

**CAPACITY, MANAGEMENT,
OPERATION & MAINTENANCE (CMOM)
MANUAL
HOWARD COUNTY, MARYLAND**



**Howard County Department of Public Works
Bureau of Utilities**

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Chapter 1 – Introduction

1.1 NEED FOR CAPACITY, MANAGEMENT, OPERATION, AND MAINTENANCE (CMOM) PROGRAM

1.1.1 WHAT IS CMOM?

The Capacity, Management, Operation, and Maintenance (CMOM) program is intended to covers all aspects of sanitary sewer collection and conveyance from wastewater generation to treatment. The primary purpose of the CMOM is to collect information and manage resources to reduce and ultimately eliminate sanitary sewer overflows (SSOs) by collating, tracking, and improving the efficiency of the sewage system.

1.1.2 SANITARY SEWER OVERFLOWS

“Sanitary Sewer Overflow” or “SSO” is a term used for an event whereby sewage exits the sanitary sewer collection and conveyance system and enters the environment. Examples of this include sewage flowing out of manholes due to excessive surcharging or blockage, pump station relief drains, or constructed overflow structures.

The general causes of SSOs are sewer failures (due to blockages, age, improper construction and inspection, and other factors), lack of capacity (due to insufficient design capacity for current or future flows, excessive infiltration and inflow, and other factors), and lack of regular maintenance (caused by clogs, backups, and other conditions).

1.1.3 UTILITY AND INFRASTRUCTURE MODERNIZATION

Unlike many municipalities that are struggling to control overflows and maintain an aging infrastructure system, Howard County’s collection system is comparatively young and sized to avoid most capacity issues. Howard County has positioned itself with sufficient resources to adequately maintain the existing sanitary sewer collection in the sanitary sewage system and keep pace with current needs. The area of greatest need with regard to the collection system is to control the County’s SSOs which are caused by grease, debris, blockages, and roots. A very small percentage of the SSOs, less than 10%, are caused by structural failures in pipes or manholes.

1.1.4 PURPOSE OF CMOM PROGRAM

The overall purpose of a CMOM program is to:

- Prevent SSOs.
- Respond to and minimize the impact of SSOs when they do occur.
- Better manage, operate, and maintain the sanitary sewer collection system.

CMOM programs provide a framework to help municipalities effectively manage their sanitary sewer systems to operate and maintain infrastructure and provide improved

customer service while complying with regulations and ensuring that the system has adequate capacity to meet its needs.

CMOM programs also extend to regulatory authorities the power to oversee how municipalities manage their systems in an effort to identify and resolve deficiencies. Ultimately, performance of each collection system will be linked to the effectiveness of its CMOM program. It is the goal that the CMOM program to use the vehicles already in place to increase system efficiency to meet performance goals, reduce the number of overflows, blocked lines, and collapsed pipes, and size sewer pipes and equipment for current and future needs.

Effectively managed CMOM programs have the following characteristics:

- 1) Adequate capacity within the sanitary sewer collection system is provided.
 - Managers anticipate required changes and make the necessary plans to correct potential problems before they develop.
 - Properly developed and updated preventive maintenance programs prevent service interruptions.
 - Physical and program deficiencies are identified so that responses are developed and prioritized in anticipation of their need.
- 2) The entire set of CMOM program components works as a unit.
 - Each of the individual components of labor, equipment, and materials are identified and maintained to provide reliable service.
 - Appropriate budgets are developed to keep parts and tools inventories current and equipment in working order.
- 3) The value of the capital assets is maintained.
 - An existing system should is maintained to extend the overall life expectancy by meeting present and future needs.

1.2 GENERAL CMOM PROGRAM SUMMARY

1.2.1 CMOM CONCEPT

The Capacity, Management, Operation, Maintenance (CMOM) program advocated by the Environmental Protection Agency (EPA) has its origin in the early 1990's when EPA decided to adopt a means of being more proactive in preventing SSOs which plagued many communities. These SSOs have the potential of exposing people and the surrounding environment to raw sewage carrying bacteria, viruses, and harmful organisms. SSO back-ups into basements are expensive requiring cleanup and disinfection of the area plus the replacement of damaged home furnishings. A serious threat resulting from SSOs is the potential to contaminate drinking water sources and impact water quality, aquatic life, and recreational activities along waterways.

1.2.2 GENERAL STANDARDS

The general performance standards in the Proposed CMOM Rule require Howard County to:

- 1) Properly manage, operate, and maintain, at all times, the parts of collection system that they own or have operational control.
- 2) Provide adequate capacity to convey base flows and peak flows.
- 3) Take all feasible steps to stop and minimize the impact of sanitary sewer overflows.
- 4) Provide notification to parties with a reasonable potential for exposure to pollutants associated with an overflow event.
- 5) Develop a written summary of their CMOM program and make it available to the public upon request including self-audits.

To meet the five general performance standards shown above, EPA believes that CMOM programs should have the following components:

- 1) Program goals consistent with the general performance standards.
- 2) Establishment of administrative and maintenance functions responsible for implementing the CMOM program and the chain of communication for complying with reporting requirements for SSO events.
- 3) Identification of the legal authority necessary for implementing the CMOM program.
- 4) Establishment of appropriate measures and activities necessary to meet the general performance standards.
- 5) Adequate design and performance provisions.
- 6) Establishment of a monitoring program for implementation of the CMOM program and a means of measuring its effectiveness.

1.2.3 COMPONENTS OF CMOM PROGRAM

There are seven components necessary for a successful CMOM program:

- 1) The program must be utility-specific. This is a common thread for each of the remaining six elements. Having a program that is specific to the individual utility means that the program should be tailored to match the utility's geographic, physical and climatic conditions, the collection system's level of complexity, the configuration of the system's infrastructure, and the system's level of sophistication.

- 2) The CMOM program must have a purpose. The program purpose is the big-picture reason why the program is needed and why it exists.
- 3) The CMOM program must have a defined goal or set of goals. The individual program goals should identify specific tasks and establish the desired accomplishments of the CMOM program.
- 4) The CMOM program must be documented. The program documentation specifies, in writing, the details of the activities and procedures that are to be followed to implement the program.
- 5) The CMOM program must be implemented by trained personnel to ensure the success of achieving the program's goals.
- 6) The CMOM program must have performance measures to determine program effectiveness. Appropriate performance measures should be established for each component of the program on an annual basis. The annual audit will evaluate how well the program accomplished the program goals established at the beginning of the year and whether the program, as implemented, is the most cost-effective approach.
- 7) The CMOM program must be subject to periodic evaluation. Proper management and operation and maintenance program implementation requires the utility to assess performance on a regular basis, usually annually. The purpose of the evaluation is to determine whether the programs are achieving established goals and to determine if the program is being implemented efficiently and at the least cost. The CMOM program must be updated to include any changes deemed necessary arising out of the periodic evaluation.

1.2.3.1 GOALS

The County must specifically identify major program goals which will be used to guide the CMOM program. The goals will establish performance, safety, customer service, and compliance guidelines consistent with environmental and human health protection rules and policies as stated in the Proposed SSO Rule.

1.2.3.2 ORGANIZATION & PERSONNEL

The County must identify administrative and management positions responsible for implementing measures in the CMOM program including lines of authority. It must also document the chain of communication for reporting SSOs from receipt of a complaint to notification of permitting authority officials, other affected agencies, and the public.

1.2.3.3 LEGAL AUTHORITY

The County must have the legal authority to implement the requirements of the CMOM program. This authority should be defined by sewer use ordinances, service agreements, or other legally binding documents. There are five classes of activity that are necessary in a CMOM program:

- 1) Control of infiltration and inflow.
- 2) Proper design and construction of sanitary sewers and connections.
- 3) Proper installation, inspection, and testing of new or rehabilitated sewers.
- 4) Management of flows from satellite facilities that connect into the collection system.
- 5) Implementation of pretreatment programs as mandated by Federal Code 40 CFR 403.5.

1.2.3.4 WATER AND SEWER PROGRAMS

The CMOM program must include the following eight measures and activities as appropriate and applicable to the County's system.

- 1) **Maintenance Facilities and Equipment:** The County should maintain adequate facilities and data processing for maintenance where personnel, materials, and equipment are dispatched and where records are kept.
- 2) **Maintenance of a Collection System Map:** The County needs to maintain record drawings showing the location of the entire collection system (pumping stations, sewers, and manholes).
- 3) **Use of Timely and Relevant Information:** The County must maintain an efficient system for timely distribution of information from the recording staff to the managers and field personnel. This will allow staff to effectively respond to emergency situations, problems, complaints, and deficiencies in the system, schedule inspections and maintenance activities, and plan staffing and budgeting.
- 4) **Routine Preventive Operation and Maintenance Activities:** A good preventive maintenance program will assist in being able to prevent service interruptions and system failures which result in SSOs. A preventive maintenance program should ensure routine inspection of the entire collection system, investigation and correction of the source of complaints, proper maintenance recordkeeping, and adequate workforce, materials, and equipment to perform maintenance activities.
- 5) **Assessment of the Capacity of the Collection System and Treatment Facilities:** The County must maintain a system to provide or make provisions for current and future sewer demands.
- 6) **Identification and Prioritization of Structural Deficiencies and Corresponding Rehabilitation Actions:** Since sanitary sewer systems are subject to harsh and corrosive conditions, the CMOM program is required to assess the structural condition of the system through field investigations including closed circuit television inspections. The results of the assessments lead to identifying and

ranking the long-term and short-term rehabilitation actions to correct the problems.

- 7) Training: Personnel employed to perform work on the collection system should be properly trained on the facilities and equipment needed to do their job efficiently. Current training includes the appropriate safety training to avoid workplace accidents.
- 8) Equipment and Replacement Parts Inventories: Maintenance facilities should have a suitable inventory of equipment and parts critical to addressing and resolving problems quickly.

1.2.3.5 DESIGN – WATER AND SEWER DESIGN AND PERFORMANCE PROVISIONS

The County has construction requirements and standards for the installation of new and rehabilitation of existing components in the sewer system and procedures for inspecting and testing installations. These standards are essential to avoid improper connections, premature line and equipment failures, interferences with other infrastructure, and other potential problems due to improper design or construction practices.

1.2.3.6 SEWAGE OVERFLOW RESPONSE PLAN

The CMOM program must include a documented sewage overflow response plan that includes: measures to protect public health and the environment, a way for field personnel to be made aware of all overflows, assurance that there is a proper response for sewage overflows, identification of individuals who will be notified, and proper training of personnel.

1.2.3.7 PUBLIC COMMUNICATION AND PUBLIC INVOLVEMENT

Regular communication with community stakeholders is encouraged to provide opportunity for comment and to make improvements to the CMOM program.

1.2.3.8 IMPLEMENTATION OF CMOM – MONITORING AND AUDITING

The proposed SSO rule calls for monitoring major CMOM program elements. The information gathered should be used to evaluate the performance of each element leading to program adjustments as needed.

The CMOM program must also be audited on a regular basis with the National Pollution Discharge Elimination System (NPDES) permitting authority, health officials, and other interested parties to evaluate its implementation and performance. The extent of the audit should be based on the size of the system and the number of overflows during the audit period. It should cover the program's compliance with permit requirements, any identified deficiencies, and steps to address them.

1.3 SUMMARY OF HOWARD COUNTY SANITARY SEWER SYSTEM

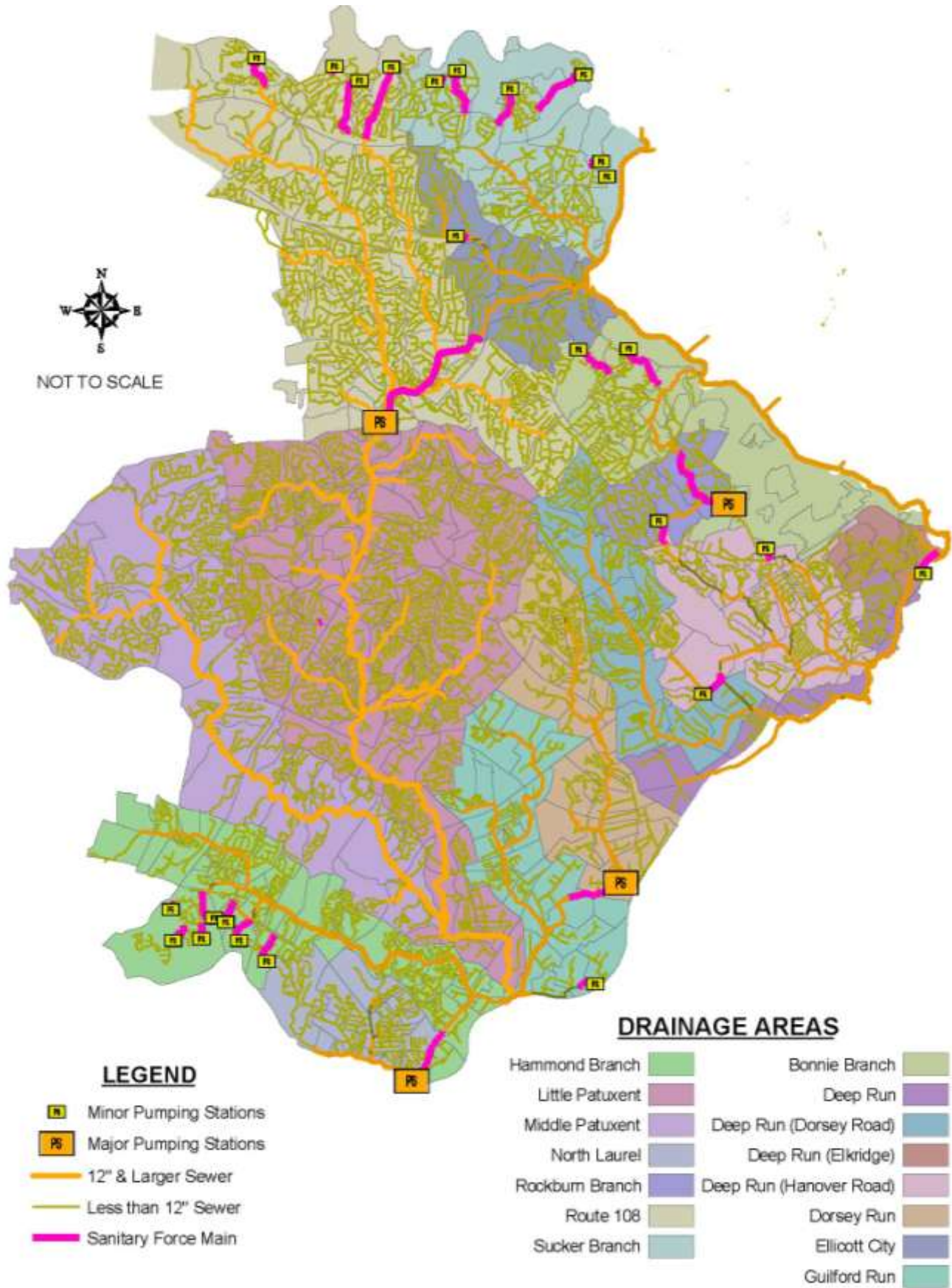
Currently Howard County's public sanitary sewer system serves approximately 85% of the County's population. The County is served by 29 pumping stations and approximately 1,000 miles of sewer ranging in size from 4 to 48 inches. The County's sanitary sewer system is divided into two service areas: Patuxent and Patapsco. A majority of the piping in the sanitary sewer system is concrete (47%) and Poly Vinyl Chloride (PVC) (44%). The concrete and PVC piping was installed within the last 50 and 32 years, respectively. The remaining system is composed of Ductile Iron (6%), Vitrified Clay Pipe (2%), or is undocumented (1%) and was installed in the 1960s and later.

Nearly 75% of the public sewage flows to the Patuxent service area. The service area is broken into seven sub-drainage areas: Route 108, Little Patuxent, North Laurel, Hammond Branch, Guilford Run, Middle Patuxent, and Dorsey Run (see Appendix 1: Figure 1 – Howard County Drainage Areas). Sewer System Evaluation Surveys into the condition of sewer lines in this service area identified minor problems (i.e. missing/damaged cleanout caps, corroded manhole rungs, ponding around manholes) that could be addressed through normal maintenance activities. Manhole rehabilitation and sewer line point repairs are needed at various locations; however few structural defects were identified.

Sewage from the Patuxent service area flows to the County's Little Patuxent Water Reclamation Plant located in Savage. Currently, the Little Patuxent Water Reclamation Plant is undergoing a \$92 Million Capital Improvement Project to make improvements to the plant including an enhanced nutrient removal expansion scheduled for completion in 2012. The upgrades will increase nitrogen and phosphorus removal and the hydraulic capacity from 25 Million Gallons per Day (MGD) to 29 MGD. The Biological Nutrient Removal (BNR) plant is composed of primary screening, grit removal, primary clarifiers, BNR reactors, final clarifiers, and sand filters. The Plant has a pretreatment process reactor and clarifier to treat high organic loads prior to discharging to the BNR treatment process.

Sewage from the Patapsco service area flows to the City of Baltimore's Patapsco Wastewater Treatment Plant through the Patapsco Interceptor. The Patapsco Interceptor is used not only by Howard County but also Baltimore County, Anne Arundel County, and Baltimore City. The eight sub-drainage areas in the Patapsco service area are Sucker Branch, Ellicott City, Bonnie Branch, Rockburn Branch, and four drainage areas in Deep Run (see Appendix 1: Figure 1 – Howard County Drainage Areas. A Sewer System Evaluation Survey for portions of the Patapsco service area is currently being performed by a consultant engineer. The final report is due to the Maryland Department of the Environment by December 31, 2011 and will detail the upgrade and replacement work needed in the area.

**Figure 1
Howard County Drainage Areas**



Chapter 2 – Goals

2.1 GENERAL

The Environmental Protection Agency (EPA) estimates that thousands of sanitary sewer overflows (SSOs) occur every year in the United States. Many municipalities have sewer collection systems that are aging with insufficient capacity to meet current and future needs. This particular condition is not a major concern of Howard County; however even well-operated and maintained systems are subject to SSOs due to blockages, structural, mechanical, or electrical failures. SSOs may carry bacteria, viruses, etc. directly into a water source that could potentially cause diseases ranging from gastroenteritis, cholera, dysentery, and hepatitis which can be transferred to people who come in contact with sewage contaminants in basements, streets, or water used for recreation though no such cases have been documented in Howard County.

The main goal of the Capacity, Management, Operations, and Maintenance (CMOM) Program is to prevent SSOs and lower potential risks to public health and the environment by improving the performance of sewer collection system and the response to SSOs when they do occur. Short-term, intermediate-term and long-term goals are developed to work in harmony with the main goal to provide more specific and task-oriented elements necessary in a CMOM program.

Howard County has already adopted many of the mechanisms necessary to meet CMOM program goals; however it is the County's aim to develop strategic and tactical plans to minimize SSOs in conjunction with CMOM program requirements. It is intended that the program will be flexible to allow adjustments to short-term, intermediate-term, and long-term goals during program implementation if monitoring data indicates that specific measures are not helping to achieve stated program goals.

2.2 OVERALL GOALS FOR HOWARD COUNTY'S CMOM PROGRAM

In order to guide the overall tracking and management of an effective and efficient CMOM program, the County intends to meet the following "General Standards" consistent with the EPA's CMOM requirements:

- Take all feasible and cost-effective steps, as appropriate, to prevent sanitary sewer overflows and to minimize the impact of sanitary sewer overflows when they do occur.
- Properly manage, operate, and maintain all parts of the sewage collection system operated by or under the control of Howard County.
- Identify sewer system capacity needs and deficiencies to provide adequate collection system capacity to convey base and peak flows.
- Establish a chain for communication for sharing information within County departments, State authorities, and community stakeholders.

The County's Capital Budget provides detailed data on the current year's capital program plus lists the anticipated budgetary needs for the next five years. FY 2010

submittals will include capital money for newly established programs related to this CMOM. The time frame for short-term goals is considered to correspond with the Capital Budget's current fiscal year. As a new budget is adopted each year, the short-term goals are re-evaluated based on the new fiscal year's funding program goals. Intermediate-term goals are considered to cover the five-year period following the current fiscal year which is also covered in the Capital Budget. Long-term goals are those goals that fall beyond the five-year window of the Capital Budget.

2.3 SHORT-TERM GOALS

Short-term goals focus on immediate measures that the County is taking to prevent SSOs by continuing maintenance activities and continuing sewer system projects previously initiated.

The short-term goals of the CMOM program are to:

- Adopt and begin to implement CMOM Program.
- Continue current Capital Improvement Program (CIP) projects targeted at increasing system capacity and reducing SSOs and infiltration & inflow (I&I).
- Clean sewer mains to prevent blockages due to fats, oils, greases, and debris.
- Clean sewers which do not have self-cleaning flow characteristics on a regular schedule.
- Clear all stoppages as quickly as possible with the probable causes analyzed and corrected.
- Reduce the number of stoppages at County-owned facilities.
- Enhance the efficiency of maintenance crews to achieve an average response time to routine sewer problems of one (1) hour or less.

2.4 INTERMEDIATE-TERM GOALS

The intermediate-term goals focus on utilizing asset management tools (such as GIS, computer information and management systems, and hydraulic modeling) that the County already has in place to improve the operation and maintenance of the sewer collection system. These intermediate-term goals focus on performing tasks and completing projects which will have an immediate impact on reducing SSOs. This also includes training personnel for implementing and auditing the CMOM program.

The intermediate-term goals of the CMOM program are to:

- Inspect manholes once every five years.
- Monitor sewage flows during wet and dry weather to locate areas susceptible to excessive I&I and to verify the hydraulic model.

- Maintain and increase the usage of the County’s Geographic Information System (GIS) and asset management system to track past and future maintenance activities, Capital Improvement Projects (CIP), customer complaints, work orders, and emergency maintenance activities.
- Continue to train the necessary personnel in the Bureau of Utilities and Bureau of Engineering to be proficient in the GIS and asset management software.
- Periodically update construction standards for new installations and the rehabilitation of system components.
- Perform smoke testing to identify sources of inflow in the sewer system that need to be eliminated to regain peak flow capacity.
- Perform short-term, high priority collection system rehabilitation projects as needed to improve system performance.
- Establish and monitor timely response to customer complaints.
- Review and revise goals and action items relating to the CMOM each calendar year.
- Educate and train the Bureau of Utilities and Bureau of Engineering personnel on the CMOM program.
- Perform regular self-audits on the CMOM program to correct deficiencies and determine areas of needed improvement.
- Establish a mechanism to obtain public input on the development, implementation, and revision of the CMOM program including making the Self-Audit Report available to the public upon request.

2.5 LONG-TERM GOALS

Long-term goals focus on continuing to reduce and prevent SSOs by expanding and enhancing maintenance activities and replacing and rehabilitating facilities as needed to prevent sewer system failures and maximize sewer system capacity. Long-term goals will also involve implementing and monitoring the effectiveness of the CMOM program to ensure that the desired results are being achieved.

The long-term goals of the CMOM program are to:

- Fully implement CMOM to minimize SSOs.
- Take appropriate steps to reduce/prevent SSOs according to the following priority: dry weather SSOs, wet weather SSOs in environmentally sensitive areas, and the remaining wet weather SSOs.
- Ensure the integrity of sanitary facilities.

- Take appropriate steps to prevent overflows caused by:
 - Sewer line blockages through preventive maintenance of sewer lines.
 - Pumping station mechanical malfunctions through proper operation and preventive maintenance.
 - Improper installation of sewers and pumps stations by adhering to design criteria and construction requirements.
 - Insufficient capacity by eliminating extraneous flows and/or providing additional capacity.
- Implement monitoring program to track the effectiveness CMOM activities, program to include:
 - Reduction in peak flows entering the system.
 - Minimizing pumping station shut downs due to equipment malfunction.
- Recover wastewater treatment capacity through I&I reductions.

Chapter 3 – Organization and Personnel

3.1 HOWARD COUNTY GOVERNMENT

The Howard County Government falls under the administrative authority of the County Executive. There are several departments administered by the County Executive related to management of the County’s sanitary sewer systems as shown in Appendix 3: Figure 1 - Howard County Government Organization Chart. These divisions include the Department of Public Works (DPW), Department of Planning & Zoning, and Department of Inspections, Licenses, & Permits.

3.2 DEPARTMENT OF PUBLIC WORKS

Title 18, Subtitle 10 of the Howard County Code delegates duties and responsibilities for administration of the Howard County Metropolitan District to a division of the Department of Public Works. Within the Department of Public Works are five (5) bureaus: Utilities, Engineering, Facilities, Environmental Services, and Highways. Within the Department of Public Works, the Bureau of Utilities and the Bureau of Engineering have been delegated the primary roles of design, operation, and maintenance of the sanitary sewer system for Howard County.

3.3 BUREAU OF UTILITIES

The Bureau of Utilities is directly responsible for the operation, maintenance, and repair of the sewage collection system, monitoring and analysis of industrial and commercial waste discharge, and permitting industrial and commercial sanitary sewer users. The Bureau of Utilities maintains a workforce of approximately 136 people. The Bureau of Utilities is comprised of four divisions under the authority of the Bureau Chief as shown in Appendix 3: Figure 2 - Bureau of Utilities Organizational Chart. The divisions include Technical Support, Maintenance, Water Reclamation, and Meters. The Meters Division reads water accounts and does not have duties directly related to the sanitary sewer system. The administration for the Bureau Chief includes a Management Assistant and Administrative Support Technician.

3.3.1 TECHNICAL SUPPORT DIVISION

The Technical Support Division is responsible for providing engineering and management of various administrative and maintenance operations for the Bureau including:

- Budgeting
- Engineering
- Water and Sewer Planning
- Construction Inspection
- GIS Mapping

- SCADA

This division also ensures compliance with various State and Federal regulations governing the water distribution system and wastewater collection system. There are approximately 13 positions which include Engineering Specialists, Regulatory Inspector, Administrative Aide, and Administrative Support Technician.

3.3.2 MAINTENANCE DIVISION

The Maintenance Division is responsible for the maintenance of the public water and sewer system. This system consists of approximately 950 miles of sewer mains, 980 miles of water mains, 9,000 hydrants, 9 elevated water tanks, and over 40 water and sewer pumping stations. Specific tasks performed related to the sewer system include:

- Inspection of new sewer house connections
- Locating sewer lines
- Maintenance of neighborhood Shared Septic Systems
- Investigation of sewer backups
- Maintenance of sewer mains, manholes, and Right-of-Ways

There are approximately 48 positions which include Operations Supervisors, Utility Workers, Engineering Support Technicians, Administrative Support Technicians, and a Regulatory Inspector.

3.3.3 WATER RECLAMATION

The County's only wastewater treatment plant is the Little Patuxent Water Reclamation Plant located at 8900 Greenwood Place in Savage. The plant serves approximately 56% of the County's population. There are 820 miles of gravity and force main sewer pipe that transport sewage to this facility. This division employs 47 positions including Operations Supervisors, Engineering Specialist, Engineering Support Technicians, Operators, Maintenance Mechanics, Electricians, Instrumentation Technicians, Operations Technicians, and Administrative Support Technicians. Facility Operations and Maintenance is part of this Division and is responsible for the operations and maintenance of the sewage pumping stations.

3.3.4 PRETREATMENT

The Howard County Pretreatment staff is based at the County's Little Patuxent Water Reclamation Plant (LPWRP) and is responsible for the implementation of the County's Pretreatment program, including limiting the discharge of Fats, Oils, and Grease (FOG) into the County's collection system. The Pretreatment staff is composed of a Pretreatment Coordinator, with a job classification of an Engineering Support Technician IV, who works under the direction of the chief process engineer at the LPWRP, two (2) Compliance Inspectors, consisting of Engineering Support Technicians I and II, and a contingent employee. The Pretreatment Coordinator manages the

activities of the program and implements the standards and regulations for the FOG program for Food Service Establishments (FSEs) and commercial and industrial users discharging into the public sewer system. The Coordinator is also responsible for issuing citations, established under the Howard County Code, for all discharge violations, and is the County's point person for public education with regards to minimizing FOG discharges from residential households. Lastly, the Pretreatment Coordinator works closely with the County's Health Department, who issue operational licenses for all FSEs, to identify new restaurants and other FSEs in order to make contact and discuss the County's Pretreatment program. The two (2) Pretreatment Compliance Inspectors, including the contingent employee, conduct random monitoring and inspections and sampling for significant industrial users, perform routine grease trap monitoring for County restaurants, assist County maintenance crews in the determination of grease deposit origins, and conduct interviews with FSE owners.

3.4 BUREAU OF ENGINEERING

The Bureau of Engineering is responsible for the design of the public infrastructure of Howard County including public sanitary sewer and water systems, storm drains, roads, bridges, as well as the advertising and inspection of public construction projects. This Bureau is comprised of the following four (4) Divisions: Utility Design, Construction Inspection, Surveys, and Transportation & Special Projects. Of the four divisions Surveys and Transportation & Special Projects do not have projects directly related to the sanitary sewer system.

3.4.1 UTILITY DESIGN DIVISION

The Utility Design Division is comprised of engineers and administrative support staff. The responsibilities of this division related to the sewer system include:

- The design, scheduling, and cost analysis of wastewater Capital Projects.
- Collaboration with Baltimore City, Baltimore County, and Anne Arundel County to provide adequate wastewater treatment to Howard County.
- Development of the sewer design standards established in the Howard County Design Manual, Volume II.
- Review of Metropolitan District incorporations to allow property owners to be served by the County's public sewer system.
- Providing technical assistance for the review of the plans and specifications for developer funded wastewater projects.

There are approximately seven (7) positions in this division including Engineering Specialists and Administrative Support Technicians.

3.4.2 CONSTRUCTION INSPECTION DIVISION

The Construction Inspection Division (CID) consists of both field inspectors and administrative staff. CID is responsible for the inspection of construction improvements to public utilities, roads, and bridges. The CID is comprised of inspection staff divided regionally into three inspection teams: East, Central, and West. Inspection teams ensure that capital and developer projects are constructed in accordance with County written agreements, approved plans, and specifications. This group performs inspections on a number of construction improvements: Capital Projects, developer projects, all grading permits, certain plumbing permits, and inter-agency county projects.

3.5 DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS

The Department of Inspections, Licenses, and Permits is the clearinghouse for processing licenses and permits, reviewing construction documents, and inspecting buildings and structures for code compliance. The department issues licenses and permits for a variety of purposes including sewer and water connections and plumbing. The Inspection and Enforcement Division performs all inspections for compliance with construction standards on private property. Inspection of items relating to grading and sediment control is handled by the Department of Public Works Construction Inspection Division.

3.6 DEPARTMENT OF PLANNING AND ZONING

The Howard County Office of Planning and Zoning provides long range and current planning to implement the Howard County Master Plan for Water and Sewerage. Planning is conducted to implement strategies that effectively address growth and development. Land use projections are a critical component of good planning which includes anticipating the magnitude, type, pace and location of future development in the County to ensure adequate planning for water and sewer infrastructure.

The Development Engineering Division is responsible for the review and approval of:

- All new construction when a building permit is required and public water and sewer is available to serve the property.
- All new connections of existing structures to the public water and sewer system.

This division ensures that there are no conflicts with any regulations pertaining to recorded easements, wetlands, or floodplains. They work closely with the Bureau of Utilities, Technical Support Division and the Bureau of Engineering, Utility Design Division to complete detailed reviews. Approximately 70 people are employed by this department.

3.7 DEPARTMENT OF TECHNOLOGY & COMMUNICATION SERVICES

The department is responsible for the infrastructure of the County's computer network and administers all of the hardware and software used to implement the County's computer applications which includes the Geographical Information Systems (GIS). The department maintains all of the county's land-lines and cellular telephones and the 800 megahertz radio system. The radio system provides mobility of voice and data throughout the entire county and allows communication with neighboring counties in emergencies. Approximately 66 people are employed by this department. This department does not support SCADA.

3.8 DEPARTMENT OF FINANCE

The Department of Finance ensures that the County's financial resources are collected, protected, invested, and distributed in a fiscally responsible manner. This department is responsible water and sewer fee revenue collection for Howard County. The Division of Miscellaneous Billings is responsible for the invoicing and collection of charges for the annual operation and maintenance of shared septic facilities. Approximately 58 people are employed by this department.

3.9 HEALTH DEPARTMENT

The Health Department is responsible the enforcement of certain Federal, State and County laws and regulations. The Howard County Health Department employs over 200 people that work toward striving to improve the services offered to the citizens of the County. The Department reaches a broad sector of the County with personal health to environmental services.

The Bureau of Environmental Health projects the health of the citizens of Howard County from diseases and hazards found in the environment. The Community Hygiene Program within this Bureau performs necessary stream water quality sampling following sewer overflows in excess of 10,000 gallons. Refer to Chapter 7 – Sewer Overflow Response Plan for information on the Health Department in responding to sanitary sewer overflows.

