

# Appendix 1:

## *Plan Implementation and Streamlining Element*





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## Section 1.0 Implementation & Streamlining

The goals, objectives and recommendations from each of the Plan Element sections provide the basis for implementation and streamlining. This section contains actions consisting of strategies, projects, programs and services identified for implementation to realize plan goals, objectives and recommendations.

The following is a listing of lead agency and implementation partners with abbreviations. Abbreviations are used in the implementation matrix in the Lead Agency & Implementation Partners column.

### Queen Anne's County Departments & Agencies

AO – QAC Administrator's Office  
AB – QAC Agricultural Board  
BOE – QAC Board of Education  
DA – Department of Aging  
DF – Department of Finance  
DPW – QAC Department of Public Works  
EDAT – QAC Department of Economic Development,  
Agriculture and Tourism  
EDC- Economic Development Commission  
ENVHD – QAC Environmental Health Department  
(State Agency)  
HA – QAC Housing Authority  
HCS – QAC Department of Housing and Community Services  
KNDF – Kent Narrow Development Foundations  
LGE – QAC Department of Land Use, Growth Management  
& Environment  
CEP – Community and Environmental Planning  
LUZ – Land Use and Zoning  
P&R – QAC Department of Parks and Recreation  
SCD – QAC Soil Conservation District

### Regional Agencies

CCNSBA – Chesapeake Country National Scenic Byway  
Alliance  
COG – Council of Governments (Towns)

R50C – Route 50 Corridor Committee  
USRC – Upper Shore Regional Council

### State Agencies

CAC – Critical Area Commission  
MDP – Maryland Department of Planning  
MDE – Maryland Department of the Environment  
MDOT – Maryland Department of Transportation  
MDTA – Maryland Transportation Authority  
MHT – Maryland Historical Trust  
SHA – Maryland State Highway Administration

- Maryland Scenic Byways, Office of Environmental Design
- Regional & Intermodal Planning Division
- Community/Highway Design Division

### Recommended Queen Anne's County Boards

HCSAB – Historic and Cultural Sustainability Advisory Board

### Other References

CWSP – Comprehensive Water & Sewerage Plan  
LESA – Land Evaluation Site Assessment

## Section 1.1 Implementation Matrix

The following Implementation Matrix is organized to correspond in color and section number with Plan Elements. Lead agency or agencies are highlighted in yellow.

Orange	Section 1.0 Land Use Element
Blue	Section 2.0 Sensitive Areas, Water Resources and Mineral Recovery Element
Green	Section 3.0 Priority Preservation Area Element
Brown	Section 4.0 Historic & Cultural Preservation Element
Rose	Section 5.0 County/Town Planning Framework Element
Purple	Section 6.0 Economic Development & Tourism Element
Turquoise	Section 7.0 Workforce Housing Element
Grey	Section 8.0 Community Facilities & Transportation Element



## Goal, Objectives & Recommendations – 1.0 Land Use

### Goal 1: Growth Management, Regulations, Design/Land Use

Objective 1: Review current site design standards to further promote environmental protection, landscaping and aesthetics as well as seeking to preserve scenic beauty, vistas, viewsapes, and un-fragmented forestland and farmland through compact residential design.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1.Continue to promote “scenic byways” with consideration of land use and design tools to ensure the corridors retain their beauty and scenic characteristics (potentially US 301 and MD 544, currently MD 213 and MD 18 are Scenic Byways) and continue to participate in the State’s Scenic Byways Program.	1.1 Implement existing Chesapeake Country Scenic Byway Corridor Management Plan.	EDAT, LGE, SHA	Y
2.Establish design standards that will preserve vistas, viewsapes, and un-fragmented farmland that include: a. Screening; b. Setbacks; c. Sign guidelines to preserve scenic appearance of the corridor; d. Enhanced buffer yard requirements along major transportation corridors; e. Contiguous clustered lots and provide for efficient road and lot design; f. Open space required by subdivisions to remain viable for agricultural practices.	2.1 Create a Corridor Overlay Zoning District and relevant standards and guidelines. 2.2 Amend Chapter 18 to implement the cluster subdivision recommendation.	CEP	N
3. Create a Route 50 Corridor Plan that considers buffer, signage and architectural standards.	3.1 Seek State and federal funding to prepare a Route 50 Corridor Plan, develop and implement.	CEP, DPW, MSHA, R50C	N
4. Develop Eastern Shore vernacular design standards for highway/retail commercial. Identify vernacular and create pattern book.	4.1 Establish a working committee to collaborate with County staff to conduct research to support development of a pattern book.	CEP, HCSAB	N
5. Utilize innovative stormwater management techniques that incorporate Environmental Site Design (ESD).	5.1 Apply the County’s new Environmental Site Design (ESD) standards.	DPW, LGE, MDE, SCD	N
6. Develop conservation-by-design standards consistent with public safety standards.	6.1 Review and modify site design and environmental standards for cluster development.	LGE, DPW, ENVHD	N





## Goal, Objectives & Recommendations – 1.0 Land Use

### Goal 1: Growth Management, Regulations, Design/Land Use

**Objective 1: Review current site design standards to further promote environmental protection, landscaping and aesthetics as well as seeking to preserve scenic beauty, vistas, viewsapes, and un-fragmented forestland and farmland through compact residential design.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
7. Discourage residential development along major transportation corridors. a. Noise is inappropriate for residents. b. Traffic congestion is greater.	7.1 Consider Corridor Overlay Districts to establish appropriate setbacks, buffers and access management standards for major transportation corridors. Use noise standards for residential neighborhoods to determine appropriate setbacks and buffers.	LGE	N
8. Review interrelation of forest protection, forest mitigation and landscape requirements to improve residential and non-residential site design.	8.1 Conduct necessary research, studies and analysis. 8.2 Develop appropriate standards and regulations.	LGE	N
<b>Objective 2: Allow growth in existing Planning Areas and provide for designation of new Planning Area(s) for purposes of preserving equity in farmland, decreasing the potential number of new units in the AG and CS districts, and developing environmental and site design standards.</b>			
1. Promote planned neighborhood development as a village that results in reduced environmental impacts.	1.1 Review and modify existing zoning districts to consider new design standards and requirements as appropriate for planned neighborhood developments.	CEP	N



## Goal, Objectives & Recommendations – 1.0 Land Use

Goal 1: Growth Management, Regulations, Design/Land Use

Objective 2: Allow growth in existing Planning Areas and provide for designation of new Planning Area(s) for purposes of preserving equity in farmland, decreasing the potential number of new units in the AG and CS districts, and developing environmental and site design standards.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
<p>2. The following items a, b, c and d shall be considered holistically. Existing zoning and other laws remain in place before any changes are made to land use or code while a new Transfer of Development Rights (TDR) program is planned, approved, and implemented, and functional receiving areas are established.</p> <p>a. Designate new County Planning Area(s) or other Planning Area around existing towns with the following characteristics:</p> <p>i. Development in New Planning Area(s) shall require the purchase of TDRs or Noncontiguous Development Rights (NCDs);</p> <p>ii. New Planning Area(s) shall be planned, in coordination with recommendations already approved, in terms of size and the number of TDR's required for different types of residences, to have the capacity to absorb the TDRs or NCDs confirmed for Agricultural (AG) and Countryside (CS) zoned properties not including rights that may be transferred using other means such as Maryland Agricultural Land Preservation Foundation (MALPF), Rural Legacy, Purchase of Development Rights (PDR), etc.;</p> <p>iii. New Planning Area(s) shall be planned to respect greenbelt and open space commitments of towns, while appropriately linked to towns to give New Planning Area(s) residents access to businesses, schools and public services;</p> <p>iv. New Planning Area(s) shall be planned to respect scenic vista setbacks from highways and shall require community designs consistent with the rural, small town character of the Eastern Shore; and</p>	<p>2.1 Create an enhanced TDR program and adopt.</p> <p>2.2 Establish Joint Planning Agreements.</p> <p>2.3 Provide technical assistance to Towns to establish Adequate Public Facilities Ordinances.</p> <p>2.4 Through mutual agreement coordinate Municipal Growth Elements (MGE) through face-to-face meetings between the County and Towns and continued coordination of planning and implementation between County and Towns with establishing appropriate density standards for newly up-zoned lands through annexation and establishment of greenbelts as well as coordination of resources to provide adequate public facilities as well as establishing the Towns as receiving areas.</p> <p>2.5 Develop an enhanced TDR program limiting TDRs to PFAs for purpose of protection of Agricultural lands.</p> <p>2.6 Identify and design new Planning Areas.</p>	CEP, AB, COG, EDAT	N
	Refer to Goal 1, Objective 1, Recommendations 1, 2 & 3.	COG, LGE and MSHA	N



## Goal, Objectives & Recommendations – 1.0 Land Use

**Goal 1: Growth Management, Regulations, Design/Land Use**

**Objective 2: Allow growth in existing Planning Areas and provide for the designated new Planning Area(s) for purposes of preserving equity in farmland, decreasing the potential number of new units in the AG and CS districts, and developing environmental and site design standards.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
v. Conduct a cost/benefit analysis which considers shared government financing options for the necessary infrastructure including water, sewer, roads and schools.	v.1 Conduct Shared Financing Study. v.2 Expand infrastructure where appropriate to support the establishment of employment centers and to address health and safety issues.	DPW, AO, CEP, COG, DPW	Y/N
b. Confirm TDRs, PDRs and NCDs on the basis of 1 dwelling unit per 8 acres for all Agricultural (AG) and all Countryside (CS) zoned land not in Critical Area.	b.1 Downzone CS from 1/5 acres to 1/8 acres so that zoning densities in the CS Zoning District are consistent with the current AG zoning cluster density.	CEP, EDAT	N
c. Review the need to eliminate the ability to transfer NCDs in the Agricultural (AG) and Countryside (CS) zoning districts.	c.1 Conduct analysis of benefits and develop incentives for TDRs to Planning Areas and Municipal Growth Areas.	CEP, EDAT	N
d. The total number of units eligible for development in the AG and CS zoning districts shall not exceed the number of units that otherwise could be developed as minor subdivisions using a density calculation of 1 dwelling per 20 acres. Major subdivisions may be permitted in the AG and CS districts, only if the development rights in excess of minor subdivision limits are transferred from those otherwise eligible for minor subdivisions.	d.1 Use this parameter as part of the downzoning of AG and CS districts.	CEP, EDAT	N
3.To promote the prompt implementation of these recommendations, the Planning Commission commits itself to recommend the adoption of a new TDR Program within eighteen months of the date of the adoption of this Plan.	Refer to Goal 1, Objective 2. 3.1 Implement immediately.		
<b>Objective 3: Support family farming by continuing to implement the zoning tools for lot line adjustments and sliding scale subdivision.</b>			
1.Continue to allow sliding scale subdivisions at the current allowed density of 1 lot per 100 acres or part thereof.	1.1 Continue current policy.	LGE	N
2.Continue to allow administrative subdivisions that permit adjusting lot lines that do not create new lots.	2.1 Continue current policy.	LGE	N



## Goal, Objectives & Recommendations – 1.0 Land Use

### Goal 1: Growth Management, Regulations, Design/Land Use

#### Objective 4: Seek to protect Critical Areas.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1.Do not allow classification changes in Critical Areas except for: a. designated Planning Areas; b.a public service need is demonstrated; c. existing and future institutional uses; or d.where there is no net increase in intensity.	1.1 Amend Chapter 14. 1.2 Encourage reuse of vacant and abandoned properties within Critical Areas.	CEP	N
2.Establish shoreline buffers on Critical Area parcels in accordance with State legislation and requirements.	2.1 Amend Chapter 14.	CEP	N
3.Within the Agricultural (AG) and Countryside (CS) zoning districts, no new development within the 300 foot shoreline buffer is permitted, except where grandfathered by provisions in Chapter 14, or unless a hardship is demonstrated.	3.1 Amend Chapter 14.	CEP	N
4.When Critical Area Transfer of Development Rights (TDRs) is used, both sending and receiving parcels must provide established buffer areas consistent with adopted State regulation.	4.1 Amend Chapter 14.	CEP	N
5.No growth allocation granted, outside of designated Planning Areas, to create Intensely Developed Areas (IDA), except for institutional and public service uses.	5.1 Amend Chapter 14.	CEP	N
<b>Objective 5: Promote energy efficient buildings.</b>			
1.Consider State and National standards for constructing green buildings when promulgated.	1.1 Apply state and national standards as appropriate for the County.	LUZ	N
2.Consider the application of Leadership in Energy and Environmental Design (LEED®) standards or other innovative energy saving technologies for public and commercial buildings.	2.1 Integrate design standards within current County Codes.	LUZ	N



## Goal, Objectives & Recommendations – 1.0 Land Use

### Goal 1: Growth Management, Regulations, Design/Land Use

#### Objective 6: Improve design standards to include innovative energy and environmentally sustainable elements.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1.Explore and research sustainable and resource conservation codes to identify opportunities appropriate for use in Queen Anne’s County.	1.1 Establish in-house working committee to research and develop sustainable and resource conservation codes.	LGE, DPW	N
2.Create a vision of desirable types of innovative energy and environmentally sustainable developments.	2.1 Prepare concept diagrams for sustainable development patterns to demonstrate application of regulation and innovative energy and environmentally sustainable solutions.	LGE, DPW	N
3.Consider increased density rewards for innovative and environmentally sustainable residential and commercial developments.	3.1 Amend Chapter 18 and 14.	CEP, DPW	N
<b>Objective 7: Explore the prospect of creating a pilot project using a shared wastewater system to achieve better rural design as well as concentrated development in any new Planning Areas.</b>			
1.Any such pilot project would need to be a public utility operated by a government entity.	1. Conduct necessary studies and investigations for using shared facilities. Identify pilot project areas working collaboratively with the property owners and/or developers. 2. Adopt appropriate regulations for shared facilities.	DPW, ENVHD, LGE	Y/N
2.A shared facility ordinance may be required.			





## Goal, Objectives & Recommendations – 1.0 Land Use

### Goal 1: Growth Management, Regulations, Design/Land Use

#### Objective 8: Proactively manage growth that reflects the County's vision and adequately provides for thoughtful growth.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1.Zoning densities in the Countryside (CS) zoning district be made consistent with the current Agricultural (AG) zoning cluster density. Downzone Countryside (CS) from 1 dwelling unit per 5 acres to 1 dwelling unit per 8 acres for cluster subdivision techniques.	1.1 Refer to Goal, Objective 2, Recommendation 2(b).	CEP, EDAT	N
2.Focus on attracting businesses that have the least impact on the environment.	2.1 Establish incentives for low-impact businesses. 2.2 Review regulations to ensure minimal environmental impacts.	EDAT, LGE	N
3.Seek to increase facilities and residential opportunities for low income, seasonal workers and the elderly.	3.1 Develop partnerships to promote housing for all types for all incomes and households. 3.2 Establish development incentives to provide these housing opportunities. 3.3 Strengthen the County's Housing Programs through funding, partnering and implementation.	HCS, CEP, HA	N
4.Be a conscientious steward of land and waterways as well as natural assets through a variety of protection measures.	4.1 Continue to enforce current policies and to strengthen and enforce those policies through County Codes. 4.2 Provide public education on the importance of stewardship and measures individual property owners can take above and beyond regulations.	CEP, CAC, DPW, MDE, SCD	N



## Goal, Objectives & Recommendations – 1.0 Land Use

### Goal 1: Growth Management, Regulations, Design/Land Use

#### Objective 9: Ensure that sufficient commercially zoned lands exist and those lands are appropriately located and provided with infrastructure.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
<p>1. Create a database of commercially developable land that accounts for sewer or septic limitations and availability, non-tidal and tidal wetlands, environmental buffers, and other limitations so that the County has an inventory of commercially developable land.</p> <p>a. Maintain an inventory of existing commercial and residential space as a means to encourage infill development and revitalization where there is existing infrastructure.</p> <p>b. The database should include a map of the undeveloped commercial land contiguous to the US 50 corridor from Kent Island to the US 50/301 split.</p> <p>c. The database should not include tax exempt properties such as churches, governmental buildings, and schools.</p>	<p>1.1 Create and maintain the database.</p> <p>1.2 Map commercially developable land.</p> <p>1.3 Develop a marketing strategy including incentives for the adaptive reuse of vacant spaces, infill development and development of target properties.</p>	EDAT, LGE	N
2. Expand the provision of infrastructure to support the establishment of employment centers.	<p>2.1 Identify necessary infrastructure in coordination with studies identified below.</p> <p>2.2 Identify funding sources.</p>	EDAT, DPW, CEP, COG	Y
3. Promote the development of Business Parks and Commercial Centers at key locations that support sustainable smart growth.	3.1 Conduct Market Studies, Environmental Impact Assessments and/or Infrastructure Assessments that identify optimum locations, mitigation measures, design standards and infrastructure investments.	EDAT, DPW, LGE	N
4. Encourage commercial zoning around towns and established Planning Areas.	Refer to Goal 1, Objective 2, Recommendation 2.	CEP, COG	N



## Goal, Objectives & Recommendations – 1.0 Land Use

### Goal 1: Growth Management, Regulations, Design/Land Use

#### Objective 10: As part of the refining of the Transfer of Development Rights (TDR) Program consider how TDRs are utilized in non-residential projects.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1.Consider the use of TDRs for increases in building height in non-residential projects.	1. Create and adopt TDR standards. 2. Amend Chapter 18.	CEP	N
2.Consider modifications to the TDR Program for floor area and impervious coverage in non-residential projects.			
Objective 11: Incorporate economic centers as part of the development pattern to support Planning Areas.			
1. Designation of new Planning Areas should include analysis of siting new economic centers that support sustainable smart growth.	Refer to Goal 1, Objective 2, Recommendations 2(a)(iii) and (v). Refer to Goal 1, Objective 9, Recommendations 2, 3 and 4.		
Objective 12: Seek to preserve unique community identities.			
1.Encourage infill development compatible with existing historic architecture that contributes to maintaining community identity.	1.1 Establish architectural standards and site design standards consistent with the character of traditional neighborhoods. 1.2 Consider preservation and sustainable tools to establish appropriate community infill development standards.	CEP, HCSAB	N
2.Consider a variety of land-use tools that promote preservation of historic sites and structures.	2.1 Explore tools and techniques for historic preservation.	CEP, HCSAB	N



## Goal, Objectives & Recommendations – 1.0 Land Use

### Goal 1: Growth Management, Regulations, Design/Land Use

#### Objective 13: Support the establishment of greenbelts to define the boundary of Planning Areas and in coordination with Towns, as appropriate.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Promote the designation of greenbelts as part of the County's Priority Preservation Area (PPA). (Refer to Section 3.0, Priority Preservation Area Element, of this Plan).	<p>Refer to Goal 1, Objective 2, Recommendation 2.</p> <p>1.1 Identify priority lands for preservation based upon LESA criteria and additional PPA criteria to determine lands to be identified as greenbelts.</p> <p>1.2 Utilize various preservation tools, techniques and incentives to permanently preserve areas identified as greenbelts.</p>	EDAT, CEP, COG	Y
<b>Objective 14: Understand the fiscal consequences of implementing the Comprehensive Plan.</b>			
1. Analyze the cost of achieving the goals and recommendations of this plan and the revenues it will produce.	<p>1.1 Conduct necessary study and analysis.</p> <p>1.2 Evaluate results of analysis to support modification and/or development of appropriate policies and regulations.</p>	AO, LGE	N



## Goal, Objectives & Recommendations – 2.0 Sensitive Areas

**Goal 1: Resource Protection, Conservation and Preservation Strategies that Promote High Water Quality and Protect Aquatic Life with Emphasis on Critical Areas.**

**Objective 1: Seek to implement watershed based planning to comply with nutrient Total Maximum Daily Loads (TMDLs) of receiving waterways as identified by the State.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Develop and implement strategies to reduce pollutant loads on a watershed by watershed basis in accordance with the nutrient TMDLs.	1.1 Seek funding for development of watershed management plans and watershed-based planning, management and regulation. 1.2 Implement policies and strategies to improve water quality with the goal of removing impaired waterways from the State's list. 1.3 Continue to enforce pump-out of on-site septic systems at least once every five years (Ordinance 08-09).	DPW, CEP, MDE	Y
2. Consider innovative nutrient reduction technologies for septic systems.	2.1 Research innovative cost effective technologies.	ENVHD, CEP, DPW	N
3. Reduce the impacts of impervious surfaces through Environmental Site Design (ESD).	3.1 Apply the County's new Environmental Site Design (ESD) standards.	DPW	N
4. Collaborate closely with Kent, Caroline and Talbot Counties with whom we share watershed boundaries.	4.1 Continue to participate in regional organizations to discuss and coordinate studies, planning and implementing mechanisms to protect water resources.	CEP, USRC and Surrounding Counties	N
<b>Objective 2: Promote and facilitate the protection of Sensitive Areas.</b>			
1. Support State programs for the protection of wetlands.	1.1 Continue to seek training and understanding of state programs and applicability to the County. 1.2 Target preservation through Queen Anne's County Land Preservation Foundation (QLPF).	DPW, EDAT, LGE,	N
2. Continue to implement the County's wetland and stream buffer protection ordinances.	2.2 Provide public outreach and education of ordinances as well as consistent enforcement.	LGE, DPW	N





Goal, Objectives & Recommendations – 2.0 Sensitive Areas			
Goal 1: Resource Protection, Conservation and Preservation Strategies that Promote High Water Quality and Protect Aquatic Life with Emphasis on Critical Areas.			
Objective 3: Seek to protect Critical Areas.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Do not allow classification changes in Critical Areas except for: <ul style="list-style-type: none"> <li>a. designated Planning Areas;</li> <li>b. a public service need is demonstrated;</li> <li>c. existing and future institutional uses; or</li> <li>d. where there is no net increase in intensity.</li> </ul>	Refer to 1.0 Land Use – Goal 1, Objective 4, Recommendation 1,		
2. Establish shoreline buffers on Critical Area parcels in accordance with State legislation and requirements.	Refer to 1.0 Land Use – Goal 1, Objective 4, Recommendations 2, 3, 4 & 5.		
3. Within the Agricultural (AG) and Countryside (CS) zoning districts, no new development within the 300 foot shoreline buffer is permitted, except where grandfathered by provisions in Chapter 14, or unless a hardship is demonstrated.			
4. When Critical Area Transfer of Development Rights (TDRs) is used, both sending and receiving parcels must provide established buffer areas consistent with adopted State regulation.			
5. No growth allocation granted, outside of designated Planning Areas, to create Intensely Developed Areas (IDA), except for institutional and public service uses.			
Goal 2: Conservation, Preservation and Regulation Strategies to Include Environmental Protection and Resource Conservation Measures.			
Objective 1: Develop steps to improve water quality in order to be removed from the State's impaired waterway list.			
1. Promote agricultural “best management practices” and in residential communities incorporate Environmental Site Design (ESD).	1.1 Promote agricultural best management practices. 1.2 Implement County’s ESD regulations with emphasis on non-structural practices for stormwater management plans. 1.3 Continue to educate both agricultural community and residential community how to minimize environmental impacts.	LGE, DPW, EDAT	N



Goal, Objectives & Recommendations – 2.0 Sensitive Areas			
Goal 2: Conservation, Preservation and Regulation Strategies to Include Environmental Protection and Resource Conservation Measures.			
Objective 1: Develop steps to improve water quality in order to be removed from the State's impaired waterway list.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
2. Manage the County's water resources in accordance with the County's Comprehensive Water and Sewerage Plan.	2.1 Continue to assess existing public water and sewerage facilities and future needs for expansion and upgrade of such facilities. 2.2 Continue to coordinate the update of the CWSP with the Comprehensive Plan and the expansion of existing Planning Areas or establishment of new Planning Areas. 2.3 Coordinate provision of public facilities with growth.	DPW, COG, LGE, Development Community	Y
3. Encourage water conservation practices.	3.1 Provide public education materials and information outlining water conservation.	CEP, DPW	N
4. Promote innovative and environmentally sustainable development to protect water resources in order to meet future demands.	4.1 Continue to update County's standards to include innovative procedures, solutions and designs.	LGE, DPW	Y
5. Seek grant opportunities for stormwater management retrofits.	5.1 Conduct an assessment to identify priority projects. 5.2 Seek grant funds for priority projects through appropriate grant programs. 5.3 Coordinate other priority infrastructure improvement projects with these projects (i.e. roadway improvements, water and sewer expansions and upgrades, etc.).	DPW, LGE, MDE	Y/N



Goal, Objectives & Recommendations – 2.0 Sensitive Areas			
Goal 2: Conservation, Preservation and Regulation Strategies to Include Environmental Protection and Resource Conservation Measures.			
Objective 1: Develop steps to improve water quality in order to be removed from the State's impaired waterway list.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
6. Encourage the development of watershed management plans.	6.1 Seek grant funding to perform watershed management plans.	DPW, CEP	Y/N
7. Track impervious surface percentage on a watershed basis.	7.1 Maintain and update County impervious surface GIS coverage. 7.2 Conduct an annual assessment by watershed. 7.3 Utilize analysis to assist with development reviews and application of ESD standards.	LGE	N
8. Further limit fertilizer use on residential properties.	8.1 Continue to enforce Ordinance 08-10 for Critical Area Buffer. 8.2 Consider other opportunities to reduce nutrients.	LGE	N
Goal 2: Conservation, Preservation and Regulation Strategies to Include Environmental Protection and Resource Conservation Measures.			
Objective 2: Protect Sensitive Areas.			
1. Continue to implement County resource protection standards, ordinances and regulations pertaining to floodplains, steep slopes, streams and stream buffers, shore buffers, wetlands, erosion hazard areas, woodlands, and habitats of threatened and endangered species.	1.1 Continue current policies.	LGE, CAC, DNR, DPW, MDE	N
2. Evaluate the need to increase the size and effectiveness of buffers.	2.1 Utilize State research and findings with respect to benefits and effectiveness of buffers to determine appropriate size. • Utilize local characteristics and data of feature to determine appropriate buffer size.	LGE, CAC, DNR	N
3. To accommodate storm surges, rising sea level, and climate change, prevent development in mapped flood zones for category 3 storms and evaluate the appropriateness to go beyond the FEMA requirements and consider further restrictions based upon projected sea level rise.	3.1 Consider relevant State and national studies and standards. 3.2 Conduct necessary analysis to determine requirements.	LGE, CAC, DNR, DPW, MDE	N



## Goal, Objectives & Recommendations – 2.0 Sensitive Areas

Goal 2: Conservation, Preservation and Regulation Strategies to Include Environmental Protection and Resource Conservation Measures.

Objective 2: Protect Sensitive Areas.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
4. Implement aggressive efforts to reduce sediment, nutrient and pollution delivery to flowing streams and the Chesapeake Bay by employing Environmental Site Design (ESD) techniques.	4.1 Implement County's ESD regulations.	DPW, LGE	N

## Goal, Objectives & Recommendations – 2.0 Sensitive Areas – Mineral Resource Recovery

Goal 1: Undeveloped Lands where Mineral Resources are Found Remain Available for Recovery Activities Accompanied with Appropriate Reclamation Plans.

Objective 1: Promote mineral resource recovery practices that seek to minimize adverse effects on the environment and that the associated reclamation plans are compatible with adjoining land uses.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Identify mineral resource recovery practices and standards that could be appropriate to enhance current regulation of mineral resource recovery with the intent to minimize environmental impacts.	1.1 Research and develop mineral resource recovery practices and standards to enhance current regulations, minimize environmental impacts, and requirements for reclamation plans to be compatible with adjoining land uses.	LGE, EPA, MDE	N



## Goal, Objectives & Recommendations – 3.0 Priority Preservation

### Goal 1: Agricultural Land Preservation

Objective 1: Establish reliable resources for agricultural land preservation and gain significant local support in conjunction with State agricultural land preservation decisions.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Support preservation of large contiguous blocks of land, such as 1,000 acres, with guidelines and agreements with participating landowners using a variety of preservation programs as incentives for permanent preservation.	1.1 Continue to implement Priority Preservation Area strategies and preservation programs. <ul style="list-style-type: none"> <li>Programs include: MALPF, MET, TDRs and PDRs</li> </ul> 1.2 Implement the rural land preservation strategy outlined in Section 3.0.	EDAT, LGE	N
2. Promote the acceptance of farms that apply for Maryland Agricultural Land Preservation Foundation (MALPF) into the Program.	2.2 Match MALPF funds from the agricultural transfer tax. 2.3 Aggressively apply for preservation funding.	DF, EDAT	N
3. Continue to utilize Federal, State and Local funding sources to support agricultural land preservation.	3.1 Maintain MALPF Certification and other State program requirements to receive State preservation resources.	EDAT, CEP	N
4. Identify tools and techniques to purchase development rights, such as: private mortgage, bonds, leases, conservation easements, Purchase of Development Rights Program (PDR) and tax incentives.	1. Conduct necessary research and analysis to determine feasibility of tools and techniques.	EDAT, LGE	N
5. Enhance the Purchase of Development Rights (PDR) program through consideration of use of County bonding authority and/or the use of other funding mechanisms.	2. Continue PDR program with dedicated funding from the recordation tax.		
	3. Continue tax credits for MALPF properties.		





## Goal, Objectives & Recommendations – 3.0 Priority Preservation

### Goal 1: Agricultural Land Preservation

#### Objective 2: Establish Priority Preservation Areas that target appropriate areas of the County's agricultural lands.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Establish agricultural PPA land that meets the minimum State requirements to ensure that the County continues to be eligible for State preservation funding.	1.1 Continue to apply the LESA criteria for the preservation of lands within area shown on Map ESA-10 Priority Preservation Area.	EDAT, CEP	N
2. Create additional ranking criteria to be used with the Land Evaluation Site Assessment (LESA) process for the MALPF program ranking and create additional tools for priority ranking criteria for preservation of land in the PPA.	2.1 In addition to lands that are either prime agricultural soils or forested, additional points can be gained if lands fall within: <ul style="list-style-type: none"> <li>• Sensitive Areas and Targeted Ecological Areas and Tier II High Quality Watersheds (refer to Maps ESA 3 and 6).</li> <li>• Contiguous to existing preserved lands.</li> <li>• Proximity to Rural Legacy Areas.</li> </ul>	EDAT	N
3. Establish an “opt out” provision for properties located in the PPA area.	3.1 Create a procedure for “opt out” by property owners located within PPA.	CEP, EDAT	N
4. Also included is Land Use Goal, 1, Objective 2, Recommendation 1 and 2 on page 1-27.	Refer to 1.0 Land Use – Goal 1, Objective 2, Recommendations 1 and 2.		



## Goal, Objectives & Recommendations – 3.0 Priority Preservation

### Goal 1: Agricultural Land Preservation

#### Objective 3: Protect and preserve agricultural land and deed-restricted open space.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Protect agricultural land through zoning regulations.	1.1 Achieve preservation of 85% deed-restricted open space when using cluster development techniques. 1.2 Protect agricultural land through zoning regulations that do not permit residential density greater than 1 dwelling per 20 acres.	CEP, EDAT	N
2. Establish the undeveloped Agricultural (AG) and Countryside (CS) zoned lands that have potential for preservation as Priority Preservation Areas.	2.1 Implement zoning regulations that support the preservation of lands identified as a PPA on Map ESA-10. 2.2 Use County's GIS mapping and LESA scoring to determine priority lands.	CEP, EDAT	N
3. Seek to coordinate with municipalities to accept growth by encouraging adequate infrastructure and/or plans to expand infrastructure.	Refer to 1.0 Land Use – Goal 1, Objective 2, Recommendation 2(a)(v).		
4. Identify and implement environmental management practices for all categories of land use.	Refer to 2.0 Sensitive Areas – Goal 2, Objective 1, Recommendations 1 & 4.		



## Goal, Objectives & Recommendations – 3.0 Priority Preservation

**Goal 2: Resource Conservation/Preservation and Environmental Protection through Sustainable Smart Growth Management Policies**

**Objective 1: Continue to achieve the preservation of 85% deed-restricted open space when using cluster development techniques on agricultural lands.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Evaluate current zoning regulations or similar regulations that support preservation.	Refer to Goal 1, Objective 3, Recommendation 1. 2.1 Continue techniques that provide preservation without any public funding through creation of deed-restricted open space.	LGE, EDAT	N
2. Evaluate current preservation tools and techniques, such as Non-Contiguous Development, PDR, and TDR and other tools to achieve the preservation goals.			
3. Identify potential tools and techniques for a Pilot Project using shared septic systems to achieve better rural design and concentrated development to reduce environmental impacts.	Refer to 1.0 Land Use – Goal 1, Objective 7, Recommendations 1 & 2.	CEP, DPW	Y
<b>Objective 2: Encourage Sustainable Smart Growth Management approaches.</b>			
1. Allow for sufficient growth and provide incentives for growth within Planning Areas, and Municipalities.	1.1 Modify infill development standards to achieve desired minimum densities. 1.2 Provide incentives for infill development and adaptive reuse of vacant and underutilized sites. 1.3 Plan and fund infrastructure to support growth identified in Municipal Growth Elements (MGEs) and County Planning Areas.	CEP, COG, EDAT, DPW	Y
2. Consider the expansion of existing Planning Areas and/or establishing new Planning Areas as receiving areas for Transfer of Development Rights (TDRs). a. Towns and Planning Areas should be considered as <b>TDR Receiving Areas</b> through mutual agreement. b. The Council of Governments, Planning Commission and Public Works Advisory Board will review the range of incentives available for providing public infrastructure within municipalities and Planning Areas that is necessary to support the utilization of TDRs. All newly up-zoned properties in the municipalities and County shall meet maximum zoning district densities and shall be required to purchase TDRs in consideration of the public infrastructure benefits and incentives to be received from the County.	Refer to 1.0 Land Use – Goal 1, Objective 2, Recommendation 2.		



## Goal, Objectives & Recommendations – 3.0 Priority Preservation

Goal 2: Resource Conservation/Preservation and Environmental Protection through Sustainable Smart Growth Management Policies

Objective 2: Encourage Sustainable Smart Growth Management approaches.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
3. Consider appropriate locations for new Planning Areas with development incentives.	3.1 Utilize ESA Maps 1, 2, 3, 6 and 10 to assist with the identification and design of new Planning Areas. 3.2 Partner with Development Community to provide public infrastructure.	CEP, DPW, Development Community	Y/N
<b>Objective 3: Promote the protection and preservation of forest lands.</b>			
1. Seek to protect forest lands from fragmentation.	1. Continue to implement the Forest Conservation Act and Amendments <ul style="list-style-type: none"> <li>Research and develop new protection measures.</li> <li>Adopt regulations to promote the protection and preservation of forest lands to achieve recommendations.</li> </ul>	LGE, CAC, DNR, MDE	N
2. Seek to retain existing levels of forested lands.			
3. Promote the conservation and expansion of forests located in areas such as stream and shoreline buffers, wetlands, and steep slopes.			
4. Consider conducting a tree canopy assessment study and subsequently establishing a reasonable canopy cover threshold for new development.	4.1 Seek grant funds to conduct study and establish development standards to protect tree canopy by establishing a reasonable canopy cover threshold for new development.	CEP	N
5. Identify and promote the conservation of habitat corridors.	5.1 Utilize various State and federal programs that emphasize the protection of wildlife habitats and habitat corridors.	CEP, DNR, EDAT, P&R	N
<b>Goal 3: Awareness, Education and Funding</b>			
<b>Objective 1: Continue to garner local support for agricultural land preservation.</b>			
1. Explore opportunity for creation of voluntary County Agricultural Districts as a mechanism to provide an inventory of potential applicants for easement acquisition.	1.1 Research successful programs.	EDAT, AB, CEP	N
2. Continue to aggressively apply for preservation funding.	2.1 Seek POS, MALPF, MET, Rural Legacy Program, CREP and CRP funds and other preservation funding.	EDAT, AB, CEP	N



Goal, Objectives & Recommendations – 4.0 Historic & Cultural Preservation			
Goal 1: Minimize Factors Impacting Historic & Cultural Resources			
Objective 1: Identify initiatives related to the inventory of historic sites and cultural resources of the County. Support historic and cultural preservation initiatives.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. County Commissioners, County Planning staff and Planning Commission should work collaboratively to support historic preservation relating to the inventory of historic sites and cultural resources within the County.	1.1 Complete current phase of historic sites inventory. 1.2 Store information in County's GIS database so sites are mapped and associated with other planning data and the status of sites can be tracked.	CEP	N
2. Identify grant opportunities to support historic sites inventory in the County.	2.1 Seek grant funding for subsequent phases of historic sites inventory. 2.2 Inventory additional sites and resources that speak to the County's history and heritage. • Define and identify additional historic landmarks.	CEP	N
3. Convene a diverse group of stakeholders to acquaint them with the Comprehensive Plan's recommendations related to the inventory of historic sites and cultural resources of the County.	Refer to Goal 2, Objective 1, Recommendation 1(a).		
Objective 2: Review various mechanisms to support historic and cultural preservation in the County.			
1. Conduct a study of various tools that may be employed to preserve historic and cultural resources of the County.	1. Reduce impacts on registered historic districts. 2. Preserve unique community identities. 3. Research land-use tools that promote preservation of historic sites and structures and adopt as appropriate.	CEP	N
2. Seek to create a toolbox of various preservation techniques used to conserve historic and cultural resources within the County.			
3. Seek to educate the community of the benefits of historic and cultural preservation.			
4. Convene a diverse group of stakeholders to encourage the application of tools that may be identified to conserve the historic and cultural resources of the County.	Refer to Goal 2, Objective 1, Recommendation 1(a).		





## Goal, Objectives & Recommendations – 4.0 Historic & Cultural Preservation

Goal 1: Minimize Factors Impacting Historic & Cultural Resources

Objective 3: Balance growth with historical and cultural preservation and attempt to preserve historic sites of Queen Anne's County.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Inventory significant sites through grant funded programs.	Refer to Goal 1, Objective 1, Recommendation 1		
2. Seek National Register of Historic Places nomination for inventoried historic sites of significance.	2.1 Complete necessary studies and documentation to meet eligibility criteria for designation.	CEP	N
<b>Goal 2: Historic Preservation Regulations</b>			
<b>Objective 1: Create a Historic and Cultural Sustainability Advisory Board.</b>			
1. Recommend to the County Commissioners the creation of this Board with the following responsibilities:	1.1 Educate the community of the benefits of historic and cultural preservation.	CEP	N
a. Investigate the merits of the creation of a Historic and Cultural Preservation Commission.	1.2 Educate the community of the benefits of historic and cultural preservation		
b. Seek to bring awareness to the issues of preservation and conservation, and identify tools that may be utilized by property owners for such purposes.	1.3 Create and staff a Historic and Cultural Sustainability Advisory Board.		
c. Seek to develop a checklist used during development review that may be used for identification and conservation of historic and cultural resources.	1.c.1 Research other Counties to determine components of checklist. 1.c.2 Develop and pilot checklist followed by adoption of procedures and requirements associated with checklist.	CEP	N
d. Seek to strengthen the demolition permit review process for potential historic sites.	1.d.1 Research other Counties to determine appropriate process. 1.d.2 Develop requirements and materials/forms to support permit process.	LGE	N
e. Review "Compliance Archeology" principles and make recommendations regarding its potential application.	1.e.1 Identify "Compliance Archeology" principles. 1.e.2 Educate the Board about applicability of principles.	CEP and HCASB	N



## Goal, Objectives & Recommendations – 4.0 Historic & Cultural Preservation

### Goal 3: Aesthetics

#### Objective 1: Reduce the impacts of signage within registered historic districts of the County.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Seek to develop signage guidelines consistent with the goals of the registered historic districts of the County.	1.1 Research sign guidelines and case law with respect to first Amendment.	CEP	N
2. Seek to strengthen existing design standards pertaining to development or redevelopment within designated historic districts.	2.1 Research design standards for infill development within historic districts. 2.2 Identify and adopt design standards.	CEP	N

### Goal 4: Feature and Area Identification

#### Objective 1: Identify additional sites and resources that speak to the history and heritage of Queen Anne's County.

1. Complete a County-wide Historic Sites Survey (including: sites, landmarks, demolished and preserved sites).	Refer to Goal 1, Objective 1, Recommendation 1,		
2. Identify areas for possible future historic district designation.	2.1 Utilize the results of the historic sites inventory and conduct additional research with respect to contributing factors and requirements to identify potential historic district designation.	CEP	N
3. Identify locations and funding opportunities for historic site markers or signage.	3.1 Research appropriate MHT and MSHA programs.	CEP	N



Goal, Objectives & Recommendations – 4.0 Historic & Cultural Preservation			
Goal 4: Feature and Area Identification			
Objective 1: Identify additional sites and resources that speak to the history and heritage of Queen Anne’s County.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
4. Define and identify additional historic landmarks in the County.	4.1 Define as part of inventory. Refer to Goal 1, Objective 1, Recommendations 1 & 2.	CEP	N
5. Develop a tracking system of demolished sites and preserved historic sites.	5.1 Develop historic asset management and tracking tool. 5.2 Integrate tracking tool with other parcel and permitting databases.	LGE	N
Objective 2: Identify historic and cultural resources that may promote arts and entertainment centers or districts that may be self-sustaining.			
1. Seek and identify opportunities to support the promotion of historic sites and cultural resources as opportunities for the arts and entertainment.	1.1 Identify historic and cultural resources that promote arts and entertainment centers.	CEP, EDAT	N
	1.2 Coordinate strategies with Economic Development and Tourism strategies in Section 6.0. <ul style="list-style-type: none"> <li>Cross-market cultural activities, tourism and historic sites.</li> <li>Create and coordinate programming for historic sites with community events and activities as well as tourism attractions.</li> <li>Continue communications and collaboration between historic sites Consortium and County Departments.</li> </ul>	CEP, EDAT, Organizations	N
	1.3 Coordinate with Queen Anne’s County Arts Council and arts organizations.		



## Goal, Objectives & Recommendations – 5.0 County/Town Planning Framework

**Goal 1: Foster Government Cooperation and Participation.**

**Objective 1: Promote inter-jurisdictional (Town/County) cooperation with respect to planning and growth related issues, including the new TDR program in order to manage growth.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Establish joint planning agreements.	1.1 Establish joint planning agreements that include initiatives and incentives to develop business and employment centers, and to accept TDRs. <ul style="list-style-type: none"> <li>TDR Program requires coordination with Towns to accept growth by supporting infrastructure and/or plans to expand infrastructure.</li> </ul> 1.2 Support planned business parks in municipalities. 1.3 Coordinate with Towns and bordering Counties on comprehensive /community plans. 1.4 Convene joint Planning Commission meetings with Towns and Bordering Counties to discuss and resolve planning issues.	CEP, GOG, USRP	N
2. County funding for Town infrastructure should be conditioned upon compliance with County APFO.	2.1 Coordinate and negotiate with the Towns.	CEP, Towns, COG	N
3. Encourage the creation of a mechanism to support the permanent establishment of Council of Governments (COG).	3.1 Foster inter-jurisdictional coordination.	CEP, GOG, USRP	N
<b>Objective 2: Initiate joint planning opportunities between County &amp; Towns and with surrounding Counties.</b>			
1. Seek to include representatives of Towns and bordering Counties in comprehensive and applicable community plan updates to encourage County cooperation among Towns and neighboring Counties.	Refer to Goal 1, Objective 1, Recommendation 1.		
2. Encourage joint planning commission meetings with Towns and bordering Counties to discuss and resolve planning issues.	2.1 Participate in joint planning opportunities between County and Towns and surrounding Counties.	CEP, COG, Towns	N



## Goal, Objectives & Recommendations – 5.0 County/Town Planning Framework

**Goal 1: Foster Government Cooperation and Participation.**

**Objective 3: Encourage State coordination with the County and the Towns.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1.Utilize the Upper Shore Regional Council, Maryland Association of Counties (MACo) and/or the Maryland Municipal League as the organizational structure to facilitate collaboration and cooperation.	1.1 Participate in meetings.	CEP	N
Objective 4: Attract State resources to match County and local resources for infrastructure improvements to support designated Planning Areas.			
1. Utilize a variety of tools such as designation/modification of Priority Funding Areas and other special designations to establish eligibility for State funds.	1.1 Establish necessary standards and regulations to comply with State eligibility requirements.	CEP, COG, Towns	N
Objective 5: Support funding initiatives for increased parks, recreation and open space which may include parking lots and facilities within the parks, within the designated Planning Areas, Towns and existing population centers.			
1.As funds are provided by the State to Queen Anne’s County, the County and Towns should coordinate project details and priorities to ensure the appropriate location and development of public facilities to meet Town/County needs.	1.1 Enhance coordination between State, County and Towns to obtain resources for infrastructure to support Planning Areas.	LGE, EDAT	N
Objective 6: Support Town planning by offering County resources for technical and professional services and planning assistance as incentives to achieve responsible smart growth.			
1. Share County resources with Towns supported by fee for service as appropriate.	Refer to Goal 1, Objective 1, Recommendation 1. 1. Implement joint planning and implementation agreements.	CEP, all County Departments	N
2. Provide technical assistance as appropriate to Municipalities for infrastructure and other planning issues.			
Objective 7: Support Town initiatives that utilize innovative energy and environmentally sustainable technology or strategies.			
1.Identify State and federal funding mechanisms for innovative energy and environmentally sustainable technology.	1.1 Research funding opportunities and consider regulations.	CEP	N
Objective 8: In accordance with Article 66B establish Town and County planning processes that foster implementation of community and comprehensive plans.			
1.Utilize the adopted plans to establish indicators and performance measures that comply with the annual reporting requirements of Article 66B.	1.1 Measure, monitor and evaluate indicators identified in various Plan Elements. Track and report annually.	CEP	N



## Goal, Objectives & Recommendations – 5.0 County/Town Planning Framework

**Goal 2: Continue to Direct Growth to Designated Planning Areas.**

**Objective 1: Allow growth in existing Planning Areas and provide for the designated new Planning Area(s) for purposes of preserving equity in farmland, decreasing the potential number of new units in the AG and CS districts, and developing environmental and site design standards.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Promote planned neighborhood development as a village that results in reduced environmental impacts.	Refer to 1.0 Land Use, Goal 1, Objective 2, Recommendation 1.		
2. The following items a, b, c and d shall be considered holistically. Existing zoning and other laws remain in place before any changes are made to land use or code while a new Transfer of Development Rights (TDR) program is planned, approved, and implemented, and functional receiving areas are established. a. Designate new County Planning Area(s) or other Planning Area around existing towns with the following characteristics:	Refer to Land Use – Goal 1, Objective 2, Recommendation 2.		
i. Development in New Planning Area (s) shall require the purchase of TDRs or Noncontiguous Development Rights (NCDs); ii. New Planning Area(s) shall be planned, in coordination with recommendations already approved, in terms of size and the number of TDR's required for different types of residences, to have the capacity to absorb the TDRs or NCDs confirmed for Agricultural (AG) and Countryside (CS) zoned properties not including rights that may be transferred using other means such as Maryland Agricultural Land Preservation Foundation (MALPF), Rural Legacy, Purchase of Development Rights (PDR), etc.; iii. New Planning Area(s) shall be planned to respect greenbelt and open space commitments of towns, while appropriately linked to towns to give New Planning Area(s) residents access to businesses, schools and public services; iv. New Planning Area (s) shall be planned to respect scenic vista set-backs from highways and shall require community designs consistent with the rural, small town character of the Eastern Shore; and	Refer to Land Use – Goal 1, Objective 2, Recommendation 2.		





## Goal, Objectives & Recommendations – 5.0 County/Town Planning Framework

**Goal 2: Continue to Direct Growth to Designated Planning Areas.**

**Objective 1: Allow growth in existing Planning Areas and provide for the designated new Planning Area(s) for purposes of preserving equity in farmland, decreasing the potential number of new units in the AG and CS districts, and developing environmental and site design standards.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
<ul style="list-style-type: none"> <li>v. Conduct a cost/benefit analysis which considers shared government financing options for the necessary infrastructure including water, sewer, roads and schools.</li> <li>b. Confirm TDRs, PDRs and NCDs on the basis of 1 dwelling unit per 8 acres for all Agricultural (AG) and Countryside (CS) zoned districts.</li> <li>c. Review the need to eliminate the ability to transfer NCDs in the Agricultural (AG) and Countryside (CS) zoning districts.</li> <li>d. The total number of units eligible for development in the AG and CS zoning districts shall not exceed the number of units that otherwise could be developed as minor subdivisions using a density calculation of 1 dwelling per 20 acres. Major subdivisions may be permitted in the AG and CS districts, only if the development rights in excess of minor subdivision limits are transferred from those otherwise eligible for minor subdivisions.</li> </ul>	Refer to Land Use – Goal 1, Objective 2, Recommendation 2.		
<p>3. To promote the prompt implementation of these recommendations, the Planning Commission commits itself to recommend the adoption of a new TDR Program within eighteen months of the date of the adoption of this Plan.</p>	Refer to Goal 1, Objective 2. 3.1 Implement immediately.		



## Goal, Objectives & Recommendations – 6.0 Economic Development & Tourism

**Goal 1: Preserve and Promote an Agricultural, Maritime and Natural Resource Based Economy.**

**Objective 1: Support agri-businesses, maritime, natural resource based and eco-businesses through existing markets and exploration of new and innovative agricultural markets and promote them within the County.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1.County government should take into consideration the fact that changes may occur in agriculture practices and associated economic impacts and should consider the commercial component of principal agricultural, maritime and natural resource based industry segments.	1.1 Amend Chapter 18 to expand the principal permitted uses in AG and CS zoning districts to certain commercial components to complement to principal agricultural uses.	CEP, EDAT	N
2.Create new ways of offering incentives to agri-businesses, eco-businesses and eco-friendly businesses.	2.1 Conduct necessary research and partner with the appropriate state agencies to offer incentives.	EDAT	N
3.Incentive programs should be sensitive to and reflect future changes in industry practices and economy	3.1 Build capacity for infrastructure to support industries in professional and technical services.	EDAT, LGE	N
4.Build and support current agricultural, maritime and recreation industry sectors.	4.1 Establish new business parks focused on providing jobs in these industries.	EDAT	N

**Goal 2: Promote Traditional Business Development.**

**Objective 1: Support methods and programs to attract and retain business using traditional economic development tools recognizing a need for business incubators and telecommuting infrastructure support.**

1.Support through appropriate planning tools the infrastructure necessary for telecommuting, for new start-up businesses and business expansion targeting high-tech and cleaner/greener businesses.	1.1 Build broadband technology to support expanded employment opportunities.	Utility Providers	N
2.Encourage occupancy and/or redevelopment of vacant commercial space.	2.1 Promote use of commercial TDRs.	EDAT	N
3.Explore opportunities for higher education and workforce development.	3.1 Provide technical and innovative training options and solutions. 3.2 Expand vocational training programs. 3.3 Attract post secondary education and training facilities and attract post graduate education and research facilities. 3.4 Support educational programs that provide post secondary education and continued education programs.	EDAT and Educational Facilities	N



## Goal, Objectives & Recommendations – 6.0 Economic Development & Tourism

### Goal 2: Promote Traditional Business Development.

#### Objective 2: Continue and expand incentives for business location and development/expansion.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1.Create incentives such as streamlined review processes and permits and other mechanisms that may be appropriate.	1.1 Asses review process and permits to determine efficiencies.	LGE	N
Objective 3: Incorporate economic centers as part of the development pattern to support Planning Areas.			
1. Designation of new Planning Areas should include analysis of citing new economic centers that support sustainable smart growth.	Refer to 1.0 Land Use – Goal 1, Objective 2, Recommendation 2(a)(iii) and (v). 1.0 Land Use Goal 1, Objective 9, Recommendations 2, 3, and 4.		
2. Promote the development of Business Parks and Commercial Centers at key locations that support sustainable smart growth.	Refer to 1.0 Land Use – Goal 1, Objective 9, Recommendation 3.		
Objective 4: Support initiatives to create employment opportunities and commercial viability.			
1.Build cooperative town/county planning initiatives to develop business and employment centers that attract employment based industries that incorporate Environmental Site Design.	1. Support initiatives to create employment opportunities, development and expansion, and commercial viability.	CEP, EDAT	N
2.Support incentives to create employment centers and include in Joint Planning Agreements.			
Objective 5: Ensure that sufficient commercially zoned lands exist and those lands are appropriately located and provided with infrastructure.			
1. Create a database of commercially developable land that accounts for sewer or septic limitations and availability, non-tidal and tidal wetlands, environmental buffers, and other limitations so that the County has an inventory of commercially developable land.	Refer to 1.0 Land Use – Goal 1, Objective 9, Recommendation 1		
a. Maintain an inventory of existing commercial and residential space as a means to encourage infill development and revitalization where there is existing infrastructure.			
b. The database should include a map of the undeveloped commercial land contiguous to the US 50 corridor from Kent Island to the US 50/301 split.			
c. The database should not include tax exempt properties such as churches, governmental buildings, and schools.			



## Goal, Objectives & Recommendations – 6.0 Economic Development & Tourism

Goal 2: Promote Traditional Business Development.

Objective 5: Ensure that sufficient commercially zoned lands exist and those lands are appropriately located and provided with infrastructure.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
2. As part of the ongoing comprehensive planning process, consider adding or deleting commercial land uses as appropriate based on analysis of the above database.	Refer to 1.0 Land Use – Goal 1, Objective 9, Recommendation 1		
3. Expand the provision of infrastructure to support the establishment of employment centers.	Refer to 1.0 Land Use – Goal 1, Objective 2 Recommendations 2 & 3. 3.1 Create planning tools to support infrastructure for telecommuting, new businesses and business expansion targeting high-tech and cleaner/greener businesses.	CEP, EDAT, DPW, COG	Y



## Goal, Objectives & Recommendations – 6.0 Economic Development & Tourism

### Goal 2: Promote Traditional Business Development.

#### Objective 5: Ensure that sufficient commercially zoned lands exist and those lands are appropriately located and provided with infrastructure.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
2. Encourage commercial zoning around towns and established Planning Areas.	Refer to 1.0 Land Use. 2.1 Collaborate with Towns to maintain and upgrade public infrastructure and services to support employment and workforce housing.	CEP, EDAT, COG	N

### Goal 3: Explore Opportunities for Hospitality Industry Niches.

#### Objective 1: Develop, support, and promote County cultural activities and heritage tourism opportunities.

1. Promote the County as a wedding destination.	1.1 Prepare an implement a work plan for the promotion of hospitality industry. <ul style="list-style-type: none"> <li>• Create a brand.</li> <li>• Work with existing businesses within this industry to collaboratively market.</li> <li>• Identify existing and new niche commercial retail and service opportunities in support of this industry and an Arts &amp; Entertainment District.</li> </ul>	EDAT	N
2. Promote ecotourism.	2.1 Participate in regional marketing strategies.	EDAT	N
3. Cross-market cultural activities, tourism and historic sites and historic and cultural events.	Refer to 4.0 historic and Cultural Preservation Goal 4, Objective 2, Recommendation 1.		
4. Coordinate with Queen Anne's County Arts Council and other organizations or committees involved in cultural or historic initiatives.			

#### Objective 2: Use historic and cultural resources to support and develop tourism.

1. Create and coordinate programming with historic and cultural sites with community events and activities as well as other tourism attractions.	Refer to 4.0 historic and Cultural Preservation Goal 4, Objective 2, Recommendation 1.		
2. Continue communication and collaboration between Historic Sites Consortium and Queen Anne's County Department of Economic Development, Agriculture & Tourism.			



## Goal, Objectives & Recommendations – 7.0 Workforce Housing

### Goal 1: Provide Affordable Workforce Housing Supply

Objective 1: Foster opportunities to create a supply of workforce housing affordable to appropriate income levels through various approaches, methods and programs.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Collaborate with the municipalities and identify locations in planning areas in which to provide workforce housing.	1.1 Establish workforce housing opportunities in Joint Planning Agreements.	CEP, COG, Towns	N
2. Encourage and allow appropriate density increases and range of unit types to allow workforce housing to be an economically viable development option.	1. Identify zoning districts and location in which to allow density increases and mix of dwelling unit types.	CEP, HA and Development Community	N
3. Encourage incorporation of workforce housing within developments.	2. Foster private-public partnerships and provide appropriate incentives.		
4. Study potential means of improving the viability of the MPDU program.	4.1. Study program and make necessary adjustments to program and applicable regulations.	HA and CEP	N
<b>Objective 2: Continue to implement various approaches, methods and programs that promote workforce housing.</b>			
1. Continue to allow accessory apartments in association with single-family lots, and commercial apartments.	1.1 Evaluate accessory and commercial apartment standards.	LGE	N
2. Promote infill development and redevelopment activities and where appropriate encourage the replacement, installation, and/or upgrade of public infrastructure improvements such as roads, curbs, gutters, public water and sewer, and sidewalks.	2.1 Replace, install and/or upgrade public infrastructure in existing communities and Planning Areas in order to promote infill development. Appropriately schedule the funding of these public facility retrofits and repairs in the Capital Improvements Program (CIP). 2.2 Develop private-public partnership.	CEP, DPW, COG and Towns	Y
3. Create partnerships between the County and Towns to identify new workforce housing opportunities.	3.1 Foster County and Town partnerships.	CEP, HA, Towns	N
4. Continue to implement the County's housing and homeownership assistance programs and expand funding and eligibility.	4.1 Maximize the level of County funding with State funding for the program.	HA	Y



## Goal, Objectives & Recommendations – 7.0 Workforce Housing

Goal 1: Provide Affordable Workforce Housing Supply

Objective 2: Continue to implement various approaches, methods and programs that promote workforce housing.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
5. Encourage non-profit involvement in providing affordable housing.	5.1 Develop partnerships between Development Community, Housing Authority and non-profit housing development corporations or providers.	HA, Development Community and Non-Profit Organizations Capital	N
6. Consider increased density as an incentive to provide affordable housing.	Refer to Goal 1, Objective 1, Recommendation 3.		





## Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation - Transportation

**Goal 1: Multi-Modal Transportation Network.**

**Objective 1: Plan, design, improve, manage, maintain and expand infrastructure and community facilities and services responsibly to meet the needs of local residents and businesses.**

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Expand public bus service.	1.1 Continue to provide transit services for special needs population. 1.2 Seek funding to expand transit service. 1.1 Coordination with Maryland Upper Shore Transit System and County Ride to seek funding and implement projects, programs and services.	MDTA, County Ride	N
2. No more major residential subdivisions should be permitted on Kent Island until transportation issues are resolved.	Refer to Goal 1, Objective 1, Recommendation 2.		
3. Examine infrastructure within Planning Areas and identify areas where infrastructure is deficient through the Comprehensive Water and Sewerage Plan (CWSP) and within the Master Roadway and Transportation Plan, which is part of this Section.	Refer to 1.0 Land Use – Goal 1, Objective 2, Recommendation 2(a)(v).		
4. Create a strategic implementation plan and funding strategies to address infrastructure deficiencies in coordination with the Capital Improvements Program (CIP).	4.1 Conduct necessary assessment of public facilities to meet current and project demands. 4.2 Appropriately schedule the funding to address these infrastructure deficiencies in the Capital Improvements Program (CIP).	CEP, DPW	Y
5. Review the use of impacts fees and impact fee subareas as an incentive to encourage development within designated Planning Areas.	5.1. Conduct necessary assessments and studies to identify subareas and appropriate impact fees.	LGE, EDAT, DPW	N



Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation			
Goal 1: Multi-Modal Transportation Network.			
Objective 2: Strongly support resolutions to traffic problems in the County caused by through traffic that impede the movement of local traffic and citizens.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. The needs of residents in the County take precedence over the “drive through” populations.	1.1 Seek funding to conduct traffic study with emphasis on peak-time and seasonal congestion mitigation.	DPW, SHA	N
a. Create a more reliable public transportation system including increased bus service for existing population.	1.a.1 Seek funding to support transit service. 1.a.2 Coordinate placement of park-and-ride facilities with current and potential bus routes.	DA, DPW, SHA	Y
b. Initiate joint planning efforts to relieve thru traffic congestion in the County and adjoining population centers.	Refer to Section 5.0 County/Town Planning Framework.		
c. In coordination with the State Highway Administration review how peak hours are determined in association with the impact on the Level of Service (LOS) for the analysis conducted in traffic studies.	1.c.1 Coordinate with SHA to determine appropriate methodology and peak times. 1.c.2 Incorporate methodology into future traffic studies.	LUZ, DPW, SHA	N
2.A list of priority transportation improvement projects in no specific order:  a. US 301 & MD 304 Interchange – complete design and fund for construction.  b. US 50/301 & MD 213 Interchange – This project is the number one component of the long-range US 50 Ocean Gateway project. Complete final design and fund for construction.  c. US 50 Ocean Gateway Safety & Capacity Improvements – Continue planning, design and construction of interim improvements along this corridor. Specifically, a new signal at Carmichael Road with geometric improvements and service road connections.	2.1 Support implementation of projects through partnership with the State, surrounding Counties and key stakeholders.	LGE, DPW, EDAT, MSH, MDOT, MDTA	Y



## Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation

Goal 1: Multi-Modal Transportation Network.

Objective 2: Strongly support resolutions to traffic problems in the County caused by through traffic that impede the movement of local traffic and citizens.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
<p>d. Cox Creek Connector &amp; Dundee Overpass – This is a needed project to provide both safety improvements and to allow for necessary highway system alternatives for local and emergency traffic mobility. Funding for planning and design is requested. Special funding sources should also be considered to address the growing concern.</p> <p>e. Stevensville Streetscape – Fund for construction.</p> <p>f. Kent Island Transit – Maintain and expand commuter bus lines and routes.</p> <p>g. MD 213 at Fey Road – Continue planning and design for safety and capacity improvements.</p> <p>h. Chesapeake Bay Bridge – Develop an implementation plan for safety, preservation and capacity improvements. This must identify both immediate and long-range plans/activities to safely and efficiently move traffic to and from the west.</p> <p>i. An independent comprehensive inspection of the bridge using the latest technology should be initiated immediately to preserve safety and maintain the current structures.</p> <p>ii. The study and evaluation of a third Bay crossing and commencement of the NEPA process is needed to evaluate future capacity requirements.</p>	<p>2.1 Support implementation of projects through partnership with the State, surrounding Counties and key stakeholders.</p>	<p>LGE, DPW, EDAT, MSH, MDOT, MDTA</p>	<p>Y</p>



Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation			
Goal 1: Multi-Modal Transportation Network.			
Objective 3: Create safe and adequate infrastructure related to mobility which is available for all modes of travel.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Identify alternate locations for a third Chesapeake Bay Bridge in collaboration and coordination with the State and other agencies.	1.1 Collaborate with planning and implementation partners to continue necessary studies to address environmental impacts and transportation needs. 1.2 Provide informational materials and community outreach.	LGE, CC, EDAT, DPW, MDTA, MDOT, SHA, State Legislative Delegation, Surrounding Counties	N
2. Work with the State Highway Administration to designate beach traffic lanes to Ocean City and Delaware beaches, which may result in: a. Removal of traffic lights along US 50; b. Reduction in accidents; and c. Improvement in local traffic mobility.	2.1 Partner with the State to study, fund and implement improvements.	DPW, SHA	Y
3. Work with the State Highway Administration and Toll Authority to develop a US 50/301 Corridor Plan to help move traffic through the County.	Refer to 1.0 Land Use – Goal 1, Objective 1, Recommendation 3.		
4. On this State road, work with the State Highway Administration to adjust the sections of US 50 between US 301 and MD 404 to be a limited controlled access highway.	4.1 Partner with the State to study, fund and implement improvements.	DPW, SHA	Y
5. Improve the local roadway system to provide alternative routes for local residents especially in areas around US 50/301. a. Provide local access/frontage roads for business and resident traffic.	5.1 Study and identify alternative routes. 5.2 Fund and implement through partnership as part of development plans and in the County's Capital Improvements Program (CIP).	CEP, DPW, Development Community, SHA	Y



## Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation

Goal 1: Multi-Modal Transportation Network.

Objective 3: Create safe and adequate infrastructure related to mobility which is available for all modes of travel.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
6. Provide commuting citizens a reliable transportation route in the County to other metropolitan areas while assuring access for deliveries to the Eastern Shore. Also promote delivery access to major airport systems, mainly Baltimore/Washington International Thurgood Marshall Airport (BWI), and warehouse facilities and other markets.	<p>6.1 Manage the roadway system safely and efficiently for all modes and users and seek to balance limited street capacity among competing uses.</p> <p>6.2 Study opportunities for alternate connections between modes of transportation within the region to support the movement of goods and people to and from the County.</p>	DPW, MDOT, SHA, Other Partners	Y
7. Support State funding of interchanges at key intersections, in no order of priority: a. At the Outlets in Queenstown; b. US 50 and MD 213 at Chesapeake College; c. US 301 and MD 304; and d. US 50 and Carmichael Road.	<p>1. Include the projects in the priority list forwarded to County Commissioners for inclusion in the Transportation Priority Letter submitted to MDOT seeking State funding for planning, design and construction.</p> <p>2. Promote ridesharing/carpooling and use of transit to reduce vehicular traffic.</p> <p>3. Partner with the State to study, fund and implement improvements.</p>	DPW, DA, LGE, MDOT, SHA	Y
8. Promote adequate public transportation and availability of park-and-ride facilities for transit.			
9. Encourage and improve bypass around Centreville.			
10. Support the interchange at US 50 and MD 404.			
11. Design a new overpass in Queenstown to connect MD 18 on the south side of US 50 and the north side of US 301. This would permit free movement for local traffic and avoid the use of US 50/301.			
12. Support a study for the realization of the Cox Creek connector.	<p>12.1 Seek funding for study.</p> <p>12.2 Establish partnership with MSHA.</p>	DPW, SHA	N



Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation			
Goal 1: Multi-Modal Transportation Network.			
Objective 3: Create safe and adequate infrastructure related to mobility which is available for all modes of travel.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
13. Support initiation of design and funding by the State Highway Administration for the replacement of the Chester River Bridge. a. Cooperate with Kent County and SHA to preserve rights-of-way so that preservation easements and developments do not prohibit construction of a new bridge. b. Promote the design of a well landscaped unit incorporating bicycle, pedestrian and local access integrated into the community fabric on both sides of the river.	13.1 Continue to coordinate with SHA and partners to support design and construction phases of the project.	DPW, SHA and Kent County	N
14. Require that any analysis of traffic safety and volume shall cover the following: a. Periods of peak usage as determined by normal rush hour traffic specific to usage. b. Peak usage specific to Chesapeake Bay Bridge and seasonal traffic. c. The ability of residents to move from one side of Route 50 to the other side of Route 50 during peak volumes on the Chesapeake Bay Bridge and seasonal traffic.	14.1 Establish study and analysis methodology for traffic impact assessments to include peak usage specific to the Chesapeake Bay Bridge and seasonal traffic.	LUZ, DPW	N
15. Acquire information regarding roadway capacity, traffic safety and volume through the use of independent traffic consultants approved and funded by the County and reimbursed by the applicant of the new project.	15.1 Establish requirements for use of County designated or approved consultants for preparation of traffic impact assessments and studies.	CEP, DPW	N
Objective 4: Develop a Transportation Study identifying capital improvement projects consistent with the Future Land Use Plan and the Master Roadway and Transportation Plan.			
1. Determine from the Transportation Study Capital Improvement Projects that are consistent with the Comprehensive Plan and annually prioritize State Highway Administration (SHA) projects in the Queen Anne's County Transportation Priority Letter.	1.1 Prioritize projects forwarded to County Commissioners for inclusion in Transportation Priority Letter. 1.2 Submit to MDOT to seek State funding for planning, design and construction.	LGE, DPW, MDOT	Y



Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation			
Objective 5: Support efforts to achieve cooperative planning with Maryland State Highway Administration (SHA).			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Support studies and leverage resources that create and mandate alternate routes for truck traffic.	1.1 Seek funding for truck access route study, which will include appropriate level of collaboration with the Towns. 1.2 Implement by installing signs along routes that restrict truck traffic and other means as recommended in the study.	DPW, COG, SHA	N
Goal 2: Ensure that transportation decisions, strategies and investments are coordinated with land use goals and support sustainable smart growth management strategy.			
Objective 1: Design transportation infrastructure to support land use goals for compact, accessible, walkable neighborhoods.			
1. Apply the complete streets philosophy to identify multi-modal transportation solutions and making connections to and from residential neighborhoods to employment and commercial centers.	1.1 Provide programs and facilities to promote bicycling, walking and carpooling to reduce vehicular use. 1.2 Continue to seek State and federal funding to assist with the completion of various phases of proposed and potential path and trail projects identified on Map CF-2. 1.3 Partner with Development Community for public improvements. 1.4 Require that new projects incorporate multi-modal solutions and that new development provide connections between neighborhoods and employment/commercial centers. 1.5 Evaluate an impact fee for off-site improvements such as sidewalks, multi-modal trails and facilities.	LGE, DPW, SHA, Development Community	Y





## Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation

**Goal 2:** Ensure that transportation decisions, strategies and investments are coordinated with land use goals and support sustainable smart growth management strategy.

**Objective 1:** Design transportation infrastructure to support land use goals for compact, accessible, walkable neighborhoods.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Apply the complete streets philosophy to identify multi-modal transportation solutions and making connections to and from residential neighborhoods to employment and commercial centers.	1.6 Review Roadway Design Manual to ensure standards accommodate multi-modal options and context sensitive design solutions when identifying right-of-way requirements as well as design. 1.7 Apply FHWA's Complete Streets standards.	LGE, DPW, SHA, Development Community	Y
<b>Objective 2:</b> Incorporate public involvement in the planning, design and construction of all transportation projects.			
1. Continue to provide opportunity for public involvement in the planning, design and construction of transportation improvements.	1.1 Continue and enhance public involvement opportunities.	LGE, DPW, P&R, SHA, Development Community	Y
<b>Objective 3:</b> Make the design and scale of transportation facilities compatible with planned land uses and with consideration for the existing and planned character of neighborhoods.			
1. Use flexibility in design to achieve context sensitive design solutions compatible with the character of the neighborhood.	1.1 Review Roadway Design Manual to ensure standards accommodate multi-modal options and context sensitive design solutions when identifying right-of-way requirements as well as design. 1.2 Consider community character and the environment when developing design solutions.	LGE, DPW, SHA	N



## Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation

**Goal 2:** Ensure that transportation decisions, strategies and investments are coordinated with land use goals and support sustainable smart growth management strategy.

**Objective 4:** Protect neighborhood streets from through traffic.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Utilize a number of access management strategies to provide adequate and safe access while discouraging through traffic. Examples include: shared driveways, one-way in/one-way out, restrict left turns, alternate traffic routes and other similar solutions.	1.1 Review and revise the Roadway Design Manual to incorporate access management strategies, solutions and techniques. 1.2 Implement strategies as part of new development projects, as well as in conjunction with County and State transportation projects and improvements as feasible.	LGE, DPW, SHA, Development Community	Y
<b>Objective 5:</b> Protect scenic corridors identified on Map T-3 by applying sustainable smart growth management strategies.			
1. Develop land use and sign regulations, site design and buffering and screening requirements to protect the character and scenic landscapes along the corridor.	Refer to 1.0 Land Use – Goal 1, Objective1, Recommendations 1-3.		
2. Implement a variety of Byway Enhancement Guiding Principles as identified in this Plan.	Refer to 1.0 Land Use – Goal 1, Objective 1, Recommendations 2, 3, & 7.		



Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation			
Goal 3: Manage the roadway system safely and efficiently for all modes and users and seek to balance limited street capacity among competing uses.			
Objective 1: Promote safe and convenient bicycle and pedestrian access throughout the transportation system and programs.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Create and continue to review and update a County Bicycle and Pedestrian Plan in conjunction with updates to the Comprehensive Plan.	1. Develop list of projects to be included in the County's Capital Improvements Program (CIP). 2. Identify specific state and federal funding sources to augment County funds. 3. Partner with the State and Development Community to implement programs and projects.	LGE, B&PAB, EDAT, DPW, P&R, SHA, Development Community	Y
2. Add bicycle lanes, signed bicycle routes and shared lane markings to develop the on-street bikeway network.			
3. Use innovative designs and bicycle-specific treatments at intersections and small connector paths to improve safety and interconnectivity.			
4. Coordinate planning, design and implementation of bicycle facilities with the incorporated towns as well as with communities across the County.			
5. Launch a bicycle parking initiative.			
6. Require new housing, retail and office development to provide bicycle parking.			
7. Work with Maryland Upper Shore Transit System and County Ride to accommodate bicycles in support of a multi-modal transit system, and improve bicycle parking at transit stops.			
8. Continue to develop off-road paths to create a connected trail system with connections to spine routes that serve key destinations in the County.			
9. Identify roadway improvements to reach acceptable levels of comfort for existing and proposed bicycle routes.			
10. Identify roadway improvements to reach acceptable levels of comfort for existing and proposed bicycle routes.			
11. Seek to strengthen the enforcement of traffic laws related to bicycles/pedestrian safety.			



Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation			
Goal 3: Manage the roadway system safely and efficiently for all modes and users and seek to balance limited street capacity among competing uses.			
Objective 1: Promote safe and convenient bicycle and pedestrian access throughout the transportation system and programs.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
12. Acknowledge Bicycle Routes Map as the Official Queen Anne's County Map for designated bicycle routes. Refer to Map T-5.			
13. Pursue various funding opportunities to improve level of comfort on specific roadway segments as identified through further study.			
14. Pursue various funding opportunities to develop, enhance and promote designated bicycle routes.			
15. Consider options for County & State wayfinding signage for bicycle routes.			
16. Promote the designated bicycle routes as viable options for connectivity.	1. Develop a list of projects to be included in the County's Capital Improvements Program (CIP). 2. Identify specific State and federal funding sources to augment County funds. 3. Partner with the State and Development Community to implement programs and projects.	LGE, B&PAB, EDAT, DPW, P&R, SHA, Development Community	Y
17. Work with residents, community groups, businesses, civic associations and all property owners to expand the network of walkways on existing public rights-of-way and in new acquisitions of open space.			
18. Create and implement a Safe Routes to School Program in public and private schools.	18.1 In coordination and collaboration with BOE seek funding to create and implement programs consistent with State and Federal Program guidelines. 18.2 Identify priority locations for improvements such as paths, trails and sidewalks to connection neighborhoods to schools. 18.3 Seek funding to assist with improvements.	CEP DPW, BOE	Y
19. Continue the extension of existing paths/trails as depicted on Map CF-2 with respect to proposed trails and greenways.	Refer to Goal 3, Objective 1, Recommendations 1-17.		



Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation			
Goal 4: Manage the roadway system safely and efficiently for all modes and users and seek to balance limited street capacity among competing uses.			
Objective 1: Promote adequate capacity on the street system for both vehicular and non-vehicular modes.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Implement with assistance from the State improvements to MD Route 8 and interchange of US 50/301 at MD Route 8.	1.1 Partner with the State to study, fund and implement improvements. 1.2 Include the project in the priority list forwarded to County Commissioners for inclusion in Transportation Priority Letter submitted to MDOT seeking State funding for planning, design and construction.	DPW, LGE, MDOT, SHA	Y
Objective 2: Promote efficient freight and goods movement.			
1. Utilize the rail to the maximum extent as possible to serve the County and region.	1.1 Coordinate with State and regional agencies that promote rail usage and expansion. 1.2 Coordinate implementation of rail transportation and economic development strategies.	EDAT	N
Objective 3: Allocate roadway right-of-way space for various modes such as vehicles, bicycles and pedestrians.			
1. Review Roadway Design Manual to ensure standards accommodate all modes of transportation when identifying right-of-way requirements as well as design. Follow Complete Streets Principles.	Refer to Goal 2, Objective 1, Recommendation 1.		
Objective 4: Make intersection improvements where necessary to enhance safety, mobility and accessibility.			
1. Partner with the State to study, design and construct intersection improvements identified on Map T-3.	1. Partner with the State to study and implement improvements.	DPW, COG, SHA	Y
2. Partner with the Towns to seek assistance from implementation partners such as the State and development community to complete transportation projects identified in Town and Community Plans as reflected on Maps T-4A through T-4G and the Designated Bicycle Routes Map T-5.	2. Include the projects in the priority list forwarded to County Commissioners for inclusion in Transportation Priority Letter submitted to MDOT seeking State funding for planning, design and construction.		



Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation			
Goal 5: Provide adequate roadways to meet current and future safety, mobility/accessibility and structural conditions needs.			
Objective 1: Continue roadway maintenance and operations to meet transportation needs.			
Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Explore innovative approaches to roadway maintenance and operations to reduce the overall cost.	1.1 Research tools and techniques for improving roadway life cycle. 1.2 Incorporate innovative maintenance and operations procedures and processes.	DPW	N
Objective 2: Continue roadway capital improvements to meet transportation needs.			
1. Explore various funding mechanisms, partnerships and grant sources to enable capital projects to be undertaken.	1.1 Continue to routinely coordinate with SHA staff to discuss current projects and future projects and funding opportunities.	DPW, SHA	N
Objective 3: Apply access management strategies to roadways.			
1. Utilize a variety of access management strategies to ensure mobility at acceptable levels of service along US 50/301.	Refer to Goal 1, Objective 4, Recommendation 1.		
Goal 6: Continue to provide transit services for special needs populations and other users.			
Objective 1: Find ways to continue service and to expand service as needs increase.			
1. Continue to seek funding to support transit service.	Refer to Goal 1, Objective 1 and Recommendation 1.		
Goal 7: Reduce traffic congestion along major corridors.			
Objective 1: Provide programs and facilities to promote bicycling, walking and carpooling to reduce vehicular use.			
1. Continue to seek state and federal funding to assist with the completion of various phases of proposed and potential path and trail projects identified on Map CF-2.	Refer to Goal 3, Objective 1 Recommendations 1-17.		
2. County elected officials, with support from the State Legislative Delegation, will continue to provide annual written priority list to the Secretary of MDOT for multi-modal transportation improvement needs.	2.1 Include the projects in the priority list forwarded to County Commissioners for inclusion in Transportation Priority Letter submitted to MDOT seeking State funding for planning, design and construction.	DPW	N



## Goal, Objectives & Recommendations – 8.0 Community Facilities & Transportation

Goal 7: Reduce traffic congestion along major corridors.

Objective 2: Promote ridesharing/carpooling and use of transit.

Recommendations	Strategy, Project, Program or Service	Lead Agency & Implementation Partners	Capital Item (Y/N)
1. Seek funding to conduct a study to support the placement of additional park-and-ride facilities.	1.1 Partner with MSHA for funding to undertake study.	CEP, DPW, SHA	N
2. Identify types of incentives needed to promote ridesharing / carpooling.	2.1 Implement MSHA strategies for ridesharing/carpooling.	DPW, SHA	N



# Appendix 2:

## *Glossary*





### Affordable Housing

Affordable housing is defined as housing for which the household is paying no more than 30 percent of their annual income for gross housing costs, including utilities.

### Agriculture

All methods of production or management of livestock, poultry, crops, vegetation and soil, other than commercial logging and timber harvesting operations; and includes but is not limited to:

- A. Tillage, plowing, seeding, fertilization, pest control, harvesting, maintenance of best management practices, and marketing;
- B. Feeding, housing, grazing, raising, and maintaining animals such as cattle, dairy cows, sheep, hogs, poultry, and equine and the handling of their by-products;
- C. Orchards, nurseries, vineyards, cheese making, winery and U-pick operations; and
- D. Silviculture, sod production, and aquaculture.

### Agri-Business

Economic activities of farms including those undertaking commercial agricultural production, and those related businesses that produce, harvest, refine, and market raw agricultural commodities into food, fiber, and energy into final products for sale and distribution to local, regional, state and global markets. It encompasses all of the economic activities that are related to commercial agricultural production, the process and refinement of raw form products into consumable goods; and the agriculture-related service industry which supports the production and distribution of agricultural products. It includes but is not limited to the following: animal husbandry, crop production, machinery sales and repair, fertilizer production and distribution, specialized farming, food, fiber, and energy processing and manufacturing, packaging, transportation, wholesale and retail trade, and the distribution of food, fiber, and energy products.

### Agritourism

Agritourism refers to enterprises and activities that are conducted on farm sites for the pleasure, education, recreation and enrichment of visitors. It allows farmers to diversify their core operations and keep farmland in production while preserving scenic vistas and maintaining farming traditions by providing authentic farm experiences for visitors. Agritourism helps educate the public about the importance of agriculture to a community's economic base, quality of life, history, and culture. Agritourism can take many forms including retail sales, hay rides, corn mazes, pick-your-own operations, and use of woodlands on farms for hunting, hiking, horseback riding, and other activities. There may be educational components including programs for schoolchildren and elderhostel tours, as well as exhibits and demonstrations tailored to specific visitor groups. Farms may combine retail sales and tours with accommodations such as bed and breakfasts and farm-stays. In essence, agritourism is providing educational and authentic agricultural experiences that enhance direct marketing of farm products and improve public support for agriculture.

### Assimilative Capacity

The capacity of a natural body of water to receive wastewaters or toxic materials without deleterious effects and without damage to aquatic life or humans who consume the water.



### Best Management Practices (BMPs)

- A. Conservation practices or systems of practices and management measures that control soil loss and reduce water quality degradation caused by nutrients, animal waste, toxic substances and sediment.
- B. Agricultural BMPs include, but are not limited to, strip cropping, terracing, contour stripping, grass waterways, animal waste structures, ponds, minimal tillage, grass and naturally vegetated filter strips, and proper nutrient application measures.

### Build-Out Analysis

A build-out analysis or development capacity analysis is a model estimating a community's potential for development based upon existing conditions (*development supply*) using a certain set of assumptions including existing land use regulations (e.g., zoning) and environmental constraints.

### Carrying Capacity

A measure of the ability of an area to accommodate the level of land use within the limits of existing infrastructure and natural resources without degrading the natural, social, cultural and economic environment of present and future generations.

### Chesapeake Bay Critical Area

All land and waters defined in §8-1807 of the Natural Resources Article, Annotated Code of Maryland, including:

- A. All waters of, and lands under, the Chesapeake Bay and its tributaries to the head of tide as indicated on the state wetlands maps and all state and private wetlands designated under Title 16 of the Environment Article, Annotated Code of Maryland; and
- B. All lands and water areas within 1,000 feet of the landward boundaries of state or private wetlands and the heads of tides designated under Title 16 of the Environment Article, Annotated Code of Maryland.

### Commercial Use

Any development approved by the County or a municipal corporation that involves the retail or wholesale marketing of goods and services. Commercial uses shall be categorized as follows:

- A. **HIGH COMMERCIAL USES** – Include the following and other similar uses of comparable intensity, scope, character, and impact: bowling alleys; package stores/stores selling liquor, beer or soft drinks (in sealed containers, not for consumption on-premises); retail sales or stores; recreational vehicle sales; convenience stores; convenience stores with gas pumps; fast-food restaurants; gasoline service stations; taverns; bars; shopping centers; regional shopping centers; new and used vehicle sales/service and repair with exterior storage and/or repair areas; light manufacturing and assembling of goods in conjunction with retail or wholesale sales (provided that all manufacturing and assembling activities are conducted indoors and such activities are clearly subordinate to the principal commercial use of the property).



