pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0024040**
Facility Type	**Municipal**	APS ID	**1026358**
Major / Minor	**Major**	Authorization ID	**1332420**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Highspire Borough Authority**	Facility Name	**Highspire STP**
Applicant Address	640 Eshelman Street	Facility Address	297 Industrial Road
	Highspire, PA 17034-1610		Highspire, PA 17034-1200
Applicant Contact	Von Hess	Facility Contact	Randy Kreider
Applicant Phone	(717) 939-3303	Facility Phone	(717) 939-6204
Client ID	189287	Site ID	252592
Ch 94 Load Status	Not Overloaded	Municipality	Highspire Borough
Connection Status	No Limitations	County	Dauphin
Date Application Received	October 30, 2020	EPA Waived?	No
Date Application Accepted	November 16, 2020	If No, Reason	Major Facility, Significant CB Discharge

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

Summary of Review

1.0 General Discussion

This factsheet supports the re-issuance of an existing NPDES permit for discharge of treated domestic wastewater from Highspire Borough Authority's (Authority) wastewater treatment plant (WWTP). The Authority owns, operates, and maintains the wastewater treatment plant. The facility is located in the Borough of Highspire, Dauphin County near the intersection of Lumber Street and Industrial Road. The facility provides biological nutrient removal using two parallel oxidation ditches. The facility discharges treated wastewater to Susquehanna River. The collection system has no combined sewers. The facility has an average annual flow of 2.0 MGD, hydraulic design capacity as 2.0 MGD and an organic design capacity of 3,800lbs/day. The facility receives flows from Borough of Highspire (33%) and Lower Swatara Township (67%). The existing NPDES permit was issued on April 26, 2016 with an effective date of May 1, 2016 and expiration date of April 30, 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 dewatered in a centrifuge and landfilled at Cumberland County Landfill. Liquid sludge is sometimes hauled out by Kline's as needed.

Approve	Deny	Signatures	Date
X		*J. Pascal Kwedza* J. Pascal Kwedza, P.E. / Environmental Engineer	November 20, 2021
X		*Maria D. Bebenek FOR* Daniel W. Martin, P.E. / Environmental Engineer Manager	December 10, 2021
X		*Maria D. Bebenek* Maria D. Bebenek, P.E./ Program Manager	December 10, 2021

Summary of Review

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*, 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.

1.3.0 Changes to the existing permit

- E. Coli monitoring has been added

1.3.1 Existing Limitations and Monitoring Requirements

Discharge Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)					
	Monthly Average	Weekly Average	Minimum	Monthly Average	Weekly Average	Instantaneous Maximum	Minimum Measurement Frequency	Required Sample Type
Flow (mgd)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/Day	Grab
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/Day	Grab
TSS	500	750	XXX	30	45	60	2/week	24-hr comp
$CBOD_5$	417	667	XXX	25	40	50	2/week	24-hr comp
Fecal Coliform (5/1 to 9/30)[(5)]	XXX	XXX	XXX	200	XXX	1000	2/week	Grab
Fecal Coliform (10/1 to 4/30)	XXX	XXX	XXX	2,000	XXX	10000	2/week	Grab
Total Phosphorus	33	XXX	XXX	2.0	XXX	4.0	2/week	24-hr comp
UV Transmittance (%)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Metered

1.3.2 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	36,529	XXX	XXX	XXX	1/Month	Calculate
Net Total Phos.	Report	4,871	XXX	XXX	XXX	1/Month	Calculate

1.4.0 Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	2
Latitude	40° 12’ 21.35”	Longitude	76° 47’ 26.87”
Quad Name	Steelton	Quad Code	1731
Wastewater Description:	Sewage		
Receiving Waters	Susquehanna River	Stream Code	06685
NHD Com ID	56404737	RMI	64.5
Drainage Area	24280.0	Yield (cfs/mi^2)	0.10
Q_{7-10} Flow (cfs)	2828.0	Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	7-C	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	pH, PCB		
Source(s) of Impairment	unknown		
TMDL Status	Pending	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:

1.4.1 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: Highspire Borough - STP

WQM Permit No.	Issuance Date
2286407	July 13, 1986
2286407 07-1	March 3, 2009

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary With Total Nitrogen Reduction	Oxidation Ditch	Ultraviolet	2

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
2	3800	Not Overloaded	Anaerobic digestion	Land fill

Changes Since Last Permit Issuance: None

2.1 Treatment Facility Description

Wastewater flows from the Borough and Township via gravity sewer to the WWTP and then pumped via a screw lift pump to a grit removal system. The wastewater is then pumped from the grit system to a distribution box which could direct flow to the oxidation ditches directly or to primary clarifier/thickener prior to oxidation ditches. Oxidation ditches are designed to operate in anaerobic/oxic /anoxic mode to nitrify and denitrify. Treated effluent flows to either of the 3 final clarifiers controlled by gates. Treated effluent from final clarifier then flows to the UV system and then eventually to outfall 001 on Susquehanna River.

2.2 Chemicals

Ferous Sulfate for phosphorus precipitation.
Micro CG as carbon source for biological nutrient removal
Cationic Polymer to enhance settling in gravity thickeners

3.0 Compliance History

3.1 DMR Data for Outfall 001 (from October 1, 2020 to September 30, 2021)

Parameter	SEP-21	AUG-21	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20
Flow (MGD) Average Monthly	1.27	0.818	0.91	0.661	0.726	0.794	0.893	0.785	0.702	0.732	0.590	0.593
Flow (MGD) Daily Maximum	2.507	1.543	2.029	0.748	0.888	1.216	1.509	1.549	0.970	1.744	0.841	0.851
pH (S.U.) Minimum	7.1	7.3	7.2	7.1	7.0	6.9	7.0	7.1	7.1	6.9	7.2	7.0
pH (S.U.) Maximum	7.6	7.6	7.6	7.4	7.4	7.3	7.3	7.3	7.3	7.4	7.5	7.5
DO (mg/L) Minimum	7.7	7.5	7.6	7.5	7.7	8.1	8.3	9.2	8.8	8.3	7.6	7.2
CBOD5 (lbs/day) Average Monthly	< 36	< 19	< 22	< 17	< 19	< 19	< 22	< 19	< 17	< 15	< 14	< 15
CBOD5 (lbs/day) Weekly Average	< 57	< 21	< 31	< 18	< 22	< 22	< 29	< 24	< 19	< 19	< 14	< 18
CBOD5 (mg/L) Average Monthly	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3.0	< 3
CBOD5 (mg/L) Weekly Average	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3.0	< 3
BOD5 (lbs/day) Raw Sewage Influent Ave. Monthly	1445	1251	1375	1285	1405	1487	1489	1565	1455	1427	1377	1330
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	2397	1497	2736	1612	1529	2212	1762	1830	1807	1891	1600	1628
BOD5 (mg/L) Raw Sewage Influent Ave. Monthly	104	167	168	200	187	209	177	198	217	224	244	235
TSS (lbs/day) Average Monthly	60	26	30	12	12	14	15	13	11	9	10	24
TSS (lbs/day) Raw Sewage Influent Ave. Monthly	1385	1363	1472	1666	1541	1556	1626	1894	1980	1769	1607	1417
TSS (lbs/day) Raw Sewage Influent Daily Maximum	2176	1739	1704	3178	1935	1772	2049	3186	4645	3135	1891	1667
TSS (lbs/day) Weekly Average	136	34	60	22	16	17	19	18	13	11	10	26

