Pennsylvania Department of Environmental Protection

Northcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0020583**
Facility Type	**Municipal**	APS ID	**1129986**
Major / Minor	**Minor**	Authorization ID	**1514330**

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Middleburg Municipal Authority**	Facility Name	**Middleburg Municipal Authority Wastewater Treatment Plant**
Applicant Address	179 W Willow Avenue	Facility Address	70 E Market Street
	Middleburg, PA 17842-1087		Middleburg, PA 17842-1064
Applicant Contact	Dustin Zechman	Facility Contact	Dustin Zechman
Applicant Phone	(570) 541-4008	Facility Phone	(570) 541-4008
Client ID	51628	Site ID	390
Ch 94 Load Status	Not Overloaded	Municipality	Middleburg Borough
Connection Status	No Limitations	County	Snyder
Date Application Received	January 30, 2025	EPA Waived?	No
Date Application Accepted	February 3, 2025	If No, Reason	Significant CB Discharge

Purpose of Application: Renewal of an existing NPDES permit for the discharge of treated sewage.

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Approve	Deny	Signatures	Date
X		Derek S. Garner / Project Manager	March 30, 2026
X		Nicholas W. Hartranft, P.E. / Environmental Engineer Manager	April 3, 2026

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.45
Latitude	40º 47' 29.17"	Longitude	-77º 2' 19.74"
Quad Name	Middleburg	Quad Code	1229
Wastewater Description:	Sewage Effluent		

Receiving Waters	Middle Creek	Stream Code	17701
NHD Com ID	54966627	RMI	12.5
Drainage Area	131	Yield (cfs/mi^2)	0.1256
Q_{7-10} Flow (cfs)	16.45	Q_{7-10} Basis	Streamgage No. 01555000
Elevation (ft)	485	Slope (ft/ft)	0.001
Watershed No.	6-A	Chapter 93 Class.	TSF
Existing Use	n/a	Existing Use Qualifier	n/a
Exceptions to Use	n/a	Exceptions to Criteria	n/a
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation, Pathogens		
Source(s) of Impairment	Agriculture, Unknown Source		
TMDL Status	n/a	Name	n/a

Nearest Downstream Public Water Supply Intake	SUEZ Water		
PWS Waters	Susquehanna River	Flow at Intake (cfs)	2,356
PWS RMI	76.73	Distance from Outfall (mi)	53.6

Treatment Facility Summary

The Middleburg Municipal Authority owns and operates the Middleburg Municipal Authority Wastewater Treatment Plant; an extended aeration treatment plant with an annual average design flow of 0.45 MGD, hydraulic capacity of 0.72 MGD, and an organic design capacity of 938 lbs BOD/day. Construction and continued operation of the treatment plant was/is covered by WQM Permit No. 5510402, originally issued December 22, 2010. The permit was amended December 30, 2019 for the installation of a electric grinder pump in the existing influent wet well.

Per the application's treatment plant process information section:

Influent flow enters one wet well and is pumped to a screening unit followed by a grit removal chamber. The sewage then flows into a splitter box and is separated into two extended aeration treatment basins with integral clarifiers. Effluent from the integral clarifiers is discharged into a UV disinfection tank and then discharged into Middle Creek. Sludge is stored in one sludge basin. Liquid sludge is hauled offsite by R. C. Stahlnecker Co.

Compliance History

The facility was most recently inspected by DEP on August 5, 2025. The inspection report indicates that the UV treatment unit display and indicator lights are not operable and that the permittee is planning to upgrade the UV treatment system. As of the date of this fact sheet, DEP is unaware of any completed or proposed UV treatment system upgrades. The inspection report notes the effluent was clear and no negative impacts were observed in Middle Creek.

The following effluent violations occurred over the existing permit's term:

Noncompliance Date	Noncompliance Description	Parameter	Sample Value	Violation Condition	Permit Value	Units	SBC
6/21/2021	Violation of permit condition	Fecal Coliform	2419.6	>	1000	No./100 ml	IMAX
11/30/2022	Late DMR Submission						
11/30/2022	Violation of permit condition	Total Nitrogen (Total Load, lbs)	< 8653	>	8219	lbs	Total Annual
3/24/2022	Violation of permit condition	Total Suspended Solids	278	>	165	lbs/day	Weekly Avg
10/25/2023	Violation of permit condition	Fecal Coliform	> 2419.6	>	1000	No./100 ml	IMAX
9/25/2024	Violation of permit condition	CBOD5	159	>	150	lbs/day	Weekly Avg
9/25/2024	Violation of permit condition	CBOD5	92	>	40	mg/L	Weekly Avg

The above effluent violations do not indicate any chronic problems that would impact the development of the permit.

There are no open violations associated with the permittee.

