pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0029726**
Facility Type	**Municipal**	APS ID	**1021119**
Major / Minor	**Minor**	Authorization ID	**1322789**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Jamestown Borough Municipal Authority**	Facility Name	**Jamestown Municipal STP**
Applicant Address	406 Jackson Street	Facility Address	Main Street Extension
	Jamestown, PA 16134-0188		Jamestown, PA 16134
Applicant Contact	Charles Swartz	Facility Contact	Michael Davidson
Applicant Phone	(724) 932-3644	Facility Phone	(724) 372-3339
Client ID	207	Site ID	261230
Ch 94 Load Status	Not Overloaded	Municipality	Jamestown Borough
Connection Status	No Limitations	County	Mercer
Date Application Received	July 31, 2020	EPA Waived?	Yes
Date Application Accepted	August 13, 2020	If No, Reason	

Purpose of Application: Renewal of an NPDES Permit for an existing discharge of treated sewage from a POTW.

Summary of Review

This is a municipally owned sewage treatment plant serving the Borough of Jamestown, Mercer County. There are no commercial or industrial users and the facility is currently not accepting hauled in waste.

There are no proposed changes to the discharge quantity or quality as part of this permit renewal.

The plant discharges to a segment of the Shenango River, which is known to contain threatened and endangered mussel species. A summary of threatened and endangered mussel species concerns and considerations is included on Page 9 of this Fact Sheet. Additionally, the draft permit will be forwarded to the US Fish & Wildlife Service and PA Fish and Boat Commission.

There are currently no open violations listed in EFACTS for this permittee (10/21/2021).

Sludge use and disposal description and location(s): Sludge is hauled offsite and disposed of at Mahoning Landfill in Springfield, Ohio.

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		Adam J. Pesek Adam J. Pesek, E.I.T. / Environmental Engineer	October 21, 2021
X		Justin C. Dickey Justin C. Dickey, P.E. / Environmental Engineer Manager	October 22, 2021

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.26
Latitude	41º 28' 59"	Longitude	-80º 26' 30"
Quad Name	Greenville West	Quad Code	0702
Wastewater Description:	Domestic Sewage		
Receiving Waters	Shenango River	Stream Code	35482
NHD Com ID	130027726	RMI	66.34
Drainage Area	170.8	Yield (cfs/mi^2)	0.023
Q_{7-10} Flow (cfs)	11.21 (Summer), 8.145 (winter)	Q_{7-10} Basis	USGS # 03101500, accrued flow #03100000
Elevation (ft)	968	Slope (ft/ft)	0.00083
Watershed No.	20-A	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)	7.71	WQN 911 field samples (2005-2020)(June-September)
Temperature (°C)	20.24 (Sum), 4.71 (Win)	WQN 911 (2005-2020)
Hardness (mg/L)	70	WQN 911 (2005-2020)(90th %)
NH_3-N	0.11	WQN 911 field samples (2002-2011)
CBOD	2.2	2005 sampling for NIDR – Shenango River Watershed

Nearest Downstream Public Water Supply Intake		Greenville Municipal Authority	
PWS Waters	Shenango River	Flow at Intake (cfs)	35.7
PWS RMI	57	Distance from Outfall (mi)	9.34

Changes Since Last Permit Issuance:

Other Comments:

Treatment Facility Summary

Treatment Facility Name: Jamestown Municipal STP

WQM Permit No.	Issuance Date
4399407 A-1	10/03/2013
4300404 A-2	3/25/2019

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Extended Aeration	UV Light	0.26

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.26	266	Not Overloaded	Drying	Landfill

Changes Since Last Permit Issuance: WQM Permit 4300404 A-2 was issued which permitted the replacement of the Liberty street pump station, replacement of the influent interceptor sewer, a new mechanical bar screen and channel, a new influent pump station, improvements to the aeration tanks, addition of four new clarifiers, making repairs to the existing clarifiers, replacement of the disinfection system with UV disinfection equipment, removing of existing sludge holding tank, construction of two new sludge holding tanks

Other Comments: N/A

Compliance History	
Summary of DMRs:	One effluent violation (total phosphorus) reported in the last 5 years.
Summary of Inspections:	Last site inspection was conducted on 7/31/2020. The inspection report indicated the planned plant improvements have not started as of that date because bids were higher than expected. Issues noted were the comminutor was not operational and updated Lab Accreditation Form with current contract lab information and lab registration information for on-site analysis was necessary. A CACP was executed on 12/22/2020 for late submission of the NPDES Permit renewal application.

