Pennsylvania Department of Environmental Protection

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0087700**
Facility Type	**Municipal**	APS ID	**39654**
Major / Minor	**Minor**	Authorization ID	**1483873**

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**South Londonderry Township Municipal Authority**	Facility Name	**South Londonderry Campbelltown East STP**
Applicant Address	27 W Market Street	Facility Address	27 W Market Street
	Palmyra, PA 17078-8736		Palmyra, PA 17078-8736
Applicant Contact	Samuel Blauch	Facility Contact	Samuel Blauch
Applicant Phone	(717) 781-9238	Facility Phone	(717) 781-9238
Client ID	43038	Site ID	250908
Ch 94 Load Status	Not Overloaded	Municipality	South Londonderry Township
Connection Status		County	Lebanon
Date Application Received	May 3, 2024	EPA Waived?	No
Date Application Accepted	May 10, 2024	If No, Reason	, DEP Discretion

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 domestic wastewater from Campbelltown East wastewater treatment plant located in South Londonderry Township, Lebanon County. South Londonderry Township Municipal Authority owns and operates the wastewater treatment plant, which provides sanitary services to South Londonderry Township. The sewer collection system is not combined and there is no bypasses or overflows approved in the collection system. The two-train extended aeration treatment plant has a hydraulic design capacity of 0.21 MGD and an organic design capacity of 525 lbs/day- BOD5. The discharge goes to Killinger Creek classified for Trout Stocking (TSF). The existing NPDES permit was issued on October 25, 2019, with an effective date of November 1, 2019, and expiration date of October 31, 2024. 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 land applied under biosolid permit number PAG083520 or sent to reed beds as needed or hauled to Annville Township STP 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	April 30, 2025
X		*Maria D. Bebenek for* Daniel W. Martin, P.E. / Environmental Engineer Manager	May 15, 2025
X		*Maria D. Bebenek* Maria D. Bebenek, P.E./ Program Manager	May 15, 2025

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 Permit.

Quarterly monitoring of E. coli has been added to the permit.

1.3 Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	.21
Latitude	40º 17' 18.74"	Longitude	-76º 33' 43.12"
Quad Name		Quad Code	
Wastewater Description:	Sewage Effluent		
Receiving Waters	Killinger Creek (TSF)	Stream Code	09705
NHD Com ID	56400711	RMI	4.05
Drainage Area	2.01	Yield (cfs/mi^2)	0.14
Q_{7-10} Flow (cfs)	0.28	Q_{7-10} Basis	USGS Gage station
Elevation (ft)	423	Slope (ft/ft)	
Watershed No.	7-D	Chapter 93 Class.	TSF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Nutrients, Pathogens		
Source(s) of Impairment	Agriculture, Source Unknown		
TMDL Status	Final	Name	Quittapahilla Creek Watershed

Background/Ambient Data		Data Source
pH (SU)		
Temperature (°F)		
Hardness (mg/L)		
Other:		

Nearest Downstream Public Water Supply Intake	PA American Water Company		
PWS Waters	Swatara Creek	Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	16

Changes Since Last Permit Issuance: None

1.3.1 Water Supply Intake

The nearest downstream water supply intake is approximately 16 miles downstream for PA American Water on Swatara Creek in South Hanover Township, Dauphin County. No impact is expected from this discharge on the intake.

2.0 Treatment Facility Summary

Treatment Facility Name: S Londonderry Campbell E STP

WQM Permit No.	Issuance Date
3898404 A-2	10/22/2019
3898404 A-1	02/07/2014
3898404	3/26/1999

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary With Ammonia And Phosphorus	Extended Aeration	Gas Chlorine	0.21

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.21	525	Not Overloaded		

Changes Since Last Permit Issuance: Permit was amended on 10/22/2019 to install new blowers and probes that increases the organic capacity to 525lbs/day.