**Figure 1
Howard County Government Organization Chart**

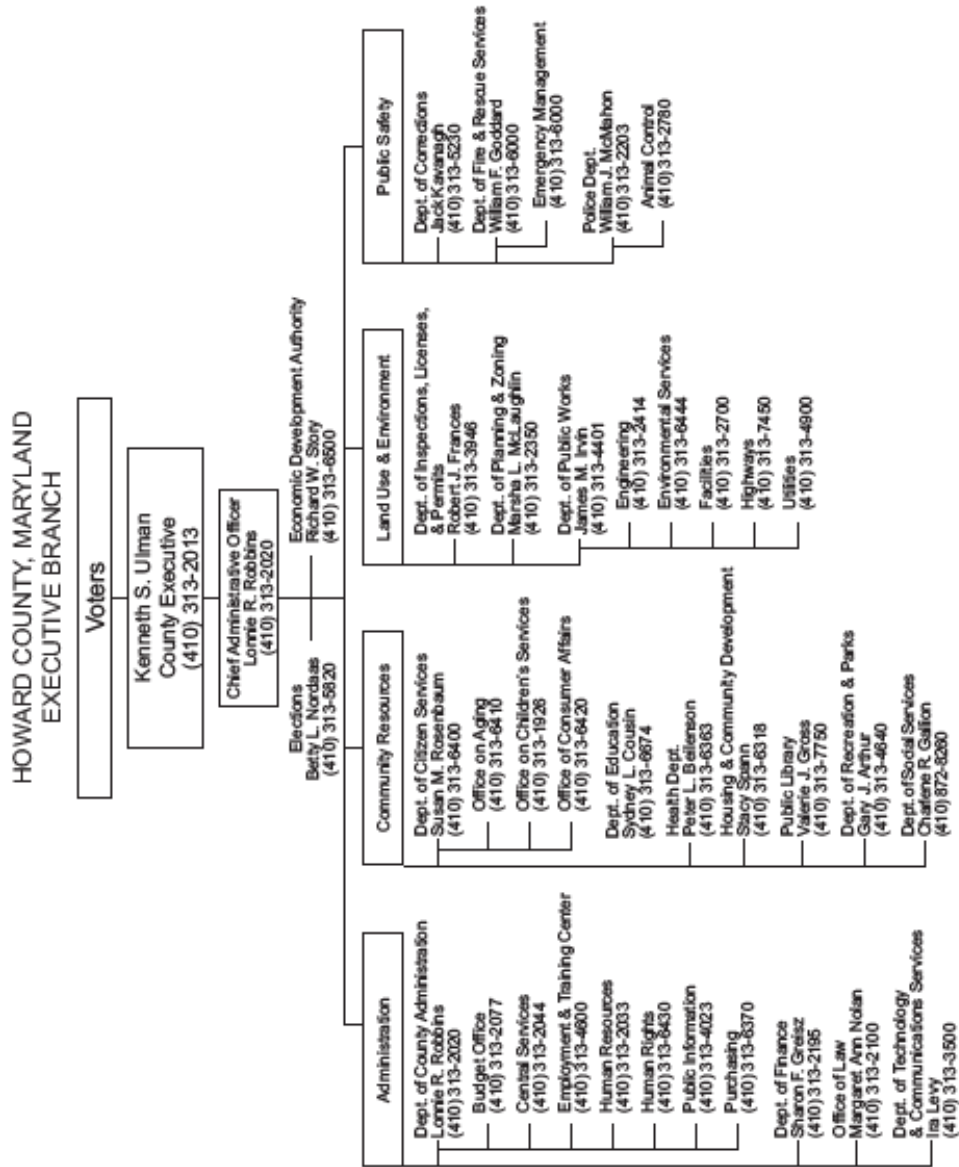


Figure 2
Bureau of Utilities Organization Chart

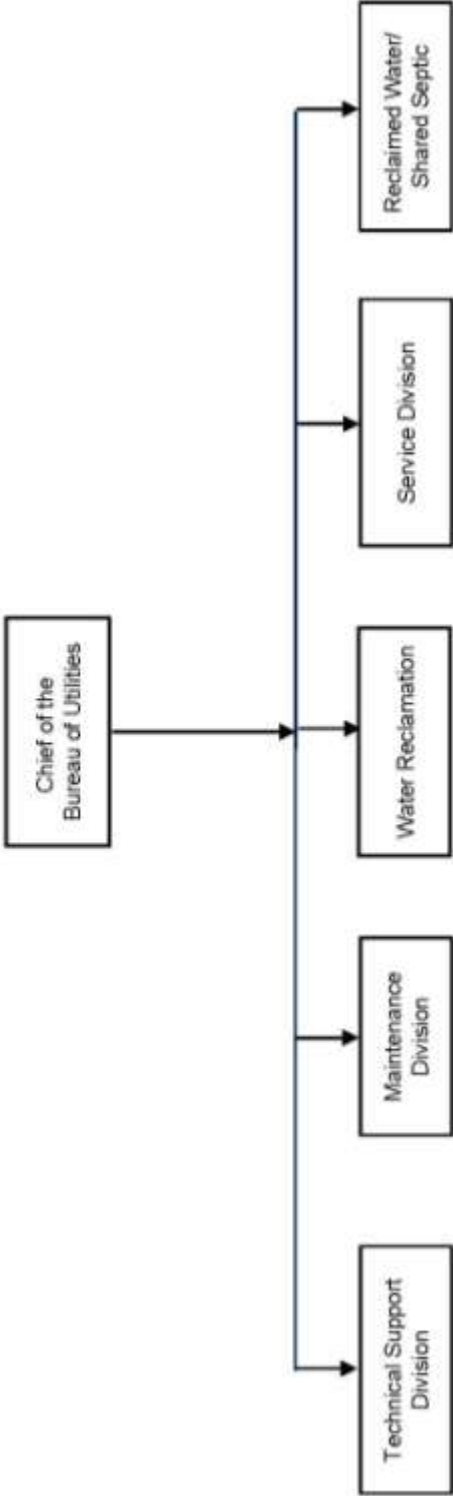
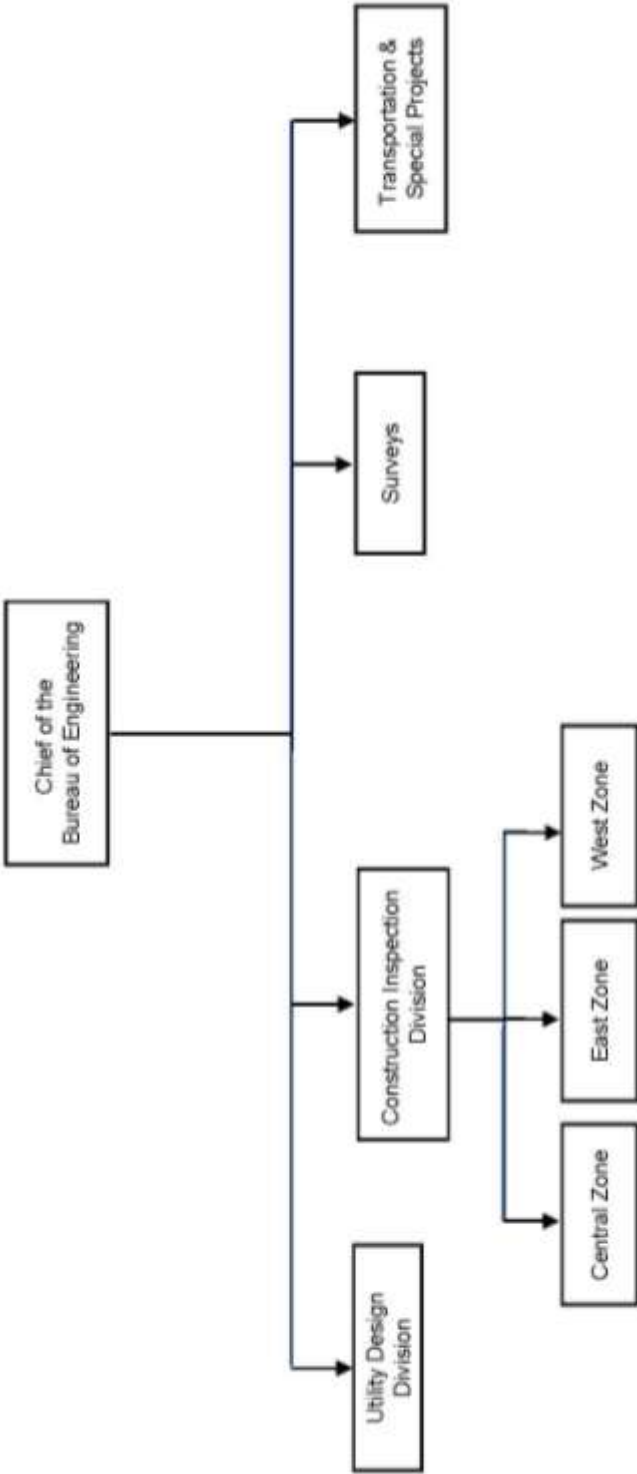


Figure 3
Bureau of Engineering Organization Chart



Chapter 4 – Legal Authority

4.1 SCOPE OF LEGAL AUTHORITY

The Clean Water Act (CWA) grants the Environmental Protection Agency (EPA) the authority of overseeing sanitary sewer collection systems. Under the provisions of Federal Code 40 CFR.122.42(f), the EPA enforces this authority through individual state National Pollution Discharge Elimination System (NPDES) permitting programs.

Existing regulations under 40 CFR 122.41 require that all NPDES permits contain two standard conditions addressing the operation and maintenance of wastewater systems. First, 40 CFR 122.41(e) requires that permitted wastewater systems be properly operated and maintained for compliance with permit conditions. Second, 40 CFR 122.41 (d) requires the permittee take all reasonable steps to minimize or prevent any discharge in violation of the permit that has a reasonable likelihood of adversely affecting human health or the environment. These conditions are the foundation for requiring permittees to provide adequate capacity in the sewage collection systems.

With respect to Howard County, the State of Maryland enforces the CWA through its guidelines for the construction of sewerage systems. The Code of Maryland Regulations (COMAR) in Section 26.03.01 requires the development of sewage systems that fit within the guidelines of local comprehensive planning (i.e. Master Plan for Water and Sewerage). Development of these sewerage systems is subject to review and approval by the Maryland Department of the Environment (MDE), as stipulated in COMAR 26.03.01.03.

Howard County further enforces CWA through the local code. Howard County Code (HCC) Section 18.122A grants the County the authority to regulate the discharge of wastes into the public sewage systems.

4.2 METROPOLITAN DISTRICT

Chapter 991 of the Acts of the Maryland General Assembly of 1943 authorized the formation of the Howard County Metropolitan Commission which had the ability to create sanitary districts. In 1965, the Maryland General Assembly passed an act which combined five Howard County sub-districts into one sanitary district called the Metropolitan District. When Howard County established the Charter form of government in 1969, the Metropolitan Commission was abolished and administrative duties were transferred to the Department of Public Works. The borders of the Metropolitan District follow the land use and zoning classifications set forth in Master Plan for Water and Sewerage for Howard County.

HCC Section 18.101 states that parcels may only be served by the public sewer system if they are located in the Metropolitan District. A parcel that is not in the Metropolitan District or the planned service area as defined in the Master Plan for Water and Sewerage can only be served by the public sewer system if ordered by the Health Department.

If sanitary sewer service is available to a parcel of land, the County may require property owners connect to a sewer line that is accessible to their property in accordance with HCC Section 18.104A.

4.3 PERMITS

4.3.1 GENERAL

COMAR 26.03.12 establishes the requirement that a permit must be obtained from the Maryland Department of the Environment (MDE) for major new construction or modifications to the sanitary sewer system. Major systems include the pipes, channels, pumping stations, structures, equipment, and appurtenances in which sewerage is collected, conveyed, and prepared for discharge and disposal. Items typically excluded from the permit requirement are gravity sewers less than 15 inches in diameter, minor building connections, plumbing systems inside the buildings served, and septic tanks and their related drain fields.

4.3.2 PRETREATMENT

HCC Section 18.122A (g) prohibits any user from discharging substances to the collection system that will interfere with the operation or performance of the collection and treatment systems. This regulation empowers the County to implement a sewage discharge permit system to control the discharge or proposed discharge of sewage to the public system from industrial users and waste haulers.

HCC Section 18.122A (g) describes the permitting process. Industrial users shall be required to:

- Modify an industrial process to reduce or eliminate pollutants to meet discharge standards
- Control, pretreat, and/or reduce or equalize flow to meet discharge standards
- Prevent the discharge and provide transport of wastes to a location or facility where disposal of the wastes is permitted
- Submit a schedule specifying the time frame for the industrial user to achieve compliance

HCC Section 18.122A (g) also describes the monitoring and reporting information that shall be furnished by existing and potential industrial users and waste haulers on sewage discharged to the public sewer system. This data includes documentation on processes, operations, maintenance, sampling, and inspection. At any time, the Department of Public Works shall have the right to enter any industrial users or waste hauler's premises where sewage is produced or where records are maintained.

Industrial users shall be responsible for accidental or slug discharges from their facility. In the event of such a discharge, the user shall submit a detailed written report describing the time, date, cause of the discharge, and the measures to be taken by the industrial user to prevent similar occurrences in the future.

Inter-jurisdictional agreements further define the requirements of the Howard County Pretreatment Program. The Sewerage Agreement between Howard County, the City of Baltimore, and Baltimore County mandates that Howard County maintain pretreatment standards at least as stringent as those of the City of Baltimore. A special agreement signed June 28, 1985 between the City of Baltimore, Howard County, Baltimore County, and Anne Arundel County establishes a pretreatment program for all sewers that flow to the Patapsco Wastewater Treatment Plant which is owned and operated by the City of Baltimore.

4.4 FATS, OILS AND GREASE (FOG)

HCC Section 18.122A (f) (5) regulates the discharge of solid and viscous wastes into the sanitary sewer system. This code specifically addresses Fats, Oils and Grease (FOG) and solid food wastes from Food Service Establishments (FSEs) and commercial and industrial users which over time can build up and block sewer lines causing sanitary sewer overflows. These sanitary sewer overflows can disrupt sewer service and carry numerous health and environmental risks.

In order to reduce sewer blockages, new FSE users that discharge into the County's sanitary sewer system must install a grease interceptor. If a FSE changes ownership, or alterations are made to the establishment that require a Howard County Building Permit a grease interceptor must be installed. Users that do not produce FOG will be exempt. Grease interceptors shall be installed at the user's expense. Grease interceptors may also be required in other commercial or industrial applications when deemed necessary by the Director (or his designee).

The Director reserves the right to make determinations on the need, adequacy, and effectiveness (performance and maintenance) of a grease interceptor based on a review of all relevant information. The Director may request specific information impacting potential FOG production including menus, hours/days of operation, food preparation procedures, clean up practices and may require repairs, modifications or replacement of poorly performing grease interceptors.

Violations and enforcement actions of the FOG Policy, as well as all pretreatment standards, are set forth in Section 18.122A (l) of the Code. There are both civil and criminal penalties detailed in this section, and the Director of Public Works has the discretionary power to begin enforcement action, through his Designee (the Pretreatment Coordinator), at the time of violation.

4.5 WASTE HAULERS AND NON-RESIDENTIAL USERS

HCC Section 20.606 requires waste (septage) haulers and non-residential users who discharge sewage which exceeds the established average concentration for Biochemical Oxygen Demand, Total Suspended Solids, or Total Phosphorus to a sewer use surcharge. Revenue collected from the sewer use surcharge is distributed between Howard County and jurisdictions where the sewage was discharged to if the user is located in the Patapsco drainage area. The money distributed to Howard County is applied to the operation and maintenance costs of the public sewer system.

4.6 INFILTRATION AND INFLOW REDUCTION

HCC Section 18.122A (f) provides the legal basis for preventing inflow and infiltration from being discharged to the sanitary sewer system. It states the following: “No user shall discharge or cause to be discharged to the public sewerage system stormwater, surface water, groundwater, roof runoff, subsurface drainage, uncontaminated cooling water or uncontaminated industrial process water.” This covers not only intentional connections (typically inflow sources) but also poor construction or negligent installation practices such as leaky house laterals that may allow infiltration.

4.7 ILLICIT CONNECTIONS

HCC Section 18.502 prohibits the discharge of sewage to storm drainage facilities by banning any pollutant or non-stormwater discharge into a storm drainage facility or waterway that contaminates or changes the physical, chemical, or biological properties of the water in the system. The County may petition for a court order to enter the property to perform repairs if individuals fail to cease the discharges within a certain time frame.

4.8 ENFORCEMENT

Title 24 of the Howard County Code (subsequent to violations outlined in Section 18.122A (l)) gives an enforcing agency the ability to impose a civil citation and fine (Appendix 4: Figure 1 – Civil Citation Sample) as an enforcement measure for violations of the Howard County Code.

Prior to issuing the civil citation an enforcement official (an individual in the agency or department charged with enforcing its laws and regulations, generally the Department or agency head or his/her designated representative) must investigate and determine if a violation exists or has occurred.

If the violation exists or has occurred the enforcement official may issue a civil citation to the person or company responsible for the violation.

The civil citation records the following information:

- The name and address of the person charged;
- The nature of the violation;
- The date when and place where the violation occurred;
- The amount of the fine;
- The location the fine may be paid; and
- Notice informing the person of the right to stand trial for the violation.

If the person charged with the violation does not pay the fine by the due date (typically 30 days from the date of issuance) and has not filed a notice of intent to stand trial, the Office of Finance shall send a formal notice of the alleged violation to the last known address of the person charged. If the fine is not paid within 15 days of the date of the formal notice, the person shall pay an additional fine. If the fine is not paid within 35 days of the date of the formal notice, the Director of Finance may request the district court to judge the case. The district court shall schedule the case

for trial and summon the defendant to appear for trial. The County Solicitor prosecutes all civil violations. The County Solicitor institutes court proceedings on behalf of County enforcement officials in court to enforce payment of civil fines.

4.9 STANDARDS

4.9.1 DESIGN AND CONSTRUCTION STANDARDS

HCC Section 18.103 gives the Department of Public Works the authority to develop standards and specifications relating to the installation of sewage, water, and, stormwater systems and roads and bridges in the County. These are contained in the following documents: Howard County Design Manual Volume I Storm Drainage (2006), Design Manual Volume II Water and Sewer (2003), Design Manual Volume III Roads and Bridges (2006), and Design Manual Volume IV Standard Specifications and Details for Construction (2007). These documents cover all aspects of the design and construction process for sanitary sewers, sewage pump stations, and related sanitary sewerage facilities from the preliminary proposal through design, construction, inspection, and testing for final acceptance. Chapter 6 – Design and Performance addresses these documents.

4.9.2 HOWARD COUNTY PLUMBING AND GASFITTING CODE

Subtitle 3 of the Howard County Code establishes that all plumbing and on-site utility work performed in Howard County shall conform to the provisions of the Howard County Plumbing and Gasfitting Code. This grants the County authority in controlling the means and methods of connecting buildings to the sanitary sewer collection system via laterals and for regulating inflow and infiltration. The Department of Inspections, Licenses, and Permits have authority to review the plans and specifications prior to issuance of a plumbing permit and to inspect the work.

4.9.3 LATERAL CONNECTION

During the construction of new sanitary sewers, the County has lateral connections installed on the collector sewers in anticipation of future needs. Lateral connections are constructed from the collector to the property line, where typically a clean-out is installed. The property owner is responsible for hiring a private contractor to construct the connection from the property line to the plumbing of the house or structure being served. The plumber must be licensed to work in Howard County and follow Howard County Plumbing and Gasfitting Code for guidelines and requirements of construction and installation. HCC Section 3.303 gives the County the right to inspect plumbing work before it is put into service to ensure that it meets code.

4.10 SANITARY SEWER SERVICE TO OTHER JURISDICTIONS

Howard County signed agreements with Baltimore County on May 6, 1963; February 28, 1964; August 2, 1968; June 4, 1979; May 3, 1982; and June 5, 1982 to establish the Patapsco River Interceptor Drainage area and the Little Patuxent Drainage Area. These agreements cover issues related to the allocation of flow capacity, user fees, inflow reduction, pretreatment, and the allocation of O&M and capital expenditures.

Howard County signed an agreement with Anne Arundel County on August 28, 1963; June 30, 1970; December 11, 1973; March 30, 1979 to construct and improve the Deep Run Interceptor in the Deep Run Drainage Area of the Patapsco River Drainage Area.

A multi-jurisdiction agreement signed June 4, 1984 exists between the Howard County, Baltimore County, Anne Arundel County and the City of Baltimore for upgrading and expanding the Patapsco Treatment Plant, Patapsco Pumping Station, force main and relief interceptor, Southwest Diversion, and Gwynns Falls relief interceptor.

Appendices within the Master Plan for Water and Sewerage contain copies of these inter-jurisdictional agreements.

4.11 "CALL BEFORE YOU DIG" PROGRAM

Maryland State Senate Bill 879 (passed in May 2001) requires utility owners to respond to all One Call Concept Tickets for marking out the location and type of existing utility lines prior to excavating in an area to prevent accidental damage to existing utilities. Howard County is a member of the State of Maryland's "One Call Concept" or "Miss Utility" program and follows the procedures described in Section 5.1.2.1.2.5.

The Code of Maryland, Title 12, Subtitle 1 requires that at least 10 working days before starting an excavation or demolition, a representative of the contractor or the person performing the excavation or demolition must contact the one call system, Miss Utility. Miss Utility will get in touch with each of the owners of underground utilities in the area of disturbance to have them mark their utilities to protect them from destruction, damage, or displacement and to prevent the death or injury to individuals, the damage to private and public property, and the loss of services provided to the general public.

4.12 FINANCIAL ISSUES

4.12.1 UTILITY SERVICE CHARGES

Howard County is authorized by HCC Section 20.601 to cover the cost of the operation and maintenance of the public sanitary sewer system, reclaimed water, and water system through sanitary sewer service, reclaimed water, and water service charges.

The sanitary sewer service charge is based on the volume of sewage discharged to the public sewer system by a sanitary sewer system user. When the user takes water from the public water system and discharges the water used to the public sewer system, the metered volume of water used shall be a measure of the volume of sewage discharged. Users that take water from the public water system and discharge a portion of it to the public sewer system shall meter the sewage before it enters the sewer system. The user shall provide, at their own expense, sewage metering facilities to measure the volume of sewage discharged to the sewer system. If sewage metering facilities are not installed then the metered volume of water used shall be a measure of the volume of sewage discharged.

When a single-family residential user of the public sewer system does not obtain water from the public water system, the sewer service charge shall be established as a special charge. If a user of the public sewer system does not come from a single-family residence and does not obtain water from the public water system, the measure of sewage discharged to the sewer system shall be based upon either metered use of water from sources which result in discharge to the sewer system or metered discharge entering the sewer system. The user shall provide, at their own expense, sewage metering facilities to measure the volume of discharge to the public sewer.

4.12.2 UTILITY ASSESSMENTS

HCC Section 20.611 authorizes the County to assess an In-Aid-of-Construction charge to partially cover the cost to construct or purchase facilities in the water and sewer system which serve or will serve all properties connected to the system. This assessment includes but is not limited to sewage treatment plants, disposal fields, lagoons, pumping stations, force mains and interceptor sewers, water storage facilities, water treatment facilities, water pumping stations, and water transmission mains, whether or not such facilities are located within Howard County.

HCC Section 20.613 authorizes the County to assess an Ad Valorem Charge to property owners in the Metropolitan District to recover the cost to Howard County of retiring and paying the interest on bonds for the payment of salaries and other expenses of the Department of Public Works related to water and sewerage systems.

The Annual Front-Foot Benefit assessment charge authorized by HCC Section 20.610 recovers the cost to Howard County to pay the interest and principal on bonds issued by the County to construct, purchase, or establish the public water supply and sewerage system within the Metropolitan District. All properties which are adjacent to public street or right-of-way or permitted by the Director of Public Works to be connected to constructed or purchased water or sewer lines shall pay an annual front-foot benefit assessment charge for water or sewer provided that these lines have been financed by the issuance of Howard County bonds.

Figure 1 Civil Citation Sample

5Z33128709

**UNIFORM MUNICIPAL INFRACTION/
CIVIL CITATION**

District Court of Maryland for

County/Municipality/State of Maryland Agency

vs. Defendant's (Last) Name First Middle

Current Address in Full

City State Zip Code

DOB Height Weight Sex Race Hair Eyes

Related Citations Telephone No. Day Night

It is formally charged that the above named defendant on 19.....
at M of Location County, Maryland
did.....

this citation is based upon an affidavit of (See attached.)

In violation of: Md. Ann. Code COMAR Municipal Ordinance/Public Local Law/Local Code

Document/Article Section Sub Section Paragraph

I sign my name as a receipt of a copy of this Citation and not as an admission of guilt. I will comply with the requirements set forth in this Citation.

Defendant's Signature

YOU MUST EITHER ELECT TO STAND TRIAL OR PAY A FINE.
NOTE: Failure to either pay the fine or request a trial date by the below mentioned date will deem you liable for the fine assessed, the fine may be doubled and a judgment on affidavit entered against you including an Order of Abatement.
OR If you request a trial date and then fail to appear in Court, the fine may be doubled and a judgment on affidavit may be entered against you.
YOU MAY PAY A FINE OF \$..... BY 19..... AT (Payment Location)

THIS WILL BE DEEMED AN ADMISSION OF GUILT AND NO TRIAL DATE WILL BE SET. OR
IF YOU ELECT TO STAND TRIAL, DO NOT FORWARD PAYMENT OF THE FINE, BUT YOU MUST NOTIFY IN WRITING AND THE DISTRICT COURT WILL NOTIFY YOU OF A TRIAL DATE AND LOCATION.

IN ADDITION..... IS SEEKING ABATEMENT OF THIS INFRACTION. YOU MAY BE ORDERED TO ABATE THIS INFRACTION OR BE ASSESSED THE COSTS FOR THE ABATEMENT, AS WELL AS A FINE OF UP TO \$1,000, PLUS COURT COSTS. FAILURE TO APPEAR SHALL RESULT IN JUDGMENT ON AFFIDAVIT.

YOU MUST APPEAR IN COURT: A court date will be sent to you by mail.
 YOU MAY ELECT TO STAND TRIAL OR YOU MAY ELECT TO PAY A PRESET FINE OF \$..... to the District Court of Maryland at and **AVOID TRIAL.** A court date will be sent to you by mail. Payment must be made on or before the scheduled trial date.
AFTER TRIAL the Court may impose a fine up to \$ plus court costs.
FAILURE TO APPEAR OR, IF PERMITTED, PAY THE PRESET FINE LISTED ABOVE, WILL RESULT IN A WARRANT BEING ISSUED FOR YOUR ARREST.

I solemnly affirm under the penalties of perjury, and upon personal knowledge or based on the affidavit, that the contents of this citation are true and that I am competent to testify on these matters. The defendant is not now in the military service, as defined in the Soldier's and Sailor's Civil Relief Act of 1940 with amendments, nor has been in such service within thirty days hereof.

Officer's Signature Date

Agency Sub-Agency I.D. No. Phone

DC 28 (Rev. 10/94)

Chapter 5 – Wastewater Programs

This section of the CMOM corresponds directly to the Measures and Activities section of the proposed CMOM. There are many measures and activities listing and describing the actual specific components that comprise a complete CMOM program in this chapter. In order to better organize this portion of the CMOM and handle the large number of topics, this chapter is divided into fourteen sections as follows:

Section 5.1 – Wastewater

Section 5.2 – Engineering

Section 5.3 – Geographic Information Systems (GIS)

Section 5.4 – Asset Management/Work Order Database System

Section 5.5 – Supervisory Control And Data Acquisition (SCADA) System

Section 5.6 – Facilities Maintenance

Section 5.7 – Training

Section 5.8 – Customer Billing

Section 5.9 – Program Funding

Section 5.10 – Industrial Pretreatment

Section 5.11 – Grease Trap Inspection and Enforcement Programs

Section 5.12 – Septage Haulers Program

Section 5.13 – Call Before You Dig Program

5.1 WASTEWATER

Howard County operates and maintains a variety of wastewater facilities including the sewer collection system, sewer Master Meters, pumping stations, the Little Patuxent Water Reclamation Plant, and shared septic facilities. It is the responsibility of the Bureau of Utilities to provide the necessary services to ensure continued sewage service to the citizens of Howard County and individuals working in the County.

5.1.1 OPERATION

Efficient operation of wastewater facilities is imperative to a well run system. The personnel employed by Howard County are charged to be familiar with their respective systems in order to ensure that they are operated within their design capacities. Failures of any part of the system must be addressed immediately to prevent disruptions in service and conditions which could lead to possible overflows.

5.1.1.1 WASTEWATER PUMPING STATIONS

There are 29 wastewater pumping stations owned by the County and operated by the Bureau of Utilities. All of the pumping stations are un-manned; all are equipped with Supervisory Control and Data Acquisition (SCADA) systems. Appendix 5: Figure 1 – Pumping Station Locations in Howard County shows the locations of the pumping stations throughout the county. Sewage flow from the pumping stations in the

Patapsco service area is ultimately transported to the Patapsco Wastewater Treatment Plant operated by the City of Baltimore. Sewage from the pumping stations in the Patuxent service area flows to the County's Little Patuxent Water Reclamation Plant located in Savage.

5.1.1.1.1 GOAL AND OBJECTIVES

It is the responsibility of the Bureau of Utilities, Facilities Maintenance Division to operate and maintain wastewater pumping stations in the County to perform their primary function of transporting wastewater while simultaneously preventing overflows and odors. Personnel are highly dedicated to achieving this function in an efficient and effective manner to maintain the high quality of equipment and minimize potential downtimes.

5.1.1.1.2 OPERATING PROCEDURES

The Bureau of Utilities, Facilities Maintenance Division has a technician visit each wastewater pumping station twice per week to monitor its condition. Facilities are checked on Mondays to make sure that no serious conditions have developed over the weekend. Those facilities with chart recorders are visited on a specific day of the week to change the charts and inspect auxiliary generator sets. At the end of the week visit (preferably Friday), the facility is checked to assure there are no conditions which would cause trouble over the weekend.

5.1.1.1.2.1 STANDARD

Utilities personnel are responsible for completing tasks on a regular schedule to avoid problems or disruption which would be detrimental to the operation of the pumping station. Many of the job tasks relate to keeping debris from clogging critical pieces of equipment.

Routine visits include numerous activities to ensure that the station is working properly and prevent the occurrence of overflows. The activities include:

- ✓ Check for proper operation of the pumping station components including air bubbler or wet well level gauge.
- ✓ Check flow recorder to verify proper cycling of pumps.
- ✓ Operate main sewage pumps manually; observe check valve operation.
- ✓ Check pump packing gland for leaks.
- ✓ Check sump area for flooding.
- ✓ Check wet well for any indication of high levels (i.e. presence of debris, accumulation of rags, etc.).
- ✓ Check exhaust fan for proper operation.
- ✓ Listen for any abnormal noises.

Once the above mentioned checks have been completed the technician fills out the Wastewater Pumping Station Log (Appendix 5: Figure 2).

The following items at pumping station are also checked at the noted frequency, if applicable.

- Bar Screens – Periodically remove screening accumulations. Screenings can be disposed of either at the Bureau of Utilities dumpster or the Alpha Ridge Landfill.
- Grit Removal - Approximately every six months, pump down wet well until pumps break suction.
- High Pressure Water Cleaning - From two to seven times per year, grease and scum accumulations must be removed from wet well walls and surfaces. Three men and a high pressure sewer cleaning truck are required.

5.1.1.1.2.2 EMERGENCY

A call for an emergency condition at a pumping station will either come from the Bureau of Utilities SCADA computer or Central Communications during off hours. Emergency conditions include mechanical and electrical failures due to normal wear and tear on the equipment, power failure, hydraulic overloading, sewer blockages, natural disasters, or even acts of vandalism. Once alerted of an emergency condition, on-call personnel will be dispatched to the site to perform a careful investigation of the conditions and a determination of possible solutions. If the solution to the problem is evident and immediately correctable, the response staff shall make the necessary corrections. If additional services are needed by support staff, the Operations Supervisor shall be informed. However, if checks of the system yield no specific cause of the failure, the system shall be reset, if necessary, and the station placed back on line.

5.1.1.1.3 STANDARD EQUIPMENT

Howard County's Design Manual determines the standard equipment that should be designed into all new pumping station placed in service to meet the needs and operational responsibilities of the Department of Public Works. This information can be found in the Howard County Design Manual Volume II, Chapter 6. Pumping station designs are divided into two categories:

- Stations (conventional) with ultimate capacities greater than 500 gallons per minute (gpm) or wet well depths greater than 25 feet.
- Stations (small) with ultimate capacities less than 500 gpm and wet well depths less than 25 feet.

Regardless of the type of pumping station designed, the following are the standard pieces of equipment which should be incorporated into every design:

- Multiple Pumps – Stations shall be capable of pumping the design flow rate with the largest single pump out of service.

- Station By-Pass – An auxiliary force main connection downstream of the station to enable the station wet well to be taken off-line for periodic maintenance or repairs.
- Lightning and Surge Protection – Protection shall comply with the latest edition of applicable codes and standards.
- Backup Power – Emergency generator or secondary power feed with automatic transfer switches located at least two feet above the 100-year flood elevation or a minimum of 24 hours of wastewater storage in the wetwell or incoming collection system.
- Telemetry System – At a minimum telemetry shall indicate pump on, pump failure, control valve failure, high and low wet well water level, loss of primary power alarm, generator/secondary power alarm, and telemetry failure.

5.1.1.1.3.1 SCADA/TELEMETRY

The County-wide SCADA System is located in the Bureau of Utilities Maintenance Building on Old Montgomery Road. The system is used to constantly monitor the operation of remote wastewater facilities sites consisting of sanitary wastewater pumping stations, shared septic systems, and sewer master meters. More information on the SCADA/telemetry system can be found in Chapter 5.5.

5.1.1.1.3.2 ALARMS

Several critical parameters are monitored by the County's SCADA/Telemetry system 24 hours per day and if any condition develops into an alarm the signal is relayed to the Remote Telemetry Unit (RTU) to the Bureau of Utilities SCADA computer. Example conditions monitored are:

- Power Fail and Generator Run.
- Station Fail.
- Out-of-Range (High/Low Levels or Pressures).
- Telemetry Fail.
- Other alarms may be required based on the specific needs of the facility.

When an alarm activates, a response crew is dispatched to investigate the problem. In most cases, the crew is able to handle the problem. However, some circumstances require additional personnel or additional parts to be ordered. In this case, a work request is filled out and forwarded to the Operations Supervisor. The Mechanic II then meets with the Operations Supervisor to prioritize the work, order parts, and make the repairs.

5.1.1.1.3.3 SECONDARY POWER

Currently all of the County's wastewater pumping stations are equipped with either standby generators or an electrical connection for a County-owned portable generator. Those systems without standby generators also have over 24 hours of sewage storage. A maintenance guide has been developed by the County to assist administrative, supervisor, and operating personnel in establishing and evaluating maintenance programs for emergency electric generating systems. This guide establishes the periodic operations and maintenance tasks required for the units. The tasks can be found in Appendix 5: Figure 3 which are typically filled out on the Pumping Station Generator Log (Appendix 5: Figure 4).

It is the responsibility of the Facilities Maintenance staff to document and obtain corrective actions if abnormalities occur during the weekly exercise periods. Periodic inspections of the generator sets are the responsibility of the Facilities Maintenance Staff.

5.1.1.1.4 RECORD KEEPING

When work needs to be performed at a pumping station, the Operations Supervisor prepares a work order outlining the work to be done. A technician completes a daily report to document the work performed on projects assigned by the supervisor. Each week the Operations Supervisor will record work hours for payroll on the Daily Work Order form (Appendix 5: Figure 5).

It is the responsibility of administrative support staff, particularly the Clerical Technician, to attend personnel meetings and coordinate inquiries with vendors on equipment and parts. The Clerical Technician maintains a preventive maintenance file system recording work performed and the date of inspections which ensures that statistical records (such as oil and water temperature, oil pressure, voltage, and amperage) are logged for the generator sets.

Technical Support Division staff is responsible for the review of system operation trends each week and energy consumption each month to provide an overall indication of the performance of the facilities. Technical Support provides planning guidance to the Superintendent Operations Manager for pump performance tests and field visits to assist in resolving complex or recurring problems.

5.1.1.2 LITTLE PATUXENT WATER RECLAMATION PLANT

The Little Patuxent Water Reclamation Plant is the only wastewater treatment facility operated by the Howard County Department of Public Works. The current capacity of the facility is 25 million gallons per day (MGD). Modifications to the plant in 2004 incorporated Biological Nutrient Removal (BNR) which reduced the total nitrogen discharge and dewatering of the sludge. Additional improvements have been designed for Enhanced Nutrient Removal (ENR) to reduce larger concentrations of total nitrogen and phosphorus and increase the hydraulic capacity to 29 MGD. Construction is anticipated to be completed in 2012.

5.1.1.2.1 GOALS AND OBJECTIVES

It is the goal of the Bureau of Utilities to safely and efficiently operate and maintain the Little Patuxent Water Reclamation Plant in accordance with all local, State, and Federal regulations and sound sanitary engineering practices. Operations functions are to be performed in a safe manner that protects the health of all employees.

Employees are to recognize that they are working in an inherently dangerous environment and to at all times consider safe practices as their highest priority. The final effluent discharged from the Plant is to be of the highest quality attainable using installed processes and equipment. Sewage overflows are to be prevented, and if they do occur, reported and cleaned up in accordance with State regulations.

Odors within the Plant and surrounding area are to be avoided by eliminating or mitigating that which causes them. Operations employees are to be cross-trained in all Operational tasks so that they can perform any Operational task required.

5.1.1.2.2 HIGH FLOW PROCEDURES

Operations staff is trained to prevent overflows, solids losses, or permit violations while still maximizing flow through the plant and minimizing storage in off-line tanks. After a high flow event, off-line tanks are to be drained as quickly as possible if they have been utilized.

Ideally high flow procedures will be initiated at least one day ahead of time based on weather forecasts or other factors indicating that plant flows will be abnormally high. Operations will be notified when this procedure is to be initiated. This procedure consists of four distinct phases: Preparing, Monitoring/Controlling, Recovering, and Documenting.

1. Preparing: Upon notification that the procedure is in effect, make preparations by doing the following:
 - a. Empty the Flow Equalization Basins (FEBs).
 - b. Fully open the influent valves to all on-line Primary Clarifiers (PCs).
 - c. Verify that at least four primary clarifiers are available for use. In addition, determine the status of all off-line liquid train process tanks and report the status to the Process Control Engineer and the Operations Superintendent.
 - d. To prevent tank damage during the high flow event, check the status of all flood valves on off-line tanks and open any found to be closed.
 - e. Check status of and calibrate gas detectors for possible use in 54 inch meter vault during filter by-pass valve adjustments.
 - f. Close off the air headers to all but the last pass of the Chlorine Contact Tank (CCT) to increase the final Effluent Dissolved Oxygen (DO).

