CHAPTER 3
WATER PLAN FOR COMMUNITY SYSTEMS

Drinking water is supplied to Prince George's County primarily through community water supply facilities such as the Washington Suburban Sanitary Commission (WSSC). In rural areas water is provided through individual wells. This chapter discusses the sources of drinking water, identifies major treatment and transmission providers, provides an inventory of community system wells, and addresses water demand and production issues. It also outlines key regional water supply agreements.

3.1 RESOURCES

The Patuxent and Potomac rivers provide the major source of the County's surface (or raw) water supply. The Potomac River is the larger of the two sources of raw water, supplying more than 40 billion gallons of water annually to the bicounty area of Montgomery and Prince George's counties. In addition to water from the free-flowing river, there are three impounded (or storage) areas that can supplement flows into the Potomac River during periods of low flow.

The Jennings Randolph Reservoir is located near Bloomington, Maryland, on the North Branch of the Potomac River at the State boundary with West Virginia, 200 miles upstream from the Potomac intake at Watkins Island. This reservoir was completed in 1981 and provides 30 billion gallons of water storage with 13 billion gallons currently allocated to water supply. The remaining capacity is used for both water quality purposes to help buffer acidity downstream resulting from acid mine drainage, and recreation.

The Savage Reservoir is located on the Savage River, slightly north of the Potomac River and the Jennings Randolph Reservoir. The Savage River flows into the Potomac just downstream of the Jennings Randolph Reservoir. It is owned by the Upper Potomac River Commission and supplements the Jennings Randolph supply augmentations to provide adequate water supply to downstream users including WSSC for Prince George's County, and meets water quality standards in the Potomac River. The Savage Reservoir has a gross capacity of 10.4 billion gallons, and the capacity of the reservoir used for water supply is 6.3 billion gallons. The U.S. Army Corps of Engineers are responsible for the maintenance and operation of the Jennings Randolph and Savage dams.

Little Seneca Lake was built solely for water supply and is located near Boyds, Maryland. It has a gross capacity of 3.9 billion gallons. WSSC owns and operates the Little Seneca Dam and controls water releases from the facility. **Table 3-1** provides an inventory of existing storage facilities (impounded water supply) on the Potomac River.

The Patuxent River is located along the northeastern border between Montgomery and Howard counties, and is the second major source of raw water which is supplied and treated by WSSC to the two counties. There are two water supply impoundments along the Patuxent River operated by the WSSC – the Triadelphia and the T.H. Duckett Reservoirs, created by the Brighton and T. Howard Duckett dams, respectively. They are used solely for water supply. The Triadelphia Reservoir is located at Brighton Dam in Montgomery County, 14 miles north of the

Table 3-1 Inventory of Existing Storage Facilities
Potomac River – Jennings Randolph and Little Seneca Lake

	JENNINGS RANDOLPH	LITTLE SENECA
Crest Elevation (above sea level)	1,514 Feet	408 Feet
Spillway Length	210 Feet	
Flooded Area at Crest Elevation	1,247 Acres	530 Acres
Area of Land Owned by WSSC	None	530 Acres
First Overflow of Dam Crest	N/A	1985
Total Length of Dam	2,130 Feet	600 Feet
Capacity of Reservoir Used For Water Supply	13 Billion Gals.	3.9 Billion Gals.
Safe Yield	155 mgd	
Average Withdrawal*		
Maximum Historical Withdrawal*	290 mgd	275 mgd

**1999 was the first time these sources were tapped to relieve drought conditions.*

northernmost tip of Washington, D.C., and has a gross storage capacity of 6.4 billion gallons. The T.H. Duckett Reservoir is located about two miles northwest of Laurel, in Prince George's County, and has a gross storage capacity of 5.7 billion gallons. **Table 3-2** provides an inventory of existing storage facilities (impounded water supply) on the Patuxent River.

Table 3-2 Inventory of Existing Storage Facilities
Patuxent River -- WSSC Reservoirs

	TRIADELPHIA	T.H. DUCKETT
Crest Elevation (above sea level)	366.4 Feet	286.4 Feet
Spillway Length	234 Feet	189 Feet
Total Length of Dam	995 Feet	840 Feet
Height of Crest above Stream Bed	64 Feet	125.45 Feet
Flooded Area of Crest Elevation	800 Acres	815 Acres
Area of Land Owned	2,936 Acres	3,023 Acres
Water Overflowed Crest for 1st Time	1944	August 1955
Gross Capacity of Reservoir	6.4 Billion Gallons	5.7 Billion Gallons
Capacity for Water Supply	5.6 Billion Gallons	5.0 Billion Gallons
Safe Yield (mgd)	45.3 mgd – Combined	
Average Daily Withdrawal (mgd)	50.6 mgd – Combined	
Maximum Daily Withdrawal (mgd)	72 mgd – Combined	

3.2 TREATMENT AND TRANSMISSION

The largest agencies involved in supplying water to Prince George's County are WSSC, the City of Bowie, and the Beltsville Agricultural Research Center.

WSSC supplies water to Prince George's and Montgomery counties from the Potomac and Patuxent rivers through two water filtration plants (WFP), Potomac WTP and Patuxent WTP. The WSSC Water Network, found as **Appendix 3-1** of this chapter, demonstrates flexibility to provide Prince George's County with water from both sources and WFPs.

3.2.1 Potomac Water Treatment Plant

WSSC withdraws water from the Potomac River near Watts Branch for processing at the Potomac Water Treatment Plant. The Potomac Plant is the subject of ongoing planning and construction to maintain treatment capacity while meeting new water quality regulations.

The Potomac Plant has a State-permitted maximum intake capacity of 300 million gallons per day (mgd) and a treatment capacity of 288 mgd. The Potomac Plant is the subject of an ongoing planning effort to maintain treatment capacity while meeting new water quality regulations that may require modifications to current treatment processes. The present average output capacity, which is water that can be reliably delivered from the Plant through the Potomac pumping station, is 337 mgd. The Potomac Plant is also the subject of a Source Water Assessment (SWA) study required by the Safe Drinking Water Act. The study is funded by the Maryland Department of the Environment (MDE) and is intended to assess the raw water upstream of the Potomac Plant's intake for any possible sources of contamination relevant to water supply, as well as the susceptibility of the plant to the contaminants.

The Potomac Plant currently has solid removal processes which include provisions for separating filter backwash and for pumping, thickening, dewatering and disposing of sedimentation solids. In April 2016, a consent decree was entered by the U.S. District Court of Maryland. Under the terms of the consent decree, WSSC is required to undertake short-term operational changes and capital improvements at the Plant to reduce significantly the amount of solids being discharged into the river, and must plan, design, and implement long-term upgrades to achieve the effluent limits, conditions, and waste load allocations established by the Maryland Department of the Environment to be incorporated into a new discharge permit to be issued by the State.

Finished water from the Potomac Plant which serves Prince Georges County is first pumped into the Montgomery Main Zone and then into the Prince George's Main Zone through by means of the Bi-County Tunnel and pressure reduction valves. From the Prince George's Main Zone, water is transmitted to the Prince George's High Zone through the Central Avenue and Hill Road pumping stations. Water moves from the High Zone to the Prince George's Intermediate Zone by way of pressure reduction valves or pumping at the Central Avenue Pumping Station. The Clinton and Potomac zones are fed from the High Zone through pressure reduction valves. Finally, the Marlboro Zone is fed by pressure reduction from the Prince George's Intermediate Zone.

The water transmission network is shown on the map *The Water Network*, included as **Appendix 3-1**. An important facility for Prince Georges County that conveys finished water from the Potomac Plant in Montgomery County into Prince George's County is the Bi-County tunnel, also known as Project 80 which became operational in 2015.

3.2.2 Patuxent Water Treatment Plant

The Triadelphia and the Duckett reservoirs provide the raw water source for the Patuxent Water Treatment Plant. To protect these reservoirs against water quality degradation and against excessive capacity loss due to sedimentation, the Patuxent Reservoirs Watershed Protection Agreement was signed in 1996 between seven local governments and agencies with interest in the issue. Included in the Agreement are Prince George's County and the WSSC. The Agreement has created a policy board composed of the executive-level representatives of the seven agencies. They meet once a year and supervise the work conducted or proposed by a Technical Advisory Committee (TAC). The TAC is engaged in monitoring, modeling, and field assessments for the reservoirs and its watershed. It also provides support to the SWA being conducted by MDE.

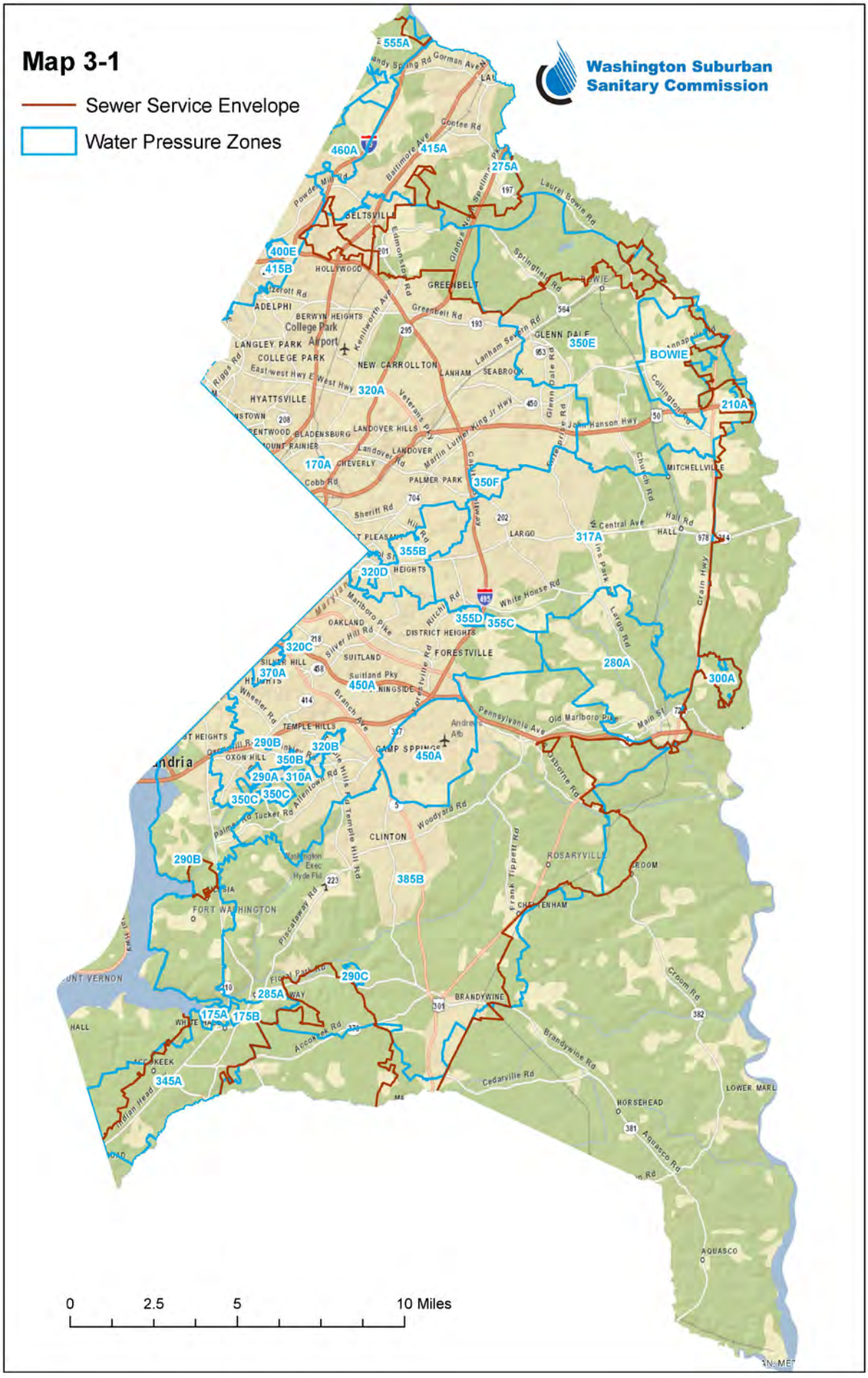
The Patuxent Water Treatment Plant can currently treat a nominal capacity of 56 mgd, and emergency capacity of 72 mgd. However, the raw water pump station can supply a maximum of 68.5 mgd to the plant. Phase II of the Patuxent Treatment Plant expansion, is currently under construction and will allow for 72 mgd nominal capacity and 110 mgd emergency capacity. These numbers are found in CIP Project W-172.05. When Phase II and the Rocky Gorge Pump Station, in combination with the fourth raw water transmission pipeline between the pump station and water treatment plant, are complete, the capacity of the plant will increase. The Triadelphia and T. H. Duckett reservoirs have a maximum storage capacity of 12.1 billion gallons.

3.2.3 Transmission

The WSSC water network in Prince George's County is divided into 28 pressure zones. Nine of the pressures zones serve large areas (450A, 415A, 385B, 350E, 345A, 320A, 317A, 290B, 280A) while the remaining 19 are small subzones. All pressure zones can be found in **Map 3-1** that also reflects the Prince George's County Water and Sewer Service Envelope, resulting from the adoption of this water and sewer plan.

The County is also served indirectly by the Wheaton Reservoirs which are located in Montgomery County, as the Wheaton Reservoirs are a main feed to the Project 80. Project 80 is a 96-inch water main that follows the alignment of the Capital Beltway to Central Avenue. *The Water Network* identifies the ground-level, elevated, and standpipe water storage facilities in the WSSC system.

Water storage facilities are an integral part of the water system. The stored water at a high elevation provides for emergency supply, capacity for fire suppression, and allows for the daily fluctuations in water use, and maintains a consistent pressure within the water pressure zone. Elevated facilities are reliable and efficient, and provide for water supply even during power outages.


Map 3-1
Sewer Service Envelope
Water Pressure Zones
Washington Suburban Sanitary Commission
555A
460A
415A
275A
400E
415B
350E
BOWIE
210A
320A
170A
350F
355B
320D
355D
355C
317A
320C
370A
450A
280A
300A
290B
320B
350B
290A
310A
350C
385B
290C
285A
175A
175B
345A
0
2.5
5
10 Miles

By design, elevated water storage tanks are tall structures usually located on high ground. Therefore, it is important to assure that the siting and design of these monumental structures are compatible with the surrounding community. New elevated water storage tanks in Prince George's County have to meet the following criteria:

1. The siting and design of water storage are developed in coordination with the community and planning agencies.

2. The siting of storage will be directed toward commercial or public lands where feasible.

3. The design of water storage will incorporate potential antenna sites.

Three new water storage facilities (described below) are proposed for Prince George's County and appear in the WSSC FY 2019 - 2024 Capital Improvement Program (CIP).

Construction of the Collington Elevated Water Storage Facility (W-147.00) was recently completed, providing additional storage in the Intermediate Zone (hg = 317'). This project provided for the site selection, planning, design, and construction of 4.0 million gallons (mg) of elevated storage to serve the Intermediate Zone. The site selection phase included a Community Outreach Program. The new facility was coordinated with the construction of the Oak Grove / Leeland Roads Water Main, Part 2 project (W-123.20). The facility is located northwest of the intersection of Leeland Road and Route 301. The project also included modifications at the existing Central Avenue Water Pumping Station (WPS) to add an additional pump and upgrade an existing pump to optimize utilization of the new Collington tanks.

The St. Barnabas Elevated Tank Replacement (W-65.10) will provide for additional usable storage in the Prince George's High Zone (hg = 450'). This project provides for evaluation of current storage levels in the zone, site selection, planning, design, and construction of a 2.5 million gallons (mg) of elevated storage to serve the High Zone. The facility is currently under construction.

Clinton Zone Water Storage Facility Implementation (W-65.02) provides for the design and construction of approximately 4.0 million gallons (mg) of water storage to serve the Clinton Pressure Zone. The planning phase was executed under Project W-62.04 and included a Community Outreach Program to elicit comment from the public. The Clinton Zone currently has only one storage facility, which poses operational problems when the existing facility must be removed from service for maintenance.

In addition to the storage projects mentioned above, the Adopted WSSC CIP 2019 - 2024 includes some major transmission projects as well. Transmission projects associated with new storage facilities mentioned above may be found in **Table 3-3**.

Table 3-3 Prince George's County Transmission Projects Associated with Storage Facilities

CIP Number	Title of Project	Storage Facility
W-34.04	Branch Avenue Water Transmission Improvements	Clinton Zone Water Storage Facility (W-62.05)
W-123.20	Oak Grove/Leeland Roads Water Main, Part 2	Collington Elevated Water Storage Facility (W147.00)

One other water main project of note is W-34.03, Water Transmission Improvements to the 385B Pressure Zone. This project provides for the planning, design, and construction for 24,000 feet of 24-inch diameter water main and a flow control valve along Accokeek Road outside the current Prince George's County Water and Sewer Service Envelope. This was the preferred route recommended as a result of a detailed alignment study that evaluated many alternatives for constructability, impact on natural resources, and community impacts.

This project will remedy an existing system deficiency, increasing the level of service and reliability to WSSC customers in the Accokeek Pressure Zone as well as address future system needs within the designated Prince George's County Water and Sewer Service Envelope. It was not designed, nor is its purpose, to provide service to any future development along Accokeek Road outside of the current service envelope.

Pursuant to the Public Utilities Article, Division II of the Annotated Code of Maryland, WSSC may not grant water or sewer service connections, hookups or authorizations for service or otherwise extend water and sewer service to any new development within the WSSD unless the development is in conformance with adopted and approved plans, programs, and policies of the applicable County's comprehensive water and sewerage plan, amendment, or revision.

More information on the above-mentioned water projects for Prince George's County may be found in the *Adopted WSSC CIP 2018 - 2023*. Excerpts of Bi-County Water Projects and Prince George's County Water Projects may be found as **Appendix 3-7** of this Chapter.

The WSSC has water system interconnections with several other jurisdictions. These interconnections are subject to formal agreements between WSSC and each individual jurisdiction. Some of these supply arrangements are used as an everyday supply, some are for emergencies only and some are used to meet the other jurisdictions' peak demands. **Table 3-4** shows interconnections in Prince George's County. Both Howard County and Charles County have approached WSSC regarding the possibility of increasing the allowable withdrawal since the last update of this plan. However, at this time, no formal requests have been made. Finished water storage facilities that serve Prince George's County are listed in **Table 3-5.**

Table 3-4 Interconnections with other Jurisdictions

Jurisdiction	Allowable Withdrawal (mgd)	WSSC Pressure Zone
City of Bowie	Not specified –emergency only	350E
Charles County	1.4	345A
Howard County	5.0	415A
DC Water	Not specified	various

3.2.4 Water Treatment Plants Using Groundwater Supplies

Underground water supplies, known as aquifers, are used for smaller community systems and individual wells. There are two community groundwater systems in the County as reflected in **Table 3-6** that are used to service 25 or more residential units.

The City of Bowie operates the largest of these. Six wells supply up to 5.2 million gallons per day to serve the northern portions of the City of Bowie. Beginning in 1989, the City made numerous improvements to its system of wells. One well was rehabilitated using chemical treatment; two wells were reconstructed; two wells were redrilled as replacement wells; and one new well was drilled. An inventory of the existing water treatment facilities follows:

Plant Design Capacity	5.2 mgd
Current Peak Capability	8.0 mgd
Average Production	2.3 mgd
Storage Capacity	4.2 mgd

As part of the City of Bowie's water treatment plant system, 600,000 gallons are stored at the water treatment plant, 600,000 gallons in a water tank on Belair Drive, and 3 million gallons at a ground-level storage facility on Media Lane. Any new connections that result in expansion of the system are considered in accordance with Chapter 25 of the City of Bowie Code.

3.2.5 Water Withdrawal (Groundwater and Surface Water) and Point of Discharge

Groundwater supplies account for a small percentage of the total water used in the County. Individual wells are not listed, although larger water withdrawals, as well as points of discharge exceeding 5,000 gallons per day (gpd) must be approved within this plan. A complete listing of water withdrawal and point of discharge permits issued by MDE in Prince George's County are provided as **Appendix 3-2** of this chapter and **Appendix 4-1** of Chapter 4, respectively.

Table 3-5 WSSC Finished Water Storage Facilities in Prince George's County

Facility Location	Type	Max Elevation (ft)	Total Capacity (mg)
Ground Level Storage			
Patuxent Reservoirs (7)	Ground level	415	18.4
South Laurel	Ground level	249	3.0
Hill Road (3)	Ground level	270	30.0
St. Barnabas Reservoir	Ground level	290	5.0
Elevated Storage			
Wildlife (3)	Elevated	350	4.5
Pointer Ridge	Elevated	317	2.0
Suitland	Elevated	445	2.0
Andrews	Elevated	450	3.0
Camp Springs	Elevated	440	1.0
Clinton	Elevated	385	3.0
St. Barnabas	Elevated	430	1.0
Forest Heights	Elevated	290	0.3
Fort Washington	Elevated	290	0.5
Accokeek	Elevated	345	0.75
Collington	Elevated	317	4.0
Standpipes			
Carole Highlands	Standpipe	310	3.0
Greenbelt	Standpipe	320	2.0
Rogers Heights	Standpipe	305	4.0

mg = million gallons

Other facilities located in Montgomery County provide service to Prince George's County user, e.g. Wheaton Reservoirs

Table 3-6 Inventory of Community System Wells

Well Name and Number	Aquifer	Coordinate Location	Depth	Diameter	Maximum Safe Yield gpd	Pumping Capacity
MUNICIPAL						
City of Bowie						
6 Wells					10,000,000 (combined total)	
No. 1	Magothy		192’	8”		
No. 2	Patapsco	834-E-	700’	8”		
No. 3	Patapsco	439-N	733’	10”		
No. 4	Patuxent		1158’	10”		6,800 gpm
No. 5	Patuxent		980’	10”		
No. 6	Patapsco		715’			
Note: Belair Community; North Bowie						
PRIVATE						
Calvert Manor Corporation						
Accokeek						
2 Wells						
No. 1	Potomac	799-E	380’	6”		(Total)
No. 2	Group	311-N	630’	6”	65,000	150 gpm

Note: Calvert Manor residential subdivision – Plat A05-1189; Tax Maps 141 E/F-4 & 151 E/F-1; Blocks A, B, & C; Water Category 3

Applicants requesting water withdrawal appropriations or point of discharge for consideration as an amendment to the Water and Sewer Plan will be reviewed consistent with the procedures set forth for legislative amendments (Chapter 6, Section 6.3), including policies and criteria (Chapter 2, Section 2.1.4) of this Plan. At a minimum, applications must include computations that demonstrate the impact of the proposed water withdrawal or point of discharge on existing natural resources, and a well-defined written proposal for its intended use and rationale.

A “Conditional Approval for Plan Amendment” will be recommended when the County determines that the proposal meets the minimum criteria, and it will serve to allow further evaluation of the proposal by MDE. This “conditional approval” does not obligate or constitute County support of the proposed use of the requested appropriation. Should the County decide that the request for water withdrawal appropriation does not meet County requirements for future environmental impacts to aquifers in the County, and the installation and use of wells, the request may be denied. A denial by the County will subsequently cancel any request submitted to the MDE. Upon concurrence with the findings of the state evaluation and approval by the MDE or its permitting agency, the request shall be incorporated as an amendment to the Water and Sewer Plan.

3.2.6 Water Reuse

Water reuse, is an environmentally friendly "green" initiative, in line with the State of Maryland's adoption of Leadership in Energy and Environmental Design (LEED) that can promote extensive conservation of water resources by recycling reclaimed water. MDE defines water reuse as the "use of reclaimed water for beneficial use or a controlled use in accordance to MDE Guidelines". For purposes of this section in this Plan (2018 Water and Sewer Plan), water reuse is further defined for groundwater, rainwater, or graywater (from fixtures not intended for human bodily waste) that has been treated in accordance to State regulations (COMAR 26.08.04.01). As a minimum, it meets the criteria of Class IV Effluent, and can be safely and effectively used for non-potable purposes in commercial and industrial practices. When used in accordance to established regulations, these non-potable purposes may consist of surface and subsurface irrigation, heating and cooling, and processing.

Water reuse, when used as stated above, almost always requires the supplemental use of potable water from the public system – posing concerns and challenges to the regulating, permitting and monitoring entities – to effectively prevent any level of cross-contamination to the public water supply. County and Bi-County agencies charged with the responsibility for safe distribution and use of the public (and private) potable water system(s) will need to effectively scrutinize water reuse systems in green building technologies and designs. Prince George's County agencies will continue their review of best practices, policies and procedures that will ultimately guide the safe implementation and permitting process for water reuse. A listing of public and private projects meeting the above criteria and currently using water reclamation and reuse strategies, are found in **Appendix 3-8** of this chapter.

3.3 WATER DEMAND AND PRODUCTION

Water production represents the amount of water delivered from the water treatment plants to the transmission system. The transmission system consists of water mains, pumping stations, pressure reduction valves, and water storage facilities. The transmission system is divided into different water pressure zones based on the distance from the water plants and elevation of land. Conversely, water demand consists of water consumed by customers and a variety of unbilled uses such as firefighting, water main breaks, maintenance of the water system, and unmetered water use.

Water demand varies greatly over the seasons. During a dry summer, the consumption may be 30 percent higher than during winter months. Daily variations in water demand may be even larger. During the drought of 1999, customers of WSSC in Prince George's County consumed a daily average of 87 mgd during the months of June, July and August. The normal average daily use for the year was 77 mgd. These variations in water demand require the County's water facilities to retain flexibility. **Table 3-7** presents WSSC's daily average and maximum water production levels since 1995.

Table 3-7– WSSC Historic Water Production

Year	Average Production (MGD)	Maximum Day Production (MGD)	Ratio
1995	167.1	233.9	1.40
1996	161.3	198.9	1.23
1997	164.6	245.8	1.49
1998	166.5	219.8	1.32
1999	168.0	263.4	1.57
2000	162.0	200.8	1.24
2001	167.4	253.2	1.51
2002	164.7	221.8	1.35
2003	164.3	206.5	1.26
2004	168.1	210.4	1.25
2005	171.9	226.2	1.32
2006	169.1	224.9	1.33
2007	172.4	222.8	1.29
2008	163.1	251.1	1.54
2009	162.7	210.0	1.29
2010	175.0	232.8	1.33
2011	169.5	225.4	1.33
2012	163.8	226.2	1.38
2013	158.6	205.7	1.30
2014	161.7	205.0	1.27
2015	164.9	200.0	1.21
2016	164.7	208.6	1.27
2017	162.6	209.7	1.29
2018	162.9	212.9	1.31

Note: Data includes all of the WSSC service area (Montgomery and Prince George's Counties)
MGD: Million Gallons/Day
Source: WSSC – Planning Group – February 2019

WSSC bases the calculation of future water demand on dwelling unit and employment projections provided by the Metropolitan Washington Council of Governments. Based on analysis of the latest water production and consumption data, WSSC has developed the following water demand per unit to be used for growth projections and planning water system improvements:

- Single-Family Dwelling Unit (SFDU):----------177.0 gallons per day (gpd)
- Employees:---------- 36.1 gpd
- Multi-Family Dwelling Unit (MFDU):----------146.8 gpd

WSSC has prepared water demand projections through the year 2040 for Prince George's County, using COG/MNCPPC Round 8.0 population forecasts and current water use factors for single-family dwelling units, multi-family dwelling units, and employees. **Table 3-8** shows the projected demands until Year 2040 for Prince George's County in five-year increments.

Table 3-8 – Projected Average Water Demands for Prince George's County

	Total Production – Million Gallons per Day (MGD)		
Calendar Year	**Main Zone**	**High Zone**	**Total**
2020	44.7	41.9	86.6
2025	45.9	43.2	89.1
2030	47.2	44.6	91.8
2035	48.1	45.8	93.9
2040	49.1	47.0	96.1

To account for hourly variation in consumption and for the use and refilling of water storage facilities, consumption criteria must span at least a 24-hour time period. To account for seasonal variations, the criteria specifies the 24-hour period of greatest projected consumption within a given year, generally referred to as the maximum day consumption. The specific numbers are obtained by multiplying the average daily consumption for the year and the maximum day factor, and distributing the result over a typical 24-hour consumption pattern. The maximum day demand factor is the ratio of the peak day demand to the average day demand, and is used in sizing the capacity of the water system facilities. The current maximum day demand factor used by WSSC is 1.43 for system-wide facilities, based on a 20% probability of exceedance. **Table 3-9** lists WSSC's daily average and maximum water production projections and planned capacity for the Washington Suburban Sanitary District (WSSD).

As shown in the table, total water consumption is anticipated to increase in the future, as the population increases. Estimated water consumption at full development represents the average consumption expected when all parcels of land are developed to the extent allowed under current zoning classifications. Since zoning classifications for individual parcels may change and the consumption factors used may also change, the full estimated development needs for production may change and are not shown in the preceding table.

The water demand projections noted above are based on the 2016 Water Production Projections Report. The 2016 update accounts for the local, regional, and national trends in per capita consumption which has been steadily declining due to water-saving fixtures and appliances. The rate of decline may shorten over time as market saturation occurs with plumbing upgrades to existing homes.

Table 3-9 – Projected Average Daily Water Demands WSSD

	Projected Demand (MGD)		Planned Capacity (MGD) * – Available Treatment Capacity – Daily Maximum
Calendar Year	Daily Average	Daily Maximum	
2020	180.8	255.7	398.0
2025	188.9	267.2	398.0
2030	197.8	279.6	398.0
2035	203.3	287.7	398.0
2040	208.7	295.2	398.0

**This is planned or available treatment capacity at both Potomac and Patuxent treatment facilities. The Daily Maximum Production at the Potomac Plant is 288 MGD. The Patuxent Plant is currently undergoing upgrades that will increase its capacity to 72 MGD (nominal) and 110 MGD (emergency).*
Note: The above data is based on the 2016 Water Production Projections by WSSC Planning Division.

The annual averages of water transmitted into Prince George's County and the Bi-County area from 1995 through 2018 are reflected in **Table 3-10** and **Table 3-11** respectively. A new transmission line (Project 80) was placed in service in November 2000, and shortly thereafter, not all water into Prince George's County had been metered. Therefore, the production numbers highlighted grey in Table 3-10 cannot be correlated with the earlier production numbers. Flow metering was corrected in November 2004.

3.3.1 Total Water Management

Since the early 1990s, water production at WSSC has shown little or no change regardless of any increase in new connections. In fact, WSSC's water production per capita, as well as production per customer account, has decreased during the past 10 years. Because of growing concerns about flat water production numbers while capital projects were increasing, Prince George's County studied the concept of Total Water Management in 1998.

Total Water Management integrates the activities of local, State, and Federal governments, and is based on the principles of pollution prevention, resource conservation, and sustainable development. The recommended strategies and measures may be geared toward water supply, transmission efficiency, and water consumption. The overarching goal is to satisfy customer needs in a cost-effective and efficient manner, minimizing any adverse environmental impact and preserving the quality of life.

Table 3-10 Prince George's County Water Production from 1995 to 2018 in millions of gallons per day (mgd)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg/Year
1995	77.1	78.2	76.7	77.3	74.7	77.5	82.3	89.9	82.9	75.3	73.6	75.9	78.5
1996	77.9	75.6	72.1	74.0	76.5	81.6	79.8	80.3	78.0	75.5	72.2	72.4	76.3
1997	74.8	72.2	69.3	71.4	77.9	81.9	89.3	88.4	83.3	78.0	73.0	69.3	77.4
1998	69.3	68.9	70.3	72.7	77.5	80.3	88.8	89.9	88.4	79.9	78.8	74.5	78.3
1999	76.9	71.1	66.0	71.8	80.3	90.6	92.1	80.0	75.3	77.8	74.6	72.3	77.4
2000	75.0	76.0	72.7	71.1	75.4	78.4	78.4	77.5	73.9	64.8	55.0	58.0	71.4
2001	55.7	52.4	55.4	53.4	61.0	60.2	50.4	48.3	48.9	48.7	52.3	52.4	53.3
2002	50.9	31.3	25.0	27.0	49.4	50.9	48.7	46.4	47.5	40.4	43.2	42.8	42.0
2003	44.9	48.1	47.5	46.2	45.0	47.4	50.9	50.2	52.4	54.9	46.8	46.2	48.4
2004	48.4	47.6	45.9	48.9	42.5	44.6	46.7	36.9	46.5	46.7	79.7	78.6	51.1
2005	80.7	81.3	80.6	80.6	85.3	91.5	84.1	89.1	90.6	83.4	77.5	77.4	83.5
2006	76.9	78.0	77.7	78.1	85.5	88.3	88.2	98.1	86.8	82.8	82.4	82.0	83.7
2007	80.6	78.6	73.1	74.3	92.4	91.4	92.6	88.3	84.2	76.7	72.0	72.2	81.4
2008	73.6	71.7	68.8	68.7	72.3	75.3	76.8	82.7	77.2	74.9	72.4	71.9	73.9
2009	77.3	72.0	70.3	74.3	71.6	76.4	82.2	80.9	77.1	73.6	72.2	75.7	75.3
2010	72.9	57.6	67.6	73.9	78.2	84.3	86.8	87.1	87.5	81.1	77.4	77.8	77.7
2011	78.7	75.0	77.6	80.9	84.4	89.7	95.6	81.0	72.0	73.2	72.6	72.5	79.4
2012	72.5	64.6	66.9	75.9	78.3	82.8	77.4	78.7	75.6	62.7	61.8	67.7	72.1
2013	67.9	62.8	59.5	64.6	67.8	69.1	71.6	70.3	69.5	64.4	63.2	64.8	66.3
2014	72.4	68.6	65.7	65.5	68.3	72.6	93.8	71.9	79.6	78.8	73.8	70.8	73.5
2015	72.6	73.2	73.0	67.2	72.2	72.2	73.3	77.0	76.3	78.3	74.7	76.4	73.9
2016	78.7	80.7	72.6	76.9	74.2	78.9	81.2	82.0	75.2	65.5	66.4	70.8	75.3
2017	73.5	71.5	68.2	71.9	73.3	81.3	83.6	84.1	85.3	77.1	77.2	76.1	76.9
2018	85.1	81.0	81.6	90.8	99.5	101.9	98.5	93.4	107.6	94.6	77.9	78.4	90.9
Monthly Avg	70.9	68.1	67.0	69.4	74.0	78.2	80.6	78.3	76.8	72.1	70.2	70.1	73.0

New transmission line (Project 80) was placed into service during November 2000. After that, not all water into Prince George's County has been metered until November 2004. Therefore, production numbers, highlighted grey in this table, cannot be correlated with the earlier production numbers.