2.1 Treatment Facility

The plant consist of an influent pump station, a comminutor/bypass bar screen, one aerated equalization tank fitted with duplex submersible discharge pumps and a flow control box, two aeration tanks equipped with coarse bubble diffusers, two dual hopper bottom clarifiers, a chlorine contact tank fitted with a chlorine gas diffuser at the inlet for chlorination and a sulfur dioxide at the end for de-chlorination, two aerobic digesters and four reed beds for sludge processing.

2.2 Chemicals

- Lime for pH adjustment as needed
- Chlorine Gas for disinfection
- Sulfur Dioxide for de-chlorination
- DelPac 2000 for phosphorus removal

3.0 Existing Effluent Limitations and Monitoring Requirements

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.12	XXX	0.40	1/day	Grab
CBOD5	43	70	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	52	78	XXX	30	45	60	1/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Nitrate-Nitrite	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	Calculation
Ammonia Nov 1 - Apr 30	13.1	XXX	XXX	7.5	XXX	15	1/week	24-Hr Composite
Ammonia May 1 - Oct 31	4.4	XXX	XXX	2.5	XXX	5	1/week	24-Hr Composite
TKN	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Phosphorus	3.5	XXX	XXX	2.0	XXX	4	1/week	24-Hr Composite
Total Phosphorus (lbs)	XXX	974 Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation

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 (lbs)	XXX	Report Total Mo	XXX	XXX	XXX	XXX	1/month	Calculation
Total Copper	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/month	24-Hr Composite

3.1 Compliance History

3.1.1 DMR Data for Outfall 001 (from March 1, 2024 to February 28, 2025)

Parameter	FEB-25	JAN-25	DEC-24	NOV-24	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24
Flow (MGD) Average Monthly	0.144	0.137	0.145	0.138	0.130	0.129	0.127	0.126	0.132	0.140	0.165	0.147
Flow (MGD) Daily Maximum	0.220	0.159	0.216	0.166	0.157	0.169	0.159	0.140	0.148	0.166	0.358	0.274
pH (S.U.) Daily Minimum	6.65	6.08	6.56	6.76	6.79	6.65	6.71	6.78	6.73	6.66	6.70	6.97
pH (S.U.) Daily Maximum	7.10	7.18	7.12	7.25	7.25	7.20	7.22	7.23	7.31	7.26	7.22	7.55
DO (mg/L) Daily Minimum	6.26	6.10	5.88	5.08	5.34	5.03	5.31	5.31	5.06	5.05	5.28	5.14
TRC (mg/L) Average Monthly	< 0.03	< 0.03	< 0.01	< 0.02	< 0.02	< 0.04	< 0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
TRC (mg/L) Instantaneous Maximum	0.18	0.10	0.09	0.16	0.09	0.18	0.10	0.09	0.12	0.07	0.07	0.08
CBOD5 (lbs/day) Average Monthly	< 3.29	3.97	3.90	< 3.19	2.58	< 2.38	< 2.05	< 2.72	< 3.12	3.57	5.56	4.13
CBOD5 (lbs/day) Weekly Average	4.14	4.34	4.96	4.40	3.58	2.97	2.28	3.54	4.28	4.69	10.79	6.91
CBOD5 (mg/L) Average Monthly	< 2.80	3.60	3.33	< 2.85	2.38	< 2.33	< 2.06	< 2.53	< 2.90	3.16	3.68	3.70
CBOD5 (mg/L) Weekly Average	3.40	4.20	4.10	4.00	3.20	2.90	2.30	3.40	3.80	4.20	5.30	6.00