- g. Start caustic feed to increase Final Effluent pH.
 - h. Set off-line East & West Process Reactor influent gates to about three inches below the influent channel top wall.
 - i. Replace the Main Influent manhole cover with the watertight cover.
 - j. Insure that the FEB Return Vault submarine door is secured for flooding.
 - k. Check and close the dewatering floor drain if necessary.
 - l. Move any vehicles or other equipment from flood-prone areas of the Plant that could be damaged or float away in the presence of high water.
 - m. Establish computer links to river levels and weather information.
 - n. Thoroughly review this policy in its entirety.
2. Monitoring/Controlling: The following critical areas and items must be monitored and controlled as the Plant flows increase:
- a. Grit basins: If the water level in the grit basin overflow box rises to the point where it overflows to the FEBs, begin to open the influent valves to any off-line PCs. Regulate the valves to maintain the water level to prevent overflow to the FEBs. When all off-line PCs are full and the PC influent valves are all 100% open and the water is still at the overflow point, begin to close the FEB influent gate. Closing this gate will raise the water level, creating more head over the PC influent pipes, allowing more flow to the PCs. If this gate is closed, you must make sure that the water level at the grit basins is not in danger of overflowing the wall and spilling onto the ground. If manpower is available and the Plant is experiencing sustained flows over 35 million gallons per day (MGD) then place a second grit basin in service.
 - b. Process Reactor (PR) Influent Channel and Process Reactors: If at any time the water level in the process reactor influent channel rises to within two inches of the top of the wall, begin to equally open the influent gates to the on-line East and West PRs. Regulate the PR influent gates equally to maintain the water level in the influent channel approximately two inches from the top of the wall. If the influent gates are fully open and the water level in the PR influent channel rises to two inches from the top of the wall, begin to open the gates to the off-line East and/or West PR. If flow is sent to the off-line reactors, regulate the flow to them as necessary to maintain the water level in the PR influent channel at two inches from the top of the wall. If it appears that the off-line PR are likely to become completely filled before the high flow event ceases, notify the Process Control Engineer that the off-line PR may need to go into service. If the water level in the East or West side PR is less than six inches from the top of their walls begin to equally open associated Final Clarifier (FC) influent gates and/or begin to restrict flow into the reactor.

Additionally, since high flows usually depress final effluent DO due to a lack of free-fall downstream of the PRs it will be important to maintain DO setpoints in the PRs. Make sure that all PR DOs are at or above their normal setpoints. This may require placing another blower in service.

- c. East & West Final Clarifier (FC) Splitter Boxes: Monitor the water level in these splitter boxes to prevent overflows. If the water level approaches the grating, make sure that the FC influent gates are adequately opened and not creating a bottleneck. Check the FC water levels and make sure that the FCs themselves are not flooding. If they are, then the filter by-pass valve needs to be opened. Finally, if the water level is still high begin restricting flow to the PRs associated with the splitter box.
 - d. Final Clarifier Sludge Blanket Depths: Monitor FC sludge blankets as frequently as necessary to prevent overflows or clarifier washouts. This is an extremely important part of this procedure. It's critical to be aware of what's happening inside the FCs to prevent the possible washout of solids. If it determined that manpower is insufficient to address this need, help will be pulled from Dewatering Operations (if available). Next call the on-call Supervisor to request help. If any East clarifier blanket depth reaches or exceeds 13 feet, or any West clarifier blanket depth reaches or exceeds 12 feet, or any North clarifier blanket depth reaches or exceeds 14 feet, notify the Process Control Engineer. If he is unavailable, notify the on-call supervisor for directions.
 - e. Final Clarifier Return Activated Sludge (RAS) wells and Filter Influent Channel: Monitor the Filter Influent Channel and FC RAS wells. If the channel rises to within two inches of the top of the overflow to the head of the plant or if RAS wells start to submerge, begin to open the filter by-pass valve on the 42 inch filter influent line in the 54 inch meter vault and start hypochlorite feed to the filter by-pass line. Regulate the valve to keep the RAS wells from flooding and maintain the water level in the channel approximately two inches from the overflow point. Be careful not to open the by-pass valve too much or too quickly since doing so may cause backflow from the Flocculator Basins to the by-pass line.
 - f. Contact Basins: Monitor the Contact Basin as frequently as necessary to prevent overflow back to the head of the plant. If the water level approaches the by-pass point, open the gate at the last pass to lower the water level.
 - g. Plant Flow: At a Final Effluent flow of 38 MGD or higher, fully open the valve on the new 36 inch Final Effluent Pump discharge line. Keep in mind that the Final Effluent Pumps may need to be placed in manual and then ramped to 100% output.
3. Recovering: The following actions should be taken when the water level in the process reactor influent channel consistently drops below two inches from the top of the wall:

- a. Begin to open the FEB return valve if there is water in the FEBs. Regulate the valve to maintain the water level in the PR influent channel at approximately two inches from the top of the wall.
 - b. When the FEBs are empty, close the FEB return valve and begin to open the off-line East and/or West PR drain valves if there is water in these tanks. Regulate the valves to maintain the water level in the PR influent channel at approximately two inches from the top of the wall.
 - c. When the off-line East and/or West PR are empty, begin to equally close the influent gates to the on-line East and West PR. Equally regulate the gates to maintain the water level in the PR Influent Channel at two inches from the top of the wall.
 - d. Close the Filter By-Pass Valve on the 42 inch line in the 54 inch Meter Vault if it was opened during the high flow event and stop hypochlorite feed. Discontinue monitoring the Filter Influent Channel.
 - e. When the influent gates to the East and West PR reach their pre-high flow settings, stop closing the gates. Discontinue monitoring the water level in the PR Influent Channel.
 - f. Re-set the FC Influent Gates to their pre-high flow positions. Resume measurement of FC sludge blanket depths once per day.
 - g. Reset PR air flows and DO setpoints if they were changed.
 - h. Discontinue caustic feed if it was started.
 - i. Return Contact Basin air headers to their normal configuration.
 - j. Drain and hose down any PCs that were used to store water during the high flow period.
 - k. NOTE: Nearly all high flow situations will be accompanied by local area flooding. As the high flow event progresses keep an eye on the river levels and make sure that the septage receiving manhole cover is replaced with the leak-proof cover. Also, make sure the Bar Screens are in the auto position so they will stop in the up position should the Bar Screen Room become flooded.
4. Documenting:
- a. Throughout the duration of the high flow event, document the various changes made to plant operations and the times they occurred. Documentation can take the form of journal entries which will be used when returning the Plant to normal flow after the high flow event is over. Items to document include: FEB levels and PR influent gate settings at the time the procedure was started, tanks available when the various preparation activities were accomplished, tanks placed on-line when flow was introduced to off-line PRs, when and to what degree the Filter By-

Pass Valve was opened, adjustments to the FC influent gates, equipment failures or malfunctions, etc.

- b. Make and record periodic observations of the river level and the corresponding level on the wall in the bar screen influent room. The river level must always be higher than the screenings room level in order to document that no raw sewage by-passing is occurring.

5.1.1.2.3 ELECTRICAL OUTAGE PROCEDURE

In order to prevent disruptions to Plant operations and the possibility of overflows, certain procedures should be followed when electrical power is lost to plant process equipment. Specific procedures for addressing power outages can be found in the “Electrical Standard Operating Procedures” located at the Operations Console.

5.1.1.2.4 REPORTING PROCEDURES – PLANT VIOLATIONS/BY-PASS

There are reporting procedures which should be followed in the event of a non-compliance of the NPDES Permit. It is the responsibility of the Shift Supervisor or OIC to take immediate action to protect the plant operation and quality of the receiving water. They must quickly notify the proper personnel and keep them informed as to plant status throughout the event. Once the OIC contacts the proper personnel as described below, it will be their responsibility to communicate with State and local officials and to prepare follow-up reports.

If for any reason the Little Patuxent Water Reclamation Plant does not comply with nor is able to comply with the National Pollution Discharge Elimination System (NPDES) Permit (raw sewage by-pass, sludge spill, heavy tank washout, etc.), the OIC will notify the Operations Superintendent immediately. If unable to contact the Operations Superintendent, the Process Control Engineer or the Bureau Chief shall be notified.

Within twenty-four hours of a violation, spill, or by-pass of wastewater, the Maryland Department of the Environment (MDE) and the Howard County Health Department must be verbally notified.

The Operations Superintendent, the Process Control Engineer or the Bureau Chief will make these notifications as follows:

1. Verbally notify MDE during normal working hours (Monday through Friday, 8 am to 5 pm) at 410-537-3510. Outside of these times, the number to call is 866-633-4686.
 - a. Before placing the call, the Telephone Report Form is completed. Notify the Duty Officer or Spill Control Coordinator that the call is in reference to a spill emergency.
 - b. Verbally notify the Health Department at 410-313-1785 during normal business hours or at 410-206-5487 during off hours.

2. Within five days, a written report must be provided to MDE. The following topics must be addressed:
 - Description of non-compliance.
 - Cause of non-compliance.
 - Duration of non-compliance.
 - Actions in response to non-compliance.
 - Measures to prevent recurrence of non-compliance.
 - Monitoring to determine impact of non-compliance.

The report may be faxed to 410-537-3733 or mailed to:

Maryland Dept. of Environment
W.M.A. – Compliance Program
1800 Washington Blvd.
Baltimore, MD 21230

Telephone: Day – 410-537-3510
Evening/Weekend – 866-633-4686

5.1.1.3 SEWAGE FLOW METERS

The County has six master sewage flow meters. Four meters are located on interceptors connected to Baltimore County within the Patapsco service area, two are located on an interceptor which passes through Anne Arundel County, and one is connected to the Maryland Department of Corrections as part of a sewage flow exchange agreement (see Appendix 5: Figure 6 – Sewage Master Meters). Sewage flow meters are operated and maintained by the Facilities Maintenance Group.

5.1.1.3.1 GOALS AND OBJECTIVES

Sewage meters are installed in several locations in the Patapsco service area to document the amount of sewage flowing into the Patapsco Interceptor which is shared by Howard County, Baltimore County, and Anne Arundel County. Flow data is collected from four master flow meters: Furnace Avenue, Bonnie Branch, Main Street, and Sylvan Lane to determine the County's share of the operating and maintenance costs for the Patapsco Interceptor, pump station, and Patapsco Wastewater Plant (which is owned and operated by the City of Baltimore). Two master meters, Dorsey Road and Montevideo Road are utilized to determine the Anne Arundel County share of the operating and maintenance cost incurred for sewage flowing into the Patapsco Interceptor.

5.1.1.3.2 OPERATING PROCEDURES

Sewage flow meters are read and maintained by Bureau of Utilities Facilities Maintenance staff. Meters are read once every two weeks and the chart recorders are changed on an as needed basis, either 7 day or 30 days. All sewage flow meters are calibrated every six months with an independent flow meter used to verify the calibrated reading.

5.1.2 SANITARY SEWER SYSTEM

Periodic maintenance of the sanitary sewer system is essential to minimize problems which could cause sanitary sewage overflows. Maintenance activities include the inspection and cleaning of the collector sewers (12 inch and less), inspecting of the interceptor sewers (greater than 12 inch), and all manholes to prevent blockages which prevent sewage flowing to its ultimate destination.

A schedule of sanitary sewer system assessment, inspection, and maintenance tasks is provided in Appendix 5: Table 1. This table outlines the County's planned procedures with scheduled dates being entered upon commencement of planned activity.

5.1.2.1 MAINTENANCE

5.1.2.1.1 CLEANING

Regularly scheduled sewer and manhole cleaning is used as a preventive measure to avert backups and overflows as well as a responsive measure for when blockages do occur in the system. For those sections of the system which exhibit frequent maintenance problems, cleaning is scheduled on a more frequent basis consisting of quarterly, semi-annual, annual, or bi-annual intervals.

Frequent maintenance occurs on sections of sewer or manholes where multiple service calls have been received to clean or unclog blockages over a period of three to six months. These sections are normally television inspected by in-house staff to determine the cause, and if a pipeline defect exists, they are scheduled for excavation and repair. For those sections that have experienced frequent blockages but are found not to have any piping defects, the maintenance supervisor determines if the specific section needs to be on a more rigorous cleaning schedule due to grease or debris accumulation. Often times, as demographic conditions of a specific service area change, sewer segments can be removed from these accelerated cleaning schedules.

Other portions of the sewer collection system that do not typically experience problems are cleaned, on average, once every five (5) years. Manholes are also inspected every five (5) years and cleaned as required. It is typically found that most areas of the collection system have a velocity greater than 2.0 feet per second which is sufficient to prevent solids from depositing and causing blockages in sewers and manholes. Interceptor Sewers, consisting of 15 inch sewers and larger, normally do not require routine cleaning as their velocities exceed 2.0 feet per second.

5.1.2.1.1.1 GOALS AND OBJECTIVES

The goal of sanitary sewer cleaning is to remove debris and solids in the sanitary sewer pipes which in turn minimizes stoppages (i.e. blockages), odor complaints, and pumping station repairs. The County has established a goal of reducing stoppages at County-owned facilities. To comply with this goal the Bureau of Utilities operates and maintains the sewer collection system in accordance with the Maryland Department of the Environment regulations and sound sanitary engineering practices. Therefore all activities are performed in a safe manner which protects the health of the sewer maintenance worker as well as the environment.

5.1.2.1.1.2 RESPONSIBILITIES

The Program Manager plans the sewer cleaning schedule according to the County's grid mapping system which tracks sewer cleaning work to ensure that all collector sewers are cleaned every five (5) years. The Program Manager is also responsible for coordinating all subcontractor firms, and scheduling repairs as well as managing the program in order to stay within cost and budget.

The Program Manager is assisted by the Operations Supervisors to see that the sewer cleaning program is carried out in accordance with scheduled activities. The Program Manager and Operations Supervisors revise the sewer contract grid sheets, updates and revises the grease cleaning grid, and checks and resolves complaints. They are in charge of scheduling subcontractors, assigning crews, and ensuring that all assigned equipment is maintained in operational condition. They must ensure that operators have been fully trained on the various types of sewer rig models. They also review work orders and assist operators in keeping sewer maintenance records.

5.1.2.1.1.3 SEWER CLEANING

Sewer cleaning uses a high velocity jet washer to blast away obstructions, debris, and dirt in sewer lines. The end result is improved hydraulic characteristics of the sewer pipe by removing sediment, roots, grease, and other debris that inhibits flow. It is also used as a preparatory step for TV inspection so that the true condition of a pipe is visible. Depending on the size of the sewer and the type of debris present, other methods are also used. Mechanical cutters may used in areas experiencing root intrusion and outside contractors with specialized equipment are used in special situations.

Procedures for cleaning sewer lines are as follows:

1. Load water.
2. Set-up traffic control.
3. Go to the starting point. Clean from highest (upstream) to lowest (downstream) point of sewer pipe.
4. Set-up equipment.

- Park truck at downstream manhole.
 - Shoot hose to upstream manhole and shut off water pressure.
 - Install shoe and pulley, as required.
 - Start hose back cleaning line.
 - Trap and remove debris.
 - NOTE: If manhole entry is necessary to clean debris, do not enter. Immediately call Operations Supervisor I for assistance.
5. Wash manhole and bench before leaving.
 6. Wire brush and scrape rim to remove debris prior to replacing manhole cover and replace manhole cover bolts, if applicable.
 7. Remove shoe, close manhole, and remove traffic controls.
 8. Proceed to next section of contract.

5.1.2.1.1.3.1 PLUGGED SEWER LINES

When notified about plugged sewer lines, the Bureau of Utilities works as quickly as possible to clear the lines and determine the cause of the problem.

The Sewer Maintenance staff will receive calls from Customer Service when a plugged sewer line is called in by a homeowner. The procedure shown below will be followed in the case of a reported plugged sewer line.

1. Talk to homeowner to determine the exact problem.
2. Check the upstream and downstream main line manholes for any blockage. If the blockage is in the main line, clean and determine nature of problem. Proceed to #7.
3. If blockage is not in the main line, locate the cleanout.
 - If the cleanout is not visible, try to get as much information from the office to help locate cleanout. If the cleanout cannot be found, have the homeowner call a plumber.
4. Remove the cleanout top and try to determine whose area of responsibility the plugged line is on.
 - Notify the homeowner if the problem is their responsibility.
 - If the plugged line is on the County side (or if in doubt), call for the sewer rig to clean the lines. After normal working hours, telephone the standby person to assist in getting the sewer rig from the yard.

5. The helper puts the hose in the cleanout as far as possible and holds it while the operator turns on the water pressure.
6. If possible, check the downstream manhole to determine what plugged the line and note it on time sheet.
7. Fill out a separate sewer cleaning work order for each plugged sewer.
8. Give as much information as possible and return the work order to supervisor at the end of the shift. If the occurrence is after hours, turn in the work order to the supervisor at the start of the next shift. Return the sewer rig to proper location in the yard.
9. The Operations Supervisor I will coordinate with office personnel to have the installation card marked with the problem, area of responsibility, date, and work order number. If the incident is the second one of a similar type, then the Operations Supervisor I will inform the Operations Supervisor II for possible further action.

5.1.2.1.1.3.2 SEWAGE BACKUPS

Intermittently residential houses and buildings connected to the County's sanitary sewer system experience sewage backups. These occurrences are not normally due to structural failures of the collection system but are usually caused by line blockages from Fats, Oils, and Grease (FOG) and/or other debris discharges into the sanitary sewer system.

Routine inspection of manholes and cleaning of sewer mains, in conformance with the procedures in Section 5.1.2.1.1, are designed to detect and eliminate sewage backups before they reach the point of an SSO and/or entry into a home or business. These types of backups can often be detected early during manhole inspections by observing an increased level in the manhole flow channel or surcharging conditions. By immediately scheduling a cleaning, backups into homes or businesses can be avoided.

In addition, aggressive cleaning of sewer segments requiring more frequent maintenance, based on the procedures outline in Section 5.1.2.1.1, helps to reduce the frequency of sewage backups into homes and businesses. To further minimize occurrences, Howard County has adopted changes to the Plumbing Code requiring the installation of backwater valves on all building sewers where the service manhole rim elevation is higher than the lowest fixture in the building.

5.1.2.1.1.4 RECORD KEEPING

Operators are to fully document the work performed on any part of the sewer system. Required paperwork will record the specific areas cleaned and will be used to determine the progress of each crew and to schedule additional work on the system.

5.1.2.1.1.4.1 SERVICE REQUEST DETAIL

Whenever a complaint is reported, the County generates a Service Request Detail (Appendix 5: Figure 7) which identifies the name of the caller, the date the call was received, the proposed problem and its location. This information is provided to the Operations Supervisor I who gives it to a crew to investigate. After the crew has investigated and resolved the problem, the necessary information is noted on the Daily Work Order which is inputted into the Service Request Detail in Hansen.

5.1.2.1.1.4.2 DAILY WORK ORDER

Each day the senior crew leader will complete a Daily Work Order (Appendix 5: Figure 5) for all crews noting all manholes, sewer lines, and equipment defects. The senior crew leader will total the day's footage on the work order for each crew. The Operations Supervisor I reviews the Daily Work Order and the Operations Supervisor II will check the records for progress and will compile a list of sewer and equipment related problems. The list of problems related to the sewer will be given to the Technical Support Division.

5.1.2.1.1.4.3 WEEKLY SEWER REPORT

At the end of each day the Operation Supervisor I records the work performed by each crew on the Weekly Sewer Report (Appendix 5: Figure 8). This report records the work which consists of cleaning sewer lines (including relieving plugged lines), televising lines, repairing sewers and manholes, responding to sewer inquiries and complaints, and smoke testing.

5.1.2.1.1.4.4 SEWER CARDS

Each operator will annotate the sewer maintenance and inspection record or Sewer Card (Appendix 5: Figure 9) for each sewer reach recording any maintenance required. Operations Supervisor I assists operators in keeping sewer maintenance records. Information from the sewer cards has also been entered onto the Hansen asset management system.

5.1.2.1.2 REPAIRS

When problems are discovered in the collection system, most repairs will be completed by the Bureau of Utilities. Depending on the type of repair needed, the extent of the repair, and other situational factors, a repair may be completed by County crews, an on-call contractor, or may become a Capital Improvement Project. If the work is included in a Capital Improvement Program, the Bureau of Engineering would take over the design using either in-house personnel or hiring an outside consultant.

County crews rely mainly on excavation, replacement and grouting to make repairs. Crews shall utilize the following best management practices (BMP) when performing repairs:

- Utilize one-bolt sleeve couplings.

- Install gravel bedding under all pipes.
- Compact ditches while backfilling.
- Barricade all trenches that will be open overnight with flashers for public safety.
- Utilize fast drying hydraulic cement in wet areas in lieu of regular cement.

5.1.2.1.2.1 GOAL AND OBJECTIVES

The main goal of sewer line repair is to eliminate damaged sections of sewer pipe which could collapse and/or otherwise fail to function properly resulting in an overflow or service disruption.

5.1.2.1.2.2 RESPONSIBILITIES

Sewer repair work performed by County personnel is under the responsibility of the Bureau of Utilities. The Operations Supervisor II makes sure that the necessary work crews are available to complete the sewer repair work and that the equipment is in proper working order before the scheduled start. The Operations Supervisor I directs sewer repair operations and is in charge of updating sewer records, filling out weekly reports, and reviewing invoices from contractors. The Operations Supervisor I is responsible for assigning crews and equipment, inspecting safety equipment and making sure that safety procedures are followed. In addition, the Program Manager will coordinate additional repair work with outside contractors on an as-needed basis.

5.1.2.1.2.3 RECORD KEEPING

The crew leader (typically a Utility Worker IV) shall fill out the daily work orders to record all defects found and repairs performed and turn them in to the Operations Supervisor I at the end of the shift.

5.1.2.1.2.4 WARRANTY

Before a repair on a sewer is completed, the Operations Supervisor II will check if the contract under which it was constructed is still under warranty. If a line is damaged or defective and is still under warranty, the Operations Supervisor II will turn the problem over to the Construction Inspection Division for repair.

5.1.2.1.2.5 UNDERGROUND UTILITY STAKEOUT

When the Bureau of Utilities receives a utility stakeout request from Miss Utility (One Call Concepts), the Engineering Support Technician will receive and route it to the appropriate locator or indicate that the County has no involvement in the request. The technician will research the request and compile necessary data for field crews. Requests for stakeouts are then forwarded to locators within 48 hours.

Before a job is started by County work crews the Operations Supervisor I will ensure that all underground utilities are staked out. The Operations Supervisor will also

determine how work will be performed to avoid damage to other utilities and if special items such as manhole trench boxes or shoring is required.

5.1.2.1.3 MANHOLE INSPECTION AND REPAIR

The Bureau of Utilities conducts sanitary manhole inspections to check that manholes are structurally sound plus to look for sources of infiltration and inflow. Options for the repair of manholes are similar to the methods used to repair sewer lines such as replacement, grouting, and lining.

5.1.2.1.3.1 RESPONSIBILITIES

The Operations Supervisor II is responsible for reviewing program schedules and workloads with the Operations Manager, assigning crews, and making sure equipment is ready and available for work. The Operations Supervisor II makes sure that crews are adequately trained and work is performed in a safe manner following all work procedures.

5.1.2.1.3.1.1 PERSONNEL AND EQUIPMENT

Regular manhole inspections are performed throughout the system with one or two people in the crew. Manhole repairs normally require four Utility Workers from the Maintenance Division; one is designated as the crew leader. Additional personnel may be assigned to a particular task, if required. Manhole inspections are performed using Rhino All Terrain Vehicles (ATV).

5.1.2.1.3.2 PROCEDURES

During the performance of maintenance activities crews may discover needed manhole repairs. If manhole repairs are found they are noted on Daily Work Order sheets. Office staff takes this information and notes the contract, manhole number, and problem on the Sewer Manhole Inspection Detail (Appendix 5: Figure 10). Before starting work, crews are required to set-up traffic control and safety measures in accordance with the Howard County Safety Manual. Any materials, equipment, and tools needed to perform repairs shall be taken to the work site.

5.1.2.1.3.2.1 BURIED MANHOLES

Buried manhole covers that are three inches or less below a paved surface are raised using a manhole riser. Manhole covers that are greater than three inches below paved or ground surface are excavated and raised with rows of brick and cement or grade ring, and parged on the outside.

5.1.2.1.3.2.2 SHIFTED & MISALIGNED MANHOLE FRAMES

Manhole frames that are shifted and misaligned from the chimney or cone/corbel by three or more inches shall be excavated and realigned. All existing frames shall be thoroughly cleaned before reinstallation. The frames shall be set in a bed of cementitious grout so that the tops of the covers are flush with the adjoining pavement or ground surface.

5.1.2.1.3.3 RIGHT-OF-WAY (ROW) CLEARING AND MOWING

The Bureau of Utilities regularly conducts sewer Right-Of-Way (ROW) clearing and mowing using both Utilities personnel and private contractors. Clearing removes trees and brush from the ROW keeping ground disturbance to a minimum. In mowing operations the backhoe is used to move obstacles between manholes before cutting grass and vegetation with the mower. Field personnel walk along the route of the sewer line looking for areas to be cleared or mowed and manhole defects. When problems are encountered personnel notify their supervisor who arranges for repairs to be performed.

5.1.2.1.3.3.1 GOALS AND OBJECTIVES

The Bureau of Utilities keeps sewer Right of Ways cleared to have suitable access to inspect utility lines and manholes as well as for personnel and equipment to respond in the event of an emergency.

5.1.2.1.3.3.2 RESPONSIBILITIES

The Operations Supervisor II is required to direct the Operations Supervisor I as to the ROW areas to be mowed and make sure that equipment is in proper working order before the scheduled start. He must supervise the updating and record keeping of daily work orders and monitor contractor progress.

The Operations Supervisor I directs mowing and clearing operations. He assists the Operation Supervisor II in whatever capacity is needed. He is in charge of updating ROW clearing sheets, assisting the crew leader in record keeping, filling out weekly reports, and reviewing invoices from contractors. The Operations Supervisor I is also responsible for assigning crew and equipment, inspecting safety equipment, and making sure that safety procedures are followed.

Utility workers carry out mowing and clearing operations following all work rules and safety procedures. They must fill out daily work orders and record all manhole and ROW defects.

The Program Manager in cooperation with the Operations Supervisor coordinates the work of outside contractors in the ROW clearing program.

5.1.2.1.3.3.3 PERSONNEL AND EQUIPMENT

If mowing and ROW clearing is completed by County crews, all personnel and needed equipment shall be brought to the site. Besides a mower, backhoe/loader, dump truck and trailer, crews shall possess portable radio, personal safety gear, gas detector and tools such as chain saws, picks, axes, measuring tape, wrenches, and manhole marker posts and drivers. All needed equipment (including personal safety equipment) must be in good condition before leaving the yard and major problems should be reported to the Operations Supervisor I before end of shift.

5.1.2.1.3.3.4 PROCEDURES

Approximately one month before the start of scheduled ROW activities, the Operations Supervisor II reviews and modifies, as necessary, the priority of areas to be cleared or mowed. He ensures that equipment needed for operations is scheduled for necessary maintenance. Any sewer line defects identified under other programs must be resolved as needed and mowing requirements are coordinated with the contractors.

The Operations Supervisor I assigns work crews and equipment on a daily basis. Paperwork associated with the previous day must be reviewed and weekly reports must be filled out each day. Equipment must be inspected each week to ensure that it is in good operating condition. All safety and work procedures must be followed including carrying a gas detector, harness, and two ropes to assist the mowing crew in removing debris from manholes. Both County and outside contractor mowing crews should be checked daily and County clearing operations will require part time supervision.

Each day the crew leader reports to his immediate supervisor to let him know if his crew members are present. Prior to leaving for the field, all necessary information pertinent to the job (blueprints, contract, etc.) must be reviewed and all personal safety gear, equipment, and materials needed for the day's work should be prepared and daily maintenance checks performed on motor and power equipment and tools.

5.1.2.1.3.3.5 RECORD KEEPING

The daily work orders are prepared by the crew leaders and given to the Operations Supervisor I at the end of the shift. The Operations Supervisor I reviews the sheets and totals the footages cleared or mowed and forwards them to the Operations Supervisor II in order that he may check them for progress and to compile the problems noted.

If a contractor is utilized for mowing, invoices must be approved by the Operations Manager. Daily mowing tasks will be coordinated with the Operations Supervisor II and Operations Supervisor I. ROW Recovery Daily Field Work Sheets (Appendix 5: Figure 11) will be filled out to track the quantity of clearing and mowing completed each day.

5.1.2.1.3.3.6 PROGRAM REVIEWS

Approximately one month before the start of the program, the Operations Supervisor II will review with the Operations Supervisor I the priority of areas to be cleared or mowed. At this time, they will review the availability of personnel and equipment.

Once the program is underway, the Operations Supervisor I reviews progress and problems daily and the Operations Manager reviews the program's progress and its budget each month.

5.1.2.1.4. CLOSED CIRCUIT TELEVISION INSPECTION OF SEWER LINES

Closed Circuit Television (CCTV) inspection uses a specially designed video camera mounted on a conveyance system to allow the camera to move through sewer lines. Operators of the unit visually examine the condition of the pipe interior to reveal locations of FOG (Fats, Oils, and Grease), structural defects, obstructions, root intrusion, offset joints, cracks, improper lateral connections, and Infiltration and Inflow (I&I) sources. For I&I source detection, CCTV inspection is used in combination with dye testing to identify cross-connections with storm drains or damaged portions of pipe that may be receiving stormwater flow. The Bureau of Utilities uses in-house staff to perform “emergency” televised inspection work on its collector sewers and house connections, and utilizes outside contractors for new construction work to inspect the As-Built condition prior to acceptance and for routine inspections.

5.1.2.1.4.1 GOALS AND OBJECTIVES

The County has a goal of performing routine CCTV inspection (including pre-cleaning by use of high pressure jetting) on approximately 5% of the sewer collector mains each year. Through the use of CCTV inspection, the County aims to identify and correct excessive sources of I&I, grease buildup, potential root blockages, and other defects. Correction tasks will include sealing, excavation and repair/replacement of sections that cannot be grouted or otherwise internally repaired.

Each drainage area will be cleaned from the collector sewers to the interceptors based upon age of the system and frequency of customer complaints. Work will commence in Fiscal Year 2011 and completion will depend upon the efficiency of the cleaning crews and the risks involved in working in a particular area. Refer to Appendix 5: Table 1 for a Wastewater Program Schedule of routine tasks that will be completed to assess, inspect, and maintain the collection system.

5.1.2.1.4.2 RESPONSIBILITIES

Operations Supervisors (I and II) are responsible for reviewing program schedules and workloads, assigning crews, and making sure equipment is ready and available for work. The Operations Supervisor I ensures that crews should be adequately trained and work should be performed in a safe manner following all work procedures. The Program Manager will coordinate with the Operations Supervisors for the scheduling of outside contractors.

5.1.2.1.4.3 RECORD KEEPING

During television inspection, work crews will fill out the TV & Grouting Log (Appendix 5: Figure 12). This form will note all pertinent information for the line including pipe diameter, pipe material, pipe condition, manhole numbers, manhole condition, and the location of all defects. Once work is completed, all forms will be turned in to the Operations Supervisor I for his review.

5.1.2.2 PUMP STATION MAINTENANCE

Repairs to pump stations are typically triggered by conditions found during routine inspections or the result of an operator investigating an alarm condition reported by the telemetry or SCADA system. Qualified technicians are on-call 24 hours a day, seven days a week to respond to alarms and emergencies. When emergency repairs are needed, the Operations Supervisors II's are involved in the decision-making process in addition to the Superintendent and Bureau Chief who is notified of major repairs. In the event an overflow does occur, refer to Chapter 7 – Sewage Overflow Response Plan.

A complete description of each emergency repair will be entered into the work order database with a note on the suspected cause. Pumping stations requiring major repairs or upgrades beyond normal maintenance activities are discussed with Bureau of Utilities management for inclusion in a Capital Improvements project.

An Operations Supervisor II will decide the priority of regularly scheduled maintenance work and will schedule the work crews and equipment. Each crew leader ensures that work is completed in accordance with safety procedures. Problems or defects encountered during the progression on work will be noted on the daily work order or service request.

5.1.2.2.1 PREVENTIVE MAINTENANCE

The preventive maintenance file system is maintained by a Bureau of Utilities, The superintendent through support staff is responsible for issuing work orders for monthly inspections and required maintenance tasks. Deficiencies discovered during scheduled maintenance that cannot be immediately corrected by the maintenance crew are reported using the Service Request Detail (Appendix 5: Figure 7). Typically components that are checked during preventive maintenance include: wastewater pumps, shafts, motor and motor controls, auxiliary power units, level controls, valves, air vent and heating systems, and general facility maintenance.

5.1.2.2.2 ELECTRICAL MAINTENANCE

Electrical maintenance at the County's pumping stations is normally completed in conjunction with weekly visits to pumping stations unless a specific problem has been identified by County personnel requiring a work order. Tasks include, but are not limited to, checking the following: the operation of alarms and/or floats, amperage draw and run time on pumps, condition of wiring to equipment, circuit breakers, SCADA systems, grounding systems for pumps and switchgear, surge protection, corrosion protection, auxiliary power, and lighting. If a particular task requires specialized knowledge, the appropriate crew will be scheduled or the work will be completed using contractual services.

5.1.2.2.3 MECHANICAL MAINTENANCE

Presently, the four critical components of each pumping station tracked through work orders are pumps, motors, generators, and wet wells. Each pumping station has a unique name with each pump and motor separately labeled.

The good method for assessing the performance level of a pumping station is by pump drawdown test which enables operators to check whether pump stations are running as designed. Pump draw-down tests are entered into the work order database system and compared to the original design points for the pump station. Significant differences between design and actual values warn operators that further attention is warranted. It reflects not only the conditions of the pump and its controls but also indirectly reflects on the condition of the force main and its air/vacuum release valves.

5.1.2.3 FORCE MAIN AND AIR/VACUUM VALVE MAINTENANCE

Each year the Facilities Maintenance Division inspects pumping station force mains and valves and performs any necessary maintenance activities such as exercising, replacing, and cleaning valves. The County's work order database tracks information on the force main which includes the name, location, pumping station, diameter and pipe material, date of installation, and the location and size of air/vacuum release valves.

5.1.2.3.1 FORCE MAIN MAINTENANCE

Most force main problems are the result of age or wear and tear rather than lack of maintenance since most are designed to be self-cleaning. Solids that settle during periods when the pumps are idle are scoured away when the pumps restart. If a problem is suspected with a pump station and force main system (evidenced by increased pump run time, increased head, etc.), the first step is to check the pump station equipment. If investigations reveal nothing there, the force main route is checked above ground for any evidence of leakage or ground movement. Other checks are also made depending on the problem encountered and the pump station and force main under consideration. A complete description of work performed on a force main is entered into the work order database.

5.1.2.3.2 AIR RELEASE/VACUUM VALVES MAINTENANCE

Force mains in many collections system suffer from diminished capacity due to poor performance of air/vacuum release valves at high points in pipelines. Gas accumulation at these high points constricts the flow, increasing head loss in the pipeline, reducing pumping capacity, increasing pump run-times, and tending to increase wear on the pumps. To combat this potential problem, the County has established an air/vacuum release valve maintenance program.

The valve maintenance program is tied to the monitoring procedures for the pumps. If tests on the pumps indicate a drop in capacity or efficiency, valve maintenance will be considered along with other pump station specific measures for possible remedial action. Maintenance activities on valves are recorded in the work order database. Valves requiring excessive maintenance become candidates for replacement. Through use of the work order database, the Bureau of Utilities provides recommendations to the Bureau of Engineering for consideration in future design.

5.1.3 SANITARY SEWER HYDRAULIC MODEL

The sanitary sewer hydraulic modeling software package used by Howard County to analyze the sanitary sewer infrastructure is XP-SWMM by XP Software. It is a commercial version of a program originally developed by the U.S. Environmental Protection Agency to model storm sewers although it can also be used to simulate flow through sanitary sewers. In XP-SWMM, the sewer collection system is represented by a system of specific points throughout the system called “nodes” which represent manholes and bends and “links” which represent pipes. The link and node data which includes the physical components such as pipe diameters, lengths, inverts, etc. is typically imported into the hydraulic model from the Geographic Information System (GIS). The flow rate inputs are typically generated from flow meter and rain gauge data analysis.

5.1.3.1 GOALS

The main goal of the sanitary sewer hydraulic model is to identify locations where there is insufficient capacity under current or projected future conditions.

The primary use of the hydraulic model is to assess capacity of the 12” and larger diameter collection system used in the Master Plan for Water and Sewer. The hydraulic model may also be used to check Capital Improvement projects to ensure that they meet current and future flow projections and to ensure that the existing sewers will provide adequate capacity based on anticipated flows for developer projects and proposed subdivisions.