- B. **MEDIUM COMMERCIAL USES** — Include the following and other similar uses of comparable intensity, scope, character, and impact: auto accessory stores; commercial or trade schools (e.g., dance studios, schools for martial arts); grocery stores and supermarkets (excluding convenience stores); laundries; theaters and auditoriums (indoor); boat sales and repair; furniture sales; garden centers, garden supplies and greenhouses; lawnmower and garden equipment sales; auto repair with repair areas; warehouses with no exterior storage; and non-fast-food restaurants.
- C. **LOW COMMERCIAL USES** — Include the following and other similar uses of comparable intensity, scope, character, and impact: business or professional offices; medical offices and clinics; veterinary offices; all other office uses; barbershops and hairdressers; deli, coffee shops, ice cream stores and stands; dry cleaners; light mechanical repair stores (e.g., watch, camera, bicycle, television); photography; tailoring; upholstering and upholstery stores; print/copy shop; banks and other financial facilities; service businesses; and travel agencies.

### Community Design/Neighborhood Character

Compact, mixed-use, walkable design consistent with the community character of existing neighborhoods that emphasizes the use of land, resources, preservation and enhancement of natural systems, open spaces and recreational areas, and historical, cultural and archeological resources.

### Comprehensive Plan

The Queen Anne's County Comprehensive Plan text and all accompanying maps, charts and explanatory material adopted by the County Commissioners on May 21, 2002, and all amendments to the Comprehensive Plan.

A document, officially adopted by the local governing body, which spells out the manner in which a municipality, county or sub-area of a county must develop. Typically, it includes a map showing proposed future land use and anticipated transportation and community facilities. It also contains policies for protecting environmental features and recommendations for amending local development – related ordinances in a manner that helps achieve the comprehensive plan's objectives. It must also explain how the jurisdiction will provide water for development and address the handling of sewage treatment plant discharges. Municipal comprehensive plans must explain how anticipated growth will impact community facilities and the environment, and identify areas where growth will occur. The plan has legal significance in that zoning, provision of water and sewer, and other local actions and other actions must be consistent with its recommendations. The comprehensive plan may also be known as a “master plan”, “master development plan” or “comprehensive master plan.”

Comprehensive Plans, also known as Master Plans, capture how people want their communities to function and grow. Local jurisdictions are required to review and, if necessary, to update their Comprehensive Plans every six years.

### Cost of Living

The cost of maintaining a certain standard of living measured by the average cost of the basic necessities of life, such as food, shelter and clothing. A rise in the cost of living reflects the rate of inflation.



### County/Town Planning Area (Community Planning Area/Planning Area)

A geographical area, defined by the Queen Anne's County Planning Commission and the Town governing body, to be considered as a "designated growth area," as defined by the state, in the development of a community plan or comprehensive plan.

### Critical Workforce

Individuals employed in Queen Anne's County by the following professions:

- Teacher employed full time;
- Law enforcement officers, including correctional officers, employed full time;
- Emergency medical technicians employed full time;
- A active member of a Volunteer Fire Company for the past 12 months, including both firefighters and emergency medical technicians, and must be certified by the president of the County Volunteer Chief's Association; and
- Emergency dispatcher.

### Depth to Ground Water

Refers to the shallowest depth to a wet soil layer (water table) at any time during the year expressed in centimeters from the soil surface, for components whose composition in the map unit is equal to or exceeds 15%.

### Development or Development Activities

- A. The division of a parcel of land into two or more parcels;
- B. The construction, reconstruction, conversion, structural alteration, relocation or enlargement of any structures;
- C. Any use or change in use of any structures or land;
- D. Any extension of any use of land; or
- E. Any clearing, grading or other movement of land for which permission may be required pursuant to this Chapter 18.

### Development Density & Intensity

- A. Density – The number of dwelling units allowed per acre based upon zoning after environmentally sensitive lands have been deducted.
- B. Intensity – The carrying capacity or the degree to which an area of land can be physically developed to the fullest extent possible.
  - The development intensity of a land area is determined by the degree of suitability it has after conservation measures have been deducted.
  - A development intensity factor may be assigned based on land suitability, sensitive water resources and infrastructure.
  - Development intensity can be controlled by a density for residential development as well as through floor area ratio on the parcel level for commercial, mixed use and industrial developments.

### Dwelling

A building or portion of a building that is designated or used for residential purposes.





### Dwelling Unit

A principal building, room or group of rooms providing, or intended to provide, living quarters for not more than one family.

### Easement

The authorization by a property owner for the use by another and for a specified purpose of any designated part of the property.

### Economic Development

Economic development is the process of improving a community's well-being through job creation, business growth, and income growth, as well as through improvements to the wider social and natural environment that strengthen the economy.

### Economic Indicators

Economic indicators consist of data and information assembled and evaluated to determine the fiscal health or welfare of a community. These indicators should be reviewed and assessed in connection with determining County plans and policies.

### Ecotourism

Ecotourism is environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features - both past and present) that promotes conservation, has low negative visitor impact, and provides for beneficially active socio-economic involvement of local populations.

### Economic Centers

Areas of the County where economic development has recently or traditionally occurred and where a large percentage of residents and commuters work located in or near established Towns including: Centreville, Chester, Stevensville, Grasonville, Queenstown, Sudlersville, and Church Hill.

### Effluent Disposal

The disposal or treatment of sewage, water, or other liquid, either partially or completely treated, or in its natural state, whether generated on-site or off-site; including sewage treatment plants, berm infiltration ponds, spray irrigation facilities and other state and County approved facilities and activities.[Amended 2-7-2006 by Ord. No. 05-11]

### Farm

- A. A parcel or combination of parcels under the same ownership that is:
  - (1) Classified as an agricultural use by the Maryland Department of Assessment and Taxation; and
  - (2) Used for agricultural purposes, including farming, dairying, pasturing, agriculture, horticulture, floriculture, viticulture, aquaculture, silviculture and animal and poultry husbandry.
- B. Includes necessary accessory uses for packing, treating or storing produce that are purely secondary to and support normal agricultural activities conducted on the parcel.



- C. Does not include the business of garbage feeding of hogs or other animals or the raising of such animals as rats, mice, monkeys and the like for use in medical or other tests and experiments.

### Forest Management

The identification, evaluation, and act of preservation of the County's forest and tree resources for the purpose of enhancing and increasing existing forest and tree resources, restoring and improving non-forested lands, and protecting and restoring forest ecosystems throughout the County.

### Growth Area

Those lands designated and identified as most appropriate for future growth and residential density. The growth areas have been designated as follows: Stevensville, Chester, Kent Narrows, Grasonville, Centreville and Queenstown in accordance with the 2002 Comprehensive Plan.

### Heritage Area

Heritage Areas are locally designated and State certified regions that contain high concentrations of historical, cultural and natural resources. Heritage areas rely on public and private partners who make commitments to preserving historical, cultural and natural resources for sustainable economic development through heritage tourism.

### Historic Structure

Any structure or cultural resource, including but not limited to residential, agricultural and commercial buildings, that is equal to or greater than 50 years of age, or otherwise deemed to be of exceptional historical significance by meeting one or more of the following aspects of Queen Anne's County, Maryland or United States history.[Added 5-15-2007 by Ord. No. 06-20]

- A. Association with historic events or activities;
- B. Association with persons who are important to the community or to specific developments of history;
- C. Embodiment of distinctive characteristics of a type, period, method of construction, or the work of a master; and/or
- D. Potential to provide important information about history or prehistory.

### Historic District

A district is a geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. A district may also comprise individual elements separated geographically but linked by association or history.

### Historic Preservation

The act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property.

### Historic Property

A district, site, building, structure or object significant in history, architecture, engineering, archeology or culture at the national, State or local level.





### Impact Fee

Any charge, fee, or assessment that is:

- A. Levied as a condition of issuance of a building permit or development approval; and
- B. Intended to fund any portion of the costs of capital improvements or any public facilities.

### Impaired Waterbody

A waterbody (i.e., stream reaches, lakes, waterbody segments) with chronic or recurring monitored violations of the applicable numeric and/or narrative water quality criteria.

### Impervious Surface

Any man-made surface that is resistant to the penetration of water. "Impervious surface" includes areas of stored lumber, outdoor storage or display, and junkyards.

### Impervious Surface Ratio

The total impervious surface area of a lot or site divided by the base site area.

### Indicators

Indicators are a tool for community assessment and measurement of various aspects or factors of health, safety and welfare of our community. Indicators measure impacts and evaluate criteria and are used to help link the past to the present and the present to the future.

The Maryland Department of Planning is promoting the use of indicators to measure progress toward achieving local and state land use goals. Indicators are measurements of physical quantities, of money, of public opinion. Indicators measure impact and are evaluation criteria.

Three significant planning bills are signed into law as part of the Smart, Green & Growing legislative package: The Smart and Sustainable Growth Act of 2009; The Smart Growth Indicators; and Planning Visions. This package strengthened local government comprehensive plans; directed local jurisdictions and the State to collect smart growth measures and establish a statewide land use goal; and updated the planning process to include 12 new planning visions.

### Index of Biotic Integrity (IBI)

The Index of Biotic Integrity (IBI) is a tool or index which is used to determine the health and integrity of the fish community in a given waterway. The IBI is a numeric measure of the biological completeness of a system. This is a comprehensive, rapid bio-assessment technique which can be applied on a relatively large scale.

### Industrial Use

- A. Any development approved by the County or a municipal corporation that have the following characteristics and include the following categories of use.
  - (1) **LIGHT INDUSTRIAL USES** — Include wholesale distribution and manufacturing activities generally conducted indoors where nuisances associated with the use, such as noise, odor, smoke and dust, are minimal; blacksmith shops; boat building; mini-warehouses (with and without outdoor storage); materials sales or storage yards (excluding asphalt or concrete mixing); bulk materials or machinery storage (fully enclosed); boat repair and auto repair; carpet and rug cleaning plants; contractors' offices and equipment storage yards; dry-



cleaning and laundry plants serving more than one outlet; extermination shops; food processing and packing plants; fuel oil (storage and sales); furniture cleaning plants; furniture refinishing shops; lumberyards; manufacturing (including the production, processing, cleaning, testing and distribution of materials, goods, foodstuffs and products) in plants with fewer than 500 employees on a single shift; mirror supply and refinishing shops; monument works; ornamental iron workshops; pilot plants; printing plants; scientific (e.g., research, testing or experimental) laboratories; trade shops (including cabinet, carpentry, planning, plumbing, refinishing and paneling); truck terminals; wholesale business and storage (wholesale business are not warehouse clubs that can be joined for a membership fee where a variety of goods are offered in bulk at wholesale or discounted prices); showrooms; incidental retail stores (that do not exceed 25,000 square feet of floor area) associated with building and plumbing supply distribution operations.

### (2) **HEAVY INDUSTRIAL USES**

(a) Have severe potential for negative impacts on any uses located relatively close to them; differ from light industrial uses in that they require unenclosed structures that are large, tall and unsightly, such as concrete batching plants; have severe potential for generation of odor and may involve large amounts of exterior storage; and, because of their scale, are likely to have a regional impact.

(b) Include public airports and public heliports; manufacturing activities (including outdoor storage), a significant part of which may be conducted outdoors, where nuisances associated with the use, such as noise, odor, smoke and dust, are significant; asphalt or concrete mixing plants; bulk material or machinery storage (unenclosed); motor or rail terminals; and manufacturing (including the production, processing, cleaning, testing and distribution of materials, goods, foodstuffs and products) in plants with 500 or more employees on a single shift.

## **Infill Development**

Development that takes place on vacant or underutilized parcels within an area that is already characterized by development.

## **Infrastructure**

Publicly supported infrastructure includes transportation networks, schools, parks, libraries, police stations, firehouses and in many cases public water and sewer. Smart Growth directs state investment in these facilities to existing communities and areas designated by local governments for future growth. Adequate and well-maintained infrastructure in these areas is a cornerstone of Smart Growth; without it, growth will be inadvertently directed further from established communities.

## **Institutional Residential Use**

Includes convents or monasteries, group-care facilities, rooming houses, migrant labor camps, shelter-care homes, and assisted living programs. [Amended 9-7-2004 by Ord. No. 04-28]



### Institutional Use

Uses approved by the County or a municipal corporation, including:

- A. Outdoor recreational uses, which include:
  - (1) Areas of active recreational activities, including, but not limited to, jogging, cycling, tot-lots, playfields, playgrounds, outdoor swimming pools, tennis courts and golf courses;
  - (2) Passive recreational uses, including, but not limited to, arboretums, areas of hiking, nature areas and wildlife sanctuaries; and
  - (3) Picnic areas, public and private parks, garden plots and beaches;
- B. Institutions such as aquariums, youth camps, cemeteries, churches, conference centers associated with nonprofit institutions, community or recreational centers, gymnasiums, privately owned libraries or museums, indoor recreational centers, public or private schools, indoor skating rinks (ice or roller), indoor swimming pools, tennis, racquetball, handball courts, rural country clubs and all other indoor recreational uses;
- C. Institutional residential uses such as convents or monasteries, group-care facilities, nursing homes, protective living facilities, rooming houses and sheltered-care homes;
- D. Public services;
- E. Public utilities;
- F. Family day-care centers; and
- G. Group day-care centers.

### Intensely Developed Area (IDA)

An area of at least 20 adjacent acres or the entire upland portion of the critical area within the boundary of a municipality, whichever is less, where residential, commercial, institutional, and/or industrial developed land uses predominate, and where relatively little natural habitat occurs. An intensely developed area shall have at least one of the following features as of December 1, 1985:

- A. Housing density equal to or greater than four dwelling units per acre;
- B. Industrial, institutional, or commercial uses are concentrated in the area; or
- C. Public sewer and water collection and distribution systems are currently serving the area and housing density is greater than three dwelling units per acre.

### Lands Available for Preservation or Lands Available for Development

Lands available for preservation are undeveloped lands that may have capacity for development and is a technical term that meets the state's requirement for measuring the theoretical estimate for development capacity to estimate development rights that can be preserved.

Lands available for development are undeveloped lands that may have capacity for development and is a technical term that meets the state's requirement for measuring the theoretical estimate for development capacity.

### Large-Lot Subdivision

A residential subdivision in which single-family residential lots are of sufficient size such that on-site lands are protected and the character of the entire community is preserved in accordance with the district regulations set forth in Chapter 18:1, Part 3, Article V, of this Chapter 18.



### Limited Development Area (LDA)

An area which is currently developed in low- or moderate-intensity uses which contains areas of natural plant and animal habitats, and in which the quality of runoff has not been substantially altered or impaired. A limited development area shall have at least one of the following features as of December 1, 1985:

- A. Housing density ranging from one dwelling unit per five acres up to four dwelling units per acre;
- B. Areas not dominated by agriculture, wetland, forest, barren land, surface water, or open space;
- C. Areas having public sewer or public water, or both; or
- D. Areas meeting the definition of intensely developed areas above, less than 20 acres in size.

### Lot of Record

Any validly recorded lot in the Land Records of Queen Anne's County that, at the time of its recordation, complied with all applicable laws, ordinances and regulations.

### Moderately Priced Dwelling Units (MPDUs)

A *dwelling unit* which:

- (1) Is offered for sale or rent to eligible *persons* or the Housing Department and sold or rented under this article;
- (2) Is offered for a maximum sales price based on number of *bedrooms*, to be determined by the Housing Department by:
  - (a) First, calculating the amount of monthly income available for mortgage principal and interest by using the formula: (median income for three-*person* household) x (target income range) x (portion of household income available for housing) / (12 months) — (property taxes) — (hazard insurance);
  - (b) Second, calculating a monthly payment for a thirty-year term mortgage at market interest rate, ensuring that the monthly payment is less than or equal to the calculation in Subsection (2)(a);
- (3) The sales price of which shall be recalculated each year by the Housing Department by taking the maximum base prices and adjusting them up or down according to changes in the CPI;
- (4) Is offered for a monthly rental price of:
  - (a) Eighty percent of HUD's fair market rents if the landlord pays all utilities (heat, water, sewer, electric, and trash); or
  - (b) Sixty-five percent of HUD's fair market rents if the landlord does not pay all utilities (heat, water, sewer, electric, and trash); and
- (5) The monthly rental price of which shall be recalculated each year by the Housing Department based on HUD's recalculation of fair market rents.

### Net Buildable Area

The portion of a lot that may be developed after all district regulations and site development standards have been calculated. Net buildable area shall equal base site area less those portions of a lot set aside to meet the requirements for setbacks, open space, landscape surface area, pervious surface area, forest conservation requirements, resource protection, and any other area regulations that prohibit development set forth in this Chapter 18.



### Noncontiguous Parcel

- A. A parcel included within a development plan that:
- (1) Is not contiguous with the developed parcel;
  - (2) Is to be designated as open space, wherein only those uses as specified in Column A of the table in § 18:1-12 of this Chapter 18 are allowed; and
  - (3) Meets the following soils criteria:
    - (a) At least 50% of the land shall classify as Class I, II or III soils; or
    - (b) If the land is wooded, 50% of the land is classified as Woodland Groups 1 or 2; or
    - (c) If there is an insufficient percentage of Class I, II or III soils alone and there is an insufficient percentage of Woodland Groups 1 or 2 soils alone, the land must have a combination of the classifications that meets or exceeds 60%.
    - (d) Plats of the noncontiguous parcel must provide the location of all existing buildings.
  - (4) May be less than all of a lot of record.
- B. The area of the noncontiguous parcel used must be at least 40 acres in size or constitute at least 1/2 the total area of the lot of record, whichever is less

### National Wetlands Inventory (NWI)

Reference to Map ESA-1 through 3 – NWI is an inventory of wetlands as identified by the US Fish & Wildlife Service. Typically these include wetlands that are 5 acres or larger in size, additional wetlands may exist.

### Nontidal Wetlands

- A. Those areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and which under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as "hydrophytic vegetation"; and
- B. Are regulated under Title 16 of the Environment Article, Annotated Code of Maryland.

### Opportunity Gap

An **opportunity gap** occurs when a household must resort to spending their retail dollars on goods and services outside their neighborhood or locale due to one or more of the following conditions:

- The specific type retail opportunity does not exist in the neighborhood;
- The quality of goods and services is simply better outside the region;
- The existing retail establishments do not carry enough product to service the neighborhood; and
- The type of retail goods or services does not meet the needs of the neighborhood residents.

### Opportunity Surplus

A surplus gap occurs when local retail sales of goods and services exceed household spending for goods and services. A surplus indicates that local retail stores are making sales to non-local households.

### Open Space

Lands specifically designated on a site plan or subdivision plat to be preserved in accordance with the provisions of Chapter 18, Chapter 18:1, Part 3, Article V, and upon which only those uses set forth in § 18:1-12 of this Chapter 18 will be allowed.



### Planning Commission

An appointed body that advises the municipal or county governing body on all matters related to the planning of growth and development, including the comprehensive plan, zoning, subdivision and other issues. It generally has the authority to approve subdivision plats and other development plans. In most cases, the planning commission advises concerning proposed rezoning, variances, special exceptions, amendments to, and redrafting of, comprehensive plans and various development-related ordinances. The planning commission generally oversees the drafting of the comprehensive plan and amendments thereto, holds public hearings and advises the governing body as to whether to adopt.

### Planning Implications

Planning implications are conclusions or circumstances that are implied based upon various trends, patterns or conditions and that if not addressed will impact the economic vitality and sustainability of the County.

### Preserved Lands

All lands subject to any legal instrument or restriction that prohibits the development of residential or nonresidential uses, including but not limited to conservation easements, covenants, and deed restrictions made pursuant to the following:

- A. the Maryland Environmental Trust or private nonprofit land trust;
- B. The Maryland Agricultural Land Preservation Foundation;
- C. A TDR instrument of transfer;
- D. A noncontiguous development; or
- E. A planned residential development

### Preservation Planning

A process that organizes preservation activities in a logical sequence including identification, evaluation, registration and treatment of historic properties. The process discusses the relationship among these activities and defines three key principles.

### Priority Funding Area (PFA)

PFAs are existing communities and places where local governments want State investment to support future growth. In accordance with the 1997 Priority Funding Areas Act, beginning October 1, 1998, the State of Maryland directed funding for projects that support growth in Priority Funding Areas (PFAs). PFAs are areas identified by the County and designated by the State where the state, county and municipalities want to target their efforts to encourage and support economic development and new growth.

### Priority Preservation Area (PPA)

Areas containing productive agricultural or forested soils, or areas capable of supporting profitable agricultural and forestry enterprises where productive soils are lacking; and areas governed by local policies that stabilize the agricultural and forested land base so that development does not convert or compromise agricultural or forest resources.





### Receiving Parcel

- A. A parcel that is eligible to receive development rights from a transferor parcel.
- B. Includes:
  - (1) A parcel in any zoning district, except the Agricultural (AG) or Noncritical Area Neighborhood Conservation (NC) Districts, that is located within the geographic boundaries of a growth area; and
  - (2) A parcel in any Countryside (CS) or Neighborhood Conservation (NC) District located within the Chesapeake Bay Critical Area.

### Residential Use

Any use approved by the County or a municipal corporation that is for existing or proposed dwelling units, including but not limited to single-family residential dwellings, single-wide manufactured homes, single-family clusters, manufactured home communities, commercial apartments, multifamily, and first floor apartments.

### Resource Conservation Area

An area characterized by nature-dominated environments (that is, wetlands, forests, abandoned fields) and resource-utilization activities (that is, agriculture, forestry, fisheries activities, or aquaculture). A resource conservation area shall have at least one of the following features as of December 1, 1985:

- A. Density is less than one dwelling unit per five acres; or
- B. Dominant land use is in agriculture, wetland, forest, barren land, surface water, or open space.

### Rural Legacy Areas

Rural Legacy Areas are established through Maryland's Rural Legacy Program for the purpose of achieving the following goals:

- to establish greenbelts of forests and farms around rural communities in order to preserve their cultural heritage and sense of place,
- to preserve critical habitat for native plant and wildlife species,
- to support natural resource economies such as farming, forestry, tourism and outdoor recreation, and
- to protect riparian forests, wetlands, and greenways to buffer the Chesapeake Bay and its tributaries from pollution run-off.

### Sensitive Species Project Review Areas (SSPRA)

Primarily represents the general locations of documented rare, threatened and endangered species as created and updated by staff of the Wildlife and Heritage Service.

### Statewide Priority Wetlands

Wetlands identified by MDE based on the "Prioritizing Sites for Wetland Restoration, Mitigation, and Preservation in Maryland" 2006 Report. Refer to National Wetland Inventory for a standard definition of wetland.





### Subdivision

- A. Any division or redivision of a tract, parcel or lot of land into two or more parts by means of mapping, platting, conveyancing, change, or rearrangement of boundaries.
- B. All subdivisions are also developments.

### Sustainability

The maintenance or enhancement of economic opportunities and community well-being while protecting and restoring the natural environment upon which people and economies depend, in order to meet the needs of the present without compromising the ability of future generations to meet their own needs.

### Sustainable Community

A sustainable community is one whose prospects for long-term vitality are good with consideration of characteristics such as: housing opportunities and choices; walkability within towns and planned residential neighborhoods; community and stakeholder collaboration; distinctive, attractive communities and neighborhoods with a strong-sense of place; predictable, fair and cost-effective development decisions; mix of land uses; preservation of open space, neighborhoods, architecture, historic/cultural resources and environmental areas; variety of transportation choices; and design standards for development and public space. A sustainable community consists of strong, attractive and economically thriving neighborhoods.

### Sustainable Smart Growth Management Strategy

The County strategy to create sustainability through preservation and conservation of agricultural land and natural and cultural resources while managing growth to reduce sprawl by directing growth in and around existing communities and planned development areas, promoting economic development and protecting sensitive natural resources, while continuing to reaffirm the county's vision of maintaining a quintessential rural community.

### Targeted Ecological Areas (Greenprint Area)

Areas where lands and watersheds of high ecological value that have been identified as conservation priorities by the Maryland Department of Natural Resources (DNR). These lands include: large blocks of forests and wetlands, rare species habitats, aquatic biodiversity hotspots and areas important for protecting water quality. These high priority lands were identified by DNR using a variety of methods developed by Agency ecologists.

### Target Investment Zone (TIZs)

Small areas within Heritage Areas where the region wishes to attract and focus interest and capital investment for rapid heritage tourism development. Capital projects within TIZs are given preference for Maryland Heritage Area Authority (MHAA) capital funds.



### Tidal Wetlands

State wetlands that are defined as any land under the navigable waters of the state below the mean high water line, affected by the regular rise and fall of tide, and private wetlands defined as any land not considered state wetlands bordering or lying beneath tidal waters, that is subject to regular or periodic tidal action and supports aquatic growth. Private wetlands include wetlands transferred by the state by a valid grant, lease, patent, or grant confirmed by Article 5 of the Declaration of Rights of the Constitution to the extent of the interest transferred. The term "regular or periodic tidal action" means the rise and fall of the sea produced by the attraction of the sun and moon uninfluenced by the wind or any other circumstance.

### Tier 1 Waters

Tier 1 mandates that water uses and the level of water quality necessary to protect the uses (i.e. fishable and swimmable) designated by the Clean Water Act shall be maintained and protected. Maryland's antidegradation policy assures that water quality continues to support designated uses. EPA regulations provide for three tiers of protection: Tier 1 specifies the minimum standard that must be met—support of balanced indigenous populations and support of contact recreation—this is often referred to as "fishable-swimmable."

### Tier 2 Waters

Tier 2 specifies existing high quality water that is better than the minimum needed to support "Fishable-Swimmable" uses. While water quality can be slightly impacted, the State Anti-degradation Policy identifies procedures that must be followed before an impact to Tier 2 water quality can be allowed. Maryland's antidegradation policy assures that water quality continues to support designated uses. EPA regulations provide for three tiers of protection: Tier 2 protects water that is better than the minimum specified for that designated use.

### Tier 3 Waters

Tier 3 governs high-quality waters that are considered outstanding *national resources, such as waters of national and State parks and wildlife refuges, or waters* of exceptional recreational or ecological significance. Tier 3 guidelines prevent any action that would threaten the quality of these waters, with the possible exception of short-term activities such as road construction or park improvements that would have no lasting impacts. Maryland's antidegradation policy assures that water quality continues to support designated uses. EPA regulations provide for three tiers of protection: Maryland is developing the third Tier of protection (Tier 3) called an Outstanding National Resource Water or ONRW.

### Total Maximum Daily Loads (TMDLs)

The following describes Total Maximum Daily Load (TMDL) for a waterbody:

- A TMDL (Total Maximum Daily Load) establishes the maximum amount of an impairing substance or stressor that a waterbody can assimilate and still meet WQSs and allocates that load among pollution contributors.
- TMDLs are a tool for implementing State water quality standards. They are based on the relationship between pollution sources and in-stream water quality conditions.
- A TMDL addresses a single pollutant or stressor for each waterbody.



TMDL is the sum of the individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources and natural background, and a margin of safety (MOS). TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measures that relate to a state's water quality standard.

### Transfer of Development Rights

- A. A transfer of development rights from a transferor parcel to a receiving parcel by an instrument of transfer.
- B. Includes any intermediate transfers to or among transferees.

### Transferrable Development Right (TDR)

A development right transferred to a receiving parcel, either by deed, easement, or other legal instrument, pursuant to Chapter 18:1, Part 6, Article XX, of this Chapter 18.

### Transferee

- A. A person to whom development rights are transferred; and
- B. All persons who have any lien, security interest, or other interest with respect to development rights held by a transferee.

### Transferor

- A. A person who transfers development rights; and
- B. All persons who have any lien, security interest or other interest with respect to development rights held by a transferor.

### Transferor Parcel

- A. A parcel of land in an Agricultural (AG) or Countryside (CS) District:
  - (1) From which development rights are transferred;
  - (2) Which is to be designated as open space, wherein only those uses as specified in Column A of the table in § 18:1-12 of this Chapter 18 are allowed; and
  - (3) Which may be less than all of a lot owned by an original transferor.
- B. A transferor parcel must meet the following soils criteria:
  - (1) At least 50% of the land shall classify as Class I, II or III soils; or
  - (2) If the land is wooded, 50% of the land is classified as Woodland Groups 1 or 2; or
  - (3) If there is an insufficient percentage of Class I, II or III soils alone and there is an insufficient percentage of Woodland Groups 1 or 2 soils alone, the land must have a combination of the classifications that meets or exceeds 60%.
- C. Plats of transferor parcels must provide the location of all existing buildings.

### Workforce Housing

Federal guideline define workforce housing as housing that is affordable to households earning incomes within the range of 60 to 120 percent of the area's median household income. Workforce housing includes single-family homes, townhouses, condominiums, starter homes and apartments affordable to area workers.



### Zoning

The reservation of an individual property, section or areas of a jurisdiction for a specific land use or particular type of residential, commercial or industrial structure, enterprise, or activity. The areas reserved for specific land uses or building types are known as zones. The zoning of a municipality or county is addressed in a zoning ordinance that lists the zones and the types of development allowed in each, plus the conditions under which they are allowed. The ordinance includes the zoning maps, which depicts each zone within a jurisdiction, and all landowners, and the zoning of land, along with the zoning ordinance and zoning map, and amendments thereto, must be officially enacted by the local governing body.

- A. **REZONING** – A change of a property's zoning classification. This rezoning could be a change in land use, such as a rezoning from residential to commercial development, or a change in density, such as a rezoning from a classification allowing only low-density single-family development to high density classification allowing apartment development. Rezoning generally must be enacted by the local governing body and when only after they follow certain administrative procedures such as hearings. A petition for a rezoning may be initiated by an agency or entity of the local government, the property owner or another party, depending on the jurisdiction. Laws provide for advance notification to the property owner when a rezoning is being considered.
- B. **UPZONING** – A rezoning from a less intense use, such as agriculture or open space, to a more intense use such as residential or commercial.
- C. **DOWNZONING** – A downzoning is a rezoning of land in a more dense use, such as commercial or high-density apartment residential, to a lesser density use such as open space or low density single-family residential. A downzoning could also be rezoning of land currently zoned for one-acre residential lots to a less dense classification that allows only 20- or 25-acre residential lots. Unless a comprehensive rezoning is planned, parcels may only be rezoned based on two criteria and must be approved by the applicant.
  - (1) That a substantial change has occurred in the neighborhood, or
  - (2) A mistake was made during the last comprehensive plan cycle.
- D. **COMPREHENSIVE REZONING** – A comprehensive rezoning can be done after the local jurisdiction thoroughly examines all of the land use and development activity and trends for that jurisdiction as a whole or for a particular section, region, or neighborhood. Once that analysis is complete, the local governing body can rezone one or more properties within the areas to be comprehensively rezoned. Because it has analyzed all land use and development issues, it can rezone without having to prove that a substantial change has occurred in the neighborhood or that a mistake was med during the last comprehensive plan cycle. A comprehensive rezoning is usually initiated by the local jurisdiction itself and often follows an update of a comprehensive plan. The intent is to ensure that the zoning is made consistent with the new plan.

### Zoning Map

- A. A detailed map showing the location and boundaries of the zoning districts established by Chapter 18 or Chapter 14.
- B. Zoning maps are entitled "Official Zoning Maps, Queen Anne's County, Maryland."

# Appendix 3:

## *Water Resources Analysis and Best Management Practices Toolkit*







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### Section 1.0 Introduction

This report is an Appendix to the Queen Anne's County's 2010 Comprehensive Plan and provides an assessment of impacts of existing and projected growth on the County's water resource limitations, challenges and solutions summarized in Section 2.0 Sensitive Areas of the Comprehensive Plan. This report addresses the requirements for the Water Resource Element (WRE) as outlined in the Maryland Department of Planning's Managing Maryland's Growth, Models and Guidelines #26 – *Water Resources Element: Planning for Water Supply and Wastewater and Stormwater Management*. The WRE analysis considers:

- Land use planning in a geographical context of watersheds.
- Estimated nutrient discharges for total nitrogen and phosphorus.
- Total Maximum Daily Loadings (TMDLs) for total phosphorus and total nitrogen by eight digit watersheds.
- Drinking Water supply to support current and future populations.
- Drinking Water treatment plant capacity.
- Wastewater capacity to support current and future populations,
- Wastewater treatment plant capacity.
- Stormwater impacts on water resources with respect to total nitrogen and phosphorous.
- Best Management Practices Toolkit.
- Conclusions and recommendations.

This WRE assessment was conducted in cooperation with each of Towns within Queen Anne's County in order to provide a complete assessment of all projected growth and public facility availability. In addition, the Towns of Centreville, Queenstown and Church Hill, have prepared assessments with respect to water resources within their jurisdictions and planning areas as part of their Comprehensive Plans. This WRE analysis incorporates those assessments. This Appendix may be incorporated by reference into each Town Comprehensive Plan.

### Section 1.1 Purpose

The purpose of the WRE is to ensure that the future development considered in the County's Comprehensive Plan and the Town's Comprehensive Plans reflect the opportunities and limitations presented by "local" and "regional" water resources. Local and regional water supply sources are predominantly the Aquia, Matawan, Magothy and Upper and Lower Patapsco aquifers, and local and regional receiving waters for stormwater are within the Chester River watershed, Choptank River watershed and the Eastern Bay watershed. The WRE also identifies suitable strategies to reduce nutrients to these "local" and "regional" receiving waters. Planning and assessment for the WRE is done at the eight-digit watershed level.

This assessment provides the basis for future collaboration with others in the region on a watershed basis. HB 1141, passed in 2006, encourages counties and local municipalities to consider water availability and source water protection issues when determining land use and zoning, and to involve state agencies early in the development process, in order to avoid situations where development may be impacted due to water-related issues.





### Section 1.2 Regional & County/Town Water Resource Issues

Many of the County's waterbodies are impaired. Impairments can be the result of one or more pollutant levels that exceed established thresholds for the waterbody. Impairments can be result of local conditions and/or regional conditions that may share the water resource. Adequate steps must be taken at the Regional and County/Town level to ensure that pollutant loadings are minimized.

Total Maximum Daily Load (TMDLs) results for total nitrogen and total phosphorous have been completed for the Corsica River watershed, Southeast Creek watershed, Middle Chester River watershed and the Upper Chester watershed. The TMDL results for the other watersheds in the County are pending completion.

Surface and groundwater supplies in eastern Maryland are generally sufficient; however they are facing increasing demand from a growing population and land irrigation. By 2030, statewide demand for water supply is expected to increase from 1,447 million gallons per day (mgd) to 1,670 mgd, an increase of 223 mgd. Demand in Queen Anne's County for water supply, including Towns, is expected to increase by 2.3 mgd by 2030. With growth and development comes a variety of impacts on the region's water resources. Regional issues include:

- Increasing ground water recharge and stream base flows.
- Reducing nonpoint sources and point sources.
- Reducing stormwater runoff and erosion.
- Reduce the frequency and magnitude of flooding.
- Sustaining the quantity of ground and surface waters to support current and future water usage (water supply, irrigation, in stream aquatic resources, recreation and others).
- Protecting sources of public drinking water supplies from pollutants.
- Confining withdrawals from water supplies (aquifers) for public drinking water or irrigation to the limitations of the water source (aquifer).
- Improving the integrated planning of land use and infrastructure to guide growth into the most desirable areas and to protect rural and natural lands.

At the County level, our economy is heavily dependent on clean streams and bays to support vital aquatic ecosystems and recreational opportunities,

In 2000, Queen Anne's County's freshwater demand included 1.42 mgd from surface sources and 7.26 mgd from groundwater sources for a total of 8.68 mgd, including 4.4 mgd for residential use and 3.9 mgd for livestock watering and irrigation. Current demand for freshwater is projected at 5.2 mgd for the year 2010. This amount would increase by 1.23 mgd by 2020 and another 1.08 mgd by 2030. By the year 2030, the total demand for freshwater is projected at 7.5 mgd. Groundwater supplies are believed to be sufficient for

*County and Town Growth Plans must direct growth to areas where sufficient wastewater capacity exists to ensure that water quality goals can be achieved.*

*Source: Maryland Department of the Environment, Water Resources and Growth Implementation of HB 1141.*





existing and projected demand; however, limited groundwater withdraw from the Aquia aquifer in Kent Island is necessary to reduce further brackish-water intrusion into the Aquia aquifer. Shallow private wells in the Templeville area have experience elevated concentrations of nitrates. In addition to those regional issues previously identified, the following is a listing of key County/Town issues associated with water resources with emphasis on drinking water, wastewater and stormwater. These issues provide the framework for study analysis, as well as the premise for recommended strategies to remedy associated consequences.

### Drinking Water

- Limited detailed hydro-geologic studies.
- Brackish water intrusion into the Aquia aquifer and future impacts of continued eastward migration.
- Additional water treatment for deeper aquifer sources.
- Increasing water storage capacity.
- Agricultural irrigation impacts.

### Wastewater

- Limited sewage treatment plant capacity and limited assimilative capacity of streams can impact development opportunities, particularly in Planning Areas.
- Limited spray irrigation lands.
- Water resources and water quality infrastructure must have sufficient capacity or ability for expansion to accommodate planned growth and development.

### Stormwater

- The amount of impervious surface across the County as well as in developed areas impact the quality, volume and rate of stormwater run-off and pollution of waterways.

The County and others across the state and Chesapeake Bay Watershed are challenged to develop best practices and best methods integrating water resources planning, policies and strategies with growth management planning, policies and strategies.

The key indicators for measuring impacts to Water Resources include:

- Preservation/conservation of designated environmentally sensitive lands;
- Current and future land use patterns:
  - Percentage of development in and outside of Planning Areas and Towns;
  - Percentage of development within Critical Areas; and
  - Nitrogen loads and Phosphorus loads (point source and nonpoint source);
- Conversion of Agricultural and Forest lands to development; and increases in impervious surfaces, especially outside of Planning Areas and Towns.

## Section 1.3 Coordination with Municipalities

Several of the municipalities within county borders provide public water and sewer service to households and businesses. Those municipalities providing public water and sewer service are addressed as part of this Appendix. Included is quantitative data from the municipalities on their drinking water and wastewater. Policy statements and implementation strategies for the Towns are



contained in their individual Comprehensive Plans and Municipal Growth Elements. This analysis was conducted and coordinated with input from participating Towns.

### Section 2.0 Vision for Water Resources

The following vision statement describes the desired outcome for the County's water resources serving as the foundation for more specific goals, objectives and policies developed in this report and the 2010 Comprehensive Plan.

**Water Resources Vision Statement:** *Despite the increase in population, Queen Anne's County is a sustainable region because County government, with strong citizen support and education, coordinated the management of land and water resources; collected, tracked and analyzed essential data; secured adequate funding for water resources planning and management; prepared and continued to update a Water Management Plan; and embraced water conservation through practicing best management practices.*

The Resource Conservation and Environmental Protection Topic Committee for the 2010 Comprehensive Plan update focused on issues and concerns related to environmentally sensitive lands, natural resources and specifically water resources. The Committee reviewed a variety of issues impacting sustainability associated with the health, safety and welfare of the environment.

The following community perspective includes a vision statement related to resource conservation and environmental protection (*water resources being just one of those resources for conservation and protection*) as well as key objectives to be addressed throughout the planning and implementation process. The vision statement is part of a broader community vision with emphasis on valued resources developed as part of the public involvement process by the Resource Conservation & Environmental Protection Topic Committee. The vision for resource conservation and environmental protection envisions:

*Queen Anne's County will remain a rural, agricultural, and maritime County because it restores, enhances, protects and conserves its valuable land, air and water resources through such measures as:*

- *Conservation and protection of agricultural lands, open spaces, woodlands, wetlands, mineral resources, wildlife and their habitats;*
- *Conservation and protection of all water resources: bays, rivers, creeks, lakes, groundwater, and shorelines, including adherence to environmental regulations and low-impact stormwater practices that seek to restore the Chesapeake Bay;*
- *Preservation of good air quality and views, including but not limited to the night sky;*
- *Support for agricultural, maritime, and tourism industries; and*
- *Environmental education programs aimed to promoting energy efficiency, comprehensive recycling practices for residences, businesses and public buildings, clean air and water policies, resource conservation and good land use.*



### Section 2.1 Water Resource Goals & Objectives

The overarching goals to support achievement of this vision developed by the Resource Conservation and Environmental Protection Topic Committee as it relates to water resources are outlined below.

- *Adopt policies, regulations, legislation, enforcement procedures and appropriate funding for programs and projects necessary to restore, enhance, protect and conserve our land, air and water resources; and establish programs designed to generate an awareness of and support for these measures.*
- Maintain safe and adequate drinking water supply to accommodate the needs of current and future populations of the County.
- Identify areas where investment in water and sewer infrastructure is necessary to provide adequate capacity for projected demand and sufficient treatment and technology to reduce pollutant loading to the Chesapeake Bay and its tributaries.
- Identify a variety of land management practices, best management practices and other tools and techniques that protect surface water and groundwater quality and quantity.
- Promote intergovernmental cooperation and coordination with respect to land use planning and implementation with the intent to minimize impacts on water resources.
- Educate and engage the general public in watershed conservation and stewardship.

The following objectives are important to achieve the vision and overarching goals for water resources:

- Achieve nutrient, sediment and pollution reduction necessary to remove each waterway from the MDE Integrated Report of Surface Water Quality;
- Continue to adopt programs to promote and facilitate the permanent protection of Sensitive Areas;
- Protect Critical Areas;
- Prevent negative impacts from development on source water quantity;
- Protection of functioning soil resources;
- Provide adequate public facilities (water, wastewater and stormwater management); and
- Provide environmentally sensitive private water and sewage disposal systems (i.e. private wells, on-lot septic systems and community water and sewerage systems).

### Section 3.0 Results of Assessment of Water Resources

#### Section 3.1 Conclusions

The following conclusions come from the information contained in this report highlighted from various reports and studies cited pertaining to water resources.

##### ***Groundwater/Drinking Water***

- There are adequate drinking water supplies for future population growth; however, the drinking water source will be at a deeper depth and require additional treatment as compared to traditionally-used shallow aquifers.
- In County and Town Planning Areas, projected population increases will produce increased demand on groundwater resources resulting in more and additional pumping and treatment from public-supply wells to meet capacity needs will be necessary. Increased pumping of the



Aquia aquifer on Southern Kent Island, beyond established limits, will produce decreases in water levels which in turn may increase brackish-water intrusion and regional water level issues.

- Approximately 43% of water withdrawn in the County is used for irrigation.
- Pumping restrictions on Kent Island for using the Aquia aquifer to serve future demand within the County Planning Areas and water service areas may require shifts in pumpage distribution between various aquifers and require additional treatment.
- Significant withdrawals from near surface artesian aquifers rather than from deep aquifer sources may cause water levels in those artesian aquifers to decline, which in turn, may cause situations such as: brackish-water intrusion and well failure due to water levels falling below the pump intake.

### **Wastewater**

- Increased sewer capacity and treatment, especially to accommodate future growth in the Planning Areas of Centreville, Queenstown and Sudlersville, will be necessary to meet current and future population needs and reduce nutrient loadings. Public health concerns suggest a need for elimination or reduction of on-site disposal systems on southern Kent Island:
  - 80% of existing septic systems in the Kent Island Estates/Romancoke areas discharge directly into groundwater and that constitutes a failure correctable only by public sewer or other innovative technology.
  - Other areas of concern on Southern Kent Island include: Queen Anne' Colony and Kentmorr Collection subarea; Chesapeake Estates, Sunny Isle of Kent, Normans/Batts Neck and Matapeake Estates Collection sub-area; and Dominion and Marling Farms Collection sub-area.

### **Stormwater**

- A reduction in nutrient loading from designated uses and projected uses is necessary to protect water resources, reduce flooding and other impacts to the natural environment.
- A balanced land use pattern across sub-watersheds with new development and redevelopment targeted for areas with existing County or Town Planning Areas with impervious surface areas not exceeding more than 10% of the sub-watershed land area without increased nutrient management treatment.
- Newly updated stormwater regulations address increased State nutrient reduction requirements and retrofit of existing stormwater systems that do not currently meet the new regulations.

## **Section 3.2 Recommendations**

The use of Best practices and innovative technologies are key implementation strategies to strengthening the sustainability of the County. Strengthening sustainability through better protection and management of water resources will achieve the County's land use goals of:

- Remaining a *quintessential rural agricultural community*;
- Protecting the Chesapeake Bay and its tributaries;
- Improving quality and quantity of stormwater;
- Directing residential growth to designated County and Town Planning Areas;



- Providing of adequate public infrastructure and supporting services; and

The following recommendations are provided based upon study results and assessment of current and future needs in the context of land use policies, strategies and regulation.

### **Drinking Water**

An essential component to successful implementation of a growth management strategy to direct new development and infill development to existing County and Town Planning Areas is the ability to serve these areas with municipal water. The following recommendations are crucial to meeting growth management goals and objectives with respect to public water supplies and facilities.

- Require the development and use of Water Supply Capacity Management Plans for each community water system to support new allocations or connections to the system and to prevent capacity over allocation.
- Establish watershed or wellhead protection strategies for water supply sources.
- Establish water service areas in the County's Comprehensive Water and Sewerage Plan consistent with the Land Use Element based upon ability of the water resource to support development based on population growth as well as development capacity analysis based upon zoning (i.e. make any necessary updates based upon changes to Planning Areas, Town annexations and Priority Funding Areas).
- Develop a Water Protection Plan working collaboratively through inter-jurisdictional agreements between the County and the Towns for planning and implementation.
  - Tracking water-level declines of groundwater resources.
  - Need for additional observation wells placed across the County to measure impacts of pumpage for domestic use and irrigation.
  - Continued monitoring and study to ensure an adequate supply of necessary water resources.
- Implement the immediate and short-term recommendations contained in the Queen Anne's County Water Service Area Study for Queen Anne's County Sanitary District (2009). The following is an abbreviated listing. Refer to the study for more details.
  - Obtain an improved water source for the Chesapeake Bay Business Park Water Treatment Plant (WTP) via a new well drawing from the Lower Patapsco aquifer.
  - Add a new well drawing from the Lower Patapsco aquifer to increase capacity to Thompson Creek WTP.
  - Construct a backup well for the Stevensville WTP.
  - Install new ion-exchange units for the Kent Island Village WTP.
  - Resolve operational connection issues between Bayside service area to the Bridge Pointe Service area.
  - Connect Stevensville service area to the Bayside service area.
  - Add a second well at the Bayside WTP for redundancy and to maximize the amount of treatment capacity.
- Make upgrades to existing water treatment facilities for the Towns as identified in their respective comprehensive plans, such as:
  - Arsenic removal at the Town of Centreville's Business Park water treatment plant to treat up to 1,440,000 gpd.





- Increased water storage capacity near Queen Anne's County High School for up to 600,000 gallons.
- Consider the reuse of water within planned annexation areas around Centreville.
- Implement water conservation policies, guidelines and regulations.
- Update the County's Comprehensive Water and Sewerage Plan consistent with any changes in land use within the 2010 Comprehensive Plan Update.

### **Wastewater**

An essential component to successful implementation of a growth management strategy to direct new development and infill development to existing County and Town Planning Areas is the ability to serve these areas with municipal sewer. The following recommendations are crucial to meeting growth management goals and objectives with respect to public and private wastewater facilities.

- Implement the recommendations contained in the Queen Anne's County Comprehensive Water and Sewerage Plan (2006 and subsequent amendments). The following is an abbreviated listing. Refer to the study for more details.
  - Address on-lot septic system failures on Southern Kent Island and other areas of concern.
  - Upgrade existing facilities as needed to meet future capacity needs.
- Update the County's Comprehensive Water and Sewerage Plan consistent with any changes in land use within the 2010 Comprehensive Plan Update.
- Use of innovative methods including Best Available Technology (BAT) for on-site treatment and disposal of wastewater to address public health concerns by reducing nitrogen discharge levels.
- Continued compliance with state and federal requirements with respect to permitting and reaching nitrogen reduction standards (use of Enhanced Nutrient Reduction (ENR) technologies) for the purpose of contributing to maintaining acceptable levels of water quality.
- Upgrade/replace existing facilities within the Towns using innovative technology to meet current and future capacity needs.
- Enhanced coordination between the County and Municipalities to identify water and sewerage service areas to identify additional water infrastructure and supply development needed to serve expected growth, such as:
  - Rerating the Town of Centreville WWTP to treat up to 750,000 gpd or substantially improve treatment to treat up to 1,000,000 gpd.
  - Acquiring additional land for spray irrigation.
  - Extend stream outfall discharge pipe in Corsica River.
  - Increase stream discharge into Corsica River..
- Develop a financing, operation and maintenance plan for water connections.

### **Stormwater**

Providing adequate treatment for the quality, volume and rate of stormwater run-off is an essential component directing new development and infill development to the County and Town Planning. The following recommendations are crucial to meeting growth management goals and objectives with respect to stormwater management.

- Develop a Watershed Management Plan working collaboratively through inter-jurisdictional agreements between the County and the Towns for planning and implementation.



- Balance the impacts of land use patterns across all landscapes (i.e. natural, agricultural, rural residential, suburban and town/village) by directing new development and infill development to existing County and Town Planning Areas or new County Planning Areas.
- Continue to implement and update as needed the County's stormwater management practices and procedures and Environmental Sensitive Design Manual practices and procedures.
- Evaluate the location of Transfer of Development Rights (TDR) receiving areas to ensure appropriate location within watersheds containing designated Planning Areas that can receive development without exceeding 10% of the watershed land area with impervious surfaces.
- Assess development plans with respect to effectiveness to implement load reduction alternatives on non-point source pollutant loads applying Environmental Sensitive Design (ESD) standards.
- Measure post construction tributary assimilative capacities for impacted sub-watersheds.
- Utilize open space and land preservation programs to provide water protection measures.
- Review and modify existing zoning and development regulations to direct growth to designated County and Town Planning Areas (i.e. ensure adequate receiving areas for TDRs, increase density in Planning Areas, and evaluate other growth management tools, such as, low impact development ordinance, household pollution reduction education programs, landscaping demonstration projects, and use of best management practices for road reconstructions).
- Identify water resource protection criterion in Forest Conservation Plans for individual developments.
- Establish appropriate buffers, setbacks and impervious surface regulations to protect water quality from impacts of development.
- Work collaboratively with the Municipalities and surrounding Counties to adopt water resource protection strategies and regulations.
- Direct growth within Priority Funding Areas (PFA) while managing or reducing the potential for development outside of the PFA to assure the ability to maintain assimilative capacity in the watershed.

### Section 3.3 Summary of Water Resource Assessment

This section provides summary level information with respect to wetlands, Chesapeake Bay Critical Areas, wastewater, drinking water and stormwater as well as a summary of point and nonpoint source impacts.

#### Section 3.3.1 Resource Lands – Agricultural, Forested and Wetlands

An inventory of resource lands such as agricultural lands, forested lands and wetlands identify changes in acreages between 2002 and 2008 as shown in Table 3-1. Overall changes in these land use classifications reflect that 10,701 acres or approximately 5% of total lands within the County were reclassified to other uses between 2002 and 2008. Resource lands could be reduced if *sustainable smart growth management strategy* is not implemented. Those long-term (2050-2100) projected potential loss of resource lands to development could include an additional 23,601 acres or 10% of total lands if preservation goals and the preferred land use is not achieved. Refer to Appendix 5: Build-Out Analysis Report for additional details pertaining to projected reduction in resource lands under maximum capacity build-out.





**Table 3-1: Change in Inventory of Agricultural and Forested Lands and Wetlands**

Select Resource Land Use Classifications	Acreage				Change 2002 – 2008		2050-2100 Projected Conditions
	1973	1997	2002	2008	Acreage Change	% Change	
Agricultural Land	155,014.8	151,335.3	150,107.2	142,962.6	-7,144.6	-4.76%	127,641.6
Forested	72,110.3	63,664.6	63,069.5	59,742.8	-3,326.7	-5.3%	51,962.8
Wetlands	3,664.6	3,760.4	3,839.7	3,609.1	-230.6	-6.0%	
<b>Total County Acreage</b>	<b>238,337 Total Acres in Queen Anne's County</b>						
Calculated Total Acreage from Datasets	230,789.8	218,760.3	217,016.4	206,314.6	-10,701.8	-4.9%	

Source: Queen Anne's County, LGE & MDE/MDP Datasets

## Section 3.3.2 Resource Lands – Critical Areas

Approximately 42,984 acres of land in the County fall within the Chesapeake Bay Critical Area designation. This includes all lands within 1,000 feet of the mean high water line of tidal waters. Development is not prohibited in the Critical Area, but development is restricted by one of three sub-categories. The most restrictive Critical Area sub-category is the Resource Conservation Areas (RCA), which limits densities no greater than 1 dwelling unit per 20 acres and limits impervious surface area generally limited to a maximum of 15% of the lot area. RCA areas are generally undeveloped areas or areas characterized by agricultural use, forests or other natural resources. Approximately 32,688 acres of land area designated as RCA with a total of 620 acres, or 1.9% of the RCA area estimated to be impervious.

The density and intensity of use in the Limited Development Areas (LDA) and Intensely Developed Areas (IDA) are established by the underlying local zoning classifications. Impervious surface areas are generally limited to a maximum of 15% of the lot area in the LDA and 80% of the lot area in IDA. Approximately 8,781 acres of land are designated as LDA with a total of 1,134 acres, or 12.9% of the LDA area estimated to be impervious. Approximately 1,514 acres of land are designated as IDA with a total of 414 acres, or 27.4% of the IDA area estimated to be impervious.

Table 3-2 depicts impervious surface acreages within Critical Areas for the Intensely Developed Areas (IDA), Limited Development Areas (LDA) and Resource Conservation Areas (RCA) designated areas of the County. Currently, five percent of total lands within the Critical Area are impervious surface. When development or redevelopment occurs, impervious surface area and stormwater runoff are minimized based upon application of County's new Environmental Design Standards.

**Table 3-2: Impervious Surface by Critical Area Designation - 2008**

Critical Areas	Total Acres	Impervious Surface		Undeveloped Land	
		Acres	Percent	Acres	Percent
Intensely Developed Area – IDA	1,514.7	414.8	27.4%	1,099.9	72.6%
Limited Development Area – LDA	8,781.3	1,134.0	12.9%	7,647.3	87.1%
Resource Conservation Area – RCA	32,688.5	620.4	1.9%	32,068.1	98.1%
<b>Total Critical Areas</b>	<b>42,984.5</b>	<b>2,169.2</b>	<b>5.0%</b>	<b>40,815.3</b>	<b>95.0%</b>

Source: Queen Anne's County, LGE & MDE/MDP Datasets



## Section 3.3.3 Water Resources – Wastewater

Table 3-3 identifies the demand and capacity of public wastewater treatment systems for various County and Town Planning Areas. The available capacity of existing public systems is sufficient for existing populations; however, additional capacity will be necessary to support projected growth within the various wastewater service areas. The wastewater treatment facilities are not interconnected and serve specific geographic County and Town Planning Areas where future growth is to be directed, or has been extended to correct septic tank failures. Expansion of existing facilities and the provision of new facilities are identified to meet the needs of planned growth as it occurs. The timing of planned expansions will be based upon individual facility needs as well as available funding from public and private partnerships.

**Table 3-3: Public Sewer Systems Demand and Capacity Summary**  
**Million Gallons per Day (MGD)**

Wastewater Treatment Plant (WWTP) Facility	Capacity Design (MGD)	Average Daily Flow (MGD)	Remaining Capacity (MGD)	Planned Growth – Future Demand Comments Relevant to Facility
Kent Narrows Stevensville Grasonville (KNSG) WWTP	3.000	1.533	1.467	The KNSG plant has reserved capacity for future development that includes non-residential space and 1,418 dwelling units plus 500,000 gallons per day (GPD) for failing septic systems. The plant is approaching capacity with these reserves.
Queenstown	.085	0.077	0.008	Plant is essentially at capacity; however the Town anticipates adding capacity for planned development as per the Queenstown Community Plan.
Centreville	0.542	0.381	0.161	The Centreville Community Plan identifies planned development which could exceed existing plant capacity; however additional plant capacity is anticipated to accommodate planned development.*
Church Hill	0.080	0.047	0.033	The Town anticipates using remaining capacity for planned development as per the Church Hill Community Plan. Plant may need to expand capacity to accommodate anticipated Priority Funding Area (PFA) expansion as well as meet the requirement that all new development within PFA be connected to sewer.
Sudlersville WWTP & Barclay**	0.090	0.044	0.046	Remaining capacity of 50,000 gpd is reserved for a new school flow and connection to the Town of Barclay. Anticipated flow associated with growth will require expansion of plant capacity.
Chesapeake College	0.015	0.005	0.010	Chesapeake College plant will utilize remaining capacity as needed to support campus expansion.

\* The Town of Centreville requested and, in 2008, MDE re-rated the new Wastewater Treatment Plant (WWTP) to process an annual daily average of 542,000 gpd of flow. This new WWTP is also capable of expansion to handle up to 1.2 million gpd of flow.

\*\* Barclay is dependent on Sudlersville for Capacity; flows include anticipated connections.



## Section 3.3.4 Water Resources – Drinking Water

Table 3-4 identifies the public water system demand and capacity for facilities owned and operated by the County and for facilities owned and operated by the Towns. Existing water treatment facilities are generally sufficient to serve existing users; however, additional capacity will be necessary to support projected growth within the various water service areas. This table reflects existing demand and planned capacity needs with projected capacity surpluses or deficits. The various public water systems are not interconnected and generally serve specific geographic County and Town Planning Areas. Interconnectivity of County facilities, new facilities and/or system expansions may be necessary to meet future demands for planned growth in several communities.

**Table 3-4: Water System Demand and Capacity**

Facility	Total Permitted Annual Average Daily Appropriations	Existing Demand	Population Served	Excess Annual Average Daily Capacity	Planned and Anticipated Capacity Needs	Net Excess Capacity	Potential Additional Users
<b>County Facilities</b>							
Bayside Chester Growth Area	198,000 gpd	114,585 gpd	1,550	83,415 gpd	35,000 gpd	48,415 gpd	194
Bridge Pointe Chester Growth Area	211,600 gpd	90,229 gpd	750	121,371 gpd	32,500 gpd	88,871 gpd	355
Grasonville Grasonville Growth Area	100,000 gpd	51,170 gpd	766	48,830 gpd	60,000 gpd	-11,170 gpd	--
Oyster Cover Kent Narrows Growth Area	95,800 gpd	90,229 gpd	588	5,571 gpd	51,000 gpd	-45,429 gpd	--
Prospect Bay Stevensville Growth Area	125,000 gpd	104,711 gpd	754	20,289 gpd	2,250 gpd	18,039 gpd	72
Riverside Chester Growth Area	5,100 gpd	6,510 gpd	58	-1,410 gpd	3,750 gpd	-5,160 gpd	--
Stevensville Stevensville Growth Area, Chesapeake Bay Business Park and Thompson Creek	925,000 gpd	706,430 gpd	5,530	218,570 gpd	110,000 gpd	108,570 gpd	434
<b>TOTAL</b>	1,660,500 gpd	1,163,865 gpd	9,996	496,635 gpd	294,500 gpd	202,135 gpd	809
<b>Town Facilities</b>							
Centreville	645,000 gpd	459,800 gpd	2,534	185,200 gpd	20,000 gpd	165,200 gpd	660
Queenstown	77,000 gpd	102,000 gpd	635	-25,000 gpd	180,000 gpd	-205,000 gpd	-
Sudlersville	17,500 gpd	19,470 gpd	432	-1,970 gpd	83,000 gpd	-84,970 gpd	-
<b>TOTAL</b>	739,500 gpd	581,270 gpd	3,601	158,230 gpd	283,000 gpd	-124,770 gpd	-660



Assessment of drinking water is accomplished by reporting on freshwater withdrawal by facility, treatment capacity and a summary of water system demand and capacity. Table 3-5 identifies the estimated freshwater withdrawal for the County with the identified groundwater allocation permit or well withdrawal limits should the most productive well used by that facility should become unavailable for any purpose. Under current demands, the Stevensville, Oyster Cove and Riverside facilities show a deficit in the event the best well is out of services.

**Table 3-5: GAP Well Withdrawal Limits Compared to Service Area Demand Projections**

Service Area	GAP Well Withdrawal Limits		2006 Daily Well Withdrawal		Deficit with Best Well Out-of-Service, GPD
	Total GPD	Best Well Out-of-Service GPD	Average	Max-Month Daily Average	
<b>County Facilities</b>					
Stevensville	1,255,000	265,000	639,000	811,000	546,000
Bridge Pointe	170,000	170,000	68,000	93,000	0
Bayside	300,000	45,000	91,000	135,000	90,000
Oyster Cove	187,000	187,000	84,000	135,000	0
Riverside	8,500	0	4,800	6,000	6,000
Grasonville	210,000	210,000	60,000	88,500	0
Prospect Bay	195,000	195,000	85,500	146,000	0
<b>Town Facilities</b>					
Centreville	645,000	NA	400,000	627,000	NA
Queenstown					
Sudlersville					

Source: Queen Anne's County, Water Service Area Study for Queen Anne's County Sanitary District, 2009

GPD=Gallons Per Day

GAP = Groundwater Allocation Permit

Table 3-6 identifies the net treatment capacity and deficits for County water treatment facilities. There is a need to improve on treatment capacity at the Stevensville and Grasonville water treatment facilities to meet 2010 demands and a need for additional treatment capacity for the projected 2040 demand for all facilities with the exception of the Riverside and Bayside-Queen's Landing treatment plants. Treatment enhancements are required unless systems can be interconnected and utilize the combined treatment capabilities of several facilities or all facilities to meet projected demands.



**Table 3-6: Net Treatment Capacity Compared to Service Area Demand Projections**

System	Net Treatment Capacity	Max-Daily Demand Assuming Moderate Growth (GPD)			Net Treatment Capacity Deficit Compared to 2010 Demands, GPD
		2008	2010	2040	
<b>County Facilities</b>					
Stevensville	478,400	609,000	869,000	1,480,000	390,600
Bridge Pointe	258,325	74,000	228,000	271,000	0
Bayside-Queen’s Landing	355,010	107,000	168,000	264,000	0
Oyster Cove	237,900	125,000	197,000	254,000	0
Riverside	37,560	2,700	6,300	9,500	0
Gransonville	154,100	84,000	158,000	194,000	3,900
Prospect Bay	182,000	140,000	144,000	218,000	0
<b>Town Facilities</b>					
Centreville Business Park	720,000	NA	NA	NA	
Centreville North Brook	750,000	400,000	440,000	NA	350,000
Queenstown					
Sudlersville					

Source: Queen Anne's County, Water Service Area Study for Queen Anne's County Sanitary District, 2009

## Section 3.3.5 Water Resources – Stormwater

A change in land cover from vegetated or forested conditions to impervious surface increases stormwater run-off volumes, which when unmanaged can contribute to a reduction in water quality and can have the potential for flooding downstream properties. Construction associated with a wide array of community development activities results in a reduction of functioning soils resources which increases rates of stormwater run-off. Therefore, there are County stormwater regulations for stormwater management when development occurs to require development activities to treat stormwater to a level that matches the output of the site as if it were in the forested condition.

Studies have documented that the quality of aquatic habitat in streams, lakes and wetlands begins to decline when the area of impervious surface within a watershed reaches 10 percent of the total land area. However, if managed properly, impervious surfaces exceeding 10 percent in Planning Areas can be achieved. Based upon the 2008 conditions depicted in Table 3-7, watersheds at or near 10% include the Kent Island Bay and Eastern Bay Watersheds since the impervious cover has reached 10.23% and 9.04% respectively. Based upon 2030 projected development patterns, there's the potential for 7.1% of Corsica River Watershed and 7.5% of Kent Narrows Watershed to be impervious, with the Eastern Bay Watershed increasing to 12.2% and Kent Island Bay Watershed to 12.9%. The Sustainable Smart Growth Management Plan in Section 1.0 and Priority Preservation Areas identified in Section 3.0 address these sub-watershed conditions with the intent to reduce impacts on the environment.





**Table 3-7: Impervious Surface Coverage –  
Comparison of Existing Conditions (2008) and Projected Conditions (2030)**

Watershed	Total Watershed Acres	Acres of Impervious Surface	2008 % Impervious Surface	2030 Impervious Surface Potential Under Current Zoning in Acres	2030 Preferred Future Land Use % Impervious Surface
Corsica River Watershed	23,877.8	855.4	3.58%	9,996.69	7.1%
Eastern Bay Watershed	11,497.1	1,038.9	9.04%	3,145.70	12.2 %
Kent Island Bay Watershed	5,171.8	529.2	10.23%	1,242.47	12.9%
Kent Narrows Watershed	6,815.5	382.1	5.61%	1,685.62	7.5%
Lower Chesapeake*	8.1	0.2	2.55%		
Lower Chester River Watershed	17,647.5	810.8	4.59%	6,380.03	5.2%
Middle Chester Watershed	7,849.9	246.1	3.14%	3,596.93	5.0%
Southeast Creek Watershed	34,721.6	660.8	1.90%	17,978.53	2.0%
Tuckahoe Creek Watershed	46,085.5	747.6	1.62%	20,071.06	1.0%
Upper Chester River Watershed	52,066.8	1,073.4	2.06%	27,169.79	2.0%
Upper Choptank Watershed	1,924.8	26.4	1.37%	28.87	1.5%
Wye River Watershed	29,512.4	838.7	2.84%	13,193.36	3.9%
<b>Total</b>	<b>237,178.8</b>	<b>7,209.6</b>	<b>3.04%</b>	<b>105,234.41</b>	

Source: Lands Available for Development – Build-Out Analysis, 2009 and WRE Tables Section 11.0

\*Lower Chesapeake Watershed –portion located within County boundaries is too small for assessment.

### Section 3.3.6 Summary of Point and Nonpoint Sources Impacts

Table 3-8 identifies the total nitrogen and phosphorus loadings for point and nonpoint sources for existing land use conditions in 2008 and for two future development scenarios referred to as build-out scenarios: Scenario 1-Maximum Build-Out under current zoning regulations (a scenario considered “worst case”) and Scenario 2-Sustainable Smart Growth Management Strategy with maximum preservation of rural agricultural areas and directing growth to County/Town Planning Areas.

As previously described, Scenario 1-Maximum Build-Out is described in detail in Appendix 5. Scenario 2 depicts the impacts for the preferred future land use scenario reflected on Maps LU-7A and LU-7B. Scenario 2 applies a variety of *sustainable smart growth management* principles resulting in lower levels of impacts to water resources with respect to quality.





### Section 3.3.7 Best Management Practices, Tools & Techniques

Water resources are best protected when a variety of best management practices, tools and techniques are available for use based upon both general characteristics of the assigned landscape typology as well as site specific conditions. Table 3-9 summarizes the best management practices (BMP), tools, techniques and strategies typically associated with general characteristics of landscapes organized by State Tributary Strategy. The State Tributary Strategies as outlined in Maryland's Chesapeake Bay Tributary Strategy Statewide Implementation Plan (January 2008) includes a variety of strategies that

Counties should consider through implementation of land use and environmental regulation of development.

BMPs, tools, techniques and strategies specific to each eight digit watershed and agricultural, natural, rural, suburban and town/village landscapes identified below and defined in Appendix 3. As previously mentioned, landscapes are further defined in Section 1.0: Land Use.



## Appendix 3: Water Resources Analysis and Best Management Practices Tool Kit

**Table 3-8: Summary of Point and Nonpoint Source Impacts for Existing Conditions and Future Growth Scenarios**

<i>(all data in lbs/year)</i>			Barclay Planning Area	Centreville Planning Area	Church Hill Planning Area	Island Growth Area	Queenstown Planning Area	Sudlersville Planning Area	County Total
<b>2008: Existing</b>	<b>Nonpoint</b>	<b>TN</b>	1,842	61,214	7,437	41,792	25,394	21,556	159,235
		<b>TP</b>	104	5,330	582	4,013	2,197	1,785	14,011
	<b>Point</b>	<b>TN</b>	-	1,616	669	10,000	-	-	12,285
		<b>TP</b>	-	58	50	700	-	-	808
	<b>Total</b>	<b>TN</b>	<b>1,842</b>	<b>62,830</b>	<b>8,106</b>	<b>51,792</b>	<b>25,394</b>	<b>21,556</b>	<b>171,520</b>
		<b>TP</b>	<b>104</b>	<b>5,388</b>	<b>632</b>	<b>4,713</b>	<b>2,197</b>	<b>1,785</b>	<b>14,819</b>
<b>Scenario 1: Maximum Build-Out</b>	<b>Nonpoint</b>	<b>TN</b>	2,802	60,394	8,837	57,575	23,080	17,983	170,671
		<b>TP</b>	113	5,791	568	4,375	2,161	1,728	14,736
	<b>Point</b>	<b>TN</b>	-	19,767	2,312	27,850	5,420	1,792	57,141
		<b>TP</b>	-	1,483	173	2,039	406	135	4,236
	<b>Total</b>	<b>TN</b>	<b>2,802</b>	<b>80,161</b>	<b>11,149</b>	<b>85,425</b>	<b>28,500</b>	<b>19,775</b>	<b>227,812</b>
		<b>TP</b>	<b>113</b>	<b>7,274</b>	<b>741</b>	<b>6,414</b>	<b>2,567</b>	<b>1,863</b>	<b>18,972</b>
<b>Scenario 2: Sustainable Smart Growth Management Strategy</b>	<b>Nonpoint</b>	<b>TN</b>	1,027	57,670	5,278	39,784	23,080	17,983	144,822
		<b>TP</b>	113	5,791	568	4,375	2,161	1,728	14,736
	<b>Point</b>	<b>TN</b>	532	20,534	2,166	33,627	5,420	4,697	66,976
		<b>TP</b>	40	1,540	162	2,472	390	353	4,957
	<b>Total</b>	<b>TN</b>	<b>1,559</b>	<b>78,204</b>	<b>7,444</b>	<b>73,411</b>	<b>28,500</b>	<b>22,680</b>	<b>211,798</b>
		<b>TP</b>	<b>153</b>	<b>7,331</b>	<b>730</b>	<b>6,847</b>	<b>2,551</b>	<b>2,081</b>	<b>19,693</b>

Source: Appendix 3 – Water Resource Analysis and Best Management Practices Toolkit 2010

Note: TN=Total Nitrogen, TP=Total Phosphorus.



## Appendix 3: Water Resources Analysis and Best Management Practices Tool Kit

**Table 3-9: Summary of Best Management Practices, Tools, Techniques and Strategies**

BMP, Tools, Techniques and Strategies (Tributary Strategy)	Agricultural Landscapes	Natural Landscapes	Rural Residential Landscapes	Suburban Landscapes	Town/Village Landscapes
<b>Point source/Urban Source Strategy</b>				Expand water & wastewater system treatment	Expand water & wastewater system treatment
<b>Stormwater Strategy</b>	BMPs and Agricultural Best Practices	BMPs, Conservation and Agricultural Best Practices	BMPs and ESD	BMPs and ESD	BMPs and ESD
<b>Onsite Sewage Disposal Strategy (OSDS)</b>	BAT	BAT	BAT	Septic Elimination through connection to public sewer and BAT	Septic Elimination through connection to public sewer
<b>Growth Management Strategy</b>	PDR and Conservation/ Preservation	PDR, Conservation/ Preservation and Restrict Development in Critical Area Buffers	Cluster Development, ESD and Existing Infrastructure	Public Water and Wastewater Systems, TDR Receiving Areas	Infill/ Redevelopment, TDR Receiving Areas
<b>Agricultural Strategy</b>	Agricultural BMPs , Stormwater BMPs and Preservation/ Conservation	Stormwater BMPs and Preservation/ Conservation	Stormwater BMPs, Preservation/ Conservation and Cluster Development	TDR Receiving Areas	TDR Receiving Areas
<b>Waterway Strategies</b>	Buffers, Preservation/ Conservation and Tree Planting	Buffers, Preservation/ Conservation, Tree Planting and Living Shore Construction	Buffers, Preservation/ Conservation, Tree Planting and Living Shore Construction	Buffers, Tree Planting and Living Shore Construction	Buffers, Tree Planting and Living Shore Construction
<b>Air Deposition Strategy</b>	Forest Conservation and Preserve Green Infrastructure	Forest Conservation and Preserve Green Infrastructure	Forest Conservation Plans and Wooded Lot Standards	Forest Conservation, Woodlot Standards, Greenbelts and Trails/Paths	Walkable Communities (Pedestrian Facilities) and Expand Transit

Source: Appendix 3: Water Resource Analysis and Best Management Practices Toolkit 2010

BAT=Best Available Technology; BMPs=Best Management Practices, ESD=Environmental Sensitive Design, TDR=Transfer of Development Rights, PDR=Purchase of Development Rights



### Section 3.4 Importance of Water Resource and Preservation in Determining Preferred Future Land Use

Land use and water resources are unequivocally linked. The type of land and the intensity of its use will have a strong influence on the receiving water resource. Depending upon the type of land use, the impacts on either the quantity or quality of water can be substantial.

This study assessed impacts on water resources with respect to nutrient loading and water/wastewater capacity needs for the following planning scenarios:

- Existing Conditions (base line);
- Maximum Capacity Build-Out under current zoning; and
- A Preferred Land Use Scenario projecting existing conditions with refinement applying a rural agricultural preservation strategy.

#### Section 3.4.1 Sustainable Smart Growth Management Strategy

Existing development and development potential to the year 2030 and beyond were studied to determine the impacts on environmentally sensitive areas and water resources, as identified in Appendix 5: Build-Out Report. Through the analysis of development potential, preservation opportunities and impacts on water resources, a **Sustainable Smart Growth Management Strategy** (Scenario 2) emerged as the planning approach for further study and evaluation to map the preferred future land use for the County.

This **Sustainable Smart Growth Management Strategy** applies the Twelve Visions of Article 66B, water resource protection strategies and **smart growth** principles emphasizing new growth to be directed to County and Town Planning Areas. This analysis and study of future land use takes into the following key components of **sustainable smart growth management** as they relate to Queen Anne's County:

- **Protection of sensitive areas and water resources** applying a variety of tools and techniques such as restricting floodplains, stream buffers and environmentally sensitive areas from consideration for development;
- **Protection of agricultural lands** for the purpose of achieving the County's Priority Preservation Goal identified in Section 3.0 Priority Preservation Areas (PPA) Element in order to maximize preservation opportunities. The analysis applies the **alternative rural land use preservation strategy** (Option 2) outlined in Section 3.0 to limit on-site development within Agriculture (AG) and Countryside (CS) zoning districts and utilizing TDRs to direct growth to County and Town Planning Areas.
- **Concentrating growth within Planning Areas** at an average density of 3.5 dwelling units per acre while preserving land with the rural agricultural areas. **Consideration of adequate public facilities** with respect to water, sewer and transportation improvements.



### Section 4.0 Existing and Projected Conditions

#### Section 4.1 Population Projections

The following tables represent population trends and projections supplied by the Maryland Department of Planning, Table 4-1.

**Table 4-1: Population Trends & Population Projections**

	1970	1980	1990	2000	2007	2008	2010	2020	2030	Compound Annual Growth Rate		
										2000-2010	2010-2020	2020-2030
Queen Anne's County	18,422	25,508	33,953	40,563	46,571	47,091	48,650	55,650	61,900	2.0%	1.4%	1.1%
Upper Eastern Shore <sup>1</sup>	131,322	151,380	180,726	209,295	235,356	236,521	243,850	288,550	328,400	1.7%	1.8%	1.4%
Maryland	3,923,897	4,216,933	4,780,753	5,296,486	5,618,344	5,633,597	5,779,400	6,339,300	6,684,250	0.9%	1.0%	0.5%

Source: Maryland Department of Planning, 2008 US Census Bureau Estimates

<sup>1</sup> Caroline, Cecil, Kent, Queen Anne's & Talbot Counties

#### Section 4.2 Watersheds

Queen Anne's County is located within the Chesapeake Bay Watershed, a watershed that stretches over an area over 64,000 square miles in size and encompassing six states. The Chesapeake Bay Watershed contains many smaller sub-watersheds. These smaller sub-watershed areas to be used by local jurisdictions to elevate water resources are referred to by the Maryland Department of Environment (MDE) as "eight-digit" watersheds. Eight-digit refers to the Hydrologic Unit Code (HUC) as carried out to 8 places, meaning that these sheds are sub-sheds to the larger watershed. Queen Anne's County is divided between eleven eight-digit watersheds. A map depicting the eight-digit watersheds in Queen Anne's County is included in **Map ESA-4 – Watersheds**. Map ESA-4 also illustrates those watersheds considered by MDE to have impairments and/or a completed Total Maximum Daily Load (TMDL) studies and established TMDLs for nutrients. Map ESA-4 indicates that all watersheds in Queen Anne's County have impairments and that four of the eleven eight-digit watersheds within the County have a completed TMDL study for nutrients by MDE.

There is a small portion of the Lower Chesapeake Bay watershed in Queen Anne's County on the western edge of Kent Island - the portion, less than 2 acres, that was considered "deminimus" or "too small" by MDE, for reporting purposes and is therefore not included in reports or summaries.

#### Section 4.3 Anti-degradation Policy

The State's anti-degradation policies regulate discharges to surface waters to maintain or improve the existing level of water quality. The policies provide differing degrees of protection according to one of three "tiers" of water quality protection assigned to all surface waters depending on their function. These anti-degradation policies are used to evaluate new discharges to waterways according to the water body's "tier" designation.

Since there are no Tier I and III designated surface waters identified in the following subsection emphasizes Tier II waters.





### Section 4.3.1 Tier I Waters

Tier I mandates that water uses and the level of water quality necessary to protect the uses (i.e. fishable and swimmable) Any pollutant discharged to a waterway that could endanger this level of protection is prohibited.

### Section 4.3.2 Tier II Waters

The Tier II designation is assigned to waters where existing water quality is better than the levels needed to meet the Federal Clean Water Act standards. Tier II waters may not receive new or increased discharges that would degrade water quality of the water body below the Tier II standards.

The Maryland Department of the Environment (MDE) describes Tier II water bodies as the following; “In addition to protecting existing uses and meeting the minimum water quality goals (sometimes referred to as “fishable and swimmable”) which are subject to the MDE anti-degradation review policy. The goal of MDE anti-degradation review for projects in watersheds containing Tier II waters is to ensure that water quality is not degraded beyond the capacity to maintain a high quality status. Applicants proposing activities that will potentially impact Tier II waters must undergo anti-degradation review before permits are approved or activities can be added to a county's water and sewer plan.”

The following are applicable policies, regulations and requirements established by the MDE with respect to county plans, reviews and exemptions.

- **County Plans** –If a proposed amendment to a County Water and Sewer Plan results in a new discharge or a major modification of an existing discharge to a Tier II water body, the applicant shall perform a Tier II anti-degradation review.
- **Tier II Anti-degradation Review** – The analysis must include reasonable alternatives that do not require direct discharge to a Tier II water body (no-discharge alternative). The analysis must include cost data and estimates to determine the cost effectiveness of the alternatives.
- **Exemptions** – The requirement to perform a Tier II anti-degradation review does not apply to individual discharges of treated sanitary wastewater of less than 5,000 gallons per day, if all of the existing and current uses continue to be met.

### Section 4.3.3 Tier III Waters

Tier III governs high-quality waters that are considered outstanding national resources, such as waters of national and State parks and wildlife refuges, or waters of exceptional recreational or ecological significance. Tier III guidelines prevent any action that would threaten the quality of these waters.

## Section 4.4 Tier II Waters in Queen Anne's County

The Tier II catchments areas encompass approximately 40.6% of the land area of the County. The Tier II Catchment areas include approximately 151 square miles or approximately 96,400 acres. Table 4-4: Tier II Catchment Areas by Watershed illustrates the percentage of each watershed that is in a Tier II Catchment Area. The Sanitary Sewer Service Areas within Tier II High Quality Waterways located in Queen Anne's County's thirteen Tier II catchment areas are illustrated in Map ESA-6.





**Table 4-2: Tier II Catchment Areas by Watershed**

Watershed	Tier II Catchments	
	Acres	Percent of Watershed
Corsica River	12,339	51.7%
Eastern Bay	0	0.0%
Kent Island Bay	0	0.0%
Kent Narrows	0	0.0%
Lower Chester River	51	0.3%
Middle Chester River	0	0.0%
Southeast Creek	16,857	48.5%
Tuckahoe Creek	35,307	76.5%
Upper Chester River	25,284	48.4%
Upper Choptank	239	12.4%
Wye River	6,286	21.3%
<b>TOTAL</b>	<b>96,363</b>	<b>40.6%</b>

*Source: Calculated using Tier II Catchment Areas identified by MDE.*

Within the Tier II catchment areas, there are nineteen listed surface water streams that have been designated by the MDE as Tier II waters. Table 4-5: Queen Anne's County Tier II Waters, indicates the date the stream segment was listed, the 12-digit watershed and the Index of Biotic Integrity (IBI).

The Index of Biotic Integrity (IBI) is a tool or scale which is used to determine the health and integrity of the fish community in a given waterway. Maryland utilizes a scale of 1-5. The lower the score, the healthier the system is to support a variety of aquatic habitats.



**Table 4-3: Queen Anne's County Tier II Waters**

Queen Anne's County Tier II Waters				
Date Listed	Stream Name	12 Digit Watershed	Fish IBI*	Benthic IBI*
2008	Alder Branch 1	021305070395	4.67	4.71
2003	Andover Branch 1	021305100425	4.17	4.57
2009	Andover Branch 2	021305100425	4.33	5.00
2007	Andover Branch UT 1	021305100425	4.67	4.71
2007	Blockstone Branch UT 1	021304050529	4.00	4.14
2008	Browns Branch 1	021305080401	4.33	4.71
2008	Browns Branch 2	021305080401	4.44	4.71
2007	Granny Finley Branch 1	021305080399	4.00	4.00
2008	Mill Stream Branch 1	021305070396	4.67	4.43
2007	Norwich Creek 1	021304050522	4.67	4.71
2003	Red Lion Branch 1	021305100419	4.30	4.45
2007	Red Lion Branch UT 1	021305100420	4.33	4.14
2007	Southeast Creek 1	021305060401	4.67	4.43
2008	Southeast Creek 2	021305080401	4.17	4.29
2003	Southeast Creek UT 1	021305080403	4.33	5.00
2007	Three Bridges Branch 1	021305070397	4.17	4.43
2008	Tuckahoe River 1	021304050531	4.67	5.00
2007	Wye East River UT 1	021305030436	4.67	4.71
2008	Wye East River UT 2	021305030436	4.00	4.14

*Note: Specific latitude and longitude for each stream section can be obtained on MDE's website.*

\*IBI = Index of Biotic Integrity

*Source: Maryland Department of the Environment, 2009.*

## Section 4.5 Impaired Water Bodies and TMDLs

Waters are classified as impaired when they exceed the water quality standards established for the water body. There are numerous standards or thresholds, including dissolved oxygen, nutrients (such as nitrogen and phosphorous), sediments, bacteria, metals, and other toxic contaminants, and biological criteria that can be measured to determine if the water body can meet the requirement to "support aquatic life."

Total Maximum Daily Loads (TMDLs) are assessments of the water bodies' threshold for accepting pollutant loads. A TMDLs assessment includes estimates of the maximum amount of pollution loads, from all sources, at which the water quality standards of that water body is attained. **Map ESA-4-Watersheds**, illustrates the impaired watershed in the County that have a TMDL study completed. At this time, TMDL assessments have not been completed by the MDE for seven of the County's eleven sub-watersheds. MDE anticipates the studies to begin in 2010-2011. Once TMDL values are established, new development in those watersheds must comply with those standards. Table 4-6 lists the impairment status and available TMDL values for nitrogen and phosphorus.



