4. LAND USE

Introduction

Land use refers to the uses or activities that occur on a parcel of land. For planning purposes, these are commonly designated as agricultural, residential, commercial, industrial, recreational, and other uses. Land use is not permanent and often evolves as the County develops.

It is important to note that land use differs from zoning. Zoning is a tool that local governments use to implement the Comprehensive Plan by regulating what can be built on a parcel and how these structures may be developed and redeveloped.

Land uses can be nonconforming, if they do not conform with zoning, most often because the use existed before the land was classified into a category. These nonconforming uses are often referred to as "grandfathered" and are generally allowed to remain in use. Like land use, zoning can change over time. For example, parcels that are zoned to allow only commercial uses may be changed in the future to allow for a mix of uses, including residential, commercial, and other types.

Land in Worcester County is dominated by agricultural uses. The County retains a rural and coastal character that it has successfully maintained so that development is concentrated primarily in municipalities and designated growth areas. Worcester County opposes offshore wind projects and needs to balance the needs of agricultural uses with solar energy development, including prohibiting solar in future growth areas.

This chapter provides information on land use categories and their distribution as per existing land use within the County, followed by details of zoning and future land use.

Goals and Objectives

Worcester County land use goals are to maintain and improve the County's rural and coastal character, protect its natural resources and ecological functions, accommodate a planned amount of growth served by adequate public facilities, improve the compatibility of new development with the County's existing built environment, continue to support the County's thriving economy, provide for residents' safety and health, and coordinate land use-based infrastructure decisions with the State of Delaware and Sussex County to the extent possible.

Specific goals and recommended actions to achieve those goals include:

1. **Continue to limit rural development to uses compatible with the County's agriculture and forestry industries.**

    - *Action Item 4.1.1:* Continue to support agriculture and forestry uses throughout the county's less developed regions.
    - *Action Item 4.1.2:* Limit rural development to uses compatible with agriculture and forestry.

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2. **Plan for new development by encouraging infill within existing population centers and planned growth centers while maintaining the character of the community.**
    - *Action Item 4.2.1:* Maintain the character of the County's existing population centers.
    - *Action Item 4.2.2:* Locate new development in or near existing population centers and within planned growth centers.
    - *Action Item 4.2.3:* Plan for infill within existing population centers without overwhelming their existing character.
3. **Foster a cooperative relationship among the municipalities and the County to plan for future growth via annexations that logically expand existing neighborhoods and communities.**
    - *Action Item 4.3.1:* Work with municipalities to develop annexation policies that encourage infill within their boundaries and expand existing neighborhoods and communities.
4. **Provide appropriate residential, commercial, institutional and industrial uses that balance the available land supply while minimizing the consumption of vacant land to preserve the County's rural and coastal character.**
    - *Action Item 4.4.1:* Provide for appropriate residential, commercial, institutional, and industrial uses.
    - *Action Item 4.4.2:* Regulate development to minimize the consumption of land and preserve the County's rural and coastal character.
    - *Action Item 4.4.3:* Balance the supply of commercially zoned land with anticipated demand of year-round residents and seasonal visitors.
5. **Locate major commercial and all industrial development in areas having adequate arterial road access, while discouraging highway strip development to maintain roadway capacity, safety, and character.**
    - *Action Item 4.5.1:* Locate major commercial and all industrial development in areas having adequate arterial road access or near such roads.
    - *Action Item 4.5.2:* Discourage highway strip development to maintain roadway capacity, safety, and character.
6. **Encourage new developments to visually improve their surroundings by including appropriate landscaping and design elements that reflect the County's established architectural types and traditions.**
    - *Action Item 4.6.1:* Design new development's architecture and landscaping to visually improve its surroundings.

4. LAND USE

7. **Explore policies and actions that encourage redevelopment of existing residential and commercial properties.**

Existing Land Use

Maryland's land use policies seek to promote sustainable growth that fosters vibrant, livable communities, preserves and protects the environment, and uses resources efficiently. The state legislation affecting land use planning and resource preservation is described in **Chapter 1, Introduction.**

Land Use Categories

The Plan classifies the county into nine land use categories:

1. **Municipality**: Although outside the County's land use jurisdiction, the County's four incorporated towns (Berlin, Ocean City, Pocomoke and Snow Hill) play a vital role in the County's land use strategy. The towns are projected to absorb much of the County's projected growth through infill development and annexations. To minimize unnecessary land consumption, the County supports strategies that direct most of the towns' projected growth into infill development. Appropriate public service expansions that result from this growth should be planned carefully and coordinated between the County and the municipalities.

2. **Residential**: This category maps existing residential development within the County's unincorporated areas. This category includes the residential areas of the Existing Developed Centers (EDC) land use category that was included in the County's 2006 Comprehensive Plan. This change was made to differentiate between Residential and Commercial developed areas within the County's unincorporated areas, and to plan for each category separately. Existing Commercial areas within the former EDC are included in the Commercial Center land use category.

   The County seeks for the current development character within these areas to be maintained. Appropriate zoning providing densities and uses consistent with this character should continue to be implemented and instituted.

   Not designated as growth areas, these areas should be limited to infill development. Density, height, bulk, and site design standards should also be consistent with existing character. Examples include Ocean Pines, West Ocean City, South Point, Libertytown, Briddletown, and Germantown. Other small crossroad clusters are included in this category as appropriate.

