CHAPTER 4

THE SEWER PLAN

4.1 PURPOSE AND SCOPE OF CHAPTER

The purpose of this chapter is to provide information to be used by the County to utilize, operate, maintain, and protect the County's environmental resources through the use of safe wastewater systems that are adequate to serve orderly development. This chapter includes the following:

1. A description of existing wastewater treatment facilities;
2. An assessment of existing systems;
3. A projection of the wastewater production for the County as a whole, and the Development District in particular; and
4. A description of the capital improvements necessary for the planning horizon (next 10 years).

The goal of the County with regards to sewer service is as stated within the Comprehensive Plan is to accommodate 75 percent of the County's population growth through the year 2025 within the areas of the Mattawoman Sewer Service Area. Ensuring that the provision of public services is coordinated with the demand for those services is a major component of any growth management strategy. Charles County faces two major issues regarding the provision of public services. One of the strongest factors in influencing the location and intensity of development is the presence of community facilities and services. The County's goal is to have development occur within the urban core and emanate outward. Water and Sewer infrastructure encourages development in areas of availability. Therefore, the County strives to develop water and sewer infrastructure within the urban areas and expand the systems outward.

4.2 EXISTING WASTEWATER TREATMENT RESOURCES

The existing sewer service within Charles County can be grouped into several categories. The designation is based on the responsible party for the facility. The types of facilities include:

- Private/Community;
- Public/Municipal;
- Institutional/Government;
- Industrial; and
- Individual Septic Systems.

There are two private/community systems within the County, ten public/municipal wastewater treatment facilities, five institutional/government facilities, and six industrial or commercial facilities served by wastewater treatment plants. In addition, there are areas throughout the County that use on-site systems for wastewater treatment and disposal. On-site systems may include conventional septic systems, mound systems, or low pressure dosing.

4.2.1 Designated Service Areas

The service areas for the private/community, public/municipal, institutional/government, and industrial facilities are shown on the corresponding Comprehensive Water and Sewer Plan maps, which are incorporated as part of this document by reference. The service areas have been defined by the County Commissioners, defined through agreements with developers, or are subject to inter-jurisdictional agreements. In addition, the Appendices included which follow this chapter refer to "map numbers." These map numbers correspond those listed on the Comprehensive Water and Sewer Plan maps.

4.2.2 Correlation of the Mattawoman Sewer Service Area with Development District

As stated in Chapter One, the County's policy is to direct 75 percent of the new growth to the Development District. The Development District closely corresponds to the Mattawoman Sewer Service Area (MSSA) as delineated on the Comprehensive Water and Sewer Plan maps. The MSSA will ultimately be served by the Mattawoman Wastewater Treatment Plant (WWTP). Thus, it is the County's ultimate objective to provide a municipal/public level of service to all residences within the Development District.

For growth outside of the Development District, the County's stated objective is to direct growth to areas of available service. The County limits growth through the use of individual septic systems, especially in areas of unsuitable soils. The Comprehensive Plan discourages the extension of public services to rural areas of the County and focuses development to the Development District.

Areas currently served by individual septic systems, but in which the individual septic systems are not functioning correctly (failing), have been also identified by the Maryland Department of the Environment and the Charles County Health Department. This might be accomplished through connection to an existing facility or through other innovative and alternative means of wastewater treatment and disposal. These areas are identified on the corresponding Comprehensive Water and Sewer Plan maps within this plan with the letter "E". In addition, Appendix 4M provides a listing of the areas of reported failing septic systems.

4.2.3 Sewer Collection and Treatment System Types

4.2.3.1. Conventional Public Systems

In areas within Charles County served by a central treatment facility, a variety of sewer collection and treatment methods are used. The County can generally be divided into drainage basins. These areas are identifiable through the ridges and valleys created by the many streams, creeks, and rivers within the County. The County's current policy regarding collection systems recommends the utilization of gravity collection systems through the use of topography, where possible. The Comprehensive Plan also discourages and/or limits the usage of pumping stations.

The County prefers gravity collection systems for a variety of factors. Compared to force main systems, they are less costly, easier to maintain, and, require no associated equipment (such as pump stations or booster stations). With these factors in mind, the County's primary system, the Mattawoman Sewer Service Area, generally corresponds to the natural drainage basin of the Mattawoman Creek, as well as other areas which were previously developed.

Pump stations can represent a higher annual operation and maintenance cost due to power usage, replacement of moving parts, and lubricants required to keep the station in working order. However, the most significant factor against pump stations is that they must be monitored continuously, this requiring constant County staff and costly equipment at the telemetry control station. Pump stations may be used, however, to "lift" wastewater over the ridge between sub-basins, or to "lift" wastewater into existing interceptors. An example of the use of pump stations for this purpose is the Waldorf system. Pump stations and lift stations convey sewage out of the Zekiah basin into the Mattawoman basin. Pump stations must be monitored by mechanical equipment. The monitoring facility must be staffed in case of emergency. In some cases, the elevation or depth of piping can be manipulated and sewer may flow by gravity to the County's systems, thus avoiding the need for a pump station.

4.2.3.2 Alternative Collection Systems

There are several other alternatives which may provide sewer service if gravity or force collection systems cannot be employed. Special site conditions, such as steep slopes or high water table may prevent the utilization of conventional systems. These alternative systems are described below.

<u>Small Diameter Gravity Sewers</u>

Small diameter gravity sewers (SDGS) are rapidly gaining popularity in unsewered areas because of their low construction costs. Unlike conventional sewers, primary treatment is provided at each connection by new or existing septic tanks, and only the liquid tank effluent is collected. Grit, grease, and solids that might cause obstructions in the collector mains are separated from the waste flow and retained in septic or interceptor tanks.

With the settleable solids removed (trapped in the interceptor tank), collector mains can be designed with smaller diameter pipe (4 inches). It is also not necessary to design for minimum self-cleansing velocities. Without the requirement for minimum velocities, the pipe slope may be reduced. This results in less excavation to lay the pipe. (Conventional sewers require minimum cleansing velocities, and thus more slope and more cut.)

Fewer manholes are also used, and most are replaced by clean-outs except at major junctions to limit infiltration/inflow (I/I) and entry of grit. The required size and shape of the mains is dictated primarily by hydraulics rather than solids-carrying capabilities as with conventional gravity sewers.

Designers must still, however, be cognizant of I/I and ultimate growth in sizing these systems. Construction costs are reduced by 30-65 percent because SDGSs may be laid to follow the topography more closely than conventional sewers and routed around most obstacles within their path without installing manholes. The interceptor tanks are an integral part of the system. They are typically located on private property, but are usually owned or maintained by the utility districts so that regular pumping is ensured to remove the accumulated solids for safe disposal. Routine maintenance is low in cost.

SDGS systems consist of:

- A house connection (household wastewaters leave the building and enter the interceptor tank);

- An interceptor tank, which is a watertight tank with baffled inlets and outlets. They are designed to remove both floating and settleable solids from the waste stream through quiescent settling over a period of 12-24 hours. Ample volume is also provided for storage of the solids, which must be periodically removed through an access port. Typically, a single-chamber septic tank, vented through the house plumbing stack vent, is used as an interceptor tank;

- A service lateral which connects to the interceptor tank and discharges to the collector main. Laterals are 3 inches in diameter, but should be no larger than the collector main to which they are connected. (Conventional gravity laterals are 4 inches in diameter.) They may include a check valve or other backflow prevention device near the connection to the main.

- A collector main is a small diameter (3 to 4 inches minimum) plastic pipe, although 1.25-in pipe has been used successfully. (Conventional gravity laterals are 8 inches in diameter.) The mains are trenched into the ground at a sufficient depth to collect the settled wastewater from most connections by gravity. Unlike conventional gravity sewers, SDGSs are not necessarily laid on a uniform gradient with straight alignment between clean-outs or manholes. In places, the mains may be depressed below the hydraulic grade line. Also, the alignment may be curvilinear between manholes and clean-outs to avoid obstacles in the path of the sewers.

- Collector main clean-outs, manholes, and vents. These appurtenances provide access to the collector mains for inspection and maintenance. (Conventional gravity sewers require manholes.) In most circumstances, clean-outs are preferable to manholes because they are less costly and can be more tightly sealed to eliminate most infiltration and grit, which commonly enter through manholes. Vents are necessary to maintain free-flowing conditions in the mains. Vents in the household plumbing are sufficient except where depressed sewer sections exist. In such cases, air-release valves or ventilated clean-outs may be necessary at the high points of the main.

SDGSs have potential for wide application. They are a viable alternative to conventional sewers in many situations, but are particularly well suited for low-density residential and commercial developments. Because of their smaller size, reduced gradients, and fewer manholes, they can have a distinct cost advantage over conventional gravity sewers, where adverse soil or rock conditions create mainline excavation problems, or where restoration costs in developed areas can be excessive. In new developments, construction of the sewers can be deferred until the number of homes built warrants their installation. In the interim, septic tank systems or holding tanks can be used. When the sewers are constructed, the tanks can be converted for use as interceptor tanks. SDGSs usually are not well suited to high-density developments because of the cost of installing and maintaining the interceptor tanks.

One major drawback to SDGS systems is that the wastewater, which has been detained for 12-24 hours, is septic and contains sulfides. Sulfides are a major nuisance byproduct of wastewater. They cause odor problems; form sulfuric acid, which leads to corrosion problems in the collection system, as well as the receiving WWTP; and, depending on the percentage of septic wastewater to fresh wastewater, cause treatment difficulties at the WWTP.

Pressure Sewers

Pressure sewer systems typically consist of small grinder pump stations, which receive the wastewater from one or more homes or commercial establishments (depending upon their proximity to each other) and pump the wastewater into a pressurized network of small diameter pipes. The pressure collection system consists of polyethylene tubing, PVC pressure pipe, and simplex (one pump) or duplex (two pumps) grinder pump stations housed in fiberglass basins. The pressure systems can discharge into gravity sewers, manholes, pump stations, larger force mains, or the WWTP. This system is provided at Cobb Island, with the addition of a septic tank effluent pumping (STEP) system, in combination with lagoons and sprayfields.

The pumps generally utilize a 2-horsepower or less motor. The force main is a small (2 to 6 inches in diameter) pipeline, which is shallowly buried (minimum of 30 inches) and follows the profile of the ground.

Each home uses a small pump to discharge to the main. This pump may be a grinder pump (GP), which grinds the solids present in wastewater to a slurry in a manner similar to a kitchen sink garbage disposal. There are two pump system configurations. One configuration utilizes a small holding tank of 30 to 60 gallons followed by a grinder pump. The second configuration places the pump at the discharge point of the existing septic tank. This second type system is called a septic tank effluent pumping (STEP) system.

The septic tank of a STEP system captures the solids, grit, grease, and stringy material that could cause problems in pumping and conveyance through small diameter piping. Grinder pumps serving individual homes are usually 2-horsepower in size; but STEP pumps, because they are not grinding material, are usually a fractional horsepower.

The service line leading from the pumping unit to the main is usually 1 to 1.5 inch diameter PVC. Backflow is prevented by a check valve on the service line and a redundant check valve at the pumping unit. If a malfunction occurs, a high-liquid-level alarm is activated. This alarm may be a light mounted on the outside wall of the home, or it may be an audible alarm, which can be silenced by the resident. The resident then notifies the sewer service district, which responds to make the necessary repair.

The construction of pressure sewers involves narrow trenches and shallow pipe depths, thereby minimizing construction costs and disturbances in developed areas. No well point dewatering is required. Disturbances to existing roads and trees can be avoided by routing the pressure pipe around obstructions and beneath roads.

Developments experiencing slow growth find pressure sewers economically attractive. The front-end infrastructure (mainline) is inexpensively provided. The cost of the pumping units is deferred until the homes are built and occupied. The cost for the pumping units may also be financed with the home.

Pressure sewer equipment can also be used in conjunction with conventional systems. Where a low-lying home or basement is too low to allow gravity flow into a fronting conventional sewer, a grinder pump or pressure-sewer-type solids-handling pump may be used at that home to discharge to the sewer. Similarly, STEP units can be used to discharge to high-lying drainfields, sand filters, mounds, and other forms of on-site wastewater disposal. A STEP system is in place in the Cobb Island portion of the County.

Vacuum Sewers

Vacuum sewers are typically considered alongside of pressure sewers, where gravity system sewers are not cost effective. A vacuum sewer system consists of three major components: the vacuum station, the collection piping, and the services. This system is used at Swan Point, due to the high water table.

The vacuum station is the heart of the vacuum sewer system. It is similar to a conventional wastewater pumping station. These stations are typically two-story concrete and block buildings, approximately 25 by 30 feet in floor space. Equipment in the station includes a collection tank, a vacuum reservoir tank, vacuum pumps, wastewater pumps, and pump controls. In addition, an emergency generator is standard equipment, whether it is located within the station or outside the station, in an enclosure, or of the portable, truck-mounted variety.

The collection tank, made of either steel or fiberglass, is the equivalent of a wet well in a conventional pumping station. The vacuum reservoir tank is connected directly to the collection tank to prevent droplet carryover. The reservoir tank also reduces the frequency of vacuum pump starts, which extends pump life. The vacuum pumps can be either liquid-ring or sliding- vane type. These pumps are usually sized for 3 to 5 hours per day run time. The wastewater discharge pumps are non-clog pumps with sufficient net positive suction head to overcome tank vacuum. Level-control probes in the collection tank regulate the wastewater pumps. Vacuum switches on the reservoir tank regulate the vacuum pumps. A fault-monitoring system alerts the operator should a low-vacuum or high-wastewater-level condition occur.

The vacuum collection piping usually consists of 6-inch and 4-inch mains, although some recent installations also include 10-inch mains. Smaller 3-inch mains used in early vacuum systems are no longer recommended, as the cost savings in mains are considered to be insignificant.

Both solvent-welded PVC pipe and rubber gasket pipe have been used, although past experience indicates that solvent welding should be avoided when possible. Where rubber gaskets are used, they must be certified by the manufacturer as being suitable for vacuum service. The mains are generally laid to the same slope as the ground with a minimum slope of 0.2 percent. For uphill transport, lifts are placed to minimize excavation depth. There are no manholes in the system; however, access can be gained at each valve pit or at the end of a line, where an access pit may be installed. Installation of the pipe and fittings follows water distribution system practices. Division valves are installed on branches and periodically on the mains to allow for isolation when troubleshooting or making repairs. Plug valves and resilient wedge gate valves have been used.

Wastewater flows by gravity from one or more homes into a 30-gallon holding tank. As the wastewater level rises in the sump, air is compressed in a sensor tube, which is connected to the valve controller. At a preset point, the sensor signals for the vacuum valve to open. The valve stays open for an adjustable period of time and then closes. During the open cycle, the holding tank contents are evacuated. The timing cycle is field-adjusted between 3 and 30 seconds. This time is usually set to hold the valve open for a total time equal to twice the time required to admit the wastewater. In this manner, air at atmospheric pressure is allowed to enter the system behind the wastewater. The time setting is dependent on the valve location, since the vacuum available will vary throughout the system, governing the rate of wastewater flow.

The valve pit typically is located along a property line. The valve pit holding tanks are usually made of fiberglass, although modified concrete manhole sections have been used for special situations (deep basements, large user, pressure/vacuum interface, etc.). A non-traffic lightweight aluminum cast iron lid is available for yard installations. Where the installation will be subjected to vehicular loading, a flush-mounted cast iron lid is used. An anti-flotation collar may be required in some cases.

Specific descriptions and information regarding the collection and transmission systems in Charles County are provided within "Inventory of Existing Sewer Systems." Appendix 4-L also provides specific information regarding the collection systems in Charles County.

4.2.3.3 On-Site Treatment Systems

Treatment systems within Charles County range from the basic individual septic systems in low density and agricultural areas to the Mattawoman WWTP site, with a treatment capacity of 20 million gallons per day (mgd). The treatment systems used throughout Charles County are also discussed in Section 4.2.4, as well as Appendices 4-D through 4-K, 4-O, and 4-P through 4-S.

On-site treatment and disposal systems include a variety of components and configurations. The most common system is the conventional septic tank with a conventional drainfield (soil absorption system).

<u>Innovative and Alternative Wastewater Treatment Program</u>

The April 1, 1996 adoption of the “Alternative On-Site Wastewater Treatment Program” allows the Charles County Health Department to utilize new types of alternative on-site sewage treatment systems for unimproved lots that were legally established prior to September 28, 1994 and cannot pass a conventional percolation test. Innovative on-site systems may be used for lots with an existing dwelling. A summary of the types of systems installed in Charles County by Election District can be found in Appendix 4J. The priority ranking for the utilization of these systems is as follows:

Innovative & Alternative Systems

1. Existing dwelling with Failed Septic System - may utilize conventional, innovative or alternative systems.
2. Existing dwelling with no indoor plumbing - may utilize conventional, innovative or alternative systems.
3. Unimproved lot that was legally established prior to September 28, 1994 - may utilize conventional or alternative systems.

The specific site dictates the type of on-site system required. Areas with sandy soils, low groundwater tables, and minimal environmental sensitivity may successfully utilize conventional septic tanks with conventional drainfields. However, areas with poor soils, high groundwater tables, and proximity to surface water bodies may require the use of advanced septic tank systems. Advanced systems include:

- Aerobic septic tanks and treatment systems;
- Alternating Fields;
- At-Grade Mound;
- Clivus System (Waterless Toilets);
- Holding Tank;
- Low Pressure Dosing; and
- Sand Mound

These advanced systems are combined with discharge systems for disposal and additional treatment. Specifically, these discharge systems are: surface disposal systems; subsurface disposal systems; and evapotranspiration systems. Surface disposal requires a nearby surface water body, however obtaining discharge permits for this type of system is highly unlikely for water bodies of Critical State Concern. Evapotranspiration systems require evapotranspiration rates that exceed rainfall, and this is not the case for Charles County (due to winter temperatures). Therefore, subsurface disposal is the only viable option.

Conventional Septic Tanks

Conventional septic tanks treat the wastewater by settling solids, trapping floating materials (oils and greases), and providing anaerobic treatment to the liquid stream. As the wastewater leaves the septic tank, some biological degradation is performed by soil microorganisms within the drainfield. The drainfield consists of perforated discharge pipes that are set in a bed of gravel. The tank effluent flows by gravity to the perforated pipe, where it is disbursed over the gravel and seeps into the soil. Although there is some biological degradation of the trapped material, periodical (recommended once every 3 years) removal of the floating and settled material should be performed. Improper maintenance may result lesser treatment of the wastewater and reduced drainfield life.

Other types of systems such as aerobic septic tank systems, nutrient removal septic tanks and treatment systems and sand filtration are discussed below.

Aerobic Septic Tank Systems

The aerobic septic tank is designed to provide additional biochemical oxygen demand (BOD) removal. An aerobic septic tank is essentially an enlarged septic tank, followed by an aeration/settling tank. These systems mechanically aerate the raw wastewater much like an extended-air wastewater treatment plant. Manufacturers of these systems claim treatment efficiencies similar to those of municipal WWTPs (90 percent BOD and 90 percent total suspended solids (TSS) removal). Unlike conventional septic tanks, aerobic systems promote nitrification of the wastewater. Nitrification is the biochemical oxidation of ammonia found in the raw wastewater to nitrates. Nitrates are a regulated wastewater effluent constituent due to potential health risks from the nitrate contamination of groundwater.

Nutrient Removal Septic Tank Systems

Nutrient removal septic tanks offer BOD and TSS removal efficiencies comparable to aerobic systems and offer some additional nutrient removal (nitrates only). These systems are similar to the aerobic system configuration, with the addition of a sand filter. Generally, the wastewater flow is separated and rerouted to achieve the additional treatment. Some of these systems are designed to separate the wastewater flow from the building into gray water (wash water) and the black water (human and food wastewater). The majority of the BOD and nutrients are contained in the black water. These systems are more capital- and energy-intensive than conventional septic tank systems and requires maintenance of the motors, pumps, and blowers. They may also require periodic chemical addition.