Table 3-11 Bi-County Water Production from 1995 to 2018 in millions of gallons per day (mgd)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg/Year
1995	158.2	158.5	157.5	161.8	160.9	170.0	183.2	199.9	182.3	160.4	156.7	155.3	167.1
1996	163.6	160.5	155.5	157.4	162.6	174.4	169.5	169.4	164.7	158.2	150.6	149.1	161.3
1997	154.2	151.2	149.4	158.3	166.5	173.4	195.9	190.6	172.2	163.4	152.3	147.9	164.6
1998	147.9	145.9	149.3	154.7	167.9	173.2	191.7	194.6	190.5	166.5	160.9	154.8	166.5
1999	159.1	151.5	154.2	158.3	185.0	204.2	207.1	173.7	161.2	155.6	153.4	153.0	168.0
2000	156.8	157.7	152.5	158.0	166.8	172.8	172.1	168.9	164.1	160.1	155.8	158.2	162.0
2001	158.6	153.9	159.6	168.3	179.5	181.2	176.8	177.4	177.5	165.5	159.1	151.0	167.4
2002	153.0	148.4	148.4	156.3	163.8	182.1	191.5	192.4	170.4	158.6	153.3	158.0	164.7
2003	162.1	158.8	159.0	160.8	163.0	168.2	174.3	176.1	168.6	161.2	160.4	159.0	164.3
2004	167.0	166.9	156.7	161.6	175.0	175.9	178.5	176.2	175.6	163.5	160.6	159.1	168.1
2005	161.1	162.0	160.9	165.2	172.6	188.4	183.5	187.2	191.5	170.0	160.8	159.8	171.9
2006	156.0	155.8	157.2	163.0	175.5	184.7	186.5	204.8	171.3	164.9	156.1	153.1	169.1
2007	150.1	163.4	156.2	158.2	183.1	189.1	201.6	194.1	187.9	174.0	155.1	155.6	172.4
2008	154.0	151.7	150.5	154.0	162.1	177.2	178.2	184.9	172.9	161.2	154.4	156.4	163.1
2009	160.0	150.4	151.6	155.0	159.4	166.6	184.8	181.9	169.8	160.9	155.8	156.7	162.7
2010	162.0	164.9	159.9	162.7	171.6	193.8	198.8	192.8	195.2	169.8	163.2	165.4	175.0
2011	164.2	159.7	158.3	163.6	173.6	194.0	201.3	182.4	167.6	160.6	155.1	153.3	169.5
2012	153.2	151.2	151.1	162.3	167.9	181.2	188.8	178.0	169.1	159.0	153.4	150.5	163.8
2013	153.3	152.9	149.5	153.3	158.8	166.8	173.4	166.7	169.0	156.7	152.2	150.7	158.6
2014	165.3	155.8	151.4	151.6	161.4	172.4	177.4	171.4	169.2	158.0	155.4	151.5	161.7
2015	155.1	161.4	158.6	157.0	170.3	169.7	176.0	182.4	179.0	160.6	157.3	151.1	164.9
2016	157.0	158.6	154.0	161.2	161.1	172.3	180.9	181.9	173.1	159.7	158.2	157.8	164.7
2017	154.1	150.0	148.3	154.6	159.4	177.9	181.8	174.1	173.8	166.3	157.3	153.9	162.6
2018	169.5	151.9	149.0	153.3	167.4	167.2	183.4	176.7	168.9	162.2	154.2	150.9	162.9
Monthly Avg	**157.6**	**156.1**	**154.3**	**159.0**	**168.2**	**178.7**	**184.9**	**182.7**	**174.6**	**162.4**	**156.4**	**154.8**	**165.8**

The major findings of the 1998 study were: the unbilled water at WSSC (i.e., difference between water production and water demand as billed) exceeded the national average; major facility planning was based on outdated assumptions of per capita consumption; and efforts to reduce usage were overlooked as an alternative to increasing capacity of the water system. As a direct result of this study, WSSC initiated its own Total Water Management study in early 2000 to identify trends in water consumption and methods that can be used to reduce future capital expenses, as well as identify better ways to predict water usage. Periodic water production projection studies and annual water audits are completed as part of continued Total Water Management efforts by WSSC. The trends identified in these studies assist in identifying future capacity and infrastructure needs, as well as provide insight as to how customers in the service area are using water.

3.3.2 Water Loss Reduction Plan (Annual 2010 - 2018)

The most recent effort in Total Water Management is the WSSC Water Loss Reduction Plan which documented the approach WSSC will take to reduce real and apparent water losses in the water distribution system. The recommended approach is based on the American Water Works Associated (AWWA) Manual M36, Water Audits and Loss Control Programs. It is based on ten practices recommended by the AWWA Manual M36. Since unaccounted for water exceeded the 10% threshold required by MDE in 2010, a Water Loss Reduction Plan was initiated. Each year, based on the results of the annual water audit, the Water Loss Reduction Plan is reviewed, updated and submitted to MDE. Excerpts from the Water Loss Reduction Plan are provided as **Appendix 3-3** of this chapter.

WSSC is taking a proactive approach to reduce its water system losses. WSSC is assessing existing water loss methods in further detail, identifying data gaps, and developing data gathering tools to better quantify losses. These efforts will take many years to implement programs designed to target the identified losses.

3.3.3 WSSC Water Conservation Plan (2010)

WSSC completed the Water Audit for 2010, and submitted its first Water Conservation Plan to the Maryland Department of the Environment (MDE) in December 2010. The Water Conservation Plan (WCP) documents WSSC long-term water resources management goals. It also documents WSSC current practices that promote water conservation, including Water Metering programs and Conservation Inventive Pricing. A copy of the WCP (extracted pages) may be found as **Appendix 3-4** of this chapter.

3.4 WATER SUPPLY SOURCE PROGRAMS AND POLICIES

Regional Drought Management in the Potomac River Basin:

In order to provide regional service during drought conditions and ensure that there is adequate flow in the river to meet the environmental flow-by, the Cooperative (CO-OP) section of the Interstate Commission of the Potomac River Basin (ICPRB) coordinates releases from the

Jennings Randolph Reservoir, located near Bloomington, Maryland, on the North Branch of the Potomac River, and the Little Seneca Lake in the County on Little Seneca Creek. These two sources of water augment the Potomac River during periods of extreme low flow in the Washington metropolitan area. The agencies that have intakes in Montgomery County and which are considered the Regional Water Supply System during a drought are: 1) The Washington Suburban Sanitary Commission, 2) the Fairfax County Water Authority (FCWA), and 3) the Washington Aqueduct Division (WAD) of the Corps of Engineers that serve the District of Columbia, Arlington, Falls Church, and a small portion of Fairfax County. The City of Rockville and the Town of Leesburg also draw their water from the metropolitan area of the Potomac River. A new Potomac River intake and water treatment plant for the Loudoun County Sanitation Authority (Loudoun Water) are under construction downstream of Leesburg in Loudoun County.

There are a number of agreements among the region's utilities describing how the water is distributed and used during drought conditions. The agreements, included in chronological order are:

- **Agreement for Future Water Supply Storage Space in the Bloomington Reservoir (1982)**
  This agreement entitles the District of Columbia, the Fairfax County Water Authority and WSSC to 36.78 percent of Jennings Randolph Reservoir storage capacity known as future supply. The metropolitan areas share would equal 13.37 billion gallons when the reservoir is full. In return, the three nonfederal signatories are required to pay 27.4% of the construction cost (local share estimated at $54.2 million, includes interest over 50 years); 34.75% of the cost of major replacement items; and, 28.56% of the annual operation and maintenance costs. Jennings Randolph water not contracted for water supply is used for water quality improvement in the North Branch of the Potomac River. Water Quality releases upstream also indirectly benefit local jurisdictions by delaying the time when low flows are experienced in the Washington area. The WMA water utilities fund the capital, operations, and maintenance costs for the water supply storage in the Jennings Randolph Reservoir.
  Note: The Maryland Potomac Water Authority (MPWA) was created in 1978 to coordinate local governments in the acquisition of water storage of the Jennings Randolph Reservoir. However, the Novation Agreement of 1982, which provided for purchasing of storage by the District of Columbia, the Fairfax County Water Authority and WSSC, transferred the function of the MPWA to the other three parties.

- **Bloomington Payment Agreement (1982)**
  This agreement delineates the three major water users' individual responsibility to pay for the capital and O&M expenditures associated with the Jennings Randolph water supply in the agreed to ratios. This agreement was necessitated by the Corp of Engineers requiring that payments had to be guaranteed. The District of Columbia was unable to make such a guarantee because their budget must be approved annually by Congress. Under the provisions of the agreement, should a

user default in payment, another user can make the payment and sue the defaulter for payment plus penalty. In addition, the defaulter loses the right to use Jennings.

- **Little Seneca Lake Cost Sharing Agreement (1982)**
  This agreement establishes the cost shares and payment mechanisms for the capital and O&M expenditures for Little Seneca Lake in Montgomery County. These costs are distributed according to the following ratios: WSSC – 50 percent; the District of Columbia – 40 percent; and Fairfax County Water Authority – 10 percent.

- **Savage Reservoir Maintenance and Operation Cost Sharing Agreement (1982)**
  This agreement addresses water releases from the Savage Reservoir, which as relatively basic, were intended to neutralize releases from the Jennings Randolph Reservoir, which were expected to be acidic due to upstream mine drainage. This dilution effect can be viewed as additional water supply gained without requiring local funds for the construction of the Savage Reservoir. The signatories exclusive of the Upper Potomac River Commission (UPRC) have agreed to fund the annual operations and maintenance, and replacement and repair costs of Savage Reservoir according to the following percentages: Fairfax County Water Authority – 16 percent; District of Columbia – 24 percent; WSSC – 40 percent; and Allegany County – 20 percent. (See the preceding discussion of the reservoir for additional information.)

- **Metropolitan Washington Water Supply Emergency Agreement (1994)**
  This agreement establishes three plans for coordinating regional actions in the event of emergencies that affect water supply from the Potomac River to the Washington metropolitan region. The first plan provides a regional response mechanism for health-related emergencies in the Washington Aqueduct Division system. The second plan provides a mechanism for emergencies that affect more than one of the utilities that withdraw raw water from the Potomac River. The final plan describes the routine planning and cooperative operating procedures which have significantly reduced the risk of drought affecting the region's water supply. Background information describing the conditions leading up to the plan and the procedures for updating it is also provided.

- **Metropolitan Washington Water Supply and Drought Awareness Response Plan: Potomac River System (2000)**
  This Council of Government plan provides implementation steps during drought conditions for the purpose of coordinated regional response. The Plan consists of two interrelated components: a regional year-round plan emphasizing wise water use and conservation; and a water supply and drought awareness and response plan. The water supply and drought awareness plan contains four stages:
  · Normal: Wise Water Use Program
  · Watch: voluntary water conservation measures
  Warning: voluntary water restrictions
  Emergency: mandatory water restrictions

This plan is primarily designed for those customers who use the Potomac River for their drinking water supply source (see **Appendix 3-5** of this chapter.). The Plan will eventually be expanded to incorporate all water supply systems throughout the region.

Regional Drought Operations:

During times of declared drought, the regional water supply system will operate according to the Drought Operations Manual of the 1982 Water Supply Coordination Agreement. Operations rules and procedures for reducing the impacts of severe droughts in the Potomac River for the Washington metropolitan area water suppliers are as follows:

- Make the most efficient use of all water supply facilities, including but not limited to the Potomac River, Jennings Randolph Lake, Occoquan Reservoir, Triadelphia Reservoir, Rocky Gorge Reservoir, and Little Seneca Lake to meet all water supply needs for the Washington Metropolitan Area.
- Maintain the probability of invoking the restriction stage of the Potomac River Low Flow Allocation Agreement at less than 5 percent during a repeat of the historical low stream flow record.
- Maintain the probability of entering the emergency stage of the Potomac River Low Flow Allocation Agreement at less than 2 percent with full reservoirs on June 1 of any year.
- Maintain the probability of not refilling any reservoir used for Washington metropolitan area water supply to 90 percent of usable capacity by the following June 1 at less than 5 percent during a repeat of the historical low stream flow record.
- Maintain flows in the Potomac River below the Seneca Pool as agreed to by the signatories to the Potomac River Low Flow Allocation Agreement.
- Minimize conflict between normal utility operations and drought operations.
- Provide consistency with the requirements of the Potomac River Low Flow Allocation Agreement.

The underlying principle in this operating procedure is to reduce unneeded reservoir releases by making larger releases only as necessary to meet water needs. The capability of existing suppliers can be substantially extended in this manner. The Water Supply Coordination Agreement for cooperative system management is the critical element which allows the users to obtain the maximum benefits of existing resources and reduce water wastage.

During a drought, WAD and the CO-OP section of the ICPRB play key roles in determining the operation of the Regional Water Supply System. The WAD is charged with determining when to declare alert, restriction, or emergency drought stages. If a restriction or emergency stage is declared, the WAD allocates each user's fair share of withdrawal based on previous usage. The CO-OP section is responsible for coordinating water withdrawals to make the most efficient use of all water supply facilities. To accomplish this objective, the CO-OP produces forecasts of water supply and need, and determines how much water WSSC and the FCWA should be withdrawing from non-Potomac River supplies on a daily basis. The CO-OP, in consideration of the needs of the WAD, WSSC, and the FCWA, also directs releases from Jennings Randolph Reservoir and Little Seneca Lake.

The signing of the Water Supply Agreements of 1982 and the completion of Little Seneca Lake in the fall of 1984 resulted in a regional consensus that area raw water supply needs are satisfied, at least through the year 2020. Recent water demand forecast and resource adequacy analysis (2015 Washington Metropolitan Area Water Supply Study) by ICPRB/CO-OP confirms that presently available resources will be stressed for the region by the year 2035 in the event of a repetition of the drought of record.

As noted above, the ICPRB evaluates the adequacy of the Potomac River system to supply drinking water needs. The ICPRB annually coordinates a week-long drought management exercise that simulates water management operations and decision making under drought conditions for the Washington metropolitan area water suppliers. Additionally, an analysis is conducted every five years in order to incorporate new demographic information into the demand forecast. A 2015 water resource analysis was conducted using the Potomac Reservoir and River Simulation Model (PRRISM). PRRISM has been updated since the last study was completed in 2010 to reflect new operating procedures for the Jennings Randolph and Savage reservoirs, as well as revised sedimentation rates. The model has also been updated to incorporate over 100 climate change models. The 2015 analysis indicates that with climate change, the current water supply system will begin to realize deficiencies beginning in 2040 during a repeat of the drought of record. As a result, under the terms of the ICPRB Water Supply Coordination Agreement, a water supply alternatives study was prepared to evaluate alternatives that could provide the adequate raw water storage necessary for the long-range planning for the three water utilities that are part of the Agreement. The recommended strategies included the development of several different quarries in Virginia and Maryland into raw water storage reservoirs. In Maryland, the Travilah quarry, in Montgomery County was identified as one of these reservoirs. The entire study is published by the ICPRB on their website at: www.potomacriver.org Future work will require project development and planning to include defining project scope, budget, funding, and schedule.

Potomac Water Filtration Plant Source Water Assessment:

MDE and WSSC completed a source water assessment (SWA) for the Potomac River and WSSC's water filtration plant in 2002. The SWA addressed issues involved with the quality and safety of the raw water the plant draws from the river for treatment and does not directly address finished water quality. From its findings, the SWA recommended the development and implementation of a source water protection plan for the Potomac Plant and for other similar facilities which draw their source water from the river. The SWA predicted the following potential improvements as a result of the successful implementation of such a plan:

- Reducing the solids loading to the plant
- Reducing the magnitude and frequency of high pH, high natural organic matter (NOM) events which result from algal, phytoplankton, and macrophyte activities in the Potomac and its tributaries
- Improving protection from pathogens including Cryptosporidium and Giardia
- Reducing the number and severity of taste and odor episodes which occur in the WSSC system
- Reducing ammonia levels and chlorine demand in the raw water

Following the completion of the SWA, WSSC actively worked with other utilities and relevant governmental agencies to establish the Potomac River Basin Drinking Water Source Protection Partnership. The Partnership, formed in 2004, is a voluntary organization of drinking water suppliers and government agencies working to protect drinking water sources, thereby safeguarding both public health and the environment.

WSSC has actively worked within the Partnership framework to develop a strategy of outreach and environmental programs to protect the Potomac drinking water supply, which serves more than 4 million people. Through work groups and active discussion at Partnership meetings, the Partnership is implementing a strategy for carrying forward source water protection as recommended by the source water assessments conducted throughout the Potomac basin, as well as important source water protection issues as they emerge.

Highest priority issues for the Partnership in 2016 were enhancing chemical contaminant knowledge in the Potomac watershed, implementing improvements to regional spill response, and source water protection activities related to toxic and non-toxic algae. In light of the West Virginia Elk River MCHM spill and the North Carolina Dan River coal ash spill in 2014, several utility members in the Partnership, together with Metropolitan Washington Council of Governments, retained a consultant to update the 2002 SWA data of potential point-source contaminants upstream of the D.C. metropolitan area water intakes. The Partnership plans to use this data to update their understanding of upstream risks, and to prioritize both outreach efforts to upstream contaminant owners and early warning and response efforts. The Partnership also plans to implement further improvements to cooperative spill response, based on lessons learned during an exercise with the Colonial Pipeline and the response to an actual latex spill in the upstream North Branch Potomac River in 2015. Finally, much national attention has been given recently to toxic algal blooms, arising from nutrient pollution, that annually affect drinking water systems around the county. While such blooms have not been commonly observed in the Potomac River, the Partnership recognizes the severe risk such blooms present to the safety of drinking water. Thus, the Partnership is devoted to advancing source water protection activities that prevent and minimize impacts of toxic and non-toxic algal blooms.

Within the separate workgroups, the Partnership also continues to monitor other high priority issues such as emerging contaminants, pipeline safety, road salts, water quality standards, stormwater, engaging upstream stakeholders and forests protection. Since 2013, the Partnership has been tracking results of sampling by water utilities in the Potomac River Basin for the third round of unregulated contaminant monitoring rule (UCMR3); a workshop was held in October 2013. The urban issues workgroup recently sponsored an information session on chloride trends in urban-affected watersheds. Utility members in the Partnership are also supporting a project under the Water Research Foundation and U.S. Endowment for Forestry and Communities, Inc., to evaluate benefits to upstream forest protection on drinking water quality and treatment costs.

Patuxent Reservoirs Watershed Protection Agreement:

The Patuxent Reservoirs Watershed Protection Group (PRWPG) was formed by agreement in October 1996 to protect the long-term biological, physical, and chemical integrity of the Triadelphia and Rocky Gorge reservoirs and the contributing 132 square-mile watershed. This group consists of a policy board and a technical advisory committee (TAC). Signatories to the agreement include Montgomery County, Howard County, Prince George's County, the Montgomery County and Howard County Soil Conservation Districts, the M-NCPPC, and WSSC. To protect the Patuxent Reservoirs Watershed, those signatories have developed and continue to implement a multi-barrier watershed management approach to assure the integrity of a continued supply of high quality, potable water at reasonable cost.

Initially an action plan was written to begin implementing the multi-barrier watershed management approach. The plan listed action items in three categories: data analysis and collection tasks, implementation tasks, and public information tasks. In 2003, the PRWPG adopted a revised action plan. This revised list of action items or work plan, titled Performance Measures and Goals for Priority Resources, represents a continuation of the commitment to coordinate protection efforts in coming years. This table contains goals, performance measures, implementation items, and a time line to achieve each goal for six priority resources selected by the TAC. Those priority resources include the following:

1. Reservoir/water supply
2. Terrestrial habitats
3. Stream systems
4. Aquatic biota
5. Rural character and landscapes
6. Public awareness and stewardship

In recognition of the interagency accomplishments, the US EPA awarded the PRWPG its Clean Water Partner for the 21st Century in 2003. The member agencies regularly evaluate the program progress to date, the establishment of quantifiable measures to judge success in protecting priority resources, the feasible rates of projects and control strategies implementation, and the need to revise or add additional goals. Many important studies have been accomplished since the PRWPG was formed. For example, in 2008, PRWPG completed the Sediment Study and the Forest Management and Recreation Use Study. In 2009, an Interim Watershed Management Report was prepared. Outreach activities to further public awareness of watershed issues have included the H2O Fest Watershed Festival, a Patuxent River Cleanup Day, and the annual Family Campfire.

In 1998, the Maryland Department of the Environment (MDE) identified both reservoirs as impaired by nutrients and identified Triadelphia Reservoir as impaired by sediment; consequently, MDE determined that the reservoirs were unable to achieve State water quality standards for their designated uses. To address these impairments, the U.S. Environmental Protection Agency (EPA) approved total maximum daily loads (TMDLs) for both reservoirs in November 2008. The water quality goal of the nutrient TMDL is to reduce high chlorophyll at concentrations that reflect excessive algal blooms, and to maintain dissolved oxygen levels at a

level that is supportive of the designated uses. The water quality goal for the sediment TMDL for Triadelphia Reservoir is to increase the useful life of the reservoir for water supply by preserving storage capacity. A phosphorus TMDL was established for each reservoir, and a sediment TMDL was established for Triadelphia Reservoir (29 percent reduction required). Significant phosphorus load reductions are required (58 percent for Triadelphia Reservoir, 48 percent for Rocky Gorge Reservoir) to meet Maryland's water quality standards. (Maryland Department of the Environment, June 2008).

In 2016, an assessment was completed estimating the progress made from 2000-2015 towards achieving the pollutant reduction goals specified in the TMDLs for the reservoirs. Urban stormwater management and agricultural best management practices (BMPs) were tallied and modeled pollutant load reductions were generated. Pollutant load estimates were also derived for land use changes, such as land converted from agricultural to residential land uses. Next steps include seeking feedback from the MDE, continuing to track land use and BMP implementation, assessing the apparent BMP implementation rates, and identifying the most cost-effective BMPs. The TAC was directed to proceed with the plan in 2017.

3.5 FINANCING

Financing of all WSSC's CIP is reviewed by the County Executives of Prince George's and Montgomery counties and approved annually by the two County Councils. Each CIP covers a six-year period. The Prince George's County Council adopts the CIP as part of the County's Comprehensive Water and Sewer Plan. The CIP is divided into three categories for both water and sewer projects: Prince George's County projects, Montgomery County projects, and Bi-County projects. **Appendix 3-6** of this chapter lists the current water projects for Prince George's County and for the Bi-County area.

System improvement projects under the CIP are financed with funds from the Water Supply and Sewage Disposal Bond Funds. The funds are repaid to bond holders over a period of 20 years by annual principal and interest payments known as debt service. Growth-related projects are usually paid through system development charges (SDC) and developer contributions.

Additional information relating to the financing, proposals and status of projects in Prince George's and Montgomery counties are found in the CIP. A copy may be requested by contacting WSSC.

The City of Bowie is required to prepare and adopt a formal budget appropriating funds for the operation, including plant improvements, of the water and sewer system. The City Council formally adopts the budget each year. Rates are established based upon the "cash needs approach." The rate structure must provide not only funds for operation and maintenance, but principal and interest payments on long-term debt, plant additions, and renewals and replacements.

APPENDIX 3-1

THE WATER NETWORK
WASHINGTON SUBURBAN SANITARY COMMISSION

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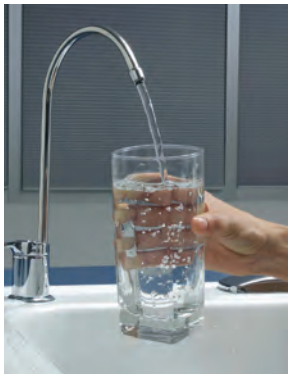
WSSC

Where Water Matters

The Water Network

WSSC's Water Distribution System for Prince George's and Montgomery Counties, Maryland



WSSC
Where Water Matters

The water from your faucet marks the end of a journey. Over 5,700 miles of water mains, 16 pumping stations and 57 storage facilities are all part of WSSC's distribution network that delivers drinking water to you and to your neighbors- and to more than 1.8 million other customers.

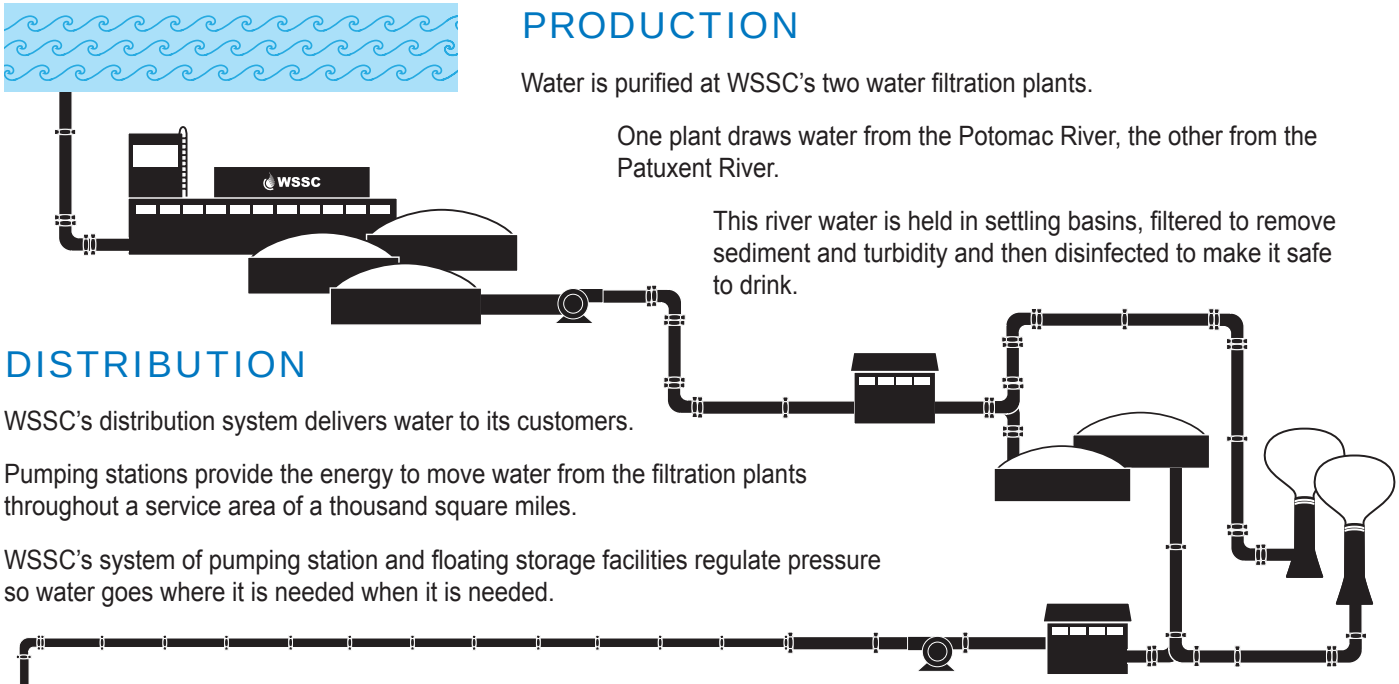
Every customer benefits from this combination of treatment plants, pumps, pipelines and storage. Filtration plants treat water from the rivers and make it safe to drink. Pumping stations move water from the filtration plants through pipelines to customers just down the road and far away. Storage facilities all along the way provide water to a system that serves both nearby areas and distant neighborhoods. This effective network meets the current as well as the growing needs of WSSC's customers.

PRODUCTION

Water is purified at WSSC's two water filtration plants.

One plant draws water from the Potomac River, the other from the Patuxent River.

This river water is held in settling basins, filtered to remove sediment and turbidity and then disinfected to make it safe to drink.

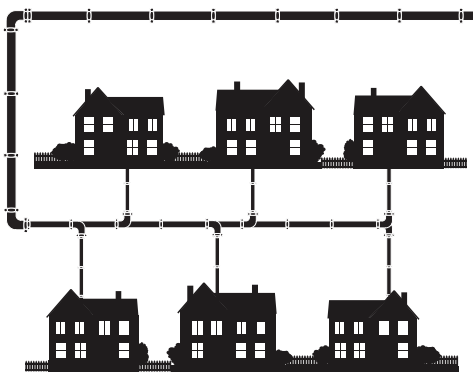


DISTRIBUTION

WSSC's distribution system delivers water to its customers.

Pumping stations provide the energy to move water from the filtration plants throughout a service area of a thousand square miles.

WSSC's system of pumping station and floating storage facilities regulate pressure so water goes where it is needed when it is needed.



NETWORK

To get where it is needed, the water travels many miles.

WSSC's distribution network includes more than 5,700 miles of pipeline.

The pipes range in size from a 96-inch diameter one leaving the Potomac filtration plant to the thousands of pipes two inches or smaller that serve individual homes.

Using energy supplied by pumping stations, these pipes can carry water to customers at every geographic elevation within the service area and into all the storage facilities.

STORAGE

Water storage provides many benefits.

It keeps water ready for use in a system where the amount used changes in a daily cycle: a lot being used at some times of the day and less at other times.

Elevated stored water is always available during emergency situations, such as power outages, treatment plant shutdowns or pipe breaks.

Storage keeps water ready for immediate use for firefighting.

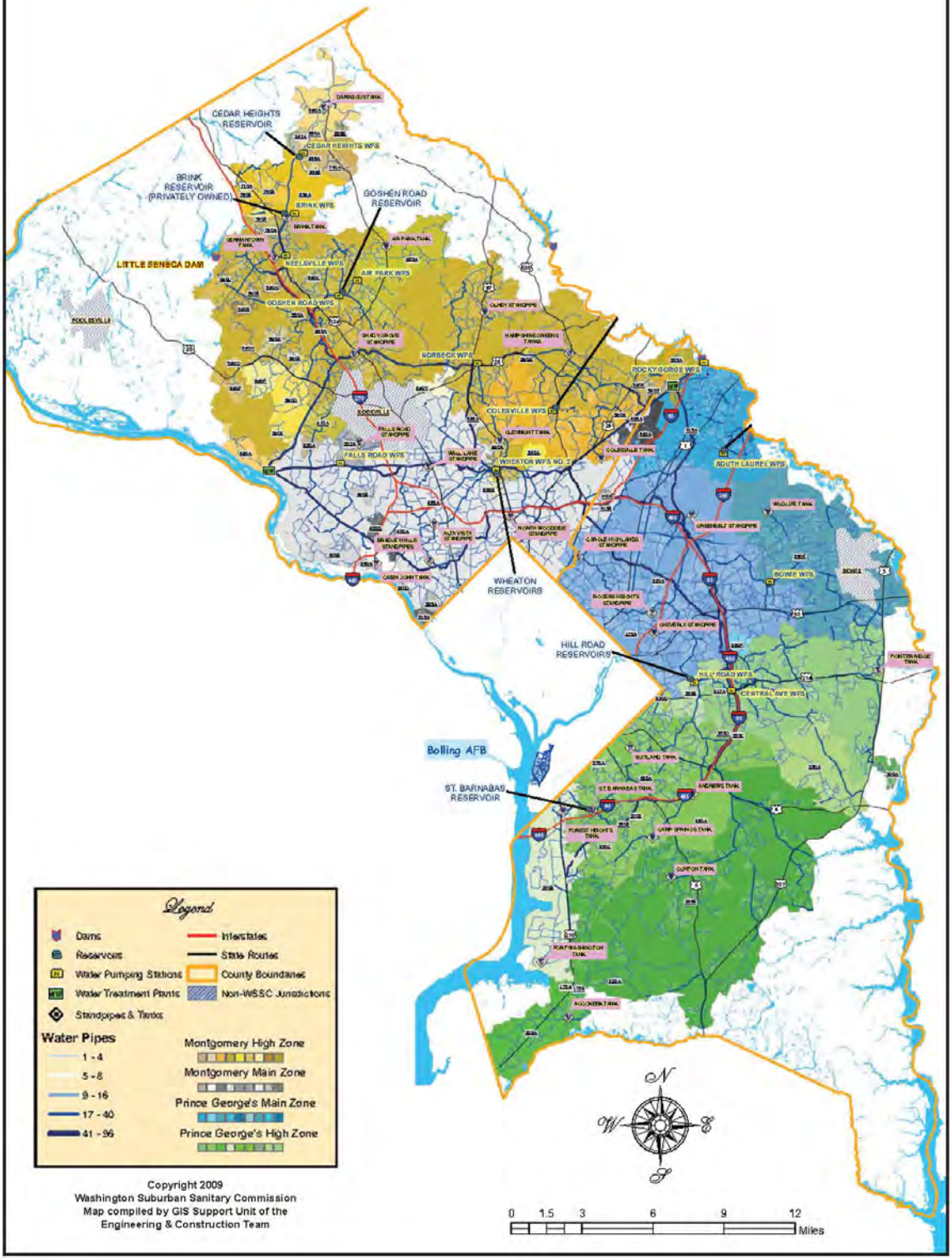
Water that has been stored in facilities that are tall or on high ground can always be used when it is needed, even if there is a power outage because it will move out of the storage by gravity.

Without a supply of stored water to meet demands, most other parts of the distribution network would have to be larger and consequently would cost more to build.

WSSC

Where Water Matters

Water Distribution Network



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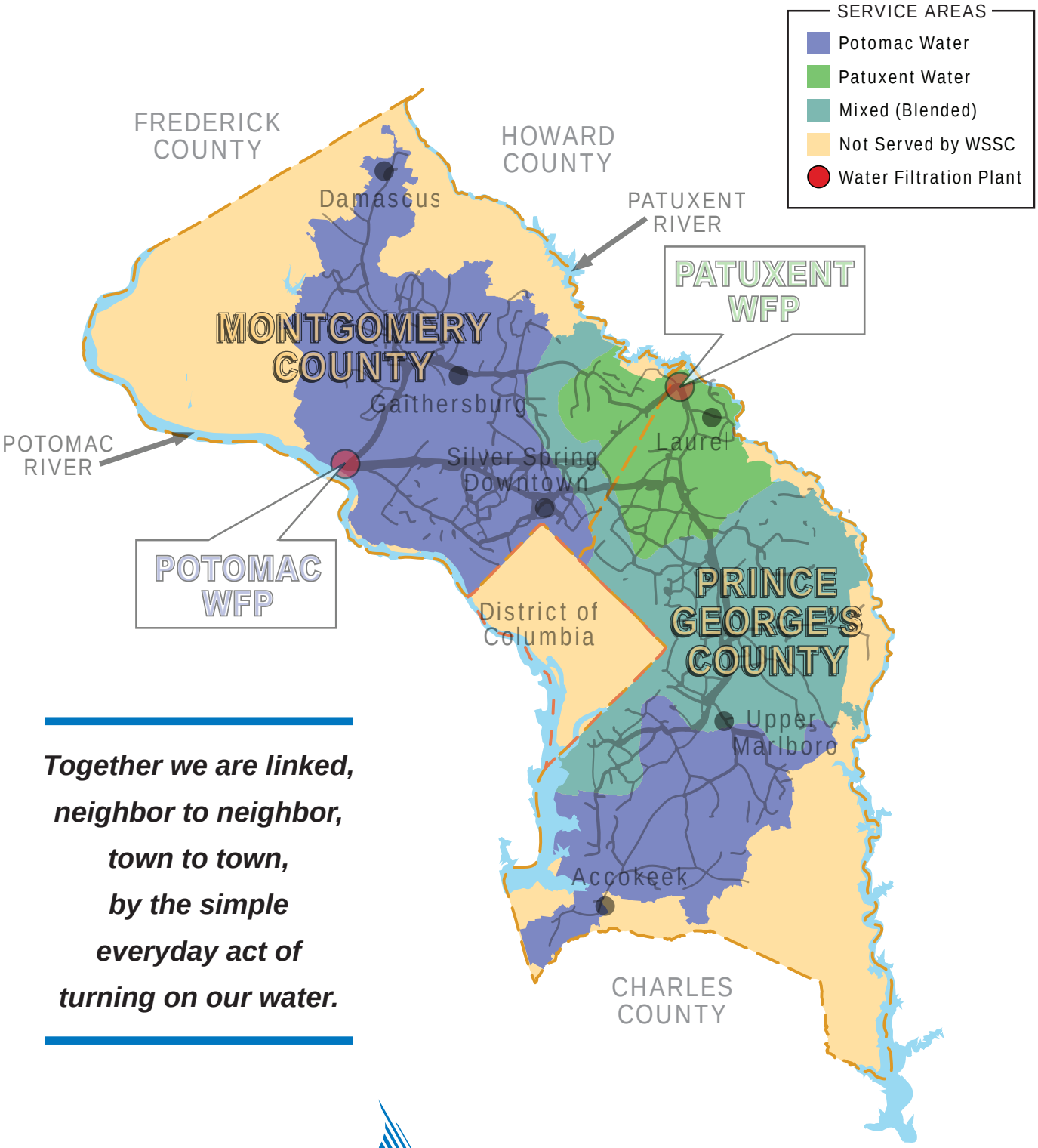
Washington Suburban Sanitary Commission
Map compiled by GIS Support Unit of the
Engineering & Construction Team



Together we are linked, neighbor to neighbor, town to town, by the simple everyday act of turning on our water.