BOD5 (lbs/day) Raw Sewage Influent Average Monthly	230	311	289	374	426	226	207	208	208	193	229	242
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	336	395	507	498	832	259	273	332	253	226	324	303
BOD5 (mg/L) Raw Sewage Influent Average Monthly	195	283	251	332	399	222	209	193	195	171	175	220
TSS (lbs/day) Average Monthly	8.33	< 7.22	7.67	8.41	< 6.90	9.57	11.19	< 6.22	7.99	8.87	< 9.25	8.38
TSS (lbs/day) Raw Sewage Influent Average Monthly	233	238	215	397	311	172	159	172	157	140	221	165
TSS (lbs/day) Raw Sewage Influent Daily Maximum	373	376	319	572	349	230	282	296	240	250	379	230
TSS (lbs/day) Weekly Average	10.14	10.34	8.58	9.27	9.23	14.31	13.66	8.34	10.13	11.18	10.48	16.11
TSS (mg/L) Average Monthly	7.00	< 6.60	6.50	7.50	< 6.40	9.25	11.20	< 5.75	7.50	7.80	< 6.75	7.50
TSS (mg/L) Raw Sewage Influent Average Monthly	202	219	184	352	288	170	161	163	146	124	173	151
TSS (mg/L) Weekly Average	8.00	10.00	7.00	8.00	9.00	13.00	13.00	8.00	9.00	10.00	8.00	14.00
Fecal Coliform (No./100 ml) Geometric Mean	7	18	14	34	4	7	11	4	42	35	41	28
Fecal Coliform (No./100 ml) Instantaneous Maximum	26	46	16	41	14	55	54	18	230	133	83	33
Nitrate-Nitrite (mg/L) Average Monthly	37.65	51.52	40.95	46.70	44.10	46.95	44.38	44.53	44.65	39.66	27.73	35.15
Total Nitrogen (mg/L) Average Monthly	< 38.65	< 52.64	< 41.95	< 47.70	< 45.10	< 47.95	< 45.38	< 45.53	< 45.65	< 40.66	< 30.03	< 36.15
Ammonia (lbs/day) Average Monthly	< 0.121	< 0.618	< 0.125	< 0.169	< 0.113	< 0.108	< 0.154	< 0.171	0.316	< 0.570	< 2.574	< 0.157

Ammonia (mg/L) Average Monthly	< 0.103	< 0.520	< 0.105	< 0.150	< 0.104	< 0.105	< 0.172	< 0.158	0.295	< 0.500	< 1.325	< 0.140
TKN (mg/L) Average Monthly	< 1.00	< 1.12	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 2.30	< 1.00
Total Phosphorus (lbs/day) Average Monthly	0.20	0.34	0.77	1.20	0.78	1.48	1.13	0.60	1.09	3.06	0.49	0.30
Total Phosphorus (mg/L) Average Monthly	0.17	0.30	0.66	1.07	0.72	1.45	1.13	0.55	1.00	2.74	0.33	0.27
Total Phosphorus (lbs) Total Annual			360.59									
Total Phosphorus (lbs) Total Monthly	5.60	10.54	23.87	36.00	24.18	44.40	35.03	18.60	32.70	94.86	14.70	9.30
Total Copper (mg/L) Daily Maximum	0.0029	0.0025	0.0068	0.0080	0.0120	0.0083	0.0090	0.0074	0.0079	0.0051	0.0036	0.0042

3.1.2 Effluent Violations for Outfall 001, from: April 1, 2024 To: February 28, 2025

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Total Phosphorus	05/31/24	Avg Mo	2.74	mg/L	2.0	mg/L

3.1.3 Summary of DMRs:

DMRs review for the facility for the last 12 months of operation, presented on the table above in section 3.1.1 indicates permit limits have been met most of the time. One violation of Total Phosphorus limitation occurred during the past 12 months of operation as presented is section 3.1.2. It is unclear what is caused the violation, and it appears to be one time occurrence.

3.1.4 Summary of Inspections:

The facility has been inspected a couple of times during the past permit cycle. No effluent violation noted during plant inspections.

4.0 Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .21
Latitude 40º 17' 18.85" **Longitude** -76º 33' 43.25"
Wastewater Description: Sewage Effluent

4.1 Basis for Effluent Limitations

In general, the Clean Water Act (CWA) 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 WQM 7.0 Stream Model

WQM 7.0 is a water quality model DEP utilizes to establish appropriate effluent limits for $CBOD_5$, NH_3-N and DO in permits. The model simulates mixing and degradation of NH_3-N in the stream and compares calculated instream NH_3-N concentrations to NH_3-N water quality criteria and also simulates mixing and consumption of D.O. in the stream due to the degradation of $CBOD_5$ and NH_3N and compares calculated instream D.O. concentrations to D.O. water quality criteria and recommends effluent limits.