Existing Effluent Limitations and Monitoring Requirements

The existing effluent limitations and monitoring requirements are as follows:

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Instantaneous Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	Report	XXX	XXX	XXX	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	90	150	XXX	25.0	40.0	50	1/week	24-Hr Composite
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Total Suspended Solids	110	165	XXX	30.0	45.0	60	1/week	24-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Ultraviolet light transmittance (%)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Metered
Ammonia-Nitrogen	Report	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite

Compliance Sampling Location: Outfall 001

The existing Chesapeake Bay nutrient requirements are as follows:

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Ammonia--N	Report	Report	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Kjeldahl--N	Report	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Total Nitrogen	Report	Report	XXX	Report	XXX	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Net Total Nitrogen	XXX	8219	XXX	XXX	XXX	XXX	1/month	Calculation
Net Total Phosphorus	XXX	1096	XXX	XXX	XXX	XXX	1/month	Calculation

Compliance Sampling Location: Outfall 001

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.45
Latitude 40º 47' 32.60" **Longitude** -77º 2' 19.90"
Wastewater Description: Sewage Effluent

Technology-Based Limitations

The following technology-based limitations apply, subject to water quality analysis and BPJ where applicable:

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)

Water Quality-Based Limitations

A “Reasonable Potential Analysis” (attached) was conducted in WQM 7.0 v1.1 and the Toxics Management Spreadsheet v1.4 (“TMS”). The WQM output indicates that the existing technology-based effluent limitations are protective of Middle Creek. TMS output indicates that no water quality-based effluent limits or monitoring requirements for toxic parameters are necessary.

Best Professional Judgment (“BPJ”) Limitations

DEP recommends that dissolved oxygen and ammonia-n reporting requirements remain in the permit to continue to characterize the wastewater and provide treatment plant operating data.

DEP recommends that existing influent reporting requirements for BOD and TSS remain in the permit for to help with Chapter 94 requirements.

DEP recommends that the permitee continues to report minimum percent transmittance of the UV disinfection system to demonstrate disinfection is occurring prior to discharge.

A quarterly reporting requirement for E. Coli is proposed per the 2017 Triennial Review of Water Quality Standards, published in the PA Bulletin on July 11, 2020.

Chesapeake Bay

Pennsylvania’s Watershed Implementation Plan (WIP), Phase III, classifies this facility as a Phase II discharger. Consequently, the existing cap loads for total nitrogen and total phosphorus, established in previous permits and identified in the WIP, will remain in the permit.

Anti-Backsliding

No effluent limits or monitoring requirements are proposed to be made less stringent. Anti-backsliding regulations should not impact permit development.

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (386-0400-001), SOPs and/or BPJ.

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Instantaneous Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	Report	XXX	XXX	XXX	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	90	150	XXX	25.0	40.0	50	1/week	24-Hr Composite
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Total Suspended Solids	110	165	XXX	30.0	45.0	60	1/week	24-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Ultraviolet light transmittance (%)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Metered
Ammonia-Nitrogen	Report	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite

Compliance Sampling Location: Outfall 001

The limitations and monitoring requirements specified below are proposed for the draft permit, to comply with Pennsylvania's Chesapeake Bay Tributary Strategy.

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date

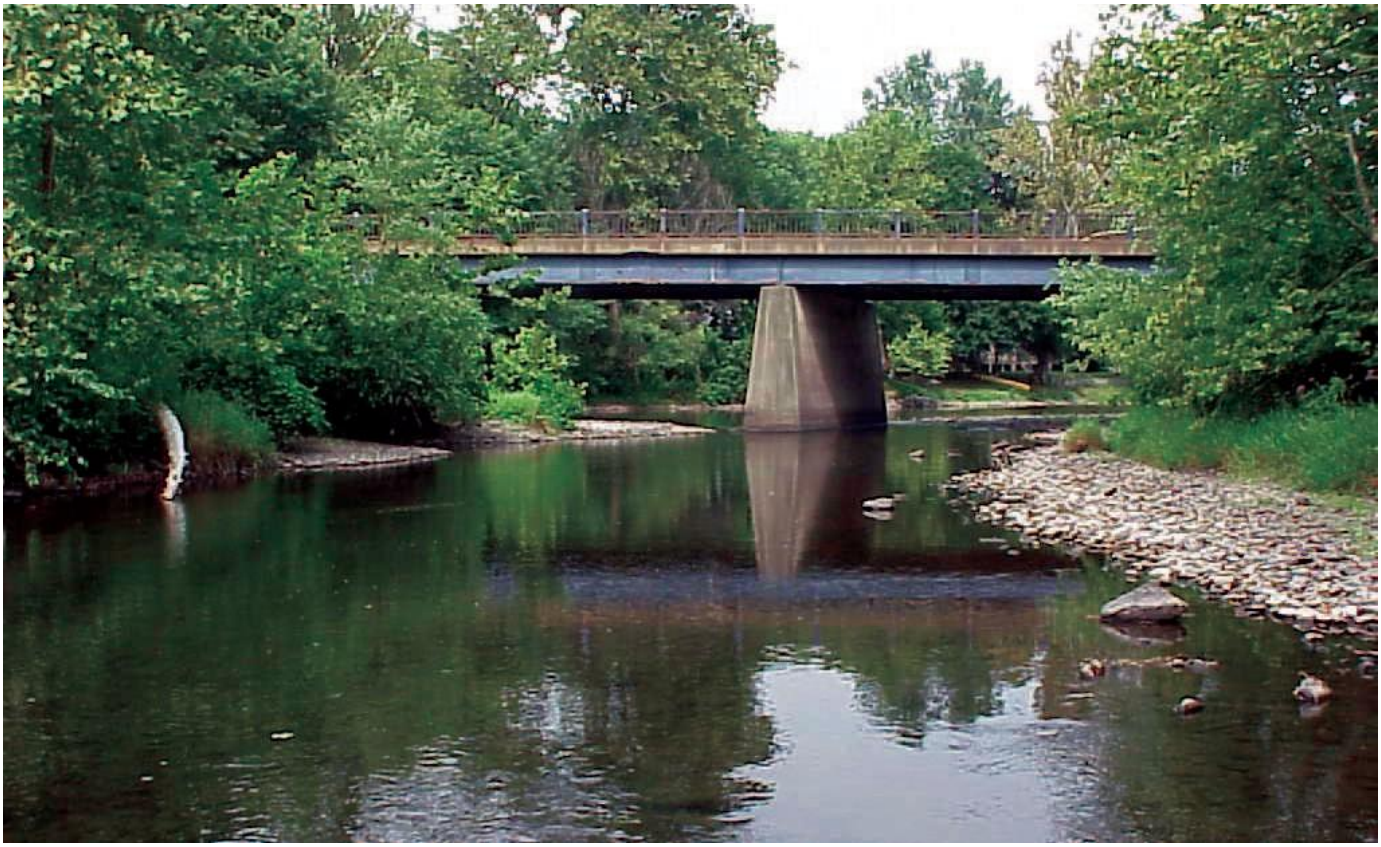
Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Ammonia--N	Report	Report	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Kjeldahl--N	Report	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Total Nitrogen	Report	Report	XXX	Report	XXX	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Net Total Nitrogen	XXX	8219	XXX	XXX	XXX	XXX	1/year	Calculation
Net Total Phosphorus	XXX	1096	XXX	XXX	XXX	XXX	1/year	Calculation