Other Comments:

Compliance History

DMR Data for Outfall 001 (from September 1, 2020 to August 31, 2021)

Parameter	AUG-21	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20
Flow (MGD) Average Monthly	0.054	0.102	0.054	0.087	0.059	0.078	0.063	0.120	0.146	0.080	0.056	0.042
Flow (MGD) Daily Maximum	0.136	0.607	0.093	0.194	0.138	0.176	0.148	0.398	0.317	0.144	0.180	0.085
pH (S.U.) Minimum	7.0	7.0	7.0	6.8	6.9	6.8	6.9	6.5	6.6	6.7	6.7	6.7
pH (S.U.) Maximum	7.3	7.4	7.5	7.1	7.4	7.3	7.4	6.8	6.8	7.0	7.0	7.0
DO (mg/L) Minimum	5.7	4.4	6.9	7.4	7.1	4.9	4.5	4.4	5.5	6.5	4.5	5.1
TRC (mg/L) Average Monthly	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.2
TRC (mg/L) Instantaneous Maximum	0.4	0.5	0.7	0.5	0.5	0.6	0.4	0.4	0.7	0.4	0.5	0.3
CBOD5 (lbs/day) Average Monthly	2.5	4.4	< 1.8	< 2.6	< 1.1	2.8	1.6	< 2.8	< 3.5	< 2.1	< 1.5	< 1.3
CBOD5 (lbs/day) Weekly Average	5	7	2	< 5	2	5	2	< 5	< 5	3	< 2.1	< 2
CBOD5 (mg/L) Average Monthly	5	6	< 5	< 3	< 2	4	3	< 3	< 3	< 3	< 3	< 3
CBOD5 (mg/L) Weekly Average	7	9	10	< 6	4	4	5	< 3	< 3	4	4	< 5
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	68	122	55	67	88	65	78	139	128	64	82	53
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	159	239	91	107	106	80	145	349	199	81	150	73
BOD5 (mg/L) Raw Sewage Influent Average Monthly	132	143	123	85	200	95	152	125	105	108	175	135
TSS (lbs/day) Average Monthly	< 2.3	< 4.3	< 2.0	< 4.8	< 2.3	< 3.6	< 2.5	< 4.7	< 7.3	< 3.2	< 2.4	< 2.0

TSS (lbs/day) Raw Sewage Influent Average Monthly	55	93	36	51	64	58	55	50	93	55	59	35
TSS (lbs/day) Raw Sewage Influent Daily Maximum	119	253	50	82	94	78	71	55	202	72	82	61
TSS (lbs/day) Weekly Average	< 4	< 8	< 3	10	< 3	< 6	< 3	9	11	< 4	3	< 3
TSS (mg/L) Average Monthly	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 6	< 5	< 5	< 5
TSS (mg/L) Raw Sewage Influent Average Monthly	111	112	79	81	144	90	110	69	73	94	135	90
TSS (mg/L) Weekly Average	< 5	< 5	5	6	< 5	< 5	< 5	< 5	7	< 5	6	< 5
Fecal Coliform (CFU/100 ml) Geometric Mean	31	38	59	9	3	17	108	22	13	27	34	24
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	208	99	411	59	10	210	866	121	23	33	76	228
Total Nitrogen (lbs/day) Average Monthly	5	10	6	8	5	5	5	5	7	7	6	5
Total Nitrogen (mg/L) Average Monthly	10.1	9.6	13.13	8.8	10.6	7.61	9.5	5.69	5.8	11.4	13.6	12.2
Ammonia (lbs/day) Average Monthly	< 1	< 2	< 1	< 1	< 1	< 1	< 2	< 1	< 1	< 1	< 1	< 1
Ammonia (mg/L) Average Monthly	< 3	< 3	< 3	< 1	< 1	< 1	< 3	< 2	< 1	< 1	< 1	< 1
Total Phosphorus (lbs/day) Average Monthly	0.2	0.4	0.5	0.2	0.1	0.1	0.1	0.2	0.4	0.2	0.2	0.2
Total Phosphorus (mg/L) Average Monthly	0.5	0.4	1.0	0.3	0.3	0.1	0.3	0.2	0.3	0.4	0.4	0.5

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.26
Latitude 41º 28' 59" **Longitude** -80º 26' 30"
Wastewater Description: Domestic Sewage

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)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)
E. Coli	Report (No./100 ml)	IMAX		92a.61

Comments: Monitoring for E. coli is placed in the permit in accordance with the Department's SOP entitled "Establishing Effluent Limitations for Individual Sewage Permits."

The technology-based limits for TRC are no longer applicable because the facility recently switched to UV disinfection.

