

**Amendment 2 to Amendment 79
to Council Bill No. 28-2023**

BY: Deb Jung

**Legislative Day 12
Date: October 11, 2023**

(This amendment restores the quotes to Chapter 3, restores the Incentivizing Natural Resource Protection and Restoration section, except for the Green Neighborhood Program section in including the Green Neighborhood Implementing Action in the EH-4 Policy Statement in Amendment 79, and amends the EH-2 Policy Statement to integrate climate change goals as specified in the Howard County Climate Action and Resiliency Plan.)

1 Substitute pages 1 and 2 of Amendment 79 with the attached pages 1 and 2 to this Amendment to
2 Amendment.

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5 Substitute the attached pages EH-8, 11, 15, 18, 19, 20, 21, 26, 33, 44, 56, and IMP-16 and 17 of
6 Amendment 87 with the attached EH-8, 11, 15, 18, 19, 20, 21, 26, 33, 44, 56, and IMP-16 and 17
7 to this Amendment to Amendment.

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Amendment 79 to Council Bill No. 28 -2023

BY: Deb Jung
Liz Walsh

Legislative Day 11
Date: 10/2/23

Amendment No. 79

(This Amendment makes the following changes to HoCo by Design Chapter 3 and Chapter 11:

*Chapter 3: Ecological
Health*

- ~~—Removes all quotes;~~
- *Includes health hazards caused by airplanes in equity considerations;*
 - *Amends the EH-1 Policy Statement Implementing Actions to track outcomes of ecological health investments and provide maintenance and enforcement, and adds an action to develop open space percentage requirements for activity centers;*
 - *Adds language regarding 2020 bird-friendly amendments to design standards;*
 - *Amends the EH-2 Policy Statement to integrate climate change goals as specified in the Howard County Climate Action and Resiliency Plan and the Implementing Actions to include resiliency in the title of the Climate Action Plan, ensure County departments align policies with ecological health goals, and adopt the International Green Construction Code;*
 - *Deletes the Green Neighborhood Program description section from the Incentivizing Natural Resource Protection and Restoration section including and removes Implementing Action #3 regarding Green Neighborhoods from EH-4 Policy Statement and remove all the implementing actions;*
 - *Amends the EH-5 Policy Statement Implementing Actions to incentivize existing commercial centers to provide stormwater management systems, reduce stormwater runoff and incorporate water quality management practices, increase the use of green stormwater infrastructure, and add the requirement that redevelopment meets new development stormwater requirements;*
 - *Amends the EH-7 Policy Statement Implementing Actions to include invasive species removal in forest management;*

*Chapter 11:
Implementation*

- *Amends the EH-1 Policy Statement Implementing Actions to track outcomes of ecological health investments and provide maintenance and enforcement, and adds an action to develop open space percentage requirements for activity centers;*

- *Amends the EH-2 Policy Statement to integrate climate change goals as specified in the Howard County Climate Action and Resiliency Plan and the Implementing Actions to include resiliency in the title of the Climate Action Plan, ensure County departments align policies with ecological health goals, and adopt the International Green Construction Code;*
- ~~*Removed EH-4 Policy Statement and all the implementing actions*~~ *Deletes the Green Neighborhood Implementing Action in the EH-4 Policy;*
- *Removed EH-4 Policy Statement and all the implementing actions;*
- *Amends the EH-5 Policy Statement Implementing Actions to incentivize existing commercial centers to provide stormwater management systems, reduce stormwater runoff and incorporate water quality management practices, increase the use of green stormwater infrastructure, and add the requirement that redevelopment meets new development stormwater requirements;*
- *Amends the EH-7 Policy Statement Implementing Actions to include invasive species removal in forest management.)*

1 In the *HoCo By Design* General Plan, attached to this Act as Exhibit A, amend the following
 2 pages as indicated in this Amendment:

- 3 • Chapter 3: Ecological Health: 5, 7, 8, 11, 14, 15, 18, 19, 20, 21, 24, 26, 33, 42, 44, and
 4 56; and
- 5 • Chapter 11: Implementation: 15, 16, 17, 18, and 20.

6 Correct all page numbers, numbering, and formatting within this Act to accommodate this
 7 amendment.

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Supporting the County's Ecological Health

Howard County contains a wealth of natural resources, including forests, meadows, wetlands, streams, and lakes, which are linked together through ecosystems (see Map 3-1). Ecosystems are comprised of all living organisms, the physical environment, and the relationships between the living and inanimate elements within a particular area. Ecosystems provide a wide variety of services that benefit humans and other species, including food production, clean water, flood control, temperature regulation, recreational opportunities, and aesthetic value. However, their monetary values are often overlooked, until human intervention is needed to repair or replace them. It is generally far more cost-effective to protect a healthy ecosystem than to try and restore one that has been degraded.

The health of these ecosystems—ecological health—is the foundation that supports economic and community health and personal well-being. Human activities can negatively affect ecological health by removing or degrading natural resources, but people can also help restore and protect these resources. The challenge is to meet current human needs while ensuring actions protect and restore ecological health so that it may continue to support future life.

Through the January 27, 2021 Executive Order 14008 on Tackling the Climate Crises at Home and Abroad, the United States joined an international movement by countries to pledge conservation of at least 30% of their land and water by 2030. This pledge is intended to help protect biodiversity and mitigate climate change through locally led conservation efforts. Howard County already has 39% of its land and water conserved in parkland, open space, and easements. The County should continue to support this movement by establishing a goal for natural resource conservation. This goal could be for the County as a whole and each major watershed.

EH-1 Policy Statement

Continue to support the County's ecological health.

