pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0081329**
Facility Type	**Municipal**	APS ID	**2825**
Major / Minor	**Minor**	Authorization ID	**1300118**

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**South Londonderry Township Municipal Authority**	Facility Name	**South Londonderry Lawn STP**
Applicant Address	27 W Market Street Palmyra, PA 17078-8736	Facility Address	Elizabethtown Road Lawn, PA 17041
Applicant Contact	Scott Galbraith	Facility Contact	Scott Galbraith
Applicant Phone	(717) 838-0573	Facility Phone	(717) 838-5556
Client ID	43038	Site ID	250904
Ch 94 Load Status	Not Overloaded	Municipality	South Londonderry Township
Connection Status	No Limitations	County	Lebanon
Date Application Received	December 20, 2019	EPA Waived?	Yes
Date Application Accepted	January 7, 2020	If No, Reason	

Purpose of Application: NPDES permit renewal for discharge of treated sewage

Summary of Review

1.0 General Discussion

This fact sheet supports the renewal of an existing NPDES permit for discharge of treated sewage from South Londonderry Township Lawn wastewater treatment plant. The facility serves the village of Upper Lawn and portions of South Londonderry Township. South Londonderry Township Municipal Authority owns, maintains, and operates the wastewater treatment plant located in South Londonderry Township, Lebanon, County. The collection system has no combined sewers and no bypasses and overflows are authorized in the collection system. The facility is activated sludge secondary treatment system with a design average annual flow of 0.0225 MGD and hydraulic design capacity of 0.0225 MGD. The organic design capacity is 54 lbs/day. The facility discharges treated sewage to Conewago Creek which is classified for Trout Stocking(TSF). The existing NPDES permit was issued on June 18, 2015 with an effective date of July 1, 2015 and expiration date of June 30, 2020. The applicant submitted a timely permit renewal application to the Department and is currently operating under the terms and conditions in the existing permit under administrative extension provisions pending Department action on the renewal application. A topographical Map showing the discharge location is presented in attachment A

1.1 Sludge use and disposal description and location(s):

Digested sludge is hauled offsite periodically to Campbelltown East wastewater treatment plant for further processing.

1.2 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*,

Approve	Deny	Signatures	Date
X		*J. Pascal Kwedza* J. Pascal Kwedza, P.E. / Environmental Engineer	March 7, 2021
X		*Maria D. Bebenek for Daniel W. Martin* Daniel W. Martin, P.E. / Environmental Engineer Manager	March 12, 2021
X		*Maria D. Bebenek* Maria D. Bebenek, P.E. / Program Manager	March 12, 2021

Summary of Review

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.

1.3 Changes to the existing Perm

Ammonia nitrogen monitoring has been added to the permit.

1.3.1 Existing Permit Limits and Monitoring Requirements

Discharge Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)					
	Monthly Average	Weekly Average	Minimum	Monthly Average	Weekly Average	Instantaneous Maximum	Minimum Measurement Frequency	Required Sample Type
Flow (mgd)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/Day	Grab
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/Day	Grab
TSS	5.6	8.4	XXX	30	45	60	2/month	8-hr comp
$CBOD_5$	4.6	7.5	XXX	25	40	50	2/month	8-hr comp
Fecal Coliform (5/1 to 9/30)[(5)]	XXX	XXX	XXX	200	XXX	XXX	2/month	Grab
Fecal Coliform (10/1 to 4/30)	XXX	XXX	XXX	2,000	XXX	XXX	2/month	Grab
Nitrate-Nitrite	XXX	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	Calculation
TKN	XXX	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite
Total Phosphorus	0.4	XXX	XXX	2.0	XXX	4.0	2/month	8-hr comp
Total Phosphorus	Report	XXX	XXX	Report	XXX	XXX	2/month	8-hr comp
Total Phosphorus	137 Annual Total	XXX	XXX	XXX	XXX	XXX	1/year	Calculate