**Table 4-4: Watershed Impairment & TMDL Status**

MDE-8-Digit Number	Watershed Name	Impairment Status	TMDL for Nitrogen (lbs/year)	TMDL for Phosphorus (lbs/year)
02130404	Upper Choptank <i>(includes Templeville and surrounding area)</i>	Impaired	Pending	Pending
02130405	Tuckahoe Creek <i>(includes Queen Anne and surrounding area)</i>	Impaired	Pending	Pending
02130501	Eastern Bay	Impaired	Pending	Pending
02130503	Wye River <i>(includes Queenstown and surrounding area)</i>	Impaired	Pending	Pending
02130504	Kent Narrows	Impaired	Pending	Pending
02130505	Lower Chester River	Impaired	Pending	Pending
02130507	Corsica River <i>(includes Centreville and surrounding area)</i>	Impaired w/TMDL Completed	Year 2000 Study 287,670	Year 2000 Study 22,244
02130508	Southeast Creek <i>(includes Church Hill and surrounding area)</i>	Impaired w/TMDL Completed	Not Studied	Year 2003 Study 21,113
02130509	Middle Chester River	Impaired w/TMDL Completed	Year 2006 Study 275,437	Year 2006 Study 16,709
02130510	Upper Chester River <i>(includes Sudlersville Barclay and surrounding area)</i>	Impaired w/TMDL Completed	Year 2006 Study 614,612	Year 2006 Study 34,354
02130511	Kent Island Bay	Impaired	Pending	Pending

Source: Maryland Department of the Environment, 2009.



## Section 4.6 Land Use and Impervious Cover by Watershed

Table 4-7 shows acreage of different types of land cover and the amount of impervious surface area for each of the sub-watersheds within the County.

**Table 4-5: Existing Land Cover and Impervious Area by Watershed (Acres) – 2008**

Watershed	Total Area	Commercial	Industrial	Residential	Agricultural	Natural Features*	Transportation & Utilities	Impervious Surface**
Corsica River	23,886.0	578.60	0	2,487.9	14,412.00	6,272.5	135.0	855.0
Eastern Bay	11,540.5	566.2	0.4	4,419.3	3,844.6	2,668.0	42.0	1,039.0
Kent Island Bay	5,040.9	304.7	0	2,138.90	1,133.2	1,437.3	26.8	529.0
Kent Narrows	6,793.8	129.3	0	1,884.3	2,241.4	2,529.7	9.1	382.0
Lower Chester River	17,659.9	432.7	56.9	1,983.2	9,636.1	5,390.0	161.0	811.0
Middle Chester River	7,815.3	80.6	0	1,035.9	5,754	944.8	0	246.0
Southeast Creek	34,730.9	144.2	0	2,157.9	22,880.1	9,395.7	129.0	661.0
Tuckahoe Creek	46,047.1	69.70	0	1,935.3	32,125.9	11,916.2	0	748.0
Upper Chester River	52,157.9	314.0	55.8	4,272.4	30,946.3	16,460.2	109.2	1,073.0
Upper Choptank	1,926.0	0.3	0	83.2	937.8	904.7	0	26.0
Wye River	29,512.9	311.4	163.2	2,943.3	18,640	7,334.8	129.2	839.0

Source: Calculated for each sub-watershed using data provided by Queen Anne's County Department of Land Use, Growth Management and the Environment. \*\*Values from Impervious Cover Geodatabase.

Existing development and development potential to the year 2030 and beyond were studied to determine the impacts on environmentally sensitive areas and water resources. The Build-Out Report contained in Appendix 5 analyzes existing conditions and build-out scenarios under maximum capacity conditions (referred to as Scenario 1). Through this water resources impact analysis of the potential impacts of development, a Growth Management Strategy (Scenario 2) emerged as the preferred future development scenario for further study and evaluation by directing development to County and Town Planning Areas.

Scenario 2 represents a balance of interests with respect to the preservation/conservation of agricultural and natural lands, community development and protection of water resources. The projected land cover/land use, impervious surface and protection of agricultural and natural lands for this scenario also referred to as the **preferred future land use plan** is detailed in Section 11.0 for each of the sub-watersheds. Impervious surface area has been calculated using two methods, one by Queen Anne's County and the other method calculated by Maryland Department of the Environment. A comparison of the two methods is provided in Table 4-8.



- The Queen Anne's County Department of Land Use, Growth Management & Environment impervious cover geodatabase was created in 2009. The impervious cover geo-database provides a general estimate amount of impervious cover within each watershed, based on features including paved and unpaved roads, bridges, paved and unpaved parking lots, driveways, public sidewalks, pools, buildings, paved athletic areas (i.e. – tennis courts), decks and patios, and stockpile, or mining areas. The percentage of impervious surface per watershed ranges from 1.4% in the Upper Choptank Watershed to 10.5% in the Kent Island Bay Watershed.
- Maryland Department of Environment provided an estimate of the amount of impervious cover and loading values per watershed (refer to Section 11.0 for tables for each sub-shed and Town). The estimates are based on acreage of land use as multiplied by a "standard" percentage that would be expected per land use. The percentage of impervious cover per watershed ranges deviate slightly from the County's results, due to the level of sophistication of the County's geo-database.

**Table 4-6: Comparison of Impervious Cover Estimates**

Watershed	MDE - MDP Values from WRE Tables		Queen Anne's County Department of Land Use, Growth Management & Environment Values from Impervious Cover Geodatabase	
	Estimate Impervious Cover (Acres)	Percent of Watershed	Impervious Cover (Acres)	Percent of Watershed
Corsica River	774	3.2%	855	3.6%
Eastern Bay	1,054	9.1%	1,039	9.0%
Kent Island Bay	549	10.9%	529	10.5%
Kent Narrows	363	5.3%	382	5.6%
Lower Chester River	752	4.3%	811	4.6%
Middle Chester River	224	2.9%	246	3.1%
Southeast Creek	386	1.1%	661	1.9%
Tuckahoe Creek	216	0.5%	748	1.6%
Upper Chester River	687	1.3%	1,073	2.1%
Upper Choptank	9	0.5%	26	1.4%
Wye River	654	2.2%	839	2.8%
<b>TOTAL</b>	<b>5,668</b>	<b>2.4%</b>	<b>7,209</b>	<b>3.0%</b>

*Areas shaded in grey are areas approaching percentages of impervious surface of concern.*

*Source: Queen Anne's County Department of Land Use, Growth Management and the Environment and  
MDE/MDP Values from WRE Tables*



### Section 4.7 Water Resources

Water Restoration Action Strategy (WRAS) plans have been completed for the Corsica River Watershed (2003-2004), Middle Chester River Watershed (2001-2002), Upper Chester River Watershed (2004-2005), and the Upper Choptank River Watershed (2002-2003). Each of the plans provides a character description of ground water, surface water, and land use within the watershed. Each plan provides strategies which seek to improve or protect water resources within watersheds.

The Corsica River Watershed Restoration Action Strategy (WRAS) identified impairments and provides guidance to achieve water quality enhancement, expanded wildlife habitat, more sensitive land use conversions and conservation. Key actions recommended in the WRAS include:

- Planting cover crops: 4,000 acres of cover crops and 2,000 acres of small grain.
- Retrofitting urban stormwater facilities to be managed on 300 acres of urban lands.
- Implement 50 acres of Horse Pasture Management to limit nutrient runoff.
- Establishing approximately 100 acres of Conservation Reserve Enhancement Program buffers.
- Providing education and outreach to the public.
- Upgrading septic systems: retrofit 30 private septic systems.
- Establishing reforested buffers on non-agricultural land: approximately 200 acres of forested land.
- Assuring low impact development strategies
- Restoring oyster populations: restore 20 acres of oyster beds.
- Restoring submerged aquatic vegetation: restore 10 acres of submerged aquatic vegetation.
- Restoring wetlands: restore 50 acres of wetlands and two miles of stream channel.
- Monitor the effectiveness of BMPs.
- Upgrade and maintain Centreville Sewerage treatment plant with enhanced nutrient management.

The WRAS also recommends initiatives that will be undertaken by local government to develop and adopt policy and programmatic changes that seek to:

- Create innovative stormwater management practices for low impact development;
- Put in place tighter enforcement controls on erosion and sedimentation;
- Achieve the maximum feasible reduction of nitrogen and phosphorous in the municipal wastewater stream;
- Create mechanisms to design, fund, construct, and maintain acres of filtering non-tidal wetlands on public lands; and
- Teach our citizens of the environmental danger of poorly maintained septic systems, over fertilized lawns, eroding shorelines, and un-buffered streams.



### Section 4.7.1 Regional Groundwater Conditions

Groundwater is the primary source of water supply in Queen Anne's County and surrounding region. Groundwater is water that is found underground in the cracks and spaces in soil, sand and rock. Groundwater is stored in--and moves slowly through--layers of soil, sand and rocks called aquifers.

Aquifers typically consist of gravel, sand, sandstone, or fractured rock, like limestone. These materials are permeable because they have large connected spaces that allow water to flow through. The speed at which groundwater flows is dependent on several factors such as the size of spaces in the soil or rock and connectivity between these spaces.

Currently, there are no US Geological Survey (USGS) monitoring locations for ground water within Queen Anne's County. Readily available data consists of data for surrounding counties and the region referred to as the Maryland Coastal Plains.

A 2004 report by the Advisory Committee on the Management and Protection of the State's Water Resources identified the need for a comprehensive assessment of ground-water resources of the Maryland Coastal Plain. The Coastal Plains aquifers supply the majority of water needs in Queen Anne's County and surrounding region. Within the Coastal Plains, the Baltimore Metro Region is expected to grow by 300,000 people between 2000 and 2030, with the Upper Eastern Shore is expected to grow by 63,000 people, and Queen Anne's County projected to grow by 21,337 people during the same timeframe.

The Maryland Geological Survey (MGS) and the U.S. Geological Survey (USGS) have begun the first phase of a three-phase assessment of Maryland's Coastal Plain aquifer system. The assessment of the Coastal Plain region is important due to the following documented conditions:

- Water levels in the Coastal Plain aquifers are declining at a significant rate.
- Water quality in some areas is significantly compromised. Contamination such as saltwater intrusion, naturally high concentrations of trace element contaminants (including arsenic and radium) and elevated concentrations of nutrients and agricultural chemicals are of concern.
- Ground-water resource managers need better tools. There is a need for more comprehensive and interactive tools to support management and permitting decisions.

One or more of the above conditions could impact the following major aquifers supplying ground water to Queen Anne's County and Eastern Shore residents, businesses and institutions.





- The **Columbia aquifer** supplies some older homes and farms in the region, and is used for irrigation, but because it is shallow, it is vulnerable to contamination from surface sources and to going dry during droughts. 2008 reports indicate water levels in the Columbia (water-table) aquifer do not show any major long-term declining trend.
- The **Miocene aquifers** underlie the Columbia aquifer in the southeastern Queen Anne's and Talbot Counties, and are used for domestic, commercial and irrigation supplies in that area.
- The **Piney Point Aquifer** underlies the Miocene sediments in the southern part of the study area, but is absent in the northwest, and is a poor aquifer in some parts of the study area. It is used for domestic and commercial supplies where it is present, and for municipal supplies in neighboring Caroline and Dorchester Counties.
- The **Aquia aquifer** underlies the Piney Point and Columbia aquifers, and is used extensively throughout the study area, except for the southeastern portion of Talbot County. The Aquia aquifer supplies the majority of water for the County and is in many instances the most important groundwater source. Brackish water is present in the Aquia aquifer in a narrow strip along the Chesapeake Bay shore of Kent Island. Water levels in the Aquia aquifer have declines at a rate of about one-half foot per year since 1990, and may continue to decline as the region's population increases, and demand for irrigation water increases. 2008 reports indicate water levels in the Aquia aquifer do not show any major long-term declining trend.
- The **Matawan aquifer** underlies the Aquia aquifer in western Queen Anne's County and possibly elsewhere. It is used for small domestic supplies in parts of Kent Island where it provides an alternative water source to the Aquia aquifer and deeper Cretaceous aquifers that have severe iron problems. This problem is typically addressed through water treatment processes using various types of technology and filters resulting in the increased cost of providing potable water. Iron poses no health risks. High levels of iron content does result in poorer water quality with respect to taste and odor as well as staining of clothing and appliances, and deterioration and clogging of pipes and heating systems using water.
- The **Magothy aquifer** underlies the Matawan aquifer and may be hydraulically connected to it in some places. It supplies water for domestic and commercial uses on Kent Island but water from the Magothy aquifer is very high in iron, and must be treated before use. The Magothy aquifer is also used for much of the municipal water supply at Easton, where iron concentrations do not pose a problem.
- The **Upper Patapsco aquifer** underlies the Magothy aquifer and supplies water for domestic, commercial and municipal uses on Kent Island and eastward to Grasonville. Water from this aquifer also has a severe iron problem in the Kent Island area but becomes less severe to the east and south. 2008 reports indicate water levels in the Upper Patapsco aquifer water levels continue a general declining trend at Queen Anne, Chester, Matapeake and Kingstown.
- The **Lower Patapsco aquifer** underlies the Upper Patapsco aquifer on Kent Island. This aquifer has been used for part of the public supply system on Kent Island since late 1999. Although water from this aquifer requires treatment for iron, concentrations are much lower than in the Magothy and Upper Patapsco aquifers. In future water treatment plants the County will consider using ultra filtration or membrane filters to remove these contaminants from the drinking water. 2008 reports indicate that the water level in the Lower Patapsco aquifer near Chester appears to have leveled off or recovered slightly, while in wells near Kingstown, the water level continues to decrease as in previous years.



- The **Middle Patapsco and Patuxent aquifers** are potential ground-water sources, but are not currently used for water supply in Queen Anne's and Talbot Counties. Recent reporting as of 2008 indicates that the water level in the Patuxent aquifer appears to be leveling off near Chester.

## Section 4.7.2 Freshwater Withdrawals (Surface and Groundwater)

The following table, Table 4-9, shows the distribution of countywide water use in 2000. Although this information is dated, the distribution of usage indicated the County's major water users are irrigation (43%), Residential Self-Supplied (28%) and public supply distribution (17%). Over 91% of freshwater withdrawals are for domestic use (public and private 45%) and agricultural use (46%). Commercial and industrial users account for less than 10% of total usage.

**Table 4-7: Freshwater Withdrawals in Queen Anne's County, MD - 2000**

Type of Withdrawal	Total Withdrawals (MGD)			Percent of Total County Withdrawals
	Surface Water	Groundwater	Total	
Public Supply Distribution	0.00	1.47	1.47	17%
Residential Self-Supplied	0.00	2.40	2.40	28%
Commercial	0.00	0.49	0.49	5%
Industrial	0.00	0.33	0.33	4%
Mining	0.00	0.00	0.00	0%
Livestock Watering	0.07	0.22	0.29	3%
Irrigation	1.35	2.35	3.70	43%
<b>Total</b>	<b>1.42</b>	<b>7.26</b>	<b>8.68</b>	<b>100%</b>

Source: 2000 USGS MD-DE-DE Water Science Center, <http://md.water.usgs.gov/freshwater/withdrawals/>

Groundwater is the sole source for municipal, industrial and private water supplies in the County. This is due to the availability of groundwater of good quality and the lack of suitable surface impoundment sites in the Aquia Formation, little treatment is required for potable water supplies, although water quality can vary within the aquifer. The Magothy Formation has high iron content that requires more extensive treatment. The following formation descriptions are from the Queen Anne's County Comprehensive Water and Sewerage Plan of 2006.

- **Wicomico Formation** – This formation exists as surface deposits over most of Queen Anne's County. Nearly all wells tapping the Wicomico Formation in the County are domestic dug or driven wells equipped with pumps yielding only a few gallons a minute. Because of its proximity to the surface, there is a high probability of groundwater contamination in this formation.
- **Calvert Formation** – The quality of the groundwater is generally good except for high silica content that may necessitate treatment if used for boiler purposes. Many wells have been drilled through the Calvert Formation to deeper aquifers as water was not found in the formation in sufficient quantity.
- **Aquia Greensand Formation** – The Aquia Greensand is currently the most important source of groundwater in Queen Anne's County. Several hundred wells withdraw water from this



formation. Most of the wells are located in a limited area on Kent Island and on the mainland at Grasonville and Queenstown. Analyses show that the groundwater from this formation contains

less iron and is softer than that from the Monmouth Formation. However, saltwater intrusion is being experienced on Kent Island. The cone of depression created by heavy pumping in the Talbot County towns of Easton and St. Michael's areas has, when combined with the Kent Island pumpage, created brackish water intrusion that is beginning to affect water quality on the northwestern half of Kent Island.

- **Monmouth Formation** – Water from this formation requires treatment due to excessive iron content. In the southern parts of Queen Anne's County this formation acts as a layer separating aquifers.
- **Piney Point Formation** – This aquifer is an important source of water in southeast Queen Anne's County.
- **Magothy Formation** – The Magothy Formation is an important potential source of groundwater; however iron removal will almost certainly be required. An increasing number of wells in Queen Anne's County are penetrating the Magothy Formation at this time as a result of new Aquia Greensand appropriations being restricted in the Grasonville and Kent Island area. For Kent Island, the Magothy and deeper formations will be the only sources available due to the over pumping and brackish water intrusion of the Aquia.
- **Raritan Formation** – Water from this formation has high iron concentrations. Although seldom tapped at this time due to its depth, the Raritan Formation is a potential water-bearing formation for the future.
- **Patapsco Formation** – During the winter of 1999, the Sanitary District constructed a test well into the Patapsco aquifer at the Stevensville water treatment plant. The results of the water quality analysis indicated an iron content of less than 5 parts per million, only one-sixth the iron produced by the on-site Magothy aquifer wells. As a result the Sanitary District has now drilled a production well into the Patapsco to replace the Magothy as the primary source of potable water.
- **Patuxent Formation** – The Patuxent Formation is a very deep aquifer in Queen Anne's County, and because large quantities of water are readily available in other aquifers, the Patuxent must be considered a reserve source rather than a source to be tapped in the immediate future. There is a potential problem with brackish water conditions.





### Section 4.8 Surface Water

The 2006 Maryland Department of the Environment's "Prioritizing Sites for Wetland Restoration, Mitigation – Queen Anne's County" report provided descriptions of surface waters within Queen Anne's County including streams and wetlands-ponds.

#### Section 4.8.1 Streams

Most of the surface water drains in one of three directions from the highest natural point in the County, located one mile northwest of Starr--into the Chester River, the Choptank River (via Tuckahoe Creek) or Eastern Bay (via the Wye River, Prospect Bay, Crab Alley Bay, and Cox Creek). The western edge of Kent Island drains directly into the Chesapeake Bay.

Because the County is relatively flat and near sea level, the streams in the County are slow moving. The downstream portion of many rivers in the County are influenced by the tides and tend to have very slow "flushing" rates, reducing their ability to act as points of discharge for sewerage treatment systems.

All surface waters of Queen Anne's County have been classified as Class I or Class II. Class I waters are to be maintained as suitable for contact recreation and aquatic life. Class II waters are to be maintained as suitable for shellfish harvesting. The Code of Maryland Regulations Water Quality Regulations (COMAR 26.08.02) gives the specific water quality parameters for both classes. Limitations have been set for bacteria, nitrogen, phosphorus, sedimentation, oil, and several other pollutants.

#### Section 4.8.2 Wetlands - Ponds

Wetlands are often credited with providing natural stormwater and flood control benefits. Inland wetlands adjacent to rivers, streams and creeks hold excess discharge and runoff during periods of increased precipitation such as storms and snow melts. Coastal wetlands also hold excess discharge from inland drainage networks as well as tidal waters during storms.

Ponds, marshes and oxbows serve an important function by receiving excess water during the rainy season and holding it throughout the dry season. These features receive water directly from a rising river or stream during the rainy season and then drain back into the river or stream as water levels drop. These water bodies serve as refuges for fish and other aquatic organisms.



### Section 4.9 State Priority Wetlands

**Map ESA-5 – DNR Sensitive Areas & Targeted Ecological Areas**, depicts the location of State Priority Wetlands and the Table 4-8 provides the acreage of State Priority Wetlands by Watershed. Note that not all wetlands within the County are designated as Statewide Priority Wetlands.

**Table 4-8: Statewide Priority Wetlands by Watershed**

Watershed	Statewide Priority Wetlands	
	Acres	Percent of Watershed
Corsica River	2,680	11.2%
Eastern Bay	191	1.7%
Kent Island Bay	-	0.0%
Kent Narrows	520	7.7%
Lower Chester River	807	4.6%
Middle Chester River	61	0.8%
Southeast Creek	5,386	15.5%
Tuckahoe Creek	7,945	17.2%
Upper Chester River	5,476	10.5%
Upper Choptank	637	33.0%
Wye River	1,710	5.8%
<b>TOTAL</b>	<b>25,413</b>	<b>10.7%</b>

*Note: At this time, there are no Statewide identified Priority Wetlands in Kent Island Bay.*

*Source: DNR provided datasets with wetlands identified by Maryland Department of the Environment.*

### Section 4.10 Wellhead Protection Areas

Currently, due to lack of available funding, the County has not studied or identified wellhead protection areas. Wellhead protection is a strategy designed to protect public drinking water supplies by managing land surface around a well where activities might affect the quality of water. The Maryland Department of the Environment (MDE) has developed a model Wellhead Protection Ordinance for to local governments to consider in the protection of water supplies.





### Section 5.0 Study Methodology

The study is consistent with the methods outlined in MDP's Models and Guidelines publication number 26: Managing Maryland's Growth, The Water Resource Element: Planning for Water Supply and Wastewater and Stormwater Management and the maximum capacity build-out analysis methods Development Capacity. The maximum development capacity was based upon existing conditions (development supply) using current zoning and environmental constraints to determine development potential, for each eight-digit watershed in the County. The results of this watershed level analysis are contained within the tables and worksheets provided in Section 11.0.

### Section 5.1 Data Sources

The analysis contained in this report is based upon readily available and widely accepted data sources. The following key resource agencies provided existing condition data: Maryland Department of Planning, Maryland Department of the Environment, Queen Anne's County Department of Land Use, Growth Management & Environment, Queen Anne's County Public Works Department, Kent Narrows/Stevensville & Grasonville Wastewater Treatment Facility (KNSG), as well as the Incorporated Towns of Queen Anne's County, and others as identified within the document. The following plans provided information used to develop the Water Resources Element:

- Town of Centreville Maryland, Wastewater Capacity Management Plan 2008
- Corsica River Watershed Section 319 National Monitoring Program Project 2007
- Prioritizing Sites for Wetland Restoration, Mitigation, and Preservation in Maryland 2006 (MDE)
- Queen Anne's County Comprehensive Water and Sewerage Plan 2006
- Queen Anne's County Groundwater Protection Report, 1989
- Selected Groundwater Level Records from Observation Wells in Queen Anne's County, Maryland, Maryland Department of Natural Resources, June 2008
- Source Water Assessment from Community Water Systems in Queen Anne's County, Maryland 2003 (MDE)
- Water Restoration Action Strategy (WRAS) Plans (various 2001-2005)

#### Growth Element Plans - Community Plans- Comprehensive Plans

- Barclay Community Plan, 2006
- Barclay Draft Municipal Growth Element Plan, 2009
- Centreville Community Plan, 2009
- Chester/Stevensville Community Plan, 2007
- Church Hill Draft Comprehensive Plan, 2009
- Grasonville Community Plan, 2010 (draft)
- Kent Narrows Community Plan, 2006
- Queenstown Draft Community Plan, 2009
- Millington Comprehensive Plan, 2007
- Sudlersville Draft Municipal Growth Element Plan, 2009
- Templeville Draft Comprehensive Plan, 2009



### Section 5.2 Maryland Chesapeake Bay Tributary Strategies

The following summarizes the seven Statewide Tributary Strategies as outlined in Maryland's Chesapeake Bay Tributary Strategy Statewide Implementation Plan (January 2008).

#### Section 5.2.1 Point Source Tributary Strategy

The Point Source Tributary Strategy addresses impacts attributed to specific identifiable end of pipe or point. Point sources are typically wastewater treatment plant (WWTP) outfalls. The strategy includes upgrade plans for WWTPs to use Enhanced Nutrient Removal (ENR) technology to meeting nutrient loading caps established for WWTPs. For local governments this may entail planning, design, and construction of ENR projects; developing implementation schedules to meet 2010 Urban Source Tributary Strategy goals, and seeking funding to make projects more affordable. The Urban Source Tributary Strategy recognizes that urban development, impervious surfaces, and sprawl development impact water qualities. Identified strategies include urban nutrient management, tree planting, urban forest buffers, erosion and sediment control, stormwater management, stream restoration, septic connections, septic denitrification, and WWTP upgrades.

#### Section 5.2.2 Stormwater Tributary Strategy

The Stormwater Tributary Strategy seeks to support the implementation of stormwater practices including upgrades of older systems and/or retrofitting developments with stormwater facilities, promoting erosion and sediment control measures, as well as implementing the approaches identified in the Maryland Stormwater Design Manual and the Municipal Separate Storm Sewer System (MS4) Permit Program. For local governments this includes adoption of stormwater management ordinances, plan reviews, plan approvals, inspections, enforcement, monitoring, etc. of stormwater projects as well as erosion and sediment control measures, support for implementation of the Stormwater Strategy to minimize the water quality impacts on local waterways, and consideration of establishing stormwater utilities (secure stable funding and develop new and innovative financing strategies for stormwater management programs).

#### Section 5.2.3 Onsite Sewage Disposal Systems (OSDS) Tributary Strategy

The Onsite Sewage Disposal Systems (OSDS) Tributary Strategy addresses the impact that septic systems have in contributing nitrogen to water systems. The strategy seeks to have 100 percent of all new OSDS include enhanced denitrification technology (nitrogen removal capabilities). The strategy acknowledges that closing the gap through implementation may be difficult but that it is necessary to reduce loadings on the Chesapeake Bay. The State has identified steps toward achieving the goal including exploration of updating the Code of Maryland Regulations, use of the Chesapeake Bay Restoration Funds, and legislative means to require or provide incentives for upgrading OSDS. Local governments are encouraged to implement local policies and code changes to encourage or require upgrades as well as seek supportive funding.

#### Section 5.2.4 Growth Management Tributary Strategy

The Growth Management Tributary Strategy reaffirms the State's commitment to achieve a 30% reduction in the annual average rate of sprawl development. The strategy reiterates the significance of Priority Funding Areas (PFAs) and directing growth to County and Town designated areas, as well as the role of the Rural Legacy Program to protect large contiguous tracts of land from sprawl development. For local governments, achieving the strategy may be realized by updating Comprehensive Plans that



direct growth to PFAs and designated areas, plan for appropriate development within areas with impaired waters, and consider Total Maximum Daily Loads (TMDLs) and impaired waters in zoning decisions and land use planning.

### **Section 5.2.5 Agricultural Tributary Strategy**

The Agriculture Tributary Strategy includes working with the farm community to implement a range of Best Management Practices (BMP) across a watershed to reduce nutrient and sediment loads. The Maryland's Chesapeake Bay Tributary Strategy Statewide Implementation Plan identifies expanded BMP options and over 23 practices to protect soil and nature resources, such as manure/nutrient management, precision agriculture, and cover crops, among others.

### **Section 5.2.6 Air Deposition Tributary Strategy**

The Air Deposition Tributary Strategy is closely tied to requirements placed on Maryland through the EPA's Clean Air Act, particularly nitrogen oxide emission reductions and the nitrogen loads on the Chesapeake Bay. The Maryland Health Air Act (HAA) was developed with the purpose of bringing Maryland into attainment with the National Ambient Air Quality Standards (NAAQS) for ozone and fine particulate matter by the federal deadline of 2010. The act seeks reductions of nitrogen oxide, sulfur dioxide, and mercury emissions primarily from coal-burning power plants, but also addresses emission from vehicle emissions.

### **Section 5.2.7 Other State Initiatives to Address Implementation Gaps Tributary Strategy**

The Other State Initiatives to Address Implementation Gaps Tributary Strategy includes identification of programs and partnerships to assist and implement strategies such as Green Highways Partnerships, Transportation Enhancement Program, Green Infrastructure, wetland restoration, habitat restoration, TMDLs, NPDES permits, land use planning, comprehensive planning, educational outreach, research, improved communication, and agricultural conservation programs, among many others.

## **Section 5.3 Water Resource Element – Water Supply Capacity**

This report assesses the adequacy of existing water supplies, estimates future water demands, identifies adequate sources and infrastructure for future needs and identifies steps that need to be taken to protect existing and future water supply sources. MDE methods have been used to conduct this assessment and to support recommendations.

The assessment assumes that the best producing wells are not in operation which would result in water supply circumstances appearing more severe than actually exists. Therefore, the analysis “builds-in” a water system redundancy and measures the delivery systems ability to provide water in the event of mechanical failure or systems break-down.

## **Section 5.4 Point & Non-Point Source Nutrients & Loadings**

Tables contained in Section 11.0 for each of the County's eight-digit sub-watershed identify the baseline nutrient loads for Nitrogen and Phosphorus as calculated from the 2002 Maryland Land Use Land Cover datasets. In order to measure the impact of change in the baseline nutrient loads resulting from the land use changes experienced in the County since 2002, the first scenario includes the inventory of land uses in the County in 2008 and a calculation of the nutrient loads generated by the change in land uses during that period. The 2008 County land use dataset used for the County's Build-Out Scenarios. The



second scenario in tables contained in Section 11 includes land uses as a result of the Maximum Build-Out Scenario. The third scenario, whose acreages of land uses are similar to Scenario 2, directs growth to County and Town Planning Areas and accounts for consideration of green-belts and lower densities in the rural areas. The third scenario seeks to encourage any new development to be directed to existing and planned sewer service areas.

Estimates of Nitrogen loadings (point source, non-point source and septic), Phosphorus loadings (point source, non-point source, and septic) based upon the completed TMDL Studies in four of County's eight-digit watersheds is also incorporated into the table to measure the projected impacts of the various land use scenarios against established maximum nutrients loadings and the 2002 baseline conditions.

### Section 5.5 Corsica River Watershed National Monitoring Program Project

As part of EPA's Clean Water Act Section 319 grant, the Corsica River Watershed was selected as a National Monitoring Program project. The purpose of the grant is to record and monitor agricultural non-point source pollution, and development of non-point source pollution and the impacts of best management practices (BMPs) on water quality in an attempt to remove a Chesapeake Bay sub-watershed from the 303d list of impaired waters. Specific monitoring objectives include documenting tidal and non-tidal surface water nutrient concentrations and loads, effectiveness of cover crops, effectiveness of nitrogen removing on-site sewage disposal systems, and effectiveness of urban stormwater management retrofits. The project is currently on-going with an estimated 2005-2010 timeframe.



## Section 6.0 Municipal Growth Elements

The following Table 6-1 summarizes planned municipal growth within incorporated Towns within Queen Anne's County as described in their Municipal Growth Elements.

**Table 6-1: Summary of Municipal Growth Elements**

Incorporated Town	Change in Planning Area	Change in Planning Area		Change in Incorporated Boundary (Annexation)
		Existing	Establishing New Planning Areas	
Barclay	Barclay has identified long-term Future Planning Areas east and west of Goldsboro Rd. See Barclay Planning Area Map.	Barclay is not currently designated as a Planning Area	Barclay has proposed a 76-acre short-term Planning Area in the draft 2009 Plan	No immediate annexations are anticipated. Short-term Planning Areas may be annexed subject to water and sewer availability
Centreville	Centreville Planning Area has been expanded to include Greenbelt Areas and County Planned Business Park.	Centreville Growth Area includes all land within the Town and nine Planning Areas, including County Planned Business Park.	Centreville has identified nine Planning Areas totaling 1,720 acres in size. Not including Greenbelt Areas and County Planned Business Park.	No immediate annexations are anticipated. The Town anticipates a phased approach to annexation: phase one would include Planning Areas 1, 2, 4, 6, and 8; phase two Planning Areas, numbers 3, 5, 7, and 9, would be annexed subsequently.
Church Hill	Church Hill has identified a Study Area approximately 9,300 acres in size in their draft 2009 Plan.	Church Hill is not currently designated as a Planning Area.	Church Hill has identified eight potential Planning Areas in their draft 2009 Plan totaling 887 lots.	No immediate annexations are anticipated. The Town anticipates phased annexations of the eight Planning Areas.
Millington	No planned changes	No planned changes	No planned changes	No planned changes
Queen Anne	Queen Anne is requesting a six-month extension to their MGE.			





**Table 6-1: Summary of Municipal Growth Elements (continued)**

Incorporated Town / Population Center	Change in Planning Area	Change in Planning Area		Change in Incorporated Boundary (Annexation)
Queenstown	Queenstown has identified a Study Area approximately 3,980 acres in size in their draft 2009 plan.	Queenstown's current Planning Area is approximately 2,845 acres in size.	Should Queenstown change their Planning Area it may change the size of the draft Planning Area.	Queenstown is approximately 921 acres in size.
Sudlersville	Sudlersville has identified a Study Area approximately 2,610 acres in size in their draft 2009 Plan.	Sudlersville is approximately 907 acres in size.	Sudlersville has identified an Inner-Loop and Outer-Loop Planning Area. The Inner-Loop is 354 acres in size. The Outer-Loop is 675 acres in size.	Sudlersville anticipates annexation of the Inner-Loop Properties as water and sewer become available and development is proposed.
Templeville	Templeville has identified a Study Area approximately 324 acres in size in their draft 2009 Plan. Portions of the Planning Area are within Caroline County.	Templeville is currently 48 acres in size, 30 of which are in Queen Anne's County.	Templeville has proposed a short-term and a long-term growth area. Short-term Planning Area is approximately 42 developable acres. Long-term Growth Area is approximately 55 developable acres.	Templeville anticipates annexation of parcels that are currently split between the County and Town jurisdiction. Growth will be subject to provision of water and sewer from Caroline County.

Many of the changes, though draft, are the result of updates to Community Plans where communities are seeking to provide services and utilities to existing or anticipated development.

## Section 6.1 County Comprehensive Water and Sewerage Plan

Revise County's Water and Sewerage Plan consistent with any land use changes identified in the 2010 Comprehensive Plan, Land Use Element. Revisions should be based upon ability of the water resource (drinking water and wastewater) to support development based on population growth as well as development capacity analysis based upon zoning. Plans for water treatment and wastewater treatment facilities and collection and conveyance systems should be considered. The revisions should also take into account expansion of Growth Areas, Town Annexations and new Growth Areas to be established to accommodate growth in and around the Towns when identifying water and sewer service areas with appropriate phasing and timing consistent with land use plans.

- Conduct water availability studies and/or collaborate on regional and statewide studies.
- Evaluate regional solutions to future water supply capacity planning.
- Utilize eight-digit watersheds to identify appropriate restrictions and protections to ensure water supply to support the timing, phasing, density and intensity of land uses.
- New development must pay for the cost of providing water.





### Section 7.0 Drinking Water Assessment

A safe and adequate drinking water supply is critical to the sustainability of existing communities and to the viability of future planned growth.

#### Section 7.1 General – Water Service Areas

Water services areas are identified in the County's 2006 Comprehensive Water and Sewerage Plan. The Comprehensive Water and Sewerage Plan also provides a description of **Water Service Areas and the Water Service Areas (and those areas of Public Health Concerns) Map ESA-6A** for water service area designations.

#### Section 7.2 Water Treatment Facilities

The Queen Anne's County 2006 Comprehensive Water and Sewerage Plan provides an in-depth description of treatment facilities, water supplies, and water demand. An inventory of all County operated water treatment facilities in the County is included in Table 7-1. Those characteristics described include the year the facility was constructed, aquifer, number of wells, iron content, net water production capacity, GAP limit, pre-treatment type and primary treatment type. Tables 7-1 through 7-5 identify the capacity of the County operated water treatment facilities, existing production capacity, limitations and projected demands, and limits on existing Groundwater Appropriation Permits (GAPS). Table 7-6 was developed using the Maryland Department of the Environment Water Capacity and Supply worksheets and was completed to include all County and municipal water treatment facilities. For each facility, Table 7-6 illustrates the water source (aquifer), the watershed in which the facility is located, and the service area of the facility, as well as the water supply and capacity using permitted appropriations, average daily limiting factor, and planned or anticipated capacity needs based on planned developments or subdivisions.

#### Section 7.3 Description of Water Treatment Facilities

This section contains a description of existing conditions for each of the Water Treatment Plants (WTPs) for Queen Anne's County Sanitary District as well as information for the individual Towns.

##### Section 7.3.1 Bayside-Queens Landing Water System

The Bayside facility has two 10" wells into the Magothy aquifer (one of which had a casing failure in 2005 and is inoperable). It has a treatment capacity of 90 gallons per minute (gpm). An ion exchange unit was added in 2005 to enhance iron removal in an attempt to improve the water quality. Its daily production in fiscal year 2004 was 71,300 gpd. Its daily production in fiscal year 2008 was 72,509 gpd with a maximum output of 127,135 gpd. Storage consists of a 14,000-gallon clear well and the system is connected via a 10" main to the Queens Landing standpipe.

The Queens Landing facility has two 10" wells into the Aquia aquifer. It has a treatment capacity of 150 gpm with a maximum output of 180,000 gallons per day assuming a 20-hour run time as the maximum allowable. Its daily production in fiscal year 2004 was 32,000 gpd. Its daily production in fiscal year 2008 was 7,909 gpd with a maximum output of 49,616 gpd. Storage consists of a 425,000-gallon standpipe (of which only 120,000 gallons is considered usable from an adequate pressure point of view) shared with Bayside's water system.



### Section 7.3.2 Bridge Point Water System

This Bridge Point facility has two 6" wells into the Magothy aquifer. It has a treatment capacity of 90 gpm with a maximum output of 98,000 gallons per day assuming a 20-hour run time as the maximum allowable. An ion exchange unit was added in 2002 to enhance iron removal. Its daily production in fiscal year 2004 was 46,500 gpd. Its daily production in fiscal year 2008 was 65,538 gpd with a maximum output of 98,957 gpd. Storage consists of one 10,000-gallon and one 7,000-gallon hydro pneumatic tank, as well as a 300,000-gallon ground storage tank serviced by a booster pump station.

The Kent Island Village facility has one 6" well into the Aquia aquifer. It has a treatment capacity of 85 gpm with a maximum output of 102,000 gallons per day assuming a 20-hour run time as the maximum allowable. This system and Bridge Pointe's system were linked together in 1999 via an 8" main. Its daily production in fiscal year 2004 was only 2,400 gpd as the Sanitary District has shifted almost full reliance on the Bridge Pointe plant to provide water to the service area. Its daily production in fiscal year 2008 was 259 gpd with a maximum output of 1,450 gpd. Storage consists of a 10,000-gallon hydro pneumatic tank.

### Section 7.3.3 Grasonville Water System

This facility has two 10" wells into the Magothy, each with a yield of 700 gpm. The treatment capacity initially will be 120 gpm. The site also has a 290,000-gallon ground storage tank. Its daily production in fiscal year 2004 was 43,000 gpd. Its daily production in fiscal year 2008 was 60,838 gpd with a maximum output of 94,700 gpd. An ion exchange unit was added in 2005 to enhance iron removal.

### Section 7.3.4 Oyster Cove Water System

This facility has two 6" wells into the Aquia aquifer. It has a treatment capacity of 250 gpm with a maximum output of 300,000 gallons per day assuming a 20-hour run time as the maximum allowable. However, production from this site is restricted to 95,800 gpd due to the limit of its Groundwater Appropriation Permit (GAP). Its daily production in fiscal year 2004 was 77,000 gpd. Its daily production in fiscal year 2008 was 66,183 gpd with a maximum output of 112,410 gpd. Storage consists of a 20,000-gallon ground storage tank and an 180,000-gallon ground storage tank.

### Section 7.3.5 Prospect Bay Water System

This facility has two 10" wells into the Aquia aquifer. It has a treatment capacity of 220 gpm with a maximum output of 264,000 gallons per day assuming a 20-hour run time as the maximum allowable. Its daily production in fiscal year 2004 was 73,000 gpd. Its daily production in fiscal year 2008 was 70,378 gpd with a maximum output of 145,769 gpd. Storage consists of a 300,000-gallon elevated storage tower.

### Section 7.3.6 Riverside Water System

This facility has one 6" well into the Magothy aquifer. It has a treatment capacity of 30 gpm with a maximum output of 36,000 gallons per day assuming a 20-hour run time as the maximum allowable. Its daily production in fiscal year 2004 was 6,000 gpd. Its daily production in fiscal year 2008 was 4,190 gpd with a maximum output of 5,861 gpd. Storage consists of a 5,000-gallon hydro pneumatic tank.



## Section 7.3.7 Stevensville Water System

The Stevensville facility has a single 20" well into the lower Patapsco. It has a treatment capacity of 375 gpm with a maximum output of 450,000 gallons per day assuming a 20-hour run time as the maximum allowable. Its daily production for the fiscal year 2004 was 446,000 gpd. Its daily production in fiscal

year 2008 was 370,664 gpd with a maximum output of 490,500 gpd. Storage consists of a 36,000-gallon clear well and a 290,000-gallon ground storage tank.

The Thompson Creek facility has one 6" well into the Aquia. The water plant can only be run on an emergency basis due to the restrictions on the Groundwater Appropriation Permit. It has a treatment capacity of 210 gpm with a maximum output of 252,000 gallons per day assuming a 20-hour run time as the maximum allowable. Its daily production in fiscal year 2004 was 111,000 gpd. Its daily production in fiscal year 2008 was 112,726 gpd with a maximum output of 272,787 gpd. Storage consists of a 270,000-gallon ground storage tank.

This Chesapeake Bay Business Park facility has one 12" well into the Monmouth aquifer. It has a treatment capacity of 50 gpm with a maximum output of 60,000 gallons per day assuming a 20-hour run time as the maximum allowable. Its daily production in fiscal year 2004 was only 4,000 gpd. Its daily production in fiscal year 2008 was 33,772 gpd with a maximum output of 67,655 gpd. This plant's treatment efficiency is severely hampered by the extremely high iron concentration in the well water. Storage consists of a 250,000-gallon elevated tower shared with Thompson Creek and Stevensville and a 20,000-gallon clear well.

In addition to County managed facilities there are several Township managed facilities, including the following as illustrated in Table 7-2 and further described in this section.

**Table 7-1: Incorporated Town Water Treatment Facilities**

Water Supply / Facility	Provides Service to:	Water Source - Aquifer (Aquia, Magothy, Patapsco)	Watershed
Centreville	Centreville Growth Area	Monmouth & Aquia	Corsica River
Church Hill	Church Hill	Aquia	Southeast Creek
Millington	Millington	Aquia	Upper Chester River
Queenstown	Queenstown Growth Area	Aquia	Wye River &
Sudlersville	Sudlersville	Aquia & Wicomico	Upper Chester River



### Section 7.3.8 Barclay

The residents of Barclay obtain their water from private wells. Many are shallow wells which range from a depth of 25 to 35 feet and utilize the surface deposits of the Wicomico Formation for their source of water. Because the shallow aquifer has shown increasing nitrate/nitrogen levels, new wells and replacement wells are being drilled deeper into the Aquia aquifer.

Two 4-inch wells are used for fire protection. One is 54-feet deep with a yield of 45 gpm and the other is 60-feet deep with a yield of 270 gpm. The location of the two wells permits every building in the town to be protected from fire damage using normal fire-fighting equipment. The existing facilities for water supply are considered adequate and can be expected to serve well into the future.

### Section 7.3.9 Centreville Water System

The Town of Centreville operates a water supply system that serves the town and some adjacent county properties. As of 2006 there were approximately 925 building connections serving an estimated 2,500 people throughout an area of about 1,450 acres, and the Town issued 248 building permits for new construction in 2006 and 2007.

The source of water supply is from two deep wells utilizing the Monmouth and Aquia Formation aquifers. Gas chlorination is used for disinfection. However, the wells have Arsenic concentrations of 20 ppb and 28 ppb, respectively. Treatment for arsenic is required to meet the 10 ppb standard that became effective in January 2006.

The main distribution lines are of 6-inch, 8-inch, and 10-inch diameters. Storage is provided by three elevated tanks with capacities of 100,000-, 200,000- and 300,000- gallons. Any 4" service mains still existing will be eliminated as funds allow upgrading the distribution system.

Presently, the entire area within the corporate limits is serviced and the only areas outside the town limits receiving service are Queen Anne's County High School and Centreville Middle School. Ultimately, the Centreville water system may be expanded to reach other developments within the Town's planned Growth Areas.

The Centreville water service map also shows an area designated as W-3 at the intersection of U.S. Route 301 and MD 304. This is an area that has a mixture of commercial, industrial and municipal uses. In addition, there are some parcels that are currently agricultural. It is the intent that the vacant areas be developed into a County-developed business park.

Water service would either be by the Town of Centreville, or by a County owned and operated water plant. No planning or design for such a facility has been initiated as yet.

### Section 7.3.10 Church Hill Water System

In the past, residents of the Town of Church Hill obtained their water from surface deposits using private shallow wells. Most of these wells have been abandoned in favor of deep wells that are more reliable in dry periods.



The deep wells in the area are about 130 to 140 feet deep utilizing the Aquia Greensand Formation. Yields range from 20 to 60 gpm and the water quality is generally good. For fire protection there are two public deep wells located throughout the town. A sewerage system has been built which should protect the groundwater in the surface deposits from further contamination.

The Pond at Church Hill, a senior housing facility added in 2005, has a small water treatment system to service 43 age-restricted senior housing units.

### **Section 7.3.11 Millington**

Most of the Town of Millington lies in neighboring Kent County. However, a small portion of the Town is within Queen Anne's County. At the present time, all water needs are supplied by private wells, some of them being deep wells. Sufficient water yield is obtained from the Aquia Greensand Formation at depths of 85 to 105 feet. Except for moderate iron content, the water is of good quality.

### **Section 7.3.12 Queen Anne**

The Town of Queen Anne lies in both Queen Anne's County and Talbot County. Presently, private wells supply all the water needs of the area. Most of the wells are deep and a few are shallow. The shallow wells obtain a sufficient quantity of water from the Wicomico Formation at depths of 20 to 30 feet. However, water quality from these wells is high in iron content. The deep wells appear to get water of better quality utilizing the Cheswold Formation found at 80 to 100 feet or the Piney Point aquifer at 160 to 200 feet. To provide for fire protection, Queen Anne has a dry main and hydrant system. When required, water is pumped from Tuckahoe Creek into a distribution system of 4-inch diameter piping.

### **Section 7.3.13 Queenstown Water System**

The Charter of the Town of Queenstown requires all developed properties within the Town limits be served by a public water system owned and operated by the Town of Queenstown. In addition, the Town provides water service to Friel's Lumber Company and the Queen Anne's County Animal Control Facility which are located outside the corporate limits of the Town. The Town presently serves water to approximately 620 units plus commercial uses.

The Town of Queenstown has three wells drilled into the Aquia aquifer. As of 2006, the Town draws water from only two wells. They are referred to as the Del Rhodes Avenue Well and the Outlet Center Well. The Del Rhodes Avenue Well and the Outlet Center Well each have pumps rated at 150 gpm. The third well located at the Wall Street tower was abandoned.

The Town currently has a permitted water appropriation of 77,000 gallons per day drawn from two production wells in the Aquia aquifer and one recently permitted in the Matawan aquifer. Between 2002 and 2006, demand exceeded the permitted rate as much as 40 to 80 percent (30 to 60 thousand gallons per day). The Town currently is seeking a permit to withdraw 154,000 gallons per day; this supply will provide current residents and pending development projects, but the withdrawal rate will not provide for additional development described in the consolidated growth alternative of the Queenstown Community Plan. Further increasing municipal water supply requires expanding the Towns' waste water treatment capacity.

Due to limited water supply and arsenic contamination in existing wells, Queenstown began investigating additional water supplies in 2008. An exploratory well installed in the Matawan aquifer





indicated high production capacity (greater than 100,000 gallons per day) and overall excellent water quality (low iron and arsenic concentrations). In 2009, the exploration well was converted to a production well and currently is the Towns' main water source. During peak demand periods, water supply can be combined or blended with supply from the Aquia municipal wells while meeting the federal drinking standard for arsenic.

A new production well, permitted for up to 180,000 gallons per day, is being required contingent on accompanying improvements and increased capacity of the wastewater treatment plant. The Town has two elevated water storage tanks. The water tower at Wall Street is reported as a 50,000 gallon tank. The water tower at the Outlet well site is a 100,000 gallon tank. To ensure adequate fire flow, the Maryland Department of the Environment recommends a total storage of 432,000 gallons for municipalities with a population of less than 1,000.

A mix of residential and commercial land uses are proposed on lands adjacent to the Town and within the Queenstown growth area. If any of these lands were to be annexed, the Town will provide water and sewer service per the Town's charter. Additional water service of 300,000 to 527,000 gallons per day will be required to serve full build-out of the proposed Queenstown growth area.

### **Section 7.3.14 Sudlersville Water System**

Sudlersville residents presently use individual wells for their water supply needs. Some wells are shallow, utilizing the surface deposits of the Wicomico Formation. All new wells and replacement wells are utilizing the Aquia aquifer as their water source. Two new public wells were installed in the Fall of 2008 to provide service to the Town.

### **Section 7.3.15 Templeville**

Templeville has two-thirds of its population living in Queen Anne's County and the other third living in Caroline County. Residents use individual wells for their water supply. Many of the wells are shallow, utilizing the Wicomico Formation at depths from 15 to 30 feet. The most dependable source of good water in the area is the Aquia Greensand Formation used by deep wells of 150 to 200 feet. Present conditions are adequate at this time and will remain so providing that the surface deposits do not become contaminated.

## **Section 7.3 Water Capacity Assessment**

Future water demand, as illustrated in the Table 7-3 through 7-7 for all Water Treatment Facilities that provide over 20,000 gallons per day of treatment, indicates that there is a permitted capacity (appropriations) of 1.66 MGD and an average day drought demand of 1.64 MGD. According to reports all but the Riverside facility are able to meet average day drought demand. Within the water service areas there is an excess annual average daily capacity of approximately 0.5 MGD. Based on planned but undeveloped sub-divisions, there is an anticipated demand for approximately 0.3 MGD. The added demand indicates that the Grasonville, Oyster Cove, and Riverside sources would be unable to meet demand under current conditions; the most limiting factor of all three facilities is permitted average daily appropriations.





**Table 7-2: Net Treatment Capacity Compared to Service Area Demand Projections**

System	Net Treatment Capacity	Max-Daily Demand Assuming Moderate Growth (GPD)			Net Treatment Capacity Deficit Compared to 2010 Demands, GPD
		2008	2010	2040	
Stevensville	478,400	609,000	869,000	1,480,000	390,600
Bridge Pointe	258,325	74,000	228,000	271,000	0
Bayside-Queen's Landing	355,010	107,000	168,000	264,000	0
Oyster Cove	237,900	125,000	197,000	254,000	0
Riverside	37,560	2,700	6,300	9,500	0
Gransonville	154,100	84,000	158,000	194,000	3,900
Prospect Bay	182,000	140,000	144,000	218,000	0

Source: Queen Anne's County, Water Service Area Study for Queen Anne's County Sanitary District, 2009

**Table 7-3: GAP Well Withdrawal Limits Compared to Service Area Demand Projections**

Service Area	Gap Well Withdrawal Limits		2006 Daily Well Withdrawal		Deficit with Best Well Out-of-Service, GPD
	Total GPD	Best Well Out-of-Service GPD	Average	Max-Month Daily Average	
Stevensville	1,255,000	265,000	639,000	811,000	546,000
Bridge Pointe	170,000	170,000	68,000	93,000	0
Bayside	300,000	45,000	91,000	135,000	90,000
Oyster Cove	187,000	187,000	84,000	135,000	0
Riverside	8,500	0	4,800	6,000	6,000
Gransonville	210,000	210,000	60,000	88,500	0
Prospect Bay	195,000	195,000	85,500	146,000	0

Source: Queen Anne's County, Water Service Area Study for Queen Anne's County Sanitary District, 2009

Line E on Tables 7-6 and 7-7 illustrate, based on the most limiting factor, the approximate net excess capacity (gpd) for new growth under maximum build-out conditions as identified by the Community Plans and Town Plans identified in Section 5.2. If an excess capacity value is negative, there is a capacity deficit for that demand category. For those Water Service Areas that have negative Daily Capacity or negative Net Excess Capacity (red numbers) may need to consider upgrades or changes in policy to meet anticipated growth.

The most limiting factor for water sources could include one of following; Total permitted Annual Average Daily Appropriations, Well-field capacity during drought, Safe yield of the reservoir system, Treatment Capacity, or Pump Capacity. Three of the seven County managed wells have as a limiting factor "Well-field capacity during drought," the remainder have "Total permitted Annual Average Daily Appropriations" as the limiting factor.



According to a Maryland Department of Natural Resources (DNR) report entitled *“Selected Ground-Water Level Records from Observation Wells in Queen Anne’s County” (June 2008)*, which presents information about 26 observation wells for a 21-month period; there are several groundwater source wells that are leveling off or show no indication of long-term declining trends such as the Patuxent Aquifer near Chester at Kent Island, the Lower Patapsco near Chester, and the water levels in wells in the Aquia and Columbia aquifers. There are however, reported decreases in water levels in wells near Kingstown (Lower Patapsco), and the Upper Patapsco Aquifer wells near Queen Anne, Chester, Matapeake, and Kingstown. The recorded decreases range from 3 feet to 8 feet since year 2000 observations.

According to correspondence between Maryland Department of the Environment and the Queen Anne’s County Environmental Health Department (2009), regarding water levels in the region south of Centreville and the impact of large water appropriations users (typically farms for irrigation), there would be approximately a 50-foot drop in water levels but that drawdown would be within the 80% management level for wells; i.e. minimal impact to water supply for large appropriation users. There may however be impact to domestic users which would require a *“minimum 142 feet of 4- inch casing or a deep packer system to maintain functionality.”* The average depth of domestic wells in the area is unknown, but domestic well depths within Queen Anne’s County tend to be 200-300 feet, and a large percentage of the older domestic systems rely on suction, packer systems, or submersible pumps (but that may be less than 100 feet down) to access water. In the future however, *“since the top of the aquifer averages -285 feet (below sea level), a new well constructed with 345 feet of 4-inch casing would ensure performance now and into the future.”* The correspondence infers that there is water supply (capacity), even for large appropriations users and domestic users, but that older domestic wells may be impacted and need to be upgraded to include “ casings or submersible pumps that are at least 100-feet down.

### Section 7.5 Maximum Capacity Water Demand

An estimate maximum capacity water demand was determined based on the output from the Queen Anne’s County Build-Out Analysis Report, using Baseline Scenario 2: Maximum Capacity Build-Out as illustrated on the **Baseline 2 Maximum Capacity Build-Out** map. Table 7-8: Water Demand under Maximum Capacity Build-Out shows the demand for water, assuming the development of additional housing units and additional non-residential space were to use water at a rate of 250 gpd for each housing unit and 0.375 gpd per each square foot of non-residential space. These water usage rates are generalized average rates used statewide for analytical purposes. The rates are typically higher than observed local rates of water usage for residential and non-residential uses.



**Table 7-4: Water Demand under Maximum Capacity Build-Out**

	2008 Existing Conditions	Estimated Short-Term Projected Conditions 2015-2020 (includes Towns)		Estimated Long-Term Projected Conditions 2050-2100 (includes Towns)	
	Existing Development	Total Development	Water Supply – Demand/ Needs* (MGD)	Total Development	Water Supply-Demand /Needs (MGD)
<b>Baseline Scenario 2: Maximum Capacity</b>					
Population	47,091	59,161		115,479	
Additional Housing Units (units)	18,890	23,368	5.84	45,638	11.4
Additional Square Footage of Non-residential Space (square feet)	10,096,366	11,251,290	4.22	22,428,764	8.4
<b>TOTAL</b>			10.06		19.8

\* Based on 250 gpd per housing unit and 0.375 gpd per square foot of non-residential space.

For purposes of this water demand analysis, Table 7-8 indicates that the County has 18,890 existing dwelling units. Applying the 250 gpd standard, these units could generate a demand for 4.72 MGD of water. Added with non-residential uses totaling 10,096,366 square feet, an additional 3.78 MGD of water demand could be generated, for a total existing County demand of 8.5 MGD. Under Maximum Capacity Build-Out short-term projected conditions there could be a demand for an additional 1.12 MGD for short-term residential demand and an additional 433,000 gpd for short-term non-residential demand would increase projected demands to a total 10.06 MGD. Under a Maximum Capacity Build-Out long-term, the amount of water demand could more than double over existing demand to 19.8 MGD,

In the 2009 Water Service Area Study prepared for the Queen Anne's County Sanitary District, it was projected that by 2040:

- None of the service areas, except Grasonville, would have the required groundwater appropriations permit withdrawal limits to meet the anticipated demands associated with a moderate growth scenario by 2040 considered in the study.
- The Stevensville, Bayside and Riverside service areas would experience severe shortages if the largest well in either service area failed under current maximum-day demands.
- Stevensville and Grasonville service area demands will exceed the net treatment capacity.
- Backup well capacity would be needed for Stevensville, Bayside and Riverside.
- Interconnection of separate service areas would provide increased redundancy and would minimize the potential for system failures.



## *Appendix 3: Water Resources Analysis and Best Management Practices Tool Kit*

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Table 7-5: Queen Anne’s County Water Treatment Facilities

Facility	Year Constructed	Aquifer	No. of Wells	Iron (MG/L)	Net Water Production Capacity, GPD	GAP (1) Limit, GPD	Treatment Type	
							Pre-Treatment	Primary Treatment
Bayside	1992	Magothy	1	26	193,100	144,00	Ion Exchange	Microfloc Aquarius
Queen’s Landing	1984	Aquia	2	1.2	167,910	27,000	--	Permutit Pressure Filters
<i>Bayside/Queen’s Landing Service Area Total</i>			3		<i>361,010</i>	<i>171,000</i>		
Bridge Pointe	1990	Magothy	2	16	139,200	100,000	Ion Exchange	Manganese Greensand
Kent Island Village(3)	1986	Aquia	1	1	179,125	15,000	--	Ion Exchange
<i>Bridge Point/KIV Service Area Total</i>			3		<i>318,325</i>	<i>115,000</i>		
Business Park	1986	Monmouth	1	32	82,400	170,000	--	Microfloc Trident
Stevensville	1986 & 1991	Lower Patapsco	1	9	408,000	750,000	--	Microfloc Aquarius
Thompson Creek	1988	Aquia	1	0.3	350,600	5,000		Microfloc Trident
<i>Stevensville Service Area Total(2)</i>			3		<i>490,400</i>	<i>920,000</i>		
Oyster Cove	1987	Aquia	2	0.2	237,900	95,800	--	Pressure Filtration
Riverside	1991	Magothy	1	16	37,560	5,100	--	Manganese Greensand
Grasonville	1996	Magothy	2	20	154,100	100,000	Ion Exchange	Microfloc Trident
Prospect Bay West	1975	Aquia	2	0.2	182,000	125,000	--	Iron-oxide Filtration

Source: Queen Anne’s County, Water Service Area Study for Queen Anne’s County Sanitary District, 2009

- Notes: (1) Groundwater Appropriation Permit daily average on a yearly basis.  
(2) Stevensville service area total does not include values from Thompson Creek WTP because that facility is for emergencies only.  
(3) Kent Island Village WTP is currently out-of-service pending resolution of ion exchange tank malfunction.



Table 7-6: Water Treatment Plant Capacity by Category

Water Treatment Facility	No. of Wells	Well Design Capacity GPD	GAP Well Withdrawal Limits Maximum Daily GPD	Design Treatment Capacity GPD	Gross Treatment Capacity GPD	Net Treatment Capacity GPD	Production Limitation
Stevensville WTP	1	840,000	1,000,000	480,000	480,000	408,000	Treatment Capacity
Business Park WTP	1	420,000	255,000	420,000	96,000	70,400	Treatment Capacity
Thompson Creek WTP	1	420,000	10,000	420,000	360,000	350,600	GAP Limit
Bridge Pointe WTP	2	240,000	150,000	180,000	156,000	139,200	Treatment Capacity
Kent Island Village	1	180,000	20,000	180,000	180,000	119,125	GAP Limit
Bayside WTP	1	240,000	255,000	240,000	216,000	193,100	GAP Limit
Queen’s Landing WTP	2	210,000	45,000	180,000	174,000	161,910	GAP Limit
Oyster Cove WTP	2	300,000	187,000	240,000	240,000	237,900	GAP Limit
Riverside WTP	1	120,000	8,5000	120,000	60,000	37,560	Treatment Capacity
Grasonville WTP	2	240,000	210,000	168,000	168,000	154,100	Treatment Capacity
Prospect Bay WTP	2	336,000	195,000	192,000	192,000	182,000	Treatment Capacity

Source: Queen Anne’s County, Water Service Area Study for Queen Anne’s County Sanitary District, 2009





Table 7-7: County Facilities – Summary of Water Supply and Demands

WATER SUPPLY FACILITY	Bay Side*	Bridge Pointe**	Grasonville	Oyster Cove	Prospect Bay	Riverside	Stevensville***	WATER SUPPLY
Provides Service to:	Chester Growth Area	Chester Growth Area	Grasonville Growth Area	Kent Narrows Growth Area	Stevensville Growth Area	Chester Growth Area	Stevensville Growth Area, Chesapeake Bay Business Park, Thompson Creek	
Water Source - Aquifer (Aquia, Magothy, Patapsco)	Magothy & Aquia Aquifers	Magothy & Aquia Aquifers	Magothy Aquifer	Aquia Aquifer	Aquia Aquifer	Magothy Aquifer	Patapsco, Magothy, Aquia Aquifers	
WATERSHED	Lower Chester Watershed	Eastern Bay Watershed	Lower Chester Watershed	Kent Narrows Watershed	Eastern Bay Watershed	Eastern Bay Watershed	Stevensville: Eastern Bay Watershed, Chesapeake Bay Business Park, Kent Island Bay Watershed, Thompson Creek: Eastern Bay Watershed	
EXISTING CONDITIONS / CAPACITY								
A. Total Permitted Annual Average Daily Appropriations	198,000 gpd	211,600 gpd	100,000 gpd	95,800 gpd	125,000 gpd	5,100 gpd	925,000 gpd	1,660,500 gpd
Average Day Capacity Limitation based on most limiting factor	193,846 gpd	85,846 gpd	100,000 gpd	95,800 gpd	125,000 gpd	5,100 gpd	134,615 gpd	740,208 gpd
LIST the MOST LIMITING FACTOR (Total permitted Annual Average Daily Appropriations, Well-field capacity during drought, Safe yield of the reservoir system, Treatment Capacity, or Pump Capacity):	Well-field capacity during drought / 1.3 Peak Factor	Well-field capacity during drought / 1.3 Peak Factor	Permitted Average Daily Appropriations	Permitted Average Daily Appropriations	Permitted Average Daily Appropriations	Permitted Average Daily Appropriations	Well-field capacity during drought / 1.3 Peak Factor	
B. EXISTING DEMAND (Average Day Drought Demand)	114,585 gpd	90,229 gpd	51,170 gpd	90,229 gpd	104,711 gpd	6,510 gpd	706,430 gpd	1,163,865 gpd
Population Served	1,550	750	766	588	754	58	5,530	9,996
Number of Connections (Residential and Non-Residential)	649	235	-	275	-	54	2,332	3,545
C. EXCESS ANNUAL AVERAGE DAILY CAPACITY								
Excess Average Day Capacity (Appropriations - Demand)	83,415 gpd	121,371 gpd	48,830 gpd	5,571 gpd	20,289 gpd	(1,410) gpd	218,570 gpd	496,635 gpd
D. PLANNED or ANTICIPATED CAPACITY NEEDS								
Potential Annual Avg. Daily Demand (from approved but undeveloped subdivisions/permits)	35,000 gpd	32,500 gpd	60,000 gpd	51,000 gpd	2,250 gpd	3,750 gpd	110,000 gpd	294,500 gpd
E. NET EXCESS CAPACITY:	48,415 gpd	88,871 gpd	(11,170) gpd	(45,429) gpd	18,039 gpd	(5,160) gpd	108,570 gpd	202,135 gpd
F. POTENTIAL ADDITIONAL USERS BASED ON NET EXCESS CAPACITY								
Potential Additional Units (Net Excess Capacity / 250 gpd )	194 Units	355 Units	(45) Units	(182) Units	72 Units	(21) Units	434 Units	809 Units

A = Permitted Appropriations  
B = Existing Demand  
C = Excess Daily Capacity (A-B)  
D = Demand based on known developments, includes residential and non-residential flows  
E = Net Excess Capacity after consideration for Planned or Anticipated Capacity Needs (C - D)  
F = Potential additional development based on net excess capacity as divided by 250 gpd (E / 250 gpd)

\*Bayside includes Bayside and Queen's Landing Facilities  
\*\* Bridge Point includes Bridge Pointe and Kent Island Facilities  
\*\*\* Stevensville includes Stevensville, Chesapeake Bay Business Park and Thompson Creek Facilities  
Source: WRE Water Capacity and Supply Worksheets (2006) & Queen Anne's County Comprehensive Water and Sewer Plan 2006 as updated

Conclusions: Water Service Areas that have negative Daily Capacity or negative Net Excess Capacity (red numbers) may need to consider upgrades or changes in policy to meet anticipated growth.





Table 7-8: Town Facilities – Summary of Water Supply and Demand

WATER SUPPLY FACILITY	Sudlersville	Queenstown	Centreville	TOTAL WATER SUPPLY
Provides Service to:	Sudlersville	Queenstown Growth Area	Centreville Growth Area	
Water Source - Aquifer (Aquia, Magothy, Patapsco)	Aquia & Wicomico	Aquia	Monmouth & Aquia	
WATERSHED	Upper Chester River	Wye River & Lower Chester River	Corsica River	
EXISTING CONDITIONS / CAPACITY				
A. Total Permitted Annual Average Daily Appropriations	17,500 gpd	77,000 gpd	645,000 gpd	739,500 gpd
Average Day Capacity Limitation based on most limiting factor	17,700 gpd	137,000 gpd	775,400 gpd	930,100 gpd
LIST the MOST LIMITING FACTOR (Total permitted Annual Average Daily Appropriations, Well-field capacity during drought, Safe yield of the reservoir system, Treatment Capacity, or Pump Capacity):				
B. EXISTING DEMAND (Average Day Drought Demand)	19,470 gpd	102,000 gpd	459,800 gpd	581,270 gpd
Population Served	432	635		1,067
Number of Connections (Residential and Non-Residential)	293	640		933
C. EXCESS ANNUAL AVERAGE DAILY CAPACITY				
Excess Average Day Capacity (Appropriations - Demand)	(1,970) gpd	(25,000) gpd	185,200 gpd	158,230 gpd
D. PLANNED or ANTICIPATED CAPACITY NEEDS				
Potential Annual Avg. Daily Demand	83,000 gpd	180,000 gpd	20,000 gpd	283,000 gpd
(from approved but undeveloped subdivisions/permits)				
E. NET EXCESS CAPACITY:	(84,970) gpd	(205,000) gpd	165,200 gpd	(124,770) gpd
F. POTENTIAL ADDITIONAL USERS BASED ON NET EXCESS CAPACITY				
Potential Additional Units (Net Excess Capacity / 250 gpd )	- Units	- Units	660 Units	- Units

A = Permitted Appropriations  
B = Existing Demand  
C = Excess Daily Capacity (A-B)  
D = Demand based on known developments, includes residential and non-residential flows  
E = Net Excess Capacity after consideration for Planned or Anticipated Capacity Needs (C - D)  
F = Potential additional development based on net excess capacity as divided by 250 gpd (E / 250 gpd)

\*Bayside includes Bayside and Queen's Landing Facilities  
\*\* Bridge Point includes Bridge Pointe and Kent Island Facilities  
\*\*\* Stevensville includes Stevensville, Chesapeake Bay Business Park and Thompson Creek Facilities

Source: WRE Water Capacity and Supply Worksheets (2006) & Queen Anne's County Comprehensive Water and Sewer Plan 2006 as updated

Conclusions: Water Service Areas that have negative Daily Capacity or negative Net Excess Capacity (red numbers) may need to consider upgrades or changes in policy to meet anticipated growth.





Table 8-1: County / Town Facilities – Summary of Wastewater Supply and Demand

EXISTING FLOW AND CONDITIONS							PLANNED "IN THE WORKS" CONNECTIONS (1)		
A	B	C	D	E	F	G	H	I	J
WWTP Facility	PERMIT NUMBER	Capacity Design (MGD)	2007 Average Daily Flow of Wastewater (MGD)*	2008 Average Daily Flow of Wastewater (MGD)	2- Year Rolling Average (MGD)	Remaining Capacity (MGD)	Number of Building Permits Approved / Requested (EDUs)	Estimate Flow from Nonresidential Uses (GPD)	Capacity Needed (MGD) Assuming 250 GPD per EDU Plus Flow for Non-residential development
Queenstown		0.000	0.077	0.000	0.077	-0.077	-	-	0.000
Centreville		0.500	0.222	0.000	0.222	0.278	-	-	0.000
Church Hill		0.000	0.054	0.000	0.054	-0.054	-	-	0.000
Barclay		0.000	0.000	0.000	0.000	0.000	-	-	0.000
Sudlersville WWTP	MD0020559	0.090	0.062	0.000	0.062	0.028	-	-	0.000

\*Maryland Department of the Environment provided data

EXISTING	INFILL DEVELOPMENT (2)			EXISTING DEVELOPMENT THAT COULD BE ADDED TO SYSTEM: SEPTIC ELIMINATION AREAS (3)			INFLOW /INFILTRATION
A	K	L	M	N	O	P	Q
WWTP Facility	Potential EDU's Assuming 250 GPD per EDU	Estimate Flow from Nonresidential Uses (GPD)	Capacity Needed (MGD) for INFILL AREAS Assuming 250 GPD per EDU Plus Flow for Non-residential development	Number of EDU's in Septic Elimination Areas	Estimate Flow from Nonresidential Uses (GPD)	Capacity Needed (MGD) For SEPTIC ELIMINATION AREAS Assuming 250 GPD per EDU Plus Flow for Non-residential development	Estimated Inflow and Infiltration Flow impacting the Wastewater Treatment Facility (Subtract column D from E). Note State defined method. **
Queenstown	-	-	-	-	-	-	(0.077)
Centreville	-	-	-	-	-	-	(0.222)
Church Hill	-	-	-	-	-	-	(0.054)
Barclay	-	-	-	-	-	-	(0.000)
Sudlersville WWTP	-	-	-	-	-	-	(0.062)

\*Maryland Department of the Environment provided data

\*\* Maryland Department of the Environment method

EXISTING FLOW & CONDITIONS	ESTIMATE REMAINING CAPACITY		FUTURE DEVELOPMENT THAT COULD BE ADDED TO SYSTEM (4)			FUTURE ESTIMATE REMAINING CAPACITY		FUTURE ESTIMATE GROWTH POTENTIAL	
	R	S	T	U	V	W	X	Y	Z
WWTP Facility	Estimate Remaining Capacity <b>without</b> I/I Estimation (MGD)	Estimate Remaining Capacity <b>with</b> I/I Estimation (MGD)	Number of EDU's in Future Sewer Areas (Assume EDU's or Nonresidential space for undeveloped lots)	Estimate Flow from Nonresidential Uses (GPD)	Capacity Needed (MGD) For FUTURE SEWER AREAS Assuming 250 GPD per EDU Plus Flow for Non-residential development	Estimate Remaining Capacity <b>without</b> I/I Estimation (MGD)	Estimate Remaining Capacity <b>with</b> I/I Estimation (MGD)	Estimate Potential EDU's <b>without</b> I/I Estimation	Estimate Potential EDU's <b>with</b> I/I Estimation
Queenstown	(0.08)	-	-	-	-	(0.08)	-	(308)	-
Centreville	0.28	0.50	-	-	-	0.28	0.50	1,112	2,000
Church Hill	(0.05)	-	-	-	-	(0.05)	-	(216)	-
Barclay	(0.00)	-	-	-	-	(0.00)	-	(0)	-
Sudlersville WWTP	0.03	0.09	-	-	-	0.03	0.09	112	360

Source: MDE- WRE Documentation

(1) PLANNED Connections: Includes approved and requested development, development required to be on system based on density, or units desiring to connect

(2) INFILL Connections: Undeveloped lots within an area already serviced by sewer that could develop and connect to system

(3) SEPTIC ELIMINATION AREA Connections: EDU's or Non-residential uses that are currently within Sewer Service Areas that have a septic system; includes uses whose septic system is failing.

(4) FUTURE DEVELOPMENT Connections: Includes an estimate of potential EDU's, or flow from uses which could be incorporated into Sewer Service Areas.



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### Section 8.0 Wastewater Assessment

This section addresses the availability of suitable receiving waters and land areas to meet wastewater treatment and disposal needs. Suitable means that surface waters can assimilate pollutants from wastewater sources, including wastewater treatment plants, community and individual septic tanks and industrial sources, without violating water quality standards.

#### Section 8.1 General –Sewer Service Areas

The Queen Anne's County 2006 Comprehensive Water and Sewerage Plan provided descriptions of Sewer Service Areas and the **Sewer Service Areas (and those areas of Public Health Concerns)** map provides the current status of Sewer Service Area Designations. Since the 2006 plan, there have been Community Plans completed for Queenstown, Wye Mills, Centreville, Sudlersville, and Church Hill areas, and the planned or anticipated growth for these may require further modification to designated sewer service areas. Note: the Wye Mills plan was not approved and analysis in this document was revised.

#### Section 8.2 Wastewater Treatment Facilities

Wastewater treatment plant information was derived from the Queen Anne's County 2006 Comprehensive Water and Sewerage Plan, 2008 Town of Centreville Maryland, Wastewater Capacity Management Plan, recently completed Community Plans, and data as provided through Water Resource Element - Wastewater Capacity Management tables (MDE reporting tables). A summary table is provided.

##### Section 8.2.1 Kent Narrows/Stevensville/Grasonville (KNSG)

The KNSG Wastewater Subdistrict is a consolidation of the Chester, Kent Narrows, Grasonville, Stevensville, and Prospect Bay subdistricts, and is the largest district and wastewater facility in Queen Anne's County. The plant's capacity is 3.0 MGD and the two-year rolling average (2007-2008) annual flow is approximately 1.53 MGD.

Major components of the existing wastewater treatment facilities are a septage handling station, primary clarification, and secondary treatment, which was constructed in 2007 and includes a 3.0 MGD activated sludge treatment plant capable of achieving Enhanced Nutrient Removal in accordance with the goals of the Chesapeake Bay nutrient reduction initiatives. Due to the outfall's discharge into shellfish waters, an emergency storage lagoon capable of holding 24 hours of flow is required.

The current wastewater collection system is a vacuum system. The wastewater transmission system is a force main consisting of five pump stations.

##### Section 8.2.2 Queenstown

The Town operated on individual septic systems until 1971. The Town then constructed a wastewater treatment system. This treatment system was designed with a capacity of 65,000 gpd. The treated wastewater was, and is still currently, discharged into Little Queenstown Creek through a submerged 8-inch outfall. A vitrified clay pipe (VCP) wastewater collection system was also constructed at this time. The Town's Charter to require all properties in the Town to be served by this publicly owned utility.

The current wastewater discharge system is permitted and rated for an 85,000 gpd, and the two-year (2007-2008) rolling average daily flow is approximately 77,000 gpd. The draft (2009) Queenstown Community Plan anticipates under a Consolidated Option approximately 1,030 additional housing units





and 885,000 square feet of non-residential space. Queenstown anticipates expansion of the existing wastewater treatment plant to manage increased flows. The estimated demand to meet the upper limits of the proposed development as well as continue service to existing development is approximately 530,000 gpd.

**Table 8-2: Wastewater Treatment Facilities Summary**

WWTP Facility	Capacity Design (MGD)	Average Flow (MGD)	Remaining Capacity (MGD)	Comments Relevant to Facility
Kent Narrows Stevensville Grasonville (KNSG) WWTP	3.000	1.533	1.467	The KNSG plant has reserved capacity for future development including non-residential space and 1,418 units plus 500,000 GPD for failing septic systems. The plant is approaching capacity with these reserves.
Queenstown	0.077	0.073	0.004	Plant is at or near capacity; however the plant anticipates adding capacity for planned development as per the Queenstown Community Plan.
Centreville	0.542	0.381	0.161	Plant has capacity which could be exceeded according to planned development identified in the Centreville Community Plan; however additional plant capacity is anticipated to accommodate planned development.*
Church Hill	0.080	0.047	0.033	The Town anticipates using remaining capacity for planned development as per the Church Hill Community Plan. Plant may need to expand capacity to accommodate anticipated Priority Funding Area (PFA) expansion and requirement that all new development within PFA be connected to sewer.
Sudlersville WWTP & Barclay**	0.090	0.044	0.046	Remaining capacity at plant is reserved for 50,000 GPD school flow and connection to Barclay residences. The anticipated additional flow will require expansion of plant capacity.
Chesapeake College	0.015	0.005	0.010	Chesapeake College plant will utilize remaining capacity as needed to support campus expansion.
<b>TOTAL***</b>	<b>3.804</b>	<b>2.083</b>	<b>1.721</b>	

\* The Town of Centreville requested and, in 2008, MDE re-rated the new WWTF to process an annual daily average of 542,000 gpd of flow. This new WWTF is also capable of expansion to handle up to 1.2 million gpd of flow.

\*\* Barclay is dependent on Sudlersville for Capacity; flows include anticipated connections.

\*\*\*Wastewater treatment systems are not interconnected.





### Section 8.2.3 Centreville

In 2008, MDE re-rated the Town's WWTF to process an annual daily average flow of 542,000 gpd. The WWTF is capable of expansion to handle up to 1.2 MGD. The two-year (2007-2008) rolling average daily flow is approximately 381,000 gpd.

The Centreville Community Plan (2009) anticipates through septic elimination areas and expansion of service area approximately 5,700 additional housing units to be added to the wastewater system. Centreville anticipates using the remainder of the plant capacity with eventual expansion to accommodate anticipated development.

### Section 8.2.4 Church Hill

Town of Church Hill treatment facility consists of a lagoon-type facility. The collection facility consists of 8-inch gravity sewer and 6-inch force main, and two pump stations. The system is designed for an average flow of 80,000 gpd and a peak flow of 140,000 gpd. The two-year rolling average annual flow is approximately 47,000 gpd.

The plant may need to expand capacity to accommodate anticipated Priority Funding Area expansion and the requirement that all new development in the Town be connected to sewer.

### Section 8.2.5 Sudlersville & Barclay

The Town of Sudlersville has constructed a community sewerage system with a capacity of 90,000 gpd designed to serve 900 people. Sewerage treatment consists of two stabilization lagoons followed by chlorination. The two-year (2007-2008) rolling average annual flow is approximately 44,000 gpd.

Remaining capacity at the plant is reserved, approximately 50,000 gpd, for a new middle school. Sudlersville and Barclay plan to create a denied access wastewater line between the communities to bring residents currently on septic onto a sewage system. Both communities anticipate, according to Community Plans, to increase in residential units and to eliminate current septic units. There are approximately 620 units anticipated for septic elimination and expansion.

According to the Draft Sudlersville Growth Management Plan (2009), there may be an additional 1,165 units which may be added to the planned WWTP in the near-term plan horizon.

### Section 8.2.6 Chesapeake College

Chesapeake College, the regional community college, operates an existing wastewater system serving approximately 3,500 students at Wye Mills. The method of treatment is an extended aeration unit followed by settling, chlorination, and dechlorination with discharge of the effluent to a tributary of the Wye East River. The collection system consists of 8-inch diameter gravity sewer lines and contains no pumping stations. The system is authorized an average flow of 15,000 gpd and a peak flow of 27,000 gpd. The two-year (2007-2008) rolling average flow is approximately 5,000 gpd.



### Section 8.3 Septic Systems

County-wide there are approximately 11,751 housing units on septic (9,119 units reported from the Chesapeake Bay Restoration Fund (CBRF) plus an estimated 2,157 housing units in pending developments to be on septic with 475 housing units on parcels spanning watersheds). Data provided in Table 8-1 are estimations only, as acreages for non-residential development include the entire parcel upon which a non-residential use is located, and there were approximately 475 units located on parcels which spanned watersheds. Housing unit counts for parcels that spanned watersheds were included in both watersheds so as not to under estimate the nitrogen impacts within watersheds. Often times it was not possible to determine where septic systems were located on a parcel and therefore in which watershed it should be included. The values in Table 8-1 were used to populate Water Resource Element Tables to estimate potential pounds of nitrogen and phosphorus that could be expected from septic systems.

**Table 8-3: Septic Systems per Watershed**

Watershed	Approximate CBRF Units Per Watershed	CBRF Acres of Non- Residential Accounts
Corsica River	905	331
Eastern Bay	1,978	141
Kent Island Bay	1,531	9
Kent Narrows	478	6
Lower Chester River	674	67
Middle Chester River	1,049	110
Southeast Creek	870	234
Tuckahoe Creek	895	328
Upper Chester River	1,900	767
Upper Choptank	60	2
Wye River	1,411	561
<b>Total</b>	<b>11,751</b>	

Source: CBRF Dataset, MDE

There are also public health and safety issues to consider, as failing septic systems, even within sewer service areas, can also contribute to groundwater contamination and ultimately Chesapeake Bay pollution. The County Department of Environmental Health indicates approximately 20 percent of the on-lot systems are failing due to age and type of technology.

In addition to the estimated nitrogen and phosphorus output from the Water Resources Element Point & Non-Point Sources tables, as provided for each watershed (refer to section Results by Watershed), the overall depth to groundwater within Queen Anne's County is less than 2 ½ feet; there are approximately 106,383 acres of land with less than 30 inches to groundwater (44.8% of the County's land area). The **Depth to Groundwater Map ESA-5** illustrates where the shallowest depths are located. Septic systems



within the shallowest depth to groundwater areas could be contributing to groundwater contamination and ultimately Chesapeake Bay pollution.

### Section 8.3.1 Prioritization of Septic Elimination Areas

Priority areas for septic elimination include southern Kent Island (an area with a predominant amount of malfunctioning on-site septic systems), Critical Areas and malfunctioning on-site septic systems within Wastewater Services Areas. Other areas for consideration for septic elimination are areas in and around the Towns and Growth Areas.

The Bay Restoration Fund (created by Senate Bill 320 in 2004) provides a dedicated source of funds, financed by wastewater treatment plant users, to upgrade Maryland's wastewater treatment plants with enhanced nutrient removal (ENR) technology. A separate fee is collected for onsite disposal users (Onsite Disposal Fund) with priority given to failing septic systems in Critical Areas to employ best available technology for nitrogen removal. The fees and process is known collectively in Queen Anne's County as the Chesapeake Bay Restoration Fund (CBRF).

## Section 9.0 Stormwater Management

Stormwater runoff from development is a major contributor of pollutants and sediment to the Bay. The use of proper best management practices (BMPs) can reduce harmful impacts to the local hydrology.

The construction of roads, buildings and other impervious surfaces disrupts the natural hydrology of the landscape. Runoff from impervious surfaces carries nonpoint source pollutants such as nutrients, sediments, oil and a variety of toxic chemicals. The following provides general impacts to waterways for each of these components:

- Nutrients, primarily nitrogen and phosphorus, cause algal blooms which cloud water and cause "dead zones" without oxygen.
- Small sediment particles decrease water clarity.
- Larger sediment settles to the bottom of waterways, smothering bottom life and fish spawning areas.
- Heavy sediment loads can fill stream channels.
- Oil and toxic chemicals can kill aquatic life and impact the ability to swim in the Bay and make fish unsafe for human consumption.