Sand Filtration Systems

A sand filtration system may follow a conventional septic tank or aerobic treatment system. Sand filtration systems aid in the degradation and removal of suspended solids, providing a higher quality effluent. Solids are captured and biologically degraded within the sand media.

Subsurface Disposal

The most common subsurface disposal practice is to utilize a soil absorption system, such as a conventional drainfield. However, in areas with poorly drained soils, alternatives to the conventional drainfield can be used. These systems essentially distribute the flow over a larger area and utilize soil microorganisms to degrade wastes. There are many types of subsurface application systems available, including:

- Alternate trench drainfields and serial distribution drainfield
- Leaching chambers
- Mound systems
- Pressure-dosed distribution
- Shallow-trench, low-pressure distribution

In the alternating trench system, there are multiple drainfields. One field rests while another is in use. This approach allows each field to renew, which extends drainfield life. It also provides a standby if one field fails. A valve directs the sewage liquid to the proper field. Fields are usually switched every 6 to 12 months. With serial distribution, a pump forces the liquid to perforated pipes in a contoured absorption field. Drop boxes regulate the liquid flow so that the highest trench fills up first, the second fills up next, and the lowest fills up last. This method is used in sloping areas.

Another method of gravity subsurface septic tank effluent application is the use of leaching chambers. Effluent flows by gravity to concrete or arched plastic chambers, where effluent is stored. The effluent floods the soil surface prior to seeping vertically through the bottom of the chamber. Soil microorganisms then break down the organic matter. In areas where soils are poor, a more porous sand soil may be constructed in a mound. Absorption drainfields may be laid down within this mound system. Septic tank effluent is pumped up to the mound where it discharges to the mound soil. Septic tank effluent is then degraded in a manner similar to the standard drainfield.

There are also systems available that dose the subsurface discharge beds periodically using a pump or syphon system to a drainfield. Pressure-dosed distribution systems force the effluent through a larger area under the soil. In addition, this system improves the exchange of air into the effluent, promoting more rapid degradation of septic tank effluent. Shallow-trench, low-pressure pipe distribution systems operate on the same principal as pressure-dosed distribution, although the drainfield is much closer to the soil surface. Aerobic soil zones are contacted, promoting more rapid and more complete degradation of septic tank effluent discharge.

4.2.3.4 Septic Problem Areas

Several areas throughout Charles County have difficulty passing the conventional percolation test, administered by the Charles County Department of Health. This is commonly due to poorly drained soils or a high water table. Several areas throughout the County experience difficulty passing the test for an On-Site Sewage Disposal System (OSDS). Properties that do not pass the test for an OSDS may not have a structure built upon them, unless public sewer becomes available to the property. However, OSDS test have become more stringent in the last two decades due to systems being installed on poor soils or high water table areas. Several existing communities in the rural areas of the County have experienced continual septic problems, requiring replacement of the OSDS or conversion to a holding tank. Further, these systems may be leaching high levels of nutrients into the water table or surface water sources.

Charles County is working with the Maryland Department of the Environment and local citizen groups to seek grant funding through the state's Bay Restoration Fund to assist in the repair and enhancement of the existing systems.

4.2.4. NPDES Permitting Process

The treatment and disposal of wastewater and sludge are regulated by several Federal, State, and local agencies. The degree of regulation is dependant on the treatment process used. The regulation of central wastewater systems discharging to surface waters (point source discharge) is regulated by the Environmental Protection Agency (EPA) through the National Pollutant Discharge Elimination System (NPDES) and the Maryland Department of the Environment (MDE.) On-site facilities, such as individual septic systems, are regulated by the Charles County Health Department. Systems discharging treated effluent to land application systems and collection and transmission systems are regulated by MDE.

The EPA regulates the discharge of pollutants into navigable water of the United States under the Federal Clean Water Act of 1977 (CWA), as amended by the Water Quality Act of 1987. Navigable water means waters of the United States, including the territorial seas, subject to the ebb and flow of the tide; all interstate waters, including interstate wetlands; and all other intrastate lakes, rivers, streams, and other wet areas (the use, degradation or destruction of which would or could affect interstate or foreign commerce). In addition to identified water bodies, impoundments of such water bodies and tributaries to such water bodies are included. EPA adopted numerous regulations to implement the CWA. These regulations are found in Title 40, Code of Federal Regulations (CFR).

The basic thrust of the Clean Water Act is the establishment of technology-based effluent limitations for major industrial categories. The particular technology requirement that applies to a given source depends on its industrial type, its age, and the pollutant involved. The regulations applicable to NPDES permitting are set forth at 40 CFR Parts 122, 124, and 125. These regulations have been significantly amended by modifications throughout recent years. While modifications have occurred to the NPDES permitting process, the basic procedure has remained fairly constant.

1. *Pre-operation Permit* - NPDES permits are operating permits, rather than construction permits. NPDES permit applications are required to be filed no later than 180 days prior to the commencement of operation of the facility.

2. *Five-Year Permit* - NPDES permits are ordinarily issued for a term of 5 years unless the implementation of new guidelines for a particular industry in question or other circumstances would justify issuance for a shorter period.

3. *Best Professional Judgement* - Permitted sources are required to meet the technology-based effluent limitations established by the EPA for that particular industry, if any, and established on a case-by-case basis pursuant to 402(a)(1) of the CWA. These latter determinations are called best professional judgement (BPJ) limits and are based on consideration of appropriate factors set forth in Section 304.

4. *Compliance, Monitoring, Recordkeeping and Reporting Requirements* - NPDES permits require the permittee to demonstrate that the effluent meets any applicable effluent limitations established by EPA. Records are required to be kept for at least 3 years, and reports are to be made to the EPA. These and other requirements are contained in general provisions, which EPA puts in the boiler plate of all permits.

5. *Federal Enforcement* - EPA enforces the requirements of the NPDES permit and CWA through the use of civil penalties and administrative penalties (fines). In addition, the EPA has the authority to pursue criminal cases within the courts. In enforcement situations, a notice of violation is ordinarily sent to the alleged violator with an opportunity to confer prior to subsequent action. In addition, the Clean Water Act has a provision for a citizen suit, whereby third parties can seek to require EPA to enforce against an alleged violator.

The current NPDES permit limits for the centralized facilities within Charles County are provided in Appendices 4-H, 4-I, 4-J, and 4-K.

4.2.5. Level of Treatment

The degree to which wastewater should be treated depends on the raw wastewater quality and the desired quality of the finished effluent. Since the degree of treatment determines the number and types of unit operations and processes to be used, there are numerous combinations of processes employed in wastewater treatment. Therefore, treatment methods can be divided into three categories, depending on the level of treatment each provides: primary, secondary and tertiary or advanced treatment.

Primary Treatment

Primary treatment includes those processes which reduce the floating and suspended solids present in the water by mechanical means or by the action of gravity. This involves passage of raw or pre-aerated wastewater through sedimentation or flotation tanks or through fine screens designed to remove the readily settleable material from suspensions. To accelerate the settling process, inorganic or organic coagulant aids may be used to increase the size and/or density of the flocculent solids and the proportion of solids that settle. Adequately designed primary treatment units remove from 98 to 99 percent of the settleable solids and from 30 to 50 percent of the oxygen demand from a domestic waste. Primary treatment, in effect, separates the raw waste into a water component and a concentrated solid or sludge component. The water component still contains significant amounts of dissolved and colloidal pollutants unaffected by primary treatment. The water component can be discharged or given further treatment designed to remove the residual pollutants. Solid components then receive additional treatment, such as digestion.

The use of primary treatment as a sole form of treatment is dependent on the receiving water used for discharge of effluent. In general, additional treatment is recommended to maintain the quality of the waters within the State.

Secondary Treatment

Secondary treatment depends on biological processes to reduce further the suspended and dissolved solids that are present in the liquid effluent after primary treatment. Secondary treatment processes include the trickling filter and activated sludge. Both require a source of balanced food, atmospheric or pure oxygen, and an environment suitable for the growth of the microorganisms.

In the trickling filter, the clarified primary effluent is allowed to trickle down through media designed to provide: 1) sufficient surface area for the types and volume of organisms required to consume the organic materials and nutrients, and 2) sufficient void volume to permit passage of liquid wastes and air in the bed. The biological life removes the pollutants from the liquid waste by absorption during its passage through the bed and converts the waste constituents to energy, new cells, waste products, and water.

In the activated-sludge process, the liquid waste is brought into intimate contact with the biological life required to assimilate the food contained in the waste and added with the raw or settled waste in the form of a return activated sludge. The return sludge is biologically-activated sludge from the aeration tank, which is removed from the aerated wastes in a final sedimentation tank. The oxygen requirements of the mixed liquid, consisting of waste and activated sludge, are supplied by introducing air into the aeration tank using aeration devices. Oxygen goes into solution and is used in the metabolism of the food. The activated-sludge process involves many process variations and utilizes many different types of aeration tanks and aeration equipment. In each case, however, the biological life of the activated sludge moves through the aeration tank with the waste flow. The amount of returned sludge and aeration provided is determined by the volume and strength of the waste and the particular process variation time. Secondary treatment processes can be designed to provide overall removals of 85 to 95 percent of the suspended solid and oxygen demand present in the raw waste.

Tertiary (Advanced) Treatment

Tertiary treatment of waste effluent from secondary treatment plants generally involves nutrient removal treatment or additional solids removal and is used to produce effluent of higher quality. Conventional secondary sewage treatment processes do not remove most inorganic soluble salts. The effluent from secondary treatment contains the biochemical oxygen demand (BOD) that escaped biochemical decomposition. Part of this BOD is exerted by the suspended solids in chemical oxygen demand (COD) of dissolved organics that resist further biodegradation in the plant. When the effluent is discharged into a watercourse, these residual contaminants continue in the natural cycle to decomposition and recomposition.

There are many methods and processes for removing nitrogen and phosphorus from domestic wastewater. Some methods rely on chemicals while others employ biological processes. Biological nutrient removal processes often enjoy significant economic advantages due to reduced operational costs. Regulatory pressures to remove nutrients and economic benefits of biological processes are the main reasons biological nutrient removal processes have flourished in recent years.

The number and reliability of biological nutrient removal processes have dramatically increased in the last 10 years. Some processes have focused on nitrogen removal, some on phosphorus removal, and others accomplish both. However, all create the appropriate environments in one shape or another.

Biological nitrogen removal is the most understood and reliable process. Two zones are necessary in all biological nitrogen removal processes. An aerobic zone is needed to provide an oxygen-rich environment where bacteria convert soluble organic nitrogen and ammonia to nitrate. Conversion of organic nitrogen and ammonia to nitrate is called nitrification. Nitrate is converted to nitrogen gas in the second zone called the anoxic zone. The anoxic zone must be completely absent of free oxygen and contain sufficient organic carbon to allow biological conversion of nitrate to nitrogen gas. This conversion is called de-nitrification. Nitrogen gas is then freely stripped from the liquid, and nitrogen removal is complete.

Biological phosphorus removal processes are somewhat more complex than biological nitrogen removal processes. However, all biological phosphorus removal processes create an anaerobic zone somewhere in the process. Phosphorus-loving bacteria enjoy biochemical advantages over other normal wastewater bacteria in the activated sludge. A readily available organic substrate (soluble BOD) is also needed in the anaerobic zone to increase the selection process.

Charles County has nearly completed installation of BNR technology at the Mattawoman facility. Construction should be completed in 2006.

4.2.6 Summary of Environmental Impact- FONSI and MOU

On January 17, 1989, the U.S. Environmental Protection Agency completed a "Finding of No Significant Impact" for the Mattawoman WWTP, indicating that implementing the project would not result in any significant primary environmental impacts. However, the FONSI was issued with reservations noted for a number of secondary impacts identified in the Environmental Assessment and in the supporting Mattawoman 201 Facilities Plan. These issues were discussed in the Addendum to the assessment as:

- Protection of non-tidal wetlands
- Limitations on growth
- Land-use controls
- Protection of groundwater supplies
- Sedimentation/erosion control enforcement

A work group was convened to identify existing procedures and to develop new measures which either would result in a mitigation plan, or define mutually acceptable options to avoid, or substantially improve these secondary impacts.

The memorandum of understanding (MOU) included responsibilities for each member of the work group: USEPA, MDE, Charles County, and Prince Georges County. The MOU is available for review from the County. A brief description of the Charles County responsibilities is as follows:

General

- The County will develop and maintain the legal, regulatory, and financial capability to implement the construction grants program.
- The County will ensure that the project complies with all applicable Federal and State laws.
- The County shall fund its local share of the project.
- The County shall maintain records necessary for the management of the project.

Specific

- The County will comply with Federal, State and local regulations to mitigate any adverse environmental impacts from the implementation of the project.
- The County will comply with MDE/MDNR regulations related to sediment and erosion control, as well as water/wastewater resources.
- The County will review regulations promulgated in the Non-tidal Wetlands Protection Act and develop a strategy for compliance before December 31, 1990.
- The County agrees to enact regulations in those areas without usual Federal and State jurisdiction, specifically the planning and managed growth in the County in accordance with an adopted Land Use Plan and the guidance of land use activities in accordance with the Water and Sewer and the adopted County Comprehensive Plan.
- The County agrees to evaluate the feasibility and to provide, if consistent with the County land-use and growth control policies, improved wastewater treatment services to residences in the Mattawoman drainage basin with inadequate septic systems. The County will reserve flow capacity of 0.6 mgd at the Mattawoman facility until a suitable wastewater disposal solution is found for those residences.

4.2.7. Effluent Disposal Techniques

Until recently, the primary means of effluent disposal from sewage treatment plants was direct discharge into a watercourse. With increased population growth and subsequent increased discharges of sewage effluent, the natural purification processes in watercourses have been stressed, and water quality has slowly deteriorated.

The alternatives to the discharge of sewage effluent into a watercourse include:

- land application (including spray irrigation and rapid infiltration basins)
- wetlands systems
- reclaimed water/reuse systems
- gray water systems

In a land application system, the soil and vegetative cover purify and dissipate the effluent as it percolates into the ground. In addition to the primary benefit of eliminating harmful pollutants in watercourses, land application can also serve to recharge groundwater supplies, allow recovery and reuse of nutrients, and may provide an economic return if used for some agricultural purposes.

Land treatment of wastewater may involve a wide variety of techniques and in some cases combinations of several. These include spray irrigation and rapid infiltration basins, overland flow. Land treatment systems vary depending on the overall design and the particular site selected. Major design parameters include topography, permeability of the soils, depth to the groundwater table, and location of nearby residences. The County has expressed a preference for land application methods of effluent disposal over surface water discharge within policy statements found in Chapter 1.

Disposal of effluent via spray irrigation requires large expanses of land that are sprayed with effluent at very low application rates (1 to 2 inches per week). Suitable spray irrigation areas are characterized by permeable to highly permeable soils. The effluent seeps through the soils, which act as a filter for the effluent. As noted above, land requirements are considerable for this disposal method due to the low effluent application rates. However, use of this method on land requiring substantial irrigation (such as golf courses or agricultural areas) is feasible. This method is discussed later in this section.

On dedicated lands, spray irrigation would be considered a non-public access method of effluent disposal. Treatment requirements would include secondary treatment with some denitrification to remove nutrients.

Rapid infiltration basins (RIBs) filter effluent through permeable to highly permeable soils at a faster pace. Basins are situated in areas where rapid infiltration is likely, such as high knolls and areas with rolling topography. Land requirements are not as extensive as for spray irrigation. RIBs require secondary treatment, at a minimum. Depending on the location of the basins, additional treatment may be necessary.

Wetland application is a concept rapidly gaining recognition as a viable alternative for effluent disposal. It represents an extension of the land treatment reuse/recycle concepts strongly encouraged by Congress. The U.S. Environmental Protection Agency (EPA) is also encouraging the use of wetlands.

The topography of most wetland ecosystems is flat; thus, the movement of water across a wetland is typically a slow process. This slow water movement results in long retention times and subsequent deposition of suspended soils and other materials. Wetlands are highly productive and efficient consumers of nutrients.

Considerable permitting and monitoring requirements are associated with wetlands use; but this method, in combination with other disposal methods, has the potential for providing the Charles County with a cost-effective and environmentally-acceptable effluent disposal alternative.

A different approach to effluent disposal is encompassed in the reuse alternative. Effluent is collected and treated by the local treatment facility, then returned to the developer or area of origin for reuse which is normally spray irrigation. This alternative places the responsibility for effluent reuse and disposal on the area generating the wastewater.

Reclaimed water recipients (i.e. developers, residents, or others) may use a variety of methods to dispose of the returned effluent. Three methods are briefly described below; however, more detailed investigation of these and other effluent disposal methods is recommended prior to their use in Charles County.

- Urban irrigation
- Agricultural irrigation
- Potable reuse

For the purposes of this Comprehensive Water and Sewer Plan, urban irrigation included providing reclaimed wastewater to virtually any irrigated land within Charles County. Public access reuse can encompass irrigation of golf courses, parks, playing fields, cemeteries, commercial/industrial areas, multifamily residential lawns, single-family residential lawns, medians, and right-of-ways.

Since urban irrigation involves applying reclaimed water to areas accessible to the public, public access levels of treatment are needed. Treatment requirements essentially include secondary treatment with filtration and high-level disinfection.

Irrigation of agricultural crops requires public access levels of treatment (filtration and high-level disinfection). A major restriction with the use of reclaimed water is that it cannot come in direct contact with foods that will not be cooked, peeled, skinned, or thermally processed prior to consumption. This restriction does not prohibit the irrigation of these crops with reclaimed water, but restricts the irrigation method that can be utilized.

Indirect potable reuse has been occurring throughout the world unintentionally wherever wastewater is discharged to a receiving stream or is applied to the land and infiltrates into an aquifer, and the stream or aquifer is subsequently used as a drinking water source. The discussion in this section focuses on the intentional blending of water supplies with reclaimed water, often referred to as pipe-to-pipe or direct-potable reuse.

For most of the other forms of reuse discussed in this report, there is experience within the United States. Intentional direct potable reuse is not currently practiced in Maryland. Potable reuse does not have the historical background that the irrigation forms of reuse have. Because of this lack of a database, intentional direct-potable reuse is not an alternative that can be implemented in the near term. It is also perceived as a last resort for water supply when all other sources have been exhausted. Less risk would be involved in the desalinization of groundwater than in the treatment of wastewater for potable purposes.

The term "gray water" has been defined as any wastewater generated from baths, showers, and washing machines. "Black water" is defined as wastewater from water closets, kitchen sinks, dishwashers, or any other non-gray water source. Basically, a gray water system consists of dual in-house piping, a septic tank, and a drainfield. One piping system collects the gray water from the baths, showers, and washing machines and conveys it to the septic tank. The other system collects the remaining wastewater (black water) and conveys it to a central sewer system.

Gray water systems can reduce wastewater flow to the central sewer system by as much as 50 percent. Flow reduction approaches 60 percent when water-saving devices (i.e., low-flush toilets) are used. When gray water systems and new collection lines are used, a stronger wastewater influent is expected. However, if the collection system is old, and groundwater is infiltrating the pipes, the influent characteristic would probably be similar to that of a conventional system. It is also important to realize that as flow to the plant is reduced, wastewater strength increases; thus, savings in treatment costs are usually much less than the reduction in flow. The major savings potential of a gray water system is in effluent disposal.

Gray water effluent quality is better than that of septic tank effluent, but poorer than that of treated effluent. Potential contamination of groundwater and surface water (i.e., lakes) is of concern, particularly in a service area which provides high recharge to an aquifer. The added capital cost of the gray water system (attributed to the installation of a septic tank, drainfield, and central sewer system) to the developer/homeowner is another disadvantage. However, this additional cost could be offset by reduced connection fees, since less flow would be expected from the dual system.

The PANDA Plant in Prince George’s County uses effluent waters from the Mattawoman Wastewater Treatment Plant (MWWTP) for Cooling purposes. The Kelson Ridge Power Plant Project in eastern Charles County proposes to construct and effluent water line from the MWWTP to the power plant, proposed to be located next to the County Landfill on Billingsley Road. The County continues to promote the use of the effluent water to reduce discharge into the rivers and streams.