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	0.0225
Latitude	40° 13’ 9.69”	Longitude	76° 32’ 37.35”
Quad Name	Elizabethtown	Quad Code	1733
Wastewater Description:	Sewage		
Receiving Waters	Conewago Creek	Stream Code	09217
NHD Com ID	56402697	RMI	15.64
Drainage Area	9.5	Yield (cfs/mi^2)	0.1
Q_{7-10} Flow (cfs)	0.95	Q_{7-10} Basis	USGS Gage Station
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-G	Chapter 93 Class.	TSF
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	Final, 04/09/2001	Name	Conewago Creek Watershed
Background/Ambient Data		Data Source	
pH (SU)			
Temperature (°F)			
Hardness (mg/L)			
Other:			
Nearest Downstream Public Water Supply Intake		Elizabethtown Water Company	
PWS Waters	Conewago Creek	Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	<10

Changes Since Last Permit Issuance: None

Public Water Supply Intake

The nearest water supply intake is approximately 10 miles downstream at West Donegal Township, Lancaster County on the Conewago Creek by the Elizabethtown Water Company. No impact is expected from this discharge.

2.0 Treatment Facility Summary				
Treatment Facility Name: South Londonderry Township - Lawn STP				
WQM Permit No.	**Issuance Date**			
3899402	3/26/1999			
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage	Secondary Treatment	Activated Sludge	Hypochlorite	0.0225
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
0.0225	54	Overloaded	Aerobic Digestion	Other facility

Changes Since Last Permit Issuance: None

2.1 : Hydraulic overload

The facility is considered hydraulically overloaded under Chapter 94.12 requirements. A corrective action plan to address the overload has been approved for implementation.

2.2 Treatment Facility

The treat plant consists of a comminutor, Influent pump station, an Equalization tank with pumps, aeration tank, a clarifier, chlorine contact tank and a sludge holding tank.

2.3 Chemicals

Lime is added for pH adjustment, Delpac added for phosphorus removal, sodium hypochlorite added for disinfection, sodium sulfite is added for de-chlorination and calcium hypochlorite for algae control in clarifier trough.

3.0 Compliance History

3.1 DMR Data for Outfall 001 (from January 1, 2020 to December 31, 2020)

Parameter	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20	MAR-20	FEB-20	JAN-20
Flow (MGD) Average Monthly	0.015	0.010	0.010	0.010	0.015	0.010	0.010	0.017	0.023	0.016	0.016	0.018
Flow (MGD) Daily Maximum	0.085	0.016	0.016	0.015	0.059	0.013	0.015	0.058	0.105	0.052	0.039	0.077
pH (S.U.) Minimum	6.71	6.76	6.62	6.85	6.75	6.69	6.88	7.10	7.02	6.74	6.93	6.63
pH (S.U.) Maximum	7.67	7.53	7.59	7.56	7.79	7.71	7.74	7.66	8.14	7.54	7.83	7.81
DO (mg/L) Minimum	5.14	7.74	6.37	7.42	5.05	6.69	6.90	5.22	5.21	7.73	5.66	5.82
TRC (mg/L) Average Monthly	0.06	0.08	0.12	0.07	0.09	0.09	0.06	0.16	0.12	0.12	0.03	0.07
TRC (mg/L) Instant. Maximum	0.69	0.81	1.22	0.89	1.03	0.84	0.89	1.32	1.06	1.40	0.23	1.03
CBOD5 (lbs/day) Average Monthly	0.25	0.33	< 0.16	0.48	0.29	< 0.19	< 0.26	0.48	< 0.33	0.21	0.59	< 0.36
CBOD5 (lbs/day) Weekly Average	0.25	0.36	< 0.17	0.51	0.38	< 0.20	0.27	0.70	0.42	0.24	0.68	0.47
CBOD5 (mg/L) Average Monthly	3.00	3.55	< 2.00	4.85	3.00	2.00	< 2.34	3.15	< 2.25	2.45	2.80	< 4.10
CBOD5 (mg/L) Weekly Average	3.00	3.90	< 2.00	5.60	3.50	< 2.00	2.70	3.80	2.50	2.90	2.80	6.20
BOD5 (lbs/day) Raw Sewage Influent Ave. Monthly	23.69	17.34	15.00	18.51	21.40	19.17	25.93	20.69	16.53	21.77	28.10	23.03
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	23.69	19.45	15.51	18.81	25.91	24.32	34.15	20.82	18.80	31.94	35.73	29.02
BOD5 (mg/L) Raw Sewage Influent Ave. Monthly	284	189	189.5	186.5	232	206	225	160	123	261	144	230
TSS (lbs/day) Average Monthly	1.08	< 1.06	0.89	1.89	0.69	< 0.51	< 0.76	< 0.76	< 1.29	< 0.55	< 1.05	0.73
TSS (lbs/day) Raw Sewage Influent Ave. Monthly	21.43	7.11	6.32	16.30	15.31	5.72	22.07	10.04	11.54	15.56	11.58	14.27

