

Application Type Renewal  
Facility Type Municipal  
Major / Minor Major

## NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Application No. PA0027618  
APS ID 712247  
Authorization ID 1216018

### Applicant and Facility Information

Applicant Name <u>Bethel Park Municipal Authority</u>	Facility Name <u>Piney Fork STP</u>
Applicant Address <u>3100 Piney Fork Road</u> <u>South Park, PA 15219</u>	Facility Address <u>3100 Piney Fork Road</u> <u>South Park Twp, PA 15219</u>
Applicant Contact <u>Scott Dunn</u>	Facility Contact _____
Applicant Phone <u>(412) 831-1049</u>	Facility Phone _____
Client ID <u>93757</u>	Site ID <u>247673</u>
Ch 94 Load Status <u>Not Overloaded</u>	Municipality <u>Bethel Park Borough</u>
Connection Status <u>No Limitations</u>	County <u>Allegheny</u>
Date Application Received <u>January 31, 2018</u>	EPA Waived? <u>No</u>
Date Application Accepted <u>February 6, 2018</u>	If No, Reason <u>Major Facility</u>
Purpose of Application <u>Renewal application to discharge treated sewage</u>	

### Summary of Review

This review is in response to an application received on February 6, 2018. Bethel Park Municipal Authority owns and operates a 4.92 MGD sewage treatment plant in Bethel Park Borough, Allegheny County. Sewage from Bethel Park Borough and parts of South Park Township is treated with screening, grit removal, primary clarification, trickling filters, final clarification, and ultraviolet disinfection before discharging through outfall 001 into Piney Creek. The Piney Fork plant also has a three million-gallon equalization tank for handling wet weather flow. Sludges from the plant are thickened, anaerobically digested, and dewatered with a belt filter press. Sludge is ultimately disposed of at the USA South Hills Landfill.

#### Public Participation

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

Approve	Deny	Signatures	Date
X		<b>James Vanek</b> James Vanek, P.E. / Environmental Engineer	December 1, 2022
X		<i>Mahbuba Iasmin</i> Mahbuba Iasmin, Ph.D., PE / Environmental Engineering Mgr	December 1, 2022

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	<u>001</u>	Design Flow (MGD)	<u>4.92</u>
Latitude	<u>40° 17' 12.24"</u>	Longitude	<u>-79° 59' 27.90"</u>
Quad Name	<u>Glassport</u>	Quad Code	<u>1606</u>
Wastewater Description: <u>Sewage Effluent</u>			
Receiving Waters	<u>Piney Fork (TSF)</u>	Stream Code	<u>39464</u>
NHD Com ID	<u>99408612</u>	RMI	<u>2.33</u>
Drainage Area	<u>12.5</u>	Yield (cfs/mi <sup>2</sup> )	<u>0.0665</u>
Q <sub>7-10</sub> Flow (cfs)	<u>0.8125</u>	Q <sub>7-10</sub> Basis	<u>Previous pollution report</u>
Elevation (ft)	<u>913</u>	Slope (ft/ft)	<u></u>
Watershed No.	<u>19-C</u>	Chapter 93 Class.	<u>TSF</u>
Existing Use	<u></u>	Existing Use Qualifier	<u></u>
Exceptions to Use	<u>none</u>	Exceptions to Criteria	<u>none</u>
Assessment Status	<u>Impaired</u>		
Cause(s) of Impairment	<u>CAUSE UNKNOWN, METALS, NUTRIENTS, PATHOGENS</u>		
Source(s) of Impairment	<u>ACID MINE DRAINAGE, MUNICIPAL POINT SOURCE DISCHARGES, SOURCE UNKNOWN</u>		
TMDL Status	<u>Final (4/7/2009)</u>	Name	<u>Peters Creek Watershed</u>
Background/Ambient Data		Data Source	
pH (SU)		<u></u>	
Temperature (°F)		<u></u>	
Hardness (mg/L)		<u></u>	
Other:		<u></u>	
Nearest Downstream Public Water Supply Intake		<u>West View Municipal Authority</u>	
PWS Waters	<u>Ohio River</u>	Flow at Intake (cfs)	<u>4800</u>
PWS RMI	<u></u>	Distance from Outfall (mi)	<u></u>

Changes Since Last Permit Issuance:

Treatment Facility Summary				
Treatment Facility Name: Piney Fork STP				
WQM Permit No.		Issuance Date		
8879-S				
0274430				
Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary With Phosphorus Reduction	Trickling Filter With Settling	Ultraviolet	4.4
Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
4.92	6155	Not Overloaded	Anaerobic Digestion	Landfill

Changes Since Last Permit Issuance:

Other Comments:

#### Compliance History

Effluent Violations for Outfall 001, from: October 1, 2021 To: August 31, 2022

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
CBOD5	05/31/22	Avg Mo	557	lbs/day	410	lbs/day
CBOD5	05/31/22	Avg Mo	557	lbs/day	410	lbs/day
CBOD5	05/31/22	Wkly Avg	1155	lbs/day	615	lbs/day
CBOD5	04/30/22	Wkly Avg	1607	lbs/day	1559	lbs/day
CBOD5	05/31/22	Wkly Avg	1155	lbs/day	615	lbs/day
CBOD5	07/31/22	Avg Mo	12	mg/L	10	mg/L

**NPDES Permit Fact Sheet  
Piney Fork STP**

**NPDES Permit No. PA0027618**

TSS	03/31/22	Avg Mo	1247	lbs/day	1231	lbs/day
TSS	04/30/22	Avg Mo	1658	lbs/day	1231	lbs/day
TSS	02/28/22	Avg Mo	1427	lbs/day	1231	lbs/day
TSS	05/31/22	Wkly Avg	2166	lbs/day	1847	lbs/day
TSS	05/31/22	Wkly Avg	2166	lbs/day	1847	lbs/day
TSS	03/31/22	Wkly Avg	1887	lbs/day	1847	lbs/day
TSS	04/30/22	Wkly Avg	3672	lbs/day	1847	lbs/day

Summary of Inspections:

Other Comments:

**Development of Effluent Limitations**

<b>Outfall No.</b>	001	<b>Design Flow (MGD)</b>	4.92
<b>Latitude</b>	40° 17' 12.00"	<b>Longitude</b>	-79° 59' 28.00"
<b>Wastewater Description:</b>	Sewage Effluent		

**Technology-Based Limitations**

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

**Table 1: Technology Based Limits**

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
CBOD <sub>5</sub>	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)

The TSS and pH limits are the same as those in EPA's secondary treatment regulation (40 CFR § 133.102).

Average monthly and maximum daily flow must be reported pursuant to 25 Pa. Code § 92a.61(d)(1). The minimum dissolved oxygen limit of 6.0 mg/L imposed in the previous permit will be reimposed in the new permit pursuant to 25 Pa. Code § 92a.61(b) (regarding reasonable monitoring requirements) and 40 CFR § 122.44(l) (regarding anti-backsliding).

In accordance with Section I of DEP's "Standard Operating Procedure for Clean Water Program Establishing Effluent Limitations for Individual Sewage Permits" [SOP No. BCW-PMT-033, Version 1.9, March 22, 2021] and under the authority of 25 Pa. Code § 92a.61(b), annual reporting for Total Nitrogen and Total Phosphorus is required for sewage discharges with design flows greater than 2,000 gpd to help evaluate treatment effectiveness and to monitor nutrient loading to the receiving watershed (this reporting was required by the previous permit and will be reimposed in the new permit). Pursuant to that same SOP and under the authority of § 92a.61(b), an annual reporting requirement for *E. coli* will be added to Outfall 001. *E. coli* was recently added to the bacteria water quality criteria in 25 Pa. Code § 93.7(a) and the monitoring will be used to determine if *E. coli* concentrations require additional controls.

Piney Fork STP uses ultraviolet light for disinfection rather than chlorine, so the TBELs for TRC from 92a.47(a)(8) are replaced with minimum and average monthly reporting requirements for ultraviolet light transmittance pursuant to §92a.61(b).

**Water Quality-Based Limitations**

A "Reasonable Potential Analysis" determined the following parameters were candidates for limitations: bis(2-ethylhexyl) phthalate, free available cyanide, and copper.