Studies have documented that the quality of aquatic habitat in streams, lakes and wetlands begins to decline when the area of impervious surface located in upstream watersheds reaches 10 percent of the total land areas. When impervious surface reaches more than 25% within a watershed, waterways can only support few fish species able to tolerate high levels of pollution.

Maryland's smart growth policies emphasize concentrating growth where development already exists within Growth Areas to reduce sprawl and the increase of impervious surface across rural landscapes. A stormwater management policy has been established by the state that specifies a 20% reduction in impervious surface area below existing conditions or water quality treatment of the volume of runoff from 20% of a site's impervious surface.

Stormwater management practices help control nonpoint source pollution through the use of nonstructural and/or structure techniques to intercept surface runoff from developed areas, filter and treat this runoff, and then discharge it at a controlled rate.



### Section 9.1 Environmental Site Design?

If planning, policies and site evaluation are done well, nutrients entering the Chesapeake Bay via stormwater can be greatly reduced. Controlling problems at their source is almost always more effective and much less expensive over the long-run. The state has identified the following Environmental Site Design (ESD) principles to be applied locally:

1. Develop a local ESD ordinance with specific benchmarks and ESD practices.
2. Require increased onsite recharge and runoff reduction volumes.
3. Require ESD mapping to ensure protection of environmentally sensitive features as part of initial site layout.
4. Require ESD as the first step in site design as a mechanism to address needs while reducing need for costly infrastructure.
5. Establish specific and numeric performance criteria to ensure a reduction of nutrient loadings to waterways.
6. Identify stringent performance criteria for design, installation and maintenance of all stormwater and ESD practices.
7. Establish specific triggers to promote non-structural controls for permanent stormwater management and for construction with the intent to maximize absorption of stormwater on-site.
8. Establish standards for runoff leaving construction sites and should prohibit off-site discharges of sediment.
9. Define more stringent stormwater criteria to protect special watersheds and maintain the biotic integrity of sensitive aquatic resources.
10. Establish mandatory training and certification for ESD for County design and plan review staff as well as third-party inspection staff.
11. Establish fees in accordance with Title 2 of the Financing Implementation portion of the Stormwater Management Act of 2007.

In 2008, the County adopted ESD standards to meet the requirements of this Act. The Maryland Department of the Environment (MDE) mandates the use of environmental site design (ESD) for all government and privately-funded projects through a regulatory program, effective April 1, 2010.

### Section 9.2 Maryland's Stormwater Management Regulations

Maryland's stormwater management law is written in the Annotated Code of Maryland, Environment Article, Title 4, Subtitle 2. Stormwater regulations are contained in the Code of Maryland Regulations (COMAR) 26.17.02. And, the procedure for calculating the size of stormwater BMPs is outlined in the Maryland Stormwater Design Manual. MDE's specific performance standards address four main categories to address water quality:

- standards requiring recharge to the water table
- flood protection
- stream channel erosion protection
- water quality improvement



### Section 9.3 County Regulation of Stormwater

In 2001 Queen Anne's County adopted a Stormwater Management Ordinance (Chapter 14, Section 4) whose purpose is to protect, maintain and enhance the public, health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse impacts associated with increased stormwater runoff. The ordinance seeks to minimize damage to property, reduce the effects of development on land, control stream channel erosion, reduce local flooding, and maintain after development, as nearly as possible, the predevelopment runoff characteristics. The coordination and enforcement of the ordinance are under the Queen Anne's County Department of Public Works. Within the ordinance are articles requiring stormwater management plans, erosion and sediment controls, water recharge, flooding controls and application of Best Management Practices (BMPs).

Queen Anne's County in its Stormwater Management Ordinance has also identified the 2000 Maryland Stormwater Design Manual (Volumes I & II), to serve as the official guide for stormwater principles, methods and practices; which was supplemented, in December 2007, with a Queen Anne's County Environmental Site Design Manual. The County has routinely adopted the State Standards for Stormwater and adopted the latest standards in 2010.

### Section 9.5 Stormwater Facilities

Queen Anne's County has been proactive in addressing stormwater. The County adopted an Environmental Site Design (ESD) before it was required, and there are demonstration projects within the County including permeable concrete and rain gardens. The Queen Anne's County Department of Public Works recently completed a Geographic Information Systems (GIS) inventory of stormwater facilities and can utilize the recently completed impervious surface coverage to augment stormwater practices, programs, and activities. Within the County there are approximately 400 stormwater facilities with reports provided to the State. Although Queen Anne's County does not have a Stormwater Utility it has been considered in the past. Stormwater facilities as well as impervious cover are illustrated on the map.





### Section 10.0 Best Management Practices Matrix

A Best Management Practices matrix is provided in Table 10-2. The matrix includes information associated with a comprehensive planning and site design approaches that aims to minimize stormwater impacts associated with water quality volume and peak flows, and water supply. This approach relates to a number of growth management initiatives such as Smart Growth, Low Impact Design (LID), conservation-by-Design and Environmental Site Design (ESD). The matrix contains a variety of Best Management Practices (BMPs) and land management techniques and strategies that can be used as a toolkit to reduce impacts on water resources.

### Section 10.1 Landscapes Typologies

The following landscapes typologies are used to describe both natural and man-made environments across the County as well as used in the assessment of each watershed and associated Best Management Practices matrix tools and techniques.

- **Agricultural Landscapes** – Areas that are predominantly used and preserved (permanently or temporarily) for agricultural use with minimal intrusions by residential, commercial, industrial and institutional uses.
- **Natural Landscapes** – Areas that are predominantly undeveloped containing natural features such as waterways, riparian buffers, wetlands, floodplains, forests, wildlife habitats and other natural features.
- **Rural Residential Landscapes** – Areas within agricultural landscapes where historical or recent residential development and/or clusters have occurred.
- **Suburban Landscapes** – Areas in and around the Towns and Growth Areas where medium to low density residential, commercial and employment centers have developed or are permitted to expand in the future.
- **Town/Village Landscapes** – Incorporated Towns and Villages where historically development has occurred and has been supported by infrastructure improvements (e.g. water, sewer, roadways, etc.).



**Table 10-1: Evaluation of Land Use Management Tools and Techniques Matrix**

**Evaluation of Land Use Management Tools and Techniques Matrix**

Key Tools/Techniques	Key Advantages	Implementation	Key Disadvantages
<b>Preserve and Repair Riparian Buffers</b>	<ul style="list-style-type: none"> <li>Reduction of peak storm flow.</li> <li>Filtering pollutants.</li> <li>Reduction of nutrients in waterways.</li> <li>Streambank stabilization.</li> <li>Stream temperature control.</li> </ul>	<ul style="list-style-type: none"> <li>Establish buffers, greenways, open space and recreational areas through comprehensive planning.</li> <li>Support local watershed groups.</li> <li>Riparian Corridor Conservation District – zoning overlay district.</li> <li>Consistency between zoning, subdivision/ development and stormwater management ordinances.</li> <li>Best Management Practices should be implemented by landowners in natural and rural landscapes.</li> </ul>	<ul style="list-style-type: none"> <li>Establishments of buffers must be clearly tied to health, safety and welfare issues and environmental protection.</li> <li>A strong buffer awareness program may be required to educate development community and property owners.</li> </ul>
<b>Stormwater Management Best Management Practices (BMPs)</b>	<ul style="list-style-type: none"> <li>Refer to Section 10.3 for examples of BMPs and other relevant information.</li> </ul>	<ul style="list-style-type: none"> <li>Part of subdivision/development plans and required by stormwater management ordinances.</li> <li>Construct stormwater facilities on lands previously developed without such facilities.*</li> <li>Conversion of dry ponds for stormwater management to extended detention or retention facilities which are more effective at nutrient removal.*</li> <li>Requirements of various County and State permits.</li> </ul>	<ul style="list-style-type: none"> <li>Lack of education/understanding of importance by the public.</li> <li>Initial cost of some practices may exceed traditional methods to address SWM.</li> </ul>
<b>Agricultural Best Management Practices*</b> <ul style="list-style-type: none"> <li>Animal Waste Management Systems (Livestock &amp; Poultry)</li> <li>Cover Crops</li> <li>Nutrient Management Plan Implementation</li> <li>Runoff Control</li> <li>Retirement of Highly Erodible Land</li> <li>Stream Protection with and without Fencing</li> <li>Conservation Tillage</li> </ul>	<ul style="list-style-type: none"> <li><b>Animal waste management systems</b> are designed to properly handle, store and use waste generated by confined animal facilities.</li> <li><b>Cover crops</b> reduce nitrate leaching losses during the winter and also reduces erosion.</li> <li><b>Nutrient management plan implementation</b> reduces impacts of nutrients due to management practices.</li> <li><b>Runoff control</b> reduces nutrient impacts on waterways.</li> <li><b>Retirement of highly erodible land</b> reduces potential for soil loss.</li> <li><b>Stream protection</b> discourages animals from entering streams.</li> <li><b>Conservation tillage</b> minimal soil disturbance.</li> </ul>	<ul style="list-style-type: none"> <li><b>Animal waste management systems</b> include ponds, lagoons and tanks for liquid waste, and sheds or pits for solid waste.</li> <li><b>Cover crops</b> are small grains planted in September or early October on land otherwise fallow with no fertilizer applied.</li> <li><b>Nutrient management plan implementation</b> comprehensive plan to manage the amount, placement, timing and application of animal waste, fertilizer, sludge or other plant nutrients.</li> <li><b>Runoff control systems</b> include ponds, lagoons and tanks for liquid waste and sheds or pits for solid waste.</li> <li><b>Retirement of erodible lands</b></li> <li><b>Stream protection</b> provides troughs or other watering devices in remote locations away from streams to discourage animals from entering the stream and use of fencing adjacent to stream crossing to limit access points.</li> <li><b>Conservation tillage</b> is a process that uses tillage equipment to seed the crop directly into the vegetative cover or crop residue on the surface.</li> </ul>	<ul style="list-style-type: none"> <li>Cost associated with use of new equipment and procedures.</li> </ul>

\*Source: Recommended Best Management Practices for Upper Eastern Shore as part of Tributary Strategies, MDE



**Evaluation of Preservation/Conservation Tools Matrix**

Key Tools/Techniques	Key Advantages	Implementation	Key Disadvantages
<b>Conservation Subdivision or Cluster Development Standards</b>	<ul style="list-style-type: none"> <li>Alternative to conventional development patterns that allow for preservation/conservation.</li> <li>Fewer environmental impacts.</li> <li>Potential reduction in infrastructure costs.</li> <li>Ability to create walkable neighborhoods and sense of community.</li> <li>On-lot systems can be used if designed and maintained properly.</li> </ul>	<ul style="list-style-type: none"> <li>Amendment of zoning ordinance and subdivision/development ordinance.</li> <li>Sketch plan process.</li> <li>Use of Map of Potential Conservation.</li> <li>Can be applied to all landscapes.</li> </ul>	<ul style="list-style-type: none"> <li>May result in the need for community sewer systems.</li> <li>Continued use of agricultural uses in open spaces of cluster development creates conflict.</li> <li>Transportation and air quality impacts are the same as conventional development.</li> <li>Poor design can result in greater visual impacts than conventional design.</li> <li>May require more site inspections.</li> </ul>
<b>Natural Features Conservation Standards or Conservation Zoning</b>	<ul style="list-style-type: none"> <li>Protection of floodplains, forests and vegetation.</li> <li>Preserve the Upper Delaware National Scenic and Recreational River Corridor.</li> <li>Protect groundwater and maintain groundwater recharge areas.</li> <li>Protect wellheads, riparian buffers, and steep slopes and manage stormwater.</li> <li>Protect and maintain water supply and reduce erosion and sedimentation.</li> <li>Protection of environmentally sensitive areas.</li> </ul>	<ul style="list-style-type: none"> <li>Delineation of water resource features should be done by a professional hydro-geologist or engineer.</li> <li>Coordination with update of Natural Areas Inventory.</li> <li>Use of Map of Potential Conservation.</li> <li>Can be applied to all landscapes.</li> </ul>	<ul style="list-style-type: none"> <li>Assessments can be costly.</li> </ul>
<b>Floodplain Regulations</b>	<ul style="list-style-type: none"> <li>Protection of floodplain and water quality.</li> <li>Protection from flood damage.</li> <li>Creates riparian buffers to support wildlife habitats, greenways and access for recreation.</li> <li>Allowable and unallowable uses are defined in the ordinance.</li> </ul>	<ul style="list-style-type: none"> <li>Map and ordinance regulations.</li> <li>Implemented as part of zoning ordinance.</li> <li>Land Development Plans subject to requirements and floodways, floodplain, flood areas and/or riparian buffers must be shown on plans.</li> </ul>	<ul style="list-style-type: none"> <li>Cost associated with development of floodplain map and ordinance.</li> <li>Requires establishment of ordinance.</li> <li>Limitations on allowable uses may be too restrictive.</li> </ul>
<b>Tree Planting*</b>	<ul style="list-style-type: none"> <li>Reduces runoff.</li> </ul>	<ul style="list-style-type: none"> <li>Includes any tree planting on any site except those along rivers and streams.*</li> <li>Applicable to all landscapes.</li> </ul>	<ul style="list-style-type: none"> <li>Cost to private property owners.</li> </ul>
<b>Urban Nutrient Management*</b>	<ul style="list-style-type: none"> <li>Reduction of excess lawn fertilizer use.</li> </ul>	<ul style="list-style-type: none"> <li>Education program targeted at suburban residents and businesses.</li> </ul>	<ul style="list-style-type: none"> <li>Voluntary compliance through education.</li> </ul>

\*Source: Recommended Best Management Practices for Upper Eastern Shore as part of Tributary Strategies, MDE



Evaluation of Preservation/Conservation Tools Matrix

Key Tools/Techniques	Key Advantages	Implementation	Key Disadvantages
<b>Resource Management Plan</b>	<ul style="list-style-type: none"> <li>Protection of natural environment.</li> <li>Preservation of open space.</li> <li>Ability to create greenways or connections.</li> <li>Provides proper context for environmental regulations, pre-emptive statutes and forest management techniques.</li> </ul>	<ul style="list-style-type: none"> <li>MDE Funding available to prepare plan.</li> <li>Plan can build upon Comprehensive Plan and Land Preservation, Parks and Recreation Plan (LPPRP).</li> <li>Utilizes map of Potential Conservation.</li> <li>Applicable to all landscapes.</li> </ul>	<ul style="list-style-type: none"> <li>Cost associated with development of the plan.</li> <li>Cost associated with implementation (management of resources) of the plan.</li> <li>May result in development of additional local land use regulations and environmental regulations.</li> <li>Forest succession may not be attractive to all residents.</li> </ul>
<b>Resource Management Practices*</b> <ul style="list-style-type: none"> <li>Forest Harvesting Practices</li> <li>Marine Pump-outs</li> <li>Structural Shore Erosion Control</li> <li>Nonstructural Shore Erosion Control</li> </ul>	<ul style="list-style-type: none"> <li><b>Forest harvesting</b> with appropriate controls in management zones will reduce erosion and impacts of runoff.</li> <li><b>Marine pump-outs</b> will improve water quality.</li> <li><b>Structural shore erosion controls</b> will stabilize eroding shorelines.</li> <li><b>Nonstructural shore erosion controls</b> will stabilize eroding shorelines. Contributes to creating wetland habitats.</li> </ul>	<ul style="list-style-type: none"> <li><b>Forest harvesting</b> is the application of regulatory and voluntary best management practices applied to timber harvesting including erosion and sediment control and streamside management zones.</li> <li><b>Marine pump-outs</b> are facilities sited at marinas for pumping sewage from boat holding tanks to dockside storage facility. Regulatory requirements are contained in ordinances.</li> <li><b>Structural shore erosion controls</b> is a practice of stabilizing eroding shorelines using stone riprap or timber bulkheads. Suitable for sites with high wave energy.</li> <li><b>Nonstructural shore erosion controls</b> a practice for stabilizing eroding shorelines by establishing marsh grasses. Suitable for sites with lower wave energy.</li> </ul>	<ul style="list-style-type: none"> <li>Costs to property owners.</li> </ul>
<b>Use of Nitrate Levels to Restrict Development (Develop a Nitrates Map)</b>	<ul style="list-style-type: none"> <li>Guides development supported by on-lot systems to appropriate areas.</li> <li>Contributes to public health, safety and welfare.</li> <li>Identifies areas for expansion of public water and sewer systems or restriction of development.</li> </ul>	<ul style="list-style-type: none"> <li>Development of a Nitrates Map.</li> <li>Identification of appropriate site analysis and testing.</li> <li>Part of plan review and permitting.</li> <li>Applicable to all landscapes.</li> </ul>	<ul style="list-style-type: none"> <li>Cost associated with development of a nitrates map.</li> <li>Additional cost to developer/property owner.</li> </ul>
<b>Purchase of Development Rights (PDR)</b>	<ul style="list-style-type: none"> <li>Municipal or state control of land through purchasing the rights of more intensive land use from current landowner.</li> <li>Landowner derives financial benefit from selling rights.</li> <li>Lower property value reduces taxes to owner.</li> <li>Property owner permitted to continue lower intensity use of property.</li> </ul>	<ul style="list-style-type: none"> <li>Financial resources or tax incentive program to support ability to purchase development rights (state, county and local municipalities).</li> <li>Tracking mechanism.</li> <li>Supports conservation and preservation of rural resource areas (natural and rural landscapes).</li> </ul>	<ul style="list-style-type: none"> <li>Tracking properties and regulation of land use.</li> <li>Loss of tax revenue.</li> </ul>

\*Source: Recommended Best Management Practices for Upper Eastern Shore as part of Tributary Strategies, MDE



Evaluation of Preservation/Conservation Tools Matrix			
Key Tools/Techniques	Key Advantages	Implementation	Key Disadvantages
<b>Priority Preservation Areas (PPAs) and other Land Preservation Programs</b>	<ul style="list-style-type: none"> <li>Targeted to natural or other environmentally sensitive resources such as wetlands, buffers along waterways, or forested areas that provide habitat for flora and fauna and wildlife habitats.</li> <li>Assist with maintaining functioning soil resources.</li> <li>If areas selected properly can contribute to wellhead protection and protection of other water resources.</li> <li>Funding may be associated with designations to assist with preservation and growth management.</li> </ul>	<ul style="list-style-type: none"> <li>Designation of PPA as part of the comprehensive planning process.</li> <li>Designation of areas based upon specific programs.</li> </ul>	<ul style="list-style-type: none"> <li>Potential for program to change or program to be augmented with a set of unknown regulations at the time of designation.</li> </ul>
<b>Transfer of Development Rights (TDR)</b>	<ul style="list-style-type: none"> <li>Cost of preservation absorbed by property owner who purchases rights.</li> <li>Allows local government to direct density and growth away from sensitive landscapes and rural resource areas.</li> </ul>	<ul style="list-style-type: none"> <li>Adequate planning to ensure adequate public facilities to support development in receiving areas.</li> <li>Appropriate to preserve rural resource areas while guiding development to designated growth areas (rural residential and village landscapes).</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to implement.</li> <li>Can be controversial.</li> <li>Often hard to identify areas where increased density is desirable.</li> <li>Must be established by ordinance.</li> </ul>
<b>Planned Residential Development</b>	<ul style="list-style-type: none"> <li>Development standards are specified prior to development approval and applicable to all phases of development through agreement.</li> <li>Allows for provision of adequate public facilities as part of development.</li> </ul>	<ul style="list-style-type: none"> <li>Adequate planning and implementation of public facilities is part of the development.</li> <li>Applicable to rural residential landscapes.</li> </ul>	<ul style="list-style-type: none"> <li>All phases of development are defined by a legal instrument and must develop in that manner regardless of change in economic market and/or changes in desired land use patterns.</li> <li>Legal agreements and extensive Solicitor involvement.</li> </ul>





Evaluation of Preservation/Conservation Tools Matrix			
Key Tools/Techniques	Key Advantages	Implementation	Key Disadvantages
<b>Traditional Neighborhood Development (TND)</b>	<ul style="list-style-type: none"> <li>• Development pattern emulates smaller, older communities.</li> <li>• Pedestrian oriented community.</li> <li>• Streets are laid out in a grid pattern.</li> <li>• More community open space is provided.</li> <li>• Variety of housing types with small or no front yards are provided.</li> <li>• Mixed use neighborhood.</li> <li>• Environment where residents can walk from home to jobs and commercial establishments.</li> <li>• Minimize environmental impacts due to less use of automobile and close proximity of uses.</li> <li>• Can be used in existing villages, boroughs and mixed use neighborhoods to preserve historic resources and architectural integrity.</li> </ul>	<ul style="list-style-type: none"> <li>• Standards are typical of villages or small urbanized areas.</li> <li>• Established through zoning ordinance and zoning map.</li> <li>• Applicable for village landscapes (existing and proposed villages).</li> </ul>	<ul style="list-style-type: none"> <li>• Perception of public in rural areas results in hesitation to apply technique to residential communities that may require some level of mix use due to remote locations or lack of access to goods and services within existing community.</li> <li>• Regulation of impacts and site design of non-residential uses must be addressed.</li> </ul>
<b>Land Preservation Programs:</b> <ul style="list-style-type: none"> <li>• Program Open Space</li> <li>• Maryland Agricultural Land Preservation Program (MALPF)</li> <li>• Rural Legacy</li> <li>• GreenPrint</li> <li>• Maryland Environmental Trust</li> <li>• Conservation Reserve Enhancement Program</li> </ul>	<ul style="list-style-type: none"> <li>• Preservation of natural resources, environmentally sensitive lands and agricultural lands.</li> <li>• Some programs provide financial benefits or tax incentives.</li> <li>• Promotes effective land management of natural environment.</li> </ul>	<ul style="list-style-type: none"> <li>• Coordination with the County and state for application/designation and eligibility requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• Limitations on type, amount and intensity of development.</li> </ul>



## Section 10.3 Stormwater Management Tools

There are several innovative tools and technologies or Best Management Practices (BMPs) available to reduce stormwater problems. The following matrix provides a brief description of various stormwater management tools applicable to all landscapes that contribute to:

- Providing acceptable practices for compliance with regulation of stormwater management.
- Minimizing the increase of surface volumes, rates and frequencies resulting from development.
- Minimizing increases to downstream flooding.
- Increasing recharge to groundwater.
- Increasing treatment and pollutant removal for groundwater recharge and surface water discharge.
- Decreasing erosion and sedimentation.
- Offering aesthetic amenities for new development.
- Reducing infrastructure requirements, space requirements and maintenance costs for stormwater handling facilities.
- Enhancing stream and riparian corridor management.

**Table 10-2: Stormwater Best Management Practices Matrix**

Stormwater Best Management Practices Matrix		
Tool	Description	Benefit
Rain Gardens	Rain gardens are gardens containing flowering plants and grasses that can survive in soil soaked with water from rain storms. However, they are not gardens that have standing water.	Rain gardens collect and slow stormwater runoff and increase its infiltration into the soil.
Grassed Swales	Grassed swales are vegetated channels designed to treat and attenuate stormwater runoff for a specified water quality volume.	As stormwater flows through the channels, it is treated through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils.
Pervious Pavement	Pervious pavement is designed to allow percolation or infiltration of stormwater through the surface into the soil.	The water is naturally filtered and pollutants are removed.
Parking Lot Filter Strips	Filter strips are gently sloping, vegetated areas adjacent to impervious surfaces. These strips are typically referred to as vegetated filter strips, grassed filter strips, grassed filters or buffer strips.	They are intended to reduce impacts of sheet flow and velocity of stormwater and help improve its water quality. They help remove sediments, other pollutants and increase infiltration.



Stormwater Best Management Practices Matrix		
Tool	Description	Benefit
Bioretention Basins	Bioretention basins are landscaped depressions or shallow basins used to slow and treat on-site stormwater runoff.	Stormwater is directed to the basin and then percolates through the system. The slowed, cleaned water is allowed to infiltrate native soils or directed to nearby stormwater drains or receiving waters.
Underground Storage	On-site, underground stormwater retention/detention captures and stores stormwater collection from surrounding impervious areas.	The facility stores stormwater and then releases it directly through an outlet pipe back into natural waters at rates designed to reduce peak flows and mimic pre-development conditions. In some cases, stored water can be allowed to infiltrate to recharge groundwater.
Green Roofs	Green roofs or vegetated roof covers (also referred to as living roofs, nature roofs and eco-roofs) are a thin layer of living plants growing on top of a roof.	A green roof is not a collection of potted plants to decorate a roof space, but rather an extension of a conventional roof which involves installation of a layered system of membranes, substrate and plants.
Stream and Shoreline Buffer Zones* ( <i>grass buffers and forested buffers</i> ): <ul style="list-style-type: none"> <li><b>Grassed Buffers</b> – A linear strip of grass along rivers and streams that filters nutrients and sediments and enhances stream habitat.</li> <li><b>Forested Buffers</b> – A linear strip of forest along rivers and streams that filters nutrients and sediment and enhances stream habitat.</li> </ul>	Floodway areas consisting of natural vegetation such as grasses, shrubs and/or forests between 50 to 100 feet used as water quality buffer areas.	These zones can be effective in preventing runoff impacts and also in enhancing fish and wildlife by filtering pollutants and slowing runoff entering the waterway. These areas protect riparian and aquatic ecosystems and improve water quality.
Conservation of Natural Areas	Conservation of pervious natural areas and drainage pathways as well as avoiding disturbance of soils and native vegetation, especially on steep slopes.	Natural vegetation is used to minimize stormwater runoff and pollutant loads from the site.

\*Source: Recommended Best Management Practices for Upper Eastern Shore as part of Tributary Strategies, MDE



### Section 11.0 Assessment of Land Use Impacts on Watersheds

The following section provides information with respect to impacts of existing land use allocations and projected and preferred future land use allocations measured using the following inventories and indicators calculated for each of the County's eight-digit watersheds.

- Acreage of lands in Conservation
- Existing acreage of residential and non-residential land use s (2008)
- Projected acreage of residential and non-residential land uses (2030) Acreage of lands in Agricultural
- Acreage of lands in Forest
- Impervious surface Acreage of land available for development
- Existing and projected Nitrogen loads
- Existing and projected Phosphorus loads
- Number of residential and non-residential septic systems

The assessment of each of the watersheds includes a suggested Best Management Practices Tool Kit for each of the landscapes located within the watershed.



Section 11.1 Corsica River Watershed - 02130507  
Existing Land Use 2008

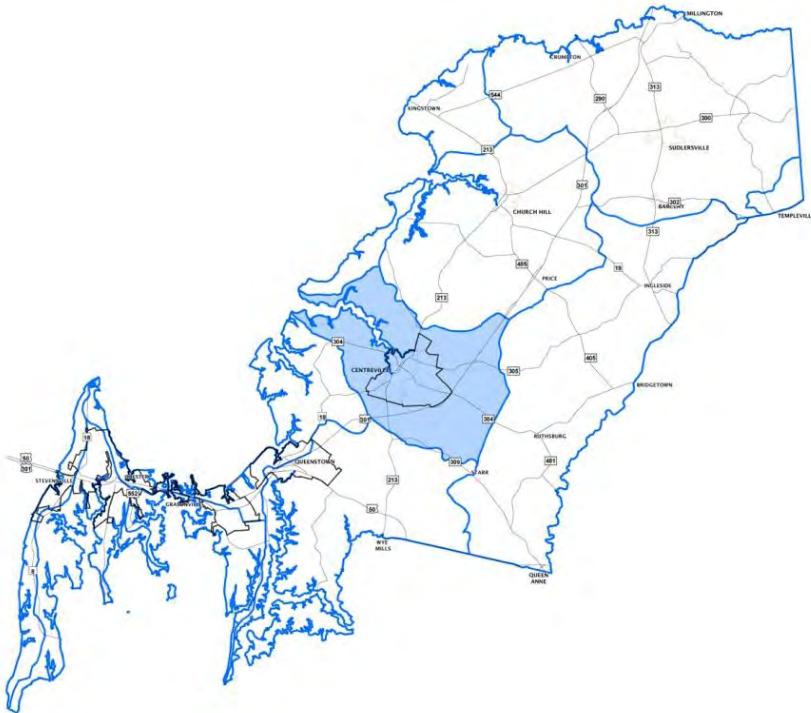
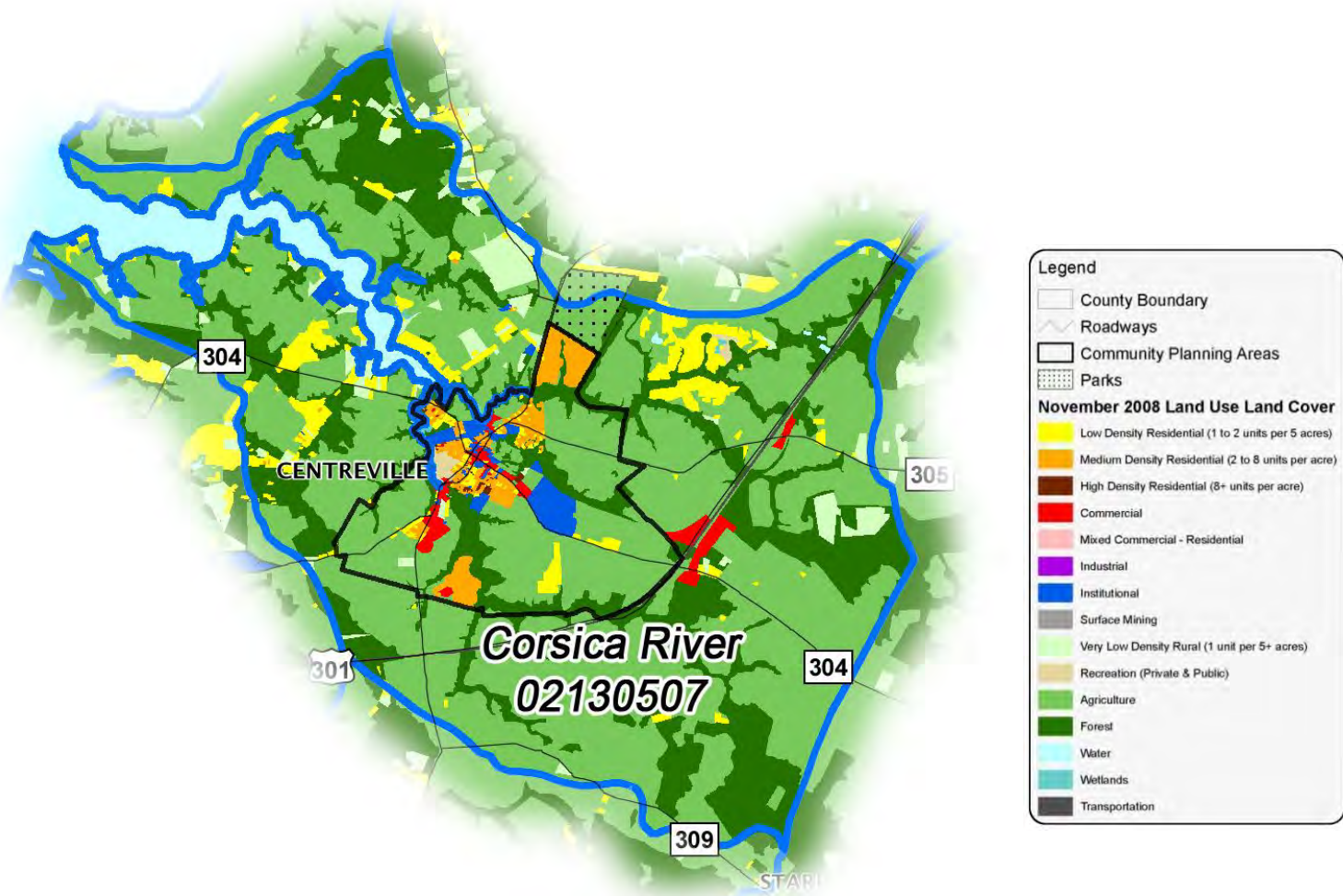


Table 11.1-1 Conservation Lands Programs	Acres
MALPF Easement	1,775.93
MALPF Greenprint	-
Rural Legacy Easement	77.70
MET	850.31
TDR Sending Areas	10.22
Private Conservation Easement	69.87
County Park	436.12
State Owned Land	-
Open Space (Deed Restricted)	1,178.34
Open Space (Non Contiguous)	726.47
MALPF Easement / Open Space	98.30
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
<b>Total</b>	<b>5,223.26</b>

Land Available for Development	Acres
Available	1,906.47
Divisible	8,090.22
<b>Total</b>	<b>9,996.69</b>

Corsica Watershed Restoration Action Strategy (WRAS)

The Town of Centreville is located at the center of the Corsica River Watershed which forms the confluence of three major non-tidal sub-watersheds. The Corsica River Watershed Restoration Action Strategy (WRAS) was published by the Town. The WRAS identified impairments and provides guidance to achieve water quality enhancement, expanded wildlife habitat, more sensitive land use conversions and conservation. Key actions recommended in the WRAS include:

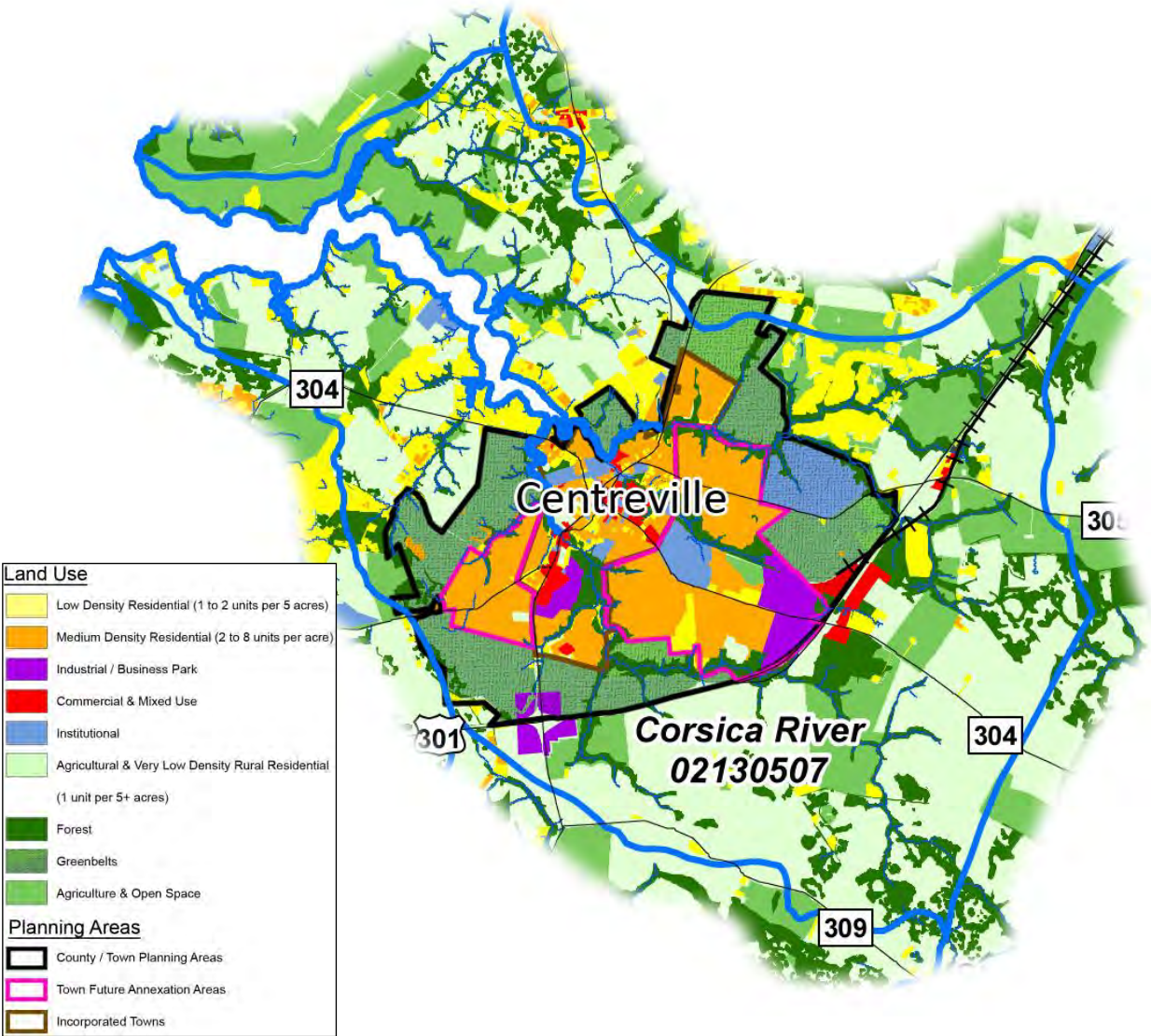
- Planting cover crops: 4,000 acres of cover crops and 2,000 acres of small grain.
- Retrofitting urban stormwater facilities to be managed on 300 acres of urban lands.
- Implement 50 acres of Horse Pasture Management to limit nutrient runoff.
- Establishing approximately 100 acres of Conservation Reserve Enhancement Program buffers.
- Providing education and outreach to the public.
- Upgrading septic systems: retrofit 30 private septic systems.
- Establishing reforested buffers on non-agricultural land: approximately 200 acres of forested land.
- Assuring low impact development strategies
- Restoring oyster populations: restore 20 acres of oyster beds.
- Restoring submerged aquatic vegetation: restore 10 acres of submerged aquatic vegetation.
- Restoring wetlands: restore 50 acres of wetlands and two miles of stream channel.
- Monitor the effectiveness of BMPs.
- Upgrade and maintain Centreville Sewerage treatment plant with enhanced nutrient management.

Source: <http://www.corsicariver.org/>

Table 11.1-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	1,164.1	4.9%	1,353.8	5.7%
Medium Density Residential (2 to 8 units per acre)	509.4	2.1%	2,250.2	9.4%
High Density Residential (8+ units per acre)	20.9	0.1%	20.9	0.1%
Commercial	255.2	1.1%	318.1	1.3%
Mixed Commercial – Residential	-	0.0%	35.4	0.1%
Industrial	-	0.0%	355.9	1.5%
Institutional	323.4	1.4%	610.0	2.6%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	793.5	3.3%	2,214.2	9.3%
Private Recreation	57.2	0.2%	57.2	0.2%
Agriculture	14,412.0	60.3%	11,212.3	46.9%
Forest	6,052.9	25.4%	5,160.6	21.7%
Water	82.4	0.3%	82.4	0.3%
Wetlands	80.0	0.3%	80.0	0.3%
Transportation	135.0	0.6%	135.0	0.6%
<b>Total</b>	<b>23,886.0</b>	<b>100.0%</b>	<b>23,886.0</b>	<b>100.0%</b>



Preferred Land Use 2030



Preferred Land Use 2030

The preferred land use within the watershed is based upon maximum capacity build-out under current zoning modified using the future land use plan for Centreville from the recently adopted Comprehensive Plan.

Table 11.1-3 Best Management Practices Tool Kit

Tools, Techniques & Strategies	LANDSCAPES				
	Agricultural	Natural	Rural Residential	Suburban	Town
Point Source / Urban Source Strategy	Spray irrigation fields within proximity to facilities and outside of Tier II Catchment Areas.				Expand Centreville WWTP with enhanced nutrient removal systems and to accommodate planned growth within an expanded PFA.
Stormwater Strategy	BMPs, nutrient and manure management plans and fencing livestock out of streams.	BMPs and preserve buffers and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, retrofitting of SW facilities or inclusion in new development and reduction in use of lawn fertilizers.	BMPs, ESD, Retrofitting of facilities.
Onsite Sewage Disposal Strategy (OSDS)	Use denitrification technology for individual or shared on-lot septic systems.	Use denitrification technology for individual or shared on-lot septic systems.	Use denitrification technology for individual or shared on-lot septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Expand Sewer Service Area to include areas consistent with Municipal Growth Element.
Growth Management Strategy	Preserve environmentally sensitive lands and agricultural lands using State and Local programs.	Use greenbelts around Centreville and restrict growth in Critical Areas. Preservation of environmentally sensitive lands.	Cluster development, ESD and encourage development around areas with existing infrastructure.	Expand Growth Area to incorporate suburban landscapes. Cluster development and ESD.	Establish Infill/Redevelopment standards. Partner to complete planned expansion of utilities (water and sewer) to support growth.
Agriculture Strategy	Nutrient and manure management, BMPs, cover crops and other best practices.	Preserve floodplains, riparian buffers and wetland buffers.	Establish TDR sending areas and utilize PDRs outside of Growth Area.	Establish receiving areas for TDRs with density bonuses.	Establish Joint Planning Agreements to establish receiving areas for TDRs.
Waterway Strategies	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers and tree planting along streams.
Air Deposition Strategy	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenways, greenbelts and forest conservation strategies and incentives.	Require Forest Conservation Plans and establish wooded lot standards outside of the Growth Area.	Require Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from the Town.	Concentrate homes, commercial uses and business parks to create walkable communities. Connect uses with sidewalks, paths and trails.

Table 11.1-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use (2008-2030)	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Projected Total Acres Lost	Projected Percent of Total Acres Lost
Agriculture	14,412.0	60.3%	11,212.3	46.9%	-3,199.70	-13.4%
Forest	6,052.9	25.4%	5,160.6	21.7%	-892.30	-3.7%
Queen Anne’s County Impervious Surfaces*	855.4	3.6%				
Statewide Priority Wetlands **	2,680.0	11.2%				
Tier II Catchment Area within Watershed	12,339	51.7%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor as to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column. Note, the Corsica River 2006 Study TMDL: Nitrogen 287,670 lbs per year and Phosphorus 22,244 pounds per year. The Queen Anne’s County portion of the Corsica River Watershed is 100%.

Table 11.1-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Corsica River Watershed (02130508)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	1,442	1,442	2,878	6,684	6,684
Agriculture	15,332	15,332	14,412	11,212	11,212
Forest	6,601	6,601	6,133	5,241	5,241
Water	91	91	82	82	82
Other	419	419	381	667	667
Total Area	23,886	23,886	23,886	23,886	23,886

Residential Septic (EDUs)	0	0	905	1,674	154
Non-Residential Septic (EDUs)	0	0	827	1,118	0

Total Nitrogen Loading					
Corsica River Watershed (02130508)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	12,622	8,735	17,433	40,494	40,494
Agriculture NPS	239,224	133,197	125,159	97,497	97,497
Forest NPS	9,793	9,127	8,480	7,246	7,246
Water NPS	921	762	688	688	688
Other Terrestrial NPS	3,634	2,531	2,297	4,025	4,025
Total Terrestrial Load	266,193	154,352	154,058	149,950	149,950

Residential Septic (EDUs)	0	0	8,412	15,559	1,431
Non-Residential Septic (EDUs)	0	0	2,743	3,706	0
Total Septic Load	0	0	11,154	19,265	1,431

Total NPS Nitrogen Load	266,193	154,352	165,212	169,216	151,382	
Total PS Load	0	0	1,616	21,383	23,254	TMDL
Total Nitrogen Load (NPS+PS)	266,193	154,352	166,828	190,599	174,636	287,670

Total Phosphorus Loading					
Corsica River Watershed (02130508)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	1,614	1,053	2,107	4,911	4,911
Agriculture NPS	16,681	12,048	11,342	8,766	8,766
Forest NPS	148	122	114	97	97
Water NPS	52	52	47	47	47
Other Terrestrial NPS	444	293	267	463	463
Total Terrestrial Load	18,940	13,567	13,876	14,284	14,284

Total PS Load	0	0	58	1,541	1,681	
						TMDL
Total Phosphorus Load (NPS+PS)	18,940	13,567	13,934	15,825	15,965	22,244

Maximum Capacity Build-Out Carrying Capacity

Maximum build-out of the watershed should not exceed 10% impervious surface with use of Tributary Strategies BMPs and other technologies. Studies have documented that the quality of aquatic habitat in streams, lakes and wetlands begins to decline when the area of impervious surface located in upstream watersheds reaches 10 percent of the total land areas. On the average, 20% of the total land area is impervious in a typical subdivision. When impervious surface reaches more than 25% within a watershed, waterways can only support few fish species able to tolerate high levels of pollution. Scientists suggest that once this point is reached even the best stormwater management practice cannot mitigate these impacts. *Source: A Citizen's Guide to Stormwater Management in Maryland.*

Impervious Cover and Open Space	(Acres)				
Corsica River Watershed (02130508)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	468	468	774	1,701	1,701
Agriculture	15,332	15,332	14,412	11,212	11,212
Forest	6,509	6,509	6,053	5,161	5,161
Percent Impervious	2.0%	2.0%	3.2%	7.1%	7.1%



Section 11.2 Centreville Growth Area  
Existing Land Use 2008

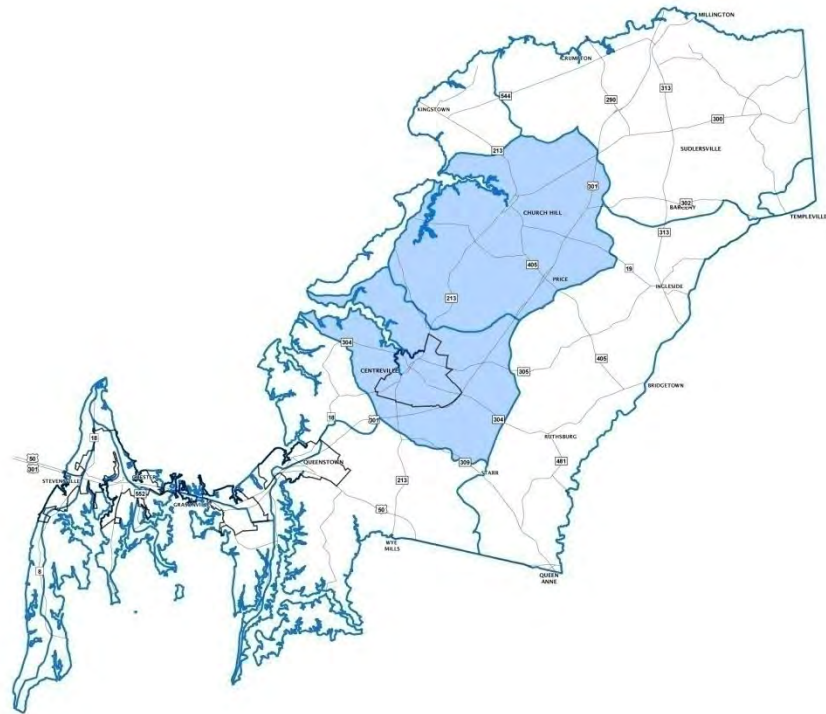
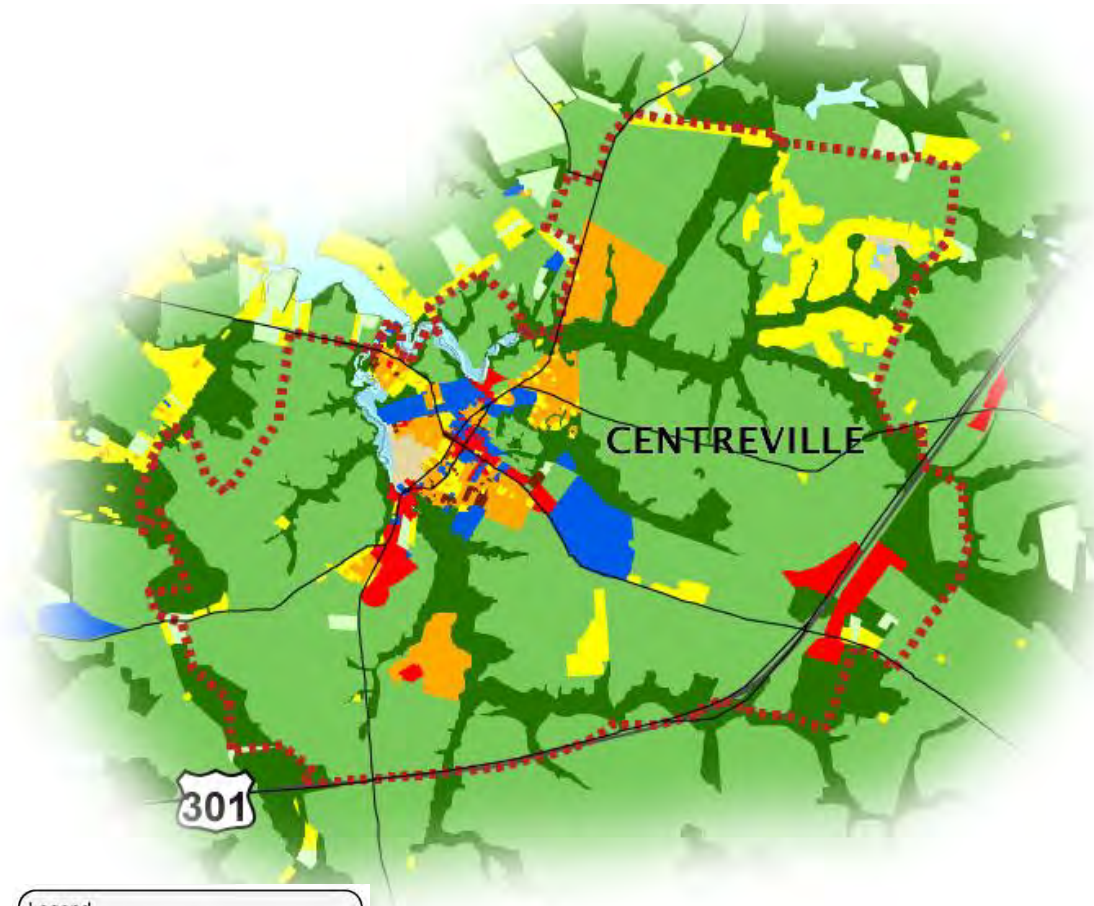


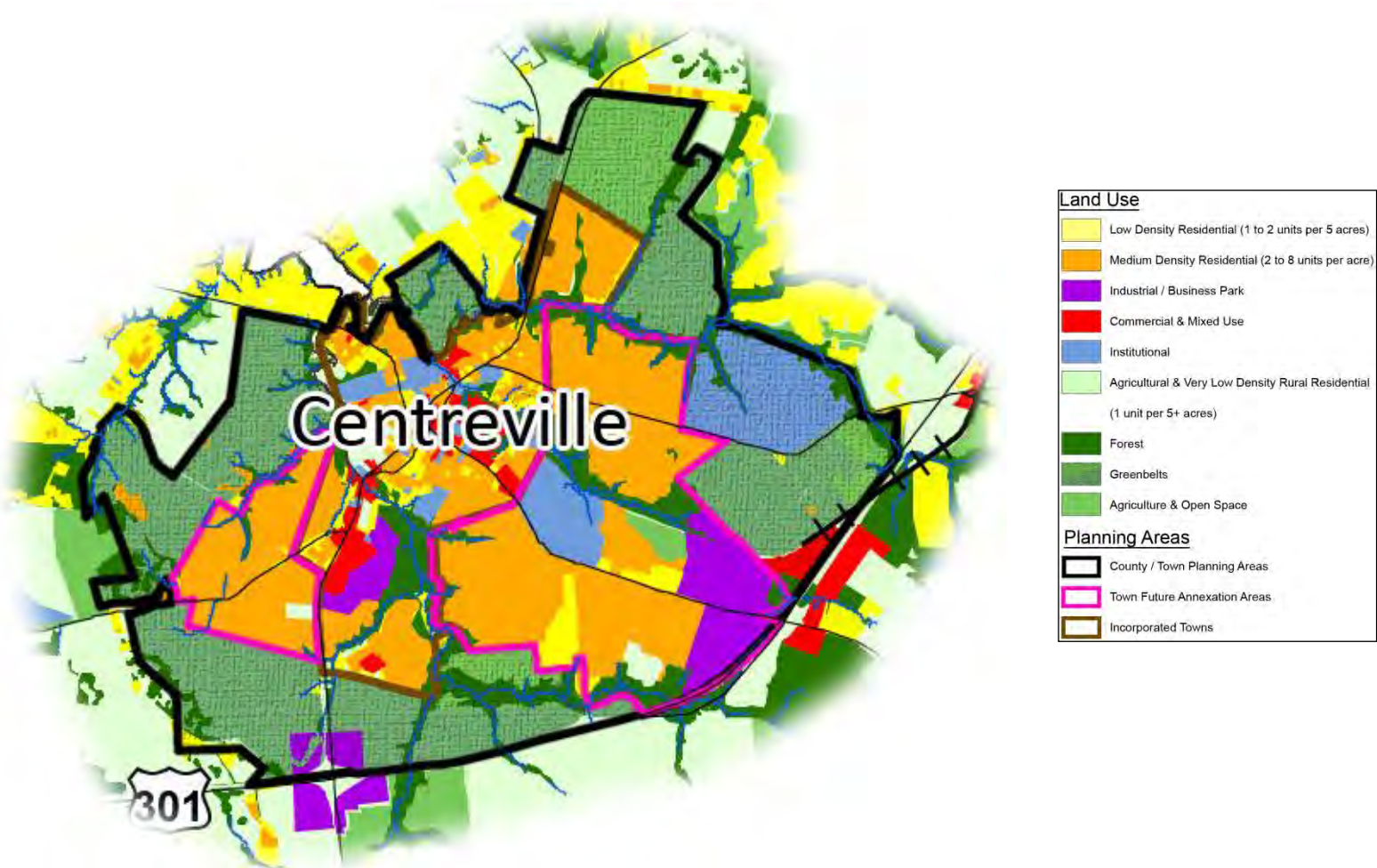
Table 11.2-1 Conservation Lands Programs	Acres
MALPF Easement	155.7
MALPF Greenprint	-
Rural Legacy Easement	-
MET	-
TDR Sending Areas	-
Private Conservation Easement	-
County Park	317.9
State Owned Land	-
Open Space (Deed Restricted)	434.7
Open Space (Non Contiguous)	562.4
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	1,470.7

Land Available for Development	Acres
Available	261.5
Divisible	1,779.7
Total	2,041.2

Table 11.2-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	563.9	6.5%	635.1	7.%
Medium Density Residential (2 to 8 units per acre)	498.5	5.7%	2,181.1	25.1%
High Density Residential (8+ units per acre)	20.9	0.2%	20.9	0.2%
Commercial	237.9	2.7%	237.0	2.7%
Mixed Commercial – Residential	-	0.0%	35.3	0.4%
Industrial	-	0.0%	353.0	4.1%
Institutional	254.2	2.9%	542.1	6.2%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	49.9	0.6%	328.9	3.8%
Private Recreation	57.2	0.7%	57.2	0.7%
Agriculture	5,126.3	58.9%	3,375.6	38.8%
Forest	1,738.1	20.0%	780.7	9.0%
Water	42.5	0.5%	42.5	0.5%
Wetlands	57.4	0.7%	57.4	0.7%
Transportation	50.3	0.6%	50.3	0.6%
Total	8,697.1	100.0%	8,697.1	100.0%



Preferred Land Use 2030



CENTREVILLE COMMUNITY PLAN

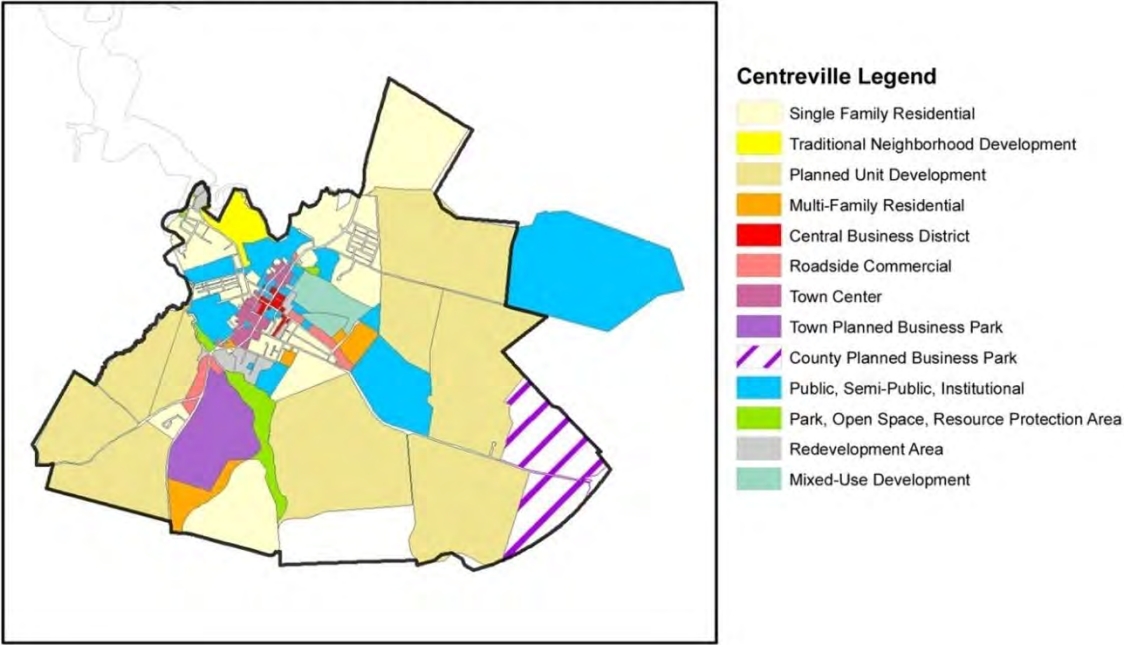


Table 11.2-3 Summary Table of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	5,126.3	58.9%	3,375.6	38.8%	-1,750.7	-20.1%
Forest	1,738.1	20.0%	780.7	9.0%	-957.4	-11.0%
Queen Anne’s County Impervious Surfaces*	530.6	6.1%				
Statewide Priority Wetlands**	577.6	6.6%				
Tier II Catchment Area within Watershed	3,948.7	45.4%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor as to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.2-4 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Centreville - Corsica River	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	823	823	1,421	3,841	3,841
Agriculture	5,643	5,643	5,126	3,376	3,376
Forest	1,860	1,860	1,796	838	838
Water	43	43	43	43	43
Other	328	328	311	599	599
Total Area	8,697	8,697	8,697	8,697	8,697

Residential Septic (EDUs)	0	0	375	252	0
Non-Residential Septic (EDUs)	0	0	0	115	0

Total Nitrogen Loading					
Centreville - Corsica River	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	7,146	4,970	8,576	23,193	23,193
Agriculture NPS	87,531	48,944	44,435	29,348	29,348
Forest NPS	2,760	2,572	2,483	1,159	1,159
Water NPS	429	355	355	355	355
Other Terrestrial NPS	2,847	1,981	1,881	3,616	3,616
Total Terrestrial Load	100,712	58,822	57,729	57,670	57,670

Residential Septic (EDUs)	0	0	3,485	2,342	0
Non-Residential Septic (EDUs)	0	0	0	381	0
Total Septic Load	0	0	3,485	2,724	0

Total NPS Nitrogen Load	100,712	58,822	61,214	60,394	57,670	
Total PS Load	0	0	1,616	19,767	20,534	TMDL
Total Nitrogen Load (NPS+PS)	100,712	58,822	62,830	80,161	78,204	287,670

Total Phosphorus Loading					
Centreville - Corsica River	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	883	581	988	2,696	2,696
Agriculture NPS	6,165	4,463	4,065	2,639	2,639
Forest NPS	42	34	33	16	16
Water NPS	24	24	24	24	24
Other Terrestrial NPS	350	231	219	416	416
Total Terrestrial Load	7,464	5,333	5,330	5,791	5,791

Total PS Load	0	0	58	1,483	1,540	
						TMDL
Total Phosphorus Load (NPS+PS)	7,464	5,333	5,388	7,274	7,331	22,244

Impervious Cover and Open Space	(Acres)				
Centreville - Corsica River	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	338	338	541	1,342	1,342
Agriculture	5,643	5,643	5,126	3,376	3,376
Forest	1,803	1,803	1,738	781	781
Percent Impervious	3.9%	3.9%	6.2%	15.4%	15.4%



Section 11.3 Eastern Bay Watershed - 02130501  
Existing Land Use 2008

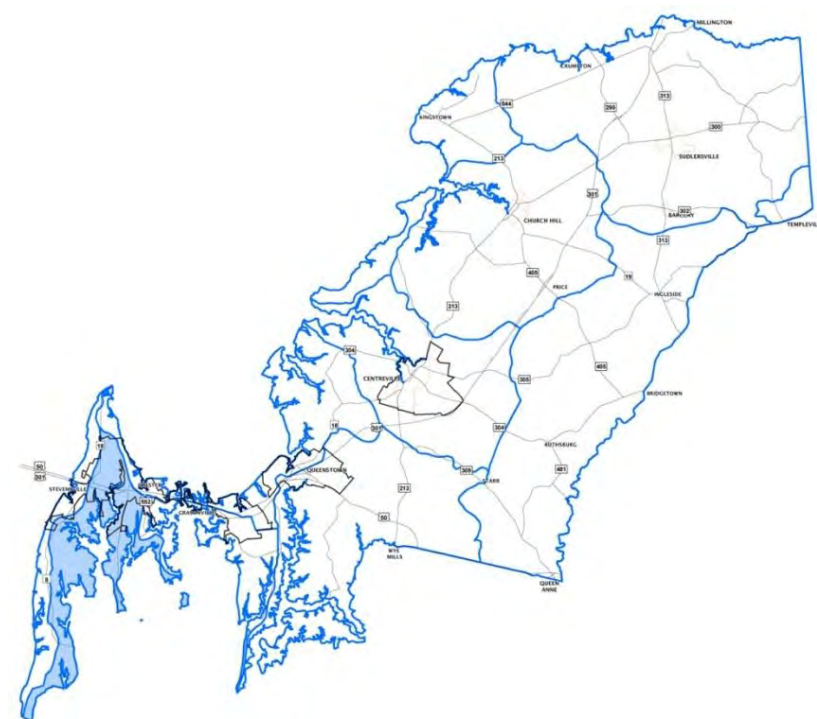
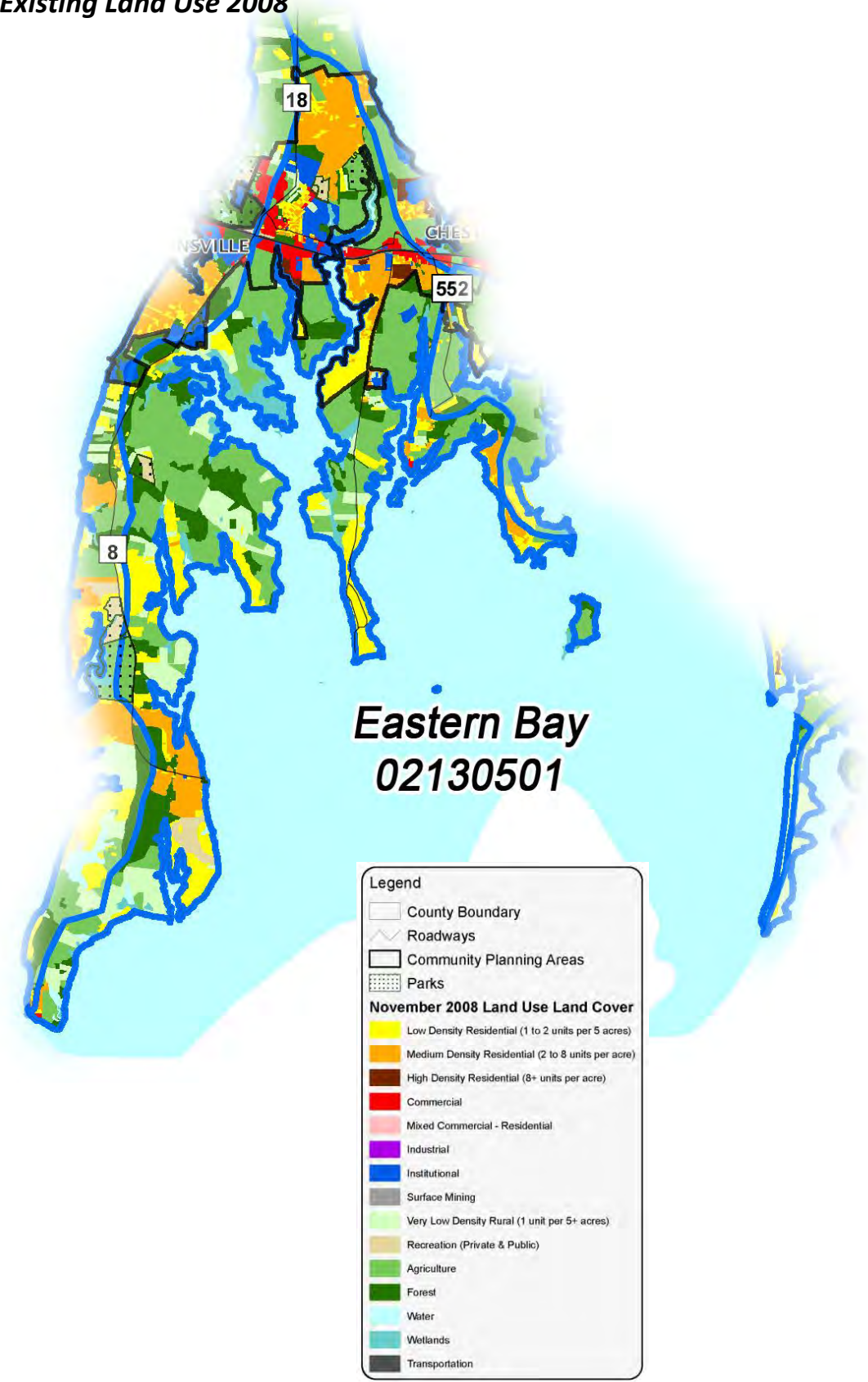


Table 11.3-1 Conservation Lands Programs	Acres
MALPF Easement	576.06
MALPF Greenprint	-
Rural Legacy Easement	-
MET	303.76
TDR Sending Areas	62.04
Private Conservation Easement	-
County Park	120.14
State Owned Land	195.97
Open Space (Deed Restricted)	235.91
Open Space (Non Contiguous)	24.81
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	2.00
County Park / NCD	2.57
County Park / Open Space	19.80
County Park / MET	98.45
MET / TDR	-
Total	1,641.50

Land Available for Development	Acres
Available	939.23
Divisible	2,206.47
Total	3,145.70

Table 11.3-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	1,778.6	15.4%	1,559.9	13.5%
Medium Density Residential (2 to 8 units per acre)	1,353.3	11.7%	2,386.7	20.7%
High Density Residential (8+ units per acre)	64.9	0.6%	64.8	0.6%
Commercial	266.5	2.3%	276.3	2.4%
Mixed Commercial – Residential	-	0.0%	113.2	1.0%
Industrial	0.4	0.0%	11.7	0.1%
Institutional	299.7	2.6%	301.1	2.6%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	1,222.5	10.6%	1,408.6	12.2%
Private Recreation	190.3	1.6%	273.6	2.4%
Agriculture	3,844.6	33.3%	3,050.8	26.4%
Forest	1,536.6	13.4%	1,110.7	9.6%
Water	190.4	1.6%	190.4	1.6%
Wetlands	750.7	6.5%	750.7	6.5%
Transportation	42.0	0.4%	42.0	0.4%
Total	11,540.5	100.0%	11,540.5	100.0%



Preferred Land Use 2030

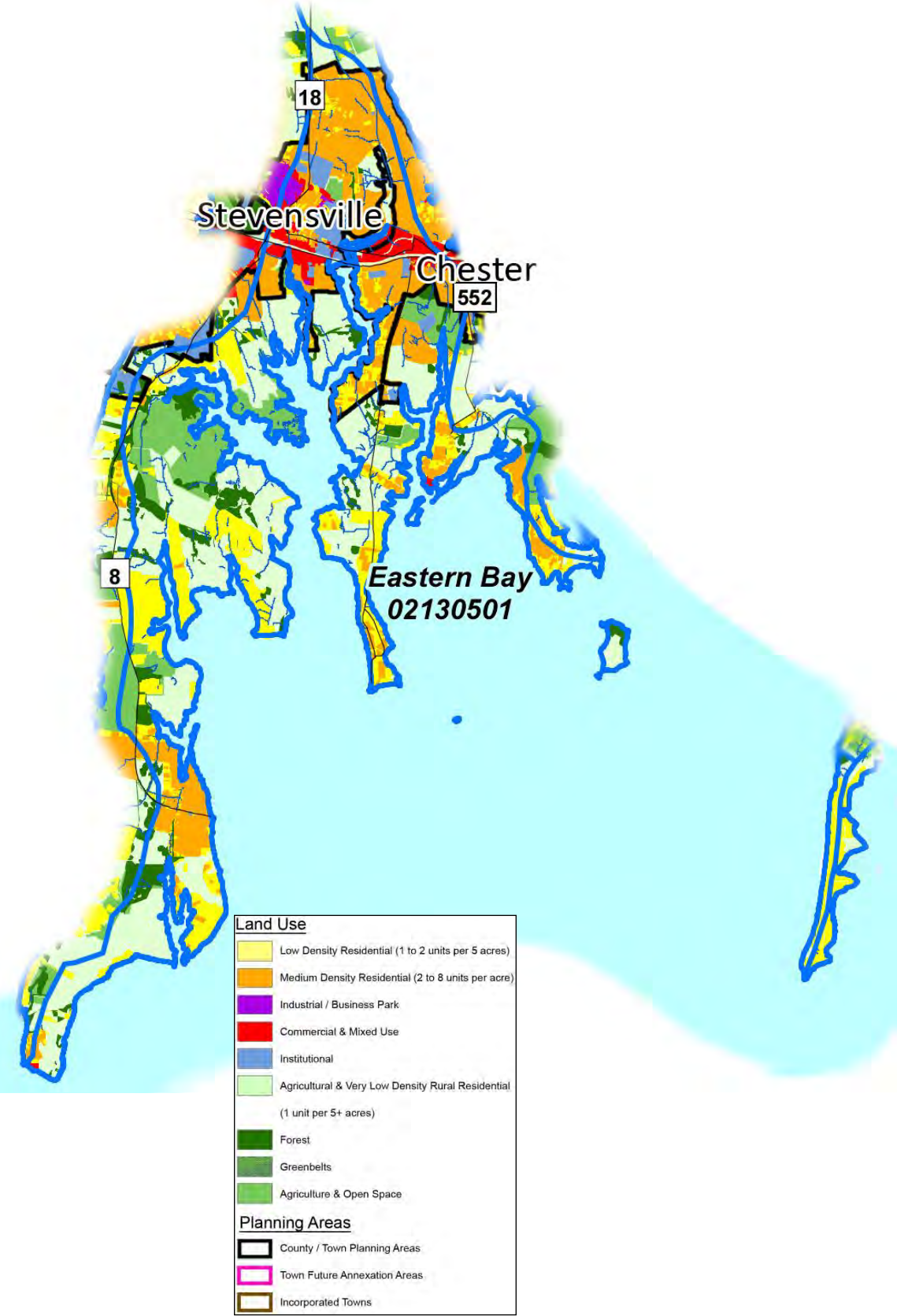


Table 11.3-3 Best Management Practices Tool Kit

Tools, Techniques & Strategies	LANDSCAPES				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
Point Source / Urban Source Strategy				Expand and enhance KNSG WWTP and collection/ conveyance system with enhanced nutrient removal systems. Connect existing development located within Sewer Service Areas and adjacent areas with failing septic systems.	Provide opportunities for connections to Queenstown to support infill/ redevelopment activity in adjacent watershed.
Stormwater Strategy	BMPs, nutrient and manure management plans and fencing livestock out of streams.	BMPs, preserve buffers and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, retrofit SW facilities or include in new development and reduction in use of lawn fertilizers.	BMPs, ESD, retrofit facilities.
Onsite Sewage Disposal Strategy (OSDS)	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Connect existing development on septic systems within PFAs to public system.
Growth Management Strategy	Preserve environmentally sensitive lands and agricultural lands using State and Local programs.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing infrastructure.	Change zoning to minimize impacts on water resources. Suburban subdivisions must provide improvements and connection to public water and sewer systems. Reduce the number of shallow wells.	Establish Infill/Redevelopment standards and incentives.
Agriculture Strategy	Nutrient and manure management, BMPs, cover crops and best practices.	Preserve floodplains, riparian buffers and wetland buffers.	TDR receiving areas should be established outside of the watershed.	TDR receiving areas should be established outside of the watershed.	
Waterway Strategies	Protect riparian buffers and wildlife habitats, tree planting along streams and living shoreline construction.	Protect riparian buffers and wildlife habitats, tree planting along streams and living shoreline construction.	Protect riparian buffers, tree planting along streams and living shoreline construction.	Protect riparian buffers, tree planting along streams and living shoreline construction.	Protect riparian buffers, tree planting along streams.
Air Deposition Strategy	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenbelts and forest conservation strategies and incentives.	Require Forest Conservation Plans and establish wooded lot standards.	Require Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from Town.	Concentrate homes, commercial uses and business parks to create walkable communities. Expand transit service. Connect uses with sidewalks, paths and trails.

Table 11.3-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Projected Total Acres Lost	Projected Percent of Total Acres Lost
Agriculture	3,844.6	33.3%	3,050.8	26.4%	-793.8	-6.9%
Forest	1,536.6	13.4%	1,110.7	9.6%	-425.9	-3.8%
Queen Anne’s County Impervious Surfaces*	1,038.9	9.0%				
Statewide Priority Wetlands**	191.0	1.7%				
Tier II Catchments in the Watershed	0.0	0.0%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.3-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Eastern Bay Watershed (02130501)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	3,843	3,843	4,728	5,863	5,863
Agriculture	4,385	4,385	3,845	3,051	3,051
Forest	2,693	2,693	2,287	1,861	1,861
Water	198	198	190	190	190
Other	421	421	490	575	575
Total Area	11,540	11,540	11,540	11,540	11,540

Residential Septic (EDUs)	0	0	1,978	175	35
Non-Residential Septic (EDUs)	0	0	353	3	0

Total Nitrogen Loading					
Eastern Bay Watershed (02130501)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	33,620	23,269	28,679	35,530	35,530
Agriculture NPS	68,640	38,126	33,343	26,503	26,503
Forest NPS	3,995	3,724	3,163	2,574	2,574
Water NPS	1,999	1,654	1,589	1,589	1,589
Other Terrestrial NPS	3,695	2,554	2,966	3,482	3,482
Total Terrestrial Load	111,949	69,326	69,740	69,678	69,678

Residential Septic (EDUs)	0	0	18,385	1,627	325
Non-Residential Septic (EDUs)	0	0	1,172	8	0
Total Septic Load	0	0	19,557	1,635	325

Total NPS Nitrogen Load	111,949	69,326	89,297	71,313	70,003
Total PS Load	0	0	0	0	0
Total Nitrogen Load (NPS+PS)	111,949	69,326	89,297	71,313	70,003

Total Phosphorus Loading					
Eastern Bay Watershed (02130501)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 2 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	4,297	2,804	3,524	4,317	4,317
Agriculture NPS	4,757	3,432	3,043	2,396	2,396
Forest NPS	61	50	42	34	34
Water NPS	112	112	108	108	108
Other Terrestrial NPS	476	310	356	423	423
Total Terrestrial Load	9,703	6,708	7,074	7,278	7,278

Total PS Load	0	0	0	0	0
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Total Phosphorus Load (NPS+PS)	9,703	6,708	7,074	7,278	7,278
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Impervious Cover and Open Space	(Acres)				
Eastern Bay Watershed (02130501)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	994	994	1,054	1,411	1,411
Agriculture	4,385	4,385	3,845	3,051	3,051
Forest	1,879	1,879	1,537	1,111	1,111
Percent Impervious	8.6%	8.6%	9.1%	12.2%	12.2%

Note: Nitrogen and phosphorus output from sewage are counted as part of the Kent Island Bay Watershed, where the outfall of the KNSG facility is located.

**Maximum Capacity Build-Out Carrying Capacity**

Maximum build-out of the watershed should not exceed 10% impervious surface with use of Tributary Strategies BMPs and other technologies. Studies have documented that the quality of aquatic habitat in streams, lakes and wetlands begins to decline when the area of impervious surface located in upstream watersheds reaches 10 percent of the total land areas. On the average, 20% of the total land area is impervious in a typical subdivision. When impervious surface reaches more than 25% within a watershed, waterways can only support few fish species able to tolerate high levels of pollution. Scientists suggest that once this point is reached even the best stormwater management practice cannot mitigate these impacts. *Source: A Citizen’s Guide to Stormwater Management in Maryland.*



Section 11.4 Kent Island Bay Watershed - 02130511  
Existing Land Use 2008

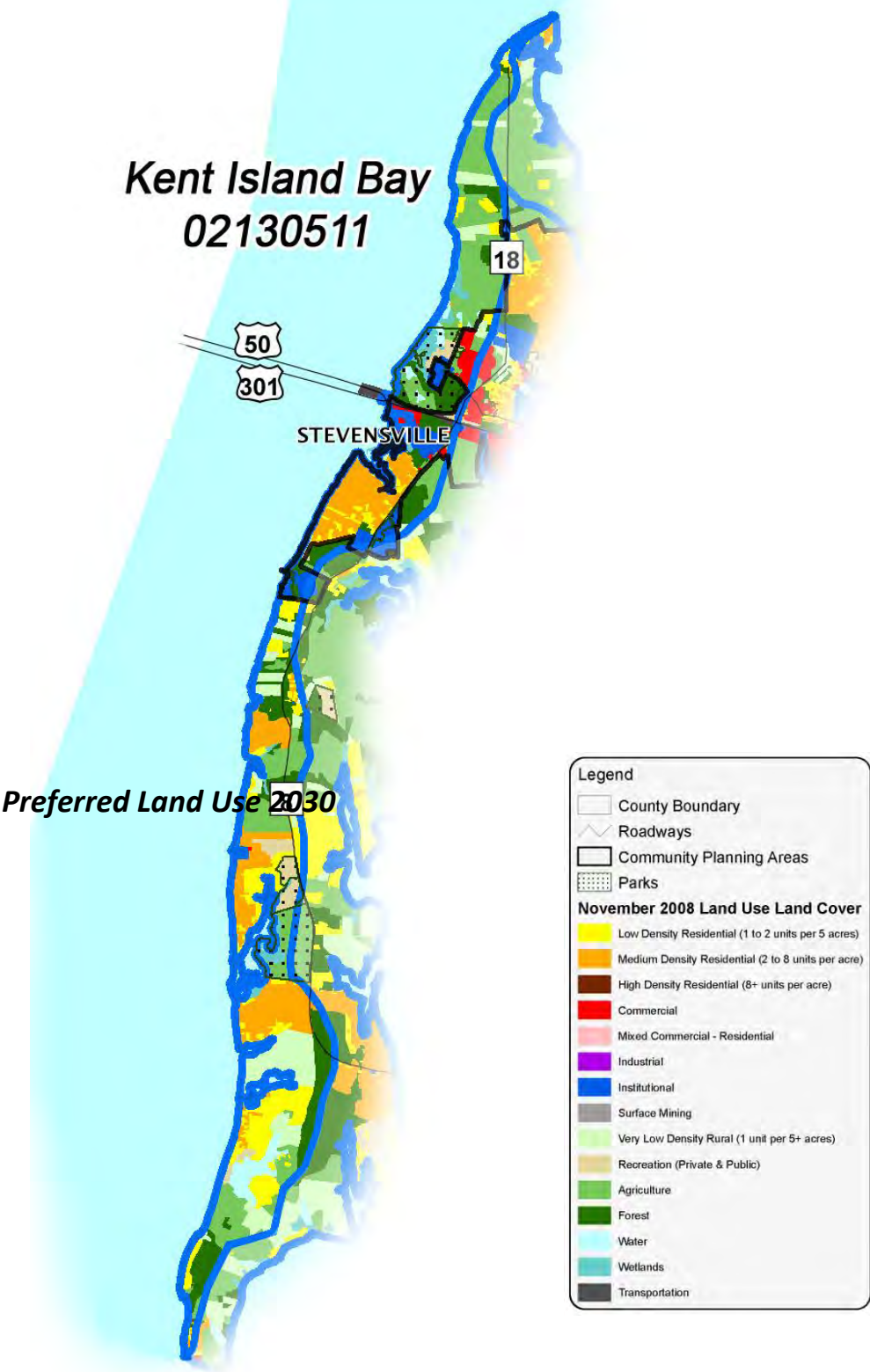
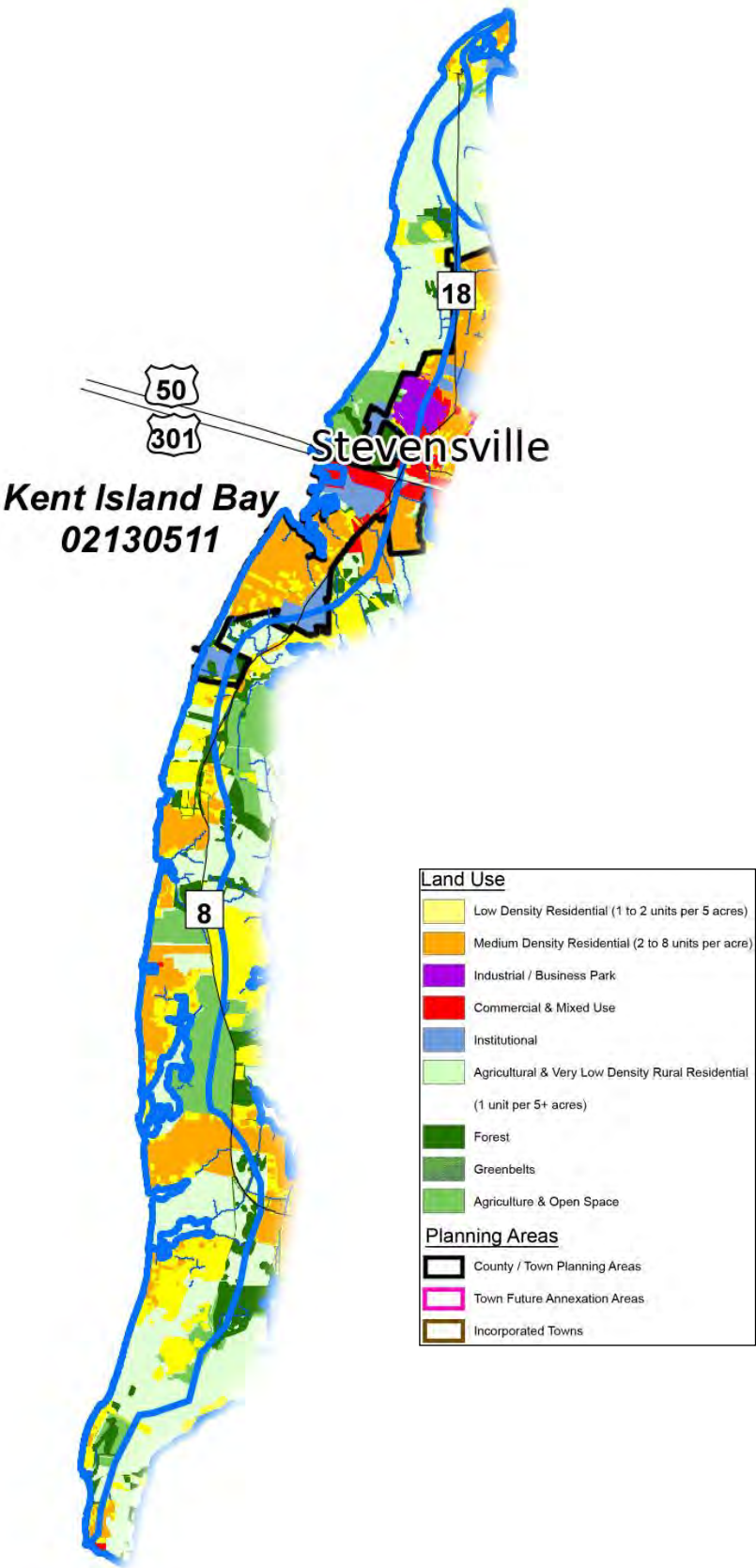


Table 11.4-1 Conservation Lands Programs	Acres
MALPF Easement	-
MALPF Greenprint	-
Rural Legacy Easement	-
MET	121.27
TDR Sending Areas	61.49
Private Conservation Easement	-
County Park	361.61
State Owned Land	25.65
Open Space (Deed Restricted)	178.13
Open Space (Non Contiguous)	-
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	42.24
County Park / NCD	0.34
County Park / Open Space	0.56
County Park / MET	125.83
MET / TDR	-
Total	917.12

Land Available for Development	Acres
Available	463.55
Divisible	778.92
Total	1,242.47

Table 11.4-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	732.9	14.5%	680.2	13.5%
Medium Density Residential (2 to 8 units per acre)	867.1	17.2%	1,049.7	19.8%
High Density Residential (8+ units per acre)	-	0.0%	-	0.0%
Commercial	100.4	2.0%	138.1	2.1%
Mixed Commercial – Residential	-	0.0%	19.8	0.2%
Industrial	-	0.0%	20.7	0.6%
Institutional	204.3	4.0%	200.3	4.0%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	538.9	10.7%	791.4	15.5%
Private Recreation	169.9	3.4%	169.8	3.4%
Agriculture	1,133.2	22.5%	943.1	20.0%
Forest	836.1	16.6%	569.7	12.0%
Water	216.7	4.3%	216.7	4.3%
Wetlands	214.6	4.3%	214.6	4.3%
Transportation	26.8	0.5%	26.8	0.5%
Total	5,040.9	100.0%	5,040.9	100.0%





**Table 11.4-3 Best Management Practices Tool Kit**

Tools, Techniques & Strategies	LANDSCAPES				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
<b>Point Source / Urban Source Strategy</b>				Expand and enhance KNSG WWTP and collection/ conveyance system with enhanced nutrient removal systems. Connect existing development located within Sewer Service Areas and adjacent areas with failing septic systems.	Within PFAs, connect existing septic systems to KNSG WWTP. Provide opportunities for connections to Queenstown to support infill/ redevelopment activity.
<b>Stormwater Strategy</b>	BMPs, nutrient and manure management plans and fencing livestock out of streams.	BMPs, preserve buffers and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, retrofit SW facilities or include in new development and reduce use of lawn fertilizers.	BMPs, ESD, retrofit facilities.
<b>Onsite Sewage Disposal Strategy (OSDS)</b>	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Connect existing development on septic systems within PFAs to public system.
<b>Growth Management Strategy</b>	Preserve environmentally sensitive lands and agricultural lands using State and Local programs.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing infrastructure.	Change zoning to minimize impacts on water resources. Suburban subdivisions must provide improvements and connection to public water and sewer systems. Reduce the number of shallow wells.	Establish Infill/Redevelopment standards and incentives.
<b>Agriculture Strategy</b>	Nutrient and manure management, BMPs, cover crops and best practices.	Appropriate floodplain, riparian buffer and wetland buffers.	TDR receiving areas should be established outside of the watershed.	TDR receiving areas should be established outside of the watershed.	
<b>Waterway Strategies</b>	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers and tree planting along streams.
<b>Air Deposition Strategy</b>	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenbelts and forest conservation strategies and incentives.	Require Forest Conservation Plans and establish wooded lot standards.	Require Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from Town.	Concentrate homes, commercial uses and business parks to create walkable communities. Expand transit service. Connect uses with sidewalks, paths and trails.

