pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northcentral Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0028266**
Facility Type	**Municipal**	APS ID	**1036353**
Major / Minor	**Minor**	Authorization ID	**1349872**

Applicant and Facility Information

Applicant Name	**Troy Borough**	Facility Name	**Troy Borough WWTP**
Applicant Address	49 Elmira Street	Facility Address	49 Elmira Street
	Troy, PA 16947-1230		Troy, PA 16947-1230
Applicant Contact	Daniel Close	Facility Contact	Daniel Close
Applicant Phone	(570) 297-2966	Facility Phone	(570) 297-2966
Client ID	52769	Site ID	255788
Ch 94 Load Status	Not Overloaded	Municipality	Troy Borough
Connection Status	No Limitations	County	Bradford
Date Application Received	April 16, 2021	EPA Waived?	No
Date Application Accepted	June 8, 2021	If No, Reason	Significant CB Discharge
Purpose of Application	Renewal of an existing NPDES permit for the discharge of treated sewage.		

Public Participation

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

Approve	Deny	Signatures	Date
X		*Derek S. Garner* Derek S. Garner / Project Manager	July 12, 2021
X		*Nicholas W. Hartranft* Nicholas W. Hartranft, P.E. / Environmental Engineer Manager	July 13, 2021

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.4
Latitude	41º 47' 22.45"	Longitude	-76º 46' 16.70"
Quad Name	Troy	Quad Code	0431
Wastewater Description:	Sewage Effluent		

Receiving Waters	Sugar Creek	Stream Code	30667
NHD Com ID	66401573	RMI	22.79
Drainage Area	56.2	Yield (cfs/mi^2)	0.008
Q_{7-10} Flow (cfs)	0.45	Q_{7-10} Basis	Streamgage No. 01516500
Elevation (ft)	1047	Slope (ft/ft)	n/a
Watershed No	4-C	Chapter 93 Class.	TSF
Existing Use	n/a	Existing Use Qualifier	n/a
Exceptions to Use	n/a	Exceptions to Criteria	n/a
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment	n/a		
Source(s) of Impairment	n/a		
TMDL Status	n/a	Name	n/a

Nearest Downstream Public Water Supply Intake	Danville Municipal Water Authority		
PWS Waters	Susquehanna River	Flow at Intake (cfs)	1,021
PWS RMI	138.06	Distance from Outfall (mi)	147

Treatment Facility Summary

The Troy Borough Wastewater Treatment Plant was constructed and operates under authorization of WQM Permit No. 0800402, originally issued July 19, 2000 and amended May 29, 2018. The treatment plant is rated for an annual average design flow of 0.4 MGD, hydraulic design capacity of 0.491 MGD, and an organic capacity of 910 lbs/day. Treatment at the facility consists of:

- One (1) grit removal chamber
- One (1) comminutor
- One (1) manual bar screen
- One (1) oxidation ditch
- Two (2) secondary clarifiers
- Two (2) chlorine contact tanks
  - One (1) chlorinator and one (1) dechlorinator
- Two (2) aerobic sludge digestion tanks

Following dechlorination, the effluent is discharged via Outfall 001 over a step aerator before entering Sugar Creek.

Wasted sludge is disposed of at Kelly Township Municipal Authority.

Compliance History

The following eDMR violations occurred during the existing permit's term:

Noncompliance Date	Noncompliance Category	Parameter	Sample Value	Violation Condition	Permit Value	Units	SBC
8/24/2017	Concentration 3 Effluent Violation	Ammonia-Nitrogen	3.88	>	2	mg/L	Weekly Average
8/24/2017	Load 2 Effluent Violation	Ammonia-Nitrogen	7.65	>	6.5	lbs/day	Weekly Average
9/28/2017	Concentration 3 Effluent Violation	Ammonia-Nitrogen	2.516	>	2	mg/L	Weekly Average
11/22/2017	Concentration 3 Effluent Violation	Ammonia-Nitrogen	4.681	>	2	mg/L	Weekly Average
11/22/2017	Load 2 Effluent Violation	Ammonia-Nitrogen	11.5	>	6.5	lbs/day	Weekly Average
6/20/2018	Load 2 Effluent Violation	Ammonia-Nitrogen	7.2	>	6.5	lbs/day	Weekly Average
8/27/2018	Concentration 3 Effluent Violation	Ammonia-Nitrogen	2.309	>	2	mg/L	Weekly Average
8/27/2018	Load 2 Effluent Violation	Ammonia-Nitrogen	20	>	6.5	lbs/day	Weekly Average
9/24/2018	Load 2 Effluent Violation	Ammonia-Nitrogen	8	>	6.5	lbs/day	Weekly Average
10/25/2018	Concentration 3 Effluent Violation	Ammonia-Nitrogen	2.198	>	2	mg/L	Weekly Average
10/25/2018	Load 2 Effluent Violation	Ammonia-Nitrogen	10	>	6.5	lbs/day	Weekly Average
7/27/2020	Concentration 3 Effluent Violation	Ammonia-Nitrogen	2.625	>	2	mg/L	Weekly Average
8/27/2020	Concentration 2 Effluent Violation	Ammonia-Nitrogen	< 3.691	>	1.5	mg/L	Average Monthly
8/27/2020	Concentration 3 Effluent Violation	Ammonia-Nitrogen	7.185	>	2	mg/L	Weekly Average
8/27/2020	Load 2 Effluent Violation	Ammonia-Nitrogen	10	>	6.5	lbs/day	Weekly Average
9/27/2020	Concentration 3 Effluent Violation	Ammonia-Nitrogen	2.983	>	2	mg/L	Weekly Average
11/28/2020	Concentration 3 Effluent Violation	Ammonia-Nitrogen	< 2.433	>	2	mg/L	Weekly Average
6/20/2018	Concentration 3 Effluent Violation	Carbonaceous Biochemical Oxygen Demand (CBOD5)	22.2	>	19	mg/L	Weekly Average
6/20/2018	Load 2 Effluent Violation	Carbonaceous Biochemical Oxygen Demand (CBOD5)	75	>	60	lbs/day	Weekly Average
6/20/2019	Concentration 3 Effluent Violation	Carbonaceous Biochemical Oxygen Demand (CBOD5)	36.9	>	19	mg/L	Weekly Average
6/20/2019	Load 2 Effluent Violation	Carbonaceous Biochemical Oxygen Demand (CBOD5)	137	>	60	lbs/day	Weekly Average
7/24/2018	Concentration 1 Effluent Violation	Dissolved Oxygen	5.9	<	6	mg/L	Minimum
8/27/2018	Concentration 1 Effluent Violation	Dissolved Oxygen	3.9	<	6	mg/L	Minimum
3/27/2020	Concentration 1 Effluent Violation	Dissolved Oxygen	5.02	<	6	mg/L	Minimum
8/24/2017	Concentration 3 Effluent Violation	Fecal Coliform	2419.6	>	1000	No./100 ml	IMAX
6/20/2018	Concentration 3 Effluent Violation	Fecal Coliform	2419.6	>	1000	No./100 ml	IMAX
3/27/2020	Concentration 3 Effluent Violation	Fecal Coliform	32440	>	10000	No./100 ml	IMAX
6/28/2020	Concentration 3 Effluent Violation	Fecal Coliform	2827.2	>	1000	No./100 ml	IMAX
8/27/2020	Concentration 3 Effluent Violation	Fecal Coliform	4839.2	>	1000	No./100 ml	IMAX