3. **Village**: This category includes traditional villages that serve as rural centers within the County. Their character should be retained, so they are planned for infill. Villages are not growth areas; therefore, any additional growth within these areas should be very limited in scope. Villages include Bishopville, Whaleyville, Public Landing, Girdletree, and Stockton.

4. **Growth Area**: This category designates areas outside incorporated municipalities that are suitable and desirable for planned future growth. These areas include new and existing locations, which meet the following criteria:

- Contain limited wetlands, hydric soils, floodplains and contiguous forest
- Comprised of generally larger parcels (100 or more acres)
- Located outside of aquifer recharge, source water protection, and other critical areas
- Situated to be cost-effectively served with adequate public sanitary and other services
- Located near employment, retailing and other services
- Served, or can be readily served, by adequate existing roadways (Level of Service C or better)

Growth areas identify generalized locations for planned new development. These areas are intended to accommodate most new growth. Densities of up to 10 dwelling units per acre should be provided for to reduce consumption of "greenfields" (currently undeveloped sites). Such density will require public water and sewer service. Location, layout, and densities should facilitate transit. Adequate transportation and other public facilities must be in place at the time of development or constructed as part of a development project.

5. **Commercial Center**: This category includes sufficient area to provide for anticipated needs for business, light industry, and other compatible uses. Retail, offices, cultural/entertainment, services, mixed uses, warehouses, civic, light manufacturing and wholesaling would locate in commercial centers.

   Commercial centers are located on prominent sites and can visually dominate a community. For this reason, special attention must be given to the volume, location and design of these uses. The first step is to balance supply with demand.

   Strip commercial centers are discouraged. These centers are characterized by:

   - A linear series of stores strung together by a one-story, curtain walled building of little or incompatible character
   - Expanse of unscreened parking between the building and the roadway
   - Minimal landscaping
   - Incongruous and incompatible architecture and signage

   Strip centers combined with "franchise" architecture can negate local sense of place, be visually destructive, and adversely affect property values.

   Commercial centers provide important services, but they should be developed to enhance community character.

   Commercial centers are planned to occur at three scales, which will be reflected in their zoning and site plan requirements: neighborhood, community and regional/highway.

   - **Neighborhood commercial** provides convenient food, gas and other day-to-day products. Neighborhood commercial should take a central place within growth node developments. They may contain mixed uses and they should be provided with sidewalks, landscaping, and other amenities. Local institutional uses such as schools, libraries, post offices and

community buildings are also desired uses. It is especially important that neighborhood commercial uses blend visually into the surrounding community.

Incorporating ancillary residential uses above the street level is encouraged. Such areas may also be appropriate additions to existing underserved population centers. These centers serve populations of 1,000 or more within a five-to-ten-minute travel time.

- **Community commercial centers** provide for larger scale commercial uses with higher volume parking demand. Groceries, pharmacies, and support services are located at these centers. Careful attention to signage, landscaping, perimeter buffers, site layout and architectural design is necessary for these uses to be compatible with the community's and the county's character. Community commercial centers serve populations of 3,000 or more within about a 10- to 20-minute travel time.

- **Regional/highway commercial centers** are designed for the most intense commercial uses, including "big box" retailers. Such uses will be restricted to sites with access to Routes 50, 113 and 13.

  Specific zones prescribing appropriate setbacks, landscaping, lighting, signage, screening and other site and architectural standards should guide the location and development of these centers. Use of service roads and/or inter-parcel connectors will help to mitigate transportation impacts. Regional centers serve populations of 25,000 or more within a 30-minute travel time.

6. **Agriculture**: The importance of agriculture to the county cannot be overstated. Its significance is economic, cultural, environmental, and aesthetic. Agriculture is the bedrock of the County's way of life. Agriculture faces challenges from international commodity prices, local development pressure, and the aging farm population, among other challenges. The County must do all it can to preserve farming as a viable industry.

   This category is reserved for farming, forestry and related industries with minimal residential and related uses permitted. Large contiguous areas of productive farms and forest shall be maintained for agricultural uses. Dust, odor, chemical applications, noise, and extended hours of operation create conflicts with incompatible uses.

   Residential and other conflicting land uses -- although permitted -- are discouraged in these areas. Only minor subdivisions of five lots or fewer are permitted. This restriction has been the strongest component of the county's agricultural preservation strategy, and it should be maintained as is. Also, as a general policy, the practice of not rezoning agricultural land for other uses should continue.

The County's strong "right-to-farm" law should remain in force. Compatible uses providing additional farm income (e.g., tourism and development of "value added" products/processing facilities) should be explored. The implementation of a transfer of development rights (TDR) program could help maintain farming and direct growth away from productive farming areas.

Agricultural land preservation should be pursued to maintain a critical mass of farms.

7. **Industry**: Traditionally a limited land consumer in Worcester County, light industry is an important component of the County's land use mix. Heavy industry, with its environmental and transportation impacts, may be compatible in selected locations. Pocomoke City has and will continue to be the focus for the County's most intense industrial uses.

   Industrial uses need good road access, large sites, sufficient electricity and public water and sewer services. Rail, port facilities, and natural gas are also desired. Selective economic development efforts focused on high-wage, low-impact industries and their supporting infrastructure will benefit the county. Industrial uses should be in the County's designated industrial zones/parks and within appropriate areas in the municipalities.

8. **Green Infrastructure**: This category includes state- and locally-designated natural and open spaces. These areas are designated to preserve environmentally significant areas and to maintain the environmental functionality of the county's landscape. Greenways improve water quality, provide flood control and maintain the county's rural and coastal character.

