Chapter 5: Water & Sewer

5.0 Accomplishments Since 2007

With regard to water, the comprehensive plan advocates measures to ensure water services and potable water supplies are sufficient to meet future demands. Current projections indicate that the County's existing storage capacity is expected to meet demand well into the future.

Protection of the water supply is another goal. To preserve the quality of the drinking water for all New Castle County residents, legislation was adopted requiring that all individual domestic drinking water supply wells be shown on the appropriate plan submission as part of any building permit application seeking a permit for a new structure or building on the subject property. The application of green technology best management practices continues to effect recharge and promote water quality in stormwater runoff.

New Castle County is primarily responsible for all sewer lines outside the incorporated municipalities. The coordination of providing new sewer lines to the growth area and the rehabilitation of existing lines in the developed portions of the County has been an ongoing effort. Land Use continues to coordinate with Special Services on the Capital Budget to ensure that the goals and objectives of proper and orderly growth are achieved. In an effort to protect the environment from the adverse effects of septic systems and to utilize existing infrastructure, legislation was adopted permitting uses which are located within a certain distance to the public sanitary sewer system, to connect to the sewer under certain conditions.

1.1 Water

5.1.1 Overview

An adequate supply of water is necessary to support human, plant and animal populations and ensure a healthy and livable community. Not only must supplies be adequate, it is also essential that they be safe and free from pollutants and contaminants that could cause harm. A number of governmental agencies and organizations have a role in regulating water supply in Delaware.

The Delaware Water Supply Coordinating Council (WSCC) is charged with developing new water supplies in New Castle County and working cooperatively to manage water supplies more efficiently. The Delaware Geological Survey (DGC), the Department of Natural Resources and Environmental Control (DNREC) and the State Water Coordinator serve as advisors to the WSCC. The Water Resources Agency, (WRA) at the University of Delaware provides services to Delaware's governments as the State Water Coordinator, through an appointment on the New Castle County Resource Protection Area Technical Advisory Committee, as a local Christina Basin watershed coordinator, and as the lead agency in charge of implementing a Source Water Protection Plan for Delaware's four drinking water intakes.

Water utilities are subject to regulation by the Delaware Public Service Commission (PSC). Most aspects of water distribution, including maximum rates, are regulated by the PSC, which is also charged with granting Certificates of Public Convenience and Necessity as appropriate when water utilities wish to expand their service territory. New Castle County is served by six water systems, four of which are public and two of which are private. At present, there is approximately one billion gallons of surplus supply drinking water available within the County.

DNREC's Water Supply Section is charged with managing and issuing well construction and use permits for wells withdrawing 50,000 gallons per day (gpd) or less and with permitting water withdrawals of over 50,000 gpd. Withdrawals of over 100,000 gpd or more within the jurisdictional area of the Delaware River Basin Commission (DRBC) must also receive approval from the DRBC. In addition, the Water Supply Section conducts long-term water supply planning, water conservation efforts and coordinates with other organizations in these pursuits.

The Division of Public Health is responsible for regulating the quality and safety of Delaware's drinking water. Surface water quality has improved significantly over the past decade. Over 50% of drinking water watersheds are now protected within the County. As a result of increased water quality, fisheries are returning. However, high nitrogen and PCB levels remain to be addressed.

In New Castle County, 75% of the drinking water is obtained from surface water sources and 25% from groundwater. The many uses of water are similar throughout the County regardless of geographic location, although Southern New Castle County (south of the Chesapeake & Delaware Canal) uses significantly more water for agricultural irrigation while the northern areas have more commercial and industrial users. South of the C & D Canal, all of the water is drawn from public and private wells. Over 60% of Delaware's drinking water comes from the Christina Basin, with over two-thirds of its surface water supply coming from Pennsylvania.

The "Delaware Water Supply Coordinating Council" (WSCC) has issued two very detailed reports to the Governor and the General Assembly describing the water supply and demand projections for Northern New Castle County (dated March 8, 2006) and for Southern New Castle County (dated June 30, 2006).