4.2.8 Sewage Sludge Management Practices

The purpose of wastewater settling and biological aeration is to remove organic matter and concentrate it in a much smaller volume of sludge for ease of handling and disposal. The cost of facilities for stabilizing, dewatering, and disposing of this concentrate is about one-third of the total capital investment in a treatment plant. Operating expenses in sludge handling may amount to an even larger fraction of the total plant operating costs.

The quantity and nature of sludge generated vary based on the character of the raw wastewater and processing units employed. Primary settling produces an anaerobic sludge of raw organics that are actively decomposed by bacteria. Therefore, these solids must be handled properly to prevent emission of obnoxious odors. In comparison with secondary biological waste, primary sludges thicken and dewater readily because of their fibrous and coarse nature. Waste from secondary biological treatment, such as aeration, is made up of suspended and colloidal solids. It is relatively odor-free because of biological oxidation, but the finely divided and dispersed particles make it difficult to de-water.

Techniques for processing waste sludge depend on the type, size, and location of the wastewater plant, unit operations employed in treatment, and the method of ultimate solids disposal. Common methods for handling, processing, and disposing of waste sludge include: storage prior to processing in the primary clarifiers or separate holding tank; thickening prior to dewatering or digestion by gravity settling or dissolved air flotation; conditioning prior to dewatering by chemical treatment; stabilization by aeration (aerobic digestion); dewatering by vacuum filtration, pressure filtration, centrifugation, and drying beds; solids disposal by burial in a landfill, incineration, or spreading on farmland; and production of soil conditioners.

Most sewage treatment plants in operation in Charles County use aerobic digestion followed by dewatering on sand beds. These plants produce approximately 7 wet tons per year (see Appendix 4-N for a complete listing). The Mattawoman WWTP uses gravity thickening, aerobic digestion, and Belt Filter Processing with the County's Land Application Contracts. Currently, the Mattawoman WWTP is processing sludge generated by its own processes plus septage from septic and holding tank sewage pumping trucks. This is approximately 6.0 to 7.0 wet tons of sludge/million gallons of plant flow. New State regulations require that all septage gathered by sewage pumping trucks be treated at a sewage treatment plant. According to these regulations, raw septage may not be applied directly to any land surface in the State. The total sludge processed at the Mattawoman WWTP is approximately 93 percent of the sludge generated in Charles County. A review of the sludge management practices at the Mattawoman WWTP was recently completed as part of the Section 201 Facility Plan. Beginning in May 1990, Mattawoman sludge was no longer landfilled. The County has recently contracted to have its sludge applied to farmland.

The Town of La Plata currently processes sludge in its aerobic digesters and dewaters it through land application. This plant also has anaerobic digesters, which currently are not in use. Recently, a filter press (pressure filtration) was installed to dewater the sludge. The Town of Indian Head processes sludge in an aerobic digester and dewaters it on sludge drying beds. Currently, the town trucks its sludge to the MWWTP. The other smaller plants located in the County do not have the facilities to process excess sludge. These plants contract haulers to dispose of the excess sludge, either at the Mattawoman WWTP or via land spreading. Appendix 4-O provides information on the sludge management practices used within the County.

4.2.9 Pretreatment of Industrial Wastes[1]

The objective of an industrial pretreatment program is to ensure that no industry or group of industries is permitted to discharge wastes which may adversely affect the operation of the treatment works. Certain wastes should be totally excluded from the treatment plant. These fall into three

[1] "Charles County Pretreatment Program Report for Mattawoman WWTP", August 1, 1990, PSC Engineers and Consultants, Inc.

categories:

- Fire or explosion hazards
- Wastes which will impair hydraulic capacities
- Safety hazards for people operating the plant or sewer system.

The County has determined that an effective means to control commercial/industrial (C/I) user's discharge containing certain quantities of toxic or limited substances is through an industrial waste permit system. The permit system requires all existing and future C/I users classified as major or minor to obtain a permit.

Section 403.8(f)(2) of the General Pretreatment Regulations identifies the procedures that the County has established to ensure compliance with the requirements of a pretreatment program. These implementation responsibilities are to:

- identify and locate all C/I users possibly subject to pretreatment program
- identify the character and volume of pollutants discharged to the treatment works by these users
- notify C/I users of applicable standards and requirements
- receive and analyze self-monitoring reports and other notices from C/I users
- randomly sample and analyze industrial effluents
- investigate instances of non-compliance
- comply with public participation requirements

4.2.10 Marina Pump-out Program

The major water quality problem involving marinas is caused by the watercraft that use the facilities. Generally, marinas are located within protected coves with little tidal action to provide the potential for water exchange. Therefore, whenever watercraft dump their domestic wastes into the waters of the marina, these wasteload concentrations tend to remain in the same general area and cause severe pollution levels throughout that portion of the waterway. All marinas with 50 or more boat slips are regulated to have pump-outs, however, the County's objective is to have all marinas served by pump-out facilities.

This potential source of pollution should be attacked at both the watercraft level and the marina level. All watercraft should be prohibited from dumping their partially-treated wasteloads indiscriminately throughout the waterways, and they should be required to dispose of their wastes at a central location for ultimate treatment and disposal. Federal regulations governing waste disposal from watercraft are enforced by the Coast Guard and the Maryland Department of Natural Resources Police. Until a decision is made on these proposals, the enforcement efforts by local regulatory agencies to restrict watercraft dumping will continue to be severely restricted. So that boats have a safe place to dispose of their wastes, marinas are strongly encouraged to install waste collection systems to remove the wastes from the watercraft and treatment facilities to properly handle the wastes.

According to a survey conducted by the Maryland Department of the Environment (MDE) there are currently at least 15 marinas located in Charles County (see Appendix 4-B). The facilities are located mainly on the Patuxent River at Benedict (5), near Cobb Island (4), and at the mouth of the Port Tobacco River (2). These marinas provide on-shore sanitary facilities, and seven are equipped with systems for collection and treatment of wastes generated in the watercraft that use the facility. The Maryland Department of Department of the Environment (MDE) regulates the marina program, although the County does implement holding tank "pump out" programs at some marinas.

Furthermore, existing marinas should be required to upgrade their on-shore waste disposal systems where pollution concentrations above the allowable limits have been documented. The County recognizes the problem imposed by watercraft sanitary wastes and will develop procedures to regulate watercraft waste disposal. The Charles County Health Department is the lead local agency for marina pump-outs. Marina pump-out facilities were included in the Cobb Island sewer project.

The MDE has procedures and rules whereby new marinas are required to be properly served by adequate sanitary waste disposal systems that eliminate this potential pollution. These systems include both on-shore facilities and dockside facilities for the watercraft.

4.3 INVENTORY OF EXISTING SEWER SYSTEMS

The existing sewer treatment and disposal systems can be grouped into four types: private/community, public/municipal, and institutional/governmental. This listing contained herein, corresponds to the informational Appendices which appear at the end of this chapter.

Appendices 4-T, 4-U, 4-V, 4-W present population projections, projected demands, and planned capacity of each sewer system is listed. Appendices 4-D, 4-E, 4-F, and 4-G list the National Pollution Discharge Elimination System (NPDES) limits and the actual performances for these facilities. Appendices 4-P, 4-Q, 4-R, and 4S provide an inventory of sewer problem areas.

4.3.1 Private/Community

There are currently three private/community systems operating in Charles County, Hughesville Sanitary Commission facility and the Potomac Heights facility.

Hughesville Sanitary Commission The Hughesville Sanitary Commission owns and operates a private/community wastewater treatment facility. The facility is located in the eastern portion of the County and provides treatment for 0.006 mgd of wastewater through the use of an absorption field. The system serves 13 commercial lots; many of which are vacant at this time.

Potomac Heights The Potomac Heights area is also served by a private facility. The 200,000 gallon per day plant discharges to the Potomac River and is experiencing NPDES violations. The plant is also under a Consent Order with the Maryland Department of the Environment to improve treatment plant efficiency or to connect to the Mattawoman Sewer System. Recently, this system has received federal grants and loans to build a sewer pump station and force main to convey the sewage to the County-operated Mattawoman WWTP. Inflow/Infiltration is still a serious problem.

Patuxent Woods The Patuxent Woods is a facility consisting of a shared septic system serving eight (8) currently recorded lots within the Patuxent Woods subdivision. The lots served contain single family housing units only, intended as homes for low-income and moderate-income households. The maximum number of households on the systems is eleven.

These lots are served by an off-site septic system with an absorption field. The system will be privately maintained by a homeowners association. However, the Charles County Commissioners will serve as a controlling authority in the event that the homeowners association fails to maintain the system properly. An agreement between the County and the homeowners association should precede the start-up of this facility. The agreement should clearly define the roles and responsibilities of all parties in terms of maintenance of the Patuxent Woods facility, as well as defining liability and contingency arrangements.

Area of two systems will be required - one area for the initial unit and another area for the recovery unit. The initial septic unit will have 6 trenches and the potential recovery unit may have up to 10 trenches.

4.3.2 Public/Municipal

There are seven public/municipal facilities in Charles County. The Town of Indian Head and the Town of La Plata provide public sewer services for properties within their corporate limits. The Charles County Commissioners own and operate the remaining five sewer treatment facilities. These facilities are described below. Appendix 4-E provides additional information regarding the public/municipal facilities.

Clifton-on-the-Potomac This subdivision is served by a treatment plant and four (4) pumping stations. Clifton-on-the-Potomac is a 512-lot subdivision with a 110-acre commercial and light industrial component. The 1990 Comprehensive Plan had designated a "Village Center" in the Clifton/Newburg vicinity but this has recently been changed to Rural Residential in the 1997 Update. The plant design capacity is 70,000 gpd, with a current average daily flow of 82,000 gpd. The effluent from the plant is pumped into the Potomac River. At full build-out the expected wastewater flows for this subdivision would be as follows: 1) residential Units @ 300 gpd/unit = 0.153 mgd; and 2) commercial and Light Industrial @ 1,080 mgd/Acre = 0.0119 mgd.

The collection system does experience excessive inflow/infiltration (I/I) during wet weather. The County has analyzed the sewer system and located problem areas, which will be repaired to reduce the I/I in the system. The treatment plant uses the activated sludge process operated in the contact stabilization mode. There is a 0.8 acre pond used for flow equalization. Sludge is processed on-site in an aerobic digester and transported for ultimate disposal.

Clifton is currently under a building moratorium because the treatment plant is at capacity. [See recent Clifton policy on septics, Pg 1-15]. The August 1, 1989 agreement with a private developer to increase the treatment capacity of the plant has not resulted in an increase in treatment capacity as was expected by the County.

Cobb Island As a result of the Cobb Island 201 Facilities Plan, a wastewater treatment plant was constructed which serves the Cobb Island area and adjacent subdivisions of Pine Grove, Hill Boulevard, Woodland Point, Potomac View, and Matthews Manor. The service area of the Cobb Island Facility is also shown on the Water and Sewer Plan maps and may not be expanded in conformance with an agreement between the County and the Maryland Department of the Environment.

Sewage from Cobb Island, Pine Grove, and Hill Boulevard is transported by means of a force main to a two-cell lagoon located on the Breeze Farm site. The effluent is discharged onto the land by means of a spray irrigation system on the Breeze Farm site and on the Cuckold Farm site. Septic tank effluent pumps (STEP) have also been installed to serve the Matthews Manor, Woodland Point, and Potomac View subdivisions. The sewage is pumped through a force main to a two-cell lagoon located on the Cuckold Farm site. The effluent is discharged onto the land by means of spray irrigation on the Cuckold Farm. The "general conditions" agreed to by the County and The Maryland Department of the Environment are listed in the supplemental policy for the allocation of Cobb Island sewer capacity.

In 1996 the County Commissioners adopted the Cobb Island Sewer Allocation Policy which allowed 27,000 gallons per day (gpd) of sewage treatment capacity to be allocated for ninety-seven (97) equivalent dwelling units for residential and 30 EDU allocations for commercial. The County Commissioners, and Maryland Department of the Environment agreed, that there is sufficient capacity in the system to accommodate these allocations.

The 1996 annual average flow was 99,032 gallons per day which is generated by 506 service connections (residential and commercial). Rated capacity is currently 158,000 gpd with 20% of the potential capacity held back for future consideration. The County should request the Maryland Department of the Environment to either re-rate the facility or review allocation/flow reports to allow additional connections in the time period of this plan.

Town of Indian Head The incorporated limits of the Town of Indian Head are served by a central sewage collection system and wastewater treatment plant with a 500,000 gallons per day capacity. The plant began operation in 1968 and received a plant upgrade in 1992. Both the systems and facility are owned and operated by the Town. The plant presently has an average daily flow of 0.358 mgd. The plant is presently achieving all the effluent quality requirements set by the NPDES permit.

The Town presently serves approximately 1,254 residential and commercial accounts within the Town of a population of 4,000 (1997 estimate). The Town's wastewater collection system dates in some areas from the 1930's. The system has periodically been expanded as warranted by development, annexation and provision of sewage treatment services to surrounding subdivisions. The collection system presently consists of approximately 54,700 linear feet of mains ranging in size from 4-inch to 12-inch. In addition, the Town operates three (3) pumping stations within the system.

The present system experiences heavy inflow/infiltration (I/I) problems. The estimated average I/I to the plant is 0.025 mgd or approximately 8% of the total plant influent flow. The Town has undertaken a program to improve the I/I problem.

The Indian Head Wastewater Treatment Plant has a design capacity of 500,000 gpd and consists of preliminary treatment in the form of a fine mechanical screen and grit removal Secondary treatment in the form of a step feed activated sludge with plug flow capability, secondary clarifiers, and chlorine contact chambers followed by dechlorination. Primary and Secondary aerobic digesters are utilized on site for sludge reduction. Sludge dewatering is accomplished using on-site reed drying beds. Liquid sludge is handled via a 2000 gallon tanker trucks and hauled to the Mattawoman WWTP.

Allocation of sewer capacity within the Town of Indian Head is on a first-come, first serve basis. However, the Town has more available capacity at the sewage treatment plant, than remaining developable land within the town boundary would require. Monthly monitoring reports are submitted to the Maryland Department of the Environment (MDE) for sewage treatment flows.

Town of La Plata The Town of La Plata is served by a sewer system that it owns and operates. The wastewater treatment facility is located northeast of the intersection of US 301 and MD 6 on a tributary of the Port Tobacco River. La Plata expanded the capacity of their treatment facility to 2.5 mgd in 2002. The upgrade to the facility included the addition of Biological Nutrient Removal precesses with final filtration and ultraviolet disinfection.

The collection system consists of a network of sewer lines, varying in size from 6" to 15", providing service to areas within the incorporated limits. Currently, the gravity collection system that serves La Plata is supplemented by thirteen (13) pumping stations. These stations include Clark's Run Pump Station, Hawthorne Pump Station, Marvin Gardens Pump Station, Clark's Run #2, Quailwood, La Plata Commerce Center, Meadows, Haldane, King's Grant, Mary Ball, Willow Lane Pump Station, Hickory Ridge Pump Station, and Willowgate Pump Station.

The existing collection system is considered of adequate capacity for the wastewater flows generated in the areas presently served. However, inflow/infiltration problems exist in portions of the collection system. Although there are no raw sewage overflows, this condition periodically overloads the treatment plant and substantially overloads its efficiency. As a result, La Plata has undertaken, as a continuing improvement project, the work of identifying sources and locations of the inflow/infiltration problems and determining the exact magnitude of their effect upon the collection and treatment system. Where feasible, La Plata is presently correcting the sources of inflow/infiltration as they are discovered; thereby continually upgrading the existing collection system. As the inflow/infiltration system problems are eliminated through upgrading the collection system, La Plata's wastewater treatment plant should be adequate to serve its sewage disposal needs for more than the next twenty years.

The treatment plant consists of an activated sludge process with final filtration, chlorine contact, and a hydraulic press filter for drying sludge removed from the process, and an outfall to a tributary of the Port Tobacco River. Sludge is presently digested in aerobic digesters then pressed and disposed of by land applying.

The average wastewater flows to this treatment facility are about 1.192 mgd, with peak flows around 1.5 mgd during periods of wet weather, due to the inflow/infiltration problems within the collector system. The sewage flow is generated by about 8,592 residents, numerous commercial establishments, seven schools and various governmental offices located within La Plata. It should be pointed out that La Plata is the county seat for Charles County and a governmental center for Southern Maryland. Therefore, the quantity of sewage actually generated in La Plata is much higher than would be expected from its residential population.

The Town has approximately 6,000 additional residential units planned over the next twenty years. This expansion will ultimately require an additional capacity of 1.3 to 1.5 million gallons per day. The improvements will likely built by the development community and dedicated to the Town for operations and maintenance. This expansion would include several additional pump stations, gravity lines, and an expansion of the sewer plant to an average daily flow of 5 mdg and a maximum of 10 mgd.

Allocation of sewer capacity within the Town of La Plata is on a first-come, first serve basis. For residential subdivision applications, the Town issues an Allocation Letter to the Charles County Health Department to confirm that adequate sewer capacity exists at the Wastewater Treatment Plant. The Health Department will sign the Allocation Letter, once capacity is confirmed. A flow factor of 225 gallons per day per dwelling unit is used to determine sewer demand. The Town uses Maryland State Standards to determine the sewer demand of institutional, commercial, and industrial uses. Monthly monitoring reports are submitted to the Maryland Department of the Environment (MDE) for sewage treatment flows.

Mattawoman Wastewater Treatment Plant (WWTP) The Mattawoman WWTF is located at Mason Springs. The service area for this facility is the Mattawoman Sewer Service Area (MSSA), the County's primary development area. The MSSA is intended to serve natural drainage basin of the Mattawoman Creek, areas previously served when the MSSA was established, and areas within the Comprehensive Plan's Development District. The function of this facility is to serve as a regional sewage treatment plant for northern Charles County and a portion of southern Prince Georges County. Charles County and the Washington Suburban Sanitary Commission (WSSC) entered into an agreement October 22, 1982, concerning the Mattawoman basin sewer service. Briefly, that agreement provides the following:

- An understanding that the treatment facility is designed to accommodate future expansion in stages to increase treatment capacity to fifty (50) million gallons per day.

- That the WSSC shall participate in the funding of construction, maintenance, and operation of the wastewater treatment plant, pumping station, the outfall line, and the Mattawoman interceptor in return for the vested right to discharge wastewater from the Washington Suburban Sanitary District into the sewer facilities.

- An agreement that Prince George's County will, as the treatment capacity of the Mattawoman Wastewater Treatment Plant is enlarged, receive additional usage and treatment capacity not to exceed twenty percent (20%) of the expanded capacity to 15 mgd. Due to the recent BNR construction, the Maryland Department of the

Environment re-rated the plant to 20 mgd. Prince George's County was not a party to this recent construction. Therefore, the Prince George's County bulk allocation remains at 3 mgd of the total plant capacity.

The major interceptors which transport wastewater to the Mattawoman Plant include: the Mattawoman Interceptor; the Piney Branch Interceptor; and the Bryans Road Interceptor. The Mattawoman Interceptor extends from the plant along Mattawoman Creek and terminates in the vicinity of the Pinefield subdivision. The Piney Branch Interceptor, which discharges into the Mattawoman Interceptor, extends along the Piney Branch and terminates at US 301, across from St. Charles. The Bryans Road interceptor transports sewer from the Bryans Road area to the Mattawoman Treatment Plant.

The North Indian Head Estates subdivision, a trailer park, and a portion of the commercial district in Bryans Road are presently served by the Bryans Road Interceptor. The Charles County Department of Utilities took over operation of this system from Charles Utilities in November of 1988. The collection system consists of 21,000 linear feet of gravity sewer pipe. One pump station operates within this system with a flow capacity of 300 gpm. The 4-inch diameter force main associated with this pump station is 980 linear feet in length. Infiltration and inflow is considered excessive within this collection system as documented by field reports filed by the Department of Utilities.