   This category includes conservation zones, which are highly restricted due to their special sensitivity. Conservation areas are defined by their soils (muck), state owned natural areas, existing conservation zoning, tidal wetlands, selected riparian corridors. Greenway and conservation areas have distinct physical characteristics, which make them special habitat areas or place extreme limitations on development.

   Such areas are "place dependent," that is, they only occur at specific locations. Their identification and preservation must be proactively addressed. After-the-fact mitigation and restoration is expensive and often of limited effect.

   Open space uses include:

   - Environmental processing (e.g., hydrology, aquifer recharge areas, larger contiguous forests)
   - Hazard areas (floodplains)
   - Environmental resources (wetlands, threatened and endangered species habitat)
   - Cultural resources
   - Outdoor recreation sites
   - Areas defining edge between urban and rural uses

   The green infrastructure system is designed to maintain existing resource areas and where absent, create sufficient natural "corridors" linking larger green "hubs." Parks, other public and

dedicated private open spaces should be included. This network provides essential wildlife food, shelter, and cover. It also provides a rural tone to developed areas and works with conservation site planning to minimize development's cumulative impact. Green infrastructure is addressed in more detail in the natural resources chapter.

The initial green infrastructure contained in this plan will be reviewed and refined further in the future.

9. **Institutional**: Institutional land uses are major public properties and facilities. County parks emphasizing active recreation are identified in this category; county passive recreation facilities are identified as green infrastructure.

Existing Land Use

The County calculated an inventory of available land in the comprehensive planning process. **Table 4-1** summarizes Worcester County's Existing Land Use by category and number of parcels, and compares it to Future Land Use, as a comparison.[1] **Map 4-1** shows the County's Existing Land Use.

Table 4-1: Land Use Summary

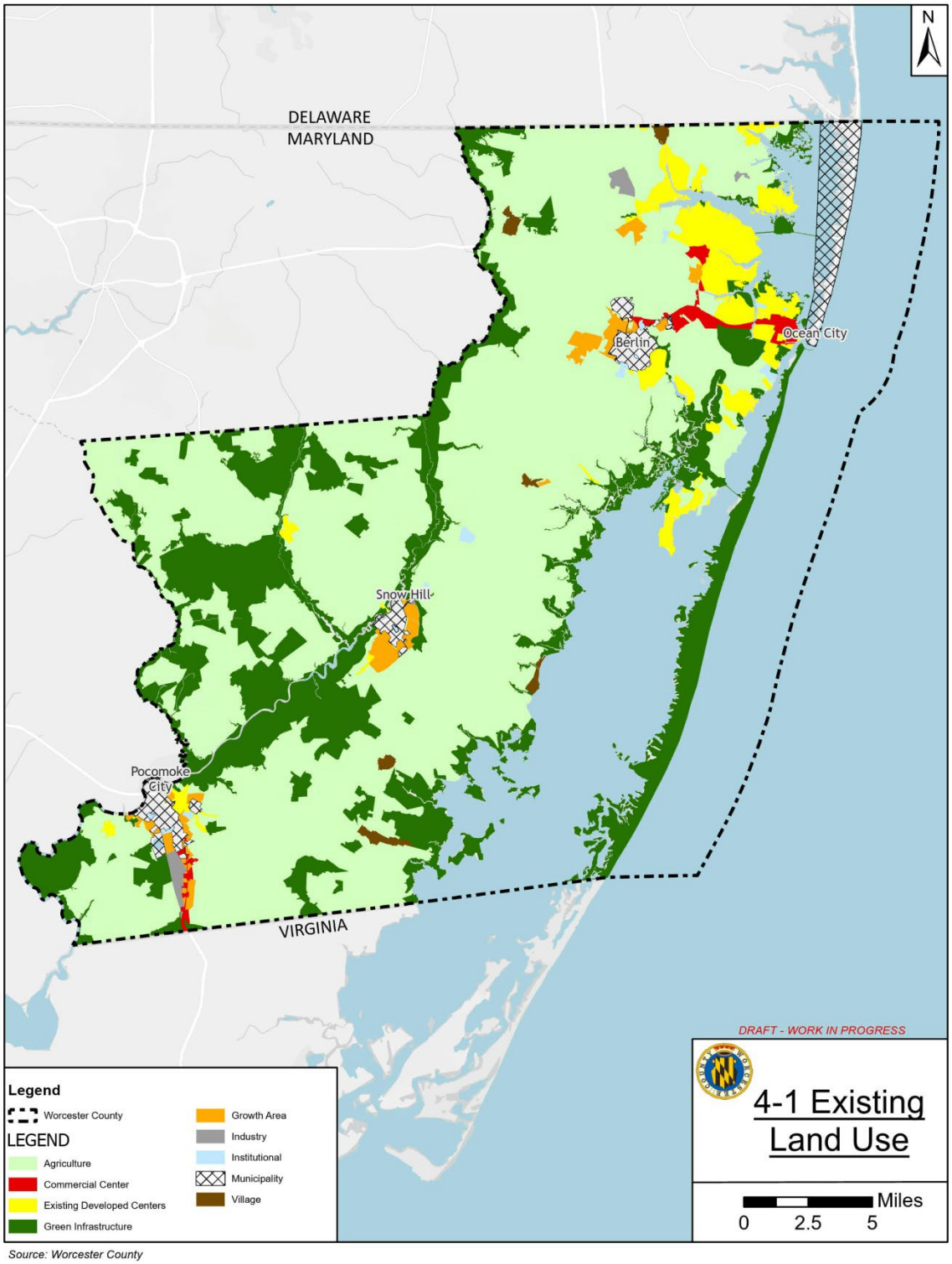
Land Use Category	Existing Land Use Total Acres	Future Land Use Total Acres	% Change
Agriculture	196,703	167,580	-17%
Commercial Center	2,433	1,948	-25%
Existing Developed Centers	14,657	N/A	N/A
Green Infrastructure	75,217	97,166	23%
Growth Area	2,860	2,841	-1%
Industry	1,329	1,066	-25%
Institutional	979	2,197	55%
Municipality	11,052	7,089	-56%
Village	1,520	1,786	15%
Residential	N/A	12,799	N/A
Total	**306,751**	**294,051**	-

