2. Background and Planning

2.1. Physical

Kent County is located on the northern portion of the Delmarva Peninsula on the eastern side of the Chesapeake Bay, across The Bay from Baltimore. The County is bordered on the north by the Sassafras River, which separates it from Cecil County. The western border is formed by the Chesapeake Bay. The Chester River defines the southern boundary separating the County from Queen Anne's County. The State of Delaware forms the eastern boundary. Thematic maps showing the topography, watersheds, soils, land use and zoning are shown in Figures 2-1 to 2-5. The information in Section 2.1 is primarily obtained from the Soil Survey of Kent County conducted by the US Department of Agriculture.

2.1.1. Climate

The climate in Kent County is typical of other water adjacent communities in the Mid Atlantic. The average daily temperature in winter is 35 degrees F, and the average daily temperature in the summer is 75 degrees. The total average precipitation is 44 inches, of this 23 inches or 50% falls April through September. The average seasonal snowfall is 17 inches. The average humidity during mid afternoon is 50 percent and 80 percent at dawn.

2.1.2. Topography

The highest relief in Kent County is approximately 100 feet above sea level at Still Pond Neck, the lowest sections are the tidal marshes which are at or just above sea level. The average elevation is between 50 and 70 feet. The southern and western parts of the county have lower topography that ranges from 15 to 50 feet (see Figure 2-1 for more detail).

2.1.3. Watersheds

The county has 268 miles of tidal shoreline and numerous streams and ponds. Kent County consists of 6 watersheds, as defined by the MDE 6 digit code which are tributaries to the Chesapeake Bay. These watersheds are the Sassafras River, Upper, Middle and Lower Chester River, Still Pond-Fairlee and Langford Watersheds. The county is bordered on its western side by the Chesapeake Bay. Figure 2-2 shows the location of the watersheds. See Chapter 5 for more information.

2.1.4. Soils

Kent County is entirely within the Atlantic Coastal Plain in three physiographic regions. These regions, ranging from youngest to oldest, are: (1) alluvial deposits on flood plains and tidal marshes; (2) Talbot plain, which is at just above sea level to about 45 feet above sea level; and (3) the Wicomico plain, which is at an elevation of 45 to more than 100 feet above sea level. The drainage of Kent County is generally good. Most of the drainage is directly into streams by overland flow. Some water moves to streams more slowly by underground flow. Underground drainage is through the coarse textured sediments, which underlie most of the soils of the county. A few areas of the county however have little or no surface drainage and slow subsurface drainage. The largest of these areas are near Golts, west of Massey along U.S. Route 301, and in the areas between Tolchester and McCleans Corner. The county also contains scattered local depressions and pot holes, called “Delmarva Bays,” that lack drainage outlets and where all drainage is provided by underground flow. These are the most common in eastern part but are scattered throughout the county.

A map of the soils in Kent County can be seen in Figure 5-3. The soils in Kent County include but are not caped to:

- Matapeake-Sassafras association – Nearly level to strongly sloping, well drained soils formed in silty and loamy materials.
- Mattapex-Matapeake-Butlertown association – Dominantly nearly level to moderately sloping, moderately well drained and well drained soils formed in silty materials.
- Sassafras-Galestown-Fort Mott association – Nearly level to steep, well drained and somewhat excessively drained soils formed in sandy and loamy materials.
- Sassafras-Bibb-Colts Neck association – Nearly level to steep, well drained and somewhat excessively drained soils formed in sandy and loamy materials.
- Woodstown-Fallingston-Sassafras association – Nearly level to strongly sloping, poorly drained to well drained soils formed by in loamy materials.
- Mattapex-Othello association – Nearly level to moderately sloping, moderately well drained and poorly drained soils formed in silty materials.
- Elkton-Keyport-Mattapex Variant association – Dominantly nearly level to moderately sloping, moderately well drained and poorly drained soils formed in clayey and silty materials.
- Westbrook-Kingsland-Ipswich association – Level, very poorly drained marsh soils formed in organic and mineral materials.

2.1.5. Land Use

Agriculture is the primary land use in Kent County; 59 % of the land is agriculture, and forests and wetlands account for 29% (MDP Land Use, 2002). There are concentrations of developed residential lands in and around the towns of Chestertown and Rock Hall and other municipalities. A map of the land use in Kent County can be seen in Figure 2-4.

2.1.6. Zoning

The zoning map can be seen in Figure 2-5. Refer to the Kent County Comprehensive Plan for more detailed zoning information.

2.1.7. Aquifers

Groundwater is the sole source for domestic water supply in the County and there have not been any reported water supply problems. These layers dip to the southeast and thus are generally deeper in the eastern part of the County and shallower in the northwestern portion.

Water-bearing sands are in the Raritan-Patapsco Formation. The top of the formation is just about at sea level in the northwestern part of the County, 350 feet below sea level near Chestertown, and 700 feet below sea level near Millington. The low pH and iron in the water, however, caps the use of this aquifer. The Magothy Formation, another extensive water-bearing formation, is near sea level in the northwest, 250 feet below sea level at Chestertown, and 500 feet below sea level at Millington. Its water is also acidic in places and has a high iron content.

The Aquia Greensand is a major aquifer on the Eastern Shore of Maryland. The water is generally of good quality and in many localities is usable with little or no treatment. However, local treatment for iron removal is sometimes necessary. In recent years this aquifer has become a source of water for supplemental irrigation on the Eastern Shore. Yields range up to 1,300 gpm. The recharge area runs from Rock Hall to Galena and is covered by younger sediments. At Chestertown the top of the Aquia is approximately at sea level.