4.3.2 Receiving Stream

The receiving stream is the Killinger Creek. According to 25 PA § 93.9o, this stream is protected for Trout Stocking Fishery (TSF). It is located in Drainage List o and State Watershed 7-D. It has been assigned stream code 09705. According to the Department's Integrated Water Quality Monitoring and Assessment Report, Killinger Creek is impaired for pathogens

and nutrients. Source is unknown and agriculture, respectively. TMDL is completed and approved by EPA in 2001. See 303d listed streams section of the report for further discussion.

4.3.3 Streamflows

Streamflows for the water quality analysis 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 the point of discharge calculated using StreamStats = 2.01 mi^2.

The summer Q_{7-10} at discharge = 2.01 mi^2 x 0.14 ft^3/s/mi^2 = 0.28 ft^3/s.

4.3.4 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 WQM model of the stream:

- Discharge pH = 6.6 (DMR median)
- Discharge Temperature = 25 ^{o} C (Default)
- Stream pH = 7.8 (WQN Station on Quittapahilla Creek)
- Stream Temperature = 19 ^{o}C (WQN Station on Quittapahilla Creek)
- Background NH_3-N = 0.0 (default)
- Discharge flow = 0.21 MGD

4.3.5 $CBOD_5$

Due to their proximities, Londonderry Township STP, Campbelltown East STP and Vanderhomes STP discharges were modeled together. The attached WQM 7.0 stream model results presented in attachment B indicates a limit of 25 mg/L for $CBOD_5$ for Campbelltown East STP discharge is adequate to protect the water quality of the stream. This limit is consistent with the existing permit and the STP has been consistently achieving below this limitation. Therefore, a limit of 25 mg/L AML, 40mg/L average weekly limit (AWL) and 50 mg/L IMAX are recommended for this permit cycle.

Mass limits are calculated as follows:

Mass based AML (lb/day) = 25 (mg/L) × 0.21(mgd) × 8.34 = 43

Mass based AWL (lb/day) = 40 (mg/L) × 0.21 (mgd) × 8.34 = 70

4.3.6 NH_3-N

The attached WQM 7.0 stream model results (attachment B) also indicates that, for the Campbelltown East STP discharge, a summer limit of 2.5 mg/L(rounded) for NH_3-N is necessary to protect aquatic life from toxicity effects. This is consistent with the existing permit and the facility is complying with the limit. The limit for winter months is 3 times the summer limit (7.5 mg/L NH_3-N).

Mass based AML (lb/day) for summer months = 2.5 (mg/L) × 0.21(mgd) × 8.34 = 4.4

Mass based AML (lb/day) for winter months = 7.5 (mg/L) × 0.21 (mgd) × 8.34 = 13.1

4.3.7 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 with reach DO goal of 6.0mg/L, this limit will be continued in the renewed permit with a daily monitoring requirement.

4.3.8 Total Suspended Solids (TSS):

There is no water quality criterion for TSS. The existing limit of 30 mg/l AML based on the minimum level of effluent quality attainable by secondary treatment as defined in 40 CFR 133.102b(1), 40 CFR 133.102b(1), 25 PA § 92a.47(a)(1) and 92a.47(a)(2) will remain in the permit.

Mass based AML (lb/day) = 30 (mg/L) × 0.21(mgd) × 8.34 = 52

Mass based AWL (lb/day) = 45 (mg/L) × 0.21 (mgd) × 8.34 = 78

4.3.9 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.

Phase 3 WIP and the supplement to the WIP, indicates renewing 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 is, classified as a phase 4, and had been monitoring and reporting Nitrate-Nitrite as N, Total Kjeldahl Nitrogen and Total Nitrogen monthly and will continue during this permit cycle. There is limitation on Total Phosphorus in the permit, no monitoring is required.