Implementing Actions

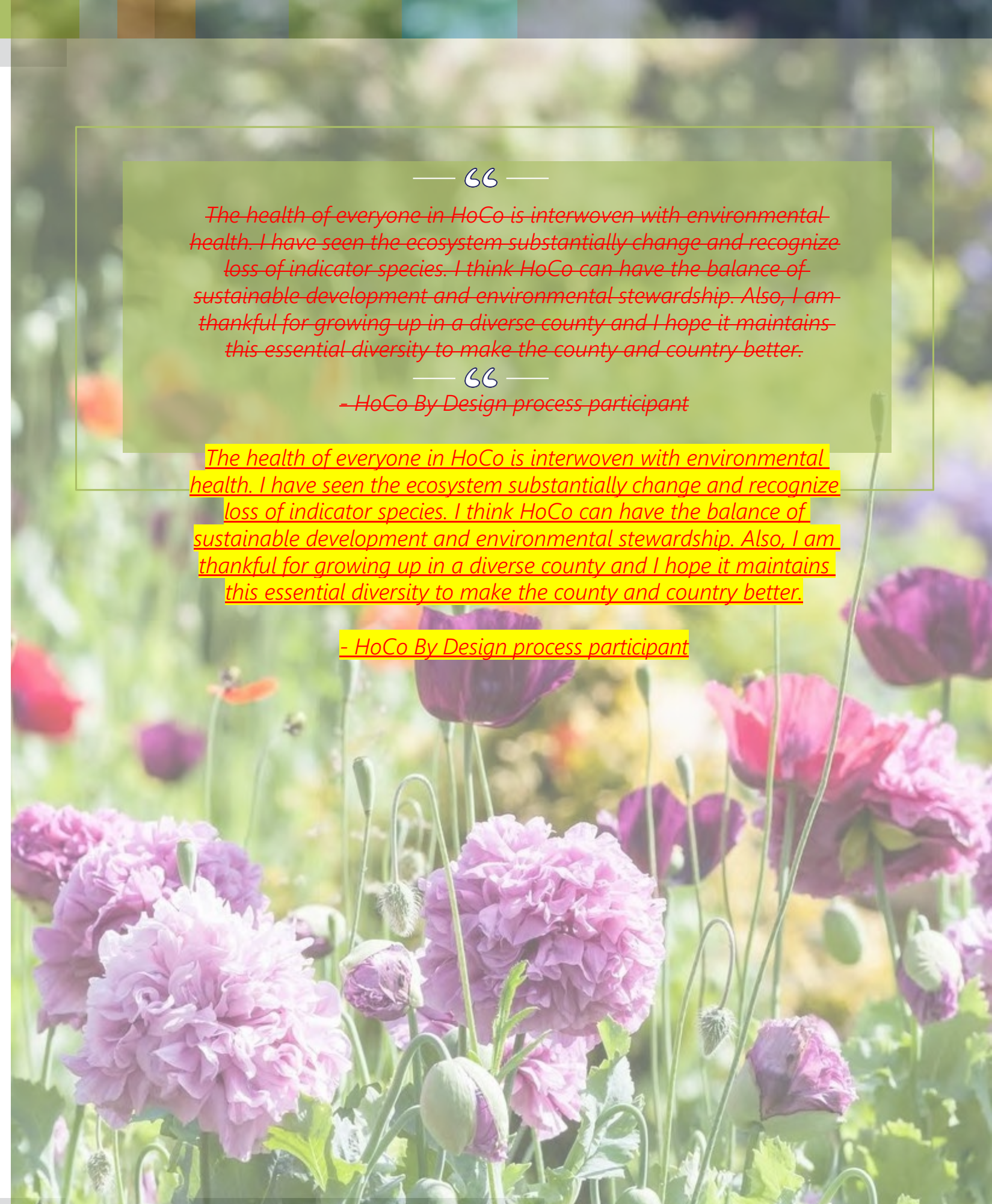
1. Integrate the goals of protecting and restoring the County's ecological health when updating county programs and policies.
2. Ensure adequate funding for programs and measures to protect and restore the County's ecological health, track outcomes of these investments, and provide necessary maintenance and enforcement.
3. Create a dedicated funding source, as was done for the Agricultural Land Preservation Program, for environmental programs.
4. Establish a natural resource protection goal for the County and each major watershed to help protect biodiversity and mitigate climate change.
5. Develop open space percentage requirements for activity centers.

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The health of everyone in HoCo is interwoven with environmental health. I have seen the ecosystem substantially change and recognize loss of indicator species. I think HoCo can have the balance of sustainable development and environmental stewardship. Also, I am thankful for growing up in a diverse county and I hope it maintains this essential diversity to make the county and country better.

— “ —
-HoCo By Design process participant

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Mitigating and Adapting to Climate Change

Climate change can be generally defined as a significant, long-term shift in weather patterns for a specific geographic region. The National Oceanic and Atmospheric Administration's (NOAA) Fourth National Climate Assessment notes that emissions of the long-lived greenhouse gases carbon dioxide, methane, nitrous oxide, and fluorinated gases are causing climate change as they build up and trap heat in the atmosphere. The assessment further notes that greenhouse gas (GHG) emissions come from human sources (fossil fuel combustion, industrial processes, deforestation) and natural sources, but emissions from human sources have increased dramatically since the start of the industrial age and the growing use of coal, oil, and natural gas.

NOAA's Maryland State Climate Summary (2017) projects impacts in Maryland from climate change will include increased average annual precipitation, especially during the winter and spring. More frequent and intense rainfall events are also projected, which could lead to more flooding events in urban areas and expanded flood inundation areas. Projected changes also include higher daytime and nighttime temperatures, which could intensify droughts. NOAA further projects that the oceans will continue to warm and sea levels will continue to rise, which may displace people living along the coast. These effects combined could shift available habitat and impact migratory patterns for plant and wildlife species. If these shifts occur at a rapid pace, species that cannot adapt quickly enough may not survive.

Not only could climate change have a devastating impact on the natural environment and plant and wildlife species, it could also economically distress many households, businesses, and families. Families could experience higher energy bills resulting from temperature extremes, unless they are able to upgrade the heating and cooling systems in their homes. They may also need to further weatherproof their homes and retrofit their properties to add stormwater management for more frequent nuisance flooding. While all households may experience impacts from climate change, lower-income and cost-burdened households could have significant challenges affording these extra costs. In Howard County, as of 2018, 5% (5,732) of all households are below the poverty line and 23% (27,310) of households are in the ALICE (Asset Limited, Income Constrained, Employed) income bracket. Financial assistance programs are available to assist income-qualified households, such as weatherization programs funded by federal and state grants.

Mitigation Measures

Mitigation measures to reduce GHG emissions in our region can include reducing the use of fossil fuels through energy conservation and efficiency in buildings and transportation, switching to renewable energy, and promoting carbon sequestration through natural resources and agriculture. Carbon sequestration is the process by which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in biomass (trunks, branches, foliage, and roots) and soils.

Many Smart Growth policies promote development patterns and actions that are in harmony with climate mitigation goals. Policies that promote compact growth, walkable communities, green buildings, complete streets, and increased transit reduce fossil fuel use. Other policies promote protecting environmental resources, such as wetlands and forests, and preserving open space and agricultural land, which can provide carbon sequestration and help mitigate increased temperature extremes. Zoning and other policies can promote renewable energy by making it easier to include solar and other on-site or local renewable energy generation, especially on developed parcels. Mitigation measures can help communities improve their quality of life and save money through reduced energy costs, an important outcome for everyone, but especially for low-income or cost-burdened households.



Photo Credit: Sue Muller



Protecting Sensitive Environmental Resources

The County Subdivision and Land Development Regulations and Zoning Regulations contain significant provisions for the protection of sensitive environmental resources when properties are developed. This section discusses regulatory protections for water resources, steep slopes, and rare, threatened and endangered species, as well as three zoning districts specifically designed to protect sensitive resources. Additional protective measures for forests and stormwater management requirements are addressed in later, separate sections.

Water Resources and Steep Slopes

Water resources include rivers, wetlands, floodplains, ponds, lakes, and groundwater. These are vital natural resources that provide drinking water, stormwater management, pollution abatement, floodwater storage, and recreation, as well as important habitat for a wide variety of plant and animal species.

