pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0082392**
Facility Type	**Municipal**	APS ID	**278295**
Major / Minor	**Minor**	Authorization ID	**1335711**

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Derry Township Municipal Authority**	Facility Name	**Derry Township Southwest STP**
Applicant Address	670 Clearwater Road	Facility Address	1800 Swatara Creek Road
	Hershey, PA 17033-2453		Middletown, PA 17057
Applicant Contact	William Rehkop	Facility Contact	William Rehkop
Applicant Phone	(717) 566-3237	Facility Phone	(717) 566-3237
Client ID	86000	Site ID	445523
Ch 94 Load Status	Not Overloaded	Municipality	Derry Township
Connection Status		County	Dauphin
Date Application Received	December 8, 2020	EPA Waived?	No
Date Application Accepted	March 30, 2021	If No, Reason	Significant CB Discharge

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 wastewater from the Derry Township Municipal Authority's (Authority) Southwest wastewater treatment plant. The Authority owns, operates, and maintains the wastewater treatment plant located in Londonderry Township. The Southwest plant serves Southwest portion of Derry Township, Eastern portion of Lower Swatara Township (Fulling Mill Road Corridor) and the Northwestern portion of Londonderry Township. The collection system has no combined sewers. The facility has a hydraulic design capacity of 0.60 mgd with an organic design capacity of 1,050 lbs/day. The facility discharges treated wastewater to Swatara Creek, which is classified for warm Water Fishes and Migratory Fishes. The existing NPDES permit was issued on May 23, 2016 with an effective date of June 1, 2016 and expiration date of May 31, 2021. The applicant submitted a timely NPDES 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 topographic map showing the discharge location is presented in attachment A.

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

Digested sludge is hauled out periodically to the Authority's Clearwater Road wastewater 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 23, 2021
X		*Maria D. Bebenek for* Daniel W. Martin, P.E. / Environmental Engineer Manager	March 29, 2021
X		*Maria D. Bebenek* Maria D. Bebenek, P.E. / Program Manager	March 29, 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 Existing Permit

Monitoring of E.Coli has been added.

1.4 Existing Limit 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
UV Transmittance (%)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Recorded
TSS	150	225	XXX	30	45	60	1/week	24-hr comp
$CBOD_5$	125	200	XXX	25	40	50	1/week	24-hr comp
NH3-N	XXX	XXX	XXX	Report	XXX	XXX	1/week	24-hr comp
Total Phosphorus	10	XXX	XXX	2.0	XXX	4.0	1/week	24-hr comp
Fecal Coliform (5/1 to 9/30)[(5)]	XXX	XXX	XXX	200	XXX	XXX	1/week	Grab
Fecal Coliform (10/1 to 4/30)	XXX	XXX	XXX	2,000	XXX	XXX	1/week	Grab

1.4.1 Chesapeake Bay Permit Requirements

Discharge Parameter	Effluent Limitations					Monitoring Requirements	
	Mass Load(lbs)		Concentrations (mg/l)				
	Monthly	Annual	Minimum	Monthly Average	Maximum	Minimum Measurement Frequency	Required Sample Type
Ammonia---N	Report	Report	XXX	Report	XXX	2/week	24-hr Comp
Kjeldahl---N	Report	XXX	XXX	Report	XXX	2/Week	24-hr Comp
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	2/Week	24-hr Comp
Total Nitrogen	Report	Report	XXX	Report	XXX	1/Month	Calculate
Total Phosphorus	Report	Report	XXX	Report	XXX	2/week	24-hr Comp
Net Total Nitrogen	Report	10,959	XXX	XXX	XXX	1/Month	Calculate
Net Total Phos.	Report	1,461	XXX	XXX	XXX	1/Month	Calculate

1.5.0 Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.6
Latitude	40º 13' 24.00"	Longitude	-76º 43' 36.64"
Quad Name	Middletown	Quad Code	1732
Wastewater Description:	Sewage Effluent		
Receiving Waters	Swatara Creek (WWF)	Stream Code	09361
NHD Com ID	56403711	RMI	4.6
Drainage Area	556.8	Yield (cfs/mi^2)	0.14
Q_{7-10} Flow (cfs)	77.9	Q_{7-10} Basis	USGS Gage Station
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-D	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)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake	Colombia Water Company		
PWS Waters	Susquehanna River	Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	<22

Changes Since Last Permit Issuance: None

1.5.1 Water Supply Intake

The nearest downstream water supply intake is approximately 22 miles downstream by Colombia Water Company on Susquehanna River in York County. Due to the distance and dilution, no impact is expected from this discharge.