Northern New Castle County

The report for northern New Castle County includes numerous statistics supporting the conclusion that a "healthy surplus" of water supply is currently available and will remain available to meet the peak demands for drought conditions through 2020 and beyond. The water supply and demand projections take into consideration several recently completed projects that have increased the water supply capacity by 1.8 billion gallons and reflect the population projections from the Delaware Population Consortium. Various potential scenarios were considered in deriving the supply / demand forecasts, but even the most conservative projections show water supply to be well above water demand well beyond 2030.

Table 5-1 shows that as of 2011, WRA projects a water supply in northern New Castle County to be approximately 127 million gallons per day (MGD), including 94 MGD from surface water and 33 MGD from ground water.

Table 5-1 Water Supply and Demand (2010): Northern New Castle County Surface Water			
Year	**Supply**	**Demand**	**+/-**
2000	73.0	83.0	-10.0
2010	94.0	81.7	12.3
2020	94.0	83.3	10.7
*source: WRA, 2010			

Southern New Castle County

Within southern New Castle County, aquifers are the sole source of drinking water. There are currently three principal water purveyors operating south of the canal as well as numerous private wells.

The report for southern New Castle County concludes that water supplies will be sufficient to serve the increasing demand at least through 2030 based on conservative projections. This anticipates a reduction in agricultural irrigation needs with an increase in use by the growing population. Since all of the water supply is derived from underground sources, the total amount of available groundwater is not accurately known but estimated to be 20 to 30 million gallons per day. The 2010 Southern New Castle County water supply and demand comparison is shown in Table 5-2. The report makes a number of recommendations to ensure that the supply stays ahead of demand. With the implementation of several changes in procedures at the state level, the demand is expected to be comfortably met in the foreseeable future.

Table 5-2

Water Supply and Demand (2010): Southern New Castle County			
Water System	**Supply**	**Demand**	**+/-**
Artesian Water	8.8	2.3	5.5
Delaware Correctional	2.1	0.2	1.9
Tidewater	2.7	1.7	1.0
Middletown	1.7	1.7	0.0
Self-Supplied	0.3	0.3	0.0
Individual Wells	1.5	1.5	0.0
Sub-Total Potable Supply	**17.1**	**7.7**	**9.4**
Farms/Nurseries	9.7	5.0	4.7
Golf Courses	0.3	0.3	0.0
Sub-Total Non-Potable	**10.0**	**5.3**	**4.7**
Total	**27.1**	**13.0**	**14.1**
* source: WRA, 2010			

5.1.2 Goals, Objectives, and Strategies

Goals:

1. **Continue to ensure water services and potable water supplies are sufficient to meet and exceed future demand.**

   Water is drawn from subsurface groundwater aquifers throughout all of southern New Castle County and much of northern New Castle County by individual homeowners, businesses, industries, and several water utility companies (water purveyors)**.** Surface waters also provide water supply to several areas north of the Chesapeake & Delaware Canal. Water quality measures cited in the Natural Resources Chapter will help to ensure that these waters are safe for public consumption.

   The water supply storage capacity in northern New Castle County has recently been substantially increased to a point where a surplus of water quantity is anticipated to be available to support the demand well into the future. The entities that own the storage facilities should be encouraged or required to keep such capacity available for use in the County rather than selling the reserve capacity to other jurisdictions. The storage capacity in the southern part of the County is also believed to be adequate although the recommendations of the Delaware Water Supply Coordinating Council cited above should be pursued and implemented.

   In addition to providing water for consumption, the water distribution infrastructure must be properly designed and installed to provide adequate flow and pressure for fire protection. Fire

hydrant locations shall meet the requirements set forth in the Delaware State Fire Prevention Regulations.

Objectives:

1. **Continue to ensure adequate water distribution infrastructure facilities to serve the needs of all properties within a franchised area including the residences, businesses, industries, as well as the ancillary needs of the fire protection network.**

   Water pipes, pumping stations, and storage facilities should be carefully designed in an efficient way to avoid conflicts with other infrastructure facilities and they should be accessible to all properties which desire to utilize them. They should also be designed to maximize fire protection capabilities.