Noncompliance Date	Noncompliance Category	Parameter	Sample Value	Violation Condition	Permit Value	Units	SBC
4/28/2021	Concentration 3 Effluent Violation	Fecal Coliform	> 2.0	>	10000	No./100 ml	IMAX
8/27/2018	Load 2 Effluent Violation	Total Suspended Solids	266	>	150	lbs/day	Weekly Average
2/18/2019	Load 2 Effluent Violation	Total Suspended Solids	194	>	150	lbs/day	Weekly Average
6/20/2019	Concentration 3 Effluent Violation	Total Suspended Solids	57.2	>	45	mg/L	Weekly Average
6/20/2019	Load 2 Effluent Violation	Total Suspended Solids	212	>	150	lbs/day	Weekly Average
8/27/2020	Concentration 2 Effluent Violation	Total Suspended Solids	47.1	>	30	mg/L	Average Monthly

As demonstrated by the table above there have been frequent effluent exceedances for several pollutants. It appears that the Operations Section is aware of the violations and is working with the permittee towards compliance.

The facility was most recently inspected by DEP on January 15, 2020. The inspection reported noted that several required treatment units were offline, a violation of the permit's condition. It appears that the violation has since been corrected and required units are now functioning.

There are no open violations associated with the permittee.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.4
Latitude 41º 47' 22.30" **Longitude** -76º 46' 16.70"
Wastewater Description: Sewage Effluent

Technology-Based Limitations

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

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

Water Quality-Based Limitations

DEP models in-stream conditions to determine if WQBELs are appropriate. Models were created using WQM 7.0 v1.1 for CBOD5, ammonia-N and dissolved oxygen and Toxics Management Spreadsheet (TMS) for toxics.

The water quality model WQM 7.0 v1.1 is used to determine the WQBELs for dissolved oxygen, CBOD5 and ammonia-n (NH3-N) based on a multiple-discharge analysis, if applicable. The model assumes complete and instantaneous mixing with the receiving surface water. The reach chosen to model the in-stream characteristics is appropriate as a recovery in dissolved oxygen levels is demonstrated. The modeling output is as follows:

Parameter	Discharge Conc. (mg/l)	Effluent Limitations		
		30 Day Average (mg/l)	Maximum (mg/l)	Minimum (mg/l)
CBOD5	13	13		
NH3-N	1.5	1.5	3	
Dissolved Oxygen	6			6

The input concentrations for CBOD5, ammonia-n, and dissolved oxygen are the average monthly water quality-based concentration limitations in the existing permit. Based on the model output, the existing limits are still appropriate.

Generally, DEP applies seasonal multipliers to CBOD5 (2x) and ammonia-n (3x), not to exceed technology-based secondary treatment limits, based on reduced biological treatment efficiencies and generally higher dilution during cold weather months. Historically, the permittee has been granted seasonal effluent limits and DEP believes the use of seasonal limits is still appropriate.

TMS is a single discharge model that does not assume instantaneous mixing with the receiving surface water upon discharge, but instead, assigns a partial mixing factor based upon surface water and discharge characteristics. Maximum concentrations for several metals that were reported in the effluent testing section of the application were entered into TMS. The model recommends that no toxic pollutants require effluent limits or monitoring requirements.

Existing total residual chlorine water quality-based effluent limits were evaluated in the TRC_CALC spreadsheet. The spreadsheet's results indicate that the existing effluent limits are appropriate.

Best Professional Judgment (BPJ) Limitations

DEP recommends that existing BOD5 and TSS influent monitoring requirements remain in the permit to continue to characterize the wastewater and help with Chapter 94 reporting.

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

Chesapeake Bay

The Troy Borough WWTP is identified as a Phase 3 facility in Phase 3 of Pennsylvania's Watershed Implementation Plan (WIP) and has been assigned cap loads of 7,306 lbs/yr total nitrogen and 974 lbs/yr total phosphorus. DEP recommends that these cap loads continue to remain in the permit.

Anti-Backsliding

No limits or monitoring requirements are less stringent than what is established in the existing permit. Anti-backsliding is not applicable.