2.0 Treatment Facility Summary

Treatment Facility Name: Derry Township Southwest STP

WQM Permit No.	Issuance Date
2289203	1/7/2019
2289203	6/25/1991

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary With Ammonia And Phosphorus	Oxidation Ditch	UV	0.6

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.6	1050	Not Overloaded		

Changes Since Last Permit Issuance: A new WQM permit in currently under review to upgrade the treatment plant and treatment process.

2.1 Treatment facility Description

The existing treatment plant consists of influent pump station, Screening unit (Rotomat)/bar screen, Grit removal (aerated), 2 oxidation ditches, 2 final clarifiers, UV for disinfection and 2 aerated sludge holding tanks for sludge digestion.

Currently, influent enters influent pump station and pumped with 3 pumps to the rotomat screening unit. Grit removal system not operational, grit is removed once a year from pump station. From the headworks building, flow enters a distribution box and is divided to the two oxidation ditches. Effluent from oxidation ditches flow via a second distribution box to two final clarifiers and then through an inline UV system for disinfection. Prior to discharge, effluent passes through a post aeration zone for re-aeration.

2.2 Treatment Chemicals

Sodium Bicarbonate added for PH adjustment and Ferrous Chloride is added for phosphorus removal.

3.0 Compliance History

3.1 DMR Data for Outfall 001 (from February 1, 2021 to January 31, 2022)

Parameter	JAN-22	DEC-21	NOV-21	OCT-21	SEP-21	AUG-21	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21
Flow (MGD) Average Monthly	0.364	0.361	0.367	0.367	0.441	0.373	0.372	0.362	0.370	0.388	0.394	0.394
Flow (MGD) Daily Maximum	0.407	0.385	0.386	0.393	0.846	0.408	0.460	0.397	0.460	0.439	0.467	0.425
pH (S.U.) Minimum	6.9	6.8	6.4	6.5	6.6	6.8	6.9	7.0	6.9	6.8	6.6	6.9
pH (S.U.) Maximum	7.6	7.7	7.6	7.8	7.7	7.8	7.8	7.7	7.7	7.6	7.7	7.7
DO (mg/L) Minimum	7.8	7.1	7.2	6.3	5.3	5.8	6.2	6.5	6.6	5.3	6.0	5.8
CBOD5 (lbs/day) Average Monthly	9	< 9	< 8	8	10	12	7	8	9	9	10	8
CBOD5 (lbs/day) Weekly Average	16	< 10	< 10	9	13	14	9	12	11	14	13	8
CBOD5 (mg/L) Average Monthly	3	< 3	< 2	2	3	4	2	3	3	3	3	2
CBOD5 (mg/L) Weekly Average	5	< 3	3	3	4	4	2	4	3	4	5	3
BOD5 (lbs/day) Raw Sewage Influent Aver. Monthly	582	748	565	608	619	635	620	611	737	594	764	681
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	743	1259	812	806	845	757	1062	889	960	765	1446	750
BOD5 (mg/L) Raw Sewage Influent Ave. Monthly	202	265	196	215	208	213	204	214	245	207	250	226
TSS (lbs/day) Average Monthly	17	15	6	8	11	19	5	7	9	12	15	13
TSS (lbs/day) Raw Sewage Influent Ave. Monthly	520	984	449	572	734	591	644	576	831	537	717	634
TSS (lbs/day) Raw Sewage Influent Daily Maximum	921	2987	871	1145	1437	937	1271	1025	1390	768	963	812
TSS (lbs/day) Weekly Average	23	18	9	9	27	30	7	13	12	25	29	20

