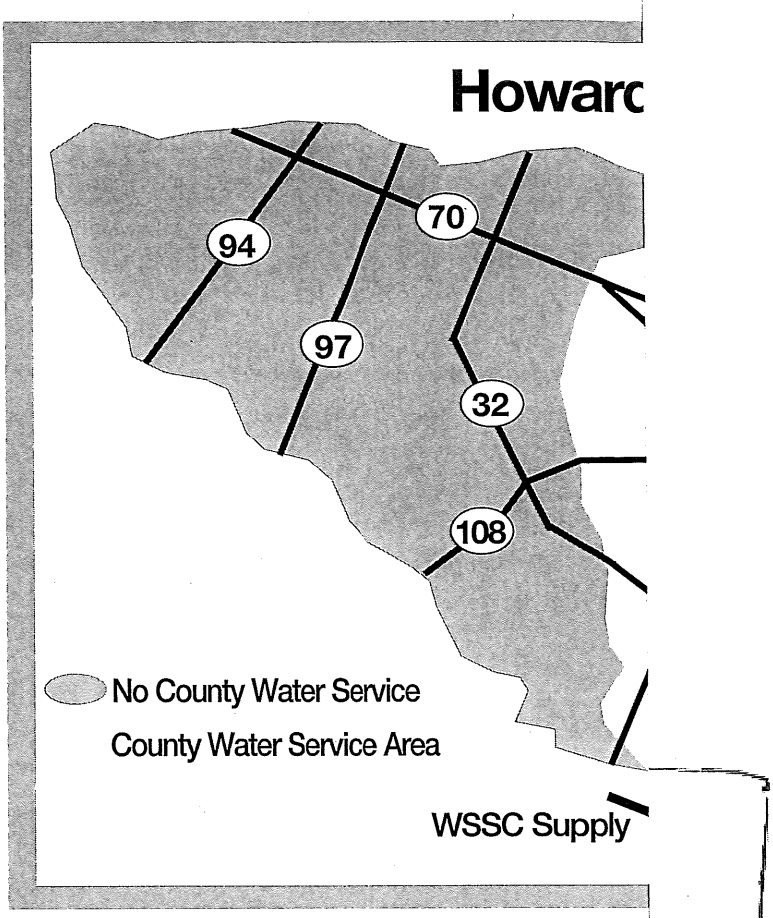
EXHIBIT 5

2014 Water Quality Report &

Water Monitoring Data

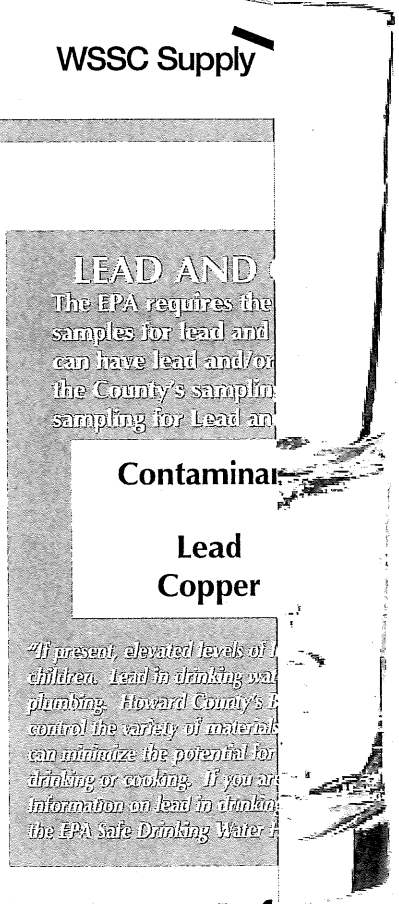


WHERE YOUR WATER COMES FROM

If you live in the North Laurel area, east of Interstate 95 and south of Patuxent Range Road, your water originates from the Washington Suburban Sanitary Commission in Laurel. If you live anywhere else in Howard County and are connected to the public water supply, your water originates from Baltimore City. As a "Consecutive Water System," Howard County purchases water from Baltimore City and the Washington Suburban Sanitary Commission. Most of the analyses are performed at their water quality laboratories. The table inside this brochure shows the results of monitoring for the period of January 1st to December 31st, 2013.

Waivers

Maryland Department of the Environment has granted the City of Baltimore monitoring waivers for the following compounds: 2,3,7,8-TCDD (Dioxin), Endothall, Diquat, Glyphosphate, Asbestos and Cyanide.



For More Inf

If you have any questio
contact Howard County
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410-313-2330 for furthe

Employees at Howard C
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Howard County is pleased to present to you this year's Water Quality Report. This report is designed to inform you about the quality water and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts our water suppliers make to continually improve the water treatment process and protect our water resources. We are committed to ensuring the quality of your water. Our water sources are surface water from the Liberty Reservoir on the North Branch of the Patapsco River, and the Loch Raven Reservoir on the main stream of the Gunpowder Falls purchased from Baltimore City, and surface water from the Patuxent River purchased from the Washington Suburban Sanitary Commission.

CLEAN FRESH WATER

Clean, fresh water is essential to our survival and one of our most precious resources. As consumers, you have the right to be informed about the quality of the water that comes to you through your tap.

This annual Water Quality Report has information about where your water comes from, why we test it and the results of those tests which clearly show that our water is safe.

Protecting Howard County's water supply and maintaining the public water delivery system is a responsibility the men and women of the Bureau of Utilities take very seriously. They do an outstanding job, and I want to thank them for all they do to make sure your water is of the highest quality.

Ken Ulman, Howard County Executive

DEAR VALUED CUSTOMER,

Howard County residents and guests continue to enjoy a high quality drinking water. The employees of Howard County's Bureau of Utilities, Department of Public Works, labor tirelessly to serve you, our customers, as dedicated stewards of this critical service. Our mission is to provide high quality, safe, and dependable drinking water. Our staff works around the clock, through all weather conditions to assure we meet this mission. Increased efforts are continuing to keep our infrastructure and systems upgraded. We hope you find this report informative and reassuring. Please do not hesitate in contacting your Howard County drinking water team at 410-313-4900 for more information. It is a pleasure serving you and please always exercise caution when driving around our crews working in or near traffic.

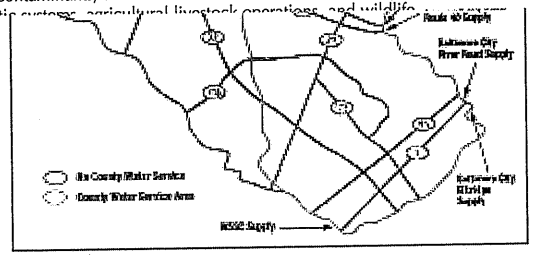
Stephen Gerwin, PE
Chief, Bureau of Utilities

WHY WATER IS TESTED:

All sources of drinking water are subject to potential contamination by substances that are naturally occurring or man made. These substances can be microbes, inorganic or organic chemicals and radioactive substances. As water travels over the land or underground, it can pick up substances or contaminants such as microbes, inorganic and organic chemicals, and radioactive substances. All drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment [illegible]



TEST RESULTS – HOWARD COUNTY - PSWID 0130002

Contaminant	Violation Y/N	Level Detected	Range	MCLG	MCL	Likely Source of Contamination
Microbiological Contaminants						
Total Coliform Bacteria	N	0.32%	0.0–1.30%	0	presence of coliform bacteria in 5% of monthly samples	Naturally present in the environment
Fecal Coliform and *E.coli*	N	ND	0	0	a routine sample and repeat sample are total coliform positive, and one is also fecal coliform or *E.coli* positive	Human and animal fecal waste

TEST RESULTS – OUR SUPPLIERS

	Baltimore City Supply				Washington Suburban Sanitary Commission Supply				
	Ashburton Plant		Montebello Plant						
[illegible] ppb	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	dry cleaners
1,2,4-Trichlorobenzene - ppb	N	<0.5	N	<0.5	N	ND	70	70	Discharge from textile-finishing factories
1,1,1 – Trichloroethane - ppb	N	<0.5	N	<0.5	N	ND	200	200	Discharge from metal degreasing sites and other factories
1,1,2 – Trichloroethane - ppb	N	<0.5	N	<0.5	N	ND	3	5	Discharge from industrial chemical factories
Trichloroethene – ppb	N	<0.5	N	<0.5	N	ND	0	5	Discharge from metal degreasing sites and other factories
TTHM - ppb [Total trihalomethanes]	N	42.0	N	45.0	N	61.3	0	80	By-product of drinking water chlorination
Vinyl Chloride - ppb	N	<0.5	N	<0.5	N	ND	0	2	Leaching from PVC piping; discharge from plastics factories
Toluene - ppb	N	<0.5	N	<0.5	N	ND	1000	1000	Discharge from petroleum factories
Xylenes - ppb	N	<0.5	N	<0.5	N	ND	10000	10000	Discharge from petroleum factories; discharge from chemical factories

HOWARD COUNTY DRINKING WATER QUALITY MONITORING PROGRAM

NAME	WATER QUALITY PARAMETER	APPLICABLE REGULATION	MONITORING PERIOD	SAMPLE LOCATION(S)	MONITORING REPORT DUE DATE	CURRENT MONITORING PERIOD	CURRENT LEVEL DETECTED	MCLG	MCL
Physical Constituents									
Point of Entry Water Quality	pH	Lead & Copper Rule	JUL-DEC; JAN-JUN: permanent	Entry points: Elibank PS, River Rd FH, Rt 40 PS, All Saints PS	January 10 and July 10, each year	Jul-Dec 2014	7.4 - 8.5	NR	
	Alkalinity						30 - 47 ppm	NR	NR
	Calcium						N/A	NR	NR
Distribution Water Quality	pH	Lead & Copper Rule	Quarterly JAN-DEC: 2 samples per site, 1 acid, 1 plain collected at least 2 weeks apart, ideally every 6 months: permanent	10 distribution sites (selected from original 50) + 4 POE (14 sites, 28 bottles)	January 10 and July 10, each year	Jul-Dec 2014	7.3 - 8.6		
	Alkalinity						27 - 41 ppm	NR	NR
	Calcium						16.5 - 23.6 ppm	NR	NR
Inorganic Contaminants									
Lead & Copper	Lead	Lead & Copper Rule	JUN, JUL, AUG,SEP only: due in 2014	50 Tier One homes (selected from prior sample sites if possible)	October 10	June-September 2014 54 Single family customers	90th percentile= 2.2 ppb	0 ppb	AL= 15 ppb
	Copper						90th percentile= 0.100 ppm	1.3 ppm	AL= 1.3 ppm
Microbiological Contaminants									
Bacterio-logical Quality	pH	SDWA	Monthly JAN-DEC: permanent	150 routine sample sites based on population	10th of each month	Monthly sampling, Nov 2014-Apr 2015	--	NR	
	Chlorine						0.05 to 1.60 ppm	4.0 ppm	4.0 ppm
	Total Coliforms						0 positive	0	Less than 5% of samples
	Fecal Coliforms			Samples that are total coliform positive			None	0	0

HOWARD COUNTY DRINKING WATER QUALITY MONITORING PROGRAM

NAME	WATER QUALITY PARAMETER	APPLICABLE REGULATION	MONITORING PERIOD	SAMPLE LOCATION(S)	MONITORING REPORT DUE DATE	CURRENT MONITORING PERIOD	CURRENT LEVEL DETECTED	MCLG	MCL
Volatile Organic Compounds									
Disinfection By-Products	Haloacetic acids (HAA5)	IESWTR	JAN-MAR, APR-JUN, JUL-SEP, OCT-DEC:	End of system for each water supplier's treatment plant	April 10th July 10th October 10th January 10th	Oct-Dec 2014	28 - 54 ppb	0 ppb	60 ppb
Disinfection By-Products	Trihalomethanes (THM)	IESWTR	JAN-DEC:	End of system for each water supplier's treatment plant	April 10th July 10th October 10th January 10th	Oct-Dec 2014	22.4 - 58.8 ppb	0 ppb	80 ppb
Consumer Confidence Reporting Requirements									
Consumer Confidence Report	Consumer Confidence Report	SDWA	JAN-DEC: permanent	Results provided by water suppliers, except Bacteriogical and Lead	July 1				
Consumer Confidence Report	Delivery Confirmation Form	SDWA	JAN-DEC: permanent	NA	October 1				

Notes: AL= Action level, MCLG= Maximum Contaminant Level Goal, MCL= Maximum Contaminant Level, ppb= parts per billion, ppm= parts per million, NR= Not Regulated

EXHIBIT 6

Baltimore County &

Howard County Sewer Agreement

SEWERAGE AGREEMENT
BETWEEN BALTIMORE COUNTY AND HOWARD COUNTY

MAY 6, 1963

THIS AGREEMENT, made this 6th day of May, 1963, by and between Baltimore County, Maryland, a municipal corporation, hereinafter called "Baltimore County", and the Howard COUNTY METROPOLITAN COMMISSION, hereinafter called "Howard County".

WHEREAS, Howard County proposes to construct a sewerage system in that part of the Patapsco River Drainage Area lying within Howard County and also to construct a sewerage system in that portion of the Little Patuxent Drainage Area upstream from Oakland Mills as shown on a map prepared by Whitman, Requardt and Associates dated September 28, 1959 and also referred to in a letter dated October 15, 1959 from Bernard L. Werner, Director of Public Works of Baltimore City, to the Chairman of the Howard County Metropolitan Commission; and

WHEREAS, said Baltimore County and Howard County are desirous of entering into an agreement to construct the Patapsco River interceptor beginning at the confluence of Herbert Run and Patapsco River and running upstream to the confluence of Sucker Branch and said Patapsco River for the purpose of conveying sewage originating in said counties through the said interceptor and thence downstream from said Herbert Run to the facilities of Baltimore City for the eventual disposal thereof;

WHEREAS, the said parties have agreed hereto that the capital cost and other charges and expenses in connection therewith shall be apportioned among them as follows:

NOW, THEREFORE, THIS AGREEMENT WITNESSETH, that in consideration of the premises and mutual benefits accruing to each of the parties hereto, they agree and covenenant one with the other as follows:

BALTIMORE COUNTY AGREES:

ITEM 1. To award a contract for the construction of a 54-inch interceptor adjacent to the Patapsco River from the vicinity of the terminus of the existing Patapsco River interceptor at Herbert Run upstream to a point sufficiently far to permit Howard County to connect its Deep Run interceptor, which distance is approximately 4,600 feet, and to furnish Howard County with an itemized statement of the cost thereof, which said total cost will be paid one-half by said Howard County and one-half by said Baltimore County. The money is to be paid by said Howard County upon the completion thereof.

ITEM 2. That the said Baltimore County will undertake the construction, as soon as practicable, of the interceptor from its terminus as set forth in the preceding paragraph upstream to the confluence of Oak Forest Branch and the said Patapsco River, said interceptor to be 42 & 48 inch in diameter, and Howard County agrees to pay to said Baltimore County upon the completion thereof that portion of the cost as determined by the ratio of Howard County's 10 mgd capacity to the total capacity of the constructed interceptor.

HOWARD COUNTY AGREES:

ITEM 3. To award a contract for the construction of an interceptor 42 inch in diameter to convey sewage originating in Baltimore County and Howard County from the confluence of Sucker Branch and Patapsco River to a point in Baltimore County approximately 3,500 feet downstream from Ellicott City and to furnish Baltimore County with an itemized statement of the cost thereof which shall be apportioned between said Counties as follows: Howard County's share would be based on the same ratio as set forth in Item 2 above, that is, the ratio 10 mgd bears to the total capacity of the interceptor, and Baltimore County's share shall be the remainder. The money is to be paid by said Baltimore County upon the completion thereof.

ITEM 4. To award a contract for the construction of a temporary sewage treatment plant to be located at the terminus downstream of the interceptor described in the preceding paragraph, and to furnish Baltimore County with an itemized statement of the cost thereof, which said cost should be apportioned at the same ratio as set forth in the preceding paragraph and shall be reimbursed to Howard County upon completion thereof.

ITEM 5. To undertake, at a time mutually agreed upon, the construction of a 42 inch interceptor beginning at the confluence of Oak Forest Branch and the Patapsco River to the said treatment plant referred to in the preceding paragraph, the cost thereof to be apportioned on the same basis as set forth in Item 3 hereof, which said moneys are to be reimbursed to Howard County by said Baltimore County upon completion thereof.

ITEM 6. Howard County agrees to pay Baltimore County the cost of operation and and maintenance of the said Patapsco River interceptor and pumping facilities in said Baltimore County and to reimburse Baltimore County for the operation and maintenance costs of Baltimore City's system, said reimbursement to be at the same rate that Baltimore County pays to Baltimore City. The amount of Howard County's share of said cost will be determined by the volume of sewage flowing through the various metering devices located in Howared County at the points of discharge of Howard County interceptors into the said Patapsco Interceptor.

ITEM 7. To reimburse Baltimore County for the operation and maintenance of said temporary sewage treatment plant located as above. Reimbursement to Baltimore County will be based upon the ratio of the actual sewage flows as measured by the metering device located in Howard County at the points of discharge of Howard County's Sucker Branch interceptor and Tiber Branch interceptor into the said Patapsco interceptor to the total flow in the said Patapsco interceptor into the temporary sewage treatment plant.

ITEM 8. It is mutually understood and agreed by the parties hereto that Howard County's capacity in the permanent facilities above mentioned upstream from the connection of the Deep Run interceptor with the said Patapsco River interceptor is an average daily flow of 5.0 mgd and a peak flow of 10.0 mgd. It is also mutually understood and agreed by the parties hereto that Howard County's flow downstream from the said Deep Run interceptor will be an estimated 10.0 mgd average daily flow and 20.0 peak flow and that the interceptors, pumping stations and treatment facilities at both Baltimore County and Baltimore City will provide these capacities for Howard County.

ITEM 9. At such time as Howard County transmits a volume of sewage through the Patapsco Pumping Station and Force Main system owned and operated by Baltimore County, Howard County will be responsible for debt service charges on the jointly used system. The appropriate debt service charge shall apply to the unamortized cost of the facilities and shall be computed by the ratio which the annual sewage flow from Howard County bears to the total annual sewage flow through the jointly used facility.

ITEM 10. Whenever it shall be necessary to enlarge existing facilities, construct or install any addition to the sewerage system under the supervision of Baltimore County or Baltimore City, which receive, transmit, pump, treat and/or dispose of sewage from Howard County, debt service will be payable to Baltimore County in the same ratio that the designed ultimate capacity allotted to Howard County bears to the total designed ultimate capacity allotted to serve all the parties through the jointly used facility.

IN WITNESS WHEREOF, the parties hereto have properly executed this Agreement, as of the day, month and year first above written.

ATTEST:

s/William A. Badger

s/Albert E. Kaltenbach
ALBERT E. KALTENBACH
Director, Department of Public Works

ATTEST:

BALTIMORE COUNTY, MARYLAND

s/ Ormsby S. Moore

By: s/Spiro T. Agnew
SPIRO T. AGNEW
County Executive

Approved as to Form and Legal Sufficiency
this 3rd day of May, 1963:

s/ Harry S. Shapiro
Asst. County Solicitor

ATTEST:

HOWARD COUNTY METROPOLITAN COMMISSION

s/Evelyn G. Meyer

By: s/Roger N. Laynor
Chairman

Approved as to Form and Legal Sufficiency
this 14th day of February, 1963:

s/LeRoy C. Moser
Member

s/
Counsel for the Commission

s/J.C. Jenkins
Member

s/David W. Force
County Commissioner Member

MODIFICATION OF JUNE 6, 1963 AGREEMENT

FEBRUARY 28, 1964

THIS MODIFICATION OF AGREEMENT is made this 28th day of February, 1964 by and between BALTIMORE COUNTY, MARYLAND, a municipal corporation, hereinafter called "Baltimore County", and the HOWARD COUNTY METROPOLITAN COMMISSION, hereinafter called "Howard County", to facilitate the early construction of the Patapsco River interceptor as outlined in Item 1 of the Agreement dated 6th day of May, 1963 by and between Baltimore County and Howard County.

MODIFICATION OF ITEM 1: To allow Howard County, subject to Baltimore County approval, to award the contact for the construction of the 54-inch interceptor adjacent to the Patapsco River from the vicinity of the terminus of the existing Patapsco River interceptor at Herbert Run upstream to a point sufficiently far to permit Howard County to connect its Deep Run interceptor, which distance is approximately 4,600 feet. The total cost of the interceptor will be paid one-half by said Howard County and one-half by said Baltimore County. Baltimore County will pay said Howard County during the period of construction of the interceptor said Baltimore County's share of the cost upon receipt of monthly requisitions from said Howard County.

ATTEST:

s/Edgar J. DeMoss

s/Albert B. Kaltenbach
ALBERT B. KALTENBACH
Director, Department of Public Works

s/ Ormsby S. Moore

By: s/Spiro T. Agnew
SPIRO T. AGNEW
County Executive
Baltimore County, Maryland

Approved as to Form and Legal Sufficiency
this 27th day of February, 1964:

APPROVED
BALTIMORE COUNTY EXECUTIVE BOARD

s/ Harry S. Shapiro
Asst. County Solicitor

FEB 18 1964 s/

ATTEST:
s/Evelyn G. Meyer

HOWARD COUNTY METROPOLITAN COMMISSION
By: s/Roger N. Laynor
Chairman

Approved as to Form and Legal Sufficiency
this 22nd day of February , 1964

s/
Member

s/Robert E. Wieder
Counsel for the Commission

s/

APPROVED
BALTIMORE COUNTY EXECUTIVE BOARD
FEB 18 1964

SEWERAGE AGREEMENT
BETWEEN BALTIMORE COUNTY AND HOWARD COUNTY

AUGUST 2, 1968

THIS AGREEMENT, made this second day of August, 1968, by and between Baltimore County, Maryland, a municipal corporation, hereinafter called "Baltimore County", and the Howard COUNTY METROPOLITAN COMMISSION, a body corporate and politic, hereinafter called "Howard County", revises the Agreement made May 6, 1963, and subsequent modification thereto dated February 28, 1964, with the exception of work that was completed prior to the date of this Agreement.

WHEREAS, Howard County proposes to construct a sewerage system in that part of the Patapsco River Drainage Area lying within Howard County and also to construct a sewerage system in that portion of the Little Patuxent Drainage Area upstream from Oakland Mills as shown on a map prepared by Whitman, Requardt and Associates dated September 28, 1959 and also referred to in a letter dated October 15, 1959 from Bernard L. Werner, Director of Public Works of Baltimore City, to the Chairman of the Howard County Metropolitan Commission; and

WHEREAS, said Baltimore County and Howard County are desirous of entering into an agreement to construct the Patapsco River Interceptor beginning at the confluence of Herbert Run and Patapsco River and running upstream to the confluence of Sucker Branch and said Patapsco River for the purpose of conveying sewage originating in said counties through the said interceptor and thence downstream from said Herbert Run to the facilities of Baltimore City for the eventual disposal thereof;

WHEREAS, Howard County is the applicant for all State and Fedral grants available to both parties hereto for the said interceptor and said parties agree to share said State and Federal grants determined by the ratio of the design capacity for each county to the total design capacity for both counties. In each contract Baltimore County and Howard County will initially provide sufficient local funds to cover the cost of the entire project in proportion to their ultimate responsibilities. As grants are received by Howard County, Howard County will remit to Baltimore County the Baltimore County share of the grants.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH, that in consideration of the premises and mutual benefits accruing to each of the parties hereto, they agree to and covenenant one with the other as follows:

ITEM 1. Howard County agrees to solicit bids for and award the contract for the construction of the interceptor from its present terminus approximately 200 feet north of Deep Creek upstream to the confluence of Oak Forest Branch and the said Patapsco River; said interceptor to be 48-inches and 54-inches in diameter. Administrative, legal and engineering services for the design and construction of this portion of the interceptor will be furnished to Howard County by Baltimore County. The cost to be pro-rated in accordance with the designed capacities as set forth below:

a) Oak Forest Branch to Dairy Branch (Santee Branch) the design capacity for Howard County is 12.0 mgd and for Baltimore County 27.6 mgd.

b) Dairy Branch (Santee Branch) to Bull Branch, the design capacity for Howard County is 12.0 mgd and 29.4 mgd for Baltimore County.

c) Bull Branch to Stillhouse Run, the design capacity for Howard County is 13.0 mgd and for Baltimore County 30.8 mgd.

d) Stillhouse Run to a point approximately 200' north of Deep Creek the design capacity for Howard County is 13.0 mgd and for Baltimore County 31.5 mgd.

ITEM 2. Howard County agrees to undertake at a time mutually agreed upon the construction of a 42-inch interceptor beginning at the confluence of Oak Forest Branch and Patapsco River and extending to the temporary treatment plant located approximately 3,000 feet south of the Tiber Branch. The total cost shall be apportioned in accordance with the design capacities noted below:

a) From the treatment plant to Thistle Branch, the design capacity for Howard County is 12.0 mgd and for Baltimore County 25.9 mgd.

b) Thistle Branch to Oak Forest Branch, the design capacity for Howard County is 12.0 mgd and for Baltimore County 26.0 mgd.

ITEM 3. Howard County agrees to pay Baltimore County upon invoicing the cost of operation and maintenance of the said Patapsco River interceptor and pumping facilities in said Baltimore County and to reimburse Baltimore County for the operation and maintenance costs of Baltimore City's system, said reimbursement to be at the same rate as that in effect at the time Baltimore City bills Baltimore County. The amount of Howard County's share of above said costs will be determined by the volume of sewage flowing through the various metering devices located in Howard County at the points of discharge of Howard County interceptors into the said Patapsco interceptor.

ITEM 4. It is mutually understood and agreed by the parties hereto that Howard County's previously set forth capacities in the permanent facilities above mentioned upstream from the connection with the Deep Run interceptor with the said Patapsco River interceptor shall be provided for in the interceptors, pumping stations and treatment facilities of both Baltimore County and Baltimore City.

ITEM 5. At such time as Howard County transmits a volume of sewage through the existing Patapsco Pumping Station and Force Main system owned and operated by Baltimore County, Howard County will be responsible for debt service charges on the jointly used system. The appropriate debt service charge shall apply to the unamortized cost of the facilities and shall be computed by the ratio which the annual sewage flow from Howard County bears to the total annual sewage flow through the jointly used facility.

ITEM 6. Whenever it shall be necessary to enlarge existing facilities, construct or install any addition to the sewerage system under the supervision of Baltimore County or Baltimore City, which receive, transmit, pump, treat and/or dispose of sewage from Howard County, debt service will be payable to Baltimore County in the same ratio that the designed ultimate capacity allotted to Howard County bears to the total designed ultimate capacity allotted to srve all the parties through the jointly used facility.

IN WITNESS WHEREOF, the parties hereto have properly executed this Agreement as of the day, month and year first above written.

ATTEST:

s/Thornton M. Mouring

s/Albert B. Kaltenbach
ALBERT B. KALTENBACH
Director, Department of Public Works

ATTEST:

s/Edward J. Jones

BALTIMORE COUNTY, MARYLAND

s/William Fornoff 8-2-68
for DALE ANDERSON, County Executive

Approved as to Form and Legal Sufficiency
this 31st day of July, 1968

s/
County Solicitor

ATTEST:

s/
Acting Secretary-Treasurer

HOWARD COUNTY METROPOLITAN COMMISSION

s/J. Calvin Voris
J. CALVIN VORIS, Chairman

Approved as to Form and Legal Sufficiency
this 23rd day of July, 1968

s/Robert E. Wieder
Counsel for the Commission

s/
Member

s/

BOARD OF COUNTY COMMISSIONERS OF
HOWARD COUNTY

s/Harry T. Murphy
Chairman

s/
Member

s/
Member

SEWERAGE AGREEMENT

BALTIMORE COUNTY AND HOWARD COUNTY

JUNE 4, 1979

THIS AGREEMENT, made this 4th day of June, 1979, by and between BALTIMORE COUNTY, MARYLAND, hereinafter referred to as the FIRST PARTY, and HOWARD COUNTY, MARYLAND, hereinafter referred to as the SECOND PARTY, each of said Parties a body corporate and politic of the State of Maryland.

WHEREAS, the First and Second Parties entered into agreements dated May 6, 1963 and August 2, 1968 providing for discharge of sewage from certain sewerage systems of Second Party into certain sewerage systems of the First Party; and

WHEREAS, the First Party has entered into agreements with Baltimore City for the disposal of sewage; and

WHEREAS, there have been substantial increases in population, volume of sewage, operation and maintenance costs, and costs of construction of jointly-used facilities since the agreements were executed on May 6, 1963 and August 2, 1968, and the Parties thereto desire to update said Agreements; and

WHEREAS, it is the intent of the parties hereto that the sewerage system of the First Party shall continue to receive sewage from the Second Party and that a method for the computation and payment of costs incurred by the First Party for construction of jointly-used facilities and for collection, transmission and disposal of sewage from the Second Party be established;

NOW, THEREFORE, THIS AGREEMENT WITNESSETH:

THAT IN CONSIDERATION of the covenants, agreements and payments hereinafter set forth, it is mutually convenanted and agreed as follows:

ARTICLE I, DEFINITIONS

A. "Capital Expenditure" is hereby defined as the net costs involved in the construction and/or installation of any sewerage facility and shall include, but not be limited to, the sum of the following items; Land and/or easements, consultants' fees, material, labor, utility relocations, overhead which may include a proportionate allocation of in-house costs associated with design, field engineering, surveys, borings, materials testing, maps and record maintenance, inspection, right-of-way expenses, advertising, administrative, clerical, and stenographic services, office space use and building operation and maintenance; and all other contributing costs or expenses. Capital expenditures shall be exclusive of grants from the Federal Government, the State of Maryland, or any capital contributions by others than the parties to this Agreement. For the purposes of this Agreement, capital expenditure shall also mean any cash contribution by the First Party to Baltimore City for the construction and/or improvement of a City-owned jointly-used facility.

B. "City" is hereby defined as the City of Baltimore, Maryland.

C. "Debt Service" is hereby defined as the sum of interest and principle for a specific capital expenditure.

D. "Design Flow Method" is a method of cost allocation determined from a tabulation of the projected volume of sewage to be contributed by each party to this Agreement that was used to design the proposed jointly-used facility. Ratios of cost responsibility of

additional facilities, including the addition of secondary and advanced waste treatment, are developed by dividing capacity allocated to each party having a beneficial interest by the projected total designed capacity allocated to all beneficially interested. Ratios of cost responsibility for the expansion of existing facilities are developed by dividing the increase in flow projected for each beneficially interested party to the design year by the total increase in flow projected to the design year for all beneficially interested parties.

E. "Director" shall mean the Director of Public Works of either the First or Second Parties, or their duly authorized representatives or agents.

F. "Facility" for the purpose of this Agreement shall mean any installation, including real and personal property, that is used or useful for the purpose of receiving, transmitting, pumping, treating and/or disposing of sewage or sludge.

G. "Jointly-used Facility" is hereby defined as any facility that receives, transmits, pumps, treats, and/or disposes of the sewage from both parties to this Agreement.

H. "Major Repair and/or Rehabilitation" is hereby defined as any restoration of a facility which does not increase the capacity of the facility and which is not considered a routine maintenance item.

J. "Sanitary Sewer" is a pipe or conduit, the specific purpose of which is to carry waste water as defined below.

K. "Purchase Design Capacity" of a jointly-used facility is hereby defined as that portion of the total design capacity of a jointly-used facility that the principal payments of either or both parties bear to the total capital expenditures for construction, improvements, and/or installation of said facility.

L. "Waste Water or Sewage" consists of the water-carried waste discharged from the dwellings, governmental and commercial business buildings, institutions and industrial establishments, together with industrial wastes, surface and sub-surface waters and storm waters which may be present.

M. "Storm Water" is excess water running off from the surface of a drainage area during and immediately following rainfall, snowfall, or other meteorological precipitation.

N. "Storm Drain" is a drain through which storm water, storm run-off, condensate, cooling water, street wash and other wash waters or drainage flow and from which waste water is excluded.

O. "Subsurface Water" is water that occurs in the lithosphere. It comprises suspended water and ground water.

P. "Surface Water" is water that rests on or flows over the surface of the lithosphere.

Q. "Volumetric Method" is a method determined by an annual calculation of the volume of sewage contributed by each party to this Agreement to each jointly-used facility. Ratios of cost responsibility are developed by dividing the volume of sewage contributed by each Party to this Agreement to the total volume of sewage that is received, transmitted, pumped, treated and/or disposed of by each jointly-used facility.

R. "Constructed and/or improved" is hereby defined as any construction or improvement, which increases the designed capacity of the facility.

ARTICLE II. RIGHTS OF EITHER PARTY NOT TO BE ABROGATED

A. Nothing in this Agreement shall limit or abrogate any right or rights delegated to either Party by Acts of the General Assembly of the State of Maryland.

B. It is further understood and agreed that the police, legislative and governmental power of either Party are in no sense attempted to be abridged or restricted by this Agreement.

C. Each Party hereto agrees to recognize all rights and privileges acquired by acquisition of property and/or rights-of-way, each from the other and/or from other parties.

ARTICLE III. RIGHT OF REVIEW

The Second Party shall, upon request, have the right to review reports, plans, bids and financing for major repairs and/or rehabilitation and construction and/or improvement of any jointly-used facility owned or operated by the First Party.

Any costs associated with said review shall be borne exclusively by the reviewing party.

Nothing in this Agreement shall limit or abrogate any right or rights of either Party to enter into other separate agreements for the planning, designing and constructing of sewerage facilities, one with the other or with other parties, providing such separate agreements do not conflict with or serve to negate prior agreements made between the two parties to this agreement.

ARTICLE IV. LIMITATION OF TERRITORY

This Agreement applies only to that portion of Howard County which is served or will be served by the Baltimore County Patapsco Pumping Station.

ARTICLE V. CONNECTIONS TO SEWERAGE SYSTEM

A. The sanitary sewers of the Second Party shall be connected with the jointly-used facilities of the First Party only at such points and as may be agreed to in writing.

B. The Second Party shall notify the First Party in writing at least five (5) days before making any connection to the jointly-used facilities of the First Party so as to allow the inspection of construction of said connections at the site of said work.

C. At no time may the First or Second Party's use of a jointly-used facility exceed their respective purchased design capacity, as between the parties hereto, of said facility without the expressed written permission of the other Party.

D. The Second Party's Director shall transmit to the First Party's Director, not later than November 1 of each year, projections of flows from the Second Party to the First Party by point of entry. Based upon said projections, the respective Directors shall prepare a Six Year Capital Improvement Program designed to accommodate the projected flows in the jointly-used facilities. The Director of the First Party shall transmit to the Director of the Second Party, by November 1 of each year, a listing of expected major repairs and/or rehabilitations and respective Directors shall prepare a schedule of such work and include their respective cost sharing in the adopted Fiscal Budget.

E. Upon approval of the annual budget, the Directors shall notify their counterparts of those system facilities that have been included in the officially adopted Capital Improvement Program and shall also provide data by years on flows to be accommodated at each point of entry and capacities to be made available for the Second Party's flows, all

predicated upon the completion of such improvements. Each such annual notification will be deemed to supercede all prior such notifications and shall be binding for the ensuing period.

F. At least bi-monthly the Second Party shall forward to the Director of the First Party, a listing of allowed individual connections which admit flows into the sewerage system of the First Party. The list shall include connection locations and anticipated average and peak flows along with any seasonal variations.

G. The parties to this Agreement do hereby acknowledge the statutory responsibility of the State Department of Health and Mental Hygiene in reference to the adequacy of the jointly-used facilities and agree to submit any disputes concerning the physical aspects of the facilities to said Department for adjudication.

ARTICLE VI. STORM WATER, SURFACE WATER AND OTHER MATERIALS NOT TO BE DISCHARGED INTO SANITARY SEWERS

A. Storm water, surface water, subsurface water and other nonpolluted wastes shall not be discharged into those sanitary sewers which drain into the jointly-used facilities of the First Party. No street inlet, catch basin, storm drain, rain leader, cellar drain, garage drain, or any other connection through which storm water, surface water, ground water or any other water not classified as waste waters can flow, shall be connected to the aforesaid sanitary sewers which drain into the jointly-used facilities of the First Party.

B. The Second Party agrees to use every effort to prevent the owners of properties in Howard County from discharging storm water into the sanitary sewers connecting with the sanitary sewers of the First Party, and if any such connections are detected, the Director of the Second Party shall require that such connections, including storm inlets and other points of entry, are otherwise diverted or abandoned and sealed.

C. No person, firm, corporation, manufacturing plant, or other establishment, shall be permitted to discharge into any sanitary sewer of the Second Party, which drains into a sanitary sewer of the First Party, any flammable liquids, acids, chemicals and/or materials or solids not normally present in domestic sewage, which, in the judgment of the Directors of the Parties hereto, jointly or severally, may be detrimental to the sewerage system, or any part thereof, of the First Party or the operation thereof. The Second Party agrees that its Industrial Waste Ordinances shall conform to at least the minimum provisions of the First Party's Industrial Waste Ordinances, as such provisions apply to waste waters flowing from the Second Party's system into the First Party's system.

D. The discharge of radioactive wastes into any of the sanitary sewers of the Second Party shall be limited as to quantity and character in accordance with the latest rules and regulations of the State Department of Health and Mental Hygiene, Deputy State or County Health Officer of Howard County, and the Deputy State or County Health Officer of Baltimore County, Maryland, whichever of these rules and regulations are most stringent.

ARTICLE VII. CONSTRUCTION OF SANITARY SEWERS

All sanitary sewers, house sewers, interceptors, manholes, bell-mouths and connections between the sanitary sewers of both Parties shall be designed and constructed in accordance with the applicable codes, rules and regulations of the party within whose boundaries the construction is located.

ARTICLE VIII. INSPECTION OF PREMISES

The premises of the properties in the territory defined in Article IV, which drain into sewers of the First Party, may be entered with previous written notice and inspected jointly

by the Directors or their representatives. Private premises are excluded from the aforegoing stipulations and may be entered only after proper authorization has been secured.

ARTICLE IX. REPAIRS AND REHABILITATIONS

A. Whenever it becomes necessary for the First Party to make major repairs and/or rehabilitations to any part of any jointly-used facility which receives, transmits, pumps, treats and/or disposes of sewage, the Second Party shall contribute its proportionate share of all costs resulting from the planning, designing and construction of the said repair and/or rehabilitation, including all materials, labor, engineering and any and all other costs involved therein. The cost of items referred to in this Article shall be apportioned according to the Volumetric Method using the quantities of sewage contributed by both parties to this Agreement, for the fiscal year preceding that in which the costs were incurred.

B. Payment by the Second Party to the First Party for repairs and/or rehabilitations covered by this Article shall be made as the work progresses. Such payment, billed each month for the proportionate share of payment for the work completed, shall be due within 30 days of the rendering of such bill.

C. Upon agreement between both parties to this Agreement, expenditures for repairs and/or rehabilitation to jointly-used facilities may be considered capital expenditures, if paid from bond money, the repayment for which to be made by the Second Party to the First Party, shall be included in the annual debt service charge as calculated by the Volumetric Method.

ARTICLE X. FINANCING OF ADDITIONAL FACILITIES

A. The capital expenditures for jointly-used sewerage facilities constructed and/or improved after June 30, 1969, except as hereinafter provided, shall be apportioned to each party to this Agreement by the Design Flow Method.

Payment by the Second Party to the First Party for the Second Party's share of improvements to City-owned jointly-used facilities for which the First Party will have paid the City the Second Party's share, will be based on the Design Flow Method. In this case, the share of the Second Party's cost responsibility shall be developed by dividing the design capacity to be contributed by the Second Party by the sum of the design capacities to the jointly-used facility, exclusive of Baltimore City's projected flow. To calculate the Second party's financial responsibility multiply its share as calculated above by the First Party's payment to the City.

Payment by the Second Party to the First Party for the Second Party's share of improvements to jointly-used facilities owned by the First Party will be based on the Design Flow Method. In this case, the share of the Second Party's cost responsibility shall be developed by dividing the design capacity to be contributed by the Second Party by the sum of the design capacities to the jointly-used facility. To calculate the Second Party's financial responsibility, multiply its share as calculated above by the First Party's capital expenditures associated with the improvements.

B. Before the First Party commences construction or installation of any additional sewerage facilities or improvements to existing sewerage facilities that may be jointly-used by the parties to this Agreement, the Second Party shall certify that funds for its share of participation are available. In the event that funds are not available, the Second Party agrees to attempt to obtain funds as quickly as possible or to make other mutually agreeable arrangements for payments.

C. Payment to the First Party by the Second Party shall be made as the work progresses. Such payment, billed each month for the proportionate share of payment for work completed, shall be due within 30 days of the rendering of such bill.

D. Upon agreement between both parties of this Agreement, any capital expenditure for a jointly-used facility may be entirely funded with the bond money of the First Party; and repayment by the Second Party to the First Party shall be included in the annual debt service charge as calculated in Article XII, paragraph B.b. of this Agreement.

E. Whenever both Parties agree to increase either Party's purchased design capacity, as between the Parties hereto, of a jointly-used facility, as stipulated in Article V, the financial responsibility for the construction, improvements, and/or installation of said facility shall be adjusted accordingly. The Party liable for the adjustment shall remit the owing amount to the other Party in a lump-sum cash payment no later than sixty (60) days after notice of said adjustment.

ARTICLE XI. DETERMINATION OF SEWAGE FLOW

A. In order to measure and record automatically the volume of sewage flowing from the sewerage system of the Second Party into the sewerage system of the First Party, recording and registering flow meters, satisfactory to and approved by the Directors of both Parties, shall be constructed, installed, and ready for regular continuous service at or near points of entry of sewage from the Second Party to the sewerage system of the First Party within one year from the date of this Agreement. The cost of said meters, their installation, and their operation and maintenance shall be borne entirely by the Second Party.

B. In the event of failure of meters installed per paragraph A above, the Second Party agrees to proceed with repairs within 60 days or to order replacements within 60 days.

C. If the Second Party cannot demonstrate progress towards replacing or repairing meters is being made within 60 days, as outlined in paragraphs A and B above, the First Party may cause said installation and/or repairs, including design, purchase of equipment and materials, labor, and entrance by the First Party unto the premises of the Second Party. The Second Party shall be liable for all of the above referred to costs and expenses incurred by the First Party for the installation and/or repairs referred to in this paragraph.

D. At least once monthly, the Second Party shall forward to the First Party the actual meter readings and recordings for each identified meter at each point of entry. By August 15 of each year, the Second Party shall also forward to the First Party an annual summary of meter readings and flows at each point of entry for the preceding fiscal year and reconciliations for any differences between the annual figures and the cumulative monthly figure.

E. In the event of meter failure, replacement, and/or repairs, where the sewage flow has been accurately metered for a minimum of 200 days in any twelve-month period, then the daily flows for the entire year shall be considered to be the same as the average daily flow of that period of the year that has been metered. In the event meter failure, replacement, and/or repairs where the sewage flow has been accurately metered for less than 200 dyas, then the sewage flow will be determined by a method mutually agreed upon by the two parties.

F. Until flow meters are installed as stipulated in Paragraph A above, the calculation of the total annual sewage flow from the sewerage system of the Second Party to the sewerage system of the First Party shall be based on 100% of the metered water consumption of the contributing areas of the Second Party or on any other method mutually considered to be a more accurate representation of actual sewage flows.

ARTICLE XII. DETERMINATION OF SEWERAGE SERVICE CHARGES

The calculations for charging the Second Party for sewerage services rendered by the First Party shall be composed of a sewerage service charge for the Second Party's share of operation and maintenance expenses of jointly-used facilities and an annual charge for debt

service for the Second Party's share of the debt service of the First Party as applied to the jointly used facilities.

The Second Party shall pay to the First Party annually a Sewerage Service Charge representing the Second Party's share of direct costs incurred by the First Party for transporting, pumping, treating and/or disposing of sewage during the preceding fiscal year. The aforementioned direct costs shall include all the operating and maintenance costs for jointly-used facilities, reduced by the amount of direct costs recovered as surcharges under the Industrial Waste Ordinance. Direct costs shall include all payroll expenses (i.e. payroll, pensions, FICA payments, Workmen's Compensation payments, leave with pay and fringe benefits), rentals, contractual services, supplies, materials, equipment expenses (i.e. maintenance and minor repairs), utilities, and other expenses, as well as other indirect Bureau expenses properly chargeable.

The Second Party shall also pay to the First Party that amount of surcharge collected from industry for reason of excessive Biological Oxygen Demand, suspended solids, or other constituents above that limit established by law of the First Party or as may be amended from time to time, as that permitted without payment of a surcharge. Such surcharge shall be in accordance with the charges established by the First Party.

If at any time a jointly-used facility is no longer used by the Second Party, the Second Party will no longer be charged for the use of the facility from the time of non-use but will be responsible for the previous period of use.

All sewerage service charges shall be computed as follows:

A. Computation of annual Operation and Maintenance Costs.

a. Determine the First Party's costs for:

1. Operation and maintenance of Patapsco Pump Station.

2. Operation and maintenance of jointly-used sewers.

3. Six percent (6%) of the sum of (1) and (2) above, which represents other indirect Bureau charges relating to sewerage services.

4. Divide the total annual sewage flow contributed by the Second Party to the Patapsco Pump Station (as stipulated in Article XI) by the total annual metered flow through the Patapsco Pump Station to obtain a factor expressed as a percentage appropriately adjusted for outages and overflows. Multiply the sum of 1, 2, and 3 above by the percentage factor so derived, to obtain the Second Party's proportionate share in the operation and maintenance of Patapsco Pump Station and jointly-used sewers.

b. Divide the total annual sewage flow contributed by the Second Party (as stipulated in Article XI) by the total annual sewage flow contributed by Anne Arundel County, Baltimore County, and Howard County, to the City's Patapsco Waste Water Treatment Plant through the Patapsco Pump Station to obtain a factor expressed as a percentage appropriately adjusted for outages and overflows. Multiply the amount that the First Party paid the City for treatment and disposal of sewage at the City's Patapsco Waste Water Treatment Plant by the percentage factor so derived, to obtain the Second Party's proportionate share in the treatment and disposal of sewage at the City Plant.

c. The sum of the costs derived in a and b above represents the Second Party's proportionate share in the First Party's operation and maintenance costs.

B. Computation of Debt Service

a. The Second Party's annual share of debt service resulting from bonds issued by the First Party for improvements to jointly-used facilities completed before June 30, 1969, except as hereinafter provided, shall be based on the Volumetric Method and shall be calculated as follows:

1. Construction and Improvements to Patapsco Pump Station and Force Main.

Divide the total annual sewage flow contributed by the Second Party to the Patapsco Pumping Station (as stipulated in Article XI) by the total annual metered flow through the Patapsco Pumping Station to obtain a factor expressed as a percentage appropriately adjusted for outages and overflows. To obtain the Second Party's proportionate share in the First Party's annual debt service for the pumping station and force main, multiply the factor so obtained above by the product of the quotient of $795,000.00 (the cost of said facilities) and $5,000,000.00 (proceeds of the Baltimore County Metropolitan District 17th Serial Bond Issue) and the First Party's annual debt service for the unamortized amount of the Baltimore County Metropolitan District 17th Serial Bond Issue. These payments by the Second Party shall continue until the facilities are abandoned or until the 17th Serial Bond Issue is fully amortized. To calculate the Second Party's share in the First Party's imputed annual debt service for the installation of an additional pump at the Patapsco Pumping Station, divide the total annual sewage flow contributed by the Second Party to the Patapsco Pumping Station (as stipulated in Article XI) by the total annual metered flow through the Patapsco Pumping Station to obtain a factor expressed as a percentage appropriately adjusted for outages and overflows; then multiply factor so obtained by $19,588.00. Such annual share of debt service shall be calculated for four (4) years.

2. Two Additional Primary Settling Tanks at the City's Patapsco Waste Water Treatment Plant.

Divide the total annual sewage flow contributed by the Second Party to the Patapsco Pump Station (as stipulated in Article XI) by the total annual sewage flow contributed by the First Party to the City's Patapsco Waste Water Treatment Plant to obtain a factor expressed as a percentage appropriately adjusted for outages and overflows. Multiply the First Party's annual debt service for their cash contribution for Primary Settling Tanks 5 and 6 at the City's Patapsco Waste Water Treatment Plant by the factor so derived, to obtain the Second Party's proportionate share for the additional tanks. Both Parties agree that the First Party's annual debt service for its cash contribution for the Primary Settling Tanks is $1,890.00 for 30 years.

3. Patapsco Interceptor (from Herbert Run downstream to Patapsco Pump Station)

The Second Party shall, annually and for forty (40) years from the date of this Agreement, pay the First Party the sum of Two Thousand and One Hundred and Fifty dollars ($2,150.00) which represents the Second Party's share of the First Party's annual debt service for the construction of the Patapsco Interceptor from Herbert Run downstream to the Patapsco Pumping Station. This amount is based upon the First Party's annual debt service of $36,660 and the Second Party's design flow allocation of 5.86% of the total ultimate design flow of the interceptor.

4. The sum of the costs derived in 1, 2 and 3 above represents the Second Party's proportionate share in the First Party's debt service for improvements to jointly used facilities.

b. If both parties agree that repayment by the Second Party to the First Party for a capital expenditure for a jointly used facility made after June 30, 1969 shall be included in the annual debt service charge, as stipulated in Article X, paragraph D, of this Agreement, the Second Party shall pay debt service on their share of the capital expenditure as determined by the Design Flow Method.

C. The sum of the costs derived in A and B above shall constitute the Second Party's annual obligation for sewerage services provided by the First Party.

ARTICLE XIII. CHARGES TO BE RECALCULATED ANNUALLY

A. The Second Party shall, by August 15 of each year, submit in writing to the First Party the readings of all sewage flow meters at points of entry to the First Party's sewerage system as stipulated in Article XI. The report submitting the meter readings and flows shall specify such locations and points of entry into the sewerage system as herein provided.

B. On or before the 15th day of January of each year, the Director of the First Party shall submit to the Director of the Second Party a statement showing computations of the Second Party's share of costs for the preceding fiscal year. The statement and computations shall be jointly prepared by both parties and shall show the net total of the various sums by the Second Party to the First Party arrived at by the methods outlined in Article XII. Said sums, so due and owing by the Second Party to the First Party, shall be payable within sixty (60) days after the date of submittal of the statements.

ARTICLE XIV. ACCESS TO RECORDS

Each party to this Agreement shall have ready access to all plans, office and field records, costs accounts, records and files for jointly used sanitary sewerage facilities and installations of the other party.

Either party shall have ready access to all design data, schedules, programs and costs estimates relating to altering or enlarging the jointly used sanitary sewerage system, or any part thereof, that serves or will serve both parties.

Each party shall have ready access to all information, records, calculations and data used to determine the total annual charge for sewerage service.

Each party shall have the right to audit the other Party's statements and accounts useful and/or necessary to the performance of this Agreement. Such audits shall be made at the auditing party's expense.

ARTICLE XV. OPERATION AND MAINTENANCE OF FACILITIES

It is agreed by both parties that each party shall supervise the operation and maintenance of the various facilities of their respective sewerage systems.

ARTICLE XVI. PATAPSCO SEWERAGE PUMPING STATION AND FORCE MAIN IMPROVEMENTS

The Second Party recognizes the benefits it will receive from the replacement of and improvement to the First Party's Patapsco Sewage Pumping Station and Force Main to be partially financed under Environmental Protection Agency's Grant No. C-240470010. Pursuant to P.L. 92-500, the Second Party recognizes the following obligations and agrees to the following provisions:

A. The Second Party agrees to limit its peak flow at any one time to 17.8 mgd during the service life of the initial pumping facilities. The initial pumping facilities are designed for a peak flow of 45 mgd to be allocated as follows:

Baltimore County	20.7 mgd
Howard County	17.8 mgd
Anne Arundel County	6.5 mgd

The Second Party agrees to fund 39.6% of the local costs associated with the improvements included within the scope of EPA Grant No. C240470010. This percentage is based upon the Design Flow Method of financing new facilities.

B. The Second Party agrees to levy a sewer user charge on each of its customers whose wastewaters flow into the First Party's Patapsco Sewerage System. Said user charge shall be designed to assure that each customer will pay its proportionate share of the Second Party's share of the First Party's cost of operation and maintenance (including replacement) of all waste treatment services provided by the First Party.

The Second Party further agrees to levy an extra-strength surcharge on each of its customers in accordance with Baltimore County's Sewer Ordinance (Bill No. 135-76). All revenue collected therefrom by reason of Baltimore County's costs in transporting and treating said extra-strength sewage shall be remitted to the First Party.

C. The Second Party agrees to enforce all the provisions of Baltimore County's Sewer Ordinance (Bill No. 135-76) as they apply to customers under the Second Party's jurisdiction.

The Second Party further agrees to report to the First Party the introduction of toxic, incompatible, or significant industrial wastes at least six (6) months prior to their acceptance into the sewerage system.

D. The Second Party agrees to develop and maintain an Industrial Cost Recovery System applicable to Grant No. C-240470010 which shall require all present and future industrial users to pay that portion of the grant amount allocable to the treatment of wastes from such users in conformance with all applicable Federal requirements.

ARTICLE XVII. ARBITRATION

In the event of any disagreement between the Parties of this Agreement over the terms of the Agreement, the Parties shall submit, on the demand of either, the matter to arbitration in the following manner: The First Party shall appoint one arbitrator, and the Second Party shall appoint one arbitrator. The two arbitrators so appointed shall select a third, who shall be chairman of the board of arbitration. If the two arbitrators are unable to agree upon the third arbitrator, the Secretary of Health and Mental Hygiene of the State of Maryland shall be requested to designate such third arbitrator; and the written decision of the majority of the board of arbitration shall be final and binding upon both Parties.

ARTICLE XVIII. TERMS OF AGREEMENT

The Parties hereto mutually agree to update the Agreements dated May 6, 1963 and August 2, 1968 between Baltimore County and Howard County relating to sewerage services provided the Second Party by the First Party, effective the date of this Agreement, and further agree that any payments provided for in this Agreement shall be retroactive to July 1, 1975 and shall continue in force and effect until the parties hereto amend this Agreement or execute a new Agreement.

If it becomes necessary or desirable, in the opinion of either party, to amend this Agreement or execute a new Agreement, such party shall so notify the other in writing at least 30 days before the end of any calendar year. Such party shall accompany its written notification with a draft of its desired amendment or new Agreement. If the parties are unable to agree, the present Agreement shall continue in force. In the case of disagreement, either party may initiate arbitration proceedings according to Article XVII, above.

IN WITNESS WHEREOF, the Parties hereto have properly executed this Agreement as of the day, month and year first above-written.

Original Agreement approved by:
County Executive of Baltimore County
County Executive of Howard County

AMENDMENT TO SEWER AGREEMENT
BETWEEN BALTIMORE AND HOWARD COUNTIES
FOR CAPITAL EXPENDITURE ALLOCATION OF THE PATAPSCO RELIEF INTERCEPTOR

JUNE 5, 1982

THIS AGREEMENT, made this fifth day of June, 1982 by and between BALTIMORE COUNTY, MARYLAND, hereinafter referred to as the FIRST PARTY, and HOWARD COUNTY, MARYLAND, hereinafter referred to as the SECOND PARTY, each of said Parties a body corporate and politic of the State of Maryland.

WHEREAS, the First and Second Parties entered into an Agreement, dated June 4, 1979, to continue the operation of the jointly used sewerage system in the Patapsco Drainage Area between the Metropolitan District of Baltimore County and Howard County, and to establish methods for the computation and reimbursement of the costs incurred by the First Party in providing sewerage services to the Second Party; and

WHEREAS, the First Party will construct a Relief Interceptor paralleling the existing original Patapsco Interceptor from the confluence of Deep Run and Patapsco River downstream to the First Party's new Patapsco Pumping Station; and

WHEREAS, the First Party has designed said Facilities to accomodate certain existing and future flows from the territory of the Second Party; and

WHEREAS, the Second Party desires to connect to or otherwise use said Facilities; and

WHEREAS, Article X of the Sewer Agreement dated June 4, 1979 stipulates that the capital expenditures of jointly used sewerage facilities of the type herein referred to shall be allocated by the Design Flow Method as defined in said Sewer Agreement; and

WHEREAS, the U.S. Environmental Protection Agency, as a condition to awarding Grant No. C-240470010 for financial aid for the Facilities pursuant to P.L. 92-500, requires an amendment to said Sewer Agreement to include certain provisions; and

WHEREAS, Article XVIII of said Sewer Agreement provides that mutually agreeable amendments may be made to the Sewer Agreement;

NOW, THEREFORE, THIS AGREEMENT WITNESSETH:

THAT IN CONSIDERATION of the covenants, agreements and payments hereinafter set forth, it is mutually covenanted and agreed as follows:

A. The Sewer Agreement between Baltimore County and Howard County dated June 4, 1979 is hereby amended.

B. DEFINITION

"Capital expenditure" is hereby defined as in the Sewer Agreement.