Existing Effluent Limitations and Monitoring Requirements

The existing effluent limitations and monitoring requirements are as follows:

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum 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	Metered
pH (S.U.)	XXX	XXX	6.0	XXX	9.0 Max	XXX	1/day	Grab
Dissolved Oxygen	XXX	XXX	6.0	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.11	XXX	0.37	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5) Nov 1 - Apr 30	80	125	XXX	25.0	38.0	50	1/week	8-Hr Composite
Carbonaceous Biochemical Oxygen Demand (CBOD5) May 1 - Oct 31	43	60	XXX	13.0	19.0	26	1/week	8-Hr Composite
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Total Suspended Solids	100	150	XXX	30.0	45.0	60	1/week	8-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	1/week	8-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
Ammonia-Nitrogen Nov 1 - Apr 30	15	20	XXX	4.5	6.0	9	2/week	8-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	5.0	6.5	XXX	1.5	2.0	3	2/week	8-Hr Composite

The limitations and monitoring requirements specified below are existing requirements established to comply with Pennsylvania's Chesapeake Bay Tributary Strategy.

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

Parameter	Effluent Limitations					Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Monthly	Annual	Minimum	Monthly Average	Maximum		
Ammonia---N	Report	Report	XXX	Report	XXX	2/week	8-Hr Composite
Kjeldahl---N	Report	XXX	XXX	Report	XXX	2/week	8-Hr Composite
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	2/week	8-Hr Composite
Total Nitrogen	Report	Report	XXX	Report	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	2/week	8-Hr Composite
Net Total Nitrogen	Report	7,306	XXX	XXX	XXX	1/month	Calculation
Net Total Phosphorus	Report	974	XXX	XXX	XXX	1/month	Calculation

Compliance Sampling Location: Outfall 001

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)		Concentrations (mg/L)				Minimum 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	Metered
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	Report Inst Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.11	XXX	0.37	1/day	Grab
CBOD5 Nov 1 - Apr 30	80	125	XXX	25.0	38.0	50	1/week	8-Hr Composite
CBOD5 May 1 - Oct 31	43	60	XXX	13.0	19.0	26	1/week	8-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	8-Hr Composite
TSS	100	150	XXX	30.0	45.0	60	1/week	8-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/year	Grab
Ammonia Nov 1 - Apr 30	15	20	XXX	4.5	6.0	9	2/week	8-Hr Composite
Ammonia May 1 - Oct 31	5	6.5	XXX	1.5	2.0	3	2/week	8-Hr Composite

Compliance Sampling Location: Outfall 001
The limitations and monitoring requirements specified below are proposed for the draft permit, to comply with Pennsylvania's Chesapeake Bay Tributary Strategy.

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

Parameter	Effluent Limitations					Monitoring Requirements	
	Mass Units (lbs)		Concentrations (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Monthly	Annual	Minimum	Monthly Average	Maximum		
Ammonia---N	Report	Report	XXX	Report	XXX	2/week	8-Hr Composite
Kjeldahl---N	Report	XXX	XXX	Report	XXX	2/week	8-Hr Composite
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	2/week	8-Hr Composite
Total Nitrogen	Report	Report	XXX	Report	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	2/week	8-Hr Composite
Net Total Nitrogen	XXX	7,306	XXX	XXX	XXX	1/month	Calculation
Net Total Phosphorus	XXX	974	XXX	XXX	XXX	1/month	Calculation

Compliance Sampling Location: Outfall 001

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
30667	SUGAR CREEK	**22.780**	1047.00	56.20	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.008	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
Troy Boro WWTP	PA0028266x	0.4000	0.4000	0.4000	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	13.00	2.00	0.00	1.50
Dissolved Oxygen	6.00	8.24	0.00	0.00
NH3-N	1.50	0.00	0.00	0.70

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
30667	SUGAR CREEK	**22.350**	1029.00	57.20	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.008	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

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

Parameter Data

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

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
04C	30667	SUGAR CREEK

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (ºC)	Analysis pH
Q7-10 Flow												
22.780	0.45	0.00	0.45	.6188	0.00793	.57	20.06	35.16	0.09	0.281	25.00	7.00
Q1-10 Flow												
22.780	0.29	0.00	0.29	.6188	0.00793	NA	NA	NA	0.09	0.309	25.00	7.00
Q30-10 Flow												
22.780	0.61	0.00	0.61	.6188	0.00793	NA	NA	NA	0.10	0.260	25.00	7.00