The present population served by the Mattawoman Plant is approximately 55,000. The water consumption recorded for these customers during 1987 averaged approximately 333 gallons per connection per day according to research completed by the Charles County Department of Planning and Growth Management. Based on a 90 percent return rate, the estimated average sewage flow rate, not including I/I is 260 gallons per day. The per capita wastewater flow is then approximately 85 gallons per day. Ultimate service population in the year 2025 is estimated to be 145,435 with total flows estimated to be 48.43 mgd.

The Mattawoman Sewage Treatment Facility is a conventional activated sludge treatment plant. The unit processes and operations of the facility include: preliminary treatment, primary settling, aeration (activated sludge), final settling, post-chlorination, dechlorination by sulfonation, gravity thickening, aerobic sludge digestion, and belt filter press de-watering. See Appendix 4-I for NPDES permit limitations for this facility.

The Mattawoman WWTP was opened in 1979 at 5.0 mgd facility. The facility was expanded to accommodate flows up to 10.0 mgd in 1990. The average daily flow for the WWTP for 1987 was 4.6 mgd. The current annual average flow is 9.391 mgd (effluent flows).

The expansion and the upgrade of the plant to 15.0 mgd was in accordance with the 201 Facilities Plan and complies with Maryland's Potomac Strategy Committee's Policy on discharge to the Potomac estuary. The actual planning area boundaries set by the State of Maryland include the entire Mattawoman Creek Basin, Waldorf, St. Charles, the Town of Indian Head and a portion of Prince Georges County.

The Maryland Department of the Environment and the U.S. Environmental Protection Agency approved the Mattawoman 201 Facility Plan, with Addendum II, in February, 1989. This approved facility plan recommended the upgrade and expansion of the existing wastewater treatment plant to 15.0 MGD. In order to improve water quality in the Potomac River, as well as meet NPDES permit requirements (Table 4-6B), the upgraded Mattawoman WWTP removes total phosphorus to the level of 0.18 mg/l.

A cursory review of the existing Mattawoman site was completed as part of this Comprehensive Water and Sewer Plan to determine if planned expansions could be contained within the plant's current boundaries with the existing site constraints. This analysis was completed with the following assumptions:

- The plant will be contained within its current property boundaries;
- On-site wetlands will present serious site development constraints and wetlands regulations will not be relaxed;
- Charles County will implement the State's program for BNR at the WWTF within the next decade.

Since design criteria for the existing facility was unknown, the information presented in the *Biological Nutrient Removal Study* prepared for The Maryland Department Of The Environment (MDE) in June 1989 was used. Most of the treatment facilities upgraded to date under the State's BNR Program have Total Nitrogen (TN) limits on a seasonal basis. This analysis utilized the same approach. The assumed design criteria utilized in the BNR model is as follows:

- Average Influent BOD = 125 mg/l
- Average Influent TSS = 125 mg/l
- Average Influent TKN = 25 mg/l
  (Note: Average Influent Values are after primary clarification)
- Peaking Factor = 1.3 (for maximum month conditions)
- Desired Operating MLSS = 2,500 mg/l
- Desired Solids Loading on the Secondary Clarifiers= 18 lbs./sq.ft./day
- Wastewater Temperature = 15 deg. C.
- Seasonal Effluent TN = 8.0 mg/l (April 1 - October 31)

The process selected for providing nitrogen removal under BNR operation is the Modified Ludzack-Ettinger (MLE) process. This process utilizes an upfront anoxic zone for denitrification (converting nitrates to nitrogen gas) followed by aeration zones for removing carbonaceous organics and nitrification (converting ammonia and organic nitrogen to nitrates). Wastewater from the end of the aeration zones is recirculated back to the front of the anoxic zone for removing the nitrates formed in the aeration zones. The MLE process has been very successful in removing nitrogen, however, it does not enhance phosphorus removal. BNR processes by themselves, cannot reduce phosphorus to the low discharge limits established for the Potomac River. Therefore, it was assumed that the existing method of removing phosphorus by adding alum and clarifying/ filtering would continue to meet total phosphorus limits of 0.18 mg/l.

Over 65 percent of the Mattawoman Treatment Facility site lies within the area designated as Resource Protection Zone (RPZ). The County has adopted zoning regulations which restrict certain activities (i.e. excavation, fill, clearing) within this overlay zone. In addition to non-tidal wetlands, the RPZ protects streams, 100 year floodplain and buffer to streams, floodplains, and wetlands. Soil surveys of the site indicate that over 85 percent of the site is Bibb and Fallsington soils, which are listed as hydric soils and indicative of wetlands. It appears that the treatment plant cannot be easily expanded outside the area identified for the ultimate expansion to 50.0 MGD. Three sides of the aeration tanks are occupied by the primary clarifiers, the secondary clarifiers, and the aerobic digesters/sludge thickeners. As a result, additional process tankage could only be added to the southeast side of the existing aeration tanks, or to northwest side of the existing pump station road along the property line. However, both of these locations appear to lie within or partially within the RPZ area.

As currently configured for a capacity without BNR of 50 MGD, approximately 10.25 million gallons of aeration tank volume can be constructed on the site. The BNR model was run at 5 MGD increments and looked at the total process tankage volume required for the MLE process versus the potential volume as shown in the expansion plans. The models were conducted at a wastewater temperature of 15 degrees C, because of the need to nitrify in the months of April and October. Historical data for some wastewater treatment plant projects in Anne Arundel and Prince George's Counties show that wastewater temperatures during these months can be at or below 15 degrees C. It is possible that the County could negotiate with the State concerning the time frame of the seasonal TN limits, where a warmer temperature of 20 degrees C. may be utilized. Therefore, as a courtesy to the County, the review was also includes a second run of the models where a wastewater temperature of 20 degrees C. was utilized.

The results of this modeling efforts indicated that the estimated flow which may be handled on the existing site at the potential tank volume of 10.25 MGD, and considering the above described site constraints are as follows:

Temp. (deg. C)	Estimated Flow (MGD)
15	20 to 25
20	30 to 35

The State is allowing the design of wastewater facilities at an influent temperature of 20 degrees C, and establishing the discharge limits after an operating period of 1 to 2 years. Therefore, the State may allow Charles County to utilize a temperature of 20 degrees C. Additionally, there is a growing body of evidence which suggests that the conventional method of sizing BNR treatment facilities may be too conservative. Newer methods of optimizing the rate of denitrification, which may reduce the carbonaceous loading in the aeration zones, are emerging. The result of these new methods are a reduction in the overall volume required to meet the same discharge limits. Therefore, this may allow for more capacity at the Mattawoman site.

Another important issue is the need to address solids loadings onto the secondary clarifiers. High solids loadings can be detrimental to a BNR operation. It is typically recommended that an average solids loading of 18 pounds per square foot per day (#/sq.ft./day) be used as a conservative approach.

To minimize the number of clarifiers constructed downstream of the aeration tanks, the secondary clarifiers should be constructed larger than the 100 foot diameter shown on the 50 MGD site plan. The facility currently has four (4) 70 foot clarifiers as part of the initial 10 MGD capacity. With the expansion to 15 MGD, the new clarifiers are shown as 100 foot diameter. In this model analysis, the next two (2) proposed clarifiers to be 100 foot diameter, for a total of four (4) 100 foot diameter clarifiers were allowed. However, any additional clarifiers beyond the existing 4 - 70 foot, and 4 - 100 foot diameter clarifiers were increased to 120 foot diameter. This will minimize the need for additional, smaller clarifiers which would have to be located in the RPZ area.

The County's CIP Department is nearing completion of the BNR system and MDE has re-rated the NPDES Permit for the plant to 20 mgd.

<u>Mt. Carmel Woods</u> The Mount Carmel Woods Subdivision is served by an extended aeration package treatment plant located south of Mitchell Road, west of US 301, and north of MD 225. The service area is shown on the Comprehensive Water and Sewer Plan maps. This wastewater facility is operated by the Charles County Commissioners. The plant discharges to Jenny Run. The design capacity of the plant is 21,000 gpd, permitted for 21,000 gpd with a current hydraulic loading of about 18,000 gpd. The plant receives wastewater from the approximately 60 connections in Mount Carmel Woods by a gravity collection system with no pumping stations. The County is currently completing a CIP project to determine the best alternative to extend a sewer main to the Mattawoman Sewer System and dismantle the Mt. Carmel Plant. Alternatives include a force main extension along Mitchell Road to US 301 up to the White Plains Pump Station, an extension to the College of Southern Maryland's Sewer Plant, and an extension of a force main to the Mattawoman interceptor directly to the northwest of the community. Results are expected by the end of 2006.

<u>Strawberry Hills Estates</u> The Strawberry Hills Estates sewer treatment facility is out of service since the Strawberry Hills Estates subdivision has been tied into the Mattawoman WWTP. The collection system consists of approximately 15,204 linear feet of eight (8) inch diameter asbestos-cement pipe and is connected to the Bryans Road Interceptor Collection System.

<u>Swan Point</u> Swan Point is being developed by USX Realty Development, a subsidiary of U.S. Steel. The facility serving this development is an activated sludge package plant that discharges in Cuckold Creek and is rated at 70,000 GPD. This facility is owned and operated by the County. Present flow is approximately 67,000 GPD; however, the original developer agreement granted additional allocations which now exceed the 70,000 GPD plant capacity. The system is currently under a moratorium until the developer (USX Realty Development) expands the system. The Swan Point sewer system meets all of its NPDES permit requirements and the effluent is dechlorinated. The County received a revised NPDES permit, and is working concurrently with the developer to expand the capacity of the sewage treatment plant. The design and construction of the ultimate plant expansion to 600,000 GPD will be funded by the developer.

4.3.3 Institutional/Government

Four entities own and operate institutional/government wastewater treatment facilities in Charles County: the Charles County Board of Education, Charles County Community College, the Southern

Maryland Correctional Institution, and the Navy (at the Naval Surface Warfare Center). These facilities are described below. Appendix 4-F provides additional information regarding treatment types, capacities, and discharge points.

The Board of Education of Charles County The Board of Education of Charles County operates treatment plants that serve Gale-Bailey Elementary School, Matthew Henson Middle School, Lackey High School, Piccowaxen Middle School, and Mt. Hope Elementary School. J.C. Parks Elementary School is served by trickling filter plants. Formerly served by a trickling filter plant, Gale-Bailey Elementary School is no longer under an NPDES Permit. The Mt. Hope Elementary School is served by a zero discharge water re-cycling treatment system. All plants are currently operating under design loads and are meeting NPDES permit effluent limitations. Construction of a sewer line to connect Lackey High School to the Mattawoman Interceptor is currently underway. Construction is expected to be completed in 2003. Upon completion of the connection, the school's existing sewage treatment facility will be abandoned. There are currently no plans for future expansions or sewer connections of the other listed school facilities.

College of Southern Maryland (CSM) This institutional complex is served by a wastewater treatment facility located north of Mitchell Road on the east side of Port Tobacco Creek. The plant is owned and operated by the CSM and serves the campus area, Maurice J. McDonough High School, the James Craik Elementary School, and the Vocational-Technical Center. The system consists of a separate grit chamber, comminutor, activated sludge aeration basin, final settling tank, post-aeration and chlorine contact chamber. In 1977, the College added a 20,000 gallon surge tank, tertiary treatment, chlorination, and dechlorination of wastewater. The outfall line extends to Port Tobacco Creek. The sludge is digested in an aerobic digester and dried in sand drying beds.

The treatment facility is designed for a sewage flow of 60,000 gpd and is currently treating an average of 29,000 gpd. The collecting sewers vary in size from 6" to 8" and serve the campus area and the other aforementioned institutions. The collection system is gravity and force main flow and is considered adequate for the wastewater flows generated in the areas presently served.

Based on the projected enrollment figures and the current plans to supply sewer services to a new middle school and an enlarged Community College, the projected wastewater flows are expected to approximate 60,000 gpd. The Charles County CIP Department is currently working on a project for the Mount Carmel Woods sewer plant, which looks at potentially connecting to the CSM plant and possibly continuing to the northwest to connect to the Mattawoman Interceptor. Results of the study should be forth-coming by the end of 2006.

Southern Maryland Correctional Institution The Southern Maryland Correctional Institution is served by a stabilization lagoon and a disinfection facility. The plant is designed to treat 100,000 gpd and presently processes 16,000 gpd average daily flow. The plant's past record shows that it is unable to meet its NPDES effluent limitations (see Table 4-J). A new treatment plant employing the land application of effluent was completed in mid-1986.

Naval Surface Warfare Center The Naval Surface Warfare Center (NSWC) is located west of and adjacent to the Town of Indian Head. The collection system and treatment facilities which serve this area are owned by the Federal Government. The system and facilities serve 2,500 employees and 1,200 residents within the NSWC boundaries. The total estimated wastewater flow at the NSWC is presently 486,000 gpd.

The treatment facilities include a total of six (6) sewage treatment plants, 21 septic tanks, and two Imhoff tanks. The total flow capacity is 650,000 gpd. The combined capacity of the septic tanks and the Imhoff system is approximately 78,000 gpd. The effluent from the 21 septic tanks and Imhoff tanks is filtered and chlorinated before discharge. Sludge is periodically removed from the septic tanks and Imhoff tanks by a private hauler. Effluent from all of the treatment facilities at the NSWC is ultimately discharged into the Potomac River. A summary of the NPDES permit requirements and performances for the facilities serving NSWC is presented in Table 4-J. Infiltration/inflow (I/I) is considered excessive in the collection system which serves the six sewage treatment plants. The collection system is presently undergoing rehabilitation to eliminate a portion of this extraneous flow.

A plan has been approved to centralize the treatment facilities at the NSWC. Under this plan, the two major treatment plants would be upgraded and expanded to handle all of the domestic sewage generated at NSWC. In addition, the 21 septic tanks, two Imhoff tanks sand filters, chlorine facilities, and four of the six package sewage treatment plants will be abandoned. New construction will include the installation of 18 pump stations, 12,000 linear feet of 4-inch diameter vitrified clay gravity sewer pipe, 20,000 linear feet of 6-inch PVC pressure pipe, 12,000 linear feet of 6-inch diameter vitrified clay gravity sewer pipe and 8,000 linear feet of 8-inch vitrified clay gravity sewer pipe.

4.3.4 Industrial

American Telephone and Telegraph (AT&T) The American Telephone and Telegraph installation in Faulkner is serviced by a trickling filter and final sand filter. The plant design capacity is 30,000 gpd with an average daily flow of 1,000 gpd. The plant is presently meeting all of the NPDES effluent limitation based on monthly averages for 1982. There are no plans for future expansion.

Mirant - Morgantown The Mirant (formerly PEPCO) generator station at Morgantown is served by a 20,000 gpd activated sludge treatment plant. The average daily flow is 7,000 gpd. The plant is presently meeting all of the NPDES effluent limitations based on monthly flows for 1982. There are no plans for future expansion.

Commercial Facilities There are four commercial establishments that are served by their own treatment facilities in the County. These establishments are Lafayette Motel, Thunderbird Dental Clinic, Thunderbird Apartments, and White House Motel. The facility serving the Thunderbird Apartments (as well as Bel Alton Motel, Chapel Point Woods Section 5 and commercial zoning in the vicinity) has upgraded their sewer treatment capacity from 18,000 to 32,000 gpd. These treatment plants are relatively small in size, ranging from 5,000 to 32,000 gpd. Of these plants, only the White House Motel meets at least two NPDES effluent limitations on a regular basis. Table 4-G includes information regarding capacities, treatment types, and discharge locations for these facilities.

4.4 ASSESSMENT OF EXISTING SYSTEMS

In addition to the centralized systems described above, many areas of Charles County are served by on-site septic systems. An assessment of existing systems, both centralized and on-site, is provided in this section.

4.4.1 <u>Failing Septic Tank Areas</u>

The 1995 population of Charles County was 111,271, of which approximately 70,000 people (approximately 63 percent of the total County population) were served by central sewage collection systems, either municipal, public, or private community. The remaining population relies on an individual treatment system, primarily consisting of septic tanks and subsurface drainfields, to provide sewage disposal. The performance of an individual septic system is dependent on installation maintenance on unsuitable soils. For some areas, these individual systems are prone to failure or malfunction due to the surrounding soil conditions and high water tables due to improper installation, maintenance, or unsuitable soils characteristics.

Systems that are located in areas with severe sewage disposal soil suitability limitations can be expected to malfunction eventually. Regularly scheduled maintenance of septic tank systems is necessary if they are to operate properly. Poorly maintained systems eventually lead to clogging of the drainfield.

The State of Maryland Department of Health has investigated the County and listed areas where septic system failures have been experienced (see Appendix 4-M). Also, Addendum II of the Mattawoman 201 Plan lists 41 failing septic areas within the Mattawoman Sewer Services Area. These are shown on the Comprehensive Water and Sewer Plan maps. Addendum II concentrated on failing septic areas within the County's Development District, as it was required as a condition of the study. Other areas outside the Development District have been identified. However, non-Development District failing areas have not been studied in any good detail.

The Charles County Health Department has identified six failing septic tank condition categories for existing septic areas within the County:

- Sewage discharge into an aquifer currently being used as a water source by wells in this or adjacent areas,
- Sewage discharge into surface waters,
- Sewage discharge to the ground surface,
- Sewage discharge into any groundwater aquifers not designated to receive sewage by a county groundwater protection report,
- Any other cause of septic tank failure, and/or
- Insufficient area to replace an existing septic system in accordance with COMAR 26.04.02.

The County has in place a failing septic tank area petition process; whereby failing areas can appeal to the County for assistance in mitigating their failing systems. This process is included in Appendix 4-Z and 4-AA.

4.4.2 Corrective Measures

As summarized in Appendices 4-T, 4-U, 4-V, and 4-W, several of the central facilities require improvements, either to meet the limits of their NPDES permits or to correct excessive infiltration/inflow problems. The correction of failing on-site septic areas can be accomplished in one of three ways: 1) individual repairs may correct the problem; 2) the area involved can connect to a centralized system if one is available; and 3) in areas where a centralized facility is not available, the area can employ innovative and alternative technologies for correction of the failing on-site septic system. These innovative and alternative systems may include rehabilitation of the septic via a mound system, utilization of a STEP system, and conveyance of water to a centralized facility and on-site individual treatment facilities. Some funding for the correction of failing individual septic systems is available through the State.

In 1989, the County, in conjunction with the County Health Department, established criteria used to rank the problem areas in the Mattawoman Sewer Service District (i.e. proximity to existing and/or future development; environmental impact; and affordability). Through this process, five areas were chosen to be addressed. The five failing septic areas are: Sun Valley/Stavors Road; Brookshaven; Laurel Drive/Laurel Acres; and the Glymont Road area. Some of these areas are connected to a central system; others are in the process of being connected to a central system.

4.5 PROJECTED SEWER SERVICE DEMANDS

As stated in Chapter 2, the purpose of developing the population projections included as part the Comprehensive Water and Sewer Plan is to provide flow projections that are correlated to the population projections used throughout the County. Chapter 2 addresses the correlation of the County's dwelling unit to the projected water and wastewater flows for Charles County. To determine existing excess capacity, as well as new service areas and potential limited capacity problem areas, the population projections derived in Chapter 2 of this report were used to project wastewater service demands for the planning horizon. The flow projections were completed as part of the Comprehensive Plan 1997 and 2006 Update. The assumptions use are described herein.

4.5.1 Population Projection Summary

Chapter 2 of this report provides the methodology used to determine the population for Charles County as a whole, and the Development District specifically. The methodology included the derivation of housing units. To convert populations projections to wastewater service demands, a flow factor was multiplied with the housing units to provide an average daily flow. Wastewater service demand was calculated with a private/community or municipal wastewater treatment provider.