C. PATAPSCO RELIEF INTERCEPTOR

a. The peak design-flow allocation of the reinforced Patapsco Interceptor System for each jurisdicition by manhole (MH) designation as described by the attached schematic* is as follows:

See Page W-7_15

(Copied from the original document for publication in the Water & Sewerage Plan)

Section	Baltimore County (mgd)	Howard County (mgd)	Anne Arundel County (mgd)	BWI Airport (mgd)
MH 34848 to MH 49188	13.80	16.10	- mgd	- mgd
MH 49188 to MH 49187	13.80	27.60	3.22	- mgd
MH 49187 to MH 49185	13.80	27.60	3.22	2.30
MH 49185 to MH 49180	13.80	27.60	6.78	2.30
MH 49180 to MH 49171	24.98	27.60	6.78	2.30
MH 49171 to MH 49170	26.85	27.60	6.78	2.30
MH 49170 to MH 49165	29.11	27.60	7.93	2.30
MH 49165 to Pump Station	29.56	27.60	7.93	2.30

b. In accord with paragraph a. above, the Second Party's percentage share of capital expenditures by manhole sections is calculated as follows:

Section	Equity in Old Pipe (mgd-peak) (2)	Ultimate Requirement (mgd-peak) (3)	Capacity Increase (mgd-peak) (4)	Relief Capacity (mgd-peak) (5)	HOWARD County's Share (4)÷(5) = % (6)
MH 34838 to MH 49188	10.00	16.10	6.1	17.48	34.90%
MH 49188 to MH 49187	16.0	27.60	11.6	17.48	66.36%
MH 49187 to MH 49185	16.0	27.60	11.6	17.48	66.36%
MH 49185 to MH 49180	16.5	27.60	11.1	17.48	63.50%
MH 49180 to MH 49171	1.0	27.60	26.6	46.71	56.95%
MH 49171 to MH 49170	1.0	27.60	26.6	48.00	55.42%
MH 49170 to MH 49165	1.0	27.60	26.6	50.26	52.92%
MH 49165 to Pump Station	1.0	27.60	26.6	50.71	52.46%

c. The percentages in paragraph b. above shall be applied to capital expenditures as defined in the Sewer Agreement. For monthly progress billing purposes, an overall weighted average percentage shall be calculated for the Second Party by applying the percentages in paragraph b. to the bid price of each Section. At the completion of construction, actual shares shall be calculated, using the percentages in paragraph b. and actual costs for each Section. For common costs that cannot be assigned to specific Sections (such as administrative and/or engineering costs, etc.), an actual overall weighted-average percentage shall be determined from those costs which can be assigned. Any difference between billed shares and actual shares shall be settled at the time that the project is closed out.

d. The Second Party agrees to limit its peak flows in the reinforced Patapsco Interceptor System at any one time to its allocations as described in paragraph a. above during the service life of the System.

D. The Second Party recognizes the benefits it will receive from the construction of the Patapsco Relief Interceptor to be financed partially under U.S. Environmental Protection Agency's Grant No. C-240470010 to the First Party. Pursuant to the requirements of Public Law 92-500, the Second Party recognizes and accepts its obligation to impose appropriate sewer use charges and surcharges with constituent threshold limits as set forth in the Howard County Code at Section 20.307. Said threshold limits shall be in conformance with the Baltimore County Code (1978), Article 34, Division 5, as may be amended from time to time. The Second Party recognizes and accepts its obligation to enforce provisions with regard to industrial wastes as set forth in the Howard County Code, Section 18.122A. Said provisions shall be at least as stringent as those set forth in the Baltimore County Code,

Article 34, Division 5, as may be amended from time to time. The Second Party recognizes and accepts its obligation to implement whatever industrial cost recovery systems or pretreatment requirements may be required in the premises and territory by the U.S. Government Protection Agency.

IN WITNESS WHEREOF, the parties hereto have properly executed this Agreement as of the day, month and year first above written.

APPROVED:
BALTIMORE COUNTY, MARYLAND

ATTEST:

Patricia L. Durkin

By: _____ (Seal)
DONALD P. HUTCHINSON
County Executive

1-27-82

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY:

_____
Chief Asst. County Solicitor

APPROVED: 1/18/82

_____
HARRY J. PISTEL
Director of Public Works

ATTEST:

_____
WILLIAM E. EAGLE
County Administrator

APPROVED:
HOWARD COUNTY, MARYLAND

By: _____ (Seal)
J. HUGH NICHOLS
County Executive

APPROVED FOR SUFFICIENCY OF FUNDS:

_____
L. DARRELL CAMPBELL, Director
Office of Finance

RECOMMENDED FOR APPROVAL:

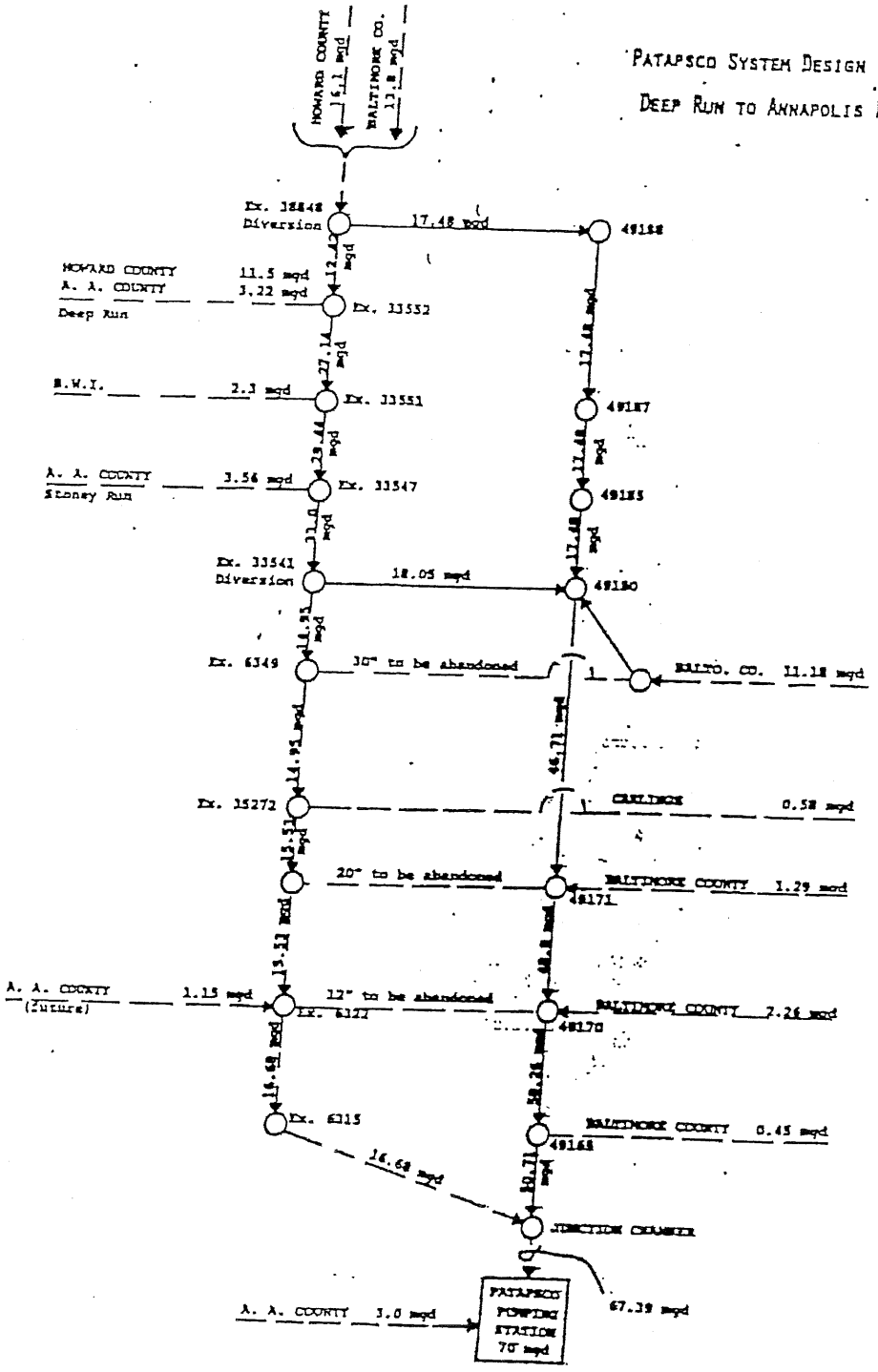
_____ 4-16-82
GEORGE F. NEITZEYER, Director
Department of Public Works

APPROVED FOR LEGAL SUFFICIENCY:

_____
TIMOTHY F. WELSH
County Solicitor

PATAPSCO SYSTEM DESIGN FLOWS

DEEP RUN TO ANNAPOLIS ROAD



SEWERAGE AGREEMENT
BETWEEN BALTIMORE COUNTY AND HOWARD COUNTY

MAY 3, 1982

THIS AGREEMENT, made this third day of May, 1982, by and between Baltimore County, Maryland, a municipal corporation, hereinafter called "Baltimore County", and HOWARD COUNTY, MARYLAND, a body corporate and politic, hereinafter called "Howard County".

WHEREAS, Baltimore County and Howard County entered into two Agreements for the construction of the Patapsco Interceptor from Herberts Run to Suckers Branch (hereinafter referred to as "Patapsco Interceptor") which Agreements were dated May 6, 1963 (with a subsequent modification thereto dated February 28, 1964) and August 2, 1968 (hereinafter referred to respectively as the "1963 and 1968 Agreements"); and

WHEREAS, during the design of the Patapsco Interceptor the capacity was revised in two reaches without amending the Agreement and the actual cost sharing was based on the revised design capacity which is shown on Attachment A; and

WHEREAS, the Patapsco Interceptor from Herberts Run to Suckers Branch was constructed in accordance with the revised design capacity for both Baltimore County and Howard County for each reach of the interceptor as shown on Attachment A; and

WHEREAS, the Baltimore County design sewage flow is less than projected and Baltimore County does not have the need for all the design capacity specified in the before stated Agreements in the Patapsco Interceptor from upstream of Deep Run to the Tiber Branch; and

WHEREAS, Howard County is desirous of purchasing some of Baltimore County's unneeded design capacity in the Patapsco Interceptor from upstream of Deep Run to Tiber Branch.

NOW, THEREFORE, THIS AGREEMENT WITNESSETH, that in consideration of the promises and conditions contained herein and other good and valuable consideration, the sufficiency of which is hereby ackowledged, the parties agree and covenant as follows:

1. The design capacity in the 1963 and 1968 Agreements are hereby amended to reflect the revised design capacity shown on Attachment A.

2. Baltimore County agrees to sell to Howard County the design capacity in the Patapsco Interceptor upstream of Deep Run to Tiber Branch as shown in Attachment B.

3. Howard County agrees to pay Baltimore County the sum of $260,488 which is the cost of the design capacity shown on Attachment B. The cost of the design capacity includes the actual contruction costs, engineering fees, right-of-way costs, etc., and is exclusive of Federal and State grants received for funding the various reaches of the Patapsco. The derivation of this cost is shown on Attachments C and D.

4. Howard County agrees to pay Baltimore County the dollar amount stated in Item 2 within sixty (60) days of the date of execution of this Agreement.

5. This Agreement shall inure to and be binding upon the parties hereto, their successors and assigns.

6. This Agreement was made and entered into in Maryland and is to be construed under the laws of Maryland.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their proper officers thereunto duly authorized the day and year first above written.

ATTEST:

s/William E. Eakle
William E. Eakle
County Administrator

HOWARD COUNTY, MARYLAND

s/J. Hugh Nichols
By: J. Hugh Nichols (Seal)
County Executive

APPROVED:

s/George F. Neimeyer 4-7-82
George F. Neimeyer, Director
Department of Public Works

APPROVED FOR LEGAL SUFFICIENCY
this 6th day of April, 1982.

s/Timothy E. Welsh
Timothy Welsh
County Solicitor

APPROVED FOR SUFFICIENCY OF FUNDS

s/J. D. Campbell 4-7-82
J. Darrell Campbell, Director
Office of Finance

ATTEST:

s/Patricia L. Kirkner

APPROVED:
BALTIMORE COUNTY, MARYLAND

By: s/Donald P. Hutchinson (Seal)
DONALD P. HUTCHINSON 5-3-82
County Executive

APPROVED AS TO FORM
AND LEGAL SUFFICIENCY:

s/Stanley J. Schapiro

APPROVED:

s/Harry J. Pistel
HARRY J. PISTEL
Director of Public Works

ATTACHMENT A

DESIGN CAPACITY BEFORE SALE IN THE PATAPSCO INTERCEPTOR
FROM HERBERTS RUN TO SUCKERS BRANCH

Reach		Design Capacity (mgd)			
		Baltimore County		Howard County	
From	To	Per Agreement	Revised*	Per Agreement	Revised*
Herberts Run	Deep Run	**	***	**	***
Deep Run	Stillhouse Run	31.5	-	13.0	-
Stillhouse Run	Bull Branch	30.8	-	13.0	-
Bull Branch	Santee Branch	29.4	-	12.0	-
Santee Branch	Oak Forest Branch	27.6	-	12.0	-
Oak Forest Branch	Thistle Branch	26.0	-	12.0	-
Thistle Branch	3000 feet east of Tiber Branch	25.9	-	12.0	-
3000 feet east of Tiber Branch		24.9	-	10.0	12.0
Tiber Branch	Suckers Branch	17.9	24.9	10.0	3.0

*Revised by letters. Actual cost sharing was based on revised design capacity.

**50% by each party.

***Design capacity is increased through the Amendment to Sewer Agreement dated June 4, 1979 between Baltimore and Howard counties for Capital Expenditure Allocation of the Patapsco Relief Interceptor which Amendment is dated April 1982.

ATTACHMENT B

DESIGN CAPACITY AFTER SALE IN THE PATAPSCO INTERCEPTOR
FROM DEEP RUN TO SUCKERS BRANCH

From	To	Design Capacity Being Sold	Design Capacity (mgd) Baltimore County	
Howard County				
Upstream of Deep Run	Stillhouse Run	3.1	28.4	16.1
Stillhouse Run	Bull Branch	3.1	27.7	16.1
Bull Branch	Santee Branch	3.1	26.3	15.1
Santee Branch	Oak Forest Branch	3.1	22.9	15.1
Oak Forest Branch	Thistle Branch	3.1	22.9	15.1
Thistle Branch	3000 feet east of Tiber Branch	3.1	22.8	15.1
3000 feet east of Tiber Branch	Tiber Branch	3.1	21.8	15.1
Tiber Branch	Suckers Branch	1.0	23.9	4.0

ATTACHMENT C

DERIVATION OF CONSTRUCTION COSTS FOR THE ADDITIONAL CAPACITY

Contract No.	Contract Costs		Local Cost (2) - (3)	Baltimore County		Cost/MGD $ (7) ÷ (5)	Additional Capacity for Howard County mgd	Constrtion Cost $ (8) x (9)
	Total	Federal & State		MGD- %	$			
(1)	(2)	(3)	(4)	(5) - (6)	(7)	(8)	(9)	(10)
1057 MH348A8 to 39206	441,975	262,507	179,468	31.5-69.7	125,089	3,971	3.1	12,310
1058	510,971	354,655	156,316	30.8-70.3	109,890	3,568	3.1	11,061
1059	286,698	202,636	84,062	29.4-71.0	59,684	2,030	3.1	6,293
1060	508,515	393,946	114,569	27.6-69.7	79,855	2,893	3.1	8,968
145	1,124,503	859,075	265,428	26.0-68.4	181,553	6,982	3.1	21,644
146	792,817	611,672	181,145	25.9-68.3	123,722	4,777	3.1	14,809
25 Part A	-	-	-	24.9-67.5	150,508	6,044	3.1	18,736
25 Part B	-	-	-	24.9-89.3	79,662	3,199	1.0	3,199

Numbers in parentheses are column numbers.

ATTACHMENT D

DERIVATION OF THE SELLING PRICE

Contract No.	ENR Index	Escalated Cost	Age (Years)	Accumulated Depreciation (3) x (4) ÷ 75	Revised Selling Price (3) - (5)
(1)	(2)	(3)	(4)	(5)	(6)
1057 MH34848 to 39206	2.89	$35,576	12	$ 5,692	$29,884
1058	3.20	35,395	13	6,135	29,260
1059	3.20	20,138	13	3,491	16,647
1060	2.89	25,918	12	4,147	21,771
145	3.20	69,261	13	12,005	57,256
146	3.20	47,389	13	8,214	39,175
25 Part A	3.92	73,445	17	16,648	56,797
25 Part B	3.92	12,541	17	2,843	9,698
		$319,663		$59,175	$260,488

Numbers in parentheses are column numbers.

EXHIBIT 7

Anne Arundel County &

Howard County Sewer Agreement

AA - Howard Co.
Sewer Agreement

Contract 22 - S

THIS AGREEMENT, made this 28 day of August, 1963 by and between the HOWARD COUNTY METROPOLITAN COMMISSION, hereinafter called "Howard" and the ANNE ARUNDEL COUNTY SANITARY COMMISSION, hereinafter called "Anne Arundel".

WHEREAS, Howard and Anne Arundel are desirous of constructing a sewerage system in the Deep Run Drainage Area, a part of the Patapsco River Drainage Area, and

WHEREAS, the Drainage Area of Deep Run lies within both Howard County and Anne Arundel County, and

WHEREAS, Howard and Anne Arundel are desirous of entering into an agreement to construct the Deep Run Interceptor beginning in the vicinity of the confluence of Deep Run and the Patapsco River and running upstream to the upper reaches of Deep Run for the purpose of conveying sewage originating in both Counties through the said interceptor and thence downstream from said confluence of Deep Run and the Patapsco River to the facilities of Baltimore County and Baltimore City for the eventual disposal thereof;

WHEREAS, the said parties have agreed hereto that the capital costs and other charges and expenses in connection therewith shall be apportioned among them;

NOW, THEREFORE, THIS AGREEMENT WITNESSETH, that in consideration of the premises and the mutual benefits accruing to each of the parties hereto, they agree and covenant as follows:

HOWARD AGREES:

Item 1 - To award Contract No. 22-S under which the Deep Run Interceptor will be constructed from the vicinity of Elkridge to Baltimore County's Patapsco Interceptor as outlined in the agreement between Baltimore County and Howard County dated May 6, 1963, and to furnish Anne Arundel with an itemized statement of the cost thereof, which said total cost will be paid by Howard and Anne Arundel as determined by the ratio of the respective

Counties' capacity of the total capacity of the constructed interceptor.

Item 2 - To provide Anne Arundel with a peak capacity of 4.42 mgd in that portion of the Deep Run Interceptor to be constructed under Contract No. 22-S.

Item 3 - To undertake at a future time the construction of the Deep Run Interceptor upstream from the terminus as constructed under Contract No. 22-S to any point or points as mutually agreed upon and to provide Anne Arundel with such capacity in the extended interceptor as requested in writing by Anne Arundel and to furnish Anne Arundel with cost estimates which shall be the basis of deposits to be made by Anne Arundel prior to the award of construction contracts and to furnish an itemized statement of the final cost thereof, which said cost shall be apportioned at the same ratio as set forth in Item 1.

Item 4 - To apply for all available Federal and State Grants of aid to assist in the cost of construction of the Deep Run Interceptor and to credit Anne Arundel its proportionate share of the Grants where applicable.

Item 5 - To maintain and operate the Deep Run Interceptor.

Anne Arundel County:

Item 6 - To advance the sum of $40,000 to Howard prior to the award of Contract No. 22-S by Howard, said amount being the estimated cost of Anne Arundel's participation in the construction of the Deep Run Interceptor under the said contract and to pay Howard within 60 days upon receipt of final audit any moneys due Howard in the event that the advanced $40,000 is not sufficient to cover Anne Arundel's cost of participation in Contract No. 22-S, it being understood, however, that in the event the advanced sum of $40,000 is in excess of Anne Arundel's proportionate share of cost of the Deep Run Interceptor that Howard will return the difference between the advanced $40,000 and the actual amount within 60 days upon completion of the contract.

Item 7 - To meter all sewage originating in Anne Arundel County at the various points of discharge into the Deep Run Interceptor, such metering to be the basis for determining the total volume of sewage discharged by Anne Arundel into the Deep Run Interceptor.

Item 8 - To pay Howard its proportionate share of the maintenance

and operating costs of the Deep Run Interceptor, such payment to be made semi-annually and within 60 days upon receipt of the bill from Howard.

Item 9 - To pay Howard all applicable charges which Howard will be assessed by Baltimore County for the conveyance and disposal of sewage originating in Anne Arundel County and conveyed by facilities in Baltimore County discharging into facilities of Baltimore City for disposal by Baltimore City, in accordance with the agreement between Baltimore County and Howard County dated May 6, 1963.

Item 10 - To pay Howard its proportionate share of project costs of extending the Deep Run Interceptor upstream from the terminus of Contract No. 22-S, the amount and method of such payment to be determined as outlined in Item 1 and Item 6 hereof.

HOWARD COUNTY

ATTEST:

Secretary-Treasurer

Approved as to Form and Legal Sufficiency this 2nd day of August, 1963.

Counsel for the Commission

HOWARD COUNTY METROPOLITAN COMMISSION

By: Chairman

Member

Member

ATTEST:

Clerk

Approved as to Form and Legal Sufficiency this 23rd day of August, 1963.

Counsel for the County Commissioners

HOWARD COUNTY BOARD OF COUNTY COMMISSIONERS

By: Chairman

Member

Member

ANNE ARUNDEL COUNTY

ATTEST:

Approved as to Form and Legal Sufficiency this day of , 1963.

Counsel for the Anne Arundel County Sanitary Commission

ANNE ARUNDEL COUNTY SANITARY COMMISSION

By: Chairman

ATTEST:

Approved as to Form and Legal Sufficiency this 24th day of , 1963.

County Solicitor

ANNE ARUNDEL BOARD OF COUNTY COMMISSIONERS

By:

James F. Collison, President

3.

THIS AGREEMENT made this 30th day of March, 1979, by and between HOWARD COUNTY, MARYLAND, party of the first part, and ANNE ARUNDEL COUNTY, MARYLAND, party of the second part, witnesseth that

AA County - Howard County Sewer Agreement Contract 580-S

WHEREAS, the Howard County Metropolitan Commission and the Anne Arundel County Sanitary Commission did, on the 28th day of August, 1963 (Contract No. 22-S), and the Howard County Metropolitan Commission and the Anne Arundel County Sanitary Commission did, on the 30th day of June, 1970, (Contract No. 181-S), and the Howard County Government and the Anne Arundel County Government did, on the 11th day of December, 1973, (Contract No. 291-S), enter into agreements to share the cost and equitable interest in a sewage system in the Deep Run Drainage Area, a part of the Patapsco Drainage Area and lying along the boundary between Howard County and Anne Arundel County, and

WHEREAS, a portion of the said improvement known as the Deep Run Interceptor has heretofore been constructed, pursuant to the agreements aforesaid, and

WHEREAS, the Howard County Metropolitan Commission has been superseded in its functions by the Charter Government of Howard County, and

WHEREAS, the Anne Arundel County Sanitary Commission has been superseded in its functions by the Charter Government of Anne Arundel County, and

WHEREAS, it has now been determined by the parties hereto to be necessary and desirable to construct a further section of the said Deep Run Interceptor, pursuant to contract specifications known as Capital Project S-4-6046, Licking Creek Interceptor, Contract No. 580-S, as prepared by Whitman, Requardt and Associates, Engineers of Baltimore, Maryland, as shown on Exhibit A within the noted limits, and

WHEREAS, Capital Project S-4-6046 is in part eligible for Federal grant funds under PL 92-500 and State grant funds under C-240365 , and

WHEREAS, application for such grants has been made by Howard County and approved by the Environmental Protection Agency and State of Maryland.

NOW, THEREFORE, in consideration of the premises and the mutual

benefits accruing to each of the parties hereto and other good and valuable consideration, it is hereby agreed and covenanted as follows:

1. Wherever the word "cost" is used in this Agreement, it shall mean all expenses, actual and constructive, necessary to the procurement, construction and installation of the designated sewerage system and appurtenances. The said expenses shall include, but are not limited to, such elements as follows: material, labor, inspection, acquisition of rights-of-way, land, office and field engineerings, extra work orders, and other expenses directly related to the project. Such costs do not include maintenance charges incurred after the completion and final acceptance of the project. Legal title to the sewerage system referred to in this Agreement shall be and remain in Howard County.

2. The party of the second part agrees to contribute as its share of the cost of the Licking Creek Interceptor as described in the specifications and plans, Howard County Contract No. 580-S, hereto attached, anticipating a total project cost of $860,000 in the manner hereinafter set forth and which amount may be adjusted on the basis of actual costs as hereinafter described.

3. The said contract (Contract No. 580-S), for the construction of this section of the Deep Run Interceptor is to be separated into five (5) parts - Part A, B, C, D, and E. Part A is the segment of the interceptor to be constructed from Manhole No. 6569 of the existing sewer located at Deep Run and built under Howard County Contract No. 291-S to Manhole No. 7866 of Contract No. 580-S near the Howard/Anne Arundel County line. The cost of Part A shall be borne by both Anne Arundel County and Howard County in accordance to the percentages shown in item 4. The cost of Part B and C of the said contract, from Manhole No. 7866 near the County line to Montevideo Road and along Montevideo Road shall be borne entirely by Howard County. Part D is the house connections in Howard County; the cost of which shall be borne entirely by Howard County. Part E is a list of contingency unit price items for the entire contract. The cost of Part E shall be tabulated

by the actual use in conjunction with Parts A, B, C and D and the cost sharing shall be borne as specified in item 4 for each Part.

4. The party of the first part allocates the peak flow capacity in the following manner:

Part A - Deep Run to County Line

Howard County	1.76 MGD	= 36.8%
Anne Arundel County	3.02 MGD	= 63.2%
	4.78 MGD	= 100.0%

Part B, C and D - County Line to Montevideo Road

Howard County	1.76 MGD	= 100.0%
Anne Arundel County	0.00 MGD	= 0.0%
	1.76 MGD	= 100.0%

5. The anticipated cost of Contract No. 580-S, excluding the metering devices, is estimated at $860,000 of which $400,000 is estimated to be the cost of Part A. The cost to be borne by each of the parties hereto of Part A is based on the aforementioned estimate and the percentage of flow capacity allocated to each as follows:

Part A - Deep Run to County Line

Howard County	36.8%	$147,200
Anne Arundel County	63.2%	$252,800
Total	100.0%	$400,000

6. The party of the second part shall pay to the party of the first part, on a cash need basis, within thirty (30) days after receipt of invoice, its pro rata share of project costs of Part A and Part E of Contract 580-S (Licking Creek Interceptor) as above described.

7. The party of the first part, upon receipt of grant monies from state and federal agencies shall pay unto Anne Arundel County its appropriate share, based upon allocations of capacities as set forth in Item 4 above.

8. In the event that the sum paid, pursuant to this Agreement, by the party of the second part on a cash need basis is in excess of the

proportionate share of costs to Anne Arundel County of Part A of the Licking Creek Interceptor, then the party of the first part will return the excess payment to Anne Arundel County within sixty (60) days after the completion of the final audit of the said contract by the Environmental Protection Agency and in the event that the said final audit of the said contract concludes that the sum paid by the party of the second part, on a cash need basis, is insufficient to cover the proportionate share of Anne Arundel County's costs of the Licking Creek Interceptor, then the party of the second part agrees to pay over to the party of the first part within (60) days of notification of said final audit the balance due by it thereon. In the event that additional funds are required in excess of those allocated by Anne Arundel County Council, sufficient additional time will be provided to Anne Arundel County to allocate the additional funds in accordance with legislation then in effect.

9. (a) The party of the first part agrees to install at Anne Arundel County cost, two metering devices estimated at $30,000 each, one of which will be installed in the vicinity of Manhole 7867 of Contract No. 580-S and will measure flow from Howard County. The second metering device will be installed in the vicinity of Manhole No. 6569 of Contract No. 291-S to measure the total discharge of the Licking Creek Interceptor sewer. The party of the first part agrees to seek State and Federal grant funds for the metering devices and to credit any grant monies received in accordance with paragraphs 7 and 8. Maintenance and reading of the meters shall be performed by the party of the first part and paid for by the party of the second part. The party of the first part shall grant reasonable access to the party of the second part in order to inspect the facilities or to read the meters.

Montevideo & Dorsey Meters

(b) The party of the first part shall bill the party of the second part annually for all wastes entering the Licking Creek Interceptor (Contract 580-S) from Anne Arundel County as determined by taking the difference between the readings of the aforementioned metering devices.

This billing will be at the same unit rate paid by Howard County to Baltimore County for discharging said wastes into the Baltimore County system, plus the actual cost of billing and handling of invoices. This invoice will be furnished after each fiscal period for the preceding fiscal year charges.

(c) The party of the first part shall bill the party of the second part annually for Anne Arundel County's share of the costs of all maintenance performed on Part A of the Licking Creek Interceptor, such share to be based upon flow capacity allocated to Anne Arundel County in paragraph 4 above. The invoices for these costs will be furnished after each fiscal period for the preceding fiscal year charges.

10. Prior to initiation of construction of Part A, the party of the first part shall submit the plans and specifications to the party of the second part for review and approval.

AS WITNESS the Hand and Seals of the parties hereto.

ATTEST:

HOWARD COUNTY

William E. Eakle
County Administrator

By J. Hugh Nichols 3/30/79 (Seal)
J. Hugh Nichols
County Executive

APPROVED:

George F. Neimeyer, Director
Department of Public Works

J. Darrell Campbell, Director
Office of Finance

3/30/79

APPROVED for Legal Sufficiency this 30 day of March, 1979.

~~Richard J. Wilkinson~~ ALAN M SCHWARTZ
Office of Law

ANNE ARUNDEL COUNTY

Mary W. Craig

By _____ (Seal)
Robert A. Pascal
County Executive

APPROVED:

_____
Anthony T. Ferrara, Director
Department of Public Works

APPROVED AS TO FORM AND LEGAL SUFFICIENCY

_____ (Seal)
Anne Arundel County Solicitor

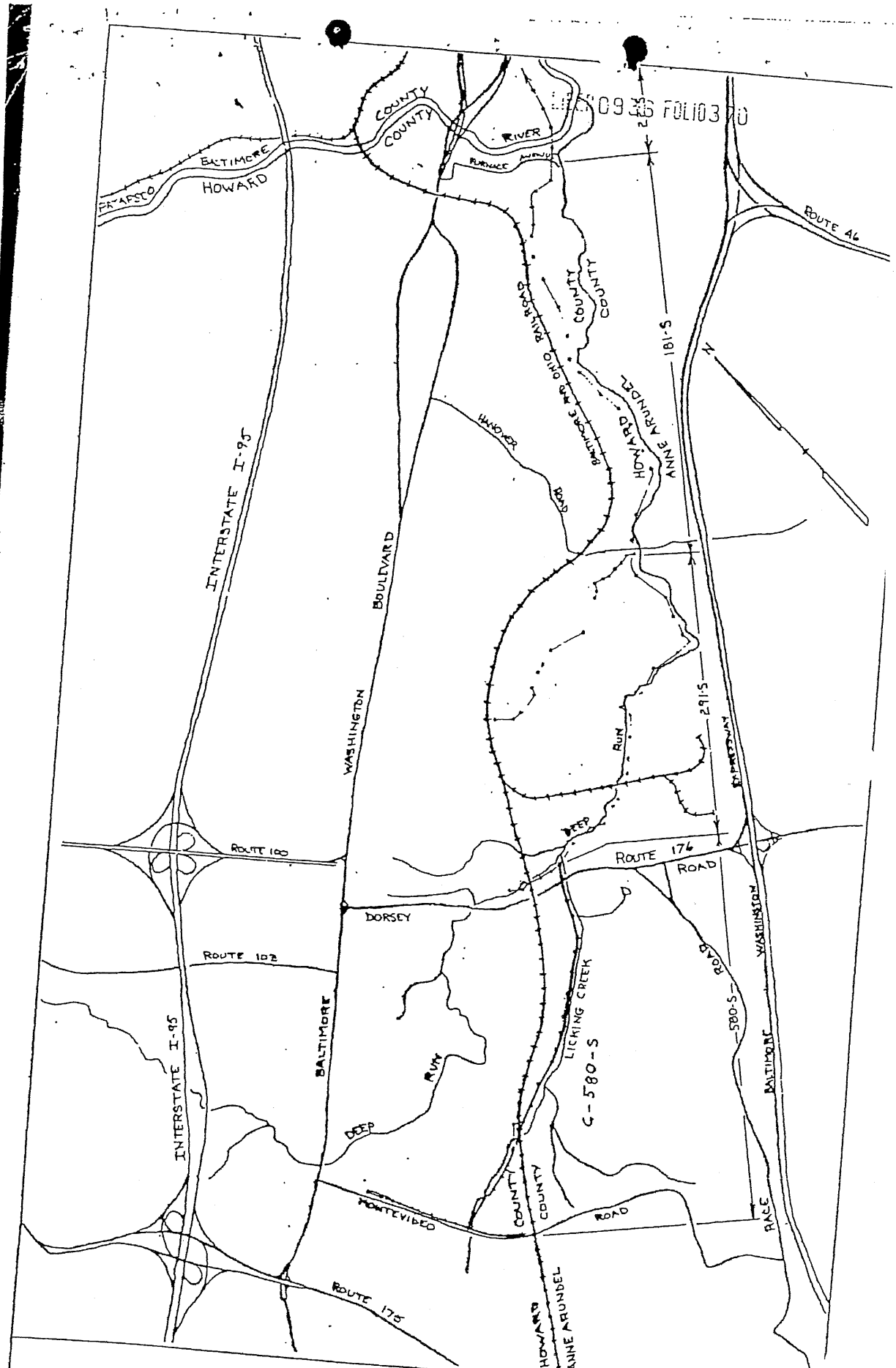


EXHIBIT A

TO THE AGREEMENT MADE THIS 30th DAY OF March, 1978.

Mail to Dept of Public Works

SCALE: 1" = 1 MILE

AA County –
Howard County
Sewer Agreement
Contract
291-S

THIS AGREEMENT made this 11th day of DECEMBER, in the year Nineteen Hundred and Seventy-73, by and between HOWARD COUNTY, MARYLAND, party of the first part; and ANNE ARUNDEL COUNTY, MARYLAND, party of the second part.

W I T N E S S E T H :

WHEREAS, the Howard County Metropolitan Commission and the Anne Arundel County Sanitary Commission did on the 28th day of August, 1962, enter into an agreement to share the cost of construction and equitable interest in a sewerage system in the Deep Run Drainage Area, a part of the Patapsco River Drainage Area and lying along the boundary between Howard County and Anne Arundel County; and

WHEREAS, the Howard County Metropolitan Commission has been superseded in its functions by the Charter Government of Howard County; and

WHEREAS, the Anne Arundel County Sanitary Commission has been superseded in its functions by the Charter Government of Anne Arundel County; and

WHEREAS, Howard County, Maryland and Anne Arundel County, Maryland, did on the 30th day of June, 1970, enter into an agreement to share the cost of construction and equitable interest in an extension of the said sewerage system in the Deep Run Drainage Area; and

WHEREAS, a portion of the said improvements known as the Deep Run Interceptor has heretofore been constructed pursuant to the agreements aforesaid; and

WHEREAS, it has now been determined by the parties hereto to be necessary and desirable to construct a further section of the Deep Run Interceptor, pursuant to Contract Specifications known as Contract No. 291-S, as prepared by Whitman, Requardt & Associates, Engineers of Baltimore City, Maryland, as amended through the date of November 1, 1972; and

NOW, THEREFORE, in consideration of the premises and mutual benefits accrueing to each of the parties hereto and other good and valuable considerations, it is hereby agreed and covenanted as follows:

1. Whenever the word cost is used in this agreement, it shall mean all expenses, actual and constructive, necessary to the procurement, construction and installation of the designated sewerage system and appurtenances. The said expenses shall include, but are not limited to, such elements as follows: material, labor, acquisition of rights-of-way, land, office and field engineering, inspection, extra work orders, and other expenses directly related to the project. Such costs do not include maintenance charges that occur after the completion and the final acceptance of the project. The legal title to the sewerage system referred to in this agreement shall be and remain in Howard County.

2. The party of the second part agrees to contribute as its share of the cost of construction of the Deep Run Interceptor as described in the Specifications and Plans, Howard County Contract 291-S, hereto attached, anticipating a total project cost of $765,288.00 based on bids heretofore received by Howard County. The exact amount for which the party of the second part shall be responsible shall be determined in the manner hereinafter set forth, which amount may be adjusted on the basis of actual cost as described.

3. The said contract (Contract 291-S) for the construction of this section of the Deep Run Interceptor is to be separated into two (2) parts - Part A and Part B. Part A is that segment to be constructed from the existing sewer located at Hanover Road to a point at Licking Creek. The cost of the construction of Part A shall be borne by both Anne Arundel County and Howard County in a manner hereinafter described. The cost for the construction of Part B of the said contract, from Licking Creek to the vicinity of Dorsey, Maryland, shall be borne entirely by Howard County, Maryland.

4. Part A of the said contract is divided into two (2) design sections which establishes the peak design flow. The party of the first part allocates the flow capacity in the following manner:

Design Section I - Hanover Road to Piney Run

Howard County	12.48 MGD	=	46.22%
Anne Arundel County	14.52 MGD	=	53.78%
	27.00 MGD	=	100.00%

Design Section II - Piney Run to Licking Creek

Howard County	11.96 MGD	=	61.33%
Anne Arundel County	7.54 MGD	=	38.67%
	19.50 MGD	=	100.00%

5. The respective cost of construction to be borne by each of the parties hereto, based on the low bid cost of $765,288.00 for Part A of the said contract, and based on the percentage of flow capacity allocated to each is as follows:

Design Section I - Hanover Road to Piney Run ($276,287.40)

Howard County	46.22%	= $127,700.04
Anne Arundel County	53.78%	= 148,587.36
		$276,287.40

Design Section II - Piney Run to Licking Creek ($489,000.60)

Howard County	61.33%	= $299,904.07
Anne Arundel County	38.67%	= 189,096.53
		$489,000.60

Items in Part A of the contract proposal applicable to Design Section I are: Item 1 through 4, Item 11, Item 14, Item 16, 21% of Item 18 and 36% of Item 19.

Items in Part A of the contract proposal applicable to Design Section II are: Item 5 through 10, Item 12, Item 13, Item 15, Item 17 and 79% of Item 18 and 64% of Item 19.

6. The party of the first part agrees to credit to Anne Arundel County's contribution to the construction of this section of the Deep Run Interceptor an appropriate share, based upon the allocation of capacities as setforth above, any grant monies received by the party of the first part from State and Federal Agencies for the construction cost of this section of the Deep Run Interceptor.

7. The party of the second part shall pay to the party of the first part, on a cash need basis, within 15 days after receipt of invoice, its pro-rata share of the construction cost of this section of the Deep Run Interceptor as above described.

8. In the event that the sum paid, pursuant to this Agreement, by the party of the second part on a cash need basis in an excess of the proportionate share of costs to Anne Arundel County of this section of the Deep Run Interceptor, then the party of the first part will return the excess payment to Anne Arundel County within sixty (60) days after the completion of the final audit of the said contract by the Environmental Protection Agency and in the event that the said final audit of the said contract shows that the sum paid by the party of the second part, on a cash need basis, is insufficient to cover the proportionate share of Anne Arundel County's cost of this section of the Deep Run Interceptor, then the party of the second part agrees to pay over to the party of the first part within sixty (60) days of notification of said final audit the balance due by it thereon.

9. (a) The party of the second part agrees to install at its cost metering devices at all points of connection to the Deep Run Interceptor.

(b) The party of the first part shall bill the party of the second part annually for all wastes entering the Deep Run Interceptor from Anne Arundel County through said metering devices at the same unit flow rate paid by Howard County to Baltimore County for discharging said wastes into the Baltimore County System, plus the actual cost of billing and handling of invoices. This invoice will be furnished after each fiscal period for the preceeding year's charges.

(c) The party of the first part shall bill the party of the second part annually for Anne Arundel County's share of the costs of all maintenance performed on the Deep Run Interceptor, such share to be based upon the percentage of flow capacity allocated to Anne Arundel County in paragraph 4 above. The invoices for these costs will be furnished after each fiscal period for the preceeding year's charges.

AS WITNESS the Hands and Seals of the parties hereto,

ATTEST:

Albert K. Wood,
County Administrator

HOWARD COUNTY, MARYLAND

BY: _____ (SEAL)
Omar J. Jones,
County Executive

APPROVED:

11/27/73
William A. Altman, Director
Department of Public Works

APPROVED FOR FUNDS:

12/1/73
J. Darrell Campbell, Director
Office of Finance

APPROVED for Legal Sufficiency this

1st day of November, 1973.

Robert E. Wieder,
Office of Law

ATTEST:

ANNE ARUNDEL COUNTY

BY: _____ (SEAL)
11/16/73 Acting County Executive

APPROVED:

Director of Public Works

APPROVED AS TO FORM AND
AND LEGAL SUFFICIENCY:

Anne Arundel County Solicitor

APPROVED FOR AVAILABILITY OF FUNDS:

Anne Arundel County Controller
(Subject to receipt of Aid Funds)

7A County - Howard County Sewer Agreement

Contract 181-S

THIS AGREEMENT, Made this 30th day of June, 1970, by and between HOWARD COUNTY, MARYLAND, party of the first part, and ANNE ARUNDEL COUNTY, MARYLAND, party of the second part, Witnesseth, that

WHEREAS, the Howard County Metropolitan Commission and the Anne Arundel County Sanitary Commission did, on the 28th day of August, 1963, enter into an agreement to share the cost of construction and equitable interest in a sewerage system in the Deep Run drainage area, a part of the Patapsco River drainage area and lying along the boundary between Howard County and Anne Arundel County, and

WHEREAS, a portion of the said improvement known as the Deep Run Interceptor has heretofore been constructed, pursuant to the agreement aforesaid, and

WHEREAS, it has now been determined by the parties hereto to be necessary and desirable to construct a further section of the said Deep Run Interceptor, pursuant to contract specifications known as Contract No. 181-S, as prepared by Whitman Requardt and Associates, Engineers, of Baltimore, Maryl[illegible], as amended through the date of August 6, 1969, and

WHEREAS, the Howard County Metropolitan Commission has been superseded in its functions by the Charter Government of Howard County, and

WHEREAS, the Anne Arundel County Sanitary Commission has been superseded in its functions by the Charter Government of Anne Arundel County,

NOW, THEREFORE, in consideration of the premises and the mutual benefits accruing to each of the parties hereto and other good and valuable consideration, it is hereby agreed and covenanted as follows:

1. Wherever the word "cost" is used in this Agreement, it shall mean all expenses, actual and constructive, necessary to the procurement, construction and installation of the designated sewerage system and appurtenances. The said expenses shall include, but are not limited to, such elements as follows: material, labor, acquisition of rights-of-way, land, office and field engineering, inspection, extra work orders, and other expenses directly

related to the project. Such costs do not include maintenance charges incurre after the completion and final acceptance of the project. Legal title to the sewerage system referred to in this Agreement shall be and remain in Howard County.

2. The party of the second part agrees to contribute as its share of the cost of construction of the Deep Run Interceptor as described in the specifications and plans hereto attached, anticipating a total project cost of $1,000,000, based on estimates heretofore prepared by Howard County, the sum of $423,300 in the manner hereinafter set forth and which amount may be adjusted on the basis of actual return costs as hereinafter described.

3. The party of the first part allocates to the party of the second part the availability of a peak capacity of 14.52 mgd, the said capacity representing current engineering estimate made by Anne Arundel County of the requirements of Anne Arundel County in the said Deep Run Interceptor, and also representing 42.33 per cent of the total designed capacity thereof.

Ho.Co. 19.78
AA Co. 14.52
34.30

4. The party of the first part agrees to credit to Anne Arundel County's contribution to the construction of the Deep Run Interceptor an appropriate share, based upon allocation of capacities as set forth above, of grant monies received by the party of the first part from state and federa agencies for the project costs of the second section of the Deep Run Interceptor, that is, the section between Elkridge and the confluence of Deep Run and Shallow Run.

5. The party of the second part shall pay to the party of the first part, on a cash need basis, within fifteen (15) days after receipt of invoice its pro rata share of project costs of construction of the Deep Run Interceptor as above described.

6. In the event that the sum paid, pursuant to this Agreement, by the party of the second part on a cash need basis is in excess of the proportiona share of costs to Anne Arundel County of the second section of the Deep Run Interceptor, then the party of the first part will return the excess payment

to Anne Arundel County within sixty (60) days after the completion of the final audit of the said contract by the FWPCA, and in the event that the said final audit of the said contract indicates that the sum paid by the party of the second part, on a cash need basis, is insufficient to cover the proportionate share of Anne Arundel County's costs of the Deep Run Interceptor, Section 2, then the party of the second part agrees to pay over to the party of the first part within sixty (60) days of notification of said final audit the balance due by it thereon.

HOWARD COUNTY

APPROVED:

Herman S. O'Neill
Herman S. O'Neill, Director
Department of Public Works

Omar J. Jones
Omar J. Jones
County Executive

APPROVED:
For Legal Sufficiency:

Thomas E. Lloyd
County Solicitor

ANNE ARUNDEL COUNTY

APPROVED:

George F. Neimeyer
George F. Neimeyer, Director
Department of Public Works

APPROVED FOR FUNDS:
(Funds not to exceed $423,300.00)

John W. Simmons, Jr.
Controller

APPROVED FOR LEGAL FORM
AND SUFFICIENCY:

Robert E. Dammeyer
Robert E. Dammeyer
Deputy Solicitor

ANNE ARUNDEL COUNTY, MARYLAND

By: Joseph W. Alton, Jr.
Joseph W. Alton, Jr.
County Executive

EXHIBIT 8

Patapsco WWTP Service Area

Memorandum of Understanding

Patapsco Sewerage System
Memorandum of Understanding

Whereas, the multi-jurisdictional use of the Patapsco wastewater treatment facilities requires cooperative agreements for sharing the use of available sewage capacities, and

Whereas, Baltimore City, Baltimore County, Howard County, Anne Arundel County, and the Department of Health and Mental Hygiene agree that there is a need to formalize these cooperative agreements into a Memorandum of Understanding which specifies how capacities established by the State will be shared amongst the jurisdictions, and

Whereas, Baltimore City, Baltimore County, Howard County and Anne Arundel County recognize and agree that this Memorandum of Understanding does not supersede, amend, add to or delete from existing agreements for facilities covered by the Memorandum of Understanding and in the event of any conflict the terms of the existing contracts will govern, and

Whereas, the previous Memorandum of Understanding dated May 4, 1978, and revised June 16, 1978, has become obsolete, and

Whereas, the Patapsco Wastewater Treatment Plant expansion and upgrading to 70 mgd has been completed, and

Whereas, the Southwest Diversion project has been completed, and

Whereas, the Baltimore County Patapsco Pump Station, force main and Patapsco relief interceptor has been completed, and

Whereas, Baltimore City has been ordered by the Director of the Water Management Administration to complete construction of all three Gwynns Falls relief interceptor contracts by May 4, 1984, and

Whereas, the Environmental Protection Agency (EPA) and the State of Maryland have provided funding for the Patapsco Treatment Plant upgrading and expansion to 70 mgd, the Baltimore County Patapsco Pump Station, force main and relief interceptor, the Southwest Diversion, the Gwynns Falls relief sewer and various other projects in the Patapsco service area, and

Whereas, the State of Maryland, Department of Health and Mental Hygiene, has certain powers, duties and responsibilities, with regard to sewage collection, treatment, and disposal and are vested in and imposed upon the Secretary of Health by the provisions of Title 9 of the Health-Environmental Article, and more specifically, but not limited to Subtitles 2, 3, and 5, and the subsections as shown in Attachment I, and

Whereas, the Mayor and City Council of Baltimore owns, operates, and is responsible for the Patapsco Wastewater Treatment Plant and those portions of the Patapsco sewage conveyance system within the political boundaries of Baltimore City, and

Whereas, Baltimore County owns, operates, and is responsible for a sewage conveyance system, part of which is physically connected to the Baltimore City Patapsco conveyance system, and

Whereas, Howard County owns, operates, and is responsible for a sewage conveyance system of which portions are physically connected to the Baltimore County Patapsco Interceptor, and

Whereas, Anne Arundel County owns, operates, and is responsible for a sewage conveyance system of which portions are physically connected to the Baltimore City Patapsco system and portions are physically connected to the Baltimore County Patapsco Interceptor and portions are physically connected to the Howard County Deep Run Interceptor, and

Whereas, the State of Maryland, State Aviation Administration, owns, operates, and is responsible for a sewage conveyance system that is located in Anne Arundel County and is physically connected to the Baltimore County Patapsco Interceptor, and

Whereas, the Mayor and City Council of Baltimore and Baltimore County have entered into agreements dated December 6, 1945, January 30, 1963, and March 6, 1974, for the purposes of continuing the operation of sewerage systems jointly-used between the City and the Metropolitan District of the County (now Charter Government of Baltimore County), and to establish a method for the computation and payment of costs incurred by the City and

County in connection with the jointly-used sewerage systems, and

Whereas, the Mayor and City Council of Baltimore and the Anne Arundel County Sanitary Commission (now Charter Government of Anne Arundel County) entered into an agreement dated August 14, 1939, and updated August 28, 1963, for the purpose of continuing the operation of the integrated (jointly-used) sewerage systems between the City and the Brooklyn Park Sanitary District and to establish a new method for the computation and payment of costs incurred by the City and the Sanitary Commission (now Charter Government of Anne Arundel County) in connection with the integrated (jointly-used) sewerage system, and

Whereas, Baltimore County and Howard County have entered into agreements dated May 6, 1963, modified February 28, 1964, revised August 2, 1968, updated June 4, 1979, amended May 3, 1982, and further amended June 5, 1982, for the purpose of continuing the use of jointly-used facilities, establishing a method for the computation and payment of costs incurred by Baltimore County and Howard County for the construction of jointly used facilities and for the collection, transmission, and disposal of sewage from Howard County and establishing peak flow limits in certain cases that will be accepted by Baltimore County from Howard County, and

Whereas, Baltimore County and Anne Arundel County have entered into an agreement dated April 21, 1976, and amended October 20, 1981, for the purposes of terminating a previous agreement dated March 13, 1958, continuing the use of jointly-used sewer facilities, establishing a method for the computation and payment of costs incurred for the collection, transmission, and disposal of sewage from Anne Arundel County and establishing peak sewage flow limits that will be accepted by Baltimore County from Anne Arundel County, and

Whereas, Howard County and Anne Arundel County have entered into agreements dated August 28, 1963, June 30, 1970, December 11, 1973, and March 30, 1979, for the purpose of sharing the costs of construction and establishing

Peak design sewage flow for each jurisdiction in a jointly-used sewage conveyance system located in the Deep Run Drainage area, a part of the Patapsco Drainage area, portions lying within Howard County and portions within Anne Arundel County, and

Whereas, Baltimore County is currently negotiating an agreement with the State of Maryland, State Aviation Administration, for the purpose of establishing a method for the computation and payment of costs incurred by Baltimore County for the construction and use of jointly-used facilities for the collection, transmission, and disposal of sewage from the Baltimore and Washington International Airport complex, and

Whereas, the population, industrial, and commercial growth in the Patapsco Sewerage System Service area created a need for the expansion of sewage conveyance and treatment facilities, and

Whereas, the expanded sewerage facilities are necessary to adequately convey and treat sewage to protect the public health, safety, comfort, and water quality, and

Whereas, the Patapsco Wastewater Treatment Plant has encountered problems during the start-up of those new components intended to expand and upgrade the Plant to its 70 mgd design capacity, and

Whereas, the Baltimore City Gwynns Falls Relief sewer is under construction, and

Whereas, the aforementioned operational problems have caused the need for allocations and to limit sewage flows into the Patapsco sewerage service area, and

Whereas, the purpose of this Memorandum of Understanding is to establish an allocation figure for each jurisdiction benefiting from the 70 mgd Patapsco Wastewater Treatment Plant and to further establish the conditions governing these flow allocations, flow diversions, and flow monitoring, in the Patapsco Sewerage Service area;

NOW, THEREFORE, THIS MEMORANDUM OF UNDERSTANDING WITNESSETH, that in consideration of the mutual benefits to each of the parties hereto it is hereby agreed as follows:

Item 1 -- The following words shall have the meaning indicated

Total design treatment capacity (TDTC) -- for the purposes of this Memorandum of Understanding is 70 mgd average daily flow.

Allowable operational capacity (AOC) -- The amount of sewage capacity as determined and set by the OEP that can be safely and lawfully processed and discharged by the Patapsco Wastewater Treatment Plant.

Useable capacity (UC) -- The portion of the allowable operational capacity that can be used by a jurisdiction.

Office of Environmental Programs (OEP)

Item 2 -- The previous Memorandum of Understanding dated May 4, 1978, and revised June 16, 1978, is no longer in effect.

Item 3 -- Each jurisdiction is allowed the following portion of the total design treatment capacity of 70 mgd at the Patapsco Wastewater Treatment Plant:

Baltimore City	19.6 mgd
Baltimore County	34.7 mgd
Howard County	10.0 mgd
Anne Arundel County	5.7 mgd

The derivation of the above figures is shown in Attachment II.

Item 4 -- The OEP, under the provisions of Title 9, Health-Environmental Article of the Annotated Code of Maryland, shall establish the allowable operational capacity of the Patapsco Wastewater Treatment Plant insofar as its ability to adequately treat sewage in a manner to protect the public health, safety, comfort, and water quality. The OEP in determining allowable operational capacity will consider, but is not limited to such factors as design capacity, the quantity and quality of existing sewage flows,

compliance with an NPDES discharge permit including any schedules of compliance, adherence to or any deviation from any schedules of proposed construction projects, adequacy of maintenance of a facility, adequacy of operation, reliability of a particular facility, history of operation, any water quality impacts, any public health impacts, and any other factor OEP considers appropriate in determining an allowable operational capacity.

The OEP will establish or set increases or decreases in the allowable operational capacity of Patapsco Wastewater Treatment Plant or declare a moratorium according to the following procedure:

A. The OEP will first notify by letter the Patapsco Task Force Committee, which consists of the directors of public works or the director of utilities or their designees, of any proposed increase or decrease in the allowable operational capacity or need for a moratorium at the Patapsco Wastewater Treatment Plant. In cases where the allowable operational capacity is proposed to be increased or decreased, the notice shall also show proposed new usable capacities for each jurisdiction. These proposed new usable capacities will be obtained by using the following formulas:

1. Increases in allowable operational capacity for each jurisdiction.

   a. $$\% \text{ increase of UC} = \frac{\text{portion of TDTC} - \text{existing UC}}{\text{TDTC} - \text{existing AOC}}$$

   b. new UC = existing UC+(%increase in UC)x(increase in AOC)

2. Decreases in allowable operational capacity for each jurisdiction.

   a. $$\% \text{ decrease of UC} = \frac{\text{existing UC} - \text{actual flows from user}}{\text{existing AOC} - \text{actual flow at WWTP}}$$

   b. new UC = existing UC - (% decrease in UC)x(decrease in AOC)

3. Where problems with physical plant management or waste characteristics result in a Consent Agreement with the State Health Department, failure of a jurisdiction or jurisdictions to meet

compliance deadlines agreed to in the Consent Agreement may result in a reduction or loss of that jurisdiction's or jurisdictions' allocation.

B. The Patapsco Task Force Committee will be given 30 days from the notice date to revise the proposed new usable capacities as shown in the notice. The OEP will accept and recognize any revisions to the proposed new usable capacities provided that:

1. the total of the revised usable capacities do not exceed the proposed allowable operational capacity.
2. each jurisdiction agrees in writing to the revised new usable capacities.
3. OEP is provided a copy of the signed document.
4. It should be understood that the formula for distribution of each jurisdiction's usable capacity is for the period of time during which the Patapsco Wastewater Treatment Plant's allowable operational capacity is less than the total design treatment capacity and thereafter limits on each jurisdiction's allocation will be based on their portion of total plant capacity.

In the case where the OEP has indicated that a moratorium is necessary, the Patapsco Task Force Committee shall be given the opportunity to correct the problem or by signature of all the jurisdictions formulate a proposed solution that will alleviate the need for a moratorium.

C. If after 30 days the Patapsco Task Force Committee fails to revise the proposed new usable capacities or formulate an acceptable proposal to alleviate the need for a moratorium, the proposed new usable capacities as shown in the original notice, or moratorium shall automatically become effective.

Item 5 -- Each jurisdiction will not allocate or take any action that will cause the usable capacity it is allowed to be exceeded and will take all necessary actions, that are proper and legal, to prevent the usable capacity figure from being exceeded.

Item 6 -- This Memorandum of Understanding shall not be used as a basis

Patapsco Wastewater Treatment Plant and shall not amend, add to, delete from or supersede or stand in the place of any existing contractual agreements; however, Howard County's cost participation through Baltimore County shall be adjusted to reflect the decrease of the purchased design capacity through Baltimore County from 10.332 mgd average daily flow to 10.000 mgd average daily flow.

Item 7 -- The proportional figures for each jurisdiction set out in item 3 are valid until the Patapsco Wastewater Treatment Plant total design treatment capacity of 70 mgd is increased by the Office of Environmental Programs.

Item 8 -- Revised proportional figures for each jurisdiction shall be established prior to any future expansion, addition, or allowable capacity rating that increases the total design treatment capacity of the Patapsco Wastewater Treatment Plant above or greater than 70 mgd.

Item 9 -- The proportional figures for each jurisdiction set out in item 3 may or may not be fully utilized by one or more jurisdictions due to physical capacity limits of the Patapsco sewage collection and conveyance system or agreed to capacity limits between jurisdictions as set forth in the above-mentioned agreements.

Item 10 -- Baltimore City (Mayor and City Council of Baltimore) shall, with all urgency, take all practical steps and actions within their means to operate and improve the Patapsco Wastewater Treatment Plant to achieve compliance with the NPDES discharge permit.

Item 11 -- The current allowable operational capacity of the Patapsco Wastewater Treatment Plant is 39.795. This allowable operational capacity of 39.795 mgd includes existing 1983 Annual Average Flows of 36.9 mgd and 2.895 mgd which may be used immediately by the user jurisdictions as shown in Attachment III.