The Pliocene and Pleistocene Deposits in the County contain water that sometimes need iron removal and deacidification. The range in depth of these deposits is from 50 feet below sea level to 50 feet above sea level.

2.2. Population

There are two major concentrations of population in Kent County, the Towns of Rock Hall and Chestertown. The Town of Rock Hall represents approximately 9% of the total county population whereas the Town of Chestertown represents over 22% of the total. Table 2-1 Shows the population history of Kent County over the past 50 years and future population projections by MDP. The 2000 Census reported that the population in the County was 19,197 and the MDP population projection for 2030 is 23,400.

2.3. Planning

2.3.1. WRE Overview

The 2009 Water and Sewer Plan Update will comply with the regulations set forth by the Maryland Department of the Environment (MDE) as outlined in Title 26 subtitle 03 Chapter 01 Planning Water Supply and Sewerage Systems. This Water and Sewer Plan update will also supply the information necessary to comply with HB 1141 (Land Use-Local Government Planning), which specifies that County Comprehensive Plans must contain a Water Resources Element (WRE) linking planning and growth decisions to scientific resource management and be consistent with the county comprehensive plan.

The WRE was developed in response to Enhanced Nutrient Removal (ENR) Strategy for the Chesapeake Bay. The WRE was designed to examine the combined nutrient loading of point and non-point sources and provide guidance for future land use and development decisions. Under the WRE, comprehensive plans must evaluate the capacity of the water and wastewater treatment plants under present conditions and projected 2030 conditions. The water plants will be evaluated based on hydraulic capacity; wastewater treatment plants will be evaluated based on hydraulic capacity and nutrient caps established by the ENR Strategy. The ENR Strategy is the specific WWTP strategy established by the Maryland's Chesapeake Bay Statewide Tributary Strategy Implementation Plan. The nitrogen and phosphorus non-point loadings under current and projected 2030 conditions were also examined and are detailed in Chapter 5.

2.3.2. Water Plant Analysis

The main source of municipal and private water supply in Kent County is groundwater drawn from the Aquia Greensand Aquifer. The water supply analysis is based solely on the yield performance of the wells in the region. Where data is available, demand was compared to capacity. Well tests were performed at four of the water treatment plants: Betterton, Kennedyville, Millington and Worton. Results of the water analysis are shown in Table 2-2. As shown in Table 2-2, these plants have adequate supply to meet their demand. Engineering judgment suggests that the rest of the water treatment plants in Kent County will have adequate supply because all of Kent County draws from same aquifer and there have been no previous reported water supply problems. The water service areas have no planned extensions and demand is not expected to increase. The exception is the Worton Treatment Plant which has adequate capacity for growth. No water supply problems are anticipated in the 2030 planning horizon.

Decades of increased pumping have caused groundwater levels in parts of the Maryland Coastal Plain to decline. Continued decline could affect the long term sustainability of this resource in Coastal Plain

communities and the agricultural industry of the Eastern Shore. Based on a recommendation from the Advisory Committee on the Management and Protection of the State's Water Resources, the Maryland and U.S. Geological Surveys have developed a Science Plan for a Comprehensive Regional Assessment of the Atlantic Coastal Plain Aquifer System. The study area will encompass all of the Maryland and Delaware Coastal Plain as well as portions of Virginia. Information from the Assessment will provide the basis of allocation ground water in the Coastal Plain in the future. Information from this effort will be incorporated in the future Water and Sewer Plan Upgrades as it becomes available.

2.3.3. Wastewater Treatment Plant Analysis

2.3.3.1. Purpose of Wastewater Treatment Plant Analysis

The purpose of the Wastewater Treatment Plant (WWTP) Analysis is to examine the available capacity of each WWTP and evaluate the potential for growth. The available capacity is evaluated based on flows and discharge nutrient caps and evaluated under present and projected future (2030) conditions. The available capacity is converted to growth potential and is presented in available equivalent dwelling units (EDUs) that can be added to each WWTP. This analysis will provide county officials with the information necessary to concentrate growth in areas served by WWTP with available capacity and develop capital programs and allocate funds to WWTPs in need of upgrades.

2.3.3.2. Procedure of Wastewater Treatment Plant Analysis

Detailed analysis procedures and intermediate results are presented in Appendix 2-A. Step by step procedures calculation sheets for selected WWTPs can be seen in Appendix 2-J. The first step in the WWTP analysis was to identify the nutrient caps established by MDE. The caps are given in lbs/year and will not increase despite increases in flow; this is defined as the Nutrient Cap for the WWTP. To establish caps, WWTPs are divided into two categories, major and minor WWTPs. Major WWTPs have a design capacity of at least 0.5 MGD and minor WWTPs have a design flow capacity of less the 0.5 MGD. Rock Hall was re-classified as a minor plant on January 30th, 2009 by MDE. The caps for the major WWTPs are based on the design capacity and discharge concentrations of 4 mg/liter of nitrogen and 0.3 mg/liter of phosphorus. The caps for the minor WWTPs are based on the projected 2020 flow and discharge concentrations of 18 mg/liter of nitrogen and 3 mg/liter of phosphorus. If a minor WWTP is expanded, the caps cannot exceed 6,100 lbs/year of nitrogen and 457 lbs/year of phosphorus.

