

WRE 2024



- **Summary & Staff Recommendations to Planning Commissions re: 60-Day Review (State & Neighboring) & Public Comment Period**
- **Redline pages reflecting staff recommendations**
- **Comments received**



As each Planning Commission updates its comprehensive plan, Action Items should be identified that are not already included in the WRE that could address limitations and water quality protection in the comprehensive plan in the areas of land use, policies, regulations, and capital/financial considerations.

Each Planning Commission may also identify Action Items that are included in the WRE relating to land use or other relevant comprehensive plan issues and that should be prioritized by also including that in the comprehensive plan and expanded further.

5.0 Overview of Master Plan & Comprehensive Plans

The 2000 Carroll County Master Plan represented the first review and revision of the direction set forth by the original 1964 Carroll County Master Plan. The 2000 plan essentially reaffirmed support for the basic premises, concepts, and development patterns charted in the 1964 Plan. There were two overriding goals of the 1964 plan. The first was to focus growth in and around existing population centers, primarily the incorporated towns, where public water and sewer service is already available. The second goal was to preserve farmland.

In the 2000 master plan, Carroll's eight municipalities and the Freedom area would continue to serve as the county's DGAs. These are the areas in which the majority of planned growth is focused. The rural character of the county is to be preserved through measures that protect our natural and cultural resources, minimize residential sprawl, and save farmland. The County would also continue to pursue the long-standing goal of preserving 100,000 acres of farmland. Employment growth and provision of adequate public facilities are also priorities. The implementation of the concurrency management program came about through the 2000 master plan process.

The 2014 master plan has the same premise, centering development in the DGAs while preserving land outside these DGAs. The 2014 master plan incorporated to the document new State legislation, such as Water Resources, Municipal Growth, Priority Preservation Area, and additional requirements in the Sensitive Areas and Environmental Resources Elements. The 2014 master plan also took into consideration the *Smart, Green, and Growing* legislation that presented 12 State Planning Visions that each Master Plan, in the state, must address and implement.

5.1 Related Maryland Planning Principles

In 2025, legislation was adopted creating 8 Sustainable Growth Planning Principles, which replaced the former 12 Planning Visions. In general, these planning principles are addressed through the process of updating each of the full comprehensive/master plans. However, as an element of the Carroll County Master Plan and each municipal comprehensive plan, the WRE helps to promote or facilitate certain of these principles. The information and recommended action items help to inform the update process for each of these plans. The topics, strategies, and action items help Carroll County communities to link and plan for water, land use, and climate resilience. Of the 8 Planning Principles, the following 4 principles are most relevant to the WRE.



- **Land:** Optimize productivity of working landscapes, including farms and forests, and fisheries, and prioritize development within population centers that are in proximity to existing infrastructure and facilities.

Development in Carroll is prioritized within the Priority Fundings Areas (PFAs) and Designated Growth Areas (DGAs). Growth is directed to these areas, as these are the areas where public water and sewer infrastructure is available. The WRE facilitates direction of growth to the DGAs by identifying the capacity needs of each of the municipal system water and sewer service areas.

- **Equity:** Engage all sectors of the community in plan development to ensure diverse voices are heard and the needs of underserved populations are prioritized.

The WRE assists the County and municipalities with aligning growth plans with water and sewer capacity and water quality, with a goal of ensuring all residents—regardless of location—have access to safe, sustainable water. Through the WRE and the other documents and initiatives it references, The plan element helps to address pollutant reductions, protecting communities from disproportionate environmental burdens. It also enables the jurisdictions to ensure that growth management does not create, or exacerbate, disparities in water quality or access.

- **Resilience:** Integrate resiliency measures that will minimize the impacts of rapid and unexpected natural- and human-caused threats on communities.

The WRE integrates planning for long-term water supply and wastewater needs to accommodate planned growth and stormwater mitigation into the local comprehensive planning process and implementing tools. It enhances resilience by addressing infrastructure vulnerabilities, protecting water quality, and measures to mitigate climate-based risks and impacts. Action items and implementing tools to address climate change impacts, such as flooding, are integrated throughout the action items to address water supply, wastewater, and stormwater, in recognition of the co-benefits they provide.

- **Ecology:** Protect and restore sensitive ecological systems and conserve natural resources, including forests, agricultural areas, and waterways.

Aquifers and groundwater are protected by analyzing water supply limitations to prevent depletion from development. Restoration of impaired waterways is addressed through numerous existing and potential future avenues. Ecosystems are protected through managing stormwater, ensuring sustainable water supply, and reducing pollution in watersheds like the Chesapeake Bay. The plan document works in coordination with other plans and implementing tools.

5.15.2 Carroll County Master Plan Water-Related Goals

- Protect and enhance the water quality of Carroll County's rivers, streams, reservoirs, and aquifers; comply with applicable state and federal requirements related to water quality and quantity; and maintain and protect adequate water supplies to serve current and planned development.



8.2.3 2008 Brinkley Bill Water Allocation

The 2008 Brinkley Bill, specifically Chapter 197 of the Laws of Maryland, 2008, aimed to address concerns about water allocation policies in Carroll, Frederick, and Washington counties. It sought to ensure that municipalities and PFAs in these counties could develop at densities aligned with the goals of Maryland's Priority Funding Areas Act. The bill prioritizes municipalities in these counties for groundwater use, specifically for wells within certain watersheds. Essentially, it provided a methodology for MDE to allocate more groundwater to public water systems serving these areas, enabling higher groundwater withdrawal allocations, particularly for redevelopment and infill within established boundaries. The Brinkley Bill is helpful for some of Carroll's municipalities and not for others. MDE developed a [guidance document](#) for Applications for Water Allocation, dated June 2014.

8.2.4 Maryland's Climate Planning Requirements

In 2015, the Maryland Commission on Climate Change was codified into law (Environment Article §§2-1301 through 1306) requiring State agencies to review their "planning, regulatory, and fiscal programs to identify and recommend actions to more fully integrate the consideration of Maryland's greenhouse gas reduction goal and the impacts of climate change." This includes explicit consideration of sea level rise, storm surges and flooding, increased temperature and precipitation, and extreme weather (Environment Article §2-1305(b)). The legislation also calls on the Maryland Commission on Climate Change, which includes State agencies, to assist "local governments in supporting community-scale climate vulnerability assessments and the development and integration of specific strategies into local plans and ordinances" (Environment Article §2-1303(d)(10)).

MDE's MDEnviroScreen – CVS tool provides a Climate Vulnerability Score (CVS) that determines the susceptibility of communities to climate impacts at the census tract level. The CVS integrates the existing Environmental Justice (EJ) Score with five additional climate variables (Tree Canopy Coverage, Urban Heat Island, Drought, Storm Surge, and Flooding), establishing climate vulnerability as a function of both climate exposure and community impact. The resulting percentile scores classify vulnerability into four categories: baseline, low, moderate, or high. No areas of Carroll County received a high CVS score.

8.2.5 Advancing Stormwater Resiliency in Maryland or "A-StoRM"

Urban and riverine flooding is a growing issue in Maryland. The increasing number of extreme rainfall events that produce intense precipitation will continue to lead to more urban and riverine flooding events unless steps are taken to mitigate their impacts. Maryland worked to address these flooding issues in 2020 by updating Maryland's stormwater management law that became effective on June 1, 2021. [Senate Bill 227](#) (SB 227) tasked MDE with developing plans to evaluate current flooding risks and update regulations to improve urban stormwater flood management. The State's Stormwater Management Law, Environment Article 4-201.1, requires MDE to report on the most recent precipitation data available, investigate flooding events since 2000, and update Maryland's stormwater quantity management standards for flood control. MDE released a report, "[Advancing Stormwater Resiliency in Maryland](#)," that provides a roadmap towards modernizing stormwater management in Maryland.



8.2.8 Equity

During the time this plan was drafted, equity considerations and funding to disadvantaged communities were being prioritized at the federal level through the [Justice40](#) initiative. Local communities that incorporate equity considerations into their planning and capital projects will be best positioned to benefit from these federal resources. The local comprehensive plan can be used as a tool that creates a vision for more equitable and sustainable communities, both in quantity and quality, and helps prioritize water resource protection, infrastructure maintenance, and capital projects in areas that have been historically underserved.

Maryland Environmental Article § 1-601.1 requires an Environmental Justice (EJ) score for specific, high-impact permits listed under § 1-601(a), effective October 1, 2022. These include air quality construction permits, landfill/incinerator permits, sewage sludge storage, water discharge permits, and hazardous/nuclear waste facility permits. The term “EJ Score” means an overall evaluation of an area’s environment and environmental justice indicators, as defined by MDE in regulation, and aggregates data in the following sub-indices: (1) pollution burden exposure; (2) pollution burden environmental effects; and (3) sensitive populations, including socioeconomic factors.

Maryland launched the EJ screening tool, [MDEnviroScreen](#). The goal of this tool is to provide users with data to inform their decisions on siting, permitting, enforcement, and infrastructure improvements. Demographic and socioeconomic data, coupled with state agency data such as proximity to active high air emission facilities or wastewater treatment facilities, will be used to help underserved and overburdened communities in Maryland. The MDEnviroScreen EJ score represents a combined measure of pollution and the potential vulnerability of a population to the effects of pollution.