Item 12 -- Each jurisdiction shall provide a sewage flow monitoring program. This flow monitoring program will establish, with all practical precision, the

annual average daily amount of sewage flow each jurisdiction is contributing to the Patapsco Sewerage System. The flow monitoring program will be based on actual sewage flow measurements and may be supplemented with water consumption or water meter records. Each jurisdiction will take steps to insure that sewage flow meters are working, calibrated and located or placed at points within the system to allow the determination of the amount of sewage flow each jurisdiction is contributing to the Patapsco Sewerage System. In the event a flow meter is malfunctioning or not present, the best information available at the time will be used.

Item 13 — Each jurisdiction will establish an allocation program to track and account for all sewage allocations granted, given, or associated with future sewage flows in the Patapsco Service Area. This flow allocation program is intended to provide a mechanism by which each jurisdiction and the OEP can show compliance with Title 9, Subtitle 9-512, and not exceed its useable capacity. Each jurisdiction's allocation program will consider and address the following elements:

A. The jurisdictions useable capacity.

B. Conveyance system capacity and limitations.

C. The allowable operational capacity established by OEP.

D. The actual sewage flows as provided from the sewage flow monitoring program.

E. Increases in sewerage system flows as a result of "wet years" also decreases in sewerage system average flows as a result of repairs or modifications to the sewage conveyance system.

F. Previously-approved projects.

G. Subdivision plats.

H. Building permits.

I. Connection permits.

J. New Federal, State, or local government facilities that will generate sewage flows.

K. Failing onsite sewage disposal systems that will be required to connect to the Patapsco Sewerage System.

L. Any activity or proposal that will, when completed, generate sewage flows into the Patapsco Sewerage Service Area.

Item 14 -- Each jurisdiction shall develop reports of both their flow monitoring program and their allocation program at least annually. The flow monitoring report will be based on measured or estimated annual average daily flows, and shall contain measured or estimated peak flows. Four copies of these reports will be submitted to OEP who will act as a clearing-house and distribute the copies of these reports to each jurisdiction. The date for submitting these reports shall be determined by the OEP.

Item 15 -- Baltimore City will not divert flows from the Gwynns Falls (High Level system currently going to Back River WWTP) and/or the Maidens Choice Run System (currently going to Back River WWTP) to the Southwest Diversion, which flows to the Patapsco WWTP, until:

A. The portions of sanitary contract 628 are constructed and operational that provide the facilities needed in order to control the amount of flow going to the Back River Wastewater Treatment Plant.

B. Accurate and up-to-date flow measurements of the flow going to high level system to be diverted and the existing flow going to the Southwest Diversion have been provided.

C. All parties to this Memorandum of Understanding have been notified in writing by Baltimore City at least 30 days prior to the actual diversion and the flow amounts stated in B will have been included with the notice; and

D. Baltimore City and Baltimore County have obtained sufficient useable capacities to allow the diversions, without exceeding their respective useable capacities.

Item 16 -- Howard County will not activate the Route 108 pump station or cease operation of the Deep Run Interim Sewage Teatment Plant, until:

A. Howard County has obtained sufficient useable capacity to allow the diversion, without exceeding its useable capacity;

B. Accurate and up-to-date measurements of the flows to be immediately or initially added to the Patpasco sewerage system by the start of operation of the Route 108 pump station and/or the diversion of flows from the Deep Run Interim Sewage Treatment Plant into the Patapsco sewerage system have been provided; and

C. All parties to this Memorandum of Understanding have been notified in writing by Howard County at least 30 days prior to the actual addition of flows into the Patapsco Sewerage System, and flow amounts as stated in b) have been included with the notice.

Item 17 -- This Memorandum of Understanding will be reviewed at least annually, but may be reviewed any time, and any changes, revisions, or modifications may be proposed by any party, at any time, and may become incorportated into this Memorandum of Understanding according to the following procedure:

A. A draft in writing of the proposed changes, revisions, or modifications must be sent to all parties.

B. A meeting must be held so that all parties may have the opportunity to discuss the proposed changes, revisions, or modifications. At least 30 days written notice must be given to all parties prior to the meeting.

C. Once the proposed changes, revisions, or modifications are agreed to in writing by all parties, then the changes, revisions, or modifications will become part of this Memorandum of Understanding.

Item 18 -- All parties of this Memorandum of Understanding realize and understand that this Memorandum of Understanding shall in no way relieve the City of Baltimore, Baltimore County, Anne Arundel County, or Howard County of any obligations to comply with any State or Federal laws, nor does this Memorandum of Understanding in any way abrogate or limit any other requirements which may now exist or hereafter be imposed by the State or the Environmental Protection Agency pursuant to conditions or requirements made a part of a grant relevant to the construction of sewage treatment works. This includes the requirement that Baltimore City and Baltimore County enter into a new service agreement as required by the step 3 grant condition of the Gwynns Falls relief interceptor.

Item 19 -- All parties agree and understand that this Memorandum of Understanding shall in no way affect the powers and duties of the Secretary including the exercise of any authority to protect the public health, safety, or comfort, or the waters of the State.

Item 20 -- All parties to this Memorandum of Understanding shall have the right to appeal any action taken by the Secretary of Health pursuant to the establishment of the allowable operating capacity of the Patapsco Wastewater Treatment Plant.

Item 21 -- In the event of any disagreement between the user jurisdictions' signatory to this Memorandum of Understanding over the terms of the Memorandum of Understanding, the user jurisdictions shall submit, on the demand of either, the matter to arbitration in the following manner: The First Party shall appoint one arbitrator, and the Second Party shall appoint one arbitrator. The two arbitrators so appointed shall select a third, who shall be chairman of the board of arbitration. If the two arbitrators are unable to agree upon the third arbitrator, the Secretary of Health and Mental Hygiene of the State of Maryland shall be requested to designate such third arbitrator; and the written decision of the majority of the board of arbitration shall be final and binding upon both Parties.

SIGNATORIES

State of Maryland

William M. Eichbaum — 6/4/84
Assistant Secretary for Environmental Programs — Date

Approved as to form and legal sufficiency

Marc K Cohen

Richard B. Sellars Jr., Director — 5-21-84
Water Management Administration — Date

Baltimore City

Custodian of City Seal

Approved as to form and legal sufficiency

Assistant City Solicitor

Approved by the Board of Estimates
this 31st day of MAY 1984

Richard A. Lidinsky, Deputy Comptroller
and Clerk to the Board of Estimates

MAYOR AND CITY COUNCIL OF BALTIMORE

William Donald Schaefer — Date
Mayor, City of Baltimore

APPROVED:

Francis W. Kuchta, Director — 5/18/84
Department of Public Works — Date
City of Baltimore

Baltimore County

Donald P. Hutchinson — 5/22/
County Executive — Date
Baltimore County

Approved as to form and legal sufficiency

Michael F. Lucey Jr. 5/22/84

Harry J. Pistel, Director — 5/21/84
Department of Public Works — Date
Baltimore County

SIGNATORIES/2

Anne Arundel County

for Adrian A. Tait 5/23/84
James Lighthizer Date
County Executive
Anne Arundel County

Approved as to form and
legal sufficiency

5/23/84
Assistant County Solicitor

Thomas Neel 5/23/84
Thomas Neel, Director Date
Department of Utilities
Anne Arundel County

Howard County

J. Hugh Nichols 5-18-84
J. Hugh Nichols Date
County Executive
Howard County

Approved as to form and
legal sufficiency

Timothy F. Welsh
George F. Neimeyer 5-18-84
George F. Neimeyer, Director Date
Department of Public Works
Howard County

ATTACHMENT I

Relative Subtitles and Sections of Title 9

Subtitle 2 - Regulation by State

Section 9-204	-	Powers and Duties of Secretary
Section 9-207	-	Order by Secretary when operation inefficient; action by Secretary if results not produced.
Section 9-208	-	Order for alterations or extensions when Department finds improvements cannot be made by change of manner of operation; powers of local health officer
Section 9-209	-	Installation of system if Secretary finds conditions dangerous to health
Section 9-210	-	Permits required to install, alter, or extend system or handle, burn, or store sewage sludge; landfills near hospitals; landfills for hazardous wastes.
Section 9-225	-	Civil Penalty
Section 9-228	-	Secretary Designated as State Water Pollution Control Agency.

Subtitle 3 - Water Pollution Control

Part III	-	Powers and Duties of Department
Part V	-	Enforcement

Subtitle 5 - County Plans

Section 9-505	-	Rules and Regulations of the Department
Section 9-512	-	Conformance to Approved Plans Required

Memorandum of Understanding

Attachment II

Derivation of Each Jurisdiction's Portion of the 70 mgd Design Treatment Capacity

Each jurisdiction's portion of the 70 mgd design treatment capacity is partially based on a percentage of the total cost or local share each jurisdiction was charged for or contributed to directly or indirectly for the three 70 mgd design capacity components of the treatment plant expansion. The allowance figure obtained by the percentage of the costs or contribution is then adjusted to reflect the direct flows from Anne Arundel County to Baltimore City.

The cost figures used in determining the percentage figure for each jurisdiction were obtained from a "Local Share Cost" table prepared by Baltimore County and dated December 13, 1979.

The steps used to obtain each jurisdiction's portion of the TDTC figures are explained below and are supplemental to the "Table for Derivation of Portion of TDTC."

A. The three 70 mgd design capacity elements are:

1. Secondary Treatment Facilities.
2. Sludge Processing Facilities, etc.

Note: The costs shown on this line include the sludge processing facilities that were built on the basis of 70 mgd and the Administration and Maintenance Building, which were built on the basis of 210 mgd. This inclusion is recognized and accepted.

3. Sludge Thickeners and Power Facilities.

   Note: The costs for this line include the sludge thickeners which were built on the basis of 70 mgd and the power facilities that were built on the basis of 210 mgd. This inclusion is recognized and accepted.

B. Each of the jurisdictions total cost or contribution for the three elements in A was obtained.

C. The total local cost for the three elements in A was obtained.

D. A percentage figure for each jurisdiction was obtained by dividing each jurisdiction's total cost or contribution for the three elements (B) by the total local costs (C).

E. The percentage figure obtained (D) was then multiplied by 70 to obtain the initial portion.

F. The initial portion figure (E) was then adjusted to account for the 1 mgd flow Anne Arundel County is contributing directly to Baltimore City.

TABLE FO. .VATION OF EACH JURISDICTION'S PROPORTION OF .C.

	Baltimore City	Baltimore County	Howard County	Anne Arundel County	Totals
Secondary Treatment					
Cost/Contribution -	1,345,200	2,224,500	611,200	333,200	4,514,100
% of element -	29.8	49.3	13.5	7.4	100
mgd of element -	20.86	34.51	9.45	5.18	70
Sludge Processing, etc.					
Cost/Contribution -	652,600	1,219,300	409,200	147,700	2,428,800
% of element -	26.9	50.2	16.8	6.1	100
mgd of element	18.83	35.14	11.76	4.27	70
Sludge Thickeners					
Power Facilities -					
Cost/Contribution -	167,800	340,900	101,400	48,100	658,200
% of element -	25.5	51.8	15.4	7.3	100
mgd of element -	17.85	36.26	10.78	5.11	70
Total Cost/ Contribution for 3 elements -	2,165,600	3,784,700	1,121,800	529,000	7,601,100
Cost of 3 elements -	7,601,100	7,601,100	7,601,100	7,601,100	
% -	28.49	49.79	14.76	6.96	100.0
Initial	$\frac{X\ 70}{19.943}$	$\frac{X\ 70}{34.853}$	$\frac{X\ 70}{10.332}$	$\frac{X\ 70}{4.872}$	70
May 8, 1984 adjustments to each jurisdiction's portion of T.D.T.C. as agreed to by all parties to this Memorandum of Understanding	19.6	34.7	10.0	5.7	70

...ACI...NT

A...owable Operational Capacity of the Pat... Wastewater Treatment Plant and Usable Capacities for Each Jurisdiction as of the Date of this Memorandum

	Baltimore City	Baltimore County	Howard County	Anne Arundel County	Totals
...itman & Requardt ...ow Monitoring Report ...991 early 1982)	SWD 2.7 direct 6.5 9.2	SWD 5.6 P.P.S. 9.9 BWI .7 16.2	P.P.S. 1.7 1.7	P.P.S. 1.9 direct 1.3 3.2	30.3
...roportional Increase ...n Flows since Whitman ...eport (See Note A)	2.004	3.529	.370	.697	6.6
...983 Annual Average ...low (Measured at ...he WWTP)	11.204	19.729	2.070	3.897	36.9
...emaining 1983 Usable ...apacities to be Intro-...uced into the Sewerage ...ystem (See Note B)	0.385	0.420	0.420	0.420	1.645
...xisting Usable Capacity ...Existing Flows & 1983 ...emaining Usable Capacities	11.589	20.149	2.490	4.317	Existing AOC 38.545
...arch 1984 Increase in ...sable Capacities Using ...emorandum Formula (See Note C)	.255	.462	.239 *.250 .489	.044	Increase in AOC + 1.25
...otal Usable ...apacities	11.844	20.611	2.979	4.361	Total Allowable Operational Capacity 39.795

*Special one time allocation of 250,000 gallons to Howard County not subject to formula.

Note A - Flow distributions were developed by using the Whitman and Requardt 1981 and early 1982 flow monitoring data and proportioning the 6.6 mgd increase in 1983 and average flows at the Patapsco Wastewater Treatment Plant to each jurisdiction. This method was used since actual meter data for all the jurisdictions' flow contributions was not available. The calculations are shown below.

Baltimore City

$\frac{9.2}{30.3} \times 6.6 = 2.004$

Baltimore County

$\frac{16.2}{30.3} \times 6.6 = 3.529$

Howard County

$\frac{1.7}{30.3} \times 6.6 = 0.370$

Anne Arundel County

$\frac{3.2}{30.3} \times 6.6 = 0.697$

Note B - During 1983 the Office of Environmental Programs granted increases in the usable capacity for each jurisdiction. Some of this capacity has been used and is included in 1983 Annual Average flow of 36.9 mgd. For the purposes of computing the unused portion of these increases, it is assumed that 30% of the increase is reflected in the 1983 Annual Average Flow of 36.9 mgd or 70% of the increases has not yet been used and each jurisdiction is entitled to this capacity.

	Balto. City	Balto. Co.	Howard Co.	A.A. Co.	Total
OEP letter May 11, 1983	None	0.050	0.050	0.050	0.150
OEP letter May 27, 1983	0.050	0.050	0.050	0.050	0.200
Balto. City letter June 15, 1983	0.500	0.500	0.500	0.500	2.000
	0.550	0.600	0.600	0.600	2.35
	X .70	X .70	X .70	X .70	X .70
Unused Capacity	0.385	0.420	0.420	0.420	1.645

Note C - Increases in usable capacities using the Memorandum Formula.

A) Formula $\%$ increase of U.C. $= \frac{\text{Portion of TDTC} - \text{existing U.C.}}{\text{TDTC} - \text{existing AOC}}$

New U.C. = existing U.C. + [(% increase of U.C.) + (increase in AOC)]

B) Known variables:

Jurisdiction	Portion of TDTC	Existing U.C.
Balto. City	19.6	11.589
Balto. Co.	34.7	20.149
Howard Co.	10.0	2.490
A.A. Co.	5.7	4.317

TDTC = 70
Existing AOC = 38.545
Increase in AOC = 1.000

C) Calculation

Baltimore City % increase in U.C. $= \frac{19.6 - 11.589}{70 - 38.545} = \frac{8.011}{31.455} = .255$

New U.C. = 11.589 + (.255 XI)

New U.C. = 11.844

Baltimore County % increase in U.C. $= \frac{34.7 - 20.149}{70 - 38.545} = \frac{14.551}{31.455} = 0.462$

New U.C. = 20.149 + (0.462 X 1)

New U.C. = 20.611

Howard County % increase in U.C. $= \frac{10.0 - 2.490}{70 - 38.545} = \frac{7.51}{31.455} = .239$

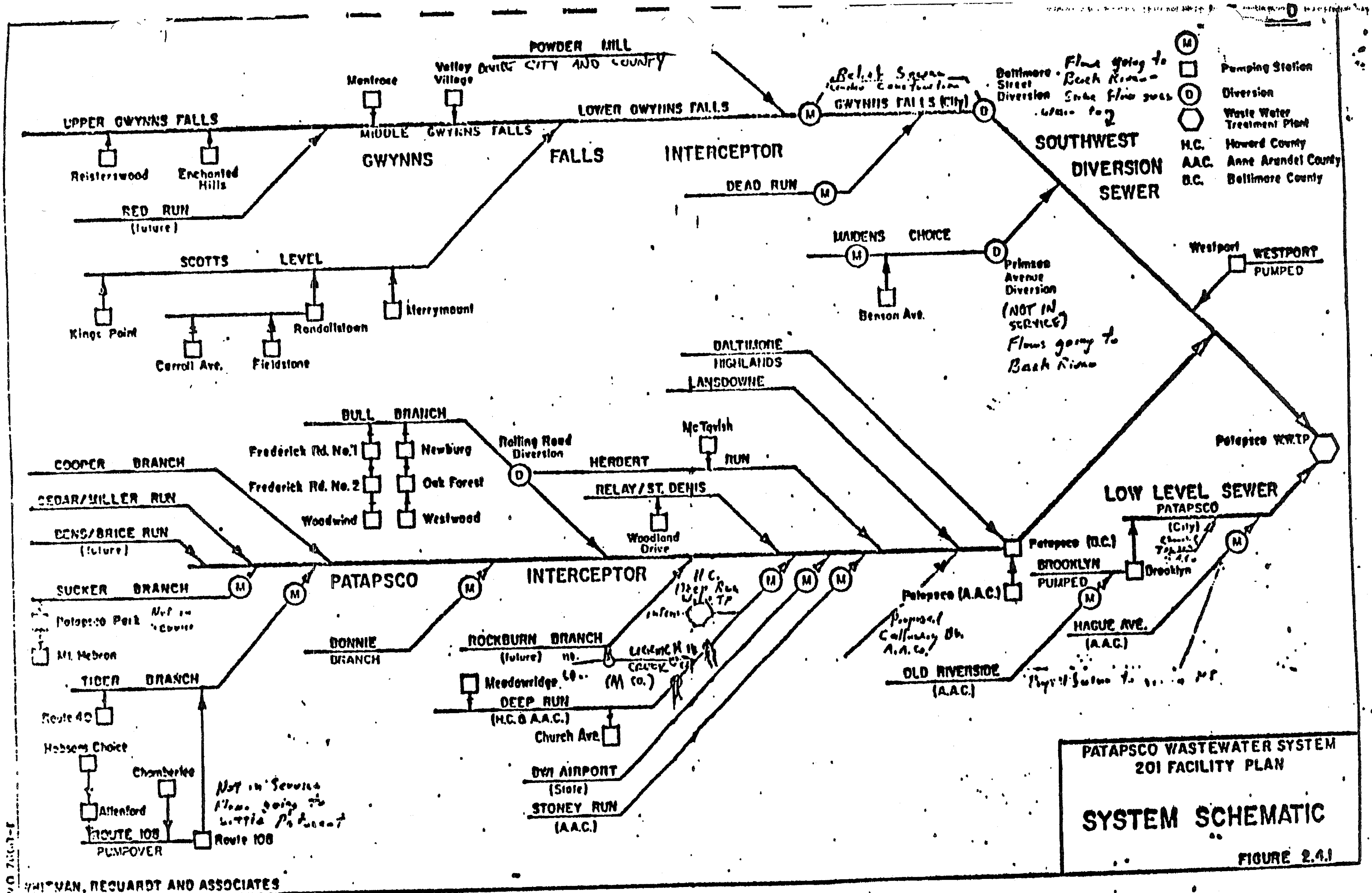
New U.C. = 2.490 + (0.239 X 1)

New U.C. = 2.729

Anne Arundel County % increase in U.C. $= \frac{5.7 - 4.317}{70 - 38.545} = \frac{1.383}{31.455} = 0.044$

New U.C. = 4.317 + (0.044 X 1)

New U.C. = 4.361



PATAPSCO WASTEWATER SYSTEM
201 FACILITY PLAN

SYSTEM SCHEMATIC

FIGURE 2.4.1

Attachment III

EXHIBIT 9

LPWRP

NPDES Discharge Permit

cc: Steve

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101 • www.mde.maryland.gov

Martin O'Malley
Governor

Anthony G. Brown
Lieutenant Governor

Robert M. Summers, Ph.D.
Secretary

SEP - 2 2014

CERTIFIED MAIL

Mr. James M. Irvin, Director
Howard County Dept. of Public Works
3430 Court House Drive
Ellicott City, Maryland 21043

RE: Discharge Permit for the Little Patuxent Water Reclamation Plant
State Discharge Permit 13-DP-1421, NPDES Permit MD0055174

Dear Mr. Irvin:

Enclosed is the above discharge permit with the effective date indicated on the cover page. The permittee is responsible for complying with all permit conditions. You are therefore advised to read the permit carefully and become thoroughly familiar with the requirements in order to maintain compliance with the permit.

Attached please find a copy of blank and sample forms for your use to calculate monthly load, year-to-date cumulative load and annual maximum load for Total Nitrogen, Total Phosphorus and Total Suspended Solids (TSS). At the end of each calendar year, the permittee will be required to fill out and submit this form along with the Discharge Monitoring Report (DMR) for the month of December. You may contact the Project Manager to obtain this form in an electronic version (EXCEL SPREADSHEET). In conjunction with the State's conversion to Watershed-based Permitting, the reapplication due date for this permit renewal will be 04/01/2017, unless the Department has granted permission for a later date.

Also enclosed are Discharge Monitoring Report Forms (EPA No. 3320-1), which must be completed for each reporting period and submitted (or electronically submitted through NetDMR) to the Department in accordance with the requirements of the permit. Please direct all future correspondence regarding permit compliance, unless directed otherwise by the discharge permit, to the following address:

Attention: Discharge Monitoring Reports
WMA - Compliance Program
Maryland Department of the Environment
1800 Washington Boulevard, STE 425
Baltimore, MD 21230-1708

You will also find enclosed a copy of the Code of Federal Regulations, Part 136 - "Guidelines Establishing Test Procedures for Analysis of Pollutants". The most current version of 40 CFR, Part 136 can be found online at U.S Government Printing Office (GPO) website. The link is: http://bit.ly/40CFR_Part136 (This link is case-sensitive). Unless otherwise specified, these guidelines are to be used for the analyses required by this permit.

In addition, we enclosed a copy of the table of the Minimum Monitoring Requirements, a copy of Department's "Toxic Pollutant Monitoring Protocol and Reporting Requirements for Toxic Chemical Testing Analytical Data (amended on 05/18/2011)" and a copy of the WWTP Effluent Toxic Chemical Monitoring Data Transmittal Cover Sheet.

If you have any questions, please contact Chris Okoye, Project Engineer, Surface Discharge Permits Division, at (410) 537-3677.

Sincerely,

Jay G. Sakai, Director
Water Management Administration

Enclosures

cc: Mr. Mark Smith, U.S. Environmental Protection Agency
Mr. Bert Nixon, Director, Howard County Health Department
Mr. Dave Lyons
Ms. Cindy Harris (Permit cover page only)
Mr. Bill Lee (with a copy of Summary Report & Fact Sheet)
Mr. Donald Currey, SSA
Mr. Dennis Rasmussen

MARYLAND DEPARTMENT OF THE ENVIRONMENT
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Secretary

DISCHARGE PERMIT

NPDES Discharge Permit Number: MD0055174	**State Discharge Permit Number:** 13-DP-1421
Effective Date: 10/01/2014	**Expiration Date:** 09/30/2019
Modification Date: (Not applicable)	**Reapplication Due Date:** 04/01/2017

Pursuant to the provisions of Title 9 of the Environment Article, Annotated Code of Maryland, and regulations promulgated thereunder, and the provisions of the Clean Water Act, 33 U.S.C. Section 1251 et seq., and implementing regulations 40 CFR Parts 122, 123, 124 and 125, the Department of the Environment hereby establishes conditions and requirements pertinent to the wastewater treatment plant and collection system and authorizes:

Howard County Department of Public Works
3430 Court House Drive
Ellicott City, Maryland 21043

TO DISCHARGE FROM: Little Patuxent Water Reclamation Plant

LOCATED AT: 8900 Greenwood Place
Savage, Howard County, Maryland 20763

THROUGH OUTFALL: 001 (WWTP Effluent)
102 (Re-claimed water pumping station)

TO: the Little Patuxent River which is Use-IP designated waters protected for water contact recreation and nontidal warmwater aquatic life, and to the Federal Reclaim Water Cooling System at the discharge point 102; in accordance with the following special and general conditions and a map incorporated herein and made a part hereof.

I. DEFINITIONS

A. "Ambient temperature" of the effluent receiving stream means the water temperature that is not impacted by a point source discharge, and it shall be measured in areas of the stream representative of typical or average conditions of the stream segment in question.

B. "Bypass" means the intentional diversion of pollutants from any portion of a treatment or collection facility.

C. "BOD_5 (Biochemical Oxygen Demand)" means the amount of oxygen consumed in a standard BOD_5 test without the use of a nitrification inhibitor at 20 degree centigrade on an unfiltered sample.

D. "Clean Water Act" means the Federal Water Pollution Control Act, as amended, 33 U.S.C. Section 1251 et seq.

E. "CFR" means the Code of Federal Regulations.

F. "COMAR" means the Code of Maryland Regulations.

G. "Department" means the Maryland Department of the Environment (MDE).

H. Discharge Limits

1. "Daily *maximum* or *(minimum)*" limitation means the *highest* (or *lowest)* allowable daily discharge in a calendar month. The daily discharge expressed as concentration (in mg/l) shall be calculated by dividing the total of measurement readings by the number of samples collected during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge expressed as loading rate of a parameter (in pounds/day) is calculated by using this formula: {daily average concentration (mg/l) x the same day total flow (in million gallons) x 8.34}.

2. "Weekly average *(maximum* or *minimum)*" limitation means the *highest* or *lowest* allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week. Each of the following 7-day periods is defined as a calendar week: Week 1 is Days 1 - 7 of the month; Week 2 is Days 8 - 14; Week 3 is Days 15 - 21; and Week 4 is Days 22 - 28. *For weekly average maximum*, if the "daily discharge" on days 29, 30 or 31 exceeds the "weekly average" discharge limitation, MDE may elect to evaluate the last 7 days of the month as Week 4 instead of Days 22 - 28. *For weekly average minimum*, if the "daily discharge" on days 29, 30 or 31 is lower than the "weekly average" discharge limitation, MDE may elect to evaluate the last 7 days of the month as Week 4 instead of Days 22 - 28.

I. DEFINITIONS

3. "Monthly average *maximum* (or *minimum)*" limitation means the *highest* (or *lowest)* allowable monthly average concentration or waste load of a parameter over a calendar month. The monthly average is calculated as the sum of all daily discharges for a parameter sampled and/or measured in that calendar month divided by the number of days on which monitoring was performed.

4. "Credit load (CL)" means the total nitrogen load reduction credit resulting from connected retired on- site sewage disposal systems (OSDS) expressed as a total monthly loading rate (lbs/month).

   See Footnote (10) in Special Condition II.A.2 for the "CL" applicable under this permit

5. (a) "Monthly total loading rate (in pounds/month)" means the total load of a parameter calculated for that calendar month. It is calculated using the formula "{(monthly average concentration in mg/l) x (Total monthly flow in Million Gallons) x 8.34}" only when sampling frequency is less than four days per week, otherwise, it is calculated as the sum of all daily discharge expressed in units of mass divided by the number of days on which monitoring was performed, times the number of days in the month. For any oufall or monitoring point where the required parameter is not monitored for concentration, a specific method of calculation is provided for that outfall in Part II.B of this permit.

   (b) "NET monthly total loading rate (in pounds/month)" means monthly total loading rate of Total Nitrogen calculated for that calendar month as 5(a) above less any onsite septic disposal system credit load (CL) in lbs/month.

6. (a) "Annual Maximum Loading Rate (in pounds/year)" limitation means the highest allowable year-to-date cumulative load of a parameter for a calendar year. It is calculated as the sum of the individual monthly total loading rates from January through the reporting month in a calendar year.

   (b) "Net Annual Maximum Loading Rate (in pounds/year)" limitation means the highest allowable year-to-date (net) cumulative load of a parameter for a calendar year. It is calculated as the sum of the individual "net monthly total loading rates" from January through the reporting month in a calendar year.

7. "Monthly log mean (Monthly geometric mean)" limit means the highest allowable value calculated as the logarithmic or geometric mean of all samples taken in the calendar month. The geometric mean is the antilogarithm of the mean of the logarithms.

I. DEFINITIONS

Discharge Monitoring

8. "Composite sample" means a combination of individual samples obtained at hourly or smaller intervals over a time period. Either the volume of each individual sample is proportional to discharge flow rates or the sampling interval (for constant volume samples) is proportional to the flow rates over the time period used to produce the composite.

9. "Grab sample" means an individual sample collected over a period of time not exceeding 15 minutes.

10. "Estimated flow" value means a calculated volume or discharge rate which is based on a technical evaluation of the sources contributing to the discharge including, but not limited to, pump capabilities, water meters, and batch discharge volumes.

11. "Measured flow" value means any method of liquid volume measurement, the accuracy of which has been previously demonstrated in engineering practice, or for which a relationship to absolute volume has been obtained.

12. "Recorded flow" means any method of providing a permanent, continuous record of flow including, but not limited to, circular and strip charts.

13. "Monthly average flow" means the total flow for a calendar month divided by the number of days in the same month.

I. "i-s (immersion stabilization)" means a calibrated device immersed in the effluent or stream, as applicable, until the temperature reading is stabilized.

J. "NPDES (National Pollutant Discharge Elimination System)" means the national system for issuing permits as designated by the Clean Water Act.

K. "Nondetectable Level" for total residual chlorine means a residual concentration of less than 0.10 mg/l as determined using either the DPD titrimetric or chlorimetric method or an alternative method approved by the Department.

L. "Outfall" means the location where the effluent is discharged into the receiving waters.

M. "Overflow" means any loss of wastewater or discharge from a sanitary sewer system, combined sewer system or wastewater treatment plant bypass (as defined in I.B) which results in the direct or potential discharge of raw, partially treated wastewater into the waters of the State.

N. "Permittee" means an individual or organization holding the discharge permit issued by the Department.

I. DEFINITIONS

O. "POTW" means a publicly owned treatment works.

P. "Sampling Point" means the effluent sampling location in the outfall line(s) downstream from the last addition point or as otherwise specified.

Q. "Sanitary Sewer Overflow (SSO)" means a discharge of untreated or partially treated sewage from a separate sewer system before the sanitary wastewater reaches the headworks of a wastewater treatment facility, pursuant to COMAR 26.08.10.01.

R. "Significant Industrial User (SIU)" is defined as any industrial user (IU) that:

1. is subject to national categorical standards; and

2. any other IU that:

   a. discharges an average of 25,000 gallons per day or more of process wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater); or

   b. contributes a process wastestream that makes up 5% or more of the average dry weather hydraulic or organic capacity of the POTW; or

   c. is designated as such by the POTW on the basis that the IU has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement; or

   d. is found by the POTW, the Department, or the Environmental Protection Agency (EPA) to have significant impact either individually or in combination with other contributing industries to the POTW, on the quality of the sludge, the POTW's effluent quality, or air emissions generated by the system.

T. "TKN (Total Kjeldahl Nitrogen)" means organic nitrogen plus ammonia nitrogen.

U. "TSS (Total Suspended Solids)" means the residue retained on the filter by an analysis done in accordance with Standard Methods or other approved methods.

V. "Upset" means the exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

II. SPECIAL CONDITIONS

A.1 Effluent Limitations (Nutrient and TSS loads), **Monitoring Point 101**(Final Effluent Sampling Point) (1) (2) (3) (4)(5)(9)

This location includes an annual loading cap for TN, TP and TSS based on the Bay TML and actual flow (5). The quality of the effluent from the facility shall be limited at all times as shown below:

Effluent Characteristics	Maximum Effluent Limits			
	Monthly Total Loading Rate (Pounds/ Month)	Net Monthly Total Loading Rate, (10) (Pounds/Month)	Annual Maximum Loading Rate, (10) (Pounds/Year)	Net Annual Maximum Loading Rate (Pounds/Year)
Total Phosphorus (6)(7)(8)	Report	---	23,358	---
Total Nitrogen (6) (7) (8)	Report	Report	309,715	Report(15)
Total Suspended Solids (5)	Report	---	2,284,170	---

Effluent Characteristics	Effluent Limits	
	Maximum	Minimum
E. Coli	126 MPN/ 100 ml monthly geometric mean value	N/A
Total Residual Chlorine (11)	UV used	N/A
pH	8.5	6.5
Dissolved Oxygen	N/A	5.0 mg/l at anytime 6.0 mg/l daily average.

An annual average flow of 29 million gallons per day (mgd) was used in waste allocation calculations to establish the effluent limitations specified in A.1 and A.2 and this unit should be used when reporting on the Discharge Monitoring Report (DMR), (EPA Form 3320-1, Rev. 01/06). Notification is to be provided to the Department at least 180 days before the annual average flow is expected to exceed this flow level. If a permit modification is required, the Department will initiate the public participation NPDES process.

II. SPECIAL CONDITIONS

A.2 Effluent Limitations, Outfall 001 (1) (2) (3) (4)

The quality of the effluent discharged by the facility at Outfall **001** shall be limited at all times as shown below:

Effluent Characteristics		Maximum Effluent Limits: Monthly Average Loading Rate, Pounds/day	Maximum Effluent Limits: Weekly Average Loading Rate, Pounds/day	Monthly Average Concentration, mg/l	Weekly Average Concentration, mg
BOD_5	4/1 to 10/31	1200	1800	5.0	7.5
	11/1 to 3/31	6300	9400	26	39
Total Ammonia Nitrogen as N	4/1 to 10/31	180	270	0.75	1.1
	11/1 to 3/31	1700	---	7.0	---
Total Suspended Solids (TSS)		6300	9400	26	39

	Monthly Total Loading Rate	Annual Maximum Loading Rate
Total Nitrogen	Report (26)	Report
Total Phosphorus	Report (26)	Report

An annual average flow of 29 million gallons per day (mgd) was used in waste allocation calculations to establish the effluent limitations specified in A.1 and A.2 above and this unit should be used when reporting on the Discharge Monitoring Report (DMR), (EPA Form 3320-1, Rev. 01/06). Notification is to be provided to the Department at least 180 days before the annual average flow is expected to exceed this flow level. If a permit modification is required, the Department will initiate the public participation NPDES process.

(1) When this permit is renewed, the new limitations might not be equal to the above limitations.

(2) There shall be no discharge of floating solids or visible foam other than trace amounts.

(3) The permit may also be reopened in accordance with the requirements of MDE's Watershed Permitting Plan under which all discharge permits in a watershed are issued the same year.

(4) The Little Patuxent River is on the 303(d) list as impaired waters for nutrient, sediment, cadmium, and impact to biological communities. Centennial Lake located within the watershed was indentified as impaired by nutrients and sediments, and have been addressed by TMDLs approved in 2002. The cadmium listing has been addressed by a Water Quality Analysis submitted in 2008 that showed no impairment. A Total Maximum Daily Load (TMDL), approved by the EPA on 9/30/2011 for nutrient and sediment, and the discharge permit TSS limit is in conformance with this TMDL.

When TMDLs for other remaining parameters are completed, limits may be imposed, after the public participation process, to incorporate any TMDL requirements.

II. SPECIAL CONDITIONS

(5) This permit is in conformance with the "Chesapeake Bay TMDL for Nitrogen, Phosphorus and Sediment" established on December 29, 2010.

(6) The Annual Maximum Loading Rate limits of 309,715 lbs/yr total nitrogen, and 23,358 lbs/yr total phosphorus include 5,159 lbs/yr TN and 516 lbs/yr TP WLA loads from the retirement and connection of the MD-VA Milk Producers WWTP (MD 0000469) to the Little Patuxent WRP.

(7) The permittee shall operate the ENR facility in a manner that optimizes the nutrient removal capability of the facility.

The first exceedance of the permit limit shall be counted and reported as daily exceedances beginning from the first exceedance, determined to the nearest day, through December 31. In addition, after any such exceedance, the permittee shall demonstrate to the Department's satisfaction that the facility is optimizing its nutrient removal capability, and neither the arrival of the next calendar year nor the issuance of a permit renewal during a period of noncompliance shall obviate continuance of any noncompliance status related to treatment optimization requirements.

(8) For Outfall **101,** at the end of each calendar year the permittee shall comply with the *concentration-based* limitations for the Annual Maximum Loading Rate defined below in addition to the TMDL-based loading rate limitations:

(a) TN Limitation (lbs/year): **4.0** mg/l x annual total flow (calendar year based in million gallons per year) x 8.34 or the combination of total nitrogen waste load allocations specified in Special Condition II.A.1 and Onsite Septic Disposal System (OSDS) credit (see footnote 10), whichever is lower. To the extent that the permittee alleges that temperature levels of 12 degrees C or lower have diminished the treatment system's capability of complying with this *concentration-based* loading rate limitation for Total Nitrogen, the permittee shall provide notification beginning with the calendar year report under the "Upset" provision in Section III.B.6 of this permit. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

(b) TP Limitation (lbs/year): **0.30** mg/l x annual total flow (calendar year based in million gallons per year) x 8.34 or the total phosphorus waste load allocations specified in Special Condition II.A.1., whichever is lower.

The details and results of the required annual calculations for the above concentration-based limits shall be submitted to the Department with the Discharge Monitoring Report for December.

Note: When the average annual wastewater flow approaches 29 MGD, an annual total nitrogen concentration of 3.5 mg/l and total phosphorus concentration of 0.25 mg/l would be necessary achieve an annual TN load of 309,715 lbs/yr and TP of 23,358 lbs/yr.

(9) The permittee may request that the permit be reopened and modified to include nutrient trading consistent with the most current "Maryland Policy for Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed" in effect at that time.

(10) A TN nutrient credit of **80.5** lbs/mon (no more than **966** lbs/year) applies for reporting and compliance purpose, resulting from retiring and connecting onsite sewerage disposal system (OSDS) to the Little Patuxent Water Reclamation Plant (See Special Conditions, footnote (15) and definitions I. H.4, I.H.5(b) and I.H.6(b).

(11) Total residual chlorine limitation of 0.013 mg/l shall apply only if chlorine or chlorine-containing compound is used in the wastewater treatment. The minimum level (quantification level) for total residual chlorine is 0.10 mg/l. The permittee may report all results below the minimum level as <0.10 mg/l (less than 0.10 mg/l).

II. SPECIAL CONDITIONS

B.1 Minimum Monitoring Requirements - Monitoring Point **101**[29]:
The effluent characteristics listed below shall be monitored:

Effluent Characteristics	Monitoring Period	Measurement Frequency	Sample Type
BOD_5 [12]	All Year	5 Days per Week	24-hour composite
Total Suspended Solids [12][15][18]	All Year	5 Days per Week	24-hour composite
Total Ammonia Nitrogen as N [12][14]	All Year	One per Day	24-hour composite
Total Phosphorus as P [12][15]	All Year	One per Day	24-hour composite
Total Nitrogen as N [12][14][15]	All Year	One per Day	Calculated
(Nitrite + Nitrate) as N [12][13][14]	All Year	One per Day	24-hour composite
Organic Nitrogen as N [12][13][14]	All Year	One per Day	24-hour composite
Orthophosphate as P [12][13]	All Year	One per month	24-hour composite
Flow [12][19][20]	All Year	Continuous	Recorded [20]
Total Monthly Flow [12][21]	All Year	Monthly	Calculated [21]
E. Coli [12][21]	All Year	Three per week	Grab
Total Residual Chlorine [12][16]	All Year	Three per day	Grab
Dissolved Oxygen [12][18]	All Year	Two per Day	Grab
pH [12][18]	All Year	Two per Day	Grab

II. SPECIAL CONDITIONS

B.2 Minimum Monitoring Requirements - Outfall **001**:

The effluent characteristics listed below shall be monitored:

Effluent Characteristics	Monitoring Period	Measurement Frequency	Sample Type
BOD_5 [12]	All Year	5 Days per Week	Calculated
Total Suspended Solids [12][18][26]	All Year	5 Days per Week	Calculated
Total Ammonia Nitrogen as N [12][14]	All Year	One per Day	Calculated
Total Phosphorus as P [12][26]	All Year	One per Day	Calculated
Total Nitrogen as N [12][14][26]	All Year	One per Day	Calculated
(Nitrite + Nitrate) as N [12][13][14]	All Year	One per Day	Calculated
Organic Nitrogen as N [12][13][14]	All Year	One per Day	Calculated
Orthophosphate as P [12][13]	All Year	One per month	Calculated
Flow [12][19][28]	All Year	Daily	Calculated
Total Monthly Flow [12]	All Year	Monthly	Calculated [21]

II. SPECIAL CONDITIONS

B.3 Non-Potable Water Requirements- Monitoring Point **102** (Pumping Station): The non-potable water flow and total residual chlorine (TRC) concentrations shall be monitored, and the other effluent characteristics listed below calculated:

Effluent Characteristics	Monitoring Period	Measurement Frequency	Sample Type
Total Suspended Solids (12)(18) (27)	All Year	5 Days per Week	Calculated
Total Phosphorus as P (12)(27)	All Year	One per Day	Calculated
Total Nitrogen as N (12)(14)(27)	All Year	One per Day	Calculated
Flow (12)(19)(20)	All Year	Continuous	Recorded (20)
Total Monthly Flow (12)(21)	All Year	Monthly	Calculated (21)
Total Residual Chlorine (12) (17)	All Year	One per Day	Grab

Monitoring Requirements, Continued:

Footnotes for the monitoring requirement

(12) "STORET" (short for STOrage and RETrieval) is a widely-used repository for water quality data reporting and monitoring. The STORET codes for the effluent characteristics described as limitations and/or monitoring requirements are: BOD_5 (00310), Total Suspended Solids (00530), Total Ammonia Nitrogen as N (00610), Total Phosphorus as P (00665), Total Nitrogen as N (00600), (Nitrite + Nitrate) as N (00630), Organic Nitrogen as N (00605), Orthophosphate as P (04175), E. Coli (51040), Total Residual Chlorine (50060), Dissolved Oxygen (00300), pH (00400), Flow (50050), Total monthly flow (82220).

(13) This parameter (without effluent limitations) must be monitored, and it shall be reported on the Monthly Operating Report (MOR) as individual results and on the Discharge Monitoring Report (DMR) (EPA Form 3320-1) as monthly average concentrations.

(14) Total nitrogen as N (in mg/l) is a calculated parameter as the sum of individual results for total ammonia nitrogen as N, organic nitrogen as N and (nitrite + nitrate) as N. All the nitrogen species must be sampled on the same day.

(15) (Monitoring Point 101 only): Prior to diverting reclaimed water to the Federal System, the permittee shall calculate and report the Monthly Total Loading Rates and the Cumulative Annual Loading Rates for nitrogen, phosphorus, and suspended solids on the DMR (see definition I.H.5.a and H.6.a).

The permittee shall also report on the DMR the Net Monthly Total Loading Rates and the Net Annual Maximum Loading Rates for nitrogen, calculated as the annual cumulated loading rate reported at Monitoring Point 101 LESS the approved OSDS credit load. The Net Monthly Total Loading Rate is the Monthly Total Loading Rate reported at Monitoring Point 101 LESS 80.5 lbs/month (See definition I.H.6), a monthly prorated load based on the approved 966 lbs/year annual credit load (see definition I.H.4.).

(16) The minimum monitoring requirements of three per day-grab samplings for total residual chlorine shall be applicable only when the wastewater at the Little Patuxent WRP is treated with chlorine or any chlorine compound. The minimum detection level (quantification level) for total residual chlorine is 0.10

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mg/l. The permittee may report all results below the minimum level as <0.10 mg/l. All results reported below the minimum level shall be considered in compliance.

(17) Monitoring only parameter for effluent reuse purpose. The monitoring results shall be reported as daily minimum and monthly average concentrations (See Special Conditions II.J for additional details).

(18) If the monthly average limitations for TSS, dissolved oxygen and pH are exceeded while the monitoring frequency is at 5 per-week for TSS and 2 per-day for DO and pH, then the monitoring frequency for the violated parameter shall automatically revert to once per-day for TSS, and 3 per-day for DO and pH, and remain as such for the permit life cycle.

(19) Flows shall be reported in millions gallons per day (mgd) to at least the nearest 10,000 gallons per day. (Example: A flow of 1,524,699 gallons per day shall be reported as 1.53 mgd.). For each calendar month, flows shall be reported on the MOR as daily individual results and on the DMR as monthly average (mgd) and daily maximum (mgd).

(20) Continuous electronic flow measurement and recording which can produce a permanent record are acceptable to the Department.

(21) "Total monthly flow" is a calculated parameter equal to sum of the daily flow results in a calendar month. It shall be reported on the monthly DMR as Total monthly flow in millions gallons (MG) to at least the nearest 10,000 gallons. (Example: A flow of 1,524,699 gallons shall be reported as 1.53 MG).

B.4 Report Submittal Requirements

Report Description	Reporting Frequency	Report Submittal Deadline
Effluent Biomonitoring Study Plan and Toxic Chemical Testing Plan (22)(23)	See footnote – 23	See footnote – 23
Effluent Biomonitoring Study Report (22)(24)	See footnote- 24	See footnote- 24
Effluent Toxic Chemical Testing Report (22)(25)	See footnote - 25	See footnote- 25

(22) If the permittee has selected a third party for submitting reports to the Department, the permittee must provide to the third party with a ***document of authorization for report submission*** which is required with the report.

(23) Within three months from the effective date of this permit, the permittee shall submit the Study Plans for effluent biomonitoring as well as toxic chemical testing and obtain approval from the Department.

(24) After MDE's approval of the Effluent Biomonitoring Study Plan, the permittee shall perform the effluent biomonitoing study and submit the comprehensive report to the Department as per requirements of the Special Condition II.D. The reporting frequency of this report shall be ***once per year for four years*** beginning effective date of this permit. The report shall be submitted to the Department along with the DMR for the month during which the test was completed, and it shall be postmarked by the 28th of the month following the test completion month. (Example: If the test is completed in March, the comprehensive report shall be submitted with the March DMR postmarked by 28th April).

(25) After MDE's approval of the Effluent Toxic Chemical Testing Plan, the permittee shall perform the effluent toxic chemical testing and submit the comprehensive report to the Department as per requirements of the Special Condition II.F. The reporting frequency of this report shall be ***once per year for three years*** beginning effective date of this permit. The report shall be submitted to the Department along with DMR for the month during which the test was completed, and it shall be postmarked by the 28th of the month

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following the test completion month. (Example: If the test is completed in March, the comprehensive report shall be submitted with the March DMR postmarked by 28th April).

(26) (Outfall 001 only): This monitoring point does not require effluent concentrations monitoring for all parameters. Each month the permittee shall calculate, and report on the DMR, the Monthly Total Loading Rates for all parameters listed in Outfall 001. The Monthly Total Loading Rates for parameters required at outfall 001 shall be calculated based on the effluent concentrations measured daily at monitoring point 101 and the daily flows measured at Outfall 001.

(27) Monitoring Point 102 in Special Condition B.3: This monitoring point does not include monitoring requirements for concentration. Each month the permittee shall calculate and report on the DMR the TSS, nitrogen, and phosphorus Monthly Total Loading Rates and the Annual Maximum Loading Rates (see definitions H.5.a and H.6.a). The Monthly Total Loading Rates shall be calculated using the daily concentrations measured at MP 101 while applying the daily flows measured at Monitoring Point 102.

(28) Outfall 001 Daily Flow shall be calculated as the measured flow at Monitoring Point 101 minus the measured flow at Monitoring Point 102.

(29) The effluent samples at the Sampling Point 101 shall be representative of the effluent quality at Outfall 001. The permittee shall notify the Department and provide justification in accordance with conditions specified in Section III.B.11 of this permit when an alternative sampling location is selected.

C. Capacity Management Plan

The permittee shall report total cumulative flow for the each calendar year for the above referenced facility. The total cumulative flow should be reported in million gallons for the entire calendar year to the nearest ten thousand gallons. The annual total cumulative flow determination shall be provided to the Department by January 28 of the following year to the address below:

Attention: Calendar Year Total Cumulative Flow
WMA – Wastewater Discharge Permits Program
Maryland Department of the Environment
1800 Washington Boulevard, STE-455
Baltimore, MD 21230-1708

A Wastewater Capacity Management Plan must be submitted by January 28 of each calendar year if the most recent three year average flow is over 80% of its design capacity or if it is anticipated to exceed 80 % in the following year. (The Department has published a "Wastewater Capacity Management Plans" guidance document, which can be found on the Department's web site as indicated below):

http://www.mde.state.md.us/assets/document/water/WastewaterCapacityMgmtGuidance.pdf.

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D. BIOMONITORING PROGRAM

1. Within three months of the effective date of the permit, the permittee shall submit to the Department for approval a study plan to evaluate wastewater toxicity at Outfall 001 by using biomonitoring. The study plan should include a discussion of:

   a. wastewater and production variability

   b. sampling & sample handling

   c. source & age of test organisms

   d. source of dilution water

   e. testing procedures/experimental design

   f. data analysis

   g. quality assurance/quality control

   h. report preparation

   i. testing schedule

2. The testing program shall consist of definitive four annual chronic testing events. The testing events shall be conducted annually during January or February of each of the first four years after approval of the study plan. This testing shall be initiated no later than the January or February following the Department's acceptance of the study plan. Each annual testing event shall include the Ceriodaphnia survival and reproduction test and the fathead minnow larval survival and growth test.)

3. The samples used for biomonitoring shall be collected at the same time and location as the samples analyzed for the effluent limitations and monitoring requirements for this outfall. For chlorinated effluents, samples shall be collected after dechlorination. The permittee shall collect 24-hour flow–proportioned composite samples unless the Department has given prior approval of an alternative sampling type.

4. The following EPA document discusses the appropriate methods:

   Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms Fourth Edition, EPA-821-R-02-013, October, 2002

II. SPECIAL CONDITIONS

5. Test results shall be submitted to the Department within one month of completion of each set of tests.

6. Test results shall be reported in accordance with MDE/WMA "Reporting Requirements for Effluent Biomonitoring Data," 3/21/03.

7. As a minimum, the reported chronic results shall be expressed as NOEC, LOEC, ChV, and IC_{25}.

8. If a 50% mortality or greater occurs in one or more effluent concentrations during the first 48 hours of the chronic tests, 48-hour LC_{50}s shall be calculated and reported along with the chronic results

9. If testing is not performed in accordance with MDE-approved study plan, additional testing may be required by the Department.

10. If the test results of any two consecutive valid toxicity tests show acute or chronic toxicity (LC_{50} equal to or less than 100% for acute tests and an IC_{25} equal to or less than the in-stream waste concentration for chronic tests), the permittee shall repeat the test within 30 days to confirm the findings of acute or chronic toxicity. Intermittent toxicity or other concerns may require additional testing or limits. If acute and/or chronic toxicity is confirmed, the permittee shall:

    a. Eliminate the source of toxicity through operational changes as soon as possible but in any case not longer than within three months, or

    b. Perform a TRE. If the permittee repeats the toxicity testing as stated above and the results of the repeat test do not confirm the acute or chronic toxicity, the Department will require the permittee to repeat the toxicity testing as stated above to reconfirm a finding of no acute or chronic toxicity. After reconfirmation, the permittee shall complete any remaining quarterly testing required.

11. If the permittee completes a TRE in accordance with II.E.10.b and unacceptable toxicity is confirmed, a Whole Effluent Toxicity (WET) permit limit and a compliance schedule will be required.

12. To address federal NPDES requirements for WET testing and limits, MDE shall implement permit limits in a new or renewal permit when a WET test result shows reasonable potential for toxicity unless it can be demonstrated that the source of toxicity has been eliminated, inappropriate test procedures were utilized, or the source has been controlled via a chemical specific permit limitation. Where reasonable potential has been assumed based on one test result, the permit shall include a WET limit effective within three years unless

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the effluent shows no toxicity in six follow-up quarterly tests. The permit may be modified to remove the WET limit if the six follow-up quarterly tests show no toxicity.

13. If plant processes or operations change so that there is a significant change in the nature of the wastewater, the Department may require the permittee to conduct a new set of tests.

14. If a significant industrial user locates within the service area so that significant change in the nature of the wastewater might be anticipated, MDE may require the permittee to conduct a new set of tests.

15. Submit all Biomonitoring related materials to:

Maryland Department of the Environment
Water Management Administration
Compliance Program
1800 Washington Blvd., Suite 420
Baltimore, MD 21230-1708

E. Toxicity Reduction Evaluation (TRE)

The permittee shall conduct a Toxicity Reduction Evaluation (TRE) when a review of toxicity test data by the Department indicates unacceptable acute or chronic effluent toxicity. A TRE is an investigation conducted to identify the causative agents of effluent toxicity, isolate the source(s), determine the effectiveness of control options, implement the necessary control measures and then confirm the reduction in toxicity.

1. Within 90 days of notification by the Department that a TRE is required, the permittee shall submit for approval by the Department a plan of study, schedule and completion date for conducting a TRE. The permittee shall conduct the TRE study consistent with the submitted plan and schedule.

2. This plan should follow the framework presented in Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants (EPA/833B-99/002) August 1999.

Additional Guidance documents on the TRE process are shown below:

Methods for Aquatic Toxicity Identification Evaluations Phase I Toxicity Characterization Procedures, Second Edition, United States Environmental Protection Agency Office of Research and Development Washington, DC 20460, EPA/600/6-91/003 February 1991.

II. SPECIAL CONDITIONS

Methods for Aquatic Toxicity Identification Evaluations Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity, United States Environmental Protection Agency Office of Research and Development, EPA/600/R-92/080 September 1993 Washington DC 20460.

Methods for Aquatic Toxicity Identification Evaluations Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, United States Environmental Protection Agency Office of Research and Development Washington DC 20460, EPA /600/R-92/08 1 September 1993.

Clarifications Regarding Toxicity Reduction and Identification Evaluations in the National Pollutant Discharge Elimination System Program, March 27, 2001, U.S. Environmental Protection Agency, Office of Wastewater Management , Office of Regulatory Enforcement, Washington, DC 20460.

3. Beginning 60 days from the date of the Department's acceptance of the TRE study plan and every 60 days thereafter, the permittee shall submit progress reports including all relevant test data to the Department. This shall continue until completion of the toxicity reduction confirmation.

4. Within 60 days of completion of the toxicity identification or the source identification phase of the TRE, the permittee shall submit to the Department a plan, schedule and completion date for implementing those measures necessary to eliminate acute toxicity, an LC50 greater than 100%, and/or eliminate chronic toxicity, an IC25 greater than the in-stream waste concentration (IWC). The implementation of these measures shall begin immediately upon submission of this plan.

5. Within 60 days of completing the implementation of the control measures to eliminate or reduce toxicity, the permittee shall submit to the Department for approval a study plan to confirm the elimination or reduction of toxicity by using biomonitoring.

6. If, for any reason, the implemented measures do not result in compliance with the Department's toxicity limitations, the permittee shall continue the TRE and a Whole Effluent Toxicity (WET) permit limit and a compliance schedule will be required.

7. Submit all TRE-related materials to:

Maryland Department of the Environment
Water Management Administration
Compliance Program
1800 Washington Blvd., Suite 420
Baltimore, MD 21230-1708

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F. Toxic Chemical Testing

1. Concurrent with the biomonitoring study plan, the permittee shall submit to the Department for approval, a study plan to perform three sets of analytical testing for toxic chemicals.

2. The toxic chemical testing study plan shall include a description of:

   a. sampling methods;

   b. analytical methods;

   c. practical detection levels; and

   d. quality control procedures.

3. Concurrently with the first three biomonitoring toxicity tests, the permittee shall perform analytical testing for the toxic chemicals identified in the Department's "Toxic Pollutant Monitoring Protocol and Reporting Requirements for Toxic Chemical Testing Analytical Data" (05/18/2011).

4. Substances other than those identified in Section 3 above may be detected in the effluent. If so, the permittee shall identify and quantify the ten present in highest concentration for those compounds for which standards are available.

5. Results of each toxic chemical test performed as per Sections II.F.3 and II.F.4 shall be submitted to the Department with results of the concurrent biomonitoring toxicity test.

6. Toxic chemical testing results shall be reported in accordance with the Department's "Toxic Pollutant Monitoring Protocol and Reporting Requirements for Toxic Chemical Testing Analytical Data" (05/18/2011).

7. If testing is not performed in accordance with the Department's approved study plan, additional testing may be required by the Department.

8. Submit all toxic chemical testing related materials to:

Attention: Toxic Chemical Data
Maryland Department of the Environment
Water Management Administration
Compliance Program
Montgomery Park Business Center
1800 Washington Boulevard, STE 420
Baltimore, MD. 21230-1708

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G. Pretreatment Program

The permittee shall operate and maintain the pretreatment program in accordance with COMAR 26.08.08, the General Pretreatment Regulations for Existing and New Sources of Pollution (40 CFR Part 403) and the approved pretreatment program submission as approved on **08/07/1985** by the Department. The program must be updated if needed to comply with COMAR 26.08.08 or 40 CFR Part 403 or modifications to the State of Maryland Publicly Owned Treatment Works (POTW) Pretreatment Delegation Agreement signed on **11/07/1991** and as amended on **07/09/2001**. The terms of the POTW Pretreatment Delegation Agreement are expressly incorporated herein as if set forth in full.