The following limitations were determined through water quality modeling (output files attached):

**Table 2: Water Quality Based Effluent Limits**

<b>Parameter</b>	<b>Limit (mg/l)</b>	<b>SBC</b>	<b>Model</b>
NH <sub>3</sub> N (5/1 – 10/31)	1.5	Average monthly	WQM 7.0
NH <sub>3</sub> N (11/1 – 4/30)	3.5	Average monthly	WQM 7.0
CBOD <sub>5</sub> (5/1 – 10/31)	10	Average monthly	WQM 7.0
Dissolved Oxygen	6.0	Average monthly	WQM 7.0
Aluminum	Report	Average monthly	Toxics Management Spreadsheet
Arsenic	Report	Average monthly	Toxics Management Spreadsheet
Benzene	Report	Average monthly	Toxics Management Spreadsheet
Boron	Report	Average monthly	Toxics Management Spreadsheet
Bis(2-ethylhexyl) phthalate	0.58 ug/l	Average monthly	Toxics Management Spreadsheet
Copper	30.1 ug/l	Average monthly	Toxics Management Spreadsheet
Free Cyanide	4.43 ug/l	Average monthly	Toxics Management Spreadsheet
Dissolved Iron	Report	Average monthly	Toxics Management Spreadsheet
Total Iron	Report	Average monthly	Toxics Management Spreadsheet
Zinc	Report	Average monthly	Toxics Management Spreadsheet

#### WQM 7.0 Water Quality Modeling Program

WQM 7.0 is a water quality modeling program for Windows that determines Waste Load Allocations ("WLAs") and effluent limitations for carbonaceous biochemical oxygen demand ("CBOD<sub>5</sub>"), ammonia-nitrogen, and dissolved oxygen ("DO") for single and multiple point-source discharge scenarios. To accomplish this, the model simulates two basic processes. In the ammonia-nitrogen module, the model simulates the mixing and degradation of ammonia-nitrogen in the stream and compares calculated instream ammonia-nitrogen concentrations to ammonia-nitrogen water quality criteria. In the DO module, the model simulates the mixing and consumption of DO in the stream due to the degradation of CBOD<sub>5</sub> and ammonia-nitrogen, and compares calculated instream DO concentrations to DO water quality criteria. WQM 7.0 then determines the highest pollutant loadings that the stream can assimilate while still meeting water quality criteria under design conditions. The output from WQM 7.0 is in the references section of this report.

WQM 7.0 Modeling for Outfall 001

**Table 3: 001 WQM 7.0 Summer Inputs**

Discharge Characteristics	
Parameter	Value
River Mile Index	2.33
Discharge Flow (MGD)	4.92
Discharge Temp. (°C) (Summer)	25.0
Basin/Stream Characteristics	
Parameter	Value
Area in Square Miles	12.5
Q <sub>7-10</sub> (cfs)	0.813
Low-flow yield (cfs/mi <sup>2</sup> )	0.067
Elevation (ft)	913
Slope	0.0044
Stream Temp. (°C) (Summer)	20.0
Reach Width (ft)	10.5
Reach Depth (ft)	1.43
Stream pH (s.u.)	7.0

is assumed to be 8.24 mg/L. The width and depth of the stream have been measured and placed in the model.

**Table 4: 001 WQM 7.0 Winter Inputs**

Discharge Characteristics	
Parameter	Value
River Mile Index	2.33
Discharge Flow (MGD)	4.92
Discharge Temp. (°C) (Winter)	15.0
Basin/Stream Characteristics	
Parameter	Value
Area in Square Miles	12.5
Q <sub>7-10</sub> (cfs)	1.63
Low-flow yield (cfs/mi <sup>2</sup> )	0.134
Elevation (ft)	913
Slope	0.0044
Stream Temp. (°C) (Winter)	5.0
Reach Width (ft)	10.5
Reach Depth (ft)	1.43
Stream pH (s.u.)	7.0

The WQM 7.0 model is run for Outfall 001 to determine whether WQBELs are necessary for CBOD<sub>5</sub>, ammonia-nitrogen, and/or dissolved oxygen. Input values for the WQM 7.0 model are shown in Tables 3 and 4.

DEP's modeling for sewage discharges is a conditional two-step process. First, a discharge is modeled for the summer period (May through October) using warm temperatures for the discharge and the receiving stream. Modeling for the summer period is done first because allowable ammonia-nitrogen concentrations in a discharge are lower at higher temperatures (i.e., warm temperatures are more likely to result in critical loading conditions). Reduced dissolved oxygen levels also appear to increase ammonia toxicity and the maximum concentration of dissolved oxygen in water is lower at higher temperatures. The second step is to evaluate WQBELs for the winter period, but only if modeling shows that WQBELs are needed for the summer period.

For the summer period, pursuant to DEP's "Implementation Guidance of Section 93.7 Ammonia Criteria" [Doc. No. 391-2000-013] (Ammonia Guidance) and in the absence of site-specific data, the discharge temperature is assumed to be 25°C and the design stream temperature and pH are assumed to be 25°C and 7.0 s.u., respectively, based on the recommendations for trout stocking fisheries. Input discharge concentrations for CBOD<sub>5</sub> and Ammonia-Nitrogen are the average monthly limits expected from secondary treatment (25 mg/L and 25.0 mg/L, respectively). The input discharge concentration for dissolved oxygen is 3.0 mg/L. The background dissolved oxygen concentration of Piney Fork at 20°C

For the winter period, pursuant to DEP's "Implementation Guidance of Section 93.7 Ammonia Criteria" [Doc. No. 391-2000-013] (Ammonia Guidance) and in the absence of site-specific data, the discharge temperature is assumed to be 15°C and the design stream temperature and pH are assumed to be 5°C and 7.0 s.u., respectively, based on the recommendations for trout stocking fisheries. Input discharge concentrations for CBOD<sub>5</sub> and Ammonia-Nitrogen are the average monthly limits expected from secondary treatment (25 mg/L and 25.0 mg/L, respectively). The input discharge concentration for dissolved oxygen is 3.0 mg/L. The background dissolved oxygen concentration of Piney Fork at 5°C is assumed to be 12 mg/L. The width and depth of the stream have been measured and placed in the model.

The results of the modeling indicate that more stringent WQBELs for Ammonia-Nitrogen, CBOD<sub>5</sub>, and Dissolved Oxygen are required. The winter WQBELs for ammonia nitrogen are more stringent than three times the summer WQBEL and will be placed in the permit.

Mass Limits

Mass limits for NH<sub>3</sub>-N are calculated using the concentration limits in Table 1 and the Piney Fork STP's design flow of 4.92 MGD with the following formula:

*Design flow (average annual) (MGD) × concentration limit (mg/L) at design flow × conversion factor (8.34) = mass limit (lb/day)*

**Table 5. Ammonia-Nitrogen Effluent Limits and Monitoring Requirements for Outfall 001**

Parameter	Mass Limits (lbs/day)	Concentration Limits (mg/L)	
	Average Monthly	Average Monthly	Instant. Maximum
Ammonia-Nitrogen May 1 – October 31	60	1.5	3.0
Ammonia-Nitrogen November 1 – April 30	140	3.5	7.0

The IMAX concentration limits for ammonia-nitrogen will appear in the permit, but since 24-hour composite sampling is required for ammonia-nitrogen and IMAX limits only apply when grab sampling is specified, Piney Fork STP does not need to report IMAX results on DMRs for compliance with the ammonia-nitrogen IMAX limits. The IMAX limits may be used by DEP to spot-check compliance by collecting a grab sample during a site inspection.

Pursuant to Chapter 5, Section C.2 of DEP's "Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits," mass limits for conventional pollutants with a magnitude greater than 60.0 are rounded down to the nearest 5.0. Ammonia-nitrogen is a non-conventional pollutant, but the rounding guidelines for conventional pollutants are followed for the mass limits as they are for ammonia-nitrogen's concentration limits.<sup>1</sup> In accordance with Section IV of DEP's "Standard Operating Procedure for Clean Water Program Establishing Effluent Limitations for Individual Sewage Permits", only average monthly mass limits are imposed for ammonia-nitrogen.

#### Total Maximum Daily Load for the Peters Creek Watershed

A Total Maximum Daily Load ("TMDL") for the Peters Creek Watershed ("Peters Creek TMDL") was completed on January 6, 2009, for the control of acid mine drainage pollutants: aluminum, iron, manganese, sediment, and pH. In accordance with 40 CFR § 122.44(d)(1)(vii)(B), when developing WQBELs, the permitting authority shall ensure that effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with the assumptions and requirements of any available wasteload allocation (WLA) for the discharge prepared by the State and approved by EPA pursuant to 40 CFR § 130.7. The Piney Fork STP was not assigned WLAs for aluminum, iron, and manganese by the Peters Creek TMDL. The TMDL does not establish wasteload allocations for sediment or pH. Since the Piney Fork STP was not assigned any specific WLA's, only monitoring will be required for iron, aluminum, and manganese.