Table 11.4-4 Summary Table of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Projected Total Acres Lost	Projected Percent of Total Acres Lost
Agriculture	1,133.2	22.5%	943.1	20.0%	-190.10	-2.5%
Forest	836.1	16.6%	569.7	12.0%	-266.40	-4.6%
Queen Anne’s County Impervious Surfaces*	529.2	10.2%				
Statewide Priority Wetlands**	0.0	0.0%				
Tier II Catchment Area within Watershed	0.0	0.0%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.4-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Kent Island Bay Watershed (02130511)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	1,752	1,752	2,266	2,727	2,727
Agriculture	1,411	1,411	1,133	943	943
Forest	1,132	1,132	1,051	784	784
Water	233	233	217	217	217
Other	513	513	374	370	370
Total Area	5,041	5,041	5,041	5,041	5,041

Residential Septic (EDUs)	0	0	1,531	182	36
Non-Residential Septic (EDUs)	0	0	23	30	0

Total Nitrogen Loading					
Kent Island Bay Watershed (02130511)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	15,302	10,602	13,741	16,531	16,531
Agriculture NPS	21,705	12,215	9,835	8,184	8,184
Forest NPS	1,680	1,566	1,453	1,084	1,084
Water NPS	2,347	1,942	1,809	1,809	1,809
Other Terrestrial NPS	4,521	3,113	2,266	2,243	2,243
Total Terrestrial Load	45,555	29,438	29,104	29,851	29,851

Residential Septic (EDUs)	0	0	14,230	1,692	335
Non-Residential Septic (EDUs)	0	0	77	99	0
Total Septic Load	0	0	14,307	1,791	335

Total NPS Nitrogen Load	45,555	29,438	43,411	31,642	30,185
Total PS Load	0	0	10,000	27,850	32,471
Total Nitrogen Load (NPS+PS)	45,555	29,438	53,411	59,492	62,656

Total Phosphorus Loading					
Kent Island Bay Watershed (02130511)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	1,942	1,269	1,682	2,020	2,020
Agriculture NPS	1,553	1,128	894	744	744
Forest NPS	25	21	19	15	15
Water NPS	132	132	123	123	123
Other Terrestrial NPS	598	387	274	272	272
Total Terrestrial Load	4,250	2,937	2,993	3,173	3,173

Total PS Load	0	0	700	2,039	2,385
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Total Phosphorus Load (NPS+PS)	4,250	2,937	3,693	5,212	5,558
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Impervious Cover and Open Space	(Acres)				
Kent Island Bay Watershed (02130511)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred land Use with Trib Strategy BMPs
Total Impervious Cover	522	522	549	653	653
Agriculture	1,411	1,411	1,133	943	943
Forest	891	891	836	570	570
Percent Impervious	10.4%	10.4%	10.9%	12.9%	12.9%

Note: Nitrogen and phosphorus output from sewage are counted as part of the Kent Island Bay Watershed, where the outfall of the KNSG facility is located.

Maximum Capacity Build-Out Carrying Capacity

Maximum build-out of the watershed should not exceed 10% impervious surface with use of Tributary Strategies BMPs and other technologies. Studies have documented that the quality of aquatic habitat in streams, lakes and wetlands begins to decline when the area of impervious surface located in upstream watersheds reaches 10 percent of the total land areas. On the average, 20% of the total land area is impervious in a typical subdivision. When impervious surface reaches more than 25% within a watershed, waterways can only support few fish species able to tolerate high levels of pollution. Scientists suggest that once this point is reached even the best stormwater management practice cannot mitigate these impacts. *Source: A Citizen’s Guide to Stormwater Management in Maryland.*



Section 11.5 Kent Narrows Watershed - 02130504  
Existing Land Use 2008

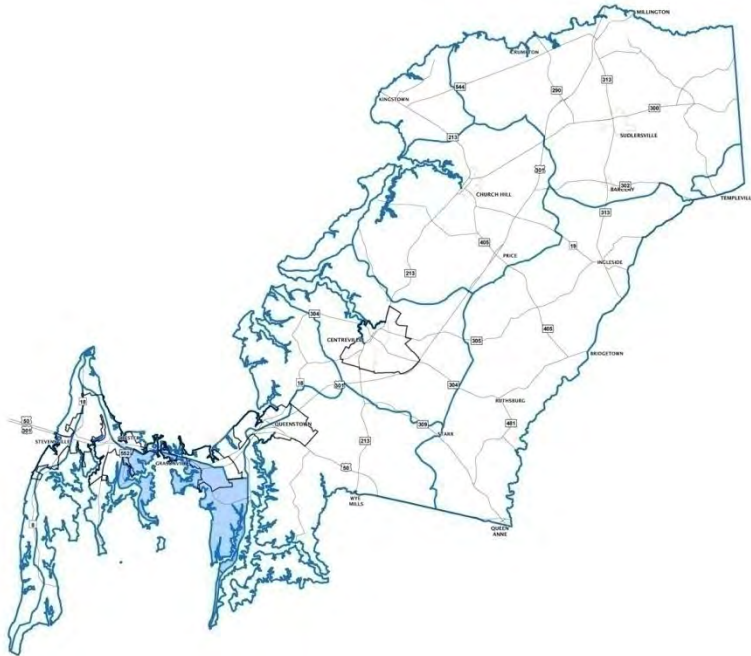
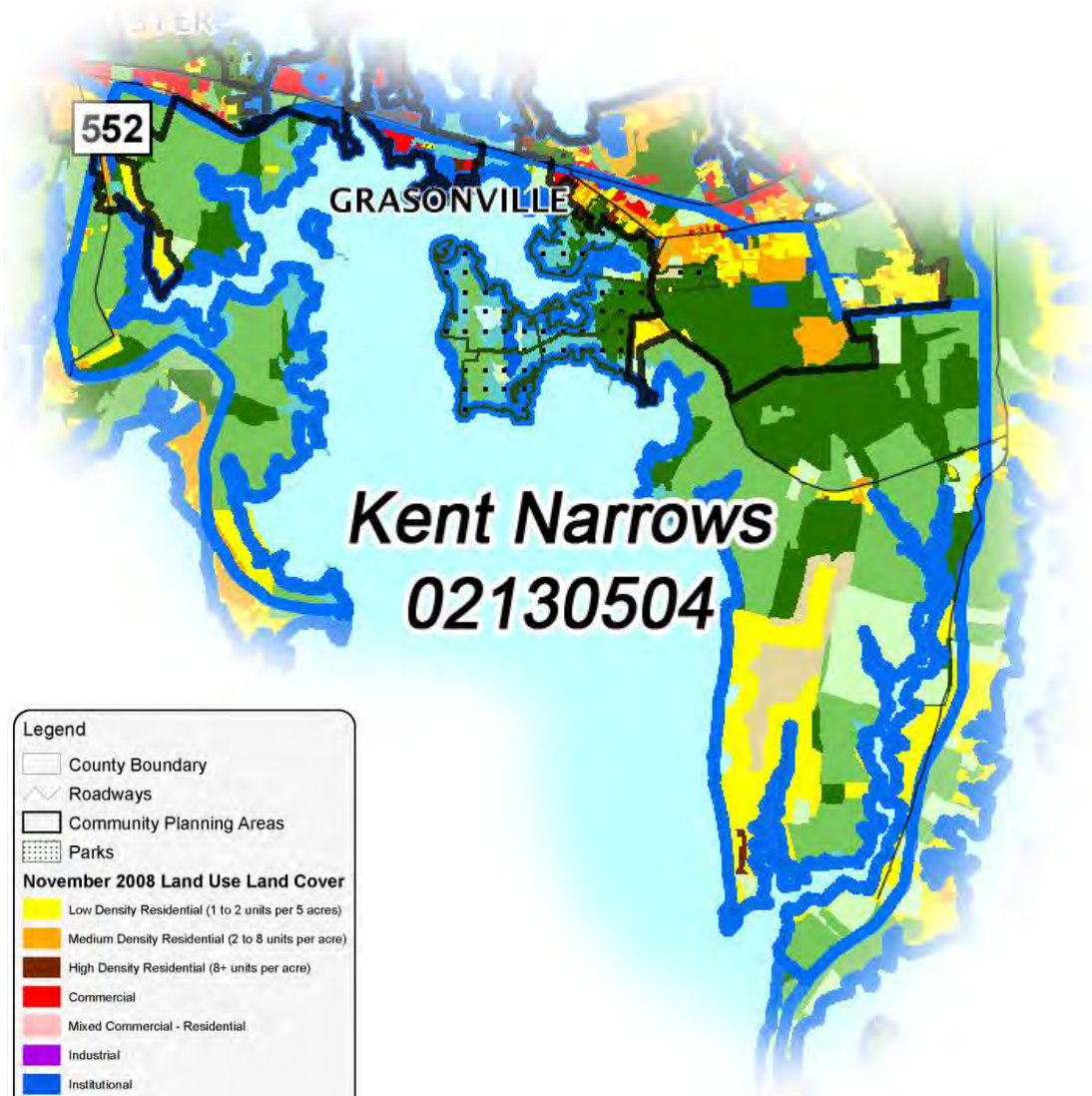


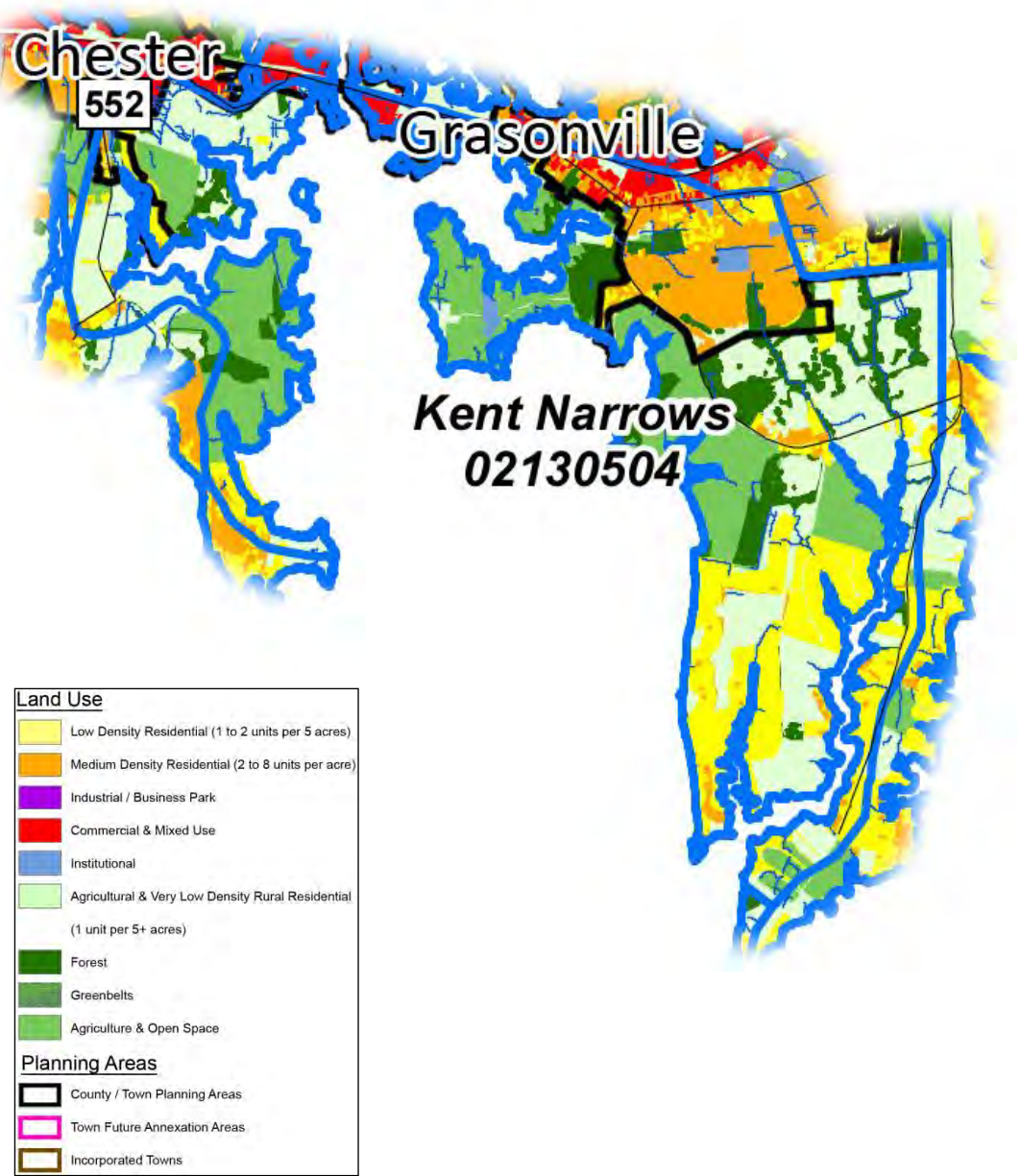
Table 11.5-1 Conservation Lands Programs	Acres
MALPF Easement	239.68
MALPF Greenprint	-
Rural Legacy Easement	-
MET	1,526.73
TDR Sending Areas	-
Private Conservation Easement	-
County Park	123.85
State Owned Land	0.06
Open Space (Deed Restricted)	130.19
Open Space (Non Contiguous)	-
MALPF Easement / Open Space	-
MET / Open Space	30.88
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	4.26
County Park / MET	-
MET / TDR	40.08
Total	2,095.73

Land Available for Development	Acres
Available	569.80
Divisible	1,115.83
Total	1,685.62

Table 11.5-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	990.5	14.6%	973.5	14.3%
Medium Density Residential (2 to 8 units per acre)	269.4	4.0%	644.9	9.5%
High Density Residential (8+ units per acre)	44.9	0.7%	44.9	0.7%
Commercial	66.2	1.0%	64.4	0.9%
Mixed Commercial – Residential	-	0.0%	79.1	1.2%
Industrial	-	0.0%	0.8	0.0%
Institutional	63.1	0.9%	61.5	0.9%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	579.5	8.5%	801.4	11.8%
Private Recreation	188.5	2.8%	188.5	2.8%
Agriculture	2,241.4	33.0%	2,184.4	32.2%
Forest	1,568.6	23.0%	968.7	14.2%
Water	92.5	1.4%	92.5	1.4%
Wetlands	680.1	10.0%	680.1	10.0%
Transportation	9.1	0.1%	9.1	0.1%
Total	6,793.8	100.0%	6,793.8	100.0%



**Preferred Land Use 2030**



**Table 11.5-3 Best Management Practices Tool Kit**

Tools, Techniques & Strategies	LANDSCAPE				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
<b>Point Source / Urban Source Strategy</b>				Expand and enhance KNSG WWTP and collection/ conveyance system with enhanced nutrient removal systems. Connect existing development located within Sewer Service Areas and adjacent areas with failing septic systems.	Within PFAs, connect existing septic systems to KNSG WWTP. Provide opportunities for connections to Queenstown to support infill/ redevelopment activity.
<b>Stormwater Strategy</b>	BMPs, nutrient and manure management plans and fencing livestock out of streams.	BMPs, preserve buffers and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, Retrofit SW facilities or include in new development and reduce use of lawn fertilizers.	BMPs, ESD, retrofit facilities.
<b>Onsite Sewage Disposal Strategy (OSDS)</b>	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Connect existing development on septic systems within PFAs to public system.
<b>Growth Management Strategy</b>	Preserve environmentally sensitive lands and agricultural lands using State and Local programs.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing infrastructure.	Change zoning to minimize impacts on water resources. Suburban subdivisions must provide improvements and connection to public water and sewer systems. Reduce the number of shallow wells.	Establish Infill/Redevelopment standards and incentives.
<b>Agriculture Strategy</b>	Nutrient and manure management, BMPs, cover crops and best practices.	Preserve floodplains, riparian buffers and wetland buffers.	TDR receiving areas should be established outside of the watershed.	TDR receiving areas should be established outside of the watershed.	
<b>Waterway Strategies</b>	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers and tree planting along streams.
<b>Air Deposition Strategy</b>	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenways, greenbelts and forest conservation strategies and incentives.	Require Forest Conservation Plans and establish wooded lot standards.	Require Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from Town/village.	Concentrate homes, commercial uses and business parks to create walkable communities. Expand transit and shuttle service. Connect uses with sidewalks, paths and trails.

Table 11.5-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres Lost	Percent of Total Acres Lost
Agriculture	2,241.4	33.0%	2,184.4	32.2%	-57.0	-0.8%
Forest	1,568.6	23.0%	968.7	14.2%	-599.9	-8.8%
Queen Anne’s County Impervious Surfaces*	382.1	5.6%				
Statewide Priority Wetlands **	520.0	7.7%				
Tier II Catchment Area within Watershed	0.0	0.0%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.5-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Kent Narrows Watershed (02130504)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	1,555	1,555	2,023	2,627	2,627
Agriculture	2,352	2,352	2,241	2,232	2,232
Forest	2,513	2,513	2,249	1,593	1,593
Water	96	96	92	92	92
Other	278	278	189	250	250
Total Area	6,794	6,794	6,794	6,794	6,794

Residential Septic (EDUs)	0	0	478	589	118
Non-Residential Septic (EDUs)	0	0	15	3	0

Total Nitrogen Loading					
Kent Narrows Watershed (02130504)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	13,653	9,427	12,284	15,945	15,945
Agriculture NPS	36,403	20,396	19,402	19,331	19,331
Forest NPS	3,729	3,475	3,109	2,203	2,203
Water NPS	969	801	772	772	772

Other Terrestrial NPS	2,453	1,687	1,149	1,520	1,520
Total Terrestrial Load	57,205	35,786	36,716	39,770	39,770

Residential Septic (EDUs)	0	0	4,443	5,475	1,097
Non-Residential Septic (EDUs)	0	0	50	8	0
Total Septic Load	0	0	4,493	5,483	1,097

Total NPS Nitrogen Load	57,205	35,786	41,210	45,253	40,867
Total PS Load	0	0	0	0	0
Total Nitrogen Load (NPS+PS)	57,205	35,786	41,210	45,253	40,867

Total Phosphorus Loading					
Kent Narrows Watershed (02130504)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	1,773	1,152	1,531	1,978	1,978
Agriculture NPS	2,579	1,868	1,796	1,778	1,778
Forest NPS	56	47	42	29	29
Water NPS	54	54	52	52	52
Other Terrestrial NPS	327	211	149	191	191
Total Terrestrial Load	4,789	3,332	3,570	4,029	4,029

Total PS Load	0	0	0	0	0
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Total Phosphorus Load (NPS+PS)	4,789	3,332	3,570	4,029	4,029
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Impervious Cover and Open Space	(Acres)				
Kent Narrows Watershed (02130504)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	368	368	363	510	510
Agriculture	2,352	2,352	2,241	2,232	2,232
Forest	1,781	1,781	1,569	913	913
Percent Impervious	5.4%	5.4%	5.3%	7.5%	7.5%

Note: Nitrogen and phosphorus output from sewage are counted as part of the Kent Island Bay Watershed, where the outfall of the KNSG facility is located.

Maximum Capacity Build-Out Carrying Capacity

Maximum build-out of the watershed should not exceed 10% impervious surface with use of Tributary Strategies BMPs and other technologies. Studies have documented that the quality of aquatic habitat in streams, lakes and wetlands begins to decline when the area of impervious surface located in upstream watersheds reaches 10 percent of the total land areas. On the average, 20% of the total land area is impervious in a typical subdivision. When impervious surface reaches more than 25% within a watershed, waterways can only support few fish species able to tolerate high levels of pollution. Scientists suggest that once this point is reached even the best stormwater management practice cannot mitigate these impacts. *Source: A Citizen’s Guide to Stormwater Management in Maryland.*



Section 11.6 Islands Growth Area  
Existing Land Use 2008

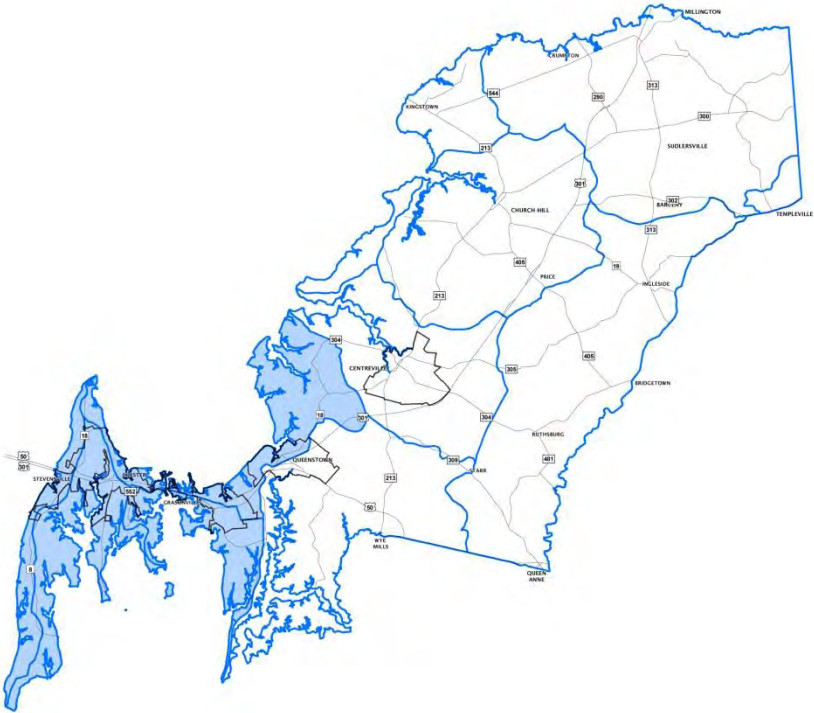
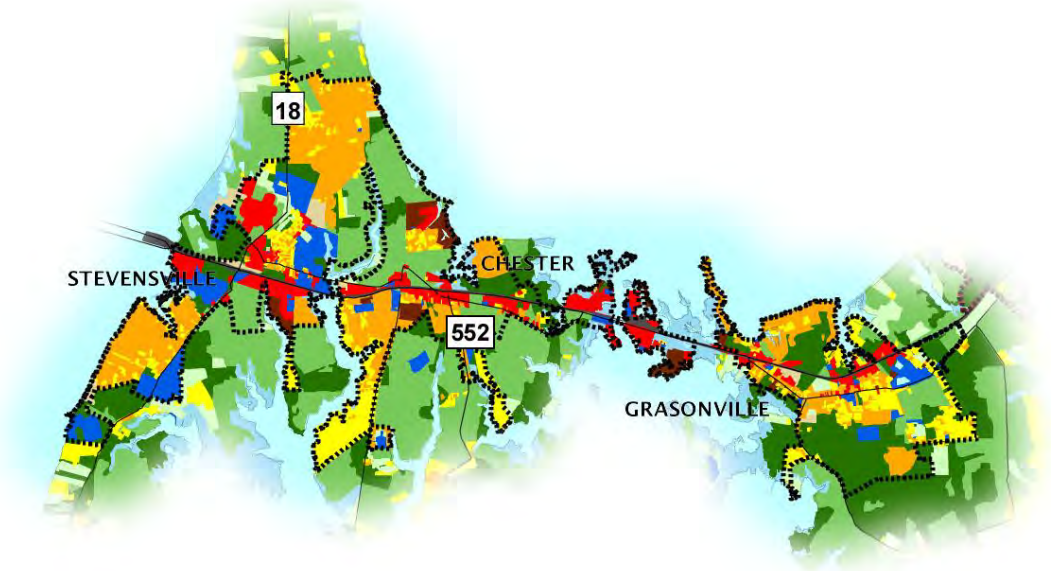
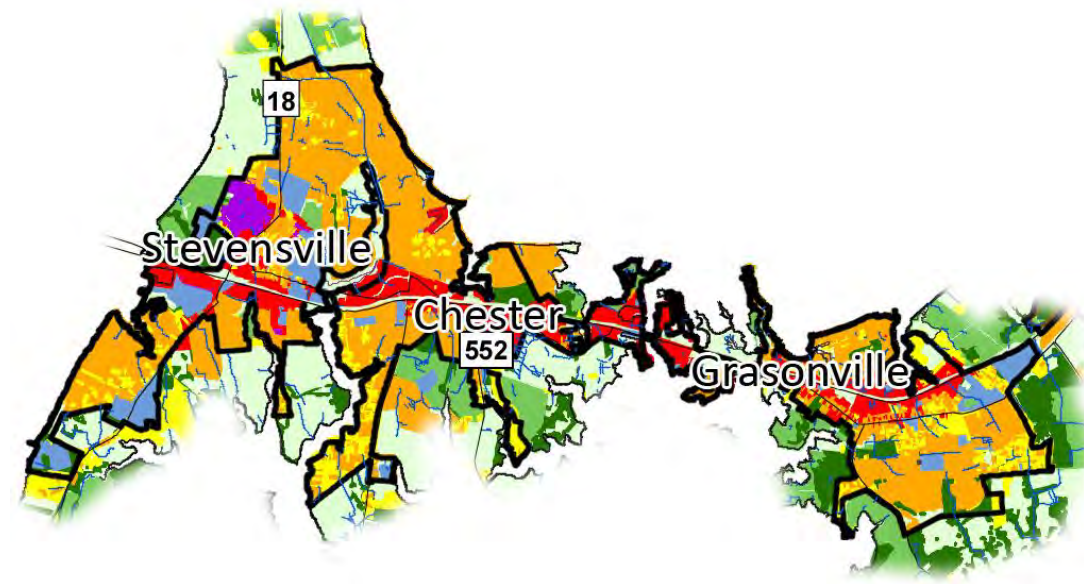


Table 11.6-1 Conservation Lands Programs	Acres
MALPF Easement	0.4
MALPF Greenprint	-
Rural Legacy Easement	-
MET	3.7
TDR Sending Areas	-
Private Conservation Easement	12.6
County Park	244.9
State Owned Land	23.0
Open Space (Deed Restricted)	268.6
Open Space (Non Contiguous)	-
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	4.3
County Park / MET	-
MET / TDR	-
<b>Total</b>	<b>557.5</b>

Land Available for Development	Acres
Available	417.4
Divisible	687.9
<b>Total</b>	<b>1,105.3</b>

Table 11.6-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	948.4	13.7%	773.9	11.2%
Medium Density Residential (2 to 8 units per acre)	1,753.1	25.4%	3,209.1	46.4%
High Density Residential (8+ units per acre)	195.0	2.8%	195.0	2.8%
Commercial	658.7	9.5%	644.1	9.3%
Mixed Commercial – Residential	-	0.0%	345.9	5.0%
Industrial	0.4	0.0%	117.8	1.7%
Institutional	588.2	8.5%	574.9	8.3%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	133.7	1.9%	76.2	1.1%
Private Recreation	83.0	1.2%	150.8	2.2%
Agriculture	1,050.6	15.2%	68.2	1.0%
Forest	1,038.1	15.0%	293.3	4.2%
Water	93.1	1.3%	93.1	1.3%
Wetlands	208.5	3.0%	208.5	3.0%
Transportation	163.1	2.4%	163.1	2.4%
<b>Total</b>	<b>6,913.9</b>	<b>100.0%</b>	<b>6,913.9</b>	<b>100.0%</b>



**Preferred Land Use 2030****Table 11.6-3 Best Management Practices Tool Kit**

Tools, Techniques & Strategies	LANDSCAPE				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
<b>Point Source / Urban Source Strategy</b>				Expand and enhance KNSG WWTP and collection/conveyance system with enhanced nutrient removal systems. Connect existing development located within Sewer Service Areas and adjacent areas with failing septic systems.	Within PFAs, connect existing septic systems to KNSG WWTP. Provide opportunities for connections to Queenstown to support infill/redevelopment activity.
<b>Stormwater Strategy</b>	BMPs, nutrient and manure management plans and fencing livestock out of streams.	BMPs, preserve buffers and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, Retrofit SW facilities or include in new development and reduce use of lawn fertilizers.	BMPs, ESD, retrofit facilities.
<b>Onsite Sewage Disposal Strategy (OSDs)</b>	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Connect existing development on septic systems within PFAs to public system.
<b>Growth Management Strategy</b>	Preserve environmentally sensitive lands and agricultural lands using State and Local programs.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing infrastructure.	Change zoning to minimize impacts on water resources. Suburban subdivisions must provide improvements and connection to public water and sewer systems. Reduce the number of shallow wells.	Establish Infill/Redevelopment standards and incentives.
<b>Agriculture Strategy</b>	Nutrient and manure management, BMPs, cover crops and best practices.	Preserve floodplains, riparian buffers and wetland buffers.	TDR receiving areas should be established outside of the watershed.	TDR receiving areas should be established outside of the watershed.	
<b>Waterway Strategies</b>	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers and tree planting along streams.
<b>Air Deposition Strategy</b>	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenways, greenbelts and forest conservation strategies and incentives.	Require Forest Conservation Plans and establish wooded lot standards.	Require Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from Town/village.	Concentrate homes, commercial uses and business parks to create walkable communities. Expand transit and shuttle service. Connect uses with sidewalks, paths and trails.

Table 11.6-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	1,050.6	15.2%	68.2	1.0%	-982.4	-14.2%
Forest	1,038.1	15.0%	293.3	4.2%	-744.8	-10.8%
Queen Anne’s County Impervious Surfaces*	1,400.7	20.3%				
Statewide Priority Wetlands**	65.9	1.0%				
Tier II Catchment Area within Watershed	0.0	0.0%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor as to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.6-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Island Growth Area	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	Scenario 1 2030 Max Build-Out with Trib Strat BMPs	Scenario 2 2030 Preferred Land Use with Trib Strat BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	3,309	3,309	3,852	5,525	5,525
Agriculture	1,187	1,187	1,051	78	78
Forest	1,672	1,672	1,247	492	492
Water	143	143	93	93	93
Other	603	603	671	726	726
Total Area	6,914	6,914	6,914	6,914	6,914

Residential Septic (EDUs)	0	0	211	1,899	0
Non-Residential Septic (EDUs)	0	0	297	43	0

Total Nitrogen Loading					
Island Growth Area	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	Scenario 1 2030 Max Build-Out with Trib Strat BMPs	Scenario 2 2030 Preferred Land Use with Trib Strat BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	28,560	19,943	23,209	33,269	33,269
Agriculture NPS	17,606	10,181	9,085	673	673
Forest NPS	2,481	2,312	1,724	681	681
Water NPS	1,442	1,193	777	777	777

Other Terrestrial NPS	5,241	3,644	4,051	4,384	4,384
Total Terrestrial Load	55,330	37,274	38,846	39,784	39,784

Residential Septic (EDUs)	0	0	1,961	17,650	0
Non-Residential Septic (EDUs)	0	0	985	141	0
Total Septic Load	0	0	2,946	17,791	0

Total NPS Nitrogen Load	55,330	37,274	41,792	57,575	39,784
Total PS Load	0	0	10,000	27,850	33,627
Total Nitrogen Load (NPS+PS)	55,330	37,274	51,792	85,425	73,411

Total Phosphorus Loading					
Island Growth Area	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	Scenario 1 2030 Max Build-Out with Trib Strat BMPs	Scenario 2 2030 Preferred Land Use with Trib Strat BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	3,429	2,271	2,626	3,738	3,738
Agriculture NPS	1,343	987	843	62	62
Forest NPS	38	31	23	9	9
Water NPS	81	81	53	53	53
Other Terrestrial NPS	649	426	468	513	513
Total Terrestrial Load	5,539	3,797	4,013	4,375	4,375

Total PS Load	0	0	700	2,039	2,472
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Total Phosphorus Load (NPS+PS)	5,539	3,797	4,713	6,414	6,847
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Impervious Cover and Open Space	(Acres)				
Island Growth Area	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	Scenario 1 2030 Max Build-Out with Trib Strat BMPs	Scenario 2 2030 Preferred Land Use with Trib Strat BMPs
Total Impervious Cover	1,286	1,286	1,546	2,195	2,195
Agriculture	1,187	1,187	1,051	78	78
Forest	1,416	1,416	1,038	293	293
Percent Impervious	18.6%	18.6%	22.4%	31.7%	31.7%



Section 11.7 Lower Chester River Watershed - 02130505  
Existing Land Use 2008

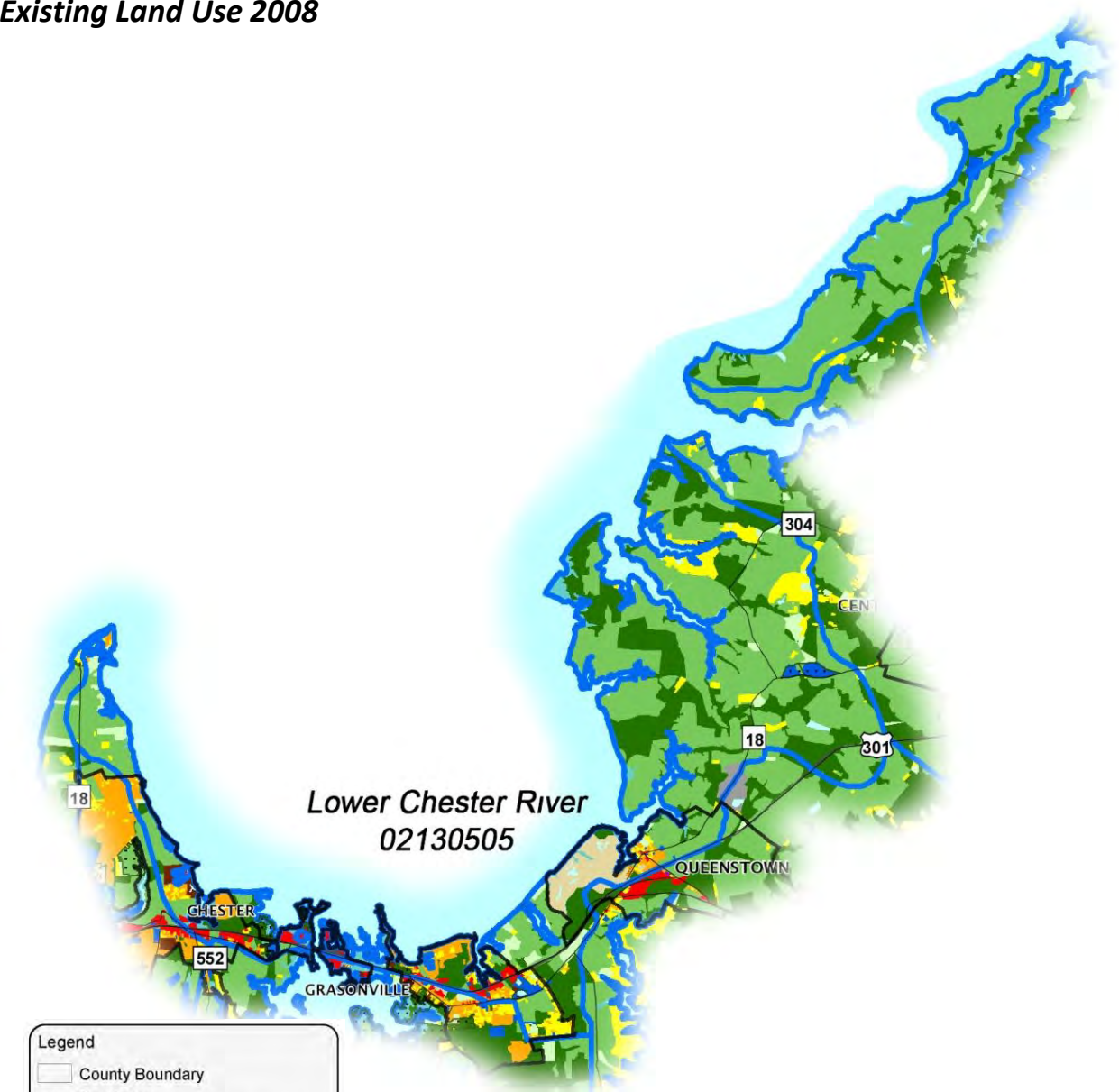


Table 11.7-1 Conservation Lands Programs	Acres
MALPF Easement	1,217.38
MALPF Greenprint	-
Rural Legacy Easement	139.60
MET	2,964.84
TDR Sending Areas	277.51
Private Conservation Easement	15.48
County Park	597.68
State Owned Land	-
Open Space (Deed Restricted)	519.77
Open Space (Non Contiguous)	117.49
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	19.87
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	5,869.63

Land Available for Development	Acres
Available	1,689.95
Divisible	4,690.09
Total	6,380.03

Table 11.7-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	901.6	5.1%	821.6	4.7%
Medium Density Residential (2 to 8 units per acre)	508.7	2.9%	1,308.1	7.4%
High Density Residential (8+ units per acre)	93.1	0.5%	93.1	0.5%
Commercial	224.0	1.3%	258.2	1.5%
Mixed Commercial – Residential	-	0.0%	305.0	1.7%
Industrial	-	0.0%	3.5	0.0%
Institutional	208.7	1.2%	199.6	1.1%
Surface Mining	56.9	0.3%	56.9	0.3%
Very Low Density Rural (1 unit per 5+ acres)	479.8	2.7%	1,280.4	7.3%
Private Recreation	426.8	2.4%	426.8	2.4%
Agriculture	9,636.1	54.6%	8,445.4	47.8%
Forest	4,050.4	22.9%	3,387.5	19.2%
Water	243.9	1.4%	243.9	1.4%
Wetlands	668.9	3.8%	668.9	3.8%
Transportation	161.0	0.9%	161.0	0.9%
Total	17,659.9	100.0%	17,659.9	100.0%



Preferred Land Use 2030

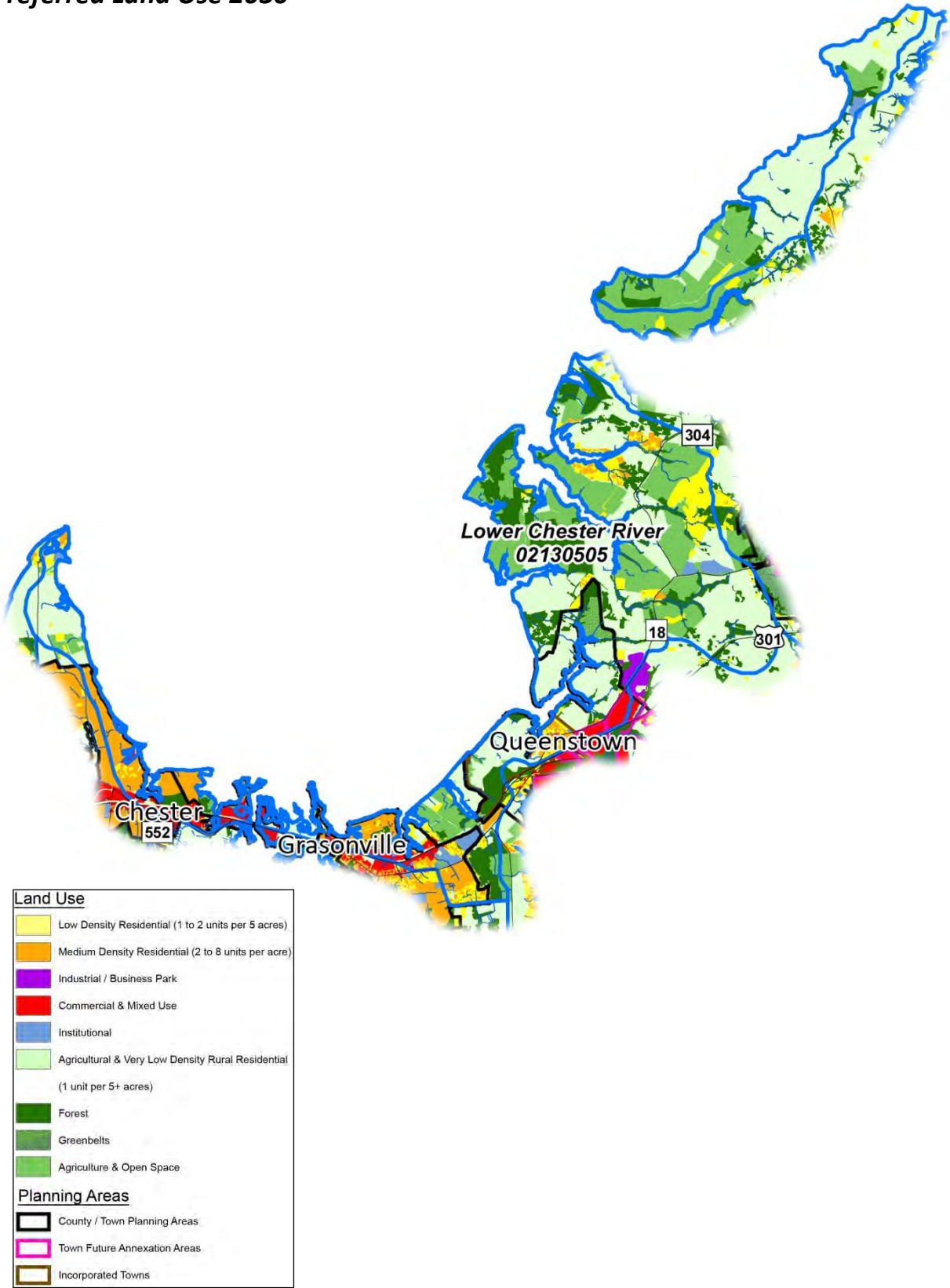


Table 11.7-3 Best Management Practices Tool Kit

Tools, Techniques & Strategies	LANDSCAPE				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
Point Source / Urban Source Strategy				Expand and enhance KNSG WWTP and Queenstown WWTP and collection/ conveyance system with enhanced nutrient removal systems. Connect existing development located within Sewer Service Areas and adjacent areas with failing septic systems.	Within PFAs, connect existing septic systems to KNSG WWTP and Queenstown WWTP.
Stormwater Strategy	BMPs, nutrient and manure management Plans and fencing livestock out of streams.	BMPs, preserve buffers and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, Retrofit SW facilities or include in new development and reduce use of lawn fertilizers.	BMPs, ESD, retrofit facilities.
Onsite Sewage Disposal Strategy (OSDS)	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Connect existing development on septic systems within PFAs to public system.
Growth Management Strategy	Preserve environmentally sensitive lands and agricultural lands using State and Local programs. Continue participation in Rural Legacy Preservation Program.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing infrastructure.	Suburban subdivisions must provide improvements and connection to public water and sewer systems.	Establish Infill/Redevelopment standards and incentives.
Agriculture Strategy	Nutrient and manure management, BMPs, cover crops and best practices.	Protect floodplains, riparian buffers and wetland buffers.	TDR receiving areas should be established outside of the watershed.	TDR receiving areas should be established outside of the watershed.	
Waterway Strategies	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers and tree planting along streams.
Air Deposition Strategy	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenways, greenbelts and forest conservation strategies and incentives.	Require Forest Conservation Plans and establish wooded lot standards.	Require Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from Town.	Concentrate homes, commercial uses and business parks to create walkable communities. Expand transit service. Connect uses with sidewalks, paths and trails.

Table 11.7-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres Lost	Percent of Total Acres Lost
Agriculture	9,636.1	54.6%	8,445.4	47.8%	-1,190.7	-6.8%
Forest	4,050.4	22.9%	3,387.5	19.2%	-662.9	-3.7%
Queen Anne’s County Impervious Surfaces*	810.8	4.6%				
Statewide Priority Wetlands**	807.0	4.6%				
Tier II Catchment Area within Watershed	51.0	0.3%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.7-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Lower Chester River Watershed (02130505)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	1,720	1,720	2,368	3,441	3,441
Agriculture	9,995	9,995	9,636	8,990	8,990
Forest	4,930	4,930	4,719	4,296	4,296
Water	257	257	244	244	244
Other	757	757	692	690	690
Total Area	17,660	17,660	17,660	17,660	17,660
Residential Septic (EDUs)	0	0	674	1,643	191
Non-Residential Septic (EDUs)	0	0	167	35	0

Total Nitrogen Loading					
Lower Chester River Watershed (02130505)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	14,986	10,402	14,317	20,833	20,833
Agriculture NPS	155,380	86,786	83,653	78,092	78,092
Forest NPS	7,314	6,817	6,526	5,940	5,940
Water NPS	2,596	2,148	2,035	2,035	2,035

Other Terrestrial NPS	6,719	4,608	4,208	4,191	4,191
Total Terrestrial Load	186,994	110,762	110,738	111,092	111,092

Residential Septic (EDUs)	0	0	6,265	15,271	1,775
Non-Residential Septic (EDUs)	0	0	552	116	0
Total Septic Load	0	0	6,817	15,387	1,775

Total NPS Nitrogen Load	186,994	110,762	117,555	126,479	112,867
Total PS Load	0	0	0	7,171	9,490
Total Nitrogen Load (NPS+PS)	186,994	110,762	117,555	133,650	122,357

Total Phosphorus Loading					
Lower Chester River Watershed (02130505)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	1,877	1,231	1,692	2,509	2,509
Agriculture NPS	10,928	7,902	7,628	7,087	7,087
Forest NPS	111	91	87	80	80
Water NPS	146	146	138	138	138
Other Terrestrial NPS	911	586	527	525	525
Total Terrestrial Load	13,973	9,956	10,073	10,339	10,339

Total PS Load	0	0	0	538	712
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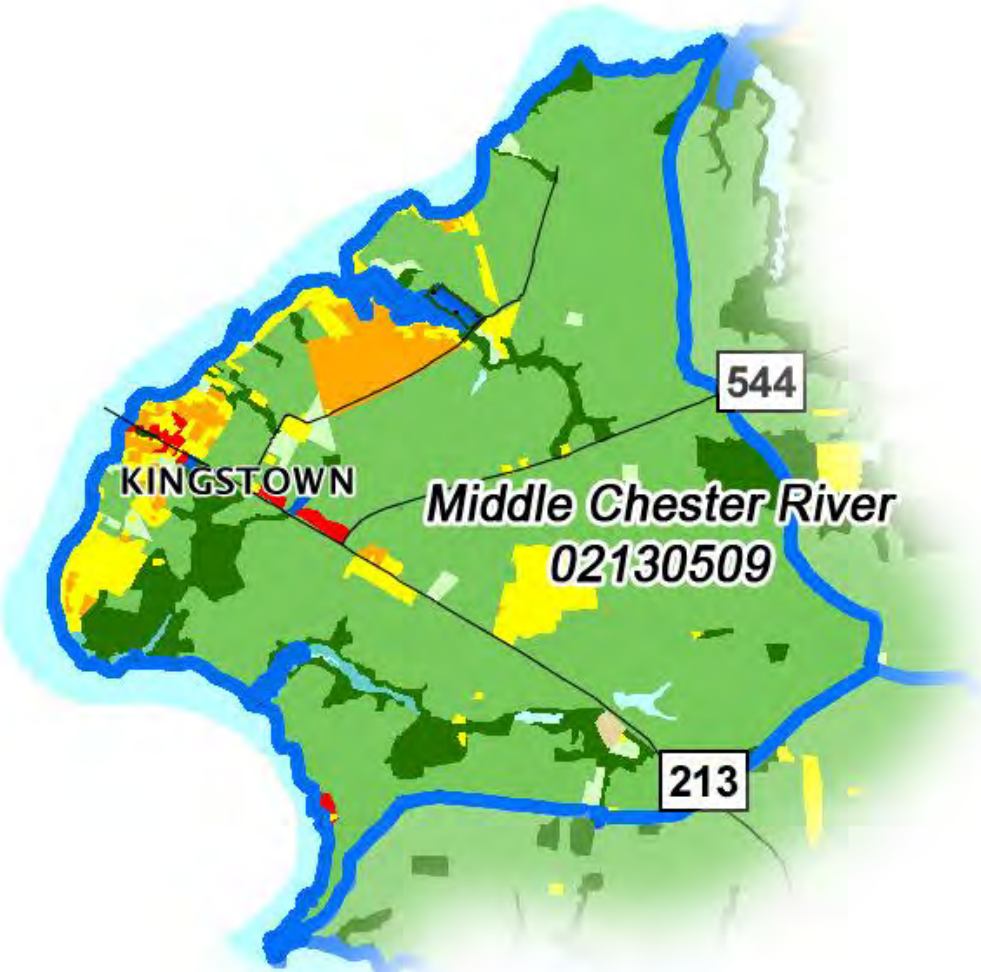
Total Phosphorus Load (NPS+PS)	13,973	9,956	10,073	10,877	11,051
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Impervious Cover and Open Space	(Acres)				
Lower Chester River Watershed (02130505)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	561	561	752	920	920
Agriculture	9,995	9,995	9,636	8,990	8,990
Forest	4,228	4,228	4,050	3,627	3,627
Percent Impervious	3.2%	3.2%	4.3%	5.2%	5.2%

Note: Nitrogen and phosphorus output from sewage are counted as part of the Kent Island Bay Watershed, where the outfall of the KNSG facility is located.



Section 11.8 Middle Chester River Watershed - 02130509  
Existing Land Use 2008



Legend

County Boundary

Roadways

Community Planning Areas

Parks

November 2008 Land Use Land Cover

Low Density Residential (1 to 2 units per 5 acres)

Medium Density Residential (2 to 8 units per acre)

High Density Residential (8+ units per acre)

Commercial

Mixed Commercial - Residential

Industrial

Institutional

Surface Mining

Very Low Density Rural (1 unit per 5+ acres)

Recreation (Private & Public)

Agriculture

Forest

Water

Wetlands

Transportation

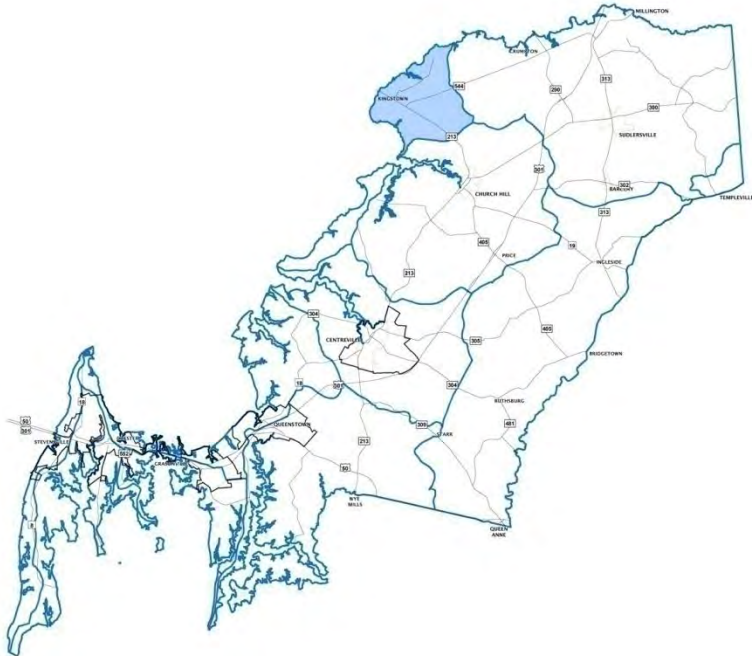


Table 11.8-1 Conservation Lands Programs	Acres
MALPF Easement	95.49
MALPF Greenprint	-
Rural Legacy Easement	1,565.25
MET	-
TDR Sending Areas	26.54
Private Conservation Easement	91.54
County Park	76.68
State Owned Land	-
Open Space (Deed Restricted)	244.06
Open Space (Non Contiguous)	443.45
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	2,543.00

Land Available for Development	Acres
Available	872.00
Divisible	2,724.93
Total	3,596.93

Table 11.8-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	595.5	7.7%	538.9	6.9%
Medium Density Residential (2 to 8 units per acre)	304.3	3.9%	617.8	7.9%
High Density Residential (8+ units per acre)	-	0.0%	-	0.0%
Commercial	55.9	0.7%	129.9	1.6%
Mixed Commercial – Residential	-	0.0%	-	0.0%
Industrial	-	0.0%	0.5	0.0%
Institutional	24.7	0.3%	24.3	0.3%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	136.1	1.7%	553.6	7.1%
Private Recreation	13.6	0.2%	13.6	0.2%
Agriculture	5,754.0	73.6%	5,156.8	66.0%
Forest	816.0	10.4%	664.7	8.5%
Water	46.0	0.6%	46.0	0.6%
Wetlands	69.2	0.9%	69.2	0.9%
Transportation	-	0.0%	-	0.0%
Total	7,815.3	100.0%	7,815.3	100.0%



Preferred Land Use 2030



Table 11.8-3 Best Management Practices Tool Kit

Tools, Techniques & Strategies	LANDSCAPE				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
Point Source / Urban Source Strategy					Make appropriate connections
Stormwater Strategy	BMPs, nutrient and manure management plans and fencing livestock out of streams.	BMPs, preserve buffers and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, Retrofit SW facilities or include in new development and reduce use of lawn fertilizers.	BMPs, ESD, and retrofit facilities.
Onsite Sewage Disposal Strategy (OSDS)	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Failing septic systems should be connected to the public sewer system.	Connect existing development on septic systems within PFAs to public system.
Growth Management Strategy	Preserve environmentally sensitive lands and agricultural lands using State and Local programs.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing infrastructure.	Suburban subdivisions must provide improvements and connection to public water and sewer systems.	Establish Infill/Redevelopment standards and incentives. Establish a Growth Area for Kingstown consistent with Sewer Service Areas.
Agriculture Strategy	Nutrient and Manure Management, BMPs, Cover Crops	Appropriate floodplain, riparian buffer and wetland buffers.	TDR receiving areas should be established outside of the watershed.	TDR receiving areas should be established outside of the watershed.	
Waterway Strategies	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams.
Air Deposition Strategy	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenbelts and forest conservation strategies and incentives.	Forest Conservation Plans and establish wooded lot standards.	Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from Town.	Concentration of homes, commercial and institutional uses for walkable community.

Table 11.8-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	5,754.0	73.6%	5,156.8	66.0%	-597.2	-7.6%
Forest	816.0	10.4%	664.7	8.5%	-151.3	-1.9%
Queen Anne’s County Impervious Surfaces*	246.1	3.1%				
Statewide Priority Wetlands**	61.0	0.8%				
Tier II Catchment Area within Watershed	0.0	0.0%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Middle Chester River 2006 Study TMDL: Nitrogen 275,437 lbs per year and Phosphorus 16,709 pounds per year.

Queen Anne’s County portion of Middle Chester River Watershed is 19.6%.

Table 11.8-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Middle Chester River Watershed (02130509)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	834	834	1,092	1,948	1,948
Agriculture	6,028	6,028	5,754	5,050	5,050
Forest	877	877	885	734	734
Water	51	51	46	46	46
Other	25	25	38	38	38
Total Area	7,815	7,815	7,815	7,815	7,815

Residential Septic (EDUs)	0	0	1,049	1,865	1,865
Non-Residential Septic (EDUs)	0	0	276	474	474

Total Nitrogen Loading						
Middle Chester River Watershed (02130509)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred land Use with Trib Strategy BMPs	
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	
Development NPS	7,272	5,046	6,623	11,818	11,818	
Agriculture NPS	94,716	52,481	50,095	43,945	43,945	
Forest NPS	1,301	1,212	1,224	1,014	1,014	
Water NPS	514	425	384	384	384	
Other Terrestrial NPS	221	153	232	229	229	
Total Terrestrial Load	104,024	59,317	58,558	57,391	57,391	
Residential Septic (EDUs)	0	0	9,750	17,334	17,334	
Non-Residential Septic (EDUs)	0	0	916	1,571	1,571	
Total Septic Load	0	0	10,666	18,905	18,905	
Total NPS Nitrogen Load	104,024	59,317	69,224	76,296	76,296	
Total PS Load	0	0	0	0	0	TMDL
Total Nitrogen Load (NPS+PS)	104,024	59,317	69,224	76,296	76,296	275,437

Total Phosphorus Loading						
Middle Chester River Watershed (02130509)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs	
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	
Development NPS	914	599	815	1,455	1,455	
Agriculture NPS	6,531	4,704	4,490	3,934	3,934	
Forest NPS	20	16	16	14	14	
Water NPS	29	29	26	26	26	
Other Terrestrial NPS	29	19	28	27	27	
Total Terrestrial Load	7,523	5,366	5,375	5,455	5,455	
Total PS Load	0	0	0	0	0	
						TMDL
Total Phosphorus Load (NPS+PS)	7,523	5,366	5,375	5,455	5,455	16,709

Impervious Cover and Open Space	(Acres)				
Middle Chester River Watershed (02130509)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	225	225	224	388	388
Agriculture	6,028	6,028	5,754	5,050	5,050
Forest	807	807	816	664	664
Percent Impervious	2.9%	2.9%	2.9%	5.0%	5.0%



Section 11.9 Southeast Creek Watershed - 02130508  
Existing Land Use 2008

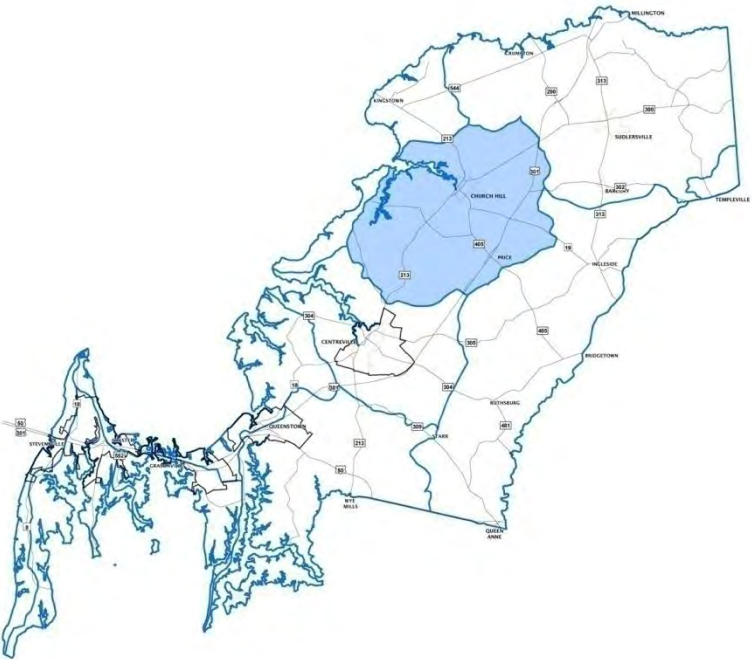
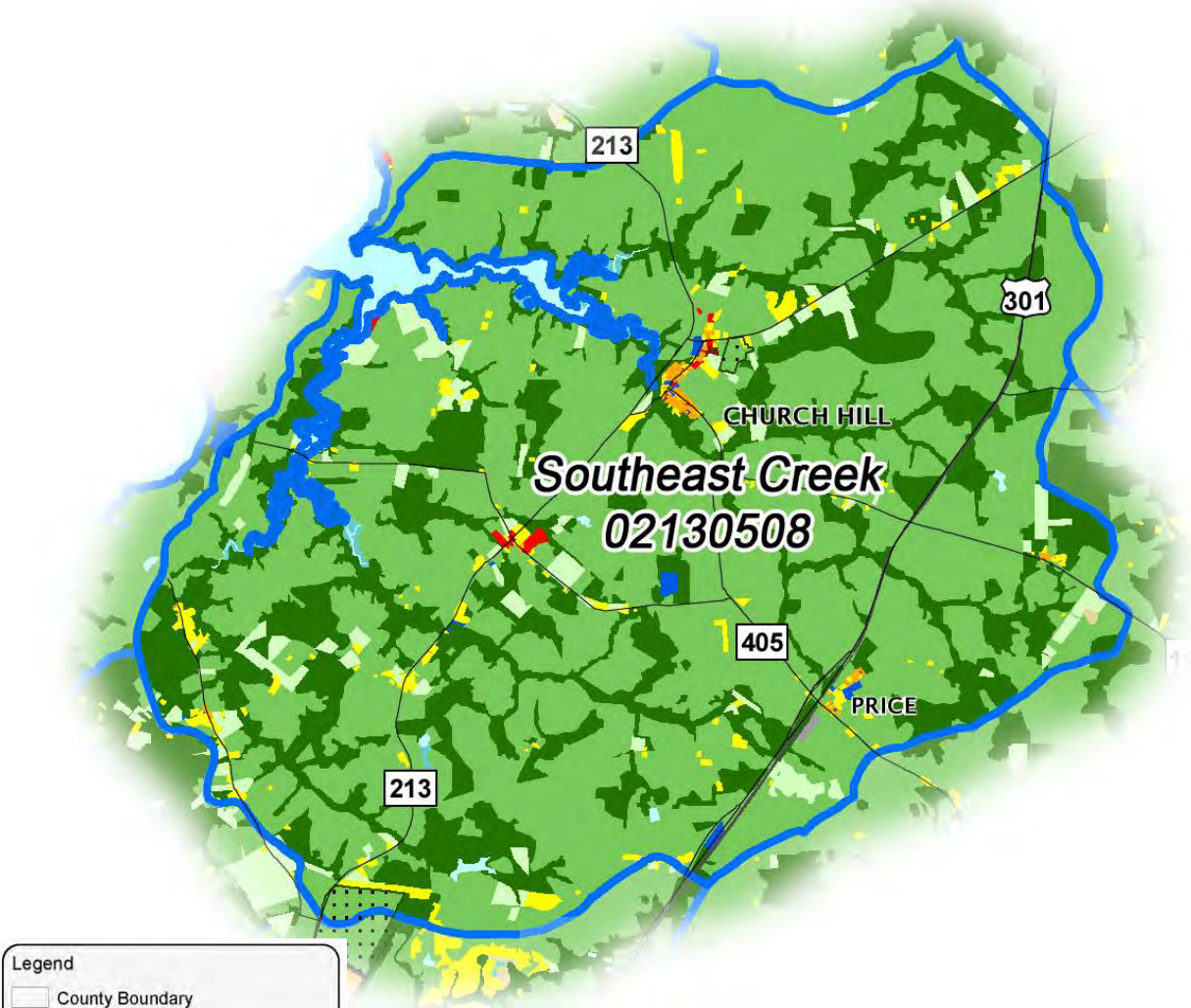


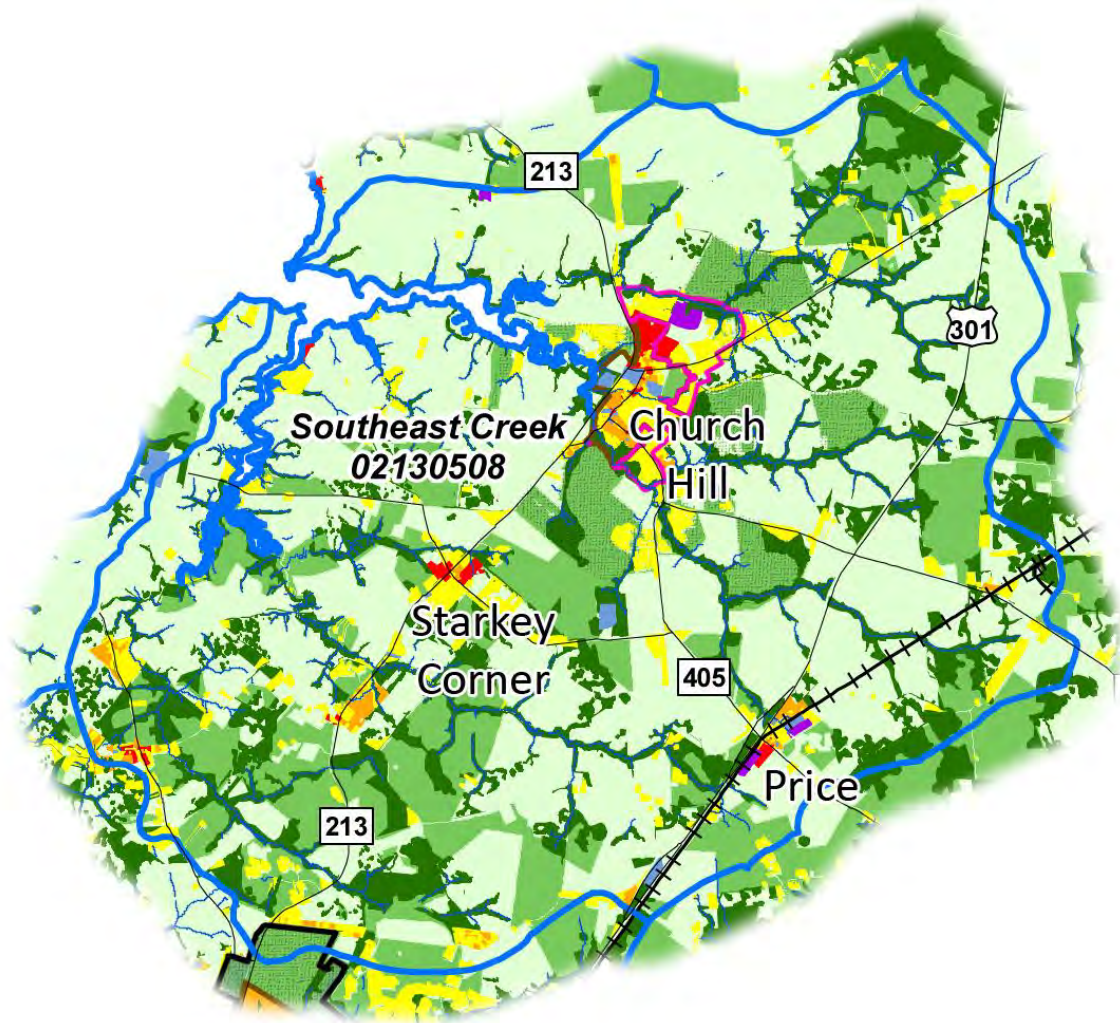
Table 11.9-1 Conservation Lands Programs	Acres
MALPF Easement	3,541.44
MALPF Greenprint	-
Rural Legacy Easement	309.19
MET	328.32
TDR Sending Areas	701.62
Private Conservation Easement	-
County Park	167.30
State Owned Land	-
Open Space (Deed Restricted)	1,701.60
Open Space (Non Contiguous)	2,386.07
MALPF Easement / Open Space	474.68
MET / Open Space	111.63
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	9,721.85

Land Available for Development	Acres
Available	5,402.97
Divisible	12,575.56
Total	17,978.53

Table 11.9-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	720.1	2.2%	1,290.1	3.7%
Medium Density Residential (2 to 8 units per acre)	96.3	0.3%	259.3	0.7%
High Density Residential (8+ units per acre)	7.5	0.0%	7.4	0.0%
Commercial	58.0	0.2%	63.0	0.2%
Mixed Commercial – Residential	-	0.0%	102.5	0.3%
Industrial	-	0.0%	53.3	0.2%
Institutional	86.2	0.2%	107.7	0.3%
Surface Mining	14.2	0.0%	14.2	0.0%
Very Low Density Rural (1 unit per 5+ acres)	1,334.0	3.8%	3,682.7	10.6%
Private Recreation	9.8	0.0%	9.8	0.0%
Agriculture	22,880.1	65.9%	20,652.8	59.5%
Forest	9,042.0	26.0%	8,005.3	23.1%
Water	107.2	0.3%	107.2	0.3%
Wetlands	246.5	0.7%	246.5	0.7%
Transportation	129.0	0.4%	129.1	0.4%
Total	34,730.9	100.0%	34,730.9	100.0%



Preferred Land Use 2030



**Preferred Land Use 2030**  
The preferred land use within the watershed is based upon maximum capacity build-out under current zoning modified using the future land use plan for Church Hill from the recently adopted Comprehensive Plan and Municipal Growth Element.



Table 11.9-3 Best Management Practices Tool Kit

Tools, Techniques & Strategies	LANDSCAPES				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
Point Source / Urban Source Strategy				Expand and enhance Church Hill WWTP and collection/ conveyance system with enhanced nutrient removal systems. Connect existing development located within Sewer Service Areas and Growth Area.	Within PFAs, connect existing septic systems to Church Hill WWTP.
Stormwater Strategy	BMPs and Nutrient and Manure Management Plans, fencing livestock out of streams.	BMPs and preservation of buffer and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, Retrofitting of SW facilities or inclusion in new development and reduction in use of lawn fertilizers.	BMPs, ESD, Retrofitting of facilities.
Onsite Sewage Disposal Strategy (OSDS)	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Connect existing development on septic systems within PFAs to public system.
Growth Management Strategy	Preservation of environmentally sensitive lands and agricultural lands using State and Local programs. Establish PPA for agricultural land outside of Growth Area.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing infrastructure.	Suburban subdivisions must provide improvements and connection to public water and sewer systems. Establish the Growth Area as a TDR receiving area.	Establish Infill/Redevelopment standards and incentives. Establish a Growth Area around the Town and update Sewer Service Areas.
Agriculture Strategy	Nutrient and Manure Management, BMPs, Cover Crops	Appropriate floodplain, riparian buffer and wetland buffers.	Establish lands outside of Growth Area as TDR sending areas.		
Waterway Strategies	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams.
Air Deposition Strategy	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenbelts and forest conservation strategies and incentives.	Forest Conservation Plans and establish wooded lot standards.	Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from Town/village.	Concentration of homes, commercial and institutional uses for walkable community.