Strategies:

1. Continue to coordinate with the Water Supply Coordinating Council (WSCC) to monitor water supply.
2. Continue efforts to increase water recharge.
3. Continue to require a Water Capacity Certification of adequate water supply from the franchised water purveyor before development approval is granted.
4. Continue to require the water purveyors to submit water quality testing evidence prior to the issuance of Certificates of Occupancy.
5. Continue working with water purveyors to ensure a safe and abundant supply of potable water and to interconnect systems throughout the County.
6. Continue to develop new potable water supplies as may be needed to insure long term availability to meet the needs of the County.
7. Continue efforts to encourage reauthorization of the Superfund Act to assist with cleanup of contaminated water sources
8. Continue to work with the appropriate agencies to promote increased regional water supply planning.
9. Continue to protect and enhance water quality.

5.2 Sanitary Sewer

5.2.1 Overview

North of the Chesapeake & Delaware (C&D) Canal, the majority of the generated sewage within the Sewer Service Area is conveyed through a network of sanitary sewer pipes and pump stations via nine major interceptor lines to the Wilmington Wastewater Treatment Plant. South of the C&D Canal, the Sewer Service Area is comprised of five areas, one of which is not presently served by an existing sewer infrastructure. The other four have operational sewer treatment and disposal facilities; one privately owned, one in the Town of Middletown and two controlled by New Castle County.

The County is divided into various Sewer Service Districts. There are various challenges and issues that need to be addressed in these areas. Sewer Basin Studies and Sewer System Evaluation Surveys are conducted throughout the County to determine the problems, solutions and associated costs. One major problem is wet weather overloading causing inflow & infiltration (I&I) problems in neighborhoods. Another problem is Fats, Oils and Grease (FOG) for which a program has been established to monitor commercial food establishments, educate the public and enforce when needed. The results of the sewershed studies have led to rehabilitation (i.e. pipe lining, joint sealing or manhole repair) and replacement (i.e. pipe bursting, jack & bore, or horizontal directional drilling) projects. Preventive Maintenance and Emergency Response are also key components to the sanitary sewer system. Funding, manpower and equipment are all in demand to address these system needs.

New Castle County Sanitary Sewer System

120,000 Sewer Accounts

Over 50 MGD "Dry Weather Flow"

1,700 miles of pipe

45,000 access structures

Separate system (sanitary & storm)

Approximately 18 hours of travel time to wastewater treatment plant

165 pump stations

4 wastewater treatment plants

30 permanent flow monitors

$65,741,483 operating budget (FY2011)

$53,786,000 Capital Budget for sanitary and storm sewers (FY2011)

**source: New Castle County Department of Special Services, 2011*

In accordance with Delaware State Code, Title 9, Chapter 13, Subchapter 3, the New Castle County Department of Special Services is empowered to work with the Department of Land Use to manage and develop plans for public facilities and infrastructure including sanitary sewers and treatment facilities in support of the Comprehensive Plan. Special Services prepares designs and specifications for sanitary sewers and treatment facilities and supervises the construction and inspection thereof. Special Services also manages, maintains, and operates public facilities and infrastructure related to sanitary sewers and treatment facilities.

The New Castle County Department of Special Services works closely with the Department of Land Use to conduct sewer capacity planning. Special Services uses the Comprehensive Plan to plan for future growth areas and to ensure that growth and development occur in an appropriate manner where supported by sanitary sewer infrastructure and capacity.

In lieu of public sanitary sewer, private sewage facilities must be reviewed and approved. In areas where existing private septic systems exist in proximity to the public sewer system, a community septic elimination program is in place to assist with conversion from private to public sewer. The average cost is $25,000 per property.

In order to analyze sewer capacity, the County uses a network of 30 permanent flow meters and nine rain gauges. This provides a real-time assessment of capacity within the sanitary sewer system. This data, coupled with field observations, expectations from ongoing capital projects, and advanced GIS modeling, allows the County to predict available capacity and link this capacity to development in need of such capacity. Available capacity is based not just on wastewater treatment plant capacity, but also capacity throughout the conveyance network.

In recent years, New Castle County has worked to manage the sanitary sewer system. In accordance with the DNREC Secretary's Order, overflow structures are being eliminated in Brandywine Hundred. These overflow structures were common practice prior to the Clean Water Act and had been built in the 1970's with Federal grant funds. The Brandywine Hundred Rehabilitation project has resolved many problems in the community.