To protect water quality and habitat within streams, the County Subdivision and Land Development Regulations require the following undisturbed streamside buffer areas:

- 75 to 100 feet along perennial streams in residential zoning districts;
- 50 feet along perennial streams in non-residential zoning districts; and
- 50 feet along intermittent streams in all zoning districts.

The regulations also require a 25-foot undisturbed buffer around nontidal wetlands. Additionally, most wetlands in the County are found within the 100-year floodplain, which is protected from disturbance.

County regulations also protect steep slopes of 25% or greater when there is a contiguous area of 20,000 square feet or larger. Disturbing steep slopes can generate excessive erosion and sedimentation that can be difficult to contain even with enhanced sediment and erosion control practices, and once disturbed steep slopes can be difficult to stabilize. This can be especially problematic when these slopes are adjacent to water bodies. When slopes of 15% or greater occur in conjunction with highly erodible soils, these erosion problems are intensified.

To provide the greatest benefit, stream and wetland buffers should be wide enough to allow adequate filtering of overland stormwater runoff, include adjacent steep slopes and highly erodible soils, and be forested. The use of a floodplain buffer can improve resilience to flooding by accounting for future changes in the floodplain due to changing weather patterns (increased rainfall), increased development, or outdated mapping.

County regulations require sediment and erosion control practices comply with the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control when development or forestry activities will result in clearing and grading. These practices prevent sediment and other pollutants from leaving a disturbed site and entering nearby water bodies during storm events. The requirements for sediment and erosion control should be reviewed to ensure they are adequate for changing precipitation patterns, especially short-duration, high-intensity storms.

EH-2 Policy Statement

Seek to integrate climate change mitigation and adaptation goals [as specified in the Howard County Climate Action and Resiliency Plan, or the most recently adopted Plan](#), into all county programs and policies.

Implementing Actions

1. Ensure the Howard County Climate Action [and Resiliency](#) Plan update continues to maximize opportunities to mitigate and adapt to climate change with clear goals and strategies [and that County Departments' policies are aligned with the plan's goals and strategies](#).
2. Evaluate and enhance opportunities where needed for climate change mitigation and adaptation measures in the Subdivision and Land Development Regulations and Zoning Regulations, such as natural resource protection and the provision of renewable energy.
3. Enhance county design requirements for county infrastructure and public and private buildings, to ensure these structures will be resilient under projected future weather patterns and minimize resource consumption.
4. [Review and update county Adopt the most current standards of the International Green Construction Code Green Building requirements](#) for opportunities to enhance the sustainability of public and private buildings.
5. Identify and ensure economically-vulnerable communities, businesses, and households have the resources necessary for mitigation and adaptation measures.



Rare, Threatened, and Endangered Species

The 2019 Maryland Department of Natural Resources (DNR) list of current and historical rare, threatened, and endangered species identifies 98 species within Howard County. Of these 98 species, 15 are animals and 83 are plants. Threats to these species are primarily caused by habitat destruction, particularly of wetlands, riparian areas, steep slopes, and forests. Therefore, protective measures for these important habitats also benefit these species.

The DNR mapped the known habitat areas for rare, threatened, and endangered species throughout Maryland as Sensitive Species Project Review Areas (SSPRA). The SSPRA information is used by the County to initially screen development proposals under the Forest Conservation Act. If this screening indicates that such habitat may be present, the developer is referred to the DNR for guidance on protecting the species and the associated habitat.

Zoning Regulations

Excluding mixed use zones, there are three residential zoning districts with a stated purpose that includes protecting environmental resources. (Note that there is a fourth district that includes this purpose, but it is applicable only to historic properties.) These zoning districts require or allow the use of cluster development to achieve this purpose. The Residential-Environmental Development (R-ED) zoning district in the East is located primarily along the Patapsco River in areas with steep and narrow stream valleys. The R-ED zoning district has a 50% open space requirement (as specified in the Subdivision and Land Development Regulations) and allows smaller lots, clustered together to keep development impacts away from steep slopes and streams. In the Rural West, the Rural Conservation (RC) zoning district requires low-density, clustered residential development for parcels of 20 acres or greater to protect agricultural lands and natural resources. This type of cluster development is also allowed on smaller lots in the RC zoning district and on any lot in the Rural Residential (RR) zoning district. Cluster development may also be appropriate to enhance environmental protection in other residential zoning districts.

EH-3 Policy Statement

Ensure the Subdivision and Land Development Regulations and Zoning Regulations provide adequate protection for sensitive environmental resources within new development and redevelopment.

Implementing Actions

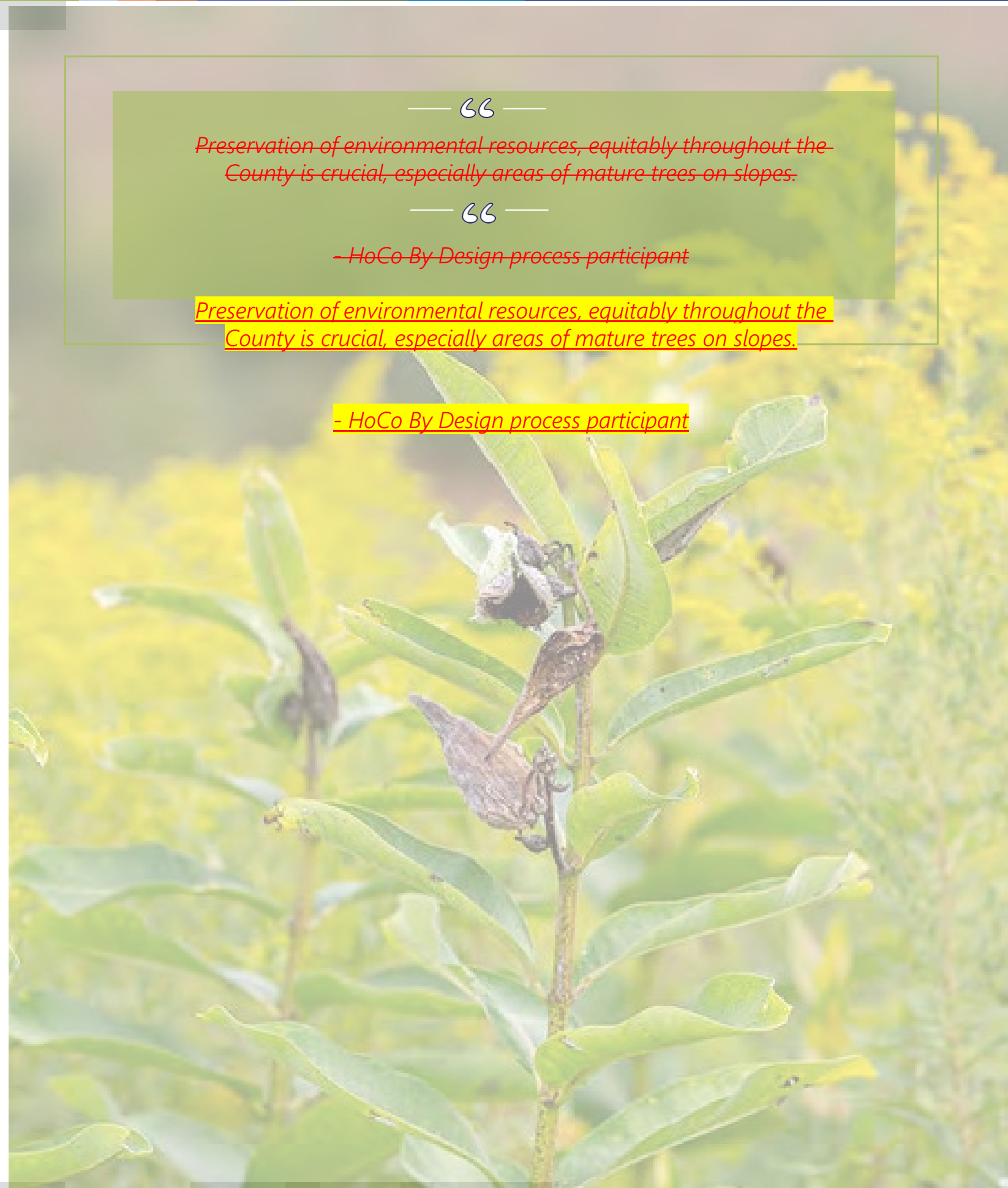
1. Evaluate and enhance protections, including sediment and erosion control, where needed for sensitive environmental resources, such as water resources, steep slopes, and rare, threatened, and endangered species, in the Subdivision and Land Development Regulations.
2. Explore whether cluster development may also be appropriate in other residential zoning districts during the zoning regulation update process.