**Table 6: TMDL WQBELs for Outfall 001**

Parameter	Maximum Daily (mg/L)
Aluminum, Total	Monitor and report
Iron, Total	Monitor and report
Manganese, Total	Monitor and report

#### Toxics Management Spreadsheet

The Toxics Management Spreadsheet (TMS) is used to calculate a reasonable potential (RP) analysis and determine water quality-based effluent limitations for discharges of toxic pollutants. Discharge characteristics and stream characteristics are placed into the TMS. For NPDES renewals, the maximum concentration reported in the application or Discharge Monitoring Reports (DMR's) is entered as the discharge concentration for that pollutant. That will be used to conduct the reasonable potential (RP) analysis after a WQBEL is calculated.

WQBEL's can be based on acute fish criterion (AFC), chronic fish criterion (CFC), threshold human health criterion (THH), or carcinogen risk level (CRC). AFC is based on the mixing of stream flow and wastewater flow after 15 minutes. CFC is

<sup>1</sup> Section IV.D of DEP's Ammonia Guidance provides a general note on precision for concentration limits with rounding guidelines for concentration limits (not specific to any parameter) equivalent to the rounding guidelines for conventional pollutants in DEP's "Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits". Therefore, the rounding guidelines for conventional pollutants are followed for both concentration and mass limits for ammonia-nitrogen.



based on the mixing of stream flow and wastewater flow after 12 hours. THH is based on the mixing of stream flow and wastewater flow after 12 hours or at the point of a potable water intake. CRL is based on the mixing of stream flow and wastewater flow after 12 hours. CRL limits use the harmonic mean flow of the stream. AFC, CFC and THH WQBEL's use the Q<sub>7-10</sub> flow of the receiving stream.

Table 2 lists the recommended WQBEL's for Piney Fork STP. Actual limits for bis-2-ethyl (hexyl) phthalate, free cyanide, and copper are recommended. Monitoring for aluminum, arsenic, benzene, boron, dissolved iron, total iron, and zinc is also recommended. The TMS recommends numeric limits for pollutants whose application reported maximum discharge concentration is equal to or greater than 50% of the WQBEL. The TMS recommends monitoring for pollutants whose application reported maximum discharge concentration is greater than 10% and less than 50% of the WQBEL for conservative pollutants. The TMS recommends monitoring for pollutants whose application reported maximum discharge concentration is greater than 25% and less than 50% of the WQBEL for non-conservative pollutants.

The input and output for the TMS is attached in the references section of this report.

### Mass Limits

In accordance with Table 5-3 of DEP's "Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits" and Section IV of DEP's "Standard Operating Procedure for Clean Water Program Establishing Effluent Limitations for Individual Sewage Permits", mass limits are calculated for CBOD<sub>5</sub> and TSS. Average monthly and average weekly mass limits in units of pounds per day are calculated using the concentration limits in Table 1 and the Uniontown STP's hydraulic re-rate design flow of 12.4 MGD with the following formula:

*Design flow (average annual) (MGD) × concentration limit (mg/L) at design flow × conversion factor (8.34) = mass limit (lb/day)*

**Table 7: Mass TBELs for Sanitary Wastewaters**

Parameter	Average (mg/L)	Monthly	Average (mg/L)	Weekly
<b>CBOD5 (5/1-10/31)</b>	410		615	
<b>CBOD5 (11/1-4/30)</b>	1025		1555	
<b>Total Suspended Solids</b>	1230		1845	

Pursuant to Chapter 5, Section C.2 of DEP's "Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits" mass limits for conventional pollutants with a magnitude greater than 60.0 are rounded down to the nearest 5.0 mg/L and limits greater than 10.0 and less than 60.0 are rounded down to the nearest 1.0 mg/L. The mass limits in Table 7 account for this rounding convention.

### Phosphorus

A cause and effect survey has been performed on Piney Fork. Data was collected between April 17, 2019 through June 5, 2019. The survey report is included in the references section. The survey concludes that Piney Fork is not attaining its designated aquatic life uses. The survey discovered elevated levels of phosphorus in Piney Fork. 25 PA Code section 96.5(c) states: "When it is determined that the discharge of phosphorus, alone or in combination with the discharge of other pollutants, contributes or threatens to impair existing or designated uses in a free-flowing surface water, phosphorus discharges from point source discharges shall be limited to an average monthly concentration of 2 mg/l."

The draft permit has interim and final limits for phosphorus. For the first three years Piney Fork STP will report phosphorus. The final two years of the permit will have a monthly average limit of 2 mg/l for phosphorus. After the cause and effect survey, the DEP's Division of Water Quality determined Piney Fork is eutrophicated and the cause is municipal point source discharges.

### **Influent Monitoring**

Pursuant to Section IV.E.8 of DEP's "Standard Operating Procedure (SOP) for Clean Water Program New and Reissuance Sewage Individual NPDES Permit Applications" [SOP No. BCW-PMT-002, Version 1.9, January 6, 2020], for POTWs with design flows greater than 2,000 GPD, influent BOD<sub>5</sub> and TSS monitoring is established in the permit with the same minimum measurement frequency and sample type used for the effluent (2/week, 24-Hr Composite) for the Piney Fork STP. The required influent monitoring will be for BOD<sub>5</sub> and TSS including average monthly and average weekly influent loading and average monthly and average weekly influent concentrations.

As stated in Footnote 3 in Part A of the current NPDES permit, the organic design capacity of 6,155 lbs BOD<sub>5</sub> per day for the treatment facility is used to prepare the annual Municipal Wasteload Management Report to determine whether an organic overload condition exists, as defined in 25 Pa. Code Chapter 94. That is, BOD<sub>5</sub> is the parameter used to determine whether a sewage treatment plant is organically overloaded.

### **Anti-Backsliding**

The seasonal effluent limits for CBOD<sub>5</sub> for May through October will remain the same as the limits in the previous permit due to anti-backsliding 40 CFR 122.44(l).

### **Industrial Contributors**

The applicant lists USA South Hills Landfill (Waste Management) as an industrial contributor to the sewage treatment plant. No other industrial contributors are listed in the application.

Permit No. PA0027618

**Whole Effluent Toxicity (WET)**

This draft permit recommends annual chronic WET testing with a TIWC of 91%. The following shows how the TIWC was determined.

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

- ☐ For the permit renewal application (4 tests).  
☒ Annually 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%, 95%, 90%, 45%, and 23%. The Target Instream Waste Concentration (TIWC) to be used for analysis of the results is: 90%.

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

Acute Partial Mix Factor (PMFa): **1.0**

Chronic Partial Mix Factor (PMFc): **1.0**

**1. Determine IWC – Acute (IWCa):**

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

$$[(4.92 \text{ MGD} \times 1.547) / ((0.8125 \text{ cfs} \times 1.0) + (4.92 \text{ MGD} \times 1.547))] \times 100 = \mathbf{90.3518\%}$$

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

**Type of Test for Permit Renewal: chronic**

**2. Determine Target IWCC (If Chronic Tests Required)**

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

$$[(4.92 \text{ MGD} \times 1.547) / ((0.8125 \text{ cfs} \times 1.0) + (4.92 \text{ MGD} \times 1.547))] \times 100 = \mathbf{90\%}$$

**3. Determine Dilution Series**

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

Dilution Series = 100%, 95%, 90%, 45%, and 23%.

**WET Limits**

Has reasonable potential been determined? ☒ YES ☐ NO

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

The WET Summary is attached in the reference section of this report.