TSS (mg/L) Average Monthly	5	4	4	2	2	2	2	2	2	2	2	5
TSS (mg/L) Raw Sewage Influent Ave. Monthly	108	182	174	262	204	217	198	238	299	280	284	251
TSS (mg/L) Weekly Average	7	5	6	4	2	3	2	2	3	2	2	5
Fecal Coliform (CFU/100 ml) Geometric Mean	< 4	7	3	< 1	1	< 1	< 2	< 1	< 2	< 1	< 1	< 2
Fecal Coliform (CFU/100 ml) Instant. Maximum	387.3	38.4	21.1	3.1	3.1	4.1	4.1	3.1	24.9	2	1	< 10.9
UV Transmittance (%) Minimum	76.9	75.2	73.7	76.3	78.3	74.9	79.7	76.8	79.6	73.4	74.7	76.1
Nitrate-Nitrite (mg/L) Average Monthly	< 2.02	< 1.79	< 1.94	< 1.69	< 2.61	< 2.27	< 2.95	< 3.57	< 1.85	< 2.28	< 1.98	< 1.83
Nitrate-Nitrite (lbs) Total Monthly	< 848	< 364	< 446	< 286	< 496	< 434	< 696	< 659	< 319	< 381	< 283	< 289
Total Nitrogen (mg/L) Average Monthly	< 2.60	< 2.63	< 2.91	< 2.48	< 3.33	< 2.97	< 3.91	< 4.32	< 2.77	< 3.5	< 2.78	< 2.96
Total Nitrogen (lbs) Effluent Net Total Monthly	< 1046	< 531	< 658	< 419	< 635	< 567	< 913	< 793	< 482	< 583	< 398	< 461
Total Nitrogen (lbs) Total Monthly	< 1046	< 531	< 658	< 419	< 635	< 567	< 913	< 793	< 482	< 583	< 398	< 461
Ammonia (mg/L) Average Monthly	< 0.1	< 0.1	< 0.21	< 0.12	< 0.12	< 0.13	< 0.22	< 0.34	< 0.1	< 0.56	< 0.1	< 0.1
Ammonia (lbs) Total Monthly	< 36	< 21	< 44	< 21	< 23	< 24	< 52	< 67	< 17	< 93	< 14	< 15
TKN (mg/L) Average Monthly	< 0.58	< 0.84	< 0.97	< 0.79	0.72	0.7	< 0.96	< 0.75	< 0.92	< 1.21	< 0.8	1.14
TKN (lbs) Total Monthly	< 199	< 167	< 213	< 133	139	< 133	< 217	< 134	< 163	< 201	< 115	173
Total Phosphorus (lbs/day)Ave. Monthly	7	4	3	1	2	1	2	1	0.7	1	1	3
Total Phosphorus (mg/L) Ave. Monthly	0.6	0.6	0.4	0.2	0.3	0.2	0.3	0.2	0.1	0.2	0.3	0.70
Total Phosphorus (lbs) Effluent Net Total Monthly	218	119	< 84	35	48	40	65	33	23	41	39	107
Total Phosphorus (lbs) Total Monthly	218	119	84	35	48	40	65	33	23	41	39	107

3.2 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 consistently. No effluent violations noted on DMRs during the period reviewed.

3.3 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)** 2
Latitude 40º 12' 21.36" **Longitude** -76º 47' 26.88"
Wastewater Description: Sewage Effluent

4.1 Basis for Effluent Limitations

In general, the 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

4.2 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 limitation not applicable

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 Stream flows

Streamflows for the water quality analysis were determined by correlating with the yield of USGS gauging station No. 01570500 on Susquehanna River in Harrisburg. The Q_{7-10} and drainage area at the gage is 3200 ft^3/s and 24100mi^2 respectively. The resulting yields are as follows:

- Q_{7-10} = (3200 ft^3/s)/ 24100 mi^2 = 0.133 $ft^3/s/ mi^2$
- Q_{30-10} / Q_{7-10} = 1.15
- Q_{1-10} / Q_{7-10} = 0.94

The drainage area at discharge estimated due to inability to accurately calculate using streamstats = 24,280 mi^2

The Q_{7-10} at discharge = 24,280mi^2 x 0.133 $ft^3/s/mi^2$ = 3229.24 ft^3/s.

For WQM 7.0 modelling purposes, 25% of the flow will be used

Q_{7-10} model = 3229.24 ft^3/s. x 0.25 = 807.31 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 = 7.2 (DMR median July to Sept)
- Discharge Temperature = 25 ^{o} C (Default)
- Stream pH = 8.2 (Taken from WQN station at Harrisburg)
- Stream Temperature = 23.5^{o}C (Taken from WQN station at Harrisburg)
- Background NH_3-N = 0.0 (default)

4.4.3 $CBOD_5$

The attached results of the WQM 7.0 stream model indicate that an average monthly limit (AML) of 25 mg/l **$CBOD_5$ is** adequate to protect the water quality of the stream for Highspire Borough STP discharge. The recommended AML of 25 mg/l, average weekly limit (AWL) of 40mg/l and instantaneous maximum limit of 50 mg/l are consistent with the existing permits and will remain in the permit. Past DMRs and inspection reports show the facility has been meeting the limits. Mass-based 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 indicates also that no limitation on NH_3 -N as a monthly average is necessary to protect the aquatic life from toxicity effects. However, 2/week monitoring of NH_3 -N requirement in the permit to ensure treatment efficiency will remain.

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 per DEP guidance.

4.4.6 Total Residual Chlorine:

The discharge does not have any reasonable potential to cause or contribute to a water quality standards violation for total residual chlorine since the permittee utilizes UV instead of chlorine for wastewater 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 in (%) is required in the permit to ensure efficiency of the UV unit.

4.4.7 Total Suspended Solids (TSS):

There is no water quality criterion 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) will remain in the permit. In addition, an AWL of 45mg/l per 40CFR 133.102(b)(2) and 25 PA § 92a.47(a)(2) is added to the permit. Mass-based limits are calculated based on 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) which combines the logic in the previous Toxics Screening Analysis Spreadsheet and PENTOXSD Model to calculate WQBELs. The results of the TMS are presented in attachment C. 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 limitations 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 Foundation requirements to reduce point source loadings of Total Nitrogen (TN) and Total Phosphorus (TP) to the Bay. In the Strategy, sewage dischargers have been prioritized by Central Office based on their delivered TN loadings to the Bay. The highest priority (Phases 1, 2, and 3) dischargers will receive 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) will be required to monitor and report TN and TP during permit renewal at a monitoring frequency following Table 6-3 of DEP's Technical Guidance for Development and Specification of effluent Limitations (No. 362-0400-001). Any facility in Phases 4 and 5 that undergoes expansion is subjected to cap load right away.

EPA published the 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 in addition to the original Chesapeake Bay Strategy. As outlined in the current Phase 3 WIP and supplement to the WIP, re-issuing permits for significant dischargers would follow the same phased approach formulated in the original Bay strategy. This facility falls in phase 1 of the strategy and is required to meet a total maximum annual Total Nitrogen Cap load of 36,529 lbs/year based on a design annual wasteflow of 2 MGD and 6 mg/l total nitrogen and a TP cap load of 4,871 lbs/year based on annual wasteflow of 2 MGD and 0.8 mg/l total phosphorus. The facility is in compliance with the bay cap load requirements.

4.4.10 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 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.

4.4.11 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.