Water Quality-Based Limitations

The following limitations were determined through water quality modeling (output files attached):

Parameter	Limit (mg/l)	SBC	Model
Ammonia Nitrogen (5/01 – 10/31)	16.0	Average Monthly	WQM 7.0 Ver 1.1
Ammonia Nitrogen (11/01 – 4/30)	17.5	Average Monthly	WQM 7.0 Ver 1.1

Comments: Wintertime modeling was conducted for this discharge, although not current standard modeling procedure, due to the unique seasonal streamflow characteristics for this discharge and North and South Shenango Joint STP's discharge due to release rates of the Pymatuning Dam, operated by USACOE. The calculated limits are slightly more stringent than the current limits due primarily to new Chapter 93 water quality criteria for ammonia nitrogen which took effect early in 2021.

A phosphorus average monthly limit of 1.0 mg/l will be retained in the permit, based on the Shenango River Trophic State Index (TSI) Study.

Toxic modeling was not done because this in a minor sewage discharge and there are no industrial or commercial users.

Best Professional Judgment (BPJ) Limitations

A dissolved oxygen limit of 4.0 mg/l as a daily minimum is placed in the permit in accordance with the Department's SOP entitled "Establishing Effluent Limitations for Individual Sewage Permits."

Other Considerations

Comments: Monitoring for influent BOD_5 and influent TSS is placed in the permit in accordance with the Department's SOP entitled "New and Reissuance Individual Sewage NPDES Permit Applications."

Monitoring for total nitrogen and UV intensity is placed in the permit in accordance with the Department's SOP entitled "Establishing Effluent Limitations for Individual Sewage Permits."

Anti-Backsliding

N/A

Threatened and Endangered Mussel Species Concerns and Considerations

The main segment of the Shenango River from the Pymatuning Dam in Jamestown, Pennsylvania, downstream to the point of inundation by Shenango River Lake near Big Bend, Mercer County, Pennsylvania, is documented to contain federally and state listed threatened and endangered mussel species. Due to the discharge being directly to the Shenango River, potential impacts to endangered mussel species were evaluated.

The USFWS has indicated in comment letters on other NPDES permits that in order to protect threatened and endangered mussel species, wastewater discharges containing ammonia-nitrogen (NH_3-N), chloride (Cl^-) and nickel, where mussels or their habitat exist, can be no more than 1.9 mg/l, 78 mg/l and 7.3 ug/l, respectively. The calculated site-specific criteria based on WQN Station 911 stream background pH and temperature data (pH of 7.71 and temperature of 20.24) results in NH3-N criteria of 1.113 mg/l.

Ammonia-Nitrogen (NH_3-N) Evaluation:

The following is a summary of the Ammonia-Nitrogen eDMR average monthly reporting data:

Ammonia-Nitrogen (NH_3-N) Sampling Data (eDMR Reporting)													
Ammonia-Nitrogen (NH_3-N) 24-hour composite samples (mg/L)	Year	January	February	March	April	May	June	July	August	September	October	November	December
	2018	<0.8	<0.8	<0.8	<0.8	<5.5	<0.8	<0.8	<1.2	<0.8	<0.8	<0.8	<0.8
	2019	<0.8	<0.8	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<1.0	<1.0	<1.0	<1.0
	2020	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	2021	<2.0	<3.0	<1.0	<1.0	<1.0	<3.0	<3.0	<3.0				
Note: Jamestown MA's current NPDES permit has 1/week NH3-N monitoring with a year-round average monthly limit of 18.0 mg/L (36 mg/L IMAX).													

The proposed permit limits for Ammonia-Nitrogen in the new permit cycle were as follows:

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Ammonia-Nitrogen May 1 - Oct 31	34.6	XXX	XXX	16.0	XXX	32	1/week	24-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	37.9	XXX	XXX	17.5	XXX	35	1/week	24-Hr Composite

The limits in the existing permit were calculated utilizing the Department DO model (WQM 7.0) which assumes a complete mix of the effluent with the receiving stream. The WQM 7.0 model was reevaluated as part of the subject permit renewal using the newly adopted ammonia-nitrogen water quality criteria (same as 2013 EPA CMG).

As can be seen from the eDMR data for the past three and a half years, the highest ammonia nitrogen concentration in the effluent was 1.0 mg/l, with most results being non-detect at MDLs ranging from 0.8 to 3.0 mg/l. This indicates that the facility is consistently denitrifying the municipal sewage to a high degree and easily meeting the calculated WQBELs in the permit. There is no perceived impact due to ammonia nitrogen with the max detectable concentration because it is less than the most stringent WQ criteria. The Endangered Mussel Species Impact Area Calculations Spreadsheet (attached) was completed using the maximum non-detect concentration of 3 mg/l to determine the potential impact area in this scenario which resulted in a maximum area of impact of 1.54 m^2 or 16.59 ft^2.