4.3.10 Phosphorus

The average monthly limit of 2mg/l phosphorus in the existing permit was required due to nutrient impairment of the stream prior to TMDL development for the Quittapahilla Creek watershed. The TMDL allocated a wasteload of 1,128.5lbs/year of Total Phosphorus to Killinger Creek. A Total Phosphorus wasteload of 974lbs/year was allocated from the total wasteload of 1,128.5lbs/yr to this facility and the rest of the wasteload of 154.5lbs/yr. was allocated to Vanderhomes STP downstream of the facility. The facility is complying with the Total Phosphorus load requirement.

4.3.11 Total Residual Chlorine:

The attached TRC results presented in attachment D utilizes the equations and calculations as 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 results presented in attachment D indicates that a water quality limit of 0.13 mg/l monthly average and IMAX of 0.44 mg/l would be needed to prevent toxicity concerns. However, the existing limits of 0.12mg/l monthly average and IMAX of 0.40mg/l will remain in the permit due to anti-backsliding restrictions. DMR and inspection reports indicate the facility is meeting the permit requirement.

4.3.12 Toxics

A reasonable potential (RP) analysis was done for pollutants submitted with the application. All pollutants that were presented in the application sampling data were entered into DEP Toxics Management Spreadsheet (TMS) to calculate

WQBELs. WQBELs recommended by the TMS are presented in attachment C. The discharge levels for all parameters analyzed except Total Copper were well below DEP's target quantitation limits (TQL) and calculated WQBELs, therefore no limitation or monitoring is required in the permit. Monitoring was recommended for Total Copper. The existing monitoring for Total Copper will continue in the permit. It is noted that the site specific criteria approved during the previous permit cycle based on the WER study is no longer valid and was not utilized for the current permit renewal.

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.

4.3.13 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 and < 0.05 MGD. Your discharge of 0.21 MGD requires 1/quarter monitoring as included in the permit.

4.3.14 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.

4.3.15 Pretreatment Requirements

The design annual average flow of the treatment plant is 0.21 MGD and the facility receives flow from no significant Industrial users. There is no approved pretreatment program for the facility, however, the permit contains standard conditions requiring the permittee to monitor and control industrial users if applicable.

5.0 Other Requirements

5.1 Anti-backsliding

Not applicable to this permit

5.2 Stormwater:

No storm water outfall is associated with this facility

5.3 Special Permit Conditions

The permit will contain the following special conditions:

Stormwater Prohibition, Approval Contingencies, Proper Waste/solids Management, Restriction on receipt of hauled in waste under certain conditions and Chlorine minimization.

5.4 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.

5.5 Class A Wild Trout Fisheries

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

5.6 303d Listed Streams:

The discharge is located on a stream segment that is designated on the 303(d) list as impaired, and the impairment is due to nutrients from agricultural activities in the watershed. TMDL for Quittapahilla Creek Watershed was approved in 2001 The wasteload allocation (WLA) for phosphorus in the Killinger creek watershed was set at 1128.5lbs/year based on Campbelltown East plant discharge. The document explained that average monthly discharge of 2mg/l at waste flow of 0.21mgd will account for less than1% total phosphorus loading to Killinger Creek and limits Campbelltown East plant discharge to the existing NPDES permit limit of 2mg/l at 0.21mgd, however Vanderhomes formerly Palm City Mobile Home Park was not included in the WLA. The WLA was divided between this facility and Vanderhomes STP downstream of the this discharge. A Total Phosphorus wasteload of 974lbs/year was allocated from a total load of 1,128.5lbs/yr to this facility and the rest of the wasteload of 154.5lbs/yr was allocated to Vanderhomes downstream of the facility.

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

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" (386-0400-001), SOPs and/or BPJ.