4.4.12 Industrial Users

Highspire Borough wastewater treatment plant receives wastewater from some industrial users throughout its service area. The industrial users and a brief description are as follows:

Industrial Users*	Discharge Rate (GPD)					Significant Industrial User?
	Process	NCCW	Sanitary	Other	*Total*	
Higher Wash LLC	563	-	-	-	563	Yes
Homestat Farm	-	-	220	-	220	No
Plouse Precision Manufacturing	843			-	843	Yes
Mack/Volvo Trucks Reman	2300		1300	-	3600	Yes
Oaul Bitting Trucking/Foodliner	1880		20	-	1900	Yes
Conagra Flour Mill						
TOTAL	5586	-	1540	-	400,000	-

4.4.13 Pretreatment Requirements

The design annual average flow of the treatment plant is 2 MGD and the facility receives some flow from categorical Industrial users. However, EPA does not require development of pretreatment program for facilities with design flow less than 5MGD. But the permit contains standard conditions requiring the permittee to monitor and control industrial users if applicable.

4.4.14 Stormwater

The permit application listed outfall 002 (40°12'09"/76°47'28") as receiving stormwater runoff from the treatment plant site. To comply with stormwater requirements of 40CFR 122.26(b)(14)(ix), part C of the permit will require compliance with the standard requirements applicable to stormwater outfalls for 002 with best management practices.

4.4.15 Biosolids Management

The biosolids treatment system comprises of 2 primary thickeners/clarifiers and 2 gravity thickeners. The gravity thickeners receive sludge from the final clarifiers. There are two anaerobic digesters, a primary anaerobic digester with fix roof(mesophilic) which receives sludge from the primary thickeners and the gravity thickeners and a secondary floating roof anaerobic digester that receives the digested sludge from the primary digester. Methane gas is captured and scrubbed and utilized in boiler to heat rooms.

4.4.16 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. Quarterly monitoring of E. Coli is required in the permit following DEP recommendation of 1/quarter monitoring of E. Coli at a minimum for this type of facility.

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 located on a 303d listed stream segment. Susquehanna River is impaired for fish consumption by PCB and aquatic life by pH. The sources of the impairments are unknown. This discharge does not appear to contribute to these impairments; therefore, no action is warranted at this time.

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, and requirement for pretreatment program development and implementation.

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

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 Whole Effluent Toxicity (WET)

Whole Effluent Toxicity (WET) is a term used to describe the aggregate toxic effect of an aqueous sample (i.e whole effluent wastewater discharge) as measured by an organism's response upon exposure to the sample (lethality, impaired growth or reproduction). WET tests replicate, to the greatest extent possible, the total effect and actual environmental exposure of aquatic life to toxic pollutants in an effluent without requiring the identification of the specific pollutants. WET testing is a vital component of the water quality standards implementation through the NPDES permitting process. EPA's promulgated WET test methods include acute and chronic tests.

6.1 For Outfall 001, ☐ Acute ☒ Chronic WET Testing was completed:

☒ For the permit renewal application (4 tests).
☐ Quarterly throughout the permit term.
☐ Quarterly throughout the permit term and a TIE/TRE was conducted.
☐ Other:

The dilution series used for the tests was: 100%, 60%, 30%, 2%, and 1%. The Target Instream Waste Concentration (TIWC) to be used for analysis of the results is: 2.

6.2 Summary of Four Most Recent Test Results

6.2.1 TST Data Analysis

(NOTE – In lieu of recording information below, the application manager may attach the DEP WET Analysis Spreadsheet).

WET Summary and Evaluation

Facility Name	Highspire Borough Authority STP
Permit No.	PA0024040
Design Flow (MGD)	2
Q_{7-10} Flow (cfs)	807.31
PMF_a	0.026
PMF_c	0.179

		Test Results (Pass/Fail)			
		Test Date	Test Date	Test Date	Test Date
Species	**Endpoint**	7/23/18	7/16/19	5/12/20	5/10/21
Ceriodaphnia	Survival	PASS	PASS	PASS	PASS

		Test Results (Pass/Fail)			
		Test Date	Test Date	Test Date	Test Date
Species	**Endpoint**	7/23/18	7/23/19	5/12/20	5/10/21
Ceriodaphnia	Reproduction	PASS	PASS	PASS	PASS

		Test Results (Pass/Fail)			
		Test Date	Test Date	Test Date	Test Date
Species	**Endpoint**	7/24/18	7/23/19	5/12/20	5/11/21
Pimephales	Survival	PASS	PASS	PASS	PASS

		Test Results (Pass/Fail)			
		Test Date	Test Date	Test Date	Test Date
Species	**Endpoint**	7/24/18	7/23/19	5/12/20	5/11/21
Pimephales	Growth	PASS	PASS	PASS	PASS

Reasonable Potential? NO

Permit Recommendations

Test Type	**Chronic**
TIWC	**2** % Effluent
Dilution Series	**1, 2, 30, 60, 100** % Effluent
Permit Limit	**None**
Permit Limit Species	

***** *A "passing" result is that in which the replicate data for the TIWC is not statistically significant from the control condition. This is exhibited when the calculated t value ("T-Test Result") is greater than the critical t value. A "failing" result is exhibited when the calculated t value ("T-Test Result") is less than the critical t value.*

Is there reasonable potential for an excursion above water quality standards based on the results of these tests? (*NOTE – In general, reasonable potential is determined anytime there is at least one test failure in the previous four tests).*

☐ **YES** ☒ **NO**

6.3 Evaluation of Test Type, IWC and Dilution Series for Renewed Permit

Acute Partial Mix Factor (PMFa): **0.026** Chronic Partial Mix Factor (PMFc): **0.179**

6.3.1. Determine IWC – Acute (IWCa):

$(Q_d \times 1.547) / ((Q_{7\text{-}10} \times PMFa) + (Q_d \times 1.547))$

[(2.0 MGD x 1.547) / ((807.31 cfs x 0.026) + (2.0 MGD x 1.547))] x 100 = **12.8%**

Is IWCa < 1%? ☐ **YES** ☒ **NO** **(YES - Acute Tests Required OR NO - Chronic Tests Required)**

If the discharge is to the tidal portion of the Delaware River, indicate how the type of test was determined:

N/A

6.3.2 Type of Test for Permit Renewal:

Chronic Test

6.3.2a. Determine Target IWCa (If Acute Tests Required)

TIWCa = IWCa / 0.3 = **%**

6.3.2b. Determine Target IWCc (If Chronic Tests Required)

$(Q_d \times 1.547) / (Q_{7\text{-}10} \times PMFc) + (Q_d \times 1.547)$

[(2.0 MGD x 1.547) / ((807.31 cfs x 0.179) + (2 MGD x 1.547))] x 100 = **2.1%**

6.3.3 Determine Dilution Series

(NOTE – check Attachment C of WET SOP for dilution series based on TIWCa or TIWCc, whichever applies).

Dilution Series = 100%, 60%, 30%, 2%, and 1%.

6.4 WET Limits

Has reasonable potential been determined? ☐ YES ☒ NO

Will WET limits be established in the permit? ☐ YES ☒ NO

If WET limits will be established, identify the species and the limit values for the permit (TU).

N/A

If WET limits will not be established, but reasonable potential was determined, indicate the rationale for not establishing WET limits:

N/A

No WETT limit or monitoring is deemed necessary. The standard Part C condition for WET testing will be included in the permit.

7.0 Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
CBOD5	417	667	XXX	25	40	50	2/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/week	24-Hr Composite
TSS	500	750	XXX	30	45	60	2/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	2/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/month	Grab
UV Transmittance (%)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Metered
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) Effluent Net	Report Total Mo	XXX	XXX	XXX	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	33	XXX	XXX	2.0	XXX	4	2/week	24-Hr Composite
Total Phosphorus (lbs) Effluent Net	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Phosphorus (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation

Compliance Sampling Location: Outfall 001

7.1 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.