Due to this facility being a minor sewage facility (design flow less than 1.0 MGD), the application only required one effluent sample for chloride and no sampling for total nickel. The lone reported effluent chloride concentration was 61 mg/l, which is less than the concentration stated by the USFWS of being protective of mussels. Nickel is not expected to be present in the effluent at levels of concern due to this being a municipal sewage treatment plant with no commercial or industrial users and they do not accept hauled in waste.

Based on this sampling data, relatively small calculated areas of impact for this this existing major sewage discharge and comparisons to characteristics of other similar minor sewage discharges, the existing discharge from the Jamestown Municipal STP facility is not believed to be having any measurable adverse effects on threatened or endangered mussel species in the Shenango River. However, the Department will establish quarterly effluent sampling for chloride and total nickel to develop a dataset as a means of further evaluating potential impacts in the upcoming permit term.

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" (362-0400-001), SOPs and/or BPJ.

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	4.0 Daily Min	XXX	XXX	XXX	1/day	Grab
UV Intensity (mW/cm2)	XXX	XXX	Report Daily Min	Report	XXX	XXX	1/day	Measured
CBOD5	33.3	50	XXX	25	40	50	1/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
TSS	25.5	56	XXX	30	45	60	1/week	24-Hr Composite
TSS 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
Total Nitrogen	XXX	Report Daily Max	XXX	XXX	Report Daily Max	XXX	1/quarter	24-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	34.6	XXX	XXX	16.0	XXX	32	1/week	24-Hr Composite

Outfall 001, Continued (from Permit Effective Date through Permit Expiration Date)

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Ammonia-Nitrogen Nov 1 - Apr 30	37.9	XXX	XXX	17.5	XXX	35	1/week	24-Hr Composite
Total Phosphorus	2.2	XXX	XXX	1.0	XXX	2	1/week	24-Hr Composite
Chloride	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite
Total Nickel	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite

Compliance Sampling Location: Outfall 001 (after disinfection)

Other Comments: Sampling frequency for total nitrogen was relaxed from 1/week to 1/quarter because there is not currently a local stream impairment for nutrients.

On September 20, 2004, the Department approved Jamestown's re-rating from 0.15 MGD to 0.26 MGD. This was a hydraulic re-rate and not an organic re-rating. To calculate the allowable $CBOD_5$ & TSS mass loadings, the federal definition of secondary treatment was applied (85% removal) to the influent loadings from the original design specifications. Since they were only granted a hydraulic re-rating, the base load from the Borough's customers should remain the same. Mass Loadings for NH_3-N and phosphorus were calculated using the higher, re-rated flow.

$CBOD_5$: BOD_5 influent = 266 lb/day x 0.15 x 25 ($CBOD_5$/30 (BOD_5) = **33.3 lb/day**

TSS: TSS influent = 170 lb/day x 0.15 = **25.5 lb/day**

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
20A	35482	SHENANGO RIVER	**68.200**	978.00	167.00	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 (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.023	11.21	0.00	0.000	0.000	0.0	0.00	0.00	20.24	7.71	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 (°C)	Disc pH
NSSJMA STP	PA0100277	1.7000	0.0000	0.0000	0.000	20.00	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	2.20	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.11	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
20A	35482	SHENANGO RIVER	**66.340**	968.00	170.80	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 (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.023	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.24	7.71	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 (°C)	Disc pH
Jamestown STP	PA0029726	0.2600	0.0000	0.0000	0.000	20.00	7.10

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.20	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.11	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
20A	35482	SHENANGO RIVER	**62.000**	949.00	183.60	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 (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.023	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.24	7.71	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 (°C)	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
20A	35482	SHENANGO RIVER

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 (°C)	Analysis pH
Q7-10 Flow												
68.200	11.21	0.00	11.21	2.6299	0.00102	.845	62.99	74.56	0.26	0.437	20.19	7.46
66.340	11.30	0.00	11.30	3.0321	0.00083	.855	64.64	75.64	0.26	1.022	20.19	7.44
Q1-10 Flow												
68.200	7.17	0.00	7.17	2.6299	0.00102	NA	NA	NA	0.21	0.530	20.18	7.39
66.340	7.23	0.00	7.23	3.0321	0.00083	NA	NA	NA	0.22	1.233	20.17	7.37
Q30-10 Flow												
68.200	15.25	0.00	15.25	2.6299	0.00102	NA	NA	NA	0.30	0.379	20.20	7.50
66.340	15.36	0.00	15.36	3.0321	0.00083	NA	NA	NA	0.30	0.889	20.20	7.49

