in December 2025 to Maryland DNR to restore 1.2 acres of wetlands in Leonard's Lane Park.
- A grant application through the Department of Transportation, RAISE Discretionary Grant Program for the Cedar Street Project has been submitted. The project area is located is Cedar Street between Dorchester Avenue and Pine Street. The activities attached to the RAISE grant proposal include:
    - Replacement of three aged culverts.
    - Creating a Green Street.
    - Creating connected, ADA compliant sidewalks on both sides of the street.
    - Creating bike lanes.
    - Installing proper lighting and signage.
    - Identifying and implementing Best Management Practices (BMPs) for stormwater to address identified drainage and flooding problems. These will include bioretention area “bump-outs,” permeable pavers, porous concrete sidewalks, catch basin water quality devices, trees, and rain gardens.

Cambridge Green Infrastructure Assessment

The purpose of the Cambridge Green Infrastructure Assessment (CGIA) is to identify vacant parcels, both privately and publicly owned, that could add significant value to the city’s flood risk reduction efforts, open space, habitat enhancements, 6, in the form of a green infrastructure. The results of the assessment: a potential citywide green infrastructure network and strategies that can be applied at the neighborhood scale. This assessment provides a tool that can be used to:

- Improve stormwater management and flood risk reduction strategies,
- Inform future planning, specifically the City’s Comprehensive Plan Update,
- Leverage public and private development,
- Prioritize acquisition, conservation, and restoration,
- Secure implementation funding,
- Enhance the tree canopy,
- Increase pedestrian and bicycle connections, and
- Promote Cambridge as a resiliency model for other municipalities.

To conduct the CGIA, various steps were undertaken.

- Step 1 – Vacant Parcel Inventory
- Step 2 – Prioritization Considerations Applied to Vacant Parcel Inventory
- Step 3 – Examination for GI Suitability & Opportunity Per Ward
- Step 4 – Strategic Actions & Recommendations

Step 1 Vacant Parcel Inventory

The vacant parcel inventory was developed using multiple datasets. These various datasets were integrated into a single database using Maryland State Department of Taxation (SDAT) identification number and parcel identification number. Departments and agencies that contributed to this integrated dataset included:

- City of Cambridge Department of Public Works – Wards (Planning Areas)
- Dorchester County Building Footprints
- Maryland State Department of Taxation (SDAT)

Vacant parcel means a **parcel of land** which contains no buildings or structures which are intended for habitation or public use.[v] The City of Cambridge includes over 869 parcels which have been identified as vacant. This assessment evaluates the potential for vacant parcels to contribute to the City's green infrastructure.

Table 1. Citywide Vacant Parcel Inventory by Vacancy Type

Parcels	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Totals
Vacant Lots						
Vacant Parcels Publicly Owned	5	5	53	10	19	90
Vacant Parcels Privately Owned	64	137	228	222	122	776
Total Vacant Lots	**69**	**142**	**281**	**232**	**141**	**866***

Source: Smith Planning & Design; City of Cambridge GIS Data: Wards & Parcels; Dorchester County GIS Data: Building Footprints; MD Department of Planning: Parcels.

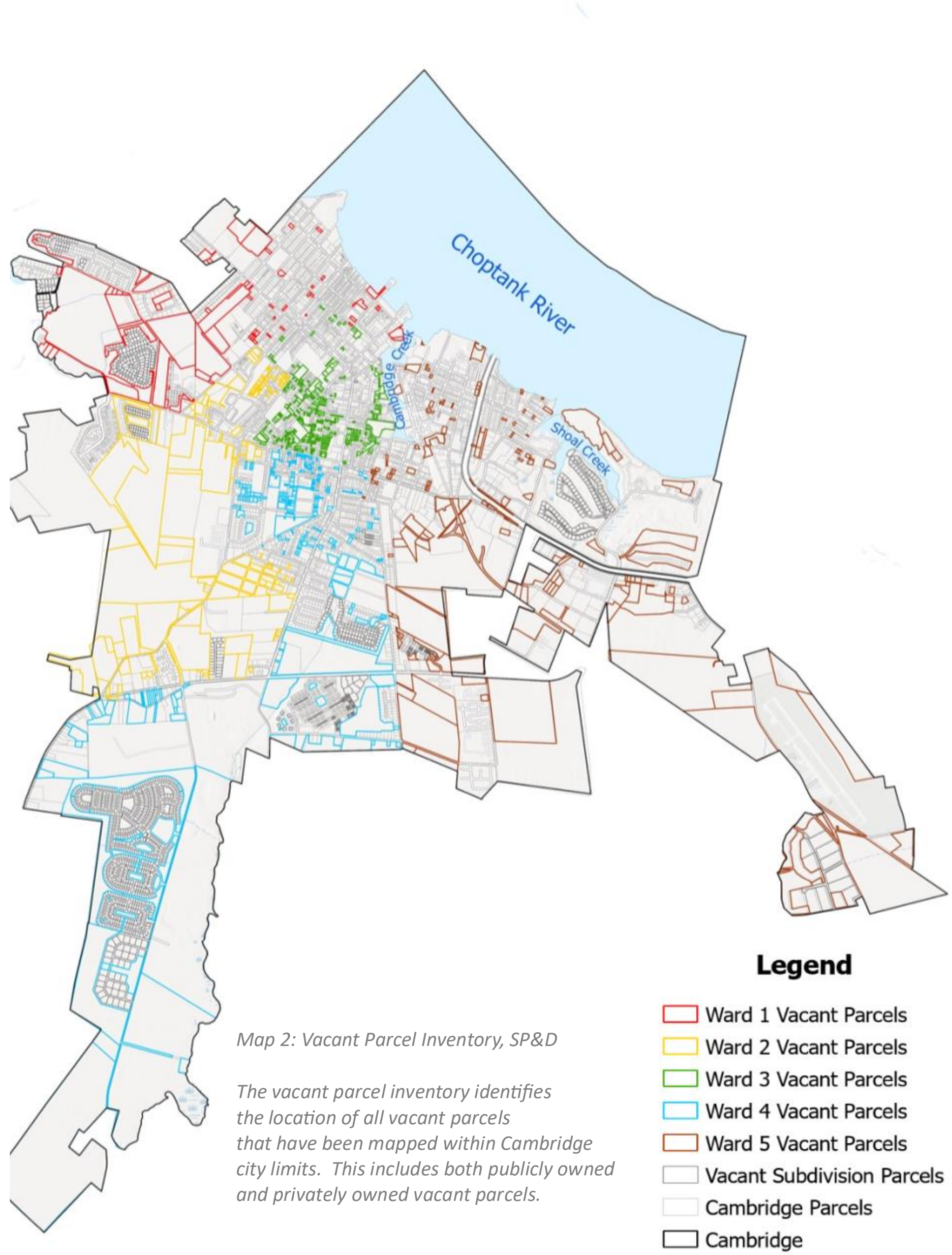
**Note: Vacant subdivision parcels are denoted in dark gray on the map and have not been included in the numbers listed in the table above.*

Vacant Parcel Inventory (VPI)

The Citywide Vacant Parcel Inventory was used in evaluating the suitability of vacant parcels to identify potential sites for the installation green infrastructure best management practices to reduce flood risk, improve water quality, expand the network of existing conserved lands including parks, community gardens, outdoor classrooms, and trail connections.

The vacant parcel inventory was developed using multiple datasets. These separate datasets were integrated into a single ArcGIS database based on Maryland State Department of Taxation tax identification number. This database was not previously available and was developed as part of this planning process. As new information becomes available, the City may update, at their discretion. In addition, associated shapefiles were developed and resulted in various mapping exhibits used throughout this plan.

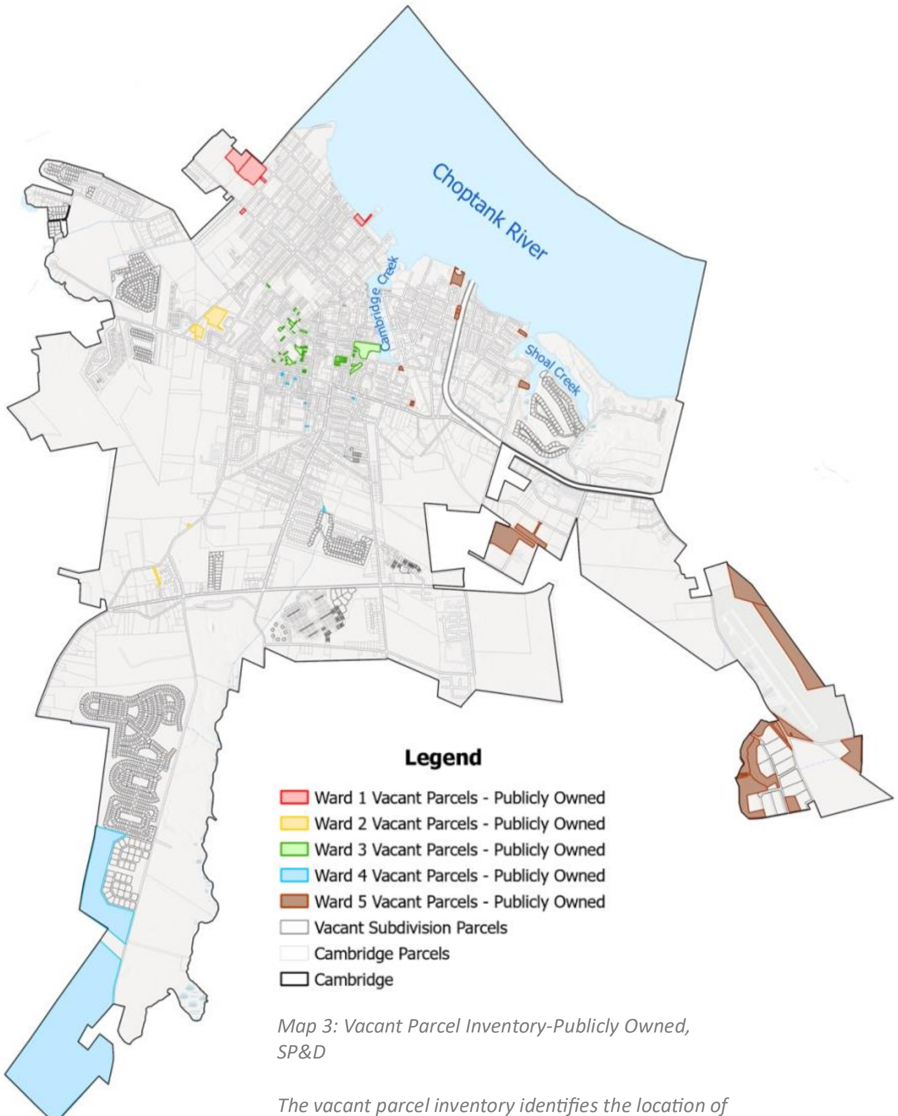
The City of Cambridge includes five election districts or wards. Each ward has been identified and color coded to correspond with the **Citywide Vacant Parcel Inventory by Vacancy Type** table on the previous page.



Map 2: Vacant Parcel Inventory, SP&D

The vacant parcel inventory identifies the location of all vacant parcels that have been mapped within Cambridge city limits. This includes both publicly owned and privately owned vacant parcels.

Vacant publicly owned parcels total eighty-nine are distributed throughout the five wards.



Map 3: Vacant Parcel Inventory-Publicly Owned, SP&D

The vacant parcel inventory identifies the location of all vacant parcels that have been mapped within Cambridge city limits. This includes both publicly owned vacant parcels only.

Step 2 Applying Prioritization Considerations to Vacant Parcel Inventory

To prioritize parcels within the Vacant Parcel Inventory (VPI) for potential Green Infrastructure (GI) opportunities, the following considerations were applied to all publicly owned vacant parcels. The VPI database was expanded to include these items for consideration, within six separate columns, answering yes/no for each item listed, per parcel. The VPI is organized by election ward. Those parcels meeting items #1, and #2 or #3, were further examined in Step 3.

1. More than 0.5 acres and/or contiguous vacant parcels or adjacent to other designated open space/recreation parcel.
2. Parcel located on roadway identified as a nuisance flood location. *Nuisance flood roadways were identified using information from various planning documents and the Make Cambridge Resilient Initiative 2024 Public Survey.*
3. Parcel located within a FEMA floodplain, see Map 4. *Specifically, the FEMA designated Special Flood Hazard Area (SFHA) or 1% annual chance event. The area formerly referred to as the 100-year floodplain.*
4. Parcel intersects with existing wetland, see Map 5.
5. Parcel includes hydric soils, see Map 6. *Indicating poorly drained soil, potential suitability for wetland.*
6. Parcel located within or adjacent to Maryland Habitat Connectivity Network- Hubs, Corridors, & Gaps, see Map 7.

One additional column was added to the VPI to indicate whether the parcel meets criteria #2 and/or #3, with Yes/No.

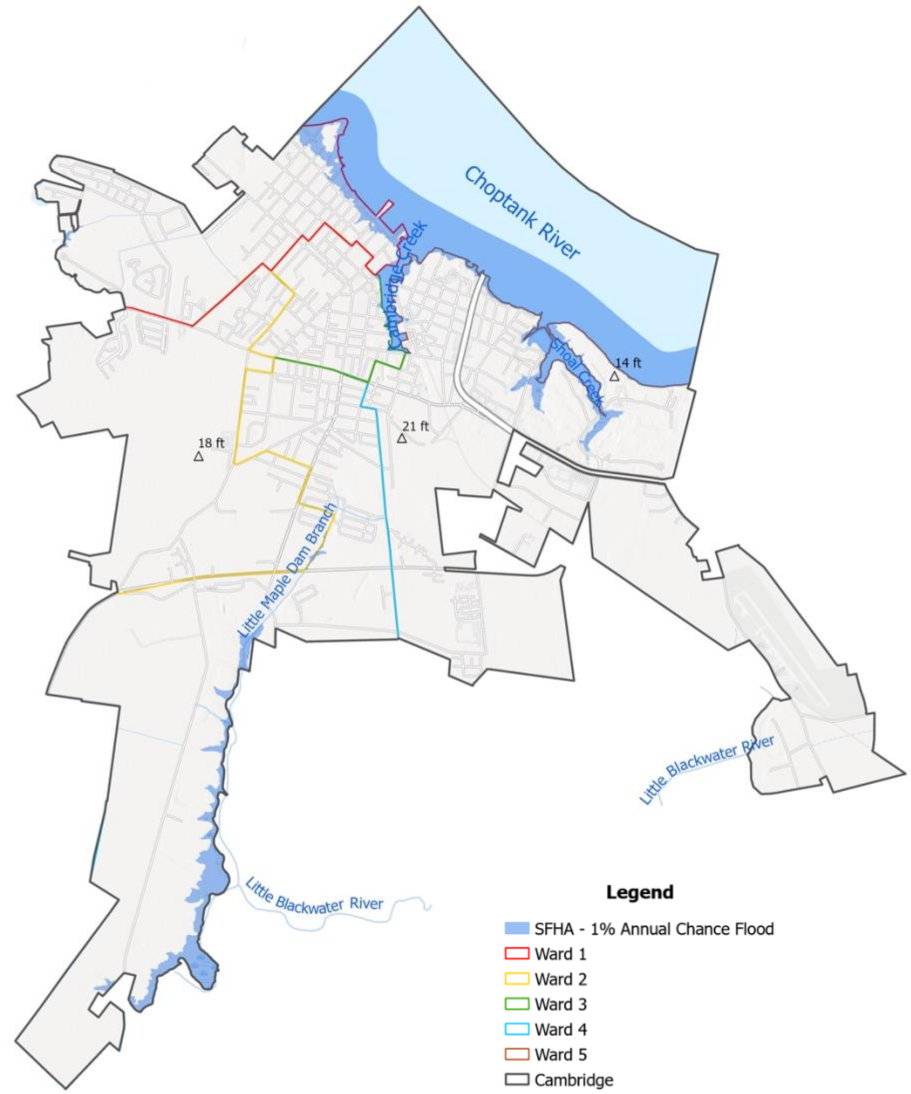
Note: These considerations were applied to privately owned parcels within the VPI, as well, except for the first two items on the listing above.

FEMA Special Flood Hazard Area

The National Flood Hazard Layer (NFHL) data incorporates all Flood Insurance Rate Map (FIRM) databases published by the Federal Emergency Management Agency (FEMA), and any Letters of Map Revision (LOMRs) that have been issued against those databases since their publication date. It is updated monthly. The FIRM Database is the digital, geospatial version of the flood hazard information shown on the published paper FIRMs. The FIRM Database depicts flood risk information and supporting data used to develop the risk data. One of the primary risk classifications used is the 1-percent-annual-chance flood event, formally known as the 100-year floodplain, and is shown on the Map. The FIRM is the basis for floodplain management, mitigation, and insurance activities for the National Flood Insurance Program (NFIP).