TSS (mg/L) Average Monthly	5	5	2	2	3	6	2	2	3	4	4	4
TSS (mg/L) Raw Sewage Influent Ave. Monthly	181	347	156	204	245	196	212	201	273	187	236	210
TSS (mg/L) Weekly Average	7	6	3	3	8	9	2	4	4	7	9	6
Fecal Coliform (CFU/100 ml) Geometric Mean	13	8	6	17	13	46	16	10	4	7	169	4
Fecal Coliform (CFU/100 ml) Instant. Maximum	2420	2420	16	26	28	59	52	2420	9	136	2420	13
UV Transmittance (%) Minimum	57	66	62	64	60	64	64	64	55	63	61	66
Nitrate-Nitrite (mg/L) Average Monthly	18	16.4	14.38	9.68	5.6	1.17	2.2	2.23	4.93	11.58	12.78	15.14
Nitrate-Nitrite (lbs) Total Monthly	1751	1580	1351	878	594	113	226	202	473	1151	1336	1408
Total Nitrogen (mg/L) Average Monthly	19.46	17.91	15.63	< 10.58	6.96	3.51	3.09	< 3.65	6.51	13.18	14.47	17.12
Total Nitrogen (lbs) Effluent Net Total Monthly	1892	1730	1468	< 963	721	341	316	< 328	630	1319	1510	1591
Total Nitrogen (lbs) Total Monthly	1892	1730	1468	< 963	721	341	316	< 328	630	1319	1510	1591
Total Nitrogen (lbs) Effluent Net Total Annual					< 2765							
Total Nitrogen (lbs) Total Annual					< 11490							
Ammonia (mg/L) Average Monthly	0.96	0.45	0.68	0.64	0.73	1.37	< 0.34	0.78	1.05	1.11	0.9	1.51
Ammonia (lbs) Total Monthly	91	44	64	62	60	133	< 35	67	106	116	95	140
Ammonia (lbs) Total Annual					< 2550							
TKN (mg/L) Average Monthly	1.47	1.54	1.25	< 0.81	1.3	2.34	0.89	< 1.42	1.58	1.6	1.69	1.83
TKN (lbs) Total Monthly	141	149	117	< 75	124	227	90	< 125	157	167	174	170
Total Phosphorus (lbs/day) Average Monthly	1	0.9	0.8	1	1	2	2	2	2	1	1	0.8

Total Phosphorus (mg/L) Average Monthly	0.32	0.3	0.25	0.49	0.41	0.57	0.46	0.64	0.69	0.4	0.34	0.25
Total Phosphorus (lbs) Effluent Net Total Monthly	31	29	23	46	40	55	47	56	69	40	35	24
Total Phosphorus (lbs) Total Monthly	31	29	23	46	40	55	47	56	69	40	35	24
Total Phosphorus (lbs) Effluent Net Total Annual					890							
Total Phosphorus (lbs) Total Annual					479							

3.2 Effluent Violations for Outfall 001, from: March 1, 2021 To: January 31, 2022

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Fecal Coliform	06/30/21	IMAX	2420	CFU/100 ml	1000	CFU/100 ml

3.3 Summary of Discharge Monitoring Reports (DMRs)**:**

DMRs review for the facility for the last 12 months of operation, presented on the table above in section 3.1 indicate permit limits have been met satisfactorily. One Fecal Coliform effluent violations noted on DMRs during the period reviewed presented is section 3.2. The violation appears to be a one-time occurrence.

3.4 Summary of Inspections:

The facility has been inspected a couple times during last permit cycle. No effluent violations identified during plant inspections. The facility has been operated and maintained well.

4.0 Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .6
Latitude 40º 13' 24.08" **Longitude** -76º 43' 35.24"
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.

4.2 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)

Comments: TRC is not applicable, UV disinfection is utilized at the site.

4.3 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

4.4 Water Quality-Based Limitations

4.4.1 Streamflow:

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 No. 01573560 on Swatara Creek near Hershey.

The Q_{7-10} and drainage area at the gage is 67.7ft3/s and 483mi^2 respectively. The resulting yields are as follows:

- Q_{7-10} = (67.7ft^3/s)/483 mi^2 = 0.14ft^3/s/ mi^2
- Q_{30-10} / Q_{7-10} = 0.89
- Q_{1-10} / Q_{7-10} = 1.23

The drainage area at discharge taken from the existing protection report = 557 mi^2
The Q_{7-10} at discharge = 557 mi^2 x 0.14 ft^3/s/mi^2 = 77.98 ft^3/s.