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Preservation of environmental resources, equitably throughout the County is crucial, especially areas of mature trees on slopes.

— “ —
-HoCo-By-Design-process-participant

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Incentivizing Natural Resource Protection and Restoration

The County currently has few incentives to encourage resource protection and restoration measures that go beyond the minimum requirements of the Subdivision and Land Development and Zoning Regulations.

Incentivizing Natural Resource Protection and Restoration

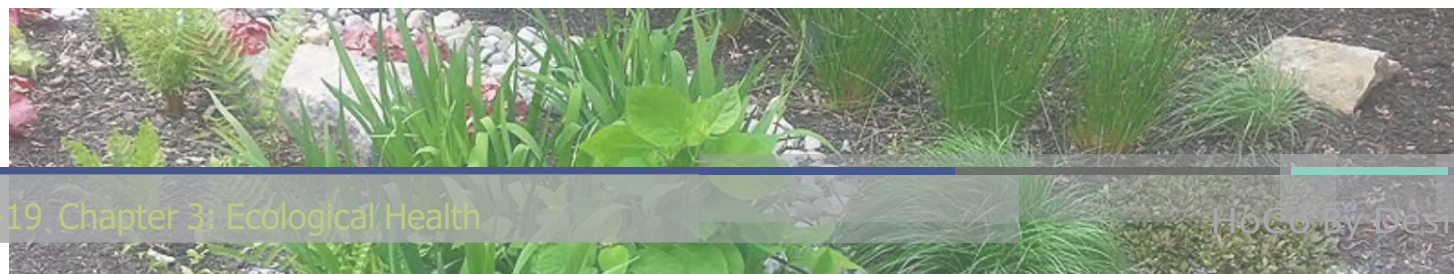
The County currently has few incentives to encourage resource protection and restoration measures that go beyond the minimum requirements of the Subdivision and Land Development and Zoning Regulations.

Green Neighborhood Program

The Subdivision and Land Development Regulations include the Green Neighborhood Program, which is a voluntary, point-based program that provides housing allocations as an incentive for more environmentally friendly and sustainable development. Under Plan Howard 2030, up to 150 housing unit allocations were set aside annually for projects that meet Green Neighborhood requirements. HoCo By Design continues this important incentive.

The Green Neighborhood Program is divided into separate Site and Home requirements. Applicants earn Site points for a wide variety of green practices, such as designing a walkable community; exceeding minimum requirements for stormwater management, stream and wetland buffers, or forest conservation; using native plants for landscaping; restoring and creating wetlands; and restoring in-stream habitat. Applicants earn Home points for green practices such as using energy and water efficient appliances and fixtures, providing on-site renewable energy, and building with wood from sustainably managed forests.

Only two developments with a total of 1,458 dwelling units have qualified as Green Neighborhoods since the program's inception in 2008. Program participation has been limited by a major national recession that slowed development shortly after the program's inception, and the wide availability of housing allocations, which has reduced their value as an incentive. In addition, the development community has reported the need for greater flexibility and options for earning points to qualify for the program. The County has also experienced challenges in enforcing long-term implementation and maintenance for some of the Green Neighborhood features, such as habitat management plans and native landscaping. The program would benefit from an evaluation and update to address these issues and to incorporate new options, such as protecting the Green Infrastructure Network and/or increasing moderate income housing units.



Zoning Regulations

The Zoning Regulations include a Density Exchange Overlay (DEO) District for the RC and RR Districts, which provides an opportunity and incentive to preserve significant blocks of farmland and rural land in the West. An overlay district is a district established to respond to special features or conditions of an area, such as historic value, physical characteristics, or location. An overlay district may also supplement or provide an alternative to the regulations of the underlying zoning district. The DEO District allows residential density in the RC and RR Districts to be exchanged between parcels. Density exchanges are intended to preserve large parcels in perpetuity, while residential development is directed toward parcels that can more readily accommodate the additional dwellings. Use of this district has been successful in permanently preserving large tracts of open space and environmental and agricultural land, and should be continued under any new zoning regime. Additionally, an overlay district may be an appropriate approach to further protect watersheds with unique conditions or resources, as well as the Green Infrastructure Network.

Additional Incentives

Additional incentives could be employed to supplement changes to the Subdivision and Land Development Regulations and Zoning Regulations for enhanced resource protection and restoration. These could include density bonuses, tax credits, housing allocations, and private-public partnerships.

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Additional Incentives

Additional incentives could be employed to supplement changes to the Subdivision and Land Development Regulations and Zoning Regulations for enhanced resource protection and restoration. These could include density bonuses, tax credits, housing allocations, and private-public partnerships.

EH-4 Policy Statement

Incentivize additional resource protection and restoration measures within new development and redevelopment.