State law defines Overburdened Communities as any census tract where three or more environmental or health indicators are higher than 75 percent of other tracts statewide. These indicators include levels of fine particulate matter in the air, ozone, proximity to industrial facilities or hazardous waste sites, traffic levels, rates of asthma-related emergency room visits, and other health and environmental conditions.

State law defines Underserved Communities as any census tract in which:

- At least 25% of the residents qualify as low-income
- At least 50% of the residents identify as nonwhite
- At least 15% of the residents have limited English proficiency

Higher scores indicate greater pollution exposure, health risks, and social sensitivity, with scores in the 75th percentile or higher considered elevated. Indicators are mapped by percentile. A 75th percentile value means a community has a higher burden than 75% of other Maryland census tracts.

The tool identified three Census tracts in Carroll County that fit the criteria for Overburdened and Underserved. These Census tracts include portions of Taneytown (24013501001), Union Bridge (24013512000), and Westminster (24013507601). See the map – **Overburdened and Underserved Areas by Census Tract** – for the location of these areas. However, no areas of Carroll County scored in the 75% percentile or higher.

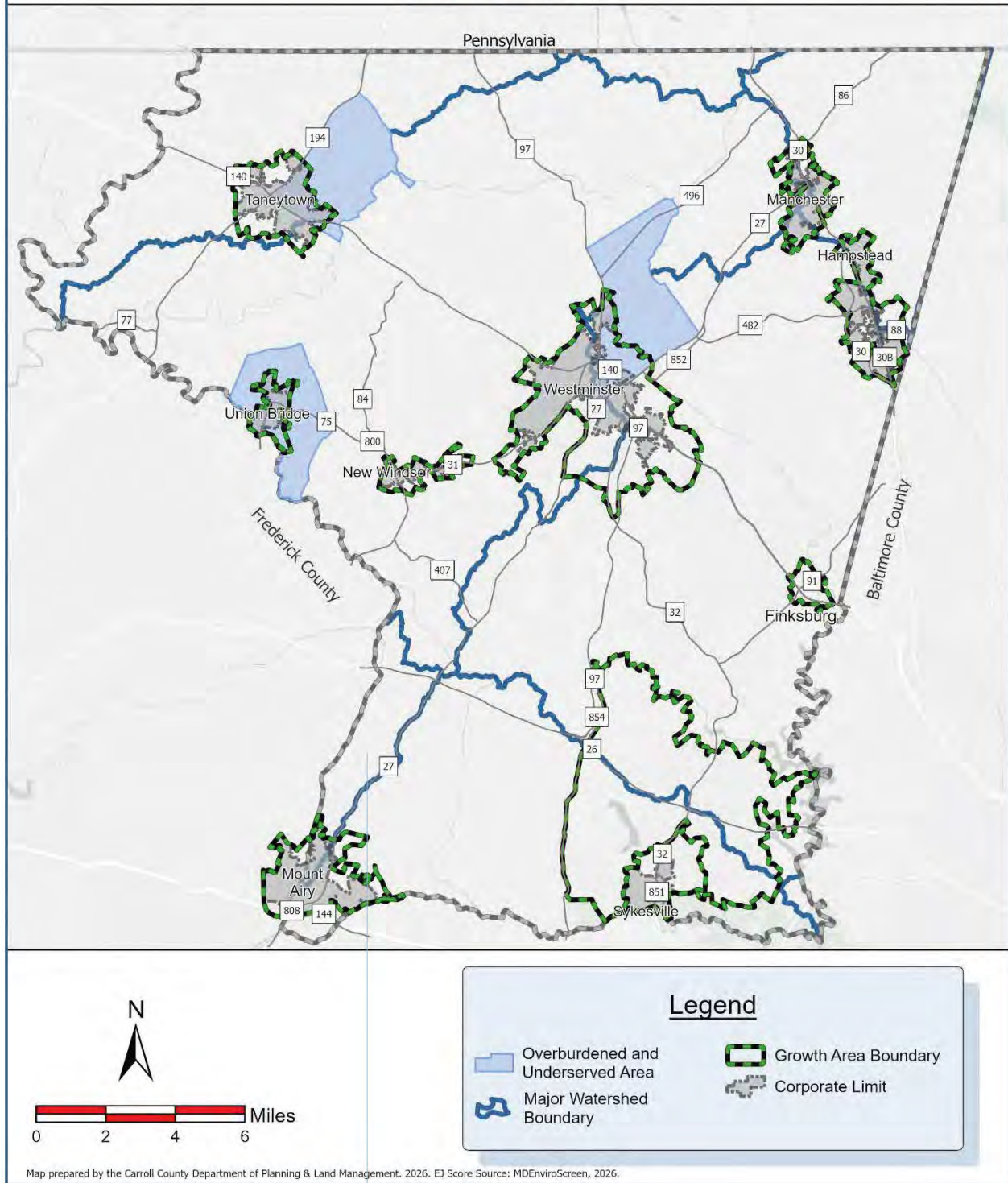


A high score in the Maryland Department of the Environment's (MDE) EJ Screening Tool (MDEnviroScreen) generally **prioritizes, increases, and accelerates access to funding** for wastewater infrastructure projects. Projects serving communities with high EJ scores (typically 75th percentile or higher) are identified as overburdened and are given, or are eligible for, higher priority in receiving state and federal funds. Although none of these areas scored greater than the 75th percentile, as it relates to water resources, each of these Census tracts had a percentile score > 94% for wastewater. In MDE's Integrated Project Priority System (IPPS) for Water Quality Revolving Loan Funds, a project in one of these areas could potentially score higher.

The MDEnviroScreen Reports showing scores and indicators can be viewed within the MDEnviroScreen tool.



Overburdened and Underserved Areas by Census Tract Carroll County, MD





For a standard WSCMP submission, the WSCMP worksheet requests information on potential additional water demand for approved (but undeveloped) subdivision lots and issued building permits. However, for the purposes of the WRE, the potential demand was based on all of the potential residential units (lots), regardless of development status.

Potential additional residential demand was initially estimated based on the County's BLI data. Within the W-1 Existing/Final Planning, W-3 Priority, and W-5 Future Water Service Areas (WSAs), the potential additional residential lots were based on the 2022 zoning. These were the required categories shown on MDE's worksheet.

The MDE WSCMP worksheets did not address demand that would be generated by areas within the DGA that are not currently within the planned WSA. A portion of this additional demand, however, was evaluated as part of Carroll County's WRE process. Future demand for water from development in the Long-Range WSAs that fall within the County's DGAs but not within a planned WSA was estimated for the WRE and included in the C&D Workbooks. The Long-Range WSAs represent areas that are planned to be served long term but not within the 10-year planning horizon of the *Water & Sewer Master Plan*. This service area is used by Carroll County for planning purposes but is not a service area required by MDE within water & sewer master plans.

Potential additional residential lots were used to estimate the future residential demand for water. It was assumed that the total number of additional residences that could be served would consume 250 gallons per day (gpd) per household/lot, which is MDE's standard rate for residential water demand projections.

To arrive at future non-residential demand, areas with adopted 2022 zoning of Commercial, Industrial, and Employment Campus were reviewed. The buildable acreage of unimproved land was also estimated. Buildable acreage excludes wetlands and floodplains. Developed but not yet served acreage was added to buildable acreage to get a total acreage on which future demand was calculated. The combination of acreage from these two types of commercial land was multiplied by 700 gallons per acre per day. Industrial acreage was multiplied by 800 gallons per acre per day (based on MDE guidance and the *Water & Sewer Master Plan*).

Institutional uses are allowed in multiple zoning districts throughout the county. Existing institutional uses and future uses in the CIP with specific locations are captured by the existing Water & Sewer Master Plan and WSAs. However, demand for other future institutional uses will be assessed at the time when specific facilities at specific locations are proposed.

For consistency, the potential future residential lots and commercial and industrial acreage to estimate future demand were the same numbers used for the 2023 *Water & Sewer Master Plan*.

For Hampstead and Mount Airy, numbers for residential, commercial, and industrial demand were modified by the municipality rather than strictly using the BLI data.

Additionally, Mount Airy capacity and demand numbers may not match the BLI estimates, as the County does not have BLI information for the portion of Mount Airy that lies within Frederick County. Therefore, where this is a factor in estimating figures used in these analyses, the Town used their own calculations to capture its entire area.