**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 April 30, 2025.**

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) <sup>(1)</sup>		Concentrations (mg/L)				Minimum <sup>(2)</sup> Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Total Phosphorus	Report	XXX	XXX	Report	Report	XXX	2/week	24-Hr Composite
Copper, Total (ug/L)	XXX	XXX	XXX	Report	Report	XXX	1/week	24-Hr Composite
Cyanide, Free (ug/L)	XXX	XXX	XXX	Report	Report	XXX	1/week	24-Hr Composite
Bis(2-Ethylhexyl)Phthalate (ug/L)	XXX	XXX	XXX	Report	Report	XXX	1/week	Grab

Compliance Sampling Location: outfall 001

Other Comments:

**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: May 1, 2025 through Permit Expiration Date.**

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) <sup>(1)</sup>		Concentrations (mg/L)				Minimum <sup>(2)</sup> Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Total Phosphorus	82.0	XXX	XXX	2.0	4.0	5	2/week	24-Hr Composite
Copper, Total (ug/L)	XXX	XXX	XXX	30.1	46.9	75.2	1/week	24-Hr Composite
Cyanide, Free (ug/L)	XXX	XXX	XXX	4.43	6.91	11.1	1/week	24-Hr Composite
Bis(2-Ethylhexyl)Phthalate (ug/L)	XXX	XXX	XXX	0.58	0.91	1.5	1/week	Grab

Compliance Sampling Location: outfall 001

Other Comments:

**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) <sup>(1)</sup>		Concentrations (mg/L)				Minimum <sup>(2)</sup> Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Recorded
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9	1/day	Grab
Dissolved Oxygen	XXX	XXX	6.0 Inst Min	XXX	XXX	XXX	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5) Nov 1 - Apr 30	1025	1555 Wkly Avg	XXX	25.0	38.0	50	2/week	24-Hr Composite
Carbonaceous Biochemical Oxygen Demand (CBOD5) May 1 - Oct 31	410	615 Wkly Avg	XXX	10.0	15.0	20	2/week	24-Hr Composite
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	Report	Report Wkly Avg	XXX	Report	Report	XXX	2/week	24-Hr Composite
Total Suspended Solids	1231	1845 Wkly Avg	XXX	30.0	45.0	60	2/week	24-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	Report Wkly Avg	XXX	Report	Report	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

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) <sup>(1)</sup>		Concentrations (mg/L)				Minimum <sup>(2)</sup> Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/month	Grab
Ultraviolet light transmittance (%)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Measured
Total Nitrogen	XXX	XXX	XXX	Report	Report Daily Max	XXX	2/week	24-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	140	XXX	XXX	3.5	XXX	7	2/week	24-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	60	XXX	XXX	1.5	XXX	3	2/week	24-Hr Composite
Aluminum, Total	XXX	XXX	XXX	Report	Report Daily Max	XXX	1/week	24-Hr Composite
Arsenic, Total	XXX	XXX	XXX	Report	Report Daily Max	XXX	1/week	24-Hr Composite
Boron, Total	XXX	XXX	XXX	Report	Report Daily Max	XXX	1/week	24-Hr Composite
Iron, Dissolved	XXX	XXX	XXX	Report	Report Daily Max	XXX	1/week	24-Hr Composite
Iron, Total	XXX	XXX	XXX	Report	Report Daily Max	XXX	1/week	24-Hr Composite
Manganese, Total	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/quarter	24-Hr Composite
Zinc, Total	XXX	XXX	XXX	Report	Report Daily Max	XXX	1/week	24-Hr Composite
Benzene (ug/L)	XXX	XXX	XXX	Report	Report Daily Max	XXX	1/week	Grab
Toxicity, Chronic - Ceriodaphnia Reproduction (TUC)	XXX	XXX	XXX	XXX	1.1 Daily Max	XXX	See Permit	24-Hr Composite
Toxicity, Chronic - Pimephales Survival (TUC)	XXX	XXX	XXX	XXX	1.1 Daily Max	XXX	See Permit	24-Hr Composite

Compliance Sampling Location: outfall 001

# References



## WQM 7.0 Model Output

## 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
19C	39464	PINEY FORK	2.330	913.00	12.50	0.00440	0.00	<input checked="" type="checkbox"/>

## Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	<u>Tributary</u> Temp (°C)	<u>Stream</u> pH	Temp (°C)	pH
	(cfsm)	(cfs)	(cfs)									
Q7-10	0.130	0.00	0.00	0.000	0.000	0.0	15.02	1.43	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

## Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Piney Fork STP	PA0027618	4.9200	0.0000	0.0000	0.000	15.00	7.00

## Parameter Data

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

## 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
19C	39464	PINEY FORK	0.700	875.00	13.80	0.00440	0.00	<input checked="" type="checkbox"/>

## Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	<u>Tributary</u> Temp (°C)	<u>Stream</u> pH	<u>Stream</u> Temp (°C)	pH
	(cfsm)	(cfs)	(cfs)									
Q7-10	0.130	0.00	0.00	0.000	0.000	0.0	15.02	1.43	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

## Discharge Data

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

## Parameter Data

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

**WQM 7.0 Modeling Specifications**

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	<input checked="" type="checkbox"/>
WLA Method	EMPR	Use Inputted W/D Ratio	<input type="checkbox"/>
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	<input type="checkbox"/>
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	<input checked="" type="checkbox"/>
D.O. Saturation	90.00%	Use Balanced Technology	<input checked="" type="checkbox"/>
D.O. Goal	6		

**WQM 7.0 Hydrodynamic Outputs**

<u>SWP Basin</u>		<u>Stream Code</u>		<u>Stream Name</u>								
19C		39464		PINEY FORK								
<u>RMI</u>	<u>Stream Flow</u> (cfs)	<u>PWS With Flow</u> (cfs)	<u>Net Stream Flow</u> (cfs)	<u>Disc Analysis Flow</u> (cfs)	<u>Reach Slope</u> (ft/ft)	<u>Depth</u> (ft)	<u>Width</u> (ft)	<u>W/D Ratio</u>	<u>Velocity</u> (fps)	<u>Reach Trav Time</u> (days)	<u>Analysis Temp</u> (°C)	<u>Analysis pH</u>
<b>Q7-10 Flow</b>												
2.330	0.81	0.00	0.81	7.6112	0.00440	1.43	15.02	10.5	0.39	0.254	24.52	7.00
<b>Q1-10 Flow</b>												
2.330	0.52	0.00	0.52	7.6112	0.00440	NA	NA	NA	0.38	0.263	24.68	7.00
<b>Q30-10 Flow</b>												
2.330	1.11	0.00	1.11	7.6112	0.00440	NA	NA	NA	0.41	0.245	24.37	7.00

NPDES Permit No. PA0027618

Piney Fork STP

**WQM 7.0 D.O.Simulation**

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>			
19C	39464	PINEY FORK			
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>		<u>Analysis pH</u>	
2.330	4.920	24.518		7.000	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>		<u>Reach Velocity (fps)</u>	
15.015	1.430	10.500		0.392	
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>		<u>Reach Kn (1/days)</u>	
17.76	1.151	1.47		0.991	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>		<u>Reach DO Goal (mg/L)</u>	
6.216	18.257	Tsivoglou		6	
<u>Reach Travel Time (days)</u>	<u>Subreach Results</u>				
0.254	<u>TravTime (days)</u>	<u>CBOD5 (mg/L)</u>	<u>NH3-N (mg/L)</u>	<u>D.O. (mg/L)</u>	
	0.025	17.13	1.44	6.16	
	0.051	16.53	1.40	6.15	
	0.076	15.94	1.37	6.17	
	0.102	15.38	1.33	6.22	
	0.127	14.84	1.30	6.27	
	0.152	14.31	1.27	6.33	
	0.178	13.81	1.24	6.40	
	0.203	13.32	1.20	6.46	
	0.229	12.85	1.17	6.52	
	0.254	12.39	1.15	6.59	

**WQM 7.0 Wasteload Allocations**

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>
19C	39464	PINEY FORK

**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
	2.330 Piney Fork STP	11.37	12.15	11.37	12.15	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
	2.330 Piney Fork STP	1.42	1.63	1.42	1.63	0	0

**Dissolved Oxygen Allocations**

RMI	Discharge Name	<u>CBOD5</u>		<u>NH3-N</u>		<u>Dissolved Oxygen</u>		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
	2.33 Piney Fork STP	19.44	19.44	1.63	1.63	6	6	0	0

NPDES Permit No. PA0027618  
Piney Fork STP

### WQM 7.0 Effluent Limits

<u>SWP Basin</u>		<u>Stream Code</u>	<u>Stream Name</u>				
19C		39464	PINEY FORK				
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)
2.330	Piney Fork STP	PA0027618	4.920	CBOD5	19.44		
				NH3-N	1.63	3.26	
				Dissolved Oxygen			6



## 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
19C	39464	PINEY FORK	2.330	913.00	12.50	0.00440	0.00	<input checked="" type="checkbox"/>

## Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Temp (°C)	<u>Tributary</u> pH	<u>Stream</u> Temp (°C)	pH
	(cfsm)	(cfs)	(cfs)									
Q7-10	0.130	0.00	0.00	0.000	0.000	0.0	15.02	1.43	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

## Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Piney Fork STP	PA0027618	4.9200	0.0000	0.0000	0.000	15.00	7.00