TSS (lbs/day) Raw Sewage Influent Daily Maximum	21.43	8.72	8.59	27.06	24.39	6.51	37.53	10.71	12.34	24.44	13.49	21.02
TSS (lbs/day) Weekly Average	1.08	1.65	1.17	1.95	0.83	0.60	0.90	< 0.92	2.00	0.67	< 1.21	0.83
TSS (mg/L) Average Monthly	13.00	< 11.50	11.00	19.00	8.00	< 5.50	< 7.00	< 5.50	< 8.5	< 6.50	< 5.00	8.00
TSS (mg/L) Raw Sewage Influent Ave. Monthly	257	77.50	78.5	173	154	62	183	79	83	187	59	170
TSS (mg/L) Weekly Average	13.00	18.00	14.00	20.00	11.00	6.00	9.00	6.00	12.00	8.00	< 5.00	11.00
Fecal Coliform (CFU/100 ml) Geometric Mean	290	4	5	32	16	6	17	2	66	8	443	22
Fecal Coliform (CFU/100 ml) Instant. Maximum	290	19	28	73	22	34	56	5	92	10	3500	95
Nitrate-Nitrite (mg/L) Average Monthly	52.70	55.35	61.45	57.15	44.30	52.10	44.85	28.05	28.30	39.20	29.95	31.00
Total Nitrogen (mg/L) Average Monthly	< 53.70	< 56.35	< 62.45	< 58.15	< 45.30	< 53.10	< 45.85	< 29.05	29.30	< 40.20	< 31.10	< 32.50
TKN (mg/L) Average Monthly	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.15	< 1.50
Total Phosphorus (lbs/day) Ave. Monthly	0.05	0.05	0.07	0.09	0.05	0.09	0.06	0.03	0.05	0.03	0.05	0.03
Total Phosphorus (mg/L) Ave. Monthly	0.61	0.55	0.83	0.83	0.52	0.92	0.48	0.24	0.36	0.28	0.26	0.38
Total Phosphorus (lbs) Total Monthly	1.55	1.50	2.17	2.79	1.55	2.79	1.80	0.93	1.50	0.93	1.45	0.93
Total Phosphorus (lbs) Effluent, Total Annual				18.87								

DMR summary for the past 12-months of operation is attached in section 3.1. No DMR violation noted for the past 12 months of operation. The facility's compliance record looks good.

3.2 Summary of Inspections:

The facility has been inspected several times during the previous permit cycle. No effluent violation noted during plant inspections.

4.0 Development of Effluent Limitations

Outfall No.	001	**Design Flow (MGD)**	.0225
Latitude	40º 13' 9.70"	**Longitude**	-76º 32' 37.35"
Wastewater Description:	Sewage Effluent		

4.1 Basis for Effluent Limitations

In general, the Clean Water Act(AWA) requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits

4.1.1 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)

4.2 Mass-Based Limits

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, if possible. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day and are calculated as follows:
Mass based limit (lb/day) = concentration limit (mg/L) × design flow (mgd) × 8.34

4.3 Water Quality-Based Limitations

4.3.1 Receiving Stream

The receiving stream is Conewago Creek. According to 25 PA § 93.9o, this stream is protected for Trout Stocking (TSF) and Migratory Fishes (MF). It is located in Drainage List O and State Watershed 7-G. It has been assigned stream code 09217. According to the Department's *Integrated Water Quality Monitoring and Assessment Report*, this segment of the stream is attaining its designated uses. However, the Conewago Creek Watershed is not attaining its designated uses. A Total Maximum Daily Load (TMDL) was developed for Conewago Creek Watershed for Total phosphorus and was approved by EPA in 2001 and revised revised on June 27, 2006. See further discussion in section 4.3.6 in the report for wasteload allocations to this discharge.