H. Protection Of Water Quality

It is a violation of this permit to discharge any substance not otherwise listed under the permit's "Effluent Limitations and Monitoring Requirements" special conditions at a level which would cause or contribute to any exceedance of the numerical water quality standards in COMAR 26.08.02.03 unless the level and the substance were disclosed in writing in the permit application prior to the issuance of the permit. If a discharge regulated by this permit causes or contributes to an exceedance of the water quality standards in COMAR 26.08.02.03, including but not limited to the general water quality standards, or if the discharge includes a pollutant that was not disclosed or addressed in the public record for the permit determination, the Department is authorized to modify, suspend or revoke this permit or take enforcement action to address unlawful discharges of pollutants.

I. Reapplication for a Permit

No later than 04/01/2017, unless permission for a later date has been granted by the Department, the permittee shall submit a new application for a permit or notify the Department of the intent to cease discharging by the expiration date. In the event that a timely and complete reapplication has been submitted and the Department is unable, through no fault of the permittee, to issue a new permit before the expiration date of this permit, the terms and conditions of this permit continue and remain fully effective and enforceable. The renewal application is required by that date in accordance with the requirements of MDE's Watershed Permitting Plan under which all discharge permits in a watershed should be issued in the same year.

II. SPECIAL CONDITIONS

J. Reclaimed Water Total Residual Chlorine Concentration and Turbidity Requirements.

(a) The Permittee shall ensure that the effluent supplied from the Little Patuxent Water Reclamation Plant (WRP) is chlorinated and maintained with adequate level of free chlorine residual in the reclaimed water system when it reaches the receiving reclaimed water tank at the Federal Facility. The permittee shall monitor the residual chlorine in the reclaimed water sent to the Federal Facility continuously at the pumping station specified as Monitoring Point **102** in this permit. The results of the residual chlorine monitoring shall be reported in the Discharge Monitoring Report (DMR, EPA Form 3320-1) as monthly average concentrations and submitted to the Department. The permittee shall provide re-chlorination infrastructures at the elevated reclaimed water tank located inside the Federal Facility area to ensure additional chlorine, if necessary, can be added to the reclaimed water system to ensure that detectable chlorine residual level is maintained in the reclaimed water on-site storage and prior to use in the cooling water makeup system.

(b) The permittee shall install a continuous on-line turbidity meter at the reclaimed water pumping station (Monitoring Point **102**) for continuous monitoring on the turbidity of the re-claimed water sent to the Federal facility in accordance with the procedures specified in 40 CFR 136. The monitoring records for turbidity shall be maintained by the facility to be available upon request from the Department. Data obtained from the continuous on-line analyzer shall be reported to MDE along with the monitoring data for free residual chlorine as specified above. In the event when turbidity exceeds 5 NTU in the supplied reuse water, the permittee shall notify the Federal Facility to use an alternative water source in lieu of the cooling tower storage tank reclaimed water. In addition, the Reclaimed Water Pumping Station shall be temporarily shut-off until proper turbidity level is restored". The results of the turbidity monitoring shall be reported in the Discharge Monitoring Report (DMR, EPA Form 3320-1) as daily maximum NTUs and submitted to the Department.

K. Reclaimed Water Supplier and User Obligations.

To ensure mutual understanding on the obligations to comply with the total residual chlorine and turbidity requirements specified in this permit. The permittee shall submit a "Memorandum of Understanding" (MOU) between the supplier and user of the reclaimed water to the Department with the above permit requirements incorporated.

III. GENERAL CONDITIONS

A. Monitoring and Reporting

1. Representative Sampling

Samples and measurements shall be taken at times that are representative of the quantity and quality of the discharge, and at evenly spaced intervals.

2. Monthly Monitoring Results

a. Discharge Monitoring Reports

Monitoring results obtained each month shall be summarized on a Discharge Monitoring Report form (EPA No. 3320-1). The permittee shall submit the Discharge Monitoring Reports to the Department postmarked no later than the 28th of the month following the reporting month. A signed original plus a copy of these reports shall be submitted to:

Attention: Discharge Monitoring Reports
WMA - Compliance Program
Maryland Department of the Environment
1800 Washington Boulevard, STE-425
Baltimore, MD 21230-1708

A signed copy of these reports shall also be sent to:

U.S. Environmental Protection Agency, Region III
NPDES Enforcement Branch (3WP42)
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Paper DMR submittal to MDE and U.S EPA as required above shall be applicable until the NetDMR submittal program is finalized and implemented by the Little Patuxent Water Reclamation facility. Upon the implementation, the permittee shall submit NetDMR to comply with the Discharge Monitoring Report (DMR) submittal requirements.

b. Monthly Operating Reports

The permittee shall submit monthly operating reports on a form acceptable to the Compliance Program. A signed original plus a copy of these reports shall be submitted to the Compliance Program postmarked no later than the 28th day of the month following the reporting month.

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c. Toxic Chemical Reporting

Any data collected according to the Department's "Toxic Pollutant Monitoring Protocol and Reporting Requirements for Toxic Chemical Testing Analytical Data" (05/18/2011) being submitted to the Department, either in fulfillment of Special Conditions II.B or pursuant to the toxic chemical testing requirement, pretreatment requirements or toxic metals or organic data collected on a voluntary basis, must be accompanied by laboratory data reports. At a minimum, these reports shall include, the name of the facility, the date(s) of sampling, beginning and ending sample time, place of sampling collection, the sample type (grab, composite, etc.), the sample description (influent or effluent), the preservation method, the analytical method used for each parameter, the analytical method detection limit, the date of analysis, the name of person performing the analysis, the analytical result, and the name and address of the laboratory performing the analyses. Chain-of-custody forms shall also be submitted. This information, along with the supporting documentation, shall be submitted to:

Attention: Toxic Chemical Data
WMA – Compliance Program
Maryland Department of the Environment
1800 Washington Boulevard, STE 420
Baltimore, Maryland 21230-1708

3. Sampling and Analysis Methods

Analytical and sampling methods shall conform to test procedures for the analysis of pollutants as identified in 40 CFR Part 136 - "Guidelines Establishing Test Procedures for the Analysis of Pollutants."

4. Analytical Laboratory

Within 30 days after the effective date of this permit, the permittee shall submit to the Department the name and address of the analytical laboratory (including the permittee's own laboratory) which is used to perform the monitoring required by this permit.

If the laboratory changes during the effective period of this permit, the permittee shall notify the Department of the new laboratory within 30 days after the change.

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5. Monitoring Equipment Maintenance

   a. The permittee shall calibrate and maintain all monitoring and analytical instrumentation to ensure accuracy of measurements.

   b. Environment Article, Section 9-343 provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

6. Recording of Results

   For each measurement or sample taken pursuant to the requirements of the permit, the permittee shall record the following information:

   a. the date, exact place and time of sampling or measurement;

   b. the person(s) who performed the sampling or measurement;

   c. the dates analyses were performed;

   d. the person(s) who performed each analysis;

   e. the analytical techniques or methods used; and

   f. the results of such analyses.

7. Additional Monitoring by Permittee

   If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report form (EPA No. 3320-1). The increased frequency shall also be reported. The results of any other monitoring performed by the permittee shall be made available to the Department upon request.

8. Record Retention

   All data used to complete the permit application and all records and information resulting from the monitoring activities required by this permit, including all records of sampling and analyses performed, calibration and maintenance of

III. GENERAL CONDITIONS

instrumentation, and recordings from continuous monitoring instruments, shall be retained for a minimum of three years. This period shall be extended automatically during the course of litigation or when requested by the Department.

B. General Requirements

1. Permit Noncompliance - Notification Requirements

All discharges authorized herein shall be consistent with the terms and conditions of this permit. If, for any reason, the permittee does not comply with or will be unable to comply with any permit condition, the permittee shall, within 24 hours, notify the Department by telephone at (410) 537-3510 during work hours or at (866) 633-4686 during evenings, weekends, and holidays. The permittee shall provide the Department with the following information in writing within five days of such oral notification.

a. a description of the noncomplying discharge including the name of the stream and the impact upon the receiving waters;

b. cause of noncompliance;

c. the duration of the period of noncompliance and the anticipated time the condition of noncompliance is expected to continue;

d. steps taken by the permittee to reduce and eliminate the noncomplying discharge;

e. steps to be taken by the permittee to prevent recurrence of the condition of noncompliance;

f. a description of the accelerated or additional monitoring to determine the nature and impact of the noncomplying discharge; and

g. the results of the monitoring described in f. above.

2. Change in Discharge

The permittee shall report any anticipated facility expansions, production increases, or process modifications which will result in new, different or an increased discharge of pollutants by submitting a new application at least 180 days prior to the commencement of the changed discharge except that if the change only affects a listed pollutant and will not violate the effluent limitations specified in this permit, by providing written notice to the Department. Following such notice, the permit may be modified by the Department to include new effluent limitations on those pollutants.

III. GENERAL CONDITIONS

3. Facility Operation and Quality Control

All waste collection, control, treatment and disposal facilities shall be operated in a manner consistent with the following:

a. Facilities shall be operated efficiently to minimize upsets and discharges of excessive pollutants.

b. The permittee shall provide an adequate operating staff qualified to carry out operation, maintenance and testing functions required to ensure compliance with this permit. Superintendents and operators must be certified by the Board of Waterworks and Waste Systems Operators located at Montgomery Park Business Center, 1800 Washington Boulevard, STE- 410, Baltimore, Maryland 21230 in accordance with Title 12 of Environmental Article, Annotated Code of Maryland, and Section 26.06.01 of the COMAR.

c. Facility maintenance work, which adversely affects or may adversely affect the discharge quality shall be scheduled during non-critical water quality periods.

4. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to waters of this State, human health or the environment resulting from noncompliance with any effluent limitations specified in this permit, and must perform accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. Bypassing

Any bypass of treatment facilities is prohibited unless the bypass does not cause any violations of the effluent limitations specified in Special Condition II.A, and is for essential maintenance to assure efficient operation, or unless the permittee can prove that:

a. the bypass is unavoidable to prevent loss of life, personal injury, or substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources; and

b. there are no feasible alternatives to the bypass; and

III. GENERAL CONDITIONS

c. the Department receives notification pursuant to General Condition III.B.1 above. Where the need for a bypass is known (or should have been known) in advance, this notification shall be submitted to the Department for approval at least ten days before the date of the bypass or at the earliest possible date if the period of advance knowledge is less than ten days; and

d. the bypass is allowed under conditions approved by the Department to be necessary to minimize adverse effects.

6. Conditions Necessary for Demonstration of Upset

An upset shall constitute an affirmative defense to an action brought for noncompliance with technology-based effluent limitations only if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence, that:

a. an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. the permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;

c. the permittee submitted a 24-hour notification of upset in accordance with the reporting requirements of General Condition III.B.1 above;

d. the permittee submitted, within five calendar days of becoming aware of the upset, documentation to support and justify the upset; and

e. the permittee complied with any remedial measures required to minimize adverse impact.

In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

7. Sewage Sludge Requirements

The permittee shall comply with all State and federal laws and regulations regarding Sewage Sludge Management, and with any regulations promulgated pursuant to Environment Article, Section 9-230 et seq. or to the Clean Water Act, Section 405 (d). A Sewage Sludge Utilization Permit is required for the collection, handling, burning, storage, treatment, land application, disposal, or transportation of sewage sludge, processed sewage sludge, or any product containing these materials in Maryland.

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8. Power Failure

The permittee shall maintain compliance with the effluent limitations and all other terms and conditions of this permit in the event of a reduction, loss or failure of the primary source of power to the wastewater collection and treatment facilities.

9. Right of Entry

The permittee shall allow the Secretary of the Department, the Regional Administrator of the Environmental Protection Agency, and their authorized representatives, upon the presentation of credentials to enter upon the permittee's premises and:

a. to have access to and to copy any records required to be kept under the terms and conditions of this permit;

b. to inspect any monitoring equipment or monitoring method required in this permit;

c. to inspect any collection, treatment, pollution management, or discharge facilities required under this permit; or

d. to sample any discharge of pollutants.

10. Property Rights/Compliance With Other Requirements

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property, invasion of personal rights, or any infringement of federal, State or local laws or regulations.

11. Reports and Information

a. Upon request, the permittee shall provide to the Department, within a reasonable time, copies of records required to be kept by this permit. The permittee shall also furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit.

b. All applications, reports or documents submitted to the Department shall be signed and certified as required by COMAR 26.08.04.01 and 40 CFR 122.22.

III. GENERAL CONDITIONS

c. Except for data determined to be confidential under COMAR 26.08.04.01, all data shall be available for public inspection at the Department and the Office of the Regional Administrator of the Environmental Protection Agency. Effluent data shall not be considered confidential.

d. Environment Article, Section 9-343 provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, shall upon conviction be punished by a fine of not more than $10,000 or by imprisonment for not more than six months or by both.

12. Transfer of Ownership or Control

In the event of any change in ownership or control of facilities from which the authorized discharge emanates, the permit may be transferred automatically to another person only if:

a. the current permittee notify the Department, in writing, of the proposed transfer at least 30 days prior to the proposed transfer date;

b. the notice includes a written agreement between the existing permittee and a new permittee containing the specific date of proposed transfer of permit coverage, and of responsibilities and liabilities under the permit; and

c. neither the current permittee nor the new permittee receive notification from the Department, within 30 days of the Department's receipt of the agreement, of its intent to modify, revoke, reissue or terminate the existing permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 12(b) above.

13. New Effluent Standards

This permit shall be revoked and reissued or modified to meet any effluent standard, water quality standard or prohibition established under the Environment Article, the Clean Water Act, or regulations promulgated thereto, and the permittee shall be so notified.

III. GENERAL CONDITIONS

14. Industrial Users

The permittee shall require all industrial users of the wastewater treatment facility to comply with user charges as established by the permittee, pursuant to Section 9-326(a)(i) of the Environment Article.

15. Noncompliance

Nothing in this permit shall be construed to preclude the institution of any legal action for noncompliance with State, federal or local laws and regulations.

16. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action against the permittee or to relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act or under the Environment Article.

17. Waterway Construction and Obstruction

The permit does not authorize the construction or placing of physical structures, facilities, debris, or the undertaking of related activities in any waters of this State including the 100 year flood plain.

18. Construction Permit

This permit is not a permit to construct. For a new facility, in order to make this permit valid, a construction permit shall be obtained to meet the requirements of COMAR 26.03.12.03(A) and Environment Article, Section 9-204(d).

19. Severability

If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect, and such invalid provisions shall be considered severed and deleted from this permit.

III. GENERAL CONDITIONS

C. Wastewater Collection System

This permit shall not authorize discharges from the wastewater collection system for this facility.

1. Reporting Requirements

Pursuant to Environment Article Sub title 9-331.1, the permittee must report sanitary sewer overflows (SSOs) which result in the direct or potential discharge of raw or diluted sewage into the surface waters or ground waters of the State to the Water Management Administration's Compliance Program. Concurrently, the permittee shall also notify the local health department. Such reports must be made via telephone as soon as practicable, but no later than 24 hours after the time that the permittee became aware of the event. Reportable SSOs include, but are not limited to, overflows into the surface of the ground, into waterways, storm drains, ditches or other manmade or natural drainage conveyances to surface or ground waters which are reasonably likely to reach waters of the State. Overflows that are wholly contained within buildings and not likely to discharge to waterways need not be reported. Treatment plant bypasses shall be reported under General Condition III.B.1. Telephone reports shall be made to (410) 537-3510 on weekdays between 8:00 a. m. and 5:00 p.m. After hours telephone notification shall be made to emergency response number at (866) 633-4686.

When the incident is reported to the Department, the following information needs to be included:

a. the location of the overflow, including city or county,

b. the name of the receiving water, if applicable;

c. an estimate of the volume of sewage discharged;

d. a description of the sewer system or treatment plant component from which the overflow was released (such as manhole, crack in pipe, pumping station wet well or constructed overflow pipe);

e. an estimate of the overflow's impact upon public health and to waters of the State;

f. the cause or suspected cause of the overflow;

g. the estimated date and time when the overflow began and stopped or the anticipated time the overflow is expected to continue;

III. GENERAL CONDITIONS

h. if known at the time of reporting, the steps taken or planned to reduce, eliminate and prevent reoccurrence of the overflow and a schedule of major milestones for those steps; (if unknown at the time the telephone report is made, the steps must be included in the written reports submitted under general conditions III.C.2).

i. if known at the time of reporting, measures taken or planned to mitigate the adverse impact of the overflow and a schedule of major milestones for those steps (if unknown at the time the telephone report is made, the steps must be included in the written reports submitted under general conditions III.D.2); and

j. whether there has already been a notification to the public and other City or County Agencies or Departments and how notification was done.

2. Written Reports

Within 5 calendar days following telephone notification of the event, the permittee shall provide MDE with a written report regarding the incident that includes, at a minimum, the information cited above.

The permittee shall maintain copies of all overflow records and reports, work orders associated with investigation of overflows, a list and description of complaints from customers or others related to overflows (including backups of sewage in to houses or businesses), and documentation of performance and implementation measures for minimum period of three years and shall make this information available to MDE for review upon written request.

This wastewater collection system provision may be superseded by a general permit for collection systems, when such a permit is issued by MDE and the permittee have been accepted for registration under the permit.

3. Other Requirements

The permittee, as directed by the State or local health department, shall also be responsible for posting notification in close proximity to the affected area/stream and for conducting appropriate water quality sampling as deemed necessary.

III. GENERAL CONDITIONS

D. Permit Expiration, Modification, or Revocation

1. Expiration of Permit

This permit and the authorization to discharge shall expire at midnight on the expiration date of the permit unless the permittee has submitted a timely and complete reapplication pursuant to Section II.I.

2. [Reserved.]

3. Permit Modification - Request of Responsible Permittee

A permit may be modified by the Department upon the written request of the permittee and after notice and opportunity for a public hearing in accordance with the provisions set forth in COMAR 26.08.04.10.

4. Permit Modification, Suspension, Revocation - Violation of Laws

A permit may also be modified, suspended or revoked by the Department, in the event of a violation of the terms or conditions of the permit, or of State or federal laws and regulations and in accordance with the provisions set forth in COMAR 26.08.04.10. This permit may be suspended or revoked upon a final, unreviewable determination that the permittee lacks, or is in violation of, any federal, state, or local approval necessary to conduct the activities authorized by this permit.

IV. CIVIL AND CRIMINAL PENALTIES

A. Civil Penalties for Violations of Permit Conditions

In addition to civil penalties for violations of State water pollution control laws set forth in Section 9-342 of the Environment Article, Annotated Code of Maryland, the Clean Water Act provides that any person who violates Section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the Act or in a permit issued under Section 404 of the Act, is subject to a civil penalty not to exceed $32,500 per day for each violation.

B. Criminal Penalties for Violations of Permit Conditions

In addition to criminal penalties for violations of State water pollution control laws set forth in Section 9-343 of the Environment Article, Annotated Code of Maryland, the Clean Water Act provides that:

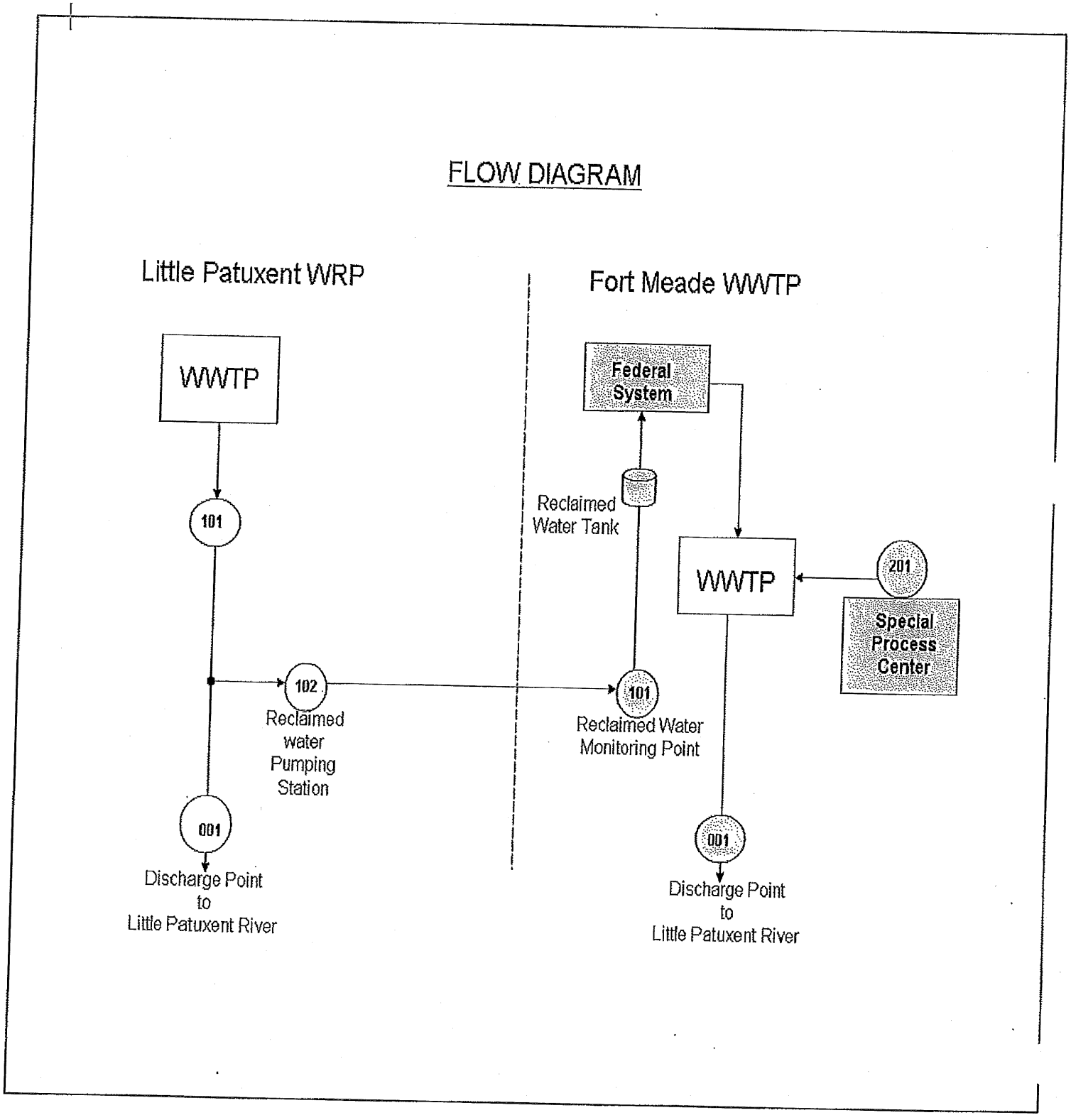
1. any person who negligently violates Section 301, 302, 306, 307, 308, 318, or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the Act, or in a permit issued under Section 404 of the Act, is subject to a fine of not less than $2,500 nor more than $27,500 per day of violation, or by imprisonment for not more than one year, or by both.

2. any person who knowingly violates Section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the Act, or in a permit issued under Section 404 of the Act, is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than three years, or by both.

3. any person who knowingly violates Section 301, 302, 306, 307, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the Act, or in a permit issued under Section 404 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, is subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both.

4. any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with or renders inaccurate any monitoring device or method required to be maintained under the Act, is subject to a fine of not more than $10,000 or by imprisonment for not more than two years, or by both.

V. MAP SHOWING DISCHARGE POINT LOCATION



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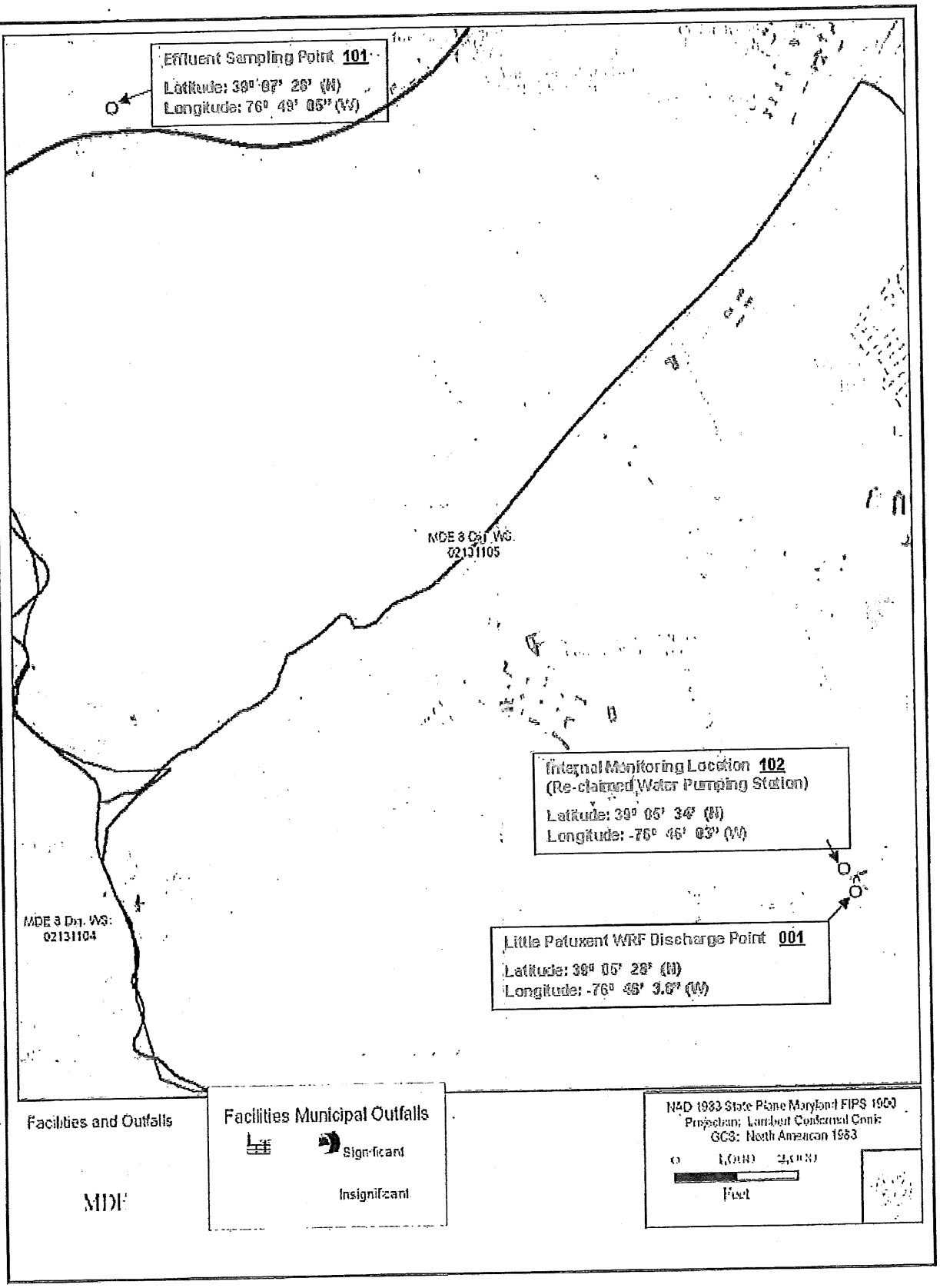
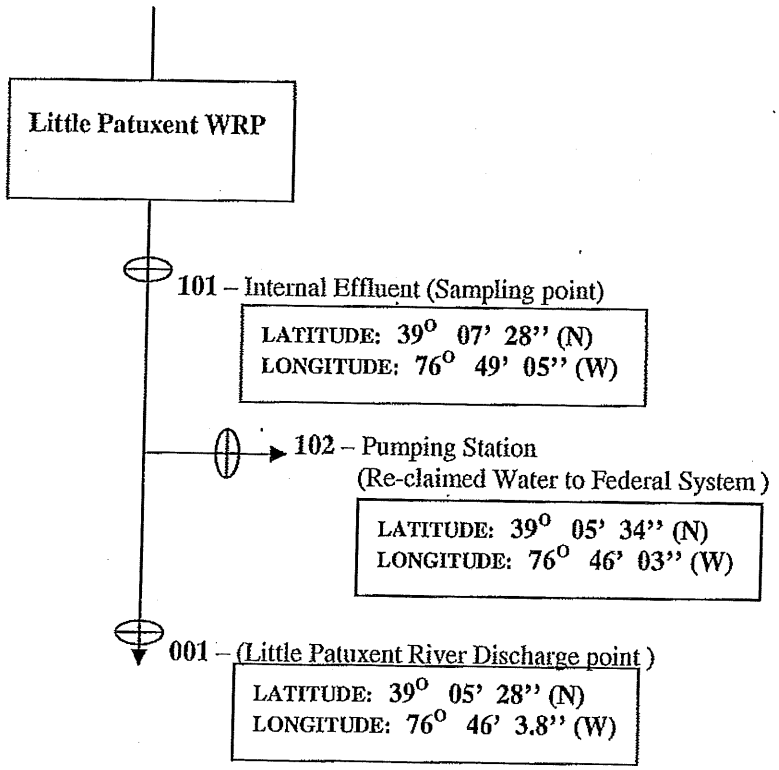


VI. NPDES PROGRAM

APPENDIX - A

Outfalls and Monitoring Points Locations

Flow Diagram



Internal Effluent Sampling Point 101 is the final effluent sample location prior to the diversion of the reclaimed water to the Federal System conveyance pipe (See Flow Diagram and Map, **Section V.**)

Internal Sampling Point 102 is the re-claimed water diversion location (See Flow Diagram and Map, **Section V.**)

Discharge Point 001 is the stream's point of discharge at the Little Patuxent River (See Flow Diagram and Map, **Section V.**)

VI. NPDES PROGRAM

On September 5, 1974, the Administrator of the U.S. Environmental Protection Agency approved the proposal submitted by the State of Maryland for the operation of a permit program for wastewater discharges pursuant to Section 402 of the Clean Water Act.

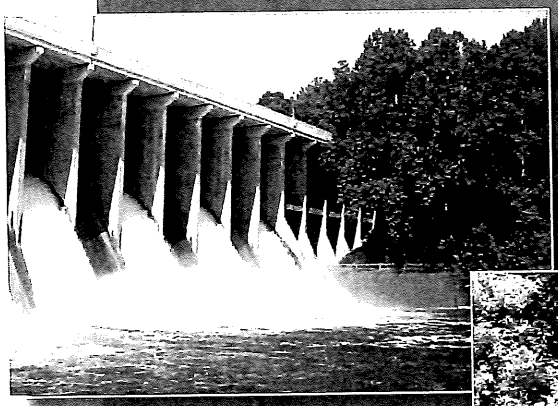
Pursuant to the aforementioned approval, this discharge permit is both a State of Maryland discharge permit and an NPDES permit.

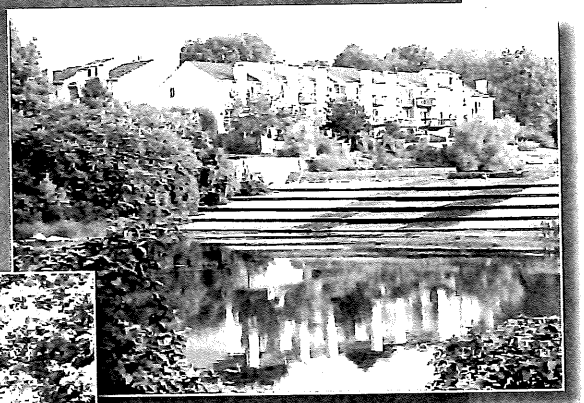
Jay G. Sakai, Director
Water Management Administration

EXHIBIT 10

Water Resources Element April 2010

WATER RESOURCES ELEMENT





An Amendment to General Plan 2000

Howard County

April 2010

PREFACE

During the 2006 legislative session, the Maryland General Assembly enacted House Bill 1141 Land Use – Local Government Planning. HB 1141 requires that local jurisdictions adopt a water resources element in their comprehensive plans. The Howard County Water Resources Element (WRE) serves as an amendment to General Plan 2000 that adds Policies and Actions intended to ensure that the County has adequate water resource capacities to meet future growth needs through 2030.

The Howard County Environmental Sustainability Board, which is comprised of environmental experts that advise the County Executive on environmental matters, served as a citizen's advisory committee for the Water Resources Element amendment. The Environmental Sustainability Board and Department of Planning and Zoning cosponsored two public meetings in fall 2009 to acquaint the public with the Draft WRE and to solicit comments. The Proposed WRE Amendment was presented to the Planning Board for review at a public hearing in December 2009. The Planning Board unanimously approved a motion to recommend County Council approval of the WRE. The County Council held a public hearing to consider the WRE Amendment in March 2010. By vote of the County Council and signature of the County Executive, the Amendment was approved on April 7, 2010 and became effective on June 8, 2010.

Additional information about the Water Resources Element amendment is available either by contacting the Department of Planning and Zoning or through the Howard County web site at:

http://www.howardcountymd.gov/

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Water Resources Element

The Water Resources Element (WRE) is an amendment to the General Plan that is required by State legislation passed in 2006. The intent of the WRE is to ensure a safe and adequate supply of drinking water, and adequate land and water capacity for the treatment of wastewater and stormwater, to support future growth.

This Water Resources Element amendment incorporates and updates relevant Policies and Actions from General Plan 2000 and adds new Policies and Actions. These Policies and Actions are intended to help the County meet an overarching goal of managing our water resources more sustainably to ensure that as the County continues to grow, our water resources will be conserved, protected and restored to health. It is critical to ensure the health of our local and regional waters, if we are to restore the Chesapeake Bay.

Growth projections for the Water Resources Element extend to the year 2030 and are based on the General Plan 2000. The WRE projections were modified to address potential requests for new development or redevelopment in Columbia Town Center, the Village Centers and Doughoregan Manor.

Drinking Water and Wastewater

The water for Howard County's public water supply system is purchased from Baltimore City and the Washington Suburban Sanitary Commission (WSSC). More than 95% of the County's public water supply is provided through the Baltimore City Central System and less than 5% is provided by WSSC. The supply of public water is not expected to be a constraint on projected growth and development within the Planned Service Area (PSA) through the year 2030. Outside the PSA, there is generally an adequate supply of good quality groundwater to serve projected demand from individual and community wells.

Source: Versar, Inc.

Although the County only gets 5% of its drinking water from the WSSC reservoirs, about half the reservoirs watershed is in the County.

To manage water resources more sustainably, the County should encourage water conservation, which will also help reduce flows to the wastewater treatment plants. The County should also increase support for the Baltimore and Patuxent Reservoirs interjurisdictional watershed protection efforts, to maintain the high quality of these drinking water supply sources.

Wastewater treatment within the PSA is provided by the Little Patuxent Water Reclamation Plant (WRP), which is owned and operated by Howard County, and the Patapsco Wastewater Treatment Plant (WWTP), which is owned and operated by Baltimore City. The service areas for these plants are largely defined by the natural drainage areas for the Patuxent and

Patapsco Rivers. Capacity at the plants is expected to be adequate to meet projected growth and development within the PSA through the year 2030.

Source: Howard County Public Information Office

The Little Patuxent Water Reclamation Plant treats wastewater for about 70% of the County served by public sewer.

To meet Chesapeake Bay cleanup goals, Maryland has established annual nutrient (nitrogen and phosphorus) loading caps for all major wastewater treatment plants in the State. Once flows at the Little Patuxent WRP exceed the amount used to establish this cap, the plant must maximize treatment to ensure the cap is met. Capacity at the Patapsco WWTP may be reduced once treatment at the plant is upgraded to meet the cap, which may in turn reduce the County's capacity allocation at the plant.

The nutrient caps must be maintained to help restore the health of the rivers and the Bay, into which the plants discharge, while ensuring the County has adequate wastewater treatment capacity to allow continued growth. To help maintain the nutrient cap at the wastewater treatment plants, development on properties added to the current PSA, large redevelopment sites within the PSA and large sites with zoning intensification within the PSA should minimize increases in flow and the nutrient concentration in flow sent to the plants. This can be achieved through a combination of water conservation and reuse, and on-site treatment of wastewater. In addition, the County should continue to look for opportunities to expand wastewater reuse and investigate options for nutrient trading.

Outside the PSA, County soils are generally capable of supporting individual and shared septic fields. The County should encourage the use of nitrogen reducing treatment for new and upgraded septic systems, to reduce nitrogen loads to groundwater and surface water.

Water and Related Land Resources

The County develops watershed management plans to set priorities and guide efforts to protect, restore and improve the County's water resources. These efforts help the County meet Federal and State requirements to improve water quality. Most water bodies in the County have degraded water quality and habitat for aquatic life, although there are also stream segments with excellent water quality and habitat. The watershed management plans have generated an extensive list of restoration projects that far exceeds the current capital budget for these projects. It is easier and more cost effective to protect high quality resources in a watershed than to allow resources to become degraded and then attempt restoration. To manage water resources more sustainably, the County should strengthen resource protection measures and enhance watershed restoration efforts.

The County should continue to prepare watershed management plans for all County watersheds. The Middle Patuxent River watershed should be a priority for future study, because it is projected to have the largest percentage of the County's future land use change. Watershed management plans should also be expanded to address wetland resources, and establish goals for forest cover and riparian forest buffers.

Development regulations can help protect water resources from impacts caused by development. New State stormwater management regulations increase pollutant removal, groundwater recharge and stream channel protection requirements for new development and redevelopment. Howard County must adopt these new regulations by May 2010. The County should also strengthen buffer requirements to enhance protection of streams, wetlands and floodplains.

Development regulations must be properly implemented and enforced to be effective. The County should ensure there are adequate resources to monitor and enforce development regulations and to effectively educate developers and contractors. The County must also ensure that stormwater management facilities, which will increase significantly in number as a result of the new stormwater management regulations, are inspected regularly and maintained over time.

The majority of land in the County is privately owned, so implementing best management practices (BMPs) on private residential, business and agricultural property is critical to improving water quality and habitat. Current outreach and education efforts should be expanded and new programs initiated to increase BMP implementation on private property. The County can also provide leadership in BMP implementation by incorporating environmentally sensitive site development and property management practices into County activities.

If the County wishes to increase the pace of watershed restoration, expanding outreach and education to increase the implementation of best management practices on private properties, additional funding is needed. The County should institute a dedicated fund to provide increased and sustained funding for the watershed management program, which is anticipated to continue to expand and evolve in response to Federal and State regulatory requirements.

Protecting our rivers, streams and wetlands from degradation is more sustainable than trying to mitigate the damage done to them.

GENERAL PLAN 2000

General Plan Visions

The central theme for the General Plan 2000 is that we are stewards of the County's social, economic and environmental systems. Six visions for Howard County's future support this central theme and provide a foundation for the Policies and Actions of the General Plan.

Vision 1: ***Our actions will complement State and regional initiatives in resource and growth management.***

Vision 2: ***Our rural lands will be productive and rural character will be conserved.***

Vision 3: ***Our development will be concentrated within a growth boundary, will be served by adequate public facilities and will encourage economic vitality.***

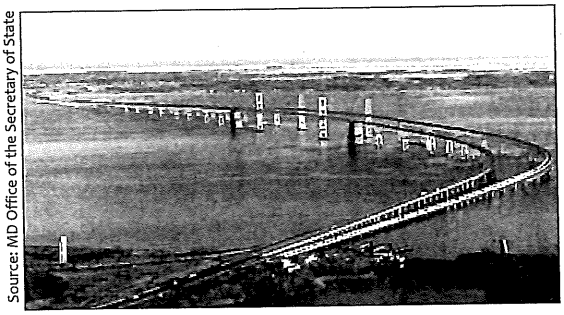
Vision 4: ***Our communities will be livable, safe and distinctive.***

Vision 5: ***Our environmental resources will be protected, used wisely and restored to health.***

Vision 6: ***Our citizens will take part in the decisions and actions that affect them.***

The Water Resources Element

The Water Resources Element is an amendment to the General Plan that is required by State legislation passed in 2006. The intent of the Water Resources Element is to ensure a safe and adequate supply of drinking water, and adequate land and water capacity for the treatment of wastewater and stormwater, to support future growth. The Water Resources Element must reflect the opportunities and limitations presented by local and regional water resources. It is intended to improve the protection of water resources and to address water resource goals within the context of local and State Smart Growth policies.



Source: MD Office of the Secretary of State

The Chesapeake Bay is an important regional water resource.

Our water resources include our rivers, wetlands, floodplains, lakes, reservoirs and groundwater. These are vital natural resources that provide drinking water, stormwater management, pollution abatement, floodwater storage, transportation and recreation, as well as important habitat for a wide variety of plant and animal species. Water resources are linked together through the hydrologic cycle, which circulates water from the atmosphere to the land, groundwater and surface water, and then back to the atmosphere. This linkage means that impacts on one resource can have successive impacts on other resources.

The General Plan 2000 contains numerous Policies and Actions related to the protection and restoration of water resources. The Responsible Regionalism chapter addresses cooperation for regional protection of water resources, Preservation of the Rural West addresses groundwater and septic systems, Balanced and Phased Growth addresses the adequate supply of drinking water and wastewater treatment capacity, and Working with Nature addresses environmental stewardship, the protection of streams and wetlands, and stormwater management.

The Working with Nature chapter also contains Policies and Actions related to green space and greenways, as a resource protection network. Green space includes open space, easements, parks and other types of conservation areas. These Policies and Actions provide the basis for green space and greenways planning in the 2005 Howard County Land Preservation, Recreation and Parks Plan.

This Water Resources Element amendment incorporates and updates relevant Policies and Actions from General Plan 2000 and adds new Policies and Actions. These Policies and Actions are intended to help the County meet an overarching goal of managing our water resources more sustainably. This includes protecting and restoring water quality to reduce the treatment costs for drinking water and ensure our waters remain fishable and swimmable, and conserving water to reduce the energy and infrastructure costs associated with water supply and wastewater treatment.

Planned Service Area and Priority Funding Area

A significant policy decision in Howard County General Plans since the 1970s was the division of the County into an eastern, urban development area, which would have public water and sewer service, and a less densely developed Rural West, which would not. The Planned Service Area (PSA) in the Master Plan for Water and Sewerage corresponds to the urban development area.

The boundary of the Planned Service Area is Howard County's growth boundary. This identification was strengthened by Maryland's 1997 Smart Growth initiatives under which most categories of State spending for infrastructure and services must be targeted to "Priority Funding Areas" in each County. Howard County's Priority Funding Area is the eastern 40% of the County that lies within the Planned Service Area for both public water and sewerage. The PSA has changed little since 1979, demonstrating the County's commitment to growth management.

Agriculture is the preferred land use in the Rural West. Zoning for the west allows low density residential development, which can be more economically served by individual wells and septic systems. Consequently, this part of the County is designated as the No Planned Service Area.

In July 1993, the County Council voted to extend the PSA to include the area around the Alpha Ridge Landfill. This extension was done solely to address citizen concerns about potential groundwater contamination originating from the Alpha Ridge Landfill, therefore, only water service is provided in this area. In 2006, the County Council voted to allow the provision of sewer service in the Alpha Ridge Water Service Area to provide public services on qualifying government owned parcels. Qualifying parcels are parcels owned by Howard County or the Board of Education, that adjoin another parcel where sewer service is available. Sewer service may be extended to a qualifying parcel only if sewer service can be extended without making the service available to any intervening non-qualifying parcel.

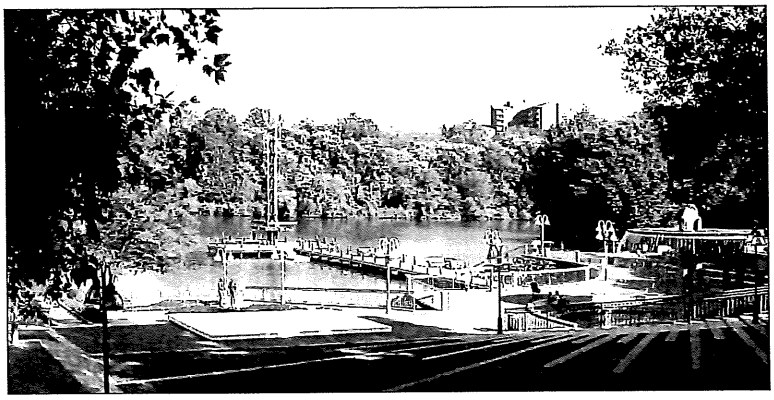
Generally, an extension to the PSA is allowed only if the proposed expansion is part of a proposed zoning and is consistent with the General Plan and Smart Growth policies or for public or institutional uses provided that such an extension is limited to the minimum parcel size necessary to serve the proposed use. In 2006, the County Council voted to limit expansions of the PSA for public or institutional uses to

properties adjoining the existing boundary of the PSA, excluding any intervening privately owned parcels not currently located in the PSA.

Figure 1 shows the General Plan 2000 Policies Map, which includes the PSA boundary.

Growth Projections

Growth projections for the Water Resources Element are based on the General Plan 2000. In Chapter 4, Balanced and Phased Growth, the General Plan 2000 sets allowed annual levels of new residential units by planning area. Using these allowed annual levels, the growth in housing units is projected, then population is estimated based on persons per housing unit and occupancy factors. Since General Plan 2000 is a 20-year plan, the growth projections for the Water Resources Element extend beyond 2020 to the year 2030. The same general pace of growth is assumed between 2020 and 2030, although development slows as developable land becomes more scarce in the out years.



Growth projections include potential redevelopment of Downtown Columbia.

Growth projections for the Water Resources Element were developed in 2008 and are based on a modified version of Round 7a of the Baltimore Metropolitan Council Cooperative Regional Forecast. The Round 7a projections were modified to address the following potential proposals during development of the Water Resources Element.

- A General Plan amendment to request additional population and commercial square footage for the redevelopment of Downtown Columbia.
- A General Plan amendment to request an extension of the PSA to allow limited new residential development on a portion of Doughoregan Manor as part of a comprehensive strategy to protect this National Historic Landmark property.
- Requests for additional population and commercial square footage for the redevelopment of the Columbia Village Centers, as may be permitted under the New Town zoning district.

In 2007, Howard County's household population was 276,263. Based on Round 7a projections, as modified above, the population is expected to grow to almost 330,000 by 2030. This is an increase of about 53,600 residents or a 19% increase over the 23-year projection period. The majority of this growth (80%) will occur inside the Planned Service Area.

In 2005, commercial land use in the County totaled just over 3,500 acres. Based on Round 7a projections, as modified above, this is expected to increase to just over 4,700 acres in 2030. The majority of this acreage (90%) will be located inside the Planned Service Area.

All discussions of projected growth, including land use changes, in the Water Resources Element used the Round 7a projections as modified above. Appendix A provides additional information on the growth projections for the Water Resources Element.

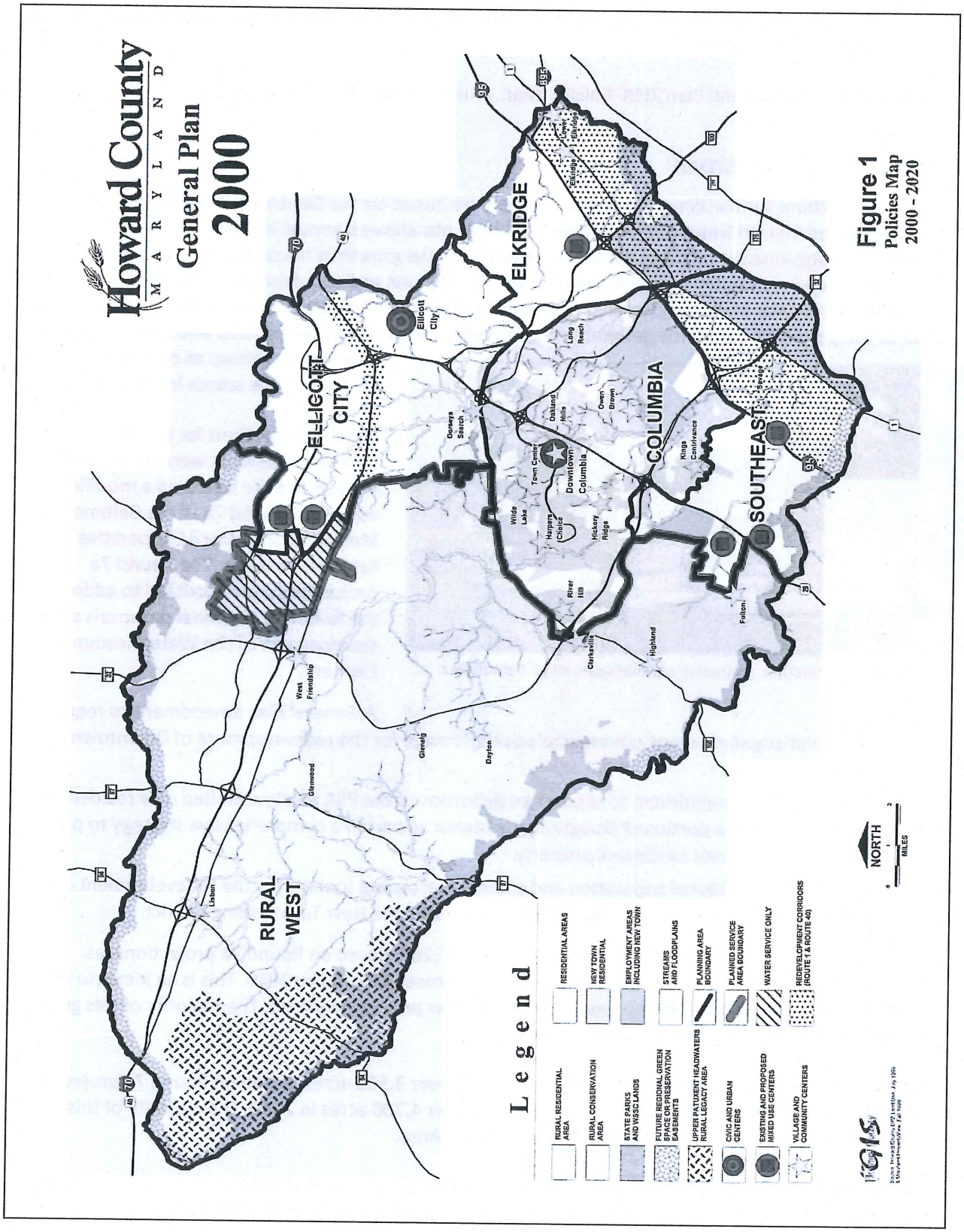


Figure 1: General Plan 2000 Policies Map

DRINKING WATER AND WASTEWATER

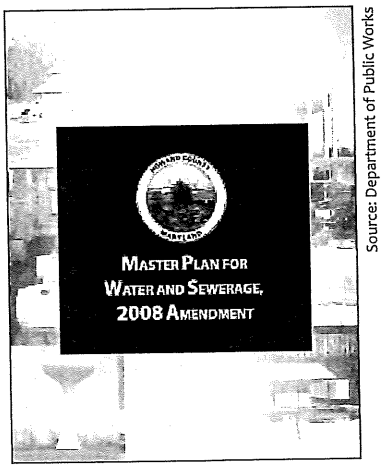
Introduction

Approximately 86% of the County's population is served by the public water and sewer system and the remaining 14% of the population is served by individual wells and individual and shared septic systems. In 2030, approximately 85% of the County's population will be served by the public system.

The pace of residential and employment growth in the County is directly related to the need for additional water and wastewater service. It is important to maintain a growth rate that does not exceed the capacity of the Baltimore City and Washington Suburban Sanitary Commission (WSSC) water supply systems and the Little Patuxent and Patapsco wastewater treatment plants that serve eastern Howard County.

The Provision of Public Water and Sewer Services

The County schedules the provision of water and sewer facilities in the Master Plan for Water and Sewerage (the Master Plan). This Water Resources Element incorporates by reference the Master Plan for Water and Sewerage adopted by the County Council on October 6, 2008. The Master Plan and any proposed amendments must be reviewed by both the Department of Planning and Zoning and the Maryland Department of Planning for consistency with the General Plan before being adopted by the County and approved by the Maryland Department of the Environment. Under State law the Master Plan must be updated every three years.



Source: Department of Public Works

The current Master Plan for Water & Sewerage was adopted by the Howard County Council in 2008.

The Master Plan establishes and delineates the Planned Service Area (PSA) and identifies the remainder of the County as the No Planned Service Area. For capital project planning and the orderly extension of facilities, the Master Plan delineates service priority areas within the PSA as existing and under construction, 0-5 years, 6-10 years, and comprehensive (beyond 10 years). Construction of water and sewer facilities requires a State permit, which may only be obtained if a property is within the 0-5 years service priority area.

Prior to the provision of public water or sewer service, a property must be included in the PSA and must enter the County's Metropolitan District. All properties in the current Metropolitan District are in the PSA, but not all properties in the current PSA are in the Metropolitan District. All properties in the Metropolitan District are subject to fees, assessments and charges, which are dedicated to the Enterprise Fund, which pays for the construction, operation, maintenance and administration of the public water and sewer system.

At times, a developer may want service to a property earlier than specified by the Master Plan and is willing to construct planned facilities in advance of the County capital project construction schedule. If the proposed development is an orderly extension of the system and is consistent with the General Plan and subdivision regulations, the County grants the service priority area change so development can occur. The request for a change in service priority area is made with the initial development plan submittal. These service priority area changes are reflected in the twice yearly update of the Master Plan.

What are the four most critical uses for public water?

- Fire protection and suppression (public safety).
- Flushing away waste (public health).
- Cooling critical equipment and computers.
- Drinking water and wash water.

The State mandates that local authorities may not issue building permits unless the water supply and sewer systems are adequate to serve the proposed development, taking into account all existing and approved developments within the service area. In addition, local authorities may not record or approve a subdivision plat unless water and sewer systems will be adequate and complete in time to serve the proposed development. In Howard County, water and sewer capacity is formally allocated to development at the end of the subdivision or site development plan review process.

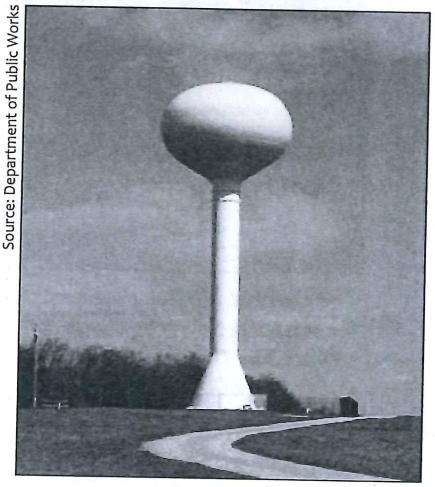
Through the self-sustaining Enterprise Fund, the County pays the construction costs for major facilities in the public water and sewer system and the developer pays the cost for the system extension to their individual development. Orderly expansion of the public water and sewer system is controlled through the County's Capital Budget and Ten-Year Capital Improvement Program, the Metropolitan District entry process, the development plan review process, and the Water and Sewer Capacity Allocation Program.

Drinking Water

The Public Water System

The water for the County's public water supply system is purchased from Baltimore City and WSSC, through a series of negotiated legal agreements. More than 95% of the County's public water supply is provided through the Baltimore City Central System and less than 5% is provided by WSSC.

Source: Department of Public Works



Howard County has nine water storage tanks within the Metropolitan District.

In addition to supplying water to Baltimore City and Howard County, the Central System also provides water to Anne Arundel, Baltimore, Carroll and Harford Counties. Howard County has several water supply agreements with Baltimore City and Baltimore County. These agreements specify the water supply through four physical connections to the Baltimore County system – one at Elkridge, two along Route 40 and one at Gun Road (also in Elkridge).

The Central System's primary water sources include Loch Raven, Prettyboy and Liberty Reservoirs, with the Susquehanna River as a backup source. The watersheds for the Baltimore system reservoirs lie primarily within Carroll and Baltimore Counties.

In addition to supplying water to Howard County, WSSC also provides water to Montgomery and Prince George's Counties. Water sources for WSSC are the Triadelphia and Rocky Gorge Reservoirs along the

Patuxent River, and the Potomac River. The watersheds for the Patuxent Reservoirs lie primarily within Howard and Montgomery Counties.

Howard County's water system is currently divided into eight pressure zones, as shown in Figure 2. An additional ninth water pressure zone is currently under development in the southern portion of the County for the Hammond Branch Extended area. This area is located west of US 29 between MD 216 and Johns Hopkins Road. The water from WSSC is normally used in the County's water pressure zone located east of I-95 between Laurel and Jessup.

Why drink public water rather than bottled water?

- Public water must meet higher standards for purity than bottled water.
- Public water is cheaper than bottled water.
- Bottled water requires considerable energy to produce and distribute.
- Bottled water results in large quantities of refuse that must be recycled or disposed of.

Baltimore City's 2003 Central System Report and 2006 Comprehensive Water and Sewer Plan outline the required improvements to the Central System through the year 2025. A future Central Water Supply System Agreement between Baltimore City, Baltimore County, Anne Arundel County and Howard County will identify the additional water supply facilities needed to provide for projected growth in the Baltimore metropolitan service area and will specify construction schedules, cost shares, water demands and flow limitations.

As shown in Figure 3, current average daily use for the County's public water system is 22.4 million gallons per day (mgd). Under current agreements, the allowable average daily flow from the Baltimore Central System and WSSC is approximately 41.5 mgd. The multiple connections and excess capacity in this supply system gives the County flexibility, should flows be reduced or unavailable through any one connection. If needed, the County system can also pump water from WSSC to other areas of the County, and water from Baltimore City can be substituted for water from WSSC.

The current agreement with WSSC provides for additional capacity, if requested by Howard County and approved by WSSC. The County is currently negotiating with WSSC for this additional capacity, to take advantage of the closer access to WSSC water. Access to this additional capacity would require distribution system improvements by WSSC and Howard County.

As shown in Figure 3, projected average daily use in 2030 is 29.1 mgd and allowable average daily flow is approximately 46.5 mgd. The projected use of water from WSSC in 2030 is maximized to take advantage of the closer access to WSSC water. If the increased flow from WSSC is not available, water from Baltimore City can be substituted. Therefore, the supply of water is not expected to be a constraint on projected growth and development within the Planned Service Area through the year 2030.