The second step in the analysis was to establish the current discharge loading of nutrients from each WWTP. The loading rates were determined from best available data on flows and discharge concentrations. Flow data was obtained from the 2005 Water and Sewer Plan and Flow Capacity Reports and Discharge Monitoring Reports (DMRs). Tolchester provided loadings and flows for the first 5 months of 2008 which were converted to concentrations. The Betterton and Worton WWTPs do not record effluent concentrations and were assumed to operating at ENR Strategy concentrations for minor WWTPs. The most recent DMRs (source details can be seen in Appendix 2-E were used to determine the concentrations for the Rock Hall, Galena, Millington and Kennedyville WWTPs. Chestertown was assumed to be operating at ENR because the available DMRs do not reflect most recent upgrades. Chestertown is considered a major WWTP and its ENR nutrient caps are based on design flow and discharge nitrogen concentrations of 4 mg/liter and 0.3 mg/liter of Phosphorus.

The future discharge loading rates were estimated by predicting the future flow and using the ENR Strategy concentrations for the major WWTPs and best available current concentrations for minor WWTPs. The future flows were estimated by comparing the ratio of acres in the current service area to acres in the future service area derived from the GIS files, with the exception of Chestertown and Millington where future flows were provided by the municipalities. In the future, this procedure will be

refined using capacity management plans or growth simulation results from MDP when information becomes available.

The next step was to evaluate if a capacity surplus or deficit is projected. First, the hydraulic capacity was compared to the hydraulic demand under present and projected future conditions. To conduct the nutrient analysis, the cap was compared to the load under present and projected future conditions. The capacity surplus or deficit was converted to equivalent dwelling units to identify growth potential. The analysis (hydraulic, nitrogen, phosphorus) that allowed for the least amount of growth was identified as the limiting factor.

2.3.3.3. Results of Wastewater Treatment Plant Analysis

The results of The WWTP analysis are shown in Tables 2-3 through 2-5. There is adequate hydraulic capacity for all WWTPs under current conditions, as shown in Table 2-3. Millington is currently discharging 55,000 gpd; however, a recent permit change request has indicated that annexations will increase the flow to 140,000 gpd within a short period of time. Subsequently 140,000 gpd is used to calculate current conditions in the WWTP analysis. Rock Hall, Galena, Tolchester, Kennedyville and Betterton have adequate capacity for their projected future growth. Chestertown is expected to use all of its available hydraulic capacity for annexations. Worton is currently in the process of upgrading its plant to 250,000 gpd and is expected to use all of the 250,000 gpd capacity. Using the current design capacity, the Millington WWTP cannot accommodate the proposed growth; however, if the planned expansion is completed, there will be adequate hydraulic capacity.

Table 2-4 and 2-5 show the results of the nitrogen and phosphorus analysis. The results show, that under current conditions, the County-owned WWTPs of Tolchester, Worton and Kennedyville along with the town-owned plants of Chestertown, Rock Hall and Betterton are meeting their nutrient caps for both nitrogen and phosphorus and have potential room for growth. Galena and Millington are currently over their nutrient caps.

Under projected 2030 conditions, Rock Hall, and Kennedyville will have additional capacity for growth. Worton (without ENR upgrade), Galena, Millington, Kennedyville and Betterton will be over their nutrient caps and would be required to expand/upgrade their WWTPs to account for projected growth. Chestertown is expected to use all of available capacity with proposed annexations. As noted previously in this section the Worton WWTP is currently being upgraded and upgrades are currently being planned for the Millington WWTP and are anticipated to meet 2030 conditions.

One of the options under the Tributary Strategy Implementation Plan allows grouping of WWTPs under a "bubble" discharge permit so that a WWTP achieving performance better than its nutrient cap could offset the performance of another WWTP or WWTPs not achieving its or their nutrient caps. The bubble permit approach provides increased infrastructure planning flexibility, however it is still the goal for all systems to eventually comply with caps and use the best available technology. Table 2-6 summarizes information for the total load of nitrogen and phosphorus under current and projected 2030 conditions for each WWTP. The permit options are also identified in this table. The county has the option of applying for a county-wide bubble permit including every WWTP or a county-owned WWTP bubble permit for Tolchester, Worton and Kennedyville WWTPs. This summary identifies the nutrient surplus or deficit within service areas corresponding with the permit option considered.

Under current conditions the county-wide plant bubble permit approach would have an excess of 20,201 lbs/year of nitrogen and 2,481 lbs/year of Phosphorus. The county plant bubble permit option would have an excess of 4,191 lbs/year of nitrogen and 547 lbs/year of phosphorus. Under projected 2030 conditions the county-wide bubble permit would have a deficit of 1,516 lbs/year of nitrogen and 49 lbs/year of

Phosphorus. The county plant bubble permit would have a deficit of 1,325 lbs/year of nitrogen and 437 lbs/year of phosphorus. The bubble permit option for either scenario would require additional upgrades to WWTPs.

An additional analysis step was taken to convert the surplus or deficit of nutrient caps to equivalent dwelling units (EDUs). The purpose of this analysis is to convert the nutrient information into a form that can easily be used for preliminary planning. The EDU analysis, shown on Table 2-7, also allows a limiting factor to be identified. The EDU analysis is an estimation based on the most current DMRs for each plant. Subsequently, the EDU analysis is not applicable to the bubble permit because each WWTP has a different effluent discharge concentration.