Source: Worcester County, Wallace Montgomery

[1] The totals for Existing and Future Land Use are different because of mapping changes from the recategorization of the Existing Developed Centers (EDC) category and are being reconciled for the final plan.

4. LAND USE

Figure 4-1: Existing Land Use



Source: Worcester County

4. LAND USE

Zoning

Zoning is one of the primary tools to implement Worcester County Comprehensive Plan. Zoning is represented on maps and detailed in the County's Zoning Ordinance. The maps show several districts or zones into which the County is divided to regulate the use of land. The document specifies the types of activities (uses) that can occur in each district either as a matter of right or under certain conditions. It also regulates building height, lot sizes, setbacks, yards and green space, the number and size of signs, and space for off-street parking.

For additional information on zoning and zoning districts, please refer to the Code of Public Local Laws of Worcester County, Maryland, Zoning and Subdivision Control Article and the official Zoning Map illustrating the location and boundaries of these zoning districts.

Table 4-2: Zoning

Zoning District	Acres	
	No.	%
A-1 Agricultural District	170,093	57.9%
A-2 Agricultural District	7,457	2.5%
E-1 Estate District	4,683	1.6%
V-1 Village District	1,080	0.4%
R-1 Rural Residential District	4,872	1.7%
R-2 Suburban Residential District	4,629	1.6%
R-3 Multi-Family Residential District	1,539	0.5%
R-4 General Residential District	1,214	0.4%
C-1 Neighborhood Commercial District	128	0.0%
C-2 General Commercial District	2,082	0.7%
C-3 Highway Commercial District	350	0.1%
I-1 Light Commercial District	1,164	0.4%
I-2 Heavy Industrial District	326	0.1%
CM Commercial Marine District	12	0.0%
RP Resource Protection District	86,756	29.5%
CA	419	0.1%
Municipalities	7,179	2.4%
Total		**293,983**

Source: Worcester County, Wallace Montgomery

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Zoning Categories

Each zoning designation is described below and is detailed in the Code of Public Local Laws of Worcester County, Maryland.

This plan recommends the removal of the E-1 Estate District as a future action when zoning changes are considered in the implementation of this plan.

A-1 Agricultural District

This district is intended to preserve, encourage and protect the County's farms and forestry operations and their economic productivity and to ensure that agricultural and forestry enterprises will continue to have the necessary flexibility to adjust their production as economic conditions change. Furthermore, it is the intent that in this district there shall be no basis, under this Title, for recourse against the effects of any normal farming or forestry operation as permitted in this district, including but not limited to noise, odor, vibration, fumes, dust or glare. This district is also intended to protect the land base resources for the County's agricultural and forestry industries from the disruptive effects of major subdivision or non-agricultural commercialization.

A-2 Agricultural District

This district is intended to foster the County's agricultural heritage and uses while also accommodating compatible uses of a more commercial nature that require large tracts of land. The A-2 District may also be used for limited residential development through consolidated development rights and as a place marker for future annexations only where adjacent to existing municipalities. Furthermore, it is the intent that in this district there shall be no basis, under this Title, for recourse against the effects of any normal farming or forestry operation as permitted in this district, including but not limited to noise, odor, vibration, fumes, dust or glare.

V-1 Village District

This district is intended to protect and preserve the unique mixed-use character and historical charm of the existing crossroads villages of the County. New development within this district should be of an appropriate scale and use to be compatible with the existing pattern of development. In addition, new development is intended to be channeled into effective service areas to permit the efficient provision of public services.

R-1 Rural Residential District

This district is intended to protect and preserve the low-density rural residential areas of the County which are not generally planned for substantial population growth and for which limited public services are available or planned. Low-density residential development is permitted in this district while relatively low intensity uses necessary to serve the needs of the local population may also be compatible. Cluster development and residential planned communities are encouraged in this district to preserve and maintain the open space and natural environment currently present in these areas.

R-2 Suburban Residential District

This district is primarily intended to protect and preserve existing residential subdivisions throughout the County and to provide for compatible infill development in those areas. Furthermore, as contemplated by the Comprehensive Plan, this district can serve as an intermediate band of traditional neighborhood development as it transitions from a higher-density core to a much lower-density edge.

The Comprehensive Plan recommends that designated growth areas be developed as traditional neighborhoods. Projects of greater than 20 dwelling units that are proposed after the effective date of this Title are required to be developed as residential planned communities to encourage traditional neighborhood development and utilization of conservation design principles. Therefore, new development in this district may be at densities higher than that cited below as the maximum density, provided adequate sewer service is available, while infill development in existing developed areas shall be at densities consistent with those allowed by the primary district regulations.