WSSC

Where Water Matters

14501 Sweitzer Lane • Laurel, MD 20707

www.wsscwater.com

For additional information
please contact the Communications Office
301-206-8100

APPENDIX 3-2

MDE WATER WITHDRAWAL PERMITS
PRINCE GEORGE'S COUNTY

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Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG1938S001(08)	Washington Suburban Sanitary Commission	10/01/2013	10/01/2025	72,000,000	120000000			Patuxent River	SANDY SPRING
PG1952G005(04)	Bhupendra Patel	04/01/2012	04/01/2024	4,000	5000	Magothy Formation			UPPER MARLBORO
PG1955G011(06)	Calvert Manor Corporation	11/02/2015	10/31/2027	24,000	38000	Lower Patapsco Aquifer	PG-94-1402; PG-67-0013		MOUNT VERNON
PG1956G005(05)	Oxon Hill Recreation Club, Inc.	03/01/2005	03/01/2017	7,000	20000	Patuxent Formation			ANACOSTIA
PG1956G007(07)	Department of Juvenile Service	06/19/2014	05/31/2026	65,000	105000	Magothy Formation			
PG1957G003(05)	Shields Enterprises, Lp	07/01/2011	07/01/2023	50,000	200000	Patapsco Formation	PG026908; PG920625		LANHAM
PG1957S003(03)	Shields Enterprises, Lp	07/01/2011	07/01/2023	50,000	200000			Horsepen Branch	LANHAM
PG1958G003(05)	U.S. Fish And Wildlife Service	06/01/2001	06/01/2012	300,000	600000	Patuxent Formation	PG670003		LAUREL
PG1958G103(03)	U.S. Fish And Wildlife Service	08/01/2001	06/01/2012	200,000	600000	Patuxent Formation	PG730986; PG031935; PG999999; PG941251; PG052827; PG670004		LAUREL

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG1958G203(02)	U.S. Fish And Wildlife Service	06/01/2001	06/01/2012	3,000	5000	Patapsco Formation	PG010923; PG730248; PG730985; PG999998; PG999997		LAUREL
PG1961G008(10)	City Of Bowie	04/01/2012	11/01/2019	200,000	500000	Magothy Formation	PG034997		BOWIE
PG1961G108(04)	City Of Bowie	04/01/2012	11/01/2019	1,500,000	2500000	Lower Patapsco Aquifer			BOWIE
PG1961G208(05)	City Of Bowie	10/01/2009	11/01/2019	1,800,000	2500000	Patuxent Formation	PG880226; PG650085; PG-88-0226; PG-14-0279		BOWIE
PG1962G007(10)	NRG Chalk Point LLC	08/04/2017	07/31/2029	660,000	1200000	Magothy Formation			BENEDICT
PG1962G107(04)	NRG Chalk Point LLC	08/04/2017	07/31/2029	1,020,000	1280000	Patuxent Formation			BENEDICT, MARYLAND
PG1963G006(06)	Cedarville Park, Inc.	08/11/2015	12/01/2020	60,000	75000	Magothy Formation	PG680011; PG810666; pg-81-0666; PG-95-0171		BRANDYWINE
PG1964S001(07)	NRG Chalk Point LLC	02/10/2015	01/31/2027	720,000,000	1100000000			Patuxent River	BENEDICT
PG1966G001(05)	Sg Housing Corporation	03/01/2004	03/01/2016	5,600	8400	Magothy Formation			UPPER MARLBORO
PG1966G006(06)	Maryland-National Capital Parks & Planning Commission	10/16/2017	09/30/2023	13,000	78000	Upper Patapsco Aquifer	PG-66-0064		ANACOSTA, MARYLAND
PG1966G011(02)	Bishop Byrne Council, Knights Of Columbu	03/01/1997	03/01/2009	3,000	5000	Patuxent Formation	PG660103		ANACOSTIA

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG1968S009(03)	City Of Bowie	04/01/2014	04/01/2026	8,000	16000			Collington Branch	BOWIE
PG1969G007(05)	Vestry Of Saint Barnabas Church	10/01/2013	10/01/2025	6,000	7500	Upper Patapsco Aquifer	PG920601; PG811859; PG811813; PG690054		UPPER MARLBORO
PG1970G012(03)	Bardon, Inc.	07/01/2011	07/01/2019	2,640,000	4320000	Quaternary System Sediments			PISCATAWAY
PG1972G004(05)	Southstar Limited Partnership	07/01/2008	07/01/2020	9,000	10000	Magothy Formation			UPPRT MARLBORO
PG1974G009(03)	Southern Maryland Concrete Products, Inc	03/01/1998	03/01/2010	7,000	9000	Magothy Formation			ANACOSTIA
PG1975G003(04)	Prince George's County Board Of Ed.	02/01/2009	02/01/2021	6,500	9500	Magothy Formation			LOWER MARLBORO
PG1975G008(11)	NRG MD Ash Management LLC	09/01/2016	08/31/2028	70,000	88000	Magothy Formation			BRANDYWINE
PG1975S011(05)	Maryland-National Capital Park & Planning Commission	12/01/2011	12/01/2023	50,000	144000			Lottsford Branch	LANHAM
PG1976S081(05)	Mncp & Pc	06/01/2011	06/01/2023	22,000	75000			Paint Branch	WASHINGTON EAST
PG1977G008(04)	Fred Ryder Enterprises, Inc.	07/01/2005	07/01/2017	20,000	100000	Lower Patapsco Aquifer			LANHAM

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG1977S008(03)	Fred Ryder Enterprises, Inc.	07/01/2005	07/01/2017	10,000	25000			Horsepen Branch	LANHAM
PG1979G002(05)	U.S. Air Force	01/01/2008	12/01/2019	70,000	280000	Magothy Formation			
PG1980S010(04)	Concert Woodmore, LLC	10/21/2015	09/30/2027	66,000	312000			Northeast Branch	
PG1981G106(04)	Bardon, Inc.	07/01/2011	07/01/2019	10,000	121500	Lower Patapsco Aquifer			PISCATAWAY
PG1983G001(03)	Maryland National Capital Park And Plann	03/01/2005	03/01/2017	300	500	Magothy Formation			BRANDYWINE
PG1983G009(04)	Susan Watson-Hardy	07/01/2012	07/01/2018	7,500	25000	Magothy Formation	PG810392; PG810812		BRANDYWINE
PG1983G010(02)	M-Ncppc	09/01/1997	09/01/2009	700	1000	Magothy Formation			UPPER MARLBORO
PG1983G011(03)	Nottingham-Myers United Mehtodist Church	07/01/2005	07/01/2017	2,000	3000	Magothy Formation	PG950467		LOWER MARLBORO, MD.
PG1983S009(03)	Susan Watson-Hardy	07/01/2012	07/01/2018	7,500	24000			Patuxent River	BRANDYWINE
PG1984G001(08)	NRG Chalk Point LLC	08/14/2015	01/31/2027	660,000	1800000	Upper Patapsco Aquifer	PG-73-0172; PG-88-1070; PG-88-1080; PG-88-1081		BENEDICT

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG1984G004(04)	Edgemeade Road RE, LLC	07/15/2016	06/30/2028	6,700	8000	Magothy Formation	PG-11-0465		
PG1986G009(02)	Patricia A. Maddy	09/01/2000	09/01/2012	5,000	10000	Patapsco Formation	PG680061; PG811412		MOUNT VERNON
PG1987G003(04)	Maryland-National Capital Park & Planning Commission	12/01/2011	12/01/2023	30,000	100000	Patapsco Formation			LANHAM
PG1988G008(08)	Tantallon Golf, LLC	10/01/2010	10/01/2022	51,000	200000	Lower Patapsco Aquifer	PG811887; PG920980		MOUNT VERNON
PG1988S008(07)	Tantallon Golf, LLC	10/01/2010	10/01/2022	10,000	200000			Swan Creek	MOUNT VERNON
PG1989G001(06)	NRG Chalk Point LLC	08/14/2015	01/31/2027	20,000	60000	Upper Patapsco Aquifer	PG-88-0568; PG-88-0569		BENEDICT
PG1989G003(02)	Denison Landscaping And Nursery, Inc.	04/01/1992	04/01/2004	8,000	45000	Magothy Formation			
PG1989G006(02)	Laddie Thomas Rhodes, Jr.	10/01/2010	10/01/2022	7,000	40000	Magothy Formation			
PG1989S012(03)	Anna Gaddis Rauch	08/01/2010	08/01/2022	10,000	30000			Western Branch	UPPER MARLBORO

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG1990G012(04)	USDA Beltsville Agricultural Research Center	10/21/2015	09/30/2027	750,000	1000000	Patuxent Formation	PG920973; PG810134; PG731451; PG810541; PG730623; PG730624; PG940129; PG920972; PG940134; PG730622; PG810544		BELTSVILLE
PG1990G023(03)	Rockhill Sand And Gravel Corp.	05/01/2010	05/01/2022	60,000	72000	Magothy Formation	PG881572		BRANDYWINE
PG1990S013(02)	USDA - FOB	03/01/2004	03/01/2016	50,000	300000			Little Paint Branch	BELTSVILLE
PG1990S015(02)	USDA - FOB	03/01/2004	03/01/2016	35,000	210000			Paint Branch	BELTSVILLE
PG1991G015(05)	Washington Brick And Terra Cotta Company	06/01/2006	06/01/2018	125,000	318000	Magothy Formation	PG88245		PISCATAWAY
PG1991S015(04)	Washington Brick And Terra Cotta Company	06/01/2006	06/01/2018	10,000	325000			Mattawoman Creek	PISCATAWAY
PG1993G003(05)	KMC Thermo, LLC	05/16/2014	04/30/2026	74,000	342000	Lower Patapsco Aquifer			Brandywine
PG1994G005(03)	Collington Episcopal Life Care Community	03/01/1999	05/01/2006	5,500	30000	Upper Patapsco Aquifer			LANTHAM, MARYLAND
PG1994G006(02)	U.S. Food And Drug Administration	08/01/2006	08/01/2018	30,000	42000	Patuxent Formation			LAUREL
PG1994G007(06)	Federal Law Enforcement Training Center	02/03/2017	01/31/2029	12,000	50000	Magothy Formation	PG-00-3724		BRANDYWINE

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG1995G019(04)	Marlton Golf Club, LLC	10/01/2011	10/01/2023	40,000	242000	Magothy Formation	PG94G073		BRANDYWINE
PG1995S020(05)	Marlton Golf Club, LLC	10/01/2011	10/01/2023	28,000	242000			Southwest Branch	BRANDYWINE
PG1996G005(04)	U.S. Air Force	01/01/2008	12/01/2019	60,000	240000	Aquia Aquifer			
PG1996G008(02)	Cloverleaf Enterprises, Inc.	03/01/1999	03/01/2002	9,500	26000	Upper Patapsco Aquifer	PG940914		ANACOSTIA
PG1996G009(01)	Landscapes Unlimited,L.L.C.	11/01/2002	11/01/2014	82,000	300000	Alluvium			BELTSVILLE
PG1996G017(02)	City Of Bowie	09/01/2009	09/01/2021	18,000	43000	Upper Patapsco Aquifer			BOWIE
PG1996G105(03)	U.S. Air Force	01/01/2008	12/01/2019	110,000	440000	Upper Patapsco Aquifer			
PG1996S205(02)	U.S. Air Force	12/01/2007	12/01/2019	10,000	40000			Piscataway Creek	

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG1997S011(05)	Patuxent Greens Golf, LLC	11/01/2005	11/01/2017	34,000	136000			Patuxent River	LAUREL
PG1998G005(02)	PAX 40, LLC	11/01/2003	11/01/2015	8,500	15000	Patuxent Formation	PG-94-0455		BOWIE
PG1998G006(02)	Presidential Golf Club, LLC	11/01/2011	11/01/2023	95,000	747000	Patuxent Formation			BRISTOL
PG1998G014(03)	Robin Dale Land LLC	01/01/2013	01/01/2016	34,000	181000	Upper Patapsco Aquifer			BRANDYWINE
PG1998G023(03)	Nasa - Goddard Space Flight Center	05/01/2006	05/01/2018	257,000	375000	Patuxent Formation	PG941408		LAUREL
PG1998S007(02)	Presidential Golf Club, LLC	11/01/2011	11/01/2023	94,000	3200000			East Branch	BRISTOL
PG1998S014(03)	Robin Dale Land LLC	01/01/2013	01/01/2016	12,000	500000			Mattawoman Creek	BRANDYWINE
PG1999G004(02)	Ed's Plant World, Inc.	01/01/2011	01/01/2023	6,000	8000	Aquia Aquifer			
PG1999G011(02)	Department Of The Treasury	11/01/2011	11/01/2023	7,500	16500	Patuxent Formation			BELTSVILLE
PG1999G015(03)	Bardon, Inc. (D/B/A Aggregate Industries	06/01/2008	06/01/2020	35,000	135000	Patuxent Formation	PG941436		WASHINGTON EAST
PG1999G017(01)	Stavrou Construction	01/01/2000	01/01/2012	3,000	10000	Magothy Formation			LANHAM
PG1999G018(02)	Susan Watson-Hardy	07/01/2012	07/01/2018	5,000	15000	Magothy Formation			BRANDYWINE

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG1999G118(02)	Susan Watson Hardy	07/01/2012	07/01/2018	7,500	15000	Quaternary System Sediments			BRANDYWINE
PG2000G003(03)	Denison Landscaping, Inc.	07/01/2006	07/01/2018	20,000	155000	Magothy Formation	PG941283		PISCATAWAY
PG2000G103(02)	Denison Landscaping, Inc.	07/01/2006	07/01/2018	10,000	155000	Quaternary System Sediments			PISCATAWAY
PG2000S003(03)	Denison Landscaping, Inc.	07/01/2006	07/01/2018	17,000	150000			Mattawoman Creek	PISCATAWAY
PG2000S007(02)	Landscapes Unlimited, L.L.C.	11/01/2002	11/01/2014	76,000	475000			Little Paint Branch	BELTSVILLE
PG2001G009(02)	Sr Industrial Limited Partnership	12/01/2013	12/01/2025	5,000	10000	Patuxent Formation	PG942163		
PG2001G011(01)	Pax 40, LLC	12/01/2001	12/01/2013	10,000	40000	Patapsco Formation			
PG2001S001(03)	Landscapes Unlimited, L.L.C.	11/01/2002	11/01/2014	32,400	317000			Little Paint Branch	BELTSVILLE
PG2002G004(03)	City Of Bowie	09/17/2015	08/31/2027	6,000	24000	Lower Patapsco Aquifer			

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG2002G005(03)	City of Bowie	09/17/2015	08/31/2027	6,000	24000	Upper Patapsco Aquifer			
PG2002G006(01)	John Denison	05/01/2002	05/01/2014	75,000	10000	Upper Patapsco Aquifer			
PG2002G009(03)	Oak Creek Golf, LLC	06/01/2010	06/01/2022	200,000	1178000	Patuxent Formation			UPPER MARLBORO, MARYLAND
PG2002G014(02)	Bardon, Inc.	02/28/2017	01/31/2029	58,500	130000	Lower Patapsco Aquifer	PG-95-0368		PISCATAWAY
PG2002S009(02)	Oak Creek Golf LLC	08/01/2007	08/01/2019	5,600	785000			Unnamed Tributary	UPPER MARLBORO, MARYLAND
PG2002S014(02)	Bardon, Inc.	02/28/2017	01/31/2029	2,900,000	3700000			Piscataway Creek	PISCATAWAY
PG2003G002(02)	Bardon, Inc.	07/01/2011	07/01/2019	9,600	20000	Lower Patapsco Aquifer			PISCATAWAY

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG2005G010(01)	Timberlake Homes, Inc.	06/01/2005	06/01/2017	5,000	7200	Magothy Formation			PISCATAWAY
PG2005G016(06)	National Harbor Development L.L.C.	03/30/2016	02/29/2020	360,000	720000	Quaternary System Sediments	PG950531; PG950532; PG950533; PG950526; PG950527; PG950528; PG950529; PG950530		MOUNT VERNON
PG2006G008(02)	Kevin Mchale	05/01/2012	05/01/2024	7,000	28000	Magothy Formation			
PG2006G015(01)	U.S. National Archives And Records Adm.	10/01/2008	10/01/2020	55,000	70000	Patuxent Formation			
PG2007G005(01)	Delanta & Alice Mills	07/01/2007	07/01/2019	6,000	18000	Upper Patapsco Aquifer			LANHAM
PG2007G006(02)	Toll Md V Limited Partnership	09/04/2014	08/31/2026	6,000	30000	Magothy Formation			
PG2010G004(02)	Maryland Natl Capt Prk & Plan Comm	04/01/2014	12/01/2022	8,000	20000	Patuxent Formation			
PG2010G005(01)	M-Ncppc	03/01/2011	03/01/2023	7,000	13600	Patapsco Formation			
PG2011G001(02)	University Of Maryland College Park	06/01/2013	06/01/2025	5,100	6000	Quaternary System Sediments			
PG2012G002(01)	Howard Robson,Inc.	05/01/2012	05/01/2015	9,900	50000	Artificial Fill			
PG2013G001(02)	Washington Suburban Sanitary Commission	05/03/2016	04/30/2028	9,500	10500	Quaternary System Sediments			
PG2013G005(02)	C S Hawthorne, LLC	10/02/2014	09/30/2026	7,800	95000	Alluvium			
PG2014G001(02)	Alliance Energy LLC	05/15/2017	04/30/2020	7,800	16600	Lower Patapsco Aquifer	PG951867; PG-10-0071; PG-10-0069		

Prince George's County
Water Withdrawal Permits (2017)

Permit Number	Permittee Name	Effective Date of Permit	Expiration Date of Permit	Allocation (Avg GPD)	Allocation (MMU GPD)	Aquifer Name	Well Tag Number	Stream Name	USGS Topo Map
PG2014G002(01)	Keys Energy Center LLC	03/02/2015	02/28/2027	145,000	500000	Upland Deposits			
PG2014G006(01)	Mattawoman Energy, LLC	12/21/2015	11/30/2027	60,000	275000	Upland Deposits			Brandywine
PG2015G002(01)	Mattawoman Energy, LLC	03/04/2016	02/25/2017	12,000	90000	Upland Deposits			
PG2017G001(01)	Mattawoman Energy, LLC	04/18/2017	03/31/2020	80,000	493000	Upland Deposits			
PG2017G004(01)	Purple Line Transit Contractors (PLTC)	10/06/2017	09/30/2029	10,100	30250	Quaternary System Sediments			Washington East

APPENDIX 3-3

WATER LOSS REDUCTION PLAN (FY 2017)
WASHINGTON SUBURBAN SANITARY COMMISSION

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WASHINGTON SUBURBAN SANITARY COMMISSION (WSSC)

WATER LOSS REDUCTION PLAN – FY2017

JUNE 2018

In accordance with the Maryland Water Conservation Act, the Washington Suburban Sanitary Commission (WSSC) conducts annual water system audits to calculate the unaccounted-for water losses in the system. The results of the Water Audit conducted for Fiscal Year 2017 (FY2017: July 2016 through June 2017) indicate that the unaccounted-for water losses were 15.7% of total system production. As part of the Water Appropriations Permit renewal process, the Maryland Department of the Environment (MDE) is requiring that utilities prepare a Water Loss Reduction Plan if the annual water system audit determines that the unaccounted-for water losses are greater than 10%. To meet these requirements, WSSC has prepared this update to the latest Water Loss Reduction Plan.

Background

As requested by MDE's Water Supply Program staff in a meeting on December 1, 2016, WSSC is submitting a condensed report of the Water Loss Reduction Plan. This report will focus on details and statistics of active programs and measures relating to Water Loss. Water Loss Reduction Plans submitted by WSSC in FY2015 and previous years can serve as a detailed description of the various Water Loss Control measures that WSSC has implemented in its system.

Top-Down Water Supply Auditing

Since 2008, WSSC has been consistently conducting comprehensive water audits. Water audits occur on a fiscal year basis, from July to June, for the sake of uniformity with other reporting practices within WSSC. Since 2010, the percentage of lost water in WSSC's system has varied from 15.7% to 20.9%. The percentage lost water for the last five years is detailed in Table 1.

Table 1: Percentage of Lost Water, FY 2013 - 2017

Year	Percentage Lost Water
FY 2013	17.1 %
FY 2014	15.7 %
FY 2015	17.9 %
FY 2016	20.9 %
FY 2017	15.7 %

The most recent comprehensive audit was performed for the time period of July 1, 2016, through June 30, 2017 (FY2017). This audit was completed using AWWA's Water Loss Control Committee Free Water Audit Software (version 4.0). The AWWA Water Audit Software Reporting Worksheet for the FY2017 water audit is shown in Figure 1. The Reporting Worksheet provides a summary of the various components of total system losses and calculates the total non-revenue water as a percentage of the total volume supplied

.

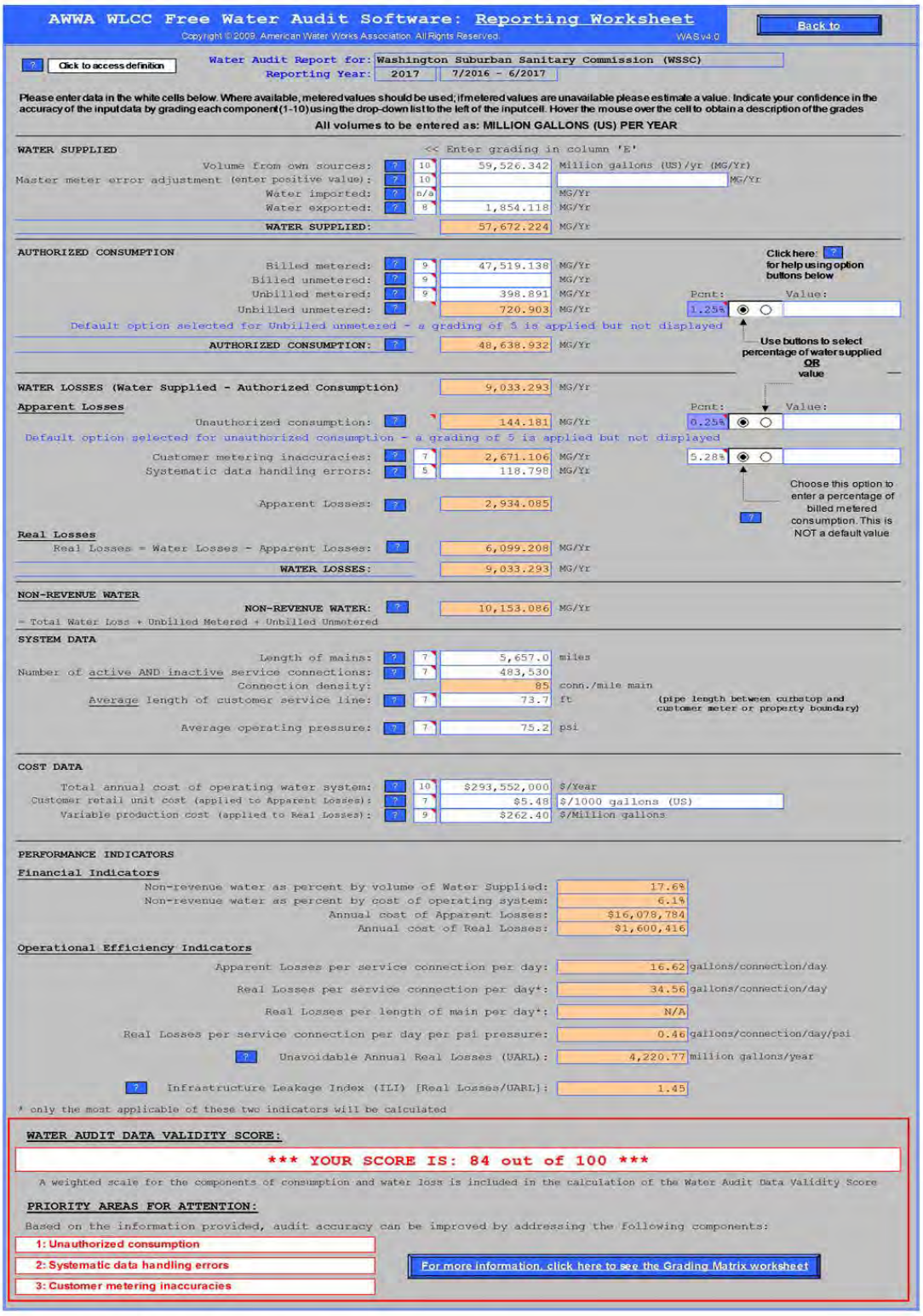

Figure 1: AWWA Water Audit Software Reporting Worksheet

A summary of the results from the FY2017 water audit is shown in Table 2.

Table 2: Summary of the FY2017 Water Audit

Water Audit Result	Quantity	Unit
Volume of Water From Own Sources (Raw Data)	59,518	MG/Yr.
Adjustments to Water From Own Sources	7	MG/Yr.
Adjusted Volume of Water From Own Sources	59,526	MG/Yr.
Water Exported	1,854	MG/Yr.
Water Supplied	57,672	MG/Yr.
Billed Metered Consumption	47,519	MG/Yr.
Billed Unmetered Consumption	0	MG/Yr.
Unbilled Metered Consumption	399	MG/Yr.
Unbilled Unmetered Consumption	721	MG/Yr.
Apparent Water Losses	2,934	MG/Yr.
Real Water Losses	6,099	MG/Yr.
Net Lost or Unmeasured Water	9,033	MG/Yr.
Percentage of Lost or Unmeasured Water (Net Lost or Unmeasured Water/Water Produced)	15.7	%

This report seeks to document some of the potential sources of water loss in WSSC's system and to highlight recent efforts that WSSC has undertaken to reduce water loss.

Financial Indicators

One of the most important means of categorizing water loss is by cost. While the volume of apparent losses (2.9 BG) for FY2017 is less than the volume of real losses (6.1 BG), the cost of lost water due to apparent losses is more than ten times the cost of lost water due to real losses. Lost water categorized as apparent losses includes all types of inaccuracies associated with customer metering, data handling errors, and unauthorized consumption. The cost of apparent losses is tied to the current water rates since the associated revenue is not captured from these losses. The volume of lost water due to system leakage is categorized as real losses. The cost of real losses is tied to the cost of water production since this loss occurs within the transmission and distribution system prior to the point of customer use.

The total cost of lost water for FY2017 in the WSSC system is detailed in Table 3.

Table 3: Cost of Lost Water

Loss Category	Water Audit Result	Water Loss (MG)	Cost of Lost Water
Apparent Losses[1]		2,934	$ 16.1 M
	Unauthorized Consumption	144	$ 0.8 M
	Customer Metering Inaccuracies	2,671	$ 14.6 M
	Data Handling Errors	119	$ 0.7 M
Real Losses[2]	System Leakage	6,099	$ 1.6 M

1. *Cost of Apparent Losses based on Retail Cost*
2. *Cost of Real Losses based on Production Cost*

This analysis of the cost of lost water is important because it can assist in the evaluation of potential methods to reduce water loss and can help prioritize a utility's focus on water loss reduction initiatives.

Meter Accuracy and Replacement

The WSSC system contains over 440,000 small residential meters and between 12,000 and 13,000 large commercial meters. From the FY2017 Water Audit, approximately 2.9 billion gallons (BG) of the water loss in WSSC's system can be attributed to apparent water losses. Of these apparent losses, the majority can be attributed to customer metering inaccuracies, estimated at 2.7 BG.

WSSC has a permanent state-of-the-art meter testing facility at the Anacostia Depot Meter Shop. This facility utilizes gravimetric technology and is capable of testing small meters and large meters up to 6 inches. WSSC performs meter testing in accordance with the standard procedures outlined in the *AWWA Manual M6, Water Meters – Selection, Installation, Testing, and Maintenance*.

WSSC conducts meter testing in the following situations:

- WSSC selects a random sample (5 percent of residential meters and 10 percent of commercial meters) of all new meter shipments. These meters are inspected and tested to verify that they meet WSSC's accuracy requirements.
- WSSC only installs manufacturers' meter models that have been thoroughly evaluated, tested, and approved. A manufacturer can request that WSSC test their model for inclusion in the list of approved meters. These meters are tested at the depot for accuracy and also in the field for ease of meter installation and meter reading.
- WSSC's Customer Service Team requests meter testing for a variety of reasons based on consumption anomalies for individual customer accounts. These anomalies include consumption that is significantly higher or lower than typical or meter registration or zero consumption. Meter testing is also requested by Customer Service to resolve billing disputes.

- WSSC customers can request a "witness test" of the meter installed on their service line if they dispute the consumption shown on their bill.
- The production meters at the Potomac and Patuxent Water Treatment Plants are tested on a semi-annual or annual basis.
- The interconnection meters are tested at least annually.
- Large commercial meters are tested twice a year.

WSSC plans to continue to utilize the results from the Meter Testing Program to update the approach to a Long-Term Change-Out Program of existing meters. Currently, WSSC's policy is to replace small meters after 30 years of service. As volumes of water pass through meters, their components wear and lose accuracy. In an effort to improve the accuracy of the large number of existing small meters in the WSSC system, WSSC has considered the implementation of a program to test the accuracy of existing small meters in the system.

The *AWWA Manual M36* suggests the implementation of a complete Automatic Meter Reading or Advanced Metering Infrastructure (AMR/AMI) system as one method of reducing apparent losses resulting from meter reading errors. WSSC has already completed a strategic implementation of AMR on the Commission's large volume, high revenue customer accounts that have their meters read monthly. WSSC is currently conducting a strategic sourcing project to examine the system options available for an AMI system, and to determine the best-suited system to support the Commission's infrastructure. This effort is happening in conjunction with the implementation of a new billing system. Due to the large amount of data generated by an AMI system, WSSC is implementing a new billing system in preparation for a new AMI metering system.

Customer Billing

In an effort to provide improved customer service to its ratepayers and stakeholders, WSSC is working to update its billing system. WSSC will replace the existing Customer Service Information System (CSIS) billing system with a new Customer Care and Billing System (CC&B). One of the goals of the CC&B is to provide the framework for the implementation of a new AMI metering system. Currently, the CC&B System is scheduled for implementation by July 2019.

As part of the CC&B, WSSC is also investigating monthly billing. WSSC currently utilizes quarterly billing for most residential customers. Monthly billing may reduce apparent water losses.

WSSC has renewed its commitment to customer relations with the development of the Customer Relations Team. In FY2017, the Customer Service Team developed a new Billing and Revenue Protection Division to focus on such billing issues. Progress has been made to reconcile unbilled accounts, and the outstanding number of such accounts has and continues to decline significantly. The new billing system is projected to be operational in FY2019 and subsequently, the roll-out of the AMI may take up to an

additional five years. It will then take several years to evaluate the effectiveness of this program with respect to apparent losses; however, based on similar programs with other utilities, WSSC believes these initiatives will further reduce the apparent losses in the system.

Assessment of Unauthorized Consumption

Unauthorized consumption of water from a system, including theft or illegal use of water, is categorized as apparent losses. For FY2017, Unauthorized Consumption was estimated at 144 MG. Because this volume is difficult to quantify, many utilities (including WSSC) estimate the amount of Unauthorized Consumption as a percentage of water supplied.

The WSSC Police and Homeland Security Services Division is responsible for investigating theft of service cases. In addition to increasing the Police and Security staff, in June 2016 WSSC launched a Theft of Service program to reduce the incidents of theft from the WSSC water system. The Program seeks to recover expired meters as well as identify theft from WSSC hydrants. In 2017, 62 inquiries for theft of service were submitted to the Police and Security staff. The inquiries resulted in eight citations issued for theft of service.

Leak Detection and Repair

WSSC has three individual programs that collectively provide a comprehensive approach to leak detection in our water system. All three programs are run through the Commission's Utility Services Department, with support from the Engineering and Construction Department. The following programs are responsible for leak detection at WSSC:

- Leak Detection Crews – WSSC currently has three fully operational, in-house, 2-person leak detection crews that conduct leak surveys for approximately seven months each year. In FY2017, the Leak Detection Crews conducted leak surveys on over 300 miles of pipeline in the WSSC system. Leak detection capabilities are limited to the warm weather months since the crews must be available to address the increase in water main breaks during the winter season.

- Water Main Condition Assessment (Ferrous Pipes) – Leak detection conducted through an outside contractor continues to occur by the Water/Wastewater Assessment Division of the Utility Services Department.

- PCCP Management Program – WSSC also performs comprehensive leak detection and leak repairs on all Pre-stressed Concrete Cylinder Pipe (PCCP) water transmission 36" and larger as part of the WSSC PCCP Management Program. Overall, 170.8 miles of PCCP pipe has been inspected as of the end of FY2017. In FY2017, WSSC inspected 27.2 miles of PCCP pipe utilizing

Smartball® and Sahara® technologies, as well as visual / sounding and electromagnetic inspections. As a result of these inspections, nine leaks were found, with an estimated leakage rate of 29 gpm total.

Leak Detection Pilot Programs

WSSC recently initiated an Innovation and Research Team under the Engineering and Environmental Services Division to research emerging technologies and innovative construction methods. This team also studies best practices in the industry to improve the way WSSC engineers its existing and future assets. In FY2017, the Division began the following several pilot programs relating to leak detection:

- Echologics – WSSC has initiated two pilots with Echologics, one for distribution mains (Echoshore-DX) and one for transmission mains (Echoshore–TX).
    - Echoshore-DX is a permanent leak detection system for water mains which leverages integrated communication capability over a private radio network. The pilot involves the installation of approximately 100 sensors on selected hydrants over one square mile of the system or approximately 11 miles of pipe. Sensors were installed in December 2017, and the pilot will last one year.
    - Echologics-TX is an acoustic monitoring system for large diameter transmission mains. The TX system utilizes hydrophones connected to the water column in order to capture the sound profile of the system and the nodes transmit the data to servers each night. The servers flag any potential leaks and prompt leak specialists to analyze the files. File analysis will provide indications of leaks or other anomalies in the transmission main. The Echologics-TX system is installed on a portion of 96-inch PCCP transmission main in the WSSC water system.

- 540 Technologies (previously Fluid Conservation) – WSSC initiated a pilot program with 540 Technologies in May 2018 to install 20 acoustic sensors in the same neighborhood as the Echoshore-DX pilot. These 20 sensors have been moved to a second location for the month of June 2018 in order to continue testing and to evaluate ease of relocation.

- Syrinix – The SYRINIX PipeMinder T transmission main monitoring service provides permanent monitoring of pressurized water supply pipelines including real-time pressure and flow reporting, early stage leak detection and locating, and real-time major burst detection. Using a fusion of sensors, including a hydrophone in direct contact with the water and a geophone in contact with the pipeline itself, the high resolution monitoring and analysis service provided by PipeMinder T allows users to manage pipeline assets, and the risks related to those assets, on an active and informed basis. WSSC is conducting a yearlong pilot of the Syrinix system along the same section of 96-inch PCCP transmission main evaluated by the Echologics-TX system.

- UTILIS – UTILIS uses spectral aerial imaging, taken from satellite-mounted sensors, to spot leakage in subterranean drinking water networks. Drinking water is detected by looking for the particular spectral signatures typical to drinking water. Eventually, the user is presented with a graphical leaks report overlaid on a map with streets, pipes and leak probability information. WSSC piloted Utilis in 2017 with poor results. Utilis performed a second flyover in 2018 covering an area of approximately 460 miles of main and service lines. Preliminary results are much better than those from 2017. The 2017 pilot was in the same area as the Echologics- DX pilot, while the 2018 pilot is in the same area as the 540 pilot.

WSSC is in the initial stages of development for the leak detection pilot programs. WSSC is also collaborating with DC Water and Howard County on their leak detection pilots. Findings and recommendations from the pilot programs will be incorporated into future Water Loss Reduction Plans.

In addition to the leak detection pilot programs, the Innovation and Engineering Research Team has also coordinated with NO-DES, Inc. in 2016 to purchase a NO-DES (Neutral Output - Discharge Elimination System) system as a pilot program. The NO-DES system is utilized for flushing and cleaning water mains 12 inches in diameter or smaller. The NO-DES system is able to flush and clean water mains with minimal water loss by utilizing a closed loop for flushing, achieved by filtering and cleaning the water before returning it to the main. The NO-DES system was evaluated in 2016 and the results were presented to the Innovation and Research Council who subsequently approved the acquisition of the NO-DES equipment, contingent upon programmatic funding in the Utility Services budget.

Infrastructure Rehabilitation and Renewal

The WSSC water system is comprised of over 5,700 miles of pipe, ranging in size up to 96 inches in diameter. Portions of the system are over 100 years old with the majority pipe in the system installed prior to 1980. The average age of pipes in the system is almost 50 years old.

As the water system ages, breaks and leaks are a significant concern and contribute to the amount of real water losses. For FY2017, real losses were estimated at 6.1 BG. Correspondingly, for FY2017, WSSC's water system experienced 1,625 breaks and leaks. The number of breaks and leaks in the system fluctuates depending on a variety of factors (temperature, age of pipe, freezing and thawing, precipitation, etc.). Table 4 provides a summary of the breaks and leaks in the WSSC water system over the last eight years. As shown, it is difficult to correlate breaks with real loss values.