Compliance Sampling Location: Outfall 001

USGS
science for a changing world

Prepared in cooperation with the Pennsylvania Department of Environmental Protection

Selected Streamflow Statistics for Streamgage Locations in and near Pennsylvania



Open-File Report 2011-1070

U.S. Department of the Interior
U.S. Geological Survey

Table 1. List of U.S. Geological Survey streamgage locations in and near Pennsylvania with updated streamflow statistics.—Continued

[Latitude and Longitude in decimal degrees; mi^2, square miles]

Streamgage number	Streamgage name	Latitude	Longitude	Drainage area (mi^2)	Regulated[1]
01541303	West Branch Susquehanna River at Hyde, Pa.	41.005	-78.457	474	Y
01541308	Bradley Run near Ashville, Pa.	40.509	-78.584	6.77	N
01541500	Clearfield Creek at Dimeling, Pa.	40.972	-78.406	371	Y
01542000	Moshannon Creek at Osceola Mills, Pa.	40.850	-78.268	68.8	N
01542500	WB Susquehanna River at Karthaus, Pa.	41.118	-78.109	1,462	Y
01542810	Waldy Run near Emporium, Pa.	41.579	-78.293	5.24	N
01543000	Driftwood Branch Sinnemahoning Creek at Sterling Run, Pa.	41.413	-78.197	272	N
01543500	Sinnemahoning Creek at Sinnemahoning, Pa.	41.317	-78.103	685	N
01544000	First Fork Sinnemahoning Creek near Sinnemahoning, Pa.	41.402	-78.024	245	Y
01544500	Kettle Creek at Cross Fork, Pa.	41.476	-77.826	136	N
01545000	Kettle Creek near Westport, Pa.	41.320	-77.874	233	Y
01545500	West Branch Susquehanna River at Renovo, Pa.	41.325	-77.751	2,975	Y
01545600	Young Womans Creek near Renovo, Pa.	41.390	-77.691	46.2	N
01546000	North Bald Eagle Creek at Milesburg, Pa.	40.942	-77.794	119	N
01546400	Spring Creek at Houserville, Pa.	40.834	-77.828	58.5	N
01546500	Spring Creek near Axemann, Pa.	40.890	-77.794	87.2	N
01547100	Spring Creek at Milesburg, Pa.	40.932	-77.786	142	N
01547200	Bald Eagle Creek below Spring Creek at Milesburg, Pa.	40.943	-77.786	265	N
01547500	Bald Eagle Creek at Blanchard, Pa.	41.052	-77.604	339	Y
01547700	Marsh Creek at Blanchard, Pa.	41.060	-77.606	44.1	N
01547800	South Fork Beech Creek near Snow Shoe, Pa.	41.024	-77.904	12.2	N
01547950	Beech Creek at Monument, Pa.	41.112	-77.702	152	N
01548005	Bald Eagle Creek near Beech Creek Station, Pa.	41.081	-77.549	562	Y
01548500	Pine Creek at Cedar Run, Pa.	41.522	-77.447	604	N
01549000	Pine Creek near Waterville, Pa.	41.313	-77.379	750	N
01549500	Blockhouse Creek near English Center, Pa.	41.474	-77.231	37.7	N
01549700	Pine Creek below Little Pine Creek near Waterville, Pa.	41.274	-77.324	944	Y
01550000	Lycoming Creek near Trout Run, Pa.	41.418	-77.033	173	N
01551500	WB Susquehanna River at Williamsport, Pa.	41.236	-76.997	5,682	Y
01552000	Loyalsock Creek at Loyalsockville, Pa.	41.325	-76.912	435	N
01552500	Muncy Creek near Sonestown, Pa.	41.357	-76.535	23.8	N
01553130	Sand Spring Run near White Deer, Pa.	41.059	-77.077	4.93	N
01553500	West Branch Susquehanna River at Lewisburg, Pa.	40.968	-76.876	6,847	Y
01553700	Chillisquaque Creek at Washingtonville, Pa.	41.062	-76.680	51.3	N
01554000	Susquehanna River at Sunbury, Pa.	40.835	-76.827	18,300	Y
01554500	Shamokin Creek near Shamokin, Pa.	40.810	-76.584	54.2	N
01555000	Penns Creek at Penns Creek, Pa.	40.867	-77.048	301	N
01555500	East Mahantango Creek near Dalmatia, Pa.	40.611	-76.912	162	N
01556000	Frankstown Branch Juniata River at Williamsburg, Pa.	40.463	-78.200	291	N
01557500	Bald Eagle Creek at Tyrone, Pa.	40.684	-78.234	44.1	N
01558000	Little Juniata River at Spruce Creek, Pa.	40.613	-78.141	220	N
01559000	Juniata River at Huntingdon, Pa.	40.485	-78.019	816	LF
01559500	Standing Stone Creek near Huntingdon, Pa.	40.524	-77.971	128	N
01559700	Sulphur Springs Creek near Manns Choice, Pa.	39.978	-78.619	5.28	N
01560000	Dunning Creek at Belden, Pa.	40.072	-78.493	172	N