A Special Flood Hazard Area (SFHA) and has a 1% chance of flooding each year. The SFHA is a high-risk flood zone that is close to bodies of water, like rivers, lakes, and floodplains.

Parcels within the inventory were assessed to determine which parcels, if any, were included within the SFHA. These parcels were identified within the VPI.



Map 4: FEMA SFHA - 1% Annual Chance Flood, City of Cambridge, MD, SP&D

The vacant parcel inventory identifies the location of all vacant parcels. Each parcel was assessed to determine 1-percent-annual-chance flood event area inclusion.

Wetlands

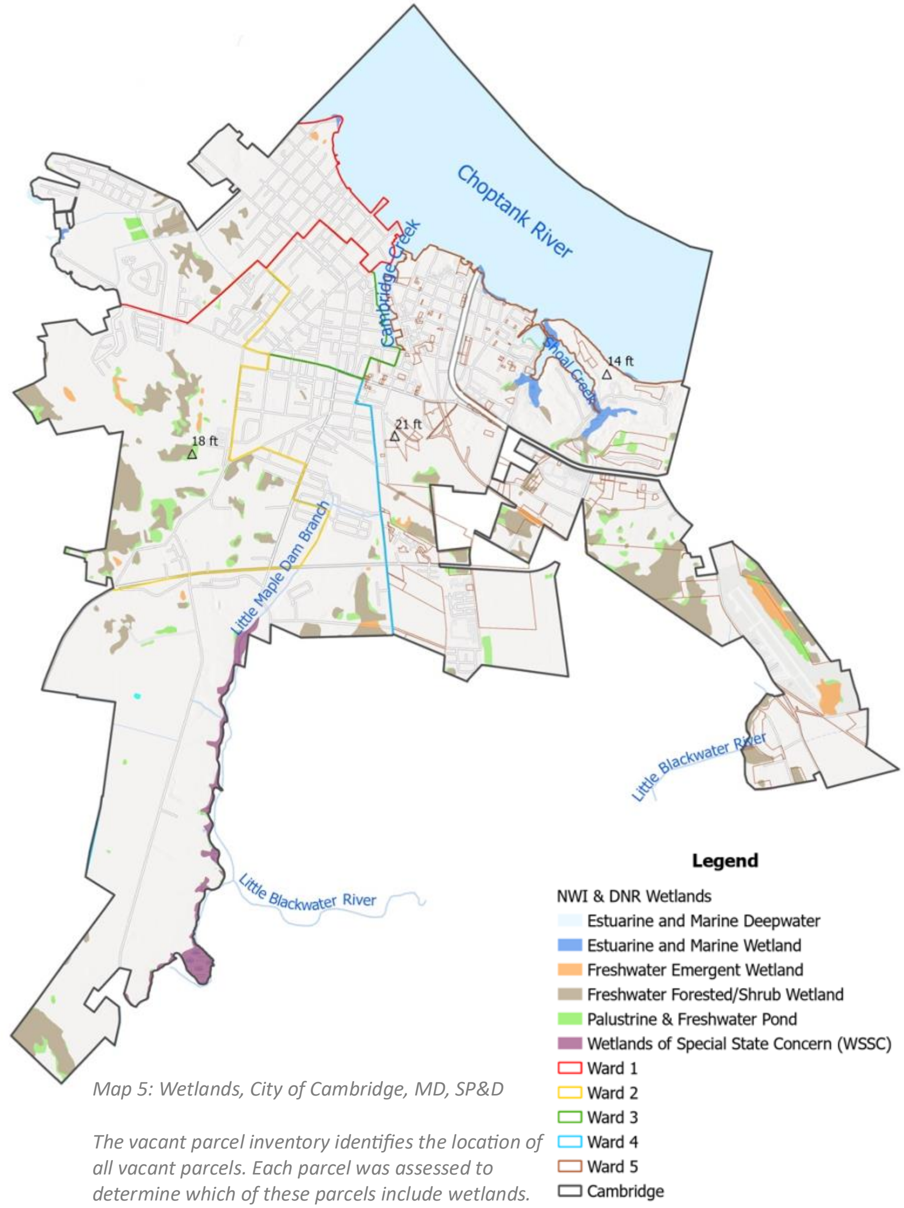
Parcels within the inventory were assessed to determine which parcels, if any, include wetlands. These parcels were identified within the VPI. Wetlands are areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season. Water saturation (hydrology) largely determines how the soil develops and the types of plant and animal communities living in and on the soil. Wetlands may support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants (hydrophytes) and promote the development of characteristic wetland (hydric) soils.[vi]

In Maryland certain wetlands with rare, threatened, endangered species or unique habitat receive special attention. The Code of Maryland Regulations (COMAR) Title 26, Subtitle 23, Chapter 06, Sections 01 & 02 identifies these Wetlands of Special State Concern (WSSC) and affords them certain protections including a 100-foot buffer from development. The Maryland Department of the Environment is responsible for identifying and regulating these wetlands.

Wetlands of Special State Concern (WSSC) in Maryland are designated for special protection due to their ecological and educational importance, or because they harbor rare or endangered species.

Note: Both the National Wetlands Inventory (NWI) and Maryland Department of Natural Resources Wetland Inventory are included on Map 5. *DNR wetlands data,* supplement NWI datasets, *Maryland iMap Maryland Wetlands - Wetlands, Polygon.*

MD DNR has identified a Palustrine wetland type located in the City of Cambridge. Palustrine wetlands are characterized by their dominance of trees, shrubs, and other vegetation, and they are not significantly affected by tidal waters. These wetlands are typically small and shallow, and they can be found in both floodplain and non-floodplain areas. Examples of palustrine wetlands include bogs, fens, swamps, billabongs, springs, and soaks.



Map 5: Wetlands, City of Cambridge, MD, SP&D

The vacant parcel inventory identifies the location of all vacant parcels. Each parcel was assessed to determine which of these parcels include wetlands.

Hydric Soils

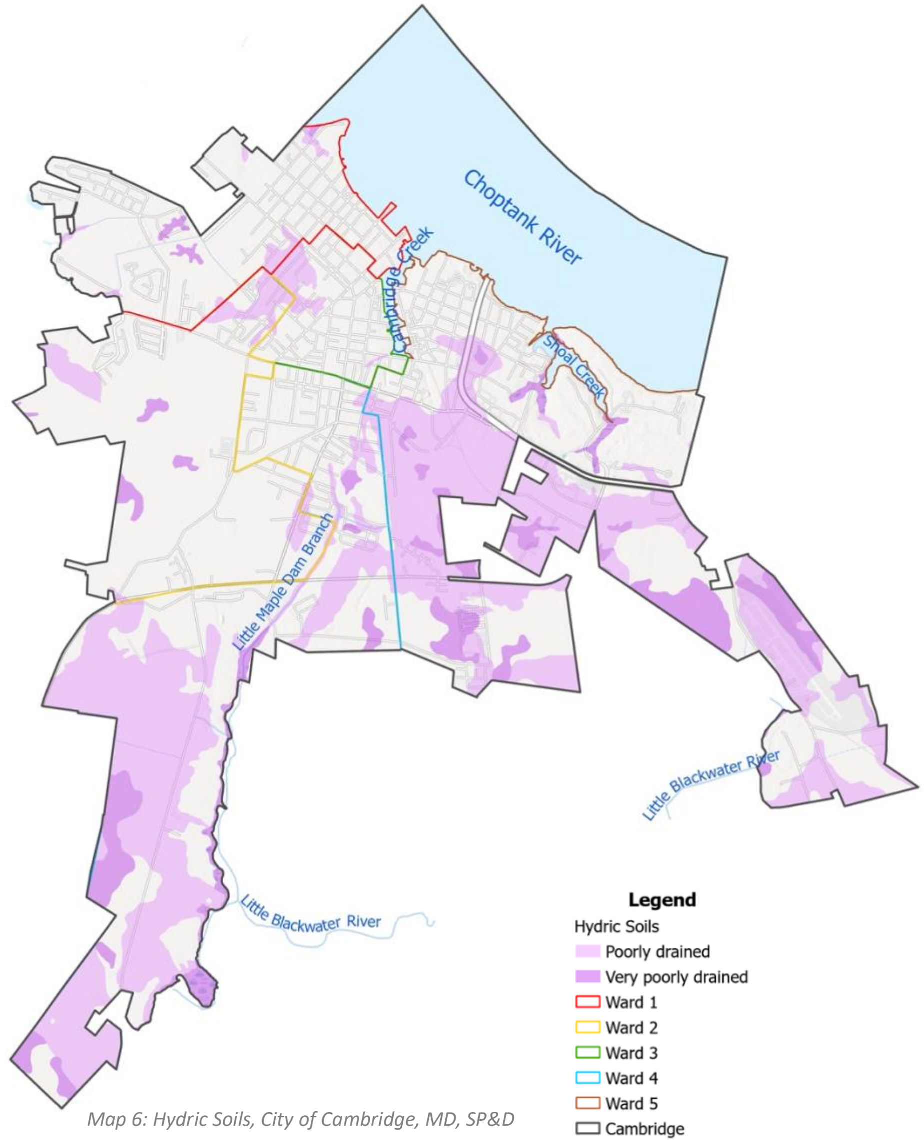
Parcels within the inventory were assessed to determine which parcels, if any, include hydric soils. These parcels were identified within the VPI.

A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.[vii] Wetland soil characteristics form when soil is continuously saturated for periods of one or two weeks or more during the growing season. The parent material influences how the soil retains water, and the hydric (wet) soil characteristics that form. In wetlands, hydric soil supports the growth and regeneration of vegetation that has adapted to grow in saturated/inundated and low-oxygen conditions. Oftentimes the soil can be used to help identify a wetland type for purposes like wetland delineation.[viii]

This Hydric Soil Category rating indicates the components of map units that meet the criteria for hydric soils. Map units are composed of one or more major soil components or soil types that generally make up 20 percent or more of the map unit and are listed in the map unit name, and they may also have one or more minor contrasting soil components that generally make up less than 20 percent of the map unit. Each major and minor map unit component that meets the hydric criteria is rated hydric.

Map Data Source: [Maryland Geology - Hydric Soils](#) - MD iMAP Data Catalog (DoIT)

Parcels that include hydric soils were identified within the VPI, see Map 6.



Map 6: Hydric Soils, City of Cambridge, MD, SP&D

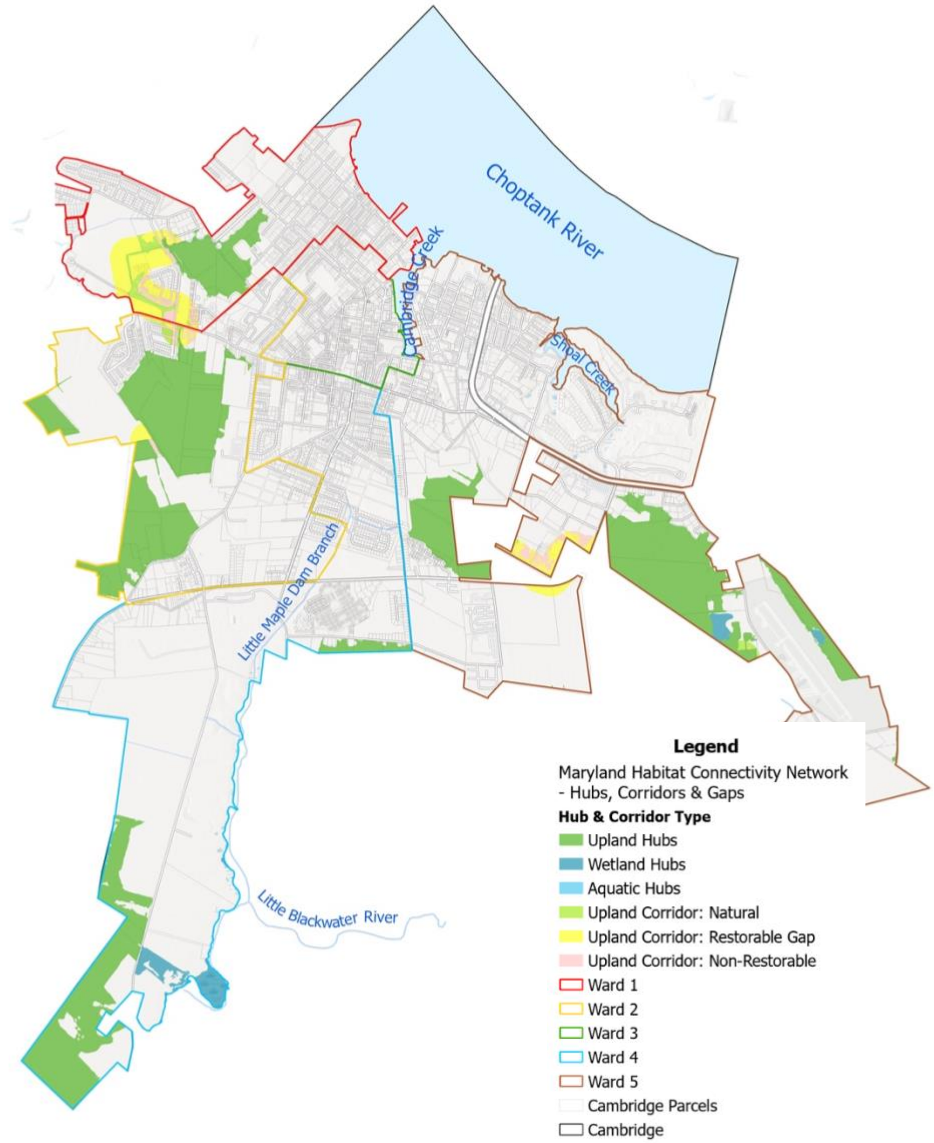
The vacant parcel inventory identifies the location of all vacant parcels. Each parcel was assessed to determine which of these parcels include hydric soils.

Habitat Connectivity Network

Maryland's Habitat Connectivity Network is a network of undeveloped lands that provide the bulk of the state's natural support system. Ecosystem services, such as cleaning the air, filtering water, storing, and cycling nutrients, conserving soils, regulating climate, and maintaining hydrologic function, are all provided by the existing expanses of forests, wetlands, and other natural lands. These ecologically valuable lands also provide marketable goods and services, like forest products, fish and wildlife, and recreation. This update provides the most up to date, high resolution green infrastructure data possible for the state. The Maryland HCN includes mapping and differentiation of types of hubs.

Wetlands hubs are defined as contiguous patches of wetlands that are a minimum of 50 acres in size.
Aquatic hubs include waterways that meet specific ecological criteria, including those located in Tier II catchments, HUC 12 watersheds with trout, or those with Anadromous fish spawning segments.
Corridors generally follow the best ecological or "most natural" routes between hubs. Typically, these are streams with wide riparian buffers and healthy fish communities. Other good wildlife corridors include ridge lines or forested valleys. Developed areas, major roads, and other unsuitable features were avoided. Forest and aquatic corridors are broken into three categories, natural corridors, restorable gaps, and non-restorable gaps.
Natural corridors (Upland & Aquatic) are defined as natural land use classes that provide the lowest cost for wildlife movement.
Restorable gaps (Upland Corridor) are land use classes that are not currently optimal for animal movement, but that could be good candidates for restoration, such as low vegetation and shrub scrub areas.
Non-Restorable Corridors (Upland & Aquatic) are land use classes wildlife avoid/pass through quickly, and that cannot be easily restored, such as impervious surfaces, roads, or buildings.

Source: [Maryland Habitat Connectivity Network - Hubs Corridors and Gaps](#) - MD iMAP Data Catalog (DoIT). September 3, 2024.



Map 7: Hydric Soils, City of Cambridge, MD, SP&D

The vacant parcel inventory identifies the location of all vacant parcels. Each parcel was assessed to determine which of these parcels include hydric soils.

Step 3 Examination for GI Suitability & Opportunity Per Election Ward

Parcels were assessed using the prioritization considerations described in Step 2. Those parcels meeting the prioritization criteria were further examined to determine suitability and opportunities for potential Green Infrastructure projects. This examination was completed per election district ward.