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
04C	30667	SUGAR 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
22.780	Troy Boro WWTP	6.76	3	6.76	3	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
22.780	Troy Boro WWTP	1.34	1.5	1.34	1.5	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)		
22.78	Troy Boro WWTP	13	13	1.5	1.5	6	6	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
04C	30667	SUGAR CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
22.780	0.400	25.000	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
20.059	0.570	35.160	0.093
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
8.37	1.308	0.87	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.944	7.919	Tsivoglou	5
Reach Travel Time (days)			
0.281			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.028	7.99	0.84	6.62
0.056	7.63	0.82	6.39
0.084	7.29	0.80	6.22
0.113	6.96	0.77	6.12
0.141	6.64	0.75	6.06
0.169	6.34	0.73	6.03
0.197	6.05	0.71	6.03
0.225	5.78	0.69	6.04
0.253	5.52	0.67	6.08
0.281	5.27	0.65	6.12

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
04C	30667	SUGAR 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)
22.780	Troy Boro WWTP	PA0028266x	0.400	CBOD5	13		
				NH3-N	1.5	3	
				Dissolved Oxygen			6

Discharge Information

Instructions | Discharge | Stream

Facility: **Troy Borough Wastewater Treatment Plant** NPDES Permit No.: **PA0028266** Outfall No.: **001**

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

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.04	100	7						

				0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Total Copper	mg/L	<	0.01									
Total Lead	mg/L	<	0.008									
Total Zinc	mg/L		0.0228									

Stream / Surface Water Information

Troy Borough Wastewater Treatment Plant, NPDES Permit No. PA0028266, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Sugar Creek**

No. Reaches to Model: **1**

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

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	030667	22.78	1047	56.2			Yes
End of Reach 1	030667	22.35	1029	57.2			Yes

Q ***7-10***

Location	RMI	LFY (cfs/mi²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	22.78	0.008										100	7		
End of Reach 1	22.35	0.008													

Q ***h***

Location	RMI	LFY (cfs/mi²)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	22.78														
End of Reach 1	22.35														

Model Results

Troy Borough Wastewater Treatment Plant, NPDES Permit No. PA0028266, Outfall 001

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

☑ ***Hydrodynamics***

Q_{7-10}

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
22.78	0.45		0.45	0.062	0.008	0.519	15.947	30.729	0.062	0.425	8.091
22.35	0.46		0.458								

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)
22.78	3.69		3.69	0.062	0.008	1.248	15.947	12.78	0.189	0.139	2.717
22.35	3.752		3.75								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 8.091 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Copper	0	0		0	13.439	14.0	116	Chem Translator of 0.96 applied
Total Lead	0	0		0	64.581	81.6	675	Chem Translator of 0.791 applied
Total Zinc	0	0		0	117.180	120	990	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 8.091 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Copper	0	0		0	8.956	9.33	77.1	Chem Translator of 0.96 applied
Total Lead	0	0		0	2.517	3.18	26.3	Chem Translator of 0.791 applied
Total Zinc	0	0		0	118.139	120	990	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 8.091 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total 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): 2.717 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total 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

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

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

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

Pollutants	Governing WQBEL	Units	Comments
Total Copper	74.2	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	26.3	µg/L	Discharge Conc ≤ 10% WQBEL
Total Zinc	635	µg/L	Discharge Conc ≤ 10% WQBEL

TRC EVALUATION

Input appropriate values in B4:B8 and E4:E7

0.45	= Q stream (cfs)	0.5	= CV Daily
0.4	= 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)
0.115	= 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 = 0.251	1.3.2.iii	WLA cfc = 0.237
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.094	5.1d	LTA_cfc = 0.138

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.115	BAT/BPJ
		INST MAX LIMIT (mg/l) = 0.376	

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)