Table 4: Breaks and Leaks per 100 miles of Water Mains

Fiscal Year	Breaks & Leaks	Mileage	Breaks & Leaks / 100 miles
2017	1,625	5,768	28
2016	1,607	5,647	28
2015	2,191	5,657	39
2014	2,055	5,620	37
2013	1,812	5,605	32
2012	1,454	5,550	26
2011	2,020	5,525	37
2010	1,852	5,500	34

WSSC maintains several programs under various divisions within the Commission that are focused on water system infrastructure rehabilitation and renewal. By systematically rehabilitating and renewing existing pipelines in the system, WSSC hopes to experience a reduction in water loss in the system as a whole.

- Water Main Reconstruction Program – The Engineering & Construction Department's Pipeline Design Division manages the Water Main Reconstruction (WMR) Program, which began in 2001. Water mains are prioritized for replacement using a combination of desktop condition assessment modeling. The list of prioritized water main replacement areas is assembled into individual projects for construction by either WSSC crews or external contractors. Since 2010, the WMR Program has replaced approximately 440 miles of distribution water mains and 29 miles of transmission water mains. In FY2017, the WMR Program replaced 69.2 miles of distribution water mains and 28.6 miles of transmission water mains. A summary of the pipe replacements by year are provided in Tables 5 and 6.

Table 5: Water Distribution Pipe (<16" diameter) Replaced

Fiscal Year	Miles Replaced (Planned) [1]	Miles Replaced (Actual)
2017	55	69.2
2016	55	56.7
2015	55	60.2
2014	51	59.5
2013	46	51.8
2012	41	59.8
2011	36.5	44.3
2010	31	38.1
TOTAL		439.6

1. *Replacement distances represent the combined miles replaced through the WMR and SEU Programs.*

Table 6: Water Transmission Pipe (16" & larger diameter) Replaced

Fiscal Year	Miles Replaced (Planned) [1]	Miles Replaced (Actual)
2017	4	9.7
2016	4	2.3
2015	4	6.0
2014	3	2.2
2013	2	3.1
2012	2	3.9
2011	2	1.4
2010	----	----
TOTAL		28.6

1. *Replacement distances represent the combined miles replaced through the WMR Program.*

- System Enhancement Unit – The System Enhancement Unit (SEU) has crews dedicated to in-house water main replacements for the water distribution system. During the winter months, when water main break frequency increases, these crews also support the Depot Maintenance Unit crews for water main repairs. SEU has a goal of 12 miles per year of replacement mains. These replacement values are included in the replacement totals in Table 5.
- PCCP Inspection Program – The Utility Services Department's Water/Wastewater Systems Assessment Division manages WSSC's Large Diameter PCCP Inspection Program. If leaks or deteriorated pipes are detected during inspection, the necessary repairs or replacements are performed prior to placing the main back in service.
- Asset Management and Condition Assessment – The Water/Wastewater Systems Assessment Division manages the inspections of buried water mains and corresponding condition results. Based on this information, the Water Condition Assessment Section makes recommendations for repairs, rehabilitation, or replacements. The Asset Strategy Manager works closely with the Water/Wastewater Systems Assessment Division to establish the existing condition and associated risks of the assets. Using decision support software, the Asset Strategy Manager projects the near and long term capital and O&M efforts needed to sustain the health of the infrastructure. The result of this effort is a prioritized list of replacement or rehabilitation needs.

Recently, WSSC's Planning Division added a new position to conduct the preliminary planning associated with the replacement and rehabilitation of PCCP mains. Priorities for replacement are based on condition assessment efforts from the PCCP Inspection Program, and are determined by the Asset Strategy Manager. The new position will help to streamline the preliminary design process for PCCP pipes in need of repair or replacement.

Water Loss Reduction Roadmap

WSSC is also working to reduce water loss through a multi-year Water Loss Reduction Roadmap exercise. As part of the exercise, WSSC will be assessing water loss methods in further detail, identifying data gaps, and developing data gathering tools to better quantify losses. WSSC is gathering additional data on metering inaccuracies, meter right-sizing, meter replacement and unauthorized consumption to better quantify apparent losses. A cost benefit analysis will be conducted to better identify which methods to pursue. WSSC is also working with field crews to better quantify real losses by gathering volume estimates from breaks and leaks. This will be a program of continuous improvement as data sources improve. Findings and recommendations from the Roadmap will be incorporated into future Water Loss Reduction Plans.

Conclusion

This FY2017 Water Loss Reduction Plan demonstrates that WSSC is taking a pro-active approach to reduce its water system losses. These efforts will take many years to compile the data to better quantify the sources of water loss and then several more years to implement the programs designed to target the identified losses. It will only be after this work is completed that measurable results could be experienced. WSSC will continue to calculate the percent water loss in its annual water audits, but will also evaluate other water loss metrics that may be more representative and useful for benchmarking purposes in accordance with AWWA research and industry practices.

APPENDIX 3-4

WATER CONSERVATION PLAN (2010)
WASHINGTON SUBURBAN SANITARY COMMISSION

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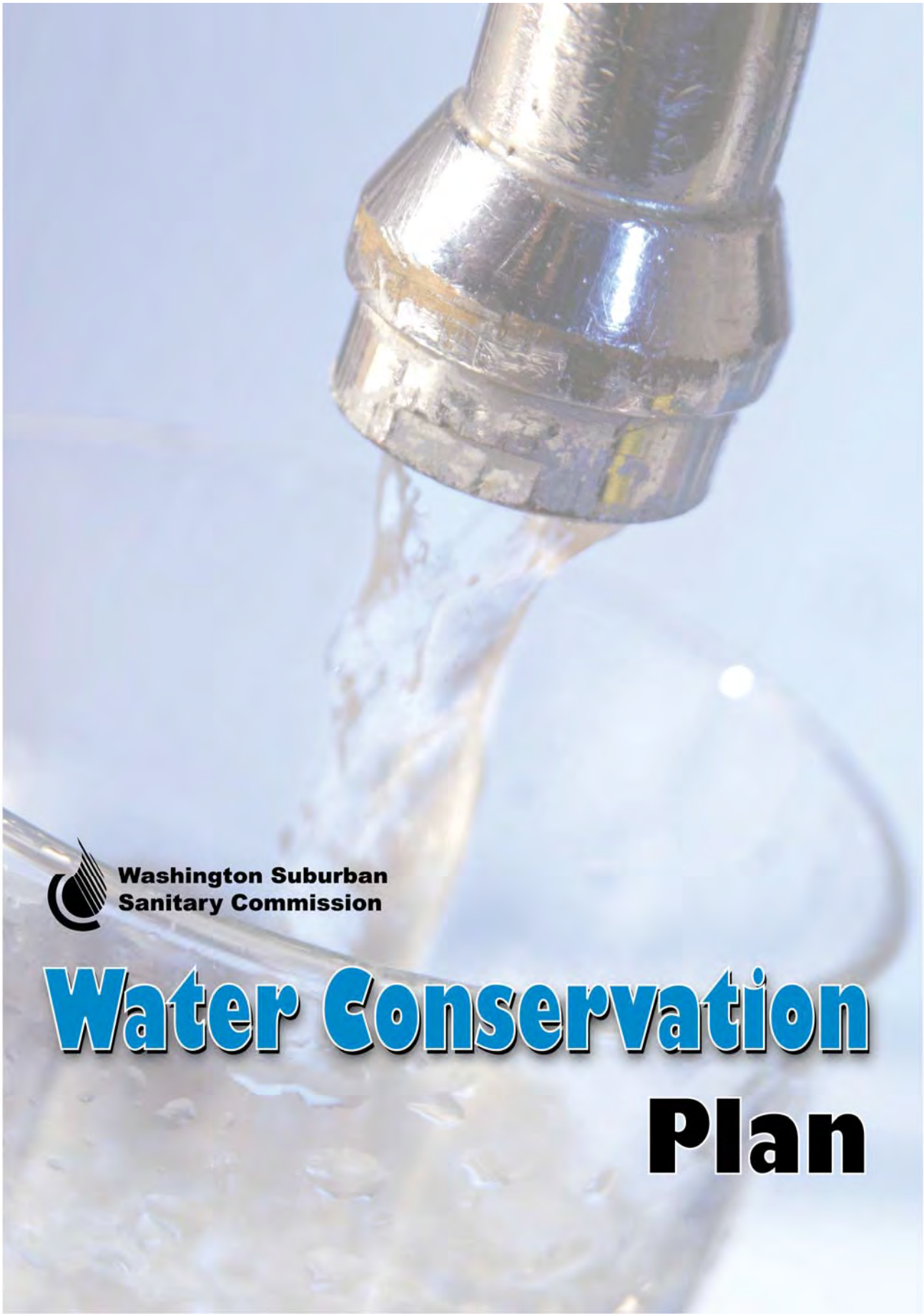

Washington Suburban
Sanitary Commission

Water Conservation Plan

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Water Conservation Plan

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1 Introduction

The Washington Suburban Sanitary Commission (WSSC or the Commission) serves nearly 1.8 million residents through approximately 460,000 connections in Prince George's and Montgomery counties. The total service area covers about 1,000 square miles. The Commission operates and maintains two water filtration plants and more than 5,500 miles of fresh water pipeline. The Patuxent and the Potomac filtration plants produce an average of 167 million gallons per day (MGD) of safe drinking water. In its 90-plus year history, WSSC drinking water has always met or exceeded federal standards.

As one of the largest water and wastewater utilities in the nation, WSSC recognizes the importance of being prudent stewards of the regional water resources. The mission of WSSC is to provide safe and reliable water and return clean water to the environment, all in an ethically and financially responsible manner. WSSC accomplishes this mission by adopting values and strategies that ensure efficient water resource management. This includes activities that promote water conservation and increase water use efficiency.

Maryland Department of the Environment (MDE) requires the WSSC to prepare a Water Conservation Plan as a condition of the Water Appropriation Permit for the Potomac Water Filtration Plant. The objective of this Water Conservation Plan is to provide an overview of the water conservation initiatives undertaken by WSSC as required in the Water Appropriations permit.

WSSC employs sound water resource management, which emphasizes careful, efficient use of water to achieve the water conservation objectives.

This Water Conservation Plan follows the guidelines and format presented in MDE's *Guidance for Maryland Public Water Systems and Best Management practices for Improving Water Conservation and Water Efficiency* published in 2010 and the U.S Environmental Protection Agency's *Water Conservation Plan Guidelines* published in 1998.

2 Goals

WSSC water conservation goals are based on long term water resources management and infrastructure funding policy. The goals will enable the most efficient use of the existing water resources and save valuable resources over the long term, while providing safe and reliable drinking water to the community.

Water Conservation goals include;

- Conducting an annual water audit to account and control water loss
- Improving the utilization and extending the life of existing facilities
- Improving drought or emergency preparedness
- Educating customers about the value of water
- Protecting and preserving environmental resources
- Promoting environmental stewardship and sustainability

WSSC will continue to work with various stakeholders in developing and implementing these goals.

3 Water Audit

A Water Audit quantifies consumption and losses that occur in the distribution system and the management processes of the water utility. WSSC will seek guidance from the following sources in completing its annual Water Audit:

1. Water Audits and Loss Control Programs (AWWA Manual M36, Third Edition)
2. Developing and Implementing a Water Conservation Plan (*MDE's Guidance for Maryland Public Water Systems on Best Management Practices for Improving Water Conservation and Water Use Efficiency*)
    a. Appendix A-1 – MDE Water Audit Guidelines
    b. Appendix A-2 – Water Audit Instructions and Worksheet
    c. Appendix A-3 – Annual Water Audit Summary

WSSC's Water Audit will be submitted annually to MDE by December 31st for the prior fiscal year (July 1 to June 30).

4 Water Demand

4.1 Water Production Forecast

WSSC's average water production is expected to increase by approximately 1% per year reaching approximately 224 million gallons per day (mgd) in the year 2030. WSSC provides most of the water to Montgomery County, Prince George's County and a small amount to other jurisdictions in Maryland.

The WSSC *Water Production Projections Report* approved in 2006 (See **Appendix A**), provides the latest water production projections. The report indicates that per (household) unit water production has remained flat over the past 5 years after significant decreases during the preceding 15 years. If per unit production continues to hold steady, total production will continue to increase as new units are added. According to this report WSSC serves 90% of the Montgomery County population, 95% of the Prince George's County population and a total of 93% of the bi-county population.

Water supply to other jurisdictions (wholesale) recently increased due to supply interruptions from alternate sources. Similar potential requests for additional supplies present possibilities for additional future increases in WSSC production requirements.

A summary of the water production projections in million gallons by WSSC customer groups based on population growth for 5, 10 and 20 years into the future are provided in Table 4.1.1.

Table 4.1.1 - Projected Average Water Production in Million Gallons per day (MGD)

Customer Group	2005	2010	2015	2020	2025	2030
Montgomery County	93	99	104	109	113	118
Prince George's County	80	84	88	92	97	103
Wholesale	2	4	4	4	4	4
System Totals	**175**	**187**	**196**	**205**	**214**	**224**

4.2 Water Users Demand Forecast

WSSC water end user groups are divided into four primary sectors; single family, multi-family, employees, and other jurisdictions (wholesale). Table 4.2.1 below shows estimated water demand in million gallons for each group in 5 year increments. The table is based on forecasted unit growth provided by the Metropolitan Washington Council of Governments (COG) and the Maryland National Capital Park and Planning Commission (M-NCP&PC) in the Round 7.0 Cooperative Growth Forecast.

Table 4.2.1- Total Water Demand per Unit Served in MGD

Year	Single Family	Multi Family	Employees	Wholesale	Production Totals
2005	90	39	44	2	**175**
2010	93	43	47	4	**187**
2015	95	46	51	4	**196**
2020	97	49	54	4	**205**
2025	99	53	58	4	**214**
2030	**102**	**57**	**61**	**4**	**224**

The forecasted production numbers account for all known and planned changes to water demand until 2030.

5 Water Conservation Measures

WSSC has a wide variety of water conservation initiatives that apply to the water facilities and system-wide infrastructure, consumer regulations and pricing. As one of the largest water utilities in the nation, WSSC employs prudent water utility management practices to monitor the system and reduce water loss that ultimately affects the financial bottom line of the Commission.

These practices include a system wide metering system, conservation incentive pricing and a range of public outreach programs. Water conservation measures of the Commission are described in the sections below.

5.1 Water Metering

5.1.1 Metering Method

WSSC meters all of its customers including wholesales customers. WSSC meters are classified based on two sizes; small meters and large meters. Small meters are typically for residential users, and large meters are for wholesale, commercial and industrial users.

WSSC has over 440,000 small meters and between 12,000 to 13,000 large meters. The Commission adds several thousand new metered services each year and may replace tens of thousands of meters a year.

WSSC has a dedicated force of approximately 50 employees who service and maintain meters, and over 250 people who are trained and capable of replacing meters in the system.

5.1.2 Meter Maintenance

WSSC has a well established program to test, calibrate and repair meters in the system. This program helps to:

- collect and analyze losses and water usage
- reduce estimated billings for large revenue customers,
- provide proper registration to provide equity in customer billings,
- reduce breakdown maintenance,
- Increase revenue since most improperly registering and/or estimated meters under register, and
- Increase integrity in the system.

The major manufacturers of large meters in WSSC's system are Badger, Hersey, Trident/Schlumberger/Neptune and Rockwell/ Invensys/ Sensus.

The WSSC preventive maintenance program allows for efficient service to the customers and reduction of water loss in the system.

5.1.3 Meter Replacement

The WSSC meter replacement program is based on the meter size and a schedule that allows for efficiency of service. Large meters are replaced or repaired/ serviced in place based on the schedule below.

- All 1-1/2" and all 2" positive displacement meters = 10 years
- All 2" DC meters = 20 years
- All DC meters larger than 2" = 10 years
- All other Large Meters not noted above receive preventive maintenance based on the Daily Average Consumption (DAC)
    - 0 - 19,999 = 4 years
    - 20,000 - 89,999 = 2 years
    - 90,000 and above = 0.5 years (6 months)

Note: DAC represents the daily average consumption of water. This is a historical average across a number of billing periods as opposed to a one billing period average, known as the average daily consumption (ADC). The DAC normalizes some of the fluctuations in a single period usage.

WSSC replaces all small meters on a 30 year schedule. This policy came out of a study done in 2004 by the University of Maryland and is commonly referred to as the Optimum Meter Age Study.

WSSC periodically studies small residential meter performance. The Commission understands that continued periodic evaluation of residential meter performance is essential to ensuring that water losses are kept to a minimum while concurrently providing guidance towards the timely implementation of new technologies.

5.1.4 Meter Sizing

As recently as 2002, WSSC revisited the issue of "Right Sizing of our Large Meters". It was called a Large Meter Downsizing Project and was done in conjunction with the initial Automatic Meter Reading (AMR) pilot project to determine if rightsizing the meters would result in increased registration and revenues. Small samples (162) of the 13,000 plus large meters were examined and resulted in downsizing of 154 meters. Only two low-pressure complaints were received from customers, both of them on shopping centers, and those two meters were restored to their original size to ensure seamless customer service. The other 152 meters remain in a resized configuration to date.

While the effort was certainly worthwhile, the result was disappointing. The expected level of increased revenues did not materialize. However, a positive aspect that surfaced is a strong indication that the current preventive maintenance program is quite effective.

5.2 Water Accounting and Loss Control

5.2.1 Loss Prevention Program

As a requirement of the State Water Appropriation permit, if upon completion of the Water Audit the unaccounted for water loss is greater than 10%, WSSC will prepare a Water Loss Reduction Plan that will address areas in the system where unaccounted water losses exist.

5.2.2 System Monitoring

WSSC has a robust monitoring system for the water production facilities. WSSC uses a Supervisory Control And Data Acquisition (SCADA) system to monitor the status of remote facilities through a microwave system of more than 2500 set points. The assimilated data is processed through software programmed for the Commission's water distribution system with all known constraints set to indicate if the system is being maintained within those constraints.

5.2.3 Storage Overflow Management

To prevent storage overflows, all water storage facilities have level transmitters that are monitored continuously in SCADA. The Commission also installed moisture probes on all overflow pipes that will independently close the altitude valves to the water storage facilities and send an alarm to the SCADA system.

5.2.4 System Inspection and Maintenance

WSSC operates an inspection and maintenance program to locate leaks in the water transmission and distribution mains so they can be repaired. One of the programs is the Prestressed Concrete Cylindrical Pipe (PCCP) Program Inspections/Leak detection that includes non-destructive testing and inspection of 12 to 18 miles of large diameter PCCP pipelines per year.

Inspections performed include visual/sounding inspections, electromagnetic surveying, sonic pulse echo surveying, acoustic monitoring, structural analysis (including nonlinear finite element analysis), and forensic analyses of PCCP pipe failures. After each inspection, consultants provide engineering analysis that includes the condition assessment of each pipe and pipeline, the degree of deterioration, the risk of failure, and reliability of each pipe and the pipeline. Based on that information, WSSC and consultants prioritize 1) pipes recommended for immediate repair/replacement prior to putting the pipeline back in service, and 2) pipes that may require replacement in the next 10 year time frame and prioritize them for surveillance under a long-term acoustic monitoring program.

5.2.5 Water Metering and Billing

WSSC meter information is used for billing customers. WSSC customer bills are based on the total amount of water that passes through a meter since the last billing period.

The water rate on the bill depends upon the amount of water that a customer uses and is referred to as Average Daily Consumption or ADC. To calculate the ADC, divide the total gallons used by the number of days
in the billing period. According to studies, an individual in our service area typically uses about 70 gallons of water per/day. If the amount of water someone used in a quarter varies dramatically from how much they used last year during the same season, we'll alert them in the message portion of the bill by including an ADC comparison between the current and past year's usage.

5.2.6 Leak Detection

WSSC continues to develop the leak detection program that includes performing leak surveys of the transmission and distribution system to reduce unaccounted for water as well as pinpointing leaks for immediate repair.

WSSC's Utility Master Plan has recommended having a more robust leak detection program. This program would provide valuable information to the Commission that would likely assist in prioritizing major capital work such as pipeline replacement projects.

The current leak detection program includes a 2-person leak detection crew that surveys approximately 100 miles a year.

WSSC future plans are to have eight (8) people total and to have this activity coming out of all four Zones: North, West, Central, and South.

WSSC also has a "Leak Inspection Program for Customers" where the customers are offered a Property Inspection for leak detection at a cost. This inspection is to help residential customers locate leaks on toilets, faucets, and other indoor water fixtures.

5.2.7 Loss Prevention technology

WSSC has taken a conservative, proactive approach for tracking deterioration of its large diameter PCCP pipelines. Since 2007, WSSC has utilized the latest technology, i.e. installing acoustic fiber optic cable (AFO) in all critical PCC Pipelines following inspection, to enable long term monitoring. To achieve this, all PCCP pipelines that are 48" or greater in diameter, are being set up with permanent AFO systems and will be monitored continuously. By 2013 AFO permanent monitoring will be installed in all PCCP pipes 48 inches and larger in diameter and some 42 inches diameter pipes.

5.2.8 Repair

WSSC repairs all leaks based on priority and as they are found. Once a leak is located, the required repair information is entered into the WSSC work order system. The WSSC work order system can prioritize leaks and breaks so that the worst case scenarios get done immediately.

5.3 Infrastructure Renewal

WSSC maintains approximately 5,500 miles of water mains and nearly 25% (about 1,380 miles) of the pipe is more than 50 years old. WSSC is faced with the critical challenge of old and failing infrastructure which has necessitated the need to embark on an aggressive Water Main Replacement Program. WSSC has developed a 30-year infrastructure plan that involves a Water Replacement Program to replace defective pipes in the system and to mitigate the frequency of water main breaks.

The WSSC water main replacement program supports the Commission's water conservation efforts by removing aging water mains that experience water loss through breaks and leaks. Since 2002, WSSC has significantly increased its water main replacement rate from approximately five miles per year to 35 miles per year. The Commission will steadily increase the rate of replacement so that as many as 60 miles are replaced each year.

5.4 Conservation Incentive Pricing

WSSC has established an increasing based rate schedule which is a strategy intended to encourage water conservation.

WSSC uses a “16 Step” increasing-rate structure as indicated in Table 5.4.1, whereby customers who use more water are charged at higher rates, and those who use less water are charged at lower rates. The rate is based on a sliding scale per 1,000 gallons of water used.

The current approved rates for Fiscal Year 2011 (July 1, 2010 to June 30, 2011) are as follows:

Table 5.4.1 - WSSC Water/Sewer Rate Schedule Effective July 1, 2010
(Rates per 1000 Gallons)

Average Daily Consumption by Customer Unit During Billing Period (Gallons Per Day)	Water Consumption Rate	Sewer Consumption Rate	Combined Water & Sewer Rate
0 - 49	$2.52	$3.09	**$5.61**
50 - 99	2.83	3.59	**6.42**
100 - 149	3.09	4.22	**7.31**
150 - 199	3.47	4.86	**8.33**
200 - 249	4.05	5.30	**9.35**
250 - 299	4.39	5.73	**10.12**
300 - 349	4.64	6.12	**10.76**
350 - 399	4.85	6.40	**11.25**
400 - 449	5.04	6.55	**11.59**
450 - 499	5.16	6.77	**11.93**
500 - 749	5.26	6.90	**12.16**
750 - 999	5.39	7.05	**12.44**
1,000 - 3,999	5.49	7.35	**12.84**
4,000 - 6,999	5.62	7.52	**13.14**
7,000 - 8,999	5.69	7.63	**13.32**
9,000 - Greater	**5.79**	**7.83**	**13.62**

Customers are billed based on their average daily consumption (in gallons) during the billing period. Most customers are billed on a quarterly basis. Customers who utilize large amounts of water are billed on a monthly basis.

As an example, a water and sewer customer who uses 14,400 gallons during a 90-day billing cycle would have an average daily consumption of 160 gallons per day. They would then be billed (14,400 / 1,000) X $8.33 or $119.95 for the billing period. A water and sewer customer who uses 240,000 gallons during a 30-day billing cycle would have an average daily consumption of 8,000 gallons per day. They would be billed (240,000 / 1,000) X $13.32 or $3,196.80 for the billing period.

Customers also pay an Account Maintenance Fee which varies based on meter size. The Account Maintenance Fee covers the fixed costs of servicing a customer account including such things as meter reading, billing and collecting.

5.5 Information and Education Program

WSSC has an information and water conservation education program that targets all customer groups, including residential, industrial, commercial and institutional. WSSC also lists water conservation practices in bill inserts to customers and in full detail on its website.

As a core partner of the Metropolitan Washington Council of Government (MWCOG) *Water Use it Wisely* (Conservation) campaign, WSSC has a history of working closely with the community to promote areas where water can be conserved and used efficiently.

5.5.1 Water Use Information

WSSC understands that when customers are aware of their daily water use, they are more likely to conserve. Therefore WSSC provides understandable and informative water bills to customers. On each bill, WSSC customers receive their average daily water consumption for the account. This allows the customers to find out what their daily water usage is for the household. Since WSSC shows water use in terms of average daily consumption per customer unit (home, apartment, building), this provides a price signal to the customer.

5.5.2 Education Program

WSSC provides information on water conservation through its participation in community events. Conservation tips are provided through brochures on water-wise landscaping as well as magnets that promote water conservation. WSSC also has a demonstration native plant garden in the parking lot of Brighton Dam which draws a large number of visitors to its recreation area and Azalea Garden. The demonstration garden has various elements that promote water conservation. There are several components of the WSSC water conservation education program:

Water Conservation Outreach Events- WSSC's outreach efforts on water conservation are focused on residential customers. These efforts include presenting information to students during "WSSC in the Classroom" presentations to over 50 schools each year, distribution of water conservation brochures and materials to residents at 50 events each year, sponsorship of our H2O Fest that draws 300-600 people to learn about environmental stewardship and water conservation, and the Children's Water Festival which teaches 600 4th graders each year about the importance of water and environmental stewardship.

WSSC also presents information upon request about water conservation to homeowner associations and citizens groups.

Brochures and Newsletters- WSSC provides a brochure called "Water Wise Landscaping" that is distributed at outreach events each year and is also sent to customers who request the brochure online.

Promote Water Reuse and recycling - WSSC website advises customers on water reuse practices including, reusing water and pool water for watering lawn and garden.

5.6 Pressure Management

WSSC employs a pressure management system that ensures the efficient use of water. WSSC requires pressure reducing valves at all service connections that experience pressures greater than 80 psi. Currently WSSC has established pressure limit policies for residential areas where the pressure at service connections must range between 40 psi and 130 psi. All pressure zone pressure reducing valves are inspected 8 to 10 times per year.

5.7 Water- Use Regulation

5.7.1 New Developments

WSSC regulates new development water use based on plumbing codes. WSSC currently uses the 2009 WSSC Plumbing and Fuel Gas Code (See **Appendix B**) which adopted the 2006 edition of the **International plumbing Code** and **International Residential Code.** The international codes set the maximum water flow rates and flush volumes for plumbing fixtures and fittings. WSSC incorporates these codes to specify the requirements for water conservation features in buildings and structures that are served by the Commission.

5.7.2 Water Use Reductions

WSSC has standard procedures (SP Number PRO 04-04) to regulate consumer water use during times of drought and other water supply emergencies. The standard procedures describe the various levels of water use restrictions for implementation based on the degree of emergency.

For drought conditions, WSSC standard procedures follow the programs prescribed in the "Metropolitan Washington Water Supply and Drought Awareness Response Plan" adopted by the COG on June 7, 2000. The procedures include guidelines for implementing voluntary and mandatory water restrictions to ensure water use reduction during drought.

Voluntary Water Use Reductions: The public and businesses are asked to take specific measures to conserve water on a voluntary basis. There are no penalties or sanctions for failure to follow such measures. However, the public and businesses will be informed that should conditions worsen, one or more of these measures could become mandatory and enforceable. Voluntary water use reductions would be triggered whenever WSSC is anticipated to be unable to meet 100% of expected demand, such as under the "Drought Warning (Orange)" level of the "Metropolitan Washington Water Supply and Drought Awareness Response Plan." Signs may be posted in public places with the notification of "voluntary water use reductions in effect" along with a list of measures.

Mandatory Water Use Reductions- The public and businesses are required to take specific measures to conserve water. Penalties and sanctions are identified for these measures and they are enforceable under local ordinances and/or state laws. Mandatory water use reductions would be triggered whenever WSSC is anticipated to be unable to meet 100% of expected demand, and voluntary reductions are insufficient to reduce demand to acceptable levels, such as under the "Drought Emergency (Red)" level of the "Metropolitan Washington Water Supply and Drought Awareness Response Plan." Signs may be posted in public places with the notification of "Mandatory water use reductions in effect" along with a list of measures.

For emergencies, WSSC standard procedures provide guidelines for implementation of temporary mandatory restrictions. Temporary mandatory water use restrictions are designed to reduce non-essential water uses and ensure continued water supply for all customers, fire protection, hospital/medical uses and other exigent needs. These mandatory restrictions are for a short duration. The WSSC General Manager has the authority to enact mandatory restrictions.

Specific water Use restrictions that are imposed on WSSC customers for a limited duration of time may include;

- Discontinue all outside water use, including watering lawns, irrigating and washing cars;
- Use water in doors only as necessary. Take short showers instead of baths, turn off water when brushing teeth, shaving or shampooing;
- Limit flushing toilets (do not flush after every use)
- Limit using washing machines and dishwashers (wash full loads only)

5.7.3 Enforcement

The Public Utilities Article, Annotated Code of Maryland, (See **Appendix C**), authorizes WSSC to limit or regulate the use and supply of water service in any area within the WSSC service area. In accordance with §29-101 of the Public Utilities Article, Annotated Code of Maryland, a person who violates WSSC water use restrictions is guilty of a misdemeanor and, on conviction, is subject to a fine not exceeding $1,000 or imprisonment not exceeding 30 days or both. The penalties for misuse of water during periods of emergency water use restrictions include a written warning for a first offense and, $500 fine for a second offense.

In accordance with §28-201, the WSSC police force has responsibility for enforcing water use restrictions in cooperation with local and county police officers within the WSSC service area.

5.8 Integrated Resource Management

Integrated resource management comes from the idea that water is often used jointly with other resources. WSSC understands that water conservation has a direct link to energy production and use. WSSC recognizes that it takes a lot of energy to treat and convey water, which is why WSSC implements operating practices that achieve energy and water savings.

5.9 Water Reuse and Recycling

WSSC supports water reuse and recycling as a water conservation measure. In addition to the public outreach programs, WSSC participates in the Chesapeake Water Environment Association (CWEA) Water Reuse Committee, and is working with Maryland Department of the Environment (MDE) to develop new water reuse regulations. To date, MDE has taken a phased approach to implementation of water reuse. Phase 1 slightly modified the existing land treatment guidelines to create a new class III effluent (high quality WWTP effluent) for unrestricted public access reuse (to irrigate water highway strips, public golf courses, school fields, etc., in addition to farmlands). MDE's Phase 2 is focused on other uses of non-potable water, including commercial, industrial, watering residential lawns, and toilet flushing.

At present WSSC does not have any operating non-potable water systems, nor does it provide non-potable water to any other operating non-potable water systems; however, this may change in the future once the new regulations are implemented and if/when beneficial reuse opportunities arise. A key concern to be addressed prior to proceeding forward with any water reuse program will be ensuring the safety of any non-potable water system and also to prevent cross-contamination of potable water systems; formation of cross-organizational partnerships is recommended to adequately address this concern. At this stage, WSSC does not foresee approving use of non-potable water in private residences. MDE is using the new Virginia Water Reuse regulation as a baseline of their committee's efforts to develop more detailed guidelines for use of non-potable water. The new regulations will identify general requirements to ensure non-potable water quality and safety, adequate cross-connection prevention, and other offset requirements, but the cross-organizational partnership will be required to develop more specific requirements and practices prior to constructing, operating, and maintaining any non-potable water systems.

6 Near-Term Implementation Strategy

As documented in this plan, WSSC already takes a comprehensive approach to water conservation. The Commission will continue to improve these practices by employing sound water resource management, which emphasizes careful, efficient use of water. Some areas where the Commission will improve on its approach include:

Water Audit- WSSC will complete an annual water audit of the water distribution system.

Water Accounting and Loss Prevention Plan - WSSC will develop a water accounting and loss prevention plan if the amount of unaccounted water in the annual audit is greater than 10%.

Information and Outreach- WSSC will continue improving the content of the informational and outreach programs to customers.

Water Reuse and Recycling - WSSC will continue to participate in the committee to develop a water reuse and recycling program.

Improve metering system – WSSC will continue to study and improve the customer metering systems with the long-term goal of replacing all meters with Automatic Meter Reading (AMR) devices. Tracking residential meter performance will have a significant impact on the Commission's decision to implement AMR on a system-wide basis.

The system-wide implementation of a proven Automatic Meter Reading system has a number of potential advantages; the elimination of estimated readings and the related customer relation problems, reduction of customer call volumes, lower customer service costs, and increased customer satisfaction.

Evaluate and Adopt New Technologies - Meter technology is also continuing to evolve. There are now small meters on the market that do not utilize any moving parts. Known as "fluidic oscillators" these meters claim to be extremely accurate, AMR compatible, and have no moving parts to wear out. The American Water Works Association (AWWA) recently adopted a standard for this type of meter. As a water conservation measure, the Commission can consider a thorough evaluation of this and other technologies to determine if the meters prove viable.

Pipes Inspection, Repair and Replacement – After more than 90 years of being in existence the Commission is faced with old, aging pipes and valves. WSSC has taken a rigorous approach to fixing these issues. WSSC has developed a 30-year infrastructure plan to replace defective pipes. Working with officials from Prince George's and Montgomery counties, we are also developing a 10-year fiscal plan to finance the needed work. The Commission will continue its pipe inspection, repair and replacement program.