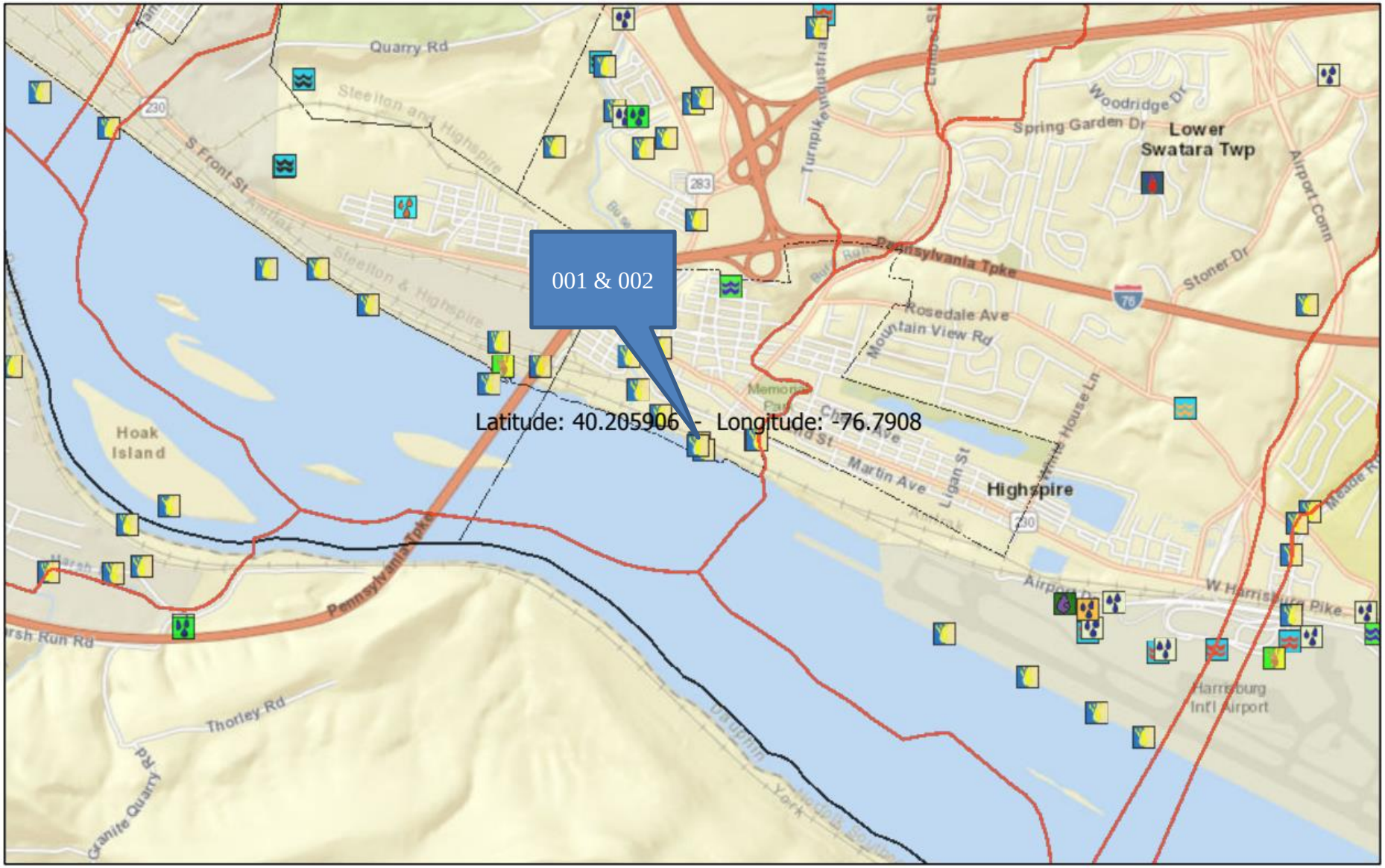
Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Total Nitrogen (lbs) Effluent Net	XXX	36529 Total Annual	XXX	XXX	XXX	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	4871 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: Outfall 001

8.0 Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment **B**)
☒	Toxics Management Spreadsheet (see Attachment)
☐	TRC Model Spreadsheet (see Attachment)
☐	Temperature Model Spreadsheet (see Attachment **C**)
☒	Toxics Screening Analysis 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 limitation for individual sewage permit
☒	Other: WIP 3 Supplement

9. Attachments

A. Topographical Map



B. WQM Model Results

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
07K	6685	SUSQUEHANNA RIVER

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
64.470	Highspire	PA0024040	2.000	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			5

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Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
07K	6685	SUSQUEHANNA RIVER	**64.470**	280.62	24280.00	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	0.133	0.00	807.31	0.000	0.000	0.0	0.00	0.00	23.50	8.20	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
Highspire	PA0024040	2.0000	2.0000	0.0000	0.000	25.00	7.20

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
07K	6685	SUSQUEHANNA RIVER	**63.180**	276.00	24281.00	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	0.133	0.00	807.34	0.000	0.000	0.0	0.00	0.00	23.50	8.20	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
Hbg Aiport IW	PA0082244	0.0460	0.0460	0.0460	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	5.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
07K	6685	SUSQUEHANNA RIVER

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
64.470	Highspire	2.05	50	2.05	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
64.470	Highspire	.47	25	.47	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)		
64.47	Highspire	25	25	25	25	5	5	0	0

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WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07K	6685	SUSQUEHANNA RIVER

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
64.470	2.000	23.506	8.185
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
659.239	1.222	539.396	1.006
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.09	0.064	0.10	0.917
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.231	3.458	Tsivoglou	5
Reach Travel Time (days)			
0.078			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.008	2.09	0.09	7.74
0.016	2.09	0.09	7.74
0.024	2.08	0.09	7.74
0.031	2.08	0.09	7.74
0.039	2.08	0.09	7.74
0.047	2.08	0.09	7.74
0.055	2.08	0.09	7.74
0.063	2.08	0.09	7.74
0.071	2.08	0.09	7.74
0.078	2.08	0.09	7.74

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	0.94	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.15	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

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WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
07K	6685	SUSQUEHANNA RIVER

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
64.470	807.31	0.00	807.31	3.094	0.00068	1.222	659.24	539.4	1.01	0.078	23.51	8.19
Q1-10 Flow												
64.470	758.87	0.00	758.87	3.094	0.00068	NA	NA	NA	0.97	0.081	23.51	8.18
Q30-10 Flow												
64.470	928.41	0.00	928.41	3.094	0.00068	NA	NA	NA	1.09	0.072	23.50	8.19

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C. T**oxic Management Spreadsheet Results**

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Highspire STP** NPDES Permit No.: **PA0024040** 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
2	182	7.2						

					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	Strea m CV	Fate Coeff	FOS	Criteri a Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L											
	Chloride (PWS)	mg/L		94.6									
	Bromide	mg/L		0.2									
	Sulfate (PWS)	mg/L		49.9									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		11									
	Total Antimony	µg/L	<	0.4									
	Total Arsenic	µg/L	<	1									
	Total Barium	µg/L		38									
	Total Beryllium	µg/L	<	0.4									
	Total Boron	µg/L		162									
	Total Cadmium	µg/L	<	0.08									
	Total Chromium (III)	µg/L	<	1									
	Hexavalent Chromium	µg/L	<	0.15									
	Total Cobalt	µg/L	<	1									
	Total Copper	µg/L		6									
	Free Cyanide	µg/L		6									
	Total Cyanide	µg/L	<	5									
	Dissolved Iron	µg/L		29									
	Total Iron	µg/L		419									
	Total Lead	µg/L	<	1									
	Total Manganese	µg/L		39									
	Total Mercury	µg/L	<	0.2									
	Total Nickel	µg/L		4									
	Total Phenols (Phenolics) (PWS)	µg/L	<	5									
	Total Selenium	µg/L	<	2									
	Total Silver	µg/L	<	0.05									
	Total Thallium	µg/L	<	0.4									
	Total Zinc	µg/L		56									
	Total Molybdenum	µg/L	<	1									
	Acrolein	µg/L	<	1									
	Acrylamide	µg/L	<	0.5									
	Acrylonitrile	µg/L	<	0.5									
	Benzene	µg/L	<	0.5									
	Bromoform	µg/L	<	0.5									