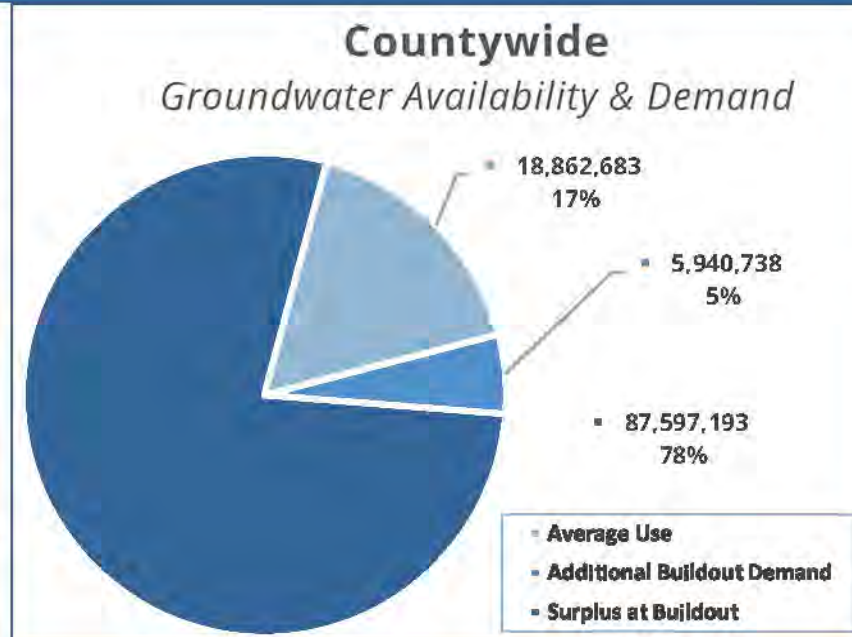
14.2.10 Countywide

Countywide

Average Use Scenario

Current average daily demands countywide are about 23.4 mgd, the majority of which are residential uses, including 5.3 mgd (23%) for municipally supplied residential demands and 8.7 mgd (37%) for self-supplied residential demands.

Other demands in the county include municipally supplied commercial (2.5%) and industrial demands (0.7%), self-supplied industrial/commercial demands (15%), agricultural demands (6.8%), and quarry operations (15%). The majority of average water demands are met by groundwater wells (81%), primarily self-supplied domestic users, rather than surface water sources (19%).



Maximum Permitted Scenario

Existing MDE-permitted maximum daily appropriations accounted for about 40 mgd countywide in 2023. Once an approximate average 8.7 mgd of self-supplied residential withdrawals are added in, the total maximum daily allowable withdrawal was 50 mgd, with an average 8.7 mgd being self-supplied residential withdrawals. The largest type of allocation in the county (38%) is municipal supply to the WSAs. Private appropriations in the county include self-supplied industrial / commercial entities (14%), quarry and mining operators (14%), and agricultural users (16%).

Current daily maximum permitted withdrawals, not including self-supplied withdrawals, are met by approximately 38% surface water supply and 62% groundwater supply. Existing usage for both groundwater and surface water are well below appropriations.

Buildout Scenario

Projected average daily buildout demands in the county are approximately 30.8 mgd. The majority of buildout demands (55%) are associated with residential uses, including 7.4 mgd (24%) for municipally supplied residential demands and 9.6 mgd (31%) for self-supplied residential demands.

Other projected buildout demands in the county include municipally supplied commercial (5%) and industrial demands (6%), self-supplied industrial/commercial demands (15%), and agricultural demands (5%). The dewatering of quarries is projected to account for approximately 14% of the buildout demands in the county.



With estimated existing and projected buildout demands of 23-31 mgd, groundwater and surface water resources in the county are theoretically more than adequate to meet existing and buildout demands. **The assessment results demonstrate that, based on groundwater resources alone, there appears to be ample water supplies available to accommodate future water demands for development. Combining available groundwater and surface water resources at buildout, the county has sufficient water supplies to accommodate future water demand, including water capacity outside of DGAs where development would most likely occur on septic.**

Countywide Water Balance Assessment Results Summary

		Average Use	Maximum Permitted	Buildout
DEMANDS				
SW	Surface Water (gpd)	4,566,448	17,131,700	6,059,164
GW	Groundwater (gpd)	18,862,683	32,491,300	24,803,421
<i>Total</i>		23,429,131	49,623,000	30,862,585
RETURNS				
SW	WWTP, NPDES Permits, and Quarries (gpd)	8,697,495	22,329,547	18,909,782
GW	Residential and Non-Residential Septic (gpd)	9,606,531	12,207,718	10,981,636
<i>Total</i>		18,304,026	34,537,265	29,891,418
WATER RESOURCES				
SW	Flowby (gpd)	118,816,408	118,816,408	118,816,408
SW	Storage (mgal)	11,609	14,904	11,867
GW	Available Groundwater (gpd)	101,418,978	101,418,978	101,418,978
GW	Surplus Groundwater (gpd)	92,162,826	81,135,396	87,597,193

Source: "WRE Update: Carroll County Water Demand and Availability," Hazen & Sawyer, May 21, 2024

The above information was excerpted from the *WRE Update: Carroll County Water Demands and Availability* report, dated May 14, 2024, and produced by Hazen. Please refer to this report for more detail on the water balance assessment.

15.0 Summary of Capacity & Limitations

15.1 Countywide Capacity

It is estimated that countywide **87,597,193** gallons of groundwater will be available after the county has fully developed (i.e., buildout) as currently (2023) planned. Based on groundwater resources alone, there appears to be ample water supplies available to accommodate future water demands for development. Combining available groundwater and surface water resources at buildout, the county has sufficient water supplies to accommodate future water demand.

When the county is examined in whole, even at buildout, the total demand from all sources is approximately 25% of the theoretical resource, as determined by the water balance assessment (*WRE Update: Carroll County Water Demands and Availability*, May 21, 2024). The question becomes "Why are there apparent water shortages in some areas of the county?" First and



was prepared for each of these eight systems to capture a snapshot of the **current** (2023) capacity and projected demand, based on **existing** adopted zoning, ordinances, and policies in place in 2022.

The current demand represents an average of the average daily flow for 2020, 2021, and 2022, less infiltration and inflow (I&I). I&I, for most systems, was estimated by subtracting the 2002 average daily flow (a particularly dry year) from the 2003 average daily flow (a particularly wet year) per MDE's worksheet. The I&I is

removed from available capacity for additional growth because it consumes flow capacity in the WWTP. While it may not result from users, it still needs to be captured in the available capacity, as it still needs to be treated by the WWTP. For efficiency and productivity, 2023 data was used for the capacity & demand (C&D) Workbooks and wastewater information, so the process could continue without constant changing of data.



The S-1 Existing/Final Planning Sewer Service Areas (SSAs) were used to identify Existing and Encumbered S-1 Infill flow (numbers 6 through 10 on the worksheet). To estimate "future" flows, the Priority and Future Sewer Service Areas (S-3 and S-5) were used (number 11 on the worksheet). These were the required categories shown on MDE's worksheet. Demand for future flows from the Long-Range Service Areas that fall within the County's DGAs was also estimated.

The County's BLI data provides estimates of potential additional residential development based on either zoning or on adopted land use designations. Within the Existing/Final Planning Service Area, potential additional residential infill lots were based on the current zoning. Infill lots could potentially apply for a building permit and request to connect to the system at any time. For all other areas, future potential additional residential lots were estimated using the adopted zoning in place in 2022, which would reflect the growth that is ultimately planned.

Potential additional residential lots were used to estimate the future residential demand for wastewater. The total demand then was estimated assuming residential lots would consume 250 gpd per household/lot.

To arrive at future commercial and industrial demand, collectively referred to as "Non-Residential" in this document, areas with 2022 adopted zoning for commercial or industrial use were reviewed. Acreage was estimated for areas that are developed but not yet served. The buildable acreage of unimproved land was also estimated. Buildable acreage excludes streams, wetlands, and floodplains. The combination of acreage from these two types of commercial land was multiplied by 700 gallons per acre per day. Industrial acreage was multiplied by 800 gallons per acre per day (based on MDE guidance and the *Water & Sewer Master Plan*).

For Hampstead and Mount Airy, BLI numbers for residential, commercial, and industrial demand were modified by the municipality rather than strictly using the BLI data.

Mount Airy capacity and demand numbers may not match the BLI estimates, as the County does not have BLI information for the portion of Mount Airy that lies within Frederick County. Therefore,



³ These data relate to areas designated in the "Long-Range Sewer Service Area" of the DGA

⁴ It should be noted that the County is only allocated 2.74 mgd of the 3.5 mgd design capacity of the WWTP.

⁵ Assumes that 85% of existing flows are attributable to the County portion and 15% of the existing flows are attributable to the State property.

Source: WRE Capacity & Demand Workbook: CC PLM, CC DPW, + individual municipalities, 2023

The table – **Future Wastewater Demand by Service Category for Each Designated Growth Area at Buildout of 2023 Sewer Service Area** – provides the total estimated buildout demand including the Long-Range Demand. It should be noted that the Long-Range Service Area serves as a planning tool for Carroll County jurisdictions/systems but is not a service area required by MDE, and it is not included in Table 32 of the *Water & Sewer Master Plan*. Only the total demand for Infill + Future should be considered for purposes of evaluating consistency of the *Water & Sewer Master Plan* with this document.

The table – **Future Wastewater Demand by Land Use for Each Designated Growth Area at Buildout of 2023 Sewer Service Area** – presents the same sewer demand estimates as the previous table, except that demand is broken out by type of land use: residential and non-residential (commercial and industrial).