WARD 1

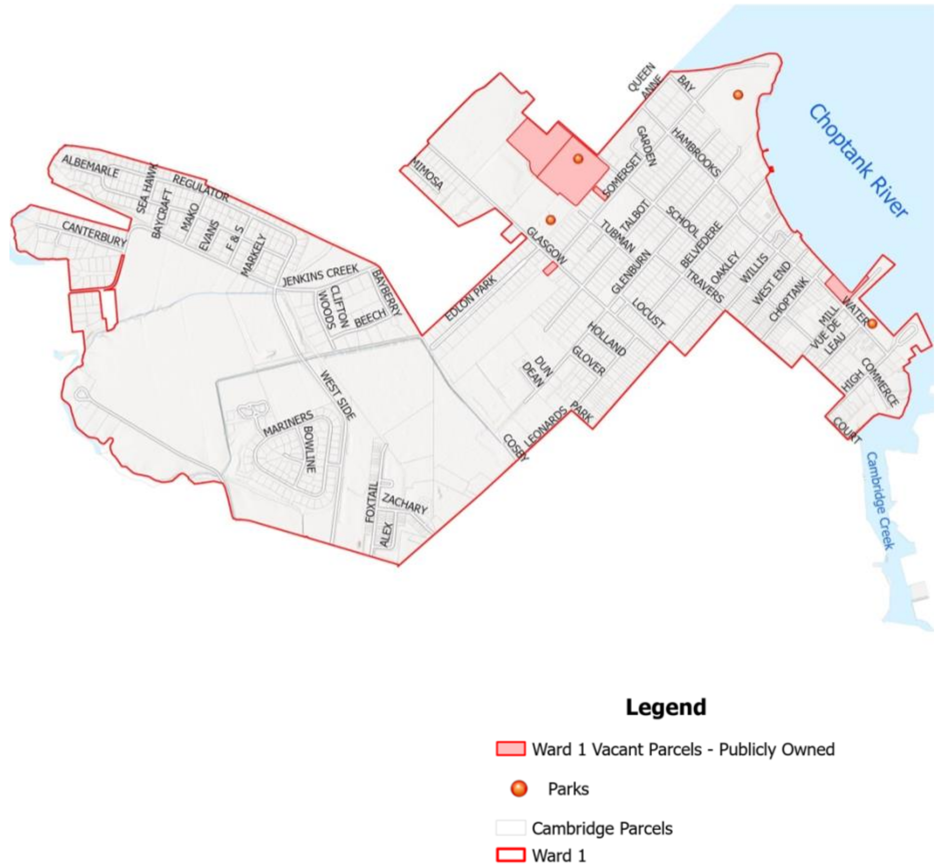
Ward 1 includes a number of vacant parcels, see Map 2. However, the majority of those vacant parcels are privately owned. In fact, of the sixty-nine vacant parcels within Ward 1, only five are publicly owned. It is important to note, three subdivisions with vacant parcels are included in Ward 1, however have been excluded from the VPI, therefore are not within the sixty-nine vacant parcel privately owned total. Ward 1 includes three community parks.

Four publicly owned vacant parcels are more than 0.5 acres and/or contiguous vacant parcels or adjacent to other designated open space/recreation parcel. Three of the four parcels have a flood risk, criteria #2 or #3 from Step 2.

- **Exhibit 1:** One large publicly owned parcel at 6.86 acres and is within the 1 percent annual chance floodplain. Pinks Pond is located just behind the parcel. In addition, this parcel is located adjacent to the School Street Athletic Field. The School Street Athletic Field is 9.5 acres size and includes both baseball and soccer fields. A portion of this parcel includes hydric soil poorly drained soil. This parcel does not include any existing wetlands.

  Note: the field is located adjacent to the Glasgow Tennis Courts on the Judy Center parcel.

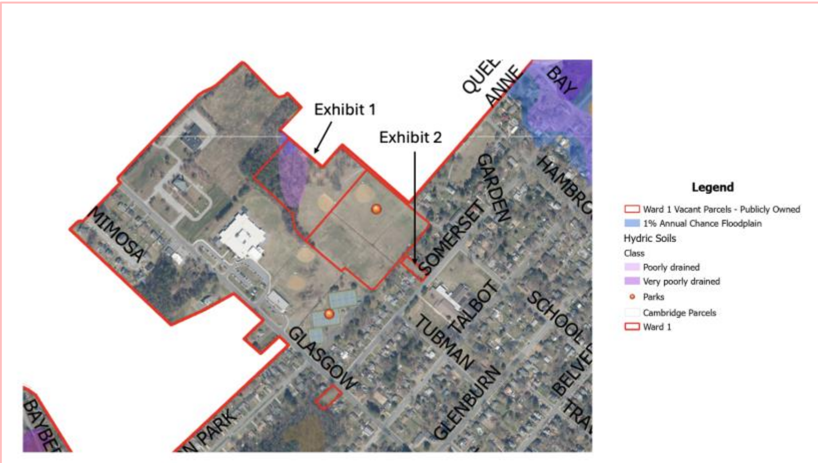
- The School Street Athletic Field is located adjacent to the large 6.86 parcel discussed above, and on the other side, a small publicly owned .33 acres vacant parcel: **Exhibit 2**. This small vacant parcel fronts on Somerset Avenue, which has been identified as a nuisance flood roadway.



Map 8: Ward 1 Publicly Owned Vacant Parcels

The vacant parcel inventory identifies the location of publicly owned vacant parcels.

- The publicly owned parcel located next to the Yacht Club is 1.57 acres. This parcel is located along Water Street, a known nuisance flood area, and is located within the 1 percent annual chance floodplain. This parcel is included within the Make Cambridge Resilient project area.

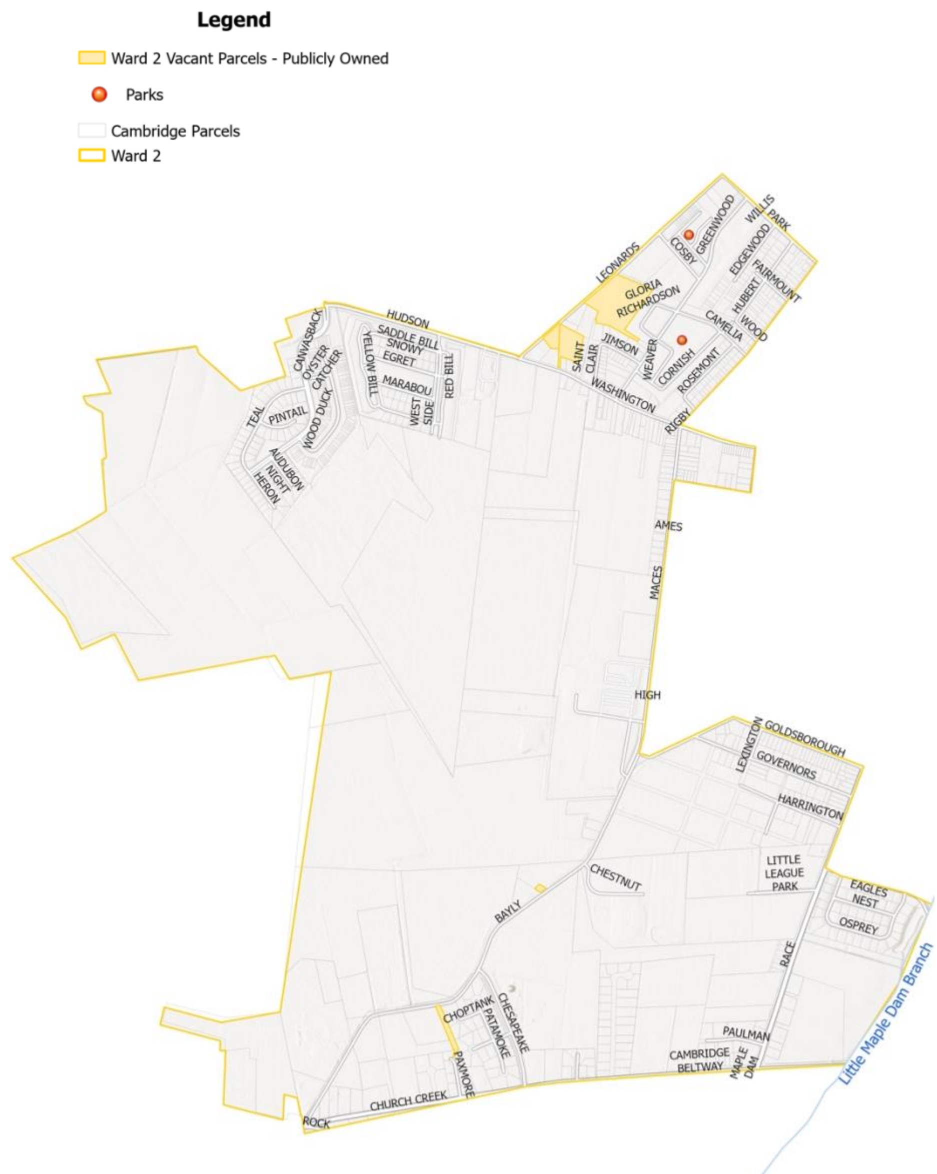


WARD 2

Ward 2 includes a high concentration of vacant parcels, see Map 2. In fact, there are one hundred forty -two vacant parcels, however only five are publicly owned. Four of the five are larger than 0.5 acres, and two of those four are contiguous, meeting criteria #1 in Step1. However, none of the four meet criteria #2 or #3 of Step 2, in that none have a known flood risk. Ward 2 includes two community parks.

- With that said, the two contiguous publicly owned properties, which are back-to-back, and located along Leonards Lane, **Exhibit 1.** Combined these properties total 2.53 acres. Both parcels contain some hydric soils, which are poorly drained.

- **Exhibit 2:** Another large publicly owned parcel at 5.88 acres, also located Leonards Lane and across from the City of Cambridge Public Works Complex may offer an opportunity. This parcel includes a MD DNR identified palustrine wetland and contains hydric soils, soils which are poorly drained. This parcel contains a small, graveled parking lot along Leonards Lane, while the remainder of the parcel is an open field.



Map 9: Ward 1 Publicly Owned Vacant Parcels

The vacant parcel inventory identifies the location of all publicly owned vacant parcels.

WARD 3

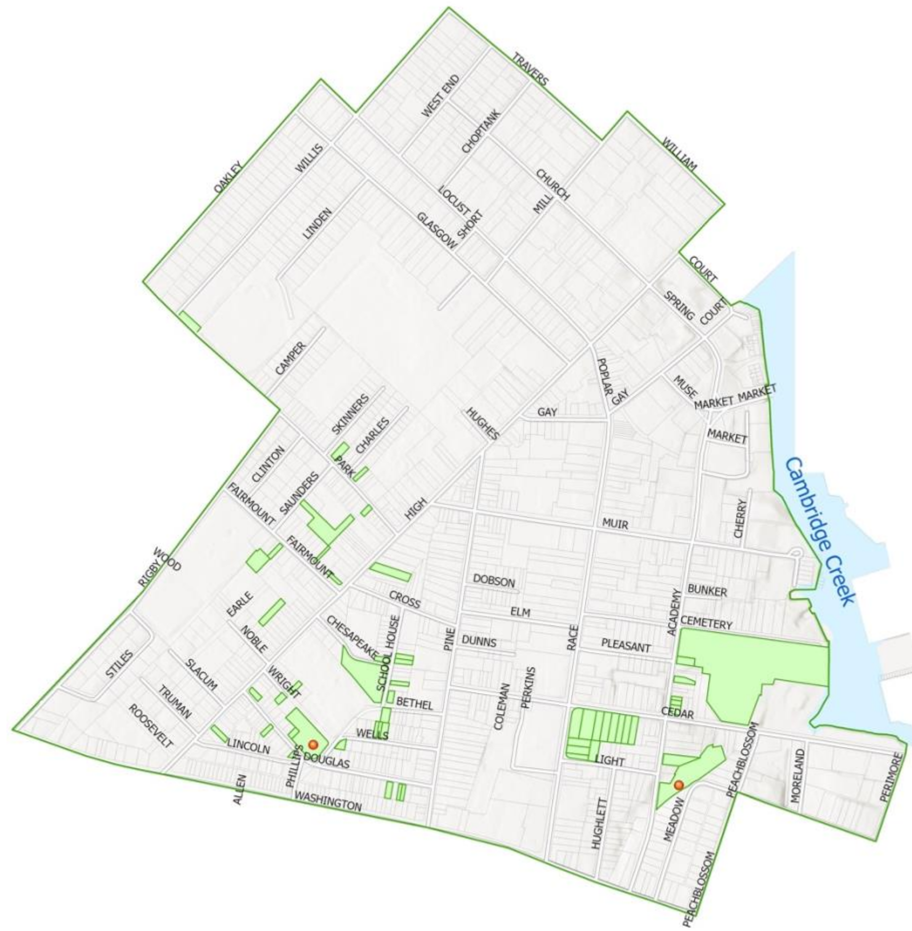
Ward 3 has the highest total of vacant lots publicly owned at fifty-three, shown in green. The majority of these vacant parcels are under a quarter acre in size. However, many of these small lots are contiguous to one another, offering a potential opportunity for green infrastructure best practices and enhanced green space/recreation. Finally, Ward 3 includes compact development and roadway network. Compact development and roadway networks in areas with older infrastructure and more concentrated impervious surfaces may experience more stormwater and water quality issues than other areas of the city, as shown on the map. Ward 3 includes two community parks.

Using the prioritization criteria in Step 2, the following parcels meet criteria #1, #2 or #3.

According to information collected over the past several years and from the most recent 2022 Dorchester County Flood Mitigation Plan, Make Cambridge Resilient online public survey, nuisance flood, there are a number of repetitive flooding roadways within Ward 3, including:

- Cedar Street,
- Choptank Avenue,
- High Street,
- Mill Street,
- Muir Street,
- Race Street,
- West End Avenue, and
- Willis Street.

Exhibit 1: There are twelve contiguous vacant parcels, all of which are associated as municipal fire department identified within the Maryland Department of Taxation database. These properties front on either Light, Race, or Cedar Street. Both Race and Cedar Street have been identified by area residents as having nuisance flood issues.



Map 10: Ward 3 Publicly Owned Vacant Parcels

The vacant parcel inventory identifies the location of publicly owned vacant parcels.

Legend

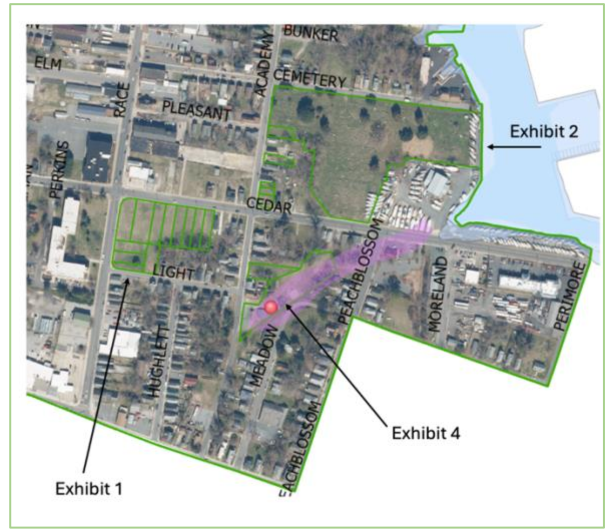
Ward 3 Vacant Parcels - Publicly Owned
Parks
Cambridge Parcels
Ward 3

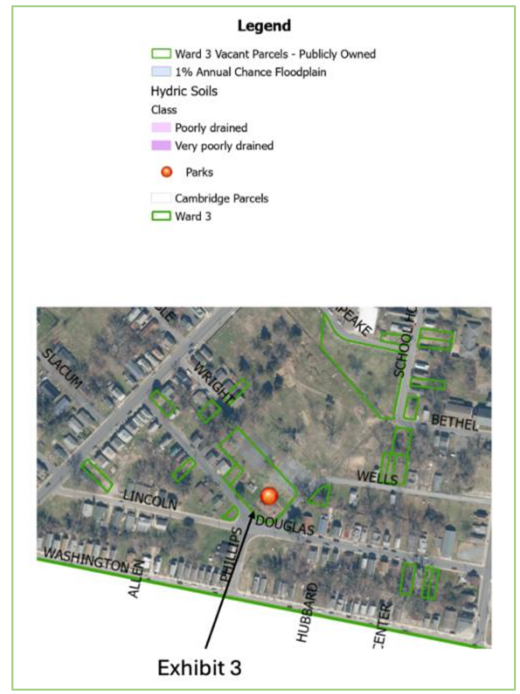
Included within Ward 3 fifty-three publicly owned vacant parcels, three are open space parcels with a designated use. One parcel is a cemetery while the two others are existing parks, Cornish Park and Meadow Avenue Park.