Group 3	Carbon Tetrachloride	µg/L	<	0.5									
	Chlorobenzene	µg/L		0.5									
	Chlorodibromomethane	µg/L	<	0.5									
	Chloroethane	µg/L	<	0.5									
	2-Chloroethyl Vinyl Ether	µg/L	<	0.5									
	Chloroform	µg/L	<	0.5									
	Dichlorobromomethane	µg/L	<	0.5									
	1,1-Dichloroethane	µg/L	<	0.5									
	1,2-Dichloroethane	µg/L	<	0.5									
	1,1-Dichloroethylene	µg/L	<	0.5									
	1,2-Dichloropropane	µg/L	<	0.5									
	1,3-Dichloropropylene	µg/L	<	0.5									
	1,4-Dioxane	µg/L	<	0.1									
	Ethylbenzene	µg/L	<	0.5									
	Methyl Bromide	µg/L	<	0.5									
	Methyl Chloride	µg/L	<	0.5									
	Methylene Chloride	µg/L	<	0.5									
	1,1,2,2-Tetrachloroethane	µg/L	<	0.5									
	Tetrachloroethylene	µg/L	<	0.5									
	Toluene	µg/L		0.9									
	1,2-trans-Dichloroethylene	µg/L	<	0.5									
	1,1,1-Trichloroethane	µg/L	<	0.5									
	1,1,2-Trichloroethane	µg/L	<	0.5									
	Trichloroethylene	µg/L	<	0.5									
	Vinyl Chloride	µg/L	<	0.5									
Group 4	2-Chlorophenol	µg/L	<	1									
	2,4-Dichlorophenol	µg/L	<	1									
	2,4-Dimethylphenol	µg/L	<	1									
	4,6-Dinitro-o-Cresol	µg/L	<	1									
	2,4-Dinitrophenol	µg/L	<	3.16									
	2-Nitrophenol	µg/L	<	1									
	4-Nitrophenol	µg/L	<	1									
	p-Chloro-m-Cresol	µg/L	<	1									
	Pentachlorophenol	µg/L	<	1									
	Phenol	µg/L	<	5									
	2,4,6-Trichlorophenol	µg/L	<	1									
Group 5	Acenaphthene	µg/L	<	1									
	Acenaphthylene	µg/L	<	1									
	Anthracene	µg/L	<	1									
	Benzidine	µg/L	<	5.26									
	Benzo(a)Anthracene	µg/L	<	1									
	Benzo(a)Pyrene	µg/L	<	1									
	3,4-Benzofluoranthene	µg/L	<	1									
	Benzo(ghi)Perylene	µg/L	<	1									
	Benzo(k)Fluoranthene	µg/L	<	1									
	Bis(2-Chloroethoxy)Methane	µg/L	<	1									
	Bis(2-Chloroethyl)Ether	µg/L	<	1									
	Bis(2-Chloroisopropyl)Ether	µg/L	<	1									
	Bis(2-Ethylhexyl)Phthalate	µg/L	<	3									
	4-Bromophenyl Phenyl Ether	µg/L	<	1									
	Butyl Benzyl Phthalate	µg/L	<	1									
	2-Chloronaphthalene	µg/L	<	1									
	4-Chlorophenyl Phenyl Ether	µg/L	<	1									
	Chrysene	µg/L	<	1									
	Dibenzo(a,h)Anthrancene	µg/L	<	1									
	1,2-Dichlorobenzene	µg/L	<	0.5									
	1,3-Dichlorobenzene	µg/L	<	0.5									
	1,4-Dichlorobenzene	µg/L	<	0.5									
	3,3-Dichlorobenzidine	µg/L	<	0.146									
	Diethyl Phthalate	µg/L	<	1									
	Dimethyl Phthalate	µg/L	<	1									
	Di-n-Butyl Phthalate	µg/L	<	3									
	2,4-Dinitrotoluene	µg/L	<	1									

	2,6-Dinitrotoluene	µg/L	<	1									
	Di-n-Octyl Phthalate	µg/L	<	1									
	1,2-Diphenylhydrazine	µg/L	<	1									
	Fluoranthene	µg/L	<	1									
	Fluorene	µg/L	<	1									
	Hexachlorobenzene	µg/L	<	1									
	Hexachlorobutadiene	µg/L	<	0.086									
	Hexachlorocyclopentadiene	µg/L	<	1									
	Hexachloroethane	µg/L	<	0.073									
	Indeno(1,2,3-cd)Pyrene	µg/L	<	1									
	Isophorone	µg/L	<	1									
	Naphthalene	µg/L	<	0.07									
	Nitrobenzene	µg/L	<	1									
	n-Nitrosodimethylamine	µg/L	<	1									
	n-Nitrosodi-n-Propylamine	µg/L	<	1									
	n-Nitrosodiphenylamine	µg/L	<	1									
	Phenanthrene	µg/L	<	1									
	Pyrene	µg/L	<	1									
	1,2,4-Trichlorobenzene	µg/L	<	0.098									
Group 6	Aldrin	µg/L	<										
	alpha-BHC	µg/L	<										
	beta-BHC	µg/L	<										
	gamma-BHC	µg/L	<										
	delta BHC	µg/L	<										
	Chlordane	µg/L	<										
	4,4-DDT	µg/L	<										
	4,4-DDE	µg/L	<										
	4,4-DDD	µg/L	<										
	Dieldrin	µg/L	<										
	alpha-Endosulfan	µg/L	<										
	beta-Endosulfan	µg/L	<										
	Endosulfan Sulfate	µg/L	<										
	Endrin	µg/L	<										
	Endrin Aldehyde	µg/L	<										
	Heptachlor	µg/L	<										
	Heptachlor Epoxide	µg/L	<										
	PCB-1016	µg/L	<										
	PCB-1221	µg/L	<										
	PCB-1232	µg/L	<										
	PCB-1242	µg/L	<										
	PCB-1248	µg/L	<										
	PCB-1254	µg/L	<										
	PCB-1260	µg/L	<										
	PCBs, Total	µg/L	<										
	Toxaphene	µg/L	<										
	2,3,7,8-TCDD	ng/L	<										
Group 7	Gross Alpha	pCi/L											
	Total Beta	pCi/L	<										
	Radium 226/228	pCi/L	<										
	Total Strontium	µg/L	<										
	Total Uranium	µg/L	<										
	Osmotic Pressure	mOs/kg											

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Stream / Surface Water Information

Highspire STP, NPDES Permit No. PA0024040, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: _____ 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	006685	64.47	280.62	24280			Yes
End of Reach 1	006685	61.4	274	24282			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	64.47	0.133	807.31									100	8.2		
End of Reach 1	61.4	0.133	807.38												

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	64.47														
End of Reach 1	61.4														

Model Results

Highspire STP, NPDES Permit No. PA0024040, Outfall 001

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.026 Analysis Hardness (mg/l): 110.61 Analysis pH: 7.86