## Parameter Data

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

## 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
19C	39464	PINEY FORK	0.700	875.00	13.80	0.00440	0.00	<input checked="" type="checkbox"/>

## Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	<u>Tributary</u> Temp (°C)	<u>Stream</u> pH	<u>Stream</u> Temp (°C)	pH
	(cfsm)	(cfs)	(cfs)									
Q7-10	0.130	0.00	0.00	0.000	0.000	0.0	15.02	1.43	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

## Discharge Data

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

## Parameter Data

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

**WQM 7.0 Modeling Specifications**

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	<input checked="" type="checkbox"/>
WLA Method	EMPR	Use Inputted W/D Ratio	<input type="checkbox"/>
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	<input type="checkbox"/>
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	<input checked="" type="checkbox"/>
D.O. Saturation	90.00%	Use Balanced Technology	<input checked="" type="checkbox"/>
D.O. Goal	6		

**WQM 7.0 Hydrodynamic Outputs**

<u>SWP Basin</u>		<u>Stream Code</u>		<u>Stream Name</u>								
19C		39464		PINEY FORK								
<u>RMI</u>	<u>Stream Flow</u> (cfs)	<u>PWS With</u> (cfs)	<u>Net Stream Flow</u> (cfs)	<u>Disc Analysis Flow</u> (cfs)	<u>Reach Slope</u> (ft/ft)	<u>Depth</u> (ft)	<u>Width</u> (ft)	<u>W/D Ratio</u>	<u>Velocity</u> (fps)	<u>Reach Trav Time</u> (days)	<u>Analysis Temp</u> (°C)	<u>Analysis pH</u>
<b>Q7-10 Flow</b>												
2.330	1.63	0.00	1.63	7.6112	0.00440	1.43	15.02	10.5	0.43	0.232	13.24	7.00
<b>Q1-10 Flow</b>												
2.330	1.04	0.00	1.04	7.6112	0.00440	NA	NA	NA	0.40	0.247	13.80	7.00
<b>Q30-10 Flow</b>												
2.330	2.21	0.00	2.21	7.6112	0.00440	NA	NA	NA	0.46	0.218	12.75	7.00

NPDES Permit No. PA0027618

Piney Fork STP

**WQM 7.0 D.O.Simulation**

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>			
19C	39464	PINEY FORK			
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>		<u>Analysis pH</u>	
2.330	4.920	13.241		7.000	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>		<u>Reach Velocity (fps)</u>	
15.015	1.430	10.500		0.430	
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>		<u>Reach Kn (1/days)</u>	
20.95	1.471	3.20		0.416	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>		<u>Reach DO Goal (mg/L)</u>	
6.395	15.321	Tsivoglou		6	
<u>Reach Travel Time (days)</u>	<u>Subreach Results</u>				
0.232	TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)	
	0.023	20.44	3.17	6.85	
	0.046	19.93	3.14	7.18	
	0.069	19.44	3.11	7.43	
	0.093	18.96	3.08	7.62	
	0.116	18.49	3.05	7.77	
	0.139	18.04	3.02	7.89	
	0.162	17.59	2.99	7.99	
	0.185	17.16	2.96	8.08	
	0.208	16.73	2.94	8.15	
	0.232	16.32	2.91	8.22	

**WQM 7.0 Wasteload Allocations**

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>
19C	39464	PINEY FORK

**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
	2.330 Piney Fork STP	24.1	27.4	24.1	27.4	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
	2.330 Piney Fork STP	3.01	3.89	3.01	3.89	0	0

**Dissolved Oxygen Allocations**

RMI	Discharge Name	<u>CBOD5</u>		<u>NH3-N</u>		<u>Dissolved Oxygen</u>		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
	2.33 Piney Fork STP	25	25	3.89	3.89	6	6	0	0

NPDES Permit No. PA0027618  
Piney Fork STP

### WQM 7.0 Effluent Limits

<u>SWP Basin</u>		<u>Stream Code</u>	<u>Stream Name</u>				
19C		39464	PINEY FORK				
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)
2.330	Piney Fork STP	PA0027618	4.920	CBOD5	25		
				NH3-N	3.89	7.78	
				Dissolved Oxygen			6

## TMS Model Output





Toxics Management Spreadsheet  
Version 1.3, March 2021

## Model Results

Bethel Park Municipal Authority, NPDES Permit No. PA0027618, Outfall 001

Instructions

Results

RETURN TO INPUTS

SAVE AS PDF

PRINT

☒ All

☐ Inputs

☐ Results

☐ Limits

☐ Hydrodynamics

☒ Wasteload Allocations

☒ AFC

CCT (min): 0.025

PMF: 1

Analysis Hardness (mg/l): 349.38

Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	830	
Total Antimony	0	0		0	1,100	1,100	1,217	
Total Arsenic	0	0		0	340	340	376	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	23,242	
Total Boron	0	0		0	8,100	8,100	8,965	
Total Cadmium	0	0		0	6.785	7.61	8.42	Chem Translator of 0.892 applied
Total Chromium (III)	0	0		0	1587.283	5,023	5,559	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	18.0	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	105	
Total Copper	0	0		0	43.678	45.5	50.4	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	24.3	
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	244.322	401	444	Chem Translator of 0.609 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	1.82	Chem Translator of 0.85 applied
Total Nickel	0	0		0	1349.253	1,352	1,496	Chem Translator of 0.998 applied
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	27.662	32.5	36.0	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	71.9	
Total Zinc	0	0		0	338.213	346	383	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	3.32	
Acrylonitrile	0	0		0	650	650	719	
Benzene	0	0		0	640	640	708	
Bromoform	0	0		0	1,800	1,800	1,992	
Carbon Tetrachloride	0	0		0	2,800	2,800	3,099	
Chlorobenzene	0	0		0	1,200	1,200	1,328	

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Chlorodibromomethane	0	0		0	N/A	N/A	N/A
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	19,922
Chloroform	0	0		0	1,900	1,900	2,103
Dichlorobromomethane	0	0		0	N/A	N/A	N/A
1,2-Dichloroethane	0	0		0	15,000	15,000	16,601
1,1-Dichloroethylene	0	0		0	7,500	7,500	8,301
1,2-Dichloropropane	0	0		0	11,000	11,000	12,174
1,3-Dichloropropylene	0	0		0	310	310	343
Ethylbenzene	0	0		0	2,900	2,900	3,210
Methyl Bromide	0	0		0	550	550	609
Methyl Chloride	0	0		0	28,000	28,000	30,989
Methylene Chloride	0	0		0	12,000	12,000	13,281
Tetrachloroethylene	0	0		0	700	700	775
Toluene	0	0		0	1,700	1,700	1,881
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	7,526
1,1,1-Trichloroethane	0	0		0	3,000	3,000	3,320
1,1,2-Trichloroethane	0	0		0	3,400	3,400	3,763
Trichloroethylene	0	0		0	2,300	2,300	2,546
Vinyl Chloride	0	0		0	N/A	N/A	N/A
2-Chlorophenol	0	0		0	560	560	620
2,4-Dichlorophenol	0	0		0	1,700	1,700	1,881
2,4-Dimethylphenol	0	0		0	660	660	730
4,6-Dinitro-o-Cresol	0	0		0	80	80.0	88.5
2,4-Dinitrophenol	0	0		0	660	660	730
2-Nitrophenol	0	0		0	8,000	8,000	8,854
4-Nitrophenol	0	0		0	2,300	2,300	2,546
p-Chloro-m-Cresol	0	0		0	160	160	177
Pentachlorophenol	0	0		0	8.723	8.72	9.65
Phenol	0	0		0	N/A	N/A	N/A
2,4,6-Trichlorophenol	0	0		0	460	460	509
Acenaphthene	0	0		0	83	83.0	91.9
Anthracene	0	0		0	N/A	N/A	N/A
Benzidine	0	0		0	300	300	332
Benzo(a)Anthracene	0	0		0	0.5	0.5	0.55
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	33,203
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	4,980
4-Bromophenyl Phenyl Ether	0	0		0	270	270	299
Butyl Benzyl Phthalate	0	0		0	140	140	155
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A
Chrysene	0	0		0	N/A	N/A	N/A
Dibenzo(a,h)Anthracene	0	0		0	N/A	N/A	N/A
1,2-Dichlorobenzene	0	0		0	820	820	908
1,3-Dichlorobenzene	0	0		0	350	350	387
1,4-Dichlorobenzene	0	0		0	730	730	808
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A