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.12	XXX	0.40	1/day	Grab
CBOD5	43	70	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	52	78	XXX	30	45	60	1/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Nitrate-Nitrite	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Nitrogen	XXX	XXX	XXX	Report	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	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Ammonia Nov 1 - Apr 30	13.1	XXX	XXX	7.5	XXX	15	1/week	24-Hr Composite
Ammonia May 1 - Oct 31	4.4	XXX	XXX	2.5	XXX	5	1/week	24-Hr Composite
TKN	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Phosphorus	3.5	XXX	XXX	2.0	XXX	4	1/week	24-Hr Composite
Total Phosphorus (lbs)	XXX	974 Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Phosphorus (lbs)	XXX	Report Total Mo	XXX	XXX	XXX	XXX	1/month	Calculation
Total Copper	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/month	24-Hr Composite

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 **D**)
☐	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, 386-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
☒	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
☐	Pennsylvania CSO Policy, 386-2000-002, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97.
☒	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
☐	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
☒	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
☒	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
☒	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 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, 386-2000-020, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 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, 386-2000-010, 3/1999.
☐	Design Stream Flows, 386-2000-003, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 386-2000-006, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
☒	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☒	SOP: Establishing effluent limitation for individual sewage permit.
☐	Other:

Attachments

A. Topographical Map

B. WQM Model Results

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
07D	9705	KILLINGER 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)
4.050	Camp. East Plt	PA0087700	0.210	CBOD5	25		
				NH3-N	2.68	5.36	
				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)
3.800	Vanderhomes MHP	PA0033065	0.036	CBOD5	25		
				NH3-N	9.35	18.7	
				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)
1.120	North Lond TA	PA0261262	1.500	CBOD5	18.78		
				NH3-N	2.81	5.62	
				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	9705	KILLINGER CREEK	**4.050**	423.00	2.01	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	19.00	7.80	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
Camp. East Plt	PA0087700	0.2100	0.2100	0.2100	0.000	25.00	6.60

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	9705	KILLINGER CREEK	**3.800**	420.00	2.20	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 (°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	19.00	7.80	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
Vanderhomes MHP	PA0033065	0.0360	0.0360	0.0360	0.000	25.00	6.60

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	9705	KILLINGER CREEK	1.120	408.00	13.44	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	19.00	7.80	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
North Lond TA	PA0261262	1.5000	1.5000	1.5000	0.000	25.00	7.10

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	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	9705	KILLINGER CREEK	**0.010**	389.00	16.20	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 (°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	19.00	7.80	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	5.00	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
07D	9705	KILLINGER 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												
4.050	0.28	0.00	0.28	.3249	0.00227	.476	9.98	20.95	0.13	0.120	22.22	6.85
3.800	0.31	0.00	0.31	.3806	0.00085	.503	11.07	22.03	0.12	1.324	22.32	6.84
1.120	1.88	0.00	1.88	2.7011	0.00324	.639	26.71	41.77	0.27	0.253	22.54	7.17
Q1-10 Flow												
4.050	0.25	0.00	0.25	.3249	0.00227	NA	NA	NA	0.12	0.123	22.39	6.83
3.800	0.27	0.00	0.27	.3806	0.00085	NA	NA	NA	0.12	1.362	22.49	6.82
1.120	1.67	0.00	1.67	2.7011	0.00324	NA	NA	NA	0.26	0.259	22.70	7.15
Q30-10 Flow												
4.050	0.35	0.00	0.35	.3249	0.00227	NA	NA	NA	0.13	0.113	21.90	6.89
3.800	0.38	0.00	0.38	.3806	0.00085	NA	NA	NA	0.13	1.253	22.01	6.87
1.120	2.31	0.00	2.31	2.7011	0.00324	NA	NA	NA	0.28	0.240	22.23	7.20

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	6		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
07D	9705	KILLINGER 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
4.050	Camp. East Plt	15.71	27.82	15.71	26.16	2	6
3.800	Vanderhomes M	12.85	50	15.7	47.01	2	6
1.120	North Lond TA	10.19	17.54	11.52	17.54	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
4.050	Camp. East Plt	1.73	3.58	1.73	2.68	2	25
3.800	Vanderhomes M	1.61	12.53	1.73	9.35	2	25
1.120	North Lond TA	1.4	2.81	1.49	2.81	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)		
4.05	Camp. East Plt	25	25	2.68	2.68	5	5	0	0
3.80	Vanderhomes MHP	25	25	9.35	9.35	5	5	0	0
1.12	North Lond TA	18.78	18.78	2.81	2.81	5	5	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07D	9705	KILLINGER CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
4.050	0.210	22.215	6.848
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
9.981	0.476	20.953	0.128
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
14.32	1.393	1.43	0.830
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.505	22.691	Owens	6
Reach Travel Time (days)			
0.120			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.012	14.06	1.42	6.65
0.024	13.80	1.41	6.77
0.036	13.55	1.39	6.86
0.048	13.30	1.38	6.94
0.060	13.06	1.36	7.01
0.072	12.82	1.35	7.07
0.084	12.59	1.34	7.12
0.096	12.36	1.32	7.16
0.108	12.13	1.31	7.20
0.120	11.91	1.30	7.24