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	5,797	
Total Antimony	0	0		0	1,100	1,100	8,502	
Total Arsenic	0	0		0	340	340	2,628	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	162,304	
Total Boron	0	0		0	8,100	8,100	62,603	
Total Cadmium	0	0		0	2.221	2.36	18.3	Chem Translator of 0.94 applied
Total Chromium (III)	0	0		0	618.816	1,958	15,135	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	126	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	734	
Total Copper	0	0		0	14.779	15.4	119	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	170	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	72.063	92.8	717	Chem Translator of 0.776 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	12.7	Chem Translator of 0.85 applied
Total Nickel	0	0		0	509.934	511	3,949	Chem Translator of 0.998 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	3.826	4.5	34.8	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	502	
Total Zinc	0	0		0	127.632	131	1,009	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	23.2	
Acrylamide	0	0		0	N/A	N/A	N/A	

Acrylonitrile	0	0		0	650	650	5,024	
Benzene	0	0		0	640	640	4,946	
Bromoform	0	0		0	1,800	1,800	13,912	
Carbon Tetrachloride	0	0		0	2,800	2,800	21,641	
Chlorobenzene	0	0		0	1,200	1,200	9,275	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	139,118	
Chloroform	0	0		0	1,900	1,900	14,685	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	15,000	15,000	115,932	
1,1-Dichloroethylene	0	0		0	7,500	7,500	57,966	
1,2-Dichloropropane	0	0		0	11,000	11,000	85,016	
1,3-Dichloropropylene	0	0		0	310	310	2,396	
Ethylbenzene	0	0		0	2,900	2,900	22,413	
Methyl Bromide	0	0		0	550	550	4,251	
Methyl Chloride	0	0		0	28,000	28,000	216,406	
Methylene Chloride	0	0		0	12,000	12,000	92,745	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	7,729	
Tetrachloroethylene	0	0		0	700	700	5,410	
Toluene	0	0		0	1,700	1,700	13,139	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	52,556	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	23,186	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	26,278	
Trichloroethylene	0	0		0	2,300	2,300	17,776	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	560	560	4,328	
2,4-Dichlorophenol	0	0		0	1,700	1,700	13,139	
2,4-Dimethylphenol	0	0		0	660	660	5,101	
4,6-Dinitro-o-Cresol	0	0		0	80	80.0	618	
2,4-Dinitrophenol	0	0		0	660	660	5,101	
2-Nitrophenol	0	0		0	8,000	8,000	61,830	
4-Nitrophenol	0	0		0	2,300	2,300	17,776	
p-Chloro-m-Cresol	0	0		0	160	160	1,237	
Pentachlorophenol	0	0		0	20.800	20.8	161	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	460	460	3,555	
Acenaphthene	0	0		0	83	83.0	641	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	300	300	2,319	
Benzo(a)Anthracene	0	0		0	0.5	0.5	3.86	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	30,000	30,000	231,863	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	34,779	
4-Bromophenyl Phenyl Ether	0	0		0	270	270	2,087	
Butyl Benzyl Phthalate	0	0		0	140	140	1,082	

2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	820	820	6,338	
1,3-Dichlorobenzene	0	0		0	350	350	2,705	
1,4-Dichlorobenzene	0	0		0	730	730	5,642	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	4,000	4,000	30,915	
Dimethyl Phthalate	0	0		0	2,500	2,500	19,322	
Di-n-Butyl Phthalate	0	0		0	110	110	850	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	12,366	
2,6-Dinitrotoluene	0	0		0	990	990	7,651	
1,2-Diphenylhydrazine	0	0		0	15	15.0	116	
Fluoranthene	0	0		0	200	200	1,546	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	10	10.0	77.3	
Hexachlorocyclopentadiene	0	0		0	5	5.0	38.6	
Hexachloroethane	0	0		0	60	60.0	464	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	77,288	
Naphthalene	0	0		0	140	140	1,082	
Nitrobenzene	0	0		0	4,000	4,000	30,915	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	131,389	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	2,319	
Phenanthrene	0	0		0	5	5.0	38.6	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	1,005	

☑ ***CFC*** CCT (min): 720 PMF: 0.179 Analysis Hardness (mg/l): 101.72 Analysis pH: 8.12

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	10,476	
Total Arsenic	0	0		0	150	150	7,143	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	195,235	
Total Boron	0	0		0	1,600	1,600	76,189	
Total Cadmium	0	0		0	0.249	0.27	13.1	Chem Translator of 0.908 applied
Total Chromium (III)	0	0		0	75.158	87.4	4,162	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	495	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	905	
Total Copper	0	0		0	9.087	9.47	451	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	248	

Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	392,891	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.564	3.25	155	Chem Translator of 0.789 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	43.1	Chem Translator of 0.85 applied
Total Nickel	0	0		0	52.763	52.9	2,520	Chem Translator of 0.997 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	4.600	4.99	238	Chem Translator of 0.922 applied
Total Silver	0	0		0	N/A	N/A	N/A	Chem Translator of 1 applied
Total Thallium	0	0		0	13	13.0	619	
Total Zinc	0	0		0	119.860	122	5,789	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	143	
Acrylamide	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	130	130	6,190	
Benzene	0	0		0	130	130	6,190	
Bromoform	0	0		0	370	370	17,619	
Carbon Tetrachloride	0	0		0	560	560	26,666	
Chlorobenzene	0	0		0	240	240	11,428	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	166,664	
Chloroform	0	0		0	390	390	18,571	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	147,617	
1,1-Dichloroethylene	0	0		0	1,500	1,500	71,427	
1,2-Dichloropropane	0	0		0	2,200	2,200	104,760	
1,3-Dichloropropylene	0	0		0	61	61.0	2,905	
Ethylbenzene	0	0		0	580	580	27,619	
Methyl Bromide	0	0		0	110	110	5,238	
Methyl Chloride	0	0		0	5,500	5,500	261,901	
Methylene Chloride	0	0		0	2,400	2,400	114,284	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	10,000	
Tetrachloroethylene	0	0		0	140	140	6,667	
Toluene	0	0		0	330	330	15,714	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	66,666	
1,1,1-Trichloroethane	0	0		0	610	610	29,047	
1,1,2-Trichloroethane	0	0		0	680	680	32,380	
Trichloroethylene	0	0		0	450	450	21,428	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	5,238	
2,4-Dichlorophenol	0	0		0	340	340	16,190	
2,4-Dimethylphenol	0	0		0	130	130	6,190	
4,6-Dinitro-o-Cresol	0	0		0	16	16.0	762	
2,4-Dinitrophenol	0	0		0	130	130	6,190	
2-Nitrophenol	0	0		0	1,600	1,600	76,189	
4-Nitrophenol	0	0		0	470	470	22,381	

p-Chloro-m-Cresol	0	0		0	500	500	23,809	
Pentachlorophenol	0	0		0	15.958	16.0	760	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	4,333	
Acenaphthene	0	0		0	17	17.0	810	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	59	59.0	2,809	
Benzo(a)Anthracene	0	0		0	0.1	0.1	4.76	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	6,000	6,000	285,710	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	43,333	
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	2,571	
Butyl Benzyl Phthalate	0	0		0	35	35.0	1,667	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	160	160	7,619	
1,3-Dichlorobenzene	0	0		0	69	69.0	3,286	
1,4-Dichlorobenzene	0	0		0	150	150	7,143	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	800	800	38,095	
Dimethyl Phthalate	0	0		0	500	500	23,809	
Di-n-Butyl Phthalate	0	0		0	21	21.0	1,000	
2,4-Dinitrotoluene	0	0		0	320	320	15,238	
2,6-Dinitrotoluene	0	0		0	200	200	9,524	
1,2-Diphenylhydrazine	0	0		0	3	3.0	143	
Fluoranthene	0	0		0	40	40.0	1,905	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	2	2.0	95.2	
Hexachlorocyclopentadiene	0	0		0	1	1.0	47.6	
Hexachloroethane	0	0		0	12	12.0	571	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	2,100	2,100	99,998	
Naphthalene	0	0		0	43	43.0	2,048	
Nitrobenzene	0	0		0	810	810	38,571	
n-Nitrosodimethylamine	0	0		0	3,400	3,400	161,902	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	59	59.0	2,809	
Phenanthrene	0	0		0	1	1.0	47.6	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	26	26.0	1,238	