4.3.2 Stream flows

The Technical Support Document for Water Quality-Based Toxics Control (TSD) (EPA, 1991) and the Pennsylvania Water Quality Standards PA WQS) recommend the flow conditions to use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD and the PA WQS state that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years ($Q_{7\text{-}10}$) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years ($Q_{1\text{-}10}$) for acute criteria. However, because the chronic criterion for ammonia is a 30-day average concentration not to be exceeded more than once every three years, EPA has used the $Q_{30\text{-}10}$ for the chronic ammonia criterion instead of the $Q_{7\text{-}10}$. The $Q_{30\text{-}10}$ is a biologically based design flow intended to ensure an excursion frequency of once every three years for a 30-day average flow rate. These flows were determined by correlating with the yield of USGS gage station No. 01571500 on Susquehanna River at Harrisburg. The $Q_{7\text{-}10}$ and drainage area at the gage is 2610ft^3/s and 24100mi^2 respectively. The resulting yields are as follows:

- $Q_{7\text{-}10}$ = (2610ft^3/s)/24100 mi^2 = 0.11 $ft^3/s/ mi^2$
- $Q_{30\text{-}10}$ / $Q_{7\text{-}10}$ = 1.17
- $Q_{1\text{-}10}$ / $Q_{7\text{-}10}$ = 0.95
- $Q_{7\text{-}10}$ (winter) / $Q_{7\text{-}10}$ =1.18

The drainage area at discharge taken from the previous permit= 9.5 mi^2

The $Q_{7\text{-}10}$ at discharge = 9.5 mi^2 x 0.110 $ft^3/s/mi^2$ = 1.05 ft^3/s.

4.3.3 NH_3N Calculations

NH_3N calculations will be based on the Department's Implementation Guidance of Section 93.7 Ammonia Criteria, dated 11/4/97 (ID No. 391-2000-013). The following data is necessary to determine the instream NH_3N criteria used in the attached computer model of the stream:

STP pH	=	6.75 (DMR median)
STP Temp	=	25°C (Default)
Stream pH	=	7.0 (Default)
Stream Temp	=	20°C (Default)
Background NH_3N	=	0 mg/l (Assumed)

4.3.4 $CBOD_5$ & NH_3-N

Water quality analysis was conducted utilizing WQM7.0 which is a steady state model that simplifies many natural processes into a reach-by-reach simulation. The model was run with the inclusion of Colebrook STP 7,900 feet upstream and Mt. Gretna STP which is about 14,000 feet upstream due to their proximity to each other. The model predicts that the interaction between the three discharges are not significant. The attached result of the WQM 7.0 stream model (attachment B) indicates an average monthly limit(AML) of 25 mg/l for $CBOD_5$ is adequate to protect the water quality of the stream. This limit is consistent with the existing permit and the facility has been consistently achieving below this limitation. Therefore, a limit of 25mg/l average monthly limit(AML), 40mg/l weekly average and 50 mg/l IMAX is recommended for this permit cycle. Mass limit calculation follows the equation presented in section 4.2.

The attached result of the WQM 7.0 stream model (attachment B) also indicates no limitation on NH_3-N as a monthly average is necessary to protect the aquatic life from toxicity effects. However, monitoring of ammonia-nitrogen will be included in the permit to evaluate treatment plant efficiency.

4.3.5 Dissolved Oxygen

The existing permit contains a limit of 5 mg/l for Dissolved Oxygen (DO). DEP's Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001, 10/97) suggests that either the adopted minimum stream D.O. criteria for the receiving stream or the effluent level determined through water quality modeling be used for the limit. Since

the WQM 7.0 model was run using a minimum D.O. of 5.0 mg/l, this limit will be continued in the renewed permit with a daily monitoring requirement per DEP guidance.