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	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
20A	35482	SHENANGO RIVER

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
68.200	NSSJMA STP	10.71	39.64	10.71	39.64	0	0
66.340	Jamestown STP	7.22	50	10.93	50	0	0

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
68.200	NSSJMA STP	1.37	8.68	1.37	7.52	2	13
66.340	Jamestown STP	1.15	25	1.39	21.67	2	13

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)		
68.20	NSSJMA STP	22.6	18.34	7.52	6.15	4	4	2	19
66.34	Jamestown STP	25	25	21.67	16.12	4	4	2	19

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
20A	35482	SHENANGO RIVER

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
68.200	1.700	20.194	7.458
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
62.992	0.845	74.563	0.260
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
5.27	0.666	1.26	0.711
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.437	1.815	Tsivoglou	5
Reach Travel Time (days)			
0.437			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.044	5.11	1.22	7.18
0.087	4.97	1.18	6.95
0.131	4.82	1.15	6.75
0.175	4.68	1.11	6.58
0.219	4.55	1.08	6.43
0.262	4.42	1.04	6.30
0.306	4.29	1.01	6.19
0.350	4.16	0.98	6.10
0.393	4.04	0.95	6.02
0.437	3.93	0.92	5.96

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
66.340	1.960	20.189	7.444
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
64.641	0.855	75.644	0.259
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
4.51	0.552	1.34	0.710
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.922	1.474	Tsivoglou	5
Reach Travel Time (days)			
1.022			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.102	4.26	1.25	5.62
0.204	4.02	1.16	5.42
0.307	3.80	1.08	5.28
0.409	3.59	1.00	5.20
0.511	3.39	0.93	5.18
0.613	3.20	0.87	5.19
0.716	3.03	0.81	5.24
0.818	2.86	0.75	5.31
0.920	2.70	0.70	5.40
1.022	2.55	0.65	5.51

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
20A	35482	SHENANGO RIVER

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)
68.200	NSSJMA STP	PA0100277	1.700	CBOD5	18.34		
				NH3-N	6.15	12.3	
				Dissolved Oxygen			4

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)
66.340	Jamestown STP	PA0029726	0.260	CBOD5	25		
				NH3-N	16.12	32.24	
				Dissolved Oxygen			4

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
20A	35482	SHENANGO RIVER	**68.200**	978.00	167.00	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 (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.023	8.15	0.00	0.000	0.000	0.0	0.00	0.00	4.71	7.71	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 (°C)	Disc pH
NSSJMA STP	PA0100277	1.7000	0.0000	0.0000	0.000	15.00	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	2.20	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.11	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
20A	35482	SHENANGO RIVER	**66.340**	968.00	170.80	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 (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.023	0.00	0.00	0.000	0.000	0.0	0.00	0.00	4.71	7.71	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 (°C)	Disc pH
Jamestown STP	PA0029726	0.2600	0.0000	0.0000	0.000	15.00	7.10

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.20	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.11	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
20A	35482	SHENANGO RIVER	**62.000**	949.00	183.60	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 (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.023	0.00	0.00	0.000	0.000	0.0	0.00	0.00	4.71	7.71	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 (°C)	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
20A	35482	SHENANGO RIVER

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 (°C)	Analysis pH
Q7-10 Flow												
68.200	8.15	0.00	8.15	2.6299	0.00102	.826	57.75	69.95	0.23	0.503	7.22	7.41
66.340	8.24	0.00	8.24	3.0321	0.00083	.836	59.44	71.1	0.23	1.170	7.48	7.39
Q1-10 Flow												
68.200	5.22	0.00	5.22	2.6299	0.00102	NA	NA	NA	0.19	0.601	8.16	7.33
66.340	5.27	0.00	5.27	3.0321	0.00083	NA	NA	NA	0.19	1.388	8.47	7.32
Q30-10 Flow												
68.200	11.08	0.00	11.08	2.6299	0.00102	NA	NA	NA	0.26	0.439	6.68	7.46
66.340	11.20	0.00	11.20	3.0321	0.00083	NA	NA	NA	0.26	1.026	6.90	7.44

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	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
20A	35482	SHENANGO RIVER

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
68.200	NSSJMA STP	16.79	49.87	16.79	49.87	0	0
66.340	Jamestown STP	10.94	50	17.07	50	0	0