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APPENDIX 3-5

METROPOLITAN WASHINGTON WATER SUPPLY AND DROUGHT AWARENESS PLAN POTOMAC RIVER SYSTEM

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Metropolitan Washington Water Supply and Drought Awareness Response Plan: Potomac River System

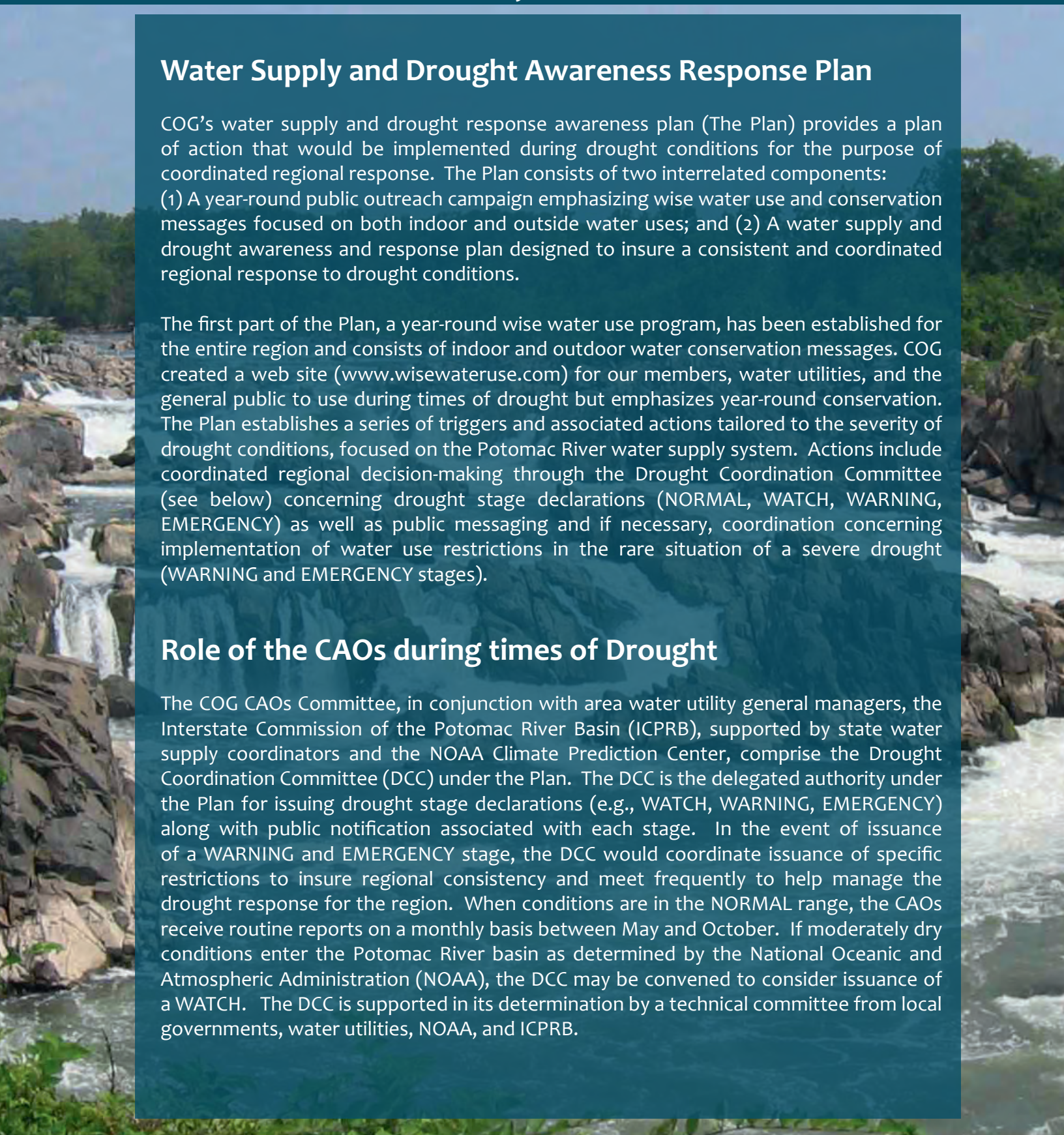
Adopted June 7, 2000

	Normal	**Watch**	**Warning**	**Emergency**
	Wise Water Use	Voluntary Water Conservation	Voluntary Water Restrictions	Mandatory Water Restrictions
Audience	Entire Metropolitan Washington Region	Entire Metropolitan Washington Region	Customers of Co-op System, associated local governments, media	Customers of Co-op System, associated local governments, media
Trigger	• None – water supply adequate to meet all demands	• NOAA "D1" drought level in Potomac River Basin (adopted on a *provisional 2-year basis and will be re-assessed during this time period)*	• Combined water supply storage at Jennings Randolph and Little Seneca reservoirs drops to 60% of capacity for 5 consecutive days; lifted when combined water storage at reservoirs increases and remains above 60% for a period of 15 days; OR • 5% Probability of not meeting unrestricted water supply demands over next 1 – 2 months	• 50% probability of not being able to meet water supply demands over next month
Actions	• Year round Water Conservation Program emphasizing "**Wise Water Use**" (Attachment B) • Routine reporting - Annual briefing in May - Monthly Water and Drought Outlooks (June-Oct.)	• Meeting of the Drought Coordination Committee • Regional media briefing/media communications; • **Announce voluntary water conservation recommendations** • Detailed water supply and drought status reporting; outline of next steps in plan; • Inform public that Potomac River Co-op Water Supply is adequate to meet unrestricted demands	• Meeting of the Drought Coordination Committee • **Announcement of voluntary water restrictions** (see attachment C-illustrative list) • Regional media briefing on a weekly basis/ongoing media communications	• Meeting of the Drought Coordination Committee • **Announcement of mandatory water restrictions** (see attachment C-illustrative list) • WAD assigns allocations to Potomac River utilities (per Low Flow Allocation Agreement) • Regional press conference on daily basis; ongoing media communications • Water supply reporting on a daily basis

	Normal	Watch	Warning	Emergency
Actions Cont.		• Press release upon first water supply release: reporting on a weekly basis thereafter • Press release when water supply storage at Jennings Randolph and Little Seneca reservoirs drops to 75% of capacity. • Press releases/briefings to include voluntary water conservation recommendations		
Messages	Wise Water Use Messages: • Wise water use--focus on inside uses: repairing plumbing problems/leaks General Information Messages: • Know your water sources and suppliers • Water supply outlook • Regional response to drought (here is how the region is prepared to respond) • Promotion of web site(s)	Voluntary Water CONSERVATION Messages: • Emphasis on water conservation outside the home or office-- • Reminders about year round wise water uses General Information Messages: • Know your water sources and suppliers • Co-op water supply system outlook • Impact on groundwater users, environment, non-co-op water systems, and agriculture • Water supply conditions have deteriorated, but Co-op water supply system still adequate • Reminder that reservoir releases are planned events • Understanding of current water supply and hydrologic and soil moisture conditions • Reminders of the next steps if conditions worsen	**Voluntary** Water RESTRICTIONS Messages: • Public and businesses asked to voluntarily implement water restrictions to help ensure adequate water supply and maintain reservoir levels • Detailed list of voluntary water restrictions issued General Information Messages: • Know your water source • Water supply conditions have deteriorated, but Co-op system water supply still adequate • Co-op water supply system outlook • Reminders of the next steps if conditions worsen	**Mandatory** Water RESTRICTIONS Messages • Public and businesses required to implement water restrictions to maintain water supplies • Detailed list of mandatory reductions issued General Information Messages: • Water supply very limited; ater use reductions essential • Know your water source • Co-op water supply outlook

WATER SUPPLY AND DROUGHT AWARENESS RESPONSE PLAN FOR THE COG REGION

A Drought Primer for COG Chief Administrative Officers
May 2015



Water Supply and Drought Awareness Response Plan

COG's water supply and drought response awareness plan (The Plan) provides a plan of action that would be implemented during drought conditions for the purpose of coordinated regional response. The Plan consists of two interrelated components: (1) A year-round public outreach campaign emphasizing wise water use and conservation messages focused on both indoor and outside water uses; and (2) A water supply and drought awareness and response plan designed to insure a consistent and coordinated regional response to drought conditions.

The first part of the Plan, a year-round wise water use program, has been established for the entire region and consists of indoor and outdoor water conservation messages. COG created a web site (www.wisewateruse.com) for our members, water utilities, and the general public to use during times of drought but emphasizes year-round conservation. The Plan establishes a series of triggers and associated actions tailored to the severity of drought conditions, focused on the Potomac River water supply system. Actions include coordinated regional decision-making through the Drought Coordination Committee (see below) concerning drought stage declarations (NORMAL, WATCH, WARNING, EMERGENCY) as well as public messaging and if necessary, coordination concerning implementation of water use restrictions in the rare situation of a severe drought (WARNING and EMERGENCY stages).

Role of the CAOs during times of Drought

The COG CAOs Committee, in conjunction with area water utility general managers, the Interstate Commission of the Potomac River Basin (ICPRB), supported by state water supply coordinators and the NOAA Climate Prediction Center, comprise the Drought Coordination Committee (DCC) under the Plan. The DCC is the delegated authority under the Plan for issuing drought stage declarations (e.g., WATCH, WARNING, EMERGENCY) along with public notification associated with each stage. In the event of issuance of a WARNING and EMERGENCY stage, the DCC would coordinate issuance of specific restrictions to insure regional consistency and meet frequently to help manage the drought response for the region. When conditions are in the NORMAL range, the CAOs receive routine reports on a monthly basis between May and October. If moderately dry conditions enter the Potomac River basin as determined by the National Oceanic and Atmospheric Administration (NOAA), the DCC may be convened to consider issuance of a WATCH. The DCC is supported in its determination by a technical committee from local governments, water utilities, NOAA, and ICPRB.

Drought Stages and Reporting

DROUGHT STAGES TRIGGERS AND ACTIONS

The table provides a synopsis of the four stages of the Plan – NORMAL, WATCH, WARNING, and EMERGENCY. The triggers that help guide declarations for each stage are noted, along with specific actions that are implemented once a stage is declared by the Drought Coordination Committee. The Drought Coordination Committee is responsible for declaring a stage, as well as declaring when conditions have returned to normal. It is also important to note that the triggers in the table are defined for the Potomac River water supply system; utilities using other sources of supply have their own criteria for drought stages for their systems. Yet, they are expected to follow the actions associated with the four stages in the Plan in terms of messaging and implementation of any water use restrictions.

Metropolitan Washington Water Supply and Drought Awareness Response Plan: Potomac River System

Adopted June 7, 2000

	Normal	Watch	Warning	Emergency
	Wise Water Use	Voluntary Water Conservation	Voluntary Water Restrictions	Mandatory Water Restrictions
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Actions	• Year round Water Conservation Program emphasizing "**Wise Water Use**" (Attachment B) • Routine reporting - Annual briefing in May - Monthly Water and Drought Outlooks (June-Oct.)	• Meeting of the Drought Coordination Committee • Regional media briefing/media communications; • **Announce voluntary water conservation recommendations** • Detailed water supply and drought status reporting; outline of next steps in plan; • Inform public that Potomac River Co-op Water Supply is adequate to meet unrestricted demands	• Meeting of the Drought Coordination Committee • **Announcement of voluntary water restrictions** (see attachment C-illustrative list) • Regional media briefing on a weekly basis/ongoing media communications	• Meeting of the Drought Coordination Committee • **Announcement of mandatory water restrictions** (see attachment C-illustrative list) • WAD assigns allocations to Potomac River utilities (per Low Flow Allocation Agreement) • Regional press conference on daily basis; ongoing media communications • Water supply reporting on a daily basis

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COG 5/31/00

LAST DROUGHT WATCH DECLARED IN 2010

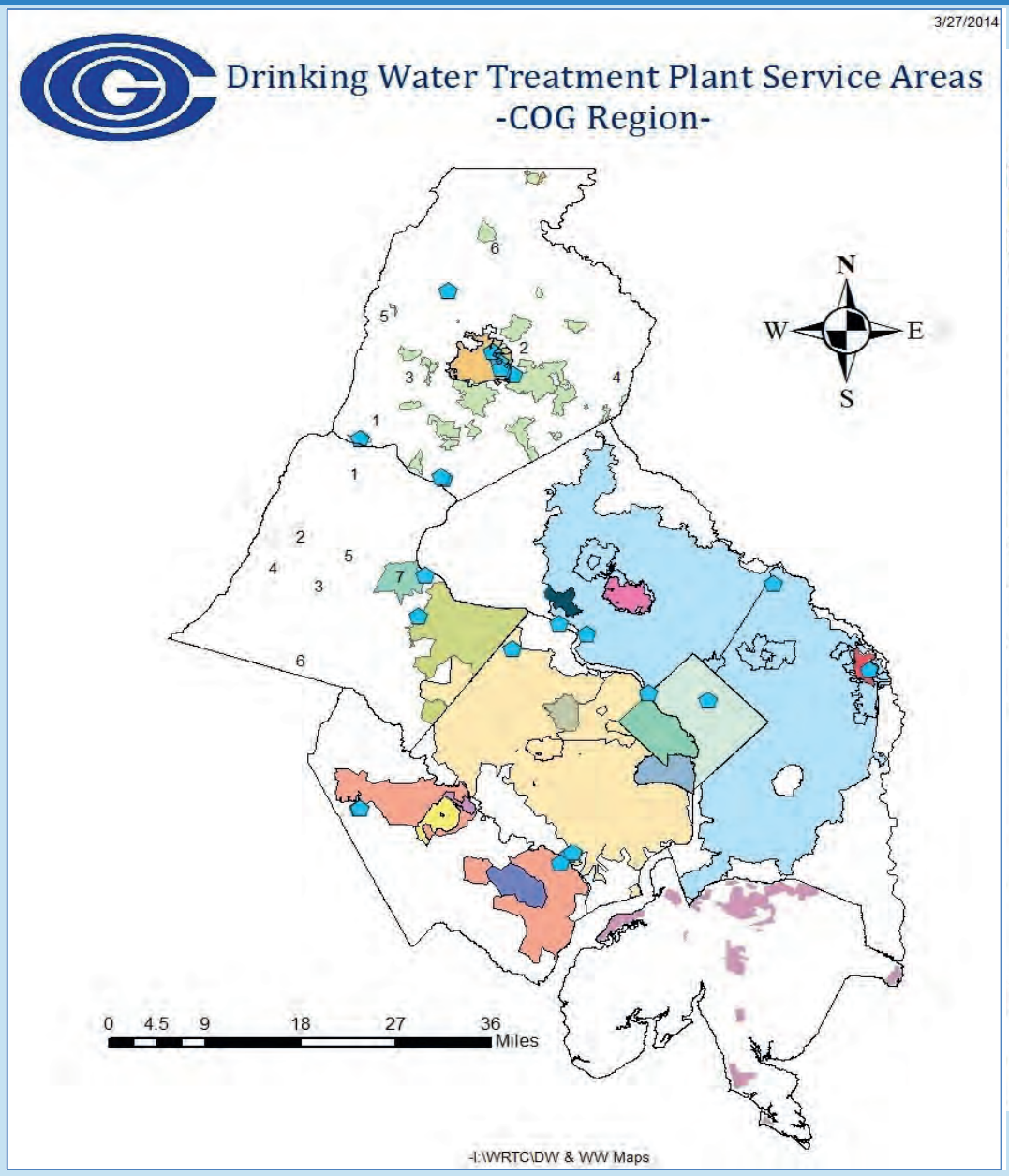
Due to unusually dry conditions, COG's DCC declared a drought 'WATCH" in September 2010. A press release was issued that urged residents and businesses to conserve water and use water wisely. It also emphasized that water supply reservoirs constructed in the early 1980s to provide water during droughts were full but would be utilized if needed.. The WATCH ended when Tropical Storm Lee hit the region.

COG's Water Supply and Drought Report

COG issues monthly reports during the drought monitoring season (typically from May—October) unless conditions deteriorate and additional reporting is needed. The report is a snapshot of current water supply and drought monitoring conditions in the Potomac River Basin along with an outlook for the next several months, including:

- The current U.S. Drought Monitor issued by NOAA
- Precipitation data
- Groundwater levels
- Seasonal drought outlooks—prediction tools issued by NOAA
- Streamflow data for Little Falls and Point of Rocks
- Current regional water supply status

Water Supply in the COG Region



The Washington metropolitan region gets nearly 75% of its drinking water from the free flowing Potomac River. Additional sources of water include the Patuxent and Occoquan reservoirs, as well as a number of additional small surface and ground water sources. During periods of low flow in the Potomac River, the Jennings Randolph Reservoir in West Virginia and the Little Seneca Reservoir in Montgomery County may be utilized to augment Potomac River flow to insure sufficient drinking water supply.

Three major water supply agencies furnish about 95% of the metropolitan region's water. These are the Washington Aqueduct of the U.S. Army Corps of Engineers (WAD), Fairfax Water (FW) and the Washington Suburban Sanitary Commission (WSSC). Other agencies in our region supply the remaining 5% of the water. Some parts of the region are supplied by utilities that purchase water wholesale from one or more of the three large water utilities mentioned above.

During times of drought, natural flows on the Potomac may not always be sufficient to meet water supply needs while still maintaining a minimum flow in the river for sustaining aquatic resources. In such cases, a cooperative entity staffed by the Interstate Commission on the Potomac River Basin coordinates the management of the water system as a whole. This group is known as the Section for Cooperative Water Supply Operations on the Potomac (CO-OP), and is formally associated with the three major supply agencies by the Water Supply Coordination Agreement of 1982.

The three major supply agencies have paid for water storage held in reservoirs in the Potomac Basin, which can augment water supply during low flow conditions so that the region's water supply demands are met while also meeting the Potomac River environmental flow-by requirements. Jennings Randolph Reservoir in the upper reaches of the Potomac River Basin stores 13 billion gallons of water that may be allocated to water supplyaugmentation. Water released from Jennings Randolph travels for 7-9 days during periods of significant drought before reaching the Washington metropolitan region. Located in Montgomery County, Little Seneca Reservoir has 4 billion gallons of storage, which can quickly augment flow in stretches of the Potomac where the intakes for the major supply agencies are located.

Frequently Asked Question about Regional Water Supply

What prompted the development of the Plan?

In 1999, the COG Board of Directors established a "Task Force on Water Supply Issues" during one of the most severe periods of drought in the 20th century The Task Force was established to find a way to improve communication and coordination among local and state governments, water supply utilities, the media and general public in the event of another serious drought in the future. The Plan was developed as a result. The Task Force included a year-round program promoting wise water use as an integral part of the new regional plan.

What is the CO-OP?

The Section for Cooperative Water Supply Operations of the Interstate Commission on the Potomac River Basin (CO-OP) began in the early 1960s and has helped maintain adequate water supply for the region's growing population. The CO-OP was created to coordinate water supply operations of the three independent water suppliers (Fairfax Water, Washington Aqueduct, WSSC) in the Washington, D.C. area during times of drought. During times of low Potomac River flows the CO-OP may post monitoring updates on current available water resources. In drought years, the CO-OP coordinates releases from regional reservoirs to ensure that water supply needs are met, along with maintaining Potomac River environmental flow-by. For additional information visit the **CO-OP website.**

What are the minimum environmental flow requirements for the Potomac River?

As water withdrawals from the Potomac River began to increase to meet the needs of the watershed's growing populations, concerns were raised about the potential consequences of such withdrawals on the Potomac River ecosystem. In 1981, the Potomac River Environmental Flow-by study was created to establish a minimum flow needed to protect its aquatic resources. The Potomac River minimum low-flow or flow-by requirement at Little Falls is 100 million gallons per day (mgd) and 300 mgd at Great Falls. To ensure that flows do not drop below these protective levels, natural flows in the river are augmented with water releases from several impoundments in the basin, as needed.

How many reservoirs are coordinated by the CO-OP and how much water can they hold? (bg—billion gallons)

Jennings Randolph – 13.4 bg (back up reservoir)
Little Seneca – 3.9 bg (back up reservoir)
Occoquan – 8.0 bg (daily use)
Patuxent – 10.2 bg (daily use)

NOTE: Loudoun County has approved of the use of Luck Stone's quarry located north of the W&OD Trail and east of Goose Creek for Water Banking. It is anticipated that approximately 1 billion gallons of water will be able to be stored in this quarry alone once mining operations are complete in the 2017-2020 timeframe. Fairfax Water is developing a plan to create a water supply reservoir at Lorton's Vulcan Quarry.

Can you tell me about the major water utilities in our area?

The Washington Aqueduct serves the District of Columbia via the DC Water, as well as portions of northern Virginia - Arlington County, part of Fairfax County and the Town of Vienna. WSSC serves Montgomery and Prince George's counties in Maryland, and provides a limited amount of water to Howard and Charles counties. Water is also provided on an emergency basis to the City of Rockville and very limited amounts to DC Water. Fairfax Water provides water to nearly 2 million people in the Northern Virginia communities of Fairfax, Loudoun, Prince William and Alexandria

Have we ever issued a Warning or Emergency? If so, when?

Since the regional plan was adopted, the region has declared a WATCH three times. It has not been necessary to declare a WARNING or EMERGENCY for the Potomac River system. However, in 2002, the combined reservoir storage in Jennings Randolph and Little Seneca briefly dropped to levels approaching the WARNING trigger, but due to sufficient rainfall it was not necessary to implement this stage of the plan. Since 2000, several smaller systems have briefly declared WARNING or EMERGENCY stages due to limited rainfall and less resilient water supply systems.

For additional resources please visit COG"s water supply and drought website at:

http://www.mwcog.org/environment/water/watersupply.asp

APPENDIX 3-6

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS (COG) MEMBER JURISDICTIONS

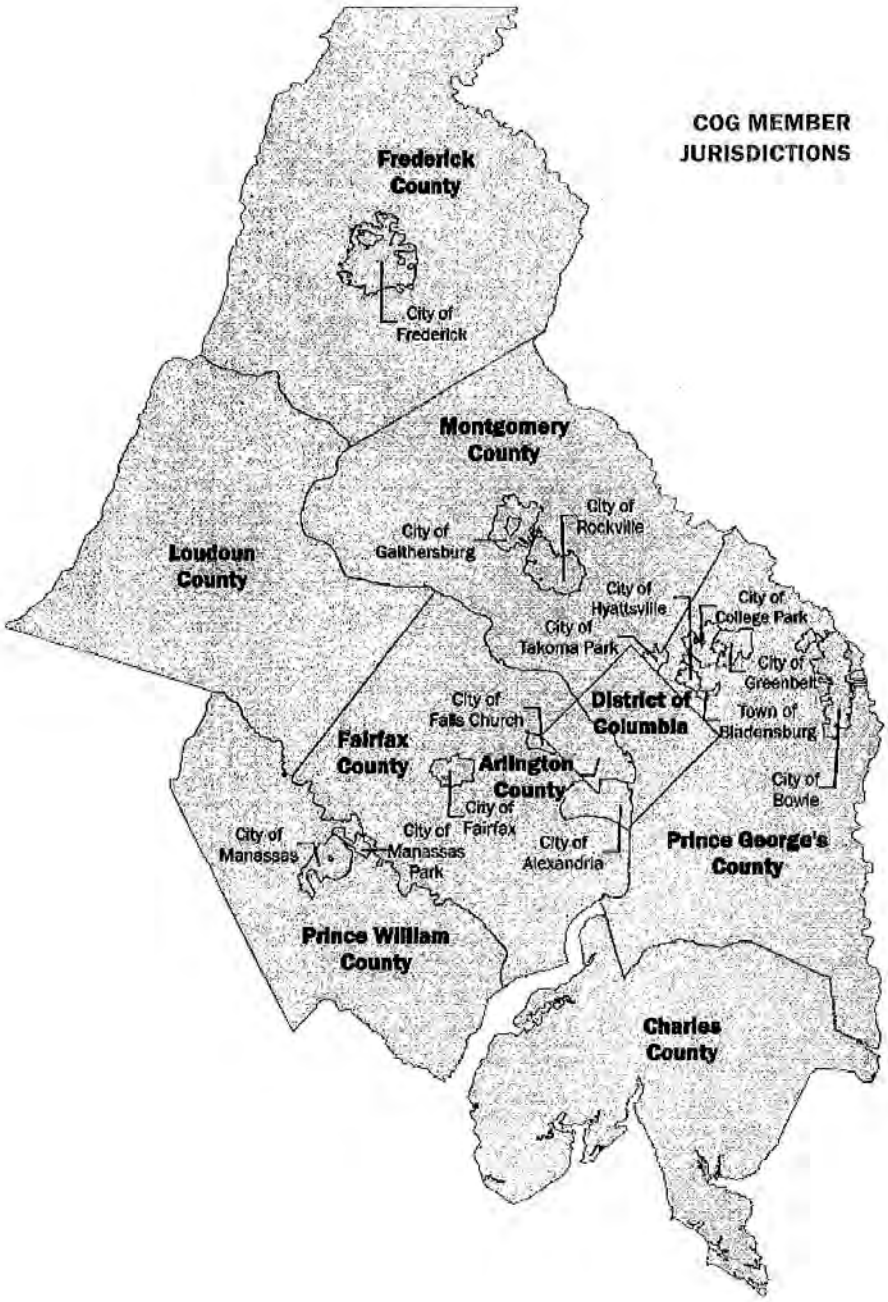
District of Columbia

Maryland

Town of Bladensburg
City of Bowie
Charles County
City of College Park
City of Frederick
Frederick County
City of Gaithersburg
City of Greenbelt
City of Hyattsville
Montgomery County
Prince George's County
City of Rockville
City of Takoma Park

Virginia

City of Alexandria
Arlington County
City of Fairfax
Fairfax County
City of Falls Church
Loudon County
City of Manassas
City of Manassas Park
Prince William County


COG MEMBER JURISDICTIONS
Frederick County
City of Frederick
Montgomery County
City of Gaithersburg
City of Rockville
Loudoun County
City of Hyattsville
City of College Park
City of Takoma Park
City of Greenbelt
City of Falls Church
District of Columbia
Town of Bladensburg
Fairfax County
Arlington County
City of Bowie
City of Fairfax
City of Manassas
City of Manassas Park
City of Alexandria
Prince George's County
Prince William County
Charles County

APPENDIX 3-7

BI-COUNTY AND PRINCE GEORGE'S COUNTY WATER PROJECTS 2019 – 2024 CAPITAL IMPROVEMENT PROGRAM

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Section 3 - Bi-County Water Projects

DATE: October 1, 2017
REVISED: February 21, 2018

FINANCIAL SUMMARY

(ALL FIGURES IN THOUSANDS)

BI-COUNTY WATER PROJECTS

AGENCY NUMBER	PROJECT NAME	EST. TOTAL COST	EXPEND THRU 17	EST. EXPEND 18	TOTAL SIX YEARS	EXPENDITURE SCHEDULE						BEYOND SIX YEARS	PAGE NUM
						YR 1 19	YR 2 20	YR 3 21	YR 4 22	YR 5 23	YR 6 24		
W-73.19	Potomac WFP Outdoor Substation No. 2 Replacement	15,052	14,450	580	22	22	0	0	0	0	0	0	3-3
W-73.21	Potomac WFP Corrosion Mitigation	17,280	15,600	1,615	65	65	0	0	0	0	0	0	3-4
W-73.22	Potomac WFP Pre-Filter Chlorination & Air Scour Improvements	24,961	7,751	4,786	12,424	7,883	4,518	23	0	0	0	0	3-5
W-73.30	Potomac WFP Submerged Channel Intake	83,104	4,322	525	78,257	70	3,917	24,255	24,150	19,950	5,915	0	3-6
W-73.32	Potomac WFP Main Zone Pipeline	37,470	950	550	35,970	1,100	660	19,030	15,180	0	0	0	3-7
W-73.33	Potomac WFP Consent Decree Program	157,480	1,500	5,430	121,150	9,850	10,500	19,950	27,300	28,350	25,200	29,400	3-8
W-139.02	Duckett & Brighton Dam Upgrades	30,754	14,066	8,142	8,546	7,801	745	0	0	0	0	0	3-9
W-161.01	Large Diameter Water Pipe & Large Valve Rehabilitation Program	435,594	0	53,208	382,386	40,661	57,862	62,865	72,021	73,751	75,226	0	3-10
W-172.05	Patuxent WFP Phase II Expansion	63,899	56,594	6,229	1,076	1,076	0	0	0	0	0	0	3-13
W-172.07	Patuxent Raw Water Pipeline	33,663	12,705	4,202	16,756	378	8,378	8,000	0	0	0	0	3-14
W-172.08	Rocky Gorge Pump Station Upgrade	22,564	7,037	10,974	4,553	2,484	2,069	0	0	0	0	0	3-15
W-202.00	Land & Rights-of-Way Acquisition - Bi-County Water	3,695	0	777	2,918	1,300	1,570	18	10	10	10	0	3-16
	Projects Pending Close-Out	141,636	140,624	1,012	0	0	0	0	0	0	0		3-17
	TOTALS	1,067,152	275,599	98,030	664,123	72,690	90,219	134,141	138,661	122,061	106,351	29,400	

POTOMAC WATER FILTRATION PLANT PROJECTS
(costs in thousands)

PROJECT NUMBER	PROJECT NAME	ADOPTED FY'18 TOTAL COST	ADOPTED FY'19 TOTAL COST	CHANGE $	CHANGE %	SIX-YEAR COST	COMPLETION DATE (est)
W-73.19	Potomac WFP Outdoor Substation No. 2 Replacement	$14,850	$15,052	$202	1.4%	$22	August 2017
W-73.21	Potomac WFP Corrosion Mitigation	15,557	17,280	1,723	11.1%	65	September 2017
W-73.22	Potomac WFP Pre-Filter Chlorination & Air Scour Improvements	22,129	24,961	2,832	12.8%	12,424	December 2020
W-73.30	Potomac WFP Submerged Channel Intake	83,104	83,104	0	0.0%	78,257	FY 2024
W-73.32	Potomac WFP Main Zone Pipeline	36,494	37,470	976	2.7%	35,970	FY 2022
W-73.33	Potomac WFP Consent Decree Program	43,050	157,480	114,430	265.8%	121,150	January 2026
	TOTALS	$215,184	$335,347	$120,163	55.8%	$247,888	

Summary: This group of projects represents operational improvements to the Potomac Water Filtration Plant (WFP) in Montgomery County. The Potomac WFP Outdoor Substation No. 2 Replacement project (W-73.19) provides for the replacement of the Outdoor Substation No. 2 (OSS-2) at the Potomac Water Filtration Plant, which is over 30 years old and contains 5kV switchgear that houses air magnetic breakers which are obsolete. The Potomac WFP Corrosion Mitigation (W-73.21) provides for upgrading/replacing existing metallic components in the eight sedimentation basins due to accelerated corrosion, along with upgrading components in the rapid mix and flocculation processes. The Potomac WFP Pre-Filter Chlorination & Air Scour Improvements project (W-73.22) provides for a pre-filter chlorination system, and the replacement of existing plant filters to improve the performance of the underdrain system. The Potomac WFP Submerged Channel Intake project (W-73.30) will provide an additional barrier against drinking water contamination, enhance reliability, and reduce treatment costs by drawing water from a location with a cleaner, more stable water quality. The Potomac WFP Main Zone Pipeline project (W-73.32) provides an 84-inch diameter redundancy main from the Main Zone pumping station to the 96-inch diameter and 66-inch diameter main why connections on River Road. The Potomac WFP Consent Decree Program project (W-73.33) provides for the planning, design, and construction required for the implementation of Short-Term Operational and Long-Term Capital Improvements at the Potomac Water Filtration Plant (WFP) to allow the Commission to meet the new discharge limitations identified in the Consent Decree.

Cost Impact: The increase in cost is due to several factors. Performance issues relating to additional concrete and equipment repair work in the basins contributed to the increase associated with W-73.21 Potomac WFP Corrosion Mitigation. The need to replace all 32 filter underdrains led to the increase in W-73.22 Potomac WFP Pre-Filter Chlorination & Air Scour Improvements. Finally, the Potomac WFP Consent Decree Program (W-73.33) was increased significantly based on estimates from the December 2016 Audit and Long-Term Upgrade Report for the Potomac WFP.

Potomac WFP Outdoor Substation No. 2 Replacement

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-73.19	113802	Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**4,405**	4,027	377	**1**	1						
Land											
Site Improvements & Utilities											
Construction	**10,593**	10,423	150	**20**	20						
Other	**54**		53	**1**	1						
Total	**15,052**	**14,450**	**580**	**22**	**22**						

C. Funding Schedule (000's)

WSSC Bonds	**15,052**	14,450	580	**22**	22						

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction required to replace the Outdoor Substation No. 2 (OSS-2) 5kV switchgear and the two motor control centers (MCCs) located in the Raw Water Pumping Station No. 1 at the Potomac Water Filtration Plant. OSS-2 is over 30 years old and contains 5kV switchgear that houses air magnetic breakers which are obsolete. The two MCCs are over 50 years old, and the manufacturer is no longer in business, making replacement parts difficult to obtain.

JUSTIFICATION

The Phase ID - Energy Performance Project included engineering and planning of equipment and operations upgrades to develop an energy efficient and guaranteed savings program to upgrade/replace pumps at the Potomac Raw Water Pumping Stations (RWPS) #1 and #2, and upgrade Main Zone pump #3. Subsequent tests and inspections of OSS-2 serving RWPS #1 and #2 resulted in a report indicating that OSS-2 was unsafe and in poor condition, and that WSSC should move in an expeditious manner to replace the switchgear in its entirety. Industry practice is to replace 5 kV switchgear between 25 and 30 years old, when in an environment with airborne chemicals. The old breakers in OSS-2 have misalignment problems, and the switchgear housing is corroded, which can pose safety risks to the plant electrical and mechanical maintenance staff as well as the operators.

Energy Performance Project, Phase ID, Energy Systems Group (ESG) (March 2009). Raw Water Pump Testing and subsequent site visits and meetings at Potomac from April to June 2009 by ESG, Whitman Requardt & Assoc., and Shah Assoc. (sub-consultants to ESG).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B above are based on actual bid. The project is substantially complete in FY'18. Estimated cost shown for FY'19 is for site restoration.

COORDINATION

Coordinating Agencies: Montgomery County Government; Prince George's County Government;
Coordinating Projects: A-103.00-Energy Performance Program;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$979	20
Total Cost	$979	20
Impact on Water and Sewer Rate	$0.02	20

F. Approval and Expenditure Data (000's)

Date First in Program	FY 11
Date First Approved	FY 11
Intial Cost Estimate	7,934
Cost Estimate Last FY	14,850
Present Cost Estimate	15,052
Approved Request Last FY	1,248
Total Expense & Encumbrances	14,450
Approval Request Year 1	22

G. Status Information

Land Status	Public/Agency owned land
Project Phase	Construction
Percent Complete	99%
Est Completion Date	August 2017

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map

MAP NOT APPLICABLE

Potomac WFP Corrosion Mitigation

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-73.21	143802	Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**2,685**	2,600	75	**10**	10						
Land											
Site Improvements & Utilities											
Construction	**14,450**	13,000	1,400	**50**	50						
Other	**145**		140	**5**	5						
Total	**17,280**	**15,600**	**1,615**	**65**	**65**						

C. Funding Schedule (000's)

WSSC Bonds	**17,280**	15,600	1,615	**65**	65						

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction required to upgrade and replace the existing metallic components in the eight Sedimentation Basins due to accelerated corrosion observed since the implementation of the full-scale Low pH Enhanced Coagulation Program in 2008. The project will also upgrade components in the Rapid Mix and Flocculation process areas in anticipation of the Ferric Chloride Feed System Project implementation that will introduce a coagulant that is not compatible with several of the existing metallic components.

JUSTIFICATION

Sedimentation Basin components, such as valve hardware, pipe couplings, operator extensions, cross beams, cross collector drive chains and pipe support brackets, are all essential elements. Failure could mean losing important and significant process capacity, possibly for extended periods of time. This could hinder the Commission's ability to meet water supply demands, particularly when the system may need to recover quickly, as in the case of a major water main break. Replacing the metallic components with compatible materials will help maintain the integrity of our system. The project also includes the replacement of the existing polyurethane sprockets, chains for the cross collector drive, augers, auger shafts, and auger chains.

Technical Memorandum No. 1 - Impact of Ferric Chloride on Existing Facilities, Hazen and Sawyer, (May 2010); Potomac Sedimentation Basin Corrosion Study, Hatch Mott MacDonald, (July 2010).

COST CHANGE

Cost increase is due to performance issues relating to additional concrete, and equipment repair work in the basins.

OTHER

The project scope has remained the same. Expenditures and schedule projections shown in Block B above are based upon actual bid. The project will be substantially complete in FY'18. Estimated cost shown for FY'19 is for project closeout activities.

COORDINATION

Coordinating Agencies: Montgomery County Government; Prince George's County Government; Maryland Department of the Environment;
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$1,124	20
Total Cost	$1,124	20
Impact on Water and Sewer Rate	$0.02	20

F. Approval and Expenditure Data (000's)

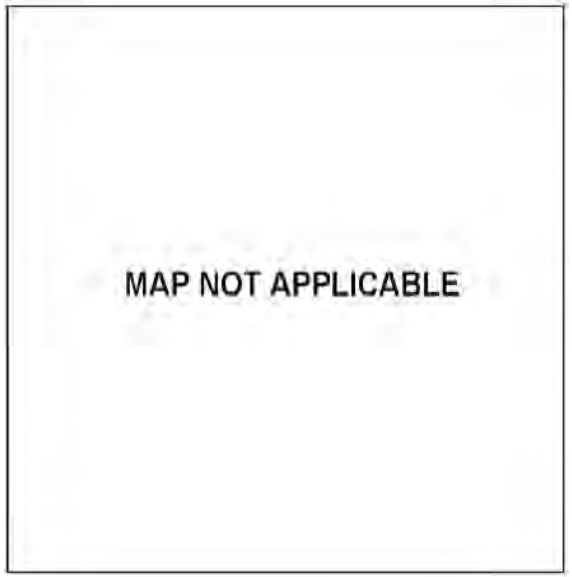
Date First in Program	FY 14
Date First Approved	FY 14
Intial Cost Estimate	7,443
Cost Estimate Last FY	15,557
Present Cost Estimate	17,280
Approved Request Last FY	760
Total Expense & Encumbrances	15,600
Approval Request Year 1	65

G. Status Information

Land Status	Not Applicable
Project Phase	Construction
Percent Complete	90%
Est Completion Date	September 2017

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map



Potomac WFP Pre-Filter Chlorination & Air Scour Improvements

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-73.22	143803	Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**2,941**	1,873	103	**965**	591	373	1				
Land											
Site Improvements & Utilities											
Construction	**20,455**	5,878	4,248	**10,329**	6,575	3,734	20				
Other	**1,565**		435	**1,130**	717	411	2				
Total	**24,961**	**7,751**	**4,786**	**12,424**	**7,883**	**4,518**	**23**				

C. Funding Schedule (000's)

WSSC Bonds	**24,961**	7,751	4,786	**12,424**	7,883	4,518	23				

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of a pre-filter chlorination system and filter air scour system for the Potomac Water Filtration Plant. It also includes the replacement of all 32 filter underdrains.