4.4.2 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:

- Discharge pH = 6.9 (Default)
- Discharge Temperature = 25 ^{o} C (Default)
- Stream pH = 8.0 (Previous Protection Report)
- Stream Temperature = 23 ^{o} C (Previous Protection Report)
- Background NH_3-N = 0.0 (default

4.4.3 $CBOD_5$

The two Derry Township MA's facilities, (Clearwater and Southwest), along with Suez Water Hummelstown Plant and the Swatara Township STP were modeled together due to their proximity to each other. The attached results of the WQM 7.0 stream model presented in attachment B indicates that for the Derry Township Southwest facility discharge, a monthly average limit of 25 mg/l CBOD5 is required to protect the water quality of the stream. This is consistent with the existing permit limitation. Therefore, the existing average monthly limit (AML) of 25 mg/l, average weekly limit (AWL) of 40mg/l and IMAX of 50mg/l will remain in the permit. Past DMRs and inspection reports show the STP has been consistently achieving below 10 mg/l CBOD5. Mass limits are calculated using the equation presented in section 4.3.

4.4.4 NH_3-N

The attached results of the WQM 7.0 stream model (attachment B) also indicates no limitation on NH3-N is necessary to protect the aquatic life from toxicity effects. The existing monitoring of NH3-N will continue in the permit to ensure treatment efficiency.

4.4.5 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.

4.4.6 Phosphorus

The limit of 2 mg/l established in the existing permit was for the protection of the Lower Susquehanna River basin. This approach has been superseded by the Chesapeake Bay Strategy, but the limit will remain in the permit due to anti-backsliding. This STP was designed to remove phosphorus and contains phosphorus limits in all previous permits. Past DMRs and inspection reports show that the STP is in compliance with the phosphorus effluent limits. Mass limits are calculated using the equation presented in section 4.3.

4.4.7 Total Suspended Solids (TSS):

There is no water quality criteria for TSS. A limit of 30 mg/l AML in the existing permit which was 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) with associated mass limits will remain in the permit. Mass limits are calculated using the equation presented in section 4.3.

4.4.8 Toxics

A reasonable potential (RP) analysis was done for pollutants sampled in support of the permit renewal application. All pollutants that were presented in the application sampling data were entered into DEP's Toxics Management Spreadsheet (TMS) to calculate Water Quality Based Effluent limits (WQBELs). It is noted that the permittee resampled some pollutants (Total Copper, Total Lead and Total, Zinc using a more sensitive method. The results of the TMS presented in attachment C indicate the discharge levels for all parameters analyzed were well below DEP's target quantitation limits (TQL) and calculated WQBELs, therefore no limitation or monitoring is required in the permit.

The recommended limits follow the logic presented in DEPs SOP, to establish limits in the permit where the maximum reported concentration exceeds 50% of the WQBEL, or for non-conservative pollutants to establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL, or to establish monitoring requirements for conservative pollutants where the maximum reported concentration is between 10% - 50% of the WQBEL.

4.4.9 Chesapeake Bay Strategy

The Department formulated a strategy in April 2007, to comply with the EPA and Chesapeake Bay 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 DEP 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 the current 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 renewals.

This facility falls in phase 2 of the strategy and is required to meet a total maximum annual Total Nitrogen Cap load of 10,959 lbs/year based on a design annual wasteflow of 0.60MGD and 6 mg/l total and a TP cap load of 1,461 lbs/year based on annual wasteflow of 0.60 MGD and 0.8 mg/l total phosphorus.

The Authority is using the existing facility to meet TP cap load by chemical precipitation and using offsets from their Clearwater road facilty to meet the cap load requirement. The Department approved offset adjustments between the Clearwater Road Plant and the Southwest Plant included in Part C of the permit

4.4.10 Influent BOD and TSS Monitoring

The permit includes 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.

4.4.11 Total Residual Chlorine

The discharge does not have the reasonable potential to cause or contribute to a water quality standards violation for total residual chlorine since the permittee no longer add chlorine to the wastewater for disinfection. Therefore, the proposed permit does not contain effluent limits for total residual chlorine. The permittee may use chlorine-based chemicals for cleaning and is required to optimize chlorine usage to prevent negative impacts on receiving stream. Daily UV transmittance (%) monitoring is required in the permit to ensure efficiency of the UV unit.