Figure 3: Allowable Water Supply and Use

Source	Current		2030	
	Average Daily Use (mgd)	Average Daily Flow (mgd)	Projected Average Daily Use (mgd)	Planned Average Daily Flow
Baltimore City	20.9	38.5	21.6	38.5
WSSC	1.5	3.0	7.5	8.0
Total	**22.4**	**41.5**	**29.1**	**46.5**

Source: DPW 2008 and 2008 Master Plan for Water and Sewerage
Note: Current use based on FY2008 water purchase records.

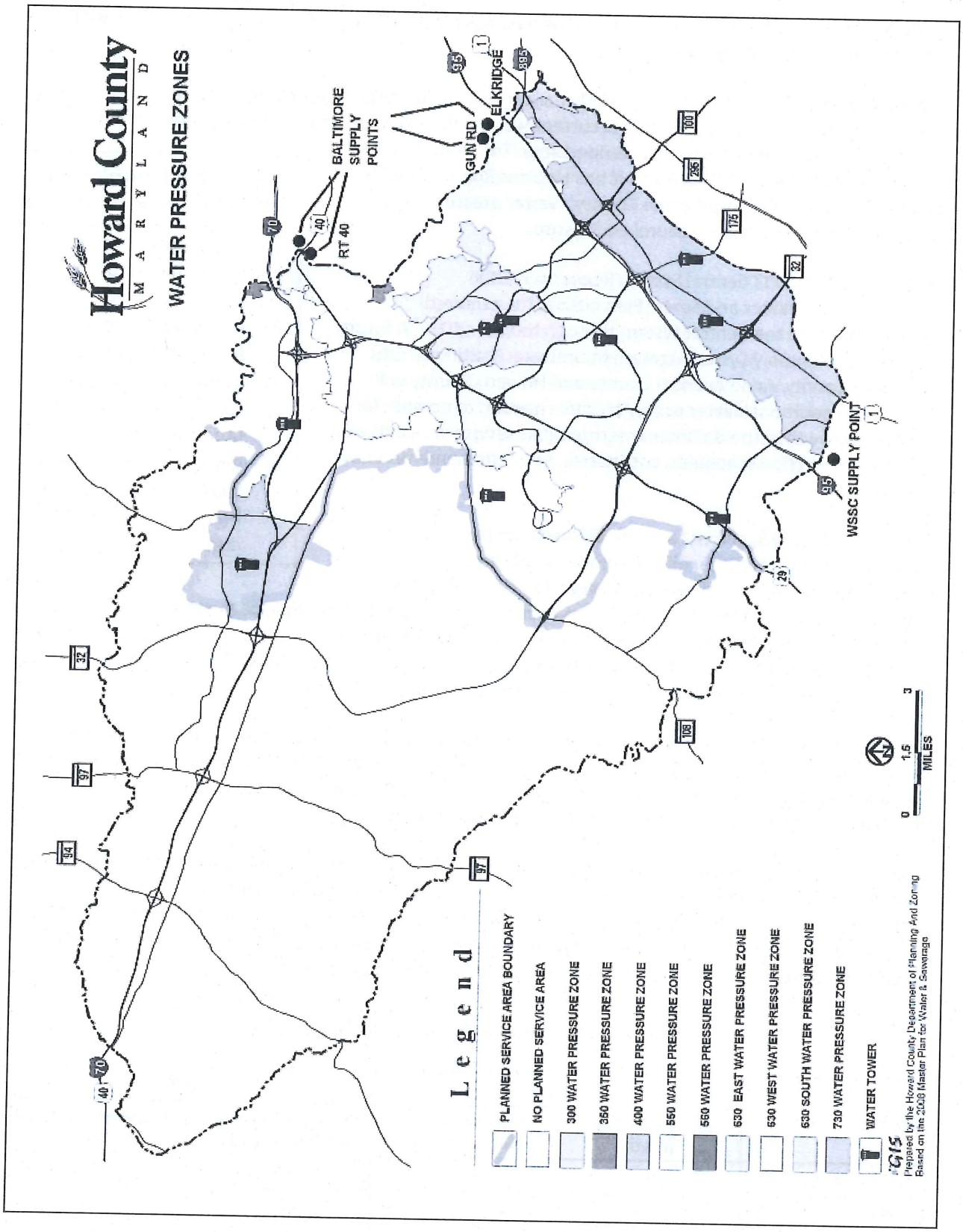


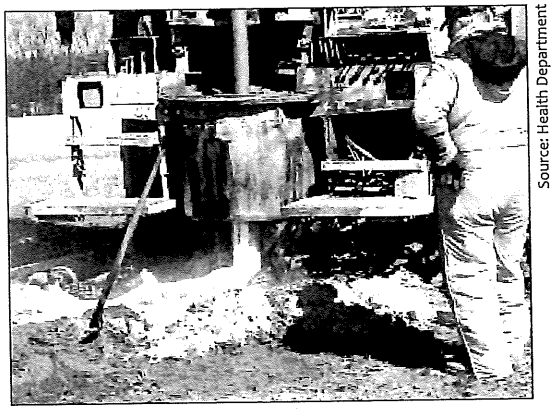
Figure 2: Water Pressure Zones Map

Outside the Planned Service Area

Groundwater is the major source of potable water where public water service is not available. The most recent study of groundwater quality and yield in the County is Water Resources of Howard County, Maryland, published by the Maryland Geological Survey in 1995 as Bulletin 38. Overall groundwater quality is generally good, however, most of the water is somewhat acidic.

Howard County lies within two physiographic provinces, the Piedmont and Coastal Plain provinces. The Fall Zone forms a boundary between the two provinces and runs in a northeast to southwest direction roughly parallel with I-95. The majority of the County (90%) lies within the Piedmont province. In the Piedmont, groundwater is found in the joints and fractures of the crystalline rock formations. In the Coastal Plain, groundwater is found in the intergranular spaces of unconsolidated sediments. The vast majority of wells in the County are in the Piedmont province.

There is generally an adequate supply of good quality groundwater within these formations to serve projected ultimate development demand outside the PSA even under drought conditions. However, this is a regional analysis that does not address individual well conditions. The ability to locate and tap groundwater in the Piedmont may vary significantly with well location, because groundwater is stored in and travels through a network of fine cracks and fissures in the bedrock aquifer.



Source: Health Department

The Health Department's Bureau of Environmental Health is responsible for review and approval of private wells in the County.

The withdrawal of water from surface and groundwater supplies is regulated by the Maryland Department of the Environment (MDE), through the issuance of Water Appropriation Permits. Small water users such as individual residences and agricultural users of less than 10,000 gallons per day are exempt from permit requirements. Permit applications are reviewed to ensure that the quantity requested is available and reasonable, that the withdrawal will not affect downstream or other users, and that the withdrawal will not impact the resource. Examples of impacts to the resource that the permitting system is intended to prevent include withdrawal from groundwater that exceeds the recharge rate of the aquifer or withdrawal from a stream that reduces flows to the point that aquatic life in the stream is harmed.

The fractured-rock aquifers of the Piedmont are generally more susceptible to contamination than the Coastal Plain aquifers. There are a few well contamination problems in various unrelated areas outside the PSA. Currently, two subdivisions are experiencing well contamination problems with excess nitrates. These problems are being addressed by the property owners with individual water quality treatment devices. In addition, Lisbon is experiencing well contamination problems with gasoline and solvents, excess nitrates and bacteriological (coliforms). MDE is providing carbon treatment on several sites and other problems are being addressed by the property owners with individual water quality treatment devices.

Radium and radon are radioactive elements found naturally occurring in the Baltimore Gneiss geologic formation that underlies a significant area in central Howard County. The Health Department has done extensive testing of wells within this formation, and both elements have been detected. Property owners with elevated levels have been advised to install treatment devices and the Health Department has done follow up testing to confirm the treatment is functioning properly.

Source Water Assessments

The Federal Safe Drinking Water Act Amendments of 1996 require source water assessments (SWA) for public water supplies. The SWA evaluates the susceptibility of the public water supply source to various contaminants and contains recommendations to protect the source from these contaminants. Source water assessments are designed to promote local, voluntary source water protection programs.

In Howard County, SWAs were developed from 2003 to 2005, for water supply systems that serve 25 or more individuals. This included the Baltimore and Patuxent Reservoir systems, and 76 well systems for facilities such as shopping centers and schools. The SWAs found that each system assessed provides drinking water that meets Safe Drinking Water Act standards, but each system is susceptible to one or more contaminants. In general, the SWA recommendations to reduce this susceptibility are to maintain and strengthen existing protection and monitoring efforts.

Source: Rob Hirsch

The Baltimore Reservoirs, which provide a majority of Howard County's drinking water, are the subject of an interjurisdictional watershed protection agreement.

Reservoir Systems

The SWAs for the Baltimore and Patuxent Reservoirs recommended limiting nonpoint source pollution to the reservoirs, especially runoff from suburban and agricultural land uses in the watersheds. The SWAs deferred to the Total Maximum Daily Loads (TMDLs), a requirement of the Federal Clean Water Act, to quantify the needed pollutant reductions. The TMDL for the Patuxent Reservoirs is discussed in the Water and Related Land Resources section, under the Total Maximum Daily Loads topic.

The Baltimore Reservoirs and the Patuxent Reservoirs are both subjects of interjurisdictional watershed management and protection agreements. Signatories to the Baltimore Reservoirs Agreement include Carroll and Baltimore Counties, the Carroll and Baltimore County Soil Conservation Districts, Baltimore City, and the Maryland Departments of Agriculture and the Environment. Signatories to the Patuxent Reservoirs Watershed Protection Agreement include Howard, Montgomery and Prince George's Counties, WSSC, the Howard and Montgomery County Soil Conservation Districts, and the Maryland-National Capital Park and Planning Commission. The Baltimore Reservoirs Agreement was signed in 1984 and the Patuxent Reservoirs Watershed Protection Agreement was signed in 1996. As a customer of the Baltimore water supply system, Howard County participates in the Baltimore Reservoirs Agreement. Howard County is a signatory to the Patuxent Reservoirs Agreement, because the County contains just over half of the watershed for this system.

Signatories to these agreements are working together to protect and improve the quality of the water flowing to these reservoirs. The Baltimore Reservoirs effort is guided by an Action Strategy and the Patuxent Reservoirs effort is guided by a Priority Resource Protection Program. (More information about the priority resources is given in the Water and Related Land Resources section, under the Patuxent Reservoirs topic.) Ongoing activities include the implementation of best management practices such as agricultural nutrient management, stream buffer plantings, stream channel stabilization, and stormwater retrofits for the control of nonpoint source pollution from agricultural and developed land, water quality monitoring in watershed streams and the reservoirs, and outreach and education to encourage environmental stewardship among those living, working and recreating in the watershed.

The reservoir protection agreements and the work done under them will help Baltimore City and WSSC, as water suppliers, and the jurisdictions within the reservoir watersheds implement the recommendations of the source water assessments. However, addressing nonpoint sources of pollution from developed and agricultural land uses requires adequate and sustained funding and private landowner cooperation. Both reservoir protection programs would benefit from increased funding and support.

Well Systems

The SWAs for the well systems recommended a number of protection measures to address potential point and nonpoint sources of contamination. Potential point sources of contamination include underground storage tanks, controlled hazardous substance generators (such as dry cleaning operations) and groundwater discharges associated with commercial areas. Nonpoint sources of contamination include agricultural land, commercial land and private septic systems.

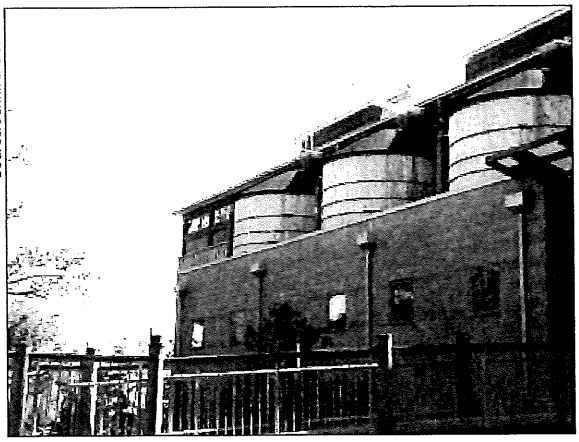
To ensure the safety of these well systems, monitoring is conducted on a regular basis by the Health Department or the system owner and the results are reported to MDE. Education for system owners is part of this monitoring process. The Health Department also mails information regularly on the need for routine well testing to private residential and nonresidential property owners with wells.

What can each of us do to conserve water?

- Install low flow toilets, faucets and showerheads
- Take shorter showers and turn off the water while brushing teeth, shaving, etc.
- Use a water saving dishwasher and clothes washer, and only run full loads.
- Do not water lawn.
- Use rain barrels to capture rain water for watering lawns and gardens.
- Plant native plants that do not require regular watering.

Water Conservation

Clean, safe drinking water is a valuable resource that should be used as wisely as possible. Potable water is currently used to flush our toilets, water our lawns and gardens, and wash our cars, when nonpotable water would suffice. The State requires low flow toilets and showerheads in all new residential construction and per capita water consumption has been decreasing in the County since 2000, primarily as a result of these fixture requirements. Additional water conservation in our homes, gardens and businesses would help the County manage water resources more sustainably and reduce flows to wastewater treatment facilities.



Source: Jennifer Dowdell

Cisterns at the Chesapeake Bay Foundation collect rainwater for nonpotable indoor uses.

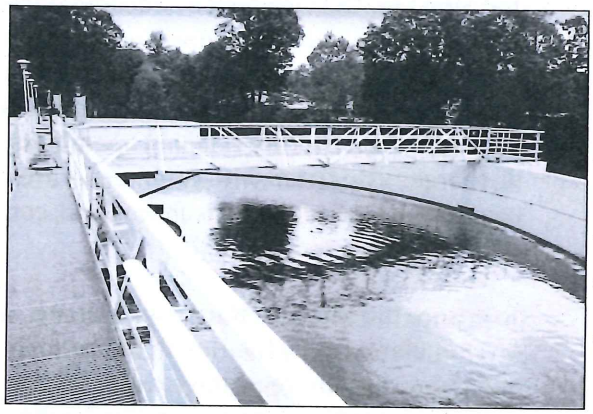
Public outreach and education, as well as financial incentives, can encourage increased water conservation by residents and businesses. Relatively easy conservation measures include using rain barrels to collect rainwater for outdoor watering and washing, replacing lawns with native plants that require less watering, and installing water conserving fixtures and appliances. More complex measures include using cisterns to collect rainwater for indoor nonpotable uses and reusing greywater. Greywater reuse or recycling takes water from washing machines, sinks and bathtubs for nonpotable uses such as flushing toilets and irrigation. Rainwater harvesting and greywater reuse for nonpotable indoor uses have been discouraged or prohibited due to human health concerns. Building codes and regulations should be reviewed and modified

where necessary to remove impediments for retrofitting existing and building new homes and businesses with water conservation and reuse practices and technology.

Wastewater

The Public Sewer System

The public sewer system is divided into two main service areas, as shown in Figure 4. The service areas are largely defined by the natural drainage areas for the Patuxent and Patapsco Rivers, which allows sewage to flow by gravity to the wastewater treatment plants located at lower points along each river. The Patuxent Service Area includes the Columbia and Savage areas of the Metropolitan District, along with the Route 108 Pumping Station Service Area. The Patapsco Service Area covers the remainder of the Metropolitan District, including the Ellicott City and Elkridge areas. The Route 108 Pumping Station Service Area is a large sub-service area that provides system flexibility. This area is north of MD 108 and west of US 29 and is geographically part of the Patuxent Service Area. If needed, the Route 108 Pumping Station gives the County the option of diverting flow from this area to the Patapsco Service Area.



Source: Howard County Public Information Office

The Little Patuxent WRP, located in Savage, is owned and operated by Howard County.

The Patuxent Service Area flows are treated by the Little Patuxent Water Reclamation Plant (WRP), which is owned and operated by Howard County. The Little Patuxent WRP discharges approximately four miles downstream of the plant to a point below the Fort Meade water intake on the Little Patuxent River in Anne Arundel County. The Patapsco Service Area flows are treated by the Patapsco Wastewater Treatment Plant (WWTP), which is owned and operated by Baltimore City. The Patapsco WWTP discharges into the Patapsco River in the Baltimore Harbor. The County's share of capacity and operating and capital costs for the Patapsco WWTP are determined by formal agreements with three other jurisdictions – Baltimore City, Baltimore County and Anne Arundel County.

Increases in treatment plant capacity through the expansion of existing plants or the addition of new plants are controlled by National Pollutant Discharge Elimination System (NPDES) permits issued by the Maryland Department of the Environment in accordance with Federal Clean Water Act requirements. These permits consider the impact wastewater treatment plant discharges will have on the water quality and downstream uses of the receiving stream. If the increase in discharges will limit downstream uses of the stream, pollution offsets may be necessary and, if this is not possible, permits can be denied. In addition, downstream users of a stream can present legal challenges to permits for treatment plant expansions if the expansion threatens to limit their use of the stream.

As part of Maryland's commitment to meet Chesapeake Bay cleanup goals established in the Chesapeake 2000 Agreement, annual nutrient (nitrogen and phosphorus) loading caps have been established for all major (design capacity greater than 0.5 mgd) wastewater treatment plants in the State. These nutrient loading caps are enforced through the NPDES permit for the plant. The NPDES permit for the Little Patuxent WRP currently has an annual nutrient loading cap that is based on a plant design capacity of 25 mgd and the use of Enhanced Nutrient Removal (ENR), a biological treatment process.

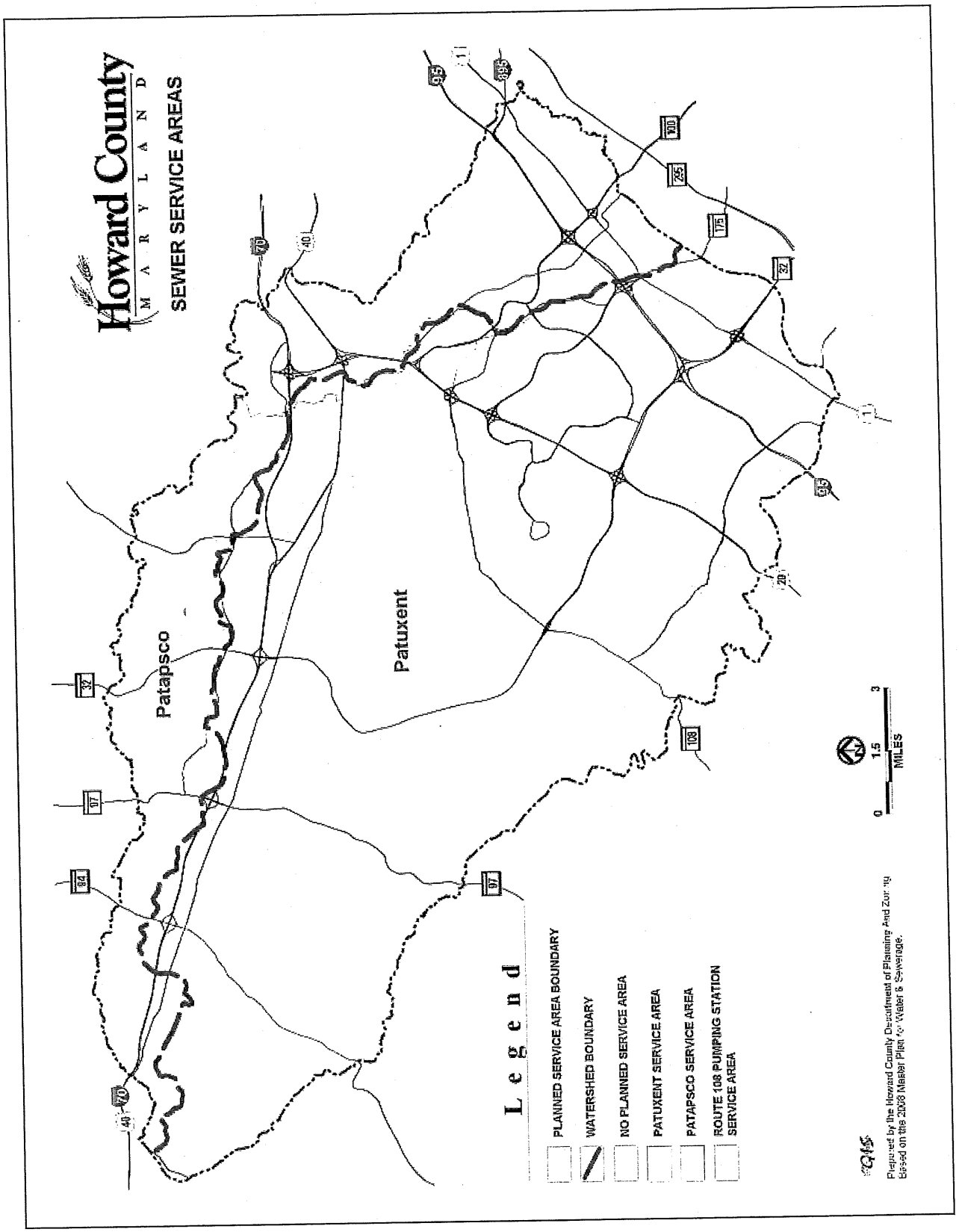


Figure 4: Sewer Service Areas Map

When ENR treatment is operating at maximum efficiency, an effluent nutrient concentration of 3.0 milligrams per liter (mg/L) or less total nitrogen and 0.3 mg/L or less total phosphorus can be achieved. However, since ENR relies on biological processes, this effluent concentration may be difficult to achieve in the winter when cold weather slows these processes, especially for nitrogen. To provide a margin of safety for nitrogen in the NPDES permit, the nutrient loading cap is based on an annual average concentration of 4.0 mg/L total nitrogen and an annual average concentration of 0.3 mg/L total phosphorus. This generates an annual nutrient loading cap for the Little Patuxent WRP of 304,556 lbs of nitrogen and 22,842 lbs of phosphorus.

As shown in Figure 5, the Little Patuxent WRP has a current capacity of 25.0 mgd and the current County usage is 18.7 mgd. This capacity will meet County needs through 2015. The County is currently expanding plant capacity to 29.0 mgd and adding ENR treatment at the plant. Construction began in 2009 and is expected to be completed in 2012. The projected usage at the plant in 2030 is 26.9 mgd.

Once flow at the Little Patuxent WRP exceeds 25 mgd, the NPDES permit will require an annual average nutrient concentration of 3.45 mg/L total nitrogen and 0.25 mg/L total phosphorus. This is based on a reduction of the nutrient cap concentrations by a ratio of 25/29. To achieve these reduced nutrient concentrations as flow increases from 25 to 29 mgd, the plant must be running at a higher efficiency for ENR treatment for a longer time each year.

Figure 6 presents the current and future annual nutrient loads for the Little Patuxent WRP. The current load is based on an annual average concentration in the discharge of 5.3 mg/L total nitrogen and 0.4 mg/L total phosphorus. The projected 2030 load is based on an annual average concentration of 3.45 mg/L total nitrogen and 0.25 mg/L total phosphorus. The addition of ENR treatment will decrease annual nitrogen loads by 6.4% and decrease annual phosphorus loads by 11.4%, even with increased flows, and keep the plant under its nutrient loading cap.

The expansion of the Little Patuxent WRP will use the entire parcel on which the plant is currently located. The County also owns an adjacent parcel that could be used for future expansions or treatment improvements, if needed.

The Patapsco WWTP has a current capacity of 73 mgd and the current County share of this capacity is 10.0 mgd. As shown in Figure 5, current usage by the County is approximately 6.6 mgd. Sewage flows in the Patapsco Service Area are projected to be 10.2 mgd by 2030. The Patapsco WWTP is currently adding ENR facilities and expanding capacity to 81 mgd. Construction began at the end of 2009 and is expected to be completed in 2012. The County share of this new capacity is projected to be 11.0 mgd.

The Patapsco WWTP also has an annual nutrient cap that is based on a plant design capacity of 73 mgd and the use of ENR treatment. This generates an annual nutrient loading cap for the plant of 889,304 lbs of nitrogen and 66,698 lbs of phosphorus. If Howard County's portion of this cap is based on the current County share of capacity at this plant, this generates an annual nutrient loading cap for County usage of 121,822 lbs of nitrogen and 9,137 lbs of phosphorus. The addition of ENR treatment may reduce future capacity at the plant, because this plant has no additional land available for expansion, and ENR treatment requires additional space and treatment time. If plant capacity is reduced, this may in turn reduce the County's capacity allocation at the plant. Capacity at the plant will be determined after the ENR addition is completed and a new NPDES permit is issued.

Figure 6 presents the current and future annual nutrient load from Howard County usage at the Patapsco WWTP. The current load is based on an annual average concentration in the discharge of 19.46 mg/L total nitrogen and 1.16 mg/L total phosphorus. The projected 2030 load is based on an assumed annual

average concentration of 3.60 mg/L total nitrogen and 0.27 mg/L total phosphorus. This is based on a reduction of the nutrient cap concentrations by a ratio of 73/81. The addition of ENR treatment will decrease annual nitrogen loads by 71.4% and decrease annual phosphorus loads by 64.0%, even with increased usage by Howard County.

The total currently planned treatment capacity of 40.0 mgd will satisfy the County's projected needs of 37.1 mgd in 2030, while maintaining the nutrient load limits at the plants. However, a question remains about a possible decrease in capacity at the Patapsco WWTP, due to the ENR upgrade and nutrient cap.

Figure 5: Wastewater Treatment Plant Capacity and Use

Treatment Plant	Current		2030	
	Average Daily Use (mgd)	Capacity (mgd)	Projected Average Daily Use (mgd)	Planned Capacity (mgd)
Patapsco	6.6	10.0	10.2	11.0
Little Patuxent	18.7	25.0	26.9	29.0
Total	**25.3**	**35.0**	**37.1**	**40.0**

Source: DPW 2008; 2008 Master Plan for Water and Sewerage; 2007 flows for current usage.

Figure 6: Wastewater Treatment Plant Nutrient Loads

Treatment Plant	Current Usage (mgd)	Current Nutrient Load (lbs/year)		2030 Usage (mgd)	2030 Nutrient Load (lbs/year)		Nutrient Cap (lbs/year)	
		Nitrogen	Phos.		Nitrogen	Phos.	Nitrogen	Phos.
Little Patuxent	18.7	301,701	22,770	26.9	282,508	20,167	304,556	22,842
Patapsco	6.6	390,972	23,306	10.2	111,779	8,383	121,822	9,137

Source: Howard County DPW 2008 and Baltimore City DPW 2010; 2008 Howard County Master Plan for Water and Sewerage; 2007 flows for current usage.

Outside the Planned Service Area

Outside the Planned Service Area, wastewater treatment is provided by individual and shared septic systems. In general, County soils are capable of supporting septic fields throughout the Rural West. Lisbon is the only problem area, due to small lot sizes, marginal soils in some areas and old systems. The County evaluated Lisbon for well and septic concerns and proposed a shared septic system in 2008; however, residents were not supportive of the proposal. Some of the problem lots may need holding tanks if suitable repair areas are not available. The Health Department also receives reports on a small number of individual failing septic systems in other areas of the County. Repairs to these systems are based upon the individual property conditions and available septic repair area.

The General Plan 2000 recommends the use of shared septic systems for cluster subdivisions, to protect groundwater and agricultural lands in the Rural West. Generally, soils that are well suited for septic systems are also well suited for agriculture. With a shared septic system, the common drain field is placed

Source: F. E. B Construction, LLC

Septic systems provide wastewater treatment outside the Planned Service Area.

on optimum soils and the individual septic tanks remain on individual lots. This allows homes to be located in areas that are marginally or poorly suited for agriculture.

Shared septic systems are owned, operated and maintained by the County, and maintenance costs are financed by the system users. The Master Plan for Water and Sewerage lists 29 existing or planned shared septic systems in the County. Nine of these systems are large enough (with design flows over 10,000 gallons per day) to require an MDE groundwater discharge permit. Because the maintenance cost per house is very high for large systems, the County no longer allows any new, large systems requiring an MDE permit after 2004, or, if owned by the Howard County Board of Education, after 2006.

The Master Plan also lists one private community and five institutional WWTPs with subsurface discharge outside the PSA. The Howard County Public School System owns three of these institutional plants.

Limiting the amount of nitrogen discharged to groundwater by individual on-site septic systems is a water quality concern. Excess nitrogen in groundwater limits the use of groundwater as a water supply source. Additionally, since groundwater is a source of base flow in streams, excess nitrogen in groundwater can also contribute to nutrient enrichment problems in streams and the Chesapeake Bay.

A variety of on-site treatment technologies have been developed to reduce the amount of nitrogen discharged from septic systems, and MDE has a list of approved manufacturers and treatment units for nitrogen reducing septic systems. Other local jurisdictions have approved, and in some areas required, the use of nitrogen reducing septic systems for replacement and new septic systems. Nitrogen reducing septic systems provide substantially better treatment, but they cost significantly more than a standard system and have ongoing operation and maintenance costs.

As part of Maryland's commitment to meet Chesapeake Bay cleanup goals, Maryland developed Tributary Strategy plans to reduce nutrient and sediment loads from each major tributary to the Chesapeake Bay. These Tributary Strategy plans include reduction strategies for nitrogen discharges to groundwater from on-site septic systems. The Tributary Strategy plans call for all new (as of 2006) septic systems to be nitrogen reducing systems, and for retrofits of all existing conventional septic systems with nitrogen reducing technology or for these systems to be connected to a wastewater treatment plant. In 2009, the State passed legislation that requires all new or replacement septic systems in the Chesapeake Bay and Coastal Bays Critical Areas use nitrogen reducing technology. Future State regulations may require nitrogen reducing technology for new and upgraded septic systems in additional areas of the State or Statewide.

Maryland's new Chesapeake Bay 2010 Restoration Fund has grant funds available for the addition of nitrogen reducing systems for existing septic systems. The priority area for these funds is the Chesapeake Bay and Coastal Bays Critical Areas. Recently, due to a surplus of funds, MDE made the funds available on a Statewide basis and Howard County residents applied for them. Most of this surplus has now been allocated. The County should make information about the CB 2010 grant funds more widely available to

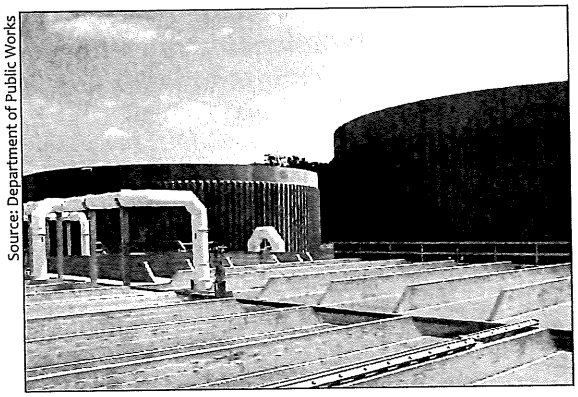
residents when the funds are available on a Statewide basis, to encourage greater voluntary participation in the program. The County could also provide financial incentives such as tax credits to encourage the use of nitrogen reducing treatment for new and upgraded septic systems.

Nitrogen reducing septic systems require regular inspection and maintenance to ensure proper operation. As these systems become more numerous, the County should investigate options to establish a long-term inspection and maintenance program.

Redevelopment within / Expansion of the Planned Service Area

The water and sewer systems in Howard County have been designed based on projected growth as permitted by zoning and the limits of the Planned Service Area, as the PSA was designated in the General Plan and the Master Plan for Water and Sewerage at the time of the system design. Growth projections developed in 2008 for the redevelopment of Columbia Town Center and the Village Centers, and the development of a portion of Doughoregan Manor create an increased water and sewer service demand within the PSA. This increase is within the projected capacity of the water supply and sewage treatment system, however, the development of a portion of Doughoregan Manor will require an expansion of the current PSA. The development for Doughoregan Manor will not require any resizing of the water delivery system, but will require the advancement and construction of a capital project, currently in the capital budget, to provide adequate capacity in the sewage collection system.

Consideration of bringing a portion of Doughoregan Manor into the PSA is premised on permanent preservation of most of this National Historic Landmark property. It is not intended to signal the potential for inclusion of any other properties with existing or proposed multi-use septic systems adjacent to the PSA. Including additional properties would further increase flow to the Little Patuxent WRP and increase the need to achieve higher efficiency ENR treatment. Wastewater treatment should be provided within the Patuxent Service Area to minimize increases in flow and the nutrient concentration in flow sent to the Little Patuxent WRP from expansion of the PSA for Doughoregan Manor.



Source: Department of Public Works

Wastewater pretreatment, such as at this industrial facility on US 1, can help reduce flow and nutrient concentration in flow sent to wastewater treatment plants.

Any future redevelopment within the PSA or extension of the PSA westward, beyond that currently projected, could require further improvements to the wastewater treatment system. These improvements could include: adding parallel collection lines, increasing capacity at existing pumping stations and adding pumping stations. Additionally, such redevelopment or new development may also require more capacity than the County has available under current NPDES nutrient cap limits and/or interjurisdictional agreements. Development on properties added to the current PSA, large redevelopment sites within the PSA and large sites with zoning intensification within the PSA should minimize increases in flow and the nutrient concentration in flow sent to the wastewater treatment plants. This can be achieved through a combination of water conservation and reuse, and wastewater treatment and the use of reclaimed water.

The nutrient loading caps for the Little Patuxent WRP and the Patapsco WWTP may be further reduced in the future to accommodate cleanup plans mandated under the Federal Clean Water Act for the Patuxent River, Patapsco River and Chesapeake Bay. An additional concern for the nutrient caps is that the effluent nutrient concentration is currently based on an annual average, but there is discussion by the regulatory

Source: Illinois Institute of Technology

Wastewater reuse for irrigation can help reduce discharges from wastewater treatment plants.

agencies of moving to a monthly average. A monthly average would be more difficult to achieve at higher flows in the colder months when the biological treatment process is slowed.

Two options available to reduce nutrient discharges from wastewater treatment plants are wastewater reuse and nutrient trading. Wastewater reuse is currently under development in Howard County. A reclaimed wastewater system is currently being constructed to use effluent from the Little Patuxent WRP for cooling and wash down water to serve industrial customers along the Route 1 corridor. This is expected to be one of the first wastewater reuse facilities in Maryland, but final implementation awaits new State regulations. Additional opportunities for wastewater reuse are being explored. Reuse of flow from the Little Patuxent WRP helps meet the nutrient cap by reducing discharges from the plant.

A variation on wastewater reuse is to build a small treatment plant (or "scalping plant") upstream of the Little Patuxent WRP, so flow is intercepted and treated for reuse before reaching the main plant. The County is considering options for scalping plants when potential customers are identified and site conditions are favorable.

Nutrient trading must take place within the framework of Phase I of Maryland's nutrient trading policy, which addresses trading between point sources and trading involving the removal of septic systems. The policy divides the State into three large trading regions: the Potomac Tributary Basin, the Patuxent Tributary Basin, and the Eastern Shore and Western Shore Tributary Basin, including the Susquehanna River watershed. The Little Patuxent WRP is located within the Patuxent Tributary Basin, and the Patapsco WWTP is located within the Eastern Shore and Western Shore Tributary Basin. The policy states that sources within each basin may trade only with other sources within that basin. Nutrient trading will be implemented through the NPDES permit system. Point sources such as WWTPs must secure the right to nutrient credits for two 5-year permit terms and submit a plan to secure the credits for at least 10 years beyond this period.

Options for nutrient trading include:

- Acquire point source discharge credits from other dischargers.
- Upgrade treatment at an existing minor WWTP (a plant with a design capacity of less than 500,000 gpd).
- Retire an existing minor WWTP after connecting its flow to a Biological Nutrient Removal or ENR facility. The County is pursuing this option by connecting the MD-VA Milk Producers WWTP to the Little Patuxent WRP.
- Retire an existing septic system by connecting it to a WWTP with ENR.
- Land application of wastewater with pre-treatment and nutrient management controls.

What can each of us do to reduce wastewater flows and the nutrient content in these flows?

- Eliminate or reduce the use of garbage disposals.
- Compost food wastes (but not meat, dairy or fats) rather than use garbage disposal.
- Do not pour fats, oil or grease down the sink.
- Do not flush down the toilet or pour down the sink objects that should go in the trash or to a household hazardous waste collection site, such as tissues, pharmaceuticals, chemical cleaners, paints, solvents, etc.
- Install a composting toilet or waterless urinal.

- Implement nonpoint source practices. There is no State policy yet on this type of trading, Phase II of the nutrient trading policy will address trades between point and nonpoint sources.

Given the uncertainty surrounding future nutrient cap limits and the influence they have on future capacity at the Little Patuxent WRP and the Patuxent WWTP, the County should continue to look for opportunities to expand wastewater reuse and investigate options for nutrient trading to reduce nutrient discharges from the plants. In evaluating alternative options, consideration shall be given to the impact on County residents and the County with respect to, but not limited to, odor, transportation of sludge, capital costs, and operating costs.

Infrastructure Maintenance

Source: Department of Public Works

The Department of Public Works, Bureau of Utilities, is responsible for maintaining the County's water and sewer system.

Maintenance of the existing water and sewer system is an ongoing concern as portions of each system reach the design life of 50 years. The Bureau of Utilities schedules major infrastructure replacements, based on an equipment design life of 50 years. Major infrastructure replacements are funded through the capital budget process and are paid for by the Enterprise Fund. The Capital Improvement Master Program has a ten-year planning horizon, which facilitates planning for major infrastructure replacements. The Bureau of Utilities also evaluates infrastructure maintenance needs annually, based upon operations and maintenance activities. These activities can include the type, number and location of water main breaks and water quality inquiries, which may be related to aging water mains, and the type, number and location of sewer system overflows and facility operational efficiencies. Based on this evaluation, recommendations are given for replacement or renovation.

Policies and Actions

Policies and Actions to address drinking water supply and wastewater treatment are based on the following goals:

- Maintain a safe and adequate drinking water supply and adequate amounts of wastewater treatment capacity to serve projected growth.
- Invest in water and sewer infrastructure that will provide adequate treatment capacity and reduce pollutant loading in rivers and streams.
- Maintain the nutrient caps at the Little Patuxent Water Reclamation Plant and the Patapsco Wastewater Treatment Plant.
- Reduce nutrient loads from septic systems.
- Encourage individuals, communities, organizations and businesses to be partners in helping the County meet drinking water and wastewater treatment goals.

Policy 1: Ensure the safety and adequacy of the drinking water supply, and promote water conservation and reuse.

1.1 Increase funding and support for implementation of the Baltimore Reservoirs Action Strategy and the Patuxent Reservoirs Priority Resource Protection Program.

1.2 Require that properties added to the current Planned Service Area, large redevelopment sites within the PSA and large sites with zoning intensification within the PSA implement water conservation and reuse practices and technology.

1.3 Modify codes and regulations as needed to remove impediments for existing development, new development and redevelopment to implement water conservation and reuse practices and technology.

1.4 Allow and promote greywater reuse for nonpotable uses.

1.5 Conduct public outreach and education to encourage greater water conservation in homes, gardens and businesses.

1.6 Provide incentives to encourage property owners to install water conserving fixtures and appliances.

Source: WSSC

Maintaining a safe and adequate supply of drinking water is a goal of the Howard County Water Resources Element.

Policy 2: Ensure the adequacy of wastewater treatment capacity.

2.1 Accommodate flows from projected growth in the Planned Service Area by completing the expansion and upgrade of the Little Patuxent Water Reclamation Plant.

2.2 Require that properties added to the current Planned Service Area, large redevelopment sites within the PSA and large sites with zoning intensification within the PSA minimize increases in flow and the nutrient concentration in flow sent to the wastewater treatment plants.

2.3 Expand wastewater reuse and nutrient trading to reduce nutrient flows and help maintain the nutrient cap at the Little Patuxent WRP and the Patapsco WWTP.

Policy 3: Reduce nitrogen loads to surface and groundwater from septic systems.

3.1 Conduct public outreach and education to encourage use of State grant funds for septic system upgrades to nitrogen reducing systems when the funds are available on a Statewide basis.

3.2 Provide financial incentives to promote the use of nitrogen reducing treatment for new and upgraded septic systems.

3.3 Investigate options to establish and maintain a long-term septic system inspection and maintenance infrastructure for nitrogen reducing systems.

WATER AND RELATED LAND RESOURCES

Introduction

One purpose of the Water Resources Element is to ensure that the County has adequate land and water capacity for the treatment of stormwater runoff. To assess treatment capacity for stormwater runoff, the County must estimate current and future pollution loads from stormwater runoff, gauge the expected impacts of these loads on water quality in local streams, lakes and reservoirs, and determine the ability of existing and new tools to mitigate these impacts. Tools to mitigate impacts can include:

- Best management practices to reduce pollution from individual properties
- Development regulations
- Stormwater management, including new and retrofit facilities
- Stream and wetland restoration

These tools can be applied on a countywide basis or be tailored to specific watershed conditions under the guidance of watershed management plans.

Stormwater Management

Stormwater runoff is generated when the amount of rainfall or snowmelt on the land exceeds the land's capacity to absorb and hold water. Human activities can decrease the land's capacity to absorb water by removing vegetation, disturbing and compacting the soil, and by covering the land with impervious surfaces such as buildings, roads and parking lots. When the land's capacity to absorb and hold water is decreased, the water available for groundwater recharge is also decreased. In addition, the land generates more runoff, which flows at a faster rate into local streams.

These changes in groundwater recharge and runoff degrade water quality and habitat in local streams. Groundwater supplies the low flow or base flow in streams. As groundwater recharge decreases, groundwater levels drop, which subsequently lowers base flow levels in streams. If base flow levels drop too much, stream channels can dry up in times of low precipitation. Conversely, increased runoff flowing at a faster rate increases the frequency and magnitude of flooding and increases stream channel erosion. Increased channel erosion generates more sediment loading in the stream and undercuts banks, often toppling trees and other vegetation along the stream banks.

Increased stormwater runoff can increase stream channel erosion, degrading stream water quality and habitat.

Stormwater runoff also carries many pollutants from the land, including: oil, grease, salts and metals from roads and driveways; sediment, fertilizers, animal waste and pesticides from lawns and agricultural fields; and nutrients and metals deposited from air pollution. This type of pollution is called nonpoint source pollution, because it comes from many diffuse sources on the land. This pollution degrades water quality and habitat in our local streams and reservoirs and, subsequently, in the Chesapeake Bay.

Stormwater management has been required in Maryland since 1984 to mitigate some of the environmental impacts caused to water bodies by development. As more has been learned about the negative impacts stormwater runoff can have on water quality and habitat conditions in our local streams, Federal, State and local regulations for stormwater management have been expanded to increase pollutant removal, groundwater recharge and stream channel protection requirements.

Environmental Site Design uses small treatment facilities, such as rain gardens (above), rather than large ponds (below).

The current State stormwater management regulations, adopted by Howard County in 2001, promote the use of low impact development or environmental site design (ESD). ESD emphasizes reducing the amount of stormwater runoff generated by using site design techniques that limit site disturbance and reduce the creation of impervious surfaces. The regulations promote the treatment of runoff by holding it on-site where it can be filtered and reabsorbed by the soil in multiple, small treatment facilities. This approach to stormwater management is different from the previous approach, which focused on collecting the majority of runoff in one or two large treatment facilities, most often stormwater management ponds.

ESD techniques can include: using cluster development and reducing road widths and parking requirements to limit site disturbance and impervious surfaces; preserving sensitive natural areas such as forests and nontidal wetlands; directing runoff from impervious surfaces such as rooftops to pervious surfaces such as lawns, to slow the flow of runoff and allow the runoff to filter through vegetation and soak back into the ground; and building smaller, on-site quality treatment facilities often called bioretention facilities. Bioretention facilities are small holding areas that treat runoff through natural processes, including soil filtration and nutrient uptake by vegetation. The use of ESD techniques can eliminate the need for large facilities such as ponds.

The State recently adopted new stormwater management regulations, in accordance with the Stormwater Management Act of 2007. The new regulations now require the use of ESD techniques to the maximum extent practicable and increase stormwater management requirements for redeveloping sites. The new regulations also require that local governments review and, where necessary, alter subdivision and zoning regulations to avoid impediments to ESD. The new State regulations went into effect on May 4, 2009 and the County has one year to adopt amended stormwater management regulations.

Requiring stormwater management for redevelopment sites offers an important opportunity to improve water quality and quantity controls for stormwater runoff in areas that were developed prior to current stormwater management regulations. The County should ensure redevelopment is designed and implemented to reduce stormwater runoff and pollutant loadings to the maximum extent practicable. The County could also create incentives for new development and redevelopment to provide onsite or offsite water quality enhancements that exceed minimum regulatory requirements.

The National Pollutant Discharge Elimination System

As a requirement of the Federal Clean Water Act, Howard County has a National Pollutant Discharge Elimination System (NPDES) permit for discharges from the County's stormwater management system. The NPDES permit has significant requirements for maintaining and improving the County's stormwater management system.

Improvements to the stormwater management system may include retrofits of existing facilities to add water quality treatment and building new facilities to serve older areas built without stormwater management. The County is required to conduct watershed assessments and implement best management practices such as stormwater retrofits, stream channel restoration and stream buffer plantings to improve water quality in our local streams. The County must also document these water quality improvements and watershed restoration efforts through chemical, physical and biological monitoring.

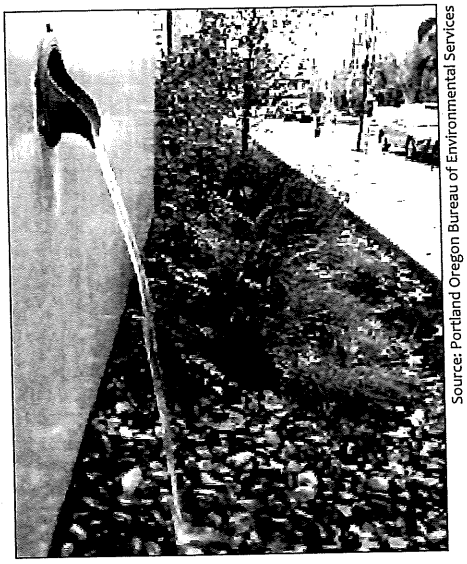
NPDES permit requirements have placed and will continue to place substantial staff and financial demands on the County. These permit requirements are expected to increase as additional Federal and State requirements are incorporated into future permit conditions.

Stormwater Management Facilities

Stormwater management systems must be regularly inspected and maintained and, as they age, deteriorated systems must be upgraded or replaced. The County is required by both State and local legislation to conduct inspections of stormwater management facilities every three years. There are approximately 3,000 stormwater management facilities in the County, and approximately 800 of these facilities are maintained by the County.

In general, the County shares maintenance responsibilities with homeowners associations for residential facilities located on open space lots, while non-residential facilities are privately maintained. The County executes maintenance agreements with the owners of stormwater management facilities that specify maintenance responsibilities and the County's right to inspect the facilities. The County is responsible for enforcement of these maintenance agreements.

With increased environmental site design, small treatment facilities will continue to become more prevalent. These types of facilities can include downspout infiltration areas or drywells and bioretention



Source: Portland Oregon Bureau of Environmental Services

Small treatment facilities, such as this stormwater planter, will become more prevalent with Environmental Site Design.

facilities that can be located on private residential lots. Long-term inspection and maintenance of these facilities is an area of concern. Developments with ESD have significantly more facilities than developments with traditional management facilities such as ponds, increasing staff time for inspections. Inspections for these facilities could range from full inspection by County staff or a consultant, to self-inspection by the property owner with reporting to the County. Routine maintenance of ESD facilities located on individual residential lots becomes the responsibility of the individual homeowner, resulting in property owner education and maintenance enforcement issues. The County should evaluate alternatives for improving, enforcing and funding long-term inspection and maintenance of stormwater management facilities, particularly those facilities located on private residential lots.

Water Quality in Local Streams

Howard County lies within the Patuxent River and Patapsco River basins, two major tributaries to the Chesapeake Bay. Approximately 75% of the County is within the Patuxent River basin and the remaining 25% of the County is within the Patapsco River basin. The main stems of these rivers have many tributary streams which drain large areas of the County. The Patuxent River and Patapsco River basins in Howard County are divided by the State into seven major watersheds, as shown in Figure 7.

In accordance with the Federal Clean Water Act, Maryland has designated use classifications for all water bodies in the State, as listed in Figure 8. The use classifications for the streams in Howard County are shown in Figure 9 There are no Use II waters in Howard County.

Figure 8: Stream Use Classifications

Use Classification	Designated Use
Use I	Water contact recreation and protection of nontidal warm water aquatic life
Use II	Support of estuarine and marine aquatic life and shellfish harvesting
Use III	Nontidal cold water (Natural trout waters)
Use IV	Recreational trout waters

Note: A "-P" after a use classification number indicates an additional use for public water supply.

The County's biological monitoring program measures the number and types of aquatic insects living in our streams.

Each use classification has specific water quality criteria. Baseline criteria are for Use I waters. The criteria are more stringent for certain parameters for Use II and IV waters, and Use III waters have the most stringent criteria.

In 2001, the County initiated a long-term, countywide biological monitoring program to track water quality and habitat trends in local streams. The results of this sampling indicate most streams in the County suffer from degraded water quality and habitat conditions. Stream corridor assessment surveys have also been conducted for all major watersheds. These surveys indicate eroding stream channels, a lack of riparian buffers and eroding pipe outfalls are common problems

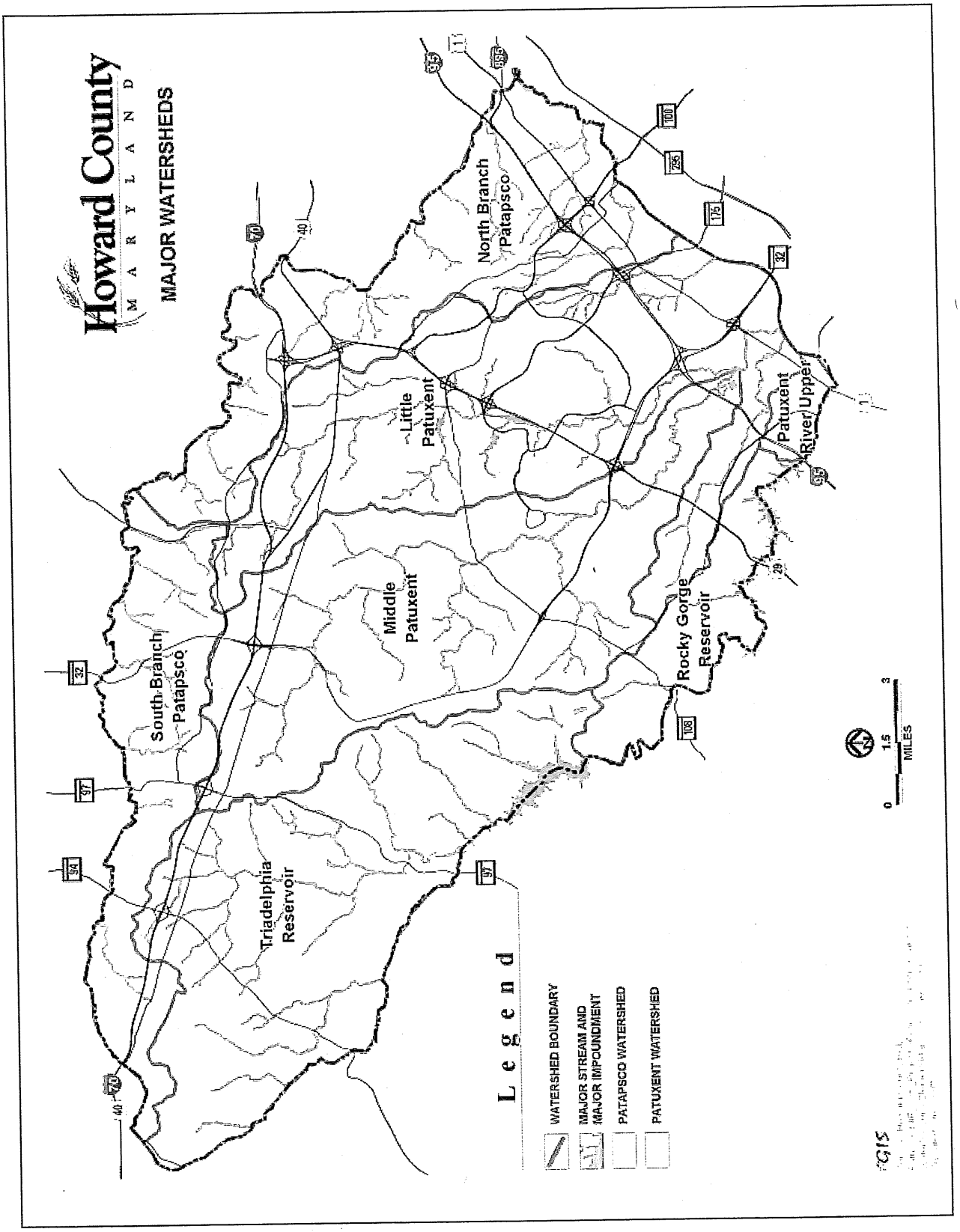


Figure 7: Major Watersheds

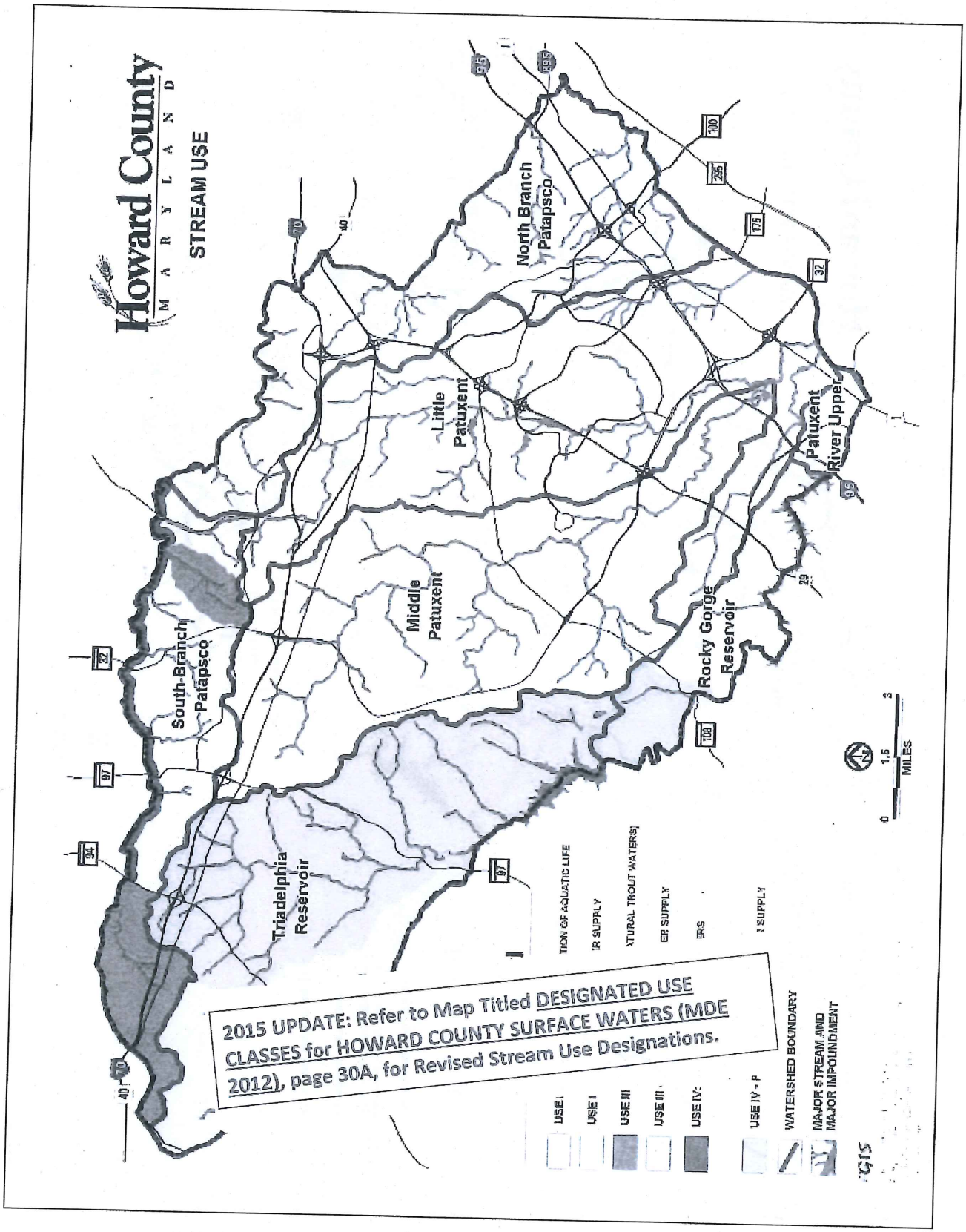
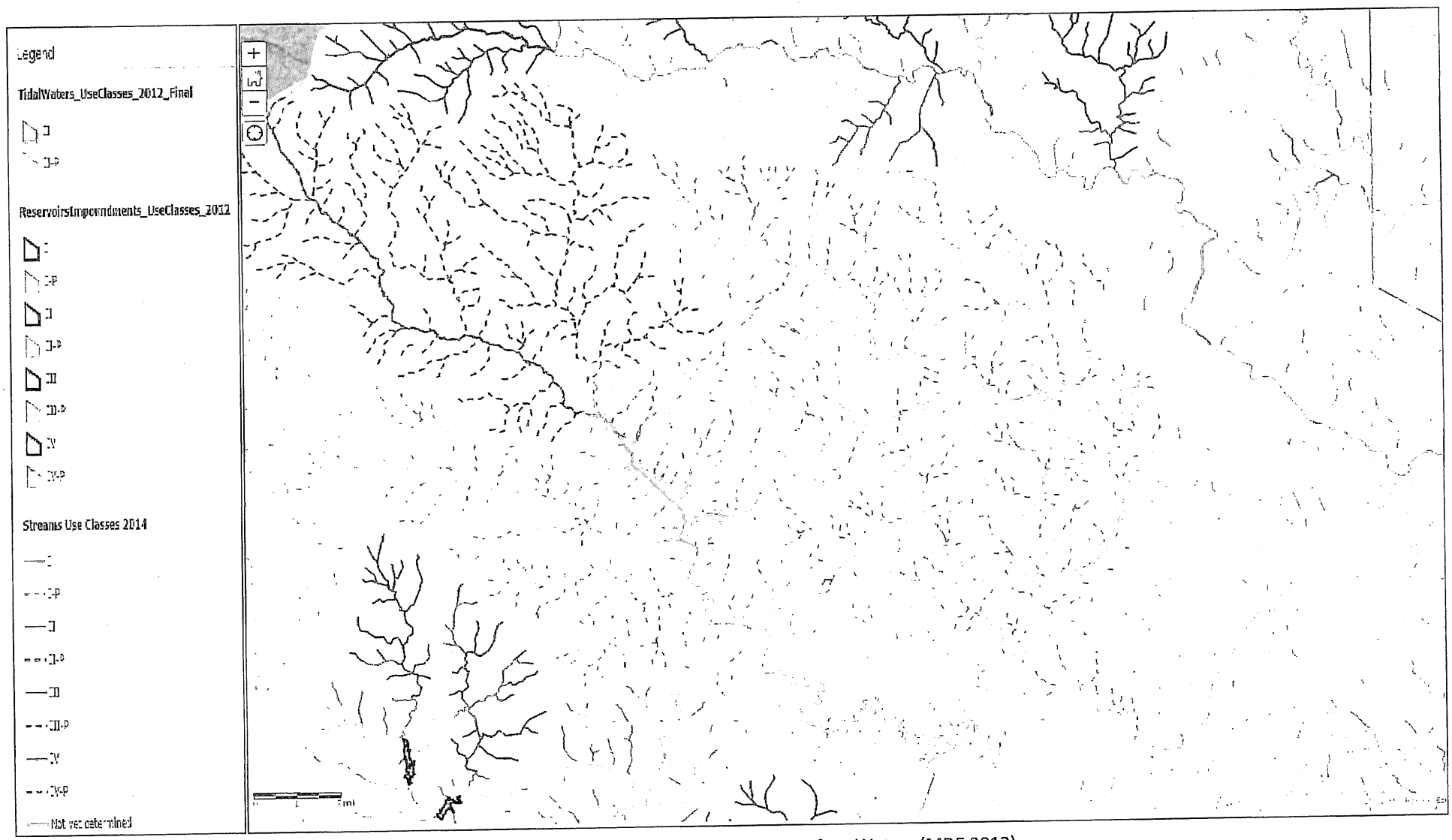


Figure 9: Stream Use



Designated Use Classes for Howard County Surface Waters (MDE 2012)

FIGURE 2-5
July 2015 Revision

in the watersheds. In addition, most water bodies do not meet State water quality standards for their use classification.