- **Exhibit 2:** The Cambridge Cemetery on Academy Street is included within Ward 3, and this vacant parcel inventory. This parcel includes an existing wetland, as identified in the National Wetland Inventory, however this wetland is very small and borders Cambridge Creek, which is also within the 1 percent annual chance floodplain. The entire parcel is located within the Maryland Critical Area, category corporate limit. This parcel is 5.55 acres in size.

- **Exhibit 3:** Cornish Park, located in the historic, African American, neighborhood of Pine Street District, at 701 Douglas Street. A recent project included refurbishment of existing basketball courts, expansion an existing pavilion, updates to playscape, creation of a perimeter exercise walking path, installation of new decorative fencing, and security cameras and lighting. The restoration of Cornish Park was part of on-going revitalization plans for the Pine Street community. This parcel is 0.71 acres.

- **Exhibit 4:** Meadow Avenue Park, located at 714 Academy Street, adjacent to the Academy Street parking lot. This park is just less than one acre, at .9 acres. The park includes a small basketball court, pavilion with picnic tables, and two small play areas. This entire parcel is within the Maryland Critical Area, category corporate limit. In addition, approximately eighty percent of the parcel includes hydric soils, or poorly drained soils. A vacant parcel adjoins this park, located at 708 Academy Street, and is 0.2 acres in size. This parcel is within the Maryland Critical Area, category corporate limit.





WARD 4

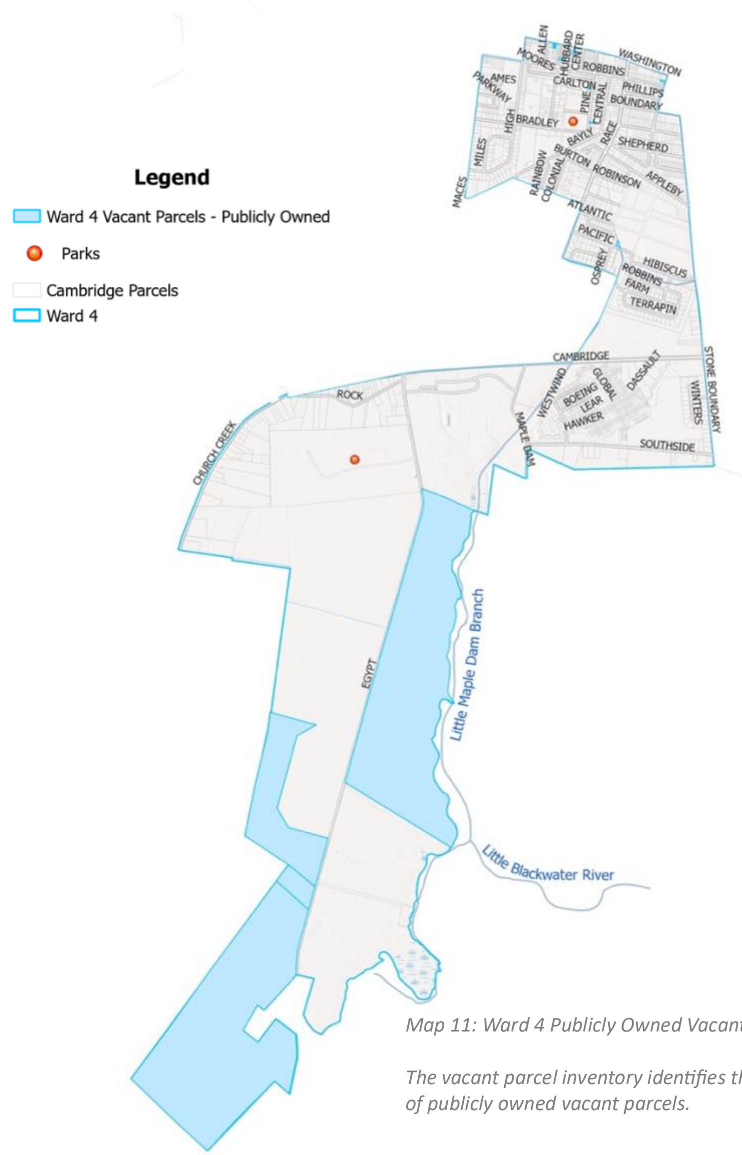
There are a total of two hundred and thirty-two vacant parcels, however only ten of those parcels are publicly owned in Ward 4. This ward includes several new subdivisions, shown in dark gray, see Map 2. However, these parcels were not included in the VPI and analysis. Ward 4 includes two community parks.

Three of the twelve publicly owned parcels are contiguous, and are over 0.5 acres meeting Step 2, criteria #1. These parcels are 85% forested.

- **Exhibit 1:** These three publicly owned parcels along Egypt Road that are denoted as upland and aquatic hubs on Maryland's Habitat Connectivity Network, see Map 7. In addition, the privately owned by a Limited Liability Corporation (LLC) parcel across from these publicly owned parcels, opposite side of Egypt Road, which includes a section of wetlands. This parcel also includes the 1% annual chance floodplain and hydric soils. A large portion of this parcel includes areas of designated wetland hub, part of Maryland's Habitat Connectivity Network. Finally, the large state-owned property adjacent to this privately owned parcel is 212.15 acres. This large parcel is located within the 1% annual chance floodplain, includes special state concerned wetland, hydric soil which are very poorly drained, and has a minimal area of designated wetland hub, Maryland's Habitat Connectivity Network. The access road to the Little Blackwater River soft launch and water trail divides the state-owned property from that of the privately owned LLC property. This entire area could be examined and considered for conservation and/or preservation.

- **Exhibit 2:** The North Drive Park is a small fenced in park surrounded by a housing development, Housing Authority of Cambridge. In total, this parcel is 5.93 acres. This Park includes picnic tables, basketball court, and playground. This parcel is in front of Pine Street, which is a nuisance flood roadway.

- **Exhibit 3:** The Egypt Road Park is ninety-five acres in size. This Park is mainly forested however the park does include a pond and interconnecting trails. This parcel also includes hydric soils, very poorly drained soils. There are several areas of wetlands included on this parcel.



Map 11: Ward 4 Publicly Owned Vacant Parcels

The vacant parcel inventory identifies the location of publicly owned vacant parcels.

Legend

- Ward 4 Vacant Parcels - Publicly Owned
- 1% Annual Chance Floodplain
- Wetlands of Special State Concern (WSSC)

NWI & DNR Wetlands

Wetland

- Freshwater Forested/Shrub Wetland
- Palustrine & Freshwater Pond

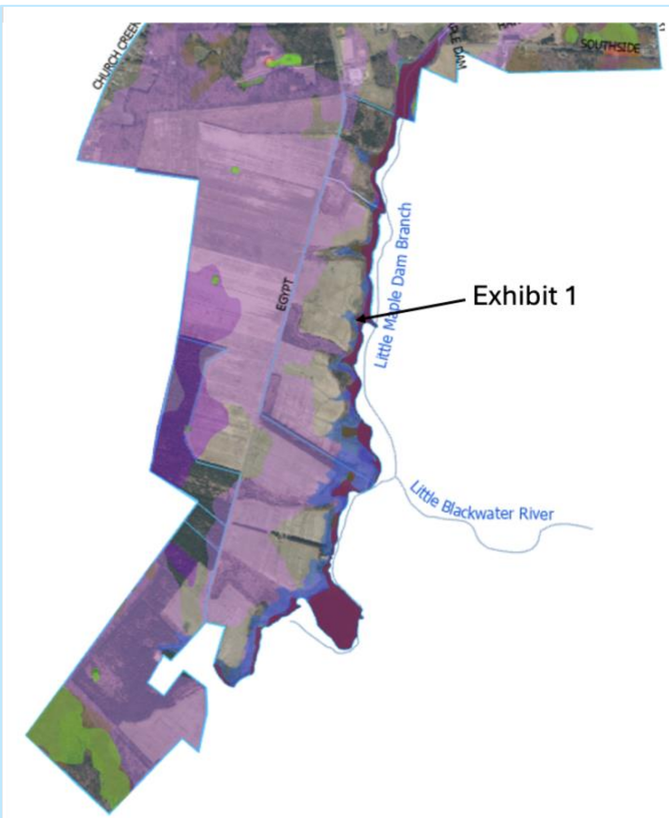
Hydric Soils

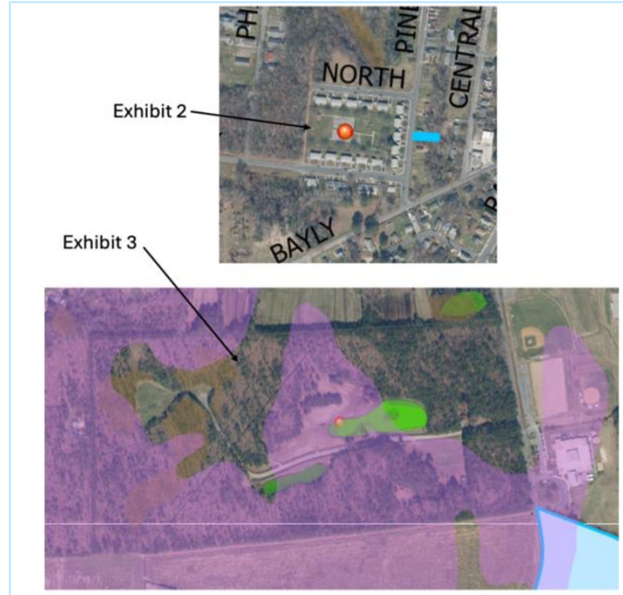
Class

- Poorly drained
- Very poorly drained

- Parks

- Cambridge Parcels
- Ward 4





WARD 5

Ward 5 includes 122 vacant parcels with 19 of those publicly owned. Only two of the 19 publicly owned parcels meet criteria #1 and/or #2. Ward 5 includes three community parks.

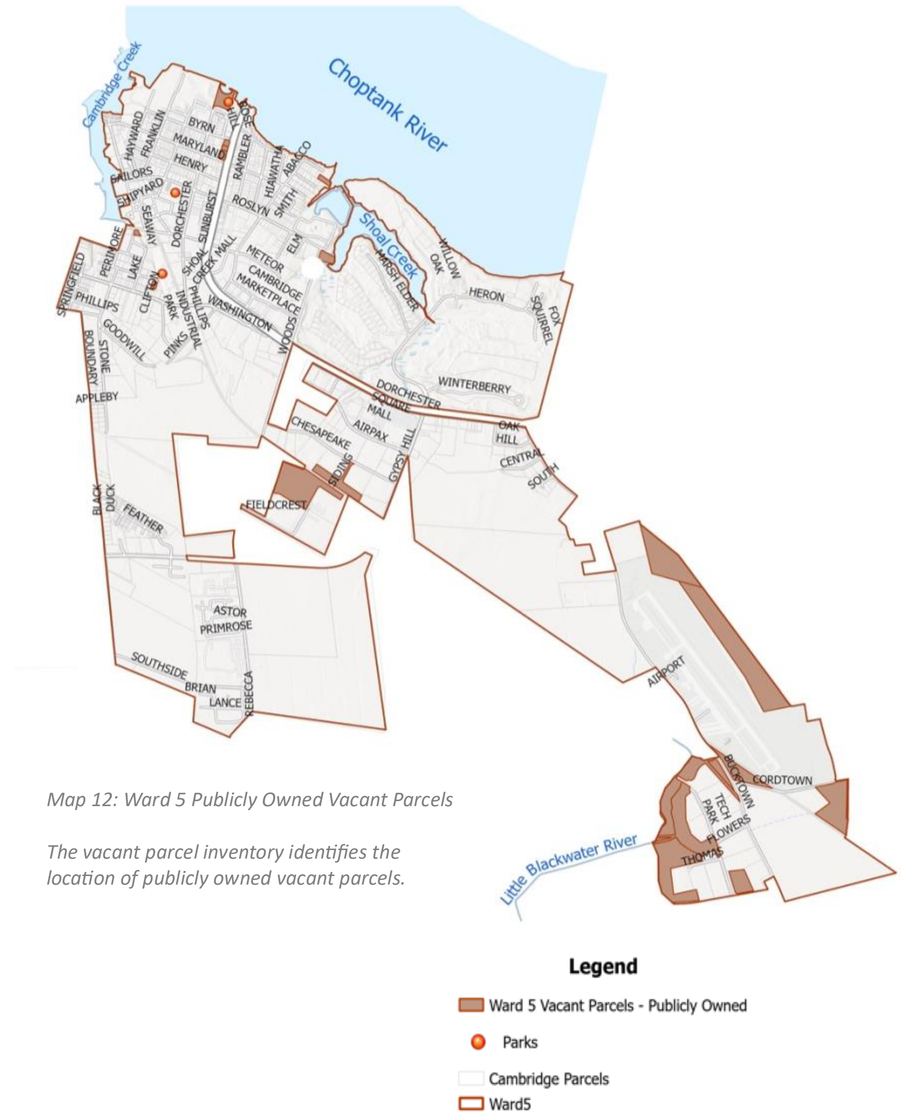
- **Exhibit 1:** A forested parcel located behind City of Cambridge Wastewater Treatment Plant is within the 1% annual chance floodplain. This area should be maintained as forested promoting water retention in flood prone area as the most economical way to absorb and clean water is to protect existing forests and wetlands.

- **Exhibit 2:** The other publicly owned parcel is adjacent to the Dorchester County Visitors Center. The parcel is currently in the Sail Winds Park. This parcel includes wetland area and is within the 1% annual chance floodplain. The parcel is located at the east end of the Route 50 Bridge across the Choptank River, at 2 Rose Hill Place in Cambridge. The park complex includes:
  - Dorchester County's Visitor Center
  - Playground
  - Restrooms
  - Relaxing garden with native plants
  - Mile-long boardwalk to stretch your legs (and your dog's legs)
  - "Flying geese" Grand National Waterfowl Association fountain
  - Beach area

<u>Do not meet the criteria, however these two parcels are publicly owned.</u>

Exhibit 3: Cannery Park: A warehouse is on this property – City owned Parcel - the Cannery Park site is located between the Packing House on Dorchester Avenue and Cambridge Creek and is bounded on the north by Cedar Street and on the south Washington Street. It is still under construction.

Exhibit 4: McCarter Park: McCarter Park is approximately 2.5 acres of recreation space having frontage on LeCompte Street and Aurora Street in Cambridge Maryland. McCarter Park features a tot lot play scape for young children to enjoy as well as multi-purpose field space. McCarter Park's other amenities include picnic tables and a pavilion. Located behind development. Includes Hydric Soils – very poorly drained.



Map 12: Ward 5 Publicly Owned Vacant Parcels

The vacant parcel inventory identifies the location of publicly owned vacant parcels.