Table 11.9-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	22,880.1	65.9%	20,652.8	59.5%	-2,227.3	-6.4%
Forest	9,042.0	26.0%	8,005.3	23.1%	-1,036.7	-2.9%
Queen Anne’s County Impervious Surfaces*	660.8	1.9%				
Statewide Priority Wetlands**	5,386.0	15.5%				
Tier II Catchment Area within Watershed	16,857.0	48.5%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.9-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Southeast Creek Watershed (02130508)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	813	813	2,345	5,587	5,587
Agriculture	23,965	23,965	22,880	20,653	20,653
Forest	9,718	9,718	9,289	8,252	8,252
Water	109	109	107	107	107
Other	126	126	110	132	132
Total Area	34,731	34,731	34,731	34,731	34,731
Residential Septic (EDUs)	0	0	870	3,075	1,311
Non-Residential Septic (EDUs)	0	0	586	708	586

Total Nitrogen Loading						
Southeast Creek Watershed (02130508)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs	
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	
Development NPS	7,134	4,926	14,255	34,013	34,013	
Agriculture NPS	372,731	208,088	198,593	179,551	179,551	
Forest NPS	14,416	13,437	12,844	11,410	11,410	
Water NPS	1,102	912	895	895	895	
Other Terrestrial NPS	1,118	768	666	796	796	
Total Terrestrial Load	396,501	228,131	227,252	226,664	226,664	
Residential Septic (EDUs)	0	0	8,086	28,581	12,185	
Non-Residential Septic (EDUs)	0	0	1,942	2,349	1,942	
Total Septic Load	0	0	10,029	30,930	14,128	
Total NPS Nitrogen Load	396,501	228,131	237,280	257,594	240,792	
Total PS Load	0	0	916	4,095	9,461	TMDL
Total Nitrogen Load (NPS+PS)	396,501	228,131	238,196	261,689	250,253	0
Total Phosphorus Loading						
Southeast Creek Watershed (02130508)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs	
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	
Development NPS	926	602	1,797	4,353	4,353	
Agriculture NPS	26,187	18,930	18,093	16,204	16,204	
Forest NPS	218	180	172	153	153	
Water NPS	62	62	61	61	61	
Other Terrestrial NPS	151	97	78	93	93	
Total Terrestrial Load	27,544	19,871	20,201	20,865	20,865	
Total PS Load	0	0	259	497	900	
					TMDL	
Total Phosphorus Load (NPS+PS)	27,544	19,871	20,460	21,362	21,765	21,113

Impervious Cover and Open Space	(Acres)				
Southeast Creek Watershed (02130508)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	195	195	386	702	702
Agriculture	23,965	23,965	22,880	20,653	20,653
Forest	9,467	9,467	9,042	8,005	8,005
Percent Impervious	0.6%	0.6%	1.1%	2.0%	2.0%



Section 11.10 Church Hill Growth Area  
Existing Land Use 2008

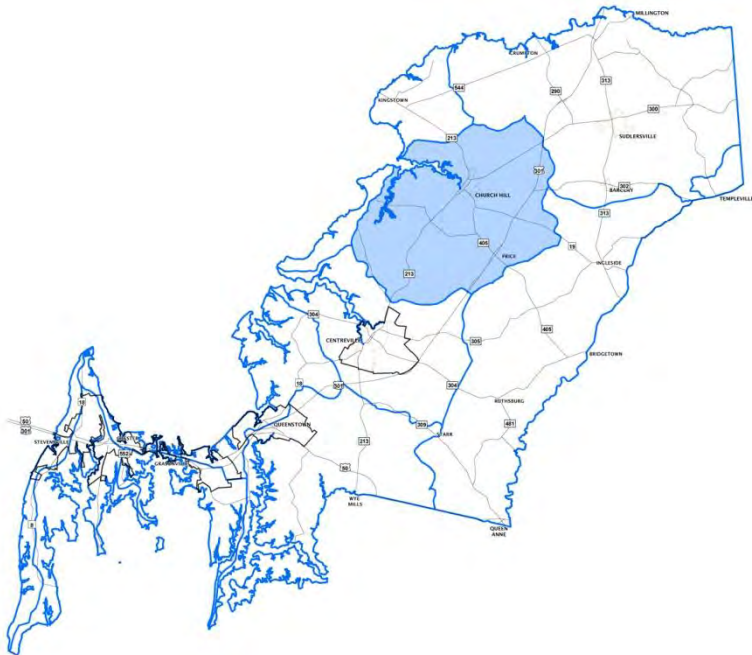


Table 11.10-1 Conservation Lands Programs	Acres
MALPF Easement	14.0
MALPF Greenprint	-
Rural Legacy Easement	-
MET	-
TDR Sending Areas	-
Private Conservation Easement	-
County Park	40.1
State Owned Land	-
Open Space (Deed Restricted)	-
Open Space (Non Contiguous)	31.6
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	85.7

Land Available for Development	Acres
Available	183.5
Divisible	227.1
Total	410.6

Table 11.10-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	93.3	9.8%	334.7	35.2%
Medium Density Residential (2 to 8 units per acre)	63.0	6.6%	70.0	7.4%
High Density Residential (8+ units per acre)	7.3	0.8%	-	0.0%
Commercial	14.2	1.5%	22.6	2.4%
Mixed Commercial – Residential	-	0.0%	61.3	6.4%
Industrial	-	0.0%	35.1	3.7%
Institutional	16.0	1.7%	43.5	4.6%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	65.0	6.8%	59.3	6.2%
Private Recreation	-	0.0%	-	0.0%
Agriculture	482.4	50.7%	141.7	14.9%
Forest	206.5	21.7%	179.5	18.9%
Water	0.2	0.0%	0.2	0.0%
Wetlands	4.3	0.5%	4.3	0.5%
Transportation	-	0.0%	-	0.0%
Total	952.2	100.0%	952.2	100.0%



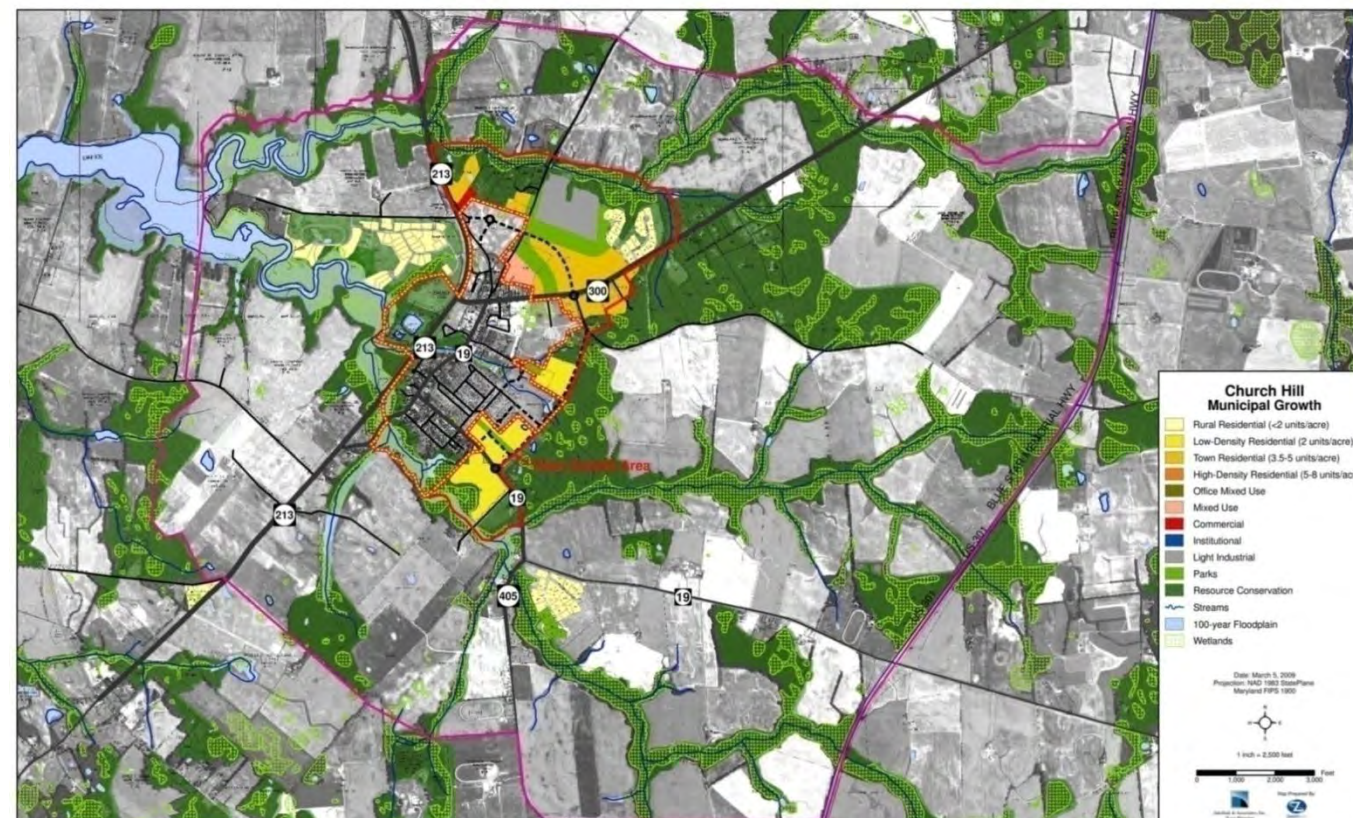
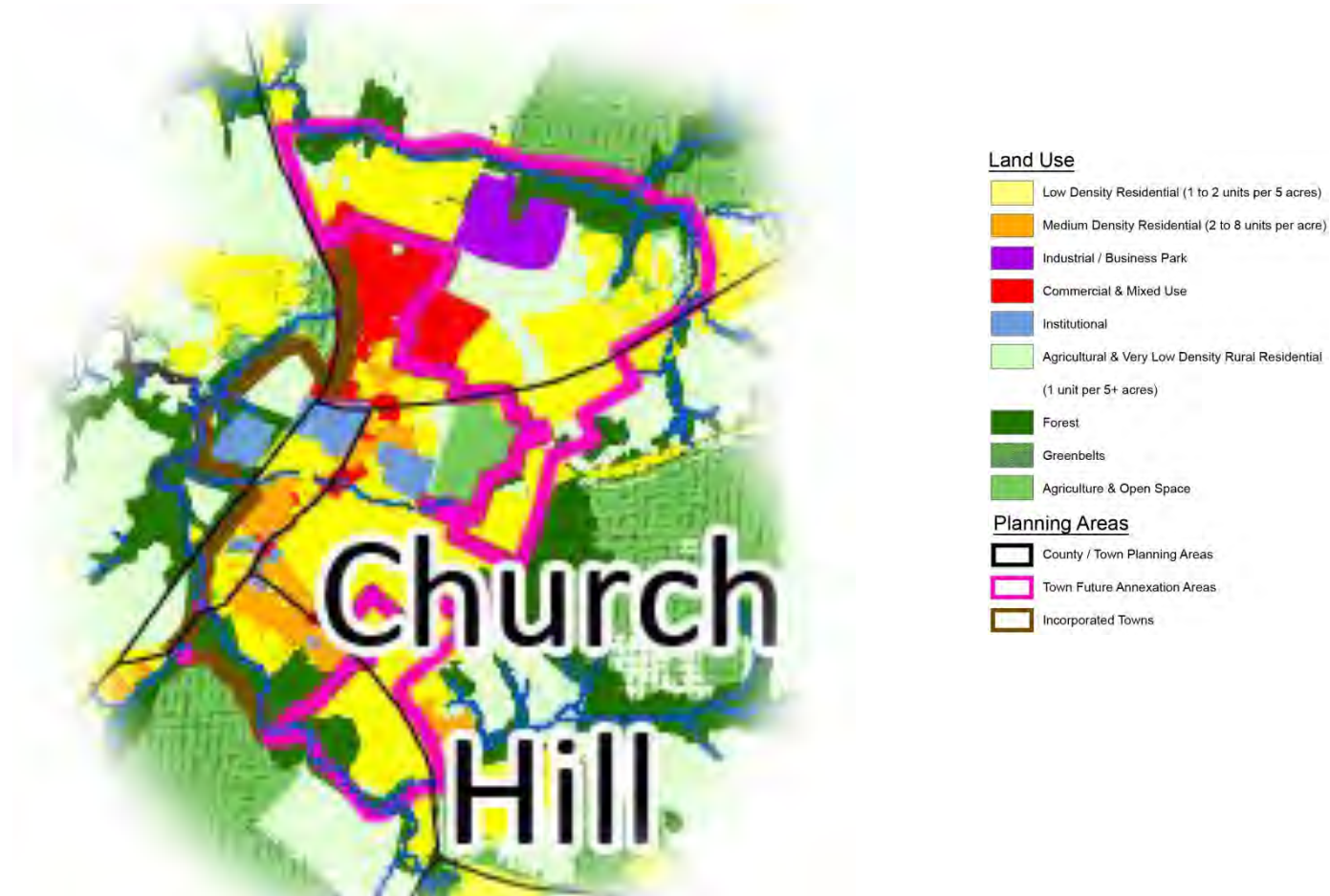
***Preferred Land Use 2030***

Table 11.10-3 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	482.4	50.7%	141.7	14.9%	-340.7	-35.8%
Forest	206.5	21.7%	179.5	18.9%	-27.0	-2.8%
Queen Anne’s County Impervious Surfaces*	60.7	6.4%				
Statewide Priority Wetlands**	120.0	12.6%				
Tier II Catchment Area within Watershed	240.3	25.2%				

*\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor as to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.*

*\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.*

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.10-4 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface Land Use and Septic Systems

Church Hill - Southeast Creek	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	130	130	243	583	583
Agriculture	615	615	482	142	142
Forest	195	195	211	184	184
Water	0	0	0	0	0
Other	12	12	16	43	43
Total Area	952	952	952	952	952
Residential Septic (EDUs)	0	0	151	383	0
Non-Residential Septic (EDUs)	0	0	0	0	0

Total Nitrogen Loading					
Church Hill - Southeast Creek	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	1,134	788	1,473	3,529	3,529
Agriculture NPS	9,466	5,320	4,171	1,230	1,230
Forest NPS	289	269	291	254	254

Water NPS	2	2	2	2	2
Other Terrestrial NPS	104	72	96	262	262
Total Terrestrial Load	10,995	6,452	6,034	5,278	5,278

Residential Septic (EDUs)	0	0	1,403	3,560	0
Non-Residential Septic (EDUs)	0	0	0	0	0
Total Septic Load	0	0	1,403	3,560	0

Total NPS Nitrogen Load	10,995	6,452	7,437	8,837	5,278	
Total PS Load	0	0	669	2,312	2,166	TMDL
Total Nitrogen Load (NPS+PS)	10,995	6,452	8,106	11,149	7,444	0

Total Phosphorus Loading					
Church Hill - Southeast Creek	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	141	93	182	424	424
Agriculture NPS	675	490	385	112	112
Forest NPS	4	4	4	3	3
Water NPS	0	0	0	0	0
Other Terrestrial NPS	12	8	11	30	30
Total Terrestrial Load	833	595	582	568	568

Total PS Load	0	0	50	173	162	
						TMDL
Total Phosphorus Load (NPS+PS)	833	595	632	741	730	21,113

Impervious Cover and Open Space	(Acres)				
Church Hill - Southeast Creek	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	41	41	52	156	156
Agriculture	615	615	482	142	142
Forest	190	190	207	179	179
Percent Impervious	4.3%	4.3%	5.5%	16.4%	16.4%



Section 11.11 Tuckahoe Creek Watershed - 02130405  
Existing Land Use 2008

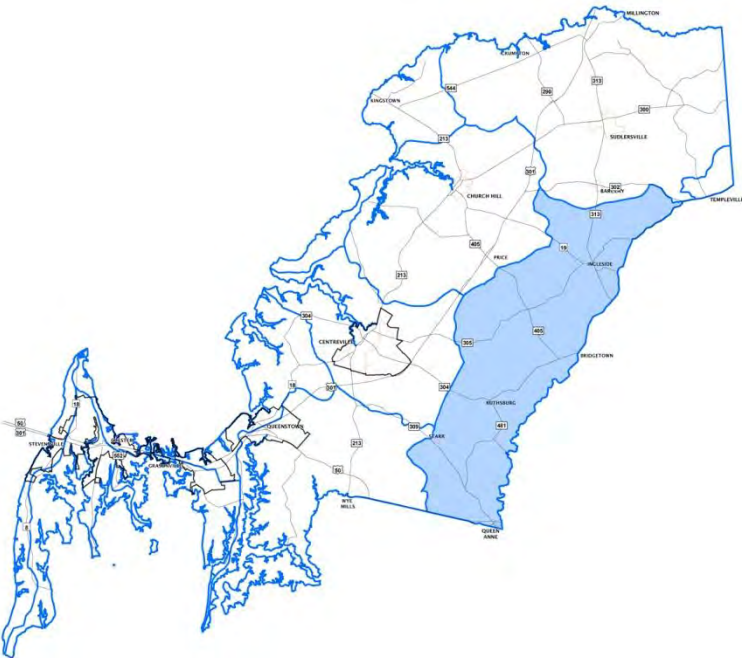
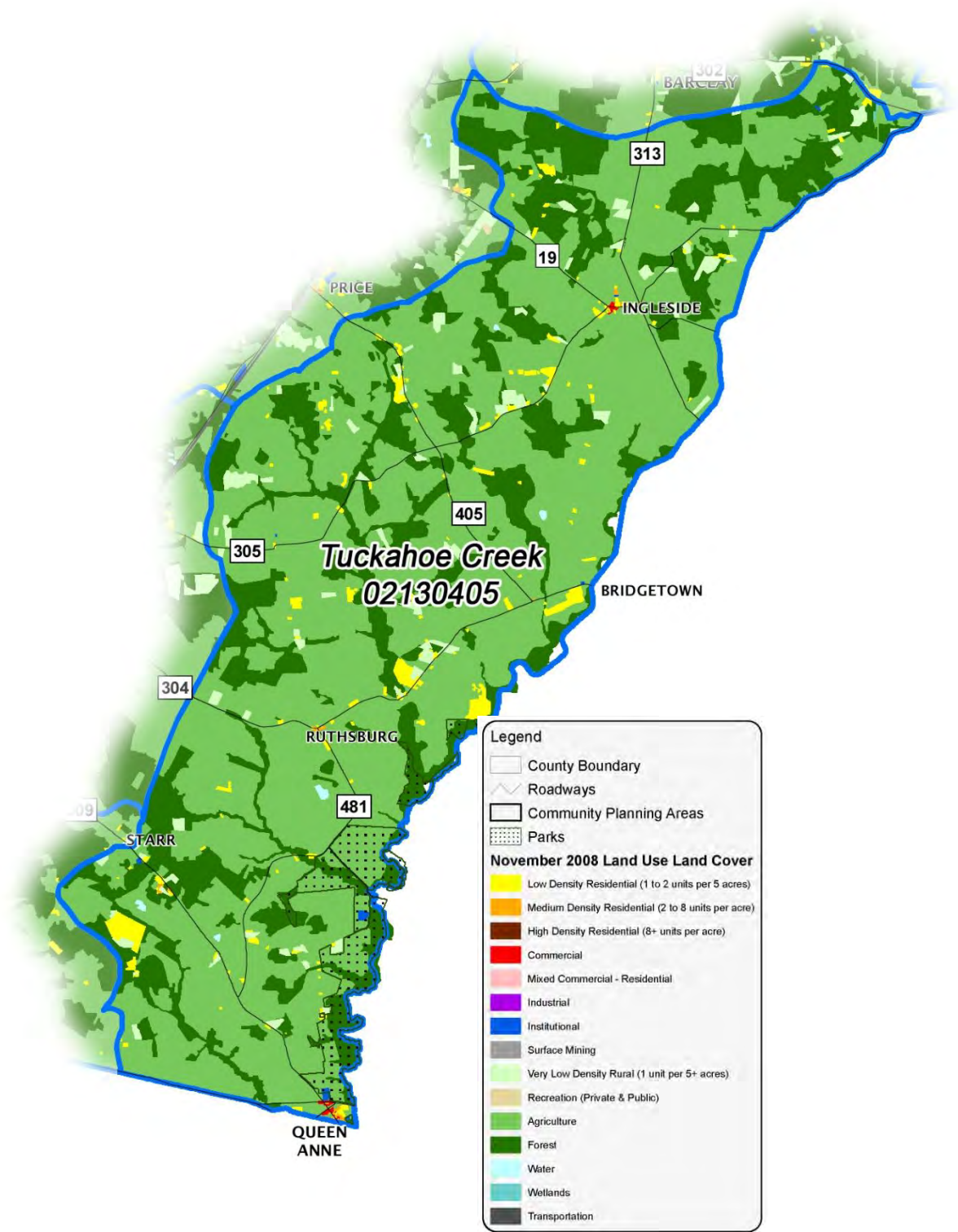


Table 11.11-1 Conservation Lands Programs	Acres
MALPF Easement	9,303.68
MALPF Greenprint	-
Rural Legacy Easement	-
MET	362.49
TDR Sending Areas	417.31
Private Conservation Easement	-
County Park	5.73
State Owned Land	1,849.37
Open Space (Deed Restricted)	2,274.30
Open Space (Non Contiguous)	3,269.98
MALPF Easement / Open Space	243.49
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	74.80
Total	17,801.15

Land Available for Development	Acres
Available	7,108.45
Divisible	12,962.61
Total	20,071.06

Table 11.11-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	890.6	1.9%	1,280.6	2.8%
Medium Density Residential (2 to 8 units per acre)	39.6	0.1%	145.3	0.3%
High Density Residential (8+ units per acre)	0.1	0.0%	0.1	0.0%
Commercial	27.4	0.1%	42.9	0.1%
Mixed Commercial – Residential	-	0.0%	31.7	0.1%
Industrial	-	0.0%	3.5	0.0%
Institutional	42.3	0.1%	40.7	0.1%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	1,005.0	2.2%	4,097.7	8.9%
Private Recreation	-	0.0%	-	0.0%
Agriculture	32,125.9	69.7%	29,384.1	63.8%
Forest	11,858.7	25.8%	10,963.0	23.8%
Water	52.0	0.1%	52.0	0.1%
Wetlands	5.5	0.0%	5.5	0.0%
Transportation	-	0.0%	-	0.0%
Total	46,047.1	100.0%	46,047.1	100.0%



Preferred Land Use 2030

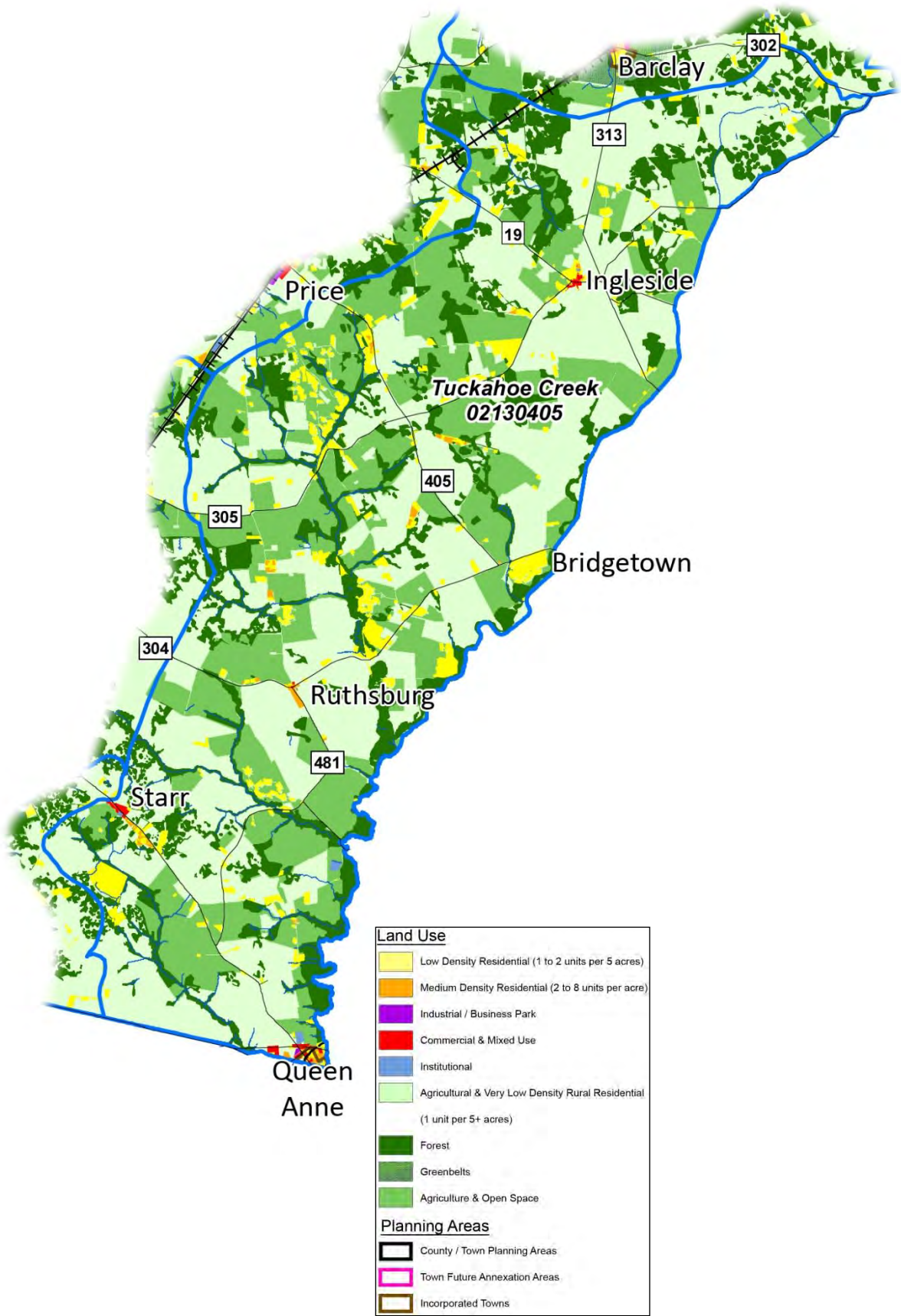


Table 11.11-3 Best Management Practices Tool Kit

Tools, Techniques & Strategies	LANDSCAPES				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
Point Source / Urban Source Strategy					Within PFAs, connect existing septic systems to Church Hill WWTP.
Stormwater Strategy	BMPs and Nutrient and Manure Management Plans, fencing livestock out of streams.	BMPs and preservation of buffer and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, Retrofitting of SW facilities or inclusion in new development and reduction in use of lawn fertilizers.	BMPs, ESD, Retrofitting of facilities.
Onsite Sewage Disposal Strategy (OSDS)	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Connect existing development on septic systems within PFAs to public system.
Growth Management Strategy	Preservation of environmentally sensitive lands and agricultural lands using State and Local programs. Establish PPA for agricultural land outside of villages.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing development.	Suburban development is not a compatible land use pattern.	Infill and redevelopment of villages.
Agriculture Strategy	Nutrient and Manure Management, BMPs, Cover Crops	Appropriate floodplain, riparian buffer and wetland buffers.	Establish lands outside of Growth Area as TDR sending areas.		
Waterway Strategies	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams construction	Protection of riparian buffers, tree planting along streams and construction	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams.
Air Deposition Strategy	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenway and forest conservation strategies and incentives.	Forest Conservation Plans and establish wooded lot standards.	Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from villages.	Provide improvements such as sidewalk where appropriate for villages to be walkable.

Table 11.11-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	32,125.9	69.7%	29,384.1	63.8%	-2,741.8	-5.9%
Forest	11,858.7	25.8%	10,963.0	23.8%	-895.7	-2.0%
Queen Anne’s County Impervious Surfaces*	747.6	1.6%				
Statewide Priority Wetlands**	7,945.0	17.2%				
Tier II Catchment Area within Watershed	35,307.0	76.5%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.11-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface Land Use and Septic Systems

Tuckahoe Creek Watershed (02130405)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	695	695	1,963	5,602	5,602
Agriculture	33,002	33,002	32,126	29,384	29,384
Forest	12,262	12,262	11,864	10,968	10,968
Water	52	52	52	52	52
Other	36	36	42	41	41
Total Area	46,047	46,047	46,047	46,047	46,047

Residential Septic (EDUs)	0	0	895	3,432	3,432
Non-Residential Septic (EDUs)	0	0	819	942	819

Total Nitrogen Loading					
Tuckahoe Creek Watershed (02130405)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 Max Build-Out with Trib Strategy BMPs	Scenario 2 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	6,106	4,213	11,958	34,163	34,163
Agriculture NPS	516,249	286,982	279,204	255,446	255,446
Forest NPS	18,191	16,955	16,405	15,166	15,166
Water NPS	524	434	434	434	434
Other Terrestrial NPS	315	220	255	245	245
Total Terrestrial Load	541,385	308,804	308,256	305,455	305,455

Residential Septic (EDUs)	0	0	8,319	31,899	31,899
Non-Residential Septic (EDUs)	0	0	2,718	3,124	2,718
Total Septic Load	0	0	11,036	35,023	34,617

Total NPS Nitrogen Load	541,385	308,804	319,292	340,478	340,072
Total PS Load	0	0	0	0	0
Total Nitrogen Load (NPS+PS)	541,385	308,804	319,292	340,478	340,072

Total Phosphorus Loading					
Tuckahoe Creek Watershed (02130405)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	797	517	1,545	4,462	4,462
Agriculture NPS	35,890	25,889	25,253	23,052	23,052
Forest NPS	276	227	220	203	203
Water NPS	29	29	29	29	29
Other Terrestrial NPS	38	25	29	28	28
Total Terrestrial Load	37,030	26,688	27,076	27,774	27,774

Total PS Load	0	0	0	0	0
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Total Phosphorus Load (NPS+PS)	37,030	26,688	27,076	27,774	27,774
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Impervious Cover and Open Space	(Acres)				
Tuckahoe Creek Watershed (02130405)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	157	157	216	453	453
Agriculture	33,002	33,002	32,126	29,384	29,384
Forest	12,257	12,257	11,859	10,963	10,963
Percent Impervious	0.3%	0.3%	0.5%	1.0%	1.0%



Section 11.12 Upper Chester River - 02130510  
Existing Land Use 2008

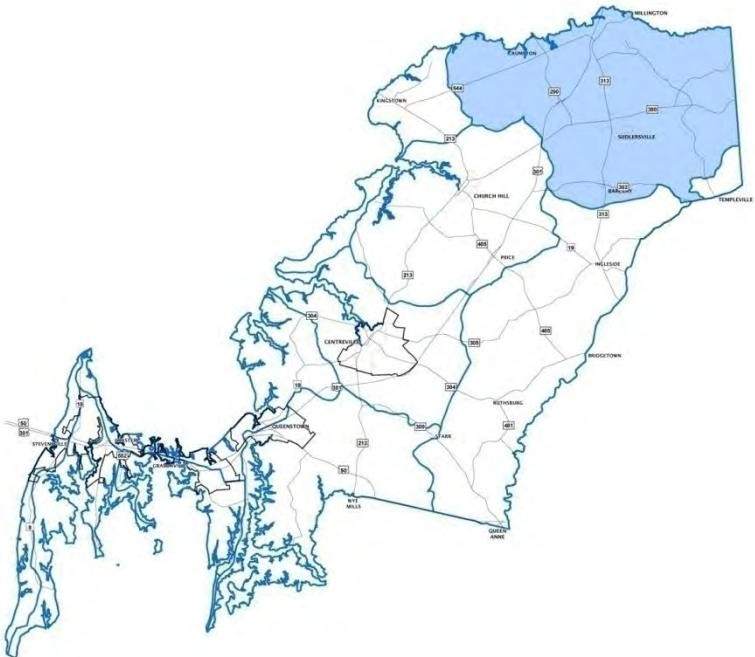
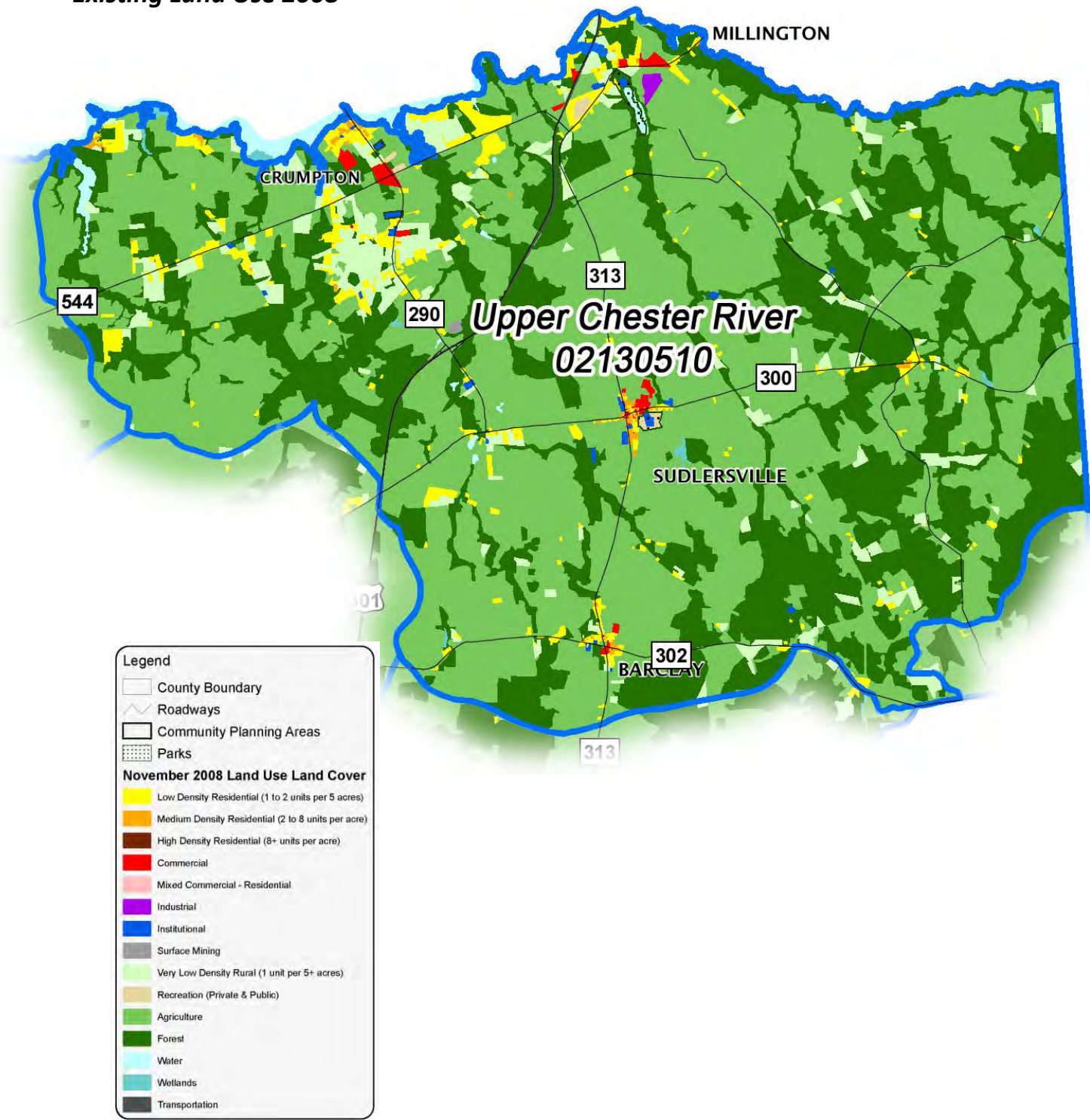


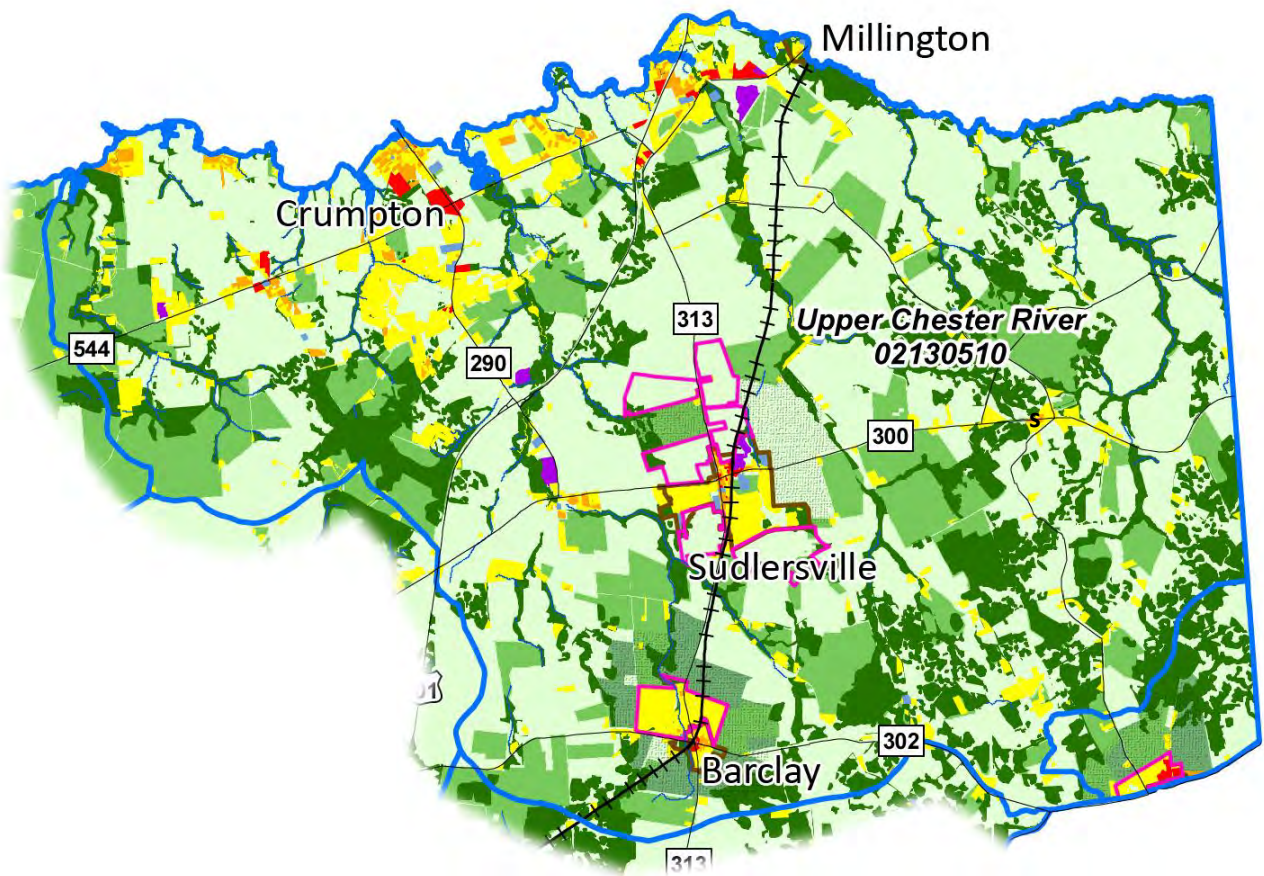
Table 11.12-1 Conservation Lands Programs	Acres
MALPF Easement	3,060.86
MALPF Greenprint	444.97
Rural Legacy Easement	2,953.41
MET	93.06
TDR Sending Areas	600.27
Private Conservation Easement	39.23
County Park	79.96
State Owned Land	201.73
Open Space (Deed Restricted)	2,953.10
Open Space (Non Contiguous)	1,032.37
MALPF Easement / Open Space	157.39
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	11,616.35

Land Available for Development	Acres
Available	9,276.31
Divisible	17,893.48
Total	27,169.79

Table 11.12-2 Updated General Land Use Classes (2008)	2008 Land Uses		Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	1,690.4	3.2%	2,208.7	4.2%
Medium Density Residential (2 to 8 units per acre)	144.7	0.3%	445.6	0.9%
High Density Residential (8+ units per acre)	1.2	0.0%	1.2	0.0%
Commercial	186.2	0.4%	167.7	0.3%
Mixed Commercial – Residential	-	0.0%	32.2	0.1%
Industrial	40.3	0.1%	108.6	0.2%
Institutional	127.8	0.2%	132.7	0.3%
Surface Mining	15.5	0.0%	15.5	0.0%
Very Low Density Rural (1 unit per 5+ acres)	2,436.1	4.7%	6,049.2	11.6%
Private Recreation	67.3	0.1%	67.3	0.1%
Agriculture	30,946.3	59.4%	28,618.2	54.9%
Forest	16,027.6	30.7%	13,836.5	26.5%
Water	222.6	0.4%	222.6	0.4%
Wetlands	142.7	0.3%	142.7	0.3%
Transportation	109.2	0.2%	109.2	0.2%
Total	52,157.9	100.0%	52,157.9	100.0%



Preferred Land Use 2030



**Preferred Land Use 2030**

The preferred land use within the watershed is based upon maximum capacity build-out under current zoning modified using the future land use plan for Sudlersville and Barclay from the recently adopted Comprehensive Plans and Municipal Growth Elements.

**Land Use**

- Low Density Residential (1 to 2 units per 5 acres)
- Medium Density Residential (2 to 8 units per acre)
- Industrial / Business Park
- Commercial & Mixed Use
- Institutional
- Agricultural & Very Low Density Rural Residential (1 unit per 5+ acres)
- Forest
- Greenbelts
- Agriculture & Open Space

**Planning Areas**

- County / Town Planning Areas
- Town Future Annexation Areas
- Incorporated Towns

Table 11.12-3 Best Management Practices Tool Kit

Tools, Techniques & Strategies	LANDSCAPES				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
Point Source / Urban Source Strategy				Expand and enhance Sudlersville WWTP and collection/ conveyance system with enhanced nutrient removal systems. Connect existing development located within Sewer Service Areas and Growth Areas to existing or expanded facilities.	Within PFAs, connect existing septic systems to Sudlersville WWTP.
Stormwater Strategy	BMPs, nutrient and manure management plans and fencing livestock out of streams.	BMPs, preserve buffered and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, Retrofit SW facilities or include in new development and reduce use of lawn fertilizers.	BMPs, ESD and retrofit facilities.
Onsite Sewage Disposal Strategy (OSDS)	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Connect existing development on septic systems within PFAs to public system.
Growth Management Strategy	Preserve environmentally sensitive lands and agricultural lands using State and Local programs. Establish PPA for agricultural land outside of towns, villages, Growth Areas and PFAs.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing development.	Suburban subdivisions must provide improvements and connection to public water and sewer systems. Establish the Growth Area as a TDR receiving area.	Infill and redevelop towns and villages. Establish a Growth Area around Sudlersville and Barclay. Establish a Growth Area boundary for Crumpton and Millington. Establish Growth Areas as TDR receiving areas.
Agriculture Strategy	Nutrient and manure management, BMPs, cover crops and best practices.	Preserve floodplains, riparian buffers and wetland buffers.	Establish lands outside of Growth Areas as TDR sending areas.		
Waterway Strategies	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers and tree planting along streams.
Air Deposition Strategy	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenways, greenbelts and forest conservation strategies and incentives.	Require Forest Conservation Plans and establish wooded lot standards.	Require Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from villages.	Provide improvements such as sidewalk where appropriate in towns and villages to enhance walkability.

Table 11.12-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	30,946.3	59.4%	28,618.2	54.9%	-2,328.1	-4.5%
Forest	16,027.6	30.7%	13,836.5	26.5%	-2,191.1	-4.2%
Queen Anne’s County Impervious Surfaces*	1,073.4	2.1%				
Statewide Priority Wetlands **	5,476.0	10.5%				
Tier II Catchment Area within Watershed	25,284.0	48.4%				

\* Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\* Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

**Note, the Upper Chester River Watershed 2006 Study TMDL: Nitrogen 614,612 lbs per year and Phosphorus 34,354 pounds per year.**

**The Queen Anne’s County portion of the Upper Chester River Watershed is 59.3%.**

Table 11.12-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Upper Chester River Watershed (02130510)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	2,048	2,048	4,608	9,122	9,122
Agriculture	32,508	32,508	30,946	28,618	28,618
Forest	17,161	17,161	16,170	13,979	13,979
Water	236	236	223	223	223
Other	205	205	211	216	216
Total Area	52,158	52,158	52,158	52,158	52,158

Residential Septic (EDUs)	0	0	1,900	3,967	2,313
Non-Residential Septic (EDUs)	0	0	1,918	2,136	1,918

Total Nitrogen Loading						
Upper Chester River Watershed (02130510)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs	
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	
Development NPS	17,987	12,419	28,027	55,560	55,560	
Agriculture NPS	508,681	282,694	268,985	248,877	248,877	
Forest NPS	25,458	23,728	22,359	19,329	19,329	
Water NPS	2,379	1,969	1,857	1,857	1,857	
Other Terrestrial NPS	1,805	1,244	1,275	1,305	1,305	
Total Terrestrial Load	556,311	322,053	322,504	326,929	326,929	
Residential Septic (EDUs)	0	0	17,660	36,872	21,498	
Non-Residential Septic (EDUs)	0	0	6,362	7,083	6,362	
Total Septic Load	0	0	24,022	43,955	27,860	
Total NPS Nitrogen Load	556,311	322,053	346,525	370,883	354,789	
Total PS Load	0	0	0	6,038	11,068	TMDL
Total Nitrogen Load (NPS+PS)	556,311	322,053	346,525	376,921	365,857	614,612

Total Phosphorus Loading						
Upper Chester River Watershed (02130510)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs	
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	
Development NPS	2,337	1,519	3,553	7,152	7,152	
Agriculture NPS	35,331	25,484	24,284	22,369	22,369	
Forest NPS	386	318	299	259	259	
Water NPS	134	134	126	126	126	
Other Terrestrial NPS	237	154	153	157	157	
Total Terrestrial Load	38,425	27,609	28,416	30,062	30,062	
Total PS Load	0	0	0	453	830	
						TMDL
Total Phosphorus Load (NPS+PS)	38,425	27,609	28,416	30,515	30,892	34,354

Impervious Cover and Open Space (Acres)					
Upper Chester River Watershed (02130510)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	466	466	687	1,030	1,030
Agriculture	32,508	32,508	30,946	28,618	28,618
Forest	17,010	17,010	16,028	13,837	13,837
Percent Impervious	0.9%	0.9%	1.3%	2.0%	2.0%



Section 11.13 Town of Barclay Growth Area  
Existing Land Use 2008

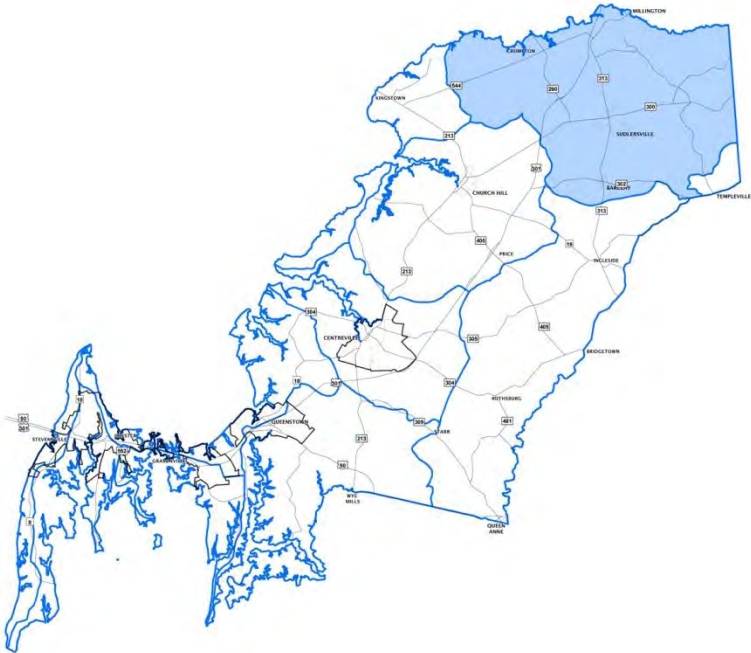
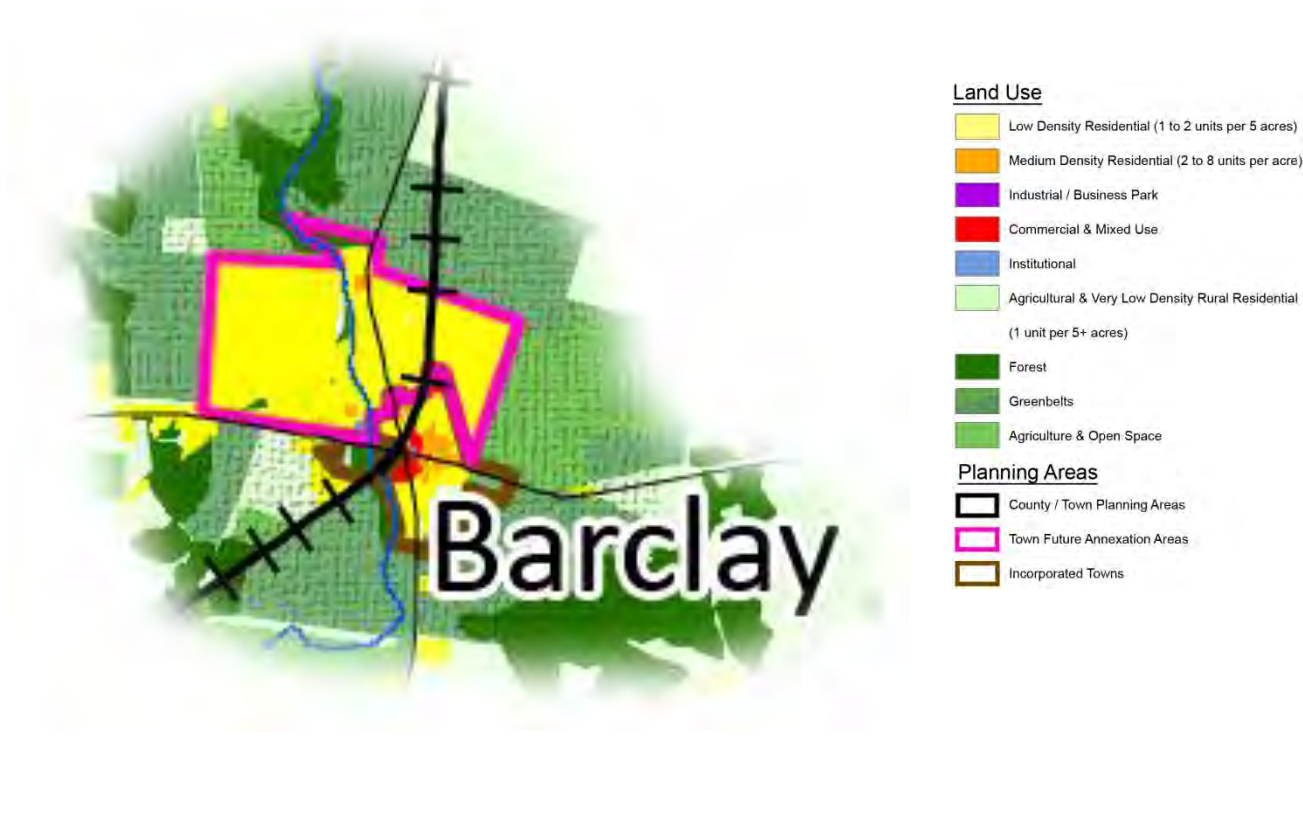


Table 11.13-1 Conservation Lands Programs	Acres
MALPF Easement	-
MALPF Greenprint	-
Rural Legacy Easement	-
MET	-
TDR Sending Areas	-
Private Conservation Easement	-
County Park	-
State Owned Land	-
Open Space (Deed Restricted)	-
Open Space (Non Contiguous)	-
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	0.0

Land Available for Development	Acres
Available	33.1
Divisible	15.7
Total	48.8

Table 11.13-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	52.9	29.0%	81.3	44.5%
Medium Density Residential (2 to 8 units per acre)	14.7	8.1%	14.7	8.1%
High Density Residential (8+ units per acre)	-	0.0%	-	0.0%
Commercial	12.7	7.0%	10.5	5.7%
Mixed Commercial – Residential	-	0.0%	-	0.0%
Industrial	-	0.0%	-	0.0%
Institutional	6.8	3.7%	6.8	3.7%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	14.9	8.1%	5.4	3.0%
Private Recreation	-	0.0%	-	0.0%
Agriculture	34.4	18.8%	30.3	16.6%
Forest	46.2	25.3%	33.6	18.4%
Water	-	0.0%	-	0.0%
Wetlands	-	0.0%	-	0.0%
Transportation	-	0.0%	-	0.0%
Total	182.6	100.0%	182.6	100.0%



Preferred Land Use 2030

From the Barclay Municipal Growth Plan Draft 2009

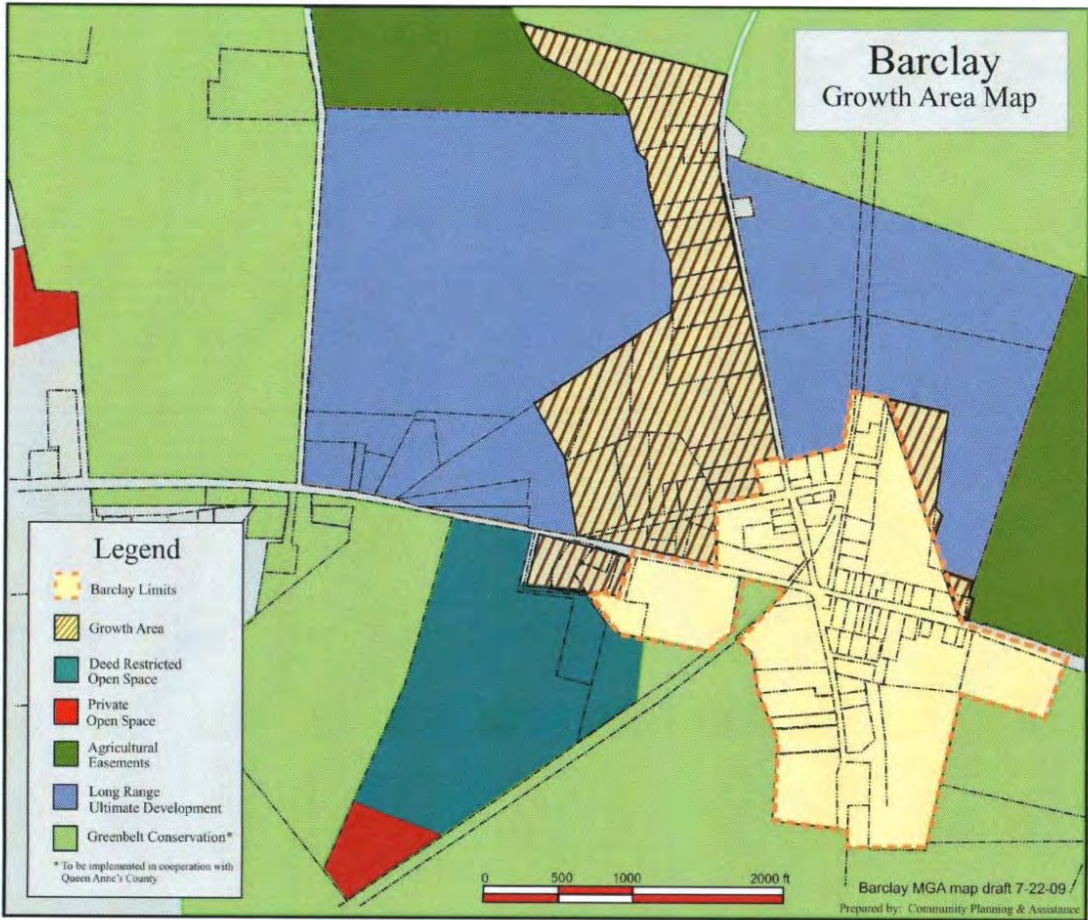


Table 11.13-3 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		Preferred Land Uses		Change in Land Use***	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	34.4	18.8%	30.3	16.6%	-4.1	-2.2%
Forest	46.2	25.3%	33.6	18.4%	-12.6	-6.9%
Queen Anne’s County Impervious Surfaces*	27.8	15.2%				
Statewide Priority Wetlands**	2.0	1.1%				
Tier II Catchment Area within Watershed	182.6	100.0%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor as to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.13-4 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Barclay - Upper Chester River	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	81	81	95	112	112
Agriculture	54	54	34	30	30
Forest	42	42	46	34	34
Water	0	0	0	0	0
Other	5	5	7	7	7
Total Area	183	183	183	183	183

Residential Septic (EDUs)	0	0	77	175	0
Non-Residential Septic (EDUs)	0	0	45	45	0

Total Nitrogen Loading					
Barclay - Upper Chester River	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	710	493	577	679	679
Agriculture NPS	854	473	296	261	261
Forest NPS	62	58	64	46	46
Water NPS	0	0	0	0	0
Other Terrestrial NPS	40	28	41	41	41
Total Terrestrial Load	1,666	1,052	977	1,027	1,027

Residential Septic (EDUs)	0	0	716	1,627	0
Non-Residential Septic (EDUs)	0	0	148	148	0
Total Septic Load	0	0	864	1,775	0

Total NPS Nitrogen Load	1,666	1,052	1,842	2,802	1,027
Total PS Load	0	0	0	0	532
Total Nitrogen Load (NPS+PS)	1,666	1,052	1,842	2,802	1,559

Total Phosphorus Loading					
Barclay - Upper Chester River	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	89	58	70	83	83
Agriculture NPS	59	42	28	25	25
Forest NPS	1	1	1	1	1
Water NPS	0	0	0	0	0
Other Terrestrial NPS	5	3	5	5	5
Total Terrestrial Load	153	105	104	113	113

Total PS Load	0	0	0	0	40
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Total Phosphorus Load (NPS+PS)	153	105	104	113	153
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Impervious Cover and Open Space (Acres)					
Barclay - Upper Chester River	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	23	23	24	26	26
Agriculture	54	54	34	30	30
Forest	42	42	46	34	34
Percent Impervious	12.9%	12.9%	12.9%	14.0%	14.0%



Section 11.14 Sudlersville Growth Area  
Existing Land Use 2008

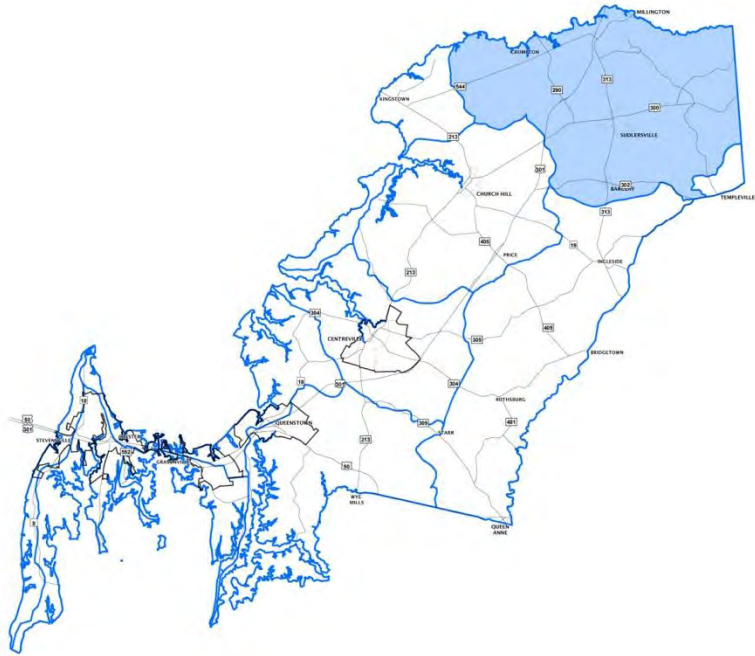
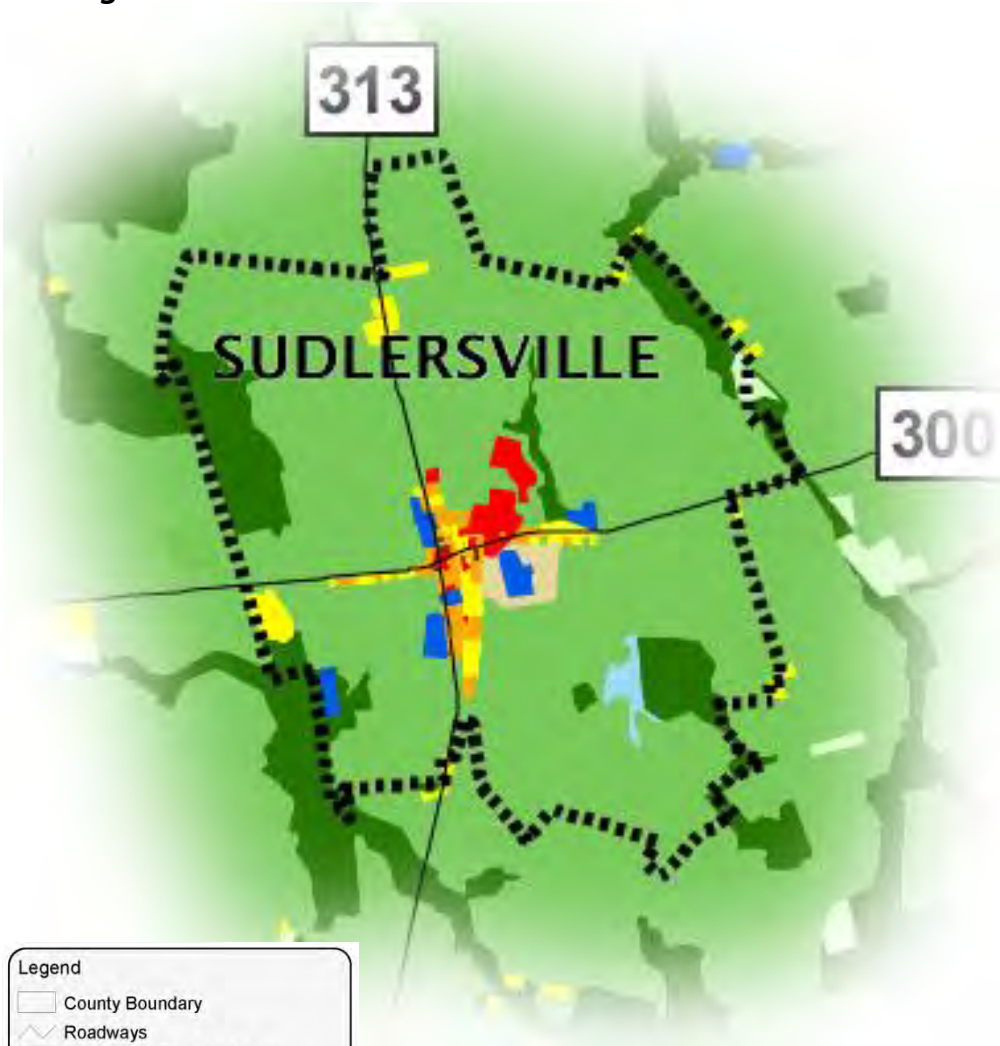


Table 11.14-1 Conservation Lands Programs	Acres
MALPF Easement	-
MALPF Greenprint	-
Rural Legacy Easement	-
MET	-
TDR Sending Areas	-
Private Conservation Easement	-
County Park	36.7
State Owned Land	-
Open Space (Deed Restricted)	331.0
Open Space (Non Contiguous)	66.9
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	434.6

Land Available for Development	Acres
Available	650.4
Divisible	1,137.6
Total	1,788.0

Table 11.14-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	61.8	2.4%	322.4	12.4%
Medium Density Residential (2 to 8 units per acre)	50.5	1.9%	50.3	1.9%
High Density Residential (8+ units per acre)	1.2	0.0%	1.2	0.0%
Commercial	41.4	1.6%	17.0	0.7%
Mixed Commercial – Residential	-	0.0%	-	0.0%
Industrial	-	0.0%	26.9	1.0%
Institutional	40.2	1.5%	46.4	1.8%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	5.8	0.2%	235.9	9.0%
Private Recreation	26.2	1.0%	26.2	1.0%
Agriculture	2,080.0	79.7%	1,498.3	57.4%
Forest	284.2	10.9%	366.8	14.1%
Water	-	0.0%	-	0.0%
Wetlands	19.1	0.7%	19.1	0.7%
Transportation	-	0.0%	-	0.0%
Total	2,610.4	100.0%	2,610.4	100.0%

Preferred Land Use 2030



- Land Use**
- Low Density Residential (1 to 2 units per 5 acres)
  - Medium Density Residential (2 to 8 units per acre)
  - Industrial / Business Park
  - Commercial & Mixed Use
  - Institutional
  - Agricultural & Very Low Density Rural Residential (1 unit per 5+ acres)
  - Forest
  - Greenbelts
  - Agriculture & Open Space
- Planning Areas**
- County / Town Planning Areas
  - Town Future Annexation Areas
  - Incorporated Towns

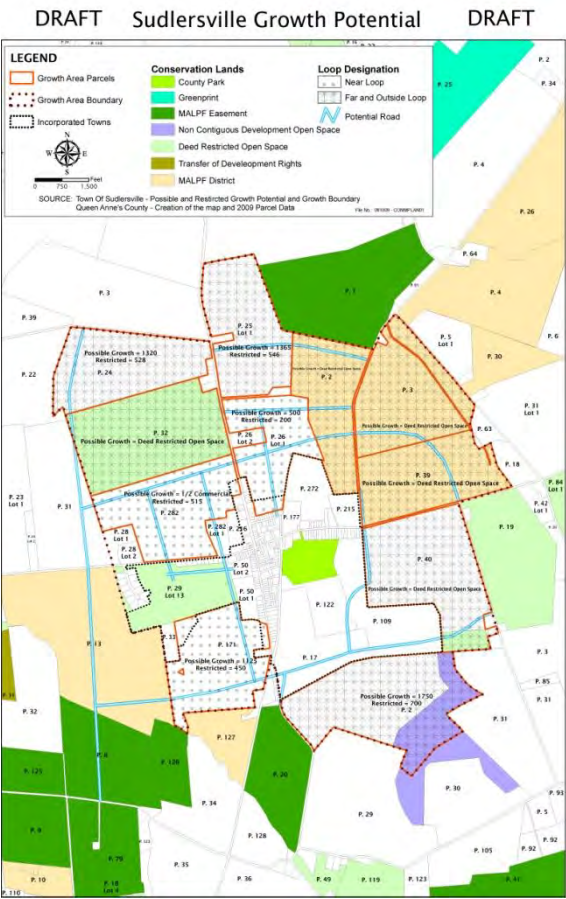
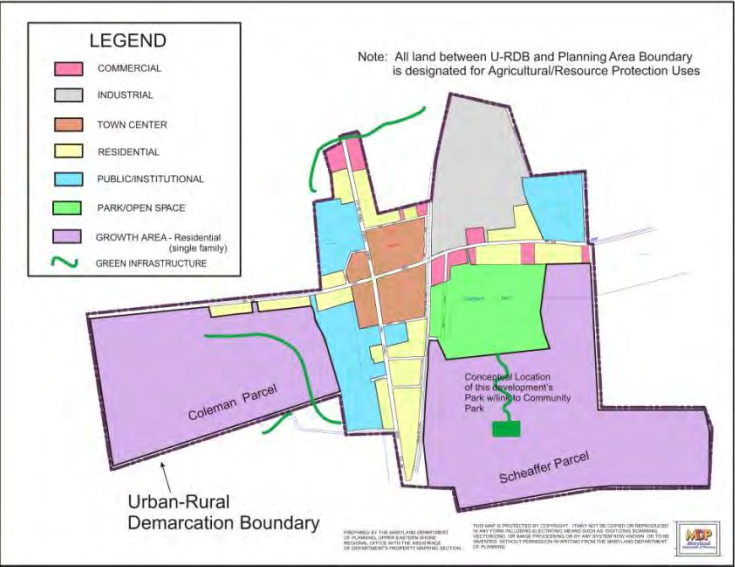




Table 11.14-3 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	2,080.0	79.7%	1,498.3	57.4%	-581.70	-22.3%
Forest	284.2	10.9%	366.8	14.1%	82.6	3.2%
Queen Anne’s County Impervious Surfaces*	67.9	2.6%				
Statewide Priority Wetlands**	88.9	3.4%				
Tier II Catchment Area within Watershed	1,067.4	40.9%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor as to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.14-4 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface

Sudlersville - Upper Chester River	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	Scenario 1 2030 Max Build-Out with Trib Strat BMPs	Scenario 2 2030 Preferred Land Use with Trib Strat BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	134	134	161	653	653
Agriculture	2,104	2,104	2,080	1,498	1,498
Forest	308	308	303	386	386
Water	6	6	0	0	0
Other	58	58	66	73	73
Total Area	2,610	2,610	2,610	2,610	2,610

Residential Septic (EDUs)	0	0	179	0	0
Non-Residential Septic (EDUs)	0	0	1	0	0

Total Nitrogen Loading						
Sudlersville - Upper Chester River				Scenario 1 2030 Max Build-Out with Trib Strat BMPs	Scenario 2 2030 Preferred Land Use Trib Strat BMPs	
	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs			
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	
Development NPS	1,164	810	969	3,972	3,972	
Agriculture NPS	33,060	18,310	18,100	13,038	13,038	
Forest NPS	456	425	419	534	534	
Water NPS	63	52	0	0	0	
Other Terrestrial NPS	515	355	402	439	439	
Total Terrestrial Load	35,258	19,952	19,891	17,983	17,983	
Residential Septic (EDUs)	0	0	1,664	0	0	
Non-Residential Septic (EDUs)	0	0	2	0	0	
Total Septic Load	0	0	1,666	0	0	
Total NPS Nitrogen Load	35,258	19,952	21,556	17,983	17,983	
Total PS Load	0	0	0	1,792	4,697	TMDL
Total Nitrogen Load (NPS+PS)	35,258	19,952	21,556	19,775	22,680	614,612
Total Phosphorus Loading						
Sudlersville - Upper Chester River				Scenario 1 2030 Max Build-Out with Trib Strat BMPs	Scenario 2 2030 Preferred Land Use with Trib Strat BMPs	
	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs			
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	
Development NPS	143	94	111	501	501	
Agriculture NPS	2,275	1,639	1,621	1,167	1,167	
Forest NPS	7	6	6	7	7	
Water NPS	4	4	0	0	0	
Other Terrestrial NPS	68	44	48	52	52	
Total Terrestrial Load	2,497	1,786	1,785	1,728	1,728	
Total PS Load	0	0	0	135	353	
					TMDL	
Total Phosphorus Load (NPS+PS)	2,497	1,786	1,785	1,863	2,081	34,354

Impervious Cover and Open Space	(Acres)				
Sudlersville - Upper Chester River	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	Scenario 1 2030 Max Build-Out with Trib Strat BMPs	Scenario 2 2030 Preferred Land Use with Trib Strat BMPs
Total Impervious Cover	50	50	69	114	114
Agriculture	2,104	2,104	2,080	1,498	1,498
Forest	289	289	284	367	367
Percent Impervious	1.9%	1.9%	2.7%	4.4%	4.4%

Section 11.15 Upper Choptank - 02130404  
Existing Land Use 2008

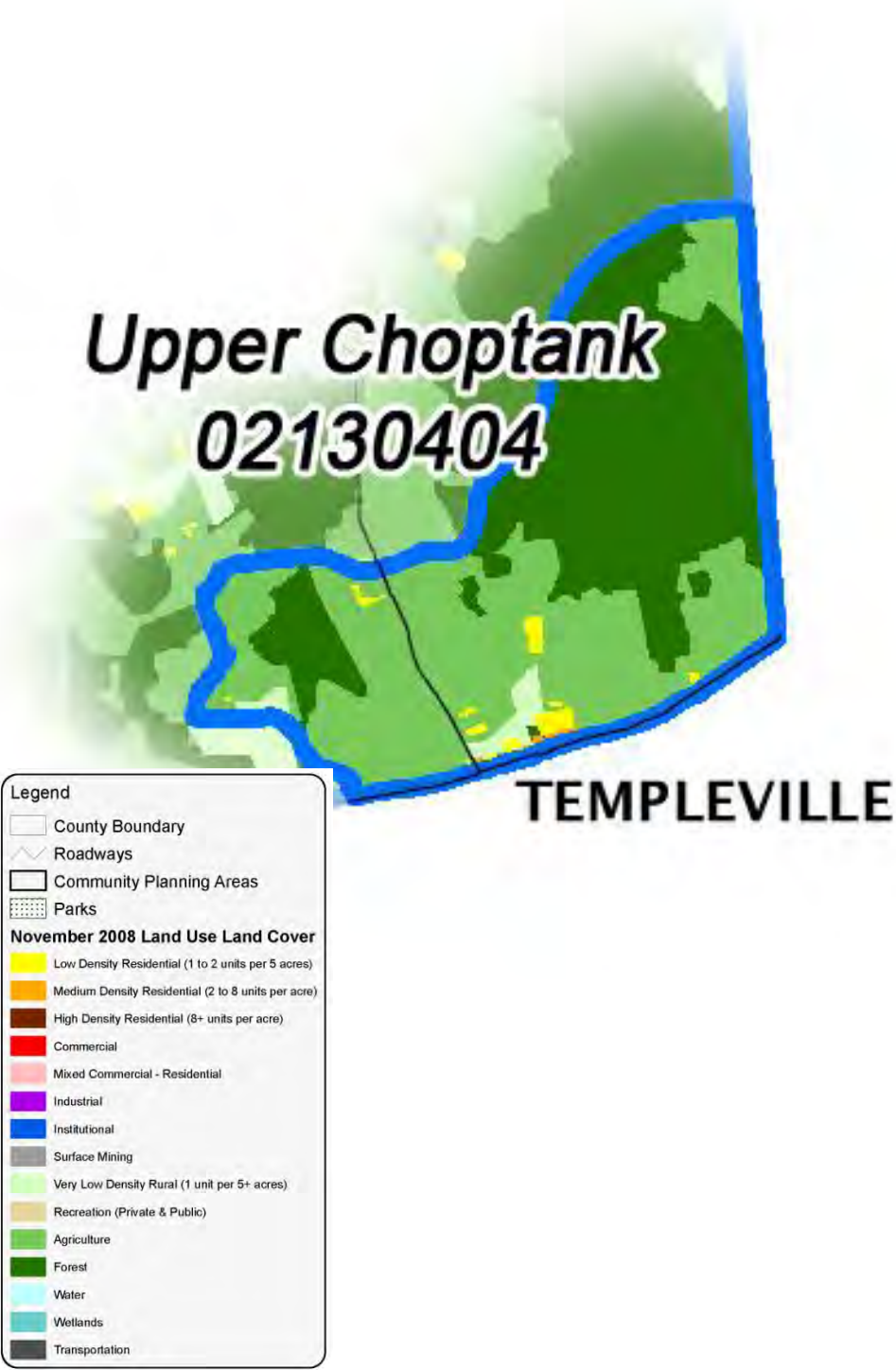


Table 11.15-1 Conservation Lands Programs	Acres
MALPF Easement	262.24
MALPF Greenprint	87.05
Rural Legacy Easement	-
MET	-
TDR Sending Areas	-
Private Conservation Easement	-
County Park	-
State Owned Land	-
Open Space (Deed Restricted)	-
Open Space (Non Contiguous)	59.82
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	409.11

Land Available for Development	Acres
Available	441.10
Divisible	333.13
Total	774.23

Table 11.15-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	32.0	1.7%	22.9	1.2%
Medium Density Residential (2 to 8 units per acre)	9.6	0.5%	19.9	1.0%
High Density Residential (8+ units per acre)	0.2	0.0%	0.2	0.0%
Commercial	-	0.0%	-	0.0%
Mixed Commercial – Residential	-	0.0%	22.3	1.2%
Industrial	-	0.0%	-	0.0%
Institutional	0.3	0.0%	0.3	0.0%
Surface Mining	-	0.0%	-	0.0%
Very Low Density Rural (1 unit per 5+ acres)	41.4	2.1%	117.9	6.1%
Private Recreation	-	0.0%	-	0.0%
Agriculture	937.8	48.7%	907.7	47.1%
Forest	904.7	47.0%	834.8	43.4%
Water	-	0.0%	-	0.0%
Wetlands	-	0.0%	-	0.0%
Transportation	-	0.0%	-	0.0%
Total	1,926.0	100.0%	1,926.0	100.0%

Preferred Land Use 2030



Table 11.15-3 Best Management Practices Tool Kit

Tools, Techniques & Strategies	LANDSCAPES				
	Agricultural	Natural	Rural Residential	Suburban	Towns
Point Source / Urban Source Strategy					Provide adequate facilities to Templeville and planned expansion.
Stormwater Strategy	BMPs and Nutrient and Manure Management Plans, fencing livestock out of streams.	BMPs and preservation of buffer and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, Retrofitting of SW facilities or inclusion in new development and reduction in use of lawn fertilizers.	BMPs, ESD, Retrofitting of facilities.
Onsite Sewage Disposal Strategy (OSDS)	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Connect homes with failing septic systems to sewer or upgrade with denitrification technology.	Connect existing development on septic systems within PFAs to public system.
Growth Management Strategy	Preservation of environmentally sensitive lands and agricultural lands using State and Local programs.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing infrastructure.	Suburban subdivisions must provide improvements and connection to public water and sewer systems.	Establish Infill/Redevelopment standards and incentives.
Agriculture Strategy	Nutrient and Manure Management, BMPs, Cover Crops	Appropriate floodplain, riparian buffer and wetland buffers.	Establish lands outside of Growth Area as TDR sending areas.		
Waterway Strategies	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams construction	Protection of riparian buffers, tree planting along streams and construction	Protection of riparian buffers, tree planting along streams and living shoreline construction	Protection of riparian buffers, tree planting along streams.
Air Deposition Strategy	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenway and forest conservation strategies and incentives.	Forest Conservation Plans and establish wooded lot standards.	Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from villages.	Provide improvements such as sidewalk where appropriate for villages to be walkable.



Table 11.15-4 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	937.8	48.7%	907.7	47.1%	-30.1	-1.6%
Forest	904.7	47.0%	834.8	43.4%	-69.9	-3.6%
Queen Anne’s County Impervious Surfaces*	26.4	1.4%				
Statewide Priority Wetlands**	637.0	33.0%				
Tier II Catchment Area within Watershed	239.0	12.4%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.15-5 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface Land Use and Septic Systems

Upper Choptank Watershed (02130404)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	32	32	83	200	200
Agriculture	1,027	1,027	938	963	963
Forest	868	868	905	763	763
Water	0	0	0	0	0
Other	0	0	0	0	0
Total Area	1,926	1,926	1,926	1,926	1,926

Residential Septic (EDUs)	0	0	60	199	199
Non-Residential Septic (EDUs)	0	0	5	47	5

Total Nitrogen Loading					
Upper Choptank Watershed (02130404)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	278	191	507	1,218	1,218
Agriculture NPS	15,993	8,914	8,160	8,376	8,376
Forest NPS	1,288	1,200	1,251	1,055	1,055
Water NPS	0	0	0	0	0
Other Terrestrial NPS	0	0	2	2	2
Total Terrestrial Load	17,558	10,305	9,919	10,650	10,650

Residential Septic (EDUs)	0	0	558	1,850	1,850
Non-Residential Septic (EDUs)	0	0	15	156	15
Total Septic Load	0	0	573	2,005	1,865

Total NPS Nitrogen Load	17,558	10,305	10,492	12,656	12,515
Total PS Load	0	0	0	0	0
Total Nitrogen Load (NPS+PS)	17,558	10,305	10,492	12,656	12,515

Total Phosphorus Loading					
Upper Choptank Watershed (02130404)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	37	24	65	154	154
Agriculture NPS	1,118	808	731	751	751
Forest NPS	20	16	17	14	14
Water NPS	0	0	0	0	0
Other Terrestrial NPS	0	0	0	0	0
Total Terrestrial Load	1,174	848	813	919	919

Total PS Load	0	0	0	0	0
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Total Phosphorus Load (NPS+PS)	1,174	848	813	919	919
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Impervious Cover and Open Space	(Acres)				
Upper Choptank Watershed (02130404)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Scenario 1 2030 Max Build-Out with Trib Strategy BMPs	Scenario 2 2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	6	6	9	28	28
Agriculture	1,027	1,027	938	963	963
Forest	868	868	905	763	763
Percent Impervious	0.3%	0.3%	0.5%	1.5%	1.5%

Section 11.16 Wye River - 02130503  
Existing Land Use 2008

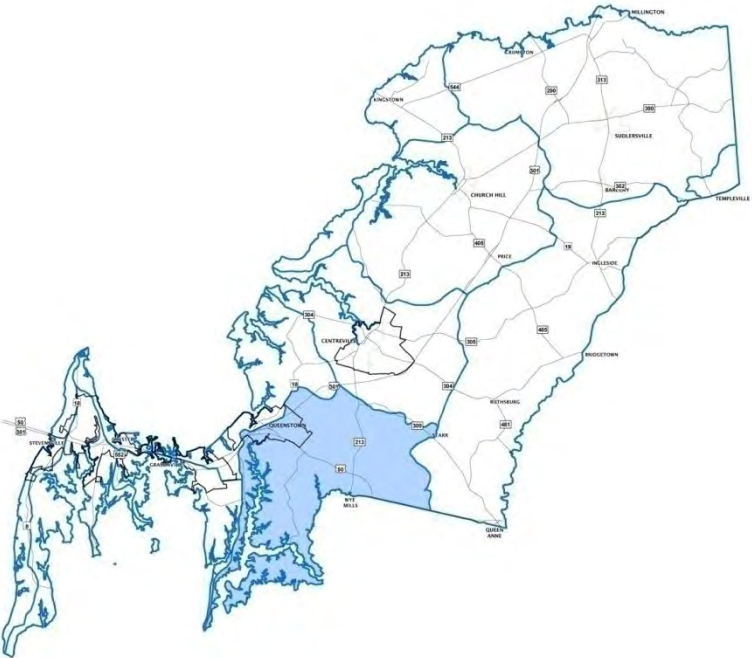
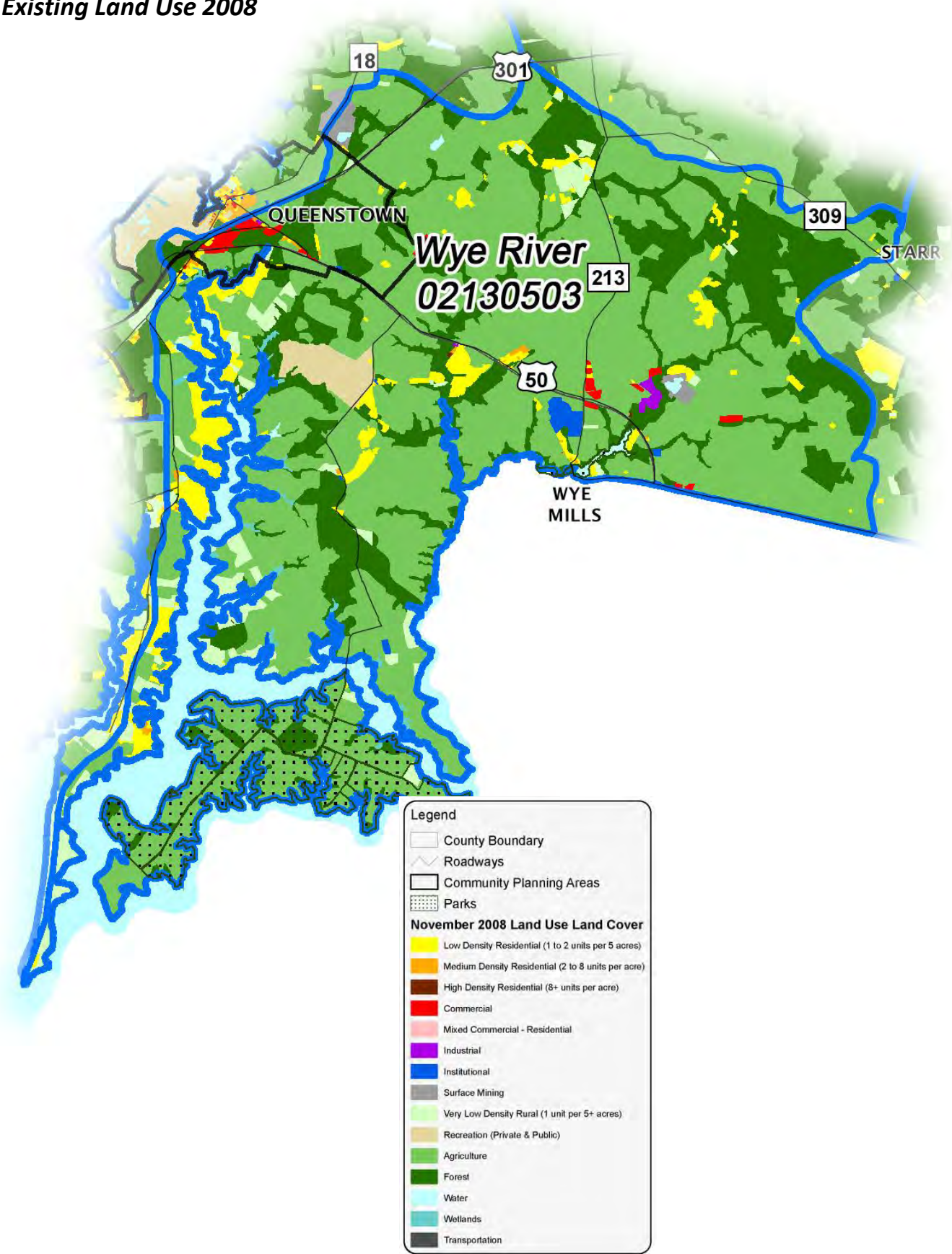


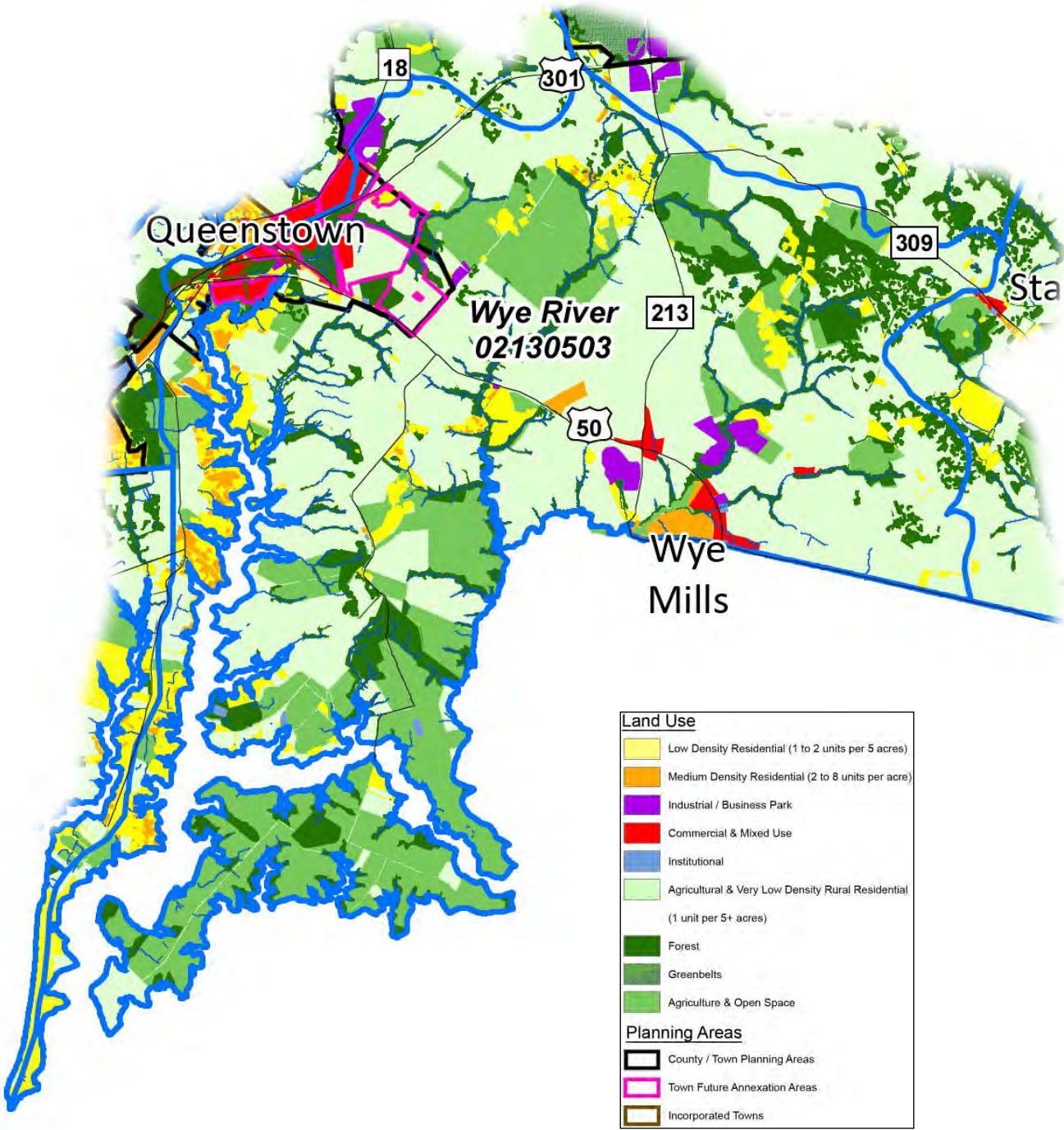
Table 11.16-1 Conservation Lands Programs	Acres
MALPF Easement	2,317.41
MALPF Greenprint	-
Rural Legacy Easement	-
MET	954.61
TDR Sending Areas	350.75
Private Conservation Easement	848.19
County Park	-
State Owned Land	2,810.12
Open Space (Deed Restricted)	728.18
Open Space (Non Contiguous)	508.93
MALPF Easement / Open Space	-
MET / Open Space	2.31
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	8,520.51

Land Available for Development	Acres
Available	3,306.93
Divisible	9,886.43
Total	13,193.36

Table 11.16-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	1,590.4	5.4%	1,482.7	5.0%
Medium Density Residential (2 to 8 units per acre)	62.0	0.2%	481.2	1.6%
High Density Residential (8+ units per acre)	5.2	0.0%	5.2	0.0%
Commercial	178.6	0.6%	184.6	0.6%
Mixed Commercial – Residential	-	0.0%	255.1	0.9%
Industrial	45.0	0.2%	311.9	1.1%
Institutional	132.8	0.4%	198.5	0.7%
Surface Mining	118.2	0.4%	118.2	0.4%
Very Low Density Rural (1 unit per 5+ acres)	1,285.7	4.4%	2,818.3	9.5%
Private Recreation	377.0	1.3%	376.9	1.3%
Agriculture	18,640.0	63.1%	16,860.6	57.1%
Forest	6,586.4	22.3%	5,928.2	20.1%
Water	148.0	0.5%	147.9	0.5%
Wetlands	223.4	0.8%	223.4	0.8%
Transportation	129.2	0.4%	129.2	0.4%
Total	29,521.9	100.0%	29,521.9	100.0%



Preferred Land Use 2030



**Preferred Land Use 2030**  
The preferred land use within the watershed is based upon maximum capacity build-out under current zoning modified using the future land use plan for Queenstown from the recently adopted Comprehensive Plan and Municipal Growth Element.

Table 11.16-3 Best Management Practices Tool Kit

Tools, Techniques & Strategies	LANDSCAPE				
	Agricultural	Natural	Rural Residential	Suburban	Town/Village
Point Source / Urban Source Strategy				Expand and enhance Queenstown WWTP and collection/ conveyance system with enhanced nutrient removal systems. Connect existing development located within Sewer Service Areas and adjacent areas with failing septic systems.	Within PFAs, connect existing septic systems to Queenstown WWTP.
Stormwater Strategy	BMPs, nutrient and manure management plans and fencing livestock out of streams.	BMPs, preserve buffers and forest conservation. No tree cutting in Critical Areas.	BMPs and ESD.	BMPs, ESD, Retrofit SW facilities or include new development and reduce use of lawn fertilizers.	BMPs, ESD, and retrofit facilities.
Onsite Sewage Disposal Strategy (OSDS)	Use denitrification technology for on-lot systems or connect to sewer system.	Use denitrification technology on-lot systems or connect to sewer system.	Use denitrification technology for on-lot systems or shared septic systems.	Failing septic systems should be connected to the public sewer system.	Connect existing development on septic systems within PFAs to public system.
Growth Management Strategy	Preserve environmentally sensitive lands and agricultural lands using State and Local programs.	Restrict development within Critical Areas.	Cluster development, ESD and encourage development toward areas with existing infrastructure.	Suburban subdivisions must provide improvements and connection to public water and sewer systems.	Establish Infill/Redevelopment standards and incentives.
Agriculture Strategy	Nutrient and manure management, BMPs, cover crops and best practices.	Preserve floodplains, riparian buffers and wetland buffers.	TDR receiving areas should be established within the watershed.	TDR receiving areas should be established within the watershed.	
Waterway Strategies	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams and living shoreline construction	Protect riparian buffers, tree planting along streams.
Air Deposition Strategy	Establish forest conservation strategies and incentives as well as utilize state and local preservation programs.	Establish greenbelts and forest conservation strategies and incentives.	Require Forest Conservation Plans and establish wooded lot standards.	Require Forest Conservation Plans and trail/path connections within greenbelts to provide access to and from Town.	Concentrate homes, commercial uses and business parks for walkable community.



Table 11.16-4 Summary Table of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		2030 Preferred Land Uses		Projected Change in Land Use 2008-2030	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	18,640.0	63.1%	16,860.6	57.1%	-1,779.4	-6.0%
Forest	6,586.4	22.3%	5,928.2	20.1%	-658.2	-2.2%
Queen Anne’s County Impervious Surfaces*	838.7	2.8%				
Statewide Priority Wetlands**	1,710.0	5.8%				
Tier II Catchment Area within Watershed	6,286	21.3%				

\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.