Table 2-1 Population Projections

	1950 Census	1960 Census	1970 Census	1980 Census	1990 Census	2000 Census
Kent County	13,677	15,481	16,146	16,695	17,842	19,197
Betterton	314	328	327	356	360	361
Chestertown	3,143	3,602	3,476	3,300	4,05	4,665
Galena	359	299	361	374	324	463
Millington	356	334	435	512	N/A	371
Rock Hall	786	1,073	1,125	1,511	1,584	1,536

- Kent County Portion

MDP Projections

Date	2005	2010	2015	2020	2025	2030
Kent County	19,850	20,650	21,450	22,250	22,900	23,400

Table 2-2

Water Supply Evaluation

Water Supply Plant	Permitted Flow (GPD)	2009 Demand (GPD)	Capacity*
Chestertown	975,000	713,000	N/A
Rock Hall	230,000	220,000	N/A
Galena	90,000	33,000	N/A
Betterton	50,000	37,000	115,200
Millington	137,000	65,425	273,600
Kennedyville	51,800	22,000	129,600
Worton-Butlertown	71,000	65,250	216,000
Fairlee	146,000	74,200	N/A

* Based on Well Production

Table 2-3- Hydraulic Capacity

General Information		2009 Conditions			2030 Conditions		
Name of Plant	Design Capacity (gpd)	Flow (gpd)	Surplus/Deficit (gpd)	Available EDU Capacity	Flow (gpd)	Surplus/Deficit (gpd)	Available EDU Capacity
Major Plants							
Chestertown WWTP[5]	1,500,000	706,000	794,000	3,176	1,500,000	0	0
Minor Plants							
Rock Hall WWTP	510,000	220,000	290,000	1,160	228,273	281,727	1,127
Galena WWTP	80,000	50,000	30,000	120	50,000	30,000	120
Millington WWTP[4]	145,000	140,000	5,000	20	250,000	-105,000	-420
Worton WWTP[3]	250,000	99,000	151,000	604	250,000	0	0
Tolchester WWTP	265,000	94,000	171,000	684	132,291	132,709	531
Kennedyville WWTP	60,000	20,000	40,000	160	41,395	18,605	74
Betterton WWTP	200,000	12,000	188,000	752	12,000	188,000	752

1 Each Equivalent Dwelling Unit was assumed to discharge 250 gpd.
2 Documentation of Source Information can be seen in Appendix 2-E.
3 Kent County is currently in the process of upgrading their Worton plant to 250,000 gpd.
4 2009 Millington flows are 55,000 gpd. The WWTP analysis current flows of 140,000 gpd are based on the request to revise the permit. 2030 flows are based on discussions at the 1/14/09 meeting, adequate capacity is expected to be available once planned upgrades are completed.
5 2030 Chestertown flow calculation predicted 805,000 gpd. Based on 1/14/09 meeting, proposed annexations will use the remaining 695,000 gpd.

Table 2-4- Nitrogen Load Capacity

General Conditions		2009 Conditions			2030 Conditions		
Name of Plant	Limit (lb/year)	Load (lb/year)	Surplus/Deficit (lb/year)	Available EDU Capacity	Load (lb/year)	Surplus/Deficit (lb/year)	Available EDU Capacity
Major Plants							
Chestertown WWTP[7]	18,273	8,597	9,676	3,179	18,265	0	0
Minor Plants							
Rock Hall WWTP	15,615	4,902	10,713	1,923	5,087	10,528	1,890
Galena WWTP	1,538	1,747	-209	-24	1,747	-209	-24
Millington WWTP [6]	3,344	8,080	-4,736	-328	14,429	-11,085	-768
Worton WWTP[5]	3,631	2,712	919	67	6,849	-3,218	-235
Tolchester WWTP	5,584	2,690	2,894	405	3,785	1,799	251
Kennedyville WWTP	1,399	264	1,135	344	547	852	258
Betterton WWTP	1,224	658	566	41	658	566	41

1 Limits were established from MDE worksheet, Appendix 2B.
2 2009 and 2030 Conditions Assume Chestertown is operating at ENR levels.
3 EDU analysis is an attempt to quantify the nutrient loading analysis in non technical terms. It is not intended to be a finite planning tool.
4 EDU analysis is based on the most current DMRs, if plant performance changes so will the number of available EDUs.
5 Kent County is currently in the process of upgrading their Worton plant to 250,000 gpd.
6 2009 Millington flows are based on the request to revise the permit. 2030 flows are based on discussions at the 1/14/09 meeting.
7 2030 Chestertown flow calculation predicted 805,000 gpd. Based on 1/14/09 meeting, proposed annexations will use the remaining 695,000 gpd.

$$AvailableEDUs = \frac{Cap - Load}{C \times 8.34 \times 365 \times 250} \times 1{,}000{,}000$$

Table 2-5 - Phosphorus Load Capacity

General Information			2009 Conditions			2030 Conditions		
Name of Plant	Limit (lb/year)	Maximum Limit if Plant Expands (lb/year)	Load (lb/year)	Surplus/Deficit (lb/year)	Available EDU Capacity	Load (lb/year)	Surplus/Deficit (lb/year)	Available EDU Capacity
Major Plants								
Chestertown WWTP[7]	1,371	1,371	645	726	3,181	1,370	0	0
Minor Plants WWTP								
Rock Hall WWTP	2,602	2,602	131	2,471	16,654	136	2,466	16,621
Galena WWTP	256	256	1,030	-774	-150	1,030	-774	-150
Millington WWTP [6]	557	457	1,040	-483	-260	1,857	-1,400	-754
Worton WWTP[5]	605	457	452	153	67	1,142	-685	-300
Tolchester WWTP	931	457	561	370	248	789	-332	95
Kennedyville WWTP	233	233	61	172	223	127	106	138
Betterton WWTP	204	204	110	94	41	110	94	41