4.4.12 Fecal Coliform and E. Coli

The existing Fecal Coliform limit is consistent with the technology limits recommended in 92a.47(a)(4) and (a)(5) and will remain in the permit. In March of 2021, EPA approved DEP's Triennial Review of Water Quality Standards, which included a new swimming season criterion for E.coli. As a result, DEP is including monitoring requirements for E. Coli in new and renewed sewage permits above 2000gpd. Monitoring frequency is based on annual average flow as follows: 1/month for design flows >= 1 MGD, 1/quarter for design flows >= 0.05 and < 1 MGD and 1/year for design flows of 0.002 – 0.05 MGD. The annual average flow of 0.60MGD for this facility requires 1/quarter monitoring as included in the permit.

4.4.13 Industrial Users

This Wastewater Treatment Plant does not receive wastewater from any significant industrial users.

4.4.14 Pretreatment Requirements

The design annual average flow of the treatment plant is 0.60 MGD 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 authority has an approved pretreatment program for the Clearwater Road treatment facility that covers this facility. The permit will contain standard conditions requiring the permittee to monitor and control industrial users if applicable.

4.4.15 Biosolids Management

Sludge is wasted to aerobic digesters for digestion.

4.4.16 Stormwater

The application identifies outfall 002 (Lat: 40°13'23**"**, Long: 76°43'36") as receiving stormwater runoff from the treatment plant site. This outfall will be included in Part C of the permit with stormwater requirements and BMP conditions.

5.0 Other Requirements

5.1 Anti-backsliding

Not applicable to this permit

5.2 Anti-Degradation (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.

5.3 Class A Wild Trout Fisheries

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

5.4 303d Listed Streams

The discharge is not located on a 303d listed stream segment.

5.5 Special Permit Conditions

The permit contains the following special conditions:

- Stormwater Prohibition, Approval Contingencies, Solids Management, Restriction on receipt of hauled in waste under certain conditions, Chlorine minimization and Storm water requirement.

5.6 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).

5.7 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)	Required
	Average Monthly	Weekly Average	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum	Measurement Frequency	Sample Type
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	XXX	XXX	XXX	1/day	Grab
CBOD5	125	200	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 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
TSS	150	225	XXX	30	45	60	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	Report	XXX	XXX	XXX	1/quarter	Grab
UV Transmittance (%)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Recorded
Nitrate-Nitrite	XXX	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Nitrate-Nitrite (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation

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	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	Calculation
Total Nitrogen (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Ammonia	XXX	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Ammonia (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
TKN	XXX	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
TKN (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Phosphorus	10	XXX	XXX	2.0	XXX	4	2/week	24-Hr Composite
Total Phosphorus (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation

Compliance Sampling Location: At outfall 001

6.1 Proposed Effluent Limitations and Monitoring Requirements

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.