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Diethyl Phthalate	0	0		0	4,000	4,000	4,427	
Dimethyl Phthalate	0	0		0	2,500	2,500	2,767	
Di-n-Butyl Phthalate	0	0		0	110	110	122	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	1,771	
2,6-Dinitrotoluene	0	0		0	990	990	1,096	
1,2-Diphenylhydrazine	0	0		0	15	15.0	16.6	
Fluoranthene	0	0		0	200	200	221	
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	11.1	
Hexachlorocyclopentadiene	0	0		0	5	5.0	5.53	
Hexachloroethane	0	0		0	60	60.0	66.4	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	11,068	
Naphthalene	0	0		0	140	140	155	
Nitrobenzene	0	0		0	4,000	4,000	4,427	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	18,815	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	332	
Phenanthrene	0	0		0	5	5.0	5.53	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	144	
Aldrin	0	0		0	3	3.0	3.32	
alpha-BHC	0	0		0	N/A	N/A	N/A	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	0.95	0.95	1.05	
Chlordane	0	0		0	2.4	2.4	2.66	
4,4-DDT	0	0		0	1.1	1.1	1.22	
4,4-DDE	0	0		0	1.1	1.1	1.22	
4,4-DDD	0	0		0	1.1	1.1	1.22	
Dieldrin	0	0		0	0.24	0.24	0.27	
alpha-Endosulfan	0	0		0	0.22	0.22	0.24	
beta-Endosulfan	0	0		0	0.22	0.22	0.24	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.086	0.086	0.095	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.52	0.52	0.58	
Heptachlor Epoxide	0	0		0	0.5	0.5	0.55	
Toxaphene	0	0		0	0.73	0.73	0.81	

☒ CFC

CCT (min): 0.025

PMF: 1

Analysis Hardness (mg/l): 349.38

Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (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	243	
Total Arsenic	0	0		0	150	150	166	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	4,538	

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Total Boron	0	0		0	1,600	1,600	1,771	
Total Cadmium	0	0		0	0.586	0.68	0.76	Chem Translator of 0.857 applied
Total Chromium (III)	0	0		0	206.473	240	266	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	11.5	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	21.0	
Total Copper	0	0		0	26.082	27.2	30.1	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	5.76	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	1,660	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	9.521	15.6	17.3	Chem Translator of 0.609 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	1.0	Chem Translator of 0.85 applied
Total Nickel	0	0		0	149.860	150	166	Chem Translator of 0.997 applied
Total Selenium	0	0		0	4.600	4.99	5.52	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	14.4	
Total Zinc	0	0		0	340.980	346	383	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	3.32	
Acrylonitrile	0	0		0	130	130	144	
Benzene	0	0		0	130	130	144	
Bromoform	0	0		0	370	370	409	
Carbon Tetrachloride	0	0		0	560	560	620	
Chlorobenzene	0	0		0	240	240	266	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	3,874	
Chloroform	0	0		0	390	390	432	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	3,431	
1,1-Dichloroethylene	0	0		0	1,500	1,500	1,660	
1,2-Dichloropropane	0	0		0	2,200	2,200	2,435	
1,3-Dichloropropylene	0	0		0	61	61.0	67.5	
Ethylbenzene	0	0		0	580	580	642	
Methyl Bromide	0	0		0	110	110	122	
Methyl Chloride	0	0		0	5,500	5,500	6,087	
Methylene Chloride	0	0		0	2,400	2,400	2,656	
Tetrachloroethylene	0	0		0	140	140	155	
Toluene	0	0		0	330	330	365	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	1,549	
1,1,1-Trichloroethane	0	0		0	610	610	675	
1,1,2-Trichloroethane	0	0		0	680	680	753	
Trichloroethylene	0	0		0	450	450	498	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	122	
2,4-Dichlorophenol	0	0		0	340	340	376	
2,4-Dimethylphenol	0	0		0	130	130	144	
4,6-Dinitro-o-Cresol	0	0		0	16	16.0	17.7	
2,4-Dinitrophenol	0	0		0	130	130	144	

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2-Nitrophenol	0	0		0	1,600	1,600	1,771
4-Nitrophenol	0	0		0	470	470	520
p-Chloro-m-Cresol	0	0		0	500	500	553
Pentachlorophenol	0	0		0	6.693	6.69	7.41
Phenol	0	0		0	N/A	N/A	N/A
2,4,6-Trichlorophenol	0	0		0	91	91.0	101
Acenaphthene	0	0		0	17	17.0	18.8
Anthracene	0	0		0	N/A	N/A	N/A
Benzidine	0	0		0	59	59.0	65.3
Benzo(a)Anthracene	0	0		0	0.1	0.1	0.11
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	6,641
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	1,007
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	59.8
Butyl Benzyl Phthalate	0	0		0	35	35.0	38.7
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A
Chrysene	0	0		0	N/A	N/A	N/A
Dibenzo(a,h)Anthracene	0	0		0	N/A	N/A	N/A
1,2-Dichlorobenzene	0	0		0	160	160	177
1,3-Dichlorobenzene	0	0		0	69	69.0	76.4
1,4-Dichlorobenzene	0	0		0	150	150	166
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A
Diethyl Phthalate	0	0		0	800	800	885
Dimethyl Phthalate	0	0		0	500	500	553
Di-n-Butyl Phthalate	0	0		0	21	21.0	23.2
2,4-Dinitrotoluene	0	0		0	320	320	354
2,6-Dinitrotoluene	0	0		0	200	200	221
1,2-Diphenylhydrazine	0	0		0	3	3.0	3.32
Fluoranthene	0	0		0	40	40.0	44.3
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	2.21
Hexachlorocyclopentadiene	0	0		0	1	1.0	1.11
Hexachloroethane	0	0		0	12	12.0	13.3
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A
Isophorone	0	0		0	2,100	2,100	2,324
Naphthalene	0	0		0	43	43.0	47.6
Nitrobenzene	0	0		0	810	810	896
n-Nitrosodimethylamine	0	0		0	3,400	3,400	3,763
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A
n-Nitrosodiphenylamine	0	0		0	59	59.0	65.3
Phenanthrene	0	0		0	1	1.0	1.11
Pyrene	0	0		0	N/A	N/A	N/A
1,2,4-Trichlorobenzene	0	0		0	26	26.0	28.8

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Aldrin	0	0		0	0.1	0.1	0.11	
alpha-BHC	0	0		0	N/A	N/A	N/A	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	N/A	N/A	N/A	
Chlordane	0	0		0	0.0043	0.004	0.005	
4,4-DDT	0	0		0	0.001	0.001	0.001	
4,4-DDE	0	0		0	0.001	0.001	0.001	
4,4-DDD	0	0		0	0.001	0.001	0.001	
Dieldrin	0	0		0	0.056	0.056	0.062	
alpha-Endosulfan	0	0		0	0.056	0.056	0.062	
beta-Endosulfan	0	0		0	0.056	0.056	0.062	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.036	0.036	0.04	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.0038	0.004	0.004	
Heptachlor Epoxide	0	0		0	0.0038	0.004	0.004	
Toxaphene	0	0		0	0.0002	0.0002	0.0002	

☒ THH

CCT (min): 0.025

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	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	6.2	
Total Arsenic	0	0		0	10	10.0	11.1	
Total Barium	0	0		0	2,400	2,400	2,656	
Total Boron	0	0		0	3,100	3,100	3,431	
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	4.43	
Dissolved Iron	0	0		0	300	300	332	
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	1,107	
Total Mercury	0	0		0	0.050	0.05	0.055	
Total Nickel	0	0		0	610	610	675	
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	0.27	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	3	3.0	3.32	
Acrylonitrile	0	0		0	N/A	N/A	N/A	
Benzene	0	0		0	N/A	N/A	N/A	

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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	111
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	36.5
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	75.3
Methyl Bromide	0	0		0	100	100.0	111
Methyl Chloride	0	0		0	N/A	N/A	N/A
Methylene Chloride	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	63.1
1,2-trans-Dichloroethylene	0	0		0	100	100.0	111
1,1,1-Trichloroethane	0	0		0	10,000	10,000	11,068
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	33.2
2,4-Dichlorophenol	0	0		0	10	10.0	11.1
2,4-Dimethylphenol	0	0		0	100	100.0	111
4,6-Dinitro-o-Cresol	0	0		0	2	2.0	2.21
2,4-Dinitrophenol	0	0		0	10	10.0	11.1
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	4,427
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A
Acenaphthene	0	0		0	70	70.0	77.5
Anthracene	0	0		0	300	300	332
Benidine	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	221
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	0.11
2-Chloronaphthalene	0	0		0	800	800	885
Chrysene	0	0		0	N/A	N/A	N/A