R-3 Multi-family Residential District

This district is intended to protect and preserve existing residential subdivisions throughout the County and to provide for compatible infill development in those areas. Furthermore, as contemplated by the Comprehensive Plan, this district can serve as the core of a traditional neighborhood development, where the highest densities are desired.

The Comprehensive Plan recommends that designated growth areas be developed as traditional neighborhoods. Projects of more than 20 dwelling units that are proposed after the effective date of this Title are required to be developed as residential planned communities to encourage traditional neighborhood development and utilization of conservation design principles. Therefore, new development in this district may be at densities higher than that cited below as the maximum density, provided adequate sewer service is available, while infill development in existing developed areas shall be at densities consistent with those allowed by the primary district regulations.

R-4 General Residential District

This district is intended to protect the existing residential subdivisions throughout the County that are currently developed in accordance with its provisions while also providing for compatible infill development. Additionally, this district is meant to accommodate the most diverse housing types and range of affordability. Projects of greater than twenty dwelling units which are proposed after the effective date of this Title are required to be developed as residential planned communities to encourage traditional neighborhood development and utilization of conservation design principles. While this district can serve as the core of a traditional neighborhood development, it is not limited to usage only in areas designated for growth by the Comprehensive Plan.

C-1 Neighborhood Commercial District

This district is intended to provide convenient commercial areas strategically based to serve the day-to-day shopping and service needs of the local neighborhood. Designed to serve populations of one thousand or more within an approximate five- to ten-minute travel time, this district shall be limited to small-scale commercial operations of far less intensity than those provided for in the C-2 General Commercial District and C-3 Highway Commercial District. The scale and design of these neighborhood

commercial uses should complement the scale and design of the existing neighborhood in which they are located and blend visually into the surrounding community.

C-2 General Commercial District

This district is intended to provide for more intense commercial development serving populations of 3,000 or more within an approximate ten- to twenty-minute travel time. These commercial centers generally have higher parking demand and greater visibility. Consequently, design standards and careful attention to signage, landscaping, perimeter buffers, site layout and architectural design are imperative. Commercial structures and uses must be compatible with the community and the County's character. Strip commercial forms of development are strongly discouraged.

C-3 Highway Commercial District

This district is intended to provide for the largest and most intense commercial development and thus function as regional centers serving populations of twenty-five thousand or more within an approximate thirty-minute travel time. Such uses shall be limited to sites with appropriate access to arterial highways. Because of the extreme visibility of the sites, appropriate setbacks, landscaping, lighting, signage, screening and other site and architectural standards shall guide the location and development of these centers. Use of service roads and interparcel connectors are necessary to mitigate transportation impacts.

I-1 Light Industrial District

This district is intended to provide for certain types of business and industry, characterized by light manufacturing, fabricating, warehousing and wholesale distribution, which are relatively free from offense and which, with proper landscaping and buffering, will not detract from the residential or commercial desirability of adjacent properties. It is intended that such districts be located with access to major thoroughfares or other major modes of transportation, depending upon the specific demands of the industry being served. Industrial parks are encouraged in this district to provide for industrial uses with common access and infrastructure, as well as the provision of open space and adequate buffering to adjacent noncompatible uses.

I-2 Heavy Industrial District

This district is intended to provide for a variety of heavy-industrial-type uses which may not be compatible with residential or commercial development due to some potential nuisance or hazard. It is intended that such districts be located with access to major thoroughfares or other major modes of transportation, depending upon the specific demands of the industry being served. Industrial parks are encouraged in this district to provide industrial uses with common access and infrastructure, as well as the provision of open space and adequate screening between adjacent incompatible uses.

CM Commercial Marine District

This district is intended to preserve and protect Worcester County's commercial fishing industry while allowing for commercial, industrial and recreational uses which of necessity must be in proximity to waterfront areas. Additionally, it provides for other compatible uses which may find a waterfront