**Future Wastewater Demand by Land Use
for Each Designated Growth Area at Buildout of 2023 Sewer Service Area
(in Gallons per Day)**

Municipal System	2023 Existing Demand ¹	Additional Demand by Land Use ²		Total Buildout Demand
		Residential	Non-Residential	
Freedom/Sykesville	1,530,000	567,750	435,551	2,533,301
Freedom (CCG portion)	1,300,500 ³	567,750	400,716	2,268,966
Hampstead	246,333	178,750	294,024	719,107
Manchester	268,000	121,250	23,048	412,298
Mount Airy	681,125	301,050	137,044	1,119,219
New Windsor	41,716	35,750	92,023	169,489
Taneytown	502,333	138,750	229,749	870,832
Union Bridge	99,433	193,500	183,294	476,227
Westminster	2,687,000	499,500	441,945	3,628,445
Total	5,826,440	2,036,300	1,801,843	9,664,583

¹ These data represent, in general, the annual average daily demand over the 3-year period 2020-2022.

² Additional Demand is based on estimated demand from land not yet served in the planned water service areas: Existing/Final, Priority, Future, and Long-Range.

³ Assumes that 85% of existing flows are attributable to the County portion and 15% of the existing flows are attributable to the State property.

Source: WRE Capacity & Demand Workbook: CC PLM, CC DPW, + individual municipalities, 2023

19.0 Current Capacity and Existing Wastewater Limitations

19.1 Capacity of Individual Municipal Systems by ~~Watershed~~ Municipal System

The municipal wastewater systems serve the populations in the DGAs. Combined, existing flows totaled 6,239,685,774,447 gpd countywide. Population served by these systems countywide was about 69,838,84,208. The table – **2023 Existing Flows and Population Served** – indicates the existing flows in 2023, based on C&D Worksheet data, and the population estimated to be served, as indicated in the 2023 *Water & Sewer Master Plan*.



2023 Existing Flows¹ and Population Served

Municipal System	Existing Flows (from C&Ds)	Population Served (from W&S Plan)
Freedom/Sykesville (CCG Portion)	1,300,500 ²	25,964
Hampstead	246,333	6,094
Manchester	256,785	4,046
Mount Airy	640,347	9,654
New Windsor	41,716	1,441
Taneytown	502,333	7,234
Union Bridge	99,433	936
Westminster	944,000	28,839
Totals	5,774,447	84,208

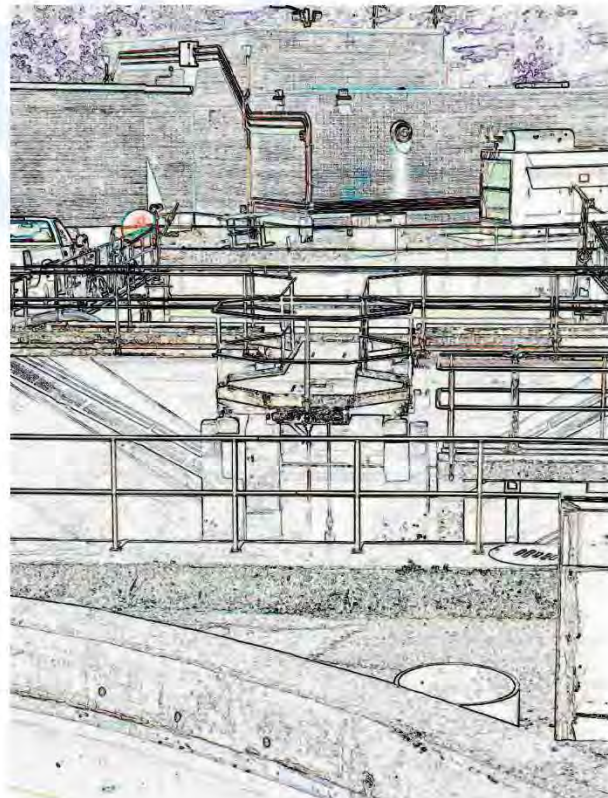
¹ 2023 Existing Flows represents the flows for the year 2023. This differs from 2023 Existing Demand in other tables, which represents the 3-year average flows for 2020-2022.

² Assumes 85% of existing flows are attributable to the County portion and 15% attributable to State property.

Source: WRE Capacity & Demand Workbook: CC PLM + individual municipalities, 2023

In the table – **Wastewater Capacity for Each Designated Growth Area at Buildout of the 2023 Sewer Service Area**, the “2023 Current” figures identify the capacity that should be available (“Remaining Capacity”) at each WWTP to serve existing and future demand once I&I is subtracted. The “Capacity Needed” represents the projected Infill and Future demand for unserved land within the SSA. Areas designated for Long-Range Service fall within the community’s DGA, which generally represents the future annexation limit. However, while these areas are planned to be served at some point, provision of service is not anticipated to occur within a 10-year timeframe. However, for purposes of long-range planning, these areas are included in future demand projections for the buildout scenario. Remaining capacity minus the existing flows yields the amount of capacity available to serve future demand. If the future demand exceeds the capacity available, the difference between the capacity available to serve future demand and the projected future demand results in a negative number. Areas within the No Planned Service area on the Sewer Service Area maps have not been included in the demand projections.

Based on the existing capacity of the community systems, all result in a negative available capacity at buildout. However, using the methodology from the MDE guidance documents for capacity management plans, these figures do not account for already identified system improvements that can be found in the 2023 *Water & Sewer Master Plan*. Limitations that restrict expansion of design capacity are identified in the Individual System-Specific section for each municipal system.





The **2023 Municipal Wastewater Demand & Capacity** graph shows the existing flows, projected total estimated demand for the SSA, and the design capacity. Red bars depict where deficits in capacity are projected based on 2023 design capacity. The future demand for all WWTPs but Manchester and Mount Airy is projected to exceed the design capacity if no additional improvements are made to increase capacity.



- Freedom, Manchester, and Mount Airy will have remaining capacity available after buildout of 2023 Service Area.
- The total demand figures for the above table and graph may vary slightly from the Future Wastewater Demand tables, as those tables do not factor in I&I.

The table – **2023 Wastewater Capacity Needed or Remaining to Meet Buildout Demand in 2023 Planned Sewer Service Areas** – shows the additional capacity needed, which is the portion of the total demand that cannot be accommodated by 2023 design capacity, and the percentage of total demand this represents.

**Wastewater Capacity Needed or Remaining to Meet
Buildout Demand for 2023 Planned Sewer Service Areas**
(Gallons per Day)

Municipal System	Total 2023 Buildout Demand	Additional Capacity Needed to Meet Service Area Buildout Demand	% of Total Demand for Which Additional Capacity Needed	Remaining Capacity Available at Buildout
Freedom (CCG alloc)	2,268,966	22,166	<1%	0
Hampstead	719,107	50,107	7%	0
Manchester	412,298	0	0%	65,452
Mount Airy	1,119,219	0	0%	10,781
New Windsor	~~186,115~~ 169,489	87,115	47%	0
Taneytown	870,832	121,832	14%	0
Union Bridge	476,227	326,827	69%	0
Westminster	3,628,445	371,445	10	0



19.2 Limitations of Individual Municipal Systems by Watershed

There are no major (500,000 gpd or greater) WWTP discharges to the Conewago Creek, Liberty Reservoir, Lower Monocacy River, or Lower North Branch Patapsco River watersheds. Therefore, these watersheds are not discussed in this section. "Total Demand" refers to demand at the buildout of the entire planned Sewer Service Area (SSA), including the Long-Range SSA. For planning purposes, quantities reported as inflow, sewer demand, or discharge are considered comparable.

The table – 2023 Buildout Demand for Municipal Systems by Watershed – aggregates the 2023 buildout demand for each system by watershed.

2023 Buildout Demand for Municipal Systems by Watershed		
Watershed	Municipal System	2023 Buildout Demand (gpd)
<u>Double Pipe Creek</u>	<u>New Windsor</u>	<u>4,290,787</u>
	<u>Union Bridge</u>	
	<u>Westminster</u>	
<u>Loch Raven</u>	<u>Hampstead</u>	<u>719,107</u>
<u>Prettyboy</u>	<u>Manchester</u>	<u>412,298</u>
<u>S. Branch Patapsco</u>	<u>Freedom (CCG portion)</u>	<u>3,388,215</u>
	<u>Mount Airy</u>	
<u>Upper Monocacy</u>	<u>Taneytown</u>	<u>870,832</u>
		<u>9,681,239</u>

Source: WRE Capacity & Demand Workbook; CC PLM, CC DPW, + individual municipalities, 2023

19.2.1 Double Pipe Creek

Westminster WWTP Summary of Wastewater Limitations: The existing controlling limitation for the WWTP is the current design capacity and the total phosphorus cap. By expanding to 6.5 mgd, the Westminster WWTP would be able to accommodate all wastewater demands to buildout, and still have excess capacity, without exceeding loading limits imposed by the City's NPDES permit. The total phosphorus cap and the design capacity, each of which is 5.0 mgd, are the controlling limitations until the ENR upgrade is complete and/or the design capacity of the plant is expanded.

Union Bridge WWTP Summary of Wastewater Limitations: The existing design capacity (0.2 mgd) of the Union Bridge WWTP represents the controlling limitation under current conditions. Longer-term, the Bay-related nitrogen loading cap represents a 0.67-mgd limit to surface water discharges, which is over 2023 projected demand. A new location for the WWTP would likely need to be considered if expansion is pursued, particularly due to flooding issues.