Tier II Waters

Despite the generally degraded condition of streams in Howard County, there are also stream segments in the County with excellent water quality and habitat for aquatic life. The State classifies these types of stream segments as Tier II waters and employs special procedures to regulate discharges to these waters to ensure water quality is not degraded. The State also encourages local governments to further protect these waters. There are six Tier II water segments in Howard County, all located outside the Planned Service Area, as shown in Figure 10. The State may designate additional Tier II waters as more information about stream conditions is collected.

A segment of the South Branch Patapsco River is designated as a Tier II water.

The County does not have information on potential water quality threats for these stream segments, which could include nearby development or agriculture that lacks best management practices or that impacts the stream buffer, particularly through forest clearing. The County should work with the State to collect information on these stream segments and institute any necessary measures to protect them.

Land Use and Nutrient Load Changes

Pollution that comes from many sources throughout a watershed is called nonpoint source pollution. By comparison, pollution that comes from a wastewater treatment plant or industrial plant discharge pipe is called point source pollution because there is a single source for the pollution.

To assess the County's future treatment capacity for stormwater runoff, the County conducted a nonpoint source (NPS) loading analysis to calculate the change in nutrient (nitrogen and phosphorus) loads due to proposed land use changes from 2007 to 2030. These land use changes were based on the Round 7a growth projections, as modified for additional growth in Downtown Columbia, the Village Centers and Doughoregan Manor. This analysis used a spreadsheet developed by the State as an analytical tool for preparing the Water Resources Element. This analysis incorporated runoff loads from land use change as well as groundwater loads from septic systems, and also estimated the future change in impervious cover.

Total land use change for the County in 2030 is projected to be approximately 21,351 acres. Total acreage for the County is approximately 162,177 acres, so this is a change for 13% of the County. This change occurs with an increase in low, medium and high density residential, and commercial land uses, with the majority of this increase being in low density residential land use. Low density residential land use is defined as ranging from 2 dwelling units per acre to 1 dwelling unit per 5 acres. This land use change has a corresponding decrease in other land uses, primarily cropland, forest, rural residential and pasture.

The projected change in land use for the County will result in a less than 1% increase in nitrogen loads and a 1% increase in phosphorus loads from the 2007 baseline load. The change in land use actually generates a decrease in runoff nitrogen loads, but this is offset by an increase in nitrogen loads from septic systems. Policies and Actions to reduce nitrogen loads from septic systems are discussed in the Drinking Water and Wastewater section.

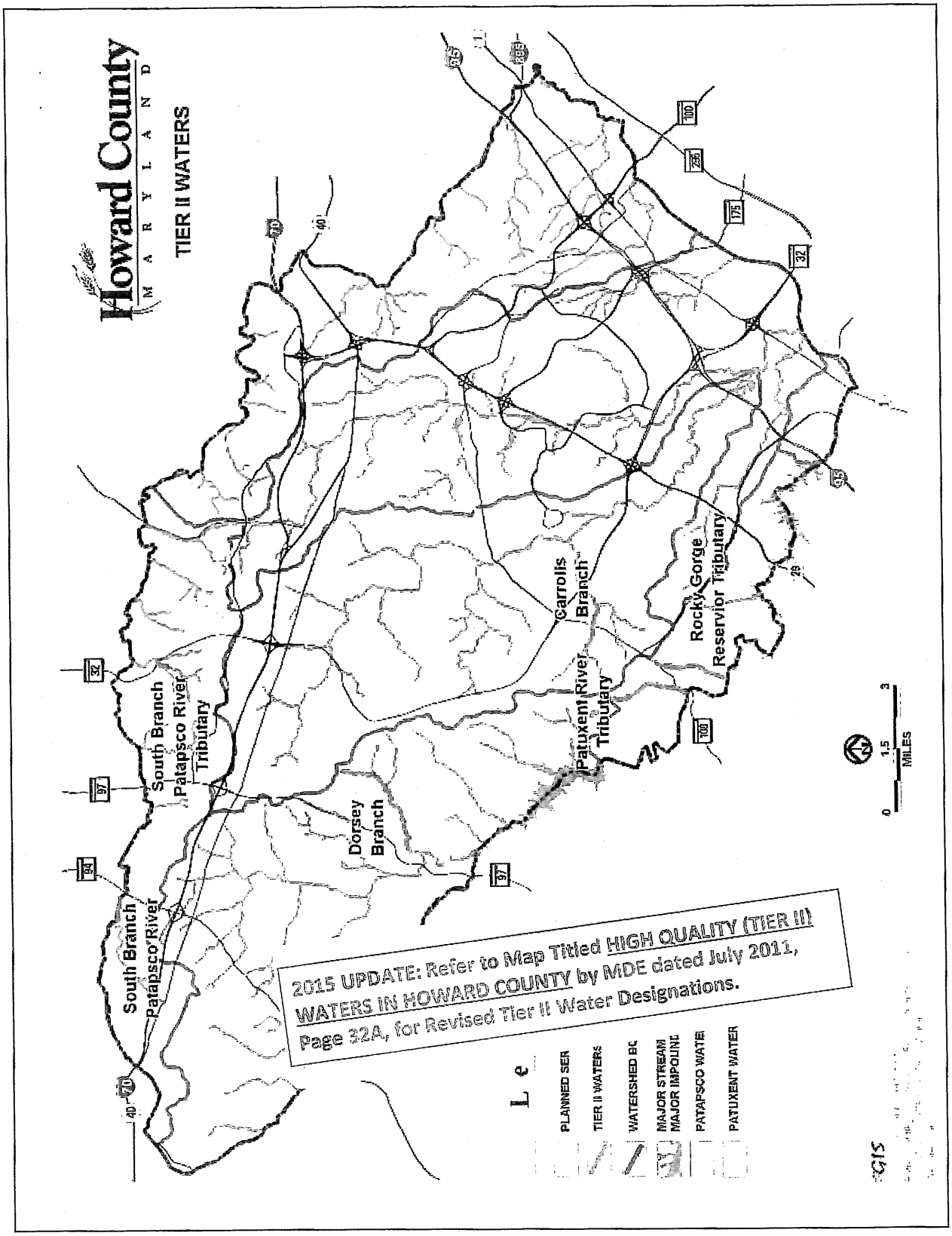
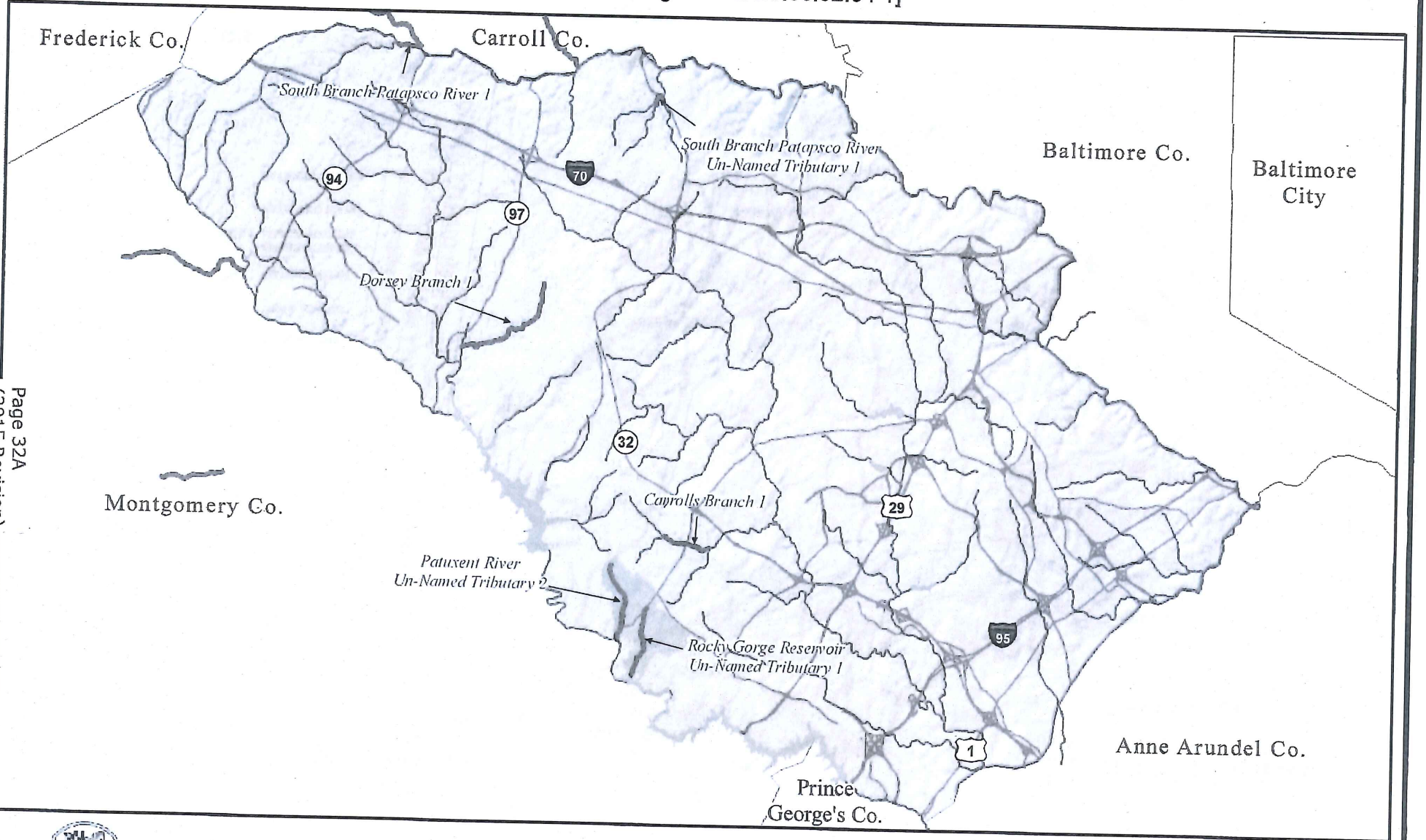


Figure 10: Tier II Waters

High Quality (Tier II) Waters in Howard County

[Code of MD Regulations 26.08.02.04-1]



MARYLAND

Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
Robert M. Summers, Secretary
Kathy M. Kinsey, Secretary

N

0 1.5 3
Miles

— Major Roads
— Streams/Rivers
Howard County
Municipal Boundary

Tier II Waters
No Capacity
Capacity Available

Tier II Watersheds
No Capacity
Capacity Available

MDE

Maryland Department of the Environment
Science Services Administration
Montgomery Park Business Center
1800 Washington Boulevard
Baltimore, Maryland 21230-1718
Date Map Prepared: July

The NPS loading analysis provided changes in land use and nonpoint source loads for the Patapsco and Patuxent River basins, and for each of the seven major watersheds in the County. When the total land use change is divided between these seven watersheds, almost 50% of this change occurs in the Middle Patuxent River (26%) and Triadelphia Reservoir (23%) watersheds. The Little Patuxent River watershed will see the third largest portion of the change at 17%, followed by the South and North Branches of the Patapsco, each at 13%. The Rocky Gorge Reservoir watershed will have a 7% portion of the change and the Patuxent River Upper watershed will have the smallest portion, at 1%.

Appendix B provides additional information on the NPS loading analysis and also provides a combined point and NPS loading analysis for the Patuxent and Patapsco River basins and the County. Total nitrogen and phosphorus loads in the County will decrease by approximately 13.8% and 12.4%, respectively, due primarily to the decrease in nutrient loads from the ENR upgrade to the Little Patuxent WRP and the Patapsco WWTP.

Impervious Cover

Impervious cover is a useful predictor of expected water quality and stream habitat conditions in a watershed. In general, as impervious cover increases with increasing development, stream health is expected to decline as forests are cleared, groundwater recharge is reduced, and polluted runoff into local streams increases in volume and frequency.

The County uses a system developed by the Center for Watershed Protection to place watersheds into one of three categories – sensitive, impacted or non-supporting – based on the level of impervious cover. Sensitive watersheds have the lowest level of impervious cover and are expected to have the healthiest streams. Impacted watersheds have a moderate level of impervious cover and are expected to have streams showing clear signs of degradation. Non-supporting watersheds have the highest level of impervious cover and are expected to have streams with significant degradation. This system can be used to prioritize healthy watersheds for actions that will protect water quality and habitat, and to prioritize degraded watersheds for actions to restore water quality and habitat. The more degraded conditions are within a watershed, the more difficult and expensive restoration efforts become.

Impervious cover in the County is projected to increase from 13% in 2007 to 15% in 2030.

Overall, impervious cover in the County increases with the projected land use changes from 13% in 2007 to 15% in 2030, an increase of 2%. This increase in impervious cover will cause the Middle Patuxent River watershed to shift from the sensitive to the impacted category, and will cause the Little Patuxent River and Patuxent River Upper watersheds to shift from the impacted to the non-supporting category.

The impervious cover categories described above were developed when stormwater management requirements did not promote or require ESD. The new stormwater management regulations are intended to maintain and even improve predevelopment runoff conditions, which could significantly reduce the impacts from new impervious cover. The effectiveness of the new regulations in mitigating impacts from impervious cover should be monitored by the State and local governments.

Development Regulations to Protect Water Resources

County regulations adopted in December 1988 require undisturbed streamside buffer areas of 75 feet along perennial streams within residential zoning districts. In 1992, regulations were added to require undisturbed streamside buffers of 50 feet along intermittent streams in all zoning districts and along perennial streams in non-residential zoning districts. In 1988, Howard County also instituted wetland protection by requiring a 25-foot undisturbed buffer around nontidal wetlands. Additionally, most wetlands in the County are found within the 100-year floodplain, and the County has prohibited development within the 100-year floodplain since 1974.

A forested buffer provides the greatest benefits for stream water quality and habitat.

In 2001, the stream buffer regulations were amended to require a 100-foot stream buffer in residential zoning districts for Use III and IV streams, located primarily in the Rural West. In addition, streams, wetlands and their buffers may no longer be located on residential lots, but must be located in open space or non-buildable preservation parcels, unless the residential lots are 10 acres or greater and the building envelope is set back from the buffer.

The effectiveness of stream and wetland buffers depends on the buffer width, vegetation and management practices. To provide the greatest benefit, buffers should be wide enough to allow adequate filtering of overland runoff and include adjacent steep slopes and highly erodible soils. A forested buffer provides the greatest benefits in terms of filtering pollutants, nutrient uptake through plant roots, erosion prevention, improved habitat for a variety of plant and animal species, and shading to keep water temperatures cool.

Current buffer requirements should be strengthened to enhance protection of streams, wetlands and floodplains. This could include increasing buffer width requirements for streams and wetlands, and instituting new requirements for floodplain buffers. In addition the stream buffer requirements should ensure that intermittent streams and perennial streams located in nonresidential areas have the same protections as streams located in residential areas.

Development regulations must be properly implemented and enforced to be effective. Sediment and erosion controls on construction sites must be correctly installed and maintained, stormwater management facilities must be built according to design plans, stream and wetland buffers and forest conservation easements must remain undisturbed during and after construction. The County should ensure there are adequate resources to monitor and enforce development regulations and to effectively educate developers and contractors.

Watershed Planning and Management

The health of our wetlands, streams, lakes and reservoirs is directly linked to the use of land within their watersheds. For this reason, a holistic approach to protecting, restoring and improving water resources should be based on a comprehensive assessment of land use, water quality and habitat conditions for the entire watershed.

The County takes a comprehensive, watershed-based approach to improve water quality and habitat in our local streams by conducting watershed studies to analyze conditions and design improvements. In general, watershed studies include a description of current water quality and habitat conditions in the watershed streams, an identification and severity ranking of problem areas, an identification and priority ranking of potential restoration projects, preliminary designs and cost estimates for priority restoration projects, and an implementation schedule.

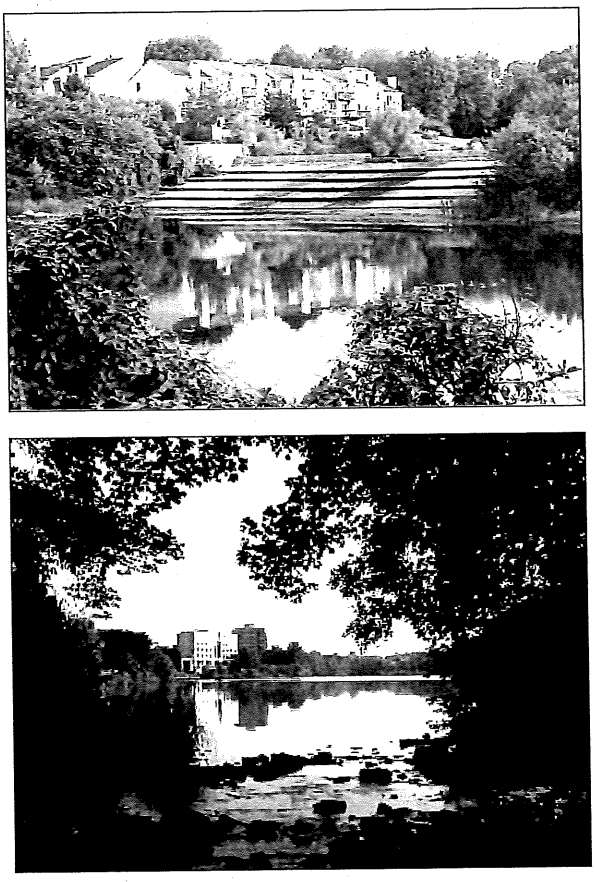
Watershed Studies

In response to NPDES permit requirements, County watershed studies have focused on the more developed watersheds in the eastern portion of the County. The County has completed watershed studies for two major watersheds, the Little Patuxent River and North Branch Patapsco River watersheds. In addition, the major watersheds in the County were divided into 62 subwatersheds and prioritized for future detailed restoration studies. Subwatershed studies have been completed for: Wilde Lake and Centennial Lake within the Little Patuxent River watershed; Sucker Branch and Rockburn Branch within the North Branch Patapsco River watershed; and Cherry Creek within the Rocky Gorge Reservoir watershed. An additional watershed study for the upper Little Patuxent River addressing the five subwatersheds in the headwaters area was completed in 2009.

In addition to County efforts, the Columbia Association (CA) initiated a watershed study in 2008 for CA property, which lies within 20 subwatersheds. Phase I of the CA study focuses on six subwatersheds located in the center of the study area. The information collected by CA will be shared with the County and the County will work cooperatively with CA on restoration activities.

Watershed management plans are needed for each watershed in the County to set priorities and guide efforts to protect, restore and improve the County's water resources. To ensure watershed goals are being met, all watershed management plans should be revisited and updated as needed, on a regular cycle.

Watershed protection and restoration goals may vary by watershed. In a healthy watershed, the goal may be to protect and maintain current conditions, whereas in a degraded watershed, the goal may be to actively restore and improve current conditions. It is easier and more cost effective to protect high quality resources in a watershed than to restore degraded resources. The more degraded a watershed, the more difficult restoration becomes and in some more highly developed watersheds conditions may be so degraded that full restoration is prohibitively expensive.



The County has completed a subwatershed study for Wilde Lake. Phase I of the Columbia Association watershed study includes the Lake Kittamaqundi subwatershed.

Based on the NPS loading analysis, the Middle Patuxent River watershed is projected to have the largest percentage of County land use change and the largest area increase in impervious cover. If this land use change and resulting increase in impervious cover is not properly managed, significant water quality and

habitat degradation could occur. The Middle Patuxent River should be a priority for development of a watershed management plan to help guide future protection, mitigation and restoration efforts.

Currently, watershed studies are focused on stream water quality and habitat. Wetlands, another important water resource, are not mapped or assessed. State and Federal wetland maps exist for the County, but they are incomplete and outdated. Wetlands are mapped on individual properties as part of the development review process, but this information is not compiled into a countywide inventory. A wetland program that inventories and maps the County's wetlands, and assesses opportunities to restore and protect existing wetlands and create new wetlands, would provide additional water quality and habitat benefits.

Restoration Projects

Restoration projects can include: building new stormwater management facilities and retrofitting existing facilities; planting forested buffers along streams; restoring and creating wetlands; stabilizing stream channels; and restoring instream habitats. Wherever possible, the County uses state of the art stream restoration design and construction techniques to achieve the long-term health of restored streams and their associated floodplains.

Source: Department of Public Works

Restoration projects can stabilize eroding stream channels and improve stream water quality and habitat.

Forest is the most beneficial land use for water quality, because forests absorb and filter stormwater runoff, prevent stream channel erosion, and provide shade to keep stream water temperatures cool. However, despite State and County forest conservation regulations, forest cover continues to be lost to development in Howard County as well as Statewide. As a result, Maryland is considering development of a "no net loss" of forest policy, but recommendations for this policy are not expected until the end of 2011.

The General Plan 2000 contains Policies and Actions related to the protection and restoration of forest, including development of a forest resource inventory and instituting a program to mitigate losses, targeting the establishment of forested stream buffers. Watershed management plans can be used to establish goals for forest cover and forested stream buffers in County watersheds. In more developed watersheds, it may be more appropriate to establish a tree canopy goal or a combination forest cover and tree canopy goal.

As each watershed and subwatershed restoration study has identified projects, these projects have been prioritized and added to the overall County watershed restoration master project list. This list also includes project sites identified from citizen referrals and complaints. The list is used as the basis for capital budget requests for restoration projects. The 2009 project list, which includes new projects from the Upper Little Patuxent Study, contains 150 projects with an estimated cost of $40 million. The County's current capital budget for these types of projects averages $1.2 million annually, although this amount is not consistent from year to year. This level of funding allows about 5 projects to proceed each year. If the County wishes to do additional watershed studies and increase the pace of restoration, additional funding is needed.

Many of these restoration projects require cooperation and participation from private landowners, so public outreach and education is a critical component of implementation. These projects not only provide environmental benefits for our local water resources and the Chesapeake Bay, but they also help the County address regulatory requirements for stormwater management NPDES permit requirements and flooding issues.

Best Management Practices

In addition to major construction projects such as stream restoration and stormwater retrofits, watershed studies also identify best management practices (BMPs) to reduce nonpoint source pollution that could be implemented by private property owners. These BMPs can include: reducing the use of fertilizers, pesticides and herbicides; planting native shrubs and trees, especially along streams; redirecting downspouts so they drain to rain barrels and/or vegetated areas; and creating rain gardens, which are gardens planted in created depressions to capture and treat runoff through soil filtration and plant uptake.

What can each of us do to reduce stormwater runoff and water pollution?

- Plant trees.
- Replace lawn with native plants that need less water.
- Do not fertilize lawn and limit the use of pesticides and herbicides.
- Do not water lawn.
- Direct downspouts away from driveways to vegetated areas such as gardens and lawns.
- Install rain barrels.
- Create rain gardens.
- Install permeable pavement or pavers.
- Wash car at carwash or on lawn.
- Pick up pet waste and dispose of it in the trash.
- Do not litter.

The majority of land in the County is privately owned, so implementing BMPs on private property is critical to improving water quality and habitat, especially in areas that were developed before stormwater management and resource protection measures were in place. Public outreach and education are essential to raise awareness about the cumulative positive or negative impacts individual actions can have on the environment. However, the County budget for outreach and education to encourage and assist private property owners with the implementation of BMPs is a minor portion of the budget for the watershed management program. Current outreach and education efforts should be expanded and new programs initiated to increase BMP implementation on private property. Working with community and environmental organizations, business associations and educational institutions often provides an effective way to reach a larger audience and encourage individual participation.

Source: Rainwater Solutions at Hayneedle.com (permission pending)

Best management practices on private property can include the use of rain barrels to capture and reuse stormwater runoff.

The County can also provide leadership in BMP implementation by incorporating environmentally sensitive site development and property management practices into County activities, as specified in the General Plan 2000 Policies and Actions. County actions can include: incorporating Green Building practices into facility design, construction and renovation; retrofitting stormwater management for County facilities; implementing demonstration projects to encourage their use by others; and reducing lawn and increasing forested riparian buffers and tree canopy on public property.

The watershed study recommendations for BMPs are directed primarily at residential and business property owners in the eastern portion of the County, but BMP implementation is also

Source: Soil Conservation District

Stream buffer plantings are an important best management practice for agricultural, residential and business properties.

important for residential and business property owners in the Rural West. It is also important in the Rural West that new best management practices continue to be implemented and existing practices be maintained on agricultural properties.

Best management practices for agricultural properties can include cover crops, conservation tillage, stream fencing to keep livestock out of streams, pasture management, stream buffer plantings and nutrient management. Nutrient management tailors the land application of fertilizers so the quantity applied does not exceed the needs of the crop. Implementing BMPs is generally voluntary, however, the 1998 State Water Quality Improvement Act requires the development and implementation of nutrient management plans for agricultural properties. Federal and State cost share programs are available to help farmers implement these practices. The Patuxent Reservoirs Watershed Protection Program also has a local cost share fund for establishing stream buffers in the reservoirs watershed. The lead agency in the County for working with agricultural landowners to assist them with technical and financial planning for the implementation of best management practices is the Howard Soil Conservation District.

Regional Water Resources

In addition to watershed planning and management for our local water resources, it is also important to remember that the County is part of the larger Patuxent and Patapsco River basins. The Patuxent River basin is located within Howard, Montgomery, Anne Arundel, Prince George's, Calvert, Charles and St. Mary's Counties. Howard County contains 21% of the basin, the second highest of the seven counties in the basin. The Patapsco River basin is located within Carroll, Baltimore, Howard and Anne Arundel Counties, as well as Baltimore City.

In 1984, each of the seven counties in the Patuxent River basin formally adopted the Patuxent River Policy Plan, which contains land management recommendations to control nonpoint source pollution in the basin. The seven counties also each adopted a 1997 Policy Plan update, which addresses the continuing challenges of growth management, personal stewardship and financing. The County should continue to coordinate and cooperate with other local, regional and State agencies and organizations on joint watershed planning and management for the Patuxent and Patapsco Rivers.

The Patuxent and Patapsco Rivers are major tributaries to the Chesapeake Bay. The multistate effort to restore the Chesapeake Bay has been and continues to be a strong influence in promoting watershed-based planning and management efforts to protect not only the Bay, but also the Bay's numerous tributary rivers and streams.

The first Chesapeake Bay Agreement (the Agreement) was signed in 1983 by Maryland, Pennsylvania, Virginia, the District of Columbia and the Environmental Protection Agency (EPA). Initial Bay restoration efforts were predominantly focused on achieving a goal of the 1987 Amendments to the Agreement to reduce nitrogen and phosphorus loadings to the Bay by 40%, using 1985 as a baseline year. This reduction was to be achieved by 2000 and then held as a cap on subsequent loadings to the Bay.

In the 1992 Amendments to the Agreement, the 40% reduction goal was apportioned among each of the Bay's major tributary watersheds. In Maryland, nutrient reduction strategies were developed for each of the State's ten major tributary watersheds, including the Patapsco and Patuxent Rivers. These Tributary Strategies include diverse efforts such as improving treatment processes at wastewater treatment plants, installing agricultural best management practices, retrofitting stormwater management facilities and planting stream buffers.

In 1995, Maryland appointed a Tributary Team for each watershed to coordinate State and local efforts to implement the strategy. The Tributary Teams are made up of representatives of the business and agricultural communities, environmental organizations, State and local governments and agencies, and private citizens. Howard County participates in the Tributary Team for the Patapsco River and the Patuxent River Commission, which is the Tributary Team for the Patuxent River.

In 2000, Maryland recommitted to restoring the Chesapeake Bay by signing the Chesapeake 2000 Agreement. This Agreement was intended to achieve water quality goals for the Bay by 2010, and requires substantially greater nutrient and sediment load reductions to protect aquatic living resources in the Bay. Maryland revised the Tributary Strategies to reflect these new reduction goals.

The current Tributary Strategies focus on three sources for best management practice implementation:

- Urban point sources – this strategy focuses on wastewater treatment plant upgrades using Enhanced Nutrient Removal technology.
- Urban nonpoint sources – this strategy addresses stormwater runoff, septic systems, growth management and urban nutrient management.
- Agriculture – this strategy addresses best management practices on farmland.

Although compliance with the Tributary Strategies is considered voluntary, the urban point source strategy is incorporated into NPDES permits issued by the State for wastewater treatment plants, and the urban nonpoint source strategy is partially incorporated into NPDES permits for stormwater discharges.

The Patapsco River, which forms Howard County's northern boundary, is one of Maryland's ten major tributaries of the Chesapeake Bay.

Total Maximum Daily Loads

The Federal Clean Water Act requires that States identify water bodies that do not meet water quality standards. If necessary, the States must then develop a Total Maximum Daily Load (TMDL) or an allowable pollutant load and implementation plan to bring the water body into compliance with the water quality standards for that pollutant. Depending on the land uses within the watershed of that water body, the TMDL is divided or allocated between the point and nonpoint sources in the watershed. Stormwater management systems operating under an NPDES permit are included in the point source allocation. In general, the current point and nonpoint source loads in a watershed must be substantially reduced to achieve the TMDL.

The TMDL point source allocation must be included in the NPDES permit limits for regulated point sources. The TMDL allocations for nonpoint sources are addressed through the TMDL implementation

plan, which must provide reasonable assurance that future voluntary and regulatory actions will result in the needed nonpoint source reductions. There is no required time frame for achieving the TMDL.

Maryland has taken the approach that municipalities and counties that meet their stormwater NPDES permit conditions will be deemed to have controlled stormwater pollution to the maximum extent practicable and meet their load allocations under a TMDL. Recently, however, the State signaled that new NPDES stormwater permits may include a requirement to develop implementation plans to address the point source allocation for approved TMDLs. These implementation plans would be developed within one year of the new permit issuance and include best management practices, expected pollutant reductions, tracking processes, benchmarks, timelines and cost estimates. Howard County's NPDES stormwater permit will be up for renewal in 2010.

Howard County has the following approved TMDLs:

- Centennial Lake – for phosphorus and sediment
- Triadelphia Reservoir – for phosphorus and sediment
- Rocky Gorge Reservoir – for phosphorus

These TMDLs specify significant reductions (48 to 58%) in phosphorus loadings, with these reductions providing concurrent acceptable reductions in sediment loadings. These reductions must come primarily from controls on runoff from agricultural and developed land.

The TMDL for Centennial Lake specifies a 51% reduction in phosphorus loads to the lake.

An excessive input of the nutrients phosphorus and nitrogen to a water body can result in eutrophication, or the over-enrichment of the water body. The nutrients spur excessive growth of aquatic plants or algal blooms, which eventually die and decompose, using up dissolved oxygen. Excessive eutrophication can produce nuisance levels of algae and interfere with designated uses such as fishing and swimming. Excessive sediment loads can reduce the storage capacity and lifespan of lakes and reservoirs. The TMDLs for Centennial Lake, Triadelphia Reservoir and Rocky Gorge Reservoir are designed to limit eutrophication and ensure the lifespan of the lake and reservoirs.

Other waterbodies in Howard County listed by the State for potential future TMDLs, include the Little Patuxent River, the Middle Patuxent River, the Patuxent River Upper and the North Branch Patapsco River. Future TMDLs will also be developed for the larger Patapsco River and Patuxent River. In addition, the Bay States and the EPA recently acknowledged that voluntary efforts will not achieve the goals of the Chesapeake 2000 Agreement by 2010. Therefore, the EPA will develop a TMDL for nutrient and sediment loads for all sources within the Bay watershed. Early discussions by the Bay States and EPA indicate that the Tributary Strategies will be used as a baseline to develop actions needed to meet Maryland's share of the Bay TMDL.

One purpose of the Water Resources Element is to identify suitable waters and land areas to meet the stormwater management and wastewater treatment needs of existing and future development. All of the waterbodies in Howard County have or will require a TMDL at the major watershed and/or the basin scale. Those watersheds that are not listed by the State for a specific pollutant TMDL are listed for impacts to biological communities, which may in turn require a TMDL to control the identified stressor to these communities. The presence of a TMDL or the need for a future TMDL is an indicator that pollution control efforts must reduce loads to the water body from existing land uses and from future land use changes,

to prevent further degradation and restore the waterbody. This Water Resources Element includes recommendations for pollution control efforts for existing and future land uses to help meet TMDL goals. As TMDLs continue to be developed and nonpoint source pollution assessments are refined, the County can more closely document current and future pollution loads to measure achievement of the TMDLs.

Patuxent Reservoirs

The Rocky Gorge and Triadelphia Reservoirs supply water for the Washington region's public water systems. Howard County contains 53% of the watershed for these reservoirs and Montgomery County contains 46%. The remaining 1% of the watershed is divided between Frederick and Prince George's Counties. The Patuxent Reservoirs are the subject of a 1996 Patuxent Reservoirs Watershed Protection Agreement, signed by Howard, Montgomery and Prince George's Counties, the Washington Suburban Sanitary Commission (WSSC), the Howard and Montgomery County Soil Conservation Districts, and the Maryland-National Capital Park and Planning Commission. Signatory agencies agreed to work together to protect the long-term biological, physical and chemical integrity of the watershed.

The Patuxent Reservoirs Watershed Protection Program identified six priority resources for protection and restoration within the watershed. These resources are the reservoirs and drinking water supply, terrestrial habitat, stream systems, aquatic biota, rural character and landscape, and public awareness and stewardship. For each priority resource, the program identified the associated resource protection issue, corresponding measures, goals, and implementation items to address the issue, and the time line and responsible partners to accomplish the implementation items.

Implementation items include reservoir and stream monitoring, stream buffer planting, agricultural BMP implementation, stormwater retrofits, stream channel restoration, agricultural land preservation, and public outreach and education. A priority implementation item is planting forested stream buffers, because this provides multiple benefits for the priority resources. Many of these implementation activities are ongoing, but additional resources are needed to meet the implementation time lines.

The NPS loading analysis indicates that phosphorus loadings will decline by 3% in the Triadelphia Reservoir watershed, but will increase by 8% in the Rocky Gorge Reservoir watershed. Given the need for additional resources to meet current implementation objectives and the significant phosphorus reductions required to meet the TMDLs, increased funding and support should be given to the Patuxent Reservoirs Watershed Protection Program.

Source: WSSC

Increasing public awareness and stewardship of watershed resources is a priority of the Patuxent Reservoirs Watershed Protection Program.

Funding

The County's watershed management program helps the County comprehensively address: the design, construction and maintenance of an adequate stormwater management system; water quality and habitat improvements in our local streams; other NPDES permit requirements; and flooding concerns. However, the program requires a sustained source of funding, and if the County wishes to increase the pace of watershed restoration, including expanding outreach and education to increase the implementation of best management practices on private properties, additional funding is needed.

Funding is needed for stream restoration and stormwater management retrofits, to maintain the SWM system, and to ensure that the County meets its Federal water quality permit requirements.

Currently, watershed management is at a competitive disadvantage for General Funds when compared with other more widely recognized areas of public need such as schools and roads. The County should institute a dedicated fund to provide increased and sustained funding for the watershed management program, which is anticipated to continue to expand and evolve in response to Federal and State regulatory requirements.

Funding options for a dedicated fund should be equitable, enforceable and have reasonable administrative costs. All property owners are responsible for some degree of runoff, both from their individual properties and from public lands that serve the general public such as roads and schools. All property owners would benefit from a comprehensive watershed management program to address stormwater management, water quality and habitat improvements in our local streams, and flooding. Therefore, an equitable fee that would apply to residential, business, agricultural and institutional property owners should be considered.

In addition to local funding, the County should continue to pursue Federal and State grant and cost-share opportunities. Grant and cost-share programs can provide funding for activities such as watershed planning, wetland creation, stream channel restoration, riparian forest buffer plantings, public outreach and education, and stormwater management.

Policies and Actions

Policies and Actions to address water and related land resources are based on the following goals:

- Use the best available water quality data and watershed analyses to guide growth policies to protect and improve water quality and meet water quality regulatory requirements.
- Improve stormwater management practices throughout the County to reduce nonpoint source pollutant loads and help achieve water quality standards.
- Protect and restore water resources, including streams, wetlands, floodplains and groundwater, to achieve water quality standards in the County's rivers and streams.
- Engage the public in watershed conservation and promote a stewardship ethic.

Policy 4: Improve stormwater management practices throughout the County to help restore and protect water resources.

4.1 Amend County ordinances to implement the 2007 Storm Water Management Act.

4.2 Eliminate regulatory barriers to the implementation of environmental site design measures and create incentives to facilitate their use where appropriate.

4.3 Ensure redevelopment is designed and implemented to reduce stormwater runoff and pollutant loadings to the maximum extent practicable.

4.4 Create incentives for new development and redevelopment to provide onsite or offsite water quality enhancements that exceed minimum regulatory requirements.

4.5 Evaluate alternatives for improving, enforcing and funding long-term inspection and maintenance of stormwater management facilities, particularly those facilities located on private residential lots.

Policy 5: Ensure development regulations adequately protect water resources, including streams, floodplains and wetlands.

5.1 Work with the State to collect information on the Tier II stream segments in the County and institute any necessary measures to protect them.

5.2 Strengthen buffer requirements to enhance protection of stream, floodplain and wetland resources.

5.3 Ensure there are adequate resources to monitor and enforce development regulations and to effectively educate developers and contractors.

Policy 6: Use watershed management plans to guide the protection and restoration of water resources.

6.1 Prepare comprehensive watershed management plans for all watersheds, to set priorities and guide efforts to protect, restore and improve the County's water resources. Complete and update all watershed management plans on a regular cycle.

6.2 Make the Middle Patuxent River watershed a priority for future study, protection and restoration.

6.3 Develop a wetland program to inventory, map, protect and enhance wetland resources.

6.4 Establish and achieve measurable goals for forest cover and riparian forest buffers in all County watersheds.

6.5 Encourage active participation of individuals, businesses and local community and environmental organizations in restoration activities.

6.6 Institute a dedicated fund (often referred to as a stormwater utility) to ensure increased and sustained funding for the watershed management program.

Protecting and restoring our rivers and streams is a goal of the Howard County Water Resources Element.

6.7 Pursue Federal and State grant and cost-share opportunities to secure additional resources for restoration efforts. Apply jointly with community and environmental organizations and with neighboring jurisdictions, as appropriate.

Policy 7: Coordinate regional protection of water resources.

7.1 Coordinate and cooperate with other local, regional and State agencies and organizations on joint watershed planning and management for the Patuxent and the Patapsco Rivers.

Policy 8: Safeguard the environmental integrity of the Patuxent Reservoirs.

8.1 Continue participation and leadership in interjurisdictional efforts to protect the Patuxent Reservoirs, including the Patuxent River Commission and the 1996 Patuxent Reservoirs Watershed Protection Agreement.

8.2 Increase funding and support for implementation of the Patuxent Reservoirs Priority Resource Protection Program.

Policy 9: Encourage individual environmental stewardship.

9.1 Conduct public outreach and education to encourage individuals and businesses both to be good stewards of their own property and to participate in community environmental enhancement efforts.

9.2 Initiate new and expand current outreach and education efforts to promote and assist private property owners with the implementation of best management practices, including installing rain gardens and rain barrels, planting stream buffers, replacing lawn with native plants, and increasing tree canopy.

9.3 Encourage the agricultural community to continue to work with local, State and Federal agencies and programs to implement best management practices.

Individual and group efforts such as planting trees are essential to achieving the goals of the Water Resources Element.

APPENDIX A: GROWTH PROJECTIONS

Introduction

The Department of Planning and Zoning's (DPZ) Division of Research uses a geographic information system (GIS) land use projection system to track and project growth and development in the County. The projection system is maintained on a continuous basis as new plans are processed and move through the development pipeline. All steps of the development process are tracked and mapped, including plans in process, recently approved and recorded plans, issued building permits, and building completions. New housing potential for uncommitted land is estimated by zoning. Uncommitted land includes all undeveloped land that is not currently being developed or planned for development. At any given time, the total capacity for all housing in the County can be determined. If the zoning is changed or a conditional use petition is granted, then the capacity is re-calculated.

This dynamic projection system can project new housing for any geography. Current geographies used include transportation analysis zones, DPZ statistical areas, DPZ planning areas, school planning polygons, water pressure zones, sewer service areas, police beats and fire box areas.

Growth projections are based on General Plan 2000. The General Plan establishes growth control totals that are the allowed annual levels of new residential units by planning area. Using these General Plan control totals, the model projects future housing units in the following order: 1) issued permits, 2) recorded unbuilt lots, 3) approved site plans, 4) in-process site plans, 5) in-process subdivision plans, and 6) uncommitted land. Once these units are projected, population for each year can be estimated based on persons per unit and occupancy factors. For more information on DPZ's projection system, please refer to the Research Report on Issue 15: County GIS Land Use Projection System, located on the DPZ web site at: http://www.co.ho.md.us/DPZ/dpzpublicationsreports.htm#research.

Since General Plan 2000 is only a 20-year plan, the growth projections for the Water Resources Element extend beyond 2020 to the year 2030. The same general pace of growth is assumed between 2020 and 2030, although development slows as land becomes more scarce in the out years.

Growth projections for the Water Resources Element are based on a modified version of Round 7a of the cooperative regional forecast. Round 7a was completed in 2008. These forecast "rounds" are updated annually and are part of the Baltimore Metropolitan Council Cooperative Forecasting process used to plan for future transportation projects in the region. Howard County also uses these projections to plan for schools, roads, water and sewer, and public safety infrastructure and operations.

The Round 7a projections were modified to address three key General Plan and / or Zoning Regulation amendments that have been requested during development of the Water Resources Element. These modifications include additional population and commercial acreage for the redevelopment of Downtown Columbia and Village Centers, and for new development on a portion of Doughoregan Manor.

These projections were aggregated by water pressure zone and sewer service area for the Department of Public Works to use in their water and sewer analysis. The following discusses the Round 7a projections with these modifications in more detail.

Projections

Residential Projections

As indicated in the Introduction, residential growth projections for the Water Resources Element are based on a modified version of Round 7a. Round 7a was completed in early 2008, based on the latest construction and development information and zoning. Like all projection rounds, General Plan 2000 control totals and pace of growth by planning area were used to establish new development at 5-year intervals. For the Water Resources Element, Round 7a projections were modified based on the following assumptions:

1. **An additional 3,900 apartment units are assu-** assumes 1,600 new units in Dow- Growth Properties' - 3,900 extra unit: phased at 780 pe Element only goe eral Plan 2000 changes. General inium), so the these units are ote that the Water Resources

2. **An additional 1,00 ...ent units are assumed in the Columbia Village Centers.** This assumption is based on recent interest for Village Center redevelopment. It is assumed that the apartment units are built evenly over 5-year increments from 2010 to 2030.

3. **An additional 2,000 units are assumed in Doughoregan Manor.** It is assumed that 1,500 apartment units are built between 2010 and 2020, and another 500 units are built between 2020 and 2025. The water and sewer analysis assumes that the Planned Service Area is expanded for this option.

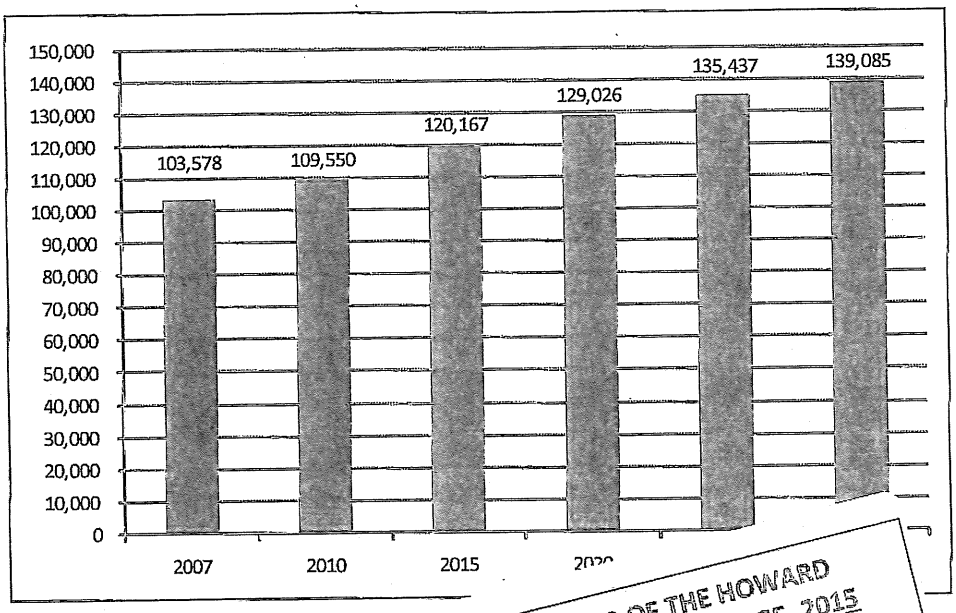
Figure A-1 summarizes the housing unit projections based on the above assumptions.

There were close to 103,600 housing units in the County in 2007. This grows to about 139,100 housing units by 2030, an increase of 35,500 homes over the 23-year projection period used for the Water Resources Element. This is a 34.2% increase over the 2007 base.

Figure A-2 shows the growth per increment. The first increment is only for 3 years. For the 5-year increments thereafter, the rate of change decreases over time – that is, the number of new homes built during each 5 years is less than the previous 5-year period.

Figures A-3 through A-5 show the projected growth by unit type in the County – single family detached (SFD), single family attached (SFA), and apartment (APT). There is a relatively small number of mobile homes (MH) not shown in the figures, so totals in these figures will not match those shown in Figures A-1 and A-2. Overall, apartments (rental and condominium) represent the largest percentage of new units projected at 47% of the total. SFD homes account for 32% of total new units projected. Townhomes or SFA units account for the remaining 20% of future units.

Figure A-1: Housing Unit Projections from 2007 to 2030



2015 UPDATE: REFER TO CHAPTER 2 OF THE HOWARD COUNTY MASTER PLAN FOR WATER & SEWERAGE- 2015 AMENDMENT FOR UPDATED ROUND 8A PROJECTIONS.

Figure A-2: ... 2030

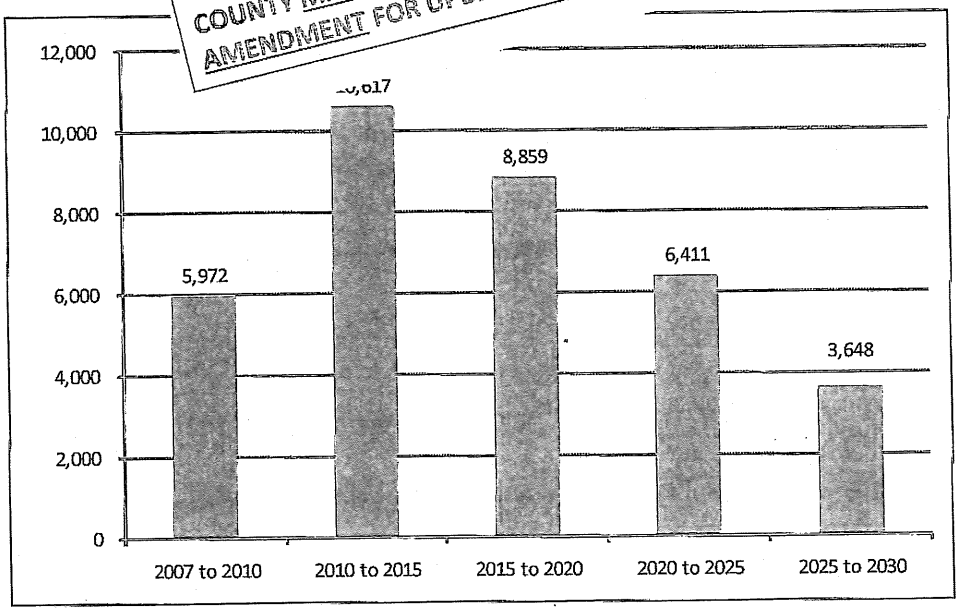


Figure A-3: Housing Unit Projections from 2007 to 2030

Unit Type	2007		2030		Growth	
	Amount	Percent	Amount	Percent	Amount	Percent
Single Family Detached (SFD)	56,479	55%	67,876	49%	11,397	32%
Single Family Attached (SFA)	21,645	21%	28,880	21%	7,235	20%
Apartment (APT)	23,918	23%	40,715	30%	16,797	47%
Total	**102,042**	**100%**	**137,471**	**100%**	**35,429**	**100%**

Figure A-4: Housing Unit Projections by Housing Unit Type from 2007 to 2030

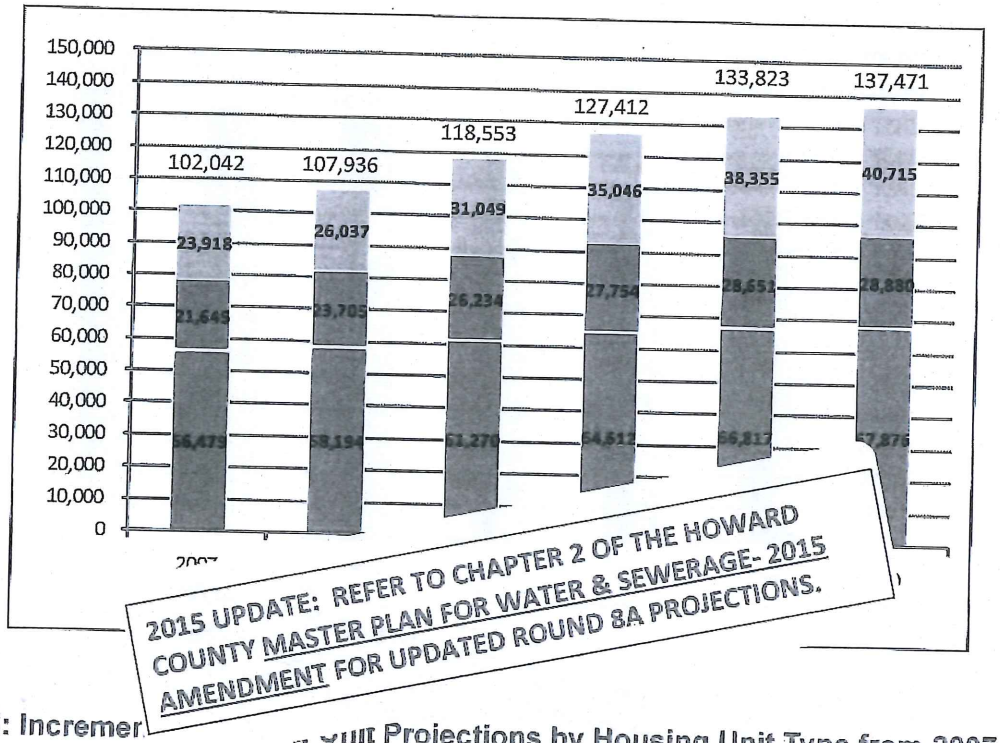


Figure A-5: Incremer[illegible] Unit Projections by Housing Unit Type from 2007 to 2030

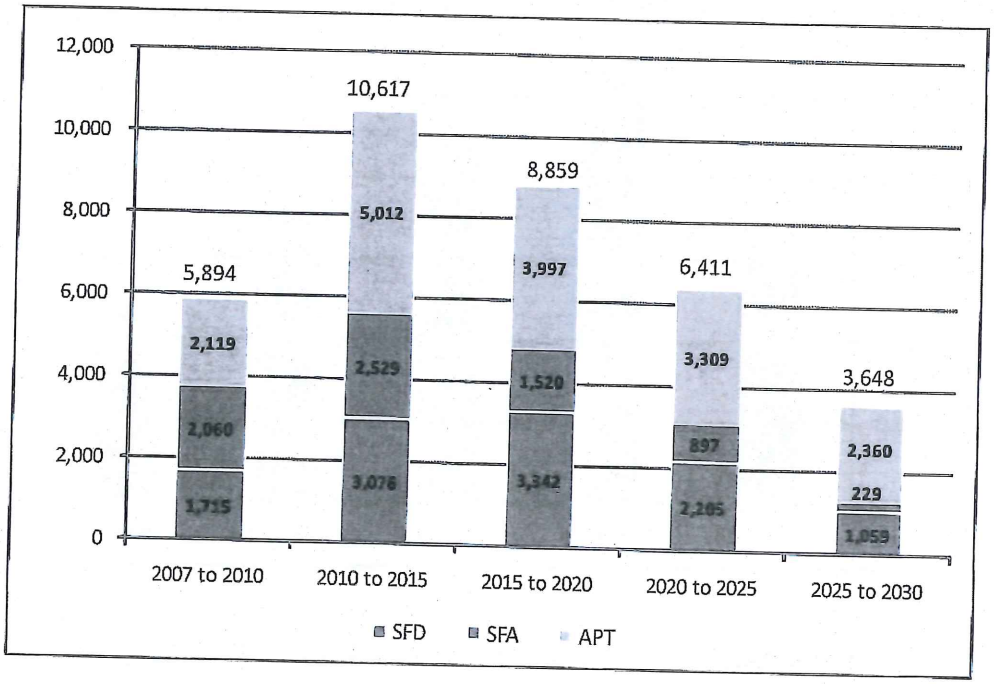


Figure A-6 summarizes the current and projected household population growth. In 2007, the household population was 276,263. It is expected to grow to almost 330,000 by 2030, an increase of about 53,600 residents. This is a 19% increase over the 23-year projection period. These estimates are based on the household size and occupancy factors shown in Figure A-7.