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
68.200	NSSJMA STP	3.34	16.96	3.34	15.9	2	6
66.340	Jamestown STP	2.74	25	3.38	23.44	2	6

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)		
68.20	NSSJMA STP	25	25	14.7	10.45	4	4	2	19
66.34	Jamestown STP	25	25	23.44	17.57	4	4	2	19

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
20A	35482	SHENANGO RIVER

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
68.200	1.700	7.220	7.407
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
57.748	0.826	69.949	0.226
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
7.76	1.121	2.63	0.262
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.208	1.160	Tsivoglou	5
Reach Travel Time (days)			
0.503			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.050	7.52	2.60	6.98
0.101	7.29	2.56	6.78
0.151	7.07	2.53	6.60
0.201	6.85	2.50	6.44
0.251	6.64	2.46	6.31
0.302	6.43	2.43	6.19
0.352	6.23	2.40	6.09
0.402	6.04	2.37	6.01
0.452	5.85	2.34	5.94
0.503	5.67	2.31	5.89

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
66.340	1.960	7.479	7.393
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
59.445	0.836	71.104	0.227
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
6.34	0.959	2.84	0.267
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.837	0.953	Tsivoglou	5
Reach Travel Time (days)			
1.170			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.117	5.95	2.75	5.56
0.234	5.58	2.66	5.35
0.351	5.24	2.58	5.21
0.468	4.92	2.50	5.12
0.585	4.62	2.43	5.08
0.702	4.34	2.35	5.09
0.819	4.07	2.28	5.12
0.936	3.82	2.21	5.19
1.053	3.59	2.14	5.28
1.170	3.37	2.07	5.38

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
20A	35482	SHENANGO RIVER

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)
68.200	NSSJMA STP	PA0100277	1.700	CBOD5	25		
				NH3-N	10.45	20.9	
				Dissolved Oxygen			4

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)
66.340	Jamestown STP	PA0029726	0.260	CBOD5	25		
				NH3-N	17.57	35.14	
				Dissolved Oxygen			4

10/21/2021

Facility:	Jamestown Municipal STP		
Permit Number:	PA0029726	Effective: Existing Discharge	Expiration:
Outfall No:	001		
Location:	Jamestown Borough, Mercer County		
Discharge to:	Shenango River		
Site Specific Mussel Survey Completed:	No		

Discharge and Stream Characteristics			Comments
Q_S	Stream Flow	7.246 MGD / 11.21 cfs	USGS # 03101500, accrued flow #03100000
Q_D	Discharge Flow	0.26 MGD / 0.4023 cfs	
$C_{S(Cl^-)}$	Instream chloride Concentration	9.47 mg/L	WQN 911 field samples (2010-2020)(June-Sept)
$C_{E(Cl^-)}$	Discharge chloride (existing)	61 mg/L	Maximum concentration from renewal application
$C_{P(Cl^-)}$	Discharge chloride (proposed)	61 mg/L	Maximum concentration from renewal application
$C_{S(NH3-N)}$	Instream NH^3-N	0.11 mg/L	WQN 911 field samples (2002-2011)
$C_{E(NH3-N)}$	Discharge NH^3-N (existing)	3 mg/L	Highest concentration reported on DMRs in last 5 years
$C_{P(NH3-N)}$	Discharge NH^3-N (proposed)	3 mg/L	Highest concentration reported on DMRs in last 5 years
pH_S	Instream pH	7.71 S.U.	WQN #911
T_S	Instream Temp.	20.24 °C	WQN #911 Summertime Mean
$C_{C(NH3-N)}$	Ammonia criteria	1.113 mg/L	From ammonia criteria comparison spreadsheet -using instream pH and Temp
$C_{C(Cl^-)}$	Chloride criteria	78 mg/L	USFWS criteria
W_S	Stream width	26 meters	Google Earth - Approximate

Ammonia Criteria Calculations:

pH_S	7.71	S.U.	*(Default value is 7.0)*	
T_S	20.24	°C	*(Default value is 20 °)*	

Acute Criteria

	METHOD and UNITS	CRITERIA	Comments	
	Current CMC (mg TAN/L) =	4.231		
	EPA 2013 CMC (mg TAN/L) =	6.463	Oncorhynchus present	* formula on pg. 41 (plateaus at 15.7 C)
		6.463	Oncorhynchus absent	* formula on pg. 42 (plateaus at 10.2 C)

Chronic Criteria

	METHOD and UNITS	CRITERIA	COMMENTS
$C_{C(NH3-N)}$	Current CMC (mg TAN/L) =	1.231	
	EPA 2013 CMC (mg TAN/L) =	1.113	* formula on pg. 46 (plateaus at 7 C)