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Dibenzo(a,h)Anthracene	0	0		0	N/A	N/A	N/A
1,2-Dichlorobenzene	0	0		0	1,000	1,000	1,107
1,3-Dichlorobenzene	0	0		0	7	7.0	7.75
1,4-Dichlorobenzene	0	0		0	300	300	332
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A
Diethyl Phthalate	0	0		0	600	600	664
Dimethyl Phthalate	0	0		0	2,000	2,000	2,214
Di-n-Butyl Phthalate	0	0		0	20	20.0	22.1
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	22.1
Fluorene	0	0		0	50	50.0	55.3
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	4.43
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	37.6
Naphthalene	0	0		0	N/A	N/A	N/A
Nitrobenzene	0	0		0	10	10.0	11.1
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	22.1
1,2,4-Trichlorobenzene	0	0		0	0.07	0.07	0.077
Aldrin	0	0		0	N/A	N/A	N/A
alpha-BHC	0	0		0	N/A	N/A	N/A
beta-BHC	0	0		0	N/A	N/A	N/A
gamma-BHC	0	0		0	4.2	4.2	4.65
Chlordane	0	0		0	N/A	N/A	N/A
4,4-DDT	0	0		0	N/A	N/A	N/A
4,4-DDE	0	0		0	N/A	N/A	N/A
4,4-DDD	0	0		0	N/A	N/A	N/A
Dieldrin	0	0		0	N/A	N/A	N/A
alpha-Endosulfan	0	0		0	20	20.0	22.1
beta-Endosulfan	0	0		0	20	20.0	22.1
Endosulfan Sulfate	0	0		0	20	20.0	22.1
Endrin	0	0		0	0.03	0.03	0.033
Endrin Aldehyde	0	0		0	1	1.0	1.11
Heptachlor	0	0		0	N/A	N/A	N/A
Heptachlor Epoxide	0	0		0	N/A	N/A	N/A
Toxaphene	0	0		0	N/A	N/A	N/A

☒ CRL

CCT (min): 0.396

PMF: 1

Analysis Hardness (mg/l): N/A

Analysis pH: N/A

Model Results

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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	
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 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	
Acrylonitrile	0	0		0	0.06	0.06	0.11	
Benzene	0	0		0	0.58	0.58	1.05	
Bromoform	0	0		0	7	7.0	12.7	
Carbon Tetrachloride	0	0		0	0.4	0.4	0.73	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.8	0.8	1.45	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	5.7	5.7	10.3	
Dichlorobromomethane	0	0		0	0.95	0.95	1.72	
1,2-Dichloroethane	0	0		0	9.9	9.9	18.0	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.9	0.9	1.63	
1,3-Dichloropropylene	0	0		0	0.27	0.27	0.49	
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	36.3	
Tetrachloroethylene	0	0		0	10	10.0	18.1	
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	1.	

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Trichloroethylene	0	0		0	0.6	0.6	1.09
Vinyl Chloride	0	0		0	0.02	0.02	0.036
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	0.054
Phenol	0	0		0	N/A	N/A	N/A
2,4,6-Trichlorophenol	0	0		0	1.5	1.5	2.72
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	0.0002
Benzo(a)Anthracene	0	0		0	0.001	0.001	0.002
Benzo(a)Pyrene	0	0		0	0.0001	0.0001	0.0002
3,4-Benzofluoranthene	0	0		0	0.001	0.001	0.002
Benzo(k)Fluoranthene	0	0		0	0.01	0.01	0.018
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	0.054
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	0.58
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	0.22
Dibenzo(a,h)Anthracene	0	0		0	0.0001	0.0001	0.0002
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	0.091
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	0.091
2,6-Dinitrotoluene	0	0		0	0.05	0.05	0.091
1,2-Diphenylhydrazine	0	0		0	0.03	0.03	0.054
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	0.0001
Hexachlorobutadiene	0	0		0	0.01	0.01	0.018
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A
Hexachloroethane	0	0		0	0.1	0.1	0.18
Indeno(1,2,3-cd)Pyrene	0	0		0	0.001	0.001	0.002
Isophorone	0	0		0	N/A	N/A	N/A
Naphthalene	0	0		0	N/A	N/A	N/A

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 **Recommended WQBELs & Monitoring Requirements**

	Mass Limits		Concentration Limits						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Aluminum	Report	Report	Report	Report	Report	µg/L	750	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Arsenic	Report	Report	Report	Report	Report	µg/L	11.1	THH	Discharge Conc > 10% WQBEL (no RP)
Total Boron	Report	Report	Report	Report	Report	µg/L	1,771	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Copper	1.23	1.92	30.1	46.9	75.2	µg/L	30.1	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Free Cyanide	0.18	0.28	4.43	6.91	11.1	µg/L	4.43	THH	Discharge Conc ≥ 50% WQBEL (RP)
Dissolved Iron	Report	Report	Report	Report	Report	µg/L	332	THH	Discharge Conc > 10% WQBEL (no RP)
Total Iron	Report	Report	Report	Report	Report	µg/L	1,660	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	346	AFC	Discharge Conc > 10% WQBEL (no RP)
Benzene	Report	Report	Report	Report	Report	µg/L	1.05	CRL	Discharge Conc > 25% WQBEL (no RP)
Bis(2-Ethylhexyl)Phthalate	0.024	0.037	0.58	0.91	1.45	µg/L	0.58	CRL	Discharge Conc ≥ 50% WQBEL (RP)
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☒ **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
Bromide	N/A	N/A	No WQS
Total Antimony	6.2	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	2,656	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Cadmium	N/A	N/A	Discharge Conc < TQL
Total Chromium (III)	266	µg/L	Discharge Conc ≤ 10% WQBEL
Hexavalent Chromium	N/A	N/A	Discharge Conc < TQL
Total Cobalt	21.0	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Total Lead	17.3	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	1,107	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	0.055	µg/L	Discharge Conc ≤ 10% WQBEL
Total Nickel	166	µg/L	Discharge Conc ≤ 10% WQBEL
Total Selenium	5.52	µg/L	Discharge Conc < TQL
Total Silver	32.5	µg/L	Discharge Conc < TQL
Total Thallium	0.27	µg/L	Discharge Conc < TQL
Total Molybdenum	N/A	N/A	No WQS
Acrolein	3.0	µg/L	Discharge Conc < TQL
Acrylonitrile	0.11	µg/L	Discharge Conc < TQL
Bromoform	12.7	µg/L	Discharge Conc ≤ 25% WQBEL
Carbon Tetrachloride	0.73	µg/L	Discharge Conc < TQL
Chlorobenzene	111	µg/L	Discharge Conc ≤ 25% WQBEL
Chlorodibromomethane	1.45	µg/L	Discharge Conc < TQL
Chloroethane	N/A	N/A	No WQS
2-Chloroethyl Vinyl Ether	3,874	µg/L	Discharge Conc < TQL
Chloroform	10.3	µg/L	Discharge Conc < TQL
Dichlorobromomethane	1.72	µg/L	Discharge Conc < TQL
1,1-Dichloroethane	N/A	N/A	No WQS
1,2-Dichloroethane	18.0	µg/L	Discharge Conc ≤ 25% WQBEL