5.1.3.2 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

In terms of hydraulic modeling, Geographic Information Systems (GIS) is an important tool in collating the physical components comprising the manholes and pipes that make up the system. GIS is also used in conjunction with the flow meter and rain gauge data to develop flow inputs for the hydraulic model for both current and future scenarios. For current flows, GIS is used to collate water usage records within a flow meter drainage area. For future flows, it is used to collate residential flows based on population and future commercial and industrial flows based on zoning. Refer to Section 5.3 for a more detailed description of GIS and how it is used for hydraulic modeling and other functions throughout the County.

5.1.3.3 FLOW METER/RAIN GAUGE PROGRAM

Refer to Section 5.1.4 for information on the flow meter and rain gauge program and how it is used for hydraulic modeling.

5.1.3.4 CALIBRATING THE HYDRAULIC MODEL

Hydraulic model calibration is the process of adjusting characteristics in the hydraulic model so that the hydraulic model reacts to specific flow rates in a manner similar to actual field conditions. Since upstream flows and conditions impact downstream conditions, it typically takes place at upstream flow meter sites and works downstream site by site. Once a flow meter drainage area has been calibrated, it is

considered complete and then not modified again when calibrating downstream flow meter sites.

The process consists of developing flow inputs from flow meter data, running the hydraulic model, and then comparing the results to the flow meter data. If the hydraulic model results match the flow meter data in terms of flow rate, depth, and velocity, the model is considered representative of the actual sanitary sewer system. If the hydraulic model results do not match the flow meter data, the next step is to modify characteristics in the hydraulic model and re-run it to see if the changes address the discrepancy and produce results that better match the flow meter data.

Typically, flow rate is not an issue during calibration and the output matches the flows entered into the hydraulic model. Flow rate can be an issue when flow balancing between parallel lines or when flow is lost through a sanitary sewer overflow during a wet weather calibration but that is rare.

Typically, the calibration process focuses more on getting the depth and velocity in the hydraulic model to match flow meter readings. Considering the Continuity Equation ($Q = V A$), a single flow rate can be the result of various combinations of depth and velocity readings. An example would be if the results of a hydraulic model calibration run produce a lower depth and higher velocity reading than the flow meter data, the pipe roughness could be increased which would reduce the velocity and increase the depth.

Hydraulic model calibration does have its limitations. The accuracy of the physical components of pipes and manholes included in the hydraulic model is dependent upon the accuracy and completeness of the GIS or record drawings used to develop it. Also, the flow characteristics such as the depth and velocity are known only at the flow meter locations. If there is a point feature such as root intrusion at a joint upstream of a flow meter site, it could affect the flow meter data by reducing the velocity and increasing the depth. During the hydraulic model calibration process, the pipes could be assigned a rougher pipe coefficient in order to get the depth and velocity data to match that of the flow meter even though it could be due to a single point.

Ideally, the model should be calibrated for a variety of circumstances that resemble potential field conditions. One model run could be for typical flow conditions which would be useful for maintenance personnel to provide information as to what flow conditions could be anticipated at a given site, such as high depths. High flow scenarios in response to design rainfall events could identify potential surcharge locations that field personnel could check when large rainfall events do occur.

5.1.3.4.1 DRY WEATHER CALIBRATION OF THE HYDRAULIC MODEL

Flow through a sewer system is composed of sewage flow, infiltration, and inflow. The initial hydraulic model calibration is for dry weather flow conditions which mean that the inflow component is not present.

Flow metering data during dry weather (days without precipitation) is used to create dry weather hydrographs for input into the hydraulic model that depict sewage and

infiltration flow rates at specific time steps. Once entered into the hydraulic model, the output from the model is compared to the original flow meter data to see that the hydraulic model mirrors the flow meter data in terms of flow rate, depth, and velocity. If it does not, hydraulic model characteristics, such as pipe roughness, are modified and the hydraulic model is run again and the process is repeated until the hydraulic model output matches the flow meter data as well as possible.

5.1.3.4.2 WET WEATHER CALIBRATION OF THE HYDRAULIC MODEL

The process for wet weather calibration of the hydraulic model is essentially the same as for dry weather although it is typically more difficult to accomplish due to the higher flow rates, depths, and velocities typically associated with rainfall events. These higher readings produce greater rates of change and greater differences between high and low values which usually make the calibration process more difficult.

5.1.3.5 HYDRAULIC MODEL DESIGN EVENTS

Once the hydraulic model has been calibrated to react to real flows in the same way that the actual sanitary sewer system does, it is used to model simulated design events to assess capacity.

The design events used consist of a series of both current and future condition scenarios and multiple rainfall events of different magnitudes such as Current (Year 2009) 2-Year 24-Hour Rainfall and Future (Year 2035) 10-Year 24-Hour Rainfall. For current conditions, the sewage component, infiltration component, and inflow component are each based on the flow meter data used to calculate them. For future conditions, the sewage component is typically projected based on future population data and land zoning while the infiltration and inflow components are projected based on assumed changes over time such as a percentage increase.

5.1.4 FLOW METER/RAIN GAUGE PROGRAM

The purpose of the flow meter and rain gauge is to measure sewage flows and precipitation which directly impact sewage flow, infiltration and inflow. Howard County utilizes permanent master meters and temporary flow meters and rain gauges. There are seven permanent master meters in the County (Appendix 5: Figure 6 – Sewage Master Meters). The master meters are billing meters that are placed at the bottom of branches flowing to other jurisdictions in order to determine Howard County flows for billing purposes. The temporary flow meters and rain gauges are typically part of Capital Improvement Projects and the data generated is used to input into hydraulic modeling to determine the capacity and needs of a sewer system. Flow meters and rain gauges are installed and monitored at specific locations for a set period of time. The duration of the monitoring is dependent on project constraints. A table of the temporary flow metering program is shown in Appendix 5: Table 2. The locations of the flow meters for several of the projects shown in Table 2 are provided in Appendix 5: Figure 13 through Figure 16.

There are a variety of flow meters available for use based on where it will be installed, the data that needs to be recorded, and personal preference. Flow meters are typically installed in the upstream piping leading to a manhole a sufficient distance

from bends or changes in elevation. Data from the flow meters is normally collected every 15 minutes and the data is periodically uploaded from the system and used as inputs into the hydraulic model. These inputs break down flow and identify potential areas where excessive I&I may be occurring.

Flow measurements are used to define the variation of flow components with time and define peak and minimum flow conditions. The sewer hydraulic model is supported by a network of permanent and temporary flow meters. Data from the permanent flow meters is used for billing purposes, serves as model input, and is analyzed by the Bureau of Utilities and Engineering to determine long-term trends. Temporary (portable) flow meters are used to assess flow under various storm conditions and are useful in determining the capacity impact of new connections. The County monitors flows at various locations and uses this information to assess how the system is functioning and to identify areas of hydraulic deficiency when input into the hydraulic model.

5.1.5 INFLOW & INFILTRATION (I&I) PROGRAM

The County has established an Inflow and Infiltration (I&I) program to identify and correct sources of I&I. Common sources of I&I include deteriorated manholes and manhole covers, cracked or broken pipe and house laterals, damaged cleanouts, roof and foundation drain connection to sewer lines, and roots. I&I reduction efforts can be costly if they are undertaken in areas where the problem is not severe. Therefore the County aims to perform I&I elimination work in those areas that will yield the greatest return on investment since complete the elimination of I&I is virtually impossible. If a portion of the system is suspected to have I&I, the first step is to determine the source since each type of problem is addressed by different techniques. The County uses a variety of tools to investigate and determine sources of I&I including:

CCTV Inspection & Grouting

Smoke Testing

Manhole Inspection

Sewer and Manhole Rehabilitation

An initiative in the I&I program is the performance of a Sewer System Evaluation Survey (SSES). A SSES has been completed in the Little Patuxent drainage area and the County is currently in the initial stages of a SSES in the Hammond Branch/Guilford Run and Patapsco drainage areas.

The Little Patuxent SSES was completed November 2005. The survey identified two areas that needed immediate attention. One area was in the location of a previous repair and the second was an area that was experiencing sewer blockages and surcharging. There were a number of minor I&I problems such as missing and damaged cleanout caps and corroded manhole rungs but no structural defects that needed to be addressed in the near future to prevent possible sewer collapse. Most of the recommendations involved manhole rehabilitation to minimize inflow due to ponding and infiltration around the manhole walls and frames.

The SSES in the Hammond Branch/Guilford Run and Patapsco drainage area started in early October 2010 and the report is scheduled for completion in November 2011.

5.1.5.1 GOALS AND OBJECTIVES

The Bureau of Utilities aims to ensure the integrity of the wastewater collection system through the elimination of as many I&I sources as possible. The primary objective of this program is to investigate and reduce sources of I&I to recover sewer, pumping station, and wastewater treatment plant capacity. The I&I Program will aid in identifying Capital Improvement Program projects for sewer rehabilitation and future sewer facilities planning plus provide additional sewer allocation availability.

5.1.5.2 PERSONNEL

I&I tasks will be coordinated by Program Manager at regular intervals and as identified by work orders. Actual field operations require personnel assigned from the Maintenance Division. Additional personnel may be required based on related activities within the program schedule, and outside contractors may be used to augment these activities.

The Operations Supervisor II works with the Program Manager to review the program schedule and workload to ensure the program is carried out in accordance with the schedule and cost estimates. He is a liaison for the Bureau of Utilities with other Howard County bureaus and divisions and neighboring municipalities pertaining to the I&I program. The Operations Supervisor II ensures the equipment is ready for service before starting field work. The Operations Supervisor II assigns field crews, makes sure that equipment operators are fully trained for the different types of I&I activities, and periodically checks the work performed.

The Operations Supervisor I assists the Operations Supervisor II and ensures that all safety and work procedures are being followed in accordance with the Howard County Safety Manual. He provides assistance to assigned field crews by and ensures that vehicle and equipment assigned to I&I crews is maintained. All paperwork is reviewed by the Operations Supervisor I who makes recommendations for further courses of action to be taken when required.

Utility workers are required to follow all safety and work procedures. They must fill out Daily Work Orders and field data sheets relevant to the specific I&I field work they are performing and forward the data sheets to the Operations Supervisor II for field activities on a timely basis. After completion of televising, crews must turn in a video of the televised work to the Project Engineer.

5.1.5.3. RECORD KEEPING

Record Keeping for CCTV inspection of sewer lines is detailed in Section 5.1.2.1.5.5.

5.1.5.4 SMOKE TESTING

Smoke testing is a method of isolating sections of the sewer system in search of illicit connections to the sanitary sewer system and subjecting them to smoke forced into the system. It is used to locate potential I&I sources to the sanitary system from roof drains, yard drains, sump pump connections, storm drain cross-connections, and cracks in pipes or manholes.

The goal of smoke testing is to determine if there are any connections to the system which would allow rainfall or surface runoff to enter the sewer system. This may be from main sewer lines and manholes, sewer laterals, or building plumbing.

Smoke testing is not performed on a routine schedule. It is used for diagnostic purposes only and is normally completed as part of a SSES.

5.1.5.4.1 PROCEDURES

Prior to smoke testing, the Bureau of Utilities notifies the Fire Administrator's Office and all customers within the area affected seven (7) days prior to the testing through use of door knob hangers (Appendix 5: Figure 17) that are hand delivered by field personnel.

Smoke testing activity should be scheduled for Monday, Tuesday, or Wednesday. Central Communications should be notified the day that a smoke test is being performed. Any corrective action, followed-up, and notification handout should be completed on Thursday and Friday.

Prior to starting work crews are to set-up traffic control and safety measures. Field equipment shall be installed per manufacturer's recommendation for the particular equipment.

Locations where smoke is seen shall be noted by Utility personnel on the Smoke Testing Work Sheet (Appendix 5: Figure 18) and Sewer System Deficiencies Log (Appendix 5: Figure 19). All work sheets should be turned in to the Operations Supervisor II and/or Operations Supervisor I after completion of scheduled area testing. Crews shall conduct a property survey to determine the type of deficiency letter to deliver to the owner. Samples of the sewer system deficiency letters are attached in Appendix 5: Figure 20 and Figure 21. If necessary, crews will perform a follow-up property survey and/or corrective action as scheduled from Technical Support Division.

To perform smoke testing, a section of sewer is isolated using temporary plugs and smoke is introduced into the main sewer lines at the manhole by a forced air machine. Those portions of the system not separated by a trap fill with smoke which escapes at any openings due to the forces air. The fog-like mist or smoke that is used is non-toxic, odorless, and not a fire hazard. The resultant smoke tracks up laterals and enters any connections to the sanitary sewer system. If the plumbing is to code and traps are filled with water, the smoke will exit only via the roof vents. Smoke emanating from other places indicates a problem or illicit connections. Smoke exiting a nearby storm inlet suggests leaky pipes or an illicit cross-connection between the storm drain and the sanitary sewer. Smoke testing can reveal the presence of illicitly

connected sump pumps. In many cases, it is difficult to detect and correct these types of sources because it would require entrance into private residences.

5.1.5.4.2 EQUIPMENT

Smoke Testing requires a pick-up truck, smoke testing equipment (blower and chemical bombs), portable generator and sewer plugs.

5.1.5.4.3 RECORD KEEPING

Crews will fill out the Smoke Testing Work Sheet (Appendix 5: Figure 18) which notes the location where smoke was seen coming out of a residence.

5.1.5.5 MANHOLE INSPECTION

Manhole inspection is used to locate structural defects, hydraulic defects, or evidence of I&I. The physical information includes information such as the location of the manhole and construction materials.

The most obvious purpose of the manhole inspection is to check the structural integrity and condition of the manhole itself. The structural condition includes information such as cracks in the manhole walls, improper frame and cover installation, and other information which may endanger the structural integrity of the manhole structure. A collapsed manhole would not only block sewage flow, it would also create a hazard to workers and the public. These inspections provide information on the condition of the frame and cover.

Hydraulic characteristics cover the number of pipes entering and exiting the manhole, the presence of drop connections, how well the flow channels function, and evidence of surcharging. Any evidence of high flows in the manhole such as debris left on the manhole rungs indicates backup conditions although it is not possible to determine if the surcharge is a result of a blockage, I&I, or insufficient capacity. Evidence of staining on the manhole walls from flow entering cracks, joints, or the frame adjustment indicates I&I.

5.1.5.6. SEWER AND MANHOLE REHABILITATION

Sewer and manhole rehabilitation includes sewer line and manhole repairs and sealing of sewer line joints and manholes.

5.1.5.6.1 PROCEDURES

Before starting any sewer and manhole rehabilitation project, the Operations Supervisor II will check to see if the area is part of a contract that is currently under warranty. If it is under warranty, the repair will be turned over to the Department of Construction, Inspections, and Surveys. If not, the work will be assigned to a Maintenance Section work crew. The Operations Supervisor II will ensure that equipment ensure this be ready for service or will coordinate necessary repairs. The Operations Supervisor I will have underground utilities staked out before the job is

started, determine if any specialized equipment is needed, and will assist work crews with additional manpower or equipment.

In general, the crew for sewer and manhole rehabilitation will consist of a crew leader and two utility workers. The crew leader will make sure that all safety and work procedures are followed. Work crews will fill out and forward Daily Work Orders and data sheets relevant to I&I work to the Operations Supervisor I.

5.1.5.6.2 EQUIPMENT

Equipment will be determined by the nature of the job but at a minimum will include a crew truck, shovels, picks, personal safety gear, probing rod, flashlight, and various hand tools.

5.1.5.6.3 RECORD KEEPING

At the completion on a project, the crew leader will note problems or defects on the Daily Work Order or Service Request. The Operations Supervisor I will review time sheet and note defects for future and corrective action and fill out the out Weekly Sewer Report. Daily Work Orders and Service Requests will be entered into the Hansen.

5.1.5.7 RESULTS OF INVESTIGATIONS

All of the information gathered from I&I investigations by Utilities staff is inputted into the Hansen database and any reports prepared by consultants is shared for review by the Bureau of Utilities and the Bureau of Engineering. Staff reviews all information available such as contract drawings and the history of repairs in the area to identify potential sources of I&I. A review of current data may result in the need for additional investigation by internal and external sources prior to identifying the sources of I&I sufficiently to make recommendations on corrective actions.

5.1.5.7.1 I&I RECOMMENDATIONS

In considering I&I reduction, the County weighs whether the cost of eliminating specific I&I sources is cost-effective compared to the cost of transport and treatment of the additional flow.

I&I source elimination tasks consist of work that can be completed by the County forces and work that will require contractual services. Typical I&I improvements completed by the County personnel include pipe replacement and grouting/sealing. Improvements performed by specialty contractors include Cured-In-Place Pipe (CIPP) lining and manhole sealing.

If multiple problems are found in a particular section of the collection system or service area, Technical Support staff prioritizes the work to be done and the cost. If the scope of the improvements exceeds what can be done by County forces private contractors forces are used to complete improvements.

5.1.6 SURFACE WATER QUALITY

The County has an ongoing effort to monitor water quality in County waterways through the Health Department. The primary intent of this monitoring program is to gauge water quality with the goal of improving it where necessary through locating and eliminating pollutant sources. This program monitors for pollutants some of which are typically associated with sanitary sewer systems such as fecal coliform. When encountered, such pollutants may be due to a sanitary sewer overflow or sewer break or possibly from surface contamination unrelated to the sanitary sewer system. When such pollutants are encountered and the sanitary sewer system is suspected of being the source, the Health Department contacts the Department of Public Works (DPW) and works with them to try to locate and eliminate the source.

If a sanitary sewer overflow does occur, refer to Chapter 7 – Sewage Overflow Response Plan.

5.1.6.1 OVERFLOW MONITORING

For the events when raw, partially treated or diluted sewage is discharged into State surface water, the Health Department decides whether there is a need to perform water quality monitoring. The sampling is conducted by the Health Department to ascertain the level of stream contamination in response to a reported sanitary sewer overflow (SSO) and to track the stream's return to normal water quality.

Stream water quality sampling is performed if a SSO exceeds 10,000 gallons. A minimum of three samples are taken: upstream of the overflow, close to the point of overflow, and one or more points downstream. Depending upon the initial results, additional full or partial bacterial contamination sampling may be performed to track water quality improvements and to aid in determining whether to lift any imposed bans on water access. Results of all water quality sampling are maintained by the Health Department.

If a sanitary sewer overflow does occur, refer to Chapter 7 – Sewage Overflow Response Plan.

5.2 ENGINEERING

The Bureau of Engineering is composed of engineers, technicians, inspectors, surveyors, and various support staff who manage projects that improve the quality of the County's water and sewer facilities as well as roads, bridges, storm drains, sidewalks, and other public facilities. This group also works with private developers to control the quality of facilities which are constructed as part of private developments with the intent of being turned over to the County to become part of the public system.

5.2.1 MASTER PLAN FOR WATER AND SEWERAGE

The Master Plan identifies water and sewer needs throughout to allow the County in order to gather the information necessary to plan for projects needed to adequately meet the future needs of residents and individuals working in the County. In accordance with the Annotated Code of Maryland (COMAR), major amendments to the

County's Master Plan are approved by the County Council and submitted to the Maryland Department of the Environment every three years Routine amendments to the Master Plan are also prepared every six months due to changes in capital projects, priorities in service areas, and water and sewer services planned.

5.2.1.1 PLANNING

The Bureau of Utilities is charged with planning and preparing the Master Plan although many other departments are also involved in preparing the Master Plan for Water and Sewerage. The planning stage includes collecting information on the present and future services needed within the County and comparing it to the County's current facilities. The plan incorporates the general policies established by the County and utilizes information from Bureau of Utilities, Bureau of Engineering, Department of Planning and Zoning and the Health Department.

The preliminary amendments are drafted by the Bureau of Utilities which are then circulated to various departments within the County as well as the Maryland Department of the Environment, Department of Natural Resources, and the Department of State Planning. After comments are received and incorporated the final draft is sent to the Public Works Board and the Planning Board for public meetings. The final version is then sent to the County Council for public hearings and additional review and comment. Once final approval is granted by the County Council, the document is sent to the Maryland Department of the Environment. Following State approval, the document is then released in its final form.

5.2.1.2 DESIGN STANDARDS

The Bureau of Engineering follows the guidelines set forth in the Howard County Design Manual Volume II Water and Sewer for the design of all new water and sewer facilities.

5.2.1.3 PROCESS FOR NEW CONNECTIONS

When a request for a new connection is submitted the Department of Planning and Zoning (DPZ) first verifies that a lot can be developed. DPZ works closely with the Bureau of Utilities, Technical Support Division and the Bureau of Engineering, Utility Design Division to complete detailed reviews by checking the Water and Sewer Allocation Report and the current hydraulic model to ensure that downstream sewers have sufficient capacity to handle the additional flows.

In most cases, the system was originally designed for maximum build-out and the new connection will not impact the collection system operation. If there is an impact, the next step is for the Bureau of Engineering to investigate options which are project-specific such as replacing an existing line with a larger one, upgrading a pump station, building a new pumping station to pump the new flows to a different sewer, and other options. Depending on the specific details of a particular situation, options for increasing capacity may or may not require a developer funding.

5.2.2 CAPITAL IMPROVEMENT PROGRAM

The Capital Improvement Program is a 10-year plan for the provision of capital facilities in the County which is updated annually. The Bureau of Engineering manages Capital Improvement Projects (CIP) from planning and budgeting through design and construction. Projects may be initiated by petition from residents or to address problems and needs identified by the Department of Public Works or other departments.

Projects selected and pursued through the CIP are chosen based on the County's needs to ensure that public facilities are built to accommodate current needs and future anticipated growth. Numerous CIPs have been completed or are ongoing to reduce SSOs and I&I in the County. A list of recent and current CIPs is provided in Appendix 5: Table 3 showing a schedule for completion and how each project has helped to reduce SSOs and I&I.

Preparation for the CIP typically starts in the late Summer/early Fall of the previous fiscal year for which the Capital Program is being prepared. The CIP includes the Capital Budget which is the current year spending plan for projects that may require more than one year to accomplish. After priorities are compared against available funding, the scope of the Fiscal Year Capital Program is finalized. Projects with low priority are reprogrammed for out-year requests.

5.2.2.1 PROJECT STAGES

The Capital Improvement Program process is broken into three stages: Planning, Design, and Construction. Engineers with the Bureau of Engineering work with other bureaus and departments to identify project needs based the following factors:

- Problems arising from routine inspections.
- Problems arising from infiltration and inflow (I&I) investigation.
- Hydraulic model/flow metering indicating insufficient capacity or hydraulic problems.
- Periodic replacement of facilities due to normal wear-and-tear and age.
- Relocation of existing facilities.
- Extension of service due to future growth or failing septic system.
- Updating and modernizing equipment with new technology.
- Replacement of facilities to reduce maintenance efforts or operation costs.

5.2.2.1.1 PLANNING

The CIP is prepared annually by the Bureau of Engineering with input from the Bureau of Utilities and other groups. Numerous coordination meetings are scheduled and discussions held between the Bureaus to initiate new projects or to modify scopes of work for on-going projects. Utilities will generally forward requests and justifications for new capital projects which are reviewed by Engineering to combine them with their own requested projects for consideration in the upcoming capital program. Once the new project or scope modification request is received by Engineering, it is assigned to a project manager for review and preparation of a draft CIP scope of work and project cost estimate. Cost estimates for capital projects are divided into several components: Planning, Design and Construction Management, Land, Site Improvement, Utilities, Construction, and Initial Furnishings and Equipment.

Upon completion of the draft CIP by the Bureau of Engineering, the proposed program is circulated for review by the Bureau of Utilities and the Director of the Department of Public Works. Reviews will confirm each project's necessity, scope of work descriptions, project cost estimates, and schedules. Once the overall program content is agreed upon by all parties, priorities are assigned by Utilities and Engineering to the individual projects.

The overall CIP is then forwarded to the County Executive for review. The CIP is then presented to the County Council. During publicly held hearings, specific details of the CIP are discussed and modifications may be proposed by the County Council. These modifications could include changing proposed budgeted dollars, deferment of proposed schedules, scope modifications, and in some cases, deletion of a particular project from the CIP. Once these final comments have been incorporated, the CIP is implemented.

5.2.2.1.2 DESIGN

The Design phase is segmented into the 30% Submittal (Preliminary Design), 50%/60% Design, and 95% Submittal, and Final Design which are submitted to the Bureau of Engineering for review and approval.

30% Submittal (Preliminary Design)

The Preliminary Design outlines the design parameters as they relate to the project. Information includes such items as:

- Location, origin, purpose, and scope of the project.
- Existing conditions.
- Population projections and projected needs.
- Design criteria.
- Design computations.

- Function, layout, and siting requirements of proposed facilities.
- Alternatives to the primary proposal.
- Cost estimates and comparison of alternatives including rights-of-way requirements and costs.
- Required permits and other agency approvals.
- Conclusions and recommendations.
- Schedule for implementation.
- Illustrations, drawings, tables, and supporting data.

The County reviews the 30% submittal and selects the alternative to be pursued by the consultant based on the recommended and alternative proposals presented in the report.

50% /60% Submittal

Based on the alternative selected by the County, the 50%/60% Design phase further develops the design based on the Preliminary Design and the County's comments. In addition to finalizing all of the design elements already started under the Preliminary Design phase, this phase also covers any other details relating to the design such as civil, mechanical, and structural design and preliminary technical specifications.

95% Submittal

Once the 50%/60% Design is approved by the County, the consultant develops the 95% Submittal which is a complete design for all disciplines including electrical and architectural plans and details. The specifications are complete with front end documentation. The drawings must conform to the County's standard format and drafting/graphic standards showing the necessary construction criteria and details for the installation of all publicly owned facilities. These drawings depict the nature and extent of proposed work and site conditions. The specifications should be developed as a supplement to the County's Standard Specifications and Standard Details to include any special provisions indicating modifications or additions to the Standard Specifications or Standard Details to describe and specify all non-standard work shown on the contract drawings as warranted by project conditions.

Final Design

The Final Design is the 95% Submittal with all of the County's final comments incorporated into contract documents.

Advertising and Bidding:

After the County receives the Final Design, the project is ready for bid. The project is advertised to request bid proposals from contractors to perform the work shown on the final drawings and specifications.

5.2.2.1.3 CONSTRUCTION

Following the bid opening, the consultant reviews the bid proposals and forwards a recommendation for award based on the receipt of a responsive bid and the response to contractor references, and the project moves to the construction phase. The project is constructed under the supervision of the Bureau of Engineering, Construction Inspection Division (CID). When all construction has been completed, the CID notifies the Bureau of Utilities, Technical Support Section, whenever a final acceptance inspection is pending. Prior to that inspection, a supervisor with the Facilities Maintenance (FM) will visit the construction site several times to familiarize himself with the layout and progress. Any coordination necessary between the contractor and the FM supervisor must be channeled through the CID and the Technical Support Section.

5.2.2.1.3.1 CONSTRUCTION INSPECTION AND TESTING PROGRAM

5.2.2.1.3.1.1 INSPECTION & TESTING

The County provides its own construction management and inspection personnel for Capital Improvement projects. The County's project manager is responsible for maintaining project files, correspondence, material certifications, daily reports, testing results, photographs and all other project information. The day-to-day inspection and testing is performed by County personnel. The design consultant is retained for some construction phase services such as shop drawing review, answering questions, and assisting in field changes as needed. In special circumstances where additional inspection or other construction phase services are required, the County may hire the design consultant or other consultants for assistance.

For sewage pumping stations, inspection is more detailed and covers a wider range of items. Inspection must be completed prior to acceptance and typically includes verifying proper equipment installation, startup provisions, infrared testing requirements, generator load bank testing, vibration testing, and other requirements. Pump station equipment operation and maintenance (O&M) manuals are required prior to conditional acceptance of the constructed contract.

In all instances, the contractor is responsible for all problems uncovered during the inspection and testing process and must address them prior to final acceptance.

Throughout the duration of construction, the inspector and contractor work together to maintain "As-Built" drawings for the project detailing any and all deviations from the original contract documents. Following completion of construction, these "As-Built" drawings are turned over to the design consultant who uses them to prepare a set of record drawings to be turned over to the County.

5.2.2.2.3.1.2 TESTING

Typical testing requirements are detailed in the project specifications. Copies of all test results are included within the project files and documented in the inspector's daily reports. All testing must be completed in the presence of the inspector or other County personnel.

For new gravity sewer pipeline construction, testing requirements generally include low pressure air testing, flushing of mains, visual inspection of manholes and gravity mains. Pressure mains are hydrostatically tested and all valving tested manually with valve keys.

5.3 GEOGRAPHIC INFORMATION SYSTEM (GIS)

Geographic Information System (GIS) technology has proved to be a very effective tool in the assembling, organizing, storing, analyzing, and displaying of geographically referenced data. GIS serves as a centralized interactive database for mapping infrastructure, land use, and virtually any information that can be linked to a geographic area or point.

The most commonly utilized GIS function is the creation of maps. Utilization of a GIS database allows for the creation of mapping of various types and purposes by showing the location of various data points and developing trends based upon geographic locations. This can be useful in identifying sewer segments that may be problematic or in identifying areas of concern for common problems such as grease or SSO structures (Howard County has no SSO structures). The mapping of planimetric data can also be utilized by field crews and supervisors to map out daily or weekly work areas or directions to complaint locations.

5.3.1 GENERAL

Howard County uses ArcGIS software by ESRI. The Department of Technology and Communication Services is responsible for organizing digitally submitted data for mapping and data analysis which is accessed by all bureaus of the Department of Public Works, as well as other Howard County agencies. The Bureau of Utilities is responsible for the modification and maintenance of the mapping and data components for water and sewer layers. The Bureau of Utilities currently utilizes Microstation drafting software (CAD) to modify and maintain the mapping of the County water and features. It currently prepares and maintains a complete water distribution system and wastewater collection system master map (layered over a County street map) consisting of all pipelines, pumping stations (both water and sewer), elevated water tanks, pressure regulating valves, etc. for the water system, and all pipelines, manholes (including numbers), pumping stations, forcemains, etc. on the sewer collection system. The current GIS mapping system, maintained by Department of Technology and Communications Services (DTCS) has collection system images for the entire collection system and attribute information is available for sewers 12 inches and larger. Mapping is color coded manually for the areas that are cleaned and relined. The Bureau of Utilities is currently preparing to contract with an outside consulting firm to fully integrate the current CAD drawings of the water distribution and wastewater collection system with the existing GIS and its Hansen

asset program. This will allow direct linkage of all water and sewer line attributes with each line segment of the pipeline GIS Drawings.

The County provides access to maps and data on-line and in-person. The GIS website (<http://www.howardcountymd.gov/maps>) makes a variety of maps and mapping services available. The information available on-line comes in two different formats: static maps and interactive maps. Static maps are published map products that are available for viewing, downloading, and printing. Generally, these maps are found in reports, publications, or presented at public meetings. Not all maps published by the County are available for downloading as some are intended for viewing only. Interactive maps are available using Internet Map Service (IMS) technology which allows web users access the same map data used by County agencies and departments. The capabilities of IMS are limited, so not all data is available through the web.

Many GIS data layers and map products are available for purchase from the Howard County Central Services Office in the Howard Building. A price list for maps can also be found on the GIS website.

5.3.2 MAP DATA

The County's GIS system includes hundreds of layers encompassing a detailed variety of map data including the sanitary sewer conveyance system. Sources for this information include 600-scale planimetric maps and As-Built contract drawings for piping 8 inches and larger in diameter. The map data includes the following:

- Cadastral Data: property boundaries including parcels, lots, rights-of-ways and subdivision boundaries, owner information, legal descriptions, improvements, valuation and transactional information along with other data pertinent to tax administration from legal records.
- Orthophotography Data: aerial photography or digital pictures.
- Planimetric and Topographic Data: natural and human-made features such as building structures, roadways, railways, utilities, vegetation, streams, lakes, power lines, radio towers, and cultural features and contour lines.

GIS layers are developed from aerial photography, contract drawings, scanned plat maps, As-Built drawings, field surveys, and other scanned images of original drawings tied to each pipe or manhole. Construction of the sanitary sewer GIS layers uses available mapping and data records and ties them together with gathered field data such as coordinate data collected from Global Positioning Satellite (GPS) surveys. As with any GIS, the mapping and data accuracy of the sanitary sewer GIS layers can only equal that of the original records from which they were constructed. In this GIS, the mapping was drafted based on the 600-scale key sheets and revised and populated based on As-Built records.

The sanitary sewer system mapping and database is updated as maintenance, construction and preventive activities, field investigations, and line changes are completed by the Bureau of Utilities, Construction Maintenance Group. When official

As-Built drawings are received after the project is constructed, the drawings or scanned images of the utilities are digitized onto operating maps or Microstation drawing files and then incorporated into the GIS.

Howard County develops and maintains numerous mapping layers. The available mapping includes: Utilities (water, sewer, Metropolitan District), Land Features (buildings, slope, streams, tree lines, and ponds/lakes/dams), Land Character (soils, topography, and watersheds), Planning (preservation easements, site development plans, subdivisions, and zoning), Political Features (congressional, council, election, and legislative districts) , Property Information (address and common points, parks and open space, and property), School Districts, and Transportation (driveways, parking lots, roads, streets, sidewalks, and trails and pathways). The maps are maintained as necessary by the responsible agencies.

5.3.3 MAINTENANCE OF MAPPING

The County maintains the GIS databases using in-house and contract resources. The Department of Technology and Communication Services is responsible for maintaining the cadastral and street centerline map. In-house staff and contract resources maintain the orthophotographic and planimetric/topographic maps. The layers containing sewer system information is updated regularly by the Bureau of Utilities, Construction Maintenance Group.

5.4 ASSET MANAGEMENT/ WORK ORDER DATABASE SYSTEM

Asset management combines management, operation and maintenance, engineering, finance, and economic practices to maximize the level of service achieved from assets and any physical component such as manholes, pipes, pump stations, or equipment that has value. Howard County utilizes an asset management/work order database system called Hansen to maintain assets, complaints, and work orders. Hansen is used for buried assets only. Facilities Maintenance Division utilizes Antero for its asset management and work order system. The system is used to plan and schedule operation and maintenance tasks but is also useful to management and engineering staff in compiling data on sewer system components for analysis. The system is used to track all sewer-related information including work orders for maintenance, rehabilitation, and emergency calls.

5.4.1 MAINTENANCE & RECORD KEEPING OF DATABASE

The Hansen database is maintained by the Bureau of Utilities, Construction Maintenance Group. This group is in charge of entering and updating work orders for the Bureau. Multiple groups use the software and print the reports needed. Operations Supervisors use the system to schedule work for crews.

5.4.2 WORK ORDERS & COMPLAINTS

Work orders are generated by the specific group performing the work to an asset whereas service requests are used to address customer complaints and non-asset related work. Each work order and service request is attributed with a work function

and the nearest address. Each group connected to the system enters, updates, and tracks their own documents.

For the most part, work orders are initiated through received customer calls or scheduled maintenance tasks. There are a number of data fields in the work orders that when completed include information on the customer and problem, identification of the structure or equipment (asset) experiencing trouble, who the project is assigned to, and who completes the work. All known information is then recorded into the work order screen. One of the work order fields includes a problem code in which the user enters the code corresponding to the problem encountered.

When work is assigned a work order is generated. In the event that work needs to be assigned to other departments, a service request is initiated and the assigned department generates the work order, if necessary. Each work order and service request is assigned to a specific department and Operations Supervisor. Once the paperwork is reviewed by the supervisor, the work order is assigned to a work crew.

Following completion of the assigned work tasks, the work order is closed out indicating who completed the work and the action taken. An activity code is entered into the work order indicating the nature of the work that has been completed.

This system retains historical data and displays previous work orders and service requests using graphical displays. Current and past activity can be queried to search for specific problems. Work orders can be tracked by querying the system through Hansen's reports.

5.4.3 REPORTS

With Hansen, Howard County is positioned to provide the immediate information through pertaining to the system through a multiple of queries that will generate reports on

- Work order history, complaints, performance and implementation measures at a particular address or location.
- Overflow events.
- Manhole overflows and mainline blockages.
- Cleaning.
- Locations of television inspection.

5.5 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

A Supervisory Control And Data Acquisition (SCADA) system generally refers to a computer system that collects data from various pieces of equipment in remote locations and then sends data to a central computer which manages and controls the data. The term SCADA refers to the entire system that includes signal hardware

(input and output), controllers, networks, Human Machine Interface (HMI), communications equipment, and software.