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
3.800	0.246	22.316	6.836
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
11.074	0.503	22.031	0.124
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
12.58	1.191	1.90	0.837
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.094	20.178	Owens	6
Reach Travel Time (days)			
1.324			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.132	10.56	1.70	7.33
0.265	8.86	1.52	7.54
0.397	7.44	1.36	7.73
0.530	6.24	1.22	7.88
0.662	5.24	1.09	7.90
0.794	4.39	0.98	7.90
0.927	3.69	0.87	7.90
1.059	3.09	0.78	7.90
1.192	2.60	0.70	7.90
1.324	2.18	0.63	7.90

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07D	9705	KILLINGER CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
1.120	1.746	22.536	7.170
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
26.707	0.639	41.773	0.268
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
10.52	1.013	1.51	0.851
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.549	8.780	Tsivoglou	6
Reach Travel Time (days)			
0.253			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.025	10.22	1.48	6.45
0.051	9.93	1.45	6.39
0.076	9.65	1.42	6.35
0.101	9.38	1.39	6.34
0.126	9.11	1.36	6.34
0.152	8.85	1.33	6.35
0.177	8.60	1.30	6.37
0.202	8.36	1.28	6.40
0.227	8.12	1.25	6.44
0.253	7.89	1.22	6.48

C. Toxic Management Spreadsheet Results

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Campbeltown East Plant** NPDES Permit No.: **PA0087700** 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
0.21	270	6.6						

					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
Group 1	Total Dissolved Solids (PWS)	mg/L		640									
	Chloride (PWS)	mg/L		146									
	Bromide	mg/L	<	1									
	Sulfate (PWS)	mg/L		37.5									
	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		13									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L	<										
	Total Iron	µg/L											
	Total Lead	µg/L											
	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											
	Total Molybdenum	µg/L											

Stream / Surface Water Information

Campbeltown East Plant, NPDES Permit No. PA0087700, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Killinger 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	009705	4.05	423	2.01			Yes
End of Reach 1	009705	3.8	420	2.2			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	4.05	0.14										100	7.8		
End of Reach 1	3.8	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	4.05														
End of Reach 1	3.8														

Model Results

Campbeltown East Plant, NPDES Permit No. PA0087700, Outfall 001

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 1.877 PMF: 1 Analysis Hardness (mg/l): 191.09 Analysis pH: 6.85

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	24.738	25.8	48.1	Chem Translator of 0.96 applied

☑ ***CFC*** CCT (min): 1.877 PMF: 1 Analysis Hardness (mg/l): 191.09 Analysis pH: 6.85

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	15.575	16.2	30.3	Chem Translator of 0.96 applied

☑ ***THH*** CCT (min): 1.877 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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

☑ ***CRL*** CCT (min): 2.488 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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

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

No. Samples/Month: 4

Model Results 4/29/2025 Page 1

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
Total Copper	Report	Report	Report	Report	Report	µg/L	30.3	CFC	Discharge Conc > 10% WQBEL (no RP)

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

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

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable

D. TRC Results

Copy of TRC_CALC1

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.28	= Q stream (cfs)	0.5	= CV Daily
0.21	= 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 = 0.294	1.3.2.iii	WLA cfc = 0.279
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.110	5.1d	LTA_cfc = 0.162

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.135	AFC
		INST MAX LIMIT (mg/l) = 0.441	

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)**