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1,1-Dichloroethylene	36.5	µg/L	Discharge Conc ≤ 25% WQBEL
1,2-Dichloropropane	1.63	µg/L	Discharge Conc < TQL
1,3-Dichloropropylene	0.49	µg/L	Discharge Conc < TQL
1,4-Dioxane	N/A	N/A	No WQS
Ethylbenzene	75.3	µg/L	Discharge Conc ≤ 25% WQBEL
Methyl Bromide	111	µg/L	Discharge Conc ≤ 25% WQBEL
Methyl Chloride	6,087	µg/L	Discharge Conc ≤ 25% WQBEL
Methylene Chloride	36.3	µg/L	Discharge Conc < TQL
Tetrachloroethylene	18.1	µg/L	Discharge Conc < TQL
Toluene	63.1	µg/L	Discharge Conc ≤ 25% WQBEL
1,2-trans-Dichloroethylene	111	µg/L	Discharge Conc ≤ 25% WQBEL
1,1,1-Trichloroethane	675	µg/L	Discharge Conc < TQL
1,1,2-Trichloroethane	1.	µg/L	Discharge Conc < TQL
Trichloroethylene	1.09	µg/L	Discharge Conc < TQL
Vinyl Chloride	0.036	µg/L	Discharge Conc < TQL
2-Chlorophenol	33.2	µg/L	Discharge Conc < TQL
2,4-Dichlorophenol	11.1	µg/L	Discharge Conc < TQL
2,4-Dimethylphenol	111	µg/L	Discharge Conc < TQL
4,6-Dinitro-o-Cresol	2.21	µg/L	Discharge Conc < TQL
2,4-Dinitrophenol	11.1	µg/L	Discharge Conc < TQL
2-Nitrophenol	1,771	µg/L	Discharge Conc < TQL
4-Nitrophenol	520	µg/L	Discharge Conc < TQL
p-Chloro-m-Cresol	160	µg/L	Discharge Conc < TQL
Pentachlorophenol	0.054	µg/L	Discharge Conc < TQL
Phenol	4,427	µg/L	Discharge Conc < TQL
2,4,6-Trichlorophenol	2.72	µg/L	Discharge Conc < TQL
Acenaphthene	18.8	µg/L	Discharge Conc < TQL
Acenaphthylene	N/A	N/A	No WQS
Anthracene	332	µg/L	Discharge Conc < TQL
Benzidine	0.0002	µg/L	Discharge Conc < TQL
Benzo(a)Anthracene	0.002	µg/L	Discharge Conc < TQL
Benzo(a)Pyrene	0.0002	µg/L	Discharge Conc < TQL
3,4-Benzofluoranthene	0.002	µg/L	Discharge Conc < TQL
Benzo(ghi)Perylene	N/A	N/A	No WQS
Benzo(k)Fluoranthene	0.018	µg/L	Discharge Conc < TQL
Bis(2-Chloroethoxy)Methane	N/A	N/A	No WQS
Bis(2-Chloroethyl)Ether	0.054	µg/L	Discharge Conc < TQL
Bis(2-Chloroisopropyl)Ether	221	µg/L	Discharge Conc < TQL
4-Bromophenyl Phenyl Ether	59.8	µg/L	Discharge Conc < TQL
Butyl Benzyl Phthalate	0.11	µg/L	Discharge Conc < TQL
2-Chloronaphthalene	885	µg/L	Discharge Conc < TQL
4-Chlorophenyl Phenyl Ether	N/A	N/A	No WQS
Chrysene	0.22	µg/L	Discharge Conc < TQL
Dibenzo(a,h)Anthracene	0.0002	µg/L	Discharge Conc < TQL
1,2-Dichlorobenzene	177	µg/L	Discharge Conc < TQL
1,3-Dichlorobenzene	7.75	µg/L	Discharge Conc < TQL
1,4-Dichlorobenzene	166	µg/L	Discharge Conc < TQL

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3,3-Dichlorobenzidine	0.091	µg/L	Discharge Conc < TQL
Diethyl Phthalate	664	µg/L	Discharge Conc < TQL
Dimethyl Phthalate	553	µg/L	Discharge Conc < TQL
Di-n-Butyl Phthalate	22.1	µg/L	Discharge Conc ≤ 25% WQBEL
2,4-Dinitrotoluene	0.091	µg/L	Discharge Conc < TQL
2,6-Dinitrotoluene	0.091	µg/L	Discharge Conc < TQL
Di-n-Octyl Phthalate	N/A	N/A	No WQS
1,2-Diphenylhydrazine	0.054	µg/L	Discharge Conc < TQL
Fluoranthene	22.1	µg/L	Discharge Conc < TQL
Fluorene	55.3	µg/L	Discharge Conc < TQL
Hexachlorobenzene	0.0001	µg/L	Discharge Conc < TQL
Hexachlorobutadiene	0.018	µg/L	Discharge Conc < TQL
Hexachlorocyclopentadiene	1.11	µg/L	Discharge Conc < TQL
Hexachloroethane	0.18	µg/L	Discharge Conc < TQL
Indeno(1,2,3-cd)Pyrene	0.002	µg/L	Discharge Conc < TQL
Isophorone	37.6	µg/L	Discharge Conc < TQL
Naphthalene	47.6	µg/L	Discharge Conc < TQL
Nitrobenzene	11.1	µg/L	Discharge Conc < TQL
n-Nitrosodimethylamine	0.001	µg/L	Discharge Conc < TQL
n-Nitrosodi-n-Propylamine	0.009	µg/L	Discharge Conc < TQL
n-Nitrosodiphenylamine	5.99	µg/L	Discharge Conc < TQL
Phenanthrene	1.11	µg/L	Discharge Conc < TQL
Pyrene	22.1	µg/L	Discharge Conc < TQL
1,2,4-Trichlorobenzene	0.077	µg/L	Discharge Conc < TQL
Aldrin	0.000001	µg/L	Discharge Conc < TQL
alpha-BHC	0.0007	µg/L	Discharge Conc < TQL
beta-BHC	0.015	µg/L	Discharge Conc < TQL
gamma-BHC	0.95	µg/L	Discharge Conc < TQL
delta BHC	N/A	N/A	No WQS
Chlordane	0.0005	µg/L	Discharge Conc < TQL
4,4-DDT	0.00005	µg/L	Discharge Conc < TQL
4,4-DDE	0.00004	µg/L	Discharge Conc < TQL
4,4-DDD	0.0002	µg/L	Discharge Conc < TQL
Dieldrin	0.000002	µg/L	Discharge Conc < TQL
alpha-Endosulfan	0.062	µg/L	Discharge Conc < TQL
beta-Endosulfan	0.062	µg/L	Discharge Conc < TQL
Endosulfan Sulfate	22.1	µg/L	Discharge Conc < TQL
Endrin	0.033	µg/L	Discharge Conc < TQL
Endrin Aldehyde	1.11	µg/L	Discharge Conc < TQL
Heptachlor	0.00001	µg/L	Discharge Conc < TQL
Heptachlor Epoxide	0.00005	µg/L	Discharge Conc < TQL
Toxaphene	0.0002	µg/L	Discharge Conc < TQL

## **Cause and Effect Survey**

**MEMO**

**TO** James Vanek  
Environmental Engineer  
Clean Water Program

**FROM** Jamie Detweiler  
Aquatic Biologist 2  
Clean Water Program

**DATE** February 28, 2022

**RE** Cause and Effect Survey  
Piney Fork  
State Water Plan: 19C  
Hydrologic Unit Code: 05020005  
Stream Code: 39464  
Aquatic Life Use Designation: TSF  
Piney Fork Sewage Treatment Plant  
Bethel Park Municipal Authority  
South Park Township, Allegheny County

## **INTRODUCTION**

From April 17, 2019 through June 5, 2019, at the request of Donald Leone, formerly of the Clean Water Program, a cause and effect survey was conducted on Piney Fork, in the vicinity of the confluence of Bethel Park Municipal Authority Piney Fork Sewage Treatment Plant (Piney Fork STP) (Figure 1). The previous data collection and assessment efforts indicate that this reach of Piney Fork is currently not attaining its protected aquatic life use as described in the latest 2022 Pennsylvania Integrated Water Quality Monitoring and Assessment Report. The listed sources are Municipal Point Source Discharges, Source Unknown, and Acid Mine Drainage; with the causes listed as Nutrients, Cause Unknown, and Acid Mine Drainage/Metals, respectively. The Department's goal for this survey was to determine if copper is exceeding Chapter 93 Water Quality Criteria above or below the discharge, to determine if the Piney Fork STP is having an impact and/or causing or contributing to nonattainment of protected uses, and to reassess Piney Fork through this reach.

Just downstream from the location where the STP discharge enters Piney Fork (40.286748, -79.991073), USGS Stream Stats calculates the drainage area as approximately 12.5 square miles (Figure 2). USGS Stream Stats also states that land use throughout the basin is predominantly urban (69%), with some forest (32%), and 17% impervious. Piney Fork is in the Middle Monongahela State Water Plan (SWP 19C) and the Lower Monongahela Hydrologic Unit (Hydrologic Unit Code 05020005). Currently, Piney Fork (Stream Code 39464) is listed as not attaining its designated Aquatic Life Use as a Trout Stocked Fishery (TSF).



NPDES Permit No. PA0027618  
Piney Fork STP

The Piney Fork Sewage Treatment Plant operates under a Part Two Permit and discharges under NPDES Permit Number PA9927618.

## **SAMPLING PROTOCOL**

Cause and effect surveys are designed to investigate possible relationships