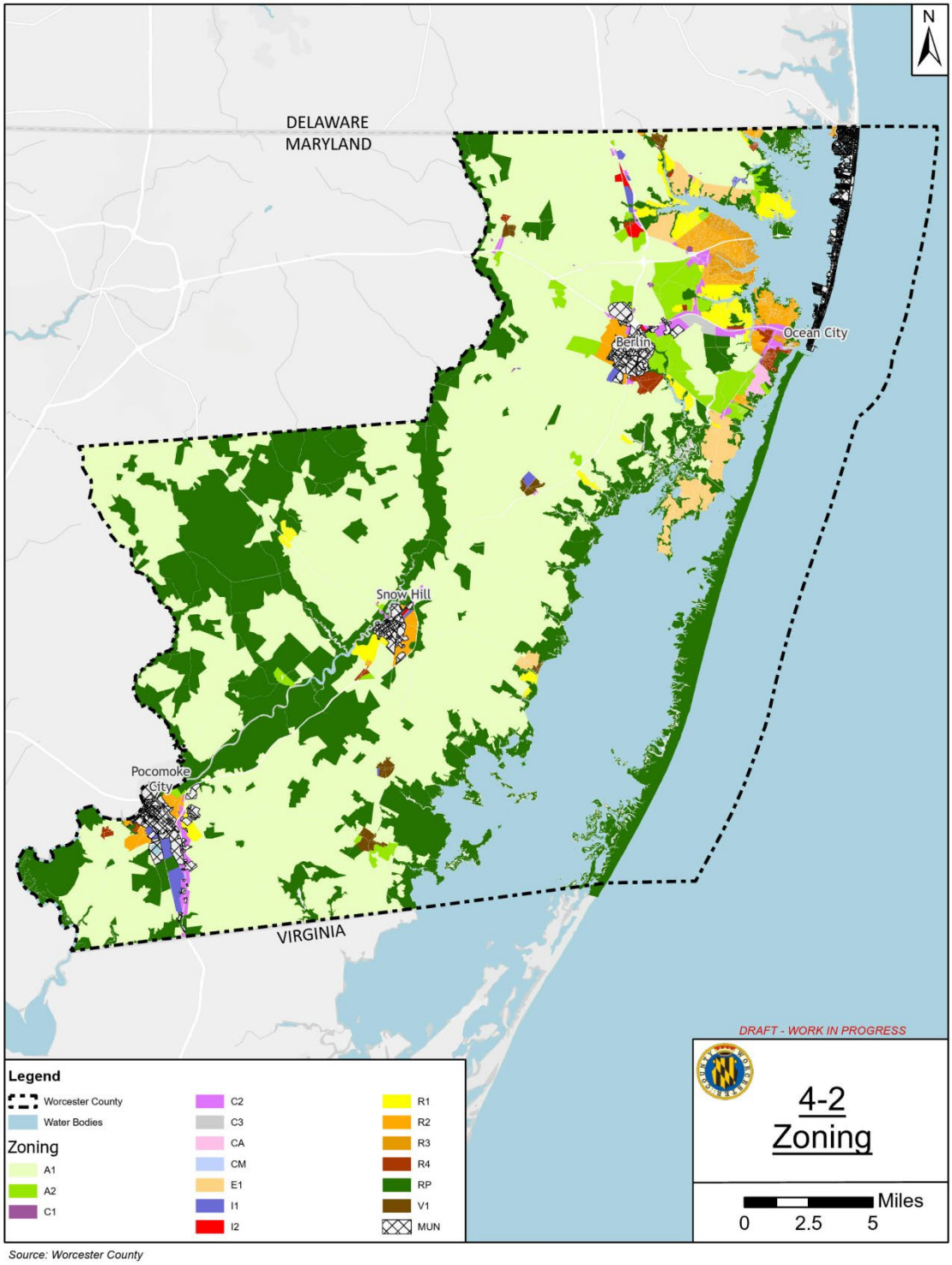
location desirable. Furthermore, it is the intent of this district that there shall be no basis, under this Title, for recourse against the effects of any normal commercial fishing or other commercial marine activity or operation as permitted in this district, including but not limited to noise, odor, vibration, fumes, dust or glare.

RP Resource Protection District

This district is intended to preserve the environmentally significant areas of the County and to protect its natural resources in all areas. The district includes those areas of the County which pose constraints for development or where development could have a substantially adverse environmental effect. This district serves to maintain the environmental functionality of the landscape by avoiding or minimizing disturbance of sensitive areas which generally include tidal and nontidal wetlands, state-owned natural areas, selected riparian corridors, conservation areas, and muck and alluvial soils. Development potential within this district is severely limited; however, some minor development may be carried out, provided it is done in a manner sufficiently sensitive to the existing natural environment and visual character of the site.