JUSTIFICATION

Due to numerous separate incidents of catastrophic filter underdrain failures since October 2006, an investigation was conducted by WSSC and ITT Leopold, suppliers of the failed underdrain systems. The investigation revealed that the ITT Leopold underdrain system with an Integral Media Support (IMS) cap is not compatible with the biologically active filters at the Potomac WFP.

Engineering Standard - I. M. S. Cap Monitoring Operation, and Maintenance Instructions, ITT Water & Wastewater, Leopold, Inc., (April 2009). Memo from John Geibel, P.E., Sr. Product Engineer @ ITT Water & Wastewater, Leopold, Inc. - Potomac Filtration Plant Visit April 2009 - to Joseph Johnson, Potomac Plant Superintendent, (May 2010);

COST CHANGE

Total project cost has increased to include the cost for replacement of all 32 filter underdrains.

OTHER

The project scope has been modified to include the replacement of all 32 filter underdrains. The Potomac Water Filtration Plant experienced fourteen separate incidents of catastrophic filter underdrain failure from October 2006 through FY'17, including three filters that failed twice. The failure rate accelerated with six of the fourteen filter failures taking place during the spring and summer of 2016. Expenditure and schedule projections shown in Block B above include design level estimates for Air Scour (which may change based on actual bids) and on actual bids for Underdrain Replacement. The original plan was to design and construct both pre-filter chlorination and air scour systems as one deliverable at the same time. However, due to the more critical need to implement pre-filter chlorination at the Potomac plant, this portion of the project was placed on an accelerated schedule for design and construction, separate from that of the air scour system. Estimated cost for FY'21 is for site restoration.

COORDINATION

Coordinating Agencies: Montgomery County Government; Prince George's County Government;
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$1,624	22
Total Cost	$1,624	22
Impact on Water and Sewer Rate	$0.03	22

F. Approval and Expenditure Data (000's)

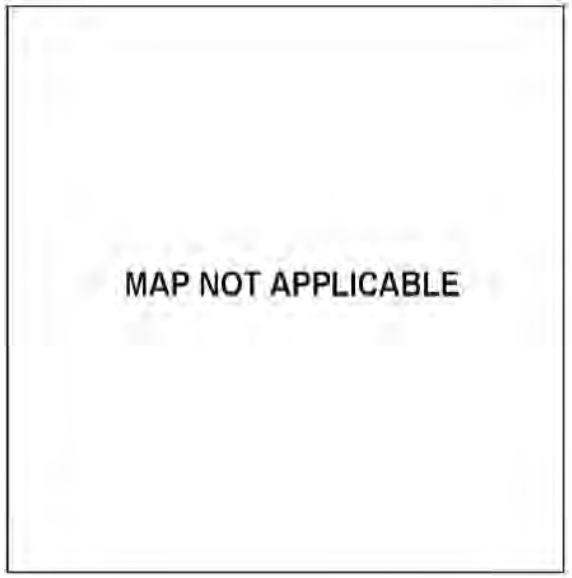
Date First in Program	FY 14
Date First Approved	FY 14
Intial Cost Estimate	5,602
Cost Estimate Last FY	22,129
Present Cost Estimate	24,961
Approved Request Last FY	9,972
Total Expense & Encumbrances	7,751
Approval Request Year 1	7,883

G. Status Information

Land Status	Not Applicable
Project Phase	Construction
Percent Complete	30%
Est Completion Date	December 2020

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map



Potomac WFP Submerged Channel Intake

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-73.30	033812	Change

PDF Date	October 1, 2017
Date Revised	Feb. 21, 2018

Pressure Zones	Potomac WFP HGPOWF;
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**10,652**	4,322	500	**5,830**	67	1,730	1,100	1,000	1,000	933	
Land											
Site Improvements & Utilities											
Construction	**68,700**			**68,700**		2,000	22,000	22,000	18,000	4,700	
Other	**3,752**		25	**3,727**	3	187	1,155	1,150	950	282	
Total	**83,104**	**4,322**	**525**	**78,257**	**70**	**3,917**	**24,255**	**24,150**	**19,950**	**5,915**	

C. Funding Schedule (000's)

WSSC Bonds	**83,104**	4,322	525	**78,257**	70	3,917	24,255	24,150	19,950	5,915	

D. Description & Justification

DESCRIPTION

This project includes planning, which involves community outreach and coordination with elected officials, design, and construction of a submerged channel intake to provide an additional barrier against drinking water contamination (particularly Giardia cysts and Cryptosporidium oocysts), as well as to enhance reliability and reduce treatment costs by drawing water from a location with cleaner, more stable water quality.

JUSTIFICATION

The project is expected to pay for itself over time based upon the reduced chemical and solids handling costs resulting from the cleaner raw water source. It also provides for a more reliable supply by eliminating the current problems associated with ice and vegetation blocking the existing bank withdrawal. This project is consistent with the industry's recommended multiple barrier approach.

"Technical Memorandum No. 2 Water Quality Needs Assessment," O'Brien & Gere Engineers, Inc. (November 2001); "Draft Source Water Assessment Study," Maryland Department of the Environment (April 2002); "Potomac WFP Facility Plan," O'Brien & Gere Engineers, Inc. (September 2002). "Draft Feasibility Study Report", Black & Veatch (November 2013).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. As part of the planning phase of this project, significant outreach activities will occur. A series of briefings with State legislators, County Council members, County Executive staff and County Council staff will be undertaken prior to commencement of further engineering work. As the planning process moves into its final stages and the National Environmental Policy Act (NEPA) approval process is underway, elected officials, county government staffs, environmental community members, and the general public will be engaged in an on-going information, outreach and project participation program. Expenditure and schedule projections shown above are planning level estimates and may change based on site-specific conditions and design constraints. Both Councils will review the results of the detailed study and must approve continuing with the project before design and construction may proceed. Land costs are included in WSSC Project W-202.00.

COORDINATION

Coordinating Agencies: Montgomery County Government; Prince George's County Government; National Park Service; Montgomery County Department of Environmental Protection; Maryland Department of the Environment; Maryland Department of Natural Resources; Prince George's County Department of Environmental Resources; U.S. Army Corps of Engineers; Maryland-National Capital Park & Planning Commission;

Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$5,406	25
Total Cost	$5,406	25
Impact on Water and Sewer Rate	$0.11	25

F. Approval and Expenditure Data (000's)

Date First in Program	FY 04
Date First Approved	FY 03
Intial Cost Estimate	936
Cost Estimate Last FY	83,104
Present Cost Estimate	83,104
Approved Request Last FY	1,523
Total Expense & Encumbrances	4,322
Approval Request Year 1	70

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	Planning
Percent Complete	95%
Est Completion Date	FY 2024

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map

MAP NOT AVAILABLE

Potomac WFP Main Zone Pipeline

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-73.32	133800	Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Montgomery Main 495A; Prince George's
Drainage Basins	
Planning Areas	Potomac-Cabin John & Vicinity PA 29;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**3,650**	950	500	**2,200**	1,000	600	300	300			
Land											
Site Improvements & Utilities											
Construction	**30,500**			**30,500**			17,000	13,500			
Other	**3,320**		50	**3,270**	100	60	1,730	1,380			
Total	**37,470**	**950**	**550**	**35,970**	**1,100**	**660**	**19,030**	**15,180**			

C. Funding Schedule (000's)

WSSC Bonds	**37,470**	950	550	**35,970**	1,100	660	19,030	15,180			

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of approximately 1,500 feet of 84-inch diameter redundancy main from the Main Zone pumping station to the 96-inch diameter and 66-inch diameter main wye connections on River Road. The project will include a rock tunnel segment.

JUSTIFICATION

The existing 78-inch diameter PCCP pipeline is the major feed to the 96-inch diameter Montgomery County Main Zone pipeline and the 66-inch diameter River Road pipeline. The primary purpose of this project is to provide redundancy for the existing line. The Business Case recommended a new 84-inch diameter main be installed from the Main Zone pumping station to the 66-inch diameter and 96-inch diameter wye connection. In addition the wye connection will be replaced as part of this project.

E-mail from M. Woodcock to C. Fricke and E. Betanzo dated April 27, 2011; "Business Case Evaluation for Potomac Water Treatment Plan - 78 inch finished water main redundancy", O'Brien and Gere Engineers, Inc. (October 2013)

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B above are Order of Magnitude estimates and may change based upon site specific conditions and design constraints.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Montgomery County Department of Public Works and Transportation; Montgomery County Government; Maryland Department of the Environment; Maryland Department of Natural Resources; U.S. Army Corps of Engineers; Maryland-National Capital Park & Planning Commission;

Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$39	23
Other Project Costs		
Debt Service	$2,437	23
Total Cost	$2,476	23
Impact on Water and Sewer Rate	$0.05	23

F. Approval and Expenditure Data (000's)

Date First in Program	FY 13
Date First Approved	FY 13
Intial Cost Estimate	330
Cost Estimate Last FY	36,494
Present Cost Estimate	37,470
Approved Request Last FY	9,504
Total Expense & Encumbrances	950
Approval Request Year 1	1,100

G. Status Information

Land Status	Not Applicable
Project Phase	Design
Percent Complete	10%
Est Completion Date	FY 2022

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	Approximately 200 mgd

H. Map

MAP NOT AVAILABLE

Potomac WFP Consent Decree Program

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-73.33	173801	Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Potomac WFP HGPOWF;
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**28,500**	1,500	4,000	**20,000**	4,000	4,000	4,000	4,000	2,000	2,000	3,000
Land	**1,000**		600	**400**	400						
Site Improvements & Utilities											
Construction	**120,600**		600	**95,000**	5,000	6,000	15,000	22,000	25,000	22,000	25,000
Other	**7,380**		230	**5,750**	450	500	950	1,300	1,350	1,200	1,400
Total	**157,480**	**1,500**	**5,430**	**121,150**	**9,850**	**10,500**	**19,950**	**27,300**	**28,350**	**25,200**	**29,400**

C. Funding Schedule (000's)

WSSC Bonds	**157,480**	1,500	5,430	**121,150**	9,850	10,500	19,950	27,300	28,350	25,200	29,400

D. Description & Justification

DESCRIPTION

The Potomac WFP Consent Decree Program provides for the planning, design, and construction required for the implementation of Short-Term Operational and Long-Term Capital Improvements at the Potomac Water Filtration Plant (WFP) to allow the Commission to meet the new discharge limitations identified in the Consent Decree.

JUSTIFICATION

The Consent Decree (CD) was Entered by the U.S. District Court of Maryland on April 15, 2016. Under the terms of the CD the Commission is required to "undertake short-term operational changes and capital improvements at the Potomac WFP that will enable WSSC to reduce significantly the pounds per day of solids discharged to the River" (CD Section II. Paragraph 6.i); and to plan, design, and implement long term "upgrades to the existing Plant or to design and construct a new plant to achieve the effluent limits, conditions, and waste load allocations established by the Maryland Department of the Environment (the Department) and/or in this Consent Decree, and incorporated in a new discharge permit to be issued by the Department" (CD Section II. Paragraph 6.ii). The CD required the Commission to submit a Draft Audit Report and Draft Long-Term Upgrade Plan to the Citizens and the Department by November 15, 2016, and final reports to the Citizens and the Department by January 1, 2017. The Final Audit and Long-Term Upgrade Plan Reports were submitted to the Citizens and the Department on December 29, 2016. The Department reviews the Audit Report and selects recommended improvements in operations, monitoring, and waste tracking, along with select capital projects that can be completed no later than April 1, 2020 and that are necessary to achieve the goals identified in CD Section IV. Paragraph 24. Additionally, the work required to implement the Long-Term Capital Improvements Project(s) shall be fully implemented in accordance with the schedule set forth in the Long Term Upgrade Plan. The Commission shall be subject to a lump-sum stipulated penalty in accordance with the CD for failure to implement the Long Term Capital Improvement Project(s) by January 1, 2026.

COST CHANGE

Cost increase is based on estimates from the December 2016 Audit and Long-Term Upgrade Report for the Potomac WFP.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown above are Order of Magnitude level estimates. The construction estimates have increased significantly based on the Short-Term Audit Report and Long-Term Upgrade Plan Report dated December 2016. The expenditure and schedule projections shown above also include $1,000,000 for Supplemental Environmental Projects included under CD Section IX. Paragraph 50. Preliminary planning work began in FY'16 under ESP project W-708.48, Potomac WFP Consent Decree Projects; operational requirements identified in CD Section IV. Interim Performance Measures and Plant Improvements are currently underway under ESP project W-708.47, Potomac WFP Turbidity Monitoring.

COORDINATION

Coordinating Agencies: Maryland Department of the Environment; Montgomery County Government; Prince George's County Government; National Park Service; U.S. Environmental Protection Agency, Region III;

Coordinating Projects: W-73.21-Potomac WFP Corrosion Mitigation; W-73.30-Potomac WFP Submerged Channel Intake;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$10,244	
Total Cost	$10,244	
Impact on Water and Sewer Rate	$0.22	

F. Approval and Expenditure Data (000's)

Date First in Program	FY 17
Date First Approved	FY 16
Intial Cost Estimate	27,250
Cost Estimate Last FY	43,050
Present Cost Estimate	157,480
Approved Request Last FY	7,000
Total Expense & Encumbrances	1,500
Approval Request Year 1	9,850

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	Planning
Percent Complete	95%
Est Completion Date	January 2026

Growth	
System Improvement	
Environmental Regulation	100%
Population Served	
Capacity	

H. Map

MAP NOT AVAILABLE

Duckett & Brighton Dam Upgrades

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-139.02	073802	Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**9,465**	7,238	1,033	**1,194**	1,023	171					
Land											
Site Improvements & Utilities											
Construction	**19,772**	6,828	6,369	**6,575**	6,069	506					
Other	**1,517**		740	**777**	709	68					
Total	**30,754**	**14,066**	**8,142**	**8,546**	**7,801**	**745**					

C. Funding Schedule (000's)

WSSC Bonds	**30,754**	14,066	8,142	**8,546**	7,801	745					

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of the upgrades required to enable the T. Howard Duckett Dam to meet current Maryland Department of the Environment (MDE) dam safety standards including the Probable Maximum Flood (PMF) criteria and maximum credible earthquake loadings. The upgrades include parapet walls on both embankments of the dam and three foot thick scour slabs tied into the rock on the downstream side of the dam. The project also includes work at the Brighton Dam to assure continued safe operation, e.g., spillway resurfacing, new stairs and intake repairs.

JUSTIFICATION

The MDE requested that WSSC perform a safety analysis of the T. Howard Duckett Dam to ensure that the dam can safely pass the Probable Maximum Flood criteria. MDE also requested that the evaluation include an analysis of the dam's ability to withstand the maximum credible earthquake loadings. The safety analysis includes geotechnical and structural evaluations.

December 13, 2004 letter from MDE; "Comprehensive Safety Evaluation of the T. Howard Duckett Dam", URS Corporation (January 2007); June 28, 2007 letter from MDE.

COST CHANGE

Costs were decreased based on the actual bid for the recently awarded Brighton Dam Upgrades construction project.

OTHER

The project scope has remained the same. Expenditures and schedule projections shown in Block B above reflect the actual bid for the Brighton Dam Upgrades construction. Construction work at Duckett Dam is substantially complete. Brighton Dam Upgrades construction project is currently under construction.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Montgomery County Government; Prince George's County Government; Howard County Government; City of Laurel; Maryland Department of the Environment; U.S. Army Corps of Engineers;

Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$2,001	21
Total Cost	$2,001	21
Impact on Water and Sewer Rate	$0.04	21

F. Approval and Expenditure Data (000's)

Date First in Program	FY 07
Date First Approved	FY 07
Intial Cost Estimate	575
Cost Estimate Last FY	35,415
Present Cost Estimate	30,754
Approved Request Last FY	10,673
Total Expense & Encumbrances	14,066
Approval Request Year 1	7,801

G. Status Information

Land Status	Not Applicable
Project Phase	Construction
Percent Complete	35%
Est Completion Date	April 2019

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map

MAP NOT AVAILABLE

Large Diameter Water Pipe & Large Valve Rehabilitation Program

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-161.01	113803	Change

PDF Date	October 1, 2017
Date Revised	Feb. 21, 2018

Pressure Zones	
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**45,049**		4,421	**40,628**	6,441	6,569	6,701	6,835	6,971	7,111	
Land											
Site Improvements & Utilities											
Construction	**369,802**		46,253	**323,549**	32,284	48,538	53,170	61,756	63,268	64,533	
Other	**20,743**		2,534	**18,209**	1,936	2,755	2,994	3,430	3,512	3,582	
Total	**435,594**		**53,208**	**382,386**	**40,661**	**57,862**	**62,865**	**72,021**	**73,751**	**75,226**	

C. Funding Schedule (000's)

WSSC Bonds	**435,594**		53,208	**382,386**	40,661	57,862	62,865	72,021	73,751	75,226	

D. Description & Justification

DESCRIPTION

The purpose of this Program is to plan, inspect, design, and rehabilitate or replace large diameter water transmission mains and large system valves that have reached the end of their useful life. Condition assessment and/or corrosion monitoring is performed on metallic pipelines, including ductile iron, cast iron, and steel, to identify lengths of pipe requiring replacement or rehabilitation and cathodic protection. The PCCP Inspection and Condition Assessment and Monitoring Program identifies individual pipe segments that require repair or replacement to assure the continued safe and reliable operation of the pipeline. The Program also identifies extended lengths of pipe that require the replacement of an increased number of pipe segments in varying stages of deterioration that are most cost effectively accomplished by the replacement or rehabilitation of long segments of the pipeline or the entire pipeline. Rehabilitation or replacement of these mains provides value to the customer by minimizing the risk of failure and ensuring a safe and reliable water supply. The Program includes installation of Acoustic Fiber Optic Monitoring equipment in order to accomplish these goals in PCCP mains.
* EXPENDITURES FOR LARGE DIAMETER WATER PIPE REHABILITATION ARE EXPECTED TO CONTINUE INDEFINITELY.

JUSTIFICATION

WSSC has approximately 1,031 miles of large diameter water main ranging from 16-inch to 96-inch in diameter. This includes 335 miles of cast iron, 326 miles of ductile iron, 35 miles of steel and 335 miles of PCCP. Internal inspection and condition assessment is performed annually on PCCP pipelines 36-inch and larger in diameter. Of the 335 miles of PCCP, 140 miles are 36-inch diameter and larger. The inspection program includes internal visual and sounding, sonic/ultrasonic testing, and electromagnetic testing to establish the condition of each pipe section and determine if maintenance repairs, rehabilitation, or replacement are needed.

The planning and design phase evaluates the alignment, hydraulic capacity, and project coordination amongst other factors in an effort to re-engineer these pipelines to meet today's design standards. The design effort includes the preparation of bid ready contract documents including all needed rights-of-way acquisitions and regulatory permits. The constructed system is inspected and an as-built plan is produced to serve as the renewed asset record.

In July 2013, WSSC's Acoustic Fiber Optic monitoring system identified breaking wires in a 54-inch diameter PCCP water transmission main in the Forestville area of Prince George's County. Upon attempting to close nearby valves to isolate the failing pipe for repair, WSSC crews encountered an inoperable valve with a broken gear, requiring the crew to drop back to the next available valve. This dropping-back to another valve would block one of the major water mains serving Prince George's county, significantly enlarging the shutdown area and reduce our capacity to supply water to over 100,000 residents. In order to minimize the risk associated with inoperable large valves and possible water outages, the large valve inspection and repair program was initiated to systematically inspect, exercise, repair and replace (when necessary) any of the 1500 large diameter valves and vaults located throughout the system.
Utility Wide Master Plan, (December 2007); 30 Year Infrastructure Plan (2007); FY2016 Water Transmission System Asset Management Plan (February 2014); WSSC FY 2018 Buried Water Asset Systems Asset Management Plan (December 2015);

COST CHANGE

Overall program costs were increased for inflation and to reflect higher construction unit costs for pipe replacements due to requirements to fill abandoned pipe.

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$28,336	25
Total Cost	$28,336	25
Impact on Water and Sewer Rate	$0.60	25

F. Approval and Expenditure Data (000's)

Date First in Program	FY 11
Date First Approved	FY 11
Intial Cost Estimate	
Cost Estimate Last FY	415,928
Present Cost Estimate	435,594
Approved Request Last FY	41,501
Total Expense & Encumbrances	
Approval Request Year 1	40,661

G. Status Information

Land Status	Not Applicable
Project Phase	On-Going
Percent Complete	0%
Est Completion Date	On-Going

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map

MAP NOT AVAILABLE

Large Diameter Water Pipe & Large Valve Rehabilitation Program

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B above are Order of Magnitude estimates and are expected to change based upon the results of the inspections and condition assessments. Life to date expenditures for this program are approximately $190 million. Additional costs associated with PCCP inspection/condition assessment, large valve inspection/repairs and emergency repairs are included in the Operating Budget.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Montgomery County Department of Public Works and Transportation; Montgomery County Government; (including localities where work is to be performed); Prince George's County Government; (including localities where work is to be performed); Maryland-National Capital Park & Planning Commission; Prince George's County Department of Permitting Inspection and Enforcement; Local Community Civic Associations;

Coordinating Projects: W-1.00-Water Reconstruction Program; A-107.00-Specialty Valve Vault Rehabilitation Program;

PATUXENT WATER FILTRATION PLANT PROJECTS
(costs in thousands)

PROJECT NUMBER	PROJECT NAME	ADOPTED FY'18 TOTAL COST	ADOPTED FY'19 TOTAL COST	CHANGE $	CHANGE %	SIX-YEAR COST	COMPLETION DATE (est)
W-172.05	Patuxent WFP Phase II Expansion	$64,214	$63,899	($315)	-0.5%	$1,076	August 2018
W-172.07	Patuxent Raw Water Pipeline	32,932	33,663	731	2.2%	16,756	FY 2020
W-172.08	Rocky Gorge Pump Station Upgrade	22,179	22,564	385	1.7%	4,553	August 2019
	TOTALS	$119,325	$120,126	$801	0.7%	$22,385	

Summary: The Patuxent Water Filtration Plant (WFP) Phase II Expansion project (W-172.05) provides for the addition of a sixth treatment train, a new electrical substation, upgrades to existing yard piping, upgrades to chemical facilities, new UV disinfection facilities, an upgrade to the existing potassium permanganate feed system, upgrades to the existing sewer system and new solids removal facilities. In conjunction with the WFP Phase II Expansion project, the Patuxent Raw Water Pipeline project (W-172.07) and the Rocky Gorge Pump Station Upgrade project (W-172.08) provide for a new raw water pipeline and the necessary modification/expansion to the pumping station to allow the delivery of up to 110 million gallons per day (MGD) of raw water to the Patuxent WFP.

Cost Impact: Not applicable.

Patuxent WFP Phase II Expansion

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-172.05	033807	Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Bi-County;
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**16,459**	13,802	2,432	**225**	225						
Land	**21**	21									
Site Improvements & Utilities											
Construction	**47,071**	42,771	3,500	**800**	800						
Other	**348**		297	**51**	51						
Total	**63,899**	**56,594**	**6,229**	**1,076**	**1,076**						

C. Funding Schedule (000's)

WSSC Bonds	**63,899**	56,594	6,229	**1,076**	1,076						

D. Description & Justification

DESCRIPTION

This project provides for the addition of a sixth treatment train, a new electrical substation, a new residuals handling facility, new UV disinfection facilities, upgrades to existing yard piping, and upgrades to chemical facilities at the Patuxent WFP along with an upgrade to the existing potassium permanganate and carbon feed systems at the Patuxent Pretreatment Facility and a new relief sewer which upgrades the existing sewer system along Sweitzer Lane to accommodate the new residuals facility.

JUSTIFICATION

Phase II will add a sixth treatment train consisting of a three stage flocculation chamber, sedimentation basin with chain and flight solids removal and plate settlers, disinfectant contact chamber, and two deep bed granular carbon filters. A fourth raw water pipeline, Patuxent Raw Water Pipeline (W-172.07) and the modification and expansion of the Rocky Gorge Water Pumping Station (W-172.08), will provide a firm raw water pumping/transmission capacity of 110 MGD. These improvements will give the plant a firm nominal capacity of 72 MGD, with emergency capacity of 110 MGD. New UV disinfection facilities are being added to the plant in order to assure compliance with future EPA regulations for Cryptosporidium treatment and Stage 2 Disinfection Byproducts Rule effective 2012. This project also adds a residuals handling facility to remove the solids from impacting the Parkway WWTP and a relief sewer along Sweitzer Lane to assure no sanitary sewer overflows (SSO) occur as a result of Plant wastewater discharge.

"Patuxent WFP Facility Plan", O'Brien & Gere Engineers, Inc., (April, 1997); In-House Study (April, 2002); Patuxent Expansion Design Criteria Report (April, 2005), "Parkway WWTP Biosolids Facility Plan", CH2M Hill (October, 2009); "Evaluation of Residuals Handling Process Alternatives", AECOM Technical Services, (July, 2011)

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B above are based on actual bids. In the event of an outage at the Potomac WFP, additional capacity at the Patuxent WFP will reduce customer impact. However, emergency conservation measures will still be required.

COORDINATION

Coordinating Agencies: Montgomery County Government; Prince George's County Government; Maryland-National Capital Park & Planning Commission; Maryland Department of the Environment; Maryland State Department of Transportation; Baltimore Gas & Electric; Maryland State Highway Administration;

Coordinating Projects: W-12.02-Prince George's County HG415 Zone Water Main; W-172.07-Patuxent Raw Water Pipeline; W-172.08-Rocky Gorge Pump Station Upgrade;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$4,157	20
Total Cost	$4,157	20
Impact on Water and Sewer Rate	$0.09	20

F. Approval and Expenditure Data (000's)

Date First in Program	FY 04
Date First Approved	FY 03
Intial Cost Estimate	33,002
Cost Estimate Last FY	64,214
Present Cost Estimate	63,899
Approved Request Last FY	8,956
Total Expense & Encumbrances	56,594
Approval Request Year 1	1,076

G. Status Information

Land Status	R/W acquired
Project Phase	Construction
Percent Complete	80%
Est Completion Date	August 2018

Growth	
System Improvement	80%
Environmental Regulation	20%
Population Served	
Capacity	72 MGD nominal/110 MGD emergency

H. Map

MAP NOT AVAILABLE

Patuxent Raw Water Pipeline

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-172.07	063804	Change

PDF Date	October 1, 2017
Date Revised	Feb. 21, 2018

Pressure Zones	
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**5,390**	4,770	220	**400**	20	200	180				
Land											
Site Improvements & Utilities											
Construction	**26,367**	7,935	3,600	**14,832**	320	7,416	7,096				
Other	**1,906**		382	**1,524**	38	762	724				
Total	**33,663**	**12,705**	**4,202**	**16,756**	**378**	**8,378**	**8,000**				

C. Funding Schedule (000's)

WSSC Bonds	**33,663**	12,705	4,202	**16,756**	378	8,378	8,000				

D. Description & Justification

DESCRIPTION

This project provides for planning, design and construction of approximately 2.5 miles of new 48-inch diameter raw water pipeline from the Rocky Gorge Raw Water Pumping Station to the Patuxent Water Filtration Plant, cleaning of the existing water lines and replacement of valves.

JUSTIFICATION

The existing raw water supply facilities are hydraulically limited to 72 MGD with all pumps running at the Rocky Gorge Pumping Station. In order to convey more than 72 MGD of raw water, a new raw water pipeline is required. A fourth raw water pipeline from Rocky Gorge Pumping Station to the Patuxent Plant and modification/expansion of the Rocky Gorge Pumping Station will provide a firm raw water pumping transmission capacity of 110 MGD. These improvements, in conjunction with expansion of the Patuxent Water Filtration Plant, will give the Plant a firm nominal capacity of 72 MGD, with an emergency capacity of 110 MG.

Patuxent WFP Facility Plan (April 1997); In-House Study (April 2002).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. The Rocky Gorge Valve Replacement and the cleaning of existing raw water pipelines are 100% complete. The new raw water pipeline is currently in design. Expenditure and schedule estimates for the new raw water pipeline may change based upon design constraints and permitting issues. The project has been delayed due to a lengthy permit and right-of-way acquisition process. As with any construction project, areas disturbed by construction will be restored. This restoration includes paving of impacted roads in accordance with Prince George's County Policy and Specifications for Utility Installation and Maintenance Manual (Section 4.7.2). Land costs are included in WSSC Project W-202.00.

COORDINATION

Coordinating Agencies: Montgomery County Government; Prince George's County Government; Maryland-National Capital Park & Planning Commission; Maryland Department of the Environment; Interstate Commission on the Potomac River Basin; Local Community Civic Associations; (West Laurel Civic Association); Baltimore Gas & Electric;

Coordinating Projects: W-172.05-Patuxent WFP Phase II Expansion; W-172.08-Rocky Gorge Pump Station Upgrade;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$341	22
Other Project Costs		
Debt Service	$2,190	22
Total Cost	$2,531	22
Impact on Water and Sewer Rate	$0.05	22

F. Approval and Expenditure Data (000's)

Date First in Program	FY 06
Date First Approved	FY 03
Intial Cost Estimate	18,750
Cost Estimate Last FY	32,932
Present Cost Estimate	33,663
Approved Request Last FY	4,180
Total Expense & Encumbrances	12,705
Approval Request Year 1	378

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	Design
Percent Complete	90%
Est Completion Date	FY 2020

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map

MAP NOT AVAILABLE

Rocky Gorge Pump Station Upgrade

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-172.08	063805	Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**5,787**	3,137	1,800	**850**	436	414					
Land											
Site Improvements & Utilities											
Construction	**15,148**	3,900	8,000	**3,248**	1,748	1,500					
Other	**1,629**		1,174	**455**	300	155					
Total	**22,564**	**7,037**	**10,974**	**4,553**	**2,484**	**2,069**					

C. Funding Schedule (000's)

WSSC Bonds	**22,564**	7,037	10,974	**4,553**	2,484	2,069					

D. Description & Justification

DESCRIPTION

This project provides for the modification and expansion of the Rocky Gorge Pump Station to allow the station to provide up to 110 MGD of raw water to the Patuxent Water Filtration Plant.

JUSTIFICATION

The modification and expansion of the Rocky Gorge Raw Water Pumping Station will provide a firm raw water pumping capacity of 110 MGD. The improvements to the pump station, along with a fourth water pipeline (W-172.07) and expansion of the Patuxent Plant (W-172.05) will give the Patuxent Plant a firm nominal capacity of 72 MGD, with emergency capacity of 110 MGD.

Patuxent WFP Facility Plan (April 1997); In-House Study (April 2002)

COST CHANGE

Not applicable.

OTHER

The project scope remains the same. Expenditure and schedule projections shown in Block B above are based on actual bids.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Montgomery County Government; Prince George's County Government; Maryland Department of the Environment; Baltimore Gas & Electric;

Coordinating Projects: W-172.05-Patuxent WFP Phase II Expansion; W-172.07-Patuxent Raw Water Pipeline; W-139.02-Duckett & Brighton Dam Upgrades;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$1,468	21
Total Cost	$1,468	21
Impact on Water and Sewer Rate	$0.03	21

F. Approval and Expenditure Data (000's)

Date First in Program	FY 06
Date First Approved	FY 03
Intial Cost Estimate	12,930
Cost Estimate Last FY	22,179
Present Cost Estimate	22,564
Approved Request Last FY	7,590
Total Expense & Encumbrances	7,037
Approval Request Year 1	2,484

G. Status Information

Land Status	Public/Agency owned land
Project Phase	Construction
Percent Complete	30%
Est Completion Date	August 2019

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	110 MGD

H. Map

MAP NOT AVAILABLE

Land & Rights-of-Way Acquisition - Bi-County Water

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-202.00	983857	Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	
Drainage Basins	
Planning Areas	Bi-County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision											
Land	**3,695**		777	**2,918**	1,300	1,570	18	10	10	10	
Site Improvements & Utilities											
Construction											
Other											
Total	**3,695**		**777**	**2,918**	**1,300**	**1,570**	**18**	**10**	**10**	**10**	

C. Funding Schedule (000's)

WSSC Bonds	**3,081**		372	**2,709**	1,091	1,570	18	10	10	10	
SDC	**614**		405	**209**	209						

D. Description & Justification

DESCRIPTION

This PDF provides a consolidated estimate of funding for the acquisition of land and rights-of-way for water projects and for easement and land acquisitions for watershed protection. Expenditures are programmed based upon anticipated schedules and are required for the completion of those specific projects. These costs do not include purchases which have already been completed.

JUSTIFICATION

Consolidation of expenditures for land and rights-of-way acquisitions provides flexibility in expending funds in a specific fiscal year and permits the WSSC to respond to the uncertainty of project-specific implementation schedules. Other considerations include the accomodation of unpredictable delays which impact the timing of a planned purchase, unanticipated rights-of-way requirements due to minor alignment changes identified late in the design phase, and the need to assure the WSSC an equitable negotiation position by avoiding project-specific cost displays prior to contacting property owners.

Acquisition needs are determined by the WSSC and are based upon facility planning efforts, alignment studies, field surveys, realignments required by other agencies, or requirements identified within the Development Services Process (DSP).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B are Order of Magnitude estimates only and may change based upon actual negotiations. When purchases are complete, the actual cost will be displayed in the expenditure schedule on the appropriate project.