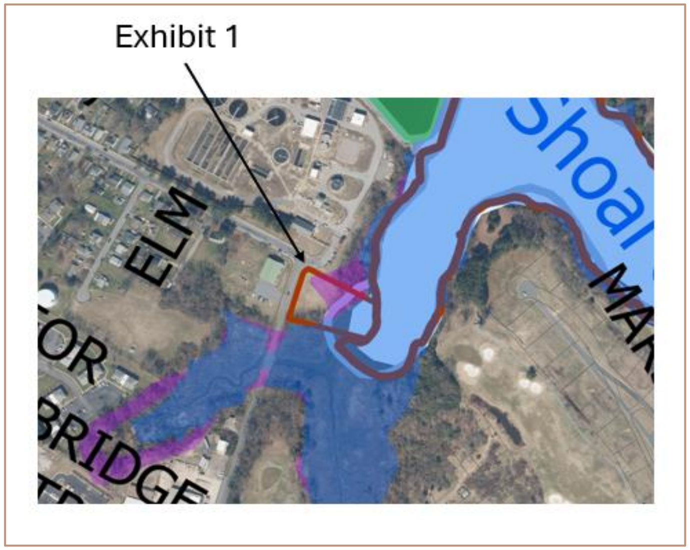


Exhibit 1
Shoal
ELM
BRIDGE

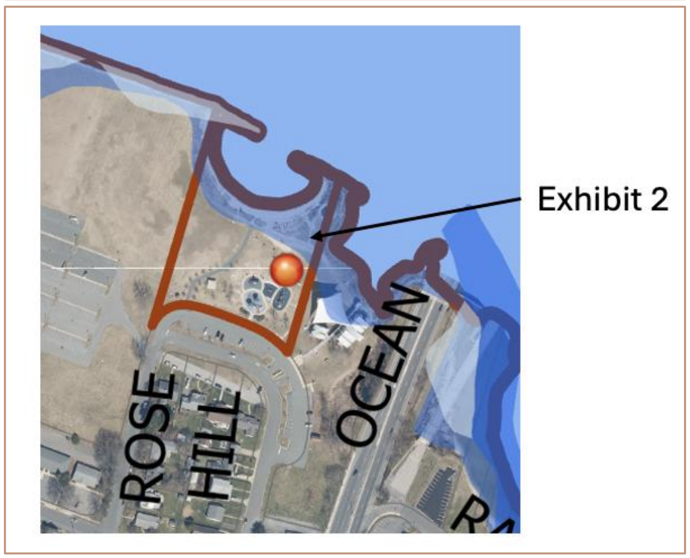
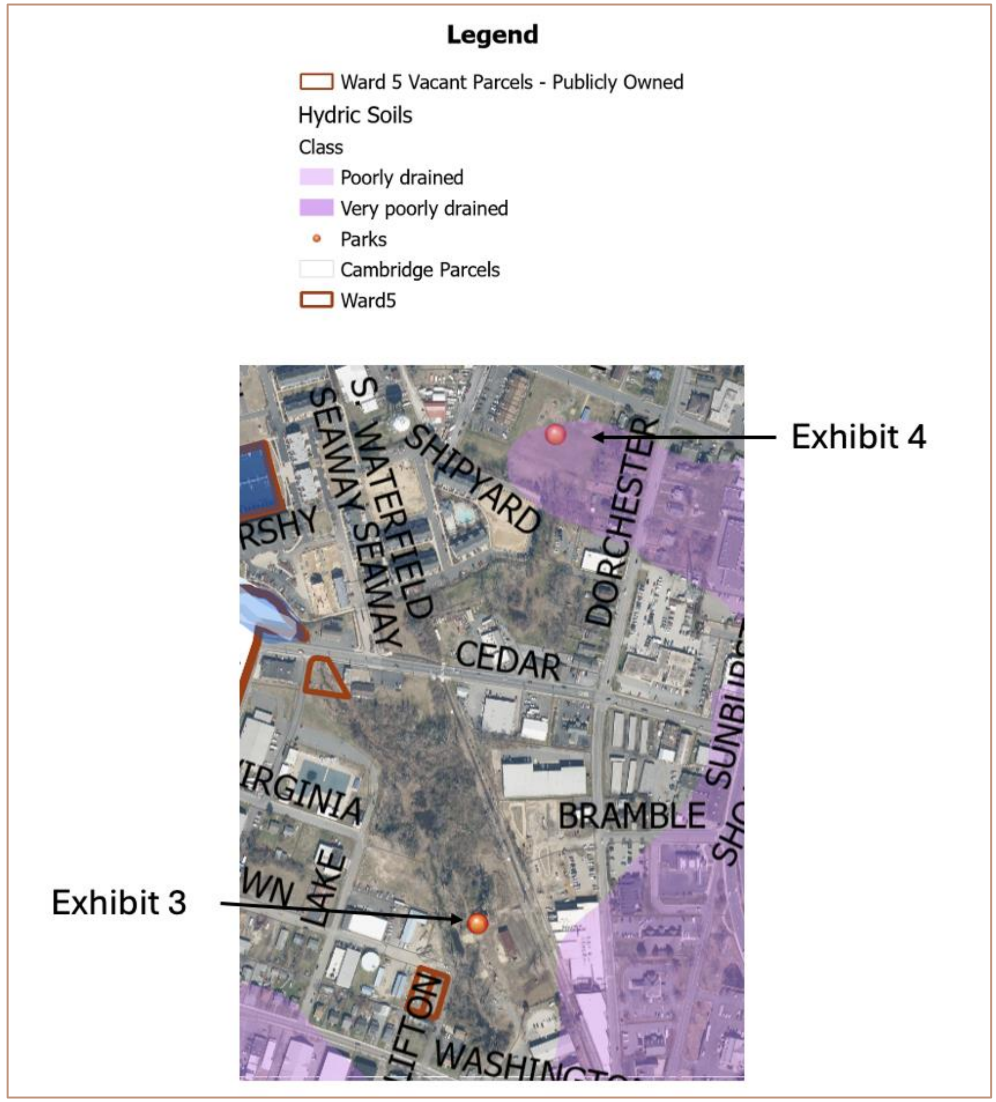


Exhibit 2
ROSE
HILL
OCEAN


Legend
Ward 5 Vacant Parcels - Publicly Owned
Hydric Soils
Class
Poorly drained
Very poorly drained
Parks
Cambridge Parcels
Ward5
Exhibit 4
Exhibit 3
S.
SEAWAY
SEAWAY
WATERFIELD
SHIPYARD
DORCHESTER
CEDAR
BRAMBLE
LAKE

Step 4 Strategic Actions & Recommendations

A meeting of the Make Cambridge Resilient Initiative Core Team was held on January 13, 2025, to discuss the findings from *Step 3, Examination for GI Suitability & Opportunity Per Election Ward.* The Vacant Parcel Inventory (VPI) along with mapping and exhibits from each ward was discussed. Opportunities were further identified for additional examination and discussion. Additionally, selected 2018 Cambridge Creek Watershed Assessment GI Projects are included, along with recommendations for Cambridge Green Ordinance Update, and the concept of Institutionalizing Green Infrastructure in Cambridge resulted from this step.

WARD 1

Exhibit 2 - 209 Somerset Avenue is owned by Dorchester County. There is an obvious drainage swale that runs through the north side of the property. There may be an option to install a bioretention cell and to enhance the treatment in the swale. Consider for project development.

WARD 3

Exhibit 1- There are twelve contiguous vacant parcels, all of which are associated as municipal fire department identified within the Maryland Department of Taxation database. These properties front on either Light, Race, or Cedar Street. Both Race and Cedar Street have been identified by area residents as having nuisance flood issues.

This area was also identified within the *2018 Cambridge Creek Assessment* as Projects 139 A & B. At the corner of Race St. and Cedar St. is a large green space that has multiple opportunities for restoration. Along Cedar St. a linear bioretention could be installed to capture runoff from the road. The curbs would need to be cut, and the sidewalk would need to be replaced in sections. The curb cuts would allow water from the road into the bioretention. The remaining section of the green space could be re-forested and the other portion turned into a park. The soil would have to be amended to increase infiltration, which would include deep ripping to fix any compacted soils and soil amendments such as sand or manure to increase infiltration and create a better soil habitat for planting.

Exhibit 4 - Meadow Street Park. There is a poorly defined drainage that runs from the parking lot on Academy Street down past the basketball court. A bioretention cell to treat runoff from the parking lot, that discharges into a bioswale that follows the drainage past the basketball court may be an option.

This area was also identified within the *2018 Cambridge Creek Assessment* as Projects 1311 A & B. The park has a lot of green space without many tree plantings. Near the parking area is room for a bioretention cell that would intercept water coming down Academy St. Another bioretention could be installed off Virginia Ave near the side of the park to intercept water coming down the road. The third bioretention could be installed at the edge of the park at the lowest point to capture overland flow coming off the local residences, impervious surfaces, and playground areas. Storm drain infrastructure exists under the park and could be tied into the bioretention practices for either overflow or underdrain purposes. Furthermore, it is suggested that additional tree plantings near the edge of the park be included. Additional plantings could also occur near the basketball court and playground to provide shade to these areas. The tree plantings would help intercept rainfall, reducing runoff, as well as provide some nutrient and sediment reductions.

WARD 4

Exhibit 3 - The Egypt Road Park, shown in light blue shading, is ninety-five acres in size. There is potential to expand this park, as various privately owned vacant parcels, shown in blue hatching, are directly adjacent to the park, as identified in the Vacant Parcel Inventory (VIP). Several other privately owned vacant parcels are in that same area, as well, providing opportunities for further linkages.

Ward 5

Exhibit 4 - McCarter Park is approximately 2.5 acres of recreation space having frontage on LeCompte Street and Aurora Street in Cambridge Maryland.

This area was also identified within the *2018 Cambridge Creek Assessment* as Projects 322. McCarter Park on LeCompte St. has large grass fields. This presents an easy opportunity to complete a tree planting or landscape restoration project that incorporates soil amendments, if necessary, as well as native tree and shrub plantings.

Expansion of existing wetlands in Wards 4 and 5.

- The most economical way to absorb and clean water is to protect existing forests and wetlands. These areas should be protected in perpetuity and expanded where possible.[ix] Existing wetland hubs are shown on Map 7: MD Habitat Connectivity Network, City of Cambridge. Expansion of existing wetlands in Wards 4 and 5 are potential projects.
- Stormwater wetlands consist of a properly designed basin that contains water, a substrate (e.g., soil, sand), and wetland plants. This technique stores floodwater during a storm and releases it slowly, reducing peak flows. There are several variations of the stormwater wetland design. The designs are characterized by the volume of the wetland in deep pool, high marsh, and low marsh, and whether the design allows for detention of small storms above the wetland surface. Stormwater wetlands require a lot of space, so only a few parcels identified in the VPI are suitable.

Create new wetlands on vacant parcels with hydric soils.

- Wetlands are characterized by hydric (water saturated) soils and aquatic plants, which vary widely depending on the region, topography, climate, hydrology, water chemistry and other factors. Map 6: Hydric Soils, City of Cambridge indicates areas of hydric soils in all five wards.

The following parcels have been identified for potential wetlands: Ward 2 Exhibit 1, Ward 4 Exhibit 3, and Ward 5 Exhibit 4.

Integrating green infrastructure and specific recommendations within the Comprehensive Plan update is a priority strategic action.

- In 2025, the City of Cambridge initiated the update of their Comprehensive Plan.
- Consider parcels and their identified characteristics within the Vacant Parcel Inventory (VIP) for open space acquisition(s) and recreation opportunities.

2018 Cambridge Creek Watershed Assessment GI Projects

Selected projects from the *2018 Cambridge Creek Watershed Assessment* (CCWA) have been integrated. Selected projects are primarily on publicly owned parcels and/or public right-of-way. In addition, these sites were reviewed using the Vacant Parcel Inventory (VIP) and Step 2 prioritization considerations.

Ward 3

Green Street Project – Identified as Project 131 A & B in the CCWA

Elm Street is a very wide street that has limited residential development. The street could be retrofitted into a green street that has curb bump-out bioretention(s), tree plantings, and other small plantings. The plantings would help beautify the neighborhood, while the bioretention(s) would provide aa reduction in stormwater and treat nutrients and sediment. There is also room to complete a long linear bioretention in the public right of way. Race Street shown with a red line below has been identified as a nuisance flood roadway. Parcels shown with green hatching are privately owned vacant parcels, included in the Vacant Parcel Inventory (VIP). These vacant parcels along Elm Street may be explored for expansion of GI best practices, particularly the long linear parcel.

Ward 3

Community Center BMP's – Identified as Project 132 in the CCWA

The community center, owned by the City of Cambridge, on Pine Street has potential for the installation of multiple small BMP's. These BMP's will reduce stormwater from the facility. Rain gardens could be installed near the buildings to collect stormwater from the downspouts (downspout disconnection). The rain gardens would help infiltrate stormwater, reducing runoff, but also trap sediment and treat nutrients. The rain gardens could also be planted with flowering plants to add landscaping to the property. A small bioretention could also be built near the building to collect and treat runoff from the parking lot and the buildings. Completing all these practices on the site would greatly reduce the stormwater leaving the community center.

In addition, Ceder Street shown in the figure below with the red line is an identified nuisance flood roadway. Parcels shown with green shading are publicly owned vacant parcels, included in the Vacant Parcel Inventory (VIP). Note the two vacant publicly owned parcels adjacent to the Community Center that have potential for inclusion in this project.

Ward 3

Academy & Cedar Street – Identified as Project 1310 in the CCWA

This site is at the corner of Academy St. and Cedar St. The properties are owned by the city of Cambridge. At present the properties are vacant lots without any standing buildings. The site is proposed to be retrofitted into a bioretention to help reduce runoff, sediment, and nutrient pollution. Academy St. slopes down to this bioretention location and there are no noticeable storm drains. To get water to this project site, there would need to be curb cuts or pipes installed to usher water from the road to the bioretention area. There are existing stormwater pipes adjacent to the site that the bioretention could be connected to for either underdrain or overflow purposes.

Cedar Street is an identified nuisance flood roadway shown in figure below with red line. The three parcels shown highlighted are publicly owned vacant parcels, included in the Vacant Parcel Inventory (VIP).

Ward 3

Race Street Parking Lot – Identified as Project 436 A in the CCWA

The Race Street public parking lot, owned by the City is long and potentially underused. The back part of the parking lot could be de-paved and transformed into a green space and tree planting could occur next to the private residences or throughout the de-paved area. Decreasing the amount of impervious area in an urban area is one of the better ways to decrease runoff and pollution. The back part of the parking lot could be de-paved and transformed into a green space and tree planting could occur next to the private residences or throughout the de-paved area. Decreasing the amount of impervious area in an urban area is one of the better ways to decrease runoff and pollution. Race Street is an identified nuisance flood roadway.

Cambridge Projects for FEMA Building Resilient Infrastructure and Communities (BRIC)

Six GI priority projects identified in Step 4 recommendations were further developed by the Center for Watershed Protection. Each project includes project description and design details followed by preliminary design and construction cost estimates. The Center for Watershed Protection focused on the identified GI projects that provided the most potential for onsite water retention. The total cost of the 6 projects is $1.3M. A summary of the costs is shown below:

GI Plan Projects	Design	Construction	Total Project
Meadow Avenue Park	$ 26,300.00	$ 45,475.00	$ 71,775.00
Race and Cedar Streets	$ 36,800.00	$ 452,335.00	$ 489,135.00
Elm Street	$ 44,300.00	$ 347,149.00	$ 391,449.00
Pine Street CC	$ 28,300.00	$ 34,765.00	$ 63,065.00
Cedar St and Academy St	$ 26,300.00	$ 92,775.00	$ 119,075.00
Race Street Parking Lot	$ 27,800.00	$ 169,655.00	$ 197,455.00
Total all GI Projects	**$ 189,800.00**	**$ 1,142,154.00**	**$ 1,331,954.00**

Table 2. Cambridge Projects for FEMA BRIC
Source: Center for Watershed Protection, provided by Amanda Pollack on February 11, 2025

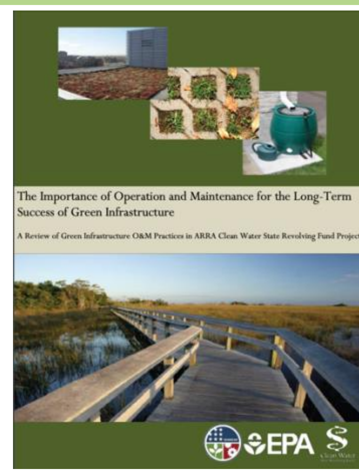
Cambridge Green Ordinance Update Options

In addition, to the Green Infrastructure (GI) assessment, recommendations for ordinance updates to improve consistency with GI goals is an essential next step.

Some suggestions for code revisions that would encourage green infrastructure practices include:

- Incorporating bioretention in general landscaping requirements.
- Using native or deep-rooted plants with ample soils in place of turfgrass. Consider adding specific language, specifically buffers.
- Reducing the total impervious area associated with parking requirements.
- Allowing the use of permeable surfacing in parking lots, driveways, fire protection areas and alleys.
- Incorporating tree planting, native plants and soil amendments (use of aeration and top dressing with organic fertilizer to foster root development and increase infiltration in turfgrass).

Institutionalize Green Infrastructure



Continued considerations for both gray and green infrastructure options will ensure that both water quantity and water quality projects are assessed, and where feasible, integrated. Open green space, parks, vegetation, and landscaping provide environmental and social benefits to residents and help create neighborhoods that are desirable places to live. Using green infrastructure creates attractive and resilient neighborhoods, which in turn can increase nearby property values.[x] However, as is the case with gray infrastructure, maintenance and monitoring of green infrastructure is needed. Currently, the City of Cambridge utilizes an in-house tablet-based tool to streamline the monitoring and maintenance of green infrastructure. Staff can inspect sites, capture photos, and upload data directly to the City's GIS system, ensuring quick access to inspection records and maintenance needs. This integration helps staff stay informed and responsive.

For future consideration, quarterly meetings of key City personnel to identify issues, tasks, and responsible staff will be held. In addition, green infrastructure will be included in annual reporting and budget requests. Basic maintenance activities may include weeding, mulching, trimming of shrubs and trees, replanting, sediment and debris removal, and inlet/outlet cleaning. The Importance of Operation and Maintenance for the Long-Term Success of Green Infrastructure, may be a useful resource.