1 Limits were established from MDE worksheet.
2 2009 and 2030 Conditions Assume Chestertown is operating at ENR levels.
3 EDU analysis is an attempt to quantify the nutrient loading analysis in non technical terms. It is not intended to be a finite planning tool.
4 EDU analysis is based on the most current DMRs, if plant performance changes so will the number of available EDUs.
5 Kent County is currently in the process of upgrading their Worton plant to 250,000 gpd.
6 2009 Millington flows are based on the request to revise the permit. 2030 flows are based on discussions at the 1/14/09 meeting.
7 2009 Chestertown flow calculation predicted 805,000 gpd. Based on 1/14/09 meeting, proposed annexations will use the remaining 695,000 gpd.

$$AvailableEDUs = \frac{Cap - Load}{C \times 8.34 \times 365 \times 250} \times 1{,}000{,}000$$

Table 2-6 Nutrient Loading Summary for Bubble Permits

	Caps (lbs/year)		2009 Conditions (lbs/year)		2030 Conditions (lbs/year)	
	Nitrogen	**Phosphorus**	**Nitrogen**	**Phosphorus**	**Nitrogen**	**Phosphorus**
Major Plants						
Chestertown WWTP	18,273	1,371	8,597	645	18,265	1,370
Minor Plants WWTP[5]						
Rock Hall WWTP	15,615	2,602	4,902	131	5,087	136
Galena WWTP	1,538	256	1,747	1,030	1,747	1,030
Millington WWTP[4]	3,344	457	8,080	1,040	14,429	1,857
Worton WWTP[3]	3,631	457	2,712	452	6,849	1,142
Tolchester WWTP	4,827	931	2,690	561	3,785	789
Kennedyville WWTP	1,399	233	264	61	547	127
Betterton WWTP	1,224	204	658	110	658	110
Bubble Permit Information						
County Wide Cap	**49,851**	**6,511**	**29,650**	**4,030**	**51,367**	**6,560**
County Wide Surplus(+)/Deficit(-)			20,201	2,481	-1,516	-49
County Plant Cap[2]	**9,857**	**1,621**	**5,666**	**1,074**	**11,182**	**2,058**
County Plant Surplus(+)/Deficit(-)			4,191	547	-1,325	-437

1 2009 and 2030 Conditions Assume Chestertown is operating at ENR levels.
2 County Plant Cap includes Worton, Tolchester and Kennedyville.
3 Kent County is currently in the process of upgrading their Worton plant to 250,00 gpd.
4 Millington is planning to upgrade its plant, phosphorus cap will reduce to 457 lbs/year.
5 If minor plants are expanded the limit will be reduced to 6,152 lbs/year of Nitrogen and 457 lbs/year of Phosphorus.

Table 2-7 Limiting Factor Based on Equivalent Dwelling Unit (EDUs)

Name of Plant	2009 Conditions		2030 Conditions	
Major Plants	**Available EDUs**	**Limiting Factor**	**Available EDUs**	**Limiting Factor**
Chestertown WWTP	3,176	Hydraulic	0	Nitrogen/Phosphorus
Minor Plants WWTP				
Rock Hall WWTP	1,160	Hydraulic	1,127	Hydraulic
Galena WWTP	-150	Phosphorus	-150	Phosphorus
Millington WWTP [4]	-328	Nitrogen	-768	Nitrogen
Worton WWTP[5]	67	Nitrogen/Phosphorus	-300	Phosphorus
Tolchester WWTP	248	Phosphorus	95	Phosphorus
Kennedyville WWTP	160	Hydraulic	74	Hydraulic
Betterton WWTP	41	Nitrogen/Phosphorus	41	Nitrogen/Phosphorus

1 2009 and 2030 Conditions Assume Chestertown is operating at ENR levels.
2 EDU analysis is an attempt to quantify the nutrient loading analysis in non-technical terms. It is not intended to be a finite planning tool.
3 EDU analysis is based on the most current DMRs, if plant performance changes so will the number of available EDUs.
4 Millington requested to upgrade their permit to 140,000 gpd, future flow will be 250,000 gpd.
5 Kent County is currently in the process of upgrading their Worton plant to 250,00 gpd.