In accordance with the DNREC Secretary's order, the County is also seeking to minimize County-wide sanitary sewer overflows. This is done through Capacity Management, Operation, and Maintenance (CMOM) which measures performance and allows improvements to be made where needed. The County also has a Fats, Oils, and Grease (FOG) program designed to reduce such substances from the sewer system in order to reduce blockages. The program involves the monitoring of commercial food establishments, educating the public, and enforcing requirements as needed.

Ongoing County efforts also include a new DelDOT Coordination program where pipes are replaced in conjunction with DelDOT paving projects. A new Asset Management Process is currently in development, which will allow the County to make data-driven decisions for long-term planning. This process will link all sanitary sewer system management efforts.

5.2.2 Policy & Recommendations

Goals:

1. **Continue to provide efficient and cost effective sanitary sewer service in the existing sewer district and to new users through expansion of the sewer system**

   A public sewer system is the most effective and environmentally sensitive way to treat wastewater in populated areas. As the provider of sewer service for approximately 112,000 customers in New Castle County, the County is committed to maintaining the existing sewer system and making necessary expansions into developing areas to offer a dependable service at a reasonable cost.

Objectives:

1. **Continue to provide capacity in sewer service areas to meet demands for existing and additional development.**

   A number of areas in northern New Castle County have extremely limited or no remaining available sewer capacity to allow further development to tie into the system. In these areas, any property owner desiring to develop their land must establish an on-site sewage disposal facility, provide rehabilitation repairs or upgrades to segments of the system that create the loss of capacity; or defer their construction until capacity in the public system becomes available. The County is committed to a program for adding capacity to accommodate the projected growth within the sewer service areas. The County is also committed to serving the Southern Sewer Service Area by providing and maintaining sewers in those areas funded through the Capital Budget.

2. **Continue to improve the efficiency of the administration and operation of the sanitary sewer system in order to minimize the expense to sewer customers.**

   Technology utilized by the Department of Special Services is continuously evaluated for efficiency and compared to the most up-to-date computer hardware and software available on the market. New Castle County seeks to acquire state-of-the-art systems that maximize effectiveness in monitoring and maintaining the sewerage system. Constant analysis or evaluations of operating procedures are performed and adjustments made to enhance productivity.

   It is necessary for New Castle County to recoup the cost of operating and maintaining the sanitary sewer system by collecting user fees from the customers. The County pursues ways to operate the sewer system more efficiently to keep the user fees as low as possible. Also, through Capital Recovery Fee collection from new customers, the County endeavors to keep stable and/or minimize the financial impact of sewer expansions on existing customers.

3. **Continually maintain and upgrade the existing sanitary sewer conveyance system of pipes, manholes, pump stations and wastewater treatment facilities to help ensure trouble-free operation.**

   While the vast majority of residents and businesses that are connected to the County's public sewer system do not experience problems, a small number of sewer-related problems do occur. The Department of Special Services sometimes encounters problems in certain areas during wet weather events. It is an objective of New Castle County to undertake all possible solutions to prevent such problems from occurring in the future.

4. **Continue to improve the efficiency of the existing sewer system by increasing capacity through the reduction of infiltration and inflow of stormwater and illicit discharges into the sewer network.**

   A significant amount of stormwater enters the sewer system by infiltrating through broken pipes and seepage into sewer manholes ("infiltration"). There are also residential dwellings and nonresidential businesses that have illegal direct connections of storm drains into the sanitary sewer pipes ("inflow"). Pipes, pump stations and wastewater treatment facilities carry and process relatively clean rainwater as a result of such infiltration and inflow, especially during wet weather events, reducing the capacity for treatment of sewage.

   Identifying and correcting these sources of stormwater from entering the system is a priority of the County and will increase the efficiency of the infrastructure and the overall capacity of the sewer system.

   The areas that currently operate at or beyond the capacity necessary for sewage treatment are continually evaluated to identify specific problems and implement necessary projects to correct the deficiencies. Sewer correction projects designed to improve the efficiency of the problematic systems and increase capacity are necessary to allow growth to proceed through approval and construction.