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[i] Dorchester County Office of Tourism: https://visitdorchester.org/cambridge-md/
[ii] 2011 City of Cambridge Comprehensive Plan https://www.choosecambridge.com/DocumentCenter/View/1530/Comprehensive-Plan-Update-31318?bidId=
[iii] First Street https://firststreet.org/city/cambridge-md/2412400_fsid/flood
[iv] At The Intersection of Equity & Green Infrastructure, United States Environmental Protection Agency, https://www.epa.gov/green-infrastructure/green-infrastructure-soak-rain-webinars
[v] Law Insider website: https://www.lawinsider.com/dictionary/vacant-parcel
[vi] United State Environmental Protection Agency, https://www.epa.gov/wetlands/what-wetland
[vii] Natural Resources Conservation Service, U.S. Department of Agriculture, https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/soil/hydric-soils
[viii] USGS.gov, https://www.usgs.gov/news/science-snippet/wetland-word-hydric-soil#
[ix] NOAA Green Infrastructure Options to Reduce Flooding, Definitions, Tips, and Considerations, Office For Coastal Management, https://coast.noaa.gov/data/docs/digitalcoast/gi-econ.pdf
[x] U.S. Environmental Protection Agency, Economic Benefits if Green Infrastructure, August 27, 2024 https://www.epa.gov/green-infrastructure/economic-benefits-green-infrastructure#:~:text=Open%20green%20space%2C%20parks%2C%20vegetation,can%20increase%20nearby%20property%20values.

Appendix 1, Preferred Stormwater Practices

Appendix 1: Preferred Practices

Table of Contents

1.1 Statement of Purpose

Green infrastructure has been defined as "A strategically planned network of natural and semi-natural areas with other environmental features, designed and managed to deliver a wide range of ecosystem services, while also enhancing biodiversity. Such services include, for example, improved water quality, improved air quality, space for recreation, improved climate resiliency. The network of green spaces improves the quality of the environment, the condition and connectivity of natural areas, and improves the quality of life of residents of the community.

The National Climate Assessment predicts that climate change will increase the frequency and severity of heavy rainfall on the Eastern Shore of Maryland resulting in greater flood risk. The threat is especially pertinent in urban areas like Cambridge where hardscape (buildings, parking lots, roads, driveways, and other impervious surfaces) prevents water from penetrating the ground, which can accelerate water runoff into storm sewers and local waterways, increasing pollutant load and flood risk. To reduce these threats, the City needs to add green infrastructure along with replacing and upgrading traditional sewer infrastructure.

The City of Cambridge Green Infrastructure Plan will help us prepare and adapt to climate change. It's a crucial step in Cambridge's transition to a cleaner, healthier, and more economically resilient future. The City of Cambridge is in the design phase of a hybrid Flood Mitigation and Living Shoreline project that will extend from Pink's Pond to Cambridge Creek. Our GI plan includes the GI components of stormwater management system designed to contain and provide treatment for a 100-year rainfall event. This includes, for example, planning, design and construction of a stormwater storage system at Gerry Boyle Park that will contain and ensure a slow, controlled subsurface discharge of stormwater to the Choptank River. The stormwater will be conveyed to the park through a new grey infrastructure system during flood events when backflow preventors are engaged to prevent flood waters from backing up into the streets.

By combining green stormwater management practices like the storage facility with other GI practices throughout the city, Cambridge can comprehensively enhance its resilience to flooding while also improving water quality through the treatment capabilities of the green infrastructure systems.

Cambridge is approximately 28 % hardscape. Our goal is to reduce impervious coverage and to provide stormwater treatment to existing impervious areas. The goal is to shave the peak off flood events by utilizing widespread green infrastructure to reduce pressure on storm sewers and wastewater treatment facilities. Green Infrastructure can make our neighborhoods more beautiful and welcoming, and even reduce the temperature of the City in the hot summer months. Green infrastructure provides stormwater management while also offering a variety of co-benefits, from improving air quality, providing children with outdoor space to play and learn, beautifying the community and increasing property values.

As we add green infrastructure in Cambridge, we must prioritize projects based on both their feasibility and their potential impact. This plan is intended to recognize the green infrastructure work already being done and identify priority projects for the future, helping City leaders, community groups, and businesses work together to make a more resilient and sustainable Cambridge.

The Cambridge Green Infrastructure Plan is a component of our Make Cambridge Resilient Plan, and Community Development Plan (appendix I), providing the city with a practical guide to addressing the impacts of flash flooding caused by increasingly intense rain events caused by climate change. The plan outlines an overall strategy for retrofitting green stormwater practices throughout the city by first reviewing overarching strategies, then the plan discusses the types of practices that we recommend implementing, and third, we list the physical settings where each practice would be practical.

Our approach is designed to be a multi-year effort to implement a series of recommended green infrastructure projects with a goal of providing temporary storage and treatment of stormwater before it is discharged to the conventional grey infrastructure storm sewer collection system or directly to the Choptank River.

The objective is to achieve a hybrid stormwater management system that stores and treats stormwater before it enters our grey infrastructure (stormwater collection system), that eventually discharges into the Choptank River. The overarching goal is to reduce the effects of impervious surfaces, addressing the associated impacts on both quality of life and water quality. Projects will be sited in areas with poor drainage to alleviate flash flooding, constructed in residential neighborhoods where they have been shown to increase property values. These projects will be designed to improve the water quality of the treated stormwater, complementing the existing grey infrastructure, and enabling the overall system to handle anticipated increases in the volume of stormwater over time.

As the city transitioned from the implementation of the Make Cambridge Resilient Flood Mitigation Project to the Make Cambridge Resilient initiative, we recognized the need to restore fish and wildlife habitat and to improve water quality to adapt to climate change long term. The restoration of our ecosystem is critical to attracting further development of the City and funding for the development and maintenance of our new infrastructure.

1.2 Physical Setting

The City of Cambridge is situated on the southern bank of the Choptank River. Cambridge occupies approximately 10 square miles, serving as the central hub for Dorchester County's population. The city's urban core is perched atop a ridge, with elevations peaking at 20 feet above sea level. Transitioning southeastward, the terrain gradually descends into low-lying areas, crisscrossed by a network of tidal streams that nourish the Little Blackwater River and Maple Dam Creek. With its water-bound surroundings influencing its character, Cambridge is renowned as a welcoming, easily navigable, and historically rich community nestled on Maryland's Eastern Shore.

Cambridge comprises a diverse mix of residential, commercial, and light industrial areas. Historically, it served as the nucleus of a thriving canning industry, employing over 10,000 individuals at its zenith in the early to mid-20th century, thus catalyzing urban development in its vicinity. The municipality's sewer and stormwater management, initially integrated through a combined system established in the 1930s, encountered challenges such as Combined Sewage Overflows. Consequently, in response to these issues, the city initiated the separation of stormwater infrastructure from sewage collection in 2012.

Gray infrastructure transports water efficiently, but it carries pollutants directly to receiving water without providing treatment. It has no co-benefits, beyond the essential role of conveying water, and contributes to the degradation of the Choptank River and other receiving waters.

Local waterways are highly influenced by the percentage of impervious coverage. The following quote from the Center for Watershed Protection characterizes streams with impervious coverage greater than 25%.

"*Once watershed impervious cover exceeds 25%, stream quality crosses a threshold. Streams in this category essentially become conduits for conveying stormwater flows and can no longer support a diverse stream community. The stream channel becomes highly unstable, and many stream reaches experience severe widening, downcutting, and streambank erosion. Pool and riffle structure needed to sustain fish is diminished or eliminated and the substrate can no longer provide habitat for aquatic insects, or spawning areas for fish. Water quality is consistently rated as fair to poor, and water recreation is no longer possible due to the presence of high bacteria levels…The biological quality of non-supporting streams is generally considered poor and is dominated by pollution tolerant insects and fish.*"

Faced with the urban characteristics of Peachblossom Creek and the headwater of Cambridge Creek and the high concentration of impervious surfaces, we recognize the impracticality of totally overhauling and remaking the streams in Cambridge. There are, however, retrofits that we can implement that are both economical and effective in reducing and capturing nutrients and sediments before they enter local waters and will reduce pollution loading to the Choptank River and cumulatively, can shave the peak off flood events, providing temporary storage and treatment while also reducing the burden on our grey stormwater infrastructure and reducing the likelihood of flash flooding in the City,

In 2010 the EPA established a cleanup plan known as the Chesapeake Bay Total Maximum Daily Load (TMDL). The plan establishes federally regulated limits for nitrogen, phosphorus, and sediment loads entering the Chesapeake. Each state in the Bay's watershed was allocated a specific reduction of these pollutants from the three different sectors that include agriculture, wastewater, and urban stormwater. To achieve these reductions, Maryland developed a Watershed Implementation Plan (WIP) that took the state's allocation and further divided it into the responsibility of each county to reduce its contribution to the overall load. Unlike most Maryland counties, Dorchester County did not adopt their WIP or the goals of the state's WIP, leaving them without a plan to address excess nutrient pollution and sediment loads.

The City is currently exempt from municipal separate stormwater sewer system requirements that require the progressive installation of best management practices to manage and treat stormwater. As a result, the majority of the City's stormwater is untreated. This plan is a city-wide supplement to the Cambridge Creek Watershed Assessment and Action Plan developed by Shore Rivers in 2018.

The Make Cambridge Resilient project has currently applied for three grants to design and implement Green Infrastructure in the City

1. Applied for funding to design and build a green space around the management of stormwater behind the Mill Street School and down the existing swale that drains between Mill Street and Choptank Avenue.
2. Applied for funding for the construction of stormwater best management practices around our Public Works building at 1025 Washington Street and City Hall at 410 Academy Street.
3. Applied for funding to tear up the sidewalks along Poplar Street and the 400 and 500 blocks of Race Street, to install Silva Cells, and to re-install sidewalks and tree plantings. We also applied for funding to construct a parking lot and walkway with pervious pavers at the Mill Street School.

These projects will serve as demonstration projects that signify The City's commitment to enacting this plan by treating stormwater throughout the city.

Tables for each ward (excluding Cambridge Creek)

- **Land Cover Area**
- **Water**
- **Tree Canopy**
- **Herbaceous vegetation**
- **Barren**
- **Structures**

- **Impervious Surface**
- **Roads**
- **Tree Canopy over structures**
- **Tree Canopy over impervious surface**
- **Tree Canopy over roads**

1.3 Ambient Conditions-Choptank River

Thomas Fisher, Professor Emeritus at UMCES Horn Point Laboratory in Cambridge, has conducted extensive research on water quality within the Choptank River throughout his professional tenure. Fisher and his team of researchers systematically assessed advancements towards water quality objectives spanning the timeframe from 1998 to 2017. Fisher's analysis revealed a reduction in both atmospheric deposition and wastewater treatment contributions attributable to management interventions implemented during this period. However, despite concerted conservation efforts, there was a noticeable increase in overall inputs, primarily attributed to increased agricultural inputs.

Out of three monitoring stations on the Choptank River, the one nearest the Cambridge wastewater treatment plant outfall, a few miles downstream of Cambridge, showed improvement. The observed water quality improvements suggest that public and industrial investments in reducing atmospheric emissions and upgrading wastewater treatment plants have improved estuarine water quality in the surrounding area. Surface waters water quality increased and the amount of algae decreased. In bottom waters, dissolved oxygen increased.

"An interesting question is why there is improving water quality at the monitoring station near the wastewater treatment plant despite an overall increase in nitrogen and pollution inputs to the estuary as a whole," said Fisher. "This response suggests that local actions matter; in this case, greatly reducing local inputs from the largest wastewater treatment plant in the area improved adjacent estuarine water quality, even when the overall estuary was receiving increased nutrient pollution loads."

Fisher's research demonstrated that even though agriculture is the dominant land use and the largest source of nutrients and sediment to the Choptank River, that local actions, taken in Cambridge, positively impacted water quality in the Choptank River near Cambridge.

Although most of Cambridge is elevated above the Choptank River there are many parts of the City that are subjected to nuisance flooding during moderate to heavy rain events and the west end regularly floods during extreme high tides, we are hopeful that the implementation of our Hybrid Flood Control/Living Shoreline project combined with our Green Infrastructure Plan will alleviate the worst of it.

Flooding in the West End in May, 2024. Photo courtesy of Shore Rivers.

1.4 Existing Green Infrastructure

The City has implemented GI projects in several locations. We retrofitted Maryland Avenue with bump out bioretention facilities, and porous pavers in the parking areas through a grant from Chesapeake Bay Trust. We also installed bioretention cells and porous pavers over parking areas at Long Wharf Park. Additionally, several developers have installed GI practices around their development, most notably, the Phillip's Packing House, that incorporated bioretention cells and porous pavers over parking areas.

One of the Maryland Ave. Bioretention cells taken during the spring of 2024. Photo-City of Cambridge.

Bioretention facility and porous pavers at the Phillip's Packing House, Cambridge, MD.

Bioretention cells in Long Wharf Park store and treat stormwater before it is discharged to the Choptank River. Photo: Cambridge DPW.

1.5 Economic Benefits of Green Infrastructure

Implementing a city-wide Green Infrastructure plan in Cambridge, MD, offers numerous economic benefits. By integrating green technologies such as permeable pavements, green roofs, and rain gardens, the city can effectively manage stormwater runoff, reducing the strain on traditional drainage systems and mitigating flooding risks. This not only lowers infrastructure maintenance costs but also enhances property values and attracts investment by creating aesthetically pleasing and environmentally sustainable urban spaces. Additionally, the adoption of green infrastructure practices promotes job creation in industries related to construction, landscaping, and environmental engineering, fosters local economic growth and resilience. Moreover, by improving air and water quality, reducing energy consumption, and enhancing biodiversity, Cambridge can bolster its appeal as a desirable destination for residents, tourists, and businesses, leading to long-term economic prosperity and sustainability.

2.1 Preferred Strategies for Stormwater Management

In developing the stormwater retrofit program in Cambridge, MD, our principles were firmly rooted in environmental stewardship, community engagement, climate resilience and sustainable urban development. Recognizing the pressing need to mitigate stormwater runoff and its adverse impacts on residents, local waterways and ecosystems, our approach was guided by a commitment to innovative solutions that not only address immediate challenges but also contribute to long-term resilience. We plan to prioritize inclusivity, ensuring that the voices and concerns of residents, businesses, and stakeholders are integral to the decision-making process about project implementation. By fostering collaboration between government agencies, environmental organizations, and the private sector, we aim to leverage diverse expertise and resources towards the shared goal of enhancing the quality of life of residents while also enhancing local water quality and restoring our natural waterways.

Through strategic planning, adaptive management, and ongoing monitoring, our program embodies a holistic and proactive approach to managing stormwater, fostering a healthier and more sustainable future for our communities.

Stream Restoration/ Stream Corridor Renovation

This objective focuses on installing retrofits to improve the quality of a stream corridor, whether it is a greenway, stream valley park or chain of wetlands. This type of retrofit is located in or near the stream corridor, and is intended to improve water quality, create wetland and wildlife habitat, daylight urban streams and to naturalize the stream corridor.

Stream restoration uses upstream retrofits to provide hydrologic control to support downstream restoration projects. Individual retrofits are installed above specific stream reaches where restoration is planned.

We plan to restore 1,000 linear feet of Peachblossom Creek to reduce nutrient and sediment pollution to Cambridge Creek. The project will also help reduce greenhouse gas emissions through sequestration and provide important stormwater protection to ensure long-term resiliency to our fragile coastal ecosystems. The city also plans to construct various GI practices like bioretention cells, bioswales, tree trenches, and dry detention basins throughout Cambridge to store and treat polluted runoff.

Cambridge Creek just above Cedar Street. Restoration funded by Maryland Department of Natural Resources.

Modify existing stormwater Ponds-

Add water quality treatment storage to an existing pond that lacks it by excavating new storage on the pond bottom, raising the height of the embankment, modifying the riser elevations/dimensions, converting unneeded quantity control storage into water quality treatment storage and/or installing internal design features to improve performance.

Storage Above Roadway Culverts

Provide water quality storage immediately upstream of an existing road culvert that crosses a low gradient, non-perennial stream without wetlands. Free storage is created by adding wetland and/or extended detention treatment behind a new embankment just upstream of the existing roadway embankment.

Storage in Conveyance Systems

Investigate the upper portions of the existing stormwater conveyance system to look for opportunities to improve the performance of existing swales, ditches, and non-perennial streams. This can be done either by creating in-line storage cells that filter runoff through swales and wetlands or by splitting flows to off-line treatment areas in a stream corridor.