4.5.2 Flow Generation Factors

4.5.2.1 Standard Flow Generation Factors

Flow generation factors are those numbers that are multiplied with a known unit (acre of land, dwelling unit, square foot) to yield a wastewater service demand in gallons per day. Generally, historical water use aggregated by consumer type is used to determine flow generation factors. The County has determined flow generation factors for wastewater service within the County. These factors are provided in Table 4-1.

4.5.2.2 Water Conservation Factors

As a result of rapid residential and business development, Charles County is confronted with an ever increasing demand for water and wastewater treatment capacity. While this demand for services has paralleled growth, the cost of developing additional capacity and operating water and wastewater facilities has continued to increase. The County's goal is to reduce the need for new capital expenditures and make more effective use of the resources now available.

The County is increasing the public's perception of the problem of water supply and encouraging them to help the County reach its goal. Specifically, that goal is to reduce per water consumption by 20 percent by the end of the planning period within existing systems and to provide for water conservation in all new systems implemented during the planning period. A reduction in potable water usage has a similar effect on wastewater service demand.

TABLE 4-1

FLOW FACTORS

TYPE USE	SEWAGE FLOW FACTOR
Single-Family Unit	333 gallons per day per unit
Townhouse Unit	258 gallons per day per unit
Duplex Unit	258 gallons per day per unit
Apartment Unit	202 gallons per day per unit
Commercial/Industrial/Business	2,000 gallons per acre

Source: Charles County Department of Planning and Growth Management, 2006.

4.5.3 Flow Projections - Wastewater Production

The wastewater service demands projected for the County were based on population projections. The County's Comprehensive Plan indicates that the total population for 2010 will be 149,756 with approximately sixty percent of the population served by the Mattawoman WWTP. This equates to 79,638 residents served within the Development District. To project future non-residential flows, the Plan assumes that 25 percent of the flows will be attributed to commercial projects and another 20 percent will be extraneous water entering the sewer system.

Through this process, the non-residential flow associated with housing units can be determined. Table 4-2 provides the breakdown of flow county-wide by residential and non-residential components. Further, a general factor is shown which estimates non-residential flow as a factor of housing units. Using the housing units by TAZ, coupled with the non-residential flow factor described above, a total wastewater service demand, by TAZ was determined as shown in Table 4-3.

4.5.4 Level of Service

A level of service is a benchmark for determining if a system is providing wastewater service that is, at a minimum, comparable to other wastewater services in the County and meets the County's minimum standards for service. The level of service for wastewater is generally defined as a facility being able to effectively treat and dispose of 260 gpd per single-family connection (the flow generation factor used in determining total wastewater service demand set by the County), on an average daily basis, to a level consistent with the centralized facilities' NPDES-permitted discharge limits. Charles County has further defined level of service to include a maximum infiltration/inflow rate of less than or equal to 20 percent of the total flow delivered to a facility. In addition, the wastewater system should be capable of accommodating the disposal of flows listed under the "Levels of Service" for water supply.

In designing a new system or expanding an existing system, the user should ensure that the County's level of service standards are met.

4.5.5 Wastewater Generation as a Function of Existing Excess Treatment Capacity

As evidenced in previous sections, several of the facilities have excess treatment capacity. Of particular concern to the County is the overall capacity for wastewater treatment within the Development District, since a majority of the expected County growth will be directed to that area. Therefore, a comparison was made of the existing capacity at the Mattawoman WWTP with the Development District flow projections. This comparison indicates that additional capacity will be required at the Mattawoman WWTP in the year 2010, assuming 35 percent of the area is still served by on-site septic systems. However, as on-site septic systems areas are added to the collection/transmission system, capacity at the Mattawoman WWTP will be insufficient.

Current excess capacity at the County's municipal and private/community plants is approximately 2.78 mgd. County-wide wastewater production is estimated to increase from 11.82 mgd to 15.91

mgd in the year 2010, an increase of 4.09 mgd. Therefore, on a County-wide basis, excess capacity is insufficient to treat flows from the growth through the year 2010.

TABLE 4-2

COUNTY-WIDE AND DEVELOPMENT DISTRICT WASTEWATER PRODUCTION

COUNTY -WIDE			DEVELOPMENT DISTRICT					
Year	Charles County Population	Total Wastewater Flow (mg/(1)	Population (2)	Residential Flow (mgd)(1)	Commercial Flow (mgd)(3)	P.G. County Flow & Allocation (mgd)	Inflow and Infiltration (mgd)(4)	Total (mgd)
1995	111,271	14.18	52,452	4.72	1.18	3.00	1.76	10.67
2000	122,852	15.66	75,300	5.44	1.36	3.00	1.92	11.73
2005	136,154	17.36	86,339	6.31	1.58	3.00	2.13	13.02
2010	149,756	19.09	95,802	7.17	1.79	3.00	2.34	14.29

(1) Sewer service area population multiplied by a sewage flow factor of 85 gpd/person.
(2) Assumes that 47 percent of the Charles County population will be connected to the Mattawoman WWTP.
(3) Assumes that 25 percent of the flows will be available for commercial projects.
(4) Assumes that 20 percent of the flows will be attributed to extraneous water entering the sewage system.

Source: 1997 Comprehensive Plan & Charles County PGM

Most of the growth through the year 2010 is projected to occur in the Development District. Development District flows will increase from 10.67 mgd (year 1995) to 14.29 mgd (year 2010), or an increase of 3.62 mgd. The Mattawoman WWTP will need to expand by a minimum of 15 mgd (assuming that the conversion to a BNR process reduces the plant's current capacity from 15 mgd to 10 mgd) to provide sufficient treatment for the projected flows. Therefore, the total treatment capacity will be 25 mgd.

Systems which are capable of providing treatment for flows within their service areas did not receive further review. However, generally, the systems' rated capacities were not capable of providing sufficient treatment for the expected demands. A tiered review of "deficit" systems was completed. The first tier reviewed the size of the potential growth area relative to the size of the existing system's service area. Many times, the central service provider's area was development specific, and not meant to be expanded into a central, regional facility. Therefore, it was assumed that much of the existing population was served by individual septic systems.

The next tier reviewed the remaining systems for possible connection or upgrades to correct the deficit situation in year 1997. These corrections were reviewed without regard to the owner/service provider. Therefore, it is possible that private/community systems should be connected to an existing municipal provider or upgraded. This may require an inter-local agreement between the service provider and the County, or the acquisition of the systems by the County in order to effect these improvements. These improvements, although described as part of the 1997 analysis, do not need to be completed in 1997, and are provided for reference only.

4.5.6 <u>Wastewater Production as a Function of New Service Areas</u>

The sewage flows from the central collection and treatment systems can be expected to follow the population growth trends. Appendices 4-U and 4-T show the projected sewage flows from municipal/ public and private/community systems located within the County. The trends for growth in Charles County appear to flow from the Waldorf area westward, and from the Bryans Road area southward. The trends can, and are, being regulated by the availability of public services. Each system is unique in that the per capita flow may vary significantly. The per capita flow column represents the gallons per capita per day (gpcd) that each system can expect: for 1990, it was calculated based on actual flow records and service population. Some systems, such as Indian Head, have high per capita flows (188 gpcd). This flow represents a significant infiltration & inflow problem in the existing system. More acceptable ranges for this parameter are 70 to 100 gpcd. All projected sewage flows assume that new sewer extensions maintain present values.

Building on the methodology used for comparison of existing system excess capacity versus projected future demands, additional steps were completed (See Table 4-3). These included:

- Determining the Year 2010 flow.
- Comparing the surplus/deficit of rated capacity available to 2010 demand.
- Calculating the incremental flow increase from year 1995 to year 2010.

Table 4-3
Existing Central Wastewater Facilities Compared To Projected Wastewater Service Demands

Owner	TAZ	Rated Capacity (mgd)	TAZ 2002 Units	2002 Flow (mgd)	2002 Surplus (Deficit) Flow (mgd)	Incremental Flow Increase 1992 to 2002 (mgd)	Comments
La Plata, Town of	varies	2.500	0	0.000	1.000	0.000	System planning responsibility of town
Mattawoman WWTP	varies	15.000	37,090	15.021	(0.021)	1.246	Planned BNR addition on FY 96 MDE priority list; all flow not connected by year 2002
Swan Point	200	0.341	1409	0.366	0.138	0.125	In light of previous septic tank problems in the area, new growth should be directed to connect to one of the two facilities as much as possible.
Cobb Island	200	0.158					
Mt. Carmel Woods	230a	0.021	156	0.041	-0.020	0.003	Initiate water conservation progarm to reduce wastewater returned to existing system
Indian Head, Town of	253a	0.500	758	0.197	0.596	0.104	System planning responsibility of town
Indian Head, Town of	254		420	0.109			
Indian Head, Town of	253b		1,117	0.290			
Potomac Heights Mutual Homeowners Assoc.	253a	0.200					Due to future connection to the Mattawoman Wastewater Treatment Facility,flowa were combined into Mattawoman calculations.
Hughesville	283b	0.007	127	0.033	-0.026	0.002	Hughesville system only serves commercial area in Hughesville, remaining flow on septic tanks
Cliffton on the Potomac	298	0.070	604	0.157	0.087	0.073	Additional flow from 1992 to 2002, if close to Cliffton on the Potomac system, should connect to central system. Some upgrades may be required.

Source: Charles County Planning and Growth Management, Charles County Department of Utilities, Maryland Dept. of the Environment, and Tri-County Council of Southern Maryland; 2006.

4.6 CAPITAL IMPROVEMENTS PROGRAMMING

As previously stated, capital improvements programming (CIP) is the multi-year scheduling of public facilities project implementation. Charles County has conducted CIP planning for a number of years and identifies programs for funding on a five-year planning horizon. Eligible public facilities projects include schools, roads, parks, as well as water and sewer facilities. The purpose of this section is to: 1) provide guidance by which the County's needs for those public facilities are assessed along with the County's fiscal resources in order to annually adopt the most effective budget for capital construction; and 2) utilize this Comprehensive Water and Sewer Plan as a mechanism to target the County's water supply and sewer needs for implementation. This chapter provides a list of needs for the existing water and sewer systems. This analysis ultimately culminates in a listing of problem areas. It should be noted that this Water and Sewer Plan differs from previous versions of the Plan by the approach to the utilization of these Appendices. This version of the Plan presents these problem areas as projects for potential correction.

With the adoption of the Zoning Ordinance, the County has gained new programs, such as the development guidance system and the Adequate Public Facilities Ordinance, to assist in the provision of improvements to its public water supply and sewer systems. These efforts will supplement the County's own capital improvements capital projects. This type of coordination ultimately benefits the integrity and efficiency of the County's infrastructure improvement program.

These procedures also assists in the implementation of Section 5-7A-02 of the Annotated Code of Maryland (Finance and Procurement Article). This law relates to State funding policy, with respect to local government capital projects. Under this law, a project utilizing State funding, grants, loans, loan guaranties, or insurance may not be approved or constructed unless:

1) the project is consistent with the Charles County Comprehensive Plan; or

2) extraordinary circumstances exist. The Economic Growth, Resource Protection, and Planning Act of 1992 requires the County present a report outlining their capital projects to the State to assure consistency with the Act. Projects not conforming to the County's Comprehensive Plan are required to demonstrate that extraordinary circumstances exist, and to document such circumstances.

The County Commissioners conduct capital improvements programming (CIP) on an annual basis. The process is a joint effort between the County Commissioners, the Department of Fiscal Services, the County's operating departments, and other County agencies. The Department of Fiscal Services coordinates the process and presents the County Commissioners with information on potential CIP projects. The County Commissioners must determine which of these projects are in the best interests of the citizens of Charles County. Ultimately, the County Commissioners adopt the County Capital Improvements Budget for that fiscal year which establishes programs and funding levels.

4.6.1 Priority System

The Departments of Utilities and Planning and Growth Management utilize a priority system to determine which projects listed in the Water and Sewer Plan should be presented to the County Commissioners for their consideration during the CIP process. The priority system is based on an assessment of need. The system is status-based, which relates to the status of the project or the funding source, and not project-based. The priority system is shown in Table 3-14, and also applies to Chapter 4, The Sewer Plan. These projects are further discussed in Chapter 5 of this document.

4.6.2 Capital Improvement - Short-Range

Proposed capital improvements are those improvements which should be completed in the immediate future. These include priority 1 projects, studies which are part of the conditional approval of development and projects under construction[2]. The projects identified are proposed by the County, but are not necessarily funded by the County. These projects are listed in Table 4-4. These projects are further discussed in Chapter 5 of this document.

4.6.3 Capital Improvements - Mid-Range

Capital improvements which are not on the strict time frame as those listed within the Proposed Capital Improvements section, but are necessary in the near term are defined as planned capital improvements. The projects identified are planned by the County, but not necessarily funded by the County. These projects are listed in Table 4-5. Projects planned for funding by the County as part of its capital improvements program are so designated within Table 4-5.

4.6.4 Capital Improvements- Long-Range

Long term projects are those which have time frames for implementation greater than 10 years. They have been identified to provide a continuum of needs within the County based on the population and flow projections. These projects are also identified to ensure that potential private-public partnerships within certain areas served by these projects can be established as development takes place. The projects are identified by the County, but not necessarily funded by the County. In addition, the County meets with the Maryland Department of the Environment on a regular basis to discuss project needs and possible State funding for these projects. These projects are listed in Table 4-6.

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[2] A historical example of a conditional project is the Lakewood Development approval. The approval included the priority classification change if the developer implemented improvements to the Waldorf system as part of his development.

Table 4-4 Proposed Capital Improvements Plan Short-Range			
Project	**Priority**	**Estimated Cost**	**County funded[a]**
Studies			
Mattawoman Interceptor Drainage Area Sewer Model - Phase 2	1	$244,000	yes
Mattawoman Interceptor Drainage Area Sewer Model - Phase 3	1	$252,000	yes
Sewer Pump Stations Service Area Study	1	$200,000	yes
Programs			
Influent/Effluent Pump Station Evaluation	1	$526,000	yes
Construction Projects			
Jude House Sewer Plant	1	$219,000	yes
Mt Carmel Woods WWTP Upgrade	1	$1,586,000	yes
Grit System Reconfiguration at Mattawoman WWTP	1	$831,000	yes
St. Charles Pump Station 3B	1	$11,722,000	yes
Benedict Central Sewer System	1	$6,774,000	yes
Piney Branch Interceptor Capacity Upgrade Phase 1	1	$14,077,000	yes
Piney Branch Interceptor Capacity Upgrade Phase 2	1	$10,424,000	yes
Pump Station 5A Upgrade	1	$4,366,000	yes
Zekiah Pump Station Upgrade Phase 1	1	$3,604,000	yes
Jude House/Bel Alton WWTP	1	$362,000	yes
Bryans Road Business Park Sewer Line	1	$1,765,000	yes
Swan Point WWTP Expansion	1	est. $6,500,000	yes
Pump Station Rehabilitations & Replacements	1	$1,552,000	yes

[a] County funded through variety of sources including CIP program, private public partnerships, grants or loans.

Source: Charles County Planning and Growth Management, Capital Improvements Program, 2006.

Table 4-5 Planned Capital Improvements Plan Mid-Range			
Project	Priority	Estimated Cost	County funded[a]
Studies			
Projects			
St. Marks Pump Station	2	developer responsibility	no
Pump Station 2A	2		yes
Route 5 Pump Station	2	developer responsibility	no

[a] County funded through variety of sources including CIP program, private public partnerships, grants or loans.

Source: Charles County Planning and Growth Management, Capital Improvements Program, 2006.

Table 4-6 Capital Improvements Plan- Future Long-Range			
Project	Priority	Estimated Cost	County funded[a]
Projects			
White Plains Sewer Infrastructure Expansion	3	developer responsible	possible
Baptist Pump Station	3	developer responsible	no
Laurel Branch Pump Station #1	3	varies	yes
Clifton Sewer System Capacity Expansion	3	developer responsible	no

[a] County funded through variety of sources including CIP program, private public partnerships, grants or loans.

Source: Charles County Planning and Growth Management, Capital Improvements Program, 2006.

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Charles County, Maryland

Appendix 4A

Summary of Existing and Planned NPDES Permit Discharges

Name of Facility	Community	Appl./Permit Number	Permits/Revisions Processing Status	Status Date	NPDES Number	Ground or Surface
Academy of Natural Sciences of Philadelphia	Benedict	97-DP-0554	Issued		MD0003093	S
American Telephone & Telegraph (AT&T)	Faulkner	80-DP-1042	Issued		MD0023361	S
Besche Oil Co., Inc.	Waldorf	88-DP-2435	Issued		MD0062839	S
Bowie Hall Trucking, Inc.	La Plata	85-DP-1670	Issued			G
Charles County Community College	La Plata	88-DP-1107	Issued		MD0052311	S
Charles County Community College	La Plata	88-DP-1107	Issued		MD0052311	S
Charles County Sand & Gravel	Waldorf	85-DP-0247	Issued		MD0050008	S
Charles Utilities, Inc.	Bryans Road	80-DP-1007	Issued		MD0024601	S
Clifton-on-the-Potomac	Newburg	85-DP-1547	Issued		MD0055557	S
Cobb Island W.W.T.P.	Cobb Island	85-DP-2211	Issued			G
Columbia LNG Corporation	Indian Head	76-DP-1325	Expired		MD0054046	S
Embassy Dairy, Inc.	Waldorf	89-DP-2619	No Permit Needed		MD0063819	S
Gale-Bailey Elem. School W.W.T.P.	Marbury	79-DP-0742	Issued		MD0023175	S
Glymont Car Wash	Indian Head	88-DP-0243	Issued		MD0054305	S
Goose Bay Aggregates, Inc.	Doncaster	86-DP-2333	Issued		MD0062171	S
G.S.A. Army Radio Station	La Plata	75-DP-1127	Expired		MD0052566	S
Howat Concrete Company, Inc.	Indian Head	81-DP-1819	No Permit Needed		MD0058459	S
Indian Head, Town of, Municipal W.W.T.P.	Indian Head	88-DP-0590	Issued		MD0020052	S
Jo-Sim Motel	Nanjemoy	75-DP-0827	No Permit Needed		MD0050130	S
Jude House	La Plata	74-DP-0741	No Permit Needed			G
Jude House	Bel Alton	80-DP-1684	Issued		MD0057614	S
J.C. Parks Elem. School W.W.T.P.	Indian Head	79-DP-0743	Issued		MD0023167	S
La Plata, Town of, Municipal W.W.T.P.	La Plata	79-DP-0518	Issued/Refiled		MD0020524	S
La Plata, Town of, Municipal W.W.T.P.	La Plata	89-DP-0518	Issued		MD0020524	S
La Plata, Town of, Municipal W.W.T.P.	La Plata	86-DP-1011	Issued		MD0051446	S
Lackey High School W.W.T.P.	La Plata	80-DP-0744	Issued		MD0023159	S
LaFayette Motel W.W.T.P.	Bel Alton	81-DP-1244	Issued		MD0053201	S
Manning, Joseph H., Hatchery	Waldorf	88-DP-1057	Issued		MD0051624	S
Maryland Fire & Rescue Institute	La Plata	86-DP-2322	Issued		MD0063827	S
Mattawoman Water Pollution Control Facility	Mason Springs	80-DP-0472	Issued		MD0021865	S
MD State Police-Barrack H (former)	Waldorf	85-DP-2237	No Permit Needed		MD0024996	G
Mount Carmel W.W.T.P.	La Plata	81-DP-1246	Issued/Refiled		MD0053228	S
Mount Carmel W.W.T.P.	La Plata	89-DP-1246	Issued		MD0053228	S
Mt. Hope Elem. School W.W.T.P.	Nanjemoy	81-DP-1870	Issued		MD0058742	S
Naval Surface Warfare Center	Indian Head	88-DP-2515	Issued		MD0003158	S
Naval Surface Warfare Center	Indian Head	88-DP-2528	Issued		MD0020885	S
Old Port Restaurant & Marina (planned)	Port Tobacco	83-DP-2088	Issue/Refiled		MD0060411	S
Old Port Restaurant & Marina (planned)	Port Tobacco	88-DP-2088	Issued		MD0060411	S