5. **Continue to explore new technologies and techniques of wastewater treatment, disposal, and re-use.**

   It is important for the County to employ the most cost effective and efficient methods of collecting, conveying, treating and disposing of wastewater that modern technologies offer. Traditional treatment plants and spray irrigation facilities utilized by New Castle County are both costly and land consumptive methods of wastewater disposal. One technology for exploration is Rapid Infiltration Basins (RIBS), which may be able to operate effectively using as little as 10% of the land that is required using traditional technologies. It is an important objective of County government to ensure the best possible technologies are implemented for the benefit of sewer customers and the environment.

6. **Implement a system maintenance funding strategy that protects the County's facilities investment by implementing a routine infrastructure replacement program.**

   Traditionally, when pipes or pump stations break or experience a problem, they are repaired or replaced as a result of the failure. Through the implementation of a program that anticipates the need to replace certain components of the infrastructure on a schedule, funding for such projects will be budgeted in advance rather than having to replace such items after a problem arises in an emergency situation.

   If a particular sewer system is operating at or beyond its design capacity for transmission of sewage, treatment and/or disposal, no additional flows shall be permitted to enter the system. Development of a property in an area without infrastructure or capacity must be deferred until such capacity is made available.

   The areas that currently operate at or beyond the capacity necessary to safely convey, treat, and dispose of the amounts of sewage generated by existing development will continue to be evaluated to identify specific problems and implement the necessary projects to correct the deficiencies thereby establishing additional capacity for current and future customers. Sewer correction projects designed to improve the efficiency of the problematic systems and increase capacity are necessary to allow growth to proceed.

7. **Continue and expand the County's "Septic Elimination Program" in order to assist communities with high percentages of failing septic systems to connect to the public sewer system.**

   Wherever financially and physically possible, the County accepts communities' petitions to have the County facilitate a septic elimination project relieving homeowners of their problematic septic systems and eliminating adverse environmental impacts of failing septic systems. There are thousands of households in New Castle County currently on septic systems and conversion of all to sewers would be prohibitively expensive. As funding permits, the County seeks to conduct septic elimination projects that prioritize communities with failing systems with potential negative environmental impacts.

   If 70% of the residents within a subdivision desire to convert from utilizing their existing septic systems in favor of connection to the public sewer infrastructure, typically due to numerous septic failures, the County may consider undertaking a septic elimination program. The abandonment of failing septic systems is an improvement to the environment and to the quality of life of the affected residents.

8. **Provide sewer capacity that may facilitate infill development within existing developed areas and the redevelopment of brownfields, abandoned and underutilized properties.**
   A priority of the County is to make public services, including public sewer capacity, available to properties that can be revitalized.

9. **Continue efforts to establish a definitive strategy and policy for the provision of sanitary sewerage within the "Southern Sewer Service Areas" south of the Chesapeake & Delaware Canal.**
   The provision of public sewerage serving subdivisions and land development proposals within the New Community Development Area shall be given the highest priority for authorization to connect to a public sewer system. It is the objective of the County to facilitate the provision of public sewerage to properties within the New Community Development Area (currently without sewer facilities) with conveyance of sewage to treatment and disposal facilities in Middletown and Water Farm #1 as a short term plan.

   The majority of new sewer infrastructure is designed and constructed by the private sector in conjunction with new subdivisions and land developments. The County will continue to encourage such private investments for future public benefit.

Strategies:

1. Continue providing increases to the sanitary sewer transmission network, disposal facilities, and treatment capacity to accommodate the existing and projected growth and the best environmental standards.
2. Continue to analyze and upgrade the existing sewer capacity computer model to reflect ever-changing system conditions and demands.
3. Continue a proactive systematic approach to sanitary sewer maintenance.
4. Continue utilization of existing sewer capacity from the Town of Middletown and County-owned wastewater facilities in southern New Castle County to accommodate development activities while studying options for construction of utility and transportation infrastructure improvements.
5. Continue to review and revise policies to reduce the use of septic systems in sewer service areas.
6. Continue to proactively undertake corrections to sanitary sewer system deficiencies as they are identified in order to reduce and eliminate the inflow and infiltration of stormwater and illicit discharges into the sewer system.