Storage Near Large Parking Lots

Provide stormwater treatment in open spaces near the downgradient outfall of large parking lots (5 acres plus)

Hotspot Operations

Install filtering or bioretention treatment to remove pollutants from confirmed or sever stormwater hotspots discovered during field investigation.

Small Parking Lots

Insert stormwater treatment within or on the margins of small parking lots, in many cases, the parking lot is delineated into a series of smaller, on-site treatment units.

Individual Streets

Look for opportunities with the street, it's right of way, cul-de-sacs and traffic calming devices to treat stormwater runoff before it gets into the storm drain network.

Underground

Provide stormwater treatment in an underground location when no surface land is available for surface treatment. Use this as a last resort at dense, ultra-urban sites, in parks under playgrounds or ball fields. This strategy is being planned for Gerry Boyle Park and the new park on Leonard's Lane.

Parks and other Open Space

While many people think of parks as already being "green," they are strong candidates for green infrastructure implementation due to their ability to manage adjacent stormwater runoff (from nearby roadways and sidewalks, for example) within the park. Parks typically have large available areas for siting green infrastructure, whether a surface feature such as a bioretention system or wetland, or a subsurface storage/infiltration trench that can be placed under existing fields or athletic courts without impacting park usage.

The City installed GI in Long Marsh Park in 2018 under a Chesapeake Bay Trust Grant we installed bioretention cells and porous pavers over parking areas. We have also applied for funding to implement GI practices at a new park on Mill Street, behind the Mill Street School that will be developed around stormwater practices. The size and significant open space of parks enables them to be utilized for neighborhood scale GI practices.

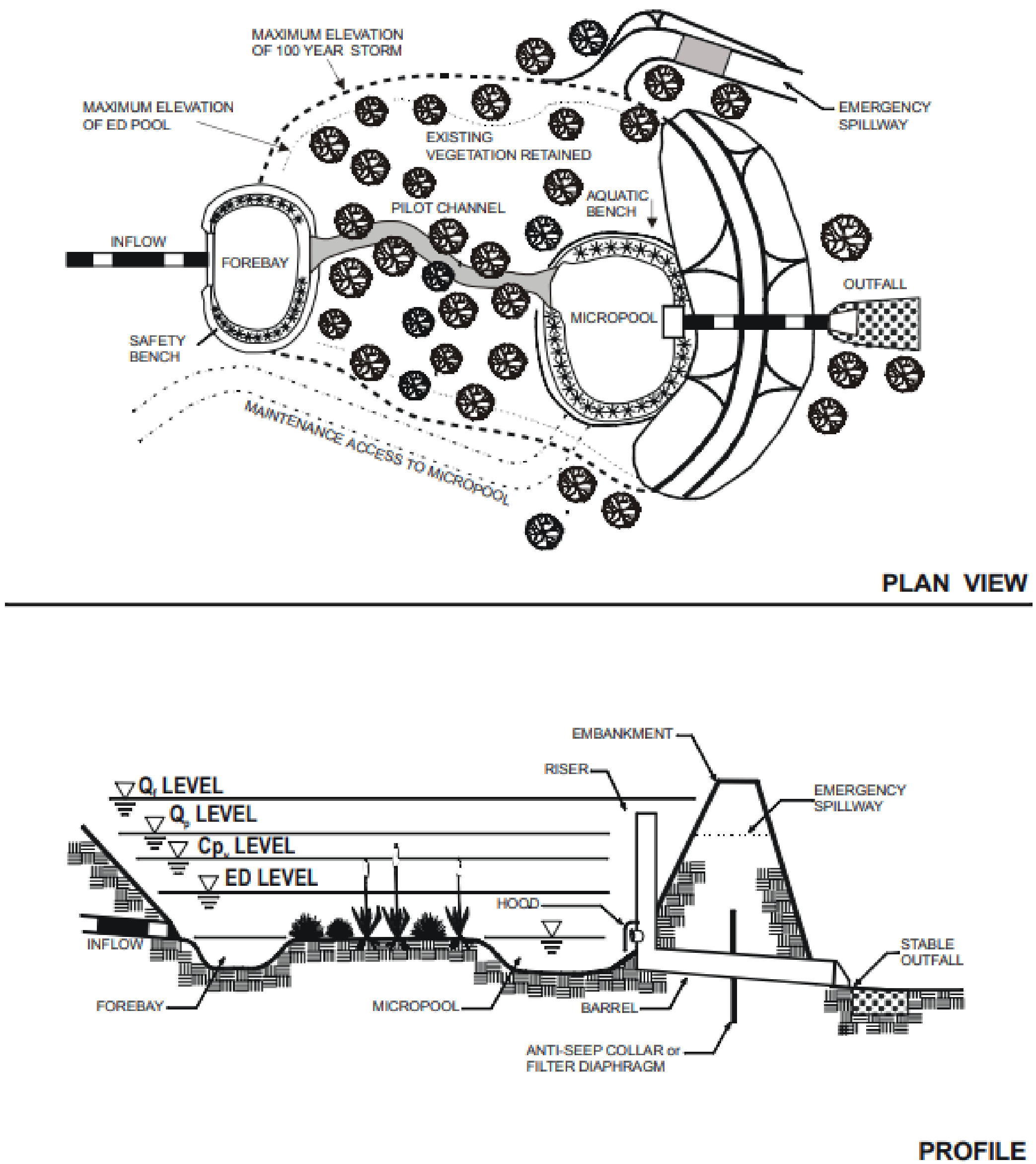
2.2 Specific Recommended Practices to Implement

Extended Detention-*This option relies on 12 – 24-hour detention of stormwater runoff after each rain event within a pond, with portions of the pond drying out in between storm events. Extended detention (ED) allows pollutants to settle out and if enough storage is available, can also provide downstream channel protection.*

Extended detention basins are hydraulic structures engineered to attenuate the flow velocity of incoming water, facilitate settling of pollutants and temporary containment of floodwaters. This mechanism allows for floodwater levels to subside and the settlement of pollutants before the discharge of treated water into the conventional stormwater conveyance system.

Chapter 3. Performance Criteria for Urban BMP Design …………………… Stormwater Ponds

P-1	**Figure 3.1** Example of "Micropool" Extended Detention Pond	P-1



A micropool is provided in an extended detention pond to prevent resuspension of previously settled sediments and prevent clogging of the low flow orifice.

Figure 1: Taken from Maryland Department of the Environment (MDE) Stormwater Design Manual

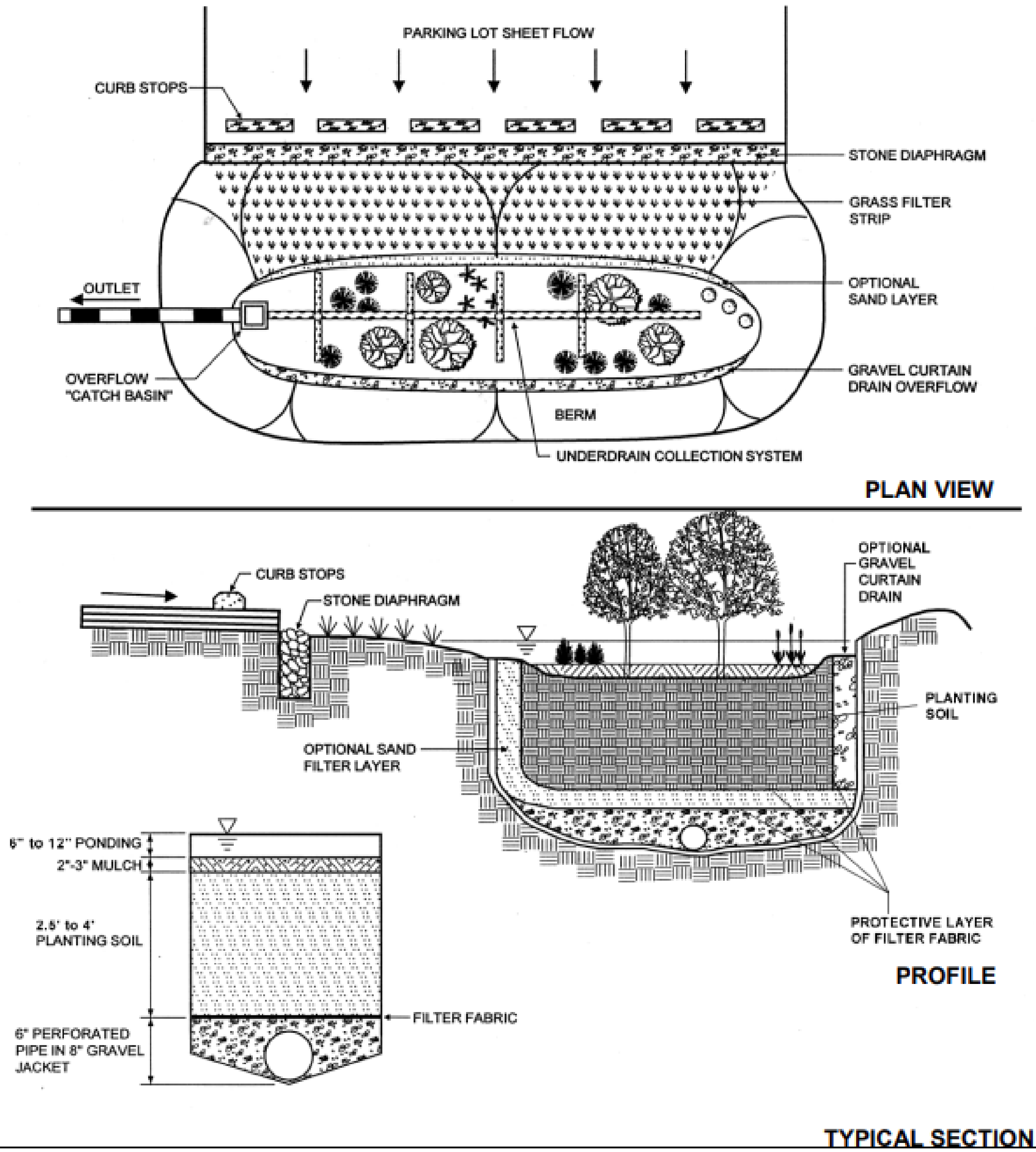
Bioretention basin

A bioretention basin is a landscaped depression that collects and filters stormwater runoff. It is a type of stormwater control measure that removes pollutants and helps to temporarily store runoff to reduce the peak of a flood event. It uses physical, chemical, and biological processes to treat the runoff that can enter the basin through pipes, ditches, or overland flow.

Bioretention basins readily receive drainage from adjacent roadways and sidewalks. They can be landscaped with native vegetation and are designed to pond water for less than 24 hours.

Chapter 3. Performance Criteria for Urban BMP Design ……… Stormwater Filtering Systems

F-6	**Figure 3.17** Example of Bioretention	F-6

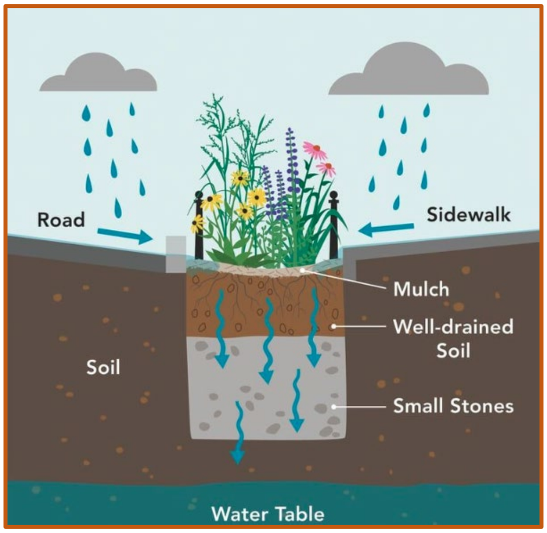


Bioretention combines open space with stormwater treatment.

Figure 2: Design criteria for bioretention from MDE Stormwater Design Manual

Bioswale (Dry Swale)

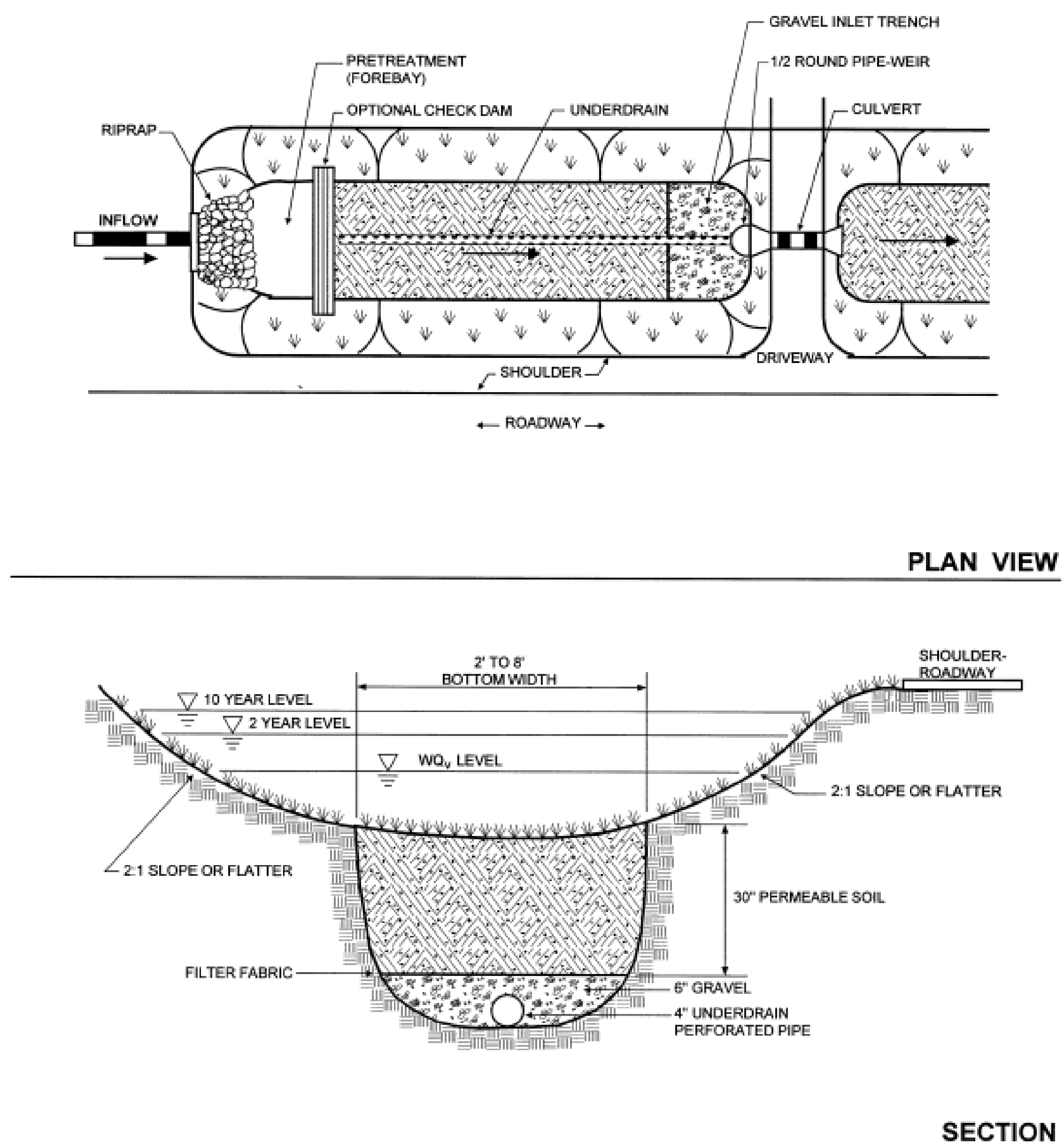
Bioswales are channels, ditches or shallow channels designed to convey water to a storm drain inlet and to remove debris and pollutants. Bioswales are typically widened and filled with a manufactured soil mixture of compost, sand and topsoil to allow for high porosity to allow water to move through them. They provide temporary storage to stormwater and remove pollutants through physical, chemical, and biological processes.



Bioswales are linear, engineered treatment facilities that can be built in roadside swales. They provide excellent attenuation of pollutants and slow stormwater before it's discharged to the grey stormwater conveyance system.