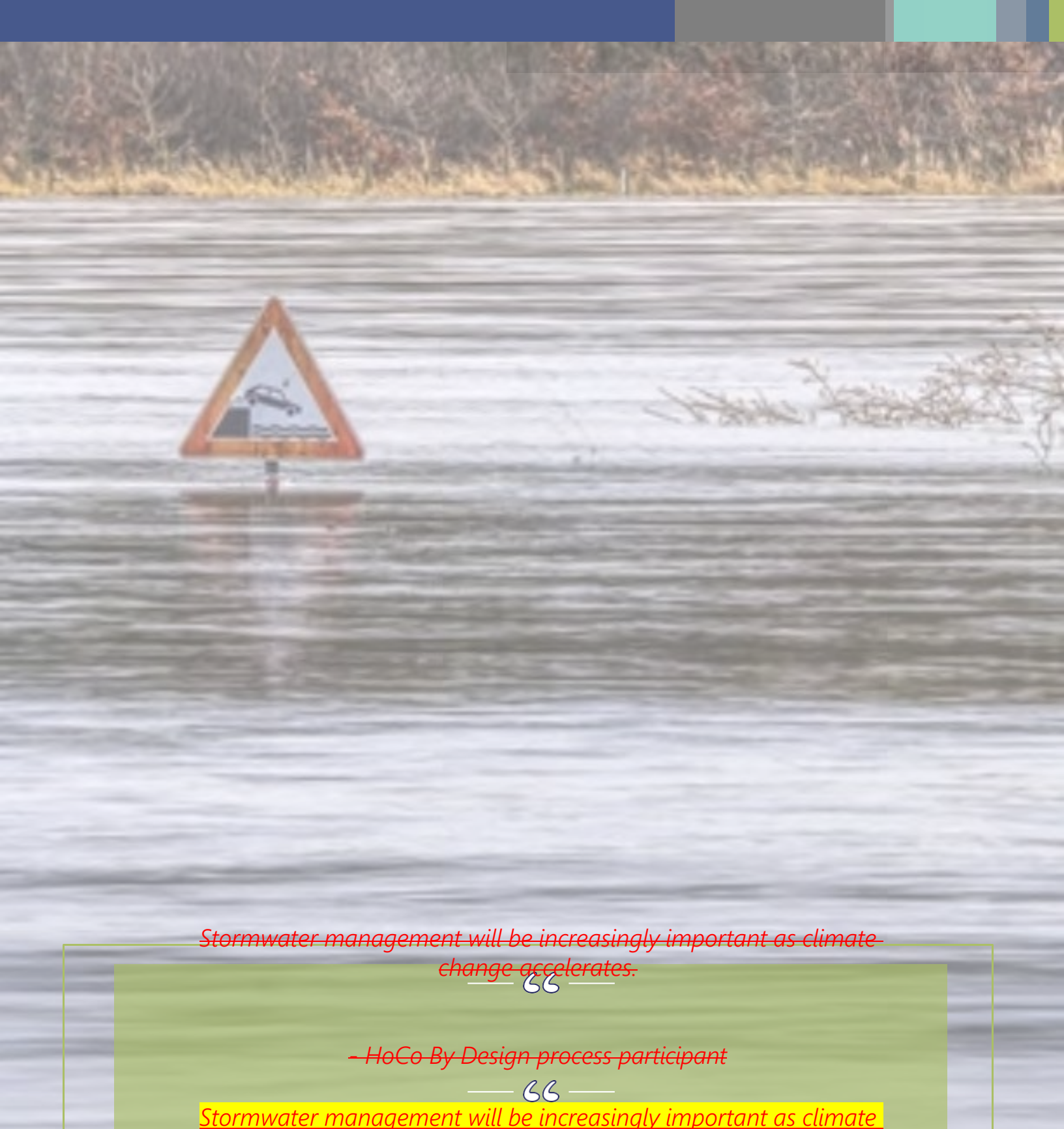
Incentivize additional resource protection and restoration measures within new development and redevelopment.

Implementing Actions

1. Consider increased use of a density exchange overlay district, in both the West and the East, to protect sensitive resources in areas with unique conditions or resources.
2. Consider incentives to encourage environmental protection and restoration when properties are developed or redeveloped, such as tax credits, density bonuses, housing allocations, and public-private partnerships.
3. Evaluate and strengthen the Green Neighborhood Program to ensure adequate incentives will increase program use and incorporate new options, such as increased moderate income housing units.

Implementing Actions

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2. Consider incentives to encourage environmental protection and restoration when properties are developed or redeveloped, such as tax credits, density bonuses, housing allocations, and public-private partnerships.
3. Evaluate and strengthen the Green Neighborhood Program to ensure adequate incentives will increase program use and incorporate new options, such as increased moderate income housing units.



Managing Stormwater

Impervious surfaces, such as roads, parking lots, and buildings, interfere with stormwater runoff’s ability to soak into the ground. Stormwater runoff travels quickly across impervious surfaces, picking up sediment and pollutants, and during warm weather, becoming warmer, before it enters nearby water bodies. The simultaneous increase in both water quantity, pollutants, and temperature leads to flooding, stream erosion, and degraded water quality and habitat. These impacts will be exacerbated by the more frequent and intense rainfall events and warmer temperatures projected to occur with climate change. Stormwater management can help remove pollutants from runoff, reduce water temperature, moderate the flow of runoff into nearby water bodies, and reduce flooding.

New Development

Since 2010, Howard County’s stormwater management regulations have required that all new development employ environmental site design (ESD) techniques to treat runoff from smaller, more frequent storms (the 1-year, 24-hour storm of 2.6 inches) to the maximum extent practicable. ESD emphasizes reducing the amount of stormwater runoff generated by using site design techniques that limit site disturbance and reduce the creation of impervious surfaces. ESD treats runoff by holding it on-site where it can be filtered and treated by the vegetation and soil in multiple, small treatment facilities. ESD is different from the County’s previous approach to stormwater management, which focused on collecting and treating runoff in large treatment facilities, most often stormwater management ponds.

However, the County continues to require stormwater management for the larger 10- and 100-year, 24-hour storm events of 4.9 and 8.5 inches, respectively, in the Tiber Branch, Deep Run, and Cattail Creek watersheds, where older development exists within the 100-year floodplain and are vulnerable to flooding. Stormwater management in these watersheds uses a combination of ESD techniques and large holding facilities, such as ponds or underground storage tanks.

In response to severe flooding events in Ellicott City in 2016 and 2018, the County also adopted stormwater management regulations to address short-duration, high-intensity storms in the Plumtree Branch and Tiber Branch watersheds (requiring quantity management for a 3.55-hour, 6.6-inch storm event). Stormwater management for these types of storms again requires a combination of ESD techniques and large holding facilities. These types of storms are projected to occur more often under the effects of climate change. The County should consider adding quantity management requirements for the 10- and 100-year storms, as well as short-duration, high-intensity storms, to other vulnerable watersheds.

Flooding Concerns

In 2021 Maryland’s stormwater management law was amended to require that the Maryland Department of the Environment (MDE) update the stormwater management regulations to incorporate the most recent precipitation data available and add quantity management standards for flood control in watersheds that have experienced flooding incidents since 2000. The amendments also require that MDE review and update the stormwater management regulations at least once every five years. The County will work with MDE to adopt the new regulations, which are expected to be finalized in 2023.