Appendix 4A
(Continued)

Name of Facility	Community	Appl./Permit Number	Permits/Revisions Processing Status	Status Date	NPDES Number	Ground or Surface
Parkway Auto Sales	La Plata	81-DP-1908	No Permit Needed			G
PEPCO (Faulkner)	Faulkner	88-DP-1623	Issued		MD0056928	S
PEPCO (Morgantown)	Newburg	86-DP-0841	Issued		MD0002674	S
Piccowaxen Middle School WWTP	Newburg	79-DP-0636	Issued		MD0023451	S
Port Tobacco Estates Treatment Plant	La Plata	74-DP-0548	No Permit Needed		MD0023574	S
Posey, Evelyn J.	Indian Head	88-DP-2549	Issued		MD0063398	S
Potomac Heights Mutual Home Owners Assoc.	Indian Head	79-DP-0682	Being Processed		MD0022675	S
Rocco Luppino	Marbury	88-DP-2470	Issued		MD0063070	S
Somar Paving Corporation	Waldorf	81-DP-1896	Expired		MD0058866	S
Southern MD Correctional Institute W.W.T.P.	Hughesville	79-DP-0750	Issued		MD0023914	S
Southern MD Oil, Inc.	La Plata	88-DP-2479	Issued		MD0063126	S
Swan Point W.W.T.P.	Issue	85-DP-1674	Issued		MD0057525	S
Thunderbird Apts. & Bel Alton Motel	Bel Alton	80-DP-0431	Issued		MD0050334	S
Thunderbird Professional Building	Faulkner	77-DP-1239	Issued/Refiled		MD0053155	S
White House Motel STP	Newburg	78-DP-1582	Issued/Refiled		MD0056553	S
White House Motel STP	Newburg	85-DP-1582	Issued		MD0056533	S

Source: Charles County Dept. of Planning and Growth Management & Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4B
Marina Sanitary Survey

Name	Maryland Grid Coordinates		Number of Slips	Hook-ups		Marine Pumpout Facility	Marina Sewage Disposal System		Water Supply System		Bacteriological Test	Shortage	Comments
	N	E		Water	Electric		Type	Failure	Type	Condition			
PATUXENT RIVER													
Desoto's Landing	248	893	16	Y	Y	N	SS	N	PW	G	Y	N	
Shorter's Place	248	893	28	N	N	N	SS	N	PW	G	Y	N	
Welch's Marina	247	893	20	N	N	N	SS	Y	PW	G	Y	N	
Patuxent Boat Shop	248	893	3	N	N	N	SS	Y	PW	G	Y	N	
Ray's Pier	248	893	14	Y	Y	N	SS	N	PW	G	Y	N	(1)
Benedict Marina	245	893	46	Y	Y	N	SS	N	PW	G	Y	N	
POTOMAC RIVER													
Cobb Island Marina	167	845	100	Y	Y	Y	PS	N	DR	G	Y	N	(2)(3)
Shymansky's Marina	167	845	75	Y	Y	Y	PS	N	DR	G	Y	Y	(2)(3)
Captain John's	167	845	68	Y	Y	Y	PS	N	DR	G	Y	N	(2)(3)
Saunder's Marina	167	845	30	Y	Y	Y	PS	N	DR	G	Y	N	(2)(3)
Bruce's Marina	167	845	30	Y	Y	Y	PS	N	DR	P	Y	N	
Aqualand Marina	194	804	186	Y	Y	N	SS	N	DR	G	Y	N	(7)
Swan Point Marina	172	825	40	Y	Y	Y	PS	N	PW	G	Y	N	(2)
Sweden Point Marina	262	745	50	Y	Y	Y	SS	N	DR	G	Y	N	(3)(5)
PORT TOBACCO RIVER													
Port Tobacco Marina	242	792	250	Y	Y	Y	PT	N	DR	G	Y	N	(6)
Goose Bay Marina	227	785	250	Y	Y	N	SS	N	DR	G	Y	N	

KEY TO SYMBOLS

Marina Sewage Disposal System

SS - Subsurface Discharge
CT - Chemical Toilet
PS - Public Collection System
HT - Holding Tank
PT - Portable Pumpout Unit

Water Supply System

DR - Drilled Well
DU - Dug Well
PW - Public Water

General Symbols

G - Good
P - Poor
Y - Yes
N - No
PC - Pending Construction of Sanitary Facilities

Notes

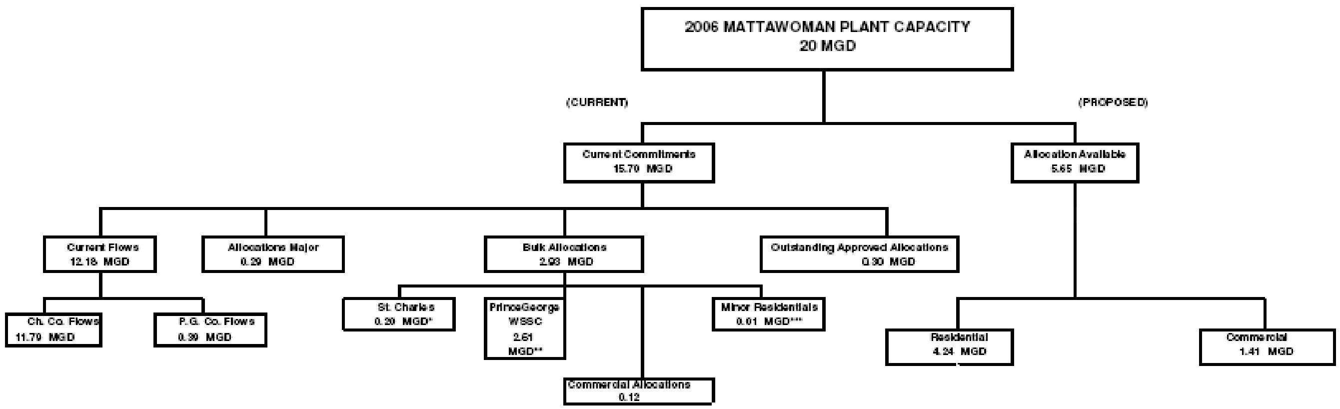
(1) Mound system for disposal of sewage
(2) Public sewerage collection system for marina and associated facilities
(3) Pump-out facilities available
(4) Holding tank for marina and associated facilities
(5) Holding tank for pump-out facility
(6) Portable sewage pump in use
(7) Has approached County for connection to public sewer

Source: Maryland Department of the Environment; Charles County Planning & Growth Management, 2006.

Charles County, Maryland

Appendix 4C

Mattawoman Plant Capacity



* St Charles Allocations for 950 units = 316,350 gpd of reserved capacity, less the units granted allocations for 2006.
** P.G. County/WSSC bulk allocation of 3 MGD, less the average metered flow for the period (1/1/06 to 12/31/06).
*** Bulk Minor Residential Allocations for this period = 5,994.
**** FY 2006 Eligibility List Allocations for @ 888 units = 295,704 GPD.

Source: Charles County Planning & Growth Management, 2006.

Charles County, Maryland
Appendix 4D
Inventory of Existing Sewage Treatment Plants
Private/Community

Map	Name	Type	MGC Coordinates (1000 feet)		Occupied	Vacant	Points of Discharge	Maximimum Site Capacity Secondary (mgd)	Maximum Site Capacity Advanced (mgd)	Existing Capacity (1) (mgd)	Average Flows (mgd)	Peak Flows (mgd)	Planned or expected abandonment, if interim (Date)
			North	East	(Acres)	(Acres)	(Location)						
5	Hughesville (Commercial)	Tank w/absorption field	255	860	1.5	0	Tank w/absorption field	--	--	0.0036	0.003	0.004	none
1/8	Potomac Heights	Primary w/RBC's	280.5	760.5	0.5	1	Potomac River	0.2	--	0.2000	0.2170	--	(2)(3)

1) Capacity is not established by NPDES permit. Values shown are from the Maryland Department of the Environment, 2006 List of NPDES Permits.
2) System is to be taken off-line when owners substantially upgrade system to County's Specifications. Flow will be diverted to the Mattawoman WWTP.
3) Under a consent order to hook-up to Mattawoman WWTP. Has received a grant from MDE to complete pump station.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4E
Inventory of Existing Sewage Treatment Plants
Public/Municipal

Map	Name	Type	MGC Coordinates (1000 feet)		Occupied (Acres)	Vacant (Acres)	Points of Discharge (Location)	Maximimum Site Capacity Secondary (mgd)	Maximum Site Capacity Advanced (mgd)	Existing Capacity (1) (mgd)	Average Flows (mgd)	Peak Flows (mgd)	Planned or expected abandonment, if interim (Date)
			North	East									
7	Clifton on the Potomac	Activated Sludge w/flow equalization pond	198	805	1.5	3.5	Potomac River	4.500	4.500	0.0700	0.0719	0.096	None
4	Jude House	Activated Sludge (Pending)	225	802	0.1	0.1	Unnamed tributary of Potomac River	--	--	0.017	0.0027	0.003	None
1	Indian Head (Town of)	Activated Sludge w/ Polishing Ponds	277	754	0.2	0.4	Mattawoman Creek	0.500	--	0.4200	0.358	0.500	None
4	La Plata (Town of)	Activated Sludge	254	803	0.2	0.8	Tributary of Port Tobacco River	1.000	--	1.0	0.8280	1.500	None
1	Mattawoman WWTP	Activated Sludge and Tertiary Treatment	273	768	30	10	Potomac River	20.0	20.000	20.0	11.2	12.9	None
4	Mt. Carmel Woods	Extended Aeration	274	825	0.5	0.5	Jenny Run	0.021	--	0.0210	0.012	0.200	None
8	Swan Point	Flow equalization pond	173	822	2	2	Cuckold Creek	0.3	--	0.06	0.069	0.095	None

1) Capacity is not established by NPDES permit. Values shown are from the Maryland Department of the Environment, 2003-2005 period list of NPDES Permits.
2) System is to be taken off-line when owners substantially upgrade system to County's Specifications. Flow will be diverted to the Mattawoman WWTP.
3) Under a consent order to hook-up to Mattawoman WWTP. Has received a grant from MDE to complete pump station.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4F
Inventory of Existing Sewage Treatment Plants
Institutional/Government

Map	Name	Type	MGC Coordinates (1000 feet)		Occupied (Acres)	Vacant (Acres)	Points of Discharge (Location)	Maximimum Site Capacity Secondary (mgd)	Maximum Site Capacity Advanced (mgd)	Existing Capacity (1) (mgd)	Average Flows (mgd)	Peak Flows (mgd)	Planned or expected abandonment, if interim (Date)
			North	East									
4	College of Southern Maryland	Activated Sludge w/ post aeration	262	795	--	--	Port Tobacco Creek	0.090	0.090	0.060	0.0290	--	None
3	Gale-Bailey Elementary School	Trickling Filters	265	757	0.40	0.20	Marbury Run	0.0150	--		0.0035	0.007	none
1	Lackey High School	Secondary w/ sand filter	272	763	0.10	--	Unnamed Tributary of Mattawoman Creek	0.0280	--	0.0280	0.0008	--	None
7	Piccowaxen Middle School (2)	Secondary w/s and filter	192	817	--	--	Ditchley Pond	0.025	--	0.0250	0.0010	--	None
4	Southern Maryland Correctional Institute	Stabilization Lagoon & disinfection	245	853	5.00	1.50	Gilbert Run/ Wicomico River	0.1000	0.1000	0.1000	0.0160	--	None
1	Naval Surface Warfare Center	Activated Sludge	281	749	--	--	Potomac River	--	--	0.486	0.1630	--	None

1) Dr. James Craik E.S., McDonough H.S., Alternative School, and Vo-Tech are all on the College of Southern Maryland System.
2) Higdon E.S. is also on the Piccowaxen system.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4G
Inventory of Existing Sewage Treatment Plants
Industrial

Map	Name	Type	MGC Coordinates (1000 feet)		Occupied (Acres)	Vacant (Acres)	Points of Discharge (Location)	Maximimum Site Capacity Secondary (mgd)	Maximum Site Capacity Advanced (mgd)	Existing Capacity (1) (mgd)	Average Flows (mgd)	Peak Flows (mgd)	Planned or expected abandonment, if interim (Date)
			North	East									
7	AT&T Facility (Faulkner)	Trickling Filters (Secondary/Tertiary)	219	804	0.01	0.01	Port Tobacco Creek/ Potomac River	--	--	0.0100	0.0010	--	None
4	Lafayette Motel	--	226.5	802.7	--	--	Ditch to Zekiah	0.0050	0.0050	0.0050	0.0040	--	None
7	PEPCO (Morgantown)	Activated Sludge	190	807	0.01	--	Potomac River	--	--	0.0200	0.0070	--	None
4	Thunderbird Appartments	--	220.5	804	--	--	Wills Branch	0.0320	0.0320	0.0320	0.011	--	None
4/7	Thunderbird Dental	--	227	801.5	--	--	Trib. to Potomac River	0.0050	0.0050	0.0050	0.0010	--	None
7	White House Motel	Sand Filters	209	803.5	--	--	Trib. to Potomac River	0.0050	0.0050	0.0050	0.001	--	None

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4H
Present WWTP Performance and NPDES Permit Effluent Limitations
Private/Community

Map	Name	Permit	BOD (mg/l)	SS (mg/l)	Fecal Coliforms (MPN/100ml)	Total Residual Chlorine (mg/l)	Minimum DO (mg/l)	pH	TKN (mg/l)	TP (mg/l)
5	Hughesville (Commercial)	N/I	N/I	N/I	N/I	N/I	N/I	N/I	N/I	N/I
1/8	Potomac Heights	All:	30	30	200	non-detectable	2.0	6.5-8.5	0.0	0.00

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland

Appendix 4I

Present WWTP Performance and NPDES Permit Effluent Limitations

Public/Municipal

Map	Name	Permit	BOD (mg/l)	SS (mg/l)	Fecal Coliforms (MPN/100ml)	Total Residual Chlorine (mg/l)	Minimum DO (mg/l)	pH	TKN (mg/l)(1)	TP (mg/l)(2)
7	Clifton on the Potomac	May to April	30	30	14	non-detectable	5.0	6.5-8.5	0.0	0.00
4	Jude House	June to May	25	30	14	non-detectable	5.0	6.5-8.5	3.0	2.8
1	Indian Head (Town of)	May to October	19 30	30 -	200 -	non-detectable non-detectable	6.0 6.0	6.5-8.5 6.5-8.5	9.0 -	0.00 -
4	La Plata (Town of)	May to October	15 23	30 -	14 -	non-detectable non-detectable	7.0 7.0	6.5-8.5 6.5-8.5	5.0 -	2.00 -
1	Mattawoman WWTP	October to September	30	30	200	0.044	5.0	6.3-8.5	n/a	0.18
4	Mt. Carmel Woods	April to March	15 30	30 -	14	0.011	7.0	6.5-7.8	5.0	2.0
8	Swan Point	February to January	30	30	14	non-detectable	5.0	6.5-8.5	0.0	0.00

1. Data is in monthly averages.
2. This limit becomes effective the year after the actual flow for any calendar year exceeds 0.018 MGD and then remains in effect. This phosphorous limit is effective as long as the average annual flow for all calendar years is less than 0.018 MGD.

Source: Maryland Department of the Environment, 2005.

Charles County, Maryland
Appendix 4J
Present WWTP Performance and NPDES Permit Effluent Limitations
Institutional/Government

Map	Name	Permit	BOD (mg/l)	SS (mg/l)	Fecal Coliforms (MPN/100ml)	Total Residual Chlorine (mg/l)	Minimum DO (mg/l)	pH	TKN (mg/l)	TP (mg/l)
4	College of Southern Maryland	May-September Remaining	10 30	30 -	14 14	non-detectable non-detectable	7.0 7.0	6.5 to 8.5 6.5 to 8.5	5.0 -	0.00 -
3	Gale-Bailey Elementary School	June-September Remaining	3 30	30.3 -	200 200	non-detectable non-detectable	7.0 7.0	6.5 to 8.5 6.5 to 8.5	3.0 -	0.00 -
1	Lackey High School	May-October Remaining	8 30	30 -	200 200	dechloronation dechloronation	5.0 5.0	6.5 to 8.5 6.5 to 8.5	7.0 -	0.00 -
7	Piccowaxen Middle School (2)	May-September Remaining	5 30	30 -	14 14	non-detectable non-detectable	7.0 7.0	6.5 to 8.5 6.5 to 8.5	3.0 -	0.00 -
4	Southern Maryland Correctional Institute	December-February Remaining	30 30	45 -	200 200	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5	0.0 -	0.00 -
1	Naval Surface Warfare Center	All	30	30	200	non-detectable	5.0	6.5 to 8.5	0.0	0.00

1) Dr. James Craik E.S., McDonough H.S., Alternative School, and Vo-Tech are all on the College of Southern Maryland System.
2) Higdon E.S. is also on the Piccowaxen system.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4K
Present WWTP Performance and NPDES Permit Effluent Limitations
Industrial

Map	Name	Permit	BOD (mg/l)	SS (mg/l)	Fecal Coliforms (MPN/100ml)	Total Residual Chlorine (mg/l)	Minimum DO (mg/l)	pH	TKN (mg/l)	TP (mg/l)
7	AT&T Facility (Faulkner)	May-October Remaining	8 30	30 -	14 14	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5	8.0 0.0	- -
4	Lafayette Motel	June to May	25	30	14	non-detectable	5.0	6.5-8.5	3.0	2.8
7	PEPCO (Morgantown)	-	-	-	-	-	-	-	-	-
4	Thunderbird Apartments	June to May	20 30	30 -	14 14	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5	3.0 -	2.0 3.6
4/7	Thunderbird Dental	June to May	20 30	30 -	14 14	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5-	3.0 -	2.0 3.6
7	White House Motel	May-September Remaining	10 30	30 -	14 14	non-detectable non-detectable	5.0 5.0	6.5 to 8.5 6.5 to 8.5	5.0 -	-

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4L
Flow Monitoring Data
Collection Sewer, Interceptors, Pumping Stations and Force Mains
Public-Municipal

Map	Sewage System	Sewer			Pumping Station					Force Mains	
		Diameter (inches)	Avg. Day Flow (mgd)	Design ADF	Number of Pumps	Capacity of each Pump (mgd)	Normal Pumping Capacity (mgd)	Average Day Pumpage (mgd)	Maximum Day Pumpage (mgd)/date	Diameter (inches)	Design Flow (mgd)
CHARLES COUNTY COMMISSIONERS											
1/2	Mattawoman Interceptor	42			-	-	-	-	-	-	-
		48			-	-	-	-	-	-	-
		54			-	-	-	-	-	-	-
		60			-	-	-	-	-	-	-
		66			-	-	-	-	-	-	-
		72	9.79	31.80	-	-	-	-	-	-	-
1/2	Piney Branch Interceptor	21			-	-	-	-	-	-	-
		36			-	-	-	-	-	-	-
		42	21.9	11.40	-	-	-	-	-	-	-
1/5	Bryans Road Interceptor	8			-	-	-	-	-	-	-
		21			-	-	-	-	-	-	-
		48	4.33	3.90	-	-	-	-	-	-	-
Waldorf System											
2	White Plains Regional Park	-	0.0012	-	2	0.4610	0.1920	0.0060	-	4	-
2	Zekiah	-	0.518	-	3	1.7208	0.7170	0.5910	-	12	-
2	White Plains Com.	-	0.012	-	2	0.1512	0.0630	0.0100	-	4	-
2	Pinefield	-	0.067	-	2	0.2448	0.1020	0.0898	-	4	-
2	Montgomery Lane	-	0.011	-	2	0.1080	0.0450	0.0158	-	-	-
2	925-C Station	-	-	-	2	0.2664	0.1110	0.0300	-	4	-
2	MD 5	-	0.152	-	2	0.5040	0.2100	0.1003	-	8	-
2	Ryon Woods	-	0.033	-	2	0.2450	0.1020	0.0602	-	-	-
2	Thomas Stone	-	0.0087	-	2	0.2650	0.1104	0.0074	-	4	-
2	DeMarr Business Park	-	0.0669	-	2	0.1699	0.0708	0.0237	-	12	-
2	Mr. Tire	-	0.0008	-	2	-	-	-	-	4	-
2	North Pointe	-	0.016	-	2	-	-	-	-	4	-
2	Brentwood	-	0.376	-	2	-	-	-	-	4	-
2	Greenhaven	-	0.071	-	2	-	-	-	-	4	-
2	Southwinds	-	0.115	-	2	-	-	-	-	4	-
St. Charles											
2	Wakefield #1	-	0.111	-	2	0.4320	0.1800	0.1062	-	-	-
2	St. Marks (Station 6)	-	0.430	-	3	0.9570	0.3990	1.3013	-	-	-
2	Pump Station 2	-	-	-	2	1.1232	0.4680	0.6887	-	10	-
2	Pump Station 2	-	N/A	-	2	-	-	-	-	16	-
2	Pump Station 2-A	-	0.807	-	2	2.8800	1.1700	1.4787	-	16	-