FLOW SUMMARY

Climatic Year	Annual Minimum Flows (cfs)				Log-Transformed Values			
	Min 1-Day	Min 7-Day	Min 30-Day	Min 90-Day	Log 1D	Log 7D	Log 30D	Log 90D
1900								
1901								
1902								
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1952								
1953	39	42.71428571	45.8	54.43333333	1.591064607	1.630573148	1.660865478	1.73586493
1954	33	42.42857143	50.9	74.57777778	1.51851394	1.627658409	1.706717782	1.872609438
1955	47	52.42857143	71	127.4444444	1.672097858	1.719568024	1.851258349	2.105320908
1956	148	166.2857143	210.7	291.0777778	2.170261715	2.22085494	2.323664536	2.464009051
1957	42	46.85714286	52.53333333	62.34444444	1.62324929	1.670775804	1.720434958	1.794797759
1958	59	61	73.7	87.36666667	1.770852012	1.785329835	1.867467488	1.941345766
1959	40	43	76.83333333	101.7888889	1.602059991	1.633468456	1.885549675	2.007700374
1960	58	65.42857143	72.46666667	83.32222222	1.763427994	1.815767438	1.860138285	1.920760844
1961	40	42.71428571	49.73333333	64.21111111	1.602059991	1.630573148	1.696647568	1.807610185
1962	30	32.71428571	42.23333333	48.41111111	1.477121255	1.514737442	1.62565536	1.68494505
1963	39	42.42857143	44.06666667	61.51111111	1.591064607	1.627658409	1.6441102	1.788953572
1964	29	31.42857143	35.1	40.61111111	1.462397998	1.497324641	1.545307116	1.608644872
1965	31	34.28571429	41.2	53.33333333	1.491361694	1.535113202	1.614897216	1.726998728
1966	21	24	31.33333333	56.93333333	1.322219295	1.380211242	1.496006599	1.755366612
1967	80	93.14285714	119.7666667	251.2222222	1.903089987	1.969149556	2.078335962	2.400058053
1968	52	56.14285714	77.16666667	104.4	1.716003344	1.74929451	1.887429741	2.018700499
1969	66	68.85714286	83.43333333	135.2	1.819543936	1.837948998	1.921339595	2.130976692
1970	56	63.28571429	72.03333333	97.13333333	1.748188027	1.801305686	1.857533512	1.987368293
1971	57	62.28571429	77.23333333	121.2777778	1.755874856	1.794388449	1.887804779	2.083781231
1972	77	79.14285714	84.43333333	114.5333333	1.886490725	1.898411725	1.926513935	2.0589319
1973	82	83.71428571	108.2666667	124.4	1.913813852	1.922799576	2.034494766	2.09482038
1974	85	88	100.9333333	142.2333333	1.929418926	1.944482672	2.004034616	2.153001388
1975	72	78.42857143	96.16666667	188.9333333	1.857332496	1.894474304	1.983024563	2.276308587
1976	83	84.71428571	99.26666667	190.0777778	1.919078092	1.927956653	1.996803439	2.278931346
1977	92	102.8571429	122.6	239.0444444	1.963787827	2.012234456	2.08849047	2.378478655
1978	70	72.28571429	79.36666667	102.1444444	1.84509804	1.859052477	1.899638141	2.009214751
1979	135	150.7142857	204.4333333	334.1111111	2.130333768	2.17815442	2.31055171	2.523890919
1980	48	49.71428571	52.66666667	61.02222222	1.681241237	1.696481204	1.721535832	1.785488019
1981	62	64.57142857	72.63333333	111.0333333	1.792391689	1.810040395	1.861135976	2.045453378
1982	56	57.42857143	65.93333333	86.05555556	1.748188027	1.759128013	1.819105033	1.934778913
1983	50	57.14285714	64.6	88.4	1.698970004	1.756961951	1.810232518	1.946452265
1984	75	81.28571429	95.46666667	133.9111111	1.875061263	1.910014226	1.979851759	2.126816614