4.3.6 Phosphorus

An average monthly limit of 2 mg/l was established in the previous permits prior to TMDL development. A TMDL for the Conewago Creek watershed was completed and approved on March 2, 2001 and revised on June 27, 2006. The TMDL allocates Phosphorus annual load of 137 lbs/yr based on the design flow of 0.0225 MGD and a concentration of 2 mg/l. This allocation was incorporated into the NPDES permit during previous permit cycles and will be continued in the permit. Due to anti-backsliding restrictions, the existing average monthly phosphorus limitation of 2mg/l will remain in the permit. The facility is complying with these limitations.

4.3.6 Total Residual Chlorine

The results presented in attachment C utilizes the equations and calculations presented in the Department's May 1, 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID No. 391-2000-015) for developing chlorine limitations. The Guidance References Chapter 92a, Section 92a.48(b) which establishes a standard BAT limit of 0.5 mg/l unless a facility-specific BAT has been developed. The calculation was done with acute PMF of 1 taken from running DEP's Toxic Management Spreadsheet. The attached result indicates that a technology-based limit of 0.5 mg/l as AML and 1.6 mg/l as IMAX would be needed to prevent toxicity concerns. The recommended limits are consistent with the existing limits and the facility is complying with the limits.

4.3.7 Total Suspended Solids(TSS):

There is no water quality criterion for TSS. A limit of 30 mg/l AML in the existing permit based on the minimum level of effluent quality attainable by secondary treatment as defined in 40 CFR 133.102b(1) and 25 PA § 92a.47(a)(1) and an AWL of 45mg/l per 40CFR 133.102(b)(2) and 25 PA § 92a.47(a)(2) will remain in the permit. Mass limits were calculated using the equation presented in section 4.2

4.3.8 Toxics

There are no parameters of concern associated with this discharge. Therefore, no reasonable potential analysis was conducted for toxic parameters.

4.3.9 Chesapeake Bay Strategy

The Department formulated a strategy in April 2007, to comply with the EPA and Chesapeake Bay Foundation requirements to reduce point source loadings of Total Nitrogen (TN) and Total Phosphorus (TP) to the Bay. In the Strategy, sewage dischargers have been prioritized by Central Office based on their delivered TN loadings to the Bay. The highest priority (Phases 1, 2, and 3) dischargers received annual loading caps based on their design flow on August 29, 2005 and concentrations of 6 mg/l TN and 0.8 mg/l TP. Phase 4 (0.2 -0.4mgd) and Phase 5(below 0.2mdg) are required to monitor and report TN and TP during permit renewal and any facility in Phases 4 and 5 that undergoes expansion is subjected to cap load right away. EPA published Chesapeake Bay TMDL in December of 2010. In order to address the TMDL, Pennsylvania developed Chesapeake Watershed Implementation Plan (WIP) Phase 1, Phase 2 and currently Phase 3 WIP and a supplement to the WIPs to be implemented with the original Chesapeake Bay Strategy.

As outlined in the current Phase 3 WIP and supplement to the WIP, re-issuing permits for significant dischargers would follow the same phased approach formulated in the original Bay strategy whilst Phase 4 and Phase 5 will be required to monitor and report TN and TP during permit renewal. This facility is classified as a phase 5, and has been monitoring Nitrate-Nitrite as N, Total Kjeldahl Nitrogen and Total Nitrogen and will continue to monitor them during this permit cycle with a reduced monitoring frequency of 1/month. No monitoring is required for Total Phosphorus since there is a Total phosphorus limit in the permit.

4.3.10 Influent BOD and TSS Monitoring

The permit will include influent BOD5 and TSS monitoring at the same frequency as is done for effluent in order to implement Chapter 94.12 and assess percent removal requirements, per DEP policy.

4.3.11 Industrial Users

This facility does not receive wastewater from any significant industrial users.

4.3.12 Pretreatment Requirements

The design annual average flow of the treatment plant is 0.0225MGD and the facility receives no flow from significant Industrial users. EPA does not require development of pretreatment program for facilities with design flow less than 5MGD. However, the permit contains standard conditions requiring the permittee to monitor and control industrial users if applicable.

5.0 Other Requirements

5.1 The permit contains the following special conditions:

Stormwater Prohibition, Approval Contingencies, Solids Management, Restriction on receipt of hauled in waste under certain conditions and condition for site specific data collection for toxics.