Chapter 3. Performance Criteria for Urban BMP Design .... Open Channel Systems

O-1	**Figure 3.18** Example of Dry Swale	O-1

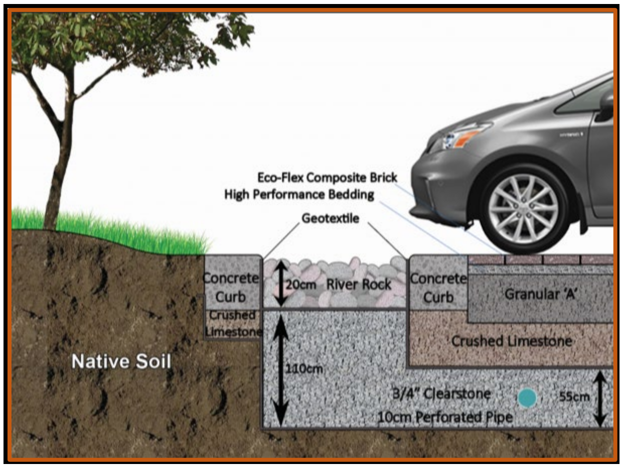


Dry swales are used at low density residential projects or for very small impervious areas.

Figure 3: Dry Swale (Bioswale) technical specifications from MDE Stormwater Design Manual

Enhanced treatment Infiltration Trench

A standard infiltration trench is a type of stormwater management system that collects and infiltrates runoff into the subsoil or to local receiving waters. Enhanced treatment can be achieved by adding media to the trench such as biochar, sand, etc. that can actively remove pollutants.



Enhanced treatment infiltration trenches offer an opportunity to convey water from the roadway to local receiving waters. If enhanced with biochar and sand can effectively remove pollutants before the water is discharged.

Green Roofs

Silva Cells/ Infiltration--- In series tied to underground trench (Cedar St.)

Rain Barrels

Porous Pavers

Rooftop Disconnect- Planters, rain barrels, rain gardens, cisterns

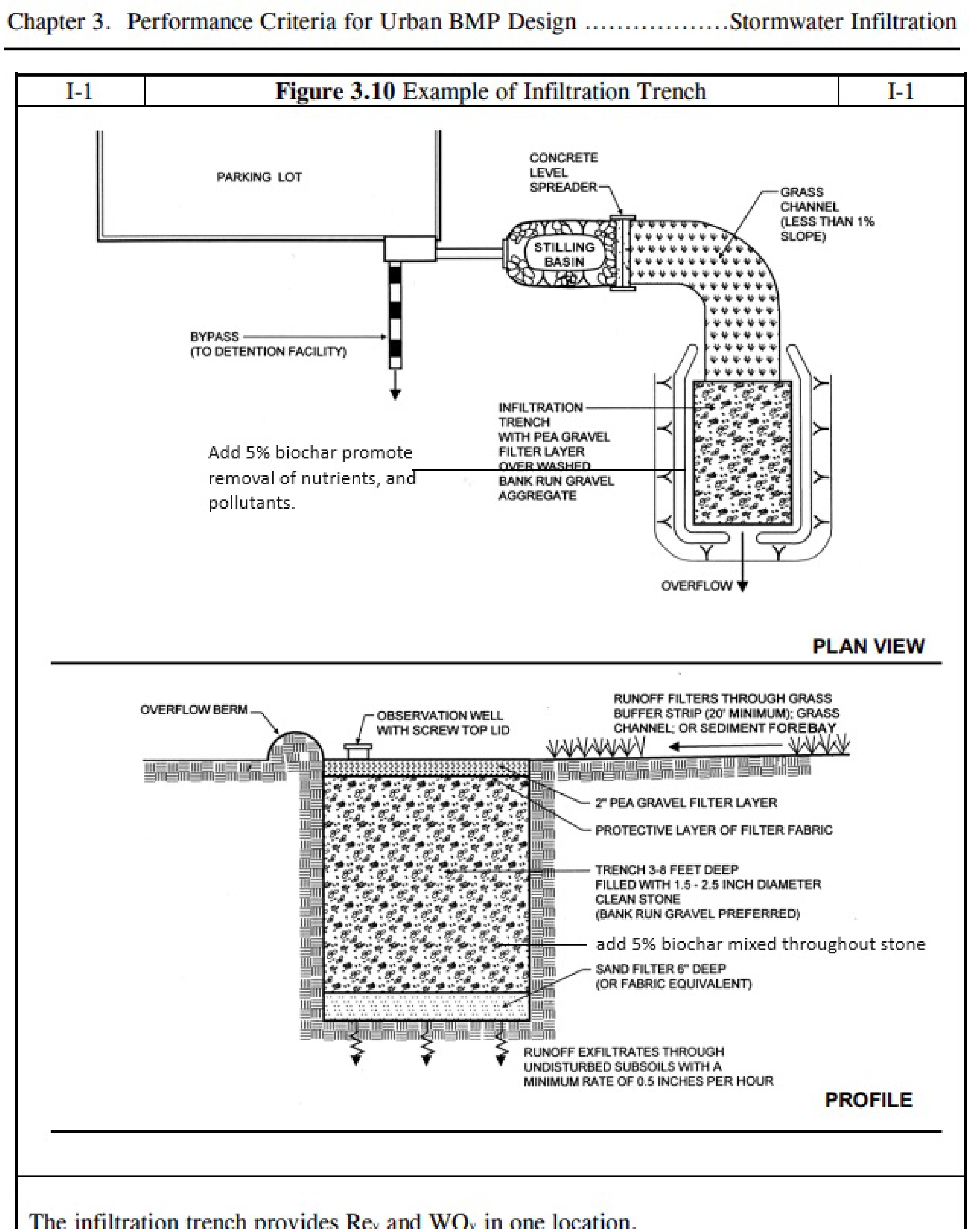
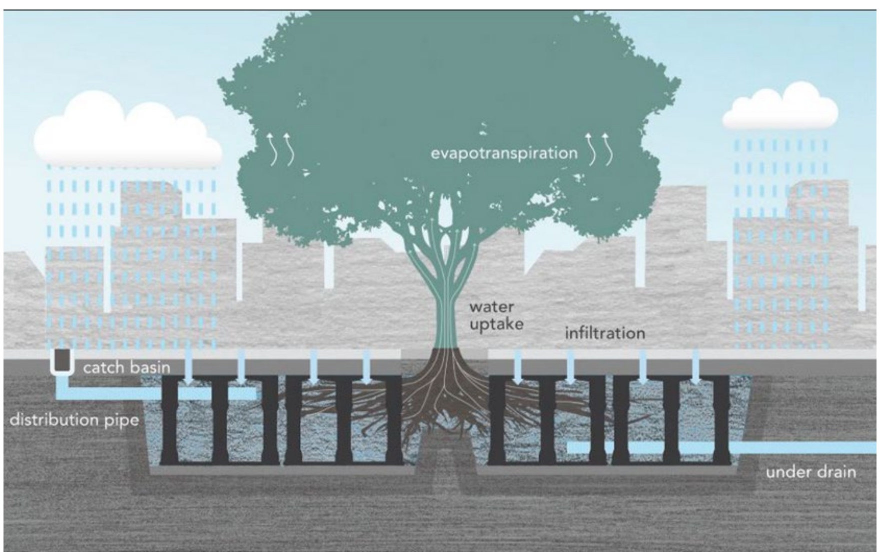


Figure 4: Specifications for Infiltration trench from MDE Stormwater Design Manual, with enhanced treatment capacity.

Silva Cells

Silva Cells are a plastic grid system that goes under sidewalks to provide both stormwater management and soil area to support roots for large trees. Sidewalks can be constructed on top of the Silva Cells and stormwater can be directed into the void area under the sidewalks. The City has applied for funding (National Fish and Wildlife Foundation) to tear up existing sidewalks on Poplar Street and the 400 and 500 blocks of Race street and to install silva cells. With the support of Main St. Cambridge, we would then divert stormwater into the area beneath sidewalks to be stored and treated and plant trees.

Silva Cells being installed in Toronto, Canada. Web image.



Drawing depicts how Silva Cells function to support large trees, provide stormwater management in an urban environment.

Programmatic Goals

In our stormwater retrofit program for Cambridge, MD, we aim to employ a diverse range of best management practices (BMPs) targeting roadside ditches, city-owned rights-of-way, and city-owned property and private property. Recognizing the importance of integrating nature-based solutions with existing grey infrastructure, our approach prioritizes the implementation of multiple small practices throughout the city. Our objective is to provide storage and treatment to both improve water quality in our local water ways and to minimize flash flooding in the city.

We intend to implement bioretention systems, bioswales, and to convert storm water ponds into dry detention basins. These features not only capture and filter stormwater runoff but also enhance biodiversity, aesthetic appeal, and community resilience. Additionally, oil and grit separators and sand filters will be strategically installed to prevent pollutants from entering water bodies, safeguarding both environmental and public health. Infiltration trenches will play a crucial role in reducing surface runoff, thus mitigating flood risks. By seamlessly integrating these BMPs with conventional stormwater infrastructure, we aim to maximize the efficiency and effectiveness of our retrofit program while minimizing its ecological footprint and long-term maintenance costs. Through this comprehensive approach, we aspire to create a more sustainable and resilient stormwater management system for the city of Cambridge, MD, that serves as a model for other communities facing similar challenges.

3.1 Sub-watershed Level retrofits

Sub-watershed retrofitting is a major, long-term commitment where hundreds of individual projects are built over a multi-year timeframe.

This section describes a multi-pronged strategy to sustain public investment in retrofitting over many years. The strategy involves multiple methods to deliver retrofits on both public and private land. While many stormwater managers believe that retrofitting primarily involves capital construction projects on public land, much great coverage can be achieved by a creative combination of financing, education, subsidies, permit coordination and stormwater regulations.

Demonstration Retrofits are typically the first method jurisdictions implement and indeed, Cambridge has several demonstration projects that have been constructed and several more in the planning stages.

Check with Scott to see if we have watershed maps.

Figure 1: Cambridge Creek Watershed

The dashed line on the LIDAR image on the right is the stretch of Peachblossom Creek to be restored. The photo on the left is a map of the Cambridge Creek watershed that also shows the location of Peachblossom Creek.

3.2 Private Property Goals

The city will partner with landowners to install bmps that treat runoff from private and public property while working with City Council to devel op

Constructed Wetlands

Constructed wetlands are shallow depressions that receive stormwater for treatment. Runoff from each new storm displaces runoff from previous storms and the residence time of several days allows multiple pollutant removal processes to operate. Pollutants are removed by a variety of biological and physical processes, and they provide excellent wildlife habitat.

Massey Farms Cascading Wetlands Treatment System 1.8 acres of wetlands with a polishing infiltration trench in a 130 acre watershed

1356 lbs/year N, 59 lbs/year P, 49,052 lbs/ year TSS

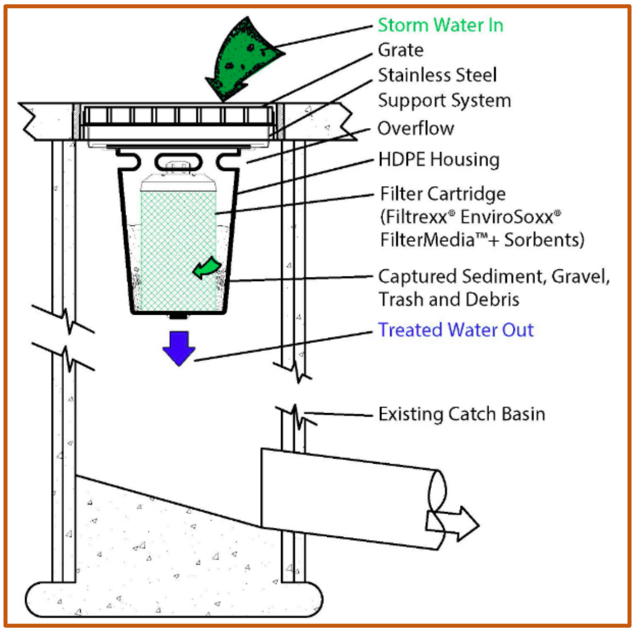
2017 2018 2022

Opportunities: While much of Cambridge has been developed and is covered in impervious surfaces, there are still opportunities within the city limits to restore wetlands and to divert stormwater to them to provide treatment and temporary storage. One example is a roughly 1/2-acre area at the soon to be developed Leonard Lane Park. This area is characterized by hydric soils with disturbed vegetation. Restoration of this wetland is part of the City's plan to develop the park

The area circled in red is the approximate wetland area that will be restored during the development of the new Leonard Lane Park with minimal impacts for the park development.

Filtering Practices

Filter practices function by filtering runoff through an engineered media and collecting treated runoff in an underdrain. The media may consist of sand, soil, compost, biochar, or a combination of these.



Private Property Program

In extending our stormwater retrofit program to private properties in Cambridge, MD, our focus is on fostering widespread participation and collaboration among homeowners and businesses. A key strategy is promoting downspout disconnection, which involves redirecting roof runoff away from storm sewers and towards more sustainable outlets such as rain barrels, cisterns, rain gardens, and garden planter boxes. These decentralized solutions not only help to manage stormwater on-site but also offer additional benefits such as water conservation, improved soil health, and enhanced aesthetic value. To incentivize private property owners to adopt these practices, we will offer a range of incentives, including financial assistance, technical support, and educational resources. By empowering individuals to take proactive measures to address stormwater issues on their own properties, we aim to create a more resilient and interconnected stormwater management network that benefits the entire community of Cambridge.

Examples of Private Property Stormwater Options

On site retrofits on residential lots educates homeowners to persuade them to install low cost on-site retrofits on their property such as rooftop disconnections, rain barrels or rain gardens.

Most effective campaigns educate the public about the need to restore watersheds, provide some simple construction tips, and direct interested residents where they can obtain more specific information and technical assistance.

Most of the retrofits designed for urban homes serve the purpose of disconnecting the rooftop runoff from the storm drain system. This can be accomplished by several methods that have been used effectively around the country to reduce runoff to storm drains, and, or to provide some treatment to water draining off of the rooftops of residential houses.

Cisterns

Cisterns allow homeowners to capture and store rainwater that can then be used to flush toilets and water gardens.

Rain Gardens

In this image, the downspout from the home has been directed towards a rain garden. Rain gardens are constructed by excavating a shallow bed, filling with a special soil mixture and planting with native plants.

Rain Barrels

Rain Barrels offer homeowners an opportunity to capture rooftop runoff that can then be utilized to water gardens, lawns, or plants. Rain barrels are typically made from 50-80 gallon plastic barrels that are placed underneath a downspout to capture water from the roof during each rain event. By attaching a soaker hose to them, users can water their landscape and empty the rain barrels, so they function as designed during the next rain event.

Rain Barrels can be either plain or decorative. They are adapted to receive rooftop runoff and a spigot is installed near the bottom of the barrel where homeowners can attach a soaker hose or fill watering cans. During summer months, we recommend placing a mosquito dunk in the barrel regularly to prevent mosquitoes from breeding in the barrel.

Planters

Connecting a planter to a downspout is another method of disconnecting rooftop runoff from the storm drain network. Planters generally have a container installed inside of a decorative box. Planters are filled with a mixture of topsoil, compost, and sand to allow for well-drained, fertile soil. They can be planted with herbs, vegetables or flowers.

Larger private property

In private communities or in commercial development with built-in stormwater management, the city is aiming to improve upon existing stormwater treatment by creating additional storage volume in stormwater management and adding additional practices to provide additional water quality management.

The recent redevelopment of the Phillips Packing House is an example of maximizing stormwater management through the installation of bioretention cells, pervious pavers, and a stormwater detention basin to treat and manage stormwater coming off of their impervious surfaces.

Commercial Properties are encouraged to meet the MD Stormwater Regulations by implementing a variety of small practices to treat the stormwater generated by their impervious surfaces. An example of this is seen in the photograph below of The Phillips Packing House that was recently redeveloped.

Retrofits on Public Land

These retrofits are typically located in stream valleys, parks, public right of way and publicly owned stormwater infrastructure. Public land retrofits are easier to deliver because they do not require land acquisition and can provide community benefits. Storage retrofits should be prioritized because they can cost-effectively treat the greatest amount of water. The Center For Watershed Protection estimates that 30-50% of a sub-watershed can be treated through public land retrofits, particularly if the community owns land in the stream corridor.

Bundle Retrofits into Municipal Construction Projects:

This method of stormwater retrofits incorporates retrofit delivery into other municipal construction capital projects. Communities are constantly investing in streetscaping, transportation projects, school construction, park improvements, water and sewer line rehabilitation, drainage improvements, and neighborhood revitalization. The idea is to bundle retrofits into routine capital projects. In some instances, the matching funds are relatively easily obtained. The largest municipal construction categories include schools, roads, water supply and wastewater treatment, parks and recreation, and municipal building