Charles County, Maryland
Appendix 4L
Flow Monitoring Data
Collection Sewer, Interceptors, Pumping Stations and Force Mains
Public-Municipal
(continued)

Map	Sewage System	Sewer			Pumping Station					Force Mains	
		Diameter (inches)	Avg. Day Flow (mgd)	Design ADF	Number of Pumps	Capacity of each Pump (mgd)	Normal Pumping Capacity (mgd)	Average Day Pumpage (mgd)	Maximum Day Pumpage (mgd)/date	Diameter (inches)	Design Flow (mgd)
St. Charles (Continued)											
2	Pump Station 3A	-	0.215	-	2	0.3456	0.1440	0.1516	-	10	-
2	Pump Station 5A	-	0.359	-	2	0.8048	0.2520	0.4222	-	12	-
2	Dorchester	-	0.286	-	2	-	-	-	-	-	-
Laurel Branch/Eutaw Forest											
1	Laurel Branch #3	-	0.0129	-	2	0.1440	0.0600	0.0168	-	4	-
1	Eutaw Forest	-	0.010	-	2	-	-	-	-	4	-
Bryans Road											
1	Pomonkey	-	0.023	-	2	-	-	-	-	-	-
1	Indian Head Manor	-	0.0399	-	2	-	-	-	-	-	-
1	Strawberry Hills	-	0.123	-	2	-	-	-	-	-	-
1	Brawner's Estates	-	0.0164	-	2	-	-	-	-	-	-
1	Potomac Heights	-	0.093	-	3	-	-	-	-	-	-
1	Bryan's Road	-	0.057	-	2	-	-	-	-	-	-
Cobb Island											
8	Hill Road	-	0.0576	-	2	-	-	-	-	-	-
8	Cobb Island	-	0.050	-	2	-	-	-	-	-	-
8	Bachelors Hope	-	0.0041	-	2	-	-	-	-	-	-
8	Bar Harbor	-	0.0069	-	2	-	-	-	-	-	-
8	Wisteria	-	0.007	-	2	-	-	-	-	-	-
8	Bath House	-	0.00006	-	2	-	-	-	-	-	-
8	Cuckold Creek	-	0.001322	-	2	-	-	-	-	-	-
8	Vaacum Station	-	-	-	2	-	-	-	-	-	-
Cliffton-on-the-Potomac											
7	Cliffton #1	-	0.039	-	2	-	-	-	-	-	-
7	Cliffton #2	-	0.0088	-	2	-	-	-	-	-	-
7	Cliffton #3	-	0.018	-	2	-	-	-	-	-	-
7	Cliffton #4	-	0.016	-	2	-	-	-	-	-	-
TOWN OF INDIAN HEAD											
1	Mattawoman Woods	-	-	-	2	-	-	0.0700	-	-	-
1	Potomac Woods	-	-	-	2	-	-	0.1340	-	-	-
1	Knotts Subdivision	-	-	-	2	-	-	0.0880	-	-	-

Charles County, Maryland
Appendix 4L
Flow Monitoring Data
Collection Sewer, Interceptors, Pumping Stations and Force Mains
Public-Municipal
(continued)

Map	Sewage System	Sewer			Pumping Station					Force Mains	
		Diameter (inches)	Avg. Day Flow (mgd)	Design ADF	Number of Pumps	Capacity of each Pump (mgd)	Normal Pumping Capacity (mgd)	Average Day Pumpage (mgd)	Maximum Day Pumpage (mgd)/date	Diameter (inches)	Design Flow (mgd)
TOWN OF LA PLATA											
4	La Plata WWTP	-	-	-	2	2.5200	-	1.0575	-	-	-
4	Caroline Drive					0.1224	-	0.005	0.009	4	
4	Stage Coach (new)					-	-	-	-	10	
4	Subdivision Road					-	-	-	-	4	
4	Mary Ball Drury Dr.					0.324				4	
4	Hickory Ridge	-	-	-	2	0.1200	-	0.0011	0.0026	6	-
4	Chark's Run #1	-	-	-	2	0.4320	-	0.0118	0.0181	6	-
4	Chark's Run #2	-	-	-	2	0.2280	-	0.012	0.0210	4	-
4	Willow Lane	-	-	-	2	0.6480	-	0.0498	0.094	6	-
4	Quailwood	-	-	-	2	0.228	-	0.004	0.0059	4	-
4	Diggs Circle	-	-	-	2	0.2180	-	0.0045	-	4	-
4	Patuxent Court	-	-	-	2	0.1440	-	0.0076	0.0154	6	-
4	Hawthorn (MD 225)	-	-	-	2	0.1440	-	0.0124	0.0685	6	-
4	La Plata Commerce	-	-	-	2	0.4176	-	0.0120	-	4	-
4	Willowgate	-	1.5	0.12	2	0.1200	-	0.0021	0.0021	4	
4	Diggs Circle				2	0.2160		0.0162		4	
4	Kings Grant #1				2	0.1598		0.0149	0.0173	6	
4	Kings Grant #2				2	0.144		0.0023	0.0036	4	
4	Haldane	-	-	-	2	0.0360	-	0.0195	0.0331	2	-
4	Washington Square	-	-	-	2	0.2405	-	0.0012	0.0016	4	-

* Jude House Pumping Station is planned to be in operation by Summer 2008. Windsor Manor and Myers Estates Pumping Stations are in the planning stages and will be constructed in the short term future. St Charles Pumping Station 3-A will undergo a major expansion and will be renamed St. Charles Pumping Station 3B.

Source: Charles County Department of Utilities, 2006, Town of La Plata, 2006 & Maryland Department of the Environment, 2006

Charles County, Maryland
Appendix 4M
Septic Tank Failure Areas

Name	Total Number of Homes	Total Number of Homes with Septic Tank Failures	% Failure	Previous Listing (2)	Change from Previous Listing	State/Federal Grant Monies (1)
MATTAWOMAN SEWER SERVICE AREA						
Avon Crest	61	3		yes		
Bel Air Estates	21	11		yes		
Bensville (MD 229)	43	9		yes		
Billingsley Forest	19	2		yes		
Billingsley Park	63	9		yes		
Brierwood Road	10	5		yes		
Brookshaven	41	21		yes		yes
Brookwood Estates	115	8		yes		
Cedarville Mobile Home Park	262	262		yes		
Chapman's Landing	51	21		yes		
Cleveland Park Estates	58	3		yes		
Columbia Park	34	10		yes		
Cramer's Subdivision (Middletown)						
Davis Road	45	28		yes		yes
Dutton's Addition	21	11		yes		
East Poplar Lane	39	35		yes		
Fenwick	27	7		yes		
Ford Height's (MD 224)	61	40		yes		
Gateway Boulevard				yes		
Glymont Road	37	20		yes		yes
Hope Acres						
Jones View	21	7		yes		
Laurel Acres	47	35		yes		yes
Marbury Area N.W.	116	82		yes		
Marbury Area S.E.	109	37		yes		
Marshall Hall	31	7		yes		
McDaniel Road				yes		
Middletown Road	16	7		yes		
Nike Site Drive	4	4		yes		
Old Indian Head Road	85	44		yes		
Phillips Road	17	7		no		
Pisgah	89	32		yes		
Pomfret Area	99	49		yes		
Pomonkey	22			no		

Appendix 4M

(continued)

Name	Total Number of Homes	Total Number of Homes with Septic Tank Failures	% Failure	Previous Listing (2)	Change from Previous Listing	State/Federal Grant Monies (1)
Quiet Acres	21	3	14.3	yes		
Raby Road	13	6	46.2	yes		
Red Hill	83	38	45.8	yes		
Renner Road				yes		
Ripley-North	33	14	42.4	yes		
Ripley-MD 225	42	14	33.3	yes		
Ripley-South of MD 225	132	132	68	yes		
Robie Manor	61	10	16.4	yes		
Shady Acres	36	6	16.7	yes		
Singing Hills	55	16	29.1	yes		
Southerland	36	21	58.3	yes		
Spring Valley	22	1	4.5	yes		
Stavor's Road	24	12	50.0	yes		yes
Sun Valley	46	31	67.4	yes		yes
Twinbrook	35	3	8.6	yes		
Waldorf (MD 228 Corridor)	49		0.0	yes		
TOTALS	**2,352**	**1,059**	**45.0**			
REMAINDER OF CHARLES COUNTY						
Annapolis Woods Road				yes		
Aqualand Area				yes		
Banks O'Dee	35	9	25.7	yes		
Beantown Park	46	5	10.9	no		
Bel Alton Estates	109	3	2.8	yes		
Bellewood	32	2	6.3	no		
Benedict				yes		
Bryantown Hills	32	2	6.3	yes		
Caernavon Woods	11	2	18.2	yes		
Capitol Estates	75	2	2.7	yes		
Chapel Point	72	4	5.6	yes		
Charles County Gardens	82	5	6.1	no		
DuMar Estates	46	5	10.9	yes		
Dump Road (WXTR Road)		3		yes		
Ellenwood	96	12	12.5	yes		
Fenwick Road	27	5	18.5	no		
Forest Grove	79	4	5.1	no		
Forest Park (Charles Co. Gardens)	79	8	10.1	no		

Appendix 4M
(continued)

Name	Total Number of Homes	Total Number of Homes with Septic Tank Failures	% Failure	Previous Listing (2)	Change from Previous Listing	State/Federal Grant Monies (1)
Gilroy Road						
Glen Oak	16			no		
Halley Estates		3		yes		
Hawthorne Manor				yes		
Hughesville Manor	37	5	13.5	yes		
Kings Manor				no		
La Plata Heights Subdivision	35	3	8.6	yes		
Malcolm				yes		
Mariellen Park	65	6	9.2	yes		
Morgantown-Southview				yes		
Mt. Carmel Estates	78	2	2.6	yes		
Nanjemoy-Liverpool Point Road				yes		
Nelson Subdivision	50	4	8.0	yes		
Newtown Village, Newtown Estates	44	7	15.9	no		
Oak Avenue				yes		
Oak Hill Estates	56	2	3.6	yes		
Oliver Shop Road	37	2	5.4	yes		
Patuxent Woods				yes		
Penn Manor	24	3	12.5	yes		
Pine Hill Estates	37	2	5.4	no		
Popes Creek				yes		
Port Tobacco				yes		
Port Tobacco Hills				yes		
Port Tobacco Riviera	158	18	11.4	no		
Robie Manor	73	2	2.7	yes		
Rock Point				yes		
Sandy Level Estates-Hughesville				yes		
Simms Landing Road				yes		
Smallwood Estates	51	3	5.9	yes		
St. Mary's Avenue-Spring Hill Area				yes		
Sutton Acres				yes		
Waldorf Manor				yes		
Warlinda/Kline Drive				yes		
Washington Avenue-US 301				yes		
TOTAL	**1,582**	**133**	**8.4%**			

1) Areas chosen to receive State Federal grant monies for failing septics
2) Listed in a previous Comprehensive Water and Sewer Plan
Source: Charles County Health Department, 2006.

Charles County, Maryland
Appendix 4N
Innovative/Alternative On-Site Sewage Systems

Election District	Number of Systems	Type of System
1	39	Low Pressure Dosing (7); Holding Tank (18); Sand Mound (6); Other (8)
2	12	Holding Tank (8); Sand Mound (4)
3	27	Holding Tank (14); Alternating Field (2); Sand Mound (8); Other (3)
4	7	Low Pressure Dosing (4); Sand Mound (4); Other (3)
5	17	Holding Tank (6); Low Pressure Dosing (4); Sand Mound (4); Other (3)
6	47	Holding Tank (21); Sand Mounds (12); Low Pressure Dosing (12); Other (2)
7	25	Holding Tank (13); Sand Mound (6); Low Pressure Dosing (5); Other (1)
8	23	Holding Tank (11); Sand Mound (5); Low Pressure Dosing (4); Other (3)
9	13	Holding Tank (6); Sand Mound (4); Other (3)
10	29	Alternating Fields (1); At Grade Mound (1); Holding Tank (15); Sand Filter (2); Sand Mound (10)
Total System	239	

Source: Charles County Health Department, 2006.

Charles County, Maryland
Appendix 4O
Wastewater Sludge Management

Treatment Facility	Average Daily Flow (mgd)	Treatment Process	Sludge Treatment	Dry (1) Estimated Quantities of Sludge (tons/MGal)	Wet Tons per year (tons)	Percent Solids %	Chemical Additives	Ultimate Disposal
La Plata (Town of)	1.21	Activated Sludge	Aerobic Digester, Plate and Frame Press	0.70	1,812	19.78	Ferric Chloride	Land Application
Indian Head (Town of)	0.300	Activated Sludge w/polishing Ponds	Aerobic Digester, Drying Belts	0.70	3,312	55		Transported to Mattawoman
Mattawoman WWTP	11.42	Activated Sludge and tertiary treatment	Aerobic Digester, Belt Filter Presses, Lime Stabilized	3383.13	15,883.2 (2)	21.25	Alum	Land Application
Cliffton-on-the-Potomac	0.077	Activated Sludge w/flow equalization pond	Aerobic Digester, Haul to Mattawoman	4.89	1040.7	0.39		Transported to Mattawoman
Potomac Heights	0.2170	Primary w/RBC's	Anaerobic Digester	0.70	(3)	(3)		Transported to Mattawoman
Southern MD Correction	0.02	Septic Tank w/sand filter	Aerobic	(3)	317	0.33		Transported to Mattawoman
College of Southern MD (1)	0.04	Activated Sludge w/post aeration	Aerobic Digester, Drying Beds	0.70	77	2.0		Transported to Mattawoman
Gale-Bailey Elem. School	0.0010	Trickling Filters	Aerobic Digester, Drying Beds	0.30	12.5	(3)		Transported to Mattawoman
Lackey High School	0.012	Secondary w/sand filter	Aerobic Digester	0.75	75	0.50		Transported to Mattawoman
Piccowaxen Middle School	0.002	Secondary w/sand filter	Aerobic Digester	0.75	44	2.00		Transported to Mattawoman
AT&T Facility (Faulkner)	0.0010	Trickling Filters	Aerobic Digester	0.30	(3)	(3)		(3)
PEPCO, Mirant (Morgantown)	0.0081	Activated Sludge	Anaerobic	0.70	99	0.20		Transported to Mattawoman
Swan Point	0.064	Flow equalization pond	Aerobic	6.89	2374.82	0.40		Transported to Mattawoman
Mt. Carmel Woods	0.011	Extended Aeration	Aerobic	5.79	1411.25	0.35		Transported to Mattawoman

(1) From Table 12-7, "Wastewater Engineering - Treatment, Disposal, Reuse," Metcalf & Eddy, Inc. 1991 and Table 13-1 (1972 edition)
(2) Mattawoman Sludge Volume only.
(3) Not Available.
(4) Summation of known quantities.

Source: Maryland Department of the Environment/ Charles County Department of Utilities, 2006.

Charles County, Maryland
Appendix 4P
Inventory of Sewage Problem Areas
Private/Community

Map	Name	Coordinates (1000 feet)		2006 Population	Treatment Capacity (mgd)	Treatment Demand (mgd)	Description of Problem	Planned Correction Date
		North	East					
5	Hughesville (commercial)	255	860	30	0.006	0.004	Capacity Problems; system near capacity	-
1/8	Potomac Heights	280.5	760.5	1800	0.200	0.217	High I/I; Deteriorating infrastructure, NPDES Violations	**

**
Potomac Heights performed several infrastructure improvements in 2001/2002 in an effort to stop I/I and overflows. However, heavy snow and rain in 2002/2003 created overflows at the treatment plant.

Source: Maryland Department of the Environment, Charles County Department of Planning and Growth Management, Charles County Department of Utilities, 2006.

Charles County, Maryland
Appendix 4Q
Inventory of Sewage Problem Areas
Public/Municipal

Map	Name	Coordinates (1000 feet)		2006 Population	Treatment Capacity (mgd)	Treatment Demand (mgd)	Description of Problem	Planned Correction Date
		North	East					
7	Clifton on the Potomac	198	805	667	0.070	0.050	High Chlorine Residual; High Inflow & Infiltration; Insufficient capacity to accommodate all recorded lots	
4	Jude House	225	802	50	0.010	0.002	Receiving stream for effluent not capable of assimilating wastewater. WWTP to be constructed.	2008-2009
1	Indian Head (Town of)	277	754	4100	0.420	0.316	Moderate inflow/infiltration	
4	La Plata (Town of)	254	803	7500	1.500	0.828	High inflow/infiltration	
1	Mattawoman WWTP	273	768	65,000	15.000	9.481		
8	Swan Point	173	822	931	0.070	0.047	Plant expansion Phase I completed.	2007-2008

Source: Maryland Department of the Environment/Charles County Department of Planning and Growth Management, 2006.

Charles County, Maryland
Appendix 4R
Inventory of Sewage Problem Areas
Institutional/Government

Map	Name	Coordinates (1000 feet)		2006 Population	Treatment Capacity (mgd)	Treatment Demand (mgd)	Description of Problem	Planned Correction Date
		North	East					
4	College of Southern Maryland (1)	262	795	~5300	0.080	0.077	-	-
3	Gale-Bailey Elementary School	265	757	472	0.015	0.005	NPDES Violation	-
1	Lackey High School (2)	272	763	1617	0.028	0.027	NPDES Violation; aging infrastructure	-
7	Piccowaxen Middle School (3)	192	817	706	0.025	0.008	-	-
4	Southern Maryland Correctional Institute	245	853	180	0.100	0.024	-	-
1	Naval Surface Warfare Center	281	749	3460	0.500	0.450	Upgrade of Treatment Facility needed to accommodate Marbury	n/a

1) Dr. James Craik E.S., McDonough H.S., Alternative School, and Vo-Tech are all on the College of Southern Maryland System.
2) Charles County has a Capital Improvement Project to connect Lakey High School to the Mattawoman Sewer Interceptor. Estimated completion is Summer 2003.
3) Higdon E.S. is also on the Piccowaxen system.

Source: Maryland Department of the Environment/Charles County Department of Planning and Growth Management, 2006.