COORDINATION

Coordinating Agencies: Not Applicable
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$200	25
Total Cost	$200	25
Impact on Water and Sewer Rate		

F. Approval and Expenditure Data (000's)

Date First in Program	FY 98
Date First Approved	FY 98
Intial Cost Estimate	
Cost Estimate Last FY	4,529
Present Cost Estimate	3,695
Approved Request Last FY	2,375
Total Expense & Encumbrances	
Approval Request Year 1	1,300

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	On-Going
Percent Complete	
Est Completion Date	Not Applicable

Growth	17%
System Improvement	83%
Environmental Regulation	
Population Served	
Capacity	

H. Map

MAP NOT AVAILABLE

PROJECTS PENDING CLOSE-OUT
Bi-County Water Projects
(costs in thousands)

Project Number	Agency Number	Project Name	Estimated Total Cost	Expenditures Thru FY'17	Estimated Expenditures FY'18	Remarks
934855	W-127.01	Bi-County Water Tunnel	$141,636	$140,624	$1,012	Project completion expected in FY'18.
		TOTALS	$141,636	$140,624	$1,012	

Section 5 - Prince George's County Water Projects

DATE: October 1, 2017

FINANCIAL SUMMARY

(ALL FIGURES IN THOUSANDS)

PRINCE GEORGE'S COUNTY WATER PROJECTS

AGENCY NUMBER	PROJECT NAME	EST. TOTAL COST	EXPEND THRU 17	EST. EXPEND 18	TOTAL SIX YEARS	EXPENDITURE SCHEDULE						BEYOND SIX YEARS	PAGE NUM
						YR 1 19	YR 2 20	YR 3 21	YR 4 22	YR 5 23	YR 6 24		
W-12.02	Prince George's County HG415 Zone Water Main	3,644	418	965	2,261	2,077	184	0	0	0	0	0	5-2
W-34.02	Old Branch Avenue Water Main	24,240	2,812	198	21,230	6,820	8,690	5,720	0	0	0	0	5-3
W-34.03	Water Transmission Improvements 385B Pressure Zone	23,253	1,203	8,830	13,220	6,620	4,400	2,200	0	0	0	0	5-4
W-34.04	Branch Avenue Water Transmission Improvements	60,377	8,295	13,825	38,257	14,751	17,741	5,765	0	0	0	0	5-5
W-34.05	Marlboro Zone Reinforcement Main	4,226	380	810	3,036	3,036	0	0	0	0	0	0	5-6
W-62.05	Clinton Zone Water Storage Facility Implementation	15,527	2,087	2,002	6,598	5,993	605	0	0	0	0	4,840	5-7
W-65.10	St. Barnabas Elevated Tank Replacement	10,784	4,346	6,016	422	422	0	0	0	0	0	0	5-8
W-84.02	Ritchie Marlboro Road Transmission & PRV	6,867	2,002	3,105	1,760	1,760	0	0	0	0	0	0	5-9
W-84.03	Smith Home Farms Water Main	2,603	801	570	1,232	414	412	406	0	0	0	0	5-10
W-84.04	Westphalia Town Center Water Main	1,532	556	43	933	313	367	253	0	0	0	0	5-11
W-84.05	Prince George's County 450A Zone Water Main	84,540	1,509	821	64,321	684	9,149	13,622	13,622	13,622	13,622	17,889	5-12
W-93.01	Konterra Town Center East Water Main	1,581	43	651	887	61	350	194	282				5-13
W-105.01	Marlton Section 18 Water Main, Lake Marlton Avenue	2,581	29	1	2,551	406	429	429	429	429	429		5-14
W-111.05	Hillmeade Road Water Main	5,438	1,002	1,760	2,676	2,676	0	0	0	0	0	0	5-15
W-119.01	John Hanson Highway Water Main, Part 1	13,970	6,078	7,282	610	610	0	0	0	0	0	0	5-16
W-120.14	Villages of Timothy Water Main, Part 1	1,069	54	540	475	475	0	0	0	0	0	0	5-17
W-120.15	Villages of Timothy Water Main, Part 2	337	18	170	149	149	0	0	0	0	0	0	5-18
W-123.14	Old Marlboro Pike Water Main	1,755	1,269	118	368	202	166		0	0	0	0	5-19
W-123.20	Oak Grove/Leeland Roads Water Main, Part 2	14,668	9,642	4,796	230	230	0	0	0	0	0	0	5-20
W-137.03	South Potomac Supply Improvement, Phase 2	54,632	30	1,313	53,289	1,575	3,478	12,863	12,863	12,863	9,647		5-21
W-147.00	Collington Elevated Water Storage Facility	15,942	15,534	274	134	134	0	0	0	0	0	0	5-22
	Projects Pending Close-Out	17,390	16,790	600	0	0	0	0	0	0	0	0	5-23
	TOTALS	366,956	74,898	54,690	214,639	49,408	45,971	41,452	27,196	26,914	23,698	22,729	

Prince George's County HG415 Zone Water Main

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-12.02		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Patuxent HG415A; Montgomery High
Drainage Basins	
Planning Areas	Patuxent PA 15;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**446**	418	24	**4**	3	1					
Land											
Site Improvements & Utilities											
Construction	**2,787**		929	**1,858**	1,800	58					
Other	**411**		12	**399**	274	125					
Total	**3,644**	**418**	**965**	**2,261**	**2,077**	**184**					

C. Funding Schedule (000's)

WSSC Bonds	**3,644**	418	965	**2,261**	2,077	184					

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of 1,500 feet of 24-inch diameter water main and new isolation valves, pressure relief valves with flow control capability, which will improve system reliability by improving the flexibility of the delivery system to the Montgomery County High Zone HG660, Main Zone HG495A and Patuxent Pressure Zone HG415A 30-inch and 42-inch diameter transmission mains leaving the Patuxent Plant.

JUSTIFICATION

The new water main will provide a redundant feed to the Montgomery County High Zone HG660, Montgomery County Main Zone HG495 and Patuxent Pressure Zone HG415A from the Potomac Plant in the event the Patuxent Plant is out of service.

BOA Contract No. PM0003A05, Task Order No. 12: Patuxent Pressure Zone HG415A Redundancy Study, Whitman, Requardt & Associates, LLP (February 2009); BOA Contract No. PM0019A08, Task Order No. 11, Patuxent Pressure Zone HG415A 24-inch Transmission Main, EBA Engineering (December 2011). PM0007A13, Task Order No. 14, Patuxent Pressure Zone HG415A 24-inch Transmission Main, EBA Engineering (March 16, 2017).

COST CHANGE

Cost increase based upon more complex design requirements.

OTHER

The project scope remains the same. Expenditure and schedule projections shown in Block B above are preliminary design level estimates and may change depending on site-specific conditions and design constrains. Land costs are included in WSSC Project W-202.00.

COORDINATION

Coordinating Agencies: Prince George's County Government; Maryland Department of the Environment; Baltimore Gas & Electric;
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$54	21
Other Project Costs		
Debt Service	$237	21
Total Cost	$291	21
Impact on Water and Sewer Rate	$0.01	21

F. Approval and Expenditure Data (000's)

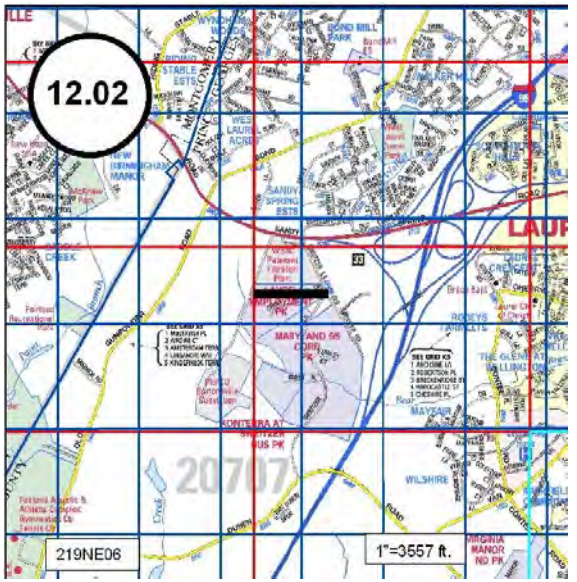
Date First in Program	FY 11
Date First Approved	FY 11
Intial Cost Estimate	1,074
Cost Estimate Last FY	3,443
Present Cost Estimate	3,644
Approved Request Last FY	2,098
Total Expense & Encumbrances	418
Approval Request Year 1	2,077

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	Design
Percent Complete	90%
Est Completion Date	FY 2020

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map



Old Branch Avenue Water Main

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-34.02		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Clinton HG385B;
Drainage Basins	
Planning Areas	Clinton & Vicinity PA 81A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**3,430**	2,650	180	**600**	200	200	200				
Land	**162**	162									
Site Improvements & Utilities											
Construction	**18,700**			**18,700**	6,000	7,700	5,000				
Other	**1,948**		18	**1,930**	620	790	520				
Total	**24,240**	**2,812**	**198**	**21,230**	**6,820**	**8,690**	**5,720**				

C. Funding Schedule (000's)

WSSC Bonds	**12,120**	1,406	99	**10,615**	3,410	4,345	2,860				
SDC	**12,120**	1,406	99	**10,615**	3,410	4,345	2,860				

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of approximately 16,000 feet of 30-inch diameter water main and a new flow control valve along Old Branch Avenue, from Allentown Road to Piscataway Road.

JUSTIFICATION

This project will provide redundancy to a large area of Prince George's County, including the 85,000 customers in Clinton Pressure Zone HG385B and dependent zones. Service to these zones would be severely disrupted with the loss of the Marlboro Road Pressure Reducing Valves or associated piping. The WSSC attempts to provide for average day demands in the event of the loss of any one water system facility and this project will meet that goal for Clinton Pressure Zone HG385B and dependent zones.

General Plan; M-NCP&PC Round 7.0 growth forecasts; WSSC Memorandum dated May 16, 2006.

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. The expenditure and schedule projections as shown in Block B above are design level estimates and may change based upon the final engineer's estimate and actual bids. Five properties have been acquired.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Prince George's County Government; Maryland-National Capital Park & Planning Commission; Maryland Department of the Environment; Prince George's County Department of Permitting Inspection and Enforcement;

Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$414	22
Other Project Costs		
Debt Service	$788	22
Total Cost	$1,202	22
Impact on Water and Sewer Rate	$0.03	22

F. Approval and Expenditure Data (000's)

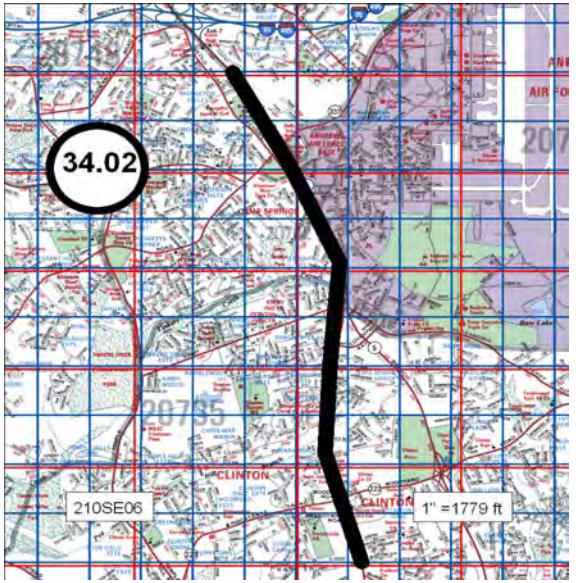
Date First in Program	FY 08
Date First Approved	FY 08
Intial Cost Estimate	10,350
Cost Estimate Last FY	23,510
Present Cost Estimate	24,240
Approved Request Last FY	8,640
Total Expense & Encumbrances	2,812
Approval Request Year 1	6,820

G. Status Information

Land Status	Public/Agency owned land
Project Phase	Design
Percent Complete	100%
Est Completion Date	FY 2021

Growth	50%
System Improvement	50%
Environmental Regulation	
Population Served	
Capacity	

H. Map



Water Transmission Improvements 385B Pressure Zone

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-34.03		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Clinton HG385B;
Drainage Basins	
Planning Areas	Clinton & Vicinity PA 81A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**1,253**	1,203	30	**20**	20						
Land											
Site Improvements & Utilities											
Construction	**20,000**		8,000	**12,000**	6,000	4,000	2,000				
Other	**2,000**		800	**1,200**	600	400	200				
Total	**23,253**	**1,203**	**8,830**	**13,220**	**6,620**	**4,400**	**2,200**				

C. Funding Schedule (000's)

SDC	**23,253**	1,203	8,830	**13,220**	6,620	4,400	2,200				

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of approximately 24,000 feet of 24-inch diameter water transmission main and a flow control valve along Accokeek Road that will improve system reliability through the HG385 and HG345 pressure zones.

JUSTIFICATION

The existing transmission mains have been stressed by recent development in southern Prince George's County. In addition, head-loss due to increased water use is preventing the Accokeek elevated tank from operating as designed. A new water main will improve our transmission capacity to serve recent and future growth, and will also improve overall reliability for southern Prince George's County customers.

Clinton Zone WSF & Transmission Improvements Modeling and Master Plan Report, Gannett Fleming, Inc. (February 2012).

COST CHANGE

Cost decreased based upon final design estimate.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B above are based on engineer's estimates and may change based on actual bid. The alignment has been established and design is being finalized. No WSSC rate supported debt will be used for this project. Land costs are included in WSSC Project W-202.00.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; (Major stakeholder as 3/4 of the proposed alignment would be on SHA ROW); Maryland-National Capital Park & Planning Commission; (MNCPPC Mandatory Referral Review Approval obtained on March 3, 2015). Maryland Department of the Environment; Maryland Department of Natural Resources; Prince George's County Department of Environmental Resources; Prince George's County Department of Permitting Inspection and Enforcement; U.S. Army Corps of Engineers; Prince George's County Government;

Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$622	22
Other Project Costs		
Debt Service		
Total Cost	$622	22
Impact on Water and Sewer Rate	$0.01	22

F. Approval and Expenditure Data (000's)

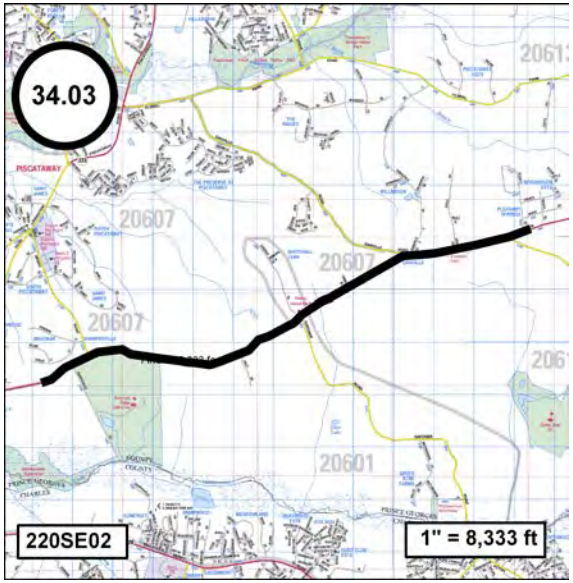
Date First in Program	FY 12
Date First Approved	FY 12
Intial Cost Estimate	173
Cost Estimate Last FY	30,240
Present Cost Estimate	23,253
Approved Request Last FY	13,365
Total Expense & Encumbrances	1,203
Approval Request Year 1	6,620

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	Design
Percent Complete	100%
Est Completion Date	FY 2021

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Branch Avenue Water Transmission Improvements

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-34.04		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Clinton HG385B;
Drainage Basins	
Planning Areas	Clinton & Vicinity PA 81A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**2,983**	2,469	257	**257**	155	78	24				
Land	**244**	244									
Site Improvements & Utilities											
Construction	**32,604**	5,582	10,684	**16,338**	5,403	6,719	4,216				
Other	**24,546**		2,884	**21,662**	9,193	10,944	1,525				
Total	**60,377**	**8,295**	**13,825**	**38,257**	**14,751**	**17,741**	**5,765**				

C. Funding Schedule (000's)

SDC	**60,377**	8,295	13,825	**38,257**	14,751	17,741	5,765				

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of approximately 21,800 feet of 42-inch diameter water transmission main and 5,400 feet of 30-inch diameter water transmission main along Branch Avenue and Surratts Road in the Clinton area.

JUSTIFICATION

The new water main will serve as a primary feed for the new Brandywine (formerly Clinton South)Tank.

Clinton Zone WSF & Transmission Improvements Modeling and Master Plan Report, Gannett Fleming, Inc. (February 2012).

COST CHANGE

Cost increase is due to the redesign of the Phase IV alignment.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B above are a mix of bid value, design and planning level estimates and are expected to change as design progresses. The project is split into four phases. The first phase is comprised of approximately 1,200 feet of 42-inch pipe along Surratts Road and has been constructed by Prince George's County as part of the County Surratts/Brandywine road widening project. The second phase is approximately 3,300 feet of 30-inch main along Branch Avenue and will be constructed by the Maryland State Highway Administration (SHA) under the SHA MD5/Brandywine interchange improvement project. The third phase is to construct approximately 12,800 feet of 42-inch pipe and 2,100 feet of 30-inch pipe along Branch Avenue. The last phase is to construct the remaining 7,798 feet of pipe along Surratts Rd and the north section to tie-in to the existing 30-inch pipe on Woodyard/Piscataway/ Road. Both Phases III (BL5273B11) and IV (BL5273F11) will be bid and constructed by WSSC. No WSSC rate supported debt will be used for this project. Land costs are included in WSSC Project W-202.00.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Maryland-National Capital Park & Planning Commission; (Mandatory Referral Process); Maryland Department of the Environment; Maryland Department of Natural Resources; Prince George's County Department of Permitting Inspection and Enforcement; U.S. Army Corps of Engineers; Prince George's County Department of Public Works and Transportation; Prince George's County Department of Permitting Inspection and Enforcement;

Coordinating Projects: W-62.05-Clinton Zone Water Storage Facility Implementation;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$704	22
Other Project Costs		
Debt Service		
Total Cost	$704	22
Impact on Water and Sewer Rate	$0.01	22

F. Approval and Expenditure Data (000's)

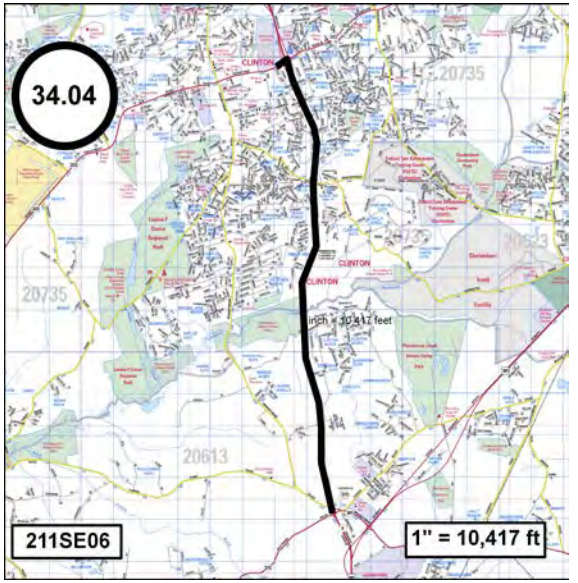
Date First in Program	FY 14
Date First Approved	FY 14
Intial Cost Estimate	23,705
Cost Estimate Last FY	54,033
Present Cost Estimate	60,377
Approved Request Last FY	13,604
Total Expense & Encumbrances	8,295
Approval Request Year 1	14,751

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	Construction
Percent Complete	30%
Est Completion Date	July 2020

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Marlboro Zone Reinforcement Main

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-34.05		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Clinton HG385B;
Drainage Basins	
Planning Areas	Clinton & Vicinity PA 81A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**725**	380	105	**240**	240						
Land											
Site Improvements & Utilities											
Construction	**3,000**		600	**2,400**	2,400						
Other	**501**		105	**396**	396						
Total	**4,226**	**380**	**810**	**3,036**	**3,036**						

C. Funding Schedule (000's)

WSSC Bonds	**4,226**	380	810	**3,036**	3,036						

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of approximately 4,000 feet of 16-inch diameter water transmission main and a flow control valve along Old Marlboro Pike in the Clinton area.

JUSTIFICATION

This new water main will provide system reliability and redundancy by connecting the 385B and 280A pressure zones.

Clinton Zone WSF & Transmission Improvements Modeling and Master Plan Report, Gannett Fleming, Inc. (February 2012).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B above are planning level estimates and are expected to change as design progresses. Land costs are included in WSSC Project W-202.00.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Maryland-National Capital Park & Planning Commission; (Mandatory Referral Process); Prince George's County Department of Environmental Resources; Prince George's County Department of Permitting Inspection and Enforcement; Prince George's County Government;
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$104	20
Other Project Costs		
Debt Service	$275	20
Total Cost	$379	20
Impact on Water and Sewer Rate	$0.01	20

F. Approval and Expenditure Data (000's)

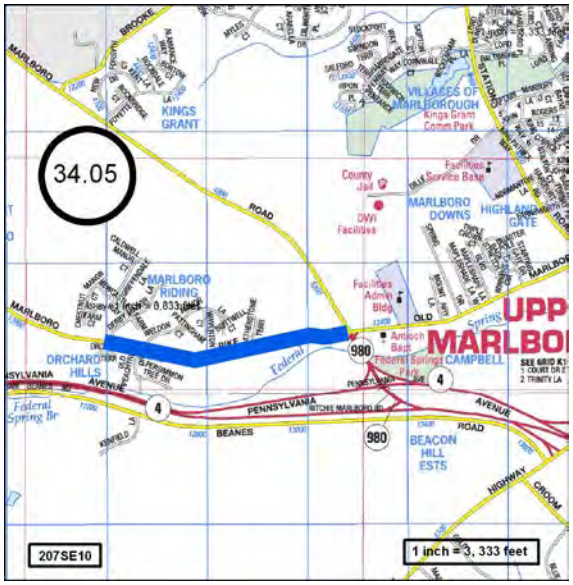
Date First in Program	FY 14
Date First Approved	FY 14
Intial Cost Estimate	5,234
Cost Estimate Last FY	4,232
Present Cost Estimate	4,226
Approved Request Last FY	2,651
Total Expense & Encumbrances	380
Approval Request Year 1	3,036

G. Status Information

Land Status	Site Selected
Project Phase	Design
Percent Complete	80%
Est Completion Date	June 2019

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map



Clinton Zone Water Storage Facility Implementation

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-62.05		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Clinton HG385B;
Drainage Basins	
Planning Areas	Clinton & Vicinity PA 81A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**2,341**	1,973	120	**198**	148	50					50
Land	**114**	114									
Site Improvements & Utilities											
Construction	**11,850**		1,700	**5,800**	5,300	500					4,350
Other	**1,222**		182	**600**	545	55					440
Total	**15,527**	**2,087**	**2,002**	**6,598**	**5,993**	**605**					**4,840**

C. Funding Schedule (000's)

SDC	**15,527**	2,087	2,002	**6,598**	5,993	605					4,840

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of approximately 4.0 million gallons (MG) of water storage to serve the Clinton area. The site selection phase of this project will include a Community Outreach Program. WSSC will construct a 2.0 MG water tank in the Brandywine area by FY'20. A future 2.0 MG water tank will be constructed in the Rosaryville area by FY'26 to meet the demands of the study area.

JUSTIFICATION

Clinton Pressure Zone HG385B serves a large and growing area of Southern Prince George's County and currently has only one storage facility. Since storage facilities must be periodically removed from service for maintenance, having only one in a large zone creates operational problems. The Modeling and Master Plan Report indicates that there will be approximately 4.0 MG of storage deficit in Clinton Pressure Zone HG385B by the year 2040.

WSSC Memorandum dated May 9, 2005, from Timothy Hirrel, Unit Coordinator, to Craig Fricke, Planning Group Leader; 2006 Water Production Projections; 2005 Water Storage Volume Criteria; Clinton Zone WSF & Transmission Improvements Modeling and Master Plan Report, Gannett Fleming, Inc. (February 2012).

COST CHANGE

Not applicable

OTHER

The project scope has remained the same. Expenditure and schedule projections shown are design level estimates and are expected to change once the project moves into construction. Estimated costs allocated for 'Beyond 6 Years' is for the future 2.0 MG water tank. No WSSC rate supported debt will be used for this project. Land costs are included in WSSC Project W-202.00.

COORDINATION

Coordinating Agencies: Prince George's County Government; Maryland-National Capital Park & Planning Commission; Maryland Department of the Environment; Prince George's County Department of Environmental Resources; Federal Aviation Administration; Maryland Department of Natural Resources;

Coordinating Projects: W-34.02-Old Branch Avenue Water Main; W-34.03-Water Transmission Improvements 385B Pressure Zone; W-34.04-Branch Avenue Water Transmission Improvements; W-34.05-Marlboro Zone Reinforcement Main;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service		
Total Cost		
Impact on Water and Sewer Rate		

F. Approval and Expenditure Data (000's)

Date First in Program	FY 13
Date First Approved	FY 13
Intial Cost Estimate	7,993
Cost Estimate Last FY	15,482
Present Cost Estimate	15,527
Approved Request Last FY	4,920
Total Expense & Encumbrances	2,087
Approval Request Year 1	5,993

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	Design
Percent Complete	100%
Est Completion Date	See Block D

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	4.0 MG

H. Map

MAP NOT APPLICABLE

St. Barnabas Elevated Tank Replacement

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-65.10		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Prince George's High HG450A; Patuxent
Drainage Basins	
Planning Areas	Suitland-District Heights & Vicinity PA

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**1,335**	1,086	169	**80**	80						
Land											
Site Improvements & Utilities											
Construction	**8,864**	3,260	5,300	**304**	304						
Other	**585**		547	**38**	38						
Total	**10,784**	**4,346**	**6,016**	**422**	**422**						

C. Funding Schedule (000's)

WSSC Bonds	**5,392**	2,173	3,008	**211**	211						
SDC	**5,392**	2,173	3,008	**211**	211						

D. Description & Justification

DESCRIPTION

This project provides for the design and construction of approximately 2.5 million gallons (MG) of water storage to serve Prince George's High Pressure Zone HG450A and the demolition of the existing St. Barnabas elevated water storage tank.

JUSTIFICATION

This project is necessary to provide storage capacity and address water quality issues in Prince George's High Pressure Zone HG450A. Specifically, the existing St. Barnabas and Camp Springs elevated tanks have low overflow elevations that impact water quality in the zone.

Prince George's County High Zone Storage Study, Hazen & Sawyer (June 2012).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B are based on actual bid. The Prince George's County High Zone Storage Study recommended moving forward with design and construction of a new tank on the existing St. Barnabas site. The new tank will replace the existing St. Barnabas elevated tank. The study also recommended pursuing acquisition of an additional site for long-term water storage needs.

COORDINATION

Coordinating Agencies: Prince George's County Government; Maryland-National Capital Park & Planning Commission; Maryland Department of the Environment; Federal Aviation Administration;

Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$351	20
Total Cost	$351	20
Impact on Water and Sewer Rate	$0.01	20

F. Approval and Expenditure Data (000's)

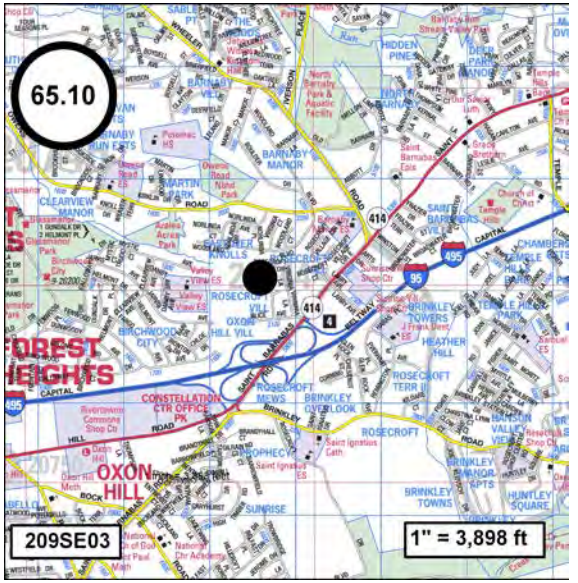
Date First in Program	FY 13
Date First Approved	FY 13
Intial Cost Estimate	7,274
Cost Estimate Last FY	11,382
Present Cost Estimate	10,784
Approved Request Last FY	4,724
Total Expense & Encumbrances	4,346
Approval Request Year 1	422

G. Status Information

Land Status	Public/Agency owned land
Project Phase	Construction
Percent Complete	36%
Est Completion Date	August 2018

Growth	50%
System Improvement	50%
Environmental Regulation	
Population Served	
Capacity	2.5 MG

H. Map



Ritchie Marlboro Road Transmission Main & PRV

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-84.02		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Prince George's High HG450A; Southern
Drainage Basins	
Planning Areas	Westphalia & Vicinity PA 78;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**1,800**	1,600	100	**100**	100						
Land	**2**	2									
Site Improvements & Utilities											
Construction	**4,430**	400	2,600	**1,430**	1,430						
Other	**635**		405	**230**	230						
Total	**6,867**	**2,002**	**3,105**	**1,760**	**1,760**						

C. Funding Schedule (000's)

SDC	**6,867**	2,002	3,105	**1,760**	1,760						

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of approximately 13,100 feet of 24-inch diameter main and a pressure reducing valve (PRV) to serve the Westphalia area. The water main will be constructed along Ritchie Marlboro Road from south of Westphalia Road to the Beltway.

JUSTIFICATION

Prince George's County High Zone Water Main Alignment and Capacity Study, Chester Engineering (September 2012).

COST CHANGE

Cost decreased based upon actual bid.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown above are based upon actual bid. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Prince George's County Government; Maryland-National Capital Park & Planning Commission; Maryland Water Management Administration; Maryland Department of Natural Resources; Prince George's County Department of Permitting Inspection and Enforcement; U.S. Army Corps of Engineers;
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$339	20
Other Project Costs		
Debt Service		
Total Cost	$339	20
Impact on Water and Sewer Rate	$0.01	20

F. Approval and Expenditure Data (000's)

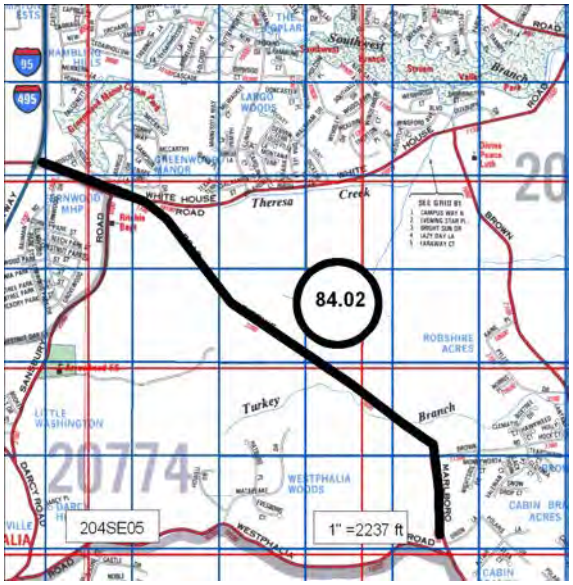
Date First in Program	FY 08
Date First Approved	FY 08
Intial Cost Estimate	2,496
Cost Estimate Last FY	12,799
Present Cost Estimate	6,867
Approved Request Last FY	5,676
Total Expense & Encumbrances	2,002
Approval Request Year 1	1,760

G. Status Information

Land Status	Land acquired
Project Phase	Construction
Percent Complete	70%
Est Completion Date	November 2018

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Smith Home Farms Water Main

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-84.03		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Southern 385B;
Drainage Basins	
Planning Areas	Westphalia & Vicinity PA 78;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**425**	158	87	**180**	63	61	56				
Land											
Site Improvements & Utilities											
Construction	**1,943**	643	409	**891**	297	297	297				
Other	**235**		74	**161**	54	54	53				
Total	**2,603**	**801**	**570**	**1,232**	**414**	**412**	**406**				

C. Funding Schedule (000's)

Contribution/Other	**2,603**	801	570	**1,232**	414	412	406				

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of 7,600 feet of 16-inch diameter water main to serve the Smith Home Farms Subdivision.

JUSTIFICATION

Smith Home Farm Subdivision Hydraulic Planning Analysis (Amended March 2015).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. Expenditure and schedule projections shown in Block B above are based upon information provided by the developer. Design and construction will be performed by the developer under a System Extension Permit. The estimated completion date is developer dependent. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Maryland-National Capital Park & Planning Commission; (Westphalia Sector Plan); Prince George's County Government;
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$197	22
Other Project Costs		
Debt Service		
Total Cost	$197	22
Impact on Water and Sewer Rate		

F. Approval and Expenditure Data (000's)

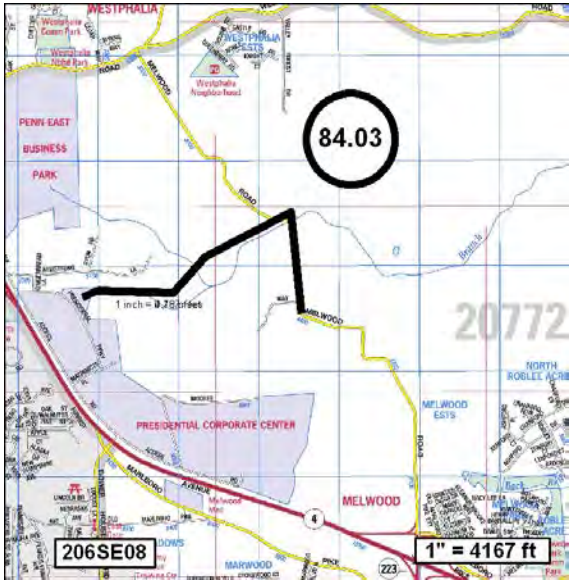
Date First in Program	FY 08
Date First Approved	FY 08
Intial Cost Estimate	1,600
Cost Estimate Last FY	2,549
Present Cost Estimate	2,603
Approved Request Last FY	409
Total Expense & Encumbrances	801
Approval Request Year 1	414

G. Status Information

Land Status	Not Applicable
Project Phase	Construction
Percent Complete	75%
Est Completion Date	Developer Dependent

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Westphalia Town Center Water Main

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-84.04		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Clinton HG385B;
Drainage Basins	
Planning Areas	Westphalia & Vicinity PA 78;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**192**	23	37	**132**	63	45	24				
Land											
Site Improvements & Utilities											
Construction	**1,212**	533		**679**	209	274	196				
Other	**128**		6	**122**	41	48	33				
Total	**1,532**	**556**	**43**	**933**	**313**	**367**	**253**				

C. Funding Schedule (000's)

Contribution/Other	**1,532**	556	43	**933**	313	367	253				

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of 4,700 feet of 16-inch diameter water main to serve Westphalia Town Center and vicinity.

JUSTIFICATION

Westphalia Town Center Hydraulic Planning Analysis (June 2009).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. The expenditure and schedule projections shown in Block B above are based upon information provided by the developer. Design and construction will be performed by the developer under a System Extension Permit. The estimated completion date is developer dependent. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Maryland-National Capital Park & Planning Commission; Prince George's County Department of Permitting Inspection and Enforcement; Prince George's County Government;
Coordinating Projects: W-84.03-Smith Home Farms Water Main;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$122	22
Other Project Costs		
Debt Service		
Total Cost	$122	22
Impact on Water and Sewer Rate		

F. Approval and Expenditure Data (000's)

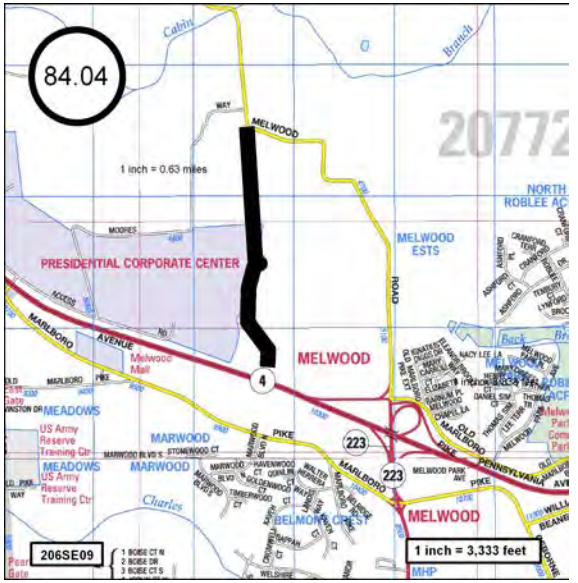
Date First in Program	FY 14
Date First Approved	FY 14
Intial Cost Estimate	1,396
Cost Estimate Last FY	1,497
Present Cost Estimate	1,532
Approved Request Last FY	302
Total Expense & Encumbrances	556
Approval Request Year 1	313

G. Status Information

Land Status	Not Applicable
Project Phase	Construction
Percent Complete	40%
Est Completion Date	Developer Dependent

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Prince George's County 450A Zone Water Main

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-84.05		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Prince George's High HG450A;
Drainage Basins	
Planning Areas	Prince George's County;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**3,708**	1,509	714	**1,485**	595	178	178	178	178	178	
Land											
Site Improvements & Utilities											
Construction	**70,002**			**54,446**		7,778	11,667	11,667	11,667	11,667	15,556
Other	**10,830**		107	**8,390**	89	1,193	1,777	1,777	1,777	1,777	2,333
Total	**84,540**	**1,509**	**821**	**64,321**	**684**	**9,149**	**13,622**	**13,622**	**13,622**	**13,622**	**17,889**

C. Funding Schedule (000's)

WSSC Bonds	**84,540**	1,509	821	**64,321**	684	9,149	13,622	13,622	13,622	13,622	17,889

D. Description & Justification

DESCRIPTION

This project provides for a capacity and alignment study, design, and construction of approximately 3.8 miles of new 48-inch diameter redundant transmission main for Prince George's High Pressure Zone HG450A. Portions of the transmission main that currently serve the HG450A and HG290B Pressure Zones will be out of service almost every year to meet the goals of the PCCP inspection program. A redundant transmission main is required to continue to provide service to our customers while the existing transmission main is planned to be out of service and to provide service in case the existing main fails.

JUSTIFICATION

When portions of the existing main are out of service, the remaining mains lack sufficient capacity and pumping against these restrictions can cause high pressure that may result in pipe failure. The new transmission main may parallel or replace existing mains as determined by modeling. The new main should be a minimum of 30-inch diameter and will start where the existing 54-inch diameter main inside the beltway connects to an existing 30-inch diameter main just north of Pennsylvania Ave. and tie in to the new 30-inch diameter main to be constructed under WSSC project W-34.02-Old Branch Avenue Water Main.