Starting in the late 1970's, the Bureau of Utilities developed a telemetering system which allows the automatic transmission and measurement of data from remote sources through a dedicated communication device. The telemetering system has evolved into the SCADA instrumentation system that operates continuously and performs three essential functions:

1. Communicates critical conditions at various facilities to the Bureau of Utilities maintenance building computer which is monitored full time.
 - Additionally, a redundant monitor exists at the Facilities Maintenance Division at the Little Patuxent Water Reclamation Plant (LPWRP).
 - After hours monitoring of the SCADA system is accomplished through a telephone dial up system.
2. Transmits "Danger" level alarm conditions to the maintenance building computer and to standby personnel after hours.
3. Provides Bureau of Utilities personnel the ability to remotely operate some facilities.

5.5.1 GOALS AND OBJECTIVES

The SCADA system is used to operate and monitor certain facilities used for wastewater collection and conveyance. Its goal is to maintain communication and telemetry between the master SCADA terminal and the remote facilities connected to the SCADA system.

5.5.2 REMOTE AND MASTER TELEMETRY UNITS

The remote sites are connected to Remote Telemetry Units (RTU) using dedicated phone circuits. Input and output points are continuously monitored by the RTU and data is transferred on a ten second polling cycle to the Master Telemetry Units (MTU) using multi-point dedicated circuits. A primary and back-up MTU is installed at the Bureau of Utilities Maintenance Shop located at 8250 Old Montgomery Road. The two MTUs share data with application software on HMI computers located at the Bureau of Utilities Maintenance Shop and at the Little Patuxent Water Reclamation Plant.

Several critical conditions (power out, high wet well, low wet well, low air pressure, generator run, and telemetry fail) are continuously monitored at SCADA-connected facilities. If one of these conditions progresses to an alarm a signal is relayed through the RTU to the MTU. During normal work hours the SCADA system is monitored at the two HMI computer locations. After normal work hours, the SCADA alarm dialer will automatically notify on-call personnel of unacknowledged station alarms at any SCADA equipped facilities after a 10-minute delay period.

5.5.3 RESPONSIBILITIES

During working hours Administrative Support Technicians watch the computer terminal and notify the Operations Supervisor of any alarm condition and dispatch maintenance personnel. On-call maintenance personnel respond to the alarms after normal work hours and communicate with the master SCADA station. The on-call Operations Supervisor is the back-up to on-call maintenance personnel and is available to assist, advise, and direct staff with the corrective action plan.

Skilled Bureau of Utilities technicians have the ability to perform all repairs and calibrations on the telemetry/SCADA system. Even though some of the telemetry and SCADA equipment is composed of complex electronics, logic circuits, circuit boards, and delicate mechanisms, in-house personnel are fully capable of maintaining the system in good repair without relying on outside consultants or service contracts.

5.6 FACILITIES MAINTENANCE

The Bureau of Utilities, Facilities Maintenance Division operates and maintains County-owned facilities and regularly reads meters in Howard County that are owned by Baltimore City or the Washington Suburban Sanitary Commission (WSSC).

5.6.1 GOALS AND OBJECTIVES

The goal of Facilities Maintenance Division is to operate and maintain wastewater facilities under their control in a manner that minimizes the possibility of overflows and enables wastewater personnel to meet the requirements of all applicable permits. Facilities Maintenance Division conducts preventive maintenance on equipment to minimize energy usage by optimizing operating efficiency of pumps and motors.

5.6.2 RESPONSIBILITIES

All facility maintenance is performed by skilled technicians who report to the supervisors of Facility Maintenance. The supervisors of the Facilities Maintenance Division report directly to the superintendent. As required, the Facilities Maintenance Division assigns personnel to other programs on a temporary basis.

Every morning, the Facilities Maintenance Division staff assembles in the Facilities Maintenance Division office at the Little Patuxent Water Reclamation Plant. After discussing any incomplete or unresolved issues from the previous day and any late reports, the Operations Supervisor checks the SCADA monitor before dispatching crews to their daily assignments. Before leaving at the end of the day, the supervisor assures that all alarm conditions/problems are repaired/resolved and brief all on call personnel.

In assigning technicians, the supervisor of Facilities Maintenance Division makes decisions according to a priority ranking system. Of highest priority, is the maintenance of any function related to supply water for fire fighting. The priority ranking is:

- Water Pumping and Storage Facilities

- Transmitters for telemetering from SCADA connected facilities
- Sewage Pumping Stations
- Little Patuxent Water Reclamation Plant

5.7 TRAINING

The County requires training for all employees in a variety of safety and other areas related to their job responsibilities. The County also sends employees to outside training or brings vendors in to perform staff training on-site. The Operation Supervisor II is responsible for ensuring that all employees receive the appropriate training and that the training is maintained current at all times.

5.7.1 GENERAL SAFETY AND TRAINING PROGRAMS

The Federal Occupation Safety and Health Administration (OSHA) provides the general standards for safety and health programs for all employees. Consistent with the OSH Act, the County aims to furnish to each employee a place of employment that is free from recognized hazards that are causing or are likely to cause death or serious physical harm to employees. A variety of safety and health programs are conducted yearly for employee groups with the Department of Public Works. New employees are briefed on the County's safety and health program at new employee orientation. Operations Supervisors continually work with employees to ensure that they have training in the following areas:

- Competent Person Training and Certification
- Confined Space Entry
- Cardio Pulmonary Resuscitation (CPR)
- Backhoe & Sewer Rig
- Lockout/Tagout Program
- Small Tool Safety

5.7.1.1 COMPETENT PERSON TRAINING AND CERTIFICATION

Competent Person Training and Certification must be completed by all field personnel and technical staff with the Bureau of Utilities each year to ensure that they are: knowledgeable of the various OSHA standards that apply to their workplace, capable of identifying and predicting workplace hazards relating to their specific work tasks, and affirmed of their authority to correct hazards to protect workers. There are numerous OSHA standards that provide information on work practices relating to toxic and hazardous materials, materials handling and storage, fall protection, and general construction. Refer to OSHA for a full list of requirements.

5.7.1.2 CONFINED SPACE ENTRY

Many work areas that employees must enter, work in, or exit are considered “confined” spaces because their configuration hinders the activities of employees and these areas are not designed for continuous occupancy. Confined spaces include, but are not limited to, underground vaults, tanks, manholes, pipelines, trenches or storage areas. OSHA uses the term “permitted space” to describe confined spaces that have one or more of the following features:

- Contains or has the potential to contain a hazardous atmosphere.
- Contains materials that have the potential to overwhelm an employee.
- Have walls that meet inward or floors that slope downward into a smaller area that could trap or suffocate an employee.
- Contains a recognized safety or health hazard such as unguarded machinery, exposed live wires, or heat.

The Bureau of Utilities has adopted a Confined Space Entry Permit program to ensure the safety of workers that must enter these areas. Prior to entering any confined space, workers are required to fill out a Confined Space Entry Permit (Appendix 5: Figure 22) to document who will enter the space and the attendant, the type of confined space, the type of safety equipment used, and atmospheric conditions. Field employees are required to complete confined space entry training yearly.

5.7.1.3 CARDIO PULMONARY RESUSCITATION (CPR)

The Bureau of Utilities requires all employees to complete hands-on training to prepare them to respond to breathing and cardiac emergencies. Cardio Pulmonary Resuscitation (CPR) training provides information on calling emergency personnel, assisting the victim by checking for their responsiveness, rescue breathing, and chest compressions.

5.7.1.4 BACKHOE & SEWER RIG

The Backhoe and Sewer Rig training not only provides the information on how to operate equipment owned by the County but also on excavation safety. Training discusses the importance of understanding the fundamentals of safely transporting, maneuvering and working with equipment in various work situations, procedures for getting on and off of equipment, and identifying the components and controls of the equipment and their function.

5.7.1.5 LOCK OUT/TAG OUT

When it becomes necessary for the Bureau of Utilities personnel to perform maintenance at a wastewater pumping station, only properly trained staff are allowed to perform the work and they must observe all established Lock-Out procedures. Lock Out/Tag Out training establishes the following procedures:

- Attach a lock-out tag with the date, time, signature, and reason for the equipment to be locked out in the same location as the lock.
- Each worker will attach his own key locks in a location which makes the equipment inoperable.
- Inform the Operations Supervisor as soon as possible when equipment is locked out with an indication of the steps that have been taken to return the equipment to service.

At some facilities, the equipment being locked out may require more than one (1) lock for both mechanical and electrical repairs. In those instances where more than one lock is installed and a facilities worker has made repairs to only his part of the equipment and other repairs are still required, he will remove his lock, sign the lock-out tag as to date and time repairs were accomplished and leave the lock-out tag so other workers and supervisors will know what is necessary to return equipment to service. After all repairs are made, all locks and lock-out tags will be removed from equipment, the equipment will be placed in service, and the supervisor will be notified.

5.7.1.6 SMALL TOOL SAFETY

Employees are trained on how to safely operate portable electric and gas power tools so that can be aware of their limitations and potential hazards. Workers are also informed of the proper clothing and personal protective equipment that should be used when working with small tools.

5.8 CUSTOMER BILLING

Each customer's sewer bill is based on water usage records and assumes water usage equals sewage rate. Water and sewer bills are issued on a quarterly basis and are determined by multiplying water usage by the current water and sewer rates. Bills are mailed allowing a thirty day payment period. Payments must be received by the Department of Finance on or before the net due date to avoid a 10% late fee on the unpaid balance. If payment is not reached the Department of Finance on or before the due date a past due notice will be issued. Failure to pay the past due charges will result in the discontinuance of service.

The sewer bill is part of the yearly property tax bill to each Howard County property owner. Since sewer and water usage charges are a property lien balances that remain unpaid can be placed in the annual tax sale.

5.9 PROGRAM FUNDING

A majority of the funding for wastewater related activities in Howard County comes from property and income taxes and user fees. The Department of Public Works is typically given the second largest appropriation from the Capital Budget, behind the Public School System. For a description of the Howard County budgetary process, refer to proposed Howard County Operating Budget for Fiscal Year 2010.

5.9.1 ENGINEERING PROGRAM

The Bureau of Engineering is funded by the General Fund which is the principal operating fund for the County government. Revenues for the General Fund come from property and income taxes.

5.9.2 OPERATION & MAINTENANCE PROGRAM

The Bureau of Utilities water and sewer operation and maintenance programs are funded entirely by the Water and Sewer Operating Fund. The money for this fund comes from user fees and is self-supporting without depending on general tax dollars.

5.9.3 CAPITAL IMPROVEMENT PROGRAM

The money to finance sewer projects comes from the Water and Sewer Special Benefit Charges Fund. The principal source of these revenues is from the Water & Sewer Ad Valorem, Sewer Front Foot Benefit Charges, and Sewer in Aid of Construction Charges.

5.10 INDUSTRIAL PRETREATMENT

There are many substances that can interfere with the operation of the sanitary sewer system, sewage pumping stations, and wastewater treatment plants. Industrial sewage or industrial wastewater is waste, sludge, or pollutants resulting from a process or the operation of industry, manufacture, trade, or business which discharges to the public sewerage system through a service connection or by a waste hauler. If untreated this sewage may contaminate treatment plant sludge limiting disposal options and increasing costs or pass through the treatment plant into the receiving waters and contaminate them.

Howard County began the Industrial Pretreatment program in June 1982. The goals of the program are to improve the water quality of the rivers and streams within Howard County, to protect the wastewater treatment facilities of the County and City of Baltimore from damage and misuse, and to protect the health of County personnel and the general public by limiting the discharge of toxic or potentially harmful substances to the sanitary sewer.

The Bureau of Utilities' Pretreatment staff, located at the Little Patuxent Water Reclamation Plant, is responsible for the implementation of the County's Pretreatment program. The Pretreatment staff is composed of a Pretreatment Coordinator and Compliance Inspectors. The Pretreatment Coordinator manages the activities of the program and implements the standards and regulations on all industrial users discharging into the public sewer system. The Pretreatment Compliance Inspectors conduct regular monitoring and inspections of all Minor Industrial Users (MIU) (food service establishments, multi-unit apartment complexes, and vehicle maintenance shops) and sampling for Significant Industrial Users (SIU). SUI are determined based on the type and classification of their processes and operations, the quality and quantity of their wastewater, and the potential impact of discharges on the County's sewerage system. Pretreatment staff coordinates with the Health Department

inspectors, the Bureau of Utilities' sewer maintenance crew, and the Bureau of Environmental storm water management staff to identify violators.

The County imposes a sewer surcharge on industrial customers who discharge wastewater stronger than that presumed to be domestic in nature, i.e., greater than 300 mg/L Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) and 12 mg/L Total Phosphorus (TP).

5.10.1 INDUSTRIAL USER PERMITTING PROGRAM

The County has implemented a permitting program to control the discharge of sewage to the public sewerage system from industrial users or from waste haulers. Any potential industrial user that wants to discharge into the public sewerage system shall submit an application for a discharge permit. The industrial permit requires the user provide, if required, for the Pretreatment, flow reduction, flow equalization, control, or storage of industrial wastewater conforming to Howard County Code 18.122A and all applicable State and Federal codes, ordinances, laws and regulations.

Where facilities for Pretreatment, flow reduction, flow equalization, control, or storage of nonconforming waste are constructed as required, the industrial user shall at their expense, provide for the continuous and satisfactory operation and maintenance of the facilities.

An industrial user is not allowed to by-pass any on-site wastewater Pretreatment equipment. Adequate backup equipment shall be installed for the purpose of preventing a by-pass from occurring. Maintenance activities shall be required for the efficient, reliable operation of the facility's Pretreatment system during normal periods of equipment downtime through the use of auxiliary Pretreatment equipment, retention of untreated waste, or through other means so that the discharge of untreated wastewater is prevented. Existing and potential industrial users and waste haulers may be required to furnish information relating to their processes and operations and covering the quantity, quality and flow properties of sewage discharged or proposed for discharge to the public sewerage system.

5.10.2 INSPECTION AND SAMPLING PROGRAM

Pretreatment facilities, flow measurement records, sewage analyses records, and operating and production records of an industrial user are subject to the following inspections:

- **Comprehensive Inspection:** A comprehensive inspection is performed by the Bureau of Utilities, Pretreatment staff once per calendar year for each SIU. The user is notified of the upcoming inspection and of any change in the schedule time or date.
- **Single Issue Inspection:** Single issue inspections are performed by the Pretreatment staff on any industrial user. Single issue inspections may be scheduled when: a new process is started, new waste is introduced into the sanitary sewer, there are problems continually meeting Pretreatment standards or requirements, progress towards the compliance schedule needs to be

verified, and complaints or problems are investigated. Single issue inspections include inspections on grease traps and oil interceptors.

Industrial users shall, if requested, measure flows and shall perform regular analyses of sewage discharged. Industrial users shall submit and have available for review logs and periodic reports which shall conform, as appropriate, to the County and Federal regulations.

Compliance inspectors have the right to access the facilities of an industrial user for the purpose of obtaining samples and flow measurements of sewage intended for discharge to the public sewerage system. Inspectors perform unannounced comprehensive sampling visits every six months. The sampling activity occurs over several days and includes monitoring for all regulated pollutant parameters or parameters found in significant concentrations in the user's permit.

5.10.3 ENFORCEMENT PROGRAM

The Pretreatment Coordinator, Bureau of Utilities, DPW shall issue a notice of violation and/or citation to any user found to be violating any rules and regulations associated with the permit. A citation may be issued for a violation of the permit. The citation shall state the nature of the violation and may require the user to submit a plan and schedule for correction.

5.11 FATS, OILS AND GREASE (FOG) PROGRAM

Fats, Oils and Grease (FOG) and solid food wastes are the leading cause of sanitary sewer overflows (SSOs) in Howard County. The objective of this program is to reduce the amount of FOG and solid food waste discharged in the sanitary sewer system. Food Service Establishments (FSEs) and other commercial or industrial users that generate FOG and solid food wastes are covered by this policy. This policy requires that grease interceptors (or other approved strategies) be installed, implemented, and maintained at the user's expense. Pretreatment Inspectors shall inspect and determine the effectiveness of grease interceptors.

On-Site Disposal Systems, County Ordinance No. 81, 2006 (Subtitle 8, Section 3.814 of the Howard County Code) requires that all buildings (except non-commercial single family residential) where food is prepared, processed, or waste from food operations occur, shall have grease interceptors. Grease interceptors are to be located on the kitchen waste drain as close as possible to the kitchen but outside of the building. The discharge from a grease interceptor shall pass through a septic tank before it is discharged to the underground disposal system or other treatment facilities.

The program involves the following policies:

- New FSEs applying for wastewater discharge permits shall identify kitchen appliances that generate FOG and provide basis for determination of grease interceptor size.
- FSEs that change ownership or change the food handling permit must have its kitchen fixtures re-evaluated for grease interceptor size requirements by a

certified engineer and shall reapply for a wastewater discharge permit with the Bureau of Utilities.

- Solid food wastes shall be disposed of in dumpsters and not in the sanitary sewers.
- Used cooking oil shall be collected in covered grease barrels and picked up by recycling or rendering companies. The volume of used cooking oil shall be recorded on a log sheet and the log sheet shall be sent to the Pretreatment Coordinator with the other self-monitoring requirements. All records on site required for self-monitoring shall be available upon request by a Howard County Pretreatment Inspector.

5.11.1 DESIGN GUIDELINES

The County has enacted design guidelines for the installation of grease interceptors. Detailed plans, showing the grease interceptor, and operating procedures must be approved by the Department of Inspection and Licensing and the Health Department. Outdoor grease interceptors shall have a minimum capacity of 750 gallons and shall have two compartments. Indoor grease interceptors shall not be installed in a common wall or on the floor space of neighboring/adjacent properties. A Howard County licensed plumbing contractor shall install all grease interceptors in compliance with the 2009 National Standard Plumbing Code and the Howard County Code.

5.11.2 MAINTENANCE PRACTICES

Part of the policy also includes maintenance practices for the effective operation of the grease interceptors. Grease interceptors should be cleaned as frequently as necessary to prevent FOG from being discharged into the sewer collection system. Grease interceptors with a combined grease/solids depth of greater than 25% of the liquid depth are considered in violation of this policy.

All waste haulers engaged in the cleaning of grease interceptors in Howard County shall have a Sewage Scavenger Permit, issued by the Howard County Environmental Health Department, for each truck used in the cleaning of grease interceptors. All waste haulers who provide services for cleaning interceptors in Howard County must complete a Hauler Inspection Report and mail this to the Pretreatment Coordinator at 8900 Greenwood Place, Savage, MD 20763, Howard County Bureau of Utilities.

All waste removed from the grease interceptor must be disposed of at a facility permitted by Maryland Department of the Environment to receive such waste. The user shall be responsible for the proper removal and lawful disposal of the grease interceptor/trap waste.

All FSEs shall be responsible for maintaining written records of grease interceptor maintenance activities on site. These records shall be posted in a prominent area of the kitchen. The building owner(s) shall be responsible for the cleaning and maintenance of shared grease interceptors, not the FSEs contributing to this shared interceptor. Owner(s) of shared grease interceptors shall determine frequency of grease interceptor cleaning to keep accumulated solids and grease levels below the allowed 25% of liquid depth. All records shall be kept and be available, upon request by a County representative. All FSEs and owners of shared grease interceptors shall

submit copies of pump outs and maintenance records to the Pretreatment Coordinator, at 8900 Greenwood Place, Savage, MD 20763, Howard County Bureau of Utilities every six months and shall post Best Management Practices in a prominent area of the kitchen.

5.11.3 COMPLIANCE AND VIOLATIONS

All FSEs are required to follow this policy. Violations of this policy will be enforced as specified in the Howard County Code Section 18.122A (L) Enforcement.

If any FSE is determined to be the source, in whole or in part, of a sanitary sewer blockage or overflow, the FSE or owner of the grease interceptor in a shared facility shall be responsible for any fines levied by the County and against the County from the State of Maryland. Where the grease interceptor is shared, the owner of the grease interceptor shall be responsible for any fines levied by the County or against the County from the State of Maryland. The FSE or owner of the shared grease interceptor shall also be responsible for the cost of cleanup. Any fines levied against a FSE or owner of a shared grease interceptor are not exclusive and the Director may use other methods to remedy the situation, such as the termination of water and wastewater services, legal action, etc. Fines from the State typically range from \$800 to \$10,000 per day. Users are given thirty days to request to stand trial or pay the fine associated with the violation and/or citation. If no response is received within that time, the Pretreatment Coordinator will initiate additional enforcement action based on the nature and extent of the violation.

Typically, FSE will be evaluated based on maintenance, cleaning, compliance, and reported grease/solids depths. The Howard County Bureau of Utilities, Pretreatment staff performs random inspections to determine if the grease and solids depth exceed 25% of the interceptor's liquid depth and/or collect samples for determination of effluent FOG concentrations. Violations and fines may be issued for the failure to clean and maintain grease traps.

5.12 SEPTAGE HAULERS PROGRAM

The only location in Howard County where septage waste can be disposed is the Little Patuxent Water Reclamation Plant. A sewer use surcharge shall be paid by waste haulers discharging to this facility with average daily pollutant concentrations exceeding one or more of the following limits:

Biochemical oxygen demand (BOD)	300 mg/l
Total suspended solids (TSS)	300 mg/l
Total phosphorus (TP)	12 mg/l

Sewer use surcharge rates for BOD, TSS and TP shall be determined by the Director of Public Works prior to the beginning of each fiscal year. Surcharge rates shall be computed using a method provided by the Director and shall be based upon:

- a) The projected operation and maintenance costs for the upcoming fiscal year for treating sewage.

- b) The projected loadings of BOD, TSS and TP for the upcoming fiscal year.

The volume of the septage discharged by waste haulers shall be calculated on either:

- a) The actual volume of sewage discharged as determined by a method acceptable to the Director of Public Works; or
- b) The carrying capacity of the waste hauler's vehicle, if the actual volume of sewage discharged cannot be determined by a method acceptable to the Director of Public Works.

Users of the public sewer system shall, at the request of the Director of Public Works, furnish data covering the source, flow properties, quantity, and quality of the sewage discharged. A random sampling program has been implemented by the Bureau of Utilities to collect samples of delivered septage waste. Samples are analyzed for BOD, TSS, and TP since these parameters are important in categorizing high strength sewage and the relevant surcharges.

5.12.1 PERMITTING PROGRAM

A Sewage Sludge Utilization Permit is required by the State of Maryland Department of the Environment for any person who transports or disposes of septage in Maryland. Septage haulers who want to discharge at the County's facility must obtain an operating permit from the Health Department and a discharge permit from the treatment facility. The discharge permit specifies certain requirements that must be met to authorize the discharge at the plant. The requirements include:

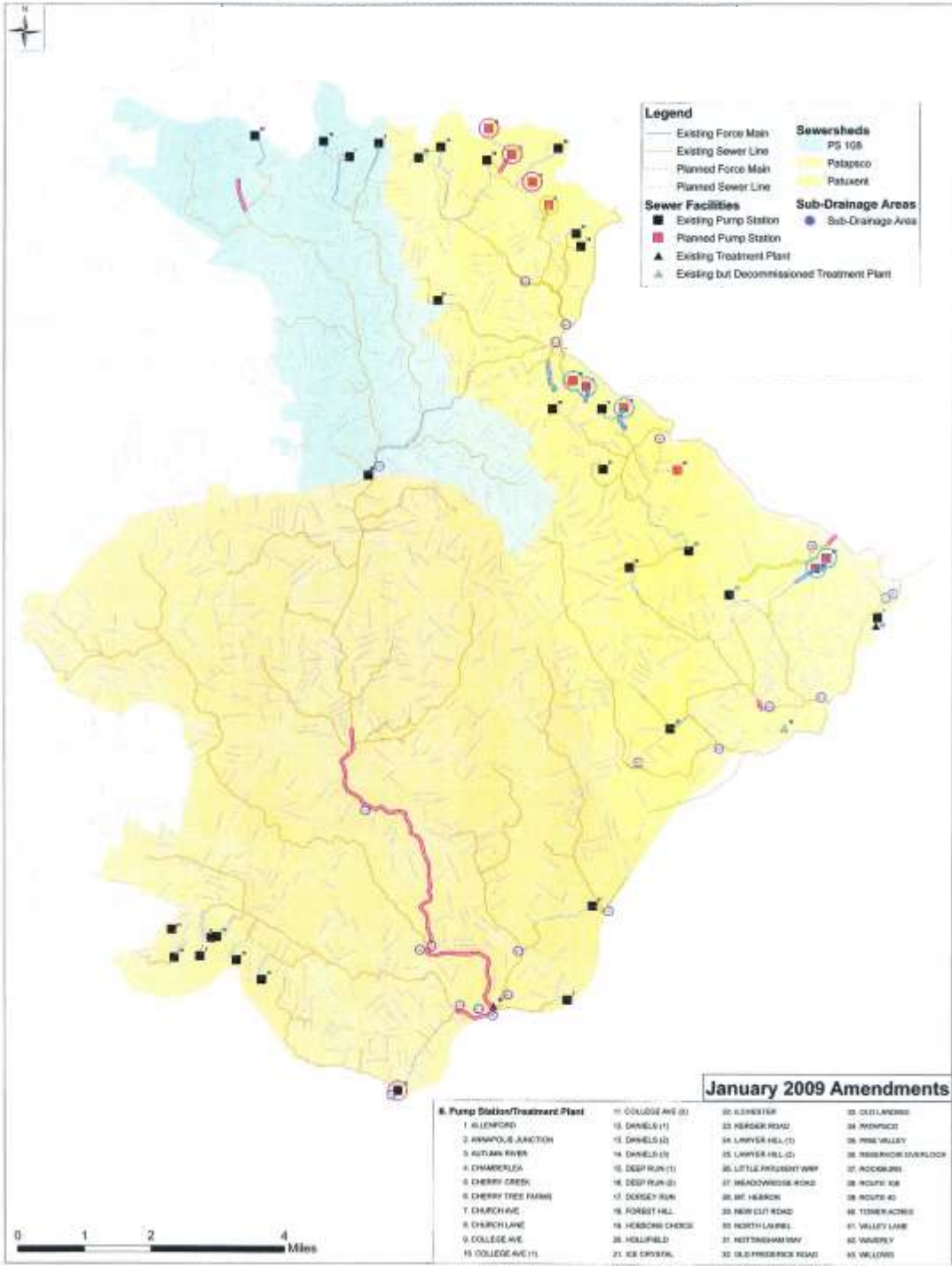
- Maintaining records of the customers serviced.
- Maintaining equipment in good operating condition.
- Following operational procedures while on the plant site.
- Providing the County with a surety to be applied to overdue charges or damages.

Waste haulers shall maintain a customer log which shall identify each customer serviced and shall provide information related to the quality and quantity of the waste collected. The customer log sheet, a copy of the issued permit by the LPWRP, and a copy of the permit issued by the Howard County Health Department shall be carried on the hauling vehicle at all times. It must be present in the septage truck at time of discharge.

5.13 CALL BEFORE YOU DIG PROGRAM

Howard County is a member of the State of Maryland's "One Call Concept" or "Miss Utility" program. The Bureau of Utilities employs a small staff including three full-time locators to handle daily requests to locate and mark public water and sewer lines.

**Figure 1
Pumping Station Locations in Howard County**



**Figure 2
Wastewater Pumping Station Log**

STATION NAME:	WASTEWATER PUMPING STATION												MONTH	YEAR			
	DATE	PUMP			AMMERS	W.W. LEVEL	AFTER PURGE	RUNNING HOURS			FLOW TOTAL	GEN S.P.			AIR TIME	BY	COMMENTE
		1	2	3				1	2	3							
1																	
2																	
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FUEL TANK CAPACITY: _____ LEVEL: _____ DATE: _____

Figure 3
Generator Set Maintenance Activities

Weekly tasks

- Fill out Pumping Station Generator Log (Figure 4)
 - Conduct operating test of generator sets and load transfer switches under load conditions. A 60-minute exercise period is an absolute minimum, and the engine manufacturer's recommendations should be followed.
 - Record all available instrument readings.
- Check the following system or systems, if applicable:
 - Operation of solenoids and regulators
 - Condition of all hoses, pipes, and connections
 - Gasoline/Diesel Fuel System
 - Main tank fuel level
 - Operation of system
 - Day tank fuel level
 - Operation of fuel supply pump and controls
 - Engine Cooling System
 - Coolant level
 - Rust inhibitor in coolant
 - Antifreeze in coolant
 - Adequate cooling water to heat exchangers
 - Adequate fresh air to engine and radiators
 - Condition of fan and alternator belts
 - Functioning of coolant heater
 - Engine Lubricating System
 - Lubricating oil level
 - Appearance of lubricating oil

- Restrictions to crankcase breather
- Quantity of lubricating oil supplies
- Operation of lubricating oil heater
- Oil pressure
- Engine Electrical Starting System
 - Battery terminals
 - Distilled water level
 - Battery charging rate
 - Battery trickle charging circuit
 - Specific gravity in all cells
 - Charge of spare batteries
- Engine Compressed Air Starting System
 - Air compressor
 - Air compressor lubricating oil level
 - Main compressed air tanks
 - Spare compressed air tanks
 - Drain water from compressed air tanks
- Engine Exhaust System
 - Condensate trap drained
 - Exhaust leaks
 - Exhaust restrictions
 - Connections tight
- Transfer Switch
 - Inside clean and free of foreign matter
 - Unusual sounds
 - Terminals and connectors color

- Wiring insulation condition
- Covers condition
- Access doors latching
- General
 - Unusual vibration, deterioration, leakage, or high surface temperatures or noise
 - Maintenance manuals, service log, basic service tools, jumpers, and supplies readily available
 - Check and record the time intervals of automatic start up and shutdown sequences
 - Overall cleanliness of room
 - No unnecessary items in room
 - Check that the standby system is set for automatic start and load transfer
 - After the weekly test, take prompt action to correct all improper conditions

Quarterly tasks

- Engine Electrical Starting System
 - Battery cap vents
- Engine Lubricating System
 - Lubricating oil or have analyzed if part of an engineered lube oil program
- Fuel System
 - Drain water from fuel filters (if applicable)
 - Drain water from day tank (if applicable)
 - Check fuel gauges and drain water from main fuel tanks
 - Inspect all main fuel tank vents
 - Drain water from fuel filters (if applicable)
 - Drain water from day tank (if applicable)

Semi-Annually

- Engine Lubricating System
 - Change oil filter, if there are sufficient hours
 - Clean crankcase breather
- Fuel System
 - General inspection of all components
 - Change fuel filter
 - Change or clean air filter
- Governor
 - Check all linkages and ball joints
 - Check oil level (if applicable)
 - Observe for unusual oil leakage
- Engine Safety Controls
 - Check operation of all engine operating alarms and safety shutdown devices (generator not under load during this check).
- Main Switchgear and Generator Switchgear
 - Operate every circuit breaker manually
 - Visually check bus bars, bracing, and feeder connections for cleanliness and signs of overheating.

Annually

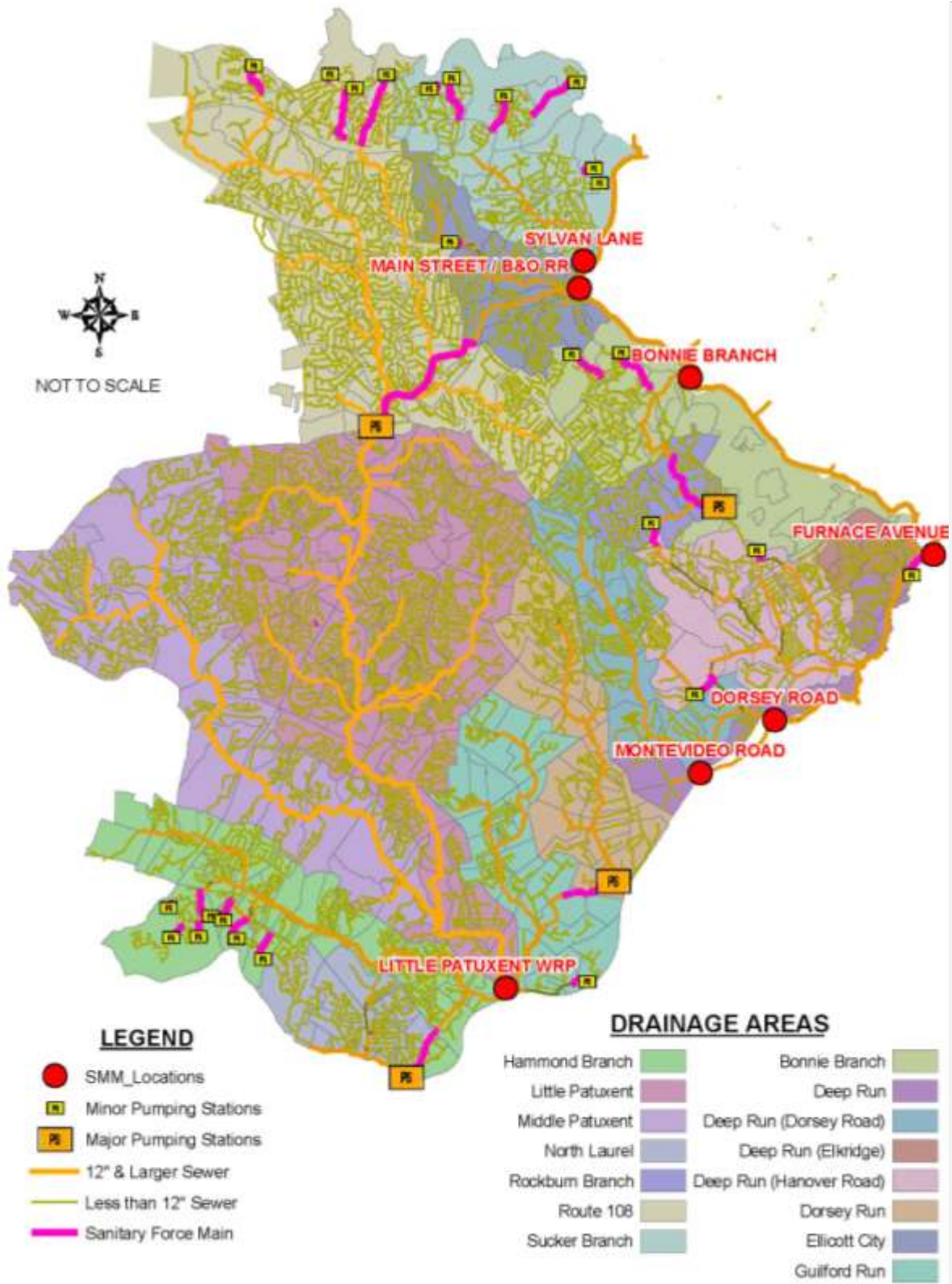
- Gasoline/Diesel Fuel System
 - Replace fuel
 - Analyze fuel for condition (replace if required)
- Lubricating Systems
 - Change oil
 - Change oil filter
 - Replace carburetor air filter

- Cooling system
 - Check condition and rod out heat exchangers, if necessary
 - Change coolant on closed systems
 - Clean exterior of all radiators
 - Check all engine water pumps and circulating pumps
 - Examine all duct work for looseness
 - Clean and check motor-operated louvers
- Exhaust System
 - Check conditions of mufflers, exhaust lines, supports, and connections
- Ignition System
 - Spark ignition engines
 - Replace points and plugs
 - Check ignition timing
 - Check condition of all ignition leads
- Generator
 - Clean generator windings
 - Check generator bearings
 - Measure and record resistance readings of generator windings using insulation tester (megger)
- Engine Control:
 - General cleaning
 - Check appearance of all components
 - Check meters
- Transfer Switch:
 - Inspect contacts and replace if indicated

Every Three Years

- System Controls:
 - Re-evaluate the settings of the voltage sensing and time delay relays
- Main Switchgear and Generator Switchgear
 - Determine if changes to the electrical supply system have been made that require a revision of the main circuit breaker, fuse, or current limiting bus duct coordination
 - Calibrate and load test main circuit breakers
 - Spot check bus bar bolts and supports for tightness
 - Obtain and record insulation tester reading on bus bars and circuit breakers
 - Obtain and record insulation tester readings on internal distribution feeders

**Figure 6
Sewage Master Meters**



**Figure 7
Sample Service Request Detail**

Howard County Bureau of Utilities 8270 Old Montgomery Road Columbia, MD 21045-0000 (410)313-4900 Fax (410)313-4989		Service Request Detail	
Report Date	11/06/2007 08:05 AM	Submitted By	Page 1
Service # 56026			
Problem PS PLUGGED SEWER			
Address 2822 MONTCLAIR DR ELLICOTT CITY MD 21043-0000			
Call Date	11/05/2007 08:18	Priority	1 URGENT
Taken By	098 KING, LINDA	Responsibility	CI COMPLAINT INVESTIGATOR
Source	TP	Project	
<input type="checkbox"/> Customer Contact Requested		Budget #	
Service Request Progress			
Schedule	(resolved)		
Inspect	Inspected from 11/05/2007 08:30 AM to 11/05/2007 10:00 AM by 135 MARK HOFFMAN		
Resolve	Resolved at 11/05/2007 10:00 AM with code CS CUSTOMER SERVICE RESPONSIBLE. No work orders are required.		
Location		Sub-Area	
Area		Map #	
District		A/P #	
Parcel			
Template Type			
Asset			
Primary Caller			
Name	PUGLIESE		
First,MI	AL,	Title	
Address			
City			
State/Province			
Country	<input type="checkbox"/> Foreign	ZIP/PC	
E-Mail			
Day Phone	(410)313-8191 x	Evening Phone	
Call Date	11/05/2007 08:18	Taken By	098
Comments	PS		
Call List			
There are no additional callers for this service number			
Log	Description	Log Started	Log Ended
Log Type			Entered By
Comments			
A	ACTION	11/05/2007 10:00	135
Plugged between cleanout and house. TV insp SHC due to previous H.O. and County root problem, did not find a problem at this time. Will schedule for 2008 chemical root treatment.			
Inspected		Resolution	
By	Date	Code	Date
	Time		Time
Scheduled Resources			
Employee ID	Scheduled Start	Scheduled End	Work Description
No resources scheduled.			