Charles County, Maryland
Appendix 4S
Inventory of Sewage Problem Areas
Industrial

Map	Name	Coordinates (1000 feet)		2006 Population	Treatment Capacity (mgd)	Treatment Demand (mgd)	Description of Problem	Planned Correction Date
		North	East					
7	AT&T Facility (Faulkner)	219	804	-	0.010	-	Periodic NPDES violations; aging infrastructure	-
4	Lafayette Motel	226.5	802.7	-	0.005	-	Periodic NPDES violations; aging infrastructure	-
7	PEPCO (Morgantown)	190	807	-	0.020	-	Periodic NPDES violations	-
4	Thunderbird Appartments	220.5	804	-	0.032	-	Periodic NPDES violation; capacity problems	-
4/7	Thunderbird Dental	227	801.5	-	0.005	-	Periodic NPDES violations	-
7	White House Motel	209	803.5	-	0.005	-	Periodic NPDES violations; aging infrastructure	-

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4T
Projected Sewage Demand and Planned Capacity
Private/Community

Map	Name	2006						2016					
		Population				Capacity (mgd)		Population				Capacity (mgd)	
		Total	Served	Unserved	gpcd	Demand	Rated	Total	Served	Unserved	gpcd	Demand	Rated
5	Hughesville (Commercial)	0	30	0	0	0.0055	0.020	0	30	0	0	0.0055	0.020
1/8	Potomac Heights	1200	1800	0	0	0.217	0.200	1200	1800	0	0	0.217	0.200

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4U
Projected Sewage Demand and Planned Capacity
Public/Municipal

Map	Name	2006						2016					
		Population				Capacity (mgd)		Population				Capacity (mgd)	
		Total	Served	Unserved	gpcd	Demand	Rated	Total	Served	Unserved	gpcd	Demand	Rated
8	Cobb Island	2000	1518	482	58	0.088	0.158	2000	1938	62	70	0.136	0.158
7	Clifton on the Potomac	667	667	0	87	0.074	0.067	1500	1500	0	85	0.128	0.200
4	Jude House	50	50	0	30	0.002	0.010	-	-	0	70	0.000	-
1	Indian Head (Town of)	4100	4100	0	79	0.316	0.410	4500	4500	0	100	0.450	0.500
4	La Plata (Town of)	7500	7500	0	115	0.828	1.000	15000	15000	0	100	1.500	1.500
1	Mattawoman WWTP	65000	59000	6000	145	7.830	15.000	90000	76000	14000	175	13.300	15.000
4	Mt. Carmel Woods	180	180	0	70	0.014	0.018	220	220	0	68	0.015	0.021
8	Swan Point	931	931	0	80	0.022	0.07	6000	6000	0	100	0.600	0.600

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4V
Projected Sewage Demand and Planned Capacity
Institutional/Government

Map	Name	2006						2016					
		Population				Capacity (mgd)		Population				Capacity (mgd)	
		Total	Served	Unserved	gpcd	Demand	Rated	Total	Served	Unserved	gpcd	Demand	Rated
4	College of Southern Maryland (1)	2200	2200	0	35	0.077	0.080	3000	3000	0	35	0.105	0.080
3	Gale-Bailey Elementary School	340	340	0	15	0.005	0.015	403	403	0	15	0.006	0.015
1	Lackey High School	1064	1064	0	25	0.027	0.028	1201	1201	0	25	0.030	0.028
7	Piccowaxen Middle School (2)	402	402	0	20	0.008	0.025	527	527	0	20	0.011	0.025
4	Southern Maryland Correctional Institute	180	190	0	125	0.024	0.100	190	190	0	125	0.024	0.100
1	Naval Surface Warfare Center	3460	3460	0	100	0.450	0.500	3460	3460	0	100	0.450	0.500

1) Dr. James Craik E.S., McDonough H.S., Alternative School, and Vo-Tech are all on the College of Southern Maryland System.

2) Higdon E.S. is also on the Piccowaxen system.

Source: Maryland Department of the Environment, 2006.

Charles County, Maryland
Appendix 4W
Projected Sewage Demand and Planned Capacity
Industrial

Map	Name	2006						2016					
		Population				Capacity (mgd)		Population				Capacity (mgd)	
		Total	Served	Unserved	gpcd	Demand	Rated	Total	Served	Unserved	gpcd	Demand	Rated
7	AT&T Facility (Faulkner)	-	-	-	-	-	0.010	-	-	-	-	-	0.010
4	Lafayette Motel	-	-	-	-	-	0.005	-	-	-	-	-	0.005
7	PEPCO (Morgantown)	-	-	-	-	-	0.020	-	-	-	-	-	0.020
4	Thunderbird Appartments	-	-	-	-	-	0.032	-	-	-	-	-	0.032
4/7	Thunderbird Dental	-	-	-	-	-	0.005	-	-	-	-	-	0.005
7	White House Motel	-	-	-	-	-	0.005	-	-	-	-	-	0.005

Source: Data was not available from Maryland Department of the Environment.

Charles County, Maryland
Appendix 4X
0, 5, 10-Year Improvement Projects

Year	Description	Estimated Costs			Construction Start
		Total	State/Federal	Local	
2002-2007	Inflow/Infiltration Program	$50,000	$0	$50,000	Ongoing
2006	Pump Station 3A (Phase 2 Upgrade)	$2,189,000	$0	$2,189,000	2006-2008
2006	CSM and Mt Carmel Woods WWPS	$1,601,000	$0	$1,601,000	2006-2010
2007-2011	Mattawoman WWTP BioNutrient Removal	$29,562,110	$10,436,970	$19,125,140	2007
2007	Sewer Pump Stations Service Area Study	$200,000	$0	$200,000	2007-2011
2007	Mattawoman WWTP Final Filter Upgrade	$1,810,000	$0	$1,539,000	2007-2011
2003-2006	Zekiah Pump Station Upgrade	$3,604,000	$0	$0	TBD
2008-2009	Bryans Road Business Park Sewer	$1,765,000	$75,000	$494,000	2009
2008-2010	Benedict Central Sewer System	$6,774,000	$0	$641,000	2010
2006-2009	Piney Branch Interceptor Rehabilitation	$2,000,000	$0	$2,00,000	2008
2008-2009	Jude House WWTP	$219,000	Unknown	Unknown	2008
2008	Route 5 Pump Station*	$200,000	$0	$200,000	2008-2012
2010	St. Marks Pump Station*	$200,000	$0	$200,000	2008-2012
2007	St. Charles Pump Station 3B	$11,722,000	$0	$11,722,000	2009
2008	Laurel Branch Pump Station #1*	Varies	TBD	TBD	Ongoing
2009	Baptist Pump Station*	Varies	$0	TBD	2014-2016
2008-2012	Pump Stations Rehab and Replacements*	$1,924,000	$0	$1,924,000	Ongoing
2008-2009	Piney Branch Interceptor Capacity Updgrade Phase 1	$14,077,000	$0	$14,077,000	2008
2008-2009	Piney Branch Interceptor Capacity Updgrade Phase 2	$10,424,000	$0	$10,424,000	2008
2008-2009	Grit System Reconfiguration at Mattawoman WWTP	$831,000	$0	$584,000	2009
2008-2009	Mt. Carmel Woods WWTP Upgrade	$1,586,000	$0	$0	2009
2008-2012	Mattawoman Sewer Interceptor Capacity Study Ph1-3	$725,000	$0	$725,000	2008
2008	White Plains Sewer Infrastructure Expansion	$472,000	$0	$472,000	2008-2012
2008	Theodore Green Blvd. Pump Station Improvements	$315,000	$0	$315,000	2008-2012
2008	Satellite Sewer System Mapping and Modeling	$251,000	$0	$251,000	2008-2012
2008	Mattawoman WWTP Electrical System Replacement Study	$3,137,000	$0	$3,137,000	2008-2012
2008	Mattawoman WWTP Berm Relocation	$589,000	$0	$589,000	2008-2012
2008	Mattawoman WWTP Automation	$2,248,000	$0	$1,911,000	2008-2012

* Various pump stations throughout Charles County need to be repaired and replaced. The allocated budget for these stations are included in the Pump Station Rehab. and Replacements category.

Source: Charles County Department of Planning and Growth Management, 2006.

Charles County, Maryland
Appendix 4Y
Points of Discharge for Effluent into Charles County, Maryland Waters

Facility	County	Discharge Point	Current Flow (MGD)	Future Flow (MGD)	Comments
Lower Potomac STP	Fairfax	Pohick Creek	54.000	80	
Lorton STP	Fairfax	Mills Branch	2.000		
Ft. Belvoir STP	Fairfax	Pohick Creek	0.048		
Harborview STP	Fairfax	Massey Creek	0.080		
Lorton-FCWA WTP	Fairfax	Accoquan Creek	30.000		
		COUNTY TOTAL	***86.128***		
Quantico-Camp Upshur STP	Prince William	Cedar Run	0.140		
Dale Service Corp., Section 1 STP	Prince William	Neabsco Creek	4.000		
Dale Service Corp., Section 8 STP	Prince William	Neabsco Creek	2.000		
Forest Grove WWTP	Prince William	Purcell Branch	0.070		
H.L. Mooney WWTP	Prince William	Neabsco Creek	12.000		
Nokesville STP	Prince William	Slate Run	0.025		
Quantico-Mainside STP	Prince William	Cedar Run	2.000		
Quantico-USMC Industrial STP	Prince William	Potomac River	2.000		Direct Discharge to Potomac
		COUNTY TOTAL	***22.235***		
Aquia AWT Plant	Stafford	Austin Run	6.000		
		COUNTY TOTAL	***6.000***		
Fairview Beach WWTP	King George	Potomac River	0.090		Direct Discharge to Potomac
Dahlgren Sanitary District A	King George	Williams Creek	0.525		
NSWC - Dahlgren A	King George	Upper Machodoc	0.400	0.6	Will use MD (strictest) regulations
Gambo Creek WWTP	King George	Gambo Creek	0.000		% active; sewage diverted to Dahlgren
Oakland Park STP	King George	Muddy Creek	0.030		
Office Hall STP	King George	Pine Hill Creek	0.000		
Purkins Corner STP	King George	Pine Hill Creek	0.000		
		COUNTY TOTAL	0.430		
Colonial Beach STP	Westmoreland	Maroc Bay	0.750	2.5	Under Consent Order to Expand
		COUNTY TOTAL	***0.750***		

Sources: Virginia Water Quality Control Board, Washington Council of Governments, Washington Suburban Sanitary Commission, King George County, Westmoreland County, Virginia, and the Town of Colonial Beach , Virginia, 1997, revised 2005

Appendix 4Z

Failing Septic Identification and Priority Ranking

FAILING SEPTIC IDENTIFICATION AND PRIORITY RANKING

The identification of sewerage problem areas is a process involving the County Department of Planning and Growth Management, the Environmental Health Division of the Health Department, and citizens affected by water supply problem areas. The Charles County Health Department has identified a number of areas as potential problem areas; these are designated with the "E" suffix on the official Charles County Water and Sewer Maps. These were based on initial surveys by the Charles County Health Department, through reports received from the Maryland Department of the Environment; and actual field visits and input from citizens. The Health Department will determine wether an area is failing based on the number of individual septic systems which fall into one or more of the "failing conditions" stated below. A threshold 30% failure rate is necessary to be eligible for potential correction. The six failing condition categories are:

1. Sewerage discharge into an aquifer currently being used as a water source by wells in adjacent areas;

2. Sewerage discharge into surface waters;

3. Sewerage discharge to the ground surface;

4. Sewerage discharge into any groundwater aquifer not designated to receive sewerage by a County groundwater protection report;

5. Insufficient area to replace an existing septic in accordance with COMAR 26.04.02; or

6. Any other cause of septic tank failure.

In order to objectively evaluate all areas identified as sewerage problem areas by the Charles County Health Department for potential correction, the County has developed a priority system. This priority system enables systems to be compared to each other, if funding is limited. The priority system evaluates 7 factors, which include:

a. Community - The location of the area and the Comprehensive Plan designation of the area.

b. Percentage Failing - Higher failure rates is an importance factor.

c. Identification of the Problem - Ranking according to the factors identified above.

d. Proximity - Proximity to infrastructure which could offer potential correction.

e. Cost - Cost necessary to correct problem.

f. Revenue Source - Potential or actual revenue source should be identified. This may include grants, developer contributions, loans, or County funded or subsidized programs.

g. Hardship - The ability of the residents to affect costs.

A priority score is derived and evaluated in light of current conditions. These are used to objectively evaluate failing septic areas.

Charles County, Maryland
Sewer Problem Area
Priority Matrix

Community

First Priority
- Existing Commercial/Industrial/Business areas within Development District

Second Priority
- Future Commercial/Industrial/Business areas within Development District

Third Priority
- Existing residential ERUs within Development District

Fourth Priority
- Future residential ERUs within the Development District

Fifth Priority
- Existing Commercial/Industrial/Business areas outside Development District

Sixth Priority
- Future Commercial/Industrial/Business areas outside Development District

Seventh Priority
- Existing residential ERUs outside of the Development District

Eight Priority
- Future residential ERUs outside of the Development District

Identification of Problem

First Priority
- Discharge to adjacent water source aquifers

Second Priority
- Discharge to aquifers

Third Priority
- Discharge to the ground surface

Fourth Priority
- Discharge to aquifers not designated to receive sewage, as per County's groundwater protection report

Fifth Priority
- Any other cause of failure

Sixth Priority
- Insufficient area to repair/replace as per COMAR 26.04.02

Proximity

First Priority
- Areas which can interconnect

Second Priority
- Areas requiring an on - site system

Revenue Sources

First Priority
- Revenue from sources other than the County

Second Priority
- Revenue from source to be established and administered by County

Third Priority
- Revenue from County funds

Charles County, Maryland
Sewer Problem Area
Priority Matrix

Area
Map Number

		Weighting Factor		Weighted Score
Community				
Development District				
	Yes	____	x 5	____
	No	____	x 1	____
Existing Commercial/Business/Industrial ERCs		____	x 5	____
Future Commercial/Business/Industrial ERCs		____	x 4	____
Current ERCs		____	x 3	____
Future ERCs		____	x 2	____
			Subtotal	____
Percent Failing (check one)				
30 to 40% failing		____	x 5	____
41% to 55% failing		____	x 10	____
56% to 65% failing		____	x 15	____
66% to 75% failing		____	x 20	____
76% to 100% failing		____	x 25	____
			Subtotal	____
Identification of Problem (check one)				
Discharge to adjacent water source aquifers		____	x 25	____
Discharge to aquifers		____	x 20	____
Discharge to the ground surface		____	x 15	____
Discharge to aquifers not designated to receive sewage		____	x 10	____
Any other cause of failure		____	x 5	____
Insufficient area to repair/replace		____	x 5	____
			Subtotal	____
Proximity (check one)				
Interconnect				
Closest Central System		____	x 25	____
On Site		____	x 10	____
			Subtotal	____
Cost to Remedy Problem				
Cost (in $millions)		____		____
Revenue Source (percentage available)				
Grants		____	x 25	____
Developer CIAC		____	x 25	____
County R&R fund		____	x 10	____
Owner/Developer/Association approved special assessment		____	x 25	____
Other funding source		____	x 15	____
	Subtotal		Subtotal	
Hardship				
Ultimate cost per each existing ERCs		____		____
Ultimate cost per each existing ERCs < $3,000		____	x 25	____
Ultimate cost per each existing ERCs > $3,000		____	x 10	____
		____	Subtotal	____

Priority Score

APPENDIX 4AA

Failing Septic Petition Process

FAILING SEPTIC PETITION PROCESS

The County Commissioners of Charles County, Maryland, on adopting this Comprehensive Water and Sewerage Plan, establish a policy framework for a petition process for the correction of failing septic systems, and conversion to the public sewerage systems operated by the County. This policy applies only to designated failing septic areas within the Mattawomen Sewer Service Area (MSSA). This Water and Sewer Plan provides additional guidance for other areas outside the MSSA.

This policy framework is patterned after the process used to provide public sewer service to four areas in the County - Glymont, Brookshaven, Laurel Drive, and Sun Valley/Stavors Road. This process is also similar, in form, to the water supply petition process. Both these processes have been given legal authority by the Governor's signature of House Bill 656 "Authority to Construct, Extend, and Acquire Water or Sewer Systems or Stormwater Management Areas". It has been assigned Chapter No. 464 in the Charles County Code. The Act took effect October 1, 1997.

This policy framework will be further detailed and administrative procedures developed upon adoption of the Water and Sewer Plan. The Act allows the County to develop a method of determining the annual benefit assessments to be levied against the properties served by the constructed water and/or sewer lines. The procedures shall specify the time and manner of payment, which may not exceed fifteen (15) years. The County Commissioners can determine the amount of interest to be charged. It should be noted that this process can receive funding from a variety of sources. These include grants, low interest loans, developer contributions in conjunction with the development guidance system, the County's failing septic correction fund, a pro-rated share of paid by the affected residents, and other sources. In most cases the cost of construction will be offset by a benefit assessment charged to the property owner benefiting from the service extension and augmented with whatever assistance the County may receive. This policy framework is as follows:

1. Contact made by citizens with the County by phone, letter, or meeting. The citizens (petitioners) shall own property which is to be served by the constructed or extended sewer system.

2. Field inspection by County staff of the designated failing septic area and examination of existing and planned facilities in the area.

3. Staff reports to the County Commissioners on the status of the failing septic area, local facilities, and scenarios for correction.

4. If the Commissioners decide to proceed with the correction of the designated failing septic area, affected residents are informed of a public information meeting.

5. Public information meeting is held. Residents are informed of: proposed process to correct the failing septic area; preliminary costs associated with the work; funding source to be used; benefits of the program; and other information, as directed by the County Commissioners.

6. Preliminary report, proposed construction timetable, and petition package released to the public. A public hearing will be held on these materials.

7. Public hearing held.

8. Commissioners approve or disapprove the petition.

9. All documents, data, drawings forwarded to the County Capital Improvement Planning Division. The design, construction, and organization processes are initiated at this point.

10. Design contract put out to bid.

11. Design Contract awarded.

12. Construction contract put out to bid.

13. Construction contract awarded.

14. Construction begins.

15. Construction completed.

16. System dedicated to County.

17. County assumes ownership, operation and maintenance of system.

Charles County, Maryland
Appendix 4BB
Sub-interceptor Conceptual Sizing
(Based on Build-out Flows)

Sub-basin Number	Estimated Build-out Flows (mgd)	Connection Point (a)	Estimated Sub-interceptor Diameter (inches) (b)
1	2.41	MH 2000	12
2	0.99	MH 2000	8
3	0.13	MH 2000	8 (c)
4	1.11	MH 2	8
5	0.59	MH 4	8 (c)
6	0.16	MH 2	8 (c)
7	0.08	MH 6	8 (c)
8	0.59	MH 6	8 (c)
9	0.62	MH 10	8 (c)
10	0.54	MH 18	8 (c)
11	0.90	MH 18	8 (c)
12	0.44	MH 25	8 (c)
13	1.06	MH 29	8
14	0.59	MH 29	8 (c)
15	0.07	MH 31	8 (c)
16	0.12	MH 40	8 (c)
17	0.04	MH 41	8 (c)
18	0.98	MH 42	8
19	0.10	MH 47	8 (c)
20	0.05	MH 47	8 (c)
21	0.24	MH 50	8 (c)
22	0.02	SI 21	-
23	0.29	MH 59	8 (c)
24	0.03	SI 23	-
25	0.26	MH 70	8 (c)
26	0.02	SI 25	-
27	0.32	MH 73	8 (c)
28	0.01	SI 27	-
29	0.04	SI 27	-
30	14.30	MH 82	30
31	0.01	SI 30	-
32	0.01	SI 30	-
33	0.01	SI 30	-
34	0.02	SI 30	-
35	0.20	MH 94	8 (c)

Appendix 4BB
(continued)

Sub-basin Number	Estimated Build-out Flows (mgd)	Connection Point (a)	Estimated Sub-interceptor Diameter (inches) (b)
36	0.00	SI 35	-
37	0.01	SI 35	-
38	0.01	SI 35	-
39	0.22	MH 114	8 (c)
40	1.38	MH 117	10
41	0.13	MH 122	8 (c)
42	0.01	SI 47	0
43	0.01	SI 47	-
44	2.05	MH 125	12
45	n/a	n/a	n/a
46	n/a	n/a	n/a
47	3.70	MH 1000	16
Total	**34.87**		

NOTES:
(a) MH = Manhole along the Mattawoman Interceptor.
SI = Tie into Sub-interceptor Number instead of MH.
(b) Assumes 5 feet per second (fps) velocity in pipe.
(c) 8-inch diameter provided due to Maryland State Guidelines for minimum sizes.

Source: Maryland Department of the Environment, 2006.