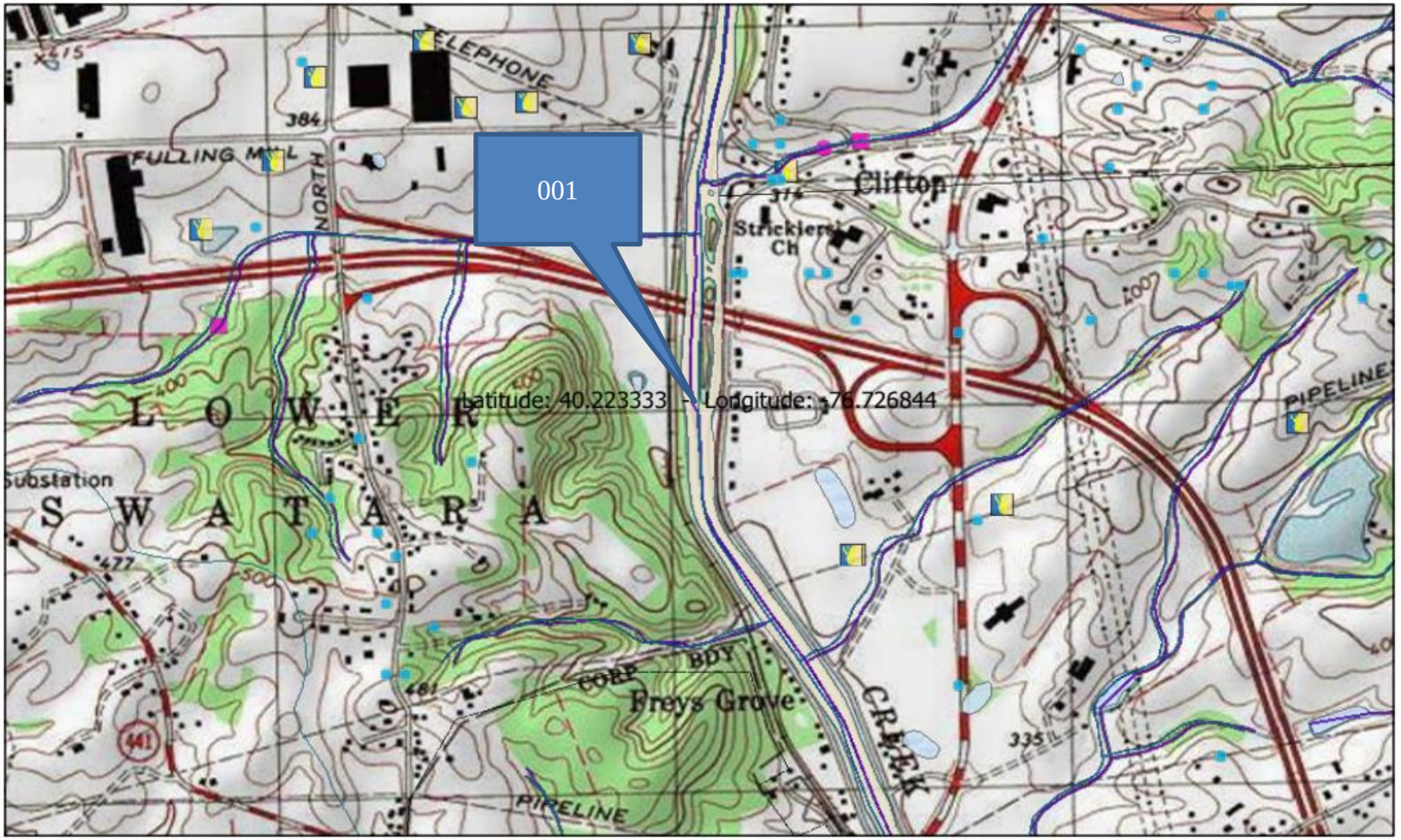
Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Total Nitrogen (lbs) Effluent Net	XXX	10959 Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Nitrogen (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Ammonia (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Phosphorus (lbs) Effluent Net	XXX	1461 Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Phosphorus (lbs)	XXX	Report 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 C)
☐	TRC Model Spreadsheet (see Attachment)
☐	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 for Individual Sewage Permits
☐	Other:

8. Attachments

A. Topographical Map



B. WQM Model Results

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
07D	9361	SWATARA 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)
14.600	Derry Clearwatr	PA0026484	5.020	CBOD5	20.63		
				NH3-N	6.51	13.02	
				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)
10.100	Suez Water	PA001464	0.250	CBOD5	25		
				NH3-N	16.39	32.78	
				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)
9.100	Swatara Twp	PA0026735	6.300	CBOD5	20.26		
				NH3-N	7.74	15.48	
				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)
4.600	Derry SW	PA0082393	0.600	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			5

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
07D	9361	SWATARA CREEK	**14.600**	318.00	505.00	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	0.140	0.00	0.00	0.000	0.000	0.0	0.00	0.00	23.00	8.00	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
Derry Clearwatr	PA0026484	5.0200	5.0200	5.0200	0.000	25.00	7.50

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

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
07D	9361	SWATARA CREEK	**10.100**	311.00	526.00	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	0.140	0.00	0.00	0.000	0.000	0.0	0.00	0.00	23.00	8.00	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
Suez Water	PA001464	0.2500	0.2500	0.2500	0.000	20.00	6.40

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

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
07D	9361	SWATARA CREEK	**9.100**	305.00	549.00	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	0.140	0.00	0.00	0.000	0.000	0.0	0.00	0.00	23.00	8.00	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
Swatara Twp	PA0026735	6.3000	6.3000	6.3000	0.000	25.00	6.90

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

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
07D	9361	SWATARA CREEK	**4.600**	289.00	557.00	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	0.140	0.00	0.00	0.000	0.000	0.0	0.00	0.00	23.00	8.00	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
Derry SW	PA0082393	0.6000	0.6000	0.6000	0.000	25.00	6.90