Sample

Figure 8 Weekly Sewer Report

WEEKLY SEWER REPORT

WEEK OF _____

PROGRAM	CODE	MON	TUE	WED	THU	FRI	SAT	SUN	TOTAL
Sewer Cleaning & Inspections (FT)	20-A								
Operator:									
Operator:									
Operator:									
Operator:									

Weekly Total (FT)

Plugged Sewer Mains	20-B								
Sewer Cleaning & Inspections Inquires and complaints	20-G								
Plugged SHC-County	20-H								
Plugged SHC-Owner	20-W								
TVD New Sewer Mains(ft)	21-B								
TVD Sewer Mains(ft)	21-C								
Sewer Manhole Inspections	21-D								
Smoke Test	21-O								
TVD SHC	21-Q								
SHC Repairs	22-B								
Clean-out Repairs	22-C								
Sewer Main Repairs	22-F								
Sewer Inquiry & Complaints	22-G								
SHC Installed	22-H								
Sewer Right of Ways	22-I								
Cluster Sewers	22-P								
Manhole Repairs	22-W								

COMMENTS

sewerms04

**Figure 9
Sample Sewer Card**

HOWARD COUNTY BUREAU OF UTILITIES

SEWER MAINTENANCE

PLAT NO. 533 S

LOCATION OUTFALL "D"

FROM M.H. NO. 7323

TO M. H. NO. 7282

SIZE OF PIPE 8"

LENGTH 214.70'

Maintenance and Inspection Record

DATE	WORK DONE	JOB NO.	OK	BY	DATE	WORK DONE	JOB NO.	OK	BY
10-31-86	INSP		✓	BR	2-19-98	Checked with Root Cutter		✓	KK
11-15-86	"		✓	SL	10-2-98	cleared to manhole			BL
	"		✓	KK	6-7-99	cleaned with Potator + chemical		✓	BL B.S.
1/18/89	"		✓	JM	3/27/01	CLEANED/GREASE		✓	M.H.
4-2-90	"		✓	BR	2-5-03	Inspected		✓	RC HD
7-15-92	"		-	BL	11/13/03	Cleaned		✓	KK
5-7-93	"		-	BR	9/14/04	INSP ^{HEAVY DEBRIS} TO MH 7282			B.L.
8-3-96	"		✓	KK	7/25/05	insp		✓	JH
3-12-99	cleared ROOT CUTTER		✓	BR	6/19/06	INSP		✓	B.L.

PWW&S - 8

Sample

HOWARD COUNTY BUREAU OF UTILITIES

SEWER MAINTENANCE

PLAT NO. 533 S

LOCATION OUTFALL "D"

FROM M.H. NO. 7324

TO M. H. NO. 7323

SIZE OF PIPE 8"

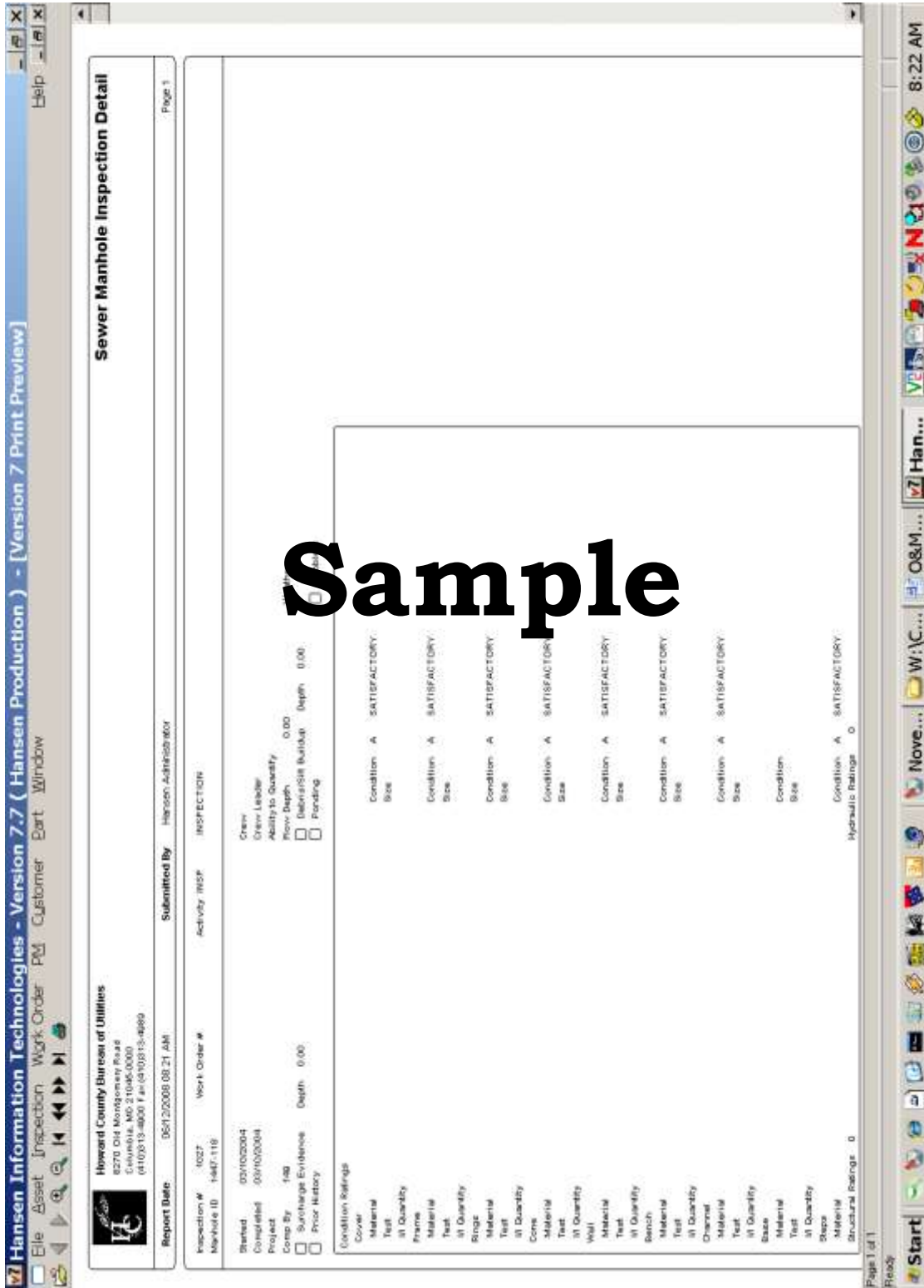
LENGTH 125.30'

Maintenance and Inspection Record

DATE	WORK DONE	JOB NO.	OK	BY	DATE	WORK DONE	JOB NO.	OK	BY
5-7-93	MH 7324 Plugged		✓	R.J.	5-7-93	insp		-	BR
10-18-84	CLEANED		✓	BR	2-2-95	Plugged - Cleaned		✓	KK
	Cleaned - Plugged		✓	KK	5-3-96	" used CUTTER		✓	KK
	Cleaned - "		✓	BR	3-12-99	CLEANED WITH ROOT CUTTER		✓	B.L. M.H.
	Cleaned - T.V.		✓	M.H.	2-9-98	"		✓	KK
	INSP		✓	KK	10-2-98	Inspected person in the sewer			BL
1/18/89	"		✓	JM	6-7-99	cleaned with Potator + chemical		✓	B.L. B.S.
3-13-90	"		-	BR	2-5-03	Inspected		✓	RC HD
7-15-92	"		-	BL	11/13/03	Cleaned		✓	KK

PWW&S - 8

Figure 10
Sewer Manhole Inspection Detail



**Figure 12
Sample TV & Grouting Log**

**DEPARTMENT OF PUBLIC WORKS
BUREAU OF UTILITIES
TV & GROUTING LOG**

Type # _____
 Development _____
 Pipe Condition good
 Pipe 12 Type AC
 Joint Type _____
 Date 4/10/08
 Location outfall mission rd
 Contract 322
 Manhole Condition good
 Inspector Hoffman
 Foreman _____



MEASUREMENT IS FROM CENTER TO MANHOLE

Distance	Area	Counter #	Remarks	Chemical Used
8'		0.00	4 of MH # 4124	
102'		1.06	infiltration present	

Figure 13
Flow Meters/Rain Gauges for Little Patuxent Parallel Sewer

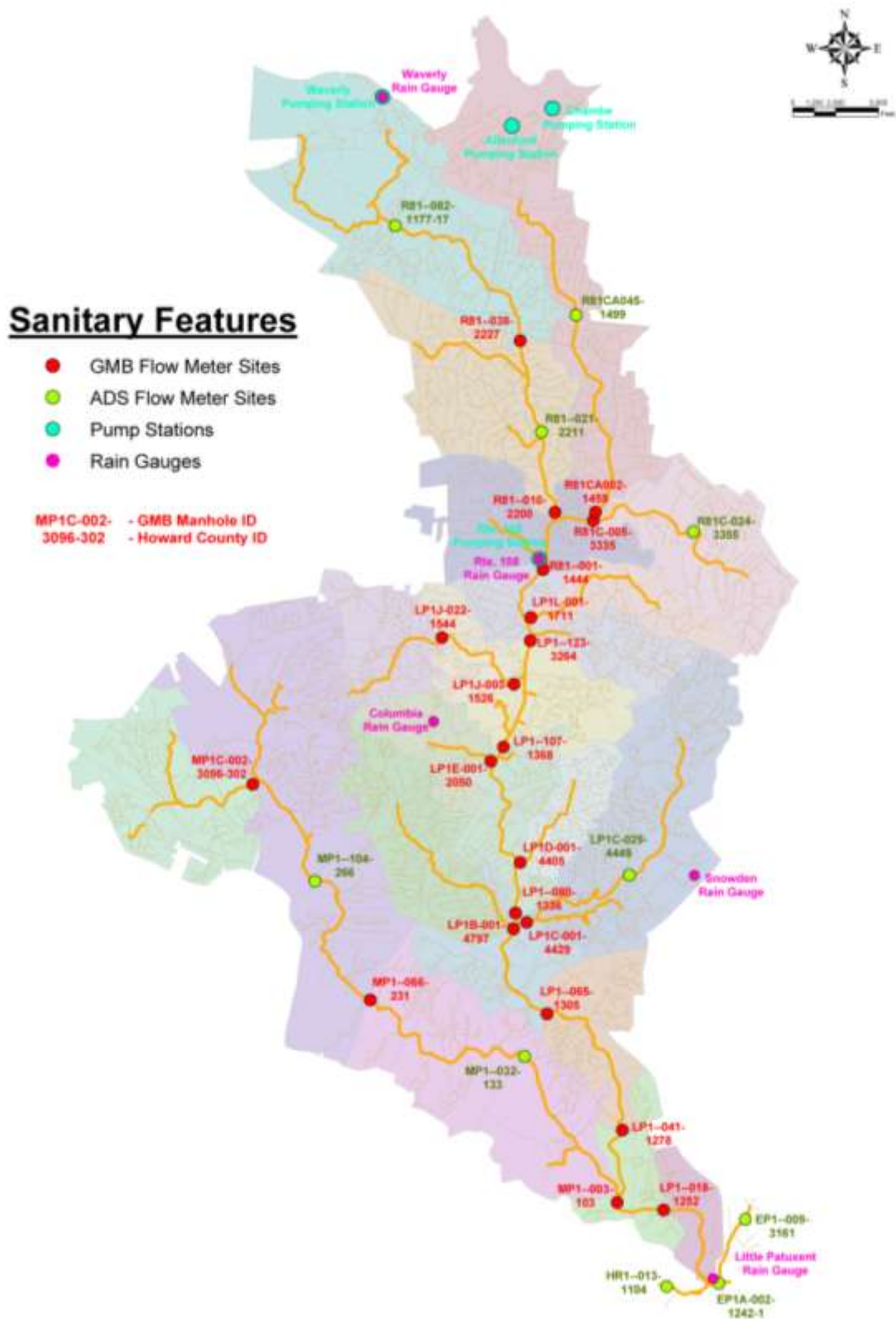


Figure 14
Flow Meters/Rain Gauges for Patapsco Sanitary Sewer Area Assessment
January 2006

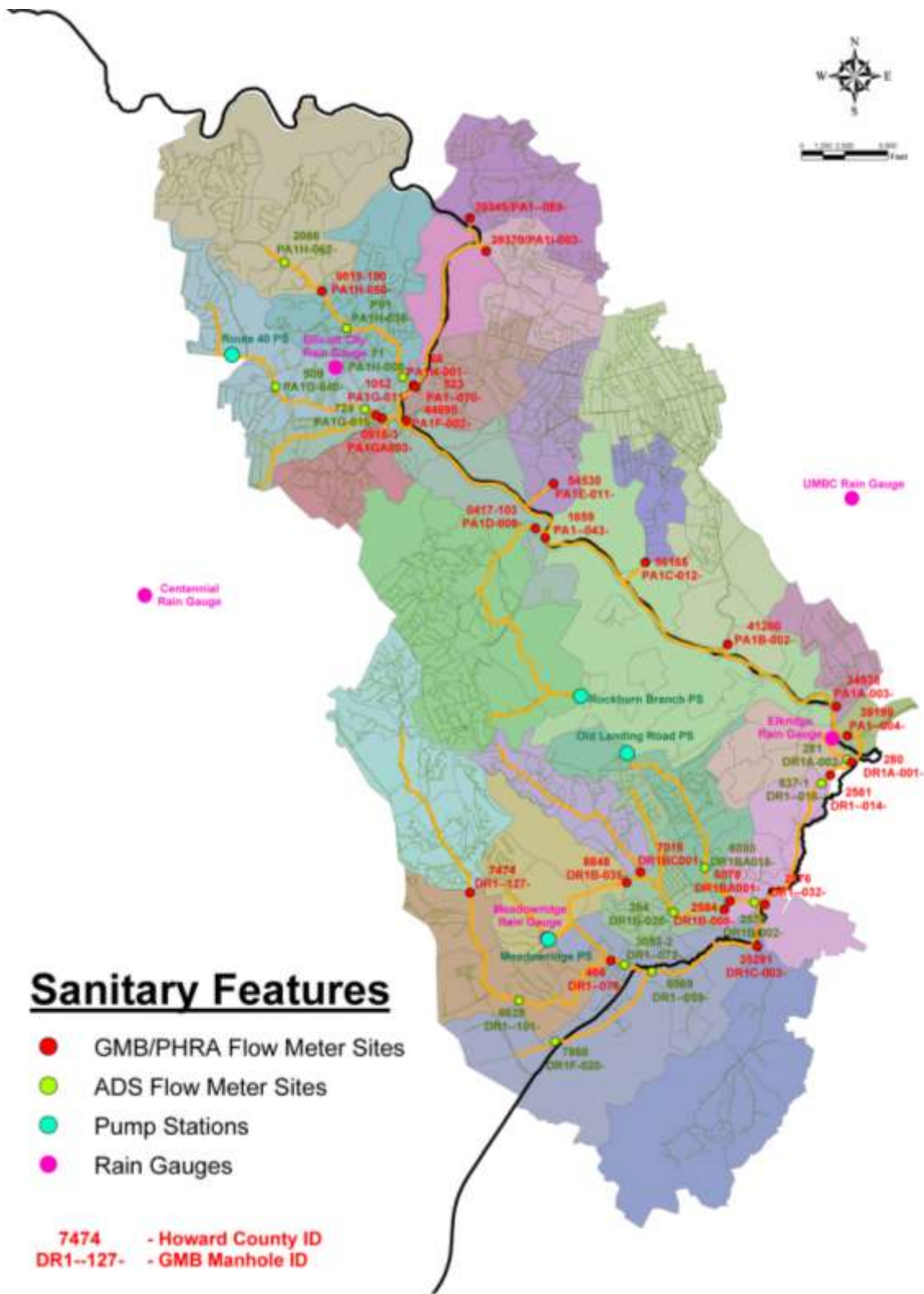


Figure 15
Flow Meters/Rain Gauges for Patapsco Sanitary Sewer Area Assessment
July 2007

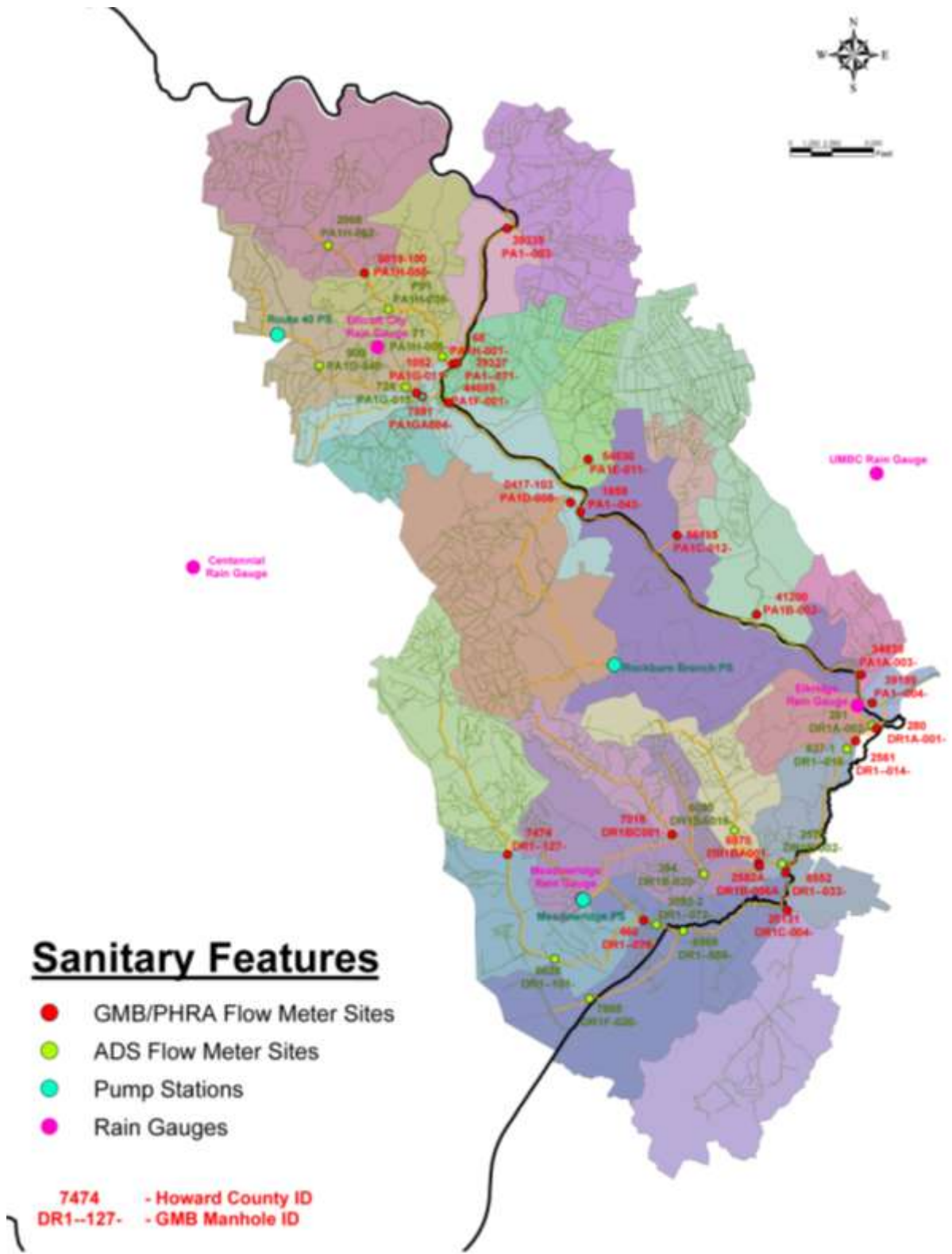


Figure 16
Flow Meters/Rain Gauges for Hammond Branch/Guilford Run Sanitary Sewer Area Assessment

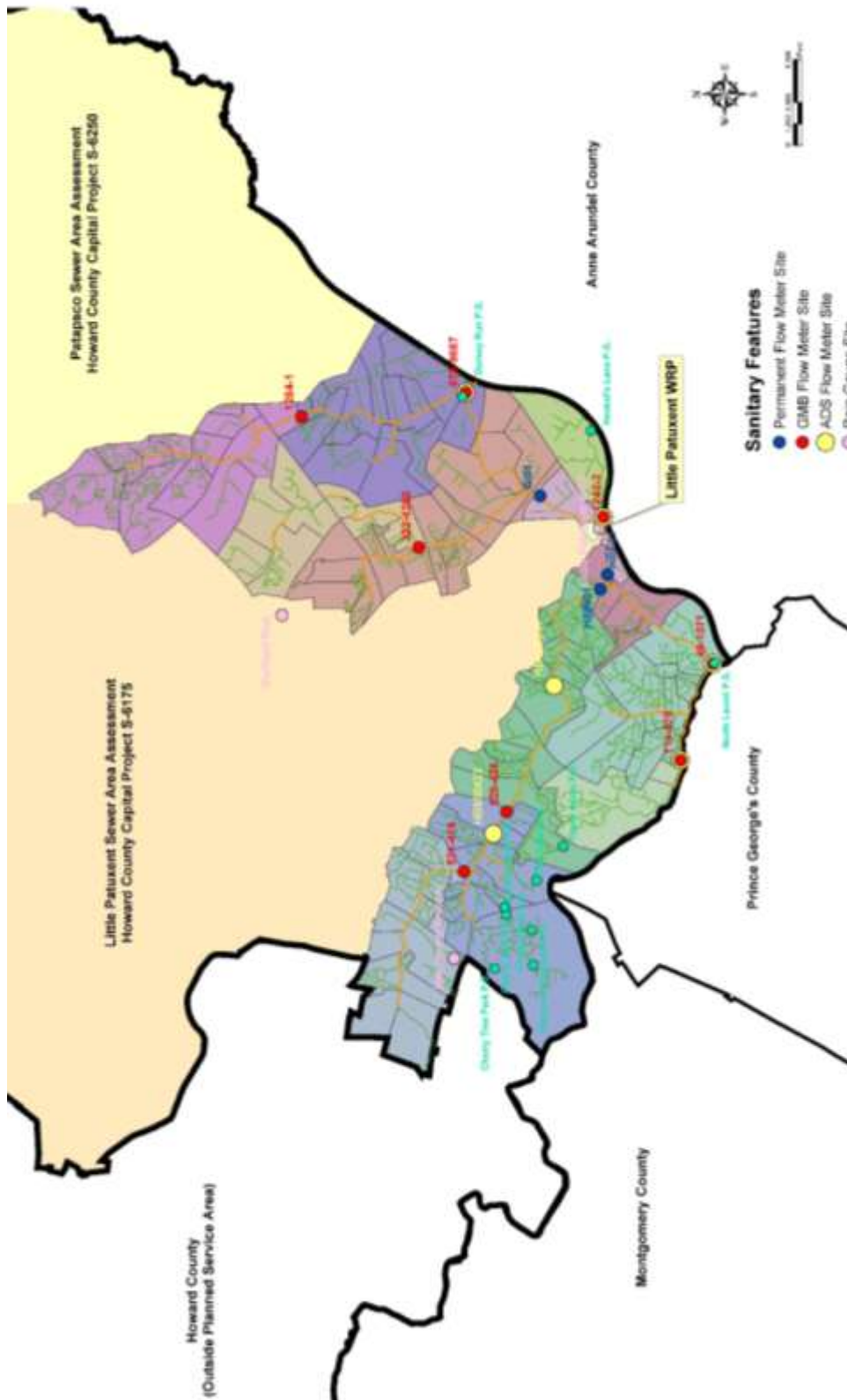


Figure 17
Sample Smoke Testing Door Hanger

HOWARD COUNTY
BUREAU OF UTILITIES
8250 Old Montgomery Rd.
Columbia, MD 21045

Dear Resident:

Public Works is conducting smoke tests in your area to locate sources of storm water inflow into the sanitary sewer. Rain storms can overload the sewage system, which may cause sewage to back up into basements. By locating and correcting these problems, the Bureau of Utilities can greatly reduce the possibility of this happening in your area.

Within the next 7 days the Bureau of Utilities' employees will be forcing a nontoxic smoke into the sewer to locate system defects. This is an "EPA" approved method of testing the sewer, It has been used for many years with a minimum of inconvenience. ***YOU WILL NOT HAVE TO BE HOME WHEN THE SMOKE TESTS ARE BEING CONDUCTED.***

In order to prevent smoke from entering your home you should run water through all *infrequently* used sinks, tubs and drains. Fixtures used on a daily basis should already have sufficient water in the trap to prohibit any smoke intrusion.

SHOULD SMOKE ENTER YOUR HOME, IT IS NOT HARMFUL TO HUMANS, PETS OR FABRICS.

The Howard County Fire Department has been notified and the Howard County Police will be able to confirm identification of employees involved in the smoke tests.

Your cooperation in keeping dogs confined and making your property accessible to the inspectors is appreciated.

If you need any assistance or further information regarding this survey, please telephone 410-313-4900.

Figure 20
Sample Sewer System Investigation Deficiency Letter



Department of Public Works
BUREAU OF UTILITIES

Stephen C. Gerwin, Bureau Chief

Sample

Dear Owner:

Subject: Sewer Cleanout Standpipe

During an investigation of the sewer system, it was noted that your cleanout pipe was damaged/broken.

This condition can cause storm water to drain into the public sewerage system creating an excessive amount of flow within the system. In order to safeguard the operation of the system and to prevent expensive construction costs to increase capacities, each resident in the community must cooperate in repairing their privately owned and maintained cleanouts.

Section 18.122 A paragraph (F)(2) of the Howard County Code states: "..... No sewer system user shall discharge or cause to be discharged to the public sewerage system, storm water, surface water, groundwater," This letter is the required notification in compliance with Section 18.122 A of the code of the need for corrective repairs.

This type of repair requires a plumbing permit. Please contact a licensed plumber to make the necessary repairs. Please notify us in writing the name of the plumber engaged to perform the repair within thirty (30) days of receipt of this notification.

Please do not hesitate to contact the Bureau at 313-4900 for answers to any questions concerning this matter.

Very truly yours,

Stephen C. Gerwin
Chief

Figure 21
Sample Sewer System Investigation Deficiency Letter



Department of Public Works
BUREAU OF UTILITIES

Stephen C. Gerwin, Bureau Chief

Sample

Dear Owner:

SUBJECT: Sewer Cleanout

During an investigation of the sewer system, it was noted that your cleanout was damaged/missing.

This condition can cause storm water to drain into the public sewerage system creating an excessive amount of flow within the system. In order to safeguard the operation of the system and to prevent expensive construction costs to increase capacities, each resident in the community must cooperate in repairing their privately owned and maintained cleanouts.

Section 18.122 A paragraph (F)(2) of the Howard County Code states: "..... No sewer system user shall discharge or cause to be discharged to the public sewerage system, storm water, surface water, groundwater, . . ." This letter is the required notification in compliance with Section 18.122 A of the code of the need for corrective repairs.

This type of repair does not require a plumbing permit. The attached form is provided for your use and information. When corrective actions are complete, please return the form to the Bureau. If you require technical assistance in affecting the repairs, please complete the form as required. In accordance with Section 18.122 A of the code, please return the form within thirty (30) days.

Please do not hesitate to contact the Bureau at 313-4900 for answers to any questions concerning this matter.

Very truly yours,

Stephen C. Gerwin
Chief

**Figure 22
Confined Space Entry Permit**

BUREAU OF UTILITIES CONFINED SPACE ENTRY PERMIT

DATE _____ DURATION _____ EXPIRES ON _____
 LOCATION OF CONFINED SPACE _____
 CONTRACT NO. _____ MANHOLE NO. _____ ACCOUNT NO. _____
 PURPOSE OF ENTRY _____
 AUTHORIZED ENTRANTS _____

ATTENDANT _____

MEASURES FOR ISOLATING & EQUIPMENT	YES	NO
LOCKOUT - DE-ENERGIZE - TAGOUT EQUIPMENT		
LINE(S) BROKEN - CAPPED - BLANKED		
VENTILATION		
SECURE AREA		
TRAFFIC CONTROL		
FULL BODY HARNESS W/"D" RING		
TRIPOD EMERGENCY ESCAPE UNIT		
LIFELINES		
COMMUNICATIONS RADIO		
PROTECTIVE CLOTHING		
HEAD / EYE / HEARING PROTECTION (CIRCLE TYPE)		
HOT WORK PERMIT REQUIRED		
FIRE EXTINGUISHERS		

COMMENTS: _____

ATMOSPHERE MONITORING

TESTS TO BE TAKEN	ACCEPTABLE ENTRY CONDITIONS*	1	2	3	4	5	6	7	8
		TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME
		____.M.	____.M.	____.M.	____.M.	____.M.	____.M.	____.M.	____.M.
OXYGEN	19.5 - 23.5%								
COMBUSTIBLE GAS	BELOW 10% LEL								
HYDROGEN SULFIDE	0 - 10 PPM**								

INDIVIDUAL CONDUCTING TEST _____

INSTRUMENT USED TO TEST ATMOSPHERE _____

IN CASE OF EMERGENCY CALL: UTILITIES 99

PERMIT AUTHORIZED BY: _____

LEL = LOWER EXPLOSIVE LIMIT PPM = PARTS PER MILLION

* AS LISTED IN 1992-93 THRESHOLD LIMIT VALUES PUBLISHED BY AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS
 ** PERMISSABLE EXPOSURE LIMITS LISTED IN OSHA 29CFR 1910.1000

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
A. Routine Assessment				
1. Right-Of-Way Cleaning and Mowing				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				

**Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule**

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				
2. Above-Ground Sewer Inspection				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
------	----------------	----------------	----------------	--------------------

3. Flow Metering				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				
4. Night-Time Flow Isolation				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
------	----------------	----------------	----------------	--------------------

5. Manhole Inspection				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				

**Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule**

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				
B. Closed Circuit Television Inspection Collector Sewers (12 inches and less)				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
------	----------------	----------------	----------------	--------------------

C. Cleaning of Collection Sewers (12 inches and less)				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				

**Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule**

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				
D. Closed Circuit Television Inspection of Interceptor Sewers (greater than 12 inches)				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				

**Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule**

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
------	----------------	----------------	----------------	--------------------

E. Sewer Repairs				
1. Point Repair				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				
2. Replacement				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
------	----------------	----------------	----------------	--------------------

3. Lining				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				
F. Manhole Cleaning				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				

**Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule**

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
------	----------------	----------------	----------------	--------------------

G. Manhole Repairs				
1. Buried Manholes				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				

**Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule**

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				
2. Shifted & Misaligned Manhole Frames				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
------	----------------	----------------	----------------	--------------------

3. Rehabilitation				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				

**Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule**

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				
H. Pumping Station Inspections				
1. Air Release/Vacuum Valve Maintenance				
<i>Little Patuxent Service Area</i>				
a. Route 108				
b. Little Patuxent				
c. North Laurel				
d. Hammond Branch				

Table 1
Wastewater Program Assessment, Inspection & Maintenance Task Schedule

Task	Date Scheduled	Date Completed	Area Completed	Noted Deficiencies
e. Guilford Run				
f. Middle Patuxent				
g. Dorsey Run				
<i>Patapsco Service Area</i>				
a. Sucker Branch				
b. Ellicott City				
c. Bonnie Branch				
d. Rockburn Branch				
e. Deep Run				
f. Deep Run (Dorsey Road)				
g. Deep Run (Hanover Road)				
h. Deep Run (Elkridge)				

**Table 2
Temporary Flow Metering Program**

Project/Location	Equipment Installed	Duration
2001 Flow Metering	30 Flow Meters 4 Rain Gauges	March 2001 – July 2001
Long-Term Flow Metering	5 Flow Meters 1 Rain Gauge	Continuous since 2001
Little Patuxent Parallel Sewer	21 Flow Meters 5 Rain Gauges	March 2001 – July 2001
Little Patuxent Sewer System Evaluation Survey	11 Flow Meters 2 Rain Gauges	March 2003 – June 2003
Patapsco Sewer Area Assessment – Round 1	24 Flow Meters 4 Rain Gauges	December 2004 – October 2004
Patapsco Sewer Area Assessment – Round 2	23 Flow Meters 5 Rain Gauges	January 2007 – April 2007
Hammond Branch / Guilford Run Sewer Area Assessment	8 Flow Meters 3 Rain Gauges	March 2006 – July 2006
Hammond Branch / Guilford Run Sewer Area Assessment	10 Flow Meters 3 Rain Gauges	February 2008 – June 2008
Patapsco Flow Metering and Hydraulic Modeling	31 Flow Meters 5 Rain Gauges	February 2010 – November 2010
Hammond Branch / Guilford Run Flow Metering and Hydraulic Modeling	16 Flow Meters 3 Rain Gauges	February 2010 – October 2010
Hammond Branch / Guilford Run Sewer System Evaluation Survey	14 Flow Meters 2 Rain Gauge	October 2010 –
Patapsco Sewer System Evaluation Survey	13 Flow Meters 2 Rain Gauges	October 2010 –

**Table 3
Howard County Sewer Capital Improvements Program**

Capital Project Number	County Priority Assigned	Coordinate Location	Description	Project Costs (\$)			Project Schedule			Project Purpose
				Total	PL660 Eligibility	Local	Prelim. Plans	Start Const.	Complete Const.	Project Description for Rehabilitation, Capacity, I/I, and Fog
S-6175	Under Const.	1360-541	A project for the study, design and construction of the Little Patuxent Parallel Interceptor.	78,230,000	-	78,230,000	2006	2009	2013	Project is to provide relief from surcharges and SSO's in the Little Patuxent Interceptor Sewer
S-6189	0-5 Years ¹	1363-524	A project for the design and construction of improvements to the North Laurel Sewage Pumping Station to increase the pumping capacity of the station.	6,530,000	-	6,530,000	2004	2009	2011	Project is to provide additional pumping capacity and eliminate SSO's at the pumping station
S-6232	Under Const.		A project to televise sewer pipes in the County's sanitary sewer system for evidence of corrosion. This project will affect repairs area where corrosion has compromised the integrity of the system.	7,875,000	-	7,875,000	on-going	on-going	on-going	Project to television inspect existing County Sewers for evidence of corrosion in order to eliminate SSO's resulting from defective pipe
S-6245	Under Construction	1365-531	A project to reduce nitrogen loading from the Little Patuxent Sewer Basin.	135,862,000	-	135,862,000	2008	2010	2012	Project for ENR upgrade to the Little Patuxent Water Reclamation Plant, also to include enhanced electrical and mechanical backup to prevent SSO's resulting from dual electrical feeder loss
S-6250	Underway		A project for study and evaluation of the County's Patapsco Sewer Service Area from the Daniels Area to the Deep Run.	930,000	-	930,000	2004	2008	2011	Project for Development of Sewer Model for the Patapsco Basin, for identification and elimination of sources of I/I and possible SSO's as well as SSES report Development
S-6255	Underway		A project for the study and evaluation of Hammond Branch and Guilford Run sewer service areas.	625,000	-	625,000	2008	2008	2011	Project for Development of Sewer Model for the Hammond and Guilford sewer Basin, for identification and elimination of sources of I/I and possible SSO's as well as SSES report Development
S-6267			A project to determine the water and sewer use patterns for residential and commercial properties within the Howard County Metropolitan District.	250,000	-	250,000	2008	2008	2011	This project is used to determine sewer use patterns for better modeling of the sewer system, resulting in SSO reduction.
S-6268			A project to protect and stabilize sewers in areas where stream and soil erosion have compromised the integrity of the sewer system to convey wastewater to the County's treatment facilities.	4,930,000	-	4,930,000	on-going	on-going	on-going	This project is used rehabilitate interceptor sewers following stream banks where the sewers have become exposed. This project will result in a reduction in SSO's due to damaged sewers.
S-6271	0-5 Years	1386-555	Construction of 1,000 ft. of parallel interceptor to the Deep Run interceptor between manholes 387 and 383.	975,000		975,000	2010	2011	2012	This project is to increase the flow carrying capacity of the Deep run Interceptor to meet future demands, including flows from AA County, and eliminate SSO's.