1985	47	49	55.5	67.9	1.672097858	1.69019608	1.744292983	1.831869774
1986	59	66	81.13333333	109.5555556	1.770852012	1.819543936	1.909199319	2.039634406
1987	52	59.57142857	82.13333333	126.1111111	1.716003344	1.775038015	1.914519449	2.100753352
1988	57	57.57142857	73.86666667	105.4444444	1.755874856	1.760207006	1.868448501	2.023023703
1989	76	83.71428571	104.7	208.8333333	1.880813592	1.922799576	2.019946682	2.319799821
1990	152	171.4285714	243.9666667	313.6333333	2.181843588	2.234083206	2.387330492	2.496422214
1991	51	52.14285714	59.63333333	73.58888889	1.707570176	1.717194824	1.775489086	1.866812246
1992	77	82	107.1666667	122.3777778	1.886490725	1.913813852	2.030059723	2.087702563
1993	64	71.85714286	85.2	95.78888889	1.806179974	1.856469945	1.930439595	1.981315136
1994	109	117.2857143	149.1666667	203.8111111	2.037426498	2.069245117	2.173671785	2.309227857
1995	49	50.85714286	55.03333333	76.73333333	1.69019608	1.706351958	1.740625819	1.884984065
1996	99	107.2857143	146.7	247.7555556	1.995635195	2.030541897	2.166430114	2.394023402
1997	75	82	102.8666667	132.8777778	1.875061263	1.913813852	2.012274667	2.123452356
1998	37	38.85714286	45.13333333	55.15555556	1.568201724	1.589470864	1.65449741	1.741589263
1999	46	50.14285714	58.9	107.6666667	1.662757832	1.700209076	1.770115295	2.032081268
2000	59	61.85714286	67.03333333	81.06666667	1.770852012	1.791389856	1.826290816	1.908842316
2001	51.8	53.35714286	56.97	75.97	1.71432976	1.727192566	1.755646219	1.880642126
2002	52.5	54.92857143	66	102.1411111	1.720159303	1.739798304	1.819543936	2.009200578
2003	215	221.4285714	255.5	507.2	2.33243846	2.345233658	2.407390904	2.705179245
2004	183	204.2857143	246.9	397.0666667	2.26245109	2.310237997	2.39252109	2.59886343
2005	43.1	44.08571429	47.88	66.44222222	1.63447727	1.644297882	1.680154142	1.822444149
2006	97.5	101.1	136.49	261.1777778	1.989004616	2.004751156	2.135100834	2.416936222
2007	42.5	43.05714286	47.20666667	62.33888889	1.62838893	1.634045208	1.674003335	1.794759057
2008								
2009								
2010								
2011								
2012								
2013								
2014								
2015								
2016								
2017								
2018								
2019								
2020								
2021								
2022								
2023								
2024								
2025								
2026								

RESULTS

Period of Record (Years):	1953-2007
Number of Years Used:	55
Mean Annual Flow (cfs):	456.06
Harmonic Mean Flow (cfs):	174.28
Low-flow Yield (cfs/mi^2):	0.1256
1Q10 / 7Q10 Ratio:	0.9180
30Q10 / 7Q10 Ratio:	1.1650

Low-Flow Frequency Analysis (Log-Pearson Type III)

Statistic	1Q10	7Q10	7Q2	30Q10	30Q2	90Q10
Count	55	55	55	55	55	55
Log Mean	1.783650264	1.816505804	1.816505804	1.897355803	1.897355803	2.051235246
Log Std Dev	0.20142316	0.200664868	0.200664868	0.213499303	0.213499303	0.252406142
Log Skewness	0.547243498	0.649993538	0.649993538	0.671271063	0.671271063	0.646847615
Return Period	10	10	2	10	2	10
Z-score	-1.28155	-1.28155	0	-1.28155	0	-1.28155
K-factor	-1.208053906	-1.191112325	-0.107065856	-1.187488621	-0.110483992	-1.19164478
FINAL RESULT (cfs)	34.70	37.80	62.38	44.04	74.78	56.29