4. LAND USE

Figure 4-2: Zoning



Source: Worcester County

4. LAND USE

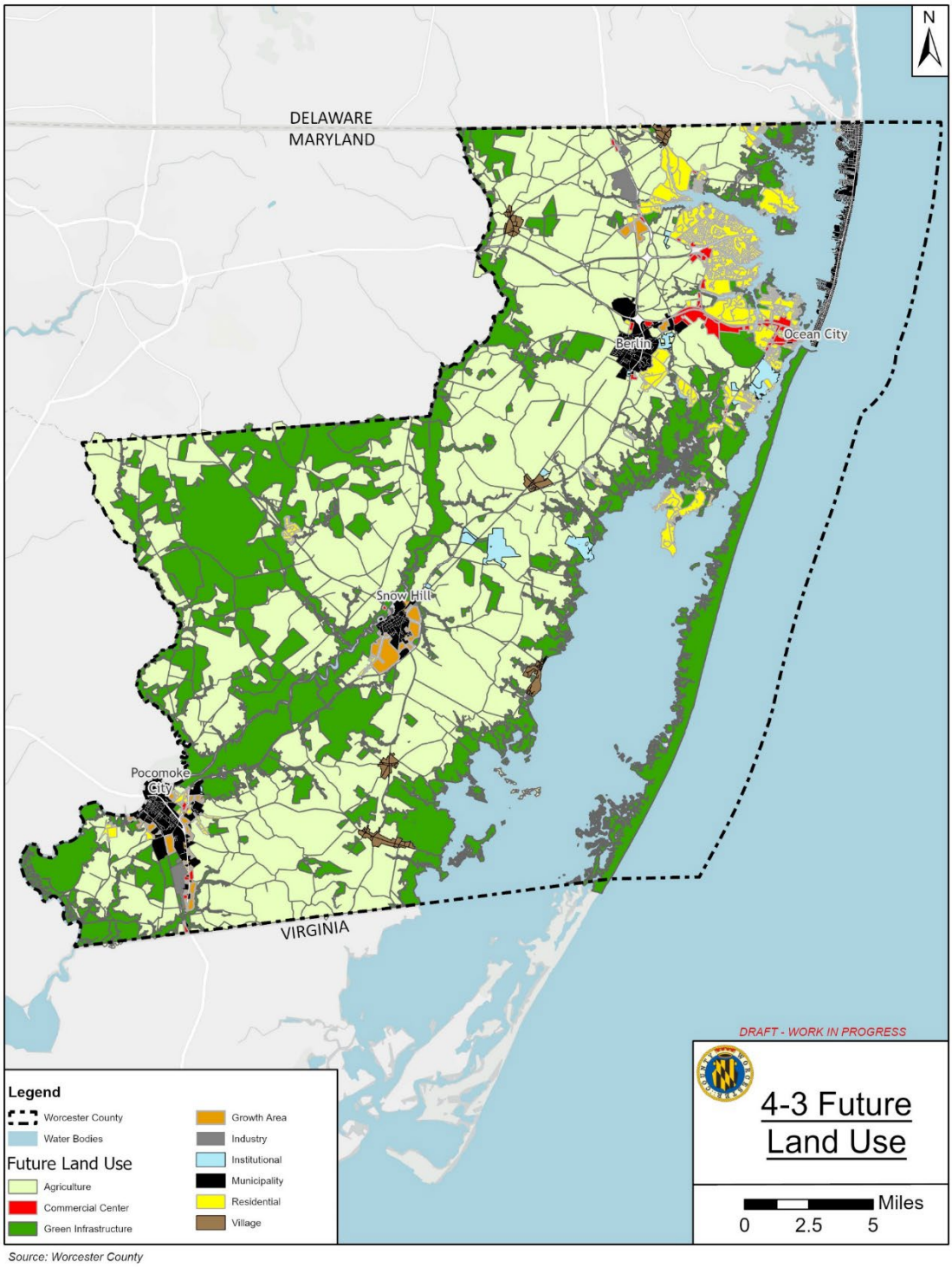
Future Land Use

Worcester County has developed a vision for future land use. Future land use information will serve as a roadmap to guide the development of the County. **Table 4-1** summarizes Worcester County's proposed Future Land Use by category. **Figure 4-3** shows the County's **Future Land Use** and **Figure 4-4** shows the areas of land use that changed from the existing.

The Future Land Use Map recognizes recent and proposed residential development in the County since the 2006 Comprehensive Plan and a limited buildout of additional parcels zoned for residential development. It is in keeping with the infrastructure constraints identified in the Water Resources Element and the goals and objectives of this Plan.

4. LAND USE

Figure 4-3: Future Land Use



Source: Worcester County

4. LAND USE

Development Capacity Analysis

To evaluate the future land use needs of the County and to define and refine the growth areas, a development capacity analysis was completed. The following sections describe this process, and the outputs, in detail. One important output generated from this analysis was the projected number of "Equivalent Dwelling Units" that resulted from this analysis and were used as an input in the Water Resources Element (see Chapter 11). The data tables for this analysis are included in **Appendix X**.

Overview

A development capacity analysis ("capacity analysis" or the analysis) is study conducted during the Comprehensive Plan process to provide a local government with insight into its development pipeline and what could eventually be developed in the jurisdiction. This analysis is generally based on the current and future land use categories designated in the Comprehensive Plan, the existing or proposed zoning districts, and the average development yields or lot creation parameters defined in the Zoning Ordinance that pertain to creation of new lots.

This analysis is primarily used to evaluate the growth capacity of the County based on current or future conditions; determine future demand for public water and sewer systems and other public facilities; identify if development caps or moratoriums are required to slow residential growth down so that public infrastructure can be expanded to accommodate the potential influx of residents; and to determine compliance with development constraints pertaining to generation of additional water quality pollutants of concerns (Total Maximum Daily Loads – part of the NPDES programs administered at the local level).

Methodology

The principal set of tools used for this analysis are Geographic Information Systems, or GIS. GIS is a suite of software and processes that enable the representation of land use, zoning, parcel ownership, and similar datasets on a two-dimensional computer screen. GIS enables planners to perform spatial analyses, or to solve problems and answer questions about facilities, properties and other elements that have a geographic component.

There are several principal datasets generally used in a capacity analysis: parcel boundaries and ownership data, existing land use, future land use, zoning boundaries, and a vacant land inventory are the most common datasets used.

To identify the specific data that are to be used for any capacity analysis, planners consider the geographic extent of the area to be examined and what GIS data is available at the level of detail required. Worcester County covers a large geographic area and typically a municipality of this size would rely primarily on Land Use data for the analysis.

In reviewing the Land Use data available at the time of this Plan Update, it was noted that, in addition to the standard areas denoted as agricultural, commercial, and high, medium and low density residential, there were specific areas that were identified as Growth Areas. Discussing these areas with County planners, it was determined that these Growth Areas were where the last Comprehensive Plan determined that development, of all types, would be targeted towards.

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These existing Growth Areas were reviewed by the County as well as the municipalities that bordered the Growth Areas to determine if any additional areas should be added, removed or modified. The planning team developed a web mapping application in conjunction with Worcester County that allowed stakeholders to view and explore each of these existing Growth Areas and to provide comments to us regarding any changes. A meeting was held with these stakeholders to delve into the comments and to identify any changes needed. Following this meeting, the Growth Areas were revised and resubmitted for review to ensure all requests had been addressed.

Setting these Growth Areas was an important step, as these boundaries defined the limits of the capacity analysis. Since the growth areas are significantly smaller than the County as a whole, the most precise method of analysis would require the use of existing Zoning data to complete the next step in the analysis. The County's most recent Zoning GIS dataset was used for this analysis.