☑ ***THH*** CCT (min): 720 PMF: 0.179 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
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	267	
Total Arsenic	0	0		0	10	10.0	476	
Total Barium	0	0		0	2,400	2,400	114,284	
Total Boron	0	0		0	3,100	3,100	147,617	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	4	4.0	190	
Dissolved Iron	0	0		0	300	300	14,285	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	47,618	
Total Mercury	0	0		0	0.050	0.05	2.38	
Total Nickel	0	0		0	610	610	29,047	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	0.24	0.24	11.4	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	3	3.0	143	
Acrylamide	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	N/A	N/A	N/A	
Benzene	0	0		0	N/A	N/A	N/A	
Bromoform	0	0		0	N/A	N/A	N/A	
Carbon Tetrachloride	0	0		0	N/A	N/A	N/A	
Chlorobenzene	0	0		0	100	100.0	4,762	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	N/A	N/A	N/A	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	N/A	N/A	N/A	
1,1-Dichloroethylene	0	0		0	33	33.0	1,571	
1,2-Dichloropropane	0	0		0	N/A	N/A	N/A	
1,3-Dichloropropylene	0	0		0	N/A	N/A	N/A	
Ethylbenzene	0	0		0	68	68.0	3,238	

Methyl Bromide	0	0		0	100	100.0	4,762	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	N/A	N/A	N/A	
1,1,2,2-Tetrachloroethane	0	0		0	N/A	N/A	N/A	
Tetrachloroethylene	0	0		0	N/A	N/A	N/A	
Toluene	0	0		0	57	57.0	2,714	
1,2-trans-Dichloroethylene	0	0		0	100	100.0	4,762	
1,1,1-Trichloroethane	0	0		0	10,000	10,000	476,183	
1,1,2-Trichloroethane	0	0		0	N/A	N/A	N/A	
Trichloroethylene	0	0		0	N/A	N/A	N/A	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	30	30.0	1,429	
2,4-Dichlorophenol	0	0		0	10	10.0	476	
2,4-Dimethylphenol	0	0		0	100	100.0	4,762	
4,6-Dinitro-o-Cresol	0	0		0	2	2.0	95.2	
2,4-Dinitrophenol	0	0		0	10	10.0	476	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	4,000	4,000	190,473	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Acenaphthene	0	0		0	70	70.0	3,333	
Anthracene	0	0		0	300	300	14,285	
Benzidine	0	0		0	N/A	N/A	N/A	
Benzo(a)Anthracene	0	0		0	N/A	N/A	N/A	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroisopropyl)Ether	0	0		0	200	200	9,524	
Bis(2-Ethylhexyl)Phthalate	0	0		0	N/A	N/A	N/A	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	0.1	0.1	4.76	
2-Chloronaphthalene	0	0		0	800	800	38,095	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	1,000	1,000	47,618	
1,3-Dichlorobenzene	0	0		0	7	7.0	333	
1,4-Dichlorobenzene	0	0		0	300	300	14,285	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	600	600	28,571	
Dimethyl Phthalate	0	0		0	2,000	2,000	95,237	
Di-n-Butyl Phthalate	0	0		0	20	20.0	952	
2,4-Dinitrotoluene	0	0		0	N/A	N/A	N/A	

2,6-Dinitrotoluene	0	0		0	N/A	N/A	N/A	
1,2-Diphenylhydrazine	0	0		0	N/A	N/A	N/A	
Fluoranthene	0	0		0	20	20.0	952	
Fluorene	0	0		0	50	50.0	2,381	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	N/A	N/A	N/A	
Hexachlorocyclopentadiene	0	0		0	4	4.0	190	
Hexachloroethane	0	0		0	N/A	N/A	N/A	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	34	34.0	1,619	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	10	10.0	476	
n-Nitrosodimethylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	N/A	N/A	N/A	
Phenanthrene	0	0		0	N/A	N/A	N/A	
Pyrene	0	0		0	20	20.0	952	
1,2,4-Trichlorobenzene	0	0		0	0.07	0.07	3.33	

☑ ***CRL*** CCT (min): 720 PMF: 0.261 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
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Barium	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	

Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	N/A	N/A	N/A	
Acrylamide	0	0		0	0.07	0.07	15.3	
Acrylonitrile	0	0		0	0.06	0.06	13.1	
Benzene	0	0		0	0.58	0.58	127	
Bromoform	0	0		0	7	7.0	1,532	
Carbon Tetrachloride	0	0		0	0.4	0.4	87.6	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.8	0.8	175	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	5.7	5.7	1,248	
Dichlorobromomethane	0	0		0	0.95	0.95	208	
1,2-Dichloroethane	0	0		0	9.9	9.9	2,167	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.9	0.9	197	
1,3-Dichloropropylene	0	0		0	0.27	0.27	59.1	
Ethylbenzene	0	0		0	N/A	N/A	N/A	
Methyl Bromide	0	0		0	N/A	N/A	N/A	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	20	20.0	4,378	
1,1,2,2-Tetrachloroethane	0	0		0	0.2	0.2	43.8	
Tetrachloroethylene	0	0		0	10	10.0	2,189	
Toluene	0	0		0	N/A	N/A	N/A	
1,2-trans-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,1,1-Trichloroethane	0	0		0	N/A	N/A	N/A	
1,1,2-Trichloroethane	0	0		0	0.55	0.55	120	
Trichloroethylene	0	0		0	0.6	0.6	131	
Vinyl Chloride	0	0		0	0.02	0.02	4.38	
2-Chlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dichlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dimethylphenol	0	0		0	N/A	N/A	N/A	
4,6-Dinitro-o-Cresol	0	0		0	N/A	N/A	N/A	
2,4-Dinitrophenol	0	0		0	N/A	N/A	N/A	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	0.030	0.03	6.57	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.5	1.5	328	
Acenaphthene	0	0		0	N/A	N/A	N/A	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	0.0001	0.0001	0.022	
Benzo(a)Anthracene	0	0		0	0.001	0.001	0.22	
Benzo(a)Pyrene	0	0		0	0.0001	0.0001	0.022	

3,4-Benzofluoranthene	0	0		0	0.001	0.001	0.22	
Benzo(k)Fluoranthene	0	0		0	0.01	0.01	2.19	
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	6.57	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	70.1	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	N/A	N/A	N/A	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	0.12	0.12	26.3	
Dibenzo(a,h)Anthrancene	0	0		0	0.0001	0.0001	0.022	
1,2-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,3-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,4-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
3,3-Dichlorobenzidine	0	0		0	0.05	0.05	10.9	
Diethyl Phthalate	0	0		0	N/A	N/A	N/A	
Dimethyl Phthalate	0	0		0	N/A	N/A	N/A	
Di-n-Butyl Phthalate	0	0		0	N/A	N/A	N/A	
2,4-Dinitrotoluene	0	0		0	0.05	0.05	10.9	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	10.9	
1,2-Diphenylhydrazine	0	0		0	0.03	0.03	6.57	
Fluoranthene	0	0		0	N/A	N/A	N/A	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	0.00008	0.00008	0.018	
Hexachlorobutadiene	0	0		0	0.01	0.01	2.19	
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A	
Hexachloroethane	0	0		0	0.1	0.1	21.9	
Indeno(1,2,3-cd)Pyrene	0	0		0	0.001	0.001	0.22	
Isophorone	0	0		0	N/A	N/A	N/A	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	N/A	N/A	N/A	
n-Nitrosodimethylamine	0	0		0	0.0007	0.0007	0.15	
n-Nitrosodi-n-Propylamine	0	0		0	0.005	0.005	1.09	
n-Nitrosodiphenylamine	0	0		0	3.3	3.3	722	
Phenanthrene	0	0		0	N/A	N/A	N/A	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	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