7Q10 Calculator

Facility: **Middleburg Municipal Authority WWTP**
NPDES Permit No.: **PA0020583**

Gage Information
USGS Station Number: **1555000**
Station Name: **Penns Creek at Penns Creek, PA**
Drainage Area (mi^2): **301**
7Q10 (cfs): **37.80**
LFY (cfs/mi^2): **0.1256**

Outfall Information
RMI: **12.50**
Drainage Area (mi^2): **131**
7Q10 (cfs): **16.45**

Downstream Locations

RMI: **11.35**
Drainage Area (mi^2): **139**
7Q10 (cfs): **17.46**

RMI: **10.33**
Drainage Area (mi^2): **141**
7Q10 (cfs): **17.71**

RMI: **9.08**
Drainage Area (mi^2): **144**
7Q10 (cfs): **18.08**

RMI:
Drainage Area (mi^2):
7Q10 (cfs):

RMI:
Drainage Area (mi^2):
7Q10 (cfs):

RMI:
Drainage Area (mi^2):
7Q10 (cfs):

StreamStats Output Report

Latitude 40.7917
Longitude -77.04004

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	8.1846	degrees
BSLOPDRAW	Unadjusted basin slope, in degrees	8.408	degrees
BSLPDRPA20	Unadjusted basin slope, in degrees, from PA v1	8.7038	degrees
CARBON	Percentage of area of carbonate rock	13.42	percent
CENTROXA83	X coordinate of the centroid, in NAD_1983_Albers, meters	1563861.307	meters
CENTROYA83	Basin centroid horizontal (y) location in NAD 1983 Albers	2128532.444	meters
DRN	Drainage quality index from STATSGO	3.19	dimensionless
DRNAREA	Area that drains to a point on a stream	131	square miles
ELEV	Mean Basin Elevation	967.2	feet
ELEVMAX	Maximum basin elevation	2216.4	feet
FOREST	Percentage of area covered by forest	62.1293	percent
GLACIATED	Percentage of basin area that was historically covered by glaciers	0	percent
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	0.9175	percent
LC01DEV	Percentage of land-use from NLCD 2001 classes 21-24	6.9186	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	6.9029	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.9688	percent
LONG_OUT	Longitude of Basin Outlet	-77.04001	decimal degrees
MAXTEMP	Mean annual maximum air temperature over basin area from PRISM 1971-2000 800-m grid	60.45	degrees F
OUTLETXA83	X coordinate of the outlet, in NAD_1983_Albers,meters	1576245	meters
OUTLETYA83	Y coordinate of the outlet, in NAD_1983_Albers, meters	2133425	meters
PRECIP	Mean Annual Precipitation	43.4	inches
ROCKDEP	Depth to rock	4.54	feet
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	1.02	percent
STRDEN	Stream Density -- total length of streams divided by drainage area	2.046	miles per square mile
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	268.078	miles
URBAN	Percentage of basin with urban development	1.0869	percent

StreamStats Output Report

Latitude 40.79453
Longitude -77.02276

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	8.2138	degrees
BSLOPDRAW	Unadjusted basin slope, in degrees	8.4373	degrees
BSLPDRPA20	Unadjusted basin slope, in degrees, from PA v1	8.7411	degrees
CARBON	Percentage of area of carbonate rock	12.88	percent
CENTROXA83	X coordinate of the centroid, in NAD_1983_Albers, meters	1564598.614	meters
CENTROYA83	Basin centroid horizontal (y) location in NAD 1983 Albers	2128860.622	meters
DRN	Drainage quality index from STATSGO	3.19	dimensionless
DRNAREA	Area that drains to a point on a stream	139	square miles
ELEV	Mean Basin Elevation	955.7	feet
ELEVMAX	Maximum basin elevation	2216.4	feet
FOREST	Percentage of area covered by forest	61.5077	percent
GLACIATED	Percentage of basin area that was historically covered by glaciers	0	percent
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	0.9597	percent
LC01DEV	Percentage of land-use from NLCD 2001 classes 21-24	7.0572	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	7.0865	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.0321	percent
LONG_OUT	Longitude of Basin Outlet	-77.0227773	decimal degrees
MAXTEMP	Mean annual maximum air temperature over basin area from PRISM 1971-2000 800-m grid	60.48	degrees F
OUTLETXA83	X coordinate of the outlet, in NAD_1983_Albers,meters	1577595	meters
OUTLETYA83	Y coordinate of the outlet, in NAD_1983_Albers, meters	2134025	meters
PRECIP	Mean Annual Precipitation	43.3	inches
ROCKDEP	Depth to rock	4.53	feet
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.99	percent
STRDEN	Stream Density -- total length of streams divided by drainage area	2.061	miles per square mile
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	286.502	miles
URBAN	Percentage of basin with urban development	1.1371	percent