Figure A-6: Household Population Projections from 2007 to 2030

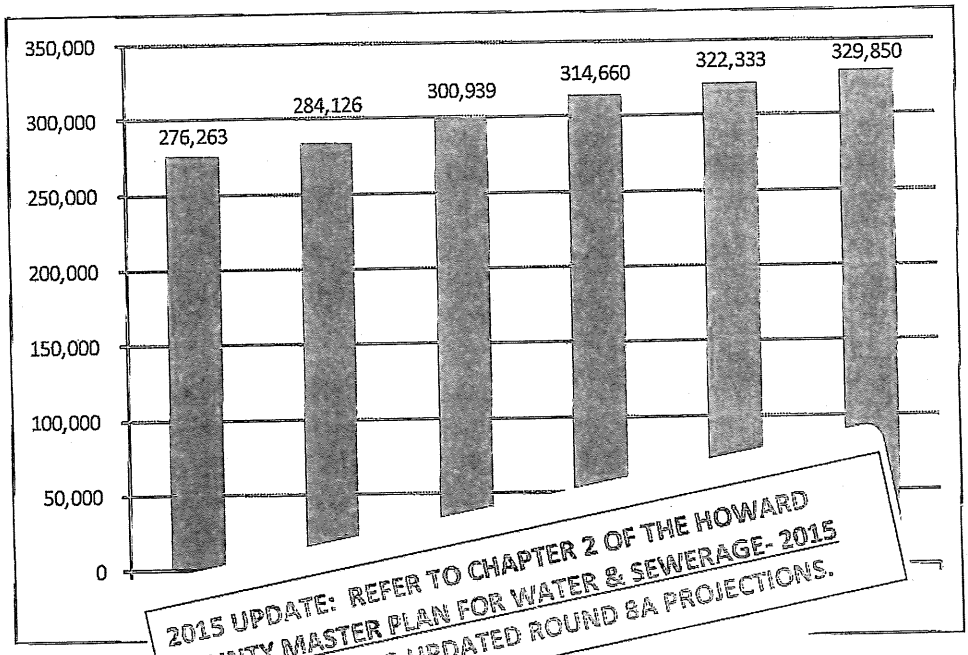


Figure A-7: Proj ...ize and Occupancy Rates from 2007 to 2030

HOUSEHOLD SIZE							
Unit Type	**2007**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
SFD	3.11	3.11	3.05	2.98	2.92	2.92	2.92
SFA	2.59	2.59	2.53	2.48	2.43	2.43	2.43
APT	1.89	1.89	1.85	1.81	1.78	1.78	1.78
MH	2.50	2.50	2.45	2.40	2.35	2.35	2.35
Age-Restricted Housing	1.20	1.20	1.20	1.20	1.20	1.20	1.20

OCCUPANCY RATES	
Unit Type	**Percent**
SFD	98.0%
SFA	97.0%
APT	96.0%
MH	97.0%

Details by Water Pressure Zone and Sewer Service Areas

Figure A-8 summarizes the total housing unit growth from 2007 to 2030 for inside and outside the Planned Service Area (PSA). This information was forwarded to the Department of Public Works (DPW) to be used in their water and sewer analysis. The details include the distinction between age-restricted housing and regular housing. Age-restricted housing has a lower household size. The detailed breakdown at 5-year growth increments and by water pressure zone and sewer service area were provided to DPW and are available from DPZ upon request.

Figure A-8: Housing Unit Projections from 2007 to 2030

	SFD	SFA	APT	MH	SFD A		APT Age Restricted	TOTAL
Outside PSA	3,961	2				0	2,000	**6,013**
Inside PSA	7,11[illegible]					1	1,719	**29,494**
TOTAL							**3,719**	**35,507**

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Figure A-9 shows [illegible] growth from 2007 to 2030. The population was determined by mu[illegible]mulative housing units times the household occupancy rates given in Figure A-7. The projected decline in household population in mobile homes is caused by the combination of a small increase in the number of mobile homes and the decrease in the household size. Similar to the housing unit information, detailed population projections at 5-year increments and by water pressure zone and sewer service area were provided to DPW and are available from DPZ upon request.

Figure A-9: Household Population Projections from 2007 to 2030

	SFD	SFA	APT	MH	SFD Age Restricted	SFA Age Restricted	APT Age Restricted	TOTAL
Outside PSA	8,389	5	0	(1)	58	0	2,304	**10,755**
Inside PSA	9,898	10,377	19,139	(113)	322	1,267	1,943	**42,833**
TOTAL	**18,287**	**10,381**	**19,139**	**(114)**	**380**	**1,265**	**4,247**	**53,586**

Nonresidential Projections

For the water and sewer modeling effort conducted by the Department of Public Works, future commercial and industrial acreage projections are required. For the Water Resources Element, the nonresidential acreage projections used are from the Round 7a projections, which were modified based on the following assumptions:

1. There will be redevelopment or an intensification of commercial use in Downtown Columbia totaling 1,008,040 square feet of retail space and 4,922,560 square feet of office space. There will also be an additional 640 hotel rooms during the development timeframe. All of this will be built out evenly over time between 2010 and 2035.

2. There will be redevelopment or an intensification of commercial uses in the Columbia Villages totaling 200,000 square feet of office space and 120,000 square feet of retail space. This will be built out evenly over time between 2010 and 2030.

3. For Doughoregan Manor, in addition to the 2,000 independent living units, there will also be a number of assisted living and nursing home beds in an institutional setting as part of a continuing care retirement community.

The cumulative industrial and commercial acreage totals for inside and outside the PSA are given in Figure A-10. Detailed projection information by sewer service area and water pressure zone was forwarded to DPW and is available from DPZ upon request.

Figure A-10: Cumulative Nonresidential Acreage from 2005 to 2030

Year	Outside PSA		Inside PSA		TOTAL	
	Indus	Comm	Indus	Comm	Indus	Comm
2005	160	346	3,610	3,179	**3,770**	**3,525**
2010	161	364	3,910	3,476	**4,071**	**3,840**
2015	161	368	4,149	3,692	**4,310**	**4,060**
2020	161	414	4,416	3,891	**4,577**	**4,304**
2025	161	462	4,666	4,149	**4,827**	**4,611**
2030	161	469	4,997	4,252	**5,157**	**4,721**

Modifications to the Growth Projections

Subsequent to the preparation of the growth projections used in this document, a proposal to develop 2,000 apartment units at Doughoregan Manor was withdrawn by the applicant. In the fall of 2009, the property owners submitted a new request to develop about 325 single family detached units on a portion of the property. It is assumed that the 325 homes would be built between 2010 and 2020. Based on the persons per household factors used in this report, the revised Doughoregan Manor development proposal would only have around 40% of the original population estimate. This new proposal for single family detached homes, if approved, would have a lesser demand for water and sewer services than the original proposal for a continuing care retirement community with 2,000 age-restricted dwelling units.

APPENDIX B:

NONPOINT AND POINT SOURCE LOADINGS

Introduction

One purpose of the Water Resources Element is to ensure that the County has adequate land and water capacity to meet the stormwater management and wastewater treatment needs of existing and future development. To assess treatment capacity for stormwater runoff and wastewater, the County estimated the nutrient nonpoint source pollution loads from stormwater runoff and septic systems based on current and future land use, and gauged the expected impacts of these loads on water quality in local streams and reservoirs. In addition, the nutrient point source pollution loads from the two major wastewater treatment plants serving the County were estimated, and the total County point and nonpoint source nutrient loads were estimated. The following discusses the results of that nonpoint and point source nutrient load analysis.

Land Use and Nonpoint Source Analysis

To assess future treatment capacity for stormwater runoff, the County conducted a nonpoint source loading analysis using the nonpoint source loading (NPS) spreadsheet developed by the Maryland Department of the Environment (MDE). MDE developed the NPS spreadsheet as an analytical tool for preparing the Water Resources Element. The NPS spreadsheet uses a simple assessment to calculate the change in nutrient (nitrogen and phosphorus) loads due to proposed land use changes and allows for a comparison between alternative future land use changes.

The NPS spreadsheet is designed for use with the Maryland Department of Planning (MDP) Growth Simulation Model (GSM), which projects future land use. Current land use is defined as the MDP 2007 land use / land cover. The GSM projects future land use on a parcel basis using population, household and employment projections, along with other local land management factors such as clustering, designated growth areas and land preservation programs. Population, household and employment projections are based on small area forecasts for Transportation Analysis Zones (TAZ). MDP uses a default zoning yield of 75% of the allowable density, although this yield is halved for infill parcels. MDP works with local governments to customize yield and to direct where growth occurs based on local growth management policies.

To confirm that the GSM was using the proper growth assumptions for Howard County, MDP also conducted a separate development capacity analysis for comparison with the County's capacity analysis. This comparison used the Baltimore Metropolitan Council TAZ Round 7a forecast. The MDP analysis included an estimate by zoning district for new household capacity. The MDP analysis estimated an additional 30,299 households, while the County analysis estimated an additional 30,674 households, a

difference of only 375 households or about 1%. This difference was not considered significant for this analysis.

The NPS spreadsheet calculates changes in nutrient runoff loads from land use changes, using a nutrient loading rate that reflects full implementation of the Tributary Strategy Best Management Practices (BMP). The Tributary Strategy BMP loading rate reflects the full spectrum of BMP implementation for all developed and agricultural land uses needed to achieve water quality goals for the Chesapeake Bay. This degree of BMP implementation may not be realistic, but it is acceptable for use in the NPS spreadsheet, because the NPS spreadsheet uses the same loading rate for current and future land use conditions. This analysis is used only for comparing the changes in current and future nutrient loads.

The nutrient loading rate is from the Chesapeake Bay Program Watershed Model phase 4.3, and varies by land use category and by basin. The loading rate is applied across 25 different land uses, including rural, low, medium and high density residential, commercial, industrial, cropland, pasture, wetlands and forest.

In addition to addressing nutrient loads from runoff, the NPS spreadsheet also includes a nitrogen loading rate for standard septic systems. The effect of replacing standard septic systems with nitrogen reducing systems can be estimated by halving the standard septic system loading rate. The NPS spreadsheet also calculates changes in impervious cover, agriculture and forest.

The GSM and the NPS spreadsheet divide Howard County into two basins – the Patuxent above the Fall Line and the Western Shore (which includes the Patapsco River) above the Fall Line. A small portion of eastern Howard County is below the Fall Line in each basin, but due to the large-scale analysis being conducted by the State, this refinement was not available. MDP used the GSM to provide an analysis for the two large basins, then ran a second analysis for the seven major watersheds in the County.

The results of the GSM for the Round 7a forecast generated future land use acreage in 2030 that was entered into the NPS spreadsheet. Land use changes for Downtown Columbia and Doughoregan Manor were then added to the NPS spreadsheet by the County. Redevelopment of the Village Centers did not result in a land use category change. The NPS spreadsheet then provided changes in nonpoint source loads for the County, the Patuxent and Patapsco River basins, and for the seven major watersheds. The following presents the results of the analysis from the GSM and the NPS spreadsheet.

Land Use Change

Figure B-1 presents the change in County acreage from 2007 to 2030 for each land use category. Total land use change for the County in 2030 is projected to be approximately 21,351 acres. Total acreage for the County is approximately 162,177 acres, so this is a change for 13% of the County. This change occurs with an increase in low, medium and high density residential, and commercial land uses, with the majority of this increase (81%) being in low density residential land use. Low density residential land use ranges from 2 dwelling units per acre to 1 dwelling unit per 5 acres. This land use change has a corresponding decrease in other land uses, primarily cropland, forest, rural residential and pasture

Figure B-2 presents the change in County acreage from 2007 to 2030 for developed land, agriculture and forest. In total, the County is projected to gain 20,710 acres of developed land, for an increase of 32% over current developed land acreage. Developed land includes low, medium and high density residential, commercial, industrial, institutional and transportation. The developed land acreage does not equal total land use change, because acreage in the industrial and institutional categories declined. The County is projected to lose 9,890 acres or 28% of existing agricultural land and 6,599 acres or 16% of existing forest.

Figure B-1: County Land Use Change

Land Use Category	2007 (acres)	2030 (acres)	Change (acres)
Low Density Residential	29,315	46,631	17,316
Medium Density Residential	16,282	19,275	2,994
Commercial	3,882	4,734	852
High Density Residential	4,773	4,962	189
Transportation	2,364	2,364	0
Row & Garden Crops	58	58	0
Water	1,007	1,007	0
Wetlands	30	30	0
Beaches	0	0	0
Bare Exposed Rock	0	0	0
Extractive	38	22	-16
Feeding Operations	127	122	-5
Agricultural Buildings	256	226	-30
Industrial	5,306	5,207	-98
Orchards & Vineyards	344	221	-123
Bare Ground	588	444	-144
Evergreen Forest	919	633	-286
Institutional	3,137	2,596	-541
Open Urban Land	3,441	2,733	-708
Brush	3,050	2,251	-800
Mixed Forest	4,225	3,409	-815
Pasture	5,280	3,616	-1,664
Rural Residential	13,688	10,347	-3,341
Deciduous Forest	34,280	29,583	-4,697
Cropland	29,789	21,721	-8,067

Figure B-2: County Developed Land, Agriculture and Forest Land Use Change

Land Use Category	2007 (acres)	2030 (acres)	Change (acres)
Developed	65,059	85,769	20,710
Agriculture	35,854	25,964	-9,890
Forest	42,475	35,876	-6,599

Figure B-3 presents the change in land use from 2007 to 2030 for the Patuxent and Patapsco River basins. Total land use change for the Patuxent River basin is projected to be approximately 16,091 acres. This is a 13% change in land use for the basin as a whole, and 75% of the total County land use change. Total land use change for the Patapsco River basin is projected to be approximately 5,642 acres. This is a 14% change in land use for the basin as a whole, and 25% of the total County land use change. The land use changes in each basin are similar to overall County changes.

Figure B-3: Land Use Change by Basin

	Patuxent			Patapsco		
Land Use Category	**2007 (acres)**	**2030 (acres)**	**Change (acres)**	**2007 (acres)**	**2030 (acres)**	**Change (acres)**
Low Density Residential	22,947	35,701	12,754	6,367	10,929	4,562
Medium Density Residential	11,921	14,414	2,493	4,361	4,862	501
Commercial	2,954	3,594	640	928	1,141	213
High Density Residential	3,526	3,730	204	1,247	1,232	-15
Transportation	1,768	1,768	0	596	596	0
Row & Garden Crops	58	58	0	0	0	0
Water	1,004	1,004	0	3	3	0
Wetlands	24	24	0	6	6	0
Beaches	0	0	0	0	0	0
Bare Exposed Rock	0	0	0	0	0	0
Extractive	3	3	0	35	19	-16
Feeding Operations	122	122	0	5	0	-5
Agricultural Buildings	186	173	-13	70	54	-16
Industrial	3,844	3,379	-465	1,462	1,828	366
Orchards & Vineyards	298	189	-109	46	32	-14
Bare Ground	521	393	-128	67	51	-16
Evergreen Forest	745	502	-243	174	131	-43
Institutional	2,344	1,999	-345	793	597	-196
Open Urban Land	2,601	1,986	-615	840	747	-93
Brush	2,552	1,891	-661	499	360	-139
Mixed Forest	2,682	2,297	-385	1,543	1,112	-431
Pasture	4,154	2,707	-1,447	1,126	909	-217
Rural Residential	10,289	8,165	-2,124	3,400	2,182	-1,218
Deciduous Forest	23,502	20,201	-3,301	10,778	9,382	-1,396
Cropland	23,730	17,475	-6,255	6,059	4,247	-1,812
Total	**121,775**		**16,091**	**40,405**		**5,642**

Figure B-4 presents the land use change for the seven 8-digit watersheds in the County. When the total County land use change is divided between these watersheds, almost 50% of this change occurs in the Middle Patuxent River (25.9%) and Triadelphia Reservoir (22.9%) watersheds. The Little Patuxent River watershed will see the third largest portion of the change at 17.0%, followed by the South and North

Branches of the Patapsco at 13.0% and 12.9%, respectively. The Rocky Gorge Reservoir watershed will have a 7.2% portion of the change and the Patuxent River Upper watershed will have the smallest portion, at 1.0%.

The land use change in most watersheds is primarily an increase in low density residential development. Exceptions to this pattern occur in the Little Patuxent River, which has a larger increase in medium density residential development, and the Patuxent River Upper, which has larger increases in commercial, and high and medium density residential development.

There is a small difference (2%) in the sum of the basin and individual watershed land use changes and the overall County change in land use. This occurs because if land use change is measured as the sum of positive land use changes, a particular land use may increase in the County but still increase or decrease in a particular basin or individual watershed. For example, industrial land use decreases for the County as a whole, but increases in the Patapsco River basin.

Figure B-4: Land Use Change by Watershed

8-digit Watershed	Change in Land Use (acres)	Percent County Total
Middle Patuxent River	5,639	25.9%
Triadelphia Reservoir	4,987	22.9%
Little Patuxent River	3,688	17.0%
South Branch Patapsco	2,835	13.0%
North Branch Patapsco	2,809	12.9%
Rocky Gorge Reservoir	1,555	7.2%
Patuxent River Upper	223	1.0%
Total	**21,736**	**99.9%**

Impervious Cover

Impervious cover, caused by built structures such as parking lots, roads and buildings, is a useful predictor of expected water quality and stream habitat conditions in a watershed. In general, as impervious cover increases with increasing development, stream health is expected to decline as forests are cleared, groundwater recharge is reduced, and polluted runoff into local streams increases in volume and frequency.

The County uses a system developed by the Center for Watershed Protection to place watersheds into one of three categories based on impervious cover, as presented in Figure B-5. Sensitive watersheds have up to 10% impervious cover and are expected to have the healthiest streams. Impacted watersheds have more than 10 and less than or equal to 25% impervious cover and are expected to have streams showing clear signs of degradation. Non-supporting watersheds have greater than 25% impervious cover and are expected to have streams with significant degradation. This system can be used to prioritize healthy watersheds for actions that will protect water quality and habitat, and to prioritize degraded watersheds for actions to restore water quality and habitat. The more degraded conditions are within a watershed, the more difficult and expensive restoration efforts become.

Figure B-5: Watershed Impervious Cover Categories

Watershed Category	Percent Impervious Cover	Expected Water Quality and Stream Health
Sensitive	Less than or equal to 10	Good to excellent
Impacted	Greater than 10 and less than or equal to 25	Fair to good
Non-supporting	Greater than 25	Poor to fair

Figure B-6 presents the change in impervious cover for the seven major watersheds in the County. Overall, impervious cover in the County increases from 20,458 acres or 12.6% of the County to 23,964 acres or 14.8% of the County, an increase of 3,507 acres or 2.2%. Impervious cover in the Patuxent River basin increases from 15,335 acres or 12.6% of the basin to 17,847 acres or 14.7% of the basin. Impervious cover in the Patapsco River basin increases from 5,123 acres or 12.7% of the basin to 6,117 acres or 15.1% of the basin. When this change in impervious cover is divided between the 8-digit watersheds, the smallest increase in impervious area will occur in the Patuxent River Upper, but because this is also the smallest watershed, it will give the largest percentage change at 5%. This increase in impervious cover will move this watershed from the impacted to the non-supporting category. The remaining watersheds all have a change of just under or over 2%, with a range of 1.8 to 2.6%.

Triadelphia Reservoir, South Branch Patapsco and Rocky Gorge Reservoir will all remain in the sensitive watershed category, with impervious cover below 10%. The Middle Patuxent River watershed will move from the sensitive category to the impacted category. The Little Patuxent River and the Patuxent River Upper watersheds will also move from the impacted to the non-supporting category. The North Branch Patapsco will remain in the impacted category.

Figure B-6: Impervious Cover by Watershed

8-digit Watershed	Impervious Cover (acres)		Impervious Cover (percentage)		Percentage Change
	2007	2030	2007	2030	
Middle Patuxent River (37,074 acres)	3,380	4,227	9.1% Sensitive	11.4% Impacted	2.3%
Triadelphia Reservoir (36,958 acres)	1,480	2,148	4.0% Sensitive	5.8% Sensitive	1.8%
Little Patuxent River (38,005 acres)	9,512	10,215	25.0% Impacted	26.9% Non-supporting	1.9%
South Branch Patapsco (16,086 acres)	676	1,059	4.2% Sensitive	6.6% Sensitive	2.4%
North Branch Patapsco (24,319 acres)	4,447	5,058	18.3% Impacted	20.8% Impacted	2.5%
Rocky Gorge Reservoir (7,996 acres)	535	742	6.7% Sensitive	9.3% Sensitive	2.6%
Patuxent River Upper (1,738 acres)	428	515	24.6% Impacted	29.6% Non-supporting	5.0%
Total	**20,458**	**23,964**			

Nutrient Loads

Figure B-7 presents the change in nonpoint source nutrient loads from 2007 to 2030 by basin and for the County as a whole. The overall change in land use for the County will result in a small increase in nitrogen loading of 793 pounds, or a less than 1% increase from the 2007 load, and a small increase in phosphorus loading of 880 pounds, or a 1% increase from the 2007 load. The change in land use generates an increase in nitrogen and phosphorus loads from low, medium and high density residential and commercial land uses, because these land uses are projected to increase in acreage. A decrease in nutrient loads is generated by other land uses that are projected to decrease in acreage. The majority of the decrease (68% for nitrogen and 71% for phosphorus) occurs from the change in cropland, with the next largest decrease (14% for nitrogen and 18% for phosphorus) coming from the change in rural residential land use. The decrease in cropland has such a significant impact on the change in nutrient loads, because the nitrogen and phosphorus loading rates for cropland can be up to twice the loading rates for developed land.

The change in land use actually generates a decrease in runoff nitrogen loads, but this is offset by an increase in nitrogen loads from septic systems. The projected nitrogen load from septic systems will be 22% of the total Countywide nitrogen load in 2030.

Figure B-7: Nonpoint Source Nutrient Loads by Basin and Countywide

Source	Nitrogen Loads (lbs/yr)				Phosphorus Loads (lbs/yr)			
	2007	2030	Change	%	2007	2030	Change	%
Patuxent								
Land Use	902,654	885,769	-16,885					
Septic	210,647	226,069	15,422					
Total	**1,113,301**	**1,111,838**	**-1,463**	**-0.1%**	**70,510**	**70,288**	**-222**	**-0.3%**
Patapsco								
Land Use	212,152	212,505	352					
Septic	75,025	76,928	1,903					
Total	**287,177**	**289,433**	**2,256**	**0.8%**	**17,308**	**18,410**	**1,102**	**6.4%**
Countywide								
Point	1,114,806	1,098,274	-16,532					
Septic	285,672	302,997	17,325					
Total	**1,400,479**	**1,401,271**	**793**	**0.1%**	**87,818**	**88,698**	**880**	**1.0%**

Under the Tributary Strategy BMP loading rates, nitrogen loading rates are generally higher in the Patuxent than the Patapsco River basin, but the difference in phosphorus loading rates is variable. A larger portion of the Patuxent River basin lies outside the Planned Service Area, and this basin has approximately three times the number of septic systems than does the Patapsco River basin.

In the Patuxent River basin, nitrogen and phosphorus loads have a minor decrease of less than 1% from 2007 loads. As with the Countywide loads, the change in land use generates an increase in nitrogen and phosphorus loads from low, medium and high density residential and commercial land uses. A decrease in

nutrient loads is generated by other land uses that are projected to decrease in acreage. The majority of the decrease occurs from the change in cropland, with the next largest decrease coming from the change in rural residential land use. The change in land use results in a significant decrease in runoff nitrogen loads, but this is offset by an increase in nitrogen loads from septic systems.

In the Patapsco River basin, nitrogen loads have a minor increase of less than 1% and phosphorus loads increase by 6% from 2007 loads. In a slightly different pattern from the Countywide loads, the change in land use generates an increase in nitrogen and phosphorus loads from low and medium density residential, commercial and industrial land uses. A decrease in nutrient loads is generated by other land uses that are projected to decrease in acreage. The majority of the decrease occurs from the change in cropland, with the next largest decrease coming from the change in rural residential land use. Both the change in land use and the addition of septic systems contribute to an increase in nitrogen loads.

Figure B-8 presents the change in nonpoint source nutrient loads from 2007 to 2030 for each major watershed. The GSM analysis of land use change for the seven 8-digit watersheds in the County did not include an assessment of septic systems, so total change in nitrogen cannot be calculated. Total change in nitrogen loads for land use Countywide is 16,532 verses 16,880 for the watersheds, or a difference of 2.0%. This seems reasonable, given the 2% difference in land use change. Total change in phosphorus loads for land use Countywide is 880 verses 758 for the watersheds, or a difference of 14%. This larger percentage difference may occur because the loadings are relatively small, so the difference is proportionately larger.

Figure B-8: Nonpoint Source Nutrient Loads by Watershed

8-digit Watershed	Nitrogen Loads (lbs/yr)				Phosphorus Loads (lbs/yr)			
	2007	2030	Change	%	2007	2030	Change	%
Middle Patuxent	287,212	279,200	-8,011	-2.8%	22,692	22,437	-254	-1.1%
Triadelphia Reservoir	304,724	292,447	-12,277	-4.0%	23,792	23,136	-756	-3.2%
Little Patuxent	251,277	252,778	1,501	0.6%	19,533	19,902	368	1.9%
S Branch Patapsco	99,787	95,052	-4,736	-4.7%	7,661	8,014	352	4.6%
N Branch Patapsco	112,364	117,196	4,832	4.3%	9,646	10,382	736	7.6%
Rocky Gorge	49,225	50,962	1,736	3.5%	3,716	4,017	302	8.1%
Patuxent River Upper	10,286	10,361	75	0.7%	785	795	10	1.3%
Total			**-16,880**				**758**	

Note that nitrogen loads are for land use only and do not include nitrogen loads from septic systems.

Point and Nonpoint Source Loadings

Figure B-9 presents the combined point source loads from the Little Patuxent Water Reclamation Plant (WRP) and the Patapsco Wastewater Treatment Plant (WRP), and nonpoint source loads from land use and septic systems for the Patuxent and Patapsco River basins and Countywide. It should be noted that the point and nonpoint source loads are not comparable in terms of accuracy. The point source loads are based on actual and projected flows and nutrient concentrations. The nonpoint source loads are based on

an assumption for best management practice implementation that is not currently in place, so they are useful only for comparing changes in nonpoint source loads.

Total nitrogen and phosphorus loads in the Patuxent River basin will decrease by approximately 1.5% and 3.0%, respectively, due primarily to the decrease in nutrient loads from the Enhanced Nutrient Removal (ENR) treatment upgrade at the Little Patuxent WRP. Total nitrogen and phosphorus loads in the Patapsco River basin will decrease by approximately 40.8% and 34.0%, respectively, due to the decrease in nutrient loads from the ENR upgrade at the Patapsco WWTP. Total nitrogen and phosphorus loads in the County will decrease by approximately 13.8% and 12.4%, respectively, due primarily to the decrease in nutrient loads from the Little Patuxent WRP and the Patapsco WWTP.

Figure B-9: Total Nutrient Loads by Basin and Countywide

Source	Nitrogen Loads (lbs/yr)				Phosphorus Loads (lbs/yr)			
	2007	2030	Change	%	2007	2030	Change	%
Patuxent								
Point	301,701	282,508	-19,193	-6.4%	22,770	20,167	-2,603	-11.4%
Nonpoint	1,113,301	1,111,838	-1,463	-0.1%	70,510	70,288	-222	-0.3%
Total	**1,415,002**	**1,394,346**	**-20,656**	**-1.5%**	**93,280**	**90,455**	**-2,825**	**-3.0%**
Patapsco								
Point	390,972	111,779	-279,193	-71.4%	23,306	8,383	-14,923	-64.0%
Nonpoint	287,177	289,433	2,256	0.8%	17,308	18,410	1,102	6.4%
Total	**678,149**	**401,212**	**-276,937**	**-40.8%**	**40,614**	**26,793**	**-13,821**	**-34.0%**
Countywide								
Point	682,673	394,287	-275,966	-40.4%	46,076	28,550	-16,594	-36.0%
Nonpoint	1,400,479	1,401,271	793	0.1%	87,818	88,698	880	1.0%
Total	**2,083,152**	**1,795,558**	**-287,594**	**-13.8%**	**133,894**	**117,248**	**-16,646**	**-12.4%**

Modifications to the Nonpoint and Point Source Loadings

Subsequent to the preparation of the nonpoint and point source nutrient load analysis used in this document, the proposal to develop 2,000 apartment units at Doughoregan Manor was withdrawn by the applicant. In the fall of 2009, the property owners submitted a new request to develop about 325 single family detached units on the same portion of the property. It is assumed that the 325 homes would be built between 2010 and 2020. If approved, the revised Doughoregan Manor development proposal would change the future land use on the property from high density residential to low density residential. Total land use change in the County would stay the same, but the 2030 land use projections would have a minor increase in low density residential land use and a minor decrease in high density residential land use. There would be a minor decrease in future impervious cover and future nonpoint source nutrient loads, because low density residential land use has a lower impervious cover and lower nutrient loading rate than high density residential land use. Point source loads from the Little Patuxent WRP and the County's total nutrient loads would also be slightly lower than projected.

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EXHIBIT 11

Reclaimed Water Management (RWM) Plan

Reclaimed Water Management (RWM) Plan for the

Howard County Department of Public Works Bureau of Utilities

Water & Wastewater Facilities
Engineering Design Services (WWFEDS)
Task No. 019
Conceptual Reclaimed Water
System Master Plan

Howard County Purchase Order M-4863
Consultant Services Agreement CA 08-13
GMB Job No. 2007337.00L

June 30, 2014

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1. GOAL / PURPOSE

The County intends to have a reclaimed water system that is a stand-alone utility on par with its water and sewer utilities. The Reclaimed Water Management (RWM) Plan is intended to supplement the Conceptual Reclaimed Water System Master Plan (Draft October 25, 2012) in order to fill in the details on the reclaimed water utility including the reclaimed water itself, its treatment, its distribution and storage, and its end users as well as operation and maintenance of the reclaimed water facilities that will comprise the system.

The development of a RWM Plan is a requirement identified in the Maryland Department of the Environment Draft Guidelines for Use of Reclaimed Water (6-11-2012 version).

2. RECLAIMED WATER UTILITY SERVICE AREA

Within Howard County, the Metropolitan District is the area designated to receive service by the water utility and sewer utility with no plans to serve areas outside of it. The County intends to limit the ultimate service area of the reclaimed water utility to the Metropolitan District as well. Therefore the ultimate service area is the Metropolitan District with the exception of providing bulk reclaimed water to Fort Meade in neighboring Anne Arundel County.

The County anticipates gradually expanding the service area starting with the current reclaimed water service area near the Little Patuxent Water Reclamation Plant (LP WRP) and extending it northward to serve the southern portion of the Metropolitan District and extending it further to the northern part in later years. Figure 2.1: Existing, 5-Year, 10-Year, and Comprehensive Priorities for Reclaimed Water System Development (Figure 7.1 from Conceptual Reclaimed Water System Master Plan, Draft October 25, 2012) shows the existing and anticipated future facilities in 5-year increments and the anticipated service areas. For planning purposes, the service areas currently anticipated match the pressure zones for the water utility. This is because the reclaimed water utility will also operate under pressure so it will be defined by elevation and topographical features.

Unlike the water and sewer utilities which are used almost universally within the Metropolitan District, it is anticipated that the reclaimed water utility will serve mostly large volume customers. In terms of number of accounts, the vast majority of water and sewer accounts are individual residential units. However considering the limitations on reclaimed water use, it is anticipated that there will be relatively few individual accounts. These accounts will likely be limited to customers with high non-potable water demands.

Figure 2.2: Existing & Pending Reclaimed Water Customers shows the location of each of the proposed reclaimed water utility customers as well as any currently considering connecting. Table 2.1: Existing & Pending Reclaimed Water Customers lists each customer and details of the agreement plus includes the reuse category for each corresponding to Table 1 – Class of Reclaimed Water Suitable for Various Types of Water Reuses from the MDE Guidelines for Use of Reclaimed Water, Draft 6-11-2012.

Figure 2.3: Water Appropriation Permits (Figure 5.2 from Conceptual Reclaimed Water System Master Plan, Draft October 25, 2012) shows the location of all active water appropriation permits in Howard County broken down by potable, irrigation, and commercial uses. The details for each are listed in Table 2.2: Existing Water Appropriation Permits within Metropolitan District and Table 2.3: Existing Water Appropriation Permits outside Metropolitan District. Reviewing those located within the Metropolitan District, there are 43 active water appropriation permits of which 27 are listed as for potable use. Referring to Table 2.2: Existing Water Appropriation Permits within Metropolitan District, there are several large volume users listed as potable which are either erroneous designations or use only a portion of their flow for potable purposes such as Chase Mining which has two permits totaling 400,000 gpd average daily flow rate and 4,798,000 gpd peak maximum month average daily flow rate.

Although Howard County will supply reclaimed water to Fort Meade in neighboring Anne Arundel County, Howard County does not consider it to be part of its reclaimed water utility service area. Fort Meade purchases bulk reclaimed water from Howard County and assumes the responsibility for its use and disposal.

3. EXISTING AND SCHEDULED RECLAIMED WATER SYSTEM GENERATION, DISTRIBUTION, AND STORAGE FACILITIES

The components that comprise a reclaimed water system consist of reclaimed water sources, reclaimed water distribution mains, reclaimed water pumping stations, and reclaimed water storage tanks. All reclaimed water facilities that currently exist or are in design or under construction are shown in Figure 3.1: Reclaimed Water System Existing and Scheduled Components.

The Little Patuxent Water Reclamation Plant (LP WRP) is the only reclaimed water source in Howard County with no other sources anticipated. The LP WRP currently has a wastewater treatment rated capacity of 29.0 million gallons per day (mgd) average daily flow rate although has a much lower average daily flow rate of approximately 17.9 mgd. Table 3.1: Little Patuxent Water Reclamation Plant (LP WRP) Final Effluent Flow Rate presents the monthly average daily flow rate at the LP WRP since 1999 which has varied over the years and also varies within the year. Table 3.1: Little Patuxent Water Reclamation Plant (LP WRP) Final Effluent Flow Rate also presents the data on a seasonal basis with the seasons defined as Winter (January – March), Spring (April – June), Summer (July – September), and Autumn (October – December). All of the effluent from the LP WRP is available for potential water reuse.

Table 3.2: Reclaimed Water Distribution Mains lists all reclaimed water distribution mains that currently exist, are under construction, or are being designed. The information includes length and size of reclaimed water piping but is limited to that owned and operated by Howard County so does not include information on reclaimed water distribution piping on the customer side.

Table 3.3: Reclaimed Water Pumping Stations lists all reclaimed water pumping stations that currently exist, are under construction, or are being designed. The information includes the peak capacity of the pumping stations.

Table 3.4: Reclaimed Water Storage Tanks lists all reclaimed water storage tanks that currently exist, are under construction, or are being designed. The information includes storage volume and is separated into two sections. The "In-System Storage" section of the table lists those storage tanks owned and operated by Howard County which are used to supply the distribution system and maintain pressure throughout the reclaimed water system. The "Out-of-System Storage" section of the table lists those storage tanks that are not owned and operated by Howard County. These "Out-of-System Storage" tanks provide storage for individual customers but cannot supply back into the County distribution system.

The Guilford Reclaimed Water Storage Tank formerly was part of the potable water system but was unnecessary with the construction of a new potable water tank nearby. The tank will be converted to function as part of the reclaimed water system.

The new reclaimed water distribution main, pumping station, and storage tank infrastructure that are currently under construction for the Fort Meade military base are all being constructed by Howard County but only part of the facilities will remain under Howard County ownership and operation. When completed, Howard County will retain ownership and operation of the new reclaimed water pumping station, diversion chamber, and distribution main piping up to the perimeter fencing for the base. All piping extending onto the base and the new storage tank located within the Fort Meade secure perimeter will be turned over to American Water Company.

Howard County maintains as-built drawings of all existing facilities which are retained in the Bureau of Utilities.

4. ANTICIPATED FUTURE RECLAIMED WATER SYSTEM GENERATION, DISTRIBUTION, AND STORAGE FACILITIES

There are no other reclaimed water sources anticipated by Howard County. Therefore all future reclaimed water system components are anticipated to be extensions from the existing reclaimed water system with additional reclaimed water distribution mains, reclaimed water pumping stations, and reclaimed water storage tanks all using reclaimed water from the LP WRP.

All reclaimed water system expansions are planned for the future at 0 – 5 year, 6 – 10 year, and greater than 10 year phases as shown in Figure 2.1: Existing, 5-Year, 10-Year, and Comprehensive Priorities for Reclaimed Water System Development (Figure 7.1 from Conceptual Reclaimed Water System Master Plan, Draft October 25, 2012).

Figure 2.1: Existing, 5-Year, 10-Year, and Comprehensive Priorities for Reclaimed Water System Development (Figure 7.1 from Conceptual Reclaimed Water System Master Plan, Draft October 25, 2012) shows all existing and planned components of the reclaimed water system in Howard County consisting of the reclaimed water source which is the Little Patuxent Water Reclamation Plant (LP WRP), distribution mains, pump stations, and storage tanks. Each component is presented in a color-code using yellow for existing facilities, purple for planned facilities (0 – 5 years), blue for near-term future facilities (6 – 10 years), and orange for long-term future facilities (greater than 10 years).

5. WATER BALANCE – EXISTING FLOWS

The Reclaimed Water Balance is the calculation of flows within the reclaimed water utility from generation through reuse and ultimate disposal. Table 5.1: Reclaimed Water Balance summarizes each component on an annual and seasonal basis with the seasons defined as Winter (January – March), Spring (April – June), Summer (July – September), and Autumn (October – December).

The only source of reclaimed water is the Little Patuxent Water Reclamation Plant (LP WRP). Table 3.1: Little Patuxent Water Reclamation Plant (LP WRP) Final Effluent Flow Rate lists the monthly average daily flow rate and the seasonal average daily flow rate from the LP WRP since 1999.

The Howard County sanitary sewer collection system includes the Route 108 Sewage Pumping Station which can divert flow from the LP WRP drainage area to the Patapsco Wastewater Treatment Plant drainage area. The County typically does not operate the Route 108 Sewage Pumping Station but it could reduce the flow to the LP WRP by up to 3.0 mgd during periods of operation which could in turn reduce the amount of reclaimed water available by the same amount.

The reclaimed water is used by various customers for different purposes. Table 5.2: Reclaimed Water Anticipated Demand by Existing & Pending Customers lists the flows used on a customer by customer basis. Table 5.3: Reclaimed Water Demand by Reuse Category lists the flows used based on the six categories identified in Table 1 – Class of Reclaimed Water Suitable for Various Types of Water Reuses from the MDE Guidelines for Use of Reclaimed Water, Draft 6-11-2012. All flows are presented on an annual and seasonal basis.

Once treated wastewater leaves the Little Patuxent Water Reclamation Plant (LP WRP), it is either discharged or diverted into the reclaimed water system. Treated wastewater that is not reclaimed for reuse is discharged to the Little Patuxent River via the LP WRP outfall (NPDES Permit Number MD0055174). Treated wastewater that is reclaimed for reuse is provided to the customers served by the reclaimed water utility which are listed in Table 2.1: Existing & Pending Reclaimed Water Customers and are located as shown on Figure 2.2: Existing & Pending Reclaimed Water Customers.

Once a customer receives the reclaimed water, there are three ultimate outcomes possible for the reclaimed water. Flow is either returned to the sanitary sewer, depleted in the reuse process, or discharged at a location other than the LP WRP outfall. Table 2.1: Existing & Pending Reclaimed Water Customers lists the ultimate disposal of the reclaimed water by each customer.

Reclaimed water that is returned to the sanitary sewer is simply added back into the influent to the LP WRP for treatment and potentially for additional reuse. One example is Dreyer's Grand Ice Cream, Inc. where reclaimed water would be used and returned to the sanitary sewer system.

Some reclaimed water flow can be lost through the process of its reuse such as through evaporation from cooling uses or consumption such as through irrigation. Again using Dreyer's Grand Ice Cream, Inc. as an example, Dreyer's would use reclaimed water for cooling purposes through which part of the flow is lost to evaporation.

In some instances, reclaimed water is disposed of at the site of use or in a product. For example, Laurel Sand and Gravel, Inc. would use reclaimed water for washing aggregates and in producing concrete.

Reclaimed water supplied to Fort Meade is a simple subtraction from the reclaimed water supply as Howard County supplies it to Fort Meade in bulk and Fort Meade takes on the responsibility of ensuring its proper use and ultimate disposal. Fort Meade uses the reclaimed water for cooling and discharges it to the sanitary sewer system on base which flows to the Fort Meade Wastewater Treatment Plant (NPDES Permit Number MD0021717)

Reclaimed water storage tanks are listed in Table 3.4: Reclaimed Water Storage Tanks but are not considered part of the reclaimed water balance calculations. Similar to storage tanks in potable water distribution systems, reclaimed water storage tanks provide additional volume to the reclaimed water distribution system in times of high demand and refill during times of low demand effectively leveling out the flow rate peaks and troughs over the course of the day. Once the initial fill-up is complete, the reclaimed storage tanks inflow and outflow should balance over the course of the day.

6. POTENTIAL FUTURE FLOWS

Looking to the future on the supply side, the potential reclaimed water supply will be equivalent to the anticipated future flow to the Little Patuxent Water Reclamation Plant (LP WRP). Referring to the Howard County Master Plan for Water and Sewerage, 2011 Amendment, the County anticipates future flows to the LP WRP to increase to 25.20 mgd average daily flow rate by Year 2035 (Table 9) thus increasing the amount of flow potentially available for reuse as reclaimed water.

On the demand side, estimating future reclaimed water demands is not practical for multiple reasons. The LP WRP is operated to achieve an effluent equivalent to Class IV reclaimed water quality which makes it acceptable for all approved reclaimed water reuses. Therefore any potential user of non-potable water is a potential customer. However connecting to the reclaimed water utility is voluntary so only customers who want the utility will be connected. Each potential customer will have to weigh the costs and benefits (economic and other) of connecting to decide if it is worth it. There will likely be some potential customers who would benefit from connecting to the reclaimed water system and others who would not.

The capital investment needed to construct the infrastructure for reclaimed water suggests that it would be economically feasible only for large volume water users who can use non-potable water for their purposes. Among businesses that already exist in the County, these would likely be users who currently use potable water from the County but could possibly also include users who obtain their water from wells. Potential customers would also have to be entities that are large enough to shoulder the burden of the additional cost of operating the reclaimed water system on-site and meeting the requirements of the reclaimed water agreement.

For potential customers, an indirect benefit provided by reclaimed water is greater water supply security. During periods of drought when water restrictions could be implemented (which potentially could affect both potable water users and well water users), reclaimed water users would not be affected by any restrictions thus providing a degree of water supply security.

Even though there is no way to predict future reclaimed water demands, there can be some value in identifying those known entities that have the potential for becoming future customers of the reclaimed water utility. That being the case, the most likely candidates for becoming reclaimed water customers are those who use large volumes of potable water and those with water appropriation permits.

Figure 6.1: 15 Highest Potable Water Users Calendar Year 2011 (Figure 5.4 from Conceptual Reclaimed Water System Master Plan, Draft October 25, 2012) shows the high volume water users within the Metropolitan District that are connected to the County's potable water system. Many of these users are food producers so are unlikely candidates for reclaimed water for use in processing although may be interested in reclaimed water for use in cooling.

Figure 2.3: Water Appropriation Permits (Figure 5.2 from Conceptual Reclaimed Water System Master Plan, Draft October 25, 2012) shows the location of all active water appropriation permits located in Howard County and identifies each as potable, irrigation, or commercial use. Table 2.2: Existing Water Appropriation Permits within Metropolitan District and Table 2.3: Existing Water Appropriation Permits outside Metropolitan District list the water appropriation permits and includes other pertinent information such as Average Daily Flow Rate and the Maximum Month Average Daily Flow Rate. The water appropriation permits located outside of the Metropolitan District are listed separately as the County has decided to provide the reclaimed water utility only within the Metropolitan District. However, the information is still maintained should there be an opportunity for the reclaimed water utility to serve these potential customers.

Another potential increase to reclaimed water demands could come from businesses looking to locate to the region. Howard County's location between the Baltimore market and Washington, D.C. market make it an attractive location for many businesses. For those that use large volumes of water that does not have to be potable, the cost savings and supply security provided by County's reclaimed water system could be an incentive to locate to Howard County.

Since the LP WRP discharges effluent meeting Class IV reclaimed water quality requirements, all MDE approved uses are eligible so there is great potential for adding users. However, the County does not have specific businesses / institutions identified that have expressed interest in receiving reclaimed water for reuse other than those listed in Table 5.2: Reclaimed Water Anticipated Demand by Existing & Pending Customers.

The reclaimed water system will serve customers located in both the drainage area to the LP WRP and the Howard County portion of the drainage area to the Patapsco Wastewater Treatment Plant. Even though the LP WRP which is the reclaimed water source receives sanitary sewage flow from only approximately 69% of the area within the Metropolitan District with the other 31% flowing to Baltimore County via the Patapsco Interceptor and on to the Patapsco Wastewater Treatment Plant owned and operated by the City of Baltimore, the reclaimed water system will serve the entire area within the Metropolitan District. In other words, reclaimed water from the LP WRP which is used in the Patapsco WWTP drainage area is anticipated to be discharged to the sanitary sewers there and ultimately will be treated at the Patapsco WWTP.

Many reclaimed water utilities across the country were initiated out of necessity due to strains on water supply (such as drought, diminishing groundwater table, and saltwater intrusion) or difficulty in disposing of wastewater treatment plant effluent. In Howard County, the impetus behind developing a reclaimed water utility was not out of necessity but rather looking to the future. The water supply for the County is adequate and anticipated to be so in the future. Effluent disposal is

also not a concern for the County as growth has not been limited due to lack of wastewater treatment capacity.

Referring to the six (6) reclaimed water reuse categories listed in Table 1 – Class of Reclaimed Water Suitable for Various Types of Water Reuses from Chapter 3 – Treatment Quality by Class Required for Uses of Reclaimed Water from the MDE Guidelines for Use of Reclaimed Water, Draft 6-11-2012, the County anticipates the following types of uses for reclaimed water:

- Irrigation for golf courses, ornamental nurseries, parks, playgrounds, schoolyards, cemeteries, lawns, and landscaping;
- Filling water bodies such as aesthetic fountains, ponds, and lagoons;
- Commercial reuse for toilet and urinal flushing, laundries, car washing, window washing, and pressure cleaning;
- Industrial use for dust control and soil compaction, washing aggregates and making concrete, parts washing and cleaning, equipment operations, and other manufacturing processes;
- Cooling water for towers, air conditioning, and closed loop cooling.

Alternately, the County anticipates little or no demand for the other MDE approved uses for reclaimed water such as:

- Irrigation for food crops, non-food crops, forested land, turf, pasture, sod farms, silviculture (forest / woodlands), and highway landscapings and other green open spaces;
- Fire protection.

The ultimate reclaimed water service area corresponds to the Metropolitan District which is comprised of primarily residential areas but with some significant commercial and industrial development as well. Therefore, there is currently little agricultural activity within the Metropolitan District so reclaimed water for farming purposes is not anticipated.

Use of reclaimed water for fire protection would require a greater degree of redundancy in the reclaimed water distribution and storage system and larger sized pipes in order to convey the higher flow rates. In addition it could raise concerns about pooled water after a fire. Therefore reclaimed water for fire protection purposes is not anticipated.

To summarize, there is no way to estimate future reclaimed water demands with any degree of probability considering the number of unknown factors that are outside of the County's control. However, there is no possibility of demand outstripping supply for the foreseeable future as the current reclaimed water supply of 17.9 mgd greatly exceeds demand possible of current potential reclaimed water users (6.42 mgd) even if the 15 highest potable water users (1.799 mgd), the water appropriation permit holders within the Metropolitan District (1.315 mgd), and the water appropriation permit holders outside of the Metropolitan District (1.463 mgd) were all also connected.

7. SERVICE AGREEMENTS

In order to ensure that both the reclaimed water customer and provider have their specific obligations and responsibilities identified, each reclaimed water customer is required to enter into a legal agreement with Howard County.

Appendix A: Reclaimed Water Utility Customer Agreement is a standard agreement that the County has adopted as the starting point for any reclaimed water customer. If there are provisions listed in the standard agreement that the potential reclaimed water customer does not agree with, the County will consider modification at the County's discretion.

8. RECLAIMED WATER USE MONITORING PROGRAM

As part of the Customer Agreement, each reclaimed customer agrees to submit to periodic checks by the County to ensure compliance with the agreement and with the requirements of the Maryland Department of the Environment Guidelines for Use of Reclaimed Water.

Prior to activating the connection to the County's reclaimed water distribution system, the customer must provide as-built drawings of all reclaimed water facilities on-site for review by the County and accompany County personnel during an inspection. Upon County approval, the connection will be activated and the customer provided with reclaimed water.

Once the reclaimed water connection is active, the County may conduct inspections as frequently as desired. However, the County expects to perform inspections on an annual basis unless there are instances of non-compliance or other concerns that would prompt more frequent inspections.

The inspections are intended to encompass all reclaimed water facilities on-site with the intent of ensuring that all necessary measures are in place in order to prevent potential human contact with reclaimed water. The inspections will focus on, but not be limited to, ensuring the following items:

- Notification information and measures are in place to inform all personnel (employees, visitors, residents, etc.) entering the area of use that reclaimed water is in use;
- All reclaimed water equipment and facilities are in functional condition and in operational order;
- All reclaimed water equipment and facilities are secured and properly marked;
- All personnel with access to the reclaimed water equipment and facilities are properly trained to work with reclaimed water;
- All reclaimed water is under control including runoff and spray;
- There is an effective cross-connection control and backflow prevention program in place and it is being followed.

The water quality of the reclaimed water is monitored at the point at which it leaves the LP WRP and the flow rate is recorded at the reclaimed water meter for each individual customer.

The County will monitor and report chlorine residual readings and turbidity readings in the reclaimed water in accordance with the current discharge permit for the Little Patuxent Water Reclamation Plant (NPDES Discharge Permit Number: MD0055174, State Discharge Permit Number: 13-DP-1421).

As the reclaimed water system expands, the County will monitor and report chlorine residual readings and turbidity readings in the reclaimed water at each County-owned reclaimed water pumping station and provide re-chlorination infrastructure.

Each Customer will have an individual Memorandum of Understanding (MOU) Agreement or User Agreement specifying any additional chlorine residual or turbidity monitoring requirements.

9. EDUCATION AND NOTIFICATION PROGRAM

In order to make information available to the public on reclaimed water, the County has developed a number of sources intended to provide as much information as is sought by the public. The information is intended to be general in nature but does include links if more specific and detailed information is desired. Much of the same information is presented in each case just using a different medium.

9.1. Educational Information

9.1.1. County Website

In order to provide information to the public on reclaimed water, there is a section of the County website dedicated to the reclaimed water utility at http://www.co.ho.md.us/reclaimedwater. In addition to the general description and information on the reclaimed water utility, the website has links to the following information:

- *Reclaimed Water Utility Customer Agreement* – If a prospective customer is interested in obtaining reclaimed water service, he can see the standard agreement (Appendix A: Reclaimed Water Utility Customer Agreement) which lists the information required in order to receive reclaimed water service and the obligations that the customer assumes upon entering the agreement as well as the Application for Receiving Reclaimed Water Service. Viewing this standard agreement is also useful for the general public in order to get a sense of what requirements each reclaimed water utility customer is held to.

- *Howard County Master Plan for Water and Sewerage* – With the inclusion of a new chapter dedicated to the reclaimed water utility being added to the Master Plan covering the existing and planned reclaimed water utility facilities, prospective customers and the general public can see the anticipated future of the reclaimed water utility in Howard County.

- *Maryland Department of the Environment* – The Howard County reclaimed water utility is being developed in accordance with the Maryland Department of the Environment Guidelines for Use of Reclaimed Water.

- *Environmental Protection Agency* – The EPA has extensive general and historical information on the use of reclaimed water throughout the United States and abroad.

For anyone interested in obtaining more detailed information specific to Howard County, the website also includes the contact information (address, telephone number, and e-mail address) of the Reclaimed Water Program Manager.

Refer to Appendix B: Reclaimed Water Information on County Website which contains the text of the webpage.

9.1.2. Reclaimed Water Informational Brochure

The County offers a multitude of informational brochures for its citizens covering many topics. These brochures are available at most County offices and various other outlets throughout the County.

The reclaimed water informational brochure provides a general overview of the County's reclaimed water utility. The brochure is laid out to include a section dedicated for mailing with the return address in place and with areas for placing an address for mailing to an individual and a stamp so that it could be mailed to anyone requesting information from the County on the reclaimed water utility.

Refer to Appendix C: Reclaimed Water Informational Brochure for a copy of the brochure.

9.1.3. Reclaimed Water Presentation

The County has prepared a standard slide presentation on reclaimed water which is included in Appendix D: Reclaimed Water Presentation (Sample). This brief slide presentation provides a general overview of reclaimed water, much of it the same as the other informational sources developed by the County. However it is intended to be flexible and can be modified for a specific audience or event.

For example if the presentation is intended for a public meeting or meeting with stakeholders, the presentation is broader in order to provide a complete picture of the program. However if the presentation is part of a training session for County personnel, the presentation can be modified to include more technical information related to the specific tasks of each position. In each case, the presentation can be modified based on the audience and the time allotted. Presentations at public meetings or other specific events will take place on an as-needed basis depending on requests to the Reclaimed Water Supervisor.

In addition to live presentations, the standard slide presentation will also be accessible via the County's website.

9.2. Notification Information

9.2.1. Notification Signage

Under Section 11: Operational Requirements of Appendix A: Reclaimed Water Utility Customer Agreement, each reclaimed water customer is required to provide signage at each entrance to his site at each point of use stating that reclaimed water is in use. This signage is intended to ensure that all personnel on site whether residents, employees, visitors, etc. are aware that reclaimed water is in use and that human contact is not permitted.

In accordance with MDE Guidelines, all signage is required to be a minimum of 8 inches wide by 4 inches high, be predominantly purple in color, and contain text stating "Reclaimed Water, Do Not Drink". In addition to the requirements identified in the MDE Guidelines, the County also requires that these signs include the County website address and the telephone number of the Reclaimed Water Program Manager and all information in both English and Spanish.

Refer to Appendix E: Reclaimed Water Warning Sign for a sample sign. Signage of different design may be acceptable with County approval.

9.2.2. Employee Notification and Training

Each reclaimed water utility customer is responsible for ensuring that all personnel associated with the reclaimed water system are aware that reclaimed water is being used and are properly trained in its use and the facilities and equipment on their site. Section 10. Reclaimed Water Supervisor of Appendix A: Reclaimed Water Utility Customer Agreement requires that each reclaimed water utility customer designates a Reclaimed Water Supervisor as the person responsible for operating the reclaimed water system. The Reclaimed Water Supervisor is responsible for obtaining the necessary training as well as ensuring that all other applicable personnel are trained as well.

Information on reclaimed water such as the Reclaimed Water Informational Brochure or the Reclaimed Water Presentation may be available from the County but provide only general information. The customer's contract with the County (Appendix A: Reclaimed Water Utility Customer Agreement) also contains pertinent information but does not contain system-specific details that also must be part of the training program.

Every reclaimed water utility customer will have a unique set of conditions (application, size and complexity of system, system configuration, etc.) that makes it impossible to develop a single training program applicable to all customers. Therefore each reclaimed water utility customer is responsible for developing system-specific information and training for operating their own system.

10. CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION PROGRAM

Howard County follows the National Standard Plumbing Code Illustrated (2012 Edition the most recent edition) as the local plumbing code. Referring to it, section G.4. Alternate Water Sources for Non-Potable Applications, G.4.3. Reclaimed (Recycled) Water Systems is the applicable section for the reclaimed water system which includes requirements prohibiting connections to potable water systems and testing for cross-connections.

In terms of cross-connection control and backflow prevention, the National Standard Plumbing Code has requirements for activating a new reclaimed water connection and for regular inspection and testing. In order to approve a new reclaimed water connection to come on-line, the end user must first pass an initial cross-connection test of the site piping. Once a reclaimed water system is operating, the system is subject to annual cross-connection inspection and testing to verify that it still meets the requirements of the plumbing code.

For both the initial reclaimed water system start-up and the annual check-ups, the process consists of a visual inspection of the piping and an operational test of both the reclaimed water system and the potable water system. The visual inspection checks all piping and appurtenances for potential direct piped connections. The cross-connection test consists of depressurizing and draining the reclaimed water system while potable water system is still in operation to check if any flow still gets in to the reclaimed water system and then reversing the process with the potable water system depressurized and drained while the reclaimed water system is in service.

Appendix F: Reclaimed Water Utility Initial and Annual Inspection Checklist is the form used by the County inspector to verify that the customer's reclaimed water piping meets the County's requirements. This checklist must be filled out and approved by the inspector in order to activate a new reclaimed water account or to pass the annual inspection in order to continue to receive reclaimed water supply.

11. UPDATING RECLAIMED WATER MANAGEMENT PLAN

Whenever a new reclaimed water customer is added, the following items must be updated:

Figures:

Figure 2.2: Existing & Pending Reclaimed Water Customers

Tables:

Table 2.1: Existing & Pending Reclaimed Water Customers

Table 5.1: Reclaimed Water Balance

Table 5.2: Reclaimed Water Anticipated Demand by Existing & Pending Customers

Table 5.3: Reclaimed Water Demand by Reuse Category

GIS

RWM Plan: At least 30 days prior to connection, provide amendment to MDE informing them of the additional reclaimed water user(s).