5.2 Stormwater

There is no stormwater outfall associated with this facility.

5.3 Anti-backsliding

Not applicable to this permit. In accordance with 40 CFR 122.44(l)(1) and (2), this draft permit does not propose to relax any existing effluent limitation.

5.4 Antidegradation (93.4):

The effluent limits for this discharge have been developed to ensure that existing instream water uses and the level of water quality necessary to protect the existing uses are maintained and protected. No High Quality Waters are impacted by this discharge. No Exceptional Value Waters are impacted by this discharge.

5.5 Class A Wild Trout Fisheries:

No Class A Wild Trout Fisheries are impacted by this discharge.

5.6 303d listed stream

The discharge is not located on a 303d listed stream segment but is within the impaired Conewago Creek Watershed. A TMDL for the Conewago Creek Watershed was completed and approved on March 2, 2001 and revised on June 27, 2006 as discussed in section 4.3.6 in the report. The facility is complying with the wasteload allocation, no further action is warranted at this time.

5.7 Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs).

5.8 Effluent Monitoring Frequency

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits are less than the effluent limits. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

6.0 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 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	4.6	7.5	XXX	25.0	40.0	50	2/month	8-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/month	8-Hr Composite
TSS	5.6	8.4	XXX	30	45	60	2/month	8-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/month	8-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2,000 Geo Mean	XXX	10,000	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1,000	2/month	Grab
Ammonia Nitrogen	Report	XXX	XXX	Report	XXX	XXX	2/month	8-Hr Composite
Nitrate-Nitrite	XXX	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	Calculation
TKN	XXX	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite

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

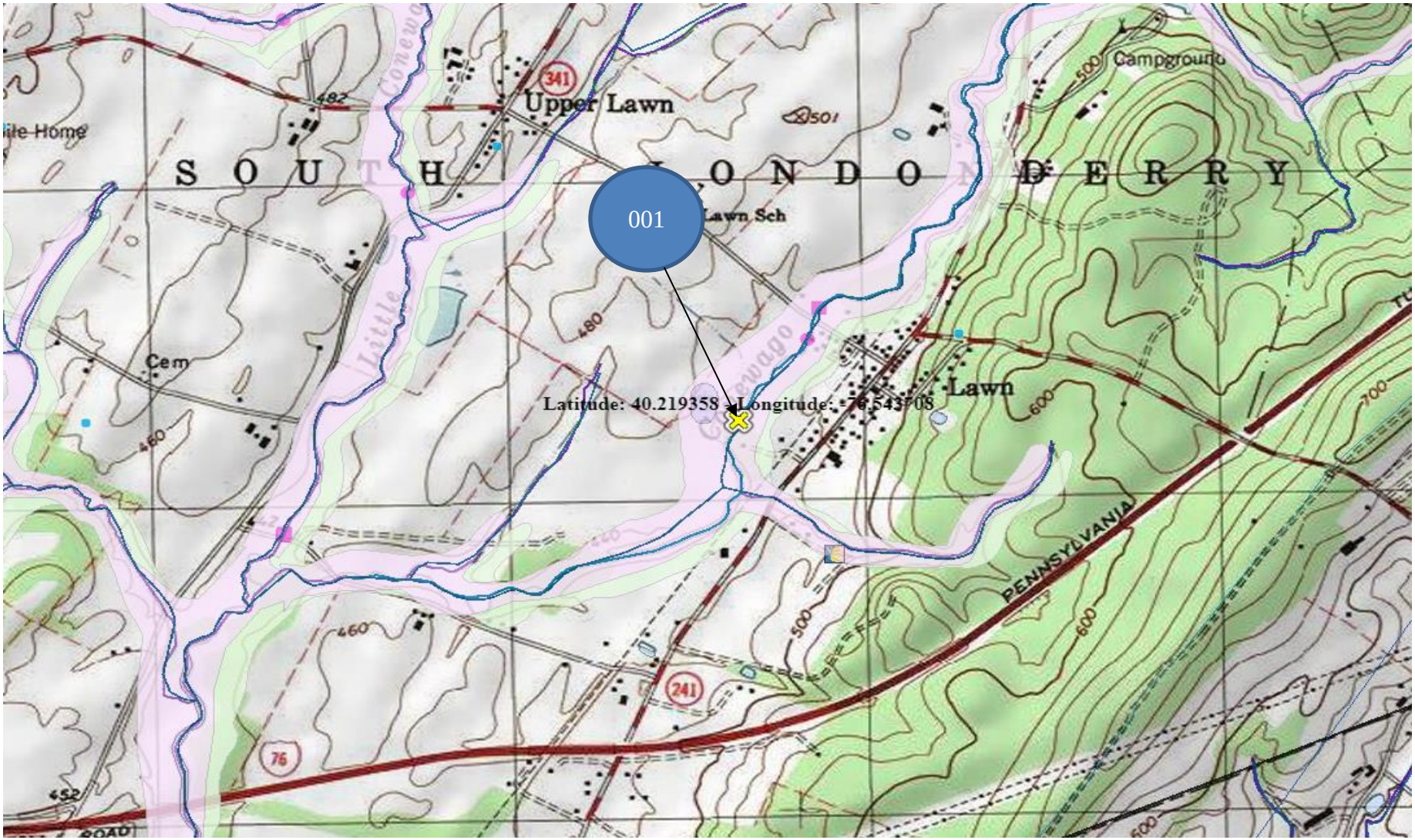
Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Total Phosphorus	0.4	XXX	XXX	2.0	XXX	4	2/month	8-Hr Composite
Total Phosphorus (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Phosphorus (lbs)	XXX	137 Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation

Compliance Sampling Location: At Outfall 001

7.0 Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment **B**)
☐	Toxics Management Spreadsheet (see Attachment)
☒	TRC Model Spreadsheet (see Attachment **C**)
☐	Temperature Model Spreadsheet (see Attachment)
☒	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☒	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
☒	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
☐	Pennsylvania CSO Policy, 385-2000-011, 9/08.
☒	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
☒	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
☐	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
☒	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
☒	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
☐	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
☒	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999.
☐	Design Stream Flows, 391-2000-023, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
☒	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☒	SOP: Establishing Effluent Limitations in Individual NPDES Permits for Sewage Dischargers.
☒	Other: TMDL for Conewago Creek Watershed

8. Attachments

A. Topographical Map



B. WQM Model Results

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
07G	9217	CONEWAGO 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)
19.750	Mt Gretna	PA0020591	0.200	CBOD5	25		
				NH3-N	3.03	6.06	
				Dissolved Oxygen			5

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)
18.250	Colebrook	PA0081311	0.044	CBOD5	25		
				NH3-N	15.94	31.88	
				Dissolved Oxygen			5

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)
15.640	Lawn	PA0081329	0.023	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			5

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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
07G	9217	CONEWAGO CREEK	**19.750**	590.00	3.00	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	0.110	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 (°C)	Disc pH
Mt Gretna	PA0020591	0.2000	0.2000	0.2000	0.000	25.00	7.14

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	5.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

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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
07G	9217	CONEWAGO CREEK	**18.250**	510.00	4.80	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	0.110	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 (°C)	Disc pH
Colebrook	PA0081311	0.0440	0.0440	0.0440	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	5.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Permit No. PA0081329

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
07G	9217	CONEWAGO CREEK	**15.640**	455.00	9.50	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	0.110	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 (°C)	Disc pH
Lawn	PA0081329	0.0225	0.0225	0.0225	0.000	25.00	6.75

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	5.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Permit No. PA0081329

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
07G	9217	CONEWAGO CREEK	**14.640**	440.00	9.60	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	0.110	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 (°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	5.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Permit No. PA0081329

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
07G	9217	CONEWAGO 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
19.750	Mt Gretna	7.72	15.55	7.72	15.55	0	0
18.250	Colebrook	9.26	50	8.03	50	0	0
15.640	Lawn	9.63	50	8.59	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
19.750	Mt Gretna	1.58	3.57	1.58	3.03	2	15
18.250	Colebrook	1.85	18.78	1.64	15.94	2	15
15.640	Lawn	1.91	25	1.73	25	0	0