StreamStats Output Report

Latitude 40.79665
Longitude -77.00759

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	8.1982	degrees
BSLOPDRAW	Unadjusted basin slope, in degrees	8.4216	degrees
BSLPDRPA20	Unadjusted basin slope, in degrees, from PA v1	8.7269	degrees
CARBON	Percentage of area of carbonate rock	12.69	percent
CENTROXA83	X coordinate of the centroid, in NAD_1983_Albers, meters	1564819.152	meters
CENTROYA83	Basin centroid horizontal (y) location in NAD 1983 Albers	2128924.982	meters
DRN	Drainage quality index from STATSGO	3.19	dimensionless
DRNAREA	Area that drains to a point on a stream	141	square miles
ELEV	Mean Basin Elevation	952	feet
ELEVMAX	Maximum basin elevation	2216.4	feet
FOREST	Percentage of area covered by forest	61.3449	percent
GLACIATED	Percentage of basin area that was historically covered by glaciers	0	percent
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	0.9778	percent
LC01DEV	Percentage of land-use from NLCD 2001 classes 21-24	7.1076	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	7.1389	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.0512	percent
LONG_OUT	Longitude of Basin Outlet	-77.0075847	decimal degrees
MAXTEMP	Mean annual maximum air temperature over basin area from PRISM 1971-2000 800-m grid	60.48	degrees F
OUTLETXA83	X coordinate of the outlet, in NAD_1983_Albers,meters	1578795	meters
OUTLETYA83	Y coordinate of the outlet, in NAD_1983_Albers, meters	2134505	meters
PRECIP	Mean Annual Precipitation	43.3	inches
ROCKDEP	Depth to rock	4.53	feet
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.99	percent
STRDEN	Stream Density -- total length of streams divided by drainage area	2.071	miles per square mile
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	291.979	miles
URBAN	Percentage of basin with urban development	1.121	percent

StreamStats Output Report

Latitude 40.80318
Longitude -76.98945

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	8.1989	degrees
BSLOPDRAW	Unadjusted basin slope, in degrees	8.4223	degrees
BSLPDRPA20	Unadjusted basin slope, in degrees, from PA v1	8.7336	degrees
CARBON	Percentage of area of carbonate rock	12.66	percent
CENTROXA83	X coordinate of the centroid, in NAD_1983_Albers, meters	1565077.891	meters
CENTROYA83	Basin centroid horizontal (y) location in NAD 1983 Albers	2129042.943	meters
DRN	Drainage quality index from STATSGO	3.19	dimensionless
DRNAREA	Area that drains to a point on a stream	144	square miles
ELEV	Mean Basin Elevation	946.6	feet
ELEVMAX	Maximum basin elevation	2216.4	feet
FOREST	Percentage of area covered by forest	61.3189	percent
GLACIATED	Percentage of basin area that was historically covered by glaciers	0	percent
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	0.9752	percent
LC01DEV	Percentage of land-use from NLCD 2001 classes 21-24	7.0867	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	7.1286	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.0556	percent
LONG_OUT	Longitude of Basin Outlet	-76.9894693	decimal degrees
MAXTEMP	Mean annual maximum air temperature over basin area from PRISM 1971-2000 800-m grid	60.49	degrees F
OUTLETXA83	X coordinate of the outlet, in NAD_1983_Albers,meters	1580135	meters
OUTLETYA83	Y coordinate of the outlet, in NAD_1983_Albers, meters	2135525	meters
PRECIP	Mean Annual Precipitation	43.2	inches
ROCKDEP	Depth to rock	4.51	feet
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	1	percent
STRDEN	Stream Density -- total length of streams divided by drainage area	2.091	miles per square mile
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	301.054	miles
URBAN	Percentage of basin with urban development	1.1026	percent

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
06A	17701	MIDDLE CREEK	**12.500**	485.00	131.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.126	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
Middleburg MA	PA0020583	0.4500	0.4500	0.4500	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
06A	17701	MIDDLE CREEK	**11.350**	479.00	139.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.126	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
06A	17701	MIDDLE CREEK	**10.330**	474.00	141.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.126	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
06A	17701	MIDDLE CREEK	**9.080**	467.00	144.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.126	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
06A	17701	MIDDLE CREEK

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (ºC)	Analysis pH
Q7-10 Flow												
12.500	16.45	0.00	16.45	.6962	0.00099	.848	65.53	77.26	0.31	0.228	20.20	7.00
11.350	17.46	0.00	17.46	.6962	0.00093	.857	67.69	78.94	0.31	0.199	20.19	7.00
10.330	17.71	0.00	17.71	.6962	0.00106	.856	67.7	79.13	0.32	0.240	20.19	7.00
Q1-10 Flow												
12.500	15.10	0.00	15.10	.6962	0.00099	NA	NA	NA	0.29	0.238	20.22	7.00
11.350	16.03	0.00	16.03	.6962	0.00093	NA	NA	NA	0.30	0.209	20.21	7.00
10.330	16.26	0.00	16.26	.6962	0.00106	NA	NA	NA	0.30	0.252	20.21	7.00
Q30-10 Flow												
12.500	19.17	0.00	19.17	.6962	0.00099	NA	NA	NA	0.34	0.210	20.18	7.00
11.350	20.34	0.00	20.34	.6962	0.00093	NA	NA	NA	0.34	0.183	20.17	7.00
10.330	20.63	0.00	20.63	.6962	0.00106	NA	NA	NA	0.35	0.221	20.16	7.00