New Windsor WWTP Summary of Wastewater Limitations: The existing design capacity (.115 mgd) of the New Windsor WWTP represents the controlling limitation under current conditions. As the plant expands and upgrades, the rated design capacity is likely to remain the controlling limitation to discharge as continuous sequential batch reactor (CSBR) technology is employed. If the Town expands the capacity of the WWTP to accommodate demand at buildout of the SSA, the controlling limitation would be the nitrogen ENR cap of 0.35 mgd.

Summary of 2023 Buildout Capacity and Limitations Individual Municipal Wastewater Systems

Municipal System	Watershed	Buildout Demand Status	2023 Design Capacity (gpd)	2023 Existing ¹ (gpd)	Buildout Demand (gpd)	Additional Capacity Needed (gpd)	Limiting Factor*					Limitation (mgd)	Actions Under Consideration to Increase Capacity
							Design Capacity	Site Limitation	TN Cap	TP Cap	Other		
Freedom (CCG portion)	S. Branch Patapsco	⚠	2,740,000	2,307,048	2,762,166	22,166	✓			✓	✓	2.740	Negotiate allocation; I&I improvements
Hampstead	Loch Raven	⚠	900,000	686,822	950,107	50,107	✓			✓		0.900	I&I improvements
Manchester	Prettyboy	✓	500,000	372,104	434,548	0	✓	✓				0.500	n/a
Mount Airy	S Branch Patapsco	✓	1,200,000	811,519	1,189,219	0	✓			✓		1.200	WWTP expansion
New Windsor	Double Pipe Creek	⚠	115,000	104,687	202,115	87,115	✓					0.115	WWTP expansion
Taneytown	Upper Monocacy	⚠	1,100,000	979,456	1,221,832	121,832	✓			✓		1.100	I&I improvements
Union Bridge	Double Pipe Creek	⚠	200,000	194,030	526,827	326,827	✓	✓				0.200	Construct <u>new-replacement</u> WWTP
Westminster	Double Pipe Creek	⚠	5,000,000	4,729,923	5,007,445	7,445	✓			✓		5.000	I&I improvements

✓ WWTP will have capacity remaining at buildout of 2023 Sewer Service Area, including Long-Range.

⚠ WWTP does not have enough capacity to serve projected demand in 2023 Sewer Service Area, but limitations can more easily be overcome.

⚠ WWTP does not have enough capacity to serve projected demand in 2023 Sewer Service Area, and limitations would be very difficult to overcome.

¹ 2023 Existing = existing flows and unserved demand in the Existing Sewer Service Area.

*This table does not include cost in the limitations, but funding is always a consideration and a possible limiting factor.

TP = Total Phosphorus; TN = Total Nitrogen



The expansion of WWTPs and improvements to collection systems require the following:

- demonstrated consistency with the local comprehensive land use plan,
- inclusion in the *Water & Sewer Master Plan*,
- a wastewater discharge NPDES permit modification (including applicable nutrient loading caps and TMDL waste load allocation), and
- other permits for the construction of the facility, including any permits required for impacts to wetlands, waterway, or the 100-year floodplain.

Public wastewater capacity is expected to represent a limitation. However, most systems should be able gain flow capacity via I&I improvements.

Manchester and Mount Airy are the only systems that will have capacity available at buildout of the 2023 Sewer Service Area.

Freedom, Hampstead, Taneytown, and Westminster will need additional capacity to serve the projected 2023 buildout demand. However, they may be able to increase flow capacity enough to meet demand through identifying and fixing inflow & infiltration (I&I) issues. The County also may be able to negotiate with the State to increase its allocation of the WWTP capacity. Beyond I&I improvements, all of these WWTPs will be constrained by caps on total phosphorus based on current design capacity. Nutrient caps would need to be evaluated if an expansion were contemplated.

To serve 2023 buildout demand, New Windsor would need to expand its WWTP, and Union Bridge would need to construct a new WWTP to replace the existing WWTP. Funding represents a significant limitation for both systems within these small towns.

20.0 Individual Private Septic Systems

20.1.1 Existing & Potential Septic Systems

Growth and development in Carroll County is concentrated in the DGAs where public water supply and wastewater services are available. Development outside the DGAs is generally served by individual private wells and septic systems. Existing development within a DGA but not yet annexed and served by a municipal system also is generally served by individual private wells and septic



29.0 Potential Effects Related to Climate Change: Stormwater

Increased storm intensity attributed to climate change will lead to greater flow velocities in streams and higher rates of streambed and streambank erosion. This may lead to higher turbidity in streams. Increased stream erosion and resulting bank instability can also lead to higher flood risks, compounding the potential challenges of climate change.

Flooding is the primary water-related hazard in Carroll County associated with climate change. Flooding is a known, disruptive issue in Carroll County that can result in structural damage, erosion, roadway obstruction, public safety impacts, and water quality concerns. For example, many locations in Carroll County already experience flooding, and some areas (e.g., Union Bridge) expect regular flooding during and after precipitation events. These instances of flooding are likely to become more frequent, more severe, and/or more widespread with climate change.

The major potential impact from road inundation is the loss of transportation access that affects residents and first responders in times of emergencies. As such, future growth and development in the county should minimize the occurrences and the potential impacts of flood blockages of roads, especially because road closures due to flooding already occur in Carroll County, and it is likely this issue will be exacerbated by future storms that bring more intense precipitation and higher stream flows. [The SHA Climate Change Vulnerability online ArcGIS web application map showcases geospatial data products related to climate change and the potential impacts on State transportation infrastructure. The purpose of this application is to support efforts to avert and mitigate potential impacts of sea-level rise that result from global climate change on State roadway and bridge infrastructure \(MDOT Climate Change programs\).](#)

Undersized stormwater structures or bridges tend to be the cause of 33.6% of the reported flooding events, based on a review of known causes of flooding. Of these, 49% occurred in DGAs. These undersized structures are primarily bridges or culverts associated with roads that have caused, or potentially will cause, further damage and road closures.

High hazard dams are not a major component of water-resource infrastructure in Carroll County because most of the municipalities use groundwater entirely. However, Cranberry Reservoir and Liberty Reservoir are part of the water supply portfolio, and it is possible that other reservoirs (e.g., Piney Run) may play a larger role in Carroll County water supplies in the future. In addition, dam failure, which may be more likely to occur from high flows or other pressures associated with climate change, may pose a major flooding threat to some sections of the county.

Another potential consideration is the transport of nutrients and other potential contaminants from increased runoff and higher stream velocities. High rates of nutrient export from the landscape are a concern in Carroll County because so much of the county is dedicated to agriculture. Nutrient export from agricultural lands tends to be higher than other land cover types. Exacerbating this issue, high nutrient inputs and warm temperatures are ideal conditions for algae growth in reservoirs and lakes. These blooms can cause aesthetic and water quality issues that can require expensive treatment to address taste and odor issues and potential toxins that pose a threat to



human and animal health. Surface water monitoring to detect conditions that are favorable for the development of algal blooms and monitoring for cyanobacteria ~~is~~ can help to better understand and track this potential water quality issue.

Advancing Stormwater Resiliency in Maryland or "A-StoRM": Maryland worked to address these flooding issues in 2020 by updating Maryland's stormwater management law that became effective on June 1, 2021. Senate Bill 227 (SB 227) tasked MDE with developing plans to evaluate current flooding risks and update regulations to improve urban stormwater flood management. The State's Stormwater Management Law, Environment Article 4-201.1, requires MDE to report on the most recent precipitation data available, investigate flooding events since 2000, and update Maryland's stormwater quantity management standards for flood control. MDE released a report, "Advancing Stormwater Resiliency in Maryland," that provides a roadmap towards modernizing stormwater management in Maryland. It also gives local jurisdictions some insight into future directions that can be expected from MDE.

MDE formed a Stakeholder Consultation Group, as well as a few technical work groups, to provide feedback as MDE develops proposed revisions to the stormwater regulations as a result of SB 227 and the A-StoRM report recommendations.

As a result of A-StoRM, as of 2024, MDE was conducting a new state-wide study of probable maximum precipitation (PMP). Changes to dam classifications and/or requirements to mitigate or account for climate change may result.

Although, as of December 2024, MDE is still developing updates to stormwater regulations as well as guidance for watershed studies and subsequent flood management plans, in anticipation, County staff took the step to identify and map areas of frequent flooding. This was a cooperative effort between the Carroll County Departments of Planning & Land Management and Public Works and the municipalities.

Carroll County and its municipalities continue to assess hazards and their risks and impacts through various assessment and implementation tools already in place. Some of the plans that address risk and hazards, including identifying capital projects, include the Carroll County Hazard Mitigation Plan and the Risk and Resilience Assessments with Emergency Response Plans developed by each municipality and submitted to EPA.



Countywide Strategies: Objectives & Action Items for All

This chapter contains the individual Strategies and specific Action Items that could be put in place for all nine jurisdictions as a means of implementing the plan and moving the entire county on a path toward achieving the goals of the plan.

In the context of the WRE, a Strategy is an overall direction or outcome that can be addressed or implemented by a set of one or more Action Items. Each jurisdiction should be striving to implement the strategies in pursuit of the overall plan goals.

The Strategies that follow generally apply to all of the eight municipal water supply and wastewater systems in the county. Under each strategy, action items are already completed or being done by *some* of the municipalities or systems. However, if it would still apply to most of the systems, it was included in this section. Action items that are very specific, or would only apply to a particular system, are included in relevant sections in the Overview of Municipal Systems in this plan document.