Whenever a new reclaimed water line, reclaimed water pump station, or reclaimed water storage tank is added, the following items must be updated:

Figures:

Figure 3.1: Reclaimed Water System Existing and Scheduled Components

Figure 4.1: Reclaimed Water System Components

Tables:

Table 3.2: Reclaimed Water Distribution Mains

Table 3.3: Reclaimed Water Pumping Stations

Table 3.4: Reclaimed Water Storage Tanks

GIS

The following items must be updated annually:

Figures:

Figure 2.1: Existing, 5-Year, 10-Year, and Comprehensive Priorities for Reclaimed Water System Development (Figure 7.1 from Conceptual Reclaimed Water System Master Plan, Draft October 25, 2012)

Figure 2.3: Water Appropriation Permits (Figure 5.2 from Conceptual Reclaimed Water System Master Plan, Draft October 25, 2012)

Figure 6.1: 15 Highest Potable Water Users Calendar Year 2011 (Figure 5.4 from Conceptual Reclaimed Water System Master Plan, Draft October 25, 2012)

Tables:

Table 2.2: Existing Water Appropriation Permits within Metropolitan District

Table 2.3: Existing Water Appropriation Permits outside Metropolitan District

Table 3.1: Little Patuxent Water Reclamation Plant (LP WRP) Final Effluent Flow Rate

Table 3.2: Reclaimed Water Distribution Mains

	Length of Reclaimed Water Main (LF)	Reclaimed Water Main Diameter (in)	Construction Contract (-)	Year (-)
Reclaimed Water and Sewer Pipelines (Dreyer's Ice Cream) Fort Meade Laurel Sand and Gravel Inc.	6,585.00	12	4447	2007 Under Construction
Total:	6,585.00 LF			

Table 3.3: Reclaimed Water Pumping Stations

Reclaimed Water Pumping Station (-)	Location of Reclaimed Water Pumping Station (-)	ADC Map Coordinates (-)	Reclaimed Water Pumping Capacity (mgd)	Pressure Zone (Lower / Upper) (-)	Construction Contract (-)	Year (-)
Reclaimed Water Pumping Station Fort Meade Reclaimed Water Pumping Station	Little Patuxent Water Reclamation Plant (LP WRP)		4.125 at 365 ft Design Point for Two Pumps in Parallel		4565	2008 Under Construction
Total:			4.125 million gallons			

Table 3.4: Reclaimed Water Storage Tanks

In-System Storage

Reclaimed Water Storage Tank (-)	Location of Reclaimed Water Storage Tank (-)	ADC Map Coordinates (-)	Reclaimed Water Storage Volume (mil gal)	Overflow Elevation (ft)	Construction Contract (-)	Year (-)
Little Patuxent Water Reclamation Plant (LP WRP)			0.000		N/A	
Guilford Reclaimed Water Storage Tank			3.000		4565	2008
Total:			3.000 million gallons			

Out-of-System Storage

Out-of-System Storage (-)	Location of Reclaimed Water Storage Tank (-)	ADC Map Coordinates (-)	Reclaimed Water Storage Volume (mil gal)	Overflow Elevation (ft)	Construction Contract (-)	Year (-)
Dreyer's Grand Ice Cream, Inc.			0.000		N/A	
Laurel Sand and Gravel Inc.			0.000		N/A	
Fort Meade			0.000		N/A	
Total:			0.000 million gallons			

Total Reclaimed Water Storage: 3.000 million gallons

Table 5.1: Reclaimed Water Balance

	Supply	Demand	Eliminated	Remainder	Discharged				Unaccounted	Outfall
	LP WRP Average Daily Effluent Flow Rate (mgd)	Reclaimed Water Average Daily Demand Flow Rate (mgd)	Flow Lost to Consumptive or Evaporative Use (mgd)	Used or Excess Reclaimed Water (mgd)	Flow Discharged to LP WRP Sanitary Sewer (mgd)	Flow Discharged to Patapsco WWTP Sanitary Sewer (mgd)	Flow Discharged to Fort Meade WWTP Sanitary Sewer (mgd)	Flow Discharged to NPDES Permitted Outfall (mgd)	Remainder / Unaccounted Flow (mgd)	LP WRP Outfall Discharge (mgd)
Winter (January - March)	18.272444	5.000000	0.000000	5.000000	0.000000	0.000000	5.000000	0.000000	0.000000	13.272444
Spring (April - June)	18.475778	5.000000	0.000000	5.000000	0.000000	0.000000	5.000000	0.000000	0.000000	13.475778
Summer (July - September)	16.947619	5.000000	0.000000	5.000000	0.000000	0.000000	5.000000	0.000000	0.000000	11.947619
Autumn (October - December)	17.711905	5.000000	0.000000	5.000000	0.000000	0.000000	5.000000	0.000000	0.000000	12.711905
Average:	17.851937	5.000000	0.000000	5.000000	0.000000	0.000000	5.000000	0.000000	0.000000	12.851937

Table 5.2: Reclaimed Water Anticipated Demand by Existing & Pending Customers

Season (-)	Fort Meade (mgd)	Dreyer's Grand Ice Cream, Inc. (mgd)	Laurel Sand and Gravel Inc. (mgd)	0 (mgd)	0 (mgd)	0 (mgd)	0 (mgd)	0 (mgd)	0 (mgd)	0 (mgd)	0 (mgd)	0 (mgd)	Total (mgd)
Winter (January - March)	5.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	5.000000
Spring (April - June)	5.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	5.000000
Summer (July - September)	5.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	5.000000
Autumn (October - December)	5.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	5.000000
Average:	5.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	5.000000
Reuse Category:	COM	COM	IND										
Minimum Reclaimed Water Quality Classification Required:	IV	IV	IV	0	0	0	0	0	0	0	0	0	
				0	0	0	0	0	0	0	0	0	

Reuse Categories

IRW: Irrigation - Restricted Access with Wider Buffer Zone (Class I minimum)
IRN: Irrigation - Restricted Access with Narrower Buffer Zone (Class II minimum)
IUO: Irrigation - Unrestricted Access and Other Restricted Uses (Class III minimum)
ILO: Residential Lawn Irrigation / Other Unrestricted Access Water Reuses (Class IV minimum)
COM: Commercial (Class IV minimum)
IND: Industrial (Class IV minimum)
Source: MDE Guidelines for Use of Reclaimed Water, Draft 6-11-2012, Table 1 - Class of Reclaimed Water Suitable for Various Types of Water Reuses

Table 5.3: Reclaimed Water Demand by Reuse Category

Season (-)	Reuse Category IRW: Irrigation - Restricted Access with Wider Buffer Zone (Class I minimum) (mgd)	IRN: Irrigation - Restricted Access with Narrower Buffer Zone (Class II minimum) (mgd)	IUO: Irrigation - Unrestricted Access and Other Restricted Uses (Class III minimum) (mgd)	ILO: Residential Lawn Irrigation / Other Unrestricted Access Water Reuses (Class IV (mgd)	COM: Commercial (Class IV minimum) (mgd)	IND: Industrial (Class IV minimum) (mgd)	Total (mgd)
Winter (January - March)	0.000000	0.000000	0.000000	0.000000	5.000000	0.000000	5.000000
Spring (April - June)	0.000000	0.000000	0.000000	0.000000	5.000000	0.000000	5.000000
Summer (July - September)	0.000000	0.000000	0.000000	0.000000	5.000000	0.000000	5.000000
Autumn (October - December)	0.000000	0.000000	0.000000	0.000000	5.000000	0.000000	5.000000
Average:	0.000000	0.000000	0.000000	0.000000	5.000000	0.000000	5.000000

Source: MDE Guidelines for Use of Reclaimed Water, Draft 6-11-2012, Table 1 - Class of Reclaimed Water Suitable for Various Types of Water Reuses

Table 1 – Class of Reclaimed Water Suitable for Various Types of Water Reuses

Reuse Category	Type of Reuse	Class[e]
Irrigation - Restricted Access[a] with Wider Buffer Zone[b]	(1)Irrigation for food crops commercially processed[c], and (2) Irrigation for forested land, non-food crops and turf including fodder, fiber and seed crops; pasture for foraging livestock; sod farms; golf courses; ornamental nurseries; and silviculture	Class I, Class II, Class III, Class IV
Irrigation - Restricted Access[a] with Narrower Buffer Zone[b]	(1)Irrigation for food crops commercially processed[c], and (2) Irrigation for forested land, non-food crops and turf including fodder, fiber and seed crops; pasture for foraging livestock; sod farms; golf courses; ornamental nurseries; and silviculture	Class II, Class III, Class IV
Irrigation - Unrestricted Access[a] and Other Restricted Uses	(1) Irrigation for parks, play grounds, school yards, cemeteries, golf courses; highway landscapings and other green open spaces where public access is not restricted; and (2) fire protection (excluding residential sprinkler system)	Class III, Class IV
Residential Lawn Irrigation/Other Unrestricted Access Water Reuses	(1)toilet and urinal flushing[d], (2) residential lawn irrigation (3) dust control and soil compaction, (4) aesthetic fountains, ponds, and lagoons, (5) non-food crops, (6) food crops (no contact with edible portion of the unprocessed crops), and (7) other water reuse categories approved by the Department.	Class IV
Commercial	Reuse of reclaimed water for laundries, car washing, snow making, air conditioning and closed loop cooling, window washing and pressure cleaning, other water reuse categories approved by the Department.	Class IV[f]
Industrial	Reuse of reclaimed water for cooling water, washing aggregates and making concrete; parts washing and cleaning, equipment operations, and other manufacturing processes approved by the Department	Class IV[f]

a) "Restricted access" means limited access by humans to areas where any water, including reclaimed water, not meeting the definition of potable water is used, resulting in minimal or no potential for human contact. Accessibility to such sites will be limited to authorized operators and personnel. "Unrestricted access" means unlimited or minimally limited access by humans to areas where any water, including reclaimed water, not meeting the definition of potable water is used, resulting in a high potential for human contact.

b) For more information on buffers for Class IV reclaimed water refer to chapter 10, section I of this document. For more information on buffers for Class I through III reclaimed waters, refer to the buffer section of the Department's "Guidelines for Land Application/Reuse of Treated Municipal Wastewaters."

c) "Food crops commercially processed" means food crops that, prior to sale to the public or others, have undergone chemical or physical processing sufficient to remove or destroy pathogens.

d) Only applicable to commercial buildings, or condominiums managed by a property management company or other similar corporate entity acceptable to the Department.

e) Please refer to MDE 'Guidelines for Land Application/Reuse of Treated Municipal Wastewaters' for Class I, Class II, and Class III reclaimed water quality limitations.

f) Only applicable to commercial and industrial uses of reclaimed water involving human contact or other public health risks. Otherwise, the Department may allow lower quality water to be used on a case by case basis, per chapter 2, section C.

Appendix A: Form of Reclaimed Water Utility Customer Agreement

between

Howard County Department of Public Works

and

_____

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1. RECITALS

This **Reclaimed Water Utility Customer** Agreement (this "Agreement") is made and entered into this _____ day of _____, _____ by and between the Howard County, Maryland, a body corporate and politic ("County"), and _____, a_____, in good standing under the laws of Maryland ("Customer").

WHEREAS, Customer is a proposed Reclaimed Water customer of the County, and Customer desires to purchase Reclaimed Water for purposes where Potable Water quality is not required by County, State, or Federal Laws and Regulations; and

WHEREAS, the County owns and operates a treatment and delivery system which shall be capable of delivering Reclaimed Water to Customer; and

WHEREAS, [an existing public Reclaimed Water pipeline is located adjacent to Customer's property] [Customer desires to haul Reclaimed Water per all applicable regulations to Customer's property] [Customer desires to reimburse the County for the construction of a public Reclaimed Water pipeline to the Customer's property]; and

WHEREAS, Customer intends to construct, operate and maintain a private Reclaimed Water system in Customer's Facility; and

WHEREAS, Customer intends to use Reclaimed Water only for the specific purpose specified herein; and

NOW THEREFORE, in consideration of the mutual covenants set forth herein, the County hereby agrees to sell and Customer hereby agrees to purchase Reclaimed Water from the County, subject to the following terms and conditions:

2. DEFINITIONS

As used in this Agreement, the following initial capitalized terms shall have the following meanings:

Air Gap Separation: A physical break between a water supply pipe and a receiving pipe or vessel.

Class IV Reclaimed Water: Reclaimed Water meeting the water quality requirements identified in the Maryland Department of the Environment Guidelines for Use of Reclaimed Water Chapter 4 – Standards for Reclaimed Water, latest edition.

County Reclaimed Water Distribution System: The purple distribution lines from the Little Patuxent Wastewater Treatment Plant, pump stations, mains, residential and commercial connections, and any other parts or components which comprise the Reclaimed Water system of the County, which is managed and operated by the Howard County Department of Public Works.

Cross-Connection to Potable Water: Unprotected actual or potential connection between a Potable Water system and any source or system containing non- Potable Water or other substance. By-pass arrangements, jumper connections, removable sections, swivel or changeover devices, or other devices through which backflow could occur are considered to be cross-connections.

Cross-Connection to Reclaimed Water: Unprotected actual or potential connection between a Reclaimed Water system and any source or system containing non-Potable Water or any substance that will reduce the quality of the Reclaimed Water. By-pass arrangements, jumper

connections, removable sections, swivel or changeover devices, or other devices through which backflow could occur are considered to be cross-connections.

Customer: Person or entity utilizing treated wastewater for agricultural, domestic, commercial or industrial purposes but does not originally treat the domestic wastewater.

Customer Agreement: Agreement or contract between the County and the Customers having Reclaimed Water service connections for monitoring and managing Reclaimed Water.

Customer's Facility: The facility owned by Customer and designated as the location to receive and utilize the Reclaimed Water under this Agreement.

MDE: Maryland Department of the Environment, an agency of the state of Maryland.

Potable Water: Water meeting the requirements of the MDE for human consumption and other domestic uses.

Reclaimed Water: Treated wastewater from the Little Patuxent Wastewater Treatment which has been treated to a quality suitable for beneficial use.

Reclaimed Water Manager: The individual employed by the County and designated as the County's contact person under this Agreement. The name and contact information is: Amy Hart, _____, 410-313-2723, ahart@howardcountymd.gov.

Reclaimed Water Supervisor: The individual employed by the Customer and designated as the Customer's contact person under this Agreement. The name and contact information is: _____.

Surface Waters: Water from rain, melting snow, springs, or seepage that lies or flows on the surface of the earth, including a watercourse, lake, or tidewater.

Any other words or phrases relating to the use of Reclaimed Water in this Agreement shall have the same definitions as those given under MDE's *Guidelines for Land Application / Reuse of Treated Municipal Wastewaters*, Draft April 2010.

3. DELIVERY OF RECLAIMED WATER

The County shall deliver Reclaimed Water from a meter or meters owned and maintained by the County. The approximate location of the Reclaimed Water meter is shown on Exhibit A – Application for Receiving Reclaimed Water Service.

The County does not guarantee to deliver the Reclaimed Water to Customer at any specific operating pressure.

The County shall have the right at any time, without notice, to shut off the delivery of Reclaimed Water for the purpose of making repairs or extensions, or for other necessary purposes. The Customer agrees the County shall not be held liable for any damage resulting from low pressure or high pressure, normal fluctuations of pressure, or interruptions of service of delivery of Reclaimed Water.

Customer hereby agrees and accepts the possibility that the County may be required to disrupt Reclaimed Water service to the Property due to emergency conditions, peak demands, or planned system maintenance. Customer shall be responsible for any damage that may be caused to Customer-owned facilities by such disruptions. In the event of any unforeseen emergency relating to the public Reclaimed Water delivery system, the County may terminate delivery of Reclaimed Water to the Property without prior notice to Customer. Whenever the County provides Customer

with notice of an emergency, Customer agrees to reduce or cease usage of Reclaimed Water service upon the County's request. In order to accommodate peak demand periods or planned maintenance of the public Reclaimed Water delivery system, the County shall provide Customer with at least twenty-four (24) hour notice of the need to completely cease Reclaimed Water usage, or to reduce the volume of Reclaimed Water used at the Property. Upon receiving such notice, Customer shall alter Customer's Reclaimed Water usage in accordance with the County's request.

In case of emergency repairs or other necessary work, or whenever the public health or safety so demands, the County may change, reduce, or limit the time for, or temporarily discontinue the supply of Reclaimed Water. Before so changing, reducing, limiting or discontinuing the supply of Reclaimed Water, the County shall, insofar as practicable, notify all Reclaimed Water consumers affected. The County shall not be responsible for any damage resulting from interruption or change of the Reclaimed Water supply, or for any damages incurred by the Customer arising out of the use or transportation of the Reclaimed Water.

If by reason of Force Majeure, the County shall be rendered unable wholly or in part to carry out its obligations under this Agreement to deliver Reclaimed Water, it shall not be required to deliver Reclaimed Water, and its failure to deliver Reclaimed Water in accordance with the terms and conditions of this Agreement, shall not be considered a breach of this Agreement. The term "Force Majeure" as used in this Agreement shall mean acts of God, strikes, lock-outs, or other industrial disturbances, acts of the public enemy, orders of any kind of the federal or state government, or any civil or military authority, insurrection, riots, epidemics, landslides, lightning, earthquakes, fires, hurricanes. storms, floods, washouts, droughts, power failures, arrests, restraint of government and people, civil disturbances, explosions, breakage or accidents to machinery, pipelines, the partial or entire failure of the Howard County Reclaimed Water System, unsuitable Reclaimed Water quality, or other causes.

Delivery of Reclaimed Water is subject to conditions identified in this Agreement. Customer agrees to accept such conditions of water pressure or service as may from time to time exist and to hold the County harmless on account of damage, if any, caused by low or high pressure, fluctuations of pressure or interruptions or curtailment of service.

4. USE OR APPLICATION OF RECLAIMED WATER

Prior to the delivery of Reclaimed Water, the County and the Customer shall complete an inspection of the Customer's facilities. All on-site modifications recommended by the County must be completed to the County's satisfaction prior to the delivery of the Reclaimed Water. In no event shall such service begin prior to the County's inspection of Customer's on-site Reclaimed Water storage and use system in order to verify compliance with all applicable requirements for the storage and use of Reclaimed Water.

The County will notify Customer at least thirty (30) days written notice of its intent to commence delivery of Reclaimed Water to the Customer's facilities.

Customer hereby certifies that the use of the Reclaimed Water is limited to the use and site set forth in Exhibit A.

5. CUSTOMER'S ON-SITE FACILITY MODIFICATIONS

The Reclaimed Water Program Manager shall review and comment on any required modifications to the Customer's Facility for the use of Reclaimed Water. All modification shall be approved by the Reclaimed Water Manager before construction commences.

The Customer shall install the necessary backflow prevention equipment to prevent Cross-connections with Reclaimed Water.

All modifications required in Customer's on-site facilities shall be the sole cost and responsibility of Customer. It shall be Customer's responsibility to construct the modifications in accordance with the approved plans and specifications, and pursuant to all permits and applicable laws and regulations.

Upon completion of all on-site modifications, Customer's Reclaimed Water and Potable Water systems, Customer shall provide the County with as-built drawings of Customer's completed Reclaimed Water system and Potable Water system on Customer's site. The drawings shall show at a minimum, the locations of all pipelines, controllers, valves, buildings, structures, property boundaries, and any other features important to the onsite use of Reclaimed Water.

The County shall install and maintain a Reclaimed Water meter on the Customer's site as required to monitor the Reclaimed Water deliveries made to Customer. Customer shall provide the County with any easements necessary for delivery of Reclaimed Water to Customer's premises at a mutually agreeable location. It is understood that the meter is the property of the County and that the Customer assumes all responsibility for any damage to, or loss of, the meter set to serve its property, and agrees to pay the County for any damages or loss.

6. INSPECTION

Customer acknowledges and agrees that, in order to verify compliance with this Agreement and with all applicable laws and regulations of the appropriate agencies of the County or the state of Maryland may inspect the Customer's facilities being served Reclaimed Water at all reasonable times. Customer hereby grants to such agencies, acting through their duly authorized employees, agents, or contractors, access at all reasonable times to enter the site for the purpose of observing construction or modification of Reclaimed Water facilities, for maintaining and repairing the Reclaimed Water facilities, for meter reading, and for observing and verifying that Customer is properly operating its Reclaimed Water facilities in accordance with the terms and conditions of this Agreement. When entering Customer's premises, the inspectors shall not unreasonably interfere with Customer's operations and its use of the premises.

7. MONITORING AND REPORTING

The Customer and the County will conduct periodic monitoring for the purpose of ensuring that the standards in this Agreement are being met at Reclaimed Water use sites. The County will provide monitoring reports annually to Customers addressing any needed improvements to comply with the standards listed in this Agreement.

8. QUALITY OF RECLAIMED WATER

Customer understands that Reclaimed Water is non-Potable Water. Customer understands and agrees that the quality of the Reclaimed Water is different from that of Customer's Potable Water supply and that Customer's practices or processes may have to be altered as a result.

Customer understands and agrees that the County provides the Reclaimed Water with no assertion or warranty as to the quality of the Reclaimed Water.

9. RECLAIMED WATER SUPERVISOR

Customer shall designate an individual as Customer's Reclaimed Water Supervisor. The Reclaimed Water Supervisor shall be Customer's coordinator and the direct contact person between County and the Customer. The Customer agrees that the Reclaimed Water Supervisor shall be responsible for the proper operation of Customer's Reclaimed Water system, implementing the requirements of this Agreement relative to the on-site use of Reclaimed Water, monitoring of Customer's Reclaimed Water system for prevention of potential hazards, and coordination with the County and other regulatory agencies. The County will assist in the training of Customer's

Reclaimed Water Supervisor as time and resources permit; however, it shall be the non-delegable responsibility of Customer to assure its Reclaimed Water Supervisor is trained in the use and handling of Reclaimed Water in accordance with all applicable rules, regulations and laws.

Customer shall complete Exhibit A – Application for Receiving Reclaimed Water Service. Customer shall inform the County in writing of the name, position, and day-time and night-time telephone numbers of Customer's Reclaimed Water Supervisor and shall promptly inform the County in writing of any changes of the person so designated or the person's contact information during the term of this Agreement.

10. OPERATIONAL REQUIREMENTS

The following use requirements are intended to satisfy the requirements of the Maryland Department of the Environment for the safe use of Reclaimed Water, per the Maryland Department of the Environment Guidelines for Land Application/Reuse of Treated Municipal Wastewaters:

A. Runoff and Spray Control:

1. Customer's Facility shall be managed so that public contact with Reclaimed Water shall be minimized.

2. Runoff of Reclaimed Water and spray shall be minimized.

3. Drinking water facilities and swimming pools shall be protected from Reclaimed Water spray.

4. Adequate measures shall be taken to minimize ponding of Reclaimed Water.

5. Reclaimed Water shall not be discharged or released to any Surface Water or storm water collection or conveyance facility.

6. Reclaimed Water use, including runoff and spray, shall be confined to the Customer's Facility designated in this approved Customer Agreement.

7. Customers using Reclaimed Water for irrigation must ensure that their irrigation systems are in good working order, maintained regularly, kept free of leaks, and are set so that Reclaimed Water is applied appropriately to the landscape, to avoid excessive puddling or runoff of Reclaimed Water. Sprinkler heads should be adjusted regularly to avoid application of Reclaimed Water to impervious services.

B. Notification:

1. Signs in both English and Spanish shall be provided at main entrances to the Customer's Facility and at Reclaimed Water hose bibs and faucets to inform the public that Reclaimed Water is being used.

C. Piping:

1. Above-ground Reclaimed Water facilities shall be marked by authorized methods to differentiate the Reclaimed Water facilities from the Potable Water facilities. Below-ground Reclaimed Water facilities shall be similarly marked if newly constructed or if exposed for repair.

2. Reclaimed Water valves, outlets, quick couplers and sprinklers shall be of a type, or secured in a manner, that permits operation only by Customer's authorized personnel.

3. For new underground construction, there shall be at least a 10-foot horizontal and 1-foot vertical separation between all pipelines transporting Reclaimed Water and those transporting Potable Water, with the Potable Water pipeline above the Reclaimed Water pipeline.

4. A backflow prevention device shall be provided at all Potable Water service connections in Customer's Facility utilizing Reclaimed Water. Backflow prevention devices must be installed, maintained and tested in accordance with the County's current cross connection control plan. There shall be no connection between Potable Water and Reclaimed Water piping. Supplementing Reclaimed Water with any Potable Water shall not be allowed except through an air-gap separation.

5. All valves of any type installed below grade (including existing valve boxes) shall be housed in a valve box with a purple locking cover.

6. All Reclaimed Water piping, valves, outlets and other appurtenances shall be color-coded purple, taped purple, or otherwise marked to identify the source of the water as being Reclaimed Water consistent with state Standards.

D. Training:

1. Inspection, supervision and employee training shall be provided by Customer to assure safe and proper operation of the Reclaimed Water system.

2. The Reclaimed Water Supervisor designated in Exhibit A – Application for Receiving Reclaimed Water Service of this Agreement shall ensure that all personnel using Reclaimed Water complete training in requirements for appropriate use of the Reclaimed Water. This training requirement may be met by: 1) familiarizing them with the terms of this service agreement, and 2) providing written materials provided by the County and discussing them with the employee(s).

E. Transfer:

1. Customer may not assign or transfer its rights under this Agreement. If a new person desires to utilize the Reclaimed Water provided under this Agreement, such person must contact the County and enter into a new agreement with the County.

11. NOTIFICATION OF PUBLIC

The Customer shall provide proper notification to Customer's employees and to the public that Reclaimed Water is being used at the Customer's Facility in accordance with applicable laws and regulations.

12. INDEMNITY

The Customer agrees to indemnify, defend and hold harmless the County, and its officers, agents, servants, employees from all suits, actions, losses, damages, claims, or liability, penalties and expenses of any character, type or description, including, without limitation, any fines, penalties and costs or damages whatsoever growing out of any action taken by any governmental entity or regulatory authority, department or agency of any governmental entity or any other person, including citizen suits, against the County for alleged noncompliance with laws, rules or regulations, whether relating to the environment or otherwise and including, without limiting the generality of the foregoing, all expenses of litigation, court costs, attorneys' fees, damages for injury, death or property damage sustained by any person or persons arising out of or occasioned by the acts of Customer, its officers, agents, employees or representatives or Customer's breach of the terms and conditions of this Agreement.

13. ENFORCEMENT

When the County finds that the Customer is not meeting the requirements of this Agreement, the County will notify the Customer in writing of its findings of non-compliance. Customer shall respond to the County with a Site Improvement Plan to include a schedule of time needed to address and resolve non-compliance issues. Unless otherwise approved by the County, Customer will have ___ days from the date the County notifies Customer of non-compliance in writing to implement the Site Improvement Plan measures.

14. PRICE AND PAYMENT FOR USE OF RECLAIMED WATER

The rate to be paid by Customer for Reclaimed Water delivered by the County under this Agreement shall be the standard rate that is applicable to that class of water and that class of Customer in effect at the time, date, and place of delivery, all as set forth in the Howard County Code. Nothing herein shall excuse Customer from payment of service or other charges as are applicable to the time, place, or manner of service and delivery.

The County shall read the Reclaimed Water meter at least quarterly consistent with the County's normal meter reading schedule for billing purposes and shall bill Customer for the total quantity delivered during the billing period in accordance with the County's standard billing practices.

The Customer and the County shall maintain records of the date and amount of Reclaimed Water delivered to Customer by the County.

Any costs arising out of the delivery to use of Reclaimed Water by Customer and from the construction, maintenance, or operation of the Reclaimed Water delivery system at the Customer's Facility shall be the sole responsibility of Customer.

Payments of bills shall be made to the County's Department of Finance each quarter on or before the due date. Amounts due for prior unpaid service will be transferred to active account. The County shall have the right to impose service charges on accounts that become delinquent or which incur in additional expenses.

The Customer will pay for all service received including Reclaimed Water consumption and charges as determined by all Reclaimed Water passing from the utilities meter to said premises from turn-on date, regardless whether Reclaimed Water is used or wasted, or whether premises are occupied by the Customer or not.

The County reserves the right, without notice to the Customer, to discontinue the service for the non-payment of any part of any bill or bills, for the violation of any part of the County's Plumbing Code, for transferring any of the Reclaimed Water delivered to the Customer's Facility, or for any uncured violation of this Agreement.

15. RESALE OF RECLAIMED WATER

Customer shall not, without the express written permission of the County and the Maryland Department of the Environment (MDE), deliver, use, or resell to off-site locations or to any person or legal entity, any of the Reclaimed Water delivered to the Property under this Agreement. Any such off-site delivery, use, or resale of Reclaimed Water purchased by Customer under this Agreement shall be made pursuant to a written resale agreement. Said resale agreement shall be approved in advance and in writing by the MDE and by the County. Said resale agreement shall incorporate this Agreement by reference, and shall expressly obligate the resale purchaser/user of Reclaimed Water to all of the terms and conditions set forth and referenced herein.

16. COMPLIANCE WITH REGULATIONS

Customer agrees, at its sole cost and responsibility, to comply with all applicable Federal, State and local laws, regulations and standards, as now exist, and are later lawfully enacted relating to the use of Reclaimed Water. Such laws, regulations, and standards may include, but not be limited to, requirements and restrictions governing use of Reclaimed Water; limits on Reclaimed Water contact with residents, guests, invitees, employees, members of the public, and adjoining properties; control of access to Reclaimed Water, its delivery system, and the area of storage and use; and warning signs on Customer's Reclaimed Water delivery system, and in the area of on-site storage and use of Reclaimed Water on the Property.

The Customer or the Customer's designee shall:

- Use application methods that reasonably preclude human contact with Reclaimed Water;
- Prevent Reclaimed Water from standing on open access areas during normal periods of use;
- Prevent Reclaimed Water from coming into contact with drinking fountains, water coolers, or eating areas;
- Secure hose bibs discharging Reclaimed Water to prevent use by the public.

If the Customer intends to discharge used or excess Reclaimed Water to any location other than the sanitary sewer or a dedicated Reclaimed Water return line, then the Customer shall obtain an NPDES permit.

The use of Reclaimed Water is regulated by the Maryland Department of the Environment Guidelines for Use of Reclaimed Water, latest edition. Customer shall fully inform itself of applicable requirements for the use of Reclaimed Water and abide by all laws and regulations governing Reclaimed Water use.

The Customer's use of Reclaimed Water will meet all applicable requirements contained in the Maryland Department of the Environment Guidelines for Use of Reclaimed Water Chapter 4 – Standards for Reclaimed Water, latest edition, as amended from time to time, or contained in any successor standards or ordinances.

Violations of these Terms and Conditions or of State standards and regulations may result in termination of Reclaimed Water service under this Agreement. Delivery of Reclaimed Water may, at County's sole discretion, be terminated for violation of the regulations or agreement.

17. TERM, RENEWAL, AND TERMINATION

The primary term of this Agreement is __ years from its date of execution by the County and the Customer. Thereafter, unless prior written notice is provided to the County by the Customer notifying the County of its intention to not renew, this Agreement shall be automatically renewed for a __ year term. Any such renewal of this Agreement shall be subject to any changes in its terms and conditions required to comply with federal, state, and local laws and regulations or deemed necessary by the County or desirable by the parties.

The County may terminate this Agreement if the County, at its sole determination, is or will be unable to deliver properly and adequately treated Reclaimed Water to Customer for any reason whatsoever for a period greater than thirty (30) days, or, the County, at its sole determination, determines that Customer is unable to adequately control the use of Reclaimed Water in accordance with this Agreement.

Either Party to this Agreement may terminate this Agreement before its expiration date with or without cause by giving the other Party at least thirty (30) days written notice. The County may terminate this Agreement at any time if the Customer fails to comply with the terms and conditions of this Agreement.

18. GENERAL CONDITIONS

This Agreement shall be construed and interpreted in accordance with the laws of the State of Maryland, and venue of any litigation hereunder shall be in a court of competent jurisdiction sitting in Howard County, Maryland.

This Agreement and the Exhibits hereto contain all the agreements of the parties with regard to this Agreement and cannot be enlarged, modified or changed in any respect except by written agreement between the parties.

The unenforceability, invalidity or illegality of any provisions of this Agreement shall not render the other provisions unenforceable, invalid or illegal, but the parties shall negotiate as to the effect of said unenforceability, invalidity or illegality on the rights and obligations of the parties.

The County and Customer will each use their best efforts to fully cooperate with one another as may be necessary to diligently obtain and maintain in effect any required permits and all other approvals and records required by regulatory requirements that may be necessary for the County and Customer to perform under, or take advantage of, the terms and conditions of this Agreement.

Notices to be given by either party to the other relative to this Agreement shall be in writing. Both parties agree that any such notice shall be effective when personally delivered or deposited, postage paid, in the U.S. Mail addressed by certified mail, return receipt request, as follows:

County: Howard County Department of Public Works
Bureau of Utilities
Reclaimed Water Manager
8250 Old Montgomery Road
Columbia, MD 21045

Customer: _____
Reclaimed Water Supervisor
_____

This Agreement is for the sole and exclusive benefit of the parties hereto and shall not be construed to confer any rights upon any third party. Nothing herein shall be construed to confer standing upon any third party who did not otherwise have such standing.

All leases, sales and other conveyances or transfers of ownership or control of the Customer's Facility receiving the Reclaimed Water during the effective term of this Agreement shall be made in writing and shall be made expressly subject to this Agreement and shall require the new owner or lessee to enter into a new agreement with the County.

Customer's agreements with a third party for the management of the site shall not in any way relieve Customer of compliance with the terms of this Agreement.

19. SIGNATURES

I, the undersigned, do hereby affirm that I have the legal authority to enter into this Agreement for the Reclaimed Water service on behalf of the Customer identified above, that I have read the terms and conditions specified in this Agreement and references herein, and that the Customer identified

above agrees to and shall be bound by said terms and conditions for the use of such water as specified in this Agreement and the references herein:

IN WITNESS WHEREOF, the County and Customer have executed this Agreement as of the date and year first written above.

Customer:

_____
(Signature)

_____
(Name, Title)

[Standard signature page of County will be inserted.]

Exhibit A – Application for Receiving Reclaimed Water Service

A. Customer:

1. Name of Customer
2. Relationship to Site (Legal Owner, Tenant, Lessee)
3. Legal Description of Property
4. Mailing Address of Customer (include City, State, and Zip Code)
5. Customer's Telephone Number
6. Customer's Fax Number
7. Customer's E-Mail
8. Address of Site for Reclaimed Water (include City, State, and Zip Code)

B. Reclaimed Water Supervisor:

1. Name of Reclaimed Water Supervisor
2. Mailing Address of Reclaimed Water Supervisor (include City, State, and Zip Code)
3. Reclaimed Water Supervisor's Telephone Number
4. Reclaimed Water Supervisor's Fax Number
5. Reclaimed Water Supervisor's E-Mail
6. Emergency Telephone Number

C. Reclaimed Water Use:

1. Intended Use(s):

___ Cooling / Cooling Tower
___ Manufacturing / Process
___ Fire Protection
___ Manufacturing / Cleaning
___ Maintenance / Cleaning
___ Irrigation (Landscape)
___ Irrigation (Agricultural)
___ Other, Explain

2. Average Daily Demand (gallons per day)

a. Winter (January - March) Average Daily Demand

b. Spring (April - June) Average Daily Demand

c. Summer (July - September) Average Daily Demand

d. Autumn (October - December) Average Daily Demand

3. Peak Flow Rate (gallons per minute)

4. Period of Use – Hours of the Day

5. Period of Use – Days of the Week

6. Period of Use – Months of the Year

Flow Lost to Consumptive or Evaporative Use

a. Winter (January - March) Average Flow Lost to Consumptive or Evaporative Use

b. Spring (April - June) Average Flow Lost to Consumptive or Evaporative Use

c. Summer (July - September) Average Flow Lost to Consumptive or Evaporative Use

d. Autumn (October - December) Average Flow Lost to Consumptive or Evaporative Use

8. Disposal Plan for Excess or Used Reclaimed Water:

D. Site Information:

1. Attach Sketch of Property including the following information:

a. Fronting Street and Nearby Intersection

b. Location(s) of Use on Property

c. Location of Reclaimed Water Meter (Based on Information provided by Howard County)

d. Location and Size of All Reclaimed Water Piping on Site

e. Location of All Connections (Hose Bibs / Spigots / Faucets, Hydrants, and all other Outlets)

f. Location(s) of Any Water Supply Wells (Potable or Non-Potable) on Property

g. Provide Distance from Water Supply Well to Nearest Reclaimed Water Outlet

Upon approval by Howard County, the County will issue a Reclaimed Water Permit Number that the Customer shall reference in all correspondence

Appendix B: Text on Reclaimed Water for Howard County Website

What is Reclaimed Water?

Reclaimed water is wastewater that has been treated to a standard that is higher than drinking water standards and reintroduced into the water cycle for reuse for non-potable purposes.

Where Does Reclaimed Water Come From?

The County's Little Patuxent Water Reclamation Plant (LP WRP) receives wastewater from approximately 70% of the County's Metropolitan District. The LP WRP treats the wastewater using the latest technologies to remove all pollutants and transform it back into pure water. At the end of the treatment process, the treated wastewater is discharged to the Little Patuxent River. Before being discharged, part of this flow is diverted to the County's reclaimed water system in order to get new life and be re-purposed.

Reclaimed Water Can Be Used For:

Reclaimed water is not potable (drinkable). However, it is appropriate for many other uses such as:

- Cooling – Air conditioning and cooling is an often overlooked but significant draw on the drinking water system. Reclaimed water can be used in cooling towers instead of drinking water.
- Manufacturing / Process – The number and types of industries with potential uses for reclaimed water is practically unlimited. Essentially any use where the water does not have to be potable and does not include human contact is a potential candidate for reclaimed water. Such users include producers of aggregates and concrete.
- Irrigation (Agricultural / Landscape) – Reclaimed water can be used for non-food product agricultural irrigation such as tree farms and sod farms, landscape / golf course irrigation, and filling decorative pools and fountains. Irrigation can account for very high flows especially during high demand periods such as during a drought.
- Other uses may be possible but each requires County review and approval on a case by case basis.

Using reclaimed water instead of drinking water can help reduce the strain on the drinking water system while still meeting the demands of customers.

Reclaimed Water Can Not Be Used For:

Reclaimed water is not applicable in all situations and is not approved for uses such as:

- Irrigation of Food Products
- Swimming Pools

Although reclaimed water is highly treated and disinfected, it is not approved for human consumption / ingestion or contact.

Why Reclaimed Water?

Using reclaimed water has a lot of benefits and is part of the County's overall effort in going green.

- Reclaimed water helps conserve water supplies. Using reclaimed water instead of drinking water reduces the demand on the drinking water system.
- Reclaimed water helps the environment. Using reclaimed water keeps it in the water cycle thus reducing wastewater treatment plant discharges to the environment.
- Reclaimed water reduces demands on infrastructure. In today's world of shrinking budgets, using reclaimed water lessens the burden to the drinking water system and the sewage treatment system by delaying or even eliminating some capacity needs.
- Reclaimed water saves money. Reclaimed water is a lower cost alternative to drinking water.

Conserving water, helping the environment, and relieving some of the pressure on the infrastructure, all while saving money.

Precautions

Reclaimed water is safe! However, using reclaimed water does not come without risks of exposure. Reclaimed water is a proven technology but as with all technologies, it has to be used in the right way. For precautionary reasons it is not approved for human contact and the County is taking the appropriate measures to prevent it:

- Reclaimed water is treated to a high standard and disinfected. The level of treatment actually exceeds that of drinking water requirements.
- Reclaimed water is approved for only limited types of uses, none of which involve significant potential for exposure to the public.
- The County screens customers applying for reclaimed water service to ensure that it will be used for only the approved purposes.
- The County requires each customer to enter into a legal agreement outlining the customer's obligations and holding them liable for any breaches.
- Reclaimed water utility piping is required to be designed and constructed to County standards.
- Before a customer can begin receiving reclaimed water, the County performs an initial inspection of the reclaimed water system piping on site in order to ensure that all requirements have been met.
- Even after a reclaimed water system has been approved and is in service, the County performs annual inspections of each existing reclaimed water customer in order to ensure that the requirements continue to be met.
- The County monitors reclaimed water usage rates in order to account for all flow.

Frequently Asked Questions

How do I know if reclaimed water is being used in an area?

Most places where reclaimed water use is applied are inaccessible to the public. However they are all posted with warning signs anyway.

What if I come into contact with reclaimed water?

Wash the affected area with soap and water from a drinking water faucet.

What if I have consumed some reclaimed water?

Although it is unlikely to be harmful, you should consult your physician as a precaution.

Is it OK if my pet drinks reclaimed water?

Howard County recommends that pets be provided with water from a drinking water faucet.

The Past is Prologue

The "Past": Reclaimed water is a proven technology. There is a long history dating back to the 1960's of municipalities across the country safely using reclaimed water.

The "Prologue": Howard County is a proactive leader in conserving water, helping the environment, and providing cost savings to its citizens. Reclaimed water is the future. Water is a valuable resource – make the most of it.

Request More Information / New Customers

Want more information or interested in receiving reclaimed water? Contact us:

Reclaimed Water Program Manager

Howard County Department of Public Works
Bureau of Utilities
Reclaimed Water Program Manager
8250 Old Montgomery Road
Columbia, MD 21045

Telephone: 410-313-____

E-Mail: ____@howardcountymd.gov

View our standard agreement which includes the Application for Receiving Reclaimed Water Service:

Reclaimed Water Utility Customer Agreement: ____

Resources

Links to Other Resources:

Howard County Master Plan for Water and Sewerage, 2011 Amendment: ____

Maryland Department of the Environment: ____

Environmental Protection Agency: ____

Where Does Reclaimed Water Come From?

The Little Patuxent Water Reclamation Plant which treats wastewater using the latest technologies to remove all pollutants and transform it back into pure water in order to get new life and be re-purposed.

"Reliable professionals delivering customer-focused water services."

Howard County Bureau of Utilities

Howard County Department of Public Works
Bureau of Utilities
Reclaimed Water Program Manager
8250 Old Montgomery Road
Columbia, MD 21045

Place Postage Here

HOWARD COUNTY RECLAIMED WATER PROGRAM

Educational Pamphlet

What is Reclaimed Water?

• Wastewater that has been treated to a standard that is higher than drinking water standards and reintroduced into the water cycle for reuse for non -potable purposes. However even though reclaimed water is highly treated and disinfected, it is not approved for uses of human consumption / ingestion or contact.

Why Reclaimed Water?

• To help conserve water supplies by reducing the demand on the drinking water system.

• To help the environment by keeping reclaimed water in the water cycle thus reducing wastewater treatment plant discharges to the environment.

• To reduce demands on infrastructure by lessening the burden to the drinking water system and the sewage treatment system by delaying or even eliminating some capacity needs.

• To save money as it is a lower cost alternative to drinking water.

Precautions

• Reclaimed water is treated to a high standard and disinfected. The level of treatment actually exceeds that of drinking water requirements.

• Reclaimed water is approved for only limited types of uses, none of which involve significant potential for exposure to the public.

• The County screens customers applying for reclaimed water service to ensure that it will be used for only the approved purposes.

• The County requires each customer to enter into a legal agreement outlining the customer's obligations and holding them liable for any breaches.

• Reclaimed water utility piping is required to be designed and constructed to County standards.

• Before a customer can begin receiving reclaimed water, the County performs an initial inspection of the reclaimed water system piping on site in order to ensure that all requirements have been met.

• Even after a reclaimed water system has been approved and is in service, the County performs annual inspections of each existing reclaimed water customer in order to ensure that the requirements continue to be met.

• The County monitors reclaimed water usage rates in order to account for all flow.

Reclaimed Water Can Be Used For:

• Air conditioning, cooling systems, and cooling towers

• Manufacturing or process water for various industries

• Irrigation for landscape and non-food agricultural sites such as golf courses and tree farms

• Other uses upon County approval

Reclaimed Water *Can't* Be Used For:

• Drinking water as reclaimed water is not potable or drinkable

• Irrigation of food products

• Swimming pools

Contact Us

Howard County Department of Public Works
Bureau of Utilities
Reclaimed Water Program Manager
8250 Old Montgomery Road
Columbia, MD 21045
(P) 410-313-****
(F) 410-313-****
E-mail: ____@howardcounty.gov

Visit us on the web:
www.co.ho.md.us/reclaimedwater

HOWARD COUNTY RECLAIMED WATER PROGRAM

EDUCATIONAL PRESENTATION

WHAT IS RECLAIMED WATER?

- Wastewater that has been treated to a standard that is higher than drinking water standards and reintroduced into the water cycle for reuse for non-potable purposes.

WHERE DOES RECLAIMED WATER COME FROM?

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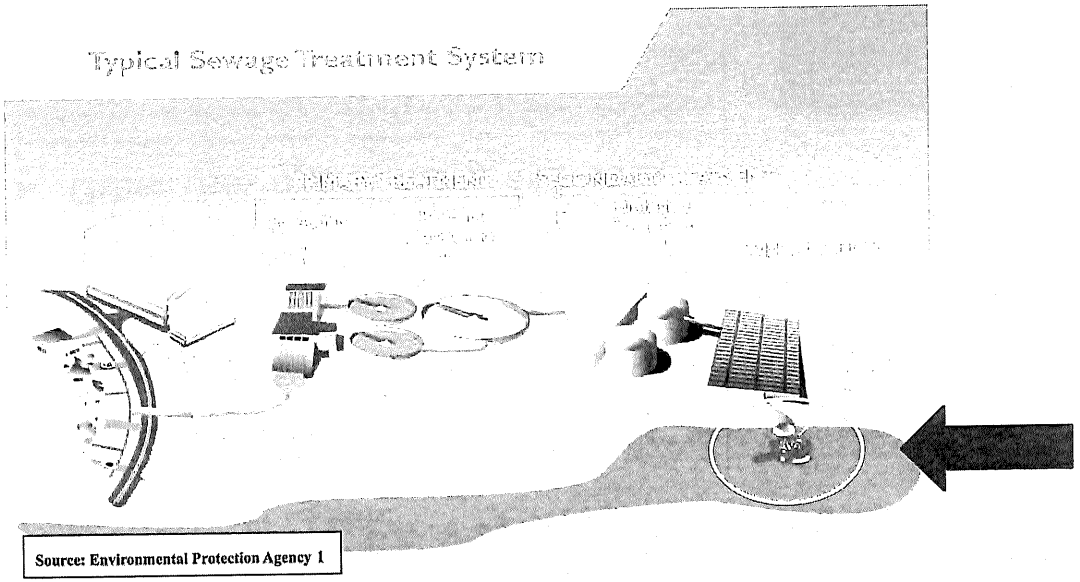

Source: Environmental Protection Agency 1

http://v2.mmsd.com/AssetsClient/Images/Wastewater%20Sect/treatment_process1_lg.jpg

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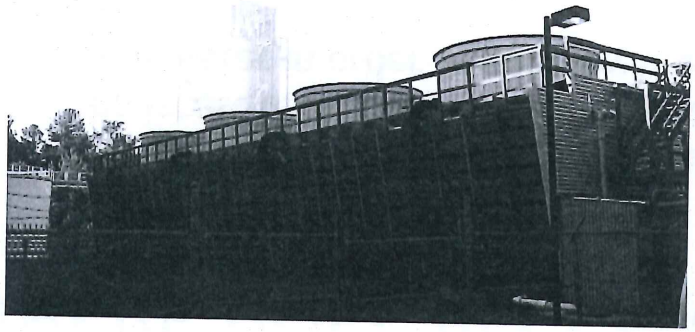
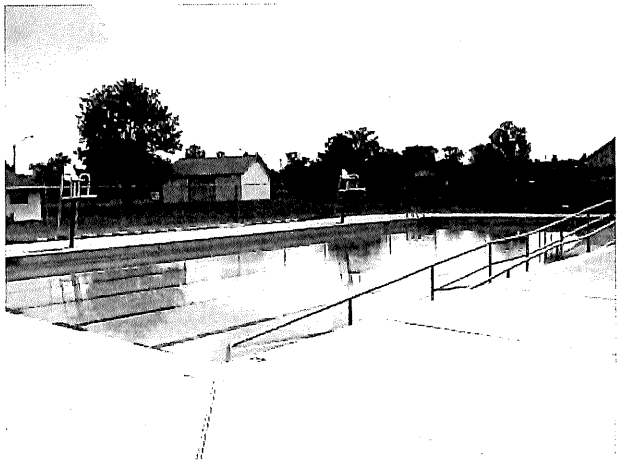
- Other uses upon County approval



RECLAIMED WATER CANNOT BE USED FOR:

- Cooking or drinking
- Body contact recreation (swimming pools & spas)
- Irrigating vegetable & herb gardens (always wash produce, regardless of water source)

Although reclaimed water is highly treated and disinfected, it is not approved for human consumption / ingestion or contact.



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PRECAUTIONS

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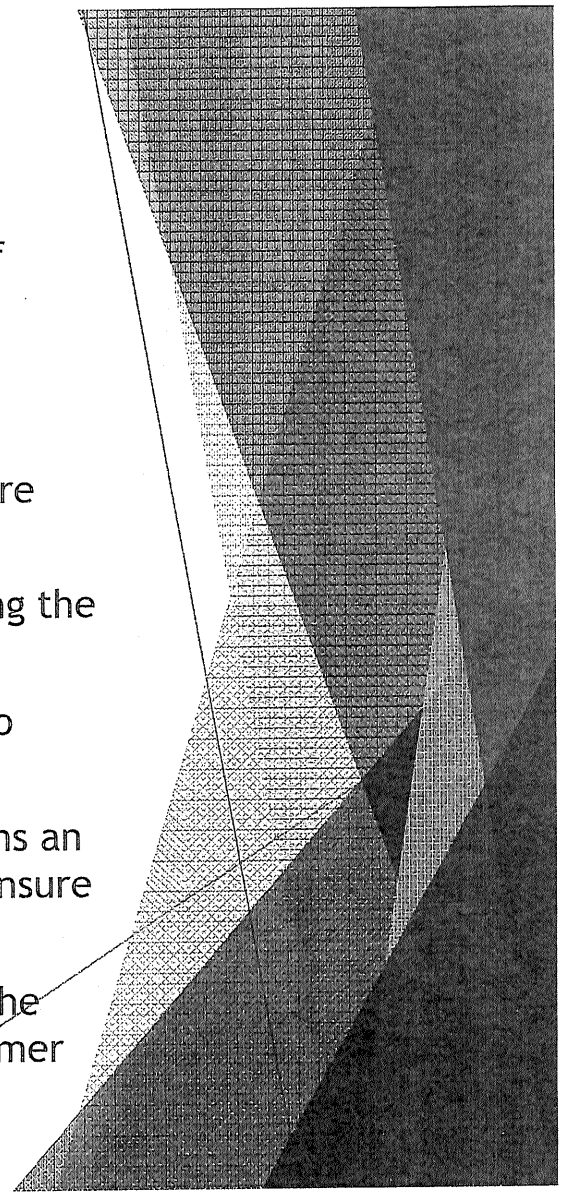
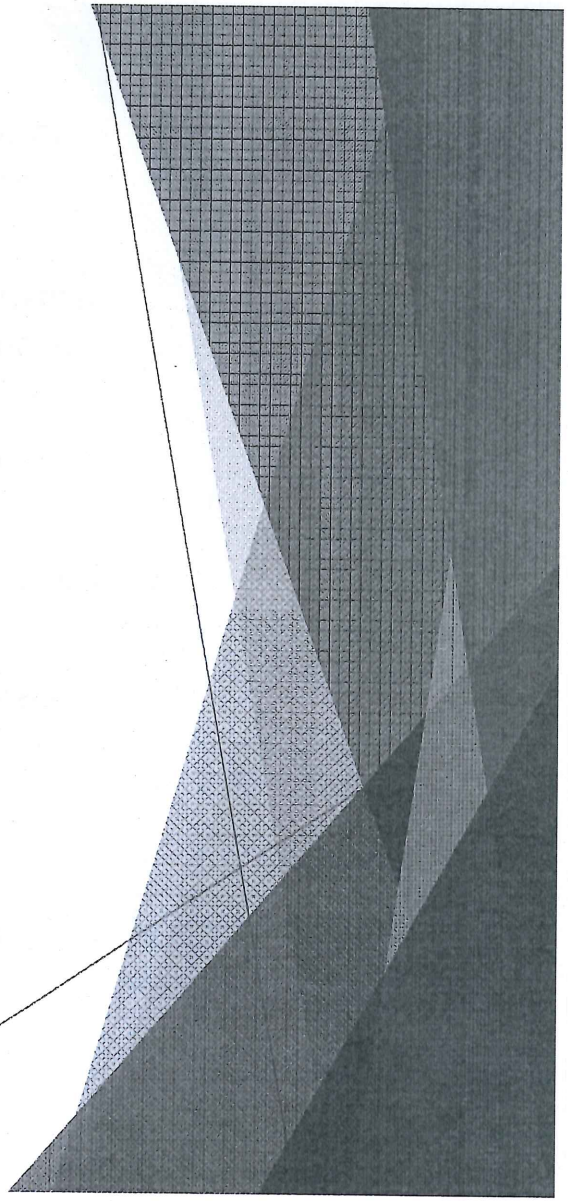


ADDITIONAL QUESTIONS?

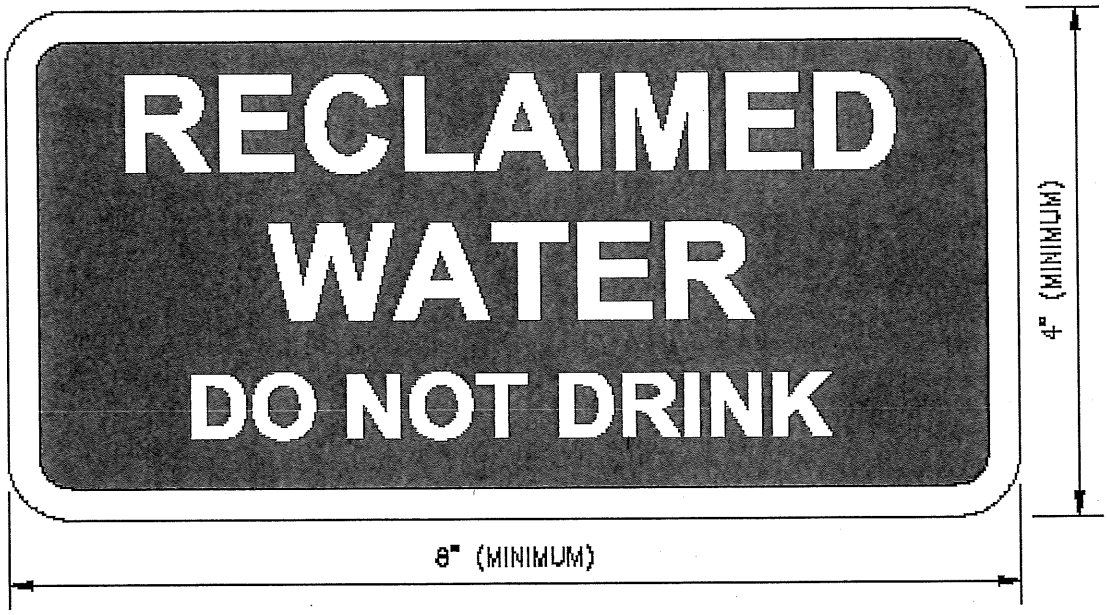
- **Howard County Department of Public Works**
  Bureau of Utilities
  Reclaimed Water Program Manager
  8250 Old Montgomery Road
  Columbia, MD 21045

  Telephone: 410-313-____
  E-Mail: _____@howardcountymd.gov

- Visit us on the web: http://www.howardcountymd.gov



Appendix E: Reclaimed Water Warning Sign



Appendix F: Reclaimed Water Utility Initial and Annual Inspection Checklist

1. General

   a. Customer Name (Business or Individual for Private Systems):

   b. Customer Address:

   c. Reclaimed Water Permit Number:

2. Notification

   a. Notification at Public Entrance:

   b. Notification of Employees in Common Area:

3. Personnel

   a. Records of Employee Training:

   b. Confirmation of Employee Training:

4. Visual Inspection

   a. Reclaimed Water System Piping:

      1) Availability of Reclaimed Water System Piping As-Built Drawings:

      2) Visual Inspection of Reclaimed Water System Piping for Cross-Connection:

      3) Evidence of Reclaimed Water System Piping Cross-Connection to Potable Water System Piping:

      4) Air Gap or Backflow Preventer on All Reclaimed Water System Piping Outlets:

      5) Completeness and Correctness of Reclaimed Water System Piping As-Built Drawings:

      6) Reclaimed Water Piping & Appurtenances Marked Purple:

      7) Reclaimed Water System Hose Bibs / Spigots / Faucets, Hydrants / Outlets, Valves, & Appurtenances Labeled and Secured:

   b. Potable Water System Piping:

      1) Availability of Potable Water System Piping As-Built Drawings:

      2) Visual Inspection of Potable Water System Piping for Cross-Connection:

      3) Evidence of Potable Water System Piping Cross-Connection to Reclaimed Water System Piping:

      4) Air Gap or Backflow Preventer on All Potable Water System Piping Outlets:

      5) Completeness and Correctness of Potable Water System Piping As-Built Drawings:

c. Reclaimed Water Use / Site:

1) Reclaimed Water Use(s):

___ Cooling / Cooling Tower
___ Manufacturing / Process
___ Fire Protection
___ Manufacturing / Cleaning
___ Maintenance / Cleaning
___ Irrigation (Landscape)
___ Irrigation (Agricultural)
___ Other, Explain:

2) Evidence of Puddling or Overspray:

3) Ultimate Disposition of Reclaimed Water:

5. Cross-Connection Testing (National Standard Plumbing Code Illustrated Section G.4.3.11 Inspection and Testing)

a. Reclaimed Water System Depressurized and Drained / Potable Water System On-Line:

1) Potable Water System Checked for Flow – All Potable Water System Hose Bibs / Spigots / Faucets, Hydrants / Outlets Verified as ACTIVE:

2) Reclaimed Water System Checked for Flow – All Reclaimed Water System Hose Bibs / Spigots / Faucets, Hydrants / Outlets Verified as INACTIVE:

b. Potable Water System Depressurized and Drained / Reclaimed Water System On-Line:

1) Reclaimed Water System Checked for Flow – All Reclaimed Water System Hose Bibs / Spigots / Faucets, Hydrants / Outlets Verified as ACTIVE:

2) Potable Water System Checked for Flow – All Potable Water System Hose Bibs / Spigots / Faucets, Hydrants / Outlets Verified as INACTIVE:

6. Approval

a. Approval:

b. Corrective Actions Needed:

c. Inspector Comments:

d. Signature of Inspector:

e. Name of Inspector (Printed):

f. Signature of Customer Representative:

g. Name of Customer Representative (Printed):

h. Date of Inspection:

EXHIBIT 12

Howard County Topographic Map

EXHIBIT 13

Howard County PlanHoward 2030 Map