Typically, a GIS analysis would begin with these datasets. However, a significant concern for Worcester County are the TMDL requirements that essentially set a threshold on the amount of water quality pollution permitted within each watershed. Because each new home or development has a measurable impact on water quality for the receiving water body, one other GIS layer was added to the GIS-based analysis. Watershed boundary data were extracted from Maryland's master watershed dataset (developed and hosted by the Maryland Department of the Environment) and integrated in Worcester's capacity analysis.

Using a processing model within GIS called 'Intersect,' the Growth Area boundaries were overlaid with the watershed data. The results of this process split the Growth Areas apart by the watershed boundaries, creating a Growth Area for each watershed.

The next step involved taking the Zoning District GIS layer and 'Intersect' the Zoning Districts with the previously created Growth Areas per watershed. The results of this process were integrated into a GIS layer showing a unique feature for each individual Zoning District, split apart by Growth Area Boundaries. The next GIS step incorporated the Parcel Boundaries layer and resulted in a single dataset that split all the areas apart by Growth Area, watershed, zoning district, and parcel. However, each individual layer's attributes, the information associated with that layers data about the location, were retained and transferred to the next composite layer. In this way, the GIS data generated in this process represented each discrete unit along with all attribute information from the original datasets.

Following this concatenation of datasets, the results were manually reviewed to make sure that only those parcels or features that have the capacity to be developed further were included in the analysis. This included vacant lands, lands in agricultural use, and parcels that are of a larger size with only a portion currently developed. All features that appeared to be developed to capacity were removed from the dataset for further analysis. The remaining features were then used for the last analysis step.

The next step involved exporting the datasets attribute table into an Excel workbook. All the individual records were summarized using Excel's Pivot Table function. Summary tables were then created that aggregated the amount of land in each Growth Area, by watershed and by Zoning District. The total aggregated amount of developable land area for each distinct category were then summarized in these Pivot Tables.

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The combined land area of each distinct category was used to provide the starting point for the actual capacity analysis. Each Zoning District includes a minimum lot size and the residential districts often include an anticipated development density, expressed in terms of dwelling units per acre. The summarized area values are input into a table that contains multiple formulas used to derive the number of dwelling units that could be created in each area.

Two methods are used for this analysis; the first uses the minimum lot size for rough calculations of the number of lots that could be created based on the summarized areas; the second uses the permitted residential density to determine the number of lots that could be created. However, before this step is performed, the total developable area is reduced by 30 percent to reflect site constraints that would prohibit disturbing sensitive areas within each feature.

The 30 percent value is based on previous Maryland Department of Planning capacity analysis models and validated by visual review of the areas within the study boundaries. After this reduction, the number of potential lots that could be created using the remaining land area and factoring in the minimum lot sizes for each zoning district was determined. This process was repeated for each zoning district and the results reflect the development standards of each district.

Because minimum lot size constraints only provide one data point to establish a build-out analysis, the development density controls established for residential parcels was used and integrated into the model. This results in two potential numbers for development capacity.

To calculate a total number of dwelling units, and to minimize the potential for variation between lot size and density and reality, the lot size projection was averaged with the density projection. Taking this average, another 30 percent reduction was applied to the number of possible dwelling units to reflect the impact of developer's findings that not all land within the total acreage of a parcel can be developed with housing units.

The lands required for roads, stormwater management, forest retention, and utility infrastructure are generally projected to be about 30 percent. This final value represents the number of potential dwelling units that can be created within our target study area. On the tables in Appendix X, the column labeled EDUs displays that final approximate number of new dwellings.

However, this approach does not quite work to estimate non-residential lands capacity. For other zoning districts that are not typically used for residential structures, non-residentially zoned lands use a slightly different approach to allow us to arrive at a comparable metric of the number of Equivalent Dwelling Units (EDUs).

EDUs are a method that can be used to convert non-residential areas to dwelling units. The conversion relies on data the planning team has gathered over the past decade or more and primarily stems from comparing residential and commercial water demand and comparing it to lot coverage restrictions in the Zoning Code and a wide range of commercial and industrial land uses. While this ratio has been generated from locations across Maryland and across multiple municipalities, it has been found to be relatively accurate for the purpose of developing buildout analyses. Our current average number of EDUs per acre of land cover is 19 units per acre of land cover.

For non-residential land uses or zoning districts, we run through similar models as detailed above. However, instead of calculating units based on lot size or density, we take the aggregate land area and apply restrictions on the amount of land cover for each zoning district. This results in the total amount of land that can be covered by structures, parking areas, or impervious surfaces in general. This area is then converted to ERU's using the ratio described above and finally results in an estimated number of ERU's for the total area.

As a last step, the ERU's are added to the EDU's, each multiplied by Worcester County's current Census-based number of people per household to arrive at the number of people that can be supported by the existing developable capacity of lands zoned and approved for future growth. It is this population value, and the number of households, that are compared to future population growth and demand, as well as to the availability of water and sewer infrastructure, school capacity, road service, and much more.

Application to Worcester County

While the review of the Growth Areas and much of the discussion surrounding their development and medication was addressed by local municipalities, the capacity analysis output provided below summarizes the analysis across the entire County. The detailed tables calculating each Growth Area's acreage and results can be found in **Appendix X** along with maps displaying the location of each Growth Area and watershed boundary.

For all Growth Areas combined, across all watersheds, we estimate that 7,343 dwelling units can be built based on the assumptions detailed above and in **Appendix X.** Of these units, 5,286 are located within non-residentially zoned lands and the remaining 2,057 units are located within residentially zoned lands.