**Table 3
Howard County Sewer Capital Improvements Program**

Capital Project Number	County Priority Assigned	Coordinate Location	Description	Project Costs (\$)			Project Schedule			Project Purpose
S-6274	0-5 Years		Upper Little Patuxent Parallel Sewer. 2,000 ft. of parallel sewer main.	1,500,000	-	1,500,000	2015	2017	2019	This project is to increase the flow carrying capacity of the Little Patuxent Interceptor, in accordance with future flow projections in the Howard County Master Water and Sewer Plan, and eliminate SSO's.
S-6709			A project to provide engineering service, inspection testing, inspector training, supplies and equipment including vehicles necessary for site inspection for the implementation of developer projects to make additions to the public water and sewer systems.	2,500,000	-	2,500,000		2010	2011	This is an ongoing project for the inspection of developer constructed sewer projects to ensure adherence to Howard County Design Manual specifications in order to eliminate faulty construction based SSO's.
S-6276	Under Const	System wide	Howard County Sewer Cleaning Project	517,000		517,000	2011	On-going	On-going	This project is to provide additional funding resources for outside firms to clean Howard County collector and interceptor sewers.
S-6264	Under Const	LPWRP	Little Patuxent Water Reclamation Plant Improvement Project - Improvements to septage receiving facilities	1,100,000		1,100,000	2010	2011	2011	This project is to enhance the septage (and grease-trap waste) acceptance facility at the Little Patuxent Water Reclamation Plant. These improvements should make taking these waste products much easier and encouraging more regular maintenance of privately owned grease traps.

	Scheduled Improvements
	0-5 years (2010)
	6-10 years (2015)
	11-15 years (2020)
	Project Related to I/I, Fog, and SSO Reduction

Chapter 6 – Design and Performance

6.1 DESIGN AND PERFORMANCE PROVISIONS – GENERAL

Howard County has issued several documents that describe the necessary procedures and components for the design and rehabilitation of the sewage collection system and other sanitary sewage facilities. These documents are the Howard County: Design Manual Volume I Storm Drainage (2006), Design Manual Volume II Water and Sewer (2003), Design Manual Volume III Roads and Bridges (2006), and Design Manual Volume IV Standard Specifications and Details for Construction (2007).

6.2 DESIGN AND PERFORMANCE DOCUMENTS

6.2.1 HOWARD COUNTY DESIGN MANUAL VOLUME I STORM DRAINAGE

This document was revised in June 2006 and provides the criteria, standards, methods, computations, coefficients, and data for the design of storm drainage systems by the design professional and developer. The range of topics covered by the manual include: Introduction, Review and Approval Procedures, Hydrology, Hydraulics, Stormwater Management, Floodplain Management, and Sediment and Erosion Control.

6.2.2 HOWARD COUNTY DESIGN MANUAL VOLUME II WATER AND SEWER

This document was revised in May 2003 and serves as a guide for producing design documents acceptable to the Department of Public Works for water and sewage facilities. It addresses details of the design process, such as computational techniques and allowable design options, tables, figures, and listings of design coefficients. The range of topics covered by the manual include: Introduction and General Information, Engineering Reports, Water Main Design, Sewer Main Design, Common Design Guidelines, Wastewater Pumping Station Design, Water Pumping Station Design, Alternate Sewer Systems, and Appendix.

6.2.3 HOWARD COUNTY DESIGN MANUAL VOLUME III ROADS AND BRIDGES

This document was revised in October 2006 and provides the criteria and standards for the design of a safe, efficient, and coordinated road system. The range of topics covered by the manual include: Introduction and General Information, Design of Roads, Design of Bridges, Retaining Walls and Small Structures, Adequate Road Facilities Test Evaluation Requirements, and Traffic Studies.

6.2.4 HOWARD COUNTY DESIGN MANUAL VOLUME IV STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION

This document was revised in May 2007 and contains descriptions of public works construction products from administrative to technical subjects. The range of topics covered by the manual includes:

- General Conditions
- Category 100 Preliminary
- Category 200 Grading
- Category 300 Drainage
- Category 400 Structures
- Category 500 Paving
- Category 600 Shoulders
- Category 700 Landscaping
- Category 800 Traffic
- Category 900 Materials
- Category 1000 Utility Construction
- Category 1100 Subdivision
- Details (General, Water, Reclaimed Water, Sewer, Shared Septic, Storm Drain, Roadway, Traffic, Landscape, and Corrosion Control)

6.2.5 OTHER REFERENCES

Howard County also makes use of state-issued design documents including: Standard Specifications for Construction and Materials (2001) and Highway Drainage Manual (1981) by the Maryland State Highway Administration, Maryland Stormwater Design Manual (2000) and the Maryland Standards and Specifications for Soil Erosion and Sediment Control (1994) by the Maryland Department of the Environment.

6.3 WASTEWATER SYSTEM

6.3.1. GRAVITY SEWER MAINS

The design of gravity sewer mains is found in Chapter 4 of the Howard County Design Manual Volume II Water and Sewer. Sewers are designed to handle the design flow rate for the service area. The design flow rate is the sum of the peaked residential, institutional, commercial, and industrial flow rates for the area including an allotment for infiltration and inflow in the service area. The pipelines are sized using the Continuity Equation¹ and a minimum velocity of 2.5 feet per second (fps). The minimum slope, coefficients, pipe material, pipe alignment, and manholes are required to be designed in accordance with the Design Manual.

¹ The Continuity Equation is $Q = V * A$

6.3.2. FORCE MAINS AND PUMPING STATIONS

The design of a force main shall be coordinated with the pumping station design meeting the standards found in Chapters 4 and 6 of the Howard County Design Manual Volume II Water and Sewer. The force main and pumping station are sized to transport the design flow rate at a velocity between 2.5 to 6 fps in the force main. Force main design should include a proposed alignment and profile, system curve, and hydraulic grade line and indicate the pipe size, clearances, materials, joints and fittings, and appurtenances as required in the Design Manual. Pumping stations must be designed to meet the requirements of the Design Manual when determining the site design, structures, equipment, electrical equipment and controls, and odor control.

Chapter 7 – Sewage Overflow Response Plan

7.1 GOALS AND OBJECTIVES

Unforeseen events will occur that require the County to quickly and efficiently mobilize personnel and equipment to respond to those events which can possibly impact the citizens of Howard County. When the Bureau of Utilities confirms that a sewage overflow event has occurred, it is the responsibility of the Bureau of Utilities to immediately dispatch the appropriate crews so the effects of the overflow can be minimized regardless of the time of day or severity. In order to meet this goal, the County must provide a framework to ensure the investigation of the situation and the completion of the necessary corrective action.

The primary objective of the Sewage Overflow Response Plan (SORP) is to:

- Protect public health and the environment
- Formalize procedures for managing sewage overflows; and
- Satisfy regulatory agencies and waste discharge permit conditions
- Minimize the risk of enforcement actions against Howard County.

The SORP as attached in Appendix 7 - Sewage Overflow Response Plan includes the procedures to respond to an overflow, notify the appropriate regulatory agencies, advise the public existing conditions via an appropriate media, and monitor the effect on the environment and the threat to public safety. The SORP will be in affect at all **public** owned sewage systems. These sewage systems include wastewater treatment plants, collection systems, pumping stations, grinder pumping stations and shared septic systems. The Plan also includes a distribution description and the procedures to maintain the SORP.

7.2 SEWAGE OVERFLOW RESPONSE PLAN OVERVIEW

All public and private or independently operated sewage facilities are required by the Maryland Department of the Environment (MDE) to report overflows or bypasses which discharge raw or partially treated or diluted sewage into any water of the State. These regulations are defined in the Code of Maryland (COMAR) Title 26, Subtitle 08, Chapter 10 (26.08.10).

Reportable overflows or untreated discharges from wastewater treatment plants can be in any quantity; however spills less than 50 gallons onto impervious surfaces that are cleaned within one (1) hour do not have to be reported to MDE. Any spill that discharges into a tributary or water of the State shall be reported to MDE. Appendix 7 - Sewage Overflow Response Plan dated May 2009 serves as the standard operating procedures for reporting sanitary sewage overflows. Reporting regulations require that discharges be verbally reported to MDE within 24 hours via telephone followed up by a

written report within five days. The information typically found in the verbal and/or written report includes:

- The county where the overflow occurred
- Type of Overflow (Sanitary Sewage Overflow (SSO)/Treatment Plant)
- Name of the Owner/Operator of Collection System or Treatment Plant
- Location – nearest street and intersection, city/town, county, zip code
- Maryland Grid Map Coordinates
- Receiving Body of Water
- Date/Time Overflow was Discovered or Occurred
- Date/Time Overflow Stopped or Expected to Stop
- Cause of Overflow
- Duration of Overflow
- Quantity (Volume) of Discharge
- Steps Taken or Planned to Prevent a Reoccurrence
- Measures Taken or Planned to Mitigate Overflow Impact
- Whether Public Notification is Required

The form used by Howard County has been attached in Appendix 7 - Sewage Overflow Report Plan. Depending on the seriousness of the discharge, MDE may have the Inspection or Enforcement Division perform an inspection after resolution of the event.

7.3 RESPONSE PLAN

The initial call to report an overflow is received by the Bureau of Utilities Customer Service [(410)313-4900] during work hours and is automatically transferred to Howard County Central Communication [Ext. 2929] during off hours. The Bureau of Utilities has personnel assigned to respond to emergencies on a monthly basis. If the initial investigation finds that the emergency is an SSO, the Operations Supervisor is notified who will assess the situation and notify the Operations Manager. To ensure that issues are addressed in a timely manner, the response time goal for routine overflow problems is less than one hour. The response time for more complicated issues depends upon the nature of the situation but a plan is developed to list the tasks that need to be completed and the time needed to complete them. During the performance of repairs, an Operations Supervisor will provide field supervision and inspection of repairs. If the event is severe, the Operations Manager will perform these duties. If

site clean-up is necessary, solids are raked and hauled away and the area may be rinsed with potable water (if available) and dusted with hydrated lime. Clean-up will be inspected by the Howard County Health Department and a determination will be made as to the whether any additional cleaning or signage is required. On-site signage is posted by the Bureau of Utilities and the Office of Public Information handles media notification.

7.3.1 NOTIFICATION

As mentioned in Section 7.2, the County is required to issue a telephone report on a SSO event to MDE within 24 hours. The Telephone Report of Sewage Overflow form which is included in Appendix 7 - Sewage Overflow Response Plan is typically completed and reported by the Operations Manager. However if the overflow occurs after normal work hours, reporting may be done by an Operations Supervisor. To the greatest extent possible, all known information is written on the Telephone Report of Sewage Overflow form. The written report for the SSO event is submitted to MDE within five (5) calendar days after the telephone notification to MDE. The written report includes a cover letter, a copy of the Telephone Report of Sewage Overflow form, maps showing the location of the overflow. The written documentation package is forwarded to Operations Manager for review and approval before being sent to MDE. The written report may be waived by MDE if the volume of the SSO was small.

In addition to the notifications to MDE, the County shall notify the public within 24 hours of any overflow event which impacts waters where public health may be endangered:

- Drinking water sources
- Shellfish harvesting
- Public bathing beaches where people swim
- Public recreation where people may boat, fish, or swim

Once the Health Department is notified by the Bureau of Utilities of a sewage spill in excess of 10,000 gallons, all relevant information is compiled and a public notification is drafted. The County's Public Information Office manages media notification and the Department of Utilities posts on-site notices. Postings include the following information:

- Potential threat to human contact
- Size and flow rate of body of water
- Sewage dilution factor into body of water based on time of year, length of discharge, current condition of body of water.

Appendix 7 - Sewage Overflow Response Plan

7.A.1. EMERGENCY RESPONSE PLAN

The purpose of the Sewage Overflow Response Plan (SORP) is to ensure that appropriate crews are immediately dispatched for every report of a confirmed sewage overflow to minimize the impact to public health, water quality, and customer service. The SORP also includes provisions to ensure that the notifications and reporting required by the Maryland Department of the Environment (MDE) are made to the appropriate local and state authorities. For purposes of this document “confirmed sewage spill” may be referred to as “sewage overflow,” “overflow,” or “SSO.”

7.A.2. OVERFLOW RESPONSE PROCEDURE

The Overflow Response Procedure presents a strategy for Bureau of Utilities to mobilize labor, materials, tools and equipment to correct or repair any condition which may cause or contribute to an unpermitted sewage discharge or other sewage overflows which are successfully contained or present no threat to jurisdictional waters of the State. The plan considers a wide range of potential system failures that could create an overflow to surface waters, land or buildings.

7.A.3. RECEIPT OF INFORMATION REGARDING AN SSO

An overflow may be detected by County employees or by concerned citizens. The Bureau of Utilities Customer Service [(410)313-4900] is primarily responsible for receiving phone calls during work hours. After hours, all calls are received by Central Communications [Ext. 2929]. The individual receiving the call should obtain all relevant information available regarding the possible overflow including:

- a. Time and date call was received.
- b. Specific location.
- c. Description of problem.
- d. Time possible overflow was noticed by the caller.
- e. Caller’s name and phone number.
- f. Observations of the caller (e.g., odor, duration, back or front of property).
- g. Other relevant information that will enable the responding personnel to quickly locate, assess and stop the overflow.

Sewage overflows detected by any personnel in the course of their normal duties shall be reported immediately to an Operations Supervisor who will assess and notify the Operations Manager. Until verified, the report of a possible spill will not be referred to as a “sanitary sewage overflow” (SSO). The Operations Manager or Operation

Supervisor II on duty shall notify MDE via telephone within 24 hours of the overflow confirmation.

7.A.4. DISPATCH OF APPROPRIATE CREWS TO SITE OF SEWAGE OVERFLOW

Failure of any element within the wastewater collection system that threatens to cause or causes an SSO will trigger an immediate response to isolate and correct the problem. Crews and equipment shall be available to respond to any SSO. First Responder will respond within one hour for minor SSO; however the resolution of more complicated problems will require sufficient time to adequately plan resources and identify corrective action. Figure A: Sewage Overflow Action Plan is a flow chart listing the steps needed and the order in which they take place.

1. Dispatching Crews and Crew Instructions:

- Responding crews shall be dispatched by radio or telephone. All standard communications procedures should be followed. Once notification of a possible sewage overflow is received, the responding crew shall immediately investigate the problem and either correct the situation or take further action.
- Immediately upon completing their investigation of a confirmed sewage overflow, responding crews shall contact an Operations Supervisor. They shall report their findings including possible damage to private and public property.
- The Operations Supervisor assesses the situation and determines the crews, materials, supplies, and equipment needed to resolve the problem. An Operations Supervisor II is on-call to authorize additional personnel or secure contractual service personnel assigned to major repairs as well as coordinate necessary activities with other groups within the County. The Operations Supervisor shall also notify the Operations Manager of the overflows.

2. Preliminary Assessment of Damage to Private and Public Property:

- The response crews should use discretion in assisting the property owner/occupant at overflow locations.
- If still photographs and video footage are taken of the outdoor area of the sewage overflow and impacted area to thoroughly document the nature and extent of impacts, they are to be forwarded to the Operations Manager for filing with the Overflow Report.

3. Supervision and Inspection:

- The Operations Supervisor shall visit the site of the overflow to ensure that work is progressing successfully.
- The Operations Manager is responsible for confirming that the Overflow Report was provided to the Maryland Department of the Environment within the specified time and the appropriate agencies are contacted and provided information on the overflow.

4. Coordination with Hazardous Material Response:

- Upon arrival at the scene of a sewage overflow, should a suspicious substance (i.e. oil sheen, foamy residue) be found on the ground surface, or should a suspicious odor (i.e. gasoline) not common to the sewer system be detected, the response crew should immediately contact the Operations Supervisor for guidance before taking further action.
- Should the Operations Supervisor determine the need to alert the hazardous material (HAZMAT) response team, the crew shall await the arrival of the Fire Department to take over the scene. **Remember that any vehicle engine, portable pump or open flame (i.e. cigarette lighter) can provide the ignition for an explosion or fire should flammable fluids or vapors be present. Keep a safe distance and observe caution until assistance arrives.** HAZMAT and/or Fire Department personnel shall be notified by calling Central Communications.
- Upon arrival of the Fire Department, the utility crew will take direction from the person with the lead authority from the Fire Department. Only when that authority determines it is safe and appropriate for the crew to proceed can they then proceed under the SORP with the containment, cleanup activities and correction.

7.A.5. OVERFLOW CORRECTION, CONTAINMENT, AND CLEANUP

SSOs of various volumes occur from time to time in spite of concerted prevention efforts. Spills may result from blocked sewers, pipe failures, mechanical malfunctions, or other natural or man-made causes. Howard County is constantly on alert and is ready to respond to confirmed overflows.

Under most circumstances, Howard County will handle response actions with its own maintenance forces. Crews are skilled and experienced and respond rapidly to problems. An important issue with respect to an emergency response is to ensure temporary actions to divert flows and repair problems do not produce a dilemma elsewhere in the system.

Circumstances may arise when Howard County could benefit from the support of private contractor construction assistance. This may be true in the case of the

excavation of large diameter pipes buried to depths requiring sheet piling and dewatering.

1. Responsibilities of Response Crew upon Arrival

It is the responsibility of the first personnel who arrive at the site of a SSO to protect the health and safety of the public by minimizing the impact of the overflow as much as possible. If the overflow is not the responsibility of Howard County but there is imminent danger to public health, public or private property, or to the quality of waters of the Maryland, then prudent emergency action should be taken until the responsible party assumes responsibility and provides actions. Upon arrival at an SSO, the response crew should do the following:

- Determine the cause of the overflow (i.e. sewer line blockage, pump station mechanical or electrical failure, sewer line break, etc.) and determine if private property is impacted.
- Notify the Operations Supervisor to identify and request, if necessary, assistance or additional resources to correct the overflow.
- Take immediate steps to stop or minimize the overflow (i.e. relieve pipeline blockage, manually operate pump station controls, repair pipe, etc.).
 - Appropriate steps may be considered where overflows from private property threaten public health and safety (e.g., an overflow running off of private property into the public right-of-way).
- Request additional personnel, materials, supplies, or equipment that will expedite and minimize the impact of the overflow.

2. Initial Measures for Containment

Initiate measures to contain the overflowing sewage and potentially recover sewage that has already been discharged to minimize the impact to public health or the environment.

- Determine the immediate destination of the overflow (i.e. storm drain, street curb gutter, body of water, creek bed, etc.).
- Identify and request the necessary materials and equipment to contain or isolate the overflow, if not readily available.
- Take immediate steps to contain the overflow (i.e. block or bag storm drains, recover through vacuum truck, divert into downstream manhole, etc.).

3. Additional Measures under Potentially Prolonged Overflow Conditions

In the event of a prolonged sewer line blockage or a sewer line collapse, a determination shall be made to set up a portable by-pass pumping operation around the obstruction.

- Appropriate measures shall be taken to determine the proper size and number of pumps required to effectively handle the sewage flow.
- Continuous or periodic monitoring of the by-pass pumping operation shall be implemented as required.
- Regulatory agency issues shall be addressed in conjunction with emergency repairs.

4. Cleanup

Sewage overflow sites are to be thoroughly cleaned after an overflow. No readily identified residue (i.e. sewage solids, papers, rags, plastics) is to remain.

- Where practical, the area is to be thoroughly flushed and cleaned of any sewage with wash-down water that is properly contained and disposed. Solids and debris are to be flushed, swept, raked, picked-up, and transported for proper disposal.
- The overflow site is to be secured to prevent contact by members of the public until the site has been thoroughly cleaned. Posting, if required by the Health Department, should be placed.
- Where appropriate, the overflow site is to be dusted with hydrated lime.
- Where sewage has resulted in ponding, the pond should be pumped dry and the residue disposed in accordance with applicable regulations and policies.
- If a ponded area contains sewage, which cannot be pumped dry, it may be treated with the appropriate chemicals in accordance with local and state regulations.

7.A.6. OVERFLOW REPORT

The Operations Manager shall complete an Overflow Report (See Figure B: Sample Sewage Overflow Written Notifications Form). The Health Department and MDE are to be promptly notified when the overflow is eliminated. Information regarding the sewage overflow should include the following:

1. Indication that the sewage overflow reached surface waters (i.e., sewage was observed running to surface waters) or whether there was an obvious indication (via sewage residue) that sewage flowed to surface waters.
2. Indication that the sewage overflow had not reached surface waters. Guidance in characterizing these overflows to include:

- a. Sewage overflows to covered storm drains (with no public access). Crews must verify by inspection that the entire volume is contained in a sump or impoundment and cleanup occurs leaving no residue.
 - b. Bypass pumping was in place and all subsequent cleanup occurs leaving no residue. NOTE: Any pre-planned bypass under these circumstances will not be considered an overflow.
 - c. On-site evidence clearly indicates all sewage was retained on land and did not reach a surface water. Furthermore, cleanup must be completed leaving no residue.
3. Determination of the start time of the sewage overflow by one of the following methods:
- a. Date and time information was received and/or reported to have begun by a response crew.
 - b. Visual observation.
 - c. Pump station and lift station flow charts and other recorded data.
4. Determination of the stop time of the sewage overflow by one of the following methods:
- a. Date and time when the blockage is cleared or flow is controlled or contained.
 - b. The arrival time of the response crew or Operations Supervisor if the overflow stopped between the time it was reported and the time of arrival.
5. Visual Observations: An estimation of the rate of sewage overflow in gallons per minute (GPM) by one of the following criteria:
- a. Direct observations of the overflow.
 - b. Measurement of actual overflow from the sewer main.
 - c. Estimation of overflow based on site conditions.
6. Determination of the volume of the sewage overflow:
- a. When the rate of overflow is known, multiply the duration of the overflow by the overflow rate.
 - b. When the rate of overflow is not known, investigate the surrounding area for evidence of ponding or other indications of overflow volume.

7. Photographs of the event, when possible.
8. Assessment of any damage to the exterior areas of public/private property. Personnel should not enter private property for purposes of estimating damage to structures, floor and wall coverings, and personal property.

7.A.7. SAMPLING

For the events when raw, treated or diluted sewage is discharged into State surface water, the Health Department decides on a case by case basis whether there is a need to perform water quality monitoring. The factors impacting the decision include:

- Volume of the overflow.
- Location of the overflow and the proximity to residential properties.
- Potential effect to the receiving waterway.

The sampling is conducted by the Health Department to ascertain the level of stream contamination in response to a reported SSO and to track the stream's return to normal water quality.

Stream water quality sampling may be performed if a SSO exceeds 10,000 gallons. A minimum of three samples are taken: upstream of the overflow, close to the point of overflow, and one or more points downstream. Depending upon the initial results, additional full or partial bacterial contamination sampling may be performed to track water quality improvements and to aid in determining whether to lift any imposed bans on water access. All results of all water quality sampling is maintained by the Health Department. Typically results are sent to the Bureau of Utilities and to MDE (via the Bureau of Utilities).

7.A.8. PUBLIC ADVISORY PROCEDURE

This section describes the actions Howard County should take, in cooperation with MDE, to limit public access to areas potentially impacted by non-permitted discharges of pollutants to surface water bodies from the wastewater collection system or affected ground surfaces, structures or other resources.

1. Temporary Signage

The Health Department has primary responsibility for determining when to post notices of polluted surface water bodies or ground surfaces that result from uncontrolled wastewater discharges from its facilities. The main factor in determining when and where to post signs is the degree of public access to any effects of the overflow that may remain at the site. The postings do not necessarily prohibit use of areas, unless posted otherwise, but provide a warning of potential public health risks due to sewage contamination.

The Health Department is responsible for the decision process regarding whether posting of a confirmed overflow is to be undertaken. The Bureau of Utilities will develop the specific language for the posting which references the overflow, recommendations to avoid contact with the waters for a determined time and contact information if there are additional questions. Signs are normally posted for 30 days.

2. Other Public Notification

When the Health Department is notified by the Bureau of Utilities that the estimated sewage overflow is in excess of 10,000 gallons at the discretion of the Health Department, Bureau of Utilities, and the County's Public Information Office (POI), the Health Department will gather all relevant information on the spill and draft the public notification. This document will then go to the Health Department's Public Information Office (PIO) representative and the Chief of Bureau of Utilities (or their designee) to verify the text of the notification. Once approved, the PIO will release the information through the County's media station or website and a copy is faxed to MDE within 24 hours of the initial confirmation of the overflow.

3. Public Inquires

Inquires from public posting or notifications are normally directed to the Health Department or the Bureau of Utilities. All calls concerning overflows (except those public health issues) shall be directed to Customer Service.

7.A.9. REGULATORY AGENCY NOTIFICATION PLAN

The Regulatory Agency Notification Plan establishes procedures that Howard County shall follow to provide formal notice to MDE as necessary in the event of SSOs. The reporting criterion below explains to whom various forms of notification should be made and lists agencies/individuals to be contacted.

Data supplied during the verification process and updates from the response crew and Operations Supervisor shall be used to prepare verbal and written overflow reports. These reports shall be made available to those desiring additional information or written confirmation.

Howard County should notify MDE and County representatives immediately and keep them abreast of response actions and final corrective actions. These primary agencies must be notified verbally and/or by fax no later than 24 hours (preferably as soon as possible) after an overflow is confirmed. The initial and any updated Overflow Report should be given to the Operations Manager.

Written notification in a "hard copy" version should be made within five (5) calendar days. The Operations Supervisor shall be responsible for ensuring compliance with the 24 hour oral or fax notification requirement. The Operations Manager will prepare and sign the written notification to MDE and others of any confirmed overflows.

Figure A
Sewage Overflow Action Plan Flow Chart

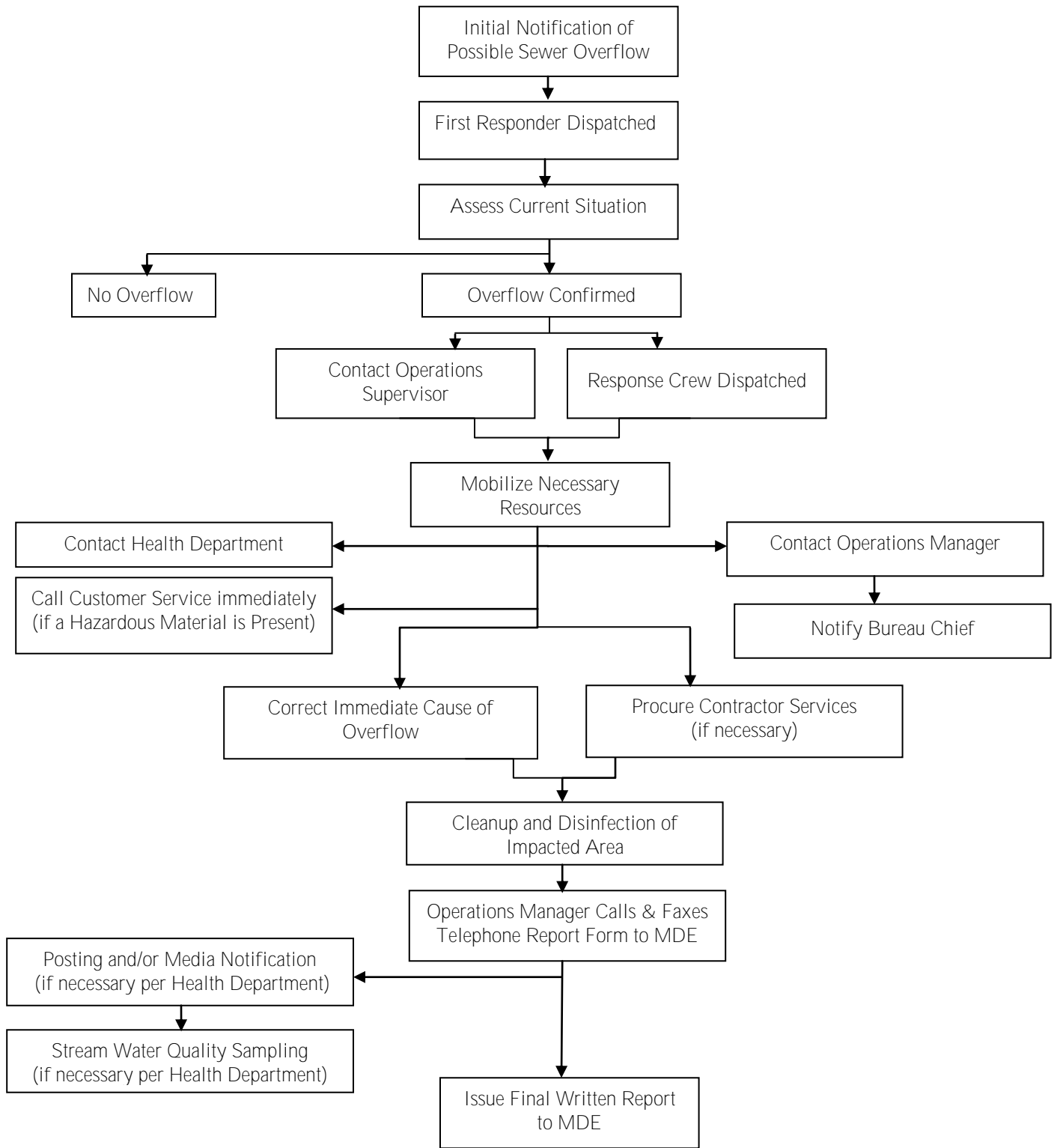


Figure B
Sample Sewage Overflow Written Notifications Form



Department of Public Works
BUREAU OF UTILITIES

Stephen Gerwin, Bureau Chief

January 20, 2009

Water Management Administration
Compliance Program
1800 Washington Blvd.
Baltimore, MD 21230

Re: Sewer System Overflow – 7143 Smooth Path Rear Outfall
Contract 489, Manhole # 6902A

Gentlemen:

As a follow up to my telephone call with your office on January 17, 2009 I would like to report the following collection system overflow, as outlined on the attachment, detected and relieved Saturday, January 17, 2009:

At approximately 11:00 A.M. on January 17, 2009, we received a report of a sanitary sewer manhole leak in the rear of 7143 Smooth Path Rear Outfall in Columbia. We responded immediately, and found a small surcharge occurring at manhole #6902A, contract 489 flowing into the adjacent area. Our sewer jet truck cleared the blockage from downstream manhole # 4442 on Contract 326 and the level dropped immediately, stopping the overflow. A small grease buildup in the pipe segment was found to be the cause. The sewer is presently flowing freely.

Based on the call from the citizen, and the amount of flow on the line, we estimate that approximately 2500 gallons may have surcharged in an approximate 3-hour period ending the event. The area around the manhole was frozen solid. Debris was picked up and removed, and lime was spread in the manhole area. No signs were posted at this time due to the condition of the ground along the nearby sewer outfall right of way.

8250-70 Old Montgomery Road, Columbia, MD 21045 (410) 313-4900 FAX (410) 313-4919 & 4989

Please see the attached 200 scale system maps for the exact location. Should you have any questions, please feel free to call me at (410) 313-4978. Thank you.

Sincerely,

Jeremy F. Motal
Operations Manager

cc: Environmental Health

attachments

8250-70 Old Montgomery Road, Columbia, MD 21045 (410) 313-4900 FAX (410) 313-4919 & 4989

HOWARD COUNTY, MARYLAND
TELEPHONE REPORT OF SEWAGE OVERFLOW

In What County did the Overflow Occur?	AL AA BA BC CA CE CH CL CO DO FR GA HA <input checked="" type="radio"/> KE MO PG QA SM SO TA WA WI WO WSSC		
Is this a combined sewer overflow (CSO)?	YES (CIRCLE ONE) <input type="radio"/> NO <input checked="" type="radio"/>	Is this a bypass	YES (CIRCLE ONE) <input type="radio"/> NO <input checked="" type="radio"/>
Is this a privately owned collection system?	YES (CIRCLE ONE) <input type="radio"/> NO <input checked="" type="radio"/>	Owner of collection system	HOWARD COUNTY, MARYLAND PSWID - 0130002 NPDES - MD 0055174
When did the Overflow Occur?	DATE 1/17/09	TIME DISCOVERED	11:00 AM <input checked="" type="radio"/> PM <input type="radio"/>
Is the Overflow Ongoing or has it been repaired?	ONGOING (CIRCLE ONE) <input type="radio"/> REPAIRED <input checked="" type="radio"/>	DURATION OF INCIDENT (approx. hours/mins)	3.0 HRS
Location of the Overflow: Street, Manhole #, Pump Station name, etc.	IN REAR OF 7143 SMOOTH PATH COLUMBIA, MD. 21045 CONTRACT 489-D MANHOLE #6902A		
MD MAP GRID Coordinates	PAGE: 15	LTR GRID: K	NUM GRID: 11
Cause of the Overflow? - Get as much information as possible.	IT APPEARS THAT A BLOCKAGE FROM GREASE OCCURRED. CLOSE TO THE DOWNSTREAM OUTLET SIDE OF THE MANHOLE.		
What has been done to correct the cause of the overflow?	THE BLOCKAGE WAS RELIEVED WITH A HIGH PRESSURE WATER JET TRUCK.		
Did any of the overflow waste water enter waters of the State (Includes storm drains)?	YES <input checked="" type="radio"/> NO <input type="radio"/>	NAME OF THE BODY OF WATER	SMALL TRIBUTARY LEADING INTO LAKE THORN
Is the receiving water designated as surface waters or for a public drinking water supply?	NO		
Has/will the affected water body be posted as being contaminated?	DUE TO THE EXTREME COLD TEMPERATURES AND FROSTY GROUND SIGNS COULD NOT BE POSTED AT THIS TIME.		
Estimated quantity of the overflow in gallons	2500 GALLONS		
What type of clean-up or other mitigation is being performed or scheduled to be performed?	A SMALL AMOUNT OF SOLID MATERIAL LAYING AROUND THE MANHOLE WILL BE CLEANED UP AND HAULAWAY. AFTERWARDS HYDRATED LIME WILL BE SPREAD AROUND THE AREA.		
Name of the person reporting the overflow.	NAME: MARK HAMILTON	PHONE: 410-313-4933	TITLE: OPERATIONS SUPERVISOR I
Name and type of facility.	FACILITY NAME: HOWARD COUNTY BUREAU OF UTILITIES TYPE OF FACILITY: W1, C2 MUNICIPAL WATER AND SEWER		
Written follow-up Notice.	REMINDE THE CALLER THAT A WRITTEN FOLLOW-UP IS REQUIRED WITHIN 5 CALENDAR DAYS (UNLESS THIS IS A CITIZEN COMPLAINT)		
Name of staff receiving report.	LARRY COHEN		
Date and time of report.	DATE 1/17/09	TIME 4:30	AM <input type="radio"/> PM <input checked="" type="radio"/>
Name of staff report was referred to for follow-up			
Copy provided to	DAVE LYONS; BILL LEE; INSPECTION DIVISION CHIEF; INSPECTOR -- and/or		
Faxed to	Field Office.		