Endangered Mussel Species Impact Area Calculations:

Existing Area of Impact

☑ N/A - No Site Specific Mussel Survey Completed for this Discharger

Approximate Area of Impact Determined from Survey =	N/A m^2	(Enter N/A if no site specific survey has been completed)
Existing Mussel Density within Area of Impact =		
Rabbitsfoot *(Quadrula cylindrical)*	per m^2	
Northern Riffleshell *(Epioblasma torulosa rangiana)*	per m^2	
Rayed Bean *(Villosa fabalis)*	per m^2	
Clubshell *(Pleurobema clava)*	per m^2	
Sheepnose *(Plethobasus cyphyus)*	per m^2	
Snuffbox *(Epioblasma triquetra)*	per m^2	
TOTAL	0 per m^2	

Method 1 - Utilizing Site Specific Mussel Survey Information

☑ N/A - No Site Specific Mussel Survey Completed for this Discharger

This method utilizes a simple comparison of the size of the existing area of impact as determined from a site specific mussel survey and the chlorides in the existing discharge compared to the chlorides in the proposed discharge after the facility upgrades treatment technologies. This method is only applicable to where the stream impairment is caused by TDS and/or chlorides as the plume has been delineated through conductivity measurements.

A.	Area of Impact Determined from Survey:	N/A	m^2
B.	Chlorides in Existing Discharge:	61	mg/L
C.	Chlorides in Proposed Discharge after Treatment Facility Upgrades:	61	mg/L
D.	Approximate Area of Impact after Treatment Facility Upgrades:	N/A	m^2

A/B = D/C Therefore, D = (A*C)/B

10/21/2021

Facility:	Jamestown Municipal STP		
Permit Number:	PA0029726	Effective: Existing Discharge	Expiration: N/A
Outfall No:	001		
Location:	Jamestown Borough, Mercer County		
Discharge to:	Shenango River		
Site Specific Mussel Survey Completed:	No		

Endangered Mussel Species Impact Area Calculations: (continued...)

Method 2 - Mass Balance Relationship of Loading and Assimilative Capacity of Stream

Chloride (Cl)	$L_{S(Cl^-)}$ = Available Chloride Loading in Stream = $C_{C(Cl^-)} - C_{S(Cl^-)}$ X Q_S(MGD) X 8.34 =	4,141 lbs/Day
	$L_{D\text{-}MAX(Cl^-)}$ = Current Maximium Discharge Chloride Loading exceeding criteria = ($C_{E(CL^-)} - C_{E(CL^-)}$) X Q_D(MGD) X 8.34 =	-37 lbs/Day
	$\%_{E(Cl^-)}$ = Percent of Stream Capacity for Current Loading = $L_{D\text{-}MAX(Cl^-)}$ / $L_{S(Cl^-)}$ =	0% of Stream Capacity
	$L_{D(Cl^-)}$ = Proposed Discharge Cl^- Loading exceeding criteria after Treatment Facility Upgrades = ($C_{P(Cl^-)} - C_{P(Cl^-)}$) X Q_D(MGD) X 8.34 =	-36.8628 lbs/Day
	$\%_{P(Cl^-)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(Cl^-)}$ / $L_{S(Cl^-)}$ =	-0.89% of Stream Capacity
	Proposed Area of Impact due to Chloride * = $(\%_{P(Cl^-)} \text{ X } W_S)^2$ X 0.5 =	0.03 m^2
	* assuming equal flow across transect and 90° spread at discharge	0.29 ft^2
Ammonia-Nitrogen (NH3-N)	$L_{S(NH3\text{-}N)}$ = Available NH3-N Loading in Stream = $C_{C(NH3\text{-}N)} - C_{S(NH3\text{-}N)}$ X Q_S(MGD) X 8.34 =	61 lbs/Day
	$L_{D\text{-}MAX(NH3\text{-}N)}$ = Current Maximium Discharge NH3-N Loading = $C_{E(NH3\text{-}N)}$ X Q_D(MGD) X 8.34 =	7 lbs/Day
	$\%_{E(NH3\text{-}N)}$ = Percent of Stream Capacity for Current Loading = $L_{D\text{-}MAX(NH3\text{-}N)}$ / $L_{S(NH3\text{-}N)}$ =	11% of Stream Capacity
	$L_{D(NH3\text{-}N)}$ = Proposed Discharge NH3-N Loading after Treatment Facility Upgrades = $C_{P(NH3\text{-}N)} - C_{C(NH3\text{-}N)}$ X Q_D(MGD) X 8.34 =	4 lbs/Day
	$\%_{P(NH3\text{-}N)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(NH3\text{-}N)}$ / $L_{S(NH3\text{-}N)}$ =	6.56% of Stream Capacity
	Proposed Area of Impact due to NH3-N * = $(\%_{P(NH3\text{-}N)} \text{ X } W_S)^2$ X 0.5 =	1.45 m^2
	* assuming equal flow across transect and 90° spread at discharge	15.64 ft^2