\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.16-5: Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface Land Use and Septic Systems

Wye River Watershed (02130503)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Max Build-Out Trib Strategy BMPs	Preferred Land Use with Trib Strategy BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	2,196	2,196	3,296	5,667	5,667
Agriculture	19,647	19,647	18,640	16,861	16,861
Forest	7,119	7,119	6,810	6,151	6,151
Water	140	140	148	148	148
Other	419	419	628	694	694
Total Area	29,522	29,522	29,522	29,522	29,522

Residential Septic (EDUs)	0	0	1,411	3,644	1,850
Non-Residential Septic (EDUs)	0	0	1,399	1,674	1,399

Total Nitrogen Loading					
Wye River Watershed (02130503)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	Max Build-Out Trib Strategy BMPs	Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	19,278	13,315	20,016	34,400	34,400
Agriculture NPS	306,451	170,646	161,846	146,633	146,633
Forest NPS	10,562	9,844	9,416	8,506	8,506
Water NPS	1,412	1,169	1,235	1,235	1,235
Other Terrestrial NPS	3,715	2,548	3,821	4,217	4,217
Total Terrestrial Load	341,418	197,523	196,334	194,990	194,990

Residential Septic (EDUs)	0	0	13,115	33,869	17,195
Non-Residential Septic (EDUs)	0	0	4,641	5,553	4,641
Total Septic Load	0	0	17,755	39,422	21,836

Total NPS Nitrogen Load	341,418	197,523	214,089	234,412	216,826
Total PS Load	0	0	450	5,469	10,926
Total Nitrogen Load (NPS+PS)	341,418	197,523	214,539	239,881	227,752

Total Phosphorus Loading					
Wye River Watershed (02130503)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	2030 Max Build-Out Trib Strategy BMPs	2030 Preferred Land Use with Trib Strategy BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	2,499	1,625	2,492	4,261	4,261
Agriculture NPS	21,372	15,437	14,668	13,175	13,175
Forest NPS	160	132	126	114	114
Water NPS	79	79	84	84	84
Other Terrestrial NPS	504	324	486	531	531
Total Terrestrial Load	24,614	17,597	17,857	18,165	18,165

Total PS Load	0	0	150	527	936
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Total Phosphorus Load (NPS+PS)	24,614	17,597	18,007	18,692	19,101
--------------------------------	--------	--------	--------	--------	--------

Impervious Cover and Open Space	(Acres)				
Wye River Watershed (02130503)	2002 LU, 2002 BMPs	2002 LU, Trib Strategy BMPs	2008 Trib Strategy BMPs	2030 Max Build-Out Trib Strategy BMPs	2030 Preferred Land Use with Trib Strategy BMPs
Total Impervious Cover	522	522	654	1,139	1,139
Agriculture	19,647	19,647	18,640	16,861	16,861
Forest	6,884	6,884	6,586	5,928	5,928
Percent Impervious	1.8%	1.8%	2.2%	3.9%	3.9%

Note: The Queenstown nitrogen and phosphorus output from sewage are counted as part of the Lower Chester River Watershed.

Section 11.17 Queenstown Growth Area  
Existing Land Use 2008

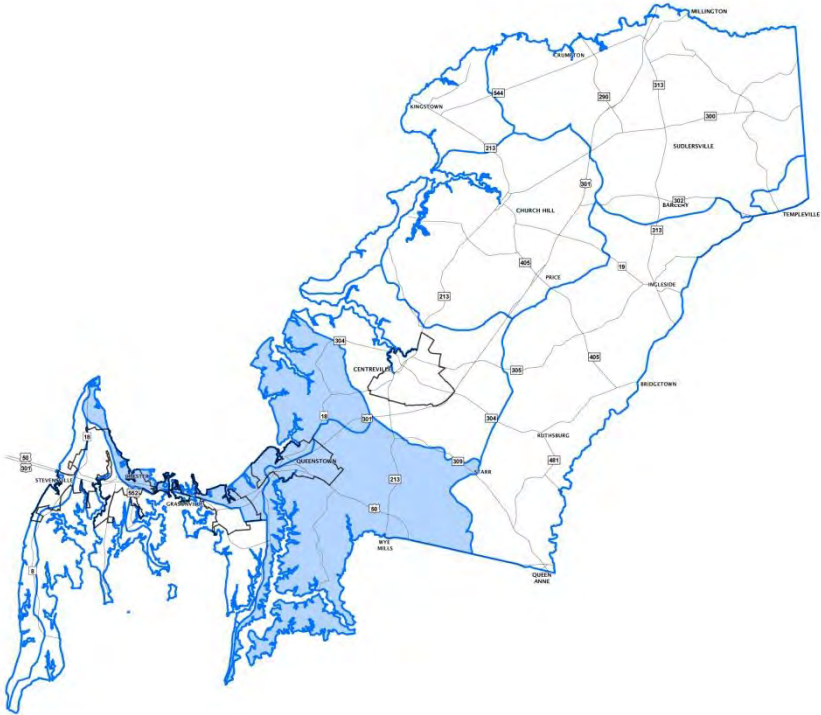


Table 11.17-1 Conservation Lands Programs	Acres
MALPF Easement	199.1
MALPF Greenprint	-
Rural Legacy Easement	-
MET	192.8
TDR Sending Areas	61.3
Private Conservation Easement	-
County Park	-
State Owned Land	-
Open Space (Deed Restricted)	24.6
Open Space (Non Contiguous)	-
MALPF Easement / Open Space	-
MET / Open Space	-
County Park / TDR	-
County Park / NCD	-
County Park / Open Space	-
County Park / MET	-
MET / TDR	-
Total	477.8

Land Available for Development	Acres
Available	562.7
Divisible	613.2
Total	1,175.9

Table 11.17-2 Updated General Land Use Classes (2008)	2008 Land Uses		2030 Preferred Land Uses	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	107.2	2.7%	151.2	3.8%
Medium Density Residential (2 to 8 units per acre)	89.8	2.3%	109.6	2.8%
High Density Residential (8+ units per acre)	1.9	0.0%	1.9	0.0%
Commercial	109.5	2.8%	94.8	2.4%
Mixed Commercial – Residential	-	0.0%	365.8	9.2%
Industrial	1.7	0.0%	22.4	0.6%
Institutional	17.7	0.4%	17.6	0.4%
Surface Mining	-	0.0%	2.1	0.1%
Very Low Density Rural (1 unit per 5+ acres)	17.4	0.4%	100.6	2.5%
Private Recreation	449.3	11.3%	449.3	11.3%
Agriculture	1,931.0	48.5%	1,487.6	37.4%
Forest	1,059.9	26.6%	982.5	24.7%
Water	42.7	1.1%	42.7	1.1%
Wetlands	86.2	2.2%	86.2	2.2%
Transportation	64.6	1.6%	64.6	1.6%
Total	3,978.9	100.0%	3,978.9	100.0%



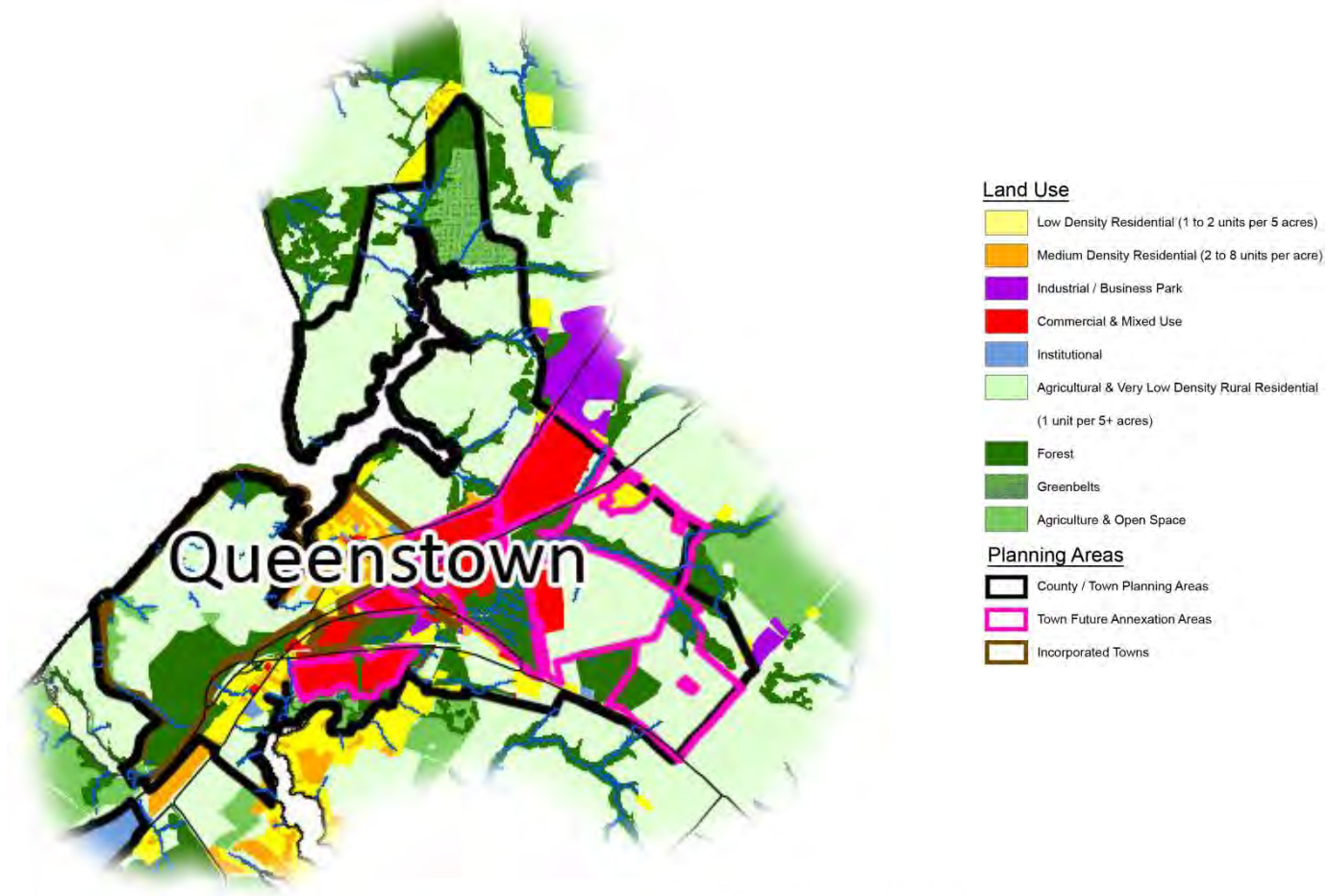
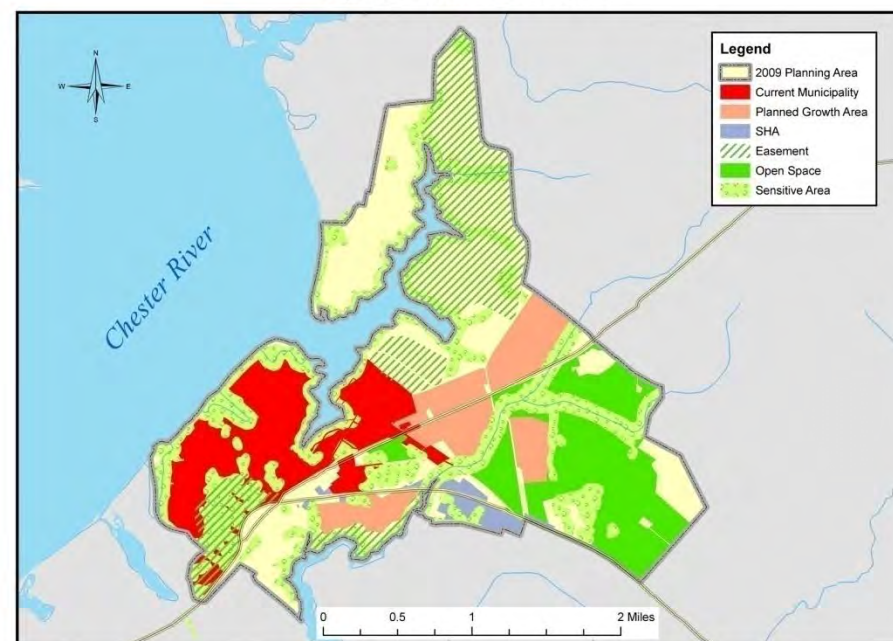
***Preferred Land Use 2030*****QUEENSTOWN**

Figure 1-9. Preserved areas in the Queenstown Community Plan. Sensitive areas include 300 foot stream buffers, wetlands, and Category III Hurricane flood zones.



Table 11.17-3 Summary of Projected Impacts to Agriculture and Forest

Land Use or Variable	2008 Land Uses		Preferred Land Uses		Change in Land Use***	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Agriculture	1,931.0	48.5%	1,487.6	37.4%	-443.4	-11.1%
Forest	1,059.9	26.6%	982.5	24.7%	-77.4	-1.9%
Queen Anne’s County Impervious Surfaces*	212.3	5.3%				
Statewide Priority Wetlands**	206.0	5.2%				
Tier II Catchment Area within Watershed	2.6	0.0%				

*\*Impervious surfaces data was created using 2004 planimetric data as updated using 2008 Aerial imagery collected by the State. There is no guarantee that all features were collected nor as to the precision of the collected features. This data provides a general value of the impervious surface within a watershed.*

*\*\*Queen Anne’s County may need to track on permits issued by MDE for development within theses wetlands to determine impacts.*

Water Resources Element – Nitrogen, Phosphorus and Impervious Surface Data

The following Nitrogen, Phosphorus and Impervious Surface table has been provided by Maryland Department of the Environment. The table was loading using the 2008 land use and the projected maximum capacity build-out values based on the Build-Out Analysis Report, May 2009 as part of this Comprehensive Plan. The preferred land use is shown in the far right column.

Table 11.17-4 Assessing Impacts of Nitrogen, Phosphorus and Impervious Surface Land Use and Septic Systems

Queenstown	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	2030 Max Build-Out Trib Strat BMPs	2030 Preferred Trib Strat BMPs
	(Acres)	(Acres)	(Acres)	(Acres)	(Acres)
Development	346	346	392	913	913
Agriculture	1,904	1,904	1,931	1,488	1,488
Forest	1,045	1,045	1,146	1,069	1,069
Water	43	43	43	43	43
Other	643	643	469	469	469
Total Area	3,981	3,981	3,981	3,981	3,981

Residential Septic (EDUs)	0	0	129	0	0
Non-Residential Septic (EDUs)	0	0	77	0	0

Total Nitrogen Loading					
Queenstown	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	2030 Max Build-Out Trib Strat BMPs	2030 Preferred Trib Strat BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	2,970	2,082	2,349	5,472	5,472
Agriculture NPS	29,674	16,532	16,790	12,917	12,917
Forest NPS	1,551	1,446	1,585	1,478	1,478
Water NPS	431	356	356	356	356
Other Terrestrial NPS	5,731	3,919	2,858	2,857	2,857
Total Terrestrial Load	40,356	24,335	23,939	23,080	23,080

Residential Septic (EDUs)	0	0	1,199	0	0
Non-Residential Septic (EDUs)	0	0	256	0	0
Total Septic Load	0	0	1,455	0	0

Total NPS Nitrogen Load	40,356	24,335	25,394	23,080	23,080
Total PS Load	0	0	0	5,420	5,420
Total Nitrogen Load (NPS+PS)	40,356	24,335	25,394	28,500	28,500

Total Phosphorus Loading					
Queenstown	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	2030 Max Build-Out Trib Strat BMPs	2030 Preferred Trib Strat BMPs
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development NPS	346	231	247	578	578
Agriculture NPS	2,072	1,497	1,534	1,170	1,170
Forest NPS	23	19	21	20	20
Water NPS	24	24	24	24	24
Other Terrestrial NPS	792	508	369	369	369
Total Terrestrial Load	3,258	2,279	2,197	2,161	2,161

Total PS Load	0	0	0	406	390
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Total Phosphorus Load (NPS+PS)	3,258	2,279	2,197	2,567	2,551
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Impervious Cover and Open Space	(Acres)				
Queenstown	2002 LU, 2002 BMPs	2002 LU, Trib Strat BMPs	2008 Trib Strat BMPs	2030 Max Build-Out Trib Strat BMPs	2030 Preferred Trib Strat BMPs
Total Impervious Cover	192	192	230	468	468
Agriculture	1,904	1,904	1,931	1,488	1,488
Forest	957	957	1,060	983	983
Percent Impervious	4.8%	4.8%	5.8%	11.8%	11.8%



# QUEEN ANNE'S COUNTY COMPREHENSIVE PLAN UPDATE

MARYLAND

## WATER RESOURCE ELEMENT FUTURE LAND USE

### Land Use

- Low Density Residential (1 to 2 units per 5 acres)
- Medium Density Residential (2 to 8 units per acre)
- Industrial / Business Park
- Commercial & Mixed Use
- Institutional
- Agricultural & Very Low Density Rural Residential  
(1 unit per 5+ acres)
- Forest
- Greenbelts
- Agriculture & Open Space

### Planning Areas

- County / Town Planning Areas
- Town Future Annexation Areas
- Incorporated Towns

NOTE:  
GREENBELT: A BELT OF PARKS, OPEN SPACE AND  
RURAL LAND SURROUNDING A TOWN OR VILLAGE.

THIS MAP PREPARED USING MARYLAND  
DEPARTMENT OF PLANNING LAND USE  
CLASSIFICATIONS TO SUPPORT THE ANALYSIS FOR  
WATER RESOURCES.

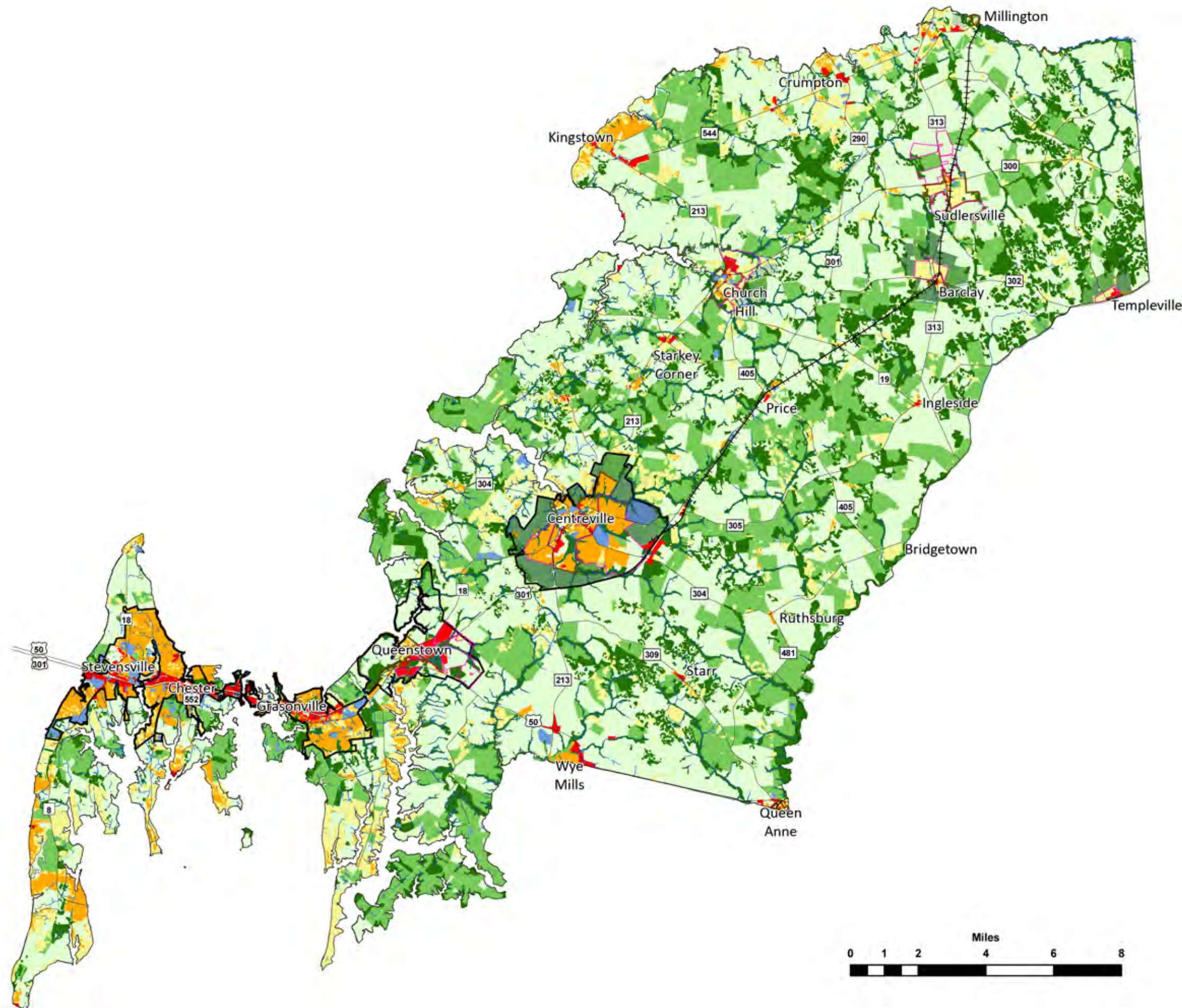


SOURCE: QUEEN ANNE'S COUNTY DEPARTMENT  
OF LAND USE, GROWTH MANAGEMENT &  
ENVIRONMENT, AND MARYLAND DEPARTMENT  
OF PLANNING.

MARCH 2010



MAP WRE-1







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- Sudlersville Draft Municipal Growth Element Plan, 2009
- Templeville Draft Comprehensive Plan, 2009

# Appendix 4:

## *Components of the Master Roadway and Transportation System*





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### Section 1.0 Introduction

The Master Roadway and Transportation Plan contained in Section 8.0 defines a compilation of goals, objectives, policies, maps and programs to guide the future development of various modes of travel, including highways, transit, transportation system for persons with disabilities, bicycles, walking, railroads, air transportation, trucking and water transportation. The various development patterns, preservation goals and economic development strategies identified in Section 1.0: Land Use, Section 3.0: Priority Preservation Area, Section 6.0: Economic Development and Tourism, along with the programs and public services described in Section 8.0: Community Facilities and Transportation will shape the County's transportation policies.

*Preserving connections from the past to create the future through sustainability can be achieved through transportation solutions that support the County's land use ethic, economic development and stewardship of the land.* Our *transportation ethic* is that the County's *transportation solutions* will consider an array of factors including *safety, traffic congestion, level of service, access, structural conditions, functionality, costs and community context*. Credibility will be established through our continued collaboration with planning and implementation partners such as:

- Federal Highway Administration (FHWA)
- MDOT/SHA
- Queen Anne's County & Incorporated Towns
- Maryland Department of the Environment (MDE) and other resource/review agencies
- National Scenic Byways
- National Recreation & Trails
- Communities
- US Environmental Protection Agency
- US Army Corps of Engineers
- US Fish and Wildlife Service
- Maryland Department of Natural Resources
- Maryland Historic Trust
- Chesapeake Bay Critical Area Commission
- National Marine Fisheries Service





### Section 2.0 Existing Transportation Network

A description of the County's existing transportation network components is contained in this Appendix. This information was created by using a variety of sources including the county roadway inventory, Maryland State Highway Administration inventories, Maryland Transportation Authority and other sources. The County's transportation network consists of roads, bridges, airports, rail lines, paths, sidewalks, trails, transit, park-and-ride facilities and other related components to support maintenance and operation of the system. This Appendix addresses the roadway network maintenance and operations, and also includes pedestrian and bicycle facilities, transit and rail systems.

### Section 2.1 Responsible Agencies

The following describes the various responsibilities of Federal, State and County agencies with respect to transportation.

- **Federal Highway Administration (FHWA)** – The mission of FHWA is to administer the Federal-Aid Highway Program, through the State Highway Agencies, to create the best transportation system in the world for the American people through proactive leadership, innovation, and excellence in service. The FHWA is a part of the United States Department of Transportation and is headquartered in Washington, D.C., with field offices located across the United States.
- **Maryland Transportation Authority (MDTA)** – MDTA is responsible for constructing, managing, operating and improving the state's toll facilities, as well as for financing new revenue-producing transportation projects. MDTA manages seven toll facilities, turnpike, two tunnels and four bridges.
- **Maryland Department of Transportation (MDOT); State Highway Administration (SHA)** – MDOT/SHA is responsible for State owned, managed and maintained transportation facilities including highway, transit, maritime and aviation facilities. Additionally, this agency administers a variety of State and FHWA programs that provide funds as well as financial grants that assist local jurisdictions for various transportation improvements and projects, which consider both vehicular and non-vehicular modes of travel.
- **Queen Anne's County Roads Board** – This Board is comprised of the five County Commissioners responsible for providing guidance to the Department of Public Works.
- **Queen Anne's County Department of Public Works, Roads Division** –The Roads Division is responsible for traffic engineering along with the maintenance of over 549 miles of County Roads and 32 bridges. Normal duties include but are not limited to road building, bridge maintenance, patching of roads, resurfacing of roads, guard rails, mowing right-of-ways, inspection of new roads and bridges, striping, snow removal, installation and maintenance of drainage pipes and culverts, fabricating as well as installing and maintaining road signs, maintaining shoulders, removing trash from roadsides, entrance permits, tree trimming, maintenance of gravel roads and acquisition and maintenance of equipment.



### Section 2.2 Roadway Network Maintenance and Operations

The County's Department of Public Works is responsible for the efficient operation and maintenance of County roads and bridges along with the design and construction of County roadway and bridge projects. The Department of Public Works also coordinates with the Towns and adjoining counties as well as the SHA and the MDTA as appropriate. Within this Department, the County Roads Division is responsible for traffic engineering and maintaining County roads and bridges. The following describes the Division's responsibilities with respect to various transportation functions and facilities:

- **Roadways** – Responsible for approximately 549 miles of County roadways with focus on system preservation and maintenance which includes repair of asphalt and gravel roads, guardrails, drainage pipes, storm drains, inlets and side ditches.
- **Bridges** – Responsible for 32 bridges with routine maintenance functions that include deck and substructure maintenance, cleaning, painting and minor repairs to bridges.
- **Snow & Ice Removal** – The County is divided into 22 snow plow routes. The county maintains salt and abrasives, stored at two permanent locations to serve the County roadways.
- **Sign Placement and Maintenance** – Maintains and places all County highway markings such as center lines, edge lines, crosswalks, stop bars, turn lanes and railroad crossings. Additionally, the division fabricates, replaces, repairs, cleans and installs road name and traffic control signs.
- **Emergency Response** – Other maintenance and operations responsibilities include responding to emergencies and snow removal. Emergency responses include road flooding, down trees, vehicle accident damages, along with tree and brush trimming and removal.

### Section 2.3 Welcome Center/Rest Stops

The State of Maryland operates numerous welcome centers and rest areas at major gateways and strategic locations within the State. The major facilities are located on Interstates and primary highways and provide modern restroom facilities, travel information, vending machines, picnic facilities, and telephones. The State owns, maintains and operates a rest stop along US 301 near Centreville. The site is located on US 301 approximately 15 miles north of its junction with US 50. The facility is located in the median of US 301 and serves both northbound and southbound traffic.

The County's visitor's center is housed at the Chesapeake Exploration Center (CEC) that is located in the Kent Narrows, just off of US 50/301 which is the major route for traveling to many destinations on the Eastern Shore including the ocean beaches. As a Gateway regional information center, CEC staff can assist visitors with directions, information and visitor services for other Gateways, as well as the many other sites of interest in the region. The CEC also includes a large and unique exhibit exploring the Eastern Shore heritage.

### Section 2.4 Rail System

The Maryland-Delaware Railroad Company provides rail service with access to Norfolk Southern Railroad for freight service. Service is provided to the Centreville Planning Area.



### Section 2.5 Bay Bridge Airport

The Bay Bridge Airport is located near the Chesapeake Bay Bridge just south of the US 50/301 and Route 8 interchange in Stevensville. The airport provides chartered flights, pilot training services, helicopter academy and access to community-based door-to-door passenger services.

In 2001, the Federal Aviation Administration (FAA) created the Air Defense Identification Zone (ADIZ) to restrict/limit air traffic routes in and around Washington D.C. and Baltimore. Modifications in 2007 that changed the ADIZ into the Special Flight Rules Area (SFRA) provided revised geographical boundaries so that the Airport is now one of 33 airports in Maryland that was removed from restricted air traffic routes. This relief of the flight restrictions has resulted in increased utilization of the Bay Bridge Airport.



### Section 2.6 SHA Bridges over Navigable Waterways

Bridges are an important element of the transportation network and roadway system. Bridges are routinely inspected and rated based on a sufficiency rating scale. The County is responsible for the maintenance and operations of 32 bridges. All structures are reported to be in good and well maintained condition.

### Section 2.7 Transit and Bus Service

The following describes the transit and bus service operations within the County:

- **County Ride** – County Ride is a public transit system for the County and is operated under the Department of Aging. This service is committed to assisting and increasing transportation and mobility options for County residents. The County provides transit service to the general public and specialized services for seniors and persons with disabilities who are unable to use the fixed-route public system.
- **Maryland Upper Shore Transit (MUST)** – MUST is a fixed route service offered through a collaborative effort between Delmarva Community Transit in Dorchester County, USTAR in Kent, Caroline and Talbot Counties and Queen Anne's County, County Ride. Special services are available for persons unable to use the regional fixed routes.
- **Private Bus Services** – Private bus service is provided by a contractor with Maryland Transportation Authority (MDTA) providing daily service to the business and government employment centers of both Washington D.C. and Baltimore, MD.



### Section 2.8 Pedestrian and Bicycle Facilities

The County is primarily responsible for developing and maintaining a variety of pedestrian and bicycle facilities across the County. The following describes existing facilities:

- **Cross Island Trail Park** – The Cross Island Trail is a linear park in Queen Anne’s County offering an avenue of safe non-motorized transportation for citizens. The trail was initiated in 1998 and completed in September 2001. The Cross Island Trail spans Kent Island west and east from Terrapin Nature Park on the shores of the Chesapeake Bay to the Kent Narrows. The trail is a 10 foot wide paved surface approximately stretching six miles in length through open fields, woodlands and over wetlands.
- **Kent Narrows Pathways** – The Kent Narrows Pathways are an existing network of trails that connect the four quadrants of the Kent Narrows. This network of pathways provide pedestrian and bicycle access throughout the Kent Narrows.
- **Kent Island South Trail (Matapeake Greenways)** – The Kent Island South Trail is a 6 mile paved trail system that parallels Route 8 from Matapeake State Park to the Romancoke Pier.

Since adoption of the previous County-wide Comprehensive Plan in 2002, there has been an increase in the viable options for alternative methods of transportation throughout the county. The County has identified proposed trails and potential greenways for bicycling and walking on Map CF-2: Park and Recreational Facilities.

In 2008, the Queen Anne’s County Bicycle and Pedestrian Advisory Committee was created. The seven members are appointed by the County Commissioners representing each of the four Election Districts along with three at-large members. The Committee was formed for the purposes of advising and making recommendations to the County on bicycle and pedestrian access issues, to act as a liaison between the public and the County, and additionally to independently and along with County staff, identify, evaluate and seek out all grants and other financial programs available for the development and maintenance of bicycle and pedestrian facilities.

The Bicycle & Pedestrian Advisory Committee seeks to identify opportunity where bicycle routes can be designated that will provide connectivity via non-motorized travel throughout Queen Anne’s County. Designated bicycle routes are identified on Map T-5: Queen Anne’s County Designated Bicycle Routes.

### Section 2.9 Queen Anne’s County Water Trail

In 1999, Queen Anne’s County began planning a recreational water trail route that would skirt the county’s shoreline from the upper reaches of the Chester River, encircle the southern end of Kent Island and loop up the Eastern Bay to Romancoke and Wye Island. This water trail includes a number of stops including Conquest Beach, the Chesapeake Exploration Center on Kent Island, Matapeake State Park, Romancoke, Wye Island and Centreville Warf. Refer to Map CF-2.





### Section 3.0 Chesapeake Country National Scenic Byway

The Chesapeake Country National Scenic Byway links the Eastern Shore's unique resources along an 86 mile stretch of State designated scenic routes running through Queen Anne's, Kent and Cecil Counties. For well over two centuries, the corridor has provided connections among the region's homes, farmsteads, rural villages, market towns and county seats. The Byway includes MD Routes 18 and 213 from Kent Island to Chesapeake City, with an extension on MD Route 20 to Rock Hall and MD Route 445 to Eastern Neck National Wildlife Refuge.

The byway links features and destinations such as:

- Working landscapes such as agricultural operations;
- Waterfronts;
- Historic town centers;
- Recreation sites; and
- Pristine natural areas.

The County has a number of the above features and destinations located along or in close proximity to the Byway. Signage, in addition to State route signage and brown historic area signs, has been installed along the corridor at the following locations:

- Centreville Gateway – MD Route 213 from US 301
- Kent Narrows Gateway – US 50/301 at Exits 41 and 42
- Stevensville/Bay Bridge Gateway – US 50/301 and MD Route 8.

### Section 3.1 Byway Enhancement Guiding Principles

The Chesapeake Country National Scenic Byway Vision and Goals suggest a set of guiding principles and strategies for community enhancement along the Byway. These principles link transportation with land use and economic and preservation goals. Objectives and strategies are detailed in the Corridor Management Plan.

#### *Vision for the Byway*

*The Chesapeake Country Scenic Byway celebrates life on Maryland's Eastern Shore, one of the truly special landscapes in the Mid-Atlantic Region. Curiosity and a sense of discovery bring ample rewards – Byway travelers learn about the region's rich history and culture while gaining an appreciation for the traditions and working life of local watermen, farmers and merchants...*

*Source: Chesapeake Country Scenic Byway Corridor Management Plan,*

#### *Byway Plan Goals*

- 1 Promote a safe and pleasant experience for all users.
- 2 Expand opportunities for experiencing and learning about the qualities that make this region special.
- 3 Support projects and initiatives that help strengthen local economies while sustaining traditional economic pursuits while protecting the high quality of life of Byway communities.
- 4 Support efforts to conserve and protect the Byway's most important natural, cultural and historic resources.
- 5 Encourage public and private investment that improves the visual quality of the roadside environment.
- 6 Encourage regional cooperation, stewardship, and economic development through partnerships.

# Appendix 5:

## *Build Out Analysis Report*





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## SECTION 1.0 INTRODUCTION

A build-out analysis is a model estimating a community's potential for development based upon existing conditions (*development supply*) using a certain set of assumptions including existing land use regulations (e.g., zoning) and environmental constraints. The emphasis of this type of analysis is to

*It is important to have an estimate of the potential development supply (location, size, density, etc.) in order for the County to adequately plan for the future.*

estimate *potential* capacity for new residential development and the County's capacity to meet commercial and industrial needs, recreational needs or other land use goals such as land preservation and conservation.

This Appendix provides detailed analysis to support assessments of the impacts existing land use and the potential future land use patterns, based on current regulations, could have on water resources, the environment, transportation and other important factors characteristic of a sustainable community.

This build-out analysis for Queen Anne's County identifies the land that remained available in 2009 for development, and the potential amount of development, by type, that could happen under 2009 zoning regulations (*where and at the maximum densities and intensities of use*), and the consequences that may result if complete build-out of available land within the County occurred. This technique of analysis is used to depict potential future conditions using maps, text and quantifiable variables such as depicting development location and quantifying development density and intensity. ***Keep in mind, the results of this analysis is not a prophecy of what will happen, but rather what could potentially occur based upon existing land use regulations.***

This report is not a policy document. Instead, it is a planning tool intended to educate and inform those interested in the planning process. This was a tool to establish a foundation for understanding of the current conditions and is based land use data compiled in 2008. It also derived information from adopted as well as pending Community Plans as of March 2009 when this analysis was completed. The analysis conducted in this Appendix is only valid as of March 2009 and does not reflect the land use options presented in Section 1.0: Land Use of this Comprehensive Plan.

Moreover, the results of this analysis serve as a guide to the Planning Commission and the County Commissioners for making *smart growth decisions that build community sustainability* with respect to land use, agriculture land preservation, resource conservation and environmental protection, infrastructure, Town/County relationships, business and economic development, and historic and cultural preservation.





### ***Section 1.1 Why Conduct a Build-Out Analysis?***

A build-out analysis is an analytical method used to not only demonstrate capacity for new development under current land use regulations, but the results can be used to support the creation of *potential future land use plans* in the comprehensive planning process based upon various planning scenarios and provides the basis for discussion to create a *preferred future land use plan*. Build-out scenarios consider past and projected development trends, current land use policies and zoning and can incorporate alternative land use policies and zoning to describe how the future of the County might unfold. This build-out analysis was based on utilizing differing variables to generate the build-out numbers, and included adopted Community Plans as well as draft Community Plans that were pending as of March 2009, Growth Area Boundaries, and the establishment of greenbelts.

Identified build-out scenarios can be analyzed to emphasize land use patterns necessary to achieve the characteristics of a sustainable community, such that the resulting land use policy provides the framework for accommodating growth and development in a responsible and appropriate scale for Queen Anne's County. A sustainable community requires a delicate balance of a variety of land uses, in appropriate locations, in order to create and maintain a sustainable tax base. How efficiently the land is used will directly relate to the sustainability of factors such as agricultural land preservation, environmental protection and preservation of open spaces, housing choices and walkable communities, business expansion, transportation and the adequacy of community facilities and services that impact the overall quality of life for residents.

### ***Section 1.2 Explanation of Maximum Capacity Build-Out***

This ***Maximum Capacity Build-Out Scenario*** describes how Queen Anne's County might possibly develop from 2008 forward into the future, based on current zoning and land use regulations, regardless of growth rates or infrastructure capacity or timeline. The scenario considers reductions for environmentally sensitive areas, consideration for preserved and conserved areas, and consideration for existing development.

A Build-Out Process and Build-Out Results were undertaken in the creation of this scenario. The build-out process is both additive and reductive in nature, meaning that some data or values were added to existing conditions, and some data or values were reduced from existing conditions as further described in greater detail in the following sections

### ***Section 1.3 Maximum Capacity Build-Out Summary Results***

Utilizing 2008 land use, the baseline analysis of the county reflects that 105,120 acres of land have some potential for development. The *Maximum Capacity* build-out scenario of these lands under current zoning regulations reveals the potential conditions outlined in the summary table on the following page.



Table 1: Maximum Capacity Build-Out Summary

Development Variable	Existing Conditions 2008 <sup>1</sup>	Estimated Short-Term Projected Conditions 2015-2020 <sup>2</sup> (Un-Incorporated Areas)	Estimated Short-Term Projected Conditions 2015-2020 (Includes Towns)	Estimated Mid-Term Projected Conditions 2020-2030 (Includes Towns)	Estimated Long-Term Projected Conditions 2050-2100
Population	47,091	56,282	59,161	71,261	115,479
Housing Units	18,860	22,368	23,467	26,986	45,638
Non-Residential Square Footage of Space (estimates including building and parking)	10,096,366	10,737,990	11,251,290	12,771,290	22,428,764

1 Using Maryland Department of Planning 2008 population as a base population and total housing units of 18,860.

2 2050 - 2100 estimate of non-residential square footage of space (building and parking) is an estimate utilizing FAR based upon building trends.

This Maximum Capacity Build-out Scenario, whose values are presented in the summary table, does not yet take into account impacts on water and natural resources, or the transportation network or the economic vitality of the County, nor does it consider the areas that will be designated for future agricultural land preservation that is addressed in the Priority Preservation Element of this Plan.

**Square Feet to Acre Conversion**

There are 43,560 square feet in one acre.

**Example**

For purposes of understanding the extent of the estimated non-residential square footage, the square footage of the Prime Outlets Shopping Center in Queenstown is approximately 340,000 square feet.



## SECTION 2.0 SOURCE OF METHODS

This analysis is based upon the State of Maryland's Models and Guidelines for conducting a build-out analysis. It measures impacts on water resources as well as other key community resources with modifications appropriate to meet County needs and planning objectives to support the update to the Comprehensive Plan. Ultimately, this approach refines the build-out methods that were used to develop the 2002 Comprehensive Plan, and utilizes land use data that was not previously available for the 2002 Plan. This approach also incorporates State requirements and new methods to support sustainable community planning.

This build-out analysis illustrates the remaining Build-Out potential of the County. This analysis was conducted to show how much development could potentially occur if all the land that could support some sort of development were to develop at the maximum densities or intensities permitted by the current zoning and land use regulations.

There are numerous methods used to conduct a build-out analysis including those utilizing variables such as building permit trends, acreage developed trends, and vacant land analysis, among others. This build-out analysis is based on lands available for development with consideration for current zoning meshed with county-wide and state-wide policies for smart growth and preservation and conservation, as well as rate of growth based upon past development trends.

### Development Density & Intensity

**Density** – The number of dwelling units allowed per acre based upon zoning after environmentally sensitive lands have been deducted.

**Intensity** – The carrying capacity or the degree to which an area of land can be physically developed to the fullest extent possible.

- *The development intensity of a land area is determined by the degree of suitability it has after conservation measures have been deducted.*
- *A development intensity factor may be assigned based on land suitability, sensitive water resources and infrastructure.*
- *Development intensity can be controlled by a density for residential development as well as through floor area ratio on the parcel level for commercial, mixed use and industrial developments.*



## Section 2.1 Development Trends 2002 to 2008

The following is a brief description of development trends from 2002 through 2008 with respect to residential units and non-residential square footage of space located in the growth areas and outside of the growth areas. These trends have been documented to describe changes since the 2002 Comprehensive Plan as well as establish a 2008 assessment of existing conditions.

**Table 2: Estimated 2008 Existing Development**

	2002			Growth Since 2002			2008		
	Growth Areas	Non-Growth Areas	Total	Growth Areas	Non-Growth Areas	Total	Growth Areas	Non-Growth Areas	Total
Non-Residential (SF) <sup>3</sup>	2,650,000	2,200,000	4,850,000	4,656,128	590,238	5,246,366	7,306,128	2,790,238	10,096,366
Dwelling Units			16,674			2,186			18,860

<sup>1</sup> Data from 2002 Comprehensive Plan Volume 1 County Profile as adjusted for 2002. Note that Non-residential square footage is an estimate that includes Towns.

<sup>2</sup> Growth Since 2002- Queen Anne's County Department of Land Use, Growth Management & Environment permit tracking process.

<sup>3</sup> As per Queen Anne's County permit tracking process, Non-residential Square Footage includes impervious coverage (building footprints, parking areas, and circulation areas) and does not include landscaped areas.

Source: Queen Anne's County Department of Land Use, Growth Management & Environment.

The above development trends are supported by detailed information contained in the appendix of this document. Appendix 1: Detailed Explanation of Table Data Sources provides information such as Growth Area vs. Non-Growth Area Development Approvals 1997-2008 (acres of development) and New Dwelling Units Permit History 2001-2005 used to generate Table 2. As illustrated in Table 2, Estimated 2008 Existing Development, Queen Anne's County had approximately 10.09 million square feet of non-residential space and 18,860 dwelling units.

## Section 2.2 Build-Out Process

The build-out process utilizes Geographic Information Systems (GIS) technologies to illustrate the impact of the Build-Out Scenario assumptions. Data and guidance for the analysis were provided by Queen Anne's County Department of Land Use, Growth Management & Environment, Maryland Department of the Environment, Maryland Department of Agriculture, Maryland Department of Natural Resources, and Maryland Department of Planning. The following steps describe the build-out process, data preparation, and outputs for use in GIS as well as analysis.

The build-out process is both additive and reductive in nature, meaning that some data or values are added to existing conditions, and some data or values are reduced from existing conditions as prescribed per scenario. There are several primary geographic data sets upon which scenarios are based including the 2008 parcel coverage that combines Queen Anne's County parcels and Maryland Property View data and the current Zoning District coverage as





provided by Queen Anne's County. The Build-Out process includes four basic steps, each of which is described below.

### STEP 1. Preparation of Data for Build-Out Analysis

This step prepares data for analysis and reporting purposes. There are some attributes or features within available datasets that require specialized handling or consideration and these processes assist with identification of those features.

#### A. Parcels Dataset Preparation (Parcel Dataset October 2008)

- i. Assign to EACH parcel its current Zoning District - in the event that a parcel is in more than one district – majority rules for assignment.
- ii. Assign to EACH parcel its Community Planning Area – (Growth Area), in the event that a parcel spans a growth area– majority rules for assignment.
- iii. Assign to EACH parcel its incorporated Town status (or not) in the event that a parcel spans an incorporated Town boundary – majority rules for assignment (Incorporated Town boundary October 2008).
- iv. Attribute the parcel coverage with values for improved/**developed** properties (use IMP values in Legal1 field, Addressable Building Coverage, Pending Developments as of October 2008, and Queen Anne's County Condominium coverage, as well as MD Property View attributes to identify schools, churches, cemeteries, senior centers, fire halls, stormwater detention areas, etcetera), **divisible** parcels (improved but could be sub-divided based on Zoning criteria), and unimproved or **available** parcels. The resulting dataset is to be used later in the process as well as providing a base-line of existing conditions (2008).

#### Standards Used for Density and Intensity

Residential density is based upon the current zoning district regulations. Non-residential development is calculated using the Floor Area Ratios (FAR) for zoning districts to determine the maximum amount of building area in square feet accounting for multiple floors.

#### B. Generate a Critical Areas, **Resource Conservation Area (RCA)** ONLY coverage (Department of Natural Resources)

- i. This coverage is used later in the process. The parcels within the Intense Development Area (IDA) and Limited Development Area (LDA), if considered for development, will build-out using appropriate Zoning; the RCA parcels, if considered for development, have additional reductions in density and are therefore “called-out” for identification.

#### C. Generate an Open Space coverage based on those parcels enrolled in Open Space since 2004. Those parcels enrolled in program prior to 2004 could conceivably be developed. This coverage is used later in the process.



## STEP 2. Identify Lands Considered for Development

This step begins with the Countywide Zoning Coverage and winnows or removes from consideration those areas of the County that are protected, unavailable for development, or are designated as open space, among others. The results of the winnowing process are Lands Considered for Development (LCD).

- A. Reduce from Zoning coverage – Department of Natural Resources (DNR) Wetland Areas (using appropriate buffers for Tidal wetlands 100 feet and Non-tidal wetlands 25 feet). Tidal and Non-Tidal are determined using DNR Ecological System Identification System which includes Marine, Estuarine, Riverine, Lacustrine, or Palustrine (M.E.R.L.P). As per DNR guidance, Step 2A was repeated using National Wetlands Inventory (NWI) datasets and the same buffers for Tidal and Non-Tidal wetlands.
- B. Reduce from Zoning coverage – Stream and water buffer areas (using 50-foot buffer around streams and water features). Datasets based on Queen Anne’s County hydrology dataset (2004).
- C. Reduce from Zoning coverage – Shoreline Buffers (100 feet) – although according to underlying Zoning, location, and type of development, shoreline buffers are permitted to vary in range (100 feet to 300 feet), in general, Queen Anne’s County indicated that 100 feet was a minimum standard that should be applied.
- D. Reduce from Zoning coverage – Maryland Agricultural Land Preservation Foundation (MALPF) easements, Maryland Environmental Trust (MET) easements, Transfer of Development Rights (TDR) sending parcels, public lands, and select Open Space (as described in Step 1C).
- E. Using RCA Critical Area Parcels (Step 1B) determine which lands considered for development at this point is also in RCA critical areas. Reclassify the Zoning as “Zone – RCA” (for instance CS-RCA). During the calculation process reduce the density of these areas within lands considered for development regardless of underlying Zoning at the prescribed density of 1 unit per 20 acres for CS zoned lands.
- F. Identify areas of Lands Considered for Development within Community Planning Areas (Growth Areas), and identify areas of Lands Considered for Development within Incorporated Towns. Identification of these areas assists with reporting.
- G. Step 2, going through the above A-F process results in identifying **Lands Considered for Development (LCD)**.



Other datasets which may have been reduced from the Zoning coverage were discussed but determined as not related to the Build-Out Analysis or which were determined to pertain to individual developments. The discussion included the following:

- Forested Areas
- Utility Easements (pipelines, power lines)
- Species of Statewide Concern, Species of County-wide Concern
- Flood Plains
- Transfer of Development Rights Receiving Areas

The Lands Considered for Development at the end of this Step provides a “standard” upon which additional reductions can be made. Rather than re-process all the data, Lands Considered for Development may start with this “standard” and prescribe additional reductions.

### **STEP 3. Identify Lands Available for Development (LCD with adjustments - LAD)**

This step begins with the Lands Considered for Development (LCD) and further winnows or removes from consideration those areas of the County that are affected by existing or potential policies as described according to scenario. The results of this step are Lands Available for Development (LAD). The LAD is then used for calculations *in the Maximum Capacity Build-Out*.

- A. Provide consideration for other areas or policies as appropriate per Scenario assumption (make reductions to Lands Considered for Development as prescribed by the Scenario).
- B. Confirm Lands Available for Development with Queen Anne’s County before proceeding to step 4.
- C. Intersect the Lands Considered for Development with the “available” and “divisible” parcels as identified in Step 1. NOTE: This intersection is significant in that the acreages submitted for zoning calculations (in Step 4) represent the balance of the land available for development after the reduction of the environmentally sensitive features as per Step 2.
- D. Use the LAD for mapping purposes based on Build-Out land uses.



#### STEP 4. Build Out Scenarios using Lands Available for Development

Submit the resulting acres of Lands Available for Development (LAD) from Step 3, to the Zoning Density/Intensity & Open Space Table (Table 3) for calculations per Zoning District. The results of the submittal provide potential housing units and square footage of non-residential space which are used to generate population and other projections. There are several variations of scenarios that could be developed depending on considerations under Step 3.

- A. Calculate potential units and Non-residential space based on LAD and Zoning
- B. Calculate additional population based on average population per unit

Build-Out Steps 3-4 can be repeated using varying development scenarios or additional considerations such as the following:

- Rate of Growth (current versus desired)
- Sewer Service Areas and sewage capacity
- Water Service Areas and water quantity issues
- School Districts
- Hydric Soils
- Others as determined as needed.

Table 3: Zoning Density/Intensity & Open Space provides the collaborative density and intensity assumptions applied to Lands Available for Development, using development standards contained in the corresponding zoning classification for each parcel of land, unless otherwise specified. This table incorporates the allowable densities, floor area ratios, and open space requirements per Zoning District that may be expected per amount of Land Available for Development. The acres of Land Available for Development are entered into Column 1. Column 2 indicates which Zoning Districts have an assumed reduction necessary for utilities. The actual spreadsheet uses the value of 0.95 for Zoning Districts with a “Yes” value. Column 3 provides an assumption about the type of development that may occur in the Zoning District as a percentage (percent Residential versus percent Non-residential). Columns 5, 8, and 10 are the actual densities or ratios permitted by Zoning District. The remaining columns are populated based on calculations and Lands Available for Development. The CS-RCA\* district includes Countryside (CS) Zoning District lands that are within the RCA areas that are available for development (identified in Step 2 E) and are “developed” at 1 unit per 20 acres; land in the Countryside (CS) Zoning District that is not within the RCA is allowed a density of 1 unit per 5 acres, and is calculated separately in the table.





Table 3: Zoning Density/Intensity & Open Space

Zoning District	(1) Acres of Land Available for Development (LAD)	(2) LAD Acres Available AFTER Reduction for ROW, Roads, & Utilities (5% for Select Districts)	(3) Residential / Non-Residential Split (Percent Residential)	(4) Acres Available for Residential Development	(5) Residential Density (Units per Acre)	(6) Number of ADDITIONAL Units Based on Acres Available	(7) Acres Available for NON Residential Development	(8) Maximum Floor Area Ratio	(9) Square Footage of Non-Residential Based on Acres Available	(10) OPEN SPACE Density (Select Districts)	(11) Potential Acres of OPEN SPACE from Development (Select Districts)
AG	Acres Per District From Step 3	Yes	100%	Values from Column 2 times Percent Residential (Column 3)	0.125	Values from Column 4 times Units per Acre (Column 5)	Values from Column 2 times 1.0 – minus Percent Residential (Column 3)	-	Values from Column 7 times Maximum Floor Area Ratio (Column 8)	0.85	Values from Column 2 times Open Space Density (Column 10)
CS	"	Yes	100%	"	0.200	"	"	-	"	0.85	"
E	"	Yes	100%	"	0.500	"	"	-	"	-	"
SE	"	Yes	100%	"	1.250	"	"	-	"	-	"
SR	"	Yes	100%	"	2.000	"	"	-	"	-	"
NC1	"	No	100%	"	1.000	"	"	-	"	-	"
NC2	"	No	100%	"	0.500	"	"	-	"	-	"
NC5	"	No	100%	"	0.200	"	"	-	"	-	"
NC8	"	No	100%	"	5.445	"	"	-	"	-	"
NC15	"	No	100%	"	2.904	"	"	-	"	-	"
NC20	"	No	100%	"	2.178	"	"	-	"	-	"
UR	"	No	100%	"	8.500	"	"	-	"	-	"
SC	"	No	0%	"	-	"	"	0.20	"	-	"
UC	"	No	10%	"	4.500	"	"	0.40	"	-	"
SI	"	No	0%	"	-	"	"	0.40	"	-	"
LIHS	"	No	0%	"	-	"	"	0.40	"	-	"
VC w/ps	"	No	25%	"	4.500	"	"	0.30	"	-	"
VC wo/ps	"	No	25%	"	1.000	"	"	0.30	"	-	"
WVC	"	No	25%	"	8.000	"	"	0.30	"	-	"
CMPD	"	No	100%	"	6.000	"	"	-	"	0.25	"



Zoning District	(1) Acres of Land Available for Development (LAD)	(2) LAD Acres Available AFTER Reduction for ROW, Roads, & Utilities (5% for Select Districts)	(3) Residential / Non-Residential Split (Percent Residential)	(4) Acres Available for Residential Development	(5) Residential Density (Units per Acre)	(6) Number of ADDITIONAL Units Based on Acres Available	(7) Acres Available for NON Residential Development	(8) Maximum Floor Area Ratio	(9) Square Footage of Non-Residential Based on Acres Available	(10) OPEN SPACE Density (Select Districts)	(11) Potential Acres of OPEN SPACE from Development (Select Districts)
TC	"	No	25%	"	4.500	"	"	0.40	"	-	"
SMPD	"	No	100%	"	3.500	"	"	-	"	0.25	"
GPRN	"	No	100%	"	3.500	"	"	-	"	0.25	"
SHVC	"	No	25%	"	4.500	"	"	0.40	"	-	"
GNC	"	No	25%	"	4.500	"	"	0.50	"	-	"
GVC	"	No	25%	"	4.500	"	"	0.50	"	-	"
AD	"	No	0%	"	-	"	"	0.40	"	-	"
SIBE	"	No	0%	"	-	"	"	0.40	"	-	"
CS-RCA*	"	No	100%	"	0.050	"	"	-	"	-	"

Outputs from the Zoning Density/Intensity & Open Space Table 3 are added to existing conditions data unless otherwise specified. The addition of the scenario outputs to existing conditions provides projected conditions.



### **Section 2.3 Maximum Capacity Build-Out Assumptions**

The following describes the Maximum Capacity assumptions, outputs and projections which can be used for measuring community impacts. This scenario is considered a baseline scenario depicting the maximum build-out under current zoning, land use regulations and environmentally constrained lands. The existing conditions for this scenario can be used to provide the baseline for development of *potential alternative growth scenarios*, and development of a *preferred scenario* to support establishment of the future land use plan for the Comprehensive Plan update. This Maximum Capacity Build-out scenario is not the *preferred scenario*.

#### **Maximum Capacity Build-Out Assumptions**

***What would the landscape look like building upon 2008 existing conditions with build-out of available lands based upon current zoning regulations?***

The Maximum Capacity describes how Queen Anne's County might possibly develop from 2008 forward into the future, based on current zoning and land use regulations, regardless of growth rates, infrastructure capacity, or timeline. This scenario does consider reductions for environmentally sensitive areas, consideration for preserved and conserved areas, and consideration for existing development. This scenario may be considered as a "*Maximum Capacity Scenario*."

Prior to submitting acreage data for analysis and calculations, specific considerations were made to the parcel datasets for this scenario. The specific considerations which reflect the current status of development within Queen Anne's County included the following:

#### **Existing Conditions – Countywide (including all Towns)**

- Existing development was excluded from Lands Available for Development and calculated based upon existing land use patterns and improved values of land from the MDProperty View data set as part of build-out (refer to Table 4, row A).
- Parcels identified as schools, cemeteries, State Highway Administration, common areas (from subdivisions), County or State Parks, senior centers, libraries, firehouses, police stations, social organizations, churches, landings, roads, water treatment plants, and pump stations were classified a "developed," and therefore are not considered as Lands Available for Development (LAD). These land use patterns are included in values identified in Table 4, row A along with other existing conditions.
- All parcels classified as "divisible" in Step 1.A.iv (page 6) and outside a Planned Service Area (for sewer only) and less than 2 acres in size were re-classified as "developed". These are parcels that already had development and were considered as too small to subdivide – under this scenario. These parcels are also considered existing conditions and included:



- Unimproved lots within recorded subdivisions since 2002 and as of October 1, 2008, with the exception of those on Kent Island, are considered existing conditions (refer to Table 4, row B).
- Unapproved pending developments as of October 2008 are considered part of existing conditions and calculated in the build-out (refer to Table 4, row C).

### ***Existing Conditions & Lands Available for Development – Towns***

- ***Queenstown***

- ***Existing Conditions*** – The developing or developable parcels identified in the 2009 draft version of the then pending Queenstown Community Plan were eliminated from Lands Available for Development and considered as part of the build-out.
- ***Lands Available for Development*** – The projected dwelling units, non-residential square footage, and population projections from the 2009 draft Community Plan's Refined Consolidated Growth Alternative were applied to the calculations to estimate dwelling units and commercial square footage (refer to Table 4, row F).

- ***Centreville***

- ***Existing Conditions*** – The developing or developable parcels identified in the Centreville Community Plan (2008) were also eliminated from Lands Available for Development and considered as part of the build-out.
- ***Land Available for Development*** – The data from Infill Areas 1-5 as well as Growth Areas 1-9 as identified in the draft plan were applied to the build-out calculations (refer to Table 4, row G).

### ***Lands Available for Development***

- Unimproved lots within recorded subdivisions since 2002 and as of October 1, 2008 on Kent Island are considered Lands Available for Development and calculated as part of the build-out (refer to Table 4, row B). These lots are considered approved pending development.
- Deeds restricted open space created prior to 2004 may still have remaining development potential, therefore the parcels were considered Lands Available for Development.
- Floor area ratio is defined in the County's zoning regulations as building area only accounting for multiple floors. Yet, for purposes of realistically estimating the 2050 – 2100 non-residential square footage based upon building trends, the analysis assigned the maximum square footage of non-residential development permitted under FAR requirements to account for both building and parking (estimated total impervious surface).
- Refer to Step 3, page 8 for definition of Lands Available for Development.





Map 1: Maximum Capacity, Lands Available Development illustrates the lands considered for development for the Maximum Capacity Scenario. Map 2: Maximum Capacity Build-Out includes existing conditions as described above. Development within areas mapped as National Wetlands Inventory, Department of Natural Resources Wetlands, Conservation Lands, and County buffer requirements for shoreline, streams, and wetlands are considered in the scenario as existing conditions. **Build-out calculations for both residential and non-residential uses were based upon Queen Anne's County (QAC) Zoning District densities and intensities.** However, for purposes of consistency with the modeling for the Water Resource Element, the Queen Anne's County residential densities were reclassified and mapped reflecting Maryland Department of Planning densities.

Table 4: Maximum Capacity Scenario illustrates the results of the capacity of build-out including existing conditions and Lands Available for Development.

**Table 4: Maximum Capacity Results**

EXISTING CONDITIONS - Queen Anne's County 2008				
Row Letter	Year / Scenario	Square Footage of Non-residential Space	Dwelling Units	Population
A	Existing Conditions (2008) <sup>1</sup>	10,096,366	18,860	47,091
B	Lots within Recorded Subdivisions (Since January 2002 and as of October 2008) <sup>2</sup>	Not Available	1,666	4,365
C	Pending Developments as of October 2008 (Not Approved)	641,624	1,842	4,826
D <sup>3</sup>	<b>TOTAL: Near Future (Un-Incorporated Areas) Approximately 2015-2020 (A + B + C)</b>	<b>10,737,990</b>	<b>22,368</b>	<b>56,282</b>
D.1 <sup>4</sup>	<b>TOTAL: Near Future (Includes Towns) Approximately 2015-2020 (A + B + C + Growth Rate)</b>	<b>11,251,290</b>	<b>23,467</b>	<b>59,161</b>

<sup>1</sup> Existing Conditions – Reflects nonresidential space through 2007 and 2008. Maryland Department of Planning 2008 population used as base population.

<sup>2</sup> Unimproved lots within recorded subdivisions since 2002 and as of October 1, 2008, excluding southern Kent Island; prior versions included unimproved lots since 2004 which equated to 1,208 lots.

<sup>3</sup> The Near Future 2015- 2020 is an adjustment and approximate timeline for when the number of proposed dwelling units and square footage of non-residential space within pending development plans may be constructed. The process attempts to account for the lag time between parcels that have an approved plan and actual construction of units.

<sup>4</sup> Includes current rate of residential and non-residential development within towns.



Table 4: Maximum Capacity Results (continued)

MAXIMUM CAPACITY RESULTS				
Lands Available for Development (LAD) under this Scenario: 105,119.25 Acres				
Row Letter	Year / Scenario	Projected Square Footage of Non-residential Space	Projected Dwelling Units	Projected Population
E	<b>Maximum Results</b> <i>(Based on Lands Available for Development Excluding Community Plans)</i>	<b>10,805,773</b>	<b>20,015</b>	<b>52,438</b>
F*	Queenstown Plan - Consolidated Option (Additional Non-residential space, dwelling units, and population)	885,000	1,030	2,183
G	Centreville Plan - Infill & All Growth Areas (Additional Non-residential space, dwelling units, and population)	Not Available	5,698	13,675
H	<b>SUBTOTAL (E through G)</b>	<b>11,690,773</b>	<b>26,743</b>	<b>68,296</b>
I**	<b>Adjustment</b> <i>(subtract for Pre-existing Improvements)</i>	0	3,473	9,099
J	<b>BUILD-OUT TOTAL: Adjusted subtotal</b> <i>(H minus I)</i>	<b>11,690,773</b>	<b>23,270</b>	<b>59,197</b>
K	<b>TOTAL County Existing PLUS Build-Out Total (D + J)</b>	<b>22,428,764</b>	<b>45,638</b>	<b>115,479</b>
L	<b>Near Future as a percentage of the TOTAL</b> <i>(How close is Queen Anne's County to the Scenario?)</i>	<b>47.9%</b>	<b>49.0%</b>	<b>48.7%</b>

F\* = Queenstown Community Plan Totals as of March 12, 2009.

I\*\* = Number was calculated based on the parcels identified as "divisible" and the value in the Dwelling Units field of the Maryland Property View dataset (from Step 1). These values are subtracted so as not to "double-count" existing development.

Table 4 indicates that the County under Maximum Capacity may accommodate approximately 22.42 million square feet of non-residential space, 45,638 housing units and a total population of 115,479. The population estimate is the result of the application of year 2000 population per dwelling unit values (2.62 persons per unit) to the number of additional housing units.

This table further indicates that the County may have under Maximum Capacity, presuming policies do not change, achieved nearly half (47.9%) of its total potential square footage of non-residential space, has slightly less than half (49.0%) of its potential housing units, and slightly less than half (48.7%) of its potential population.



Table 5: Maximum Capacity Zoning Density/Intensity & Open Space

Zoning District	(1) Acres of Land Available for Development (LAD)	(2) LAD Acres Available AFTER Reduction for ROW, Roads, & Utilities (5% for Select Districts)	(3) Residential / Non-Residential Split (Percent Residential)	(4) Acres Available for Residential Development	(5) Residential Density (Units per Acre)	(6) Number of ADDITIONAL Units Based on Acres Available	(7) Acres Available for NON Residential Development	(8) Maximum Floor Area Ratio	(9) Square Footage of Non-Residential Based on Acres Available	(10) OPEN SPACE Density (Select Districts)	(11) Potential Acres of OPEN SPACE from Development (Select Districts)
AG	80,950.08	76,902.57	100%	76,902.57	0.125	9,612.82	-	-	-	0.85	68,807.56
CS	8,554.35	8,126.63	100%	8,126.63	0.200	1,625.33	-	-	-	0.85	7,271.20
E	252.68	240.05	100%	240.05	0.500	120.03	-	-	-	-	-
SE	988.33	938.92	100%	938.92	1.250	1,173.65	-	-	-	-	-
SR	63.99	60.79	100%	60.79	2.000	121.58	-	-	-	-	-
NC1	1,527.25	1,527.25	100%	1,527.25	1.000	1,527.25	-	-	-	-	-
NC2	809.17	809.17	100%	809.17	0.500	404.58	-	-	-	-	-
NC5	1,231.69	1,231.69	100%	1,231.69	0.200	246.34	-	-	-	-	-
NC8	86.20	86.20	100%	86.20	5.445	469.34	-	-	-	-	-
NC15	172.22	172.22	100%	172.22	2.904	500.13	-	-	-	-	-
NC20	677.63	677.63	100%	677.63	2.178	1,475.88	-	-	-	-	-
UR	-	-	100%	-	8.500	-	-	-	-	-	-
SC	182.58	182.58	0%	-	-	-	182.58	0.20	1,590,677	-	-
UC	48.21	48.21	10%	4.82	4.500	21.69	43.39	0.40	756,012	-	-
SI	139.68	139.68	0%	-	-	-	139.68	0.40	2,433,720	-	-
LIHS	114.35	114.35	0%	-	-	-	114.35	0.40	1,992,508	-	-
VC w/ps	132.25	132.25	25%	33.06	4.500	148.78	99.18	0.30	1,296,149	-	-
VC wo/ps	-	-	25%	-	1.000	-	-	0.30	-	-	-
WVC	4.78	4.78	25%	1.19	8.000	9.55	3.58	0.30	46,808	-	-
CMPD	79.73	79.73	100%	79.73	6.000	478.40	-	-	-	0.25	19.93
TC	107.39	107.39	25%	26.85	4.500	120.81	80.54	0.40	1,403,365	-	-
SMPD	148.27	148.27	100%	148.27	3.500	518.93	-	-	-	0.25	37.07
GPRN	274.74	274.74	100%	274.74	3.500	961.61	-	-	-	0.25	68.69



Zoning District	(1) Acres of Land Available for Development (LAD)	(2) LAD Acres Available AFTER Reduction for ROW, Roads, & Utilities (5% for Select Districts)	(3) Residential / Non-Residential Split (Percent Residential)	(4) Acres Available for Residential Development	(5) Residential Density (Units per Acre)	(6) Number of ADDITIONAL Units Based on Acres Available	(7) Acres Available for NON Residential Development	(8) Maximum Floor Area Ratio	(9) Square Footage of Non-Residential Based on Acres Available	(10) OPEN SPACE Density (Select Districts)	(11) Potential Acres of OPEN SPACE from Development (Select Districts)
SHVC	12.16	2.16	25%	3.04	4.500	13.68	9.12	0.40	158,911	-	-
GNC	20.89	20.89	25%	5.22	4.500	23.51	15.67	0.50	341,307	-	-
GVC	14.17	14.17	25%	3.54	4.500	15.94	10.63	0.50	231,465	-	-
AD	9.64	9.64	0%	-	-	-	9.64	0.40	168,020	-	-
SIBE	22.20	22.20	0%	-	-	-	22.20	0.40	386,834	-	-
CS-RCA*	8,494.61	8,494.61	100%	8,494.61	0.050	424.73	-	-	-	-	-
<b>TOTAL</b>	<b>105,119.25</b>	<b>100,578.78</b>		<b>99,848.20</b>		<b>20,014.55</b>	<b>730.58</b>		<b>10,805,773</b>		<b>76,204.45</b>

Table 5 provides the specific results per zoning district of the Maximum Capacity Build-Out, and indicates that there would be 105,120 acres of Land Available for Development. This table also indicates that the approximate 105,120 acres of Land Available for Development could yield 20,015 additional housing units and 10.8 million square feet of non-residential space. Land Available for Development plus adjustments as made for Community Plans and pre-existing improvements yields an additional 11.69 million square feet of non-residential space, an additional 23,270 housing units, and a 59,197 population increase. These values when added to existing conditions, as provided in Table 8 equate to approximately 45,638 housing units, approximately 22.42 million square feet of non-residential space, and a total population of 115,479.

Recall that this scenario may be considered as “*maximum capacity*” and inherent in the build-out is the assumption that some existing developed parcels could further subdivide for additional development under current Zoning, thus contributing to an increased number of housing units, population and square footage of non-residential space.





Table 6: Results compares the 2008 land use classifications with the projected land use classifications under the Maximum Capacity scenario at full build-out.

**Table 6: Results – Comparison of 2008 Land Use Classification with Maximum Capacity Land Use Classifications**

Updated General Land Use Classes (2008)	2008 Land Uses Including Water		2008 Land Uses Excluding Water		Maximum Capacity Land Uses Including Water		Maximum Capacity Land Uses Excluding Water	
	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres	Total Acres	Percent of Total Acres
Low Density Residential (1 to 2 units per 5 acres)	11,296.6	3.4%	11,296.6	4.8%	12,524.3	3.8%	12,524.3	5.3%
Medium Density Residential (2 to 8 units per acre)	4,224.6	1.3%	4,224.6	1.8%	9,692.6	2.9%	9,692.6	4.1%
High Density Residential (8+ units per acre)	256.7	0.1%	256.7	0.1%	256.6	0.1%	256.6	0.1%
Commercial	1,487.3	0.5%	1,487.3	0.6%	1,646.5	0.5%	1,646.5	0.7%
Mixed Commercial – Residential	-	0.0%	-	0.0%	988.6	0.3%	988.6	0.4%
Industrial	85.7	0.0%	85.7	0.0%	937.6	0.3%	937.6	0.4%
Institutional	1,530.5	0.5%	1,530.5	0.6%	1,894.3	0.6%	1,894.3	0.8%
Surface Mining	204.8	0.1%	204.8	0.1%	204.8	0.1%	204.8	0.1%
Very Low Density Rural (1 unit per 5+ acres)	10,002.3	3.1%	10,002.3	4.2%	23,961.2	7.4%	23,961.2	10.0%
Recreation (Public & Private)	1,510.0	0.5%	1,510.0	0.6%	1,593.3	0.5%	1,593.3	0.7%
Agriculture	142,962.7	43.8%	142,962.7	60.3%	127,641.6	39.2%	127,641.6	53.7%
Forest	59,742.8	18.3%	59,742.8	25.1%	51,962.8	15.9%	51,962.8	21.9%
Water	88,176.8	27.1%	-	0.0%	88,176.8	27.1%	-	0.0%
Wetlands	3,609.1	1.1%	3,609.1	1.5%	3,609.1	1.1%	3,609.1	1.5%
Transportation	763.4	0.2%	763.4	0.3%	763.4	0.2%	763.4	0.3%
<b>Total</b>	<b>325,853.3</b>	<b>100.0%</b>	<b>237,676.5</b>	<b>100.0%</b>	<b>325,853.3</b>	<b>100.0%</b>	<b>237,676.5</b>	<b>100.0%</b>



The large increase in acreage between 2008 and Maximum Capacity Land Use for the Very Low Density Rural class is the result of Lands Available for Development (LAD) that were considered as “available” or “divisible” within districts and built-out according to Zoning. For LAD within Agriculture Zoning Districts, the 85/15 percent split for conservation, as applied within Queen Anne’s County was applied; where 15 percent was used for development and 85 percent remained agriculture or forest. The increase in Institutional acreages was derived from Centreville Plan. The Surface Mining land use class remained constant in terms of acreage, as there was no build-out assumption to increase surface mining per se, but there is an increase in Industrial land use acreages which reflect LAD within Industrial Districts. Transportation Land Use acreages remained constant for mapping purposes; however, considerations for new transportation and other rights-of-way were made through build-out assumptions as described in Table 5.



### SECTION 3.0 PRELIMINARY ASSESSMENT OF IMPACTS

The following information shown in Tables 7A, 7B, 7C, 7D, 7E and 7F is a preliminary assessment of impacts for the Maximum Capacity scenario which gauges **community sustainability factors and indicators** such as water and wastewater needs, estimated school students and impacts on water resources with respect to pollutants as well as impacts on agricultural land, forested land and impervious surface.

The tables provide data concerning total population, total housing units, and total non-residential space, as well as additional population, additional housing units, and additional non-residential space as a result of conducting a Maximum Capacity Analysis. A statement about how the impact was calculated is provided for each table. Existing Condition 2008 data reflect existing conditions within Queen Anne's County and are provided for comparative purposes. In general, variables and assumptions used for calculations are based on standards as established by Maryland Department of Planning, Maryland Department of the Environment, and Queen Anne's County.



### Section 3.1 Projections of Population, Housing Units, and Non-Residential Space

Table 9A provides the total population, total housing units, and total non-residential space for the Un-incorporated areas of Queen Anne's County as well as all of Queen Anne's County.

**Table 7A: Assessment of Impacts based upon Maximum Capacity Build-Out**

Development Variable		Existing Conditions 2008	Estimated Short-Term Projected Conditions 2015-2020	Estimated Mid-Term Projected Conditions 2020-2030	Estimated Long-Term Projected Conditions 2050-2100
Future - Considering Pending Developments ONLY (Table 6 Row D) (Un-incorporated Areas)	Total Population	47,091	56,311	56,311	115,479
	Total Housing Units	18,860	22,368	24,566	45,638
	Total Non-Residential Square Footage of Space	10,096,366	10,737,990	12,257,990	22,428,764

Source: Build-Out Analysis Report Table 6 - Row D. \* Near Future unincorporated areas of the County.

Future - Considering Pending Developments Plus Current Rate of Development County-wide (Includes Towns)	<b>Total Population</b>	47,091	<b>59,161</b>	<b>71,261</b>	<b>115,479</b>
	<b>Total Housing Units</b>	18,860	<b>23,467</b>	<b>26,986</b>	<b>45,638</b>
	<b>Total Non-Residential Square Footage of Space</b>	10,096,366	<b>11,251,290</b>	<b>12,771,290</b>	<b>22,428,764</b>

Source: Build-Out Analysis Report Table 6 plus ten year residential building permit average of Incorporated Towns (91.6 units per year) for twelve year period.





**Table 7A: Assessment of Impacts based upon Maximum Capacity Build-Out (*continued*)**

Development Variable		Existing Conditions 2008	Estimated Short-Term Projected Conditions 2015-2020	Estimated Mid-Term Projected Conditions 2020-2030	Estimated Long-Term Projected Conditions 2050-2100
Future - Considering Pending Developments ONLY (Table 4 Un-incorporated Areas)	Additional Housing Units (Total)		3,508*	5,706	26,778
	Additional Population (Total)		9,191*	14,950	68,388
	New Non-residential Space (Total)		641,624*	1,154,924	12,332,397
Source: Build-Out Analysis Report Table 6. * Near Future unincorporated areas of the Count – Rows B & C totaled).					
Future - Considering Pending Developments Plus Current Rate of Development County-wide (Includes Towns)	<b>Additional Housing Units (Total):</b> Church Hill Community Plan rate of residential development are consistent with growth rate for incorporated Towns and are therefore not added to estimate		4,607	8,126	26,778
	<b>Additional Population (Total)</b>		12,070	24,170	68,388
	<b>New Non-residential Space (Total):</b> Includes Pending Development (Table 4 Row B & C), estimates for current growth rate of Non-residential Space. All Community Plans are consistent with calculated rate of non-residential growth.		1,154,924	1,670,924	12,332,397

Source: Build-Out Analysis Table 6 plus ten year residential building permit average of Incorporated Towns (91.6 units per year) for twelve year period; plus non-residential growth rate per year (approximately 43,000 square feet per year) for 12 years.

The above portion of Table 7A provide the additional population, additional housing units, and addition non-residential space for the Un-incorporated areas of Queen Anne's County as well as all of Queen Anne's County; where additional is based on Maximum Capacity build-out assumptions and are in addition to Existing Conditions 2008. 2030 projections assume current rate of growth.



## Section 3.2. Projections of Students Generated, Water Consumption and Sewerage

**Table 7B: Summary of County-wide Impacts Based on Additional Housing Units & Non-residential Space**

Development Variable	Existing Conditions 2008	Estimated Short-Term Projected Conditions 2015-2020	Estimated Mid-Term Projected Conditions 2020-2030	Estimated Long-Term Projected Conditions 2050-2100
Total Number of School Students (Potential)	7,859	9,835	11,345	19,347

Source: Queen Anne's County School Enrollment 2008-2009, assumes 0.429 students per new housing unit - as per the Size Based Residential Impact Fees Study, March 2007 Queen Anne's County.

Calculated Residential Water Consumption (250 GPD) Total	4,715,000	5,866,750	6,746,500	11,409,500
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Source: Total housing units \* 250 GPD

Housing Units on Septic County-wide (Chesapeake Bay Restoration Fund 2008 Data)	11,276	14,332	12,811	31,463
Housing Units Sewered (assumed) – Countywide	7,584	9,135	14,175	14,175

Housing Units within Community Planning Areas (Growth Areas) on Septic (CBRF Data)	342			
Housing Units within Incorporated Towns (Not within Community Planning Areas) on Septic (CBRF Data)	146			

Source: 2008 Chesapeake Bay Restoration Fund (CBRF) Dataset, 2015-2020 assumes 1,551 units (Towns and County) are added to sewer based on existing capacity Mid-Term assumes an additional 5,040 units are added to sewer systems therefore maximizing capacity; Long -Term Projection assumes no change in capacity.

The Existing Conditions 2008 number of students were actual enrollments for 2008-2009, the Short-term and Long-term estimates were based on additional housing units and 0.429 students per new housing unit. Residential water consumption was based on total housing units and 250 gallons per day per unit. Septic System data were based on the Chesapeake Bay Restoration Fund (CBRF) 2008 dataset for the entire County. Sewered units (2008) were calculated by subtracting CBRF data from total units. Short-term, Mid-term, and Long-term sewered and un-sewered units included an assumption that 1,551 planned units Short-term, and an



additional 5,040 units Mid-term would be added to existing wastewater treatment facilities and would therefore bring existing systems to capacity countywide.

**Table 7B: Summary of County-wide Impacts Based on Additional Housing Units & Non-residential Space (continued)**

Development Variable	Existing Conditions 2008	Estimated Short-Term Projected Conditions 2015-2020	Estimated Mid-Term Projected Conditions 2020-2030	Estimated Long-Term Projected Conditions 2050-2100
Calculated <b>Treated Residential</b> Sewage Flow (250 GPD per Unit)	1,896,000	2,283,750	3,543,750	3,543,750
Calculated <b>Non-Treated Residential</b> Sewage Flow (250 GPD per Unit)	2,819,000	3,583,000	3,202,750	7,865,750
Calculated <b>Treated Non-residential</b> Sewage Flow (GPD)	1,893,000	7,873,609	8,066,097	11,687,649
Calculated <b>Non-Treated Non-residential</b> Sewage Flow (GPD)	5,120,000			
<b>Total Calculated Treated Sewerage Flow</b> (Capacity - WRE Tables - County & Towns)	3,789,000	10,157,359	11,609,847	15,231,399
<b>Total Calculated Non-Treated Sewerage Flow</b> (Septic)	7,939,000	3,583,000	3,202,750	7,865,750
<b>Total Sewage Flow (Treated plus Non-treated)</b>	<b>11,728,000</b>	<b>13,740,359</b>	<b>14,812,597</b>	<b>23,097,149</b>

Source: WRE Reporting Tables for Towns, 2015-2020 assumes 1,551 units (Towns and County) are added to sewer based on existing capacity Mid-Term assumes an additional 5,040 units are added to sewer systems therefore maximizing capacity; Long -Term Projection assumes no change in capacity.

Calculated sewerage flows were based on the total treated average annual daily flow from all reporting wastewater treatment facilities in Queen Anne's County, as reported as part of the Water Resources Element Process. Within Queen Anne's County there are approximately 3.789 million gallons per day of treated wastewater. Residential flows were based on additional housing units (sewered and unsewered from Table 7B) assuming that each additional unit produced 250 gallon per day per unit; the calculated flows were added to 2008 flows. Non-residential flows were based on additional non-residential space assuming that each additional square foot produced 0.375 gallons per day per square foot (Kent Narrows Stevensville Grasonville Waste Water



Treatment Plant's (KNSG WWTP) assumed flow for commercial development) as added to 2008 flows. All projected non-residential flows were assumed to be treated. Short-term flows included an adjustment of an additional 50,000 gpd for a school in Sudlersville.

### ***Section 3.3 Summary of County – wide Potential Nitrogen and Phosphorus Loadings***

Estimate pounds per year of Nitrogen and Phosphorus were based on Maryland Department of the Environment Water Resources Element – Nitrogen, Phosphorus & Impervious Surface (WRE-NPS) Reporting Table's loading values (2008). Loading values used in the WRE-NPS were based on the Chesapeake Bay Watershed Model (2006) as reviewed by Maryland Department of Planning and Maryland Department of the Environment. The loading values were for the Eastern Shore and were considered current for 2008. Inputs to calculate Nitrogen and Phosphorus included number of housing units on septic, acreage of non-residential units on septic, and acreage of land uses (Refer to Table 4 and Table 8) as well as point source data (WWTPs) for Nitrogen and Phosphorus.

**Table 7C: Summary of County-wide Impacts Based on Additional Housing Units & Non-residential Space**

<b>Development Variable</b>	<b>Existing Conditions 2008</b>	<b>Estimated Short-Term Projected Conditions 2015-2020</b>	<b>Estimated Mid-Term Projected Conditions 2020-2030</b>	<b>Estimated Long-Term Projected Conditions 2050-2100</b>
<b>Nitrogen (pounds/Year)</b> - Calculated County-wide TMDL -Tributary Strategy BMP's from WRE Tables	2,394,677			2,563,064
<b>Phosphorus (pounds/Year)</b> - Calculated County-wide TMDL -Tributary Strategy BMP's from WRE Tables	188,397			192,914

*Source: Water Resources Element - Nitrogen, Phosphorus, and Impervious Surface (WRE-NPS) Reporting Tables; Total Maximum Daily Load (TMDL) values are outputs from the WRE-NPS Reporting Tables; Maximum Capacity Build-Out assumes that only 2,733 units are added to sewer based on available capacity.*



### Section 3.4 Transportation – Vehicle Trips Generated

Calculated increases in Residential Trips were based on additional housing units and average weekday trips (9.57 trips per housing unit) from the **Institute of Transportation Engineers (ITE) Trip Generation, 7th Edition**, for Single Family Detached Housing.

Calculated increases in Non-residential Trips were based on additional non-residential space and average weekday trips per 1,000 square feet of Non-residential space. Assumptions were made for the type of future non-residential space by averaging trips per 1,000 square feet for General Light Industrial, Shopping Center, High Turnover sit-down Restaurant, General Office Building, Day Care Center and Government Office Complex uses.