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.918	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.165	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	6		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
06A	17701	MIDDLE CREEK

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
12.500	Middleburg MA	16.46	50	16.46	50	0	0
11.350		NA	NA	16.47	NA	NA	NA
10.330		NA	NA	16.48	NA	NA	NA

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
12.500	Middleburg MA	1.87	25	1.87	25	0	0
11.350		NA	NA	1.87	NA	NA	NA
10.330		NA	NA	1.87	NA	NA	NA

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
12.50	Middleburg MA	25	25	25	25	3	3	0	0
11.35		NA	NA	NA	NA	NA	NA	NA	NA
10.33		NA	NA	NA	NA	NA	NA	NA	NA

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
06A	17701	MIDDLE CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
12.500	0.450	20.203	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
65.530	0.848	77.264	0.309
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.93	0.463	1.01	0.711
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.030	2.091	Tsivoglou	6
Reach Travel Time (days)			
0.228			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.023	2.90	1.00	7.96
0.046	2.87	0.98	7.90
0.068	2.84	0.97	7.84
0.091	2.81	0.95	7.79
0.114	2.78	0.94	7.74
0.137	2.75	0.92	7.69
0.159	2.72	0.91	7.65
0.182	2.69	0.89	7.61
0.205	2.67	0.88	7.58
0.228	2.64	0.86	7.54

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
11.350	0.450	20.192	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
67.686	0.857	78.942	0.313
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.60	0.350	0.82	0.710
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.583	1.991	Tsivoglou	6
Reach Travel Time (days)			
0.199			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.020	2.58	0.80	7.57
0.040	2.57	0.79	7.55
0.060	2.55	0.78	7.53
0.080	2.53	0.77	7.52
0.100	2.51	0.76	7.51
0.120	2.49	0.75	7.50
0.139	2.48	0.74	7.49
0.159	2.46	0.73	7.48
0.179	2.44	0.72	7.47
0.199	2.43	0.71	7.47

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
06A	17701	MIDDLE CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
10.330	0.450	20.189	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
67.702	0.856	79.126	0.318
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.42	0.266	0.70	0.710
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.477	2.310	Tsivoglou	6
Reach Travel Time (days)			
0.240			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.024	2.40	0.69	7.49
0.048	2.39	0.67	7.50
0.072	2.37	0.66	7.52
0.096	2.36	0.65	7.53
0.120	2.34	0.64	7.55
0.144	2.33	0.63	7.56
0.168	2.31	0.62	7.58
0.192	2.30	0.61	7.59
0.216	2.28	0.60	7.61
0.240	2.27	0.59	7.63

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
06A	17701	MIDDLE CREEK

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
12.500	Middleburg MA	PA0020583	0.450	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			3

Discharge Information

Instructions | Discharge | Stream

Facility: **Middleburg Municipal Authority WWTP** NPDES Permit No.: **PA0020583** Outfall No.: **001**

Evaluation Type **Custom / Additives** Wastewater Description: **Sewage**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.45	100	7						

				0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Total Dissolved Solids (PWS)	mg/L		296									
Total Zinc	mg/L		0.0473									
Chloride (PWS)	mg/L		62.8									
Sulfate (PWS)	mg/L		45.4									

Stream / Surface Water Information

Middleburg Municipal Authority WWTP, NPDES Permit No. PA0020583, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: _____ No. Reaches to Model: 1

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	017701	12.5	485	131			Yes
End of Reach 1	017701	11.35	479	139			Yes

Q $_{7\text{-}10}$

Location	RMI	LFY (cfs/mi²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	12.5	0.126										100	7		
End of Reach 1	11.35	0.126													

Q $_{h}$

Location	RMI	LFY (cfs/mi²)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	12.5														
End of Reach 1	11.35														

Model Results

Middleburg Municipal Authority WWTP, NPDES Permit No. PA0020583, Outfall 001

Instructions | *Results* | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All | ○ Inputs | ○ Results | ○ Limits

☑ ***Hydrodynamics***

Q_{7-10}

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
12.5	16.51		16.51	0.696	0.00099	0.848	65.6	77.326	0.309	0.227	221.093
11.35	17.51		17.514								

Q_h

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
12.5	86.14		86.14	0.696	0.00099	1.73	65.6	37.927	0.765	0.092	81.172
11.35	90.721		90.72								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.260 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	117.180	120	860	Chem Translator of 0.978 applied
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	

☑ ***CFC*** CCT (min): ###### PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	118.139	120	2,961	Chem Translator of 0.986 applied
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	

☑ ***THH*** CCT (min): ###### PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	

☑ ***CRL*** CCT (min): 81.172 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Total Zinc	551	µg/L	Discharge Conc ≤ 10% WQBEL
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