Similarly, Action Items within the WRE are individual specific activities that, as a whole, are intended to address or implement one or more strategies. Inclusion of individual Action Items **does not represent a commitment** to implement that Action Item. They are activities that *could* be pursued to help move the County and/or municipality toward the desired direction or outcome.

Specific capital improvements need to be incorporated to the *Water & Sewer Master Plan* and approved by MDE for public water and wastewater. In addition, MDE typically requires a Capacity Management Plan (CMP) @_at 80% of operating capacity. Capacity needs can be re-evaluated, prioritized, and addressed at that time based on the needs of existing and planned growth. Specific activities to address TMDLs need to be included in the *Countywide TMDL Implementation Plan*, which is approved by MDE, and progress reported through the *NPDES MS4 Annual Report*.

Strong consideration will be given to finding funding sources for water-resource-related projects across the board that will not place undue burden on underserved or overburdened populations.

31.0 Potential Future Scenarios for Consideration

The importance of diversifying the County's water supply becomes even ~~more clear~~clearer when considering the uncertainties that exist when trying to plan for multiple possible future scenarios. Various uncertainties exist for each of the County's water supply options with respect to future regulations, water quality conditions, and county growth. The concept of "Scenario Planning" provides a framework that encompasses such uncertainties and can help preserve the flexibility that the County needs to ensure that its options remain open and that implementable solutions are found.



- ☉ Continue the County's strong support and implementation of erosion and sediment control and stormwater management regulations [2010 WRE]
- ☉ Provide staff and funding to the Soil Conservation District (SCD) for technical assistance to farmers and landowners for the implementation of BMPs [2010 WRE]
- ☉ Support SCD in providing technical assistance and guidance on programs available to farmers and landowners for the implementation of BMPs and coordinate activities and funding between district, State, and federal programs [2010 WRE]
- ☉ Retrofit existing municipal stormwater management facilities that do not meet existing stormwater management requirements to meet the impervious area restoration requirements of the joint NPDES MS4 permit [2024 WRE]
- ☉ Continue to ensure that current stormwater management facility designs are resilient (e.g., they safely pass these intense rainfall events without overtopping or failing), which will be further supported through adoption of revisions to Code Chapter 153, Stormwater Management, to comply with revisions to the State's stormwater management regulations per the A-StoRM initiative [2024 WRE]
- ☉ Continue to aggressively promote Carroll County's land preservation programs, such as the Maryland Agricultural Land Preservation Foundation (MALPF), Carroll County Easement Purchase Program, Rural Legacy, Critical Farms, and the Leveraged Installment Purchase Agreement (IPA) program [2024 WRE]
- ☉ Prepare and submit to MDE the required Watershed Restoration and Protection Program (WPRP) Annual Report [2024 WRE]
- ☉ Prepare and submit to MDE biennially the required Financial Assurance Plan (FAP), which indicate how stormwater runoff will be treated and paid for over the next five years and will provide the financial roadmap for complying with the TMDLs [2024 WRE]
- ☉ Continue to facilitate the Water Resource Coordination Council (WRCC) as the forum for joint coordination of stormwater management projects required by the NPDES MS4 permit [2024 WRE]

Impervious surfaces are mainly constructed surfaces - rooftops, sidewalks, roads, and parking lots - covered by impenetrable materials such as asphalt, concrete, brick, and stone. These materials seal surfaces, repel water, and prevent precipitation from infiltrating soils. Soils compacted by urban development are also highly impervious. By decreasing infiltration, impervious surfaces increase stormwater runoff.

Impervious surfaces allow many types of pollutants, derived from a variety of sources, to accumulate upon them. Many of these pollutants are subsequently washed into waterbodies by stormwater runoff, severely degrading water quality. This type of pollution is known as nonpoint source water pollution and is linked to land use activities. Water quality problems increase with greater levels of imperviousness and intensity of land use. Carroll County currently has a number of streams on Maryland's list of impaired waters.

Specific "To Do" Action Items:

Short-Term Action Items

- ☐ Participate on MDE's advisory groups for development of new stormwater management regulations as a result of Maryland's A-StoRM effort [2024 WRE]
- ☐ Revise local stormwater management regulations to incorporate the revisions made to the State's Stormwater Management Act as a result of the A-StoRM initiative, which is anticipated to address both stormwater runoff quantity and quality changes due to climate change [2024 WRE]
- ☐ Investigate incorporating state-of-the-art, non-conventional culvert designs in new road construction to help mitigate debris jams and flooding events associated with high, intensive stormflow events projected to occur more frequently with climate change. Advanced



culvert/stream crossing designs may also facilitate passage of fishes and other aquatic organisms and improve connectivity among populations. [2024 WRE, DNRI]

Long-Term Action Items

☐ n/a

34.4 Identify changes to planned land use patterns and land development requirements to help achieve the needed reduction in pollutant loads

Specific Action Items Already in Place:

- ✓ Adopted zoning and land use changes to severely limit development in sensitive areas such as stream and wetland buffers, floodplains, areas underlain by carbonate rock, and steep slopes [2010 WRE]
- ✓ Evaluated the specific impervious cover rates for each land use category in Carroll County based on existing and projected development. [2024 WRE]
- ✓ Developed and applied a new model (MapShed) through the NPDES program, which takes this into account. This model was then replaced as of the 2024 reporting year with MDE's TIPP spreadsheets for progress tracking and reporting. [2024 WRE]
- ✓ Completed a true land cover layer for the county based on latest available orthophotography and using the same land cover categories as the Chesapeake Bay Program Model 5.0 MidPoint assessment. The County worked with the Conservation Conservancy to update land cover. It was incorporated to the Bay Program Model 6.0. [2024 WRE]
- ✓ Worked with the municipalities, where applicable, to incorporate in their road standards measures that reduce the required street width and that allow for the minimum required pavement width needed to support travel lanes, on-street parking, and emergency vehicle access [2010 WRE]
- ✓ Implemented 2007 State stormwater management regulations, which are designed to reduce impervious surface associated with new construction [2010 WRE]
- ✓ Evaluated and adopted, where needed, amendments to parking requirements, imposing limits on the surface area of a site devoted to parking [2010 WRE]
- ✓ Required in the Landscape Manual the use of landscaped islands in parking lots and certain types of roadways to decrease the amount of impervious area and capture additional stormwater runoff [2010 WRE]
- ✓ Incorporated stormwater conveyance and treatment features, such as grass channels, stormwater curb extensions, and linear stormwater tree pits, into closed-section roadways [2010 WRE]
- ✓ Encouraged the use of alternative, permeable sidewalk, and trail surfaces [2010 WRE]
- ✓ Removed all SHA-owned properties from the impervious baseline acreage/GIS layer/data, as these areas fall under SHA's NPDES permit [2024 WRE]





- ☐ Enhance GIS-based analysis of watersheds to track and “take credit” for all implementation activities, including those already accomplished [2024 WRE]
- ☐ Consider tree species for urban and buffer plantings that would thrive in an altered climate. A recommended resource is the USDA’s webpage, [Climate Change Projects for Individual Tree Species](#). [2024 WRE, DNRI]
- ☐ Consider stronghold and Tier II watersheds when prioritizing conservation efforts, restoring riparian forest buffers, and enhancing SWM BMPs [2024 WRE]

Long-Term Action Items

- ☐ n/a

34.3 Enhance stormwater management programs

Specific Action Items Already in Place:

- ✓ Modernized subdivision ordinances to promote innovative site design techniques [from 2007 Guidance doc]
- ✓ Incorporated the use of nonstructural BMPs such as natural conservation areas, roof and non-roof top disconnection, vegetated swales, sheet flow to buffer, reduced impervious cover to the maximum extent practicable and promote ESD or LID techniques, as required by State regulations and Carroll County local laws [2010 WRE]
- ✓ Required permanent protection of existing forest on development sites and promoted the enhancement of existing contiguous and creation of new forest areas [2010 WRE]
- ✓ Revised and adopted local stormwater regulations to incorporate and implement Maryland’s Stormwater Management Act of 2007 [2010 WRE]
- ✓ Evaluated and adopted policies requiring increased bioretention of stormwater and onsite infiltration of stormwater, i.e., bioretention areas [2010 WRE]
- ✓ Established a County Watershed Restoration and Protection Program (WPRP) and Fund, per the requirements of § 4-202.1(j)(7), Environment Article, Annotated Code of Maryland, to provide a dedicated fund for enhanced inspection, maintenance, and restoration activities for stormwater [2024 WRE]
- ✓ Established maintenance program and associated funding for stormwater management facilities to be maintained, updated, and/or upgraded [2024 WRE]
- ✓ Became NPDES MS4 co-permittees with the County, effective with the fourth-generation permit December 29, 2014, to cooperatively and more efficiently and cost effectively address permit requirements across jurisdictional boundaries [2024 WRE]
- ✓ Developed a Memorandum of Agreement (MOA) between the County and all eight municipalities to address the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) requirements, to address how cost-sharing of stormwater mitigation/restoration projects will take place, and to delegate the administrative responsibilities of the Permit. It was signed by the County Commissioners and Mayors on October 23, 2014. This is a perpetual agreement. [2024 WRE]