**Table 7D: Summary of Vehicle Trips Generated**

Calculated Increase in Trips – Residential		44,089	77,766	256,265
Calculated Increase in Trips - Non-residential		101,640	131,633	606,877

*Source: Institute of Transportation Engineers (ITE) Trip Generation 7th Edition. Near Future trips based on average of weekday trips for General Light Industrial, Shopping Center, High Turnover sit-down Restaurant, and General Office Building uses as defined by ITE (47.02 per 1,000 sq. ft.). Estimated Long Term Conditions also include Day Care Center and Government Office Complex Uses (49.21 trips per 1,000 sq. ft.).*





### Section 3.5 Projected Impact Fees

Data in Table 9E were calculated based on additional housing units and additional non-residential space of un-incorporated areas. Impact Fees were based on Queen Anne's County FY 2009 Impact Fee Chart with the assumption that new housing units would be approximately 2,585 square feet. An average rate per square foot for all Non-residential Development of \$1.106 per square foot was applied to additional non-residential space.

**Table 7E: Projected Impact Fees for Un-Incorporated Areas**

	Existing Conditions 2008	Estimated Short-Term Projected Conditions 2015-2020	Estimated Mid-Term Projected Conditions 2020-2030	Estimated Long-Term Projected Conditions 2050-2100
<b>IMPACT FEES - Residential</b>				
Assumed Total Square Footage of Residential Units (2,585 square feet per unit)		9,068,180	14,750,010	69,221,130
Public Schools (\$3.31 per square foot)		\$ 30,015,676	\$ 48,822,533	\$ 229,121,940
Fire (\$0.38 per square foot)		\$ 3,445,908	\$ 5,605,004	\$ 26,304,029
Parks and Recreation (\$0.36 per square foot)		\$ 3,264,545	\$ 5,310,004	\$ 24,919,607
<b>Total (\$4.05 per square foot)</b>		<b>\$ 36,726,129</b>	<b>\$ 59,737,541</b>	<b>\$ 280,345,576</b>
<i>Source: Queen Anne's County FY 2009 Impact Fee Chart; Size Based Residential Impact Fees Study, March 2007 Queen Anne's County - Using Median Size of Units at 2,585 square feet</i>				
<b>IMPACT FEES - Non-residential</b>		<b>\$ 2,390,756</b>	<b>\$ 2,958,466</b>	<b>\$ 13,639,632</b>
<i>Source: Queen Anne's County FY 2009 Impact Fee Chart, using average rate per square foot for all Non-residential Development (\$1.106 per square foot)</i>				
<b>IMPACT FEES - TOTAL</b>				
Residential Impact Fees plus Non-residential Impact Fees		<b>\$ 39,116,885</b>	<b>\$ 62,696,007</b>	<b>\$ 293,985,208</b>



### Section 3.6 Projected Change in Agricultural and Forested Lands and Amount of Impervious Surface

Estimate changes in Agriculture and Forest Lands are based on Maximum Capacity Build-Out assumption and data from Table 6. Change in Impervious Surface were calculated based on Maryland Department of the Environment Water Resources Element – Nitrogen, Phosphorus & Impervious Surface (WRE-NPS) Reporting Table's loading values (2008) for impervious surface. Loading values used in the WRE-NPS were based on the Chesapeake Bay Watershed Model (2006) as reviewed by Maryland Department of Planning and Maryland Department of the Environment. The loading values were for the Eastern Shore and were considered current for 2008.

**Table 7F: Change in Agricultural and Forested Lands and Impervious Surface Space County-wide**

Development Variable	Existing Conditions 2008	Estimated Short-Term Projected Conditions 2015-2020	Estimated Mid -Term Projected Conditions 2020-2030	Estimated Long-Term Projected Conditions 2050-2100	
	2008 Acres			Acres	Percent Change
Change in Select Land Uses					
Change in Agriculture Lands	142,962.60			127,641.63	-10.7%
Change in Forested Lands	59,742.80			51,962.79	-13.0%
Change in Impervious Surface	5,795.51			9,349.65	61.3%

Source: Table 8, WRE Nitrogen, Phosphorus Impervious Surface Calculations Table - Using MDE Impervious Surface Loading Values



## **REFERENCES**

Barclay Community Plan  
Centreville Community Plan  
Church Hill Community Plan, (Growth Element – 2009)  
(2002) Comprehensive Plan Volume 1, County Profile  
Institute of Transportation Engineers (ITE) Trip Generation, 7th Edition  
Maryland Department of Planning (MDP) 2008 Land Use/Land Cover Datasets  
Maryland Department of the Environment – Water Resources Element  
Millington Community Plan  
Queen Anne’s County Datasets and Development Trends  
Queenstown Community Plan – 2030 Build-Out Consolidated Growth Plan, Draft 2009  
Sudlersville Community Plan



## APPENDIX 1: DETAILED EXPLANATION OF TABLE DATA SOURCES

This appendix details the various sources of data for tables contained in this report.

**Table 1: Summary Table (page 3)**

**Population:**

- Maryland Department of Planning; Total Resident Population for Maryland's Jurisdictions, 2000 – 2008
- Application of Census 2000 population per dwelling unit value; 2.62 persons per unit for each additional unit

**Square feet of Non-residential space:**

- 2002 Comprehensive Plan, Volume I: County Profile – Table 8
- Queen Anne's County Department of Land Use, Growth Management & Environment building permit information 2002-2008
- Queen Anne's County Department of Land Use, Growth Management & Environment Pending Developments as of October 2008

**Dwelling units:**

- 2000 Census – STF1, Maryland Department of Planning
- Queen Anne's County Department of Land Use, Growth Management & Environment building permit information since 2000
- Queen Anne's County Department of Land Use, Growth Management & Environment - Pending Developments as of October 2008

**Table 2: Estimated 2007 Existing Development (page 5)**

**Square feet of Non-residential space:**

- 2002 Comprehensive Plan, Volume I: County Profile – Table 8
- Queen Anne's County Department of Land Use, Growth Management & Environment building permit information 2002-2008
- Queen Anne's County Department of Land Use, Growth Management & Environment Pending Developments as of October 2008

**Dwelling units:**

- 2000 Census – STF1, Maryland Department of Planning
- Queen Anne's County Department of Land Use, Growth Management & Environment building permit information since 2000
- Queen Anne's County Department of Land Use, Growth Management & Environment - Pending Developments as of October 2008

The following support tables (Tables A1-1 through A1-4) identifying dwelling units and lots are provided as background information to support analysis.



Table A1-1: New Dwelling Units Permit History 2001-2005

GROWTH AREAS	2001		2002		2003		2004		2005		5-Year Averages	
	# of New Units	Distribution b/t GA & NGA	# of New Units	Distribution	# of New Units	Distribution	# of New Units	Distribution	# of New Units	Distribution	Avg. # of New Units	Average Distribution
In the Unincorporated County	227	54.8%	264	62.3%	83	43.7%	120	52.4%	33	19.4%	145	46.52%
In the Towns	80		79		93		75		139		93	
<b>Countywide</b>	<b>307</b>	<b>62.0%</b>	<b>343</b>	<b>68.2%</b>	<b>176</b>	<b>61.5%</b>	<b>195</b>	<b>63.7%</b>	<b>172</b>	<b>52.8%</b>	<b>239</b>	<b>61.65%</b>

**NON-GROWTH AREAS**

In the Unincorporated County	187	45.2%	160	37.7%	107	56.3%	109	47.6%	137	80.6%	140	53.48%
In the Towns	1		0		3		2		17		5	
<b>Countywide</b>	<b>188</b>	<b>38.0%</b>	<b>160</b>	<b>31.8%</b>	<b>110</b>	<b>38.5%</b>	<b>111</b>	<b>36.3%</b>	<b>154</b>	<b>47.2%</b>	<b>145</b>	<b>38.35%</b>

**TOTALS**

In the Unincorporated County	414	100.00%	424	100.00%	190	100.00%	229	100.00%	170	100.00%	285	100.00%
In the Towns	81		79		96		77		156		98	
<b>Countywide</b>	<b>495</b>	<b>100.0%</b>	<b>503</b>	<b>100.0%</b>	<b>286</b>	<b>100.0%</b>	<b>306</b>	<b>100.0%</b>	<b>326</b>	<b>100.0%</b>	<b>383</b>	<b>100.00%</b>

Note - Replacements have been subtracted out and are not included in the permit count

Source: Queen Anne's County Department of Land Use, Growth Management & Environment.





Table A1-2: New Dwelling Units Permit History 2006-2008

Note -

GROWTH AREAS	2006		2007		2008	
	# of New Units	Distribution b/t GA & NGA	# of New Units	Distribution	# of New Units	Distribution
In the Unincorporated County	112	39.7%	92	41.6%	80	49.1%
In the Towns	200		75		39	
<b>Countywide</b>	<b>312</b>	<b>61.8%</b>	<b>167</b>	<b>53.2%</b>	<b>119</b>	<b>53.4%</b>

**NON-GROWTH AREAS**

In the Unincorporated County	170	60.3%	129	58.4%	83	50.9%
In the Towns	23		18		21	
<b>Countywide</b>	<b>193</b>	<b>38.2%</b>	<b>147</b>	<b>46.8%</b>	<b>104</b>	<b>46.6%</b>

**TOTALS**

In the Unincorporated County	282	100.00%	221	100.00%	163	100.00%
In the Towns	223		93		60	
<b>Countywide</b>	<b>505</b>	<b>100.0%</b>	<b>314</b>	<b>100.0%</b>	<b>223</b>	<b>100.0%</b>

*Replacements have been subtracted out and are not included in the permit count*

*Source: Queen Anne's County Department of Land Use, Growth Management & Environment.*



**Table A1-3: Growth Area vs. Non-Growth Area Development Approvals 1997-2002<sup>1</sup>**

	1997	1998	1999	2000	2001	2002
Residential Lots in Growth Area	83	162	20	183	36	79
Residential Acres <sup>2</sup>	25.4	68.9	6.6	65.2	34.932	14.93
Average Lot Size	0.32	0.43	0.33	0.36	0.97	0.19
Residential Lots Outside of Growth Area	141	52	51	46	24	54
Residential Acres <sup>2</sup>	388	146.3	150	125.3	44.3	208.7
Average Lot Size	2.8	2.8	3	2.7	1.8	3.9
Percent Residential Lots in Growth Area	37%	76%	28%	80%	84%	47%
Percent Residential Lots Outside Growth Area	63%	24%	72%	20%	16%	53%
Non-Residential Development in Growth Area <sup>3</sup>	26.7	8.3	3.9	1.6	3.5	19.73
Non-Residential Development Outside of Growth Area	4.3	0.7	4.9	3.5	3.5	0.28
Percent Non-Residential In Growth Area	86%	92%	44%	31%	50%	99%
Percent Non-Residential Outside Growth Area	14%	8%	56%	69%	50%	1%

<sup>1</sup>

Includes minor and major subdivisions lots less than 20 acres and non-residential impervious coverage granted final approval by the Department of Planning and Zoning or the Planning Commission. Does not include building permit or other construction permit data. Areas outside of Growth Areas include rural areas and existing neighborhoods and villages, which are not designated as Growth Areas

<sup>2</sup>

Includes subdivision lot and road area. Does not include open space

<sup>3</sup>

Includes impervious coverage (i.e., building footprints, parking areas and circulation areas). Does not include landscape areas.

*NOTE: Table includes acres for Lots (not number of units) and does not include Incorporated Town data.*

*Source: Queen Anne's County Department of Land Use, Growth Management & Environment.*



**Table A1-4: Growth Area vs. Non-Growth Area Development Approvals 2003-2008<sup>1</sup>**

	2003	2004	2005	2006	2007	2008
Residential Lots in Growth Area	80	10	41	299	130	9
Residential Acres <sup>2</sup>	24.97	2.68	32.82	66.66	41.98	8.36
Average Lot Size	0.31	0.27	0.80	0.22	0.32	0.93
Residential Lots Outside of Growth Area	110	110	225	214	254	55
Residential Acres <sup>2</sup>	95.4	238.1	383.8	353.5	402.8	152.6
Average Lot Size	0.87	2.16	1.71	1.65	1.59	2.77
Percent Residential Lots in Growth Area	16%	8%	15%	58%	34%	14%
Percent Residential Lots Outside Growth Area	84%	92%	85%	42%	66%	86%
Non-Residential Development in Growth Area <sup>3</sup>	5.9	3.08	28.09	22.53	14.75	12.81
Non-Residential Development Outside of Growth Area	1.4	0.45	7.88	0.89	0	2.65
Percent Non-Residential In Growth Area	81%	87%	78%	96%	100%	83%
Percent Non-Residential Outside Growth Area	19%	13%	22%	4%	0%	17%

<sup>1</sup>

Includes minor and major subdivisions lots less than 20 acres and non-residential impervious coverage granted final approval by the Department of Planning and Zoning or the Planning Commission. Does not include building permit or other construction permit data. Areas outside of Growth Areas include rural areas and existing neighborhoods and villages, which are not designated as Growth Areas

<sup>2</sup>

Includes subdivision lot and road area. Does not include open space

<sup>3</sup>

Includes impervious coverage (i.e., building footprints, parking areas and circulation areas). Does not include landscape areas.

*NOTE: Table includes acres for Lots (not number of units) and does not include Incorporated Town data.*

*Source: Queen Anne's County Department of Land Use, Growth Management & Environment.*

### **Table 3: Zoning Density/Intensity & Open Space (pages 10-11)**

Queen Anne's County Density/Intensity and Dimensional/Bulk Requirements Table, reviewed and approved by Queen Anne's County Department of Land Use, Growth Management & Environment

### **Table 4: Maximum Capacity Scenario Results (page 14)**

#### **Population:**

- Maryland Department of Planning; Total Resident Population for Maryland's Jurisdictions, 2000 – 2008
- Application of Census 2000 population per dwelling unit value; 2.62 persons per unit for each additional unit

#### **Square feet of Non-residential space:**

- 2002 Comprehensive Plan, Volume I: County Profile – Table 8
- Queen Anne's County Department of Land Use, Growth Management & Environment building permit information 2002-2008



- Queen Anne's County Department of Land Use, Growth Management & Environment Pending Developments as of October 2008
- ROW C: This number does not include any pending development since October 2008 nor does it include a projection of additional development that could potentially transpire from this time-frame to today.

**Dwelling units:**

- 2000 Census – STF1, Maryland Department of Planning
- Queen Anne's County Department of Land Use, Growth Management & Environment building permit information 2000-2008
- Queen Anne's County Department of Land Use, Growth Management & Environment - Pending Developments as of October 2008
- Centreville Community Plan (2008)
- Queenstown Community Plan – additional dwelling units, population, and nonresidential space as of March 12, 2009
- ROW I - Calculated based on the parcels identified as “divisible” and the value in the Dwelling Units field or Apartments field of the Maryland Property View dataset (from Build-Out Process Step 1). These values are subtracted so as not to “double-count” existing development.
- All projections (residential and non-residential) were calculated based upon Lands Available for Development acreages and applying the values from Table 5 which include Queen Anne’s County Density/Intensity and Dimensional/Bulk Requirements Table, as reviewed and approved by Queen Anne's County Department of Land Use, Growth Management & Environment and then applying Census 2000 population per dwelling unit values; 2.62 persons per unit for each additional unit.
- All analysis focuses on residential and non-residential development. Non-residential development is not further subcategorized to distinguish industrial, commercial, institutional, etc. Since many of Queen Anne’s County residential, mixed residential and commercial Zoning Districts allow institutional uses, there is no way of determining what a specific “nonresidential” use may be as ultimately this is market-driven.

**Table 7A-7F: Assessment of Impacts based upon Maximum Capacity Build-Out (pages 32-34)**

**GROWTH RATE**

Queen Anne’s County Department of Land Use, Growth Management & Environment ten year residential building permit average for Incorporated Towns (91.6 units per year), and calculated non-residential growth rate per year (approximately 43,000 square feet per year) based on Queen Anne’s County Department of Land Use, Growth Management & Environment Growth Area vs. Non-Growth Area Development Approvals 1997-2008.



YEAR / TOWN	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	1999-2008 Total	10 Year Average
Centreville	15	5	78	79	89	71	139	200	74	38	788	78.8
Church Hill	3	5	0	0	3	2	16	22	18	27	96	9.6
Queenstown	10	1	2	0	4	4	0	4	1	1	27	2.7
Sudlersville	0	0	0	0	0	0	1	0	0	0	1	0.1
Queen Anne	0	0	1	0	0	0	0	0	0	0	1	0.1
Barclay	0	0	0	0	0	0	1	0	0	0	1	0.1
Templeville	0	0	0	0	0	0	0	0	0	0	0	0.0
Millington							1	1	0	0	2	0.5
Total	28	11	81	79	96	77	158	227	93	66	916	91.6

Source: Queen Anne's County Department of Land Use, Growth Management & Environment for Towns reporting development.

#### STUDENTS

Students per new housing unit (0.429 students) based on Queen Anne's County Department of Land Use, Growth Management & Environment study, **Size Based Residential Impact Fees Study**, March 2007.

Queen Anne's County School Enrollment 2008-2009, as provided by Queen Anne's County Department of Land Use, Growth Management & Environment.

#### SEPTIC

Septic source included the 2008 Chesapeake Bay Restoration Fund (CBRF) Dataset, which indicated number of units and general type of use (residential, non-residential, and other).

#### WATER CONSUMPTION

Residential water consumption (250 GPD per unit) based on Maryland Department of the Environment standard as used for Water Resource Element reporting.

#### COMMUNITY PLANS

Centerville Community Plan 2008 Update

Church Hill Community Plan – Growth Element - Draft - March 2009

Queenstown Community Plan – Draft – March 2009

Wye Mills Area Community Plan – Draft – April 2009

Community Planning Areas (Growth Areas) as provided by Queen Anne's County Department of Land Use, Growth Management & Environment.

#### WATER RESOURCE ELEMENT

Water Resources Element – Nitrogen, Phosphorous & Impervious Surface (WRE-NPS) Reporting Tables as provided by Maryland Department of the Environment.

- Calculated County-wide TMDL -Tributary Strategy BMP's from WRE Tables - Nitrogen (pounds/Year)





- Calculated County-wide TMDL -Tributary Strategy BMP's from WRE Tables - Phosphorus (pounds/Year)

Loading Values are based on the Chesapeake Bay Watershed Model (2006) as reviewed by Maryland Department of Planning and Maryland Department of the Environment. The loading values are for the Eastern Shore and are considered current for 2008.

#### CALCULATED INCREASE IN TRIPS

Trip rates per land uses are from the **Institute of Transportation Engineers (ITE) Trip Generation, 7th Edition**. Near Future trips were based on average of weekday trips for General Light Industrial, Shopping Center, High Turnover Sit-Down Restaurant, and General Office Building uses as defined by ITE (47.02 trips per 1,000 sq. ft.). Estimated Long Term Condition trips were supplemented with land uses of Day Care Center and Government Office Complex Uses, as they were similar to anticipated long-term uses (49.21 trips per 1,000 sq. ft.).

#### IMPACT FEES - Residential

Fees and assumed total square footage of new residential units (2,585 square feet per unit) based on Queen Anne's County FY 2009 Impact Fee Chart; and **Size Based Residential Impact Fees Study**, March 2007 Queen Anne's County Department of Land Use, Growth Management & Environment.

#### IMPACT FEES - Non-residential

Queen Anne's County FY 2009 Impact Fee Chart, using an average rate per square foot for all Non-residential Development (\$1.106 per square foot).



## APPENDIX 2: MAXIMUM CAPACITY BUILD-OUT IMPACTS ON WATER RESOURCES

Analysis assumes that Maximum Capacity Build-Out utilizes remaining wastewater capacity with additional development on septic.

QUEEN ANNE'S COUNTY	2002 LU 2002 BMPs	2002 LU Trib Strat BMPs	2008 Trib Strat BMPs	Max Build-Out Trib Strat BMPs
	(Acres)	(Acres)	(Acres)	(Acres)
Development	17,289	17,289	28,116	28,116
Agriculture	150,107	150,107	142,963	142,963
Forest	66,909	66,909	63,352	63,352
Water	88,299	88,299	88,177	88,177
Other	3,249	3,249	3,245	3,245
Total Area	325,853	325,853	325,853	325,853

Residential Septic (EDUs)	9,724	9,724	11,276	31,463
Non-Residential Septic (EDUs)	10,293	10,293	6,400	0

Total Nitrogen Loading					TMDL
QUEEN ANNE'S COUNTY	2002 LU 2002 BMPs	2002 LU Trib Strat BMPs	2008 Trib Strat BMPs	Max Build-Out Trib Strat BMPs	
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development Non-Point Source	151,385	104,722	170,664	283,341	0
Agriculture Non-Point Source	2,343,168	1,304,465	1,241,821	1,138,207	0
Forest Non-Point Source	99,261	92,517	87,599	78,173	0
Water Non-Point Source	890,577	736,918	735,901	735,901	
Other Terrestrial Non-Point Source	28,627	19,722	19,680	21,649	0
<b>Total Terrestrial Load</b>	<b>3,513,018</b>	<b>2,258,345</b>	<b>2,255,665</b>	<b>2,257,271</b>	<b>0</b>

Residential Septic (EDUs)	96,640	96,640	104,806	292,435	0
Non-Residential Septic (EDUs)	36,497	36,497	21,224	0	0
<b>Total Septic Load</b>	<b>133,137</b>	<b>133,137</b>	<b>126,030</b>	<b>292,435</b>	<b>0</b>

<b>Total Non-Point Source Nitrogen Load</b>	<b>3,646,155</b>	<b>2,391,482</b>	<b>2,381,695</b>	<b>2,549,707</b>	<b>0</b>
<b>Total Point Source Load</b>	<b>0</b>	<b>0</b>	<b>12,982</b>	<b>13,357</b>	<b>0</b>

<b>Total Nitrogen Load (NPS+PS)</b>	<b>3,646,155</b>	<b>2,391,482</b>	<b>2,393,761</b>	<b>2,563,064</b>	<b>0</b>
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Total Phosphorus Loading					TMDL
QUEEN ANNE'S COUNTY	2002 LU 2002 BMPs	2002 LU Trib Strat BMPs	2008 Trib Strat BMPs	Max Build-Out Trib Strat BMPs	
	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)	(Lbs/Yr)
Development Non-Point Source	19,416	12,658	21,148	35,409	0
Agriculture Non-Point Source	163,430	117,993	112,557	102,590	0
Forest Non-Point Source	1,503	1,239	1,173	1,047	0
Water Non-Point Source	50,010	50,010	49,941	49,941	0
Other Terrestrial Non-Point Source	3,773	2,444	2,411	2,635	0
<b>Total Terrestrial Load</b>	<b>238,132</b>	<b>184,344</b>	<b>187,230</b>	<b>191,622</b>	<b>0</b>
<b>Total Point Source Load</b>	<b>0</b>	<b>0</b>	<b>1,167</b>	<b>1,292</b>	<b>0</b>
<b>Total Phosphorus Load (NPS+PS)</b>	<b>238,132</b>	<b>184,344</b>	<b>188,397</b>	<b>192,914</b>	<b>0</b>


Impervious Cover and Open Space (Acres)				
QUEEN ANNE'S COUNTY	2002 LU 2002 BMPs	2002 LU Trib Strat BMPs	2008 Trib Strat BMPs	Max Build-Out Trib Strat BMPs
Total Impervious Cover	4,575	4,575	5,796	8,500
Agriculture	150,107	150,107	142,963	130,924
Forest	63,070	63,070	59,743	52,926
Percent Impervious	1.4%	1.4%	1.8%	2.6%


MARYLAND


MAXIMUM CAPACITY  
LANDS AVAILABLE  
FOR DEVELOPMENT


Legend

 County Boundary

 Roadways

 Community Planning Areas

 Lands Available for Development

 Major Subdivision Properties

 Minor Subdivision Properties

AREAS IN WHITE WERE REMOVED FROM CONSIDERATION AS BASED ON COMMUNITY PLANS AND EXISTING DEVELOPMENT WITHIN THE COUNTY. AREAS ALSO INCLUDE ENVIRONMENTALLY SENSITIVE LANDS SUCH AS WETLANDS, WETLAND BUFFERS, STREAMS, STREAM BUFFERS, PERMANENTLY PRESERVED, SHORE-LINE BUFFERS, AND OTHER SENSITIVE AREAS.

CENTREVILLE & PORTIONS OF QUEENSTOWN, WHICH ARE ILLUSTRATED AS WHITE (REMOVED FROM CONSIDERATION) WERE BUILT-OUT ACCORDING TO THEIR INDIVIDUAL COMMUNITY PLANS AS ILLUSTRATED IN THE MAXIMUM BUILD-OUT MAP.

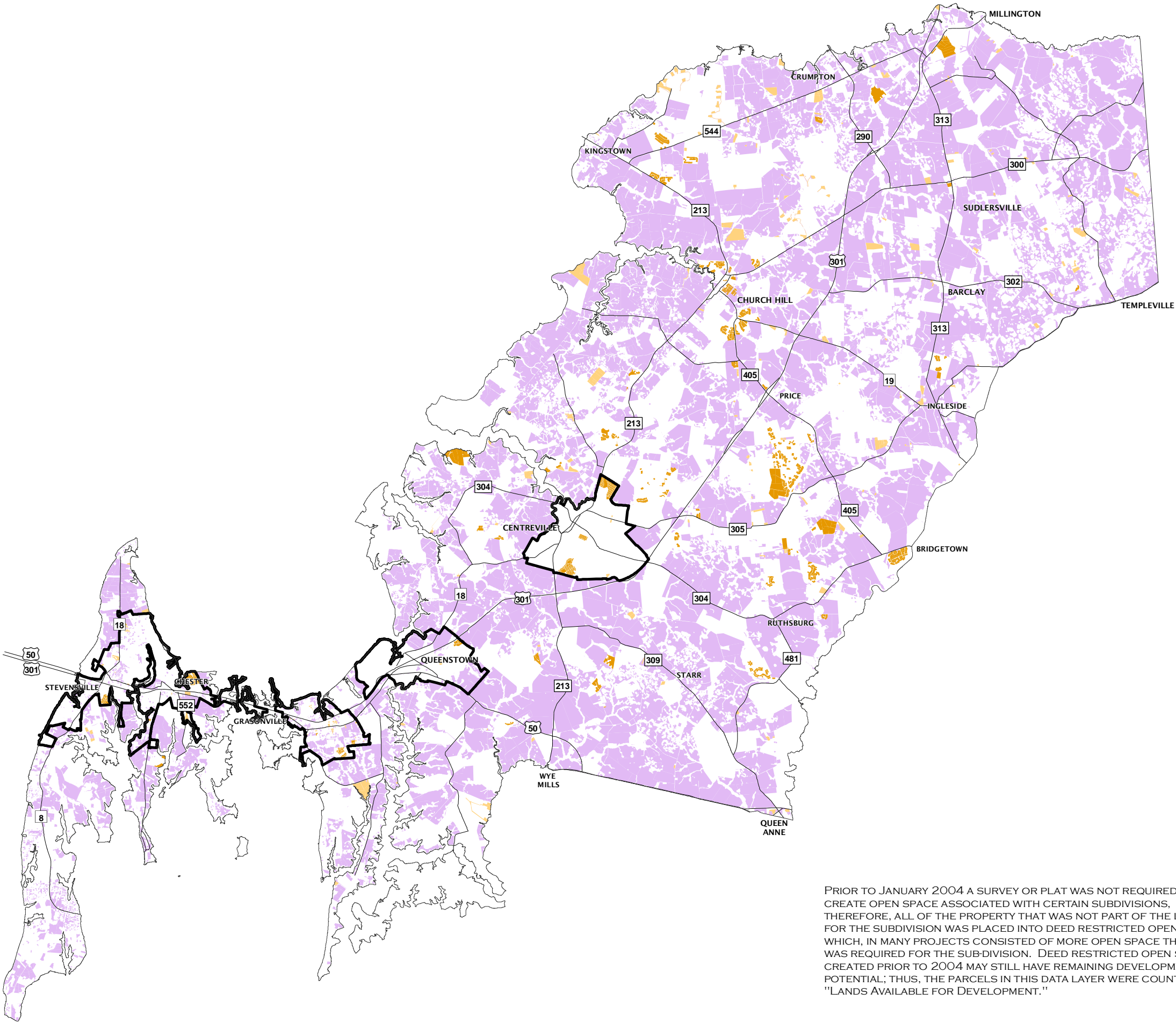
MAJOR SUBDIVISION IS MORE THAN 5 LOTS  
MINOR SUBDIVISIONS IS 5 LOTS OR LESS

SUBDIVISION DATA SINCE 2002



SOURCE: QUEEN ANNE'S COUNTY DEPARTMENT OF LAND USE, GROWTH MANAGEMENT & ENVIRONMENT, SATELLITE IMAGERY 2007-2008, AND 2008 TAX PARCELS AS COMPILED BY JMT.

MAY 2009



PRIOR TO JANUARY 2004 A SURVEY OR PLAT WAS NOT REQUIRED TO CREATE OPEN SPACE ASSOCIATED WITH CERTAIN SUBDIVISIONS, THEREFORE, ALL OF THE PROPERTY THAT WAS NOT PART OF THE LOTS FOR THE SUBDIVISION WAS PLACED INTO DEED RESTRICTED OPEN SPACE, WHICH, IN MANY PROJECTS CONSISTED OF MORE OPEN SPACE THAN WAS REQUIRED FOR THE SUB-DIVISION. DEED RESTRICTED OPEN SPACE CREATED PRIOR TO 2004 MAY STILL HAVE REMAINING DEVELOPMENT POTENTIAL; THUS, THE PARCELS IN THIS DATA LAYER WERE COUNTED AS "LANDS AVAILABLE FOR DEVELOPMENT."



MARYLAND

MAXIMUM CAPACITY  
BUILD-OUT

Legend

County Boundary

Roadways

Community Planning Areas

Parks

Maximum Capacity

Low Density Residential (1 to 2 units per 5 acres)

Medium Density Residential (2 to 8 units per acre)

High Density Residential (8+ units per acre)

Commercial

Mixed Commercial - Residential

Industrial

Institutional

Surface Mining

Very Low Density Rural (1 unit per 5+ acres)

Recreation (Private & Public)

Agriculture

Forest

Water

Wetlands

Transportation

NOTES: CENTREVILLE, WYE MILLS, AND QUEENSTOWN AREAS ARE BUILT-OUT AS DEPICTED FROM COMMUNITY PLANS.

MAPPING INCLUDES 2008 LAND USE AND PRE-EXISTING IMPROVEMENTS REDUCED FROM LANDS CONSIDERED FOR BUILD-OUT. WETLANDS AND WATER LAND USES ARE ALSO 2008 LAND USE CARRY-OVERS AND DO NOT REPRESENT DNR WETLANDS.

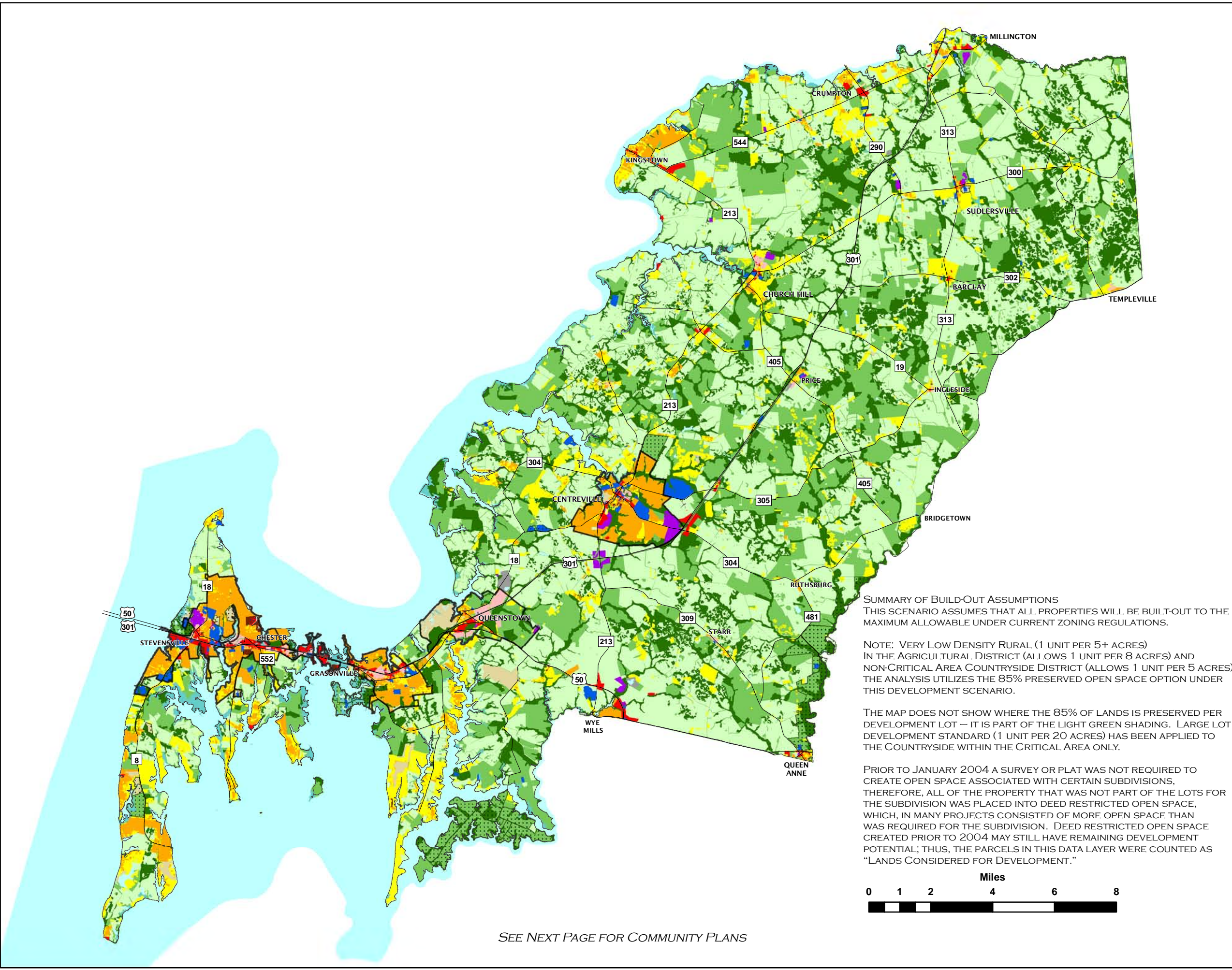
RESIDENTIAL DENSITIES REFLECT MARYLAND DEPARTMENT OF PLANNING DENSITIES AND DO NOT REFLECT QUEEN ANNE'S COUNTY ZONING DENSITIES. DENSITIES HAVE BEEN CALCULATED TO MEET WRE REQUIREMENTS AS DETERMINED BY MDE AND MDP.

CREATED BY ASSIGNING LULC SYMBOLOLOGY.



SOURCE: MARYLAND DEPARTMENT OF PLANNING, QUEEN ANNE'S COUNTY DEPARTMENT OF LAND USE, GROWTH MANAGEMENT & ENVIRONMENT, SATELLITE IMAGERY 2007-2008, AND 2008 TAX PARCELS AS COMPILED BY JMT.

JULY 2010



SUMMARY OF BUILD-OUT ASSUMPTIONS  
THIS SCENARIO ASSUMES THAT ALL PROPERTIES WILL BE BUILT-OUT TO THE MAXIMUM ALLOWABLE UNDER CURRENT ZONING REGULATIONS.

NOTE: VERY LOW DENSITY RURAL (1 UNIT PER 5+ ACRES) IN THE AGRICULTURAL DISTRICT (ALLOWS 1 UNIT PER 8 ACRES) AND NON-CRITICAL AREA COUNTRYSIDE DISTRICT (ALLOWS 1 UNIT PER 5 ACRES) THE ANALYSIS UTILIZES THE 85% PRESERVED OPEN SPACE OPTION UNDER THIS DEVELOPMENT SCENARIO.

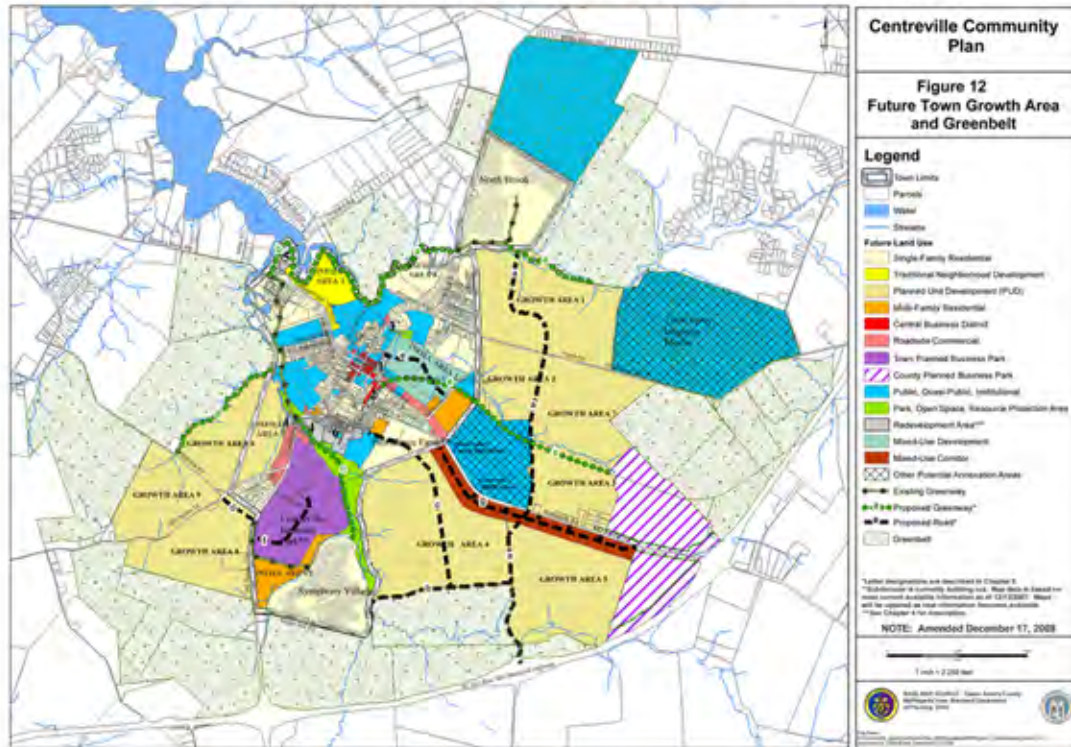
THE MAP DOES NOT SHOW WHERE THE 85% OF LANDS IS PRESERVED PER DEVELOPMENT LOT – IT IS PART OF THE LIGHT GREEN SHADING. LARGE LOT DEVELOPMENT STANDARD (1 UNIT PER 20 ACRES) HAS BEEN APPLIED TO THE COUNTRYSIDE WITHIN THE CRITICAL AREA ONLY.

PRIOR TO JANUARY 2004 A SURVEY OR PLAT WAS NOT REQUIRED TO CREATE OPEN SPACE ASSOCIATED WITH CERTAIN SUBDIVISIONS, THEREFORE, ALL OF THE PROPERTY THAT WAS NOT PART OF THE LOTS FOR THE SUBDIVISION WAS PLACED INTO DEED RESTRICTED OPEN SPACE, WHICH, IN MANY PROJECTS CONSISTED OF MORE OPEN SPACE THAN WAS REQUIRED FOR THE SUBDIVISION. DEED RESTRICTED OPEN SPACE CREATED PRIOR TO 2004 MAY STILL HAVE REMAINING DEVELOPMENT POTENTIAL; THUS, THE PARCELS IN THIS DATA LAYER WERE COUNTED AS “LANDS CONSIDERED FOR DEVELOPMENT.”

SEE NEXT PAGE FOR COMMUNITY PLANS



# CENTREVILLE COMMUNITY PLAN



# QUEENSTOWN

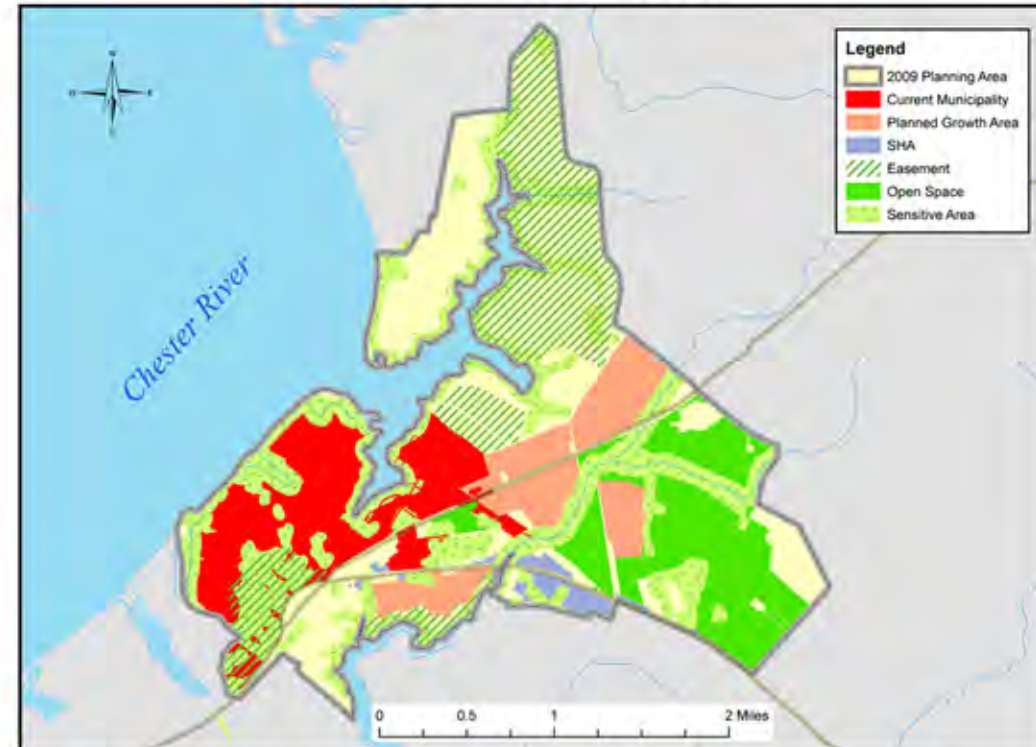
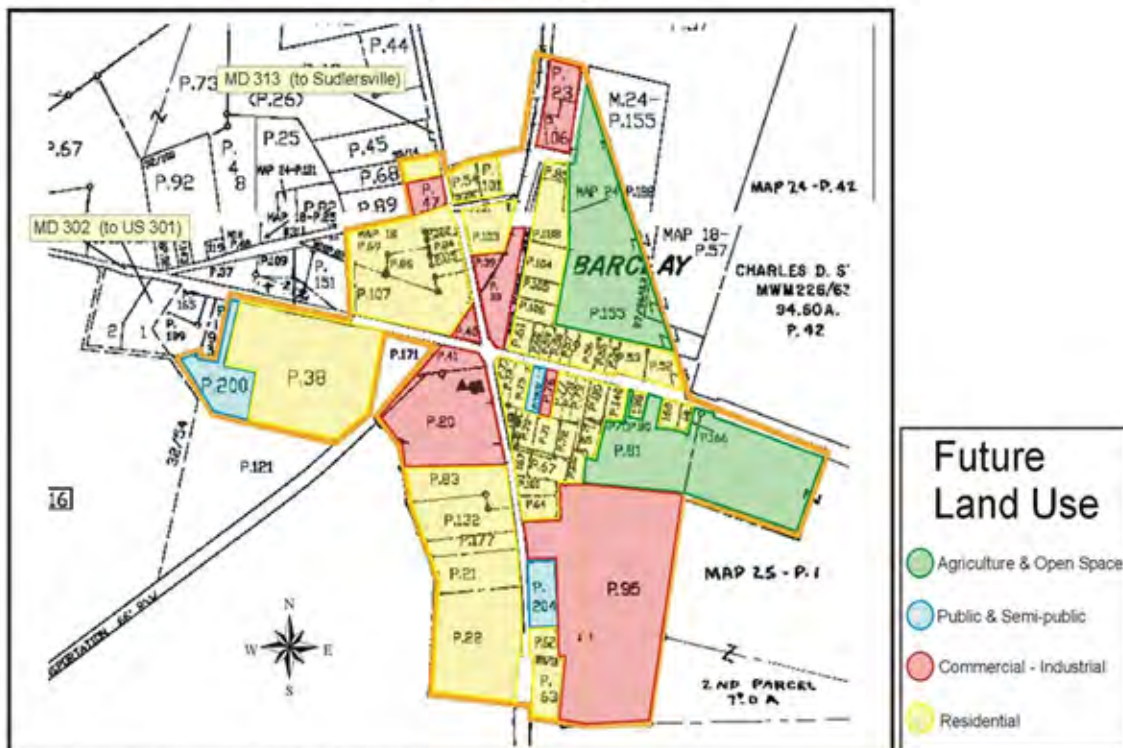
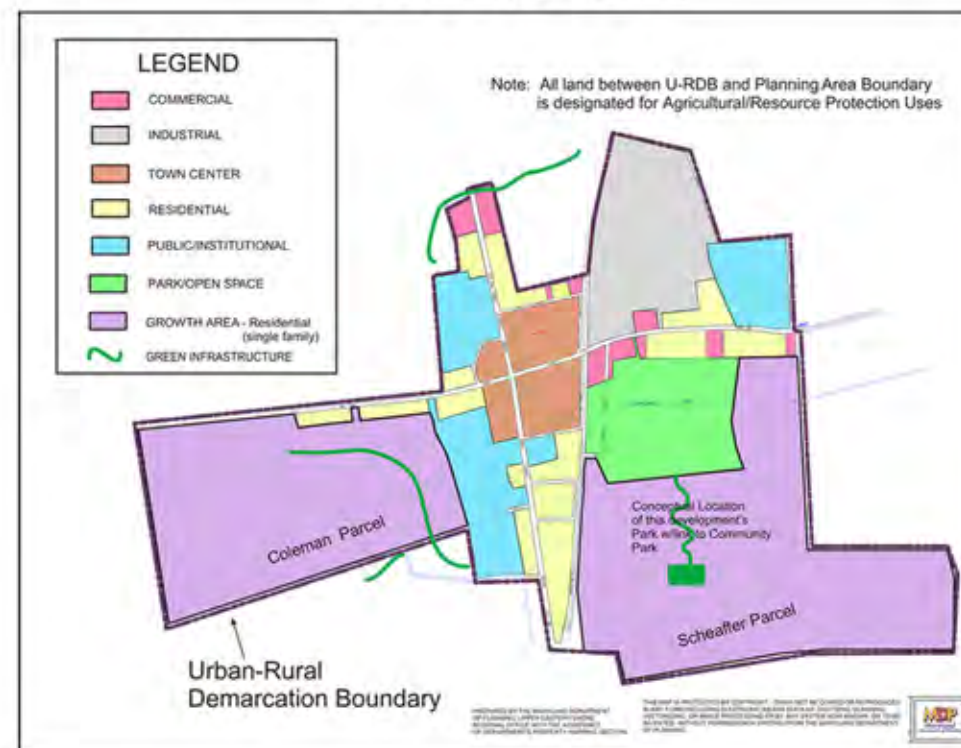


Figure 1-9. Preserved areas in the Queenstown Community Plan. Sensitive areas include 300 foot stream buffers, wetlands, and Category III Hurricane flood zones.

# Town of Barclay



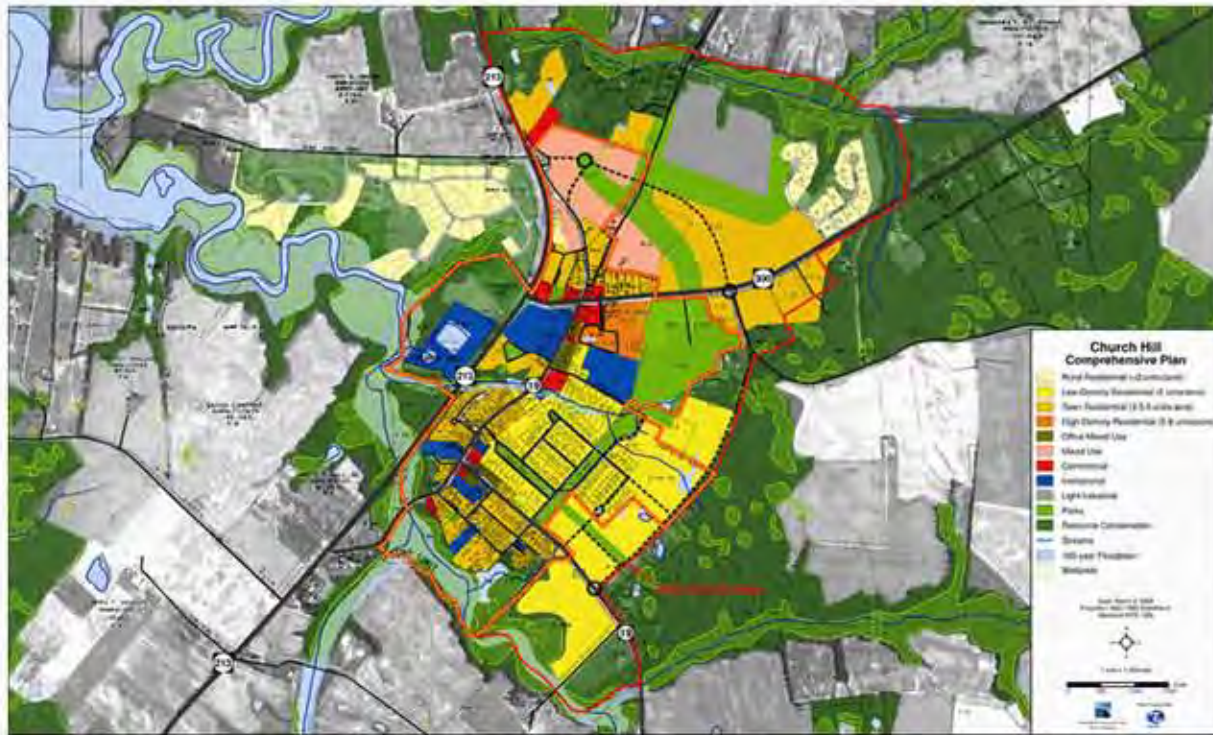
# SUDLERSVILLE



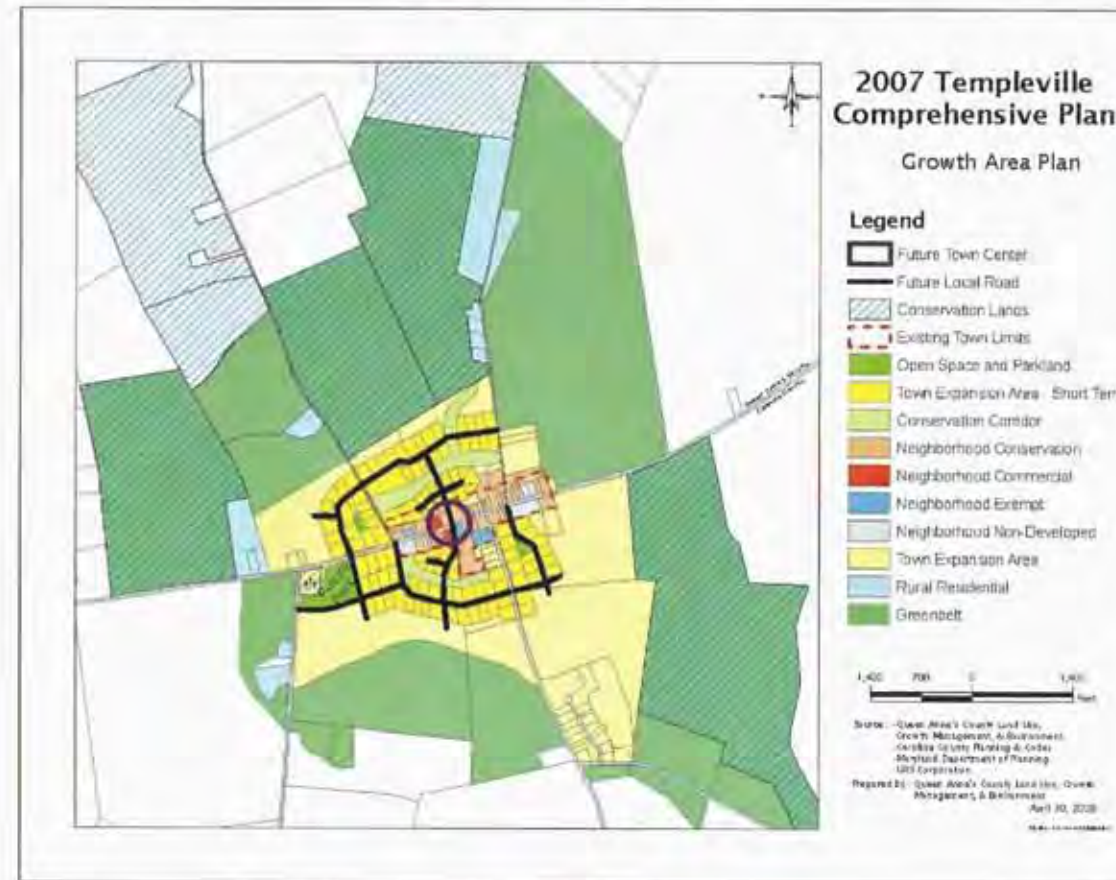
SOURCE: QUEEN ANNE'S COUNTY DEPARTMENT OF LAND USE, GROWTH MANAGEMENT & ENVIRONMENT, SATELLITE IMAGERY 2007-2008, AND 2008 TAX PARCELS AS COMPILED BY JMT.



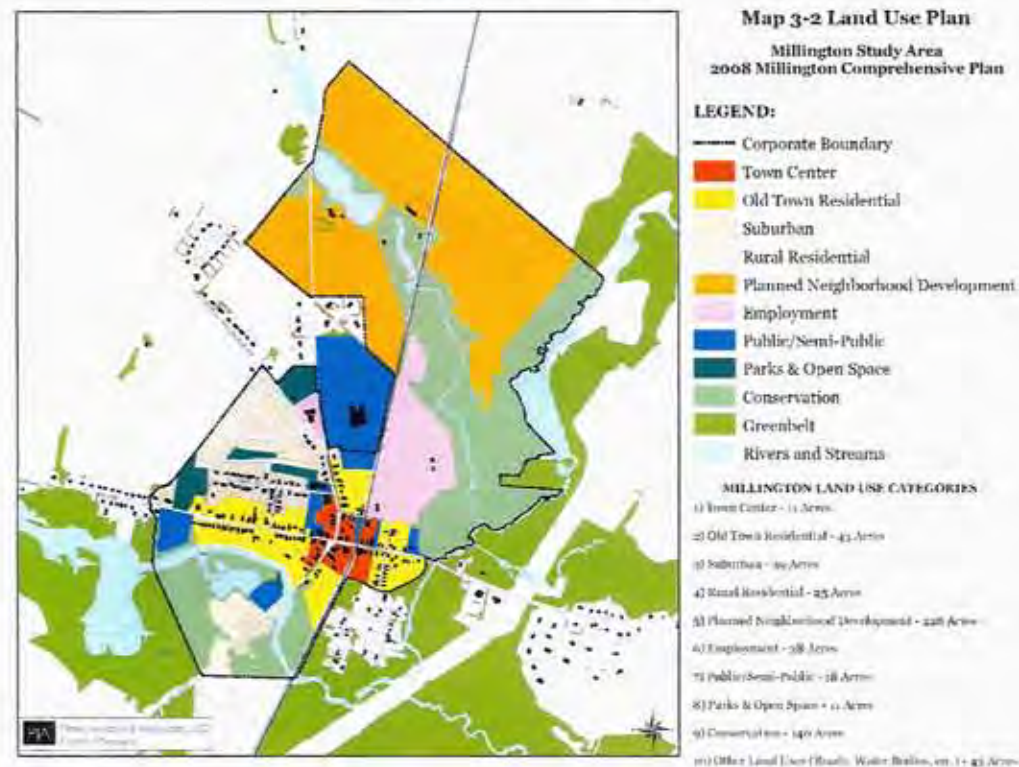
## CHURCH HILL



## TEMPLEVILLE



## MILLINGTON



## MAXIMUM CAPACITY BUILD-OUT

## COMMUNITY PLANS



SOURCE: QUEEN ANNE'S COUNTY DEPARTMENT OF LAND USE, GROWTH MANAGEMENT & ENVIRONMENT, SATELLITE IMAGERY 2007-2008, AND 2008 TAX PARCELS AS COMPILED BY JMT.

SEPTEMBER 2009





# Appendix 6:

## *Capacity Analysis for Defined Planning Path*





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## Section 1.0 Introduction

In 2004, the State of Maryland and local governments committed to include a development capacity analysis in Comprehensive Plans in accordance with a Memorandum of Understanding and an Executive Order from the Governor. This analysis was prepared in support of the **Sustainable Smart Growth Management Strategy** identified in Section 1.0: Land Use Element and as supported by other Plan Elements.

The analysis contained in this section is the **Capacity Analysis Defining the Planning Path** for Queen Anne's County. This analysis further describes the strategy for achieving the goal of **encouraging land uses and infrastructure improvements that will protect our waterways, conserve our natural resources and support sustainable and responsible agriculture** as identified on Map LU-7A: Comprehensive Plan Map: Countywide Land Use and quantified in Table 1-4 contained in Section 1.0: Land Use Element; the capacity for preservation contained in Section 3.0: Priority Preservation Area (PPA) Element; and, the capacity to manage growth outlined in Section 1.0: Land Use Element and Section 5.0: County/Town Planning Framework Element. This analysis provides the basis for growth management and preservation policies contained in the County's 2010 Comprehensive Plan.

A development capacity analysis, sometimes also referred to as "build-out analysis" or "buildable lot inventory" is an estimate of the total amount of development that may be built in an area under a certain set of assumptions, including applicable land-use laws, policies (e.g. zoning) and environmental constraints. This analysis includes the following components:

- Methods and Assumptions for Capacity Analysis; and
- Defining the Planning Path to achieve the vision for Queen Anne's County:
  - Capacity Analysis Summary;
  - Assessment of Capacity Analysis for Preservation (referenced in Section 3.0: PPA Element, Preservation Yield Option 2); and
  - Assessment of Capacity to Manage Growth applying various strategies in support of the rural land use preservation strategy detailed in Section 3.0: PPA Element and the sustainable smart growth management strategy described in Sections 1.0: Land Use Element and 5.0: County/Town Planning Framework Element.

The Maximum Capacity Build-Out Analysis under current zoning is contained in Appendix 5: Build-Out Report. The Maximum Capacity Build-Out results were used as a basis for discussions with the community to assist in **defining the planning path** to achieve the desired future plan.

## Section 1.1 Methods & Assumptions for Capacity Analysis

The following methods and assumptions were used in conducting the capacity analysis for the purpose of estimating the theoretical capacity for new residential development within the entire County. This is an analysis of the land area available for residential development, including infill development and residential components as part of mixed-use projects within the designated County Planning Areas.

The following subsections describe methods and assumptions utilized to estimate the County's development capacity applying the **Sustainable Smart Growth Management Strategy** outlined in Section 1.0: Land Use Element.





### Section 1.1.1 Method for Identifying Developable Land

The following outlines the methods used to support the capacity analysis defining the planning path for the County:

- Parcel data and tax assessment records maintained by the County were used to determine developable lands.
- Zoning Maps and calculations of zoning yield are used as a guide to where and what type of future development is allowed. The maximum density allowed in each zoning category is identified in Appendix 5: Build-Out Analysis Report.
- Future Town Annexation properties applying *smart growth* minimum density of 3.5 dwelling unit per acre.
- County Planning Areas' lands available for infill development versus and development.
- Major and Minor Subdivisions approved from January 2002 to April 2009 to identify both existing development since the last comprehensive plan update in 2002 as well as new development potential as a result of recent subdivision activity.
- Lands excluded from calculation of capacity:
  - Protected land and lands with environmental constraints.
  - Permanently preserved land.
  - Common use facilities (common areas in subdivisions).
  - Properties with exempt status such as churches, schools, cemeteries, state highway property, county property (public works).

### Section 1.1.2 Capacity Analysis Assumptions

This section outlines the various assumptions applied to calculate development capacity for areas outside County Planning Areas, Town Annexation Areas and inside County Planning Areas.

#### *Outside County Planning Areas*

The following assumptions were applied to determine capacity for lands outside of County Planning Areas:

#### **1. Agriculture (AG) and Countryside (CS) Zoning**

- 1:20 density – maximum of 5 development rights on-site.
- Development on-site is maximized.
- Remaining development rights can be transferred at a 1:8 transfer ratio.
- All lots on-site will be clustered with 15% of net buildable area for each property.
- Lots that are improved and less than 20 acres will be excluded. These lots have no further development rights.
- Only allow minor subdivisions.

#### **2. Suburban Estates (SE) Zoning**

- Development capacity based upon 1.25 acre minimum lot size to meet the Environmental Health Department requirements for on-site sewerage disposal systems.

#### **3. Estate (E) Zoning**

- Assumes an approximate 2 acre lot.



#### 4. Neighborhood Conservation (NC) Zoning

- Assumes 1 development right per vacant parcel. The total number of vacant parcels is 2,055.
- Approximately 1,612 of these vacant lots are located on Southern Kent Island with documentation of no available new lots with on-site sewerage disposal systems.
- Vacant lots within the NC Zoning Districts may or may not be buildable due to environmental conditions and Environmental Health Department requirements for on-site sewerage disposal systems.

##### *Town Annexation Areas*

The following assumptions were applied for Town Annexation Areas:

- Capacity was calculated applying the *smart growth* minimum density of 3.5 units per acre; and
- Existing development capacity was calculated by applying the County's allowable density of one unit per eight acres for County zoned land prior to annexation and Town upzoning.

##### *Inside County Planning Areas*

The following assumptions were applied for inside of County Planning Areas:

- Capacity was calculated based upon maximum density of current zoning districts for lands available for new development.
- Infill lots of record were assumed 1 dwelling unit per lot.

### Section 1.2 Capacity Analysis Summary

Table 1 on the following page summarizes development capacity when applying the *Sustainable Smart Growth Management Strategy* outlined in Section 1.0: Land Use Element. Development capacity on undeveloped land has been based on the assumptions and maximum development densities outlined previously in Section 1.1.2 of this appendix. This analysis is supported by growth management and preservation policies as outlined in the Assessment of Capacity Analysis for Preservation and Assessment of Capacity for Growth Management contained in subsequent sections of this appendix (Sections 1.3 and 1.4). The results of this analysis clearly indicate that there is sufficient land to accommodate reasonable future growth in Queen Anne's County with the ability to achieve desired levels of preservation of rural lands.

This Capacity Analysis Summary presents a theoretical potential of 19,039 new dwelling units, as shown in Table 1: Residential Development Capacity Analysis Summary. Of those 19,039 new dwelling units, the capacity has been defined for both inside Planning Areas and Outside of Planning Areas.

- 13,443 new dwellings representing growth from infill lots and new lots on undeveloped land inside Planning Areas. Of the calculated capacity:
  - 1,917 new dwelling units estimated from infill development associated with vacant lots of record in existing neighborhoods and completion of construction of residences on lots within recently approved subdivisions;
  - 2,208 new dwellings represent estimated growth on undeveloped land within the County's Planning Areas.
  - 9,318 new dwellings represent growth on undeveloped land that will be newly upzoned within Town Annexation Areas applying *smart growth* minimum density of 3.5 units per acre.
    - Of which approximately 5,266 of those dwelling units on new lots could potentially result from TDRs sent from lands zoned Agriculture (AG) and



Countryside (CS) targeted for permanent preservation as part of the County's Priority Preservation Area (PPA).

- 5,596 new dwellings representing growth on undeveloped land that will be newly upzoned outside of Planning Areas. The breakdown consists of:
  - 2,670 new dwelling units estimated from development within the Agriculture (AG) and Countryside (CS) zoning districts.
  - 2,926 new dwelling units estimated from undeveloped lands within Suburban Estates (SE), Estates (E) and Neighborhood Conservation (NC) zoning districts.

**Table 1: Residential Development Capacity Analysis Summary**

County/Town Planning Areas	Zoning Designation	Acres	Capacity (Number of New Dwelling Units On-Site)	Capacity for TDRs*
<b>Capacity Inside Planning Areas</b>	<b>Inside Priority Funding Areas (PFAs)</b>			
	• Residential Infill Lots - County Lands	705	1,917	
	• Residentially Zoned County Land	731	2,208	
	<b>Town Annexation Areas</b>	3,072	9,318	
	<b>Subtotal</b>	<b>4,508</b>	<b>13,443</b>	
<b>Capacity Outside Planning Areas</b>	Agriculture (AG) and Countryside (CS)	119,004	2,670	5,266
	Suburban Estates (SE)	939	751	
	Neighborhood Conservation (NC)**	2,575	2,055	
	Estates (E)	240	120	
	<b>Subtotal</b>		<b>5,596</b>	<b>5,266</b>
<b>Total Capacity</b>		<b>122,758</b>	<b>19,039</b>	<b>5,266</b>

\*Capacity for TDRs is the number of dwelling units that can be transferred off-site to a designated receiving area for development.

\*\*Includes the 1,612 undeveloped lots of record in the Southern Kent Island Study Area.

The ability to achieve desired levels of growth management and preservation of rural lands outlined in Section 1.3 of this appendix and detailed in Section 3.0 PPA Element while allowing reasonable levels of growth has the potential for:

- Meeting the County's short-term preservation goal of 100,000 acres; and
- Meeting the County's long term preservation goal of approximately 114,861 acres of lands zoned Agriculture (AG) and Countryside (CS) through use of a PPA.



### Section 1.3 Assessment of Capacity Analysis for Preservation

The lands within the designated PPA as depicted on Map ESA-10 include lands zoned Agricultural (AG) and Countryside (CS) with the exceptions described in Sections 1.1.1 and 1.1.2 of this appendix. The following option for rural land use preservation is the key preservation strategy supportive of the **Sustainable Smart Growth Management Strategy** identified in Section 1.0 Land Use Element and Section 3.0 PPA Element. The following assumptions are identified for this agricultural/rural lands preservation strategy:

- Option 2 Described in Section 3.0 Priority Preservation Area (PPA) – Application of **alternative agricultural/rural land use preservation strategy** with the following assumptions:
  - on-site development density at 1 dwelling unit per 20 acres on parcels up to 100 acres, with a limit of 5 units, which includes any existing dwellings;
  - farm employee dwelling units are excluded;
  - new lots are clustered with an average minimum lot size that meets the Environmental Health Department requirements where the remaining portion of the parcel is placed in deed restricted open space; and
  - for parcels that are greater than 100 acres, after on-site development at one unit per 20 acres, the remaining acreage is calculated at a density of one unit per eight acres for TDRs in keeping with the PPA Preservation Goal.

Note: The above are assumptions for the purpose of calculating various preservation strategy options as described. The assumption for average size of new lots (1.25 acres) is for purposes of assessing Option 2 and is not an existing or recommended zoning regulation.

Table 2: Capacity for Preservation

Long Term PPA Preservation Potential		Approximate Acres
		PPA Goal – 95,203
(1)	<b>Total Number of Acres within Designated PPA (also approximate undeveloped acreage)</b>	<b>119,004</b>
(a)	Environmentally sensitive areas preserved through zoning and other regulations (acreage is included in lines 1, 2, 3 and 4)	30,604
(b)	75 pending MALPF applications for preservation potential (acreage is included in lines 1, 2, 3 and 4)	11,047
(2)	Preferred rural area land use – 1 unit per 20 acres up to 100 acres capped at 5 units total with dwelling units clustered on an average 1.25 acre lot each* with requirement for deed restricted open space and use of TDRs	114,861
(3)	<b>Yield for potential preservation</b>	<b>114,861</b>
(4)	<b>PPA Preservation Goal</b>	<b>95,203</b>
(5)	<b>Potential Amount Exceeding PPA Goal</b>	<b>19,658</b>

Source: Calculated using datasets provided by Queen Anne's County, Department of Land Use, Growth Management and the Environment, 2009

\*Actual lot size will be based upon environmental health factors.

The application of the **preferred rural land use strategy** described as Option 2 above, results in a yield for potential preservation of 114,861 acres. If the maximum yield were achieved to preserve land under this option, the County has the potential to exceed the PPA goal for preservation by 19,658 acres. This



option supports the County's preservation goal for the PPA and the Sustainable Smart Growth Management Strategy identified in Section 1.0 Land Use Element.

## **Section 1.4 Assessment of Capacity to Manage Growth**

Achieving sustainable smart growth through preservation of rural agricultural land and protection of water resources and environmental sensitive lands can be accomplished through application of a variety of land use/land management strategies. These strategies emphasize infill and redevelopment opportunities, rural land preservation using Transfer of Development Rights (TDRs) and development potential in future Town Annexation areas.

### **Section 1.4.1 Infill Development Strategy**

Infill development strategies support realizing growth in County Planning Areas where public investment has been made for infrastructure. These Planning Areas, also designated as state Priority Funding Areas (PFAs), are required to establish minimum density standards of 3.5 dwelling units per acre. In order to meet agricultural preservation goals outlined in Section 3.0 PPA Element, future development in Queen Anne's County must meet minimum density standards. Infill development is development that takes place on vacant, undeveloped or underutilized parcels within an area that is already characterized by development such as the County's Planning Areas.

Under current zoning, applying the highest permitted density, the estimated potential infill dwelling unit capacity is identified in Table 3 on the following page. Infill dwelling unit capacity accounts for development within County Planning Areas on vacant and unimproved lots in approved subdivisions and new units on undeveloped land. This analysis indicates the potential for 1,917 dwelling units as infill development in existing approved subdivisions and the potential for 2,208 new dwelling units on undeveloped land with a total of 4,125 dwelling units through infill development.

Infill development strategies include redevelopment opportunities. The analysis for this table does not include redevelopment opportunities which could exceed current densities.





**Table 3: County Planning Area Infill Dwelling Unit Capacity**

County Planning Areas	Planning Area Characteristics	Planning Area Potential Based Upon Current Zoning			
		Vacant Lots in Subdivisions Platted Prior to 2002*	Unimproved Lots in Subdivision Approved Since 2002*	Acres Available for New Subdivision on Undeveloped Land	Potential New Dwelling Units on Undeveloped Land
Chester/Stevensville	Mixed Land Use Patterns (Infill, Redevelopment and Specified New Development)	94	1,769**	306.39	941
Kent Narrows	Mixed Land Use Patterns (Infill and Redevelopment)	0	0	1.05	11
Grasonville	Growth & Development (Infill, Redevelopment and New Development)	21	33	424.01	1,256
<b>Total Capacity of County Planning Areas</b>		<b>115</b>	<b>1,802</b>	<b>731.45</b>	<b>2,208</b>

\*Vacant lots in subdivisions and unimproved acre lots of record.

\*\*Four Season's Development Proposal – 1,350 Units are included in the total count.

Notes: Dwelling units can consist of apartments, single-family dwellings, townhouses and condominiums.

All vacant properties associated with subdivisions were estimated to have one development right.

Redevelopment was not considered in this analysis.

Properties that were improved and less than 0.5 acre after wetlands were removed were not considered to have further development potential.

Improved properties with split zoning would be considered to be improved twice. (Approximately 20 split zoned properties).

### Section 1.4.2 Rural Land Preservation Strategy Using TDRs

In order to achieve preservation goals established in Section 3.0 PPA Element, an assessment of the ability to successfully manage growth using a viable TDRs program considers the following:

- The potential number of TDRs for areas within the PPA consisting of lands available for preservation zoned Agriculture (AG) and Countryside (CS) approximately 119,004 acres as identified in Table 1-7 of Section 1.0 Land Use Element;
- The potential capacity for Town Planning Areas to receive TDRs as identified in Table 1-8 of Section 1.0 Land Use Element;
- The establishment of minimum densities for zoning districts;
- The capacity for development in County Planning Areas where investment of infrastructure has been made;
- The capacity for municipal growth based upon the expansion of infrastructure; and
- The potential for a new Planning Area(s) where additional infrastructure investment will occur.



Available capacity to preserve rural agricultural lands may be achieved through various options that make use of different ratios for utilizing TDRs to send development rights to Planning Areas identified in the County provided that smart growth Priority Funding Area (PFA) densities of 3.5 units per acre are achieved. For example, a scenario may use a ratio of 50% by-right and 50% TDR or 60% by right units and 40% TDRs. No units may be developed without employing a ratio of by-right development rights and TDRs development rights.

This approach requires the County refinement of the TDR program with the possibility for use of additional tools to realize preservation goals such as:

- Joint Planning Agreements with Towns to establish receiving areas and provide adequate public facilities to support development;
- Land banking of receiving areas;
- Continued use of PDR Program and Critical Farms Program to purchase TDRs;
- Continued use of MALPF funds for preservation; and
- Enhanced PDR and TDR Programs.

The following summarizes the assumptions used to determine the potential number of TDRs for rural agricultural lands zoned Agriculture (AG) and Countryside (CS) under the preferred preservation strategy for agriculture/rural land use preservation:

- **Option 2** – Application of *alternative agriculture/rural land use preservation strategy* with the following assumptions:
  - on-site development density at 1 dwelling unit per 20 acres on parcels up to 100 acres, with a limit of 5 units, which includes any existing dwellings;
  - farm employee dwelling units are excluded;
  - new lots are clustered with an average minimum lot size that meets the Environmental Health Department requirements where the remaining portion of the parcel is placed in deed restricted open space; and
  - for parcels that are greater than 100 acres, after on-site development at one unit per 20 acres, the remaining acreage is calculated at a density of one unit per eight acres for TDRs in keeping with the PPA Preservation Goal.

Note: The above are assumptions for the purpose of calculating various rural land use preservation strategy options as further described in Section 3.0 PPA Element. The assumption for average size of new lots (1.25 acres) is for purposes of assessing Option 2 and is not an existing or recommended zoning regulation.



**Table 4: Potential Number of TDRs for Areas within the Designated PPA**

Preservation Option	Area Description	Acres	Maximum TDR Sending Rural Agricultural Lands	TDR Sending Rural Agricultural Lands Preservation
Option 1	Acres within Entire Designated PPA Available for TDRs utilizing 1 unit/8 acres	119,004	14,876 DUs	NA
Option 2	Acres Available for TDRs after each parcel utilizes available 1 unit /20 acre development rights (equaling approximately 2,674 development rights)	42,498*	NA	5,266 DUs

*\*Utilizes a TDR density calculation of 1 unit/8 acres. DU=Dwelling Units.*

*Note: The 2,674 development rights were calculated using the County's GIS data including the parcel layer based upon assumptions presented in Option 2. Refer to Map ESA-10: Designated Priority Preservation Areas.*

Table 4 identifies the potential number of potential TDRs within the County's designated PPA based upon the previously described strategy options for preservation of rural lands. Table 5 on the following page identifies the potential for TDR receiving capacity within the areas identified by incorporated Towns for annexation. Map LU-6 identifies current incorporated Town boundaries as well as identified annexation areas within Town Fringe Areas.

### **Section 1.4.3 Development in Future Town Annexation Areas Strategy**

Future Town Annexation areas are identified in Town Municipal Growth Areas for the purpose of managing future growth. These areas have been identified as the Town Fringe or areas for future upzoning (an increase in density associated with zoning from County's AG or CS Districts to a Town Zoning District). In order for the County to implement a viable TDR Program, these lands need to be designated as TDR Receiving Areas. Table 5 identifies the potential development capacity or TDR receiving capacity the Town Fringe (future annexation areas).

When comparing the potential TDRs sending from rural agricultural lands applying the options for land preservation in the previous section, the opportunity to receive TDRs within the Town Fringe or Annexation Areas may depend upon a development density and zoning density of 3.5 units per acre. The Town Fringe areas as identified in Town Municipal Growth Elements can easily accommodate the potential of 5,266 dwelling units under Option 2. The maximum estimated dwelling units to be received within the Town Fringe areas is approximately 9,700 dwelling units which falls short of the potential 14,876 dwelling units if all rights are transferred from rural agricultural lands under Option 1. If the desire is to reach the maximum amount of preserved rural land under Option 1, the County's Planning Areas would need to receive approximately 3,879 dwelling units or there would be a need to explore further expansion of Planning Areas or creation of additional Planning Areas; or achieve densities higher than 3.5 within Planning Areas.

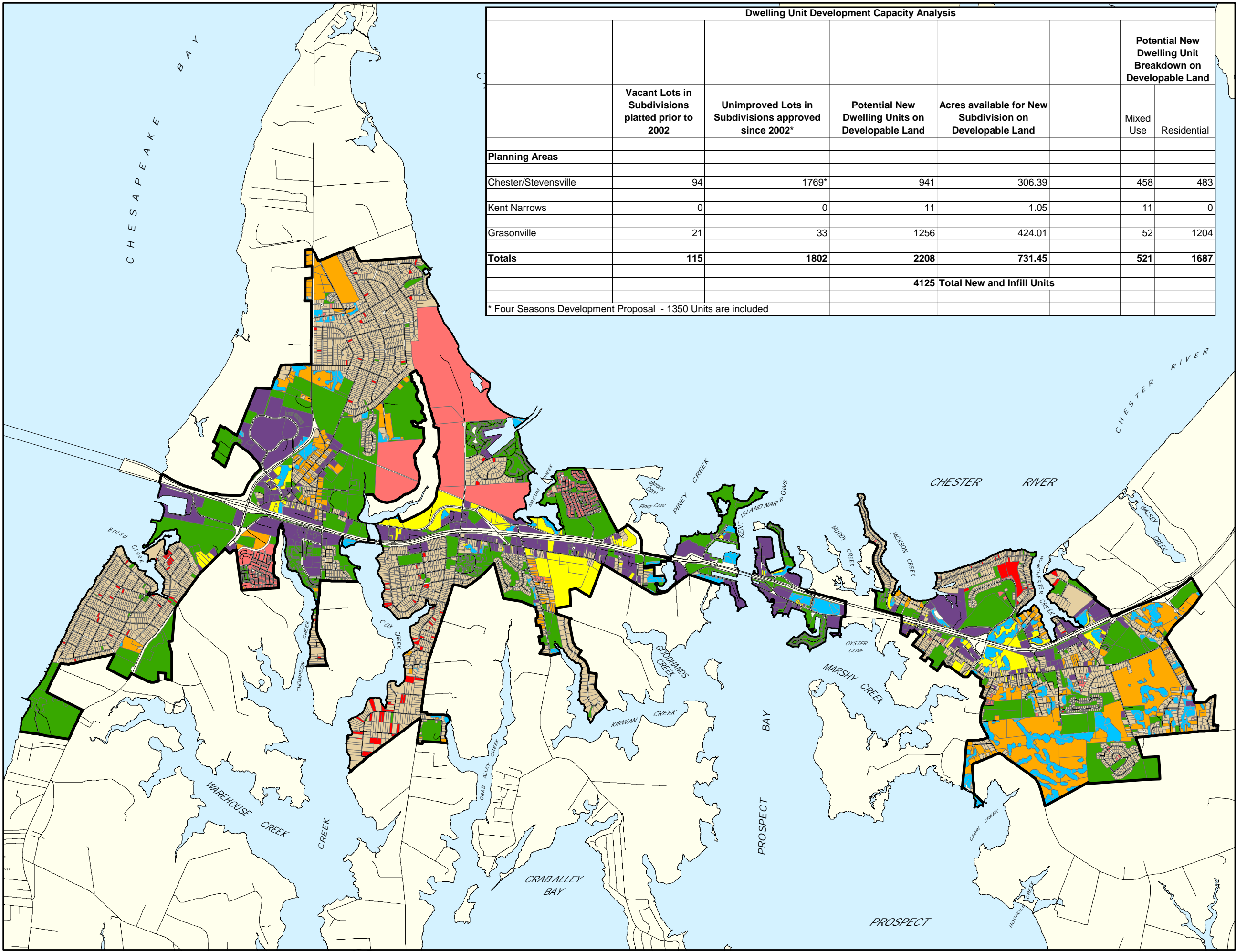


**Table 5: Potential Development Capacity or TDR Receiving Capacity in Town Fringe (Future Annexation Areas)**

Planning Area and Municipality	Column A: Planning Area and Municipal Growth Strategies	Acres in Town Fringe	Column B: Capacity Applying Smart Growth Density of 3.5 Units/Acre (Town Fringe or Annexation Area)	Column C: Development Capacity Allowed under County Density 1 Unit / 8 Acres*	Column D: Net (Column B-C) Dwelling Units
<b>Incorporated Towns</b>					
<b>Centreville</b>	Capacity to receive growth is planned.	1,720 acres	4,967 units*	215 units	4,752 units
<b>Queenstown</b>	Capacity to manage growth is based upon transfer of development rights within Planning Area.				
<b>Church Hill</b>	Capacity to receive growth is planned.	226 acres	791 units	28 units	763 units
<b>Sudlersville</b>	Capacity to receive growth is planned.	345 Acres Inner Loop	1,208 units	43 units	1,165 units
		675 acres Outer Loop	2,363 units	84 units	2,279 units
<b>Millington</b>	No capacity to receive growth is planned in County. Town is also in Kent County.				
<b>Templeville</b>	Limited capacity to receive growth is planned in County. Town is also in Caroline County.	30 acres	105 units	3 units	102 units
<b>Barclay</b>	Capacity to receive growth is planned.	76 acres	266 units	9 units	257 units
<b>Queen Anne</b>	No growth is planned in County.				
<b>TOTAL CAPACITY</b>		<b>3,072 acres</b>	<b>9,700 units</b>	<b>382 units</b>	<b>9,318 units</b>

\*Column C reflects the number of potential dwelling units based upon existing density for County zoned land prior to annexation and Town upzoning. (Refer to Section 3.5, Goal 2, Objective 2, Recommendation 2.b)





Dwelling Unit Development Capacity Analysis						
Planning Areas	Vacant Lots in Subdivisions platted prior to 2002	Unimproved Lots in Subdivisions approved since 2002*	Potential New Dwelling Units on Developable Land	Acres available for New Subdivision on Developable Land	Potential New Dwelling Unit Breakdown on Developable Land	
					Mixed Use	Residential
Chester/Stevensville	94	1769*	941	306.39	458	483
Kent Narrows	0	0	11	1.05	11	0
Grasonville	21	33	1256	424.01	52	1204
Totals	115	1802	2208	731.45	521	1687
			4125	Total New and Infill Units		
* Four Seasons Development Proposal - 1350 Units are included						

QUEEN ANNE'S COUNTY

COMPREHENSIVE PLAN UPDATE

MARYLAND

RESIDENTIAL  
DEVELOPMENT  
CAPACITY ANALYSIS  
FOR  
COUNTY PLANNING AREAS

Legend

- Growth Area Boundary
- Residential Property with Subdivision Potential
- Mixed Use Property with Subdivision Potential
- Vacant Property in Subdivisions platted after 2002
- Vacant Property in Subdivisions platted prior to 2002
- No Further Development Potential
- Commercial and Industrial Zoned Land
- Wetlands on Land Available for Subdivision
- Parks/Public Land/Community Open Space

NOTES:

- Properties that were improved and less than 0.5 acre after wetlands were removed were not considered to have further development potential
- Redevelopment was not considered in this analysis
- All vacant properties associated with subdivisions were estimated to have one development right
- Improved properties with split zoning would be considered to be improved twice. (Approximately 20 split zoned properties)



SOURCE: QUEEN ANNE'S COUNTY DEPARTMENT OF LAND USE, GROWTH MANAGEMENT AND ENVIRONMENT, MARYLAND DEPARTMENT OF NATURAL RESOURCES, U.S. FISH AND WILDLIFE SERVICE, AND MARYLAND DEPARTMENT OF PLANNING.

JUNE 2010