Method 3 - Mass Balance Relationship of Stream Flow, Proposed Effluent Quality, and Mussel Protection Criteria

Chloride (Cl)	$Q_{A(Cl^-)}C_{S(Cl^-)} + Q_DC_{P(Cl^-)} = Q_TC_{C(Cl^-)}$	
	$Q_{A(Cl^-)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(Cl^-)}C_{S(Cl^-)} + Q_DC_{P(Cl^-)} = (Q_D+Q_S)C_{C(Cl^-)}$	
	SOLVING FOR $Q_{A(Cl^-)}$ = $[(Q_DC_{P(Cl^-)} / C_{C(Cl^-)}) - Q_D)] / (1 - C_{S(Cl^-)}/C_{C(Cl^-)})$ =	-0.099797 cfs
	$\%_{P(Cl^-)}$ = Percent of Stream Width Required to Assimilate Chlorides to Criteria Concentration = $Q_{A(Cl^-)}$ / Q_S (cfs) =	-0.8903%
	$W_{I(Cl^-)}$ = Proposed Width of Stream required to Assimilate Chlorides to Criteria Concentration = W_S X $\%_{P(Cl^-)}$	-0.231465 meters
	Proposed Area of Impact due to Chloride * = $(W_{I(Cl^-)})^2$ X 0.5 =	0.03 m^2
	* assuming equal flow across transect and 90° spread at discharge	0.29 ft^2
Ammonia-Nitrogen (NH3-N)	$Q_{A(NH3\text{-}N)}C_{S(NH3\text{-}N)} + Q_DC_{P(NH3\text{-}N)} = Q_TC_{C(NH3\text{-}N)}$	
	$Q_{A(NH3\text{-}N)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(NH3\text{-}N)}C_{S(NH3\text{-}N)} + Q_DC_{P(NH3\text{-}N)} = (Q_D+Q_S)C_{C(NH3\text{-}N)}$	
	SOLVING FOR $Q_{A(NH3\text{-}N)}$ = $[(Q_DC_{P(NH3\text{-}N)} / C_{C(NH3\text{-}N)}) - Q_D)] / (1 - C_{S(NH3\text{-}N)}/C_{C(NH3\text{-}N)})$ =	0.7569 cfs
	$\%_{P(NH3\text{-}N)}$ = Percent of Stream Width Required to Assimilate NH3-N to Criteria Concentration = $Q_{A(NH3\text{-}N)}$ / Q_S (cfs) =	6.7517%
	$W_{I(NH3\text{-}N)}$ = Proposed Width of Stream required to Assimilate NH3-N to Criteria Concentration = W_S X $\%_{P(NH3\text{-}N)}$	1.755451 meters
	Proposed Area of Impact due to NH3-N * = $(W_{I(NH3\text{-}N)})^2$ X 0.5 =	1.54 m^2
	* assuming equal flow across transect and 90° spread at discharge	16.59 ft^2

Jamestown Municipal STP
Jamestown Borough, Mercer County
NPDES# PA0029726

Date	pH min	pH max	10^ -pH min	10^ -pH max	Ave (10^pH min & pH max)	-Log (Ave pH)
Jul-18	7.0	7.4	1E-07	3.98E-08	6.99E-08	**7.2**
Aug-18	7.1	7.3	7.94E-08	5.01E-08	6.48E-08	**7.2**
Sep-18	7.1	7.6	7.94E-08	2.51E-08	5.23E-08	**7.3**
Jul-19	6.7	7.3	2E-07	5.01E-08	1.25E-07	**6.9**
Aug-19	6.8	7.5	1.58E-07	3.16E-08	9.51E-08	**7.0**
Sep-19	7.2	7.6	6.31E-08	2.51E-08	4.41E-08	**7.4**
Jul-20	6.6	7.0	2.51E-07	1E-07	1.76E-07	**6.8**
Aug-20	6.7	7.0	2E-07	1E-07	1.5E-07	**6.8**
Sep-20	6.7	7.0	2E-07	1E-07	1.5E-07	**6.8**
Jul-21	7.0	7.4	1E-07	3.98E-08	6.99E-08	**7.2**
					Median:	**7.1**