Ongoing Action Items:



Ongoing Action Items:

- ☉ Continue to promote and direct growth to PFAs, which will resolve conflicting and competing requirements [2010 WRE]
- ☉ Retrofit stormwater management facilities into existing subdivisions where there are no stormwater facilities in order to help meet the NPDES MS4 permit requirements of reducing impervious cover [2024 WRE]
- ☉ Continue to update the BLI data to derive future land use scenario acreages, estimate water and sewer demand, and other use for other relevant applications [2024 WRE]
- ☉ Update and maintain data for annual submission to MDE of the TMDL Implementation Progress and BMP implementation toward achieving TMDLs [2024 WRE]
- ☉ Reduce nutrient pollution resulting from septic systems [2024 WRE]
 - ☉ Coordinate with the Carroll County Health Department to track new septic approvals to input and keep up to date. The County coordinates with the Health Department to track upgrades from conventional to BAT for NPDES MS4 compliance credit [2024 WRE]
 - ☉ Identify failing septic systems, prioritize the systems that should be either connected to public sewer or upgraded or replaced using best available technology (BAT), and leverage funds to pay for such improvements. Fees charged to public sewer and private septic system users goes into the Bay Restoration Fund, which is used to upgrade septic systems with BAT systems. These funds are administered through the Carroll County Health Department. [2024 WRE]

Specific "To Do" Action Items:

Short-Term Action Items

- ☐ During the update of the comprehensive/master plan, evaluate if buildout of the land use plan and transportation element ensure safe travel between critical services and the locations where those services are needed [2024 WRE]
- ☐ During the update of the comprehensive/master plan, evaluate if buildout of the land use plan and transportation element ensure reliable water and energy supply to support the seven critical lifeline assets and services [2024 WRE]
- ☐ When updating the Sensitive Areas Element, build in strategies that help provide a strong connection between the Sensitive Areas Element and the WRE [2024 WRE]
- ☐ Include projects in the Land Preservation, Park, and Recreation Plan (LPPRP) that could support hazard mitigation and climate change adaption [2024 WRE]
- ☐ Adopt changes to the Landscape Ordinance to require the use of xeriscaping principles exclusively with native plants that protect the environment and support wildlife [2010 WRE]
- ☐ Evaluate and implement changes to the land use designation and/or zoning of certain areas to promote development in areas not environmentally sensitive and in locations with appropriate infrastructure as part of the *next* comprehensive plan update process [2010 WRE]
- ☐ Evaluate and adopt, where appropriate, parking requirements to determine if opportunities exist to reduce required parking for new development, which would result in a decrease in the amount of new impervious area [2010 WRE]
- ☐ Evaluate the feasibility and benefits of implementing MDOT's Complete Streets initiative where appropriate within DGAs, which may include options for incorporating SWM BMPs [2024 WRE]
- ☐ Decrease allowable residential densities in rural areas outside DGAs to reduce the number of future residential septs that could be added, thereby reducing some of the potential increase in nitrogen loads [2010 WRE]



- ☐ Avoid planning for additional development near Maryland's high quality (Tier II) waters, coldwater streams, and other sensitive waters [2024 WRE]
- ☐ Reduce nutrients from failing septic systems while also protecting public health: [2024 WRE]
 - ☐ Coordinate with the Health Department to identify communities with failing septic systems and communities with aging systems that could benefit from community systems. The Health Department, which is a State agency, oversees septic systems and determines when, where, and why septic systems fail.
 - ☐ Evaluate the feasibility and cost benefit of developing community systems for communities identified as having failing or aging systems

Long-Term Action Items

- ☐ n/a

34.5 Reduce flood event impacts to water quality and mitigate effects of climate change

Specific Action Items Already in Place:

- ✓ Identified areas in each watershed where frequent flooding ~~has~~ occurred on or after January 1, 2000, as well as noted potential reasons for flooding, such as floodplain encroachment, under-sized conveyance system(s), etc. [2024 WRE]
- ✓ Developed an updated and consistent database of known flooding areas, including riverine floodplain expansion areas [2024 WRE]
- ✓ Developed and adopted the Carroll County Hazard Mitigation Plan, which is a comprehensive strategy designed to reduce long-term risks to life and property from natural hazards like flooding, severe storms, and earthquakes. The plan focuses on proactive measures, including strict floodplain management, infrastructure upgrades, and public education. [2024 WRE]
- ✓ Each municipality completed a Risk and Resilience Assessment and subsequent Emergency Response Plan, which was then submitted to EPA. [2024 WRE]
- ✓ The County adopted Floodplain Management Code, Chapter 153, that generally prohibits new construction, filling, and significant soil disturbance within 100-year floodplains to minimize safety risks and environmental damage. It applies to both FEMA and non-FEMA designated areas, requires special, often restrictive, approvals for any development, including a 100-foot setback from the top of the bank for most streams. This Code is also used by all the municipalities, except for Westminster, which has its own floodplain management code. [2024 WRE]

Ongoing Action Items:

- ☐ n/a

Specific "To Do" Action Items:

Short-Term Action Items

- ☐ Work with MDE to help define "flooding event," including a classification system to categorize the severity of flooding and flood impacts to help the County and municipalities identify where flood-mitigation projects should be prioritized [from 2021 A-StoRM Report; Hazen]
- ☐ Prioritize identified areas of frequent flooding for more detailed study, possibly as part of the watershed-specific flood management plans [2024 WRE]
- ☐ Coordinate with MDE on appropriate and feasible measures that could be implemented as the State works to increase its capacity to provide more technical guidance and modeling regarding



the potential impacts from extreme events including impacts to temperature and the hydrologic regime, as well as possible changes to pollutant impacts due to climate change [2024 WRE]

- ☐ Identify critical infrastructure located in floodplains and develop mitigation and adaption strategies to address flooding and other climate change impacts [2024 WRE, Hazen]
- ☐ Develop comprehensive watershed-specific flood management plans for each watershed in which recurring flooding event impacts are known to occur [from 2021 A-StoRM Report]
- ☐ Identify if planned development is in or adjacent to a watershed where downstream and disadvantaged communities experience chronic or repeat flooding and, if so, identify mitigation measures or alternatives [2024 WRE]
- ☐ Identify areas above and below drinking water reservoir dams and other high, significant, and low hazard dams. Consider restrictions in these areas regarding new development unless dam safety storm capacity issues are adequate or expected to be addressed as part of a development project. [2024 WRE]
- ☐ Consider policies to prevent affordable housing from ~~being located~~ in areas at greater risk of flooding [2024 WRE]
- ☐ Take advantage of opportunities to secure funding from the Comprehensive Flood Management Grant Program (CFMGP) to support watershed studies and related model development, as needed [2024 WRE]
- ☐ Take advantage of opportunities to secure funding from the Comprehensive Flood Management Grant Program (CFMGP) for relocation or elevation of affected and planned infrastructure, where financially and logistically feasible [2024 WRE]
- ☒ Expand Rural Legacy Areas in the county to provide a greater level of preservation/conservation to natural resource lands and wetlands and riparian buffers and access to funding for easements on land to protect vulnerable areas and provide infiltration and flood/storm surge attenuation benefits in water hazard/flood prone areas [2024 WRE]
- ☐ Consider stronghold and Tier II watersheds when expanding Rural Legacy Areas (RLAs) [2024 WRE]
- ☐ Actively participate in Carroll County's five-year update to the Multi-Jurisdictional Hazard Mitigation Plan, and adopt the plan once approved by FEMA [2024 WRE]
- ☐ Investigate the use of Maryland Department of Natural Resources' (DNR) Ecosystem Service, which assigns a dollar range on resource lands for their ability to perform carbon sequestration, nitrogen removal, stormwater mitigation and flood prevention, wildlife habitat and biodiversity, air pollutant removal, groundwater recharge, and surface water protection, as a tool for grant writing and when identifying and prioritizing practices that may be effective and financially feasible for flood mitigation and water quality projects [2024 WRE]

Long-Term Action Items

- ☐ Integrate comprehensive watershed studies and model development into the local growth and development planning process [from 2021 A-StoRM Report]
- ☐ Continue to work with MDE to identify, document, and implement comprehensive solutions to flood prone areas [from 2021 A-StoRM Report]

35.0 Emerging Contaminants: Countywide

Some examples of emerging contaminants that may be present in drinking water supplies, wastewater, and/or stormwater runoff are per- and polyfluoroalkyl substances (PFAS), polycyclic



43.1.2 Sustain existing wastewater treatment capacity

System-Specific Action Items Already in Place:

- ✓ Adopted an adequate public facilities ordinance to ensure adequate wastewater capacity is available to serve planned development before it proceeds

Ongoing Action Items:

- ⊙ When updating the land use plan in the Town's master plan, coordinate with the County to ensure that the Freedom WWTP can adequately accommodate projected additional wastewater demand

System-Specific "To Do" Action Items:

- ☐ n/a

43.1.3 Develop new public wastewater treatment and disposal capacity

The Town is served by the Freedom wastewater system. Strategies and Action items related to developing wastewater treatment and disposal capacity can be found in the Freedom section of the Municipal System-Specific section of this plan.