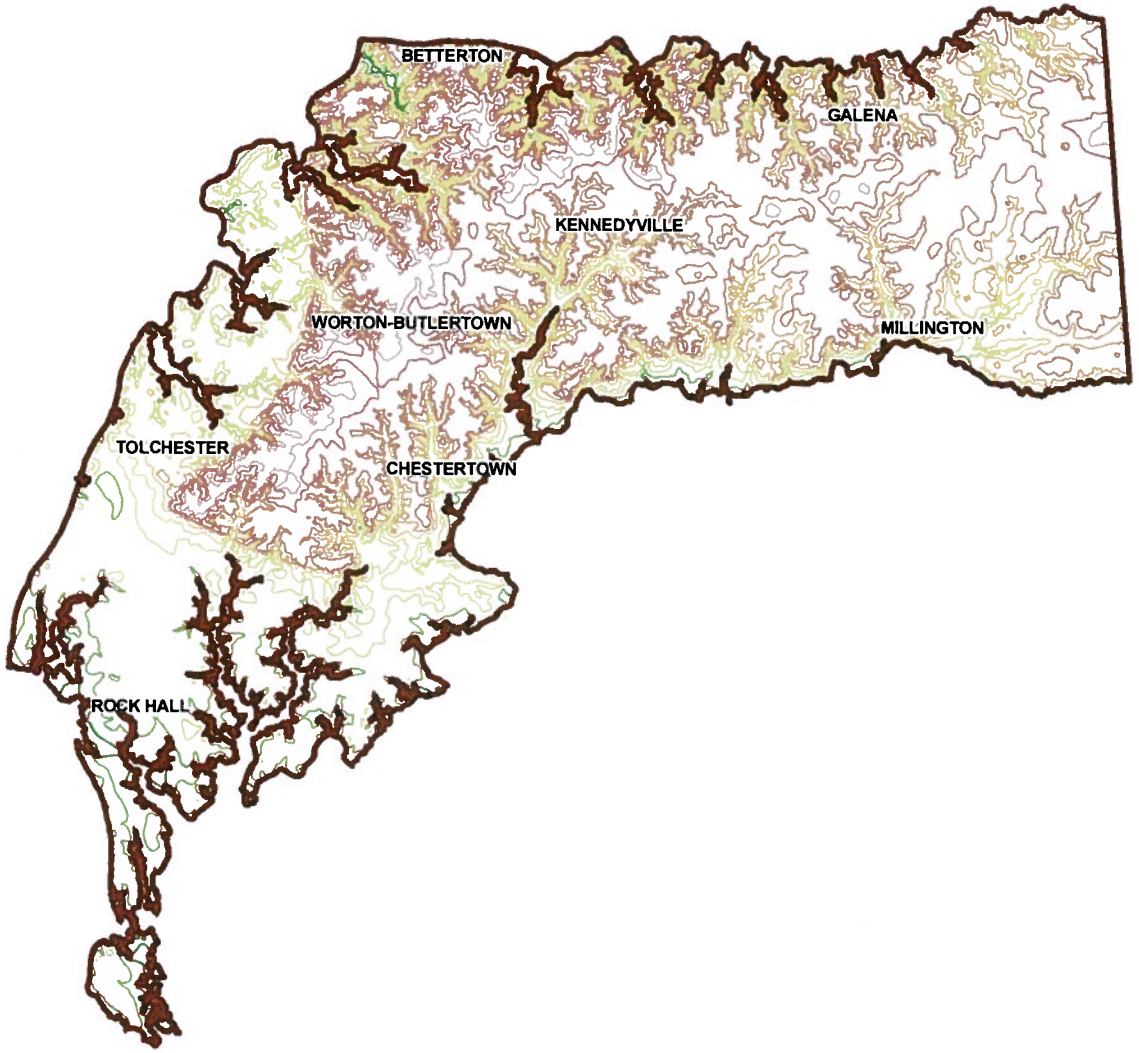

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FIGURE 2-1

N

LEGEND

- County Boundary

Topography

Elevation (Feet)

- 0
- 10
- 20
- 30
- 40
- 50
- 60
- 70
- 80
- 90

KENT COUNTY
COMPREHENSIVE WATER &
SEWER PLAN 2009

KENT COUNTY TOPOGRAPHY

0 1.5 3 6
Miles

OCTOBER 2009
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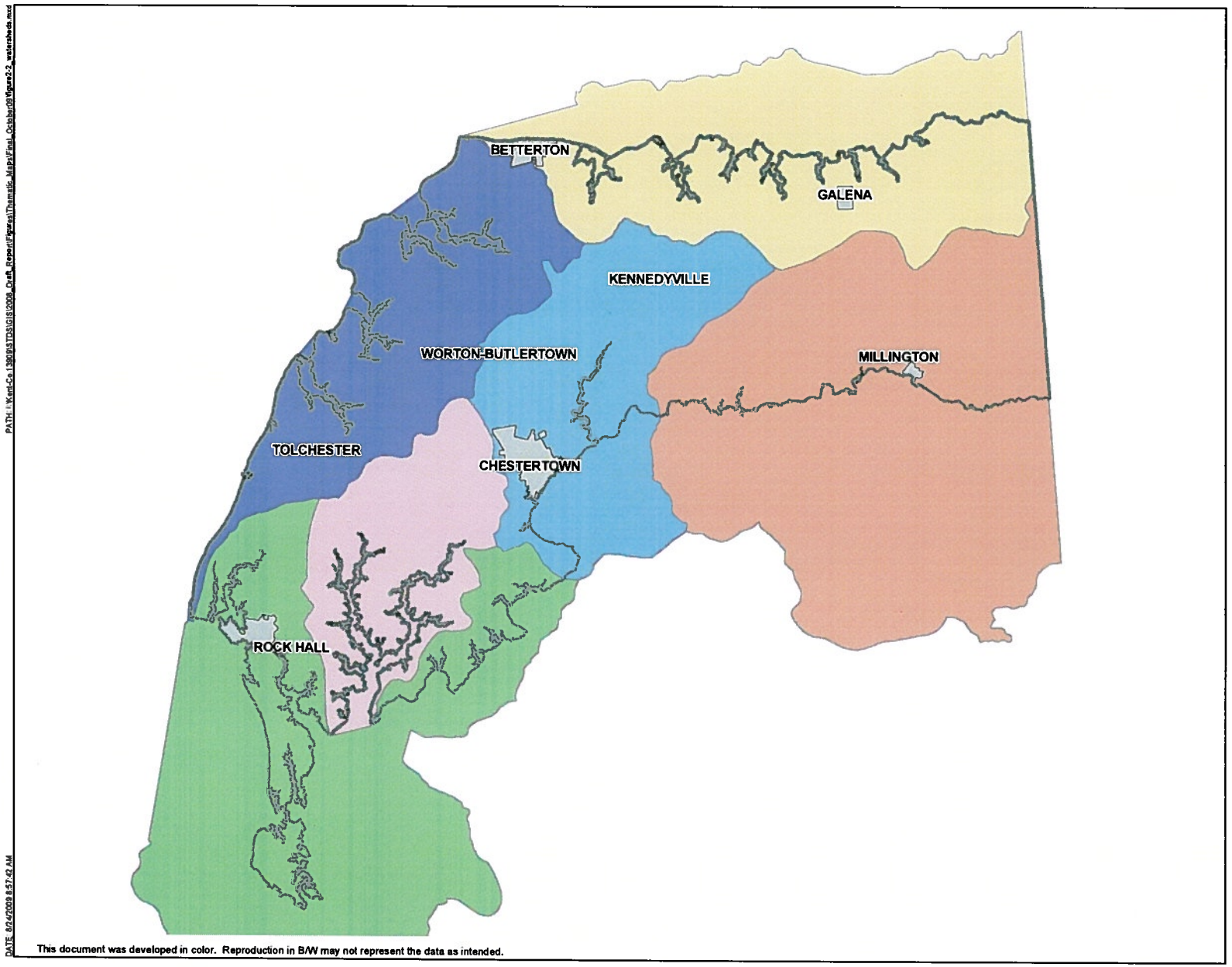