D. WET Test Results

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Survival
TIWC (decimal)	0.02
No. Per Replicate	1
T ST b value	0.75
T ST alpha value	0.2

Facility Name: Highspire Borough Authority STP

Permit No.: PA0024040

Replicate No.	Test Completion Date 7/23/2018 Control	TIWC
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11		
12		
13		
14		
15		
Mean	1.000	1.000
Std Dev.	0.000	0.000
# Replicates	10	10
T-Test Result		
Deg. of Freedom		
Critical T Value		
Pass or Fail	PASS	

Replicate No.	Test Completion Date 7/16/2019 Control	TIWC
1	1	1
2	1	1
3	0	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11		
12		
13		
14		
15		
Mean	0.900	1.000
Std Dev.	0.316	0.000
# Replicates	10	10
T-Test Result		
Deg. of Freedom		
Critical T Value		
Pass or Fail	PASS	

Replicate No.	Test Completion Date 5/12/2020 Control	TIWC
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11		
12		
13		
14		
15		
Mean	1.000	1.000
Std Dev.	0.000	0.000
# Replicates	10	10
T-Test Result		
Deg. of Freedom		
Critical T Value		
Pass or Fail	PASS	

Replicate No.	Test Completion Date 5/10/2021 Control	TIWC
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11		
12		
13		
14		
15		
Mean	1.000	1.000
Std Dev.	0.000	0.000
# Replicates	10	10
T-Test Result		
Deg. of Freedom		
Critical T Value		
Pass or Fail	PASS	

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Reproduction
TIWC (decimal)	0.02
No. Per Replicate	1
T ST b value	0.75
T ST alpha value	0.2

Facility Name: Highspire Borough Authority STP

Permit No.: PA0024040

Replicate No.	Test Completion Date 7/23/2018 Control	TIWC
1	36	34
2	32	36
3	32	35
4	37	32
5	32	38
6	34	40
7	34	34
8	36	35
9	37	29
10	29	29
11		
12		
13		
14		
15		
Mean	33.900	34.200
Std Dev.	2.644	3.521
# Replicates	10	10
T-Test Result	6.8665	
Deg. of Freedom	15	
Critical T Value	0.8662	
Pass or Fail	PASS	

Replicate No.	Test Completion Date 7/23/2019 Control	TIWC
1	27	25
2	28	30
3	4	34
4	23	30
5	35	31
6	34	31
7	30	32
8	34	32
9	28	32
10	30	31
11		
12		
13		
14		
15		
Mean	27.300	30.800
Std Dev.	8.982	2.348
# Replicates	10	10
T-Test Result	4.5768	
Deg. of Freedom	15	
Critical T Value	0.8662	
Pass or Fail	PASS	

Replicate No.	Test Completion Date 5/12/2020 Control	TIWC
1	36	33
2	28	16
3	34	35
4	34	34
5	37	36
6	39	34
7	36	34
8	36	32
9	31	34
10	36	34
11		
12		
13		
14		
15		
Mean	34.700	32.200
Std Dev.	3.164	5.789
# Replicates	10	10
T-Test Result	3.1211	
Deg. of Freedom	14	
Critical T Value	0.8681	
Pass or Fail	PASS	

Replicate No.	Test Completion Date 5/10/2021 Control	TIWC
1	36	36
2	34	36
3	31	36
4	40	43
5	27	26
6	32	35
7	36	36
8	29	36
9	17	25
10	24	18
11		
12		
13		
14		
15		
Mean	30.600	32.700
Std Dev.	6.703	7.349
# Replicates	10	10
T-Test Result	3.4626	
Deg. of Freedom	16	
Critical T Value	0.8647	
Pass or Fail	PASS	

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Survival
TWC (decimal)	0.02
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name: Highspire Borough Authority STP

Permit No.: PA0024040

Test Completion Date: 7/24/2018

Replicate No.	Control	TWC
1	10	10
2	10	9
3	9	8
4	9	10
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	9.500	9.250
Std Dev.	0.577	0.957
# Replicates	4	4

T-Test Result	3.6457
Deg. of Freedom	4
Critical T Value	0.7407
Pass or Fail	PASS

Test Completion Date: 7/23/2019

Replicate No.	Control	TWC
1	10	10
2	9	9
3	10	10
4	10	9
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	9.750	9.500
Std Dev.	0.500	0.577
# Replicates	4	4

T-Test Result	5.3848
Deg. of Freedom	5
Critical T Value	0.7267
Pass or Fail	PASS

Test Completion Date: 5/12/2020

Replicate No.	Control	TWC
1	10	10
2	10	9
3	10	9
4	9	9
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	9.750	9.250
Std Dev.	0.500	0.500
# Replicates	4	4

T-Test Result	5.1314
Deg. of Freedom	5
Critical T Value	0.7267
Pass or Fail	PASS

Test Completion Date: 5/11/2021

Replicate No.	Control	TWC
1	10	10
2	10	10
3	10	10
4	10	10
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	10.000	10.000
Std Dev.	0.000	0.000
# Replicates	4	4

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	PASS

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Growth
TIWC (decimal)	0.02
No. Per Replicate	10
T ST b value	0.75
T ST alpha value	0.25

Facility Name
Highspire Borough Authority STP

Permit No.
PA0024040

Test Completion Date: 7/24/2018

Replicate No.	Control	TIWC
1	0.439	0.46
2	0.404	0.396
3	0.391	0.443
4	0.395	0.491
5		
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12		
13		
14		
15		
Mean	0.407	0.448
Std Dev.	0.022	0.040
# Replicates	4	4
T-Test Result	6.6195	
Deg. of Freedom	4	
Critical T Value	0.7407	
Pass or Fail	PASS	

Test Completion Date: 7/23/2019

Replicate No.	Control	TIWC
1	0.331	0.376
2	0.304	0.369
3	0.285	0.337
4	0.359	0.31
5		
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12		
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14		
15		
Mean	0.320	0.348
Std Dev.	0.032	0.030
# Replicates	4	4
T-Test Result	5.5581	
Deg. of Freedom	5	
Critical T Value	0.7267	
Pass or Fail	PASS	

Test Completion Date: 5/12/2020

Replicate No.	Control	TIWC
1	0.34	0.428
2	0.371	0.425
3	0.396	0.465
4	0.368	0.387
5		
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14		
15		
Mean	0.369	0.426
Std Dev.	0.023	0.032
# Replicates	4	4
T-Test Result	8.2453	
Deg. of Freedom	5	
Critical T Value	0.7267	
Pass or Fail	PASS	

Test Completion Date: 5/11/2021

Replicate No.	Control	TIWC
1	0.433	0.431
2	0.481	0.413
3	0.476	0.476
4	0.45	0.507
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.460	0.457
Std Dev.	0.023	0.043
# Replicates	4	4
T-Test Result	4.8652	
Deg. of Freedom	4	
Critical T Value	0.7407	
Pass or Fail	PASS	