43.1.4 Protect and restore water quality and make progress toward any applicable TMDLs

System-Specific Action Items Already in Place:

- ✓ Received designation as a Sustainable Maryland community to improve access to funding for green and sustainability practices [2024 WRE]
- ✓ In May 2025, SHA completed a drainage improvement project on MD 851 from Main Street to Warfield Road in Sykesville, which included drainage and pavement upgrades to address failing storm drain system and impacts to the road surface. [2024 WRE, MDOT]

Ongoing Action Items:

- ⊙ Remain committed to conservation and environmental stewardship through the Town's ordinances [2024 WRE]
- ⊙ Continue to work with the Maryland Department of transportation (MDOT) to identify and advance stormwater management solutions that mitigate flooding impacts to Springfield Road and affected properties [2024 WRE]

System-Specific "To Do" Action Items:

Short-Term Action Items

- ☐ Integrate green infrastructure into the downtown streetscape and infill development projects as a way to help reduce the quantity of and improve the quality of stormwater runoff, which could include curbside green infrastructure, green walls, bioswales, rain gardens, planter boxes, and/or permeable pavement [2024 WRE]
- ☐ Establish a policy to evaluate and prioritize green infrastructure, where feasible, for all Town-related projects [2024 WRE]
- ☐ Ensure the Town's priority flood and stormwater mitigation projects are included in the Hazard Mitigation Plan to make them eligible for hazard mitigation assistance funding [2024 WRE]



The Town can meet current and projected demands up until the permitted amount of 208,300 gpd is reached. Thereafter, the Town will need to seek alterations to appropriation permits, which will require evaluations related to recharge area(s) and sustainable well yields. It is possible that additional recharge acreage and/or new water supply sources would need to be developed, which could have financial implications for the Town.

Even with developer funding as new development projects are proposed, the wastewater treatment plant (WWTP) would also be a limiting factor. Until capacity limitations associated with the WWTP are increased, the capacity of the water supply system would be limited to the current design WWTP capacity of 200,000 gpd (without water reuse measures in place). The timeframe for new development projects, including the Phillips and former Bowman properties, is unknown.

Summary of 2023 Buildout Capacity and Limitations for Union Bridge Water Supply System							
Buildout Demand Status	2022 Appropriated Capacity (gpd)	Average Day Capacity Limitation (gpd)	2022 Existing ¹ (gpd)	Buildout Demand (gpd)	Additional Capacity Needed (gpd)	Critical Limiting Factor (mgd)	Actions to Consider for Increasing Capacity as Needed
●	208,300	100,800	93,649	470,330	369,530	- System Capacity - WWTP Capacity	- New WWTP - Addn'l water sources ↑ appropriations

● Water supply system does not have enough capacity to serve projected demand in 2023 Water Service Area, and limitations would be very difficult to overcome

¹ 2022 Existing = existing pumped and unserved demand in the Existing Water Service Area. Includes drought demand.

*This table does not include cost in the limitations, but funding is always a consideration and a possible limiting factor.

45.1.5 Water Demand Management

The Mayor and the Council Person who oversees the water system determine when water restrictions go into effect. These measures are voluntary and include no watering of lawns or washing cars, houses, or sidewalks. Residents are notified of restrictions via the Town newsletter and [website](#), as well as public notices around town.

45.2 Wastewater

The Union Bridge WWTP is owned and operated by the Town of Union Bridge. The 200,000 gpd plant consists of a rotary screen, activated sludge processing with two extended aeration basins, settling basins, secondary clarifiers, aerated chlorine contact chamber, and a sulfur dioxide gas feeder system for dechlorination. Sludge is transported to the Westminster WWTP. The plant discharges to Little Pipe Creek, which flows into Double Pipe Creek at a three-year (2020-2022) average flow of approximately 150,033 gpd.

To prevent planning to capacity limits, as of 2024, Town policy proactively triggers action towards system improvements once remaining capacity falls within 20,000 gpd of the current design capacity. Per MDE, MDE has determined any new capacity will must be in the form of a new plant relocated out of the floodplain to replacing the old plant built in 1962. The Town Engineer, GHD, completed a revised PER-ENR Report submitted to MDE, which includes ENR technology using an oxidation ditch for treatment as the cost-effective option.



While funding arrangements remain uncertain, funding is critical to be able to move forward (not only for capital construction but for O & M costs) for the existing users to be able to handle user rates of a new plant. The Town received an approval letter from MDE in December 2025 accepting the design and allowing the Town to proceed to the design phase. The preliminary design includes ENR treatment level and a design of 0.4 mgd, which would expand the existing capacity by 0.2 mgd. MDE is willing to fund costs associated with an upgrade to ENR for the replacement WWTP. The Town is pursuing additional funding to allow the design and construction to proceed.

45.2.1 Wastewater Demand

The total future wastewater demand assumes that everything within the 2023 Sewer Service Area (SSA) builds out according to the zoning in place in 2022. If this were to occur, the total future wastewater demand for the Union Bridge WWTP would be 476,227 gpd. The numbers in the "2023 Union Bridge Future Wastewater Demand" table are based strictly on BLI calculations. They do not reflect factors unique to this municipal system that may have been considered in the C&D Workbook calculations and figures presented in the next table, "2023 Union Bridge Wastewater Capacity Available for Existing and Future Growth."

**Union Bridge Future Wastewater Demand at Buildout of 2023 Sewer Service Area
(in Gallons per Day)**

Municipal System	2023 Existing Demand ¹	Planned Future Demand ²		Long-Range Demand ³	Total Buildout Demand
		Infill Demand	Future Demand		
Union Bridge	99,433	43,997	141,750	191,047	476,227
Municipal System	2023 Existing Demand ¹	Additional Demand by Land Use ²			Total Buildout Demand
		Residential	Non-Residential		
Union Bridge	99,433	193,500	183,294		476,227

¹ These data represent, in general, the annual average daily demand over the 3-year period 2020-2022 minus I&I.

² Planned Future Demand and Additional Demand by Land Use are based on estimated demand from land not yet served in the planned sewer service areas. Infill demand is calculated for areas classified in the "Existing/Final Planning" service category; Future demand is calculated for the combined area classified in the "Priority" or "Future" service category.

³ Long-Range Demand is based on estimated demand from land not yet served in the Long-Range Planned Sewer Service Area.

Source: WRE Capacity & Demand Workbook: CC PLM + Town of Union Bridge, 2023

The table – **Union Bridge Future Wastewater Demand at Buildout of 2023 Sewer Service Area** – provides the total estimated buildout demand including the Long-Range Demand. It should be noted that the Long-Range Service Area serves as a planning tool for Carroll County jurisdictions/systems but is not a service area required by MDE, and it is not included in Table 32 of the *Water & Sewer Master Plan*. Only the total demand for Infill + Future should be considered for purposes of evaluating consistency of the *Water & Sewer Master Plan* with this document.

45.2.2 Wastewater Capacity

If Union Bridge were to build out according to the zoning in place in 2022 within the 2023 SSA, the Town would need to expand the system beyond its current capacity to make available an additional 326,827 gpd in wastewater flows.



System-Specific "To Do" Action Items:

Short-Term Action Items

- ☐ Conduct an I&I study to determine current level of inflows from I&I to potentially regain some capacity until a new wastewater treatment plant (WWTP) can be constructed and operational; make system improvements to reduce I&I; adjust the capacity on the C&D Workbook to update available capacity [2024 WRE]
- ☐ Revise the SSA for Union Bridge shown in the 2023 *Water & Sewer Master Plan* to reflect the modifications made to the DGA/MGA with the 2024 Town plan review of the *Union Bridge & Environs Community Comprehensive Plan* [2024 WRE]

Long-Term Action Items

- ☐ n/a

45.3.5 Develop new public wastewater treatment and disposal capacity

System-Specific Action Items Already in Place:

- ✓ Completed a Preliminary Engineering Report (PER) for the construction of a new WWTP, including ENR treatment, and submitted to MDE for review and final approval as of 2024 [2024 WRE]
- ✓ Received approval from MDE in December 2025 to proceed with design and engineering of a 0.4 mgd replacement WWTP located outside of the floodplain [2024 WRE]

Ongoing Action Items:

- ☒ n/a

System-Specific "To Do" Action Items:

Short-Term Action Items

- ☐ Re-evaluate the 2023 buildout capacity availability and demand estimates based on the planned growth associated with the Town's 2024 comprehensive plan amendment; prioritize planned improvements and their timing accordingly [2024 WRE]
- ☐ Incorporate to the *Water & Sewer Master Plan* priorities for wastewater system improvements for the next 10 years to ensure improvements can move forward in support of the comprehensive plan as funding and other opportunities become available [2024 WRE]
- ☐ Evaluate Pursue additional funding alternatives for the construction costs of a new-relocated WWTP that are not eligible for ENR funding from MDE [2010-2024 WRE]

Long-Term Action Items

- ☐ Pursue ENR treatment as part of the design for a new WWTP and seek funding opportunities to assist with design and construction [2024 WRE]
- ☐ Construct a new WWTP that not only will accommodate anticipated growth shown in the Town's comprehensive plan, but also addresses the frequent and recurring flooding issues associated with the WWTP [2024 WRE]

Long-Term Action Items

- ☐ n/a