FIGURE 2-2

N

LEGEND

- County Boundary
- Municipality

Watershed

- Langford Creek
- Lower Chester River
- Middle Chester River
- Sassafras River
- Stillpond-Fairlee
- Upper Chester River

KENT COUNTY
COMPREHENSIVE WATER &
SEWER PLAN 2009

KENT COUNTY WATERSHEDS

0 1.5 3 6
Miles

OCTOBER 2009
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Draft Figure 2-3

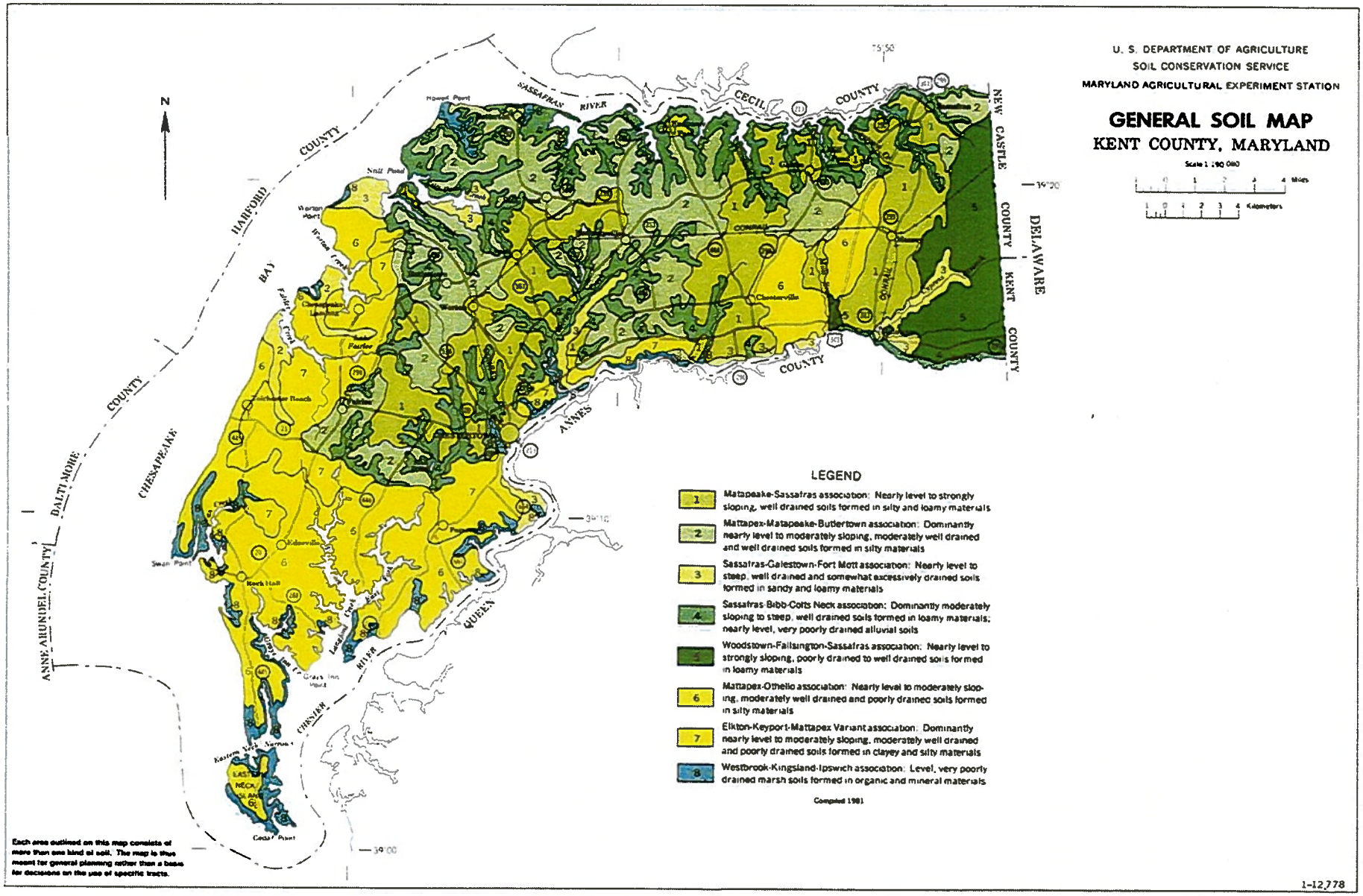

FIGURE 2-4

N

LEGEND

2002 Land Use/Land Cover

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Industrial
- Institutional
- Other Developed Land
- Agriculture
- Forest
- Water
- Wetlands
- Barren Land

KENT COUNTY