Stormwater management will be increasingly important as climate change accelerates.

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- HoCo By Design process participant

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- HoCo By Design process participant

Managing Natural Resources by Watersheds

The health of wetlands, streams, lakes, and reservoirs is directly linked to the use of land within their watersheds. For this reason, the County takes a watershed-based approach to comprehensively address the design, construction, and maintenance of the stormwater management system; water quality and habitat improvements in local streams; and flooding concerns.

The Chesapeake Bay is a valued source of beauty, recreation, and commercial activity in Maryland, and it has played an important role in Maryland's history and development. The multistate effort to restore the Chesapeake Bay continues to be a strong influence in promoting watershed-based planning and management efforts to protect not only the Bay, but also the Bay's numerous tributary rivers and streams. For additional information about restoration efforts for the Chesapeake Bay, please see Technical Appendix A.

Howard County lies within the Patuxent River and Patapsco River watersheds, two major tributaries to the Chesapeake Bay. Approximately 75% of the County is within the Patuxent River watershed and the remaining 25% of the County is within the Patapsco River watershed. The main stems of these rivers have many tributary streams which drain large areas of the County. The Patuxent River and Patapsco River watersheds in Howard County are divided by the State into seven major watersheds, as shown in Map 3-2.

Watershed management plans generally include:

- A description of current land use within the watershed;
- Water quality and habitat conditions in the watershed streams;
- An identification and severity ranking of problem areas;
- An identification and priority ranking of potential restoration projects;
- Preliminary designs and cost estimates for priority restoration projects; and
- An implementation schedule.

Restoration projects can include:

- Building new stormwater management facilities in areas that lack them and retrofitting existing facilities to add water quality treatment;
- Planting forest, especially to create forested buffers along streams;
- Restoring and creating wetlands; and
- Stabilizing stream channels and restoring instream habitats.

Many of these restoration projects require cooperation and participation from private landowners, so public outreach and education is a critical component of implementation.



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I support watershed-based approach because our water goes to the Chesapeake Bay, an estuary that depends on its health from all surrounding areas. Mitigating runoff and managing pollution is a major factor in improving the health of our watershed.

—
-HoCo By Design process participant

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- HoCo By Design process participant

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Trees are infrastructure.

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— HoCo By Design process participant

Trees are infrastructure.

— HoCo By Design process participant

Expanding Tree Canopy and Forest Cover

Tree canopy and forest cover help reduce and filter stormwater runoff, minimize erosion and sedimentation of streams, create wildlife habitats, sequester carbon, improve air quality, provide health benefits, and moderate local temperatures. They form visual buffers and are scenic in their own right. Increasing tree and forest cover is also an effective measure for climate change mitigation and adaptation. For these reasons, establishing goals for forest cover and forested stream buffers by watershed helps to achieve multiple objectives. In more developed watersheds, it may be more appropriate to establish a tree canopy goal.

Existing Tree Canopy and Forest Cover

A Report on Howard County, Maryland’s Existing and Possible Tree Canopy was published in 2011 by the U.S. Forest Service and the University of Vermont. This report defined tree canopy as the layer of leaves, branches and stems of trees that cover the ground when viewed from above. Tree canopy includes individual trees, such as those found within a parking lot or residential lawn, as well as trees within a forest. Using 2007 tree canopy data, the report found that the County contained approximately 80,000 acres of tree canopy or 50% of the County had tree canopy cover. The County tree canopy cover in 2007 is shown in Map 3-3.

A forest is a natural ecological community dominated by trees, generally including woody understory plants such as shrubs and young trees, and herbaceous vegetation such as grasses and flowers. To be fully effective as a complex environmental community, forest areas need to be large enough to provide space for a variety of native plant and animal species, to afford protection from outside intrusions, and to be able to mature and regenerate themselves.

Based on a separate analysis by the County of 2009 forest cover data, the County contained approximately 45,460 acres of forest or 28% of the County was in forest cover (distinctive from tree canopy). Forest cover in the eastern portion of the County is prevalent primarily within stream valley areas where sensitive resources have discouraged development or within publicly-owned conservation areas, such as the Patapsco Valley State Park and the Middle Patuxent Environmental Area. In the Rural West, upland and stream valley forests are more extensive. County forest cover in 2009, the most recent data available when the HoCo By Design scenarios were developed, is shown in Map 3-1. Countywide forest cover data should be updated on a regular and consistent basis to help assess changes in forest cover and manage forest resources over time.

Forest loss and fragmentation result in a continuing decline in forest interior habitat, which is generally defined as forest at least 300 feet from the forest edge. Forest interior habitat is generally more isolated from disturbance than forest edge habitat, and has a closed canopy that creates moist, shaded growing conditions, with less predation by forest edge species (raccoons, crows, cats) and fewer invasive species. In 2009, only 17% of the forest cover in the County was forest interior habitat. The loss of forest interior habitat threatens the survival of species that require this type of habitat, such as reptiles, amphibians and migratory songbirds.

Tree Planting Priorities for Economically-Vulnerable Communities

Howard County does not have an overall goal for tree canopy or forest cover, but Maryland has a policy that 40% of all land in the State should be covered by tree canopy. The County has several programs that provide free native trees to help increase tree canopy cover on qualifying residential properties, including the Stream ReLeaf and Turf to Trees Programs, along with an annual tree giveaway.

Map 3-4 shows tree canopy cover by subwatershed and census tracts with average household annual median income under \$50,000. There are four subwatersheds with less than 40% tree canopy coverage that contain one or more of these census tracts. Map 3-5 shows subwatersheds that have less than 40% tree canopy cover and impervious cover over 25%, along with census tracts with average household annual median income under \$50,000. Watersheds with higher levels of impervious cover and lower levels of tree canopy cover will experience greater heat island impacts, and households in these census tracts may have economic difficulty addressing these impacts. There are three subwatersheds that reflect these conditions and contain one or more of these census tracts. These subwatersheds should be prioritized for native tree planting programs, with a focus on residential areas within these census tracts, where there are willing participants.



Implementing the Green Infrastructure Network Plan

Howard County's Green Infrastructure Network is comprised of a mapped system of hubs and corridors that includes and links the most ecologically significant natural areas in the County, as shown in Map 3-6. Hubs are large, natural areas that provide valuable habitat for plants and wildlife. Large contiguous blocks of interior forest and sizable wetland complexes are essential components of hubs. Corridors are linear features that tie hubs together and they may include rivers and streams, narrow sections of forest, and other upland areas.