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

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
07D	9361	SWATARA CREEK	**2.300**	277.00	569.00	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	0.140	0.00	0.00	0.000	0.000	0.0	0.00	0.00	23.00	8.00	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	0.00	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 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
07D	9361	SWATARA 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
14.600	Derry Clearwatr	3.55	32.35	3.55	28.63	3	11
10.100	Suez Water	3.6	50	4	44.26	3	11
9.100	Swatara Twp	5.93	47.55	6.24	42.09	3	11
4.600	Derry SW	3.41	50	6.37	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
14.600	Derry Clearwatr	.7	8.54	.7	6.51	3	24
10.100	Suez Water	.7	25	.75	19.05	3	24
9.100	Swatara Twp	.95	10.16	.98	7.74	3	24
4.600	Derry SW	.68	25	1	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)		
14.60	Derry Clearwatr	25	20.63	6.51	6.51	5	5	3	10
10.10	Suez Water	25	25	19.05	16.39	5	5	3	10
9.10	Swatara Twp	25	20.26	7.74	7.74	5	5	3	10
4.60	Derry SW	25	25	25	25	5	5	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07D	9361	SWATARA CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
14.600	5.020	23.198	7.916
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
153.076	1.103	138.733	0.465
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
3.84	0.528	0.64	0.895
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.922	0.689	Tsivoglou	5
Reach Travel Time (days)			
0.592			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.059	3.71	0.61	7.60
0.118	3.58	0.58	7.31
0.178	3.45	0.55	7.04
0.237	3.33	0.52	6.80
0.296	3.21	0.49	6.58
0.355	3.09	0.47	6.38
0.414	2.98	0.44	6.20
0.474	2.88	0.42	6.04
0.533	2.77	0.40	5.89
0.592	2.68	0.38	5.77

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
10.100	5.270	23.176	7.857
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
148.849	1.080	137.885	0.509
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.76	0.416	0.44	0.894
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.851	2.909	Tsivoglou	5
Reach Travel Time (days)			
0.120			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.012	2.74	0.44	5.90
0.024	2.73	0.43	5.95
0.036	2.71	0.43	6.00
0.048	2.69	0.42	6.05
0.060	2.68	0.42	6.09
0.072	2.66	0.41	6.14
0.084	2.65	0.41	6.18
0.096	2.63	0.40	6.22
0.108	2.62	0.40	6.27
0.120	2.60	0.40	6.31

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07D	9361	SWATARA CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
9.100	11.570	23.357	7.597
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
161.955	1.096	147.709	0.534
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
4.40	0.665	1.14	0.906
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.238	1.815	Tsivoglou	5
Reach Travel Time (days)			
0.515			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.052	4.23	1.09	5.98
0.103	4.06	1.04	5.76
0.155	3.90	0.99	5.58
0.206	3.75	0.94	5.44
0.258	3.60	0.90	5.32
0.309	3.46	0.86	5.23
0.361	3.32	0.82	5.17
0.412	3.19	0.78	5.13
0.464	3.07	0.75	5.11
0.515	2.95	0.71	5.10

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
4.600	12.170	23.369	7.584
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
161.138	1.092	147.620	0.550
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
3.15	0.560	0.94	0.907
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.133	2.748	Tsivoglou	5
Reach Travel Time (days)			
0.255			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.026	3.10	0.92	5.20
0.051	3.05	0.90	5.26
0.077	3.00	0.88	5.33
0.102	2.95	0.86	5.39
0.128	2.90	0.84	5.45
0.153	2.85	0.82	5.51
0.179	2.80	0.80	5.57
0.204	2.76	0.78	5.63
0.230	2.71	0.76	5.69
0.255	2.66	0.74	5.74