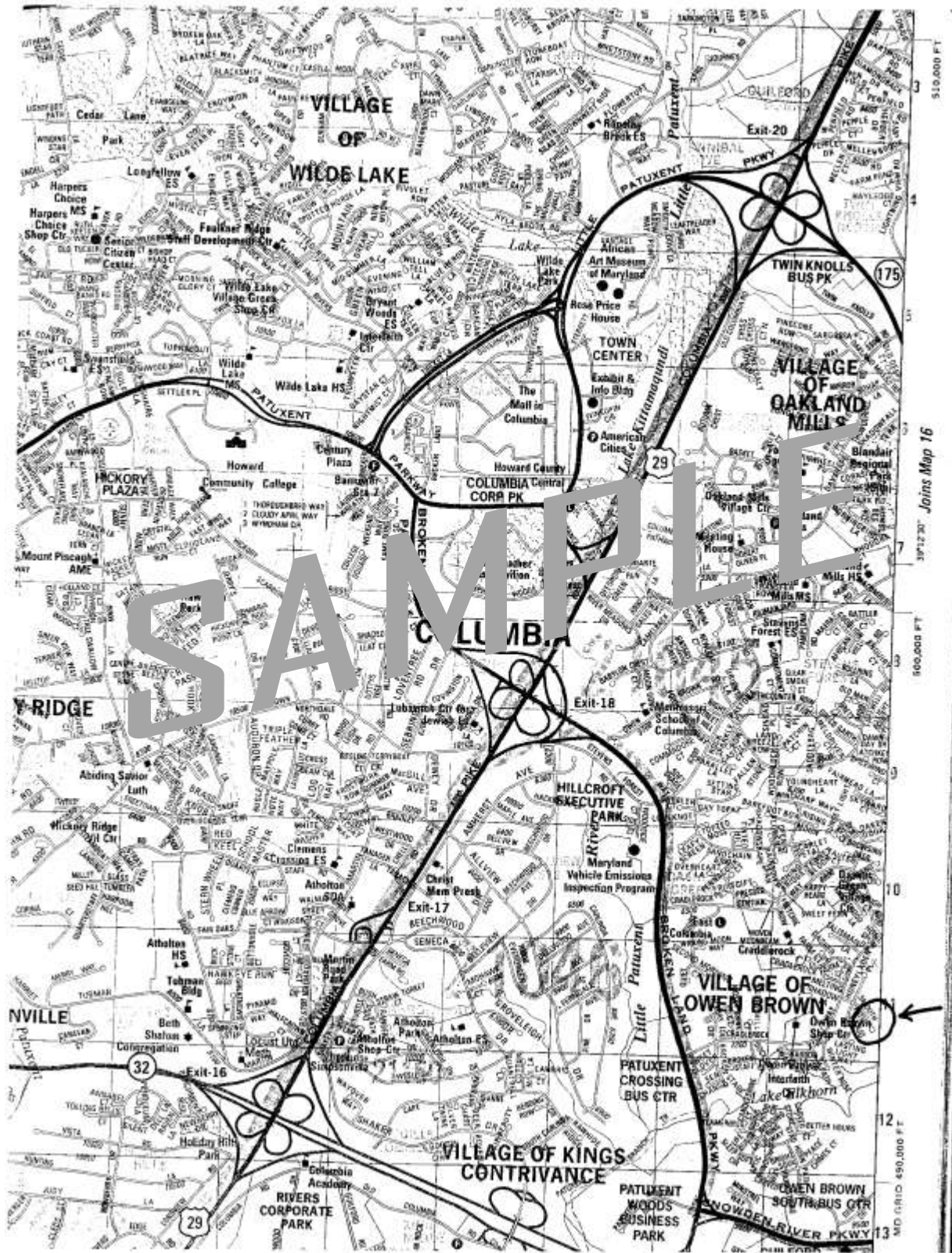
GREATER THAN 10,000 GAL.
INDICATE BY CIRCLING

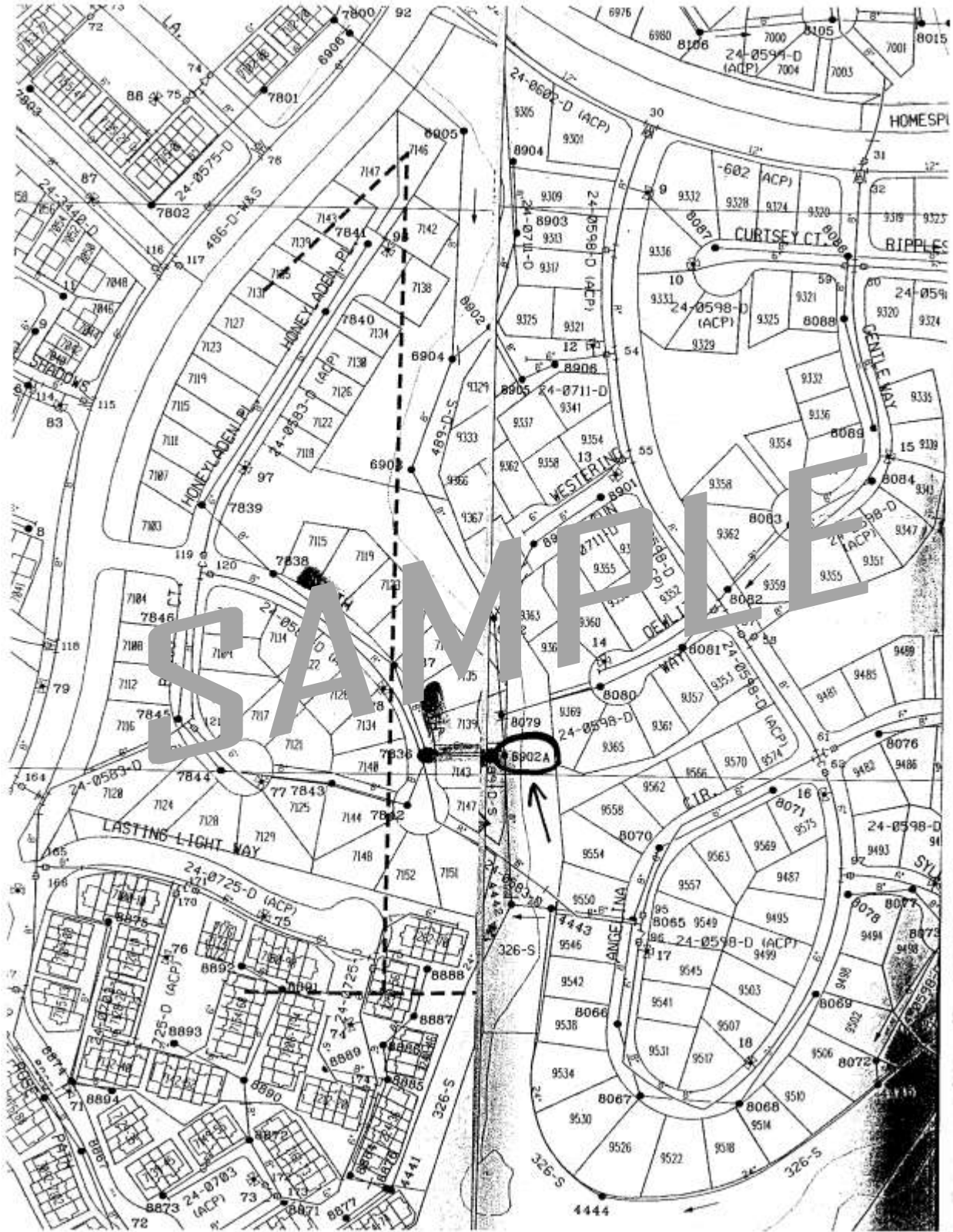
ALWAYS NOTIFY:

1. MDE - REGULAR HOURS 410-537-3510
AFTER HOURS 1-866-633-4686
FAX 410-537-3733
2. DIRECTOR'S OFFICE FAX 410-313-3408

3. HoCo ENV. HEALTH DEPT 313-2640
FAX 313-2648
ROBERT WEBER 313-1770
BERT NIXON 313-1785

PUBLIC INFORMATION
VICKI GOODMAN
410-313-3299





Chapter 8 – Public Communication and Involvement

8.1 GENERAL

Public involvement is an important component of the CMOM program. Everyone served by the County's sewer system is a stakeholder and will be affected by the CMOM program. Stakeholders include homeowners, businesses, community advocates, environmental activists, and other interested parties. In order to keep the public informed and maintain support for the County's efforts, the County has developed a Public Involvement Plan.

The key to working with the public is communication. The County's Public Involvement Plan uses multiple communications media such as public meetings, brochures, websites, direct mailings, and press releases to provide information to the public and provide a means for interaction with the County.

The goals of the Public Involvement Plan are as follows:

- Increase public awareness of the importance of the sanitary sewer system.
- Notify the public as to the CMOM project.
- Provide a source for information to the community.
- Provide a means for interaction and participation between the public and the County.
- Provide a means for collaboration and coordination with existing County and regional efforts.

The County's Public Involvement Plan works on two levels: general and project-specific. This means that specific components of the program are geared toward a specific audience. For instance, sewer billing information is a general topic affecting all customers and is therefore more general in presentation. Project-specific information, such as construction of a replacement interceptor in an existing neighborhood, is much more detailed and is developed as needed for each project.

8.2 COMMUNICATION WITH THE PUBLIC

The means for communication with the public are generally through brochures, direct mailings, bill stuffers, websites, press releases, and public meetings. Depending on the situation any or all mediums may be used. The specific context and audience for a given issue dictates what medium is selected for communication. Prior to distribution to the public each item is first provided to the affected County personnel to allow them to become knowledgeable and familiar with the issue in anticipation of questions from the public.

The County is very sensitive and responsive to public interest. Utility complaints called in by the public are received by Customer Service and noted on the complaint log. They fill out a complaint form and turn it over to the Bureau of Utilities Operations Supervisor I to be resolved. During the investigation of the complaint and the resolution of the problem, employees are encouraged to interact with the public as they perform their normal duties. After the problem is resolved, the Operations Supervisor I fills in the field remarks areas and turns it back in to the office staff who record the remarks on the complaint log.

8.3 PUBLIC INVOLVEMENT: GENERAL AUDIENCE

Emergencies affecting service and overflows are generally addressed via press release, postings, and the County's website due to the potential dangers to public health and time-sensitive nature. Additional public notification information regarding overflows is covered under Chapter 7 – Sewage Overflow Response Plan.

Rate changes and other high interest issues are typically conveyed by bill stuffers, press releases, and public meetings. In general, bill stuffers are the most effective for conveying important information of interest to all customers.

General programs such as the grease control program and the CMOM program are usually addressed through the County's website. These types of programs are broad in nature and intended to inform customers as to how to prevent service problems.

8.4 PUBLIC INVOLVEMENT: PROJECT-SPECIFIC

Projects affecting smaller areas such as extending sewer service are handled more directly and with more detail. Typically, these kinds of projects affect a small number of people but in a very significant way. Direct mailing is the preferred method of notification for these types of projects with a public meeting to address questions and concerns.

The Bureau of Utilities and Bureau of Engineering work with the Public Information Office to develop an outreach plan for projects affecting the public. The Bureau of Utilities also works with affected property owners using letters or flyers, press releases, information on the website, and public information meetings to inform them of projects occurring in their area.

When smoke testing is scheduled for an area, this activity warrants additional notification and public awareness. Due to the nature of smoke testing and the inherent danger of mistakenly notifying fire and police for a non-emergency situation, Utilities personnel or their designated representative notify residents seven days in advance of the testing by the use of door hangers (see Appendix 5: Smoke Testing Door Hanger). This direct contact ensures that the occupants of a home or building scheduled for smoke testing are aware of the potential for smoke entering the structure and what it means. The intent is to avoid erroneous emergency calls.

8.5 CUSTOMER RELATIONS TEAM

The Customer Relations Team (see Chapter 9 – Implementation of CMOM Program) is the direct connection between the public and the sewer utility. The team meets on a regular basis to discuss service-related sewer issues including customer complaints, actions taken by the County to address complaints, and ways to inform customers of the work being completed to combat SSO's. The community representative brings to the table the public's input to the CMOM program and the public's perceptions on such matters as timeliness of County response to complaints and suggestions on how to better inform the public about CMOM and other sanitary sewer related issues.

This team consists of members of various DPW sections with direct contact with the community plus a community representative. This work group is intended to ensure that County citizens and other stakeholders have the opportunity to provide input to the development, implementation, periodic updating, and self-auditing components of the CMOM program. The work group community representative may be a member of an existing public interest group, a member of a homeowner association, or simply a concerned County citizen.

Chapter 9 – Implementation of CMOM Program

9.1 CMOM PROGRAM SELF-AUDIT

9.1.1 GENERAL

The ability to modify elements of the CMOM program as needed is another factor in ensuring the best possible program in terms of practicality, cost-effectiveness, and overall applicability of the program. As part of the CMOM program, the Bureau of Utilities will perform comprehensive self-evaluations annually to ensure the CMOM program is being implemented in accordance with the program's intent.

The Self-Audit is looking for program effectiveness, adherence to schedule, and overall improvement of the sewer utility. This Self-Audit is also charged with identifying deficiencies in the program or its implementation and recommending steps to correct them including a proposed schedule. Specifically, the Self-Audit will document:

- Deficiencies that keep the program from achieving its performance measures.
- Deficiencies leading to sanitary sewer overflows, permit violations, or Clean Water Act violations.
- Deficiencies leading to decreased customer service and/or unwarranted deterioration of utility assets.
- Changes that should be made to the program that will make its implementation more efficient, thereby conserving resources.
- Remedies needed to correct deficiencies and a proposed schedule for implementing those remedies.

9.1.2 SELF-AUDIT SCHEDULE

The final aspect of the Self-Audit portion of the CMOM program is to establish a schedule for incorporating and implementing program improvements into the CMOM program including a provision for following up. The first CMOM program Self-Audit will take place one year after the CMOM program is approved by the Maryland Department of the Environment. This will allow enough time to fully implement the program before the first comprehensive assessment is made, yet be soon enough to identify potential program weaknesses early to correct them.

After the initial audit, subsequent Self-Audits on the performance measures on Page 9A-1 and 9A-2 will be conducted annually. Self-Audits on the performance measures on Pages 9A-3 through 9A-40 will be conducted at five year intervals.

9.1.3 CMOM PROGRAM / UTILITY SELF-AUDIT REVIEW PROCEDURE

The Self-Audit process involves interviewing the various personnel involved in carrying out the CMOM program. It also includes observance of field activities, field inspection of equipment and resources, and review of pertinent records and management information systems. Specific audit components include audit findings (program deficiencies), audit responses (steps to correct each deficiency), and schedules to implement audit responses. All data is compiled in a report and submitted to MDE.

In order to assist the Self-Audit process, the County will utilize a checklist developed by the EPA as shown in Appendix 9-A: CMOM Self-Audit Checklist. The checklist has four main sections:

- I. CMOM Programs Recent Performance Summary
- II. Management Programs
- III. Operation Programs
- IV. Maintenance Programs

The checklist will be filled out by Bureau Supervisors and forwarded to the Bureau Chief and the Operations Manager for review and implementation.

9.1.3.1 INTERVIEWS

As part of the Self-Audit process, the Bureau Supervisory personnel interview field personnel and staff members as needed. The purpose of these interviews is to document the general management philosophy of the utility, operation and maintenance programs, and the interaction with other departments which comprise the CMOM program.

9.1.3.2 FIELD EVALUATION

The auditing process requires observation of CMOM activities through field or on-site evaluations comprised of interviews and on-the-job observations with engineering, operation, and maintenance program personnel. Field evaluations include inspection of maintenance yards and equipment, vehicles, as well as the offices where management, engineering, operation, and maintenance related activities and information management activities take place.

The purpose of these evaluations is to determine exactly how the specific management, engineering, operation, and maintenance program activities are being carried out. The evaluations allow an assessment of how well personnel understand the utility's functions, how well the personnel are trained, and how closely the personnel follow the utility's operating procedures.

9.1.3.3 RECORDS REVIEW

Self-Audit personnel review all of the various types of the sewer utility's documents and records. Among the many such documents are included the sewer system maps, complaint logs, work orders, sewer assessment reports, standard operating and maintenance procedures, typical forms used by field and office personnel, safety and training program manuals, plus all of the other documents related to the sewer system. This type of review also looks at how capital dollars are spent in order to ensure that funding is being directed to where it can best improve the system.

9.1.3.4 DOCUMENTATION OF SSO VIOLATIONS

One of the measures used to evaluate the effectiveness of the CMOM program is to track the number of SSOs that occur, the volume of overflow, the duration of the overflow, and the cause. Every SSO is investigated by the Bureau of Utilities and the cause and resolution is documented. All collected information is evaluated during the Self-Audit to determine if current procedures and policies need to be amended. The process for reporting SSOs is described in Chapter 7 – Sewage Overflow Response Plan.

9.1.3.5 EXAMINATION OF PROGRAMS RELATIVE TO PERFORMANCE

Based on the interviews, field evaluations, records review, and review of SSO violations, personnel collate all of the information and put together a complete picture of the sewer utility and status of the CMOM program. This examination is intended to identify CMOM program elements that meet or exceed their goals and those that fall short of them.

9.1.3.6 DEFINITION OF DEFICIENCIES

Those CMOM program elements that do not meet their goals based on the performance measures are identified in the self-audit process for further investigation. This investigation consists of looking at these areas more closely to confirm their deficiency and determine the causes. In general, each program element deficiency can be categorized as being due to a lack of adequate program elements, inadequate implementation of program elements, or a combination of both.

9.1.3.7 IDENTIFICATION OF PROGRAM IMPROVEMENTS NEEDED TO ENHANCE PERFORMANCE

With the deficiencies and causes identified, the Self-Audit provides recommendations for addressing the deficiencies and their causes. Although the CMOM program document serves as an operational guide for all DPW staff regarding sewer-related activities, this self-auditing aspect provides the flexibility to make changes in the program in response to changing conditions in the collection system or based on improved information or techniques.

Appendix 9 - CMOM Self Audit Checklist

I. CMOM Programs Recent Performance Summary			
Performance Measures for Previous 12 Months	Year		Month
	Goal	Actual	Comment
A. Number of Customer Complaints			
B. Number of NPDES Permit Violations			
C. Number of Capacity Related Overflows			
D. Number of Maintenance Related Overflows			
E. Number of Operations Related Overflows			
F. Number of Blockages Caused by FOG			
G. Number of Blockages Caused by Sources Other Than FOG			
H. Number of Structural Pipe Failures			
I. Number of Pump Station Failures			
J. Monthly Average Treatment Plant Flow Rate (gallon per capita-day [gpcd])			
K. Monthly Average Treatment Plant Flow Rate (gpcd)			
L. Number of By-Passes at Treatment Plant			

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
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	Goal	Actual	Comment
M. Volume of Treatment Plant By-Pass			
N. Linear Feet of Sewer Line CCTV'd			
O. Linear Feet of Sewer Line Cleaned			
P. Length of Sewer Line Repaired			
Q. Number of Manholes Inspected			
R. Number of Manholes Repaired			
S. Number of Grease Interceptors Inspected			
T. Number of Smoke Tests Performed			
U. Number of Pump Stations Repaired			

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
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II. Management Programs			
Performance Measures for Previous 60 Months	Year	Month	
	A. Table of Organization		
	1. Organization Chart		
	a. Organization Units Shown		
	b. Lines of Authority Shown		
	c. Organization Units' Functions Described		
	d. Organizations Units' Positions Shown		
	e. Duties Described		
	f. Positions Budgeted and Filled Indicated		
	2. Relation to Other Departments		
	a. Relation to Wastewater Treatment		
	b. Department of Public Works		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	c. Relation to Building Permits Function		
	d. Relation to Building Inspector Function		
	B. Training Programs		
	1. Technical Training Programs		
	a. Training and Refresher Training Required		
	b. Conferences, Seminars		
	c. Certification		
	d. Records		
	2. Skills Training Programs (Equipment, Tools, Tasks)		
	a. Training and Refresher Training Required		
	b. Manufacturer/Supplier/Equipment Training		
	c. Conferences, Seminars		
	d. Certification		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	e. Records		
	3. Safety Training Programs		
	a. Training and Refresher Training Required		
	b. Regular Safety Meetings		
	c. Certification		
	d. Written Safety Policy		
	e. Standardized Reporting Forms		
	f. Confined Space Entry		
	1) Locations Marked		
	2) Permit System		
	3) Standard Confined Space Entry Procedure		
	g. CPR/First Aid		
	h. Traffic Management		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	1) Standard Traffic Management Procedure		
	i. Lockout/Tagout		
	1) Equipment Marked		
	2) Authorized Personnel Limitation		
	3) Information on Tag (Date)		
	j. Safety Equipment		
	1) Tripod and Hoist		
	2) Atmosphere Testing Equipment		
	3) Self Contained Breathing Apparatus		
	4) Lights and Barricades		
	5) Exhaust Fans		
	6) Personal Protection Clothing		
	k. Performance Measures		
	1) Injuries		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	2) Lost Days		
	3) Workman's Compensation Claims		
	4) Records to Management Information System		
	C. Utility Asset Management System		
	1. Management Programs Information Management Systems		
	a. Operations Summary – Daily/Weekly		
	b. Maintenance Summary – Daily/Weekly		
	c. Complaint Summary – Daily/Weekly		
	d. Rehabilitation Summary		
	e. System Performance Summary		
	f. Computer Based		
	g. Management Decision Making Process		
	2. Operations Programs Information Management Systems		
	a. Operating Reports		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	b. Standard Forms		
	c. Supervisor Review		
	d. Maintenance of Records		
	e. Computer Based		
	f. Feeds into Asset Management System		
	3. Maintenance Programs		
	a. Maintenance Reports		
	b. Standard Forms		
	c. Supervisor Review		
	d. Maintenance of Records		
	e. Computer Based		
	f. Feeds into Asset Management System		
	4. Complaint Management and Tracking System		
	a. Complaint Reports		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	b. Standard Forms		
	c. Supervisor Review		
	d. Maintenance of Records		
	e. Computer Based		
	f. Feeds into Asset Management System		
	5. Performance Indicators Computation Program		
	a. Performance of Utility Operations		
	b. Performance of Utility Maintenance		
	c. Performance of Complaint Response		
	d. Performance of Sewer and Treatment Systems		
	e. Computer Based		
	f. Feeds in Management Systems		
	D. Engineering Programs		
	1. Collection and Transmission System Plans Program		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	a. As-Built Plans on File		
	b. Procedure for Recording Changes/ Updates		
	c. Availability of Field Crews		
	2. System Inventory		
	a. Inventory of Sewer Attributes (age, pipe size, material, invert elevation, pump stations, etc.)		
	3. Mapping Program		
	a. Mapping System		
	b. Lines, Manholes, Appurtenances Coded		
	c. Information in GIS		
	d. Links to Asset Management System		
	4. Sewer System Design Program		
	a. Documented Design Criteria (slope, bedding, etc.)		
	b. Standard Construction Details (manholes, etc.)		
	c. Standard Materials and Construction		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	Practices		
	d. Standard Design Review Process		
	e. Standard Review Forms		
	f. Service Laterals Construction Standards		
	5. Sewer Construction Program		
	a. Review/Approval Process for Design		
	b. Warranty for New Sewers		
	6. Construction Inspection Program		
	a. New Construction Inspection Procedures		
	b. New Construction Testing Procedures		
	c. County Inspection Guidelines		
	d. County Testing Guidelines		
	e. Inspection/Testing Standard Forms and Reports		
	f. Established Inspector /Tester Qualifications		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	g. Inspection Supervision		
	h. New Sewer Construction Televised		
	7. Acquisition Considerations Programs		
	a. Pre-Acquisition Inspection/Evaluation Process		
	b. Standard Design and Construction Criteria Evaluation Process		
	8. Continuing Sewer System Assessment Program		
	a. Sewerage Assessment Priority Parameters (Information used to set assessment priorities)		
	1) Complaints		
	2) Flow Monitoring		
	3) Overflows		
	4) Pump Station Run Times		
	5) Field Crew Work Orders		
	6) Sewer Assessments		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	7) Other		
	b. Sanitary Sewer Evaluation Studies		
	1) Defects Scheduled for Repair		
	2) Report Generated		
	c. Dyed Water Flooding Program		
	1) Standard Dyed Water Procedures		
	2) Manhole Dyed Water Forms		
	3) Dyed Water Flooding Information Management		
	d. Corrosion Defect Identification Program		
	1) Corrosion Identification Procedures		
	2) Corrosion Identification Forms		
	3) Corrosion Defect Analysis		
	4) Corrosion Defect Information Management		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	e. Routine Manhole Inspection Program		
	1) Standard Manhole Inspection Procedures		
	2) Manhole Inspection Form		
	3) Manhole Defect Analysis		
	4) Manhole Information Management		
	f. Flow Monitoring Program		
	1) Permanent Flow Meters		
	2) Temporary Flow Meters		
	3) Rainfall Measurement		
	4) Flow Monitoring Information Management		
	g. CCTV Program		
	1) Dedicated CCTV Personnel		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	2) Dedicated CCTV Equipment		
	3) CCTV SOPs Including Cleaning		
	4) CCTV by Contract		
	5) CCTV Performance Measures		
	6) CCTV Information Management		
	7) Retention of CCTV Tapes		
	h. Gravity System Defect Analysis Program		
	1) Standard Defect Code		
	2) Defect Identification Guidelines		
	3) Defect Determination		
	i. Smoke Testing Program		
	1) Standard Smoke Testing Procedures		
	2) Smoke Testing Forms		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	3) Smoke Testing Performance Goals		
	4) Smoke Testing Defect Analysis		
	5) Smoke Testing Information Management		
	j. Service Lateral Investigations Program		
	1) Service Lateral Investigation Techniques		
	2) Service Lateral Investigation Forms		
	3) Service Lateral Investigation Performance Goals		
	4) Service Lateral Investigation Analysis		
	5) Service Lateral Investigation Information Management		
	k. Pump Station Performance Program		
	1) Pump Run Time Meters		
	2) Nominal Average Pump Operating Time		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	3) Root Cause Failure Analysis		
	4) Remote Sensing		
	5) Pump Station Performance Information Management		
	9. Infrastructure Rehabilitation Program		
	a. Gravity Lines Rehabilitation Program		
	1) Sewer Rehabilitation Priorities		
	2) Sewer Rehabilitation Completed (Techniques)		
	3) Sewer Rehabilitation Scheduled		
	b. Manhole Rehabilitation Program		
	1) Manhole Rehabilitation Priorities		
	2) Manhole Rehabilitation Completed (Techniques)		
	3) Manhole Rehabilitation Scheduled		
	c. Pump Station/Force Main Rehabilitation Program		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	1) Pump Station/Force Main Rehabilitation Priorities		
	2) Pump Station/Force Main Rehabilitation Scheduled		
	3) Pump Station/Force Main Rehabilitation Completed		
	10. System Capacity Assurance Program		
	a. Capacity Assurance Process for New Construction		
	b. Standard Design Flow Rate Rules of Thumb		
	c. Projected Flow Impact Modeling/ Calculation Techniques		
	1) Hydraulic Model of Gravity System		
	2) Hydraulic Model of Pressure System		
	3) Other Techniques		
	d. Metering of Related Existing Peak Flows		
	e. Certification of Adequate Capacity		
	f. Capacity Assurance Information Management Program		
	E. Sanitary Sewer Overflow Reporting and Notification Program		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	1. Un-permitted Discharge Reporting Program		
	a. State Agency		
	1) State Agency Reporting Requirements		
	2) Procedure for Meeting State Requirements		
	b. Reports to Public/Other Organizations		
	1) Public Health Authorities		
	2) Stream Posting		
	3) Annual Summary Report Available to Public		
	c. Standard Form		
	d. Un-permitted Discharge Information Management		
	2. Sanitary Sewer Overflow Notification Program		
	a. State Agency		
	1) State Agency Reporting Requirements		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	2) Procedure for Meeting State Requirements		
	b. Reports to Public/Other Organizations		
	1) Public Health Authorities		
	2) Posting		
	3) Annual Summary Report Available to Public		
	c. Standard Form		
	d. Sanitary Sewer Overflow Information Management		
	F. Financing and Cost Analysis Program		
	1. Operations Cost Analysis Program		
	a. Labor and Equipment		
	b. Contracted Activities		
	2. Maintenance Cost Analysis Program		
	a. Labor and Equipment		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	b. Contracted Activities		
	3. Capital Improvement Program Funding		
	a. Five Year Planning Horizon		
	b. Spending the Last Five Years		
	c. Spending the Next Five Years		
	4. Budget and Customer Rate Setting Analysis		
	a. Budget Process		
	b. Rate Setting Process		
	G. Equipment and Tools Management Programs		
	1. Spare Parts Inventory Management Program		
	a. Spare Parts Storage Location		
	b. Critical Spare Parts Identified		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	c. Spare Part Inventory Management		
	d. Computerized		
	2. Equipment and Tools Repair Management Program		
	a. Equipment and Tools Storage Location		
	b. Equipment and Tools Access Controlled		
	c. Equipment and Tools Inventory Management		
	d. Computerized		
	3. Supplies Management Program		
	a. Supplies Storage Location		
	b. Supplies Access Control		
	c. Supplies Inventory Management		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	d. Computerized		
	H. Customer Service Programs		
	1. Complaint Management Program		
	a. Complaint/Customer Service		
	b. Work Order Generation		
	c. Dispatch		
	d. Standard Forms		
	e. Standard Codes		
	f. Follow-Up with Customer		
	g. Complaint Response Performance		
	h. Complaint Records Location		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	2. Public Information Program		
	a. Notification for Utilities' Activities (i.e. Smoke Testing)		
	b. Notification re: Major Construction or Maintenance		
	3. Public Education Program		
	a. Defined Public Education Program		
	b. Public Meetings		
	c. Flyers/Bill Inserts		
	I. Legal Support Programs		
	1. Inter-Jurisdictional Agreement Program		
	a. Agreement with other municipalities		
	b. Management, Operation, and Maintenance Provisions		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	2. Ordinances		
	a. Sewer Use Ordinance		
	b. Grease Management Ordinance		
	c. Pretreatment Ordinance		
	d. Service Lateral Ordinance		
	e. Septic Haulers Ordinance		
	f. "Call Before You Dig" Ordinance		
	g. Other Pertinent Ordinances		
	3. Legal Staff Availability for Case Work & Counsel		
	a. Pretreatment Legal Support Program		
	b. Grease Control Legal Support Program		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	c. Service Laterals Legal Support Program		
	d. Septic Haulers Legal Support Program		
	e. "Call Before You Dig" Legal Support Program		
	J. Water Quality Monitoring Program		
	1. Routine and Investigative Water Quality Monitoring Program		
	a. Location of Monitoring Stations		
	b. Sampling Parameters		
	c. Standard Sampling Procedures		
	d. Record Maintenance		
	2. Water Quality Monitoring for Spill Impact		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	a. Location of Monitoring Stations		
	b. Sampling Parameters		
	c. Standard Sampling Procedures		
	d. Record Maintenance		
	K. Contingency Plan for Sewer Treatment		
	1. Contingency Planning Process		
	a. Management Process for Developing Plan		
	b. System Overview and Vulnerability		
	c. Severe Natural Events Considered		
	d. Failure of Critical System Component(s)		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	e. Vandalism or Third Party Events		
	2. Response Flow Diagram		
	a. Includes Senior Management		
	b. Includes Major Component Plans		
	3. Public and Agency Notification Plan		
	a. Criteria Established to Initiate Public Notification		
	b. Step by Step Procedure Flow Diagram		
	c. Plan for Regular Business Hours		
	d. Plan for Off Hours, Weekends, and Holidays		
	4. Emergency Flow Control Plan		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	a. Criteria Established to Initiate Flow Control		
	b. Flow Re-Routing		
	c. Flow Diversion		
	d. Household Flow Reduction/Advisories		
	e. Commercial Flow Reduction/Advisories		
	f. Water Pressure Reduction/Advisories		
	g. Pretreatment SIU Information		
	h. Treatment Plant Options		
	5. Emergency Operations and Maintenance Plan		
	a. Criteria Established to Initiate Emergency O&M		
	b. Step by Step Procedure Flow Diagram		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	c. Plan for Regular Business Hours		
	d. Plan for Off Hours, Weekends, and Holidays		
	e. Stand-By Equipment		
	f. Stand-By Contractors		
	g. Access to Critical Spare Parts		
	6. Preparedness Training Program		
	a. Specialized Training Course		
	b. Field Trials		
III. Operation Programs			
	A. Pump Station Operation Programs		
	1. Routine Operating Programs		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	a. SOPs		
	b. Standard Forms		
	c. Operating Conditions and Alarms		
	d. Stand-By Power		
	2. Emergency Operating Program		
	a. Emergency SOPs		
	b. Stand-By Power		
	c. Emergency By-Pass		
	B. Pretreatment Programs (Sewer and Plan Protection – Not an Evaluation of the Pretreatment Program)		
	1. Industrial User Permitting Program		
	2. Inspection and Sampling Program		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	3. Enforcement Program		
	C. Corrosion Control Programs		
	1. Inspection Program		
	2. Monitoring Program		
	D. Grease Trap Inspection and Enforcement Programs		
	1. Permitting Program		
	2. Inspection Program		
	3. Enforcement Program		
	E. New Connection Tap-In Program		
	1. Installation of New Service Taps		
	2. Inspection Program		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	3. Enforcement Program		
	F. Flow Monitoring Field Operation Programs		
	1. Permanent Stations		
	a. Routine Servicing		
	b. Contract		
	2. Temporary Stations		
	c. Routine Servicing		
	d. Contract		
	G. Septic Haulers Program		
	1. Permitting Program		
	2. Inspection Program		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	3. Enforcement Program		
	H. "Call Before You Dig" Program		
	1. Permitting Program		
	2. Inspection Program		
	3. Enforcement Program		
IV. Maintenance Programs			
	A. Pump Station Preventive Maintenance		
	1. Electrical Maintenance		
	a. Pump Stations - SMPs		
	b. Scheduling		
	c. Standard Forms		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	d. Records		
	2. Mechanical Maintenance		
	a. Pump Stations - SMPs		
	b. Scheduling		
	c. Standard Forms		
	d. Records		
	3. Physical Maintenance		
	a. Pump Stations - SMPs		
	b. Scheduling		
	c. Standard Forms		
	d. Records		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	B. Force Main Preventive Maintenance		
	1. Air Release Valves		
	a. Scheduling		
	b. Standard Forms		
	c. Records		
	2. Valve Exercise Program		
	a. Scheduling		
	b. Standard Forms		
	c. Records		
	C. Gravity Line Preventive Maintenance		
	1. Routine Hydraulic Cleaning		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	a. Scheduling		
	b. Equipment (Jetter, Combination Unit)		
	c. Standard Forms		
	d. Records		
	2. Routine Mechanical Cleaning		
	a. Scheduling		
	b. Number of Crews/Personnel		
	c. Equipment (Rodder, Bucket Machine)		
	d. Standard Forms		
	e. Records		
	3. Root Control Program		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	a. Scheduling		
	b. Hydraulic Root Removal		
	c. Mechanical Root Removal		
	d. Chemical Control		
	e. Standard Forms		
	f. Records		
	4. Manhole Preventive Maintenance		
	a. Scheduling		
	b. Rings and Lids		
	c. Structural Repair		
	d. Standard Forms		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	e. Records		
	D. Maintenance of Way		
	1. Maintenance of Rights-of-Way Easements		
	a. Scheduling		
	b. Number of Stream Crossings		
	c. Standard Forms		
	d. Records		
	2. Monitoring of Street Paving		
	a. Scheduling		
	b. Coordination with Street/Highway Department		
	c. Manhole/Valve Rising		

Appendix 9 - CMOM Self Audit Checklist

Reviewed (Yes/No)	Description	Action Taken 1-Changes Needed 2-No Changes 3-Not Applicable	Comment
	3. Line Location for Third Parties		
	a. Scheduling		
	b. Standard Forms		
	c. Records		