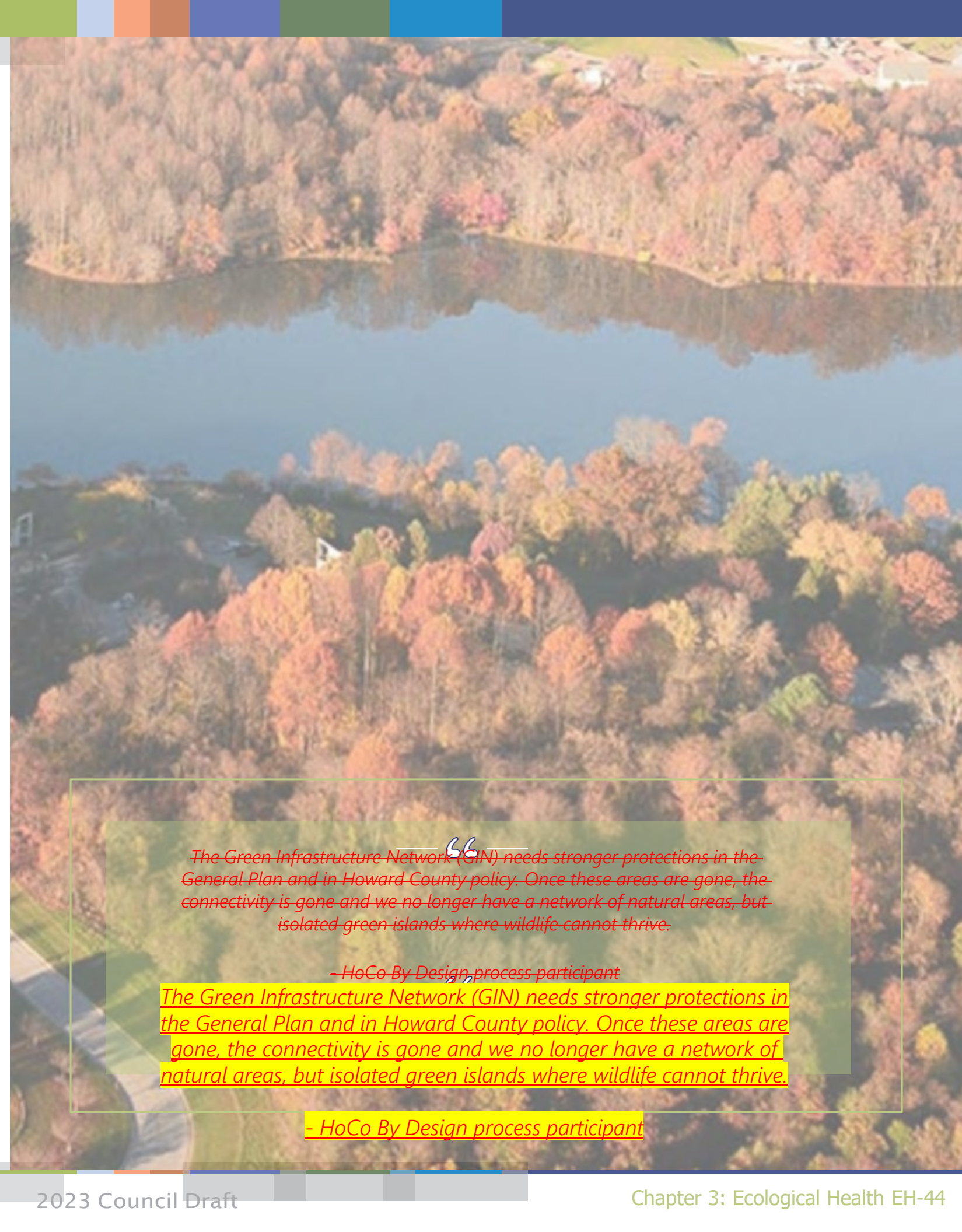
The intent of the Green Infrastructure Network is to provide a protected system of interconnected waterways, wetlands, forests, meadows, and other natural areas. The network helps support native plant and animal species, maintain natural ecological processes, sustain air and water resources, and contribute to the health and quality of life of Howard County's communities. A protected network of continuous habitat is a valuable resource for plant and animal species now and in the future, especially if they need to shift their habitat range due to climate change.

According to the 2012 Green Infrastructure Network (GIN) Plan, there are 51 hubs that contain approximately 22,148 acres or 14% of the County's total land area. Approximately 76% of the land in the hubs is protected in parkland or open space, and 11% is under an agricultural, environmental, or historic easement. The remaining 13% of the land is in a variety of uses and approximately 6% is uncommitted, which is land that still has development potential based on the zoning.

According to the 2012 GIN Plan, there are 48 corridor connections in the network. The corridor system contains approximately 6,173 acres or 4% of the County's total land area. Approximately 26% of this system is protected in parkland or open space, and 26% is under an agricultural or environmental easement. The remaining 48% of the land is in a variety of uses and approximately 11% is uncommitted. Protected land within the GIN is shown in Map 3-7.

Since development of the GIN Plan, the County conducted site visits to confirm the viability of the corridors for safe wildlife passage, with a focus on road crossings and areas close to existing development. Based on this assessment, two corridors (Cattail Creek – Friendship North and South) were removed from the GIN because they were not viable for wildlife passage. A mapping update of the network is needed to reflect these and other changes, such as corridor realignments and new development.

The GIN Plan defines goals and objectives to protect and enhance the network. It also contains a comprehensive toolkit for implementation that includes stewardship, financial incentives, regulatory protection, easements, acquisition, and indicator monitoring. The HoCo By Design public engagement process and the Environment Strategic Advisory Group (SAG) provided extensive comments on the importance of the GIN to identify and protect the County's most sensitive and ecologically beneficial resources. Further, the Environment SAG reported that "the Green Infrastructure Network is a valuable resource for the County, but implementation of the Green Infrastructure Network Plan has been slow." While the County has made some progress with plan implementation,



The Green Infrastructure Network (GIN) needs stronger protections in the General Plan and in Howard County policy. Once these areas are gone, the connectivity is gone and we no longer have a network of natural areas, but isolated green islands where wildlife cannot thrive.

-HoCo By Design process participant

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Encouraging Environmental Stewardship

The majority of land in the County is privately owned, so environmental stewardship on private property is critical to protecting and restoring natural resources. Healthy natural resources support ecosystems that will be better able to adapt to climate change. Stewardship actions can include reducing the use of pesticides and herbicides, installing rain gardens and rain barrels, planting native tree species (especially along streams and wetlands), and replacing lawn with native plants and pollinator gardens, and removing and refraining from planting non-native invasive plants.

Public outreach and education are essential to raise awareness about the cumulative positive or negative impacts individual actions can have on the environment. Maryland schools are required to provide a comprehensive, multi-disciplinary environmental literacy instructional program for all students and this program must include opportunities for outdoor learning. Through a combination of efforts by government agencies, community and environmental organizations, business associations, and educational institutions, there is a wide variety of outreach and education programs available in the County for residential, commercial, and institutional property owners. Some programs may also include financial incentives or assistance, such as rebates, and planning and installation services. Where needed, these efforts should be expanded and new programs initiated to increase stewardship activities on private property. For example, a rising concern is the detrimental impact to local freshwater streams, lakes, and wetlands from the overuse of winter salt on roads, driveways, and parking lots. Education programs about the proper use of winter salt could help reduce this negative impact.