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)		
19.75	Mt Gretna	25	25	3.03	3.03	5	5	0	0
18.25	Colebrook	25	25	15.94	15.94	5	5	0	0
15.64	Lawn	25	25	25	25	5	5	0	0

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WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07G	9217	CONEWAGO CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
19.750	0.200	22.419	7.062
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
10.043	0.468	21.476	0.136
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
13.13	1.298	1.47	0.843
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.674	24.653	Owens	5
Reach Travel Time (days)			
0.673			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.067	11.91	1.39	7.30
0.135	10.80	1.31	7.52
0.202	9.80	1.24	7.64
0.269	8.88	1.17	7.74
0.337	8.06	1.10	7.83
0.404	7.31	1.04	7.89
0.471	6.63	0.99	7.89
0.539	6.01	0.93	7.89
0.606	5.45	0.88	7.89
0.673	4.95	0.83	7.89

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
18.250	0.244	22.084	7.043
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
13.120	0.500	26.257	0.138
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
5.81	0.790	1.79	0.822
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.747	21.845	Owens	5
Reach Travel Time (days)			
1.155			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.115	5.25	1.62	7.93
0.231	4.75	1.48	7.93
0.346	4.30	1.34	7.93
0.462	3.89	1.22	7.93
0.577	3.52	1.11	7.93
0.693	3.18	1.01	7.93
0.808	2.88	0.92	7.93
0.924	2.60	0.84	7.93
1.039	2.35	0.76	7.93
1.155	2.13	0.69	7.93

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WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07G	9217	CONEWAGO CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
15.640	0.266	21.415	7.018
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
17.670	0.547	32.319	0.151
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.63	0.346	1.03	0.781
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.973	4.211	Tsivoglou	5
Reach Travel Time (days)			
0.405			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.041	2.59	0.99	7.93
0.081	2.55	0.96	7.91
0.122	2.51	0.93	7.89
0.162	2.48	0.90	7.88
0.203	2.44	0.88	7.87
0.243	2.40	0.85	7.87
0.284	2.37	0.82	7.88
0.324	2.33	0.80	7.88
0.365	2.30	0.77	7.90
0.405	2.26	0.75	7.91

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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	0.95	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.18	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

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WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
07G	9217	CONEWAGO 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 (°C)	Analysis pH
Q7-10 Flow												
19.750	0.33	0.00	0.33	.3094	0.01010	.468	10.04	21.48	0.14	0.673	22.42	7.06
18.250	0.53	0.00	0.53	.3775	0.00399	.5	13.12	26.26	0.14	1.155	22.08	7.04
15.640	1.04	0.00	1.04	.4123	0.00284	.547	17.67	32.32	0.15	0.405	21.41	7.02
Q1-10 Flow												
19.750	0.31	0.00	0.31	.3094	0.01010	NA	NA	NA	0.13	0.683	22.48	7.06
18.250	0.50	0.00	0.50	.3775	0.00399	NA	NA	NA	0.14	1.174	22.15	7.04
15.640	0.99	0.00	0.99	.4123	0.00284	NA	NA	NA	0.15	0.414	21.47	7.02
Q30-10 Flow												
19.750	0.39	0.00	0.39	.3094	0.01010	NA	NA	NA	0.14	0.641	22.21	7.06
18.250	0.62	0.00	0.62	.3775	0.00399	NA	NA	NA	0.15	1.092	21.89	7.04
15.640	1.23	0.00	1.23	.4123	0.00284	NA	NA	NA	0.16	0.379	21.25	7.02

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C. TRC Calculations

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

1.05	= Q stream (cfs)	0.5	= CV Daily
0.0225	= Q discharge (MGD)	0.5	= CV Hourly
30	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)	0	=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 9.642	1.3.2.iii	WLA cfc = 9.393
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 3.593	5.1d	LTA_cfc = 5.460

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500	BAT/BPJ
		INST MAX LIMIT (mg/l) = 1.635	

WLA afc	**(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...** **...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)**
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)
LTA_afc	wla_afc*LTAMULT_afc
WLA_cfc	**(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))...** **...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)**
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)
LTA_cfc	wla_cfc*LTAMULT_cfc
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)
INST MAX LIMIT	**1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)**