COMPREHENSIVE WATER &
SEWER PLAN 2009

KENT COUNTY LAND USE (2002)

0 1.5 3 6
Miles

OCTOBER 2009
13909/42582

O'BRIEN & GERE

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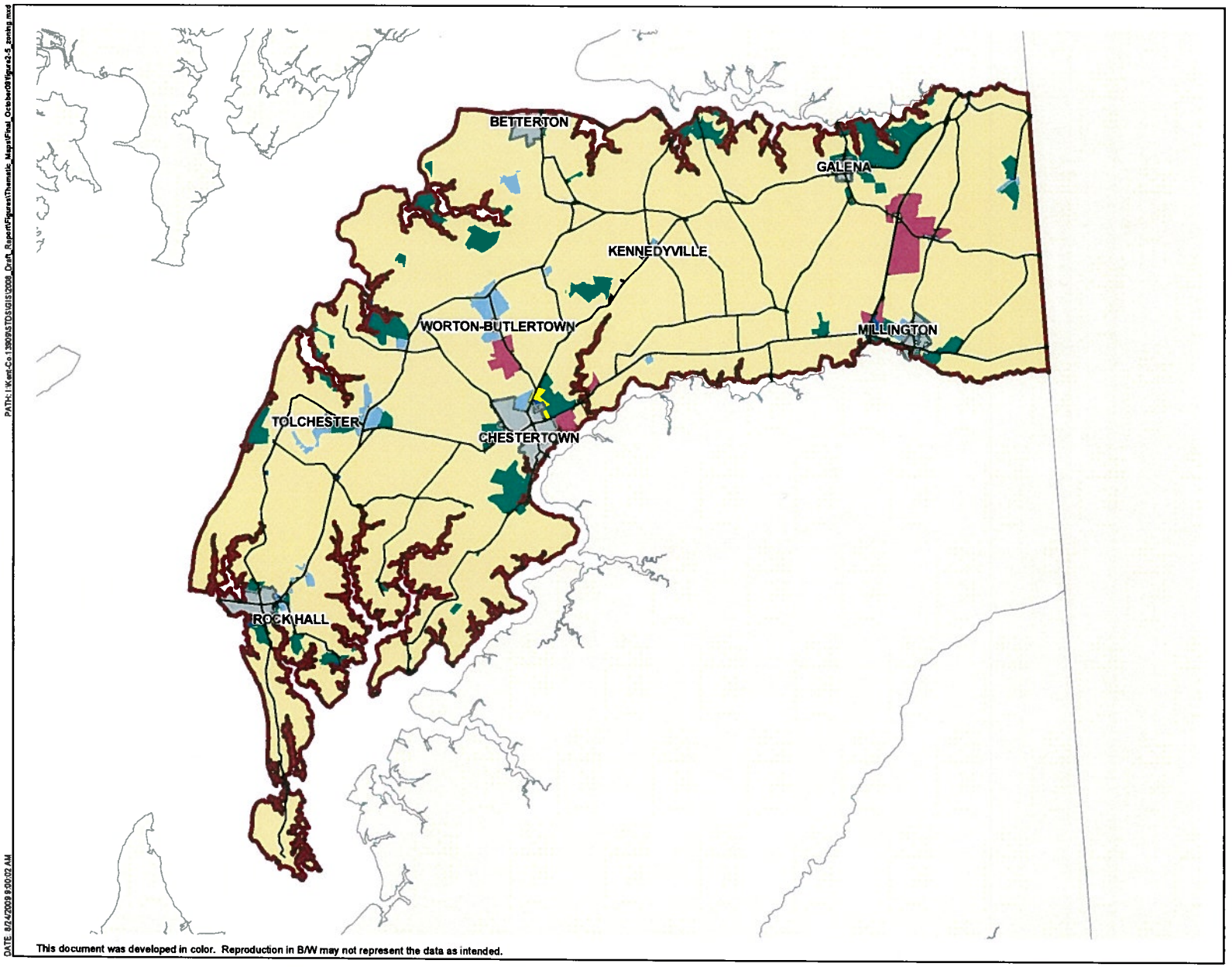

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FIGURE 2-5

N

LEGEND

- Major Roads
- County Boundary
- Incorporated Town

General Zoning

- Commercial
- Industrial
- Agricultural
- Low Density Residential
- Medium Density Residential
- High Density Residential

KENT COUNTY
COMPREHENSIVE WATER &
SEWER PLAN 2009

KENT COUNTY GENERAL ZONING

0 1.5 3 6
Miles

OCTOBER 2009
13909/42582

O'BRIEN & GERE