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
07D	9361	SWATARA 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												
14.600	70.70	0.00	70.70	7.7659	0.00029	1.103	153.08	138.73	0.46	0.592	23.20	7.92
10.100	73.64	0.00	73.64	8.1527	0.00114	1.08	148.85	137.88	0.51	0.120	23.18	7.86
9.100	76.86	0.00	76.86	17.8988	0.00067	1.096	161.96	147.71	0.53	0.515	23.36	7.60
4.600	77.98	0.00	77.98	18.827	0.00099	1.092	161.14	147.62	0.55	0.255	23.37	7.58
Q1-10 Flow												
14.600	62.92	0.00	62.92	7.7659	0.00029	NA	NA	NA	0.44	0.628	23.22	7.91
10.100	65.54	0.00	65.54	8.1527	0.00114	NA	NA	NA	0.48	0.127	23.20	7.84
9.100	68.41	0.00	68.41	17.8988	0.00067	NA	NA	NA	0.51	0.543	23.39	7.57
4.600	69.40	0.00	69.40	18.827	0.00099	NA	NA	NA	0.52	0.269	23.40	7.56
Q30-10 Flow												
14.600	86.96	0.00	86.96	7.7659	0.00029	NA	NA	NA	0.52	0.533	23.16	7.93
10.100	90.58	0.00	90.58	8.1527	0.00114	NA	NA	NA	0.57	0.108	23.15	7.88
9.100	94.54	0.00	94.54	17.8988	0.00067	NA	NA	NA	0.59	0.468	23.30	7.64
4.600	95.92	0.00	95.92	18.827	0.00099	NA	NA	NA	0.61	0.232	23.31	7.63

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	0.89	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.23	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

C. Toxics Management Spreadsheet (TMS)

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: Derry Twp MA Southwest STP NPDES Permit No.: PA0082392 Outfall No.: 001

Evaluation Type: Major Sewage / Industrial Waste 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
0.6	100	6.9						

	Discharge Pollutant	Units	Max Discharge Conc		0 if left blank: Trib Conc	Stream Conc	0.5 if left blank: Daily CV	Hourly CV	0 if left blank: Stream CV	Fate Coeff	FOS	1 if left blank: Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		415									
	Chloride (PWS)	mg/L		139									
	Bromide	mg/L	<	0.2									
	Sulfate (PWS)	mg/L		49.4									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L											
	Total Antimony	µg/L											
	Total Arsenic	µg/L	<										
	Total Barium	µg/L											
	Total Beryllium	µg/L	<										
	Total Boron	µg/L											
	Total Cadmium	µg/L	<										
	Total Chromium (III)	µg/L	<										
	Hexavalent Chromium	µg/L	<										
	Total Cobalt	µg/L											
	Total Copper	µg/L		7									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L											
	Total Lead	µg/L	<	1									
	Total Manganese	µg/L											
	Total Mercury	µg/L	<										
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L	<										
	Total Silver	µg/L	<										
	Total Thallium	µg/L	<										
	Total Zinc	µg/L		68									
	Total Molybdenum	µg/L											
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

Stream / Surface Water Information

Derry Twp MA Southwest STP, NPDES Permit No. PA0082392, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: Swatara Creek

No. Reaches to Model: 1

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

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	009361	4.6	289	557			Yes
End of Reach 1	009361	2.3	277	569			Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi^2)*	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	4.6	0.14										172	8		
End of Reach 1	2.3	0.14													

Q_h

Location	RMI	LFY (cfs/mi^2)	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	4.6														
End of Reach 1	2.3														

Model Results

Derry Twp MA Southwest STP, NPDES Permit No. PA0082392, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | (●) All ( ) Inputs ( ) Results ( ) Limits

☑ ***Hydrodynamics***

$Q_{7\text{-}10}$

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)
4.6	77.98		77.98	0.928	0.00099	1.082	148.587	137.333	0.491	0.286	835.395
2.3	79.66		79.66								

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)
4.6	334.64		334.64	0.928	0.00099	2.046	148.587	72.638	1.104	0.127	327.225
2.3	340.936		340.94								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.134 Analysis Hardness (mg/l): 166.1 Analysis pH: 7.71

Pollutants	Stream Conc	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	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	21.680	22.6	277	Chem Translator of 0.96 applied
Total Lead	0	0		0	111.710	156	1,910	Chem Translator of 0.717 applied
Total Zinc	0	0		0	180.149	184	2,258	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 720 PMF: 0.928 Analysis Hardness (mg/l): 171.1 Analysis pH: 7.94

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	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	14.171	14.3	1,166	Chem Translator of 0.96 applied
Total Lead	0	0		0	4.492	6.3	498	Chem Translator of 0.713 applied
Total Zinc	0	0		0	186.209	189	14,918	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 720 PMF: 0.928 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	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

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

Model Results 3/8/2022 Pag

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	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

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

No. Samples/Month: 4

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