The County can also continue to exemplify stewardship by incorporating environmentally sensitive site development and property management practices into county activities. County actions could include exceeding minimum Green Building requirements for county buildings; improving energy efficiency and expanding use of renewable energy in county operations; retrofitting stormwater management for county facilities; implementing demonstration projects to encourage their use by others; replacing lawn with native plantings and pollinator gardens; and increasing forested riparian buffers and tree canopy on public property.

— “ —

Surveys of biodiversity show the world's overall decline in species. What good is farmland if there are no pollinators for the crops?

Contiguous open space and the ecosystem it supports is the only way to protect our food sources in the long run...Sustainability and food security mean preservation of our local farms and pollinators. - HoCo By Design process participant

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- HoCo By Design process participant

| Table 10-1: Implementation Matrix | | |
|--|---|--|
| Policy and Implementing Actions | Lead Agency | Timeframe (Mid-Term five-year, Long-Term six+ years, Ongoing) |
| GCF-1 - Provide limited and predictable Planned Service Area expansions. | | |
| 1. Planned Service Area expansions should include a development proposal that is consistent with the General Plan. | DPZ | Ongoing |
| 2. Any Planned Service Area expansion shall establish a transition that is compatible with and enhances surrounding communities, and provides an environmental benefit. | DPZ | Ongoing |
| 3. Any Planned Service Area expansion shall meet the criteria above. | DPZ | Ongoing |
| EH-1 - Continue to support the County's ecological health. | | |
| 1. Integrate the goals of protecting and restoring the County's ecological health when updating county programs and policies. | OCS DPZ DPW DRP HCHD | Mid-Term |
| 2. Ensure adequate funding for programs and measures to protect and restore the County's ecological health, <u>track outcomes of these investments, and provide necessary maintenance and enforcement.</u> | OCS DRP DPW HSCD Elected Officials OOB | Ongoing |
| 3. Create a dedicated funding source, as was done for the Agricultural Land Preservation Program, for environmental programs. | DPZ OCS Elected Officials OOB | Mid-Term |
| 4. Establish a natural resource protection goal for the County and each major watershed to help protect biodiversity and mitigate climate change. | OCS DPZ | Mid-Term |
| <u>5. Develop open space percentage requirements for activity centers.</u> | DPZ OCS Elected Officials | <u>Mid-Term</u> |

| Table 10-1: Implementation Matrix | | |
|---|---|--|
| Policy and Implementing Actions | Lead Agency | Timeframe (Mid-Term five-year, Long-Term six+ years, Ongoing) |
| EH-2 - Seek to integrate climate change mitigation and adaptation goals <u>as specified in the Howard County Climate Action and Resiliency Plan, or the most recently adopted Plan,</u> into all county programs and policies. | | |
| 1. Ensure the Howard County Climate Action <u>and Resiliency</u> Plan update continues to maximize opportunities to mitigate and adapt to climate change with clear goals and strategies <u>and that County Departments' policies are aligned with the plan's goals and strategies.</u> | OCS | Mid-Term |
| 2. Evaluate and enhance opportunities where needed for climate change mitigation and adaptation measures in the Subdivision and Land Development Regulations and Zoning Regulations, such as natural resource protection and the provision of renewable energy. | DPZ OCS | Ongoing |
| 3. Enhance county design requirements for county infrastructure and public and private buildings, to ensure these structures will be resilient under projected future weather patterns and minimize resource consumption. | DPW DILP OCS DPZ Private Partners | Ongoing |
| 4. <u>Review and update county Adopt the most current standards of the International Green Construction Code Green Building requirements</u> for opportunities to enhance the sustainability of public and private buildings. | DILP DPW DPZ OCS Private Partners | Mid-Term |
| 5. Identify and ensure economically-vulnerable communities, businesses, and households have the resources necessary for mitigation and adaptation measures. | DCRS OEM OHRE OCS DPW HCHD HCEDA | Ongoing |

| Table 10-1: Implementation Matrix | | |
|--|----------------------------------|--|
| Policy and Implementing Actions | Lead Agency | Timeframe (Mid-Term five-year, Long-Term six+ years, Ongoing) |
| EH-3 - Ensure the Subdivision and Land Development Regulations and Zoning Regulations provide adequate protection for sensitive environmental resources within new development and redevelopment. | | |
| 1. Evaluate and enhance protections, including sediment and erosion control, where needed for sensitive environmental resources, such as water resources, steep slopes, and rare, threatened, and endangered species, in the Subdivision and Land Development Regulations. | DPZ HSCD | Mid-Term |
| 2. Explore whether cluster development may also be appropriate in other residential zoning districts during the zoning regulation update process. | DPZ | Mid-Term |
| EH-4 - Incentivize additional resource protection and restoration measures within new development and redevelopment. | | |
| <u>1. Consider increased use of a density exchange overlay district, in both the West and the East, to protect sensitive resources in areas with unique conditions or resources.</u> | DPZ | Mid-Term |
| <u>2. Consider incentives to encourage environmental protection and restoration when properties are developed or redeveloped, such as tax credits, density bonuses, housing allocations, and public-private partnerships.</u> | DPZ HCEDA Private Partners | Mid-Term |
| 3. Evaluate and strengthen the Green Neighborhood Program to ensure adequate incentives will increase program use and incorporate new options, such as increased moderate income housing units. | DPZ DILP OCS | Mid-Term |

| Table 10-1: Implementation Matrix | | |
|--|---------------------------------------|--|
| Policy and Implementing Actions | Lead Agency | Timeframe (Mid-Term five-year, Long-Term six+ years, Ongoing) |
| EH-5 - Evaluate and improve stormwater management requirements to enhance climate change resilience. | | |
| 1. Conduct a flooding vulnerability assessment to determine which watersheds are susceptible to chronic flooding under current and expected future precipitation patterns. | DPW | Ongoing |
| 2. Update stormwater management design standards to address current and expected future precipitation patterns. Consider adding quantity management requirements, including management for short-duration, high-intensity storms in vulnerable watersheds. | DPZ DPW OCS | Mid-Term |
| 3. Evaluate opportunities to further reduce stormwater runoff and pollutant loadings when redevelopment. | DPZ DPW OCS | Mid-Term |
| 4. Continue to use a nature-based or green stormwater infrastructure approach (bioretention, swales) in combination with a built or gray infrastructure approach (pipes, ponds) to address flood mitigation and adaptation, to maximize ecological benefits. | DPW DPZ OCS Private Partners | Ongoing |
| 5. Evaluate alternatives for improving, enforcing, and funding long-term inspection and maintenance of stormwater management facilities, particularly those facilities located on private residential lots. | DPW Private Partners | Mid-Term |