COST CHANGE

Cost estimate increased based on the final selected alignment and preliminary design estimate.

OTHER

The project scope has remained the same. Expenditure and schedule projects shown above are preliminary design level estimates and are expected to change as the project moves through design. An alignment and capacity study has been performed and final alignment and pipeline diameter has been selected. The project is expected to move into final design phase in the next fiscal year. Land costs are included in WSSC Project W-202.00.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Prince George's County Government; Maryland-National Capital Park & Planning Commission; (Mandatory Referral Process); Prince George's County Department of Permitting Inspection and Enforcement; Maryland Department of Natural Resources; Prince George's County Department of Public Works and Transportation; National Park Service; Maryland Historical Trust; U.S. Army Corps of Engineers; Washington Metropolitan Area Transit Authority;
Coordinating Projects: W-34.02-Old Branch Avenue Water Main;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$821	
Other Project Costs		
Debt Service	$5,499	
Total Cost	$6,320	
Impact on Water and Sewer Rate	$0.13	

F. Approval and Expenditure Data (000's)

Date First in Program	FY 13
Date First Approved	FY 13
Intial Cost Estimate	374
Cost Estimate Last FY	40,308
Present Cost Estimate	84,540
Approved Request Last FY	1,609
Total Expense & Encumbrances	1,509
Approval Request Year 1	684

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	Design
Percent Complete	30%
Est Completion Date	FY 2025

Growth	
System Improvement	100%
Environmental Regulation	
Population Served	
Capacity	

H. Map

Konterra Town Center East Water Main

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-93.01		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	P.G. 415A;
Drainage Basins	Northeast Branch Branch 08;
Planning Areas	Northwestern Area PA 60;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**183**	8	74	**101**	7	40	22	32			
Land											
Site Improvements & Utilities											
Construction	**1,197**	35	492	**670**	46	264	147	213			
Other	**201**		85	**116**	8	46	25	37			
Total	**1,581**	**43**	**651**	**887**	**61**	**350**	**194**	**282**			

C. Funding Schedule (000's)

Contribution/Other	**1,581**	43	651	**887**	61	350	194	282			

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of 9,200 feet of 16-inch diameter water main to serve the Konterra Town Center East, located in the area bound by Interstate 95, the Intercounty Connector and Konterra Drive. The sleeve for the water main crossing the Intercounty Connector was built under WSSC Project S-28.18 Konterra Town Center East Sewer.

JUSTIFICATION

Letter of Findings - Hydraulic Planning Analysis (August 29, 2013).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. The expenditures and schedule projections shown in Block B are based upon information provided by the developer. Design and construction will be performed by the developer under a Systems Extension Permit. Estimated completion date is developer dependent. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Prince George's County Government;
Coordinating Projects: S-28.18-Konterra Town Center East Sewer Main;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$238	23
Other Project Costs		
Debt Service		
Total Cost	$238	23
Impact on Water and Sewer Rate	$0.01	23

F. Approval and Expenditure Data (000's)

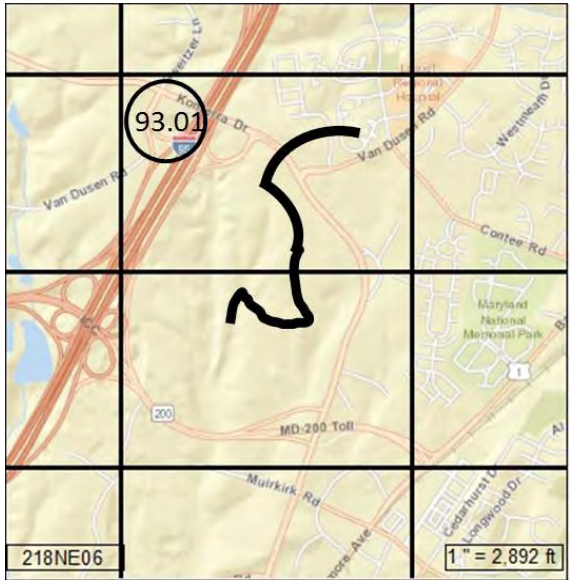
Date First in Program	FY 09
Date First Approved	FY 09
Intial Cost Estimate	610
Cost Estimate Last FY	1,593
Present Cost Estimate	1,581
Approved Request Last FY	61
Total Expense & Encumbrances	43
Approval Request Year 1	61

G. Status Information

Land Status	Not Applicable
Project Phase	Construction
Percent Complete	3%
Est Completion Date	Developer Dependent

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Marlton Section 18 Water Main, Lake Marlton Avenue

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-105.01		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Clinton HG385B;
Drainage Basins	
Planning Areas	Rosaryville PA 82A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**394**	29	1	**364**	44	64	64	64	64	64	
Land											
Site Improvements & Utilities											
Construction	**1,854**			**1,854**	309	309	309	309	309	309	
Other	**333**		0	**333**	53	56	56	56	56	56	
Total	**2,581**	**29**	**1**	**2,551**	**406**	**429**	**429**	**429**	**429**	**429**	

C. Funding Schedule (000's)

Contribution/Other	**2,581**	29	1	**2,551**	406	429	429	429	429	429	

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of 5,400 feet of 16-inch diameter water main to provide service to East Marlton, Section 18, along Heathermore Boulevard and Lake Marlton Avenue.

JUSTIFICATION

East Marlton Hydraulic Planning Analysis (February 2008).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. The expenditures and schedule projections shown in Block B are based upon information provided by the developer. Design and construction will be performed by the developer under a Systems Extension Permit. Estimated completion date is developer dependent. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Prince George's County Government; Maryland-National Capital Park & Planning Commission; Maryland Department of the Environment;
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$140	25
Other Project Costs		
Debt Service		
Total Cost	$140	25
Impact on Water and Sewer Rate		

F. Approval and Expenditure Data (000's)

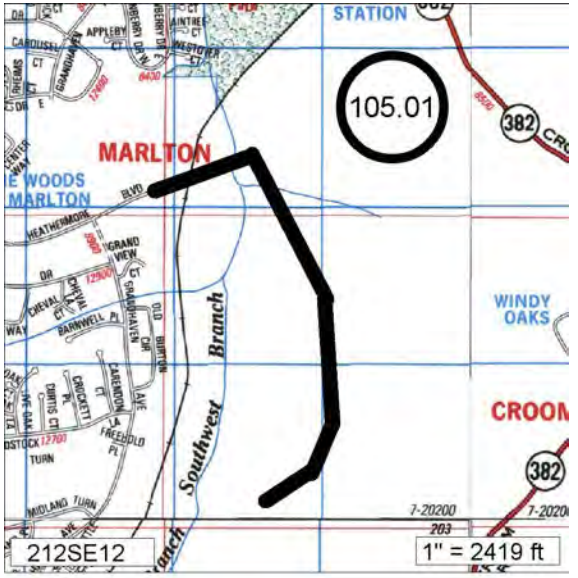
Date First in Program	FY 02
Date First Approved	FY 02
Intial Cost Estimate	398
Cost Estimate Last FY	2,480
Present Cost Estimate	2,581
Approved Request Last FY	386
Total Expense & Encumbrances	29
Approval Request Year 1	406

G. Status Information

Land Status	Not Applicable
Project Phase	Design
Percent Complete	20%
Est Completion Date	Developer Dependent

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Hillmeade Road Water Main

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-111.05		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Bowie HG350E;
Drainage Basins	
Planning Areas	Bowie & Vicinity PA 71A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**1,032**	972	30	**30**	30						
Land	**30**	30									
Site Improvements & Utilities											
Construction	**3,797**		1,500	**2,297**	2,297						
Other	**579**		230	**349**	349						
Total	**5,438**	**1,002**	**1,760**	**2,676**	**2,676**						

C. Funding Schedule (000's)

SDC	**5,438**	1,002	1,760	**2,676**	2,676						

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of approximately 7,300 feet of 24-inch diameter water main along Hillmeade Road from Lanham-Severn Road to an existing 24-inch diameter water main in Hillmeade Road at Daisy Lane.

JUSTIFICATION

The purpose of this project is to provide adequate pressure in response to growth in the Bowie area.

Bowie-Glen Dale Water Storage Facility Plan, O'Brien & Gere Engineers, Inc. (October 1990); Water Resources Planning Section Memorandum dated May 31, 1996; M-NCP&PC Round 6 growth forecasts.

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. Expenditures and schedule projections shown in Block B are design level estimates and may change based upon site-specific conditions and actual bid. This project has been delayed due to outstanding permitting issues. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Prince George's County Government; Maryland-National Capital Park & Planning Commission; AMTRAK; Maryland Department of Natural Resources; Prince George's County Department of Permitting Inspection and Enforcement; U.S. Army Corps of Engineers;

Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$189	20
Other Project Costs		
Debt Service		
Total Cost	$189	20
Impact on Water and Sewer Rate		

F. Approval and Expenditure Data (000's)

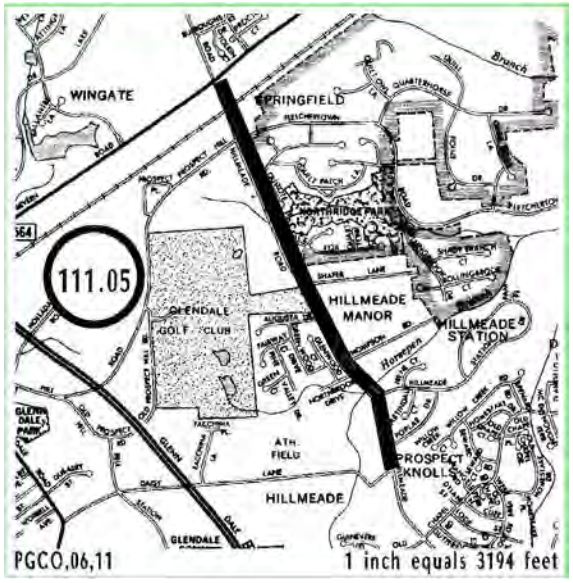
Date First in Program	FY 98
Date First Approved	FY 98
Intial Cost Estimate	1,898
Cost Estimate Last FY	5,698
Present Cost Estimate	5,438
Approved Request Last FY	3,114
Total Expense & Encumbrances	1,002
Approval Request Year 1	2,676

G. Status Information

Land Status	Land acquired
Project Phase	Design
Percent Complete	100%
Est Completion Date	December 2018

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



John Hanson Highway Water Main, Part 1

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-119.01		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Prince George's Main HG320A; Prince
Drainage Basins	
Planning Areas	Collington & Vicinity PA 74B; Largo-

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**1,100**	900	120	**80**	80						
Land											
Site Improvements & Utilities											
Construction	**11,600**	4,625	6,500	**475**	475						
Other	**1,270**	553	662	**55**	55						
Total	**13,970**	**6,078**	**7,282**	**610**	**610**						

C. Funding Schedule (000's)

SDC	**13,970**	6,078	7,282	**610**	610						

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of 9,300 feet of 36-inch diameter water main along John Hanson Highway and Martin Luther King Jr. Highway, from Whitfield Chapel Road to Folly Branch.

JUSTIFICATION

This project will provide service to the growing area of Bowie and to the low pressure area north of Route 50, Prince George's Main Pressure Zone HG320A. This main will provide redundancy to existing and future developments in the Bowie area.
General Plan; M-NCP&PC Round 6.2 growth projections; WSSC Memorandum dated April 7, 1997.

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. The expenditure and schedule projections shown in Block B above are based upon actual bid. The redundancy and water system reliability benefits of this project would be immediate. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Prince George's County Government; Prince George's County Department of Environmental Resources; Maryland Department of the Environment; U.S. Army Corps of Engineers; U.S. Fish and Wildlife Service; Maryland-National Capital Park & Planning Commission; Maryland Department of Natural Resources;
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$241	20
Other Project Costs		
Debt Service		
Total Cost	$241	20
Impact on Water and Sewer Rate	$0.01	20

F. Approval and Expenditure Data (000's)

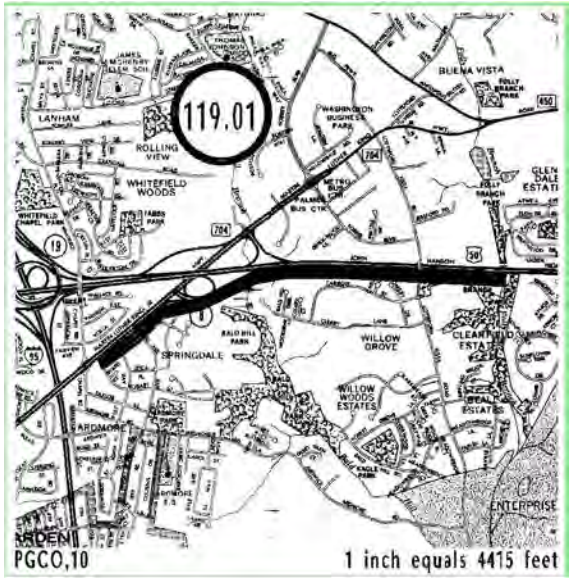
Date First in Program	FY 82
Date First Approved	FY 82
Intial Cost Estimate	675
Cost Estimate Last FY	14,500
Present Cost Estimate	13,970
Approved Request Last FY	6,600
Total Expense & Encumbrances	6,078
Approval Request Year 1	610

G. Status Information

Land Status	Not Applicable
Project Phase	Construction
Percent Complete	30%
Est Completion Date	FY 2019

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Villages of Timothy Water Main, Part 1

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-120.14		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Southern 385B;
Drainage Basins	
Planning Areas	Brandywine & Vicinity PA 85A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**156**	54	80	**22**	22						
Land											
Site Improvements & Utilities											
Construction	**781**		390	**391**	391						
Other	**132**		70	**62**	62						
Total	**1,069**	**54**	**540**	**475**	**475**						

C. Funding Schedule (000's)

Contribution/Other	**1,069**	54	540	**475**	475						

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of 3,800 feet of 16-inch water main to serve the Villages of Timothy project, Part 7.

JUSTIFICATION

Villages of Timothy Hydraulic Planning Analysis (Amended April 2017).

COST CHANGE

The expenditures and schedule have been updated based upon information provided by the developer.

OTHER

The project scope has remained the same. The expenditure and schedule projections shown in Block B above are based upon information provided by the developer. The estimated completion date is developer dependent. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Prince George's County Government;
Coordinating Projects: W-120.15-Villages of Timothy Water Main, Part 2;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$26	20
Other Project Costs		
Debt Service		
Total Cost	$26	20
Impact on Water and Sewer Rate		

F. Approval and Expenditure Data (000's)

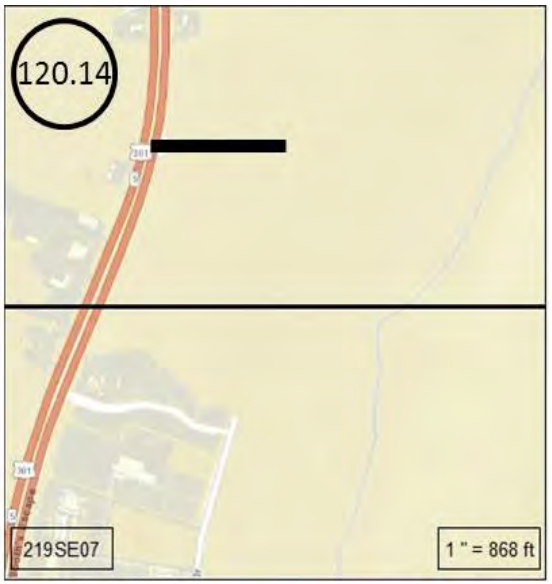
Date First in Program	FY 94
Date First Approved	FY 94
Intial Cost Estimate	176
Cost Estimate Last FY	277
Present Cost Estimate	1,069
Approved Request Last FY	28
Total Expense & Encumbrances	54
Approval Request Year 1	475

G. Status Information

Land Status	Not Applicable
Project Phase	Planning
Percent Complete	100%
Est Completion Date	Developer Dependent

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Villages of Timothy Water Main, Part 2

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-120.15		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Southern 385B;
Drainage Basins	
Planning Areas	Brandywine & Vicinity PA 85A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**49**	18	25	**6**	6						
Land											
Site Improvements & Utilities											
Construction	**247**		123	**124**	124						
Other	**41**		22	**19**	19						
Total	**337**	**18**	**170**	**149**	**149**						

C. Funding Schedule (000's)

Contribution/Other	**337**	18	170	**149**	149						

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of 1,250 feet of 16-inch water main to serve the Villages of Timothy project, Part 6.

JUSTIFICATION

Villages of Timothy Hydraulic Planning Analysis (Amended April 2017).

COST CHANGE

The expenditures and schedule have been updated based upon information provided by the developer.

OTHER

The project scope has remained the same. The expenditure and schedule projections shown in Block B above are based upon information provided by the developer. The estimated completion date is developer dependent. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Prince George's County Government;
Coordinating Projects: W-120.14-Villages of Timothy Water Main, Part 1;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$70	20
Other Project Costs		
Debt Service		
Total Cost	$70	20
Impact on Water and Sewer Rate		

F. Approval and Expenditure Data (000's)

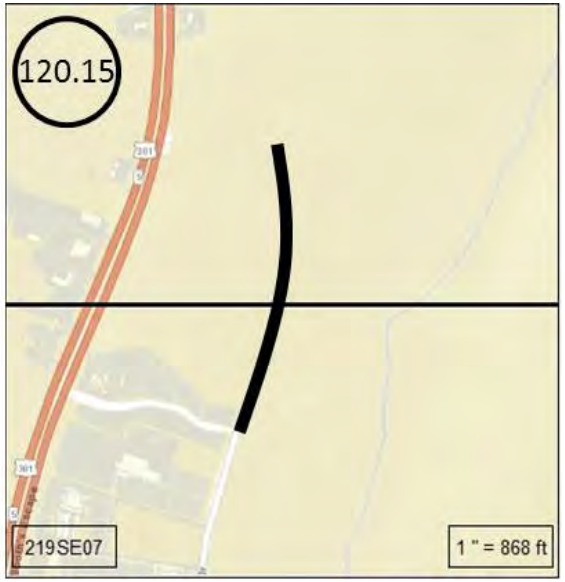
Date First in Program	FY 94
Date First Approved	FY 94
Intial Cost Estimate	159
Cost Estimate Last FY	688
Present Cost Estimate	337
Approved Request Last FY	64
Total Expense & Encumbrances	18
Approval Request Year 1	149

G. Status Information

Land Status	Not Applicable
Project Phase	Planning
Percent Complete	100%
Est Completion Date	Developer Dependent

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Old Marlboro Pike Water Main

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-123.14		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Clinton HG385B;
Drainage Basins	
Planning Areas	Upper Marlboro & Vicinity PA 79;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**233**	189	11	**33**	16	17					
Land											
Site Improvements & Utilities											
Construction	**1,459**	1,080	92	**287**	160	127					
Other	**63**		15	**48**	26	22					
Total	**1,755**	**1,269**	**118**	**368**	**202**	**166**					

C. Funding Schedule (000's)

Contribution/Other	**1,755**	1,269	118	**368**	202	166					

D. Description & Justification

DESCRIPTION

This project provides for the design and construction of approximately 9,000 feet of 16-inch diameter water main along Old Marlboro Pike and on-site at the applicant's property to serve the Addison Property development.

JUSTIFICATION

Old Marlboro Pike Hydraulic Analysis (February 2003). Review of Project #DA3538Z03 for the Addison Property development. Based on Development Services and Planning Group studies, a 16-inch diameter water main was deemed necessary to provide service to the Addison Property development as well as to future development.

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. The expenditure and schedule projections shown in Block B above are based upon information provided by the developer. Design and construction will be performed by the developer under a System Extension Permit. The estimated completion date is developer dependent. No WSSC rate supported debt will be used for this project.

COORDINATION

Coordinating Agencies: Maryland State Highway Administration; Prince George's County Government; Maryland-National Capital Park & Planning Commission; Maryland State Department of Transportation; Prince George's County Department of Permitting Inspection and Enforcement; Prince George's County Department of Environmental Resources;
Coordinating Projects: Not Applicable

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$233	21
Other Project Costs		
Debt Service		
Total Cost	$233	21
Impact on Water and Sewer Rate		

F. Approval and Expenditure Data (000's)

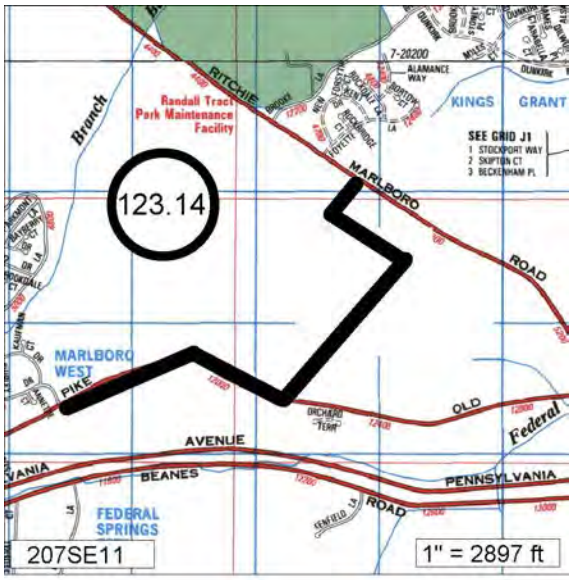
Date First in Program	FY 04
Date First Approved	FY 04
Intial Cost Estimate	800
Cost Estimate Last FY	1,748
Present Cost Estimate	1,755
Approved Request Last FY	202
Total Expense & Encumbrances	1,269
Approval Request Year 1	202

G. Status Information

Land Status	Not Applicable
Project Phase	Construction
Percent Complete	80%
Est Completion Date	Developer Dependent

Growth	100%
System Improvement	
Environmental Regulation	
Population Served	
Capacity	

H. Map



Oak Grove/Leeland Roads Water Main, Part 2

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-123.20		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Prince George's Intermediate HG317A;
Drainage Basins	
Planning Areas	Mitchellville & Vicinity PA 74A;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**2,392**	2,322	60	**10**	10						
Land	**12**	12									
Site Improvements & Utilities											
Construction	**11,808**	7,308	4,300	**200**	200						
Other	**456**		436	**20**	20						
Total	**14,668**	**9,642**	**4,796**	**230**	**230**						

C. Funding Schedule (000's)

WSSC Bonds	**7,334**	4,821	2,398	**115**	115						
SDC	**7,334**	4,821	2,398	**115**	115						

D. Description & Justification

DESCRIPTION

This project provides for the planning, design, and construction of approximately 16,805 feet of 24-inch diameter water main along Oak Grove and Leeland Roads, and 1,240 feet of 16-inch diameter water main in Church Road in the Upper Marlboro Planning Area of Prince George's County.

JUSTIFICATION

The Intermediate & Marlboro Zones Water Storage Facility siting study recommended the placement of 4 million gallons of storage at the Safeway Distribution Center near the intersection of Leeland Road and Route 301 in Prince George's County. Based upon the final site selection, a 24-inch diameter water main along Oak Grove and Leeland Roads will be needed to connect to the new storage facility and provide adequate hydraulic capacity to the Intermediate Pressure Zone HG317A distribution system. This project will also provide a second feed to the Beechtree development west of Route 301 and south of Leeland Road.

Intermediate & Marlboro Zones Water Storage Facility (September 1999).

COST CHANGE

Cost increased based upon actual bid for the B contract.

OTHER

The project scope has remained the same. The expenditure and schedule projections in Block B above are based upon the actual bids for Contract A and Contract B. The project was bid under two separate contracts: Contract A is complete; Contract B was issued Notice to Proceed in February 2017. The B contract will be constructed with WSSC supplied ductile iron pipe.

COORDINATION

Coordinating Agencies: Prince George's County Government; Maryland State Highway Administration;

Coordinating Projects: W-147.00-Collington Elevated Water Storage Facility;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$467	20
Other Project Costs		
Debt Service	$477	20
Total Cost	$944	20
Impact on Water and Sewer Rate	$0.02	20

F. Approval and Expenditure Data (000's)

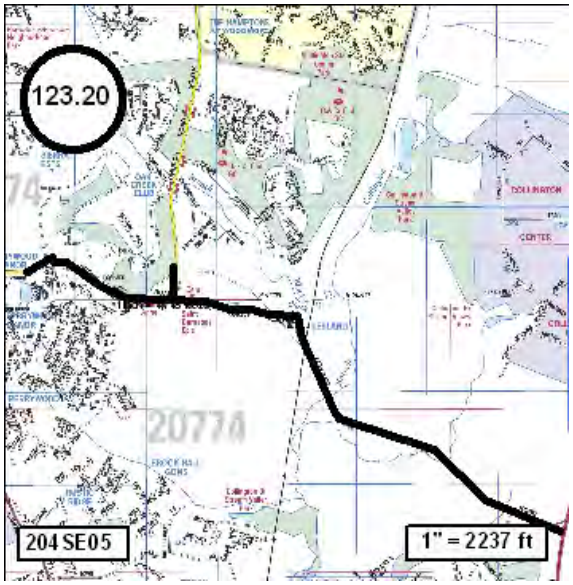
Date First in Program	FY 02
Date First Approved	FY 02
Intial Cost Estimate	4,117
Cost Estimate Last FY	14,444
Present Cost Estimate	14,668
Approved Request Last FY	2,322
Total Expense & Encumbrances	9,642
Approval Request Year 1	230

G. Status Information

Land Status	R/W acquired
Project Phase	Construction
Percent Complete	90%
Est Completion Date	June 2019

Growth	50%
System Improvement	50%
Environmental Regulation	
Population Served	
Capacity	

H. Map



South Potomac Supply Improvement, Phase 2

A. Identification and Coding Information		
Agency Number	Project Number	Update Code
W-137.03		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Rosecroft HG290A; Potamac 290B;
Drainage Basins	
Planning Areas	Henson Creek PA 76B; Henson Creek

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**4,030**	30	1,250	**2,750**	1,500	312	250	250	250	188	
Land											
Site Improvements & Utilities											
Construction	**48,000**	0	0	**48,000**	0	3,000	12,000	12,000	12,000	9,000	
Other	**2,602**		63	**2,539**	75	166	613	613	613	459	
Total	**54,632**	**30**	**1,313**	**53,289**	**1,575**	**3,478**	**12,863**	**12,863**	**12,863**	**9,647**	

C. Funding Schedule (000's)

WSSC Bonds	**36,054**	20	866	**35,168**	1,039	2,295	8,489	8,489	8,489	6,367	
SDC	**18,578**	10	447	**18,121**	536	1,183	4,374	4,374	4,374	3,280	

D. Description & Justification

DESCRIPTION

This project provides for the design and construction of 4.4 miles of 42-inch diameter ductile iron pipe and a new flow control valve vault to replace 3.5 miles of 42-inch diameter PCCP water transmission main in Henson Creek. The new main will be relocated out of Henson Creek and into the roadway along Palmer Road, Tucker Road, and Allentown Road. The project limits are between Indian Head Highway and Temple Hill Road. A parallel distribution main will be constructed to serve residential customers along Palmer, Tucker, and Allentown Roads. Also will include a 10-inch diameter water main replacement along Tucker Rd, an additional Valve, and 500 feet of 42-inch diameter PCCP pipe replacement in Rosecroft area.

JUSTIFICATION

During design of the 42-inch PCCP transmission main replacement under CIP W-137.02, South Potomac Supply Improvement, Phase 1, WSSC and the Maryland Department of the Environment discussed extensive requirements for stream restoration of Henson Creek. At that time, WSSC staff identified up to 3.5 miles of pipe south of the project area that is exposed along eroding stretches of Henson Creek. An alignment study began under CIP W-137.03, South Potomac Supply Improvement, Phase 2, to evaluate possible relocation of the existing 42-inch PCCP main between Rosecroft Drive and Indian Head Highway. The 3.5 miles of PCCP main will be relocated out of Henson Creek and into a roadway alignment between Temple Hill Road and Indian Head Highway, for a total of 4.4 miles of new 42-inch ductile iron pipe. The transmission main will be relocated out of the 290B pressure zone and into the 450A pressure zone. Phase 2 includes the installation of a flow control valve between pressure zones 450A and 290B.

Concept Finalization Report, O'Brien & Gere Engineers Inc. (January 2014); Alignment Study - Final: Henson Creek 42-Inch Water Main Replacement, O'Brien & Gere Engineers Inc. (April 2017).

COST CHANGE

Costs increased due to the addition of a new 10-inch diameter water main replacement along Tucker Rd, an additional Valve, and 500 feet of 42-inch diameter PCCP pipe replacement in Rosecroft area.

OTHER

The project scope has remained the same. The alignment study for Phase 2 was completed in April 2017. Schedule and expenditure projections for Phase 2 are planning level estimates and may change based upon a final evaluation of the recommended alignment, restoration requirements, and other site-specific conditions. Land costs are included in WSSC Project W-202.00

COORDINATION

Coordinating Agencies: Prince George's County Government; Maryland-National Capital Park & Planning Commission; Maryland Department of the Environment; Maryland Department of Natural Resources; Prince George's County Department of Permitting Inspection and Enforcement; U.S. Army Corps of Engineers; Washington Gas Light Company;

Coordinating Projects: W-84.05-Prince George's County 450A Zone Water Main; W-34.02-Old Branch Avenue Water Main; W-137.02-South Potomac Supply Improvement, Phase 1

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance	$602	25
Other Project Costs		
Debt Service	$2,345	25
Total Cost	$2,947	25
Impact on Water and Sewer Rate	$0.06	25

F. Approval and Expenditure Data (000's)

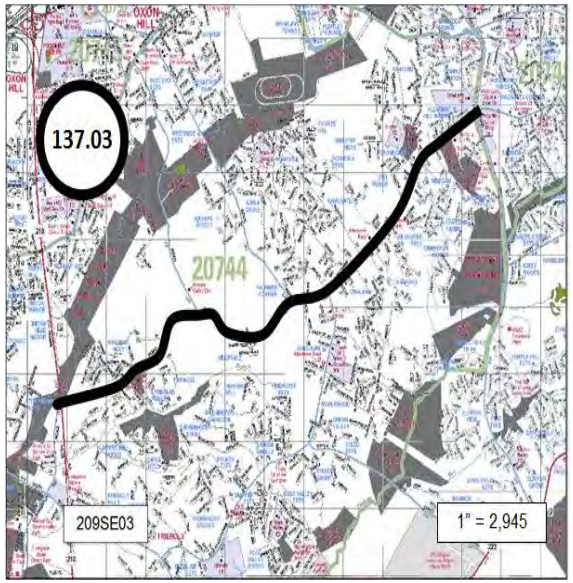
Date First in Program	FY 18
Date First Approved	FY 07
Intial Cost Estimate	53,374
Cost Estimate Last FY	53,374
Present Cost Estimate	54,632
Approved Request Last FY	1,024
Total Expense & Encumbrances	30
Approval Request Year 1	1,575

G. Status Information

Land Status	Land and R/W to be acquired
Project Phase	Design
Percent Complete	30%
Est Completion Date	FY 2024

Growth	34%
System Improvement	66%
Environmental Regulation	
Population Served	
Capacity	

H. Map



Collington Elevated Water Storage Facility

A. Identification and Coding Information

Agency Number	Project Number	Update Code
W-147.00		Change

PDF Date	October 1, 2017
Date Revised	

Pressure Zones	Prince George's Intermediate HG317A;
Drainage Basins	
Planning Areas	Collington & Vicinity PA 74B;

B. Expenditiure Schedule (000's)

Cost Elements	Total	Thru FY'17	Estimate FY'18	Total 6 Years	Year 1 FY'19	Year 2 FY'20	Year 3 FY'21	Year 4 FY'22	Year 5 FY'23	Year 6 FY'24	Beyond 6 Years
Planning, Design & Supervision	**3,143**	3,073	49	**21**	21						
Land	**130**	130									
Site Improvements & Utilities											
Construction	**12,631**	12,331	200	**100**	100						
Other	**38**		25	**13**	13						
Total	**15,942**	**15,534**	**274**	**134**	**134**						

C. Funding Schedule (000's)

WSSC Bonds	**7,971**	7,767	137	**67**	67						
SDC	**7,971**	7,767	137	**67**	67						

D. Description & Justification

DESCRIPTION

This project provides for the site selection, planning, design, and construction of 4 million gallons (MG) of elevated storage to serve the Intermediate Zone. The site selection phase included a Community Outreach Program. A portion of the Safeway Distribution Facility property, at Leeland Road and Route 301, was acquired as the site for the new water storage tanks. This project also includes modifications at the existing Central Avenue Water Pumping Station to add an additional pump and upgrade an existing pump in order to optimize the utilization of the new Collington Tanks and provide redundancy in the affected zones.

JUSTIFICATION

The Prince George's High Zone Facility Plan indicates there is a need to provide up to 4 MG of additional storage to the Intermediate Zone to meet demands to the year 2020. During the siting phase, this project determined the site and size of the new facility.
Prince George's County High Zone Facility Plan (April 1996); Water Storage Volume Criteria Report (November 2005).

COST CHANGE

Not applicable.

OTHER

The project scope has remained the same. The expenditure and schedule projections shown in Block B are based upon actual bid.

COORDINATION

Coordinating Agencies: Prince George's County Government; Maryland-National Capital Park & Planning Commission; City of Bowie;
Coordinating Projects: W-123.20-Oak Grove/Leeland Roads Water Main, Part 2;

E. Annual Operating Budget Impact (000's)

		FY of Impact
Staff		
Maintenance		
Other Project Costs		
Debt Service	$519	20
Total Cost	$519	20
Impact on Water and Sewer Rate	$0.01	20

F. Approval and Expenditure Data (000's)

Date First in Program	FY 98
Date First Approved	FY 98
Intial Cost Estimate	12,536
Cost Estimate Last FY	17,022
Present Cost Estimate	15,942
Approved Request Last FY	134
Total Expense & Encumbrances	15,534
Approval Request Year 1	134

G. Status Information

Land Status	Land acquired
Project Phase	Construction
Percent Complete	95%
Est Completion Date	March 2018

Growth	50%
System Improvement	50%
Environmental Regulation	
Population Served	
Capacity	4.0 MG

H. Map

PROJECTS PENDING CLOSE-OUT

Prince George's Water Projects

(costs in thousands)

Project Number	Agency Number	Project Name	Estimated Total Cost	Expenditures Thru FY'17	Estimated Expenditures FY'18	Remarks
	W-120.16	Villages of Timothy Water Main, Part 3	$0	$0	$0	Project combined with W-120.14 & W-120.15.
	W-137.02	South Potomac Supply Improvement, Phase 1	17,390	16,790	600	Project completion expected in FY'18.
		TOTALS	$17,390	$16,790	$600	

APPENDIX 3-8

PRINCE GEORGE'S COUNTY
APPROVED WATER REUSE FACILITIES

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The following list is comprised of facilities that have been approved for water reuse having met the minimum criteria outlined by the County in Section 3.2.6 of this water and sewer plan.

Public Facilities (Federal, State, County, Municipal – owned)		
Project Name	***Type of non-potable source***	***Proposed Use***
Fairmount Heights High School	Rainwater	Toilet Flushing
WMATA 3433 Pennsy Drive	Rainwater	Toilet Flushing
M-NCPPC Randall Farms Greenhouse 1200 Ritchie Marlboro Road	Rainwater	Irrigation
Laurel Library 507 7th Street Laurel	Rainwater	Irrigation
National Archives & Records Administration (NARA) College Park	Groundwater	Cooling
University of Maryland Physical Sciences Complex Regents Drive, College Park	Groundwater	Toilet Flushing
Private Facilities		
Project Name	***Type of non-potable source***	***Proposed Use***
Alice Ferguson Foundation Bryans Road, Accokeek	Rainwater Groundwater Gray Water	Toilet Flushing & Landscaping
MGM Casino National Harbor	Rainwater	Irrigation & Toilet Flushing
Plumbers Union Local #5 Forbes Blvd, Lanham	Rainwater	Water service for training & Toilet Flushing
Surf N Suds Forestville	Gray Water	Laundry Cleaning
Hotel at UMCP College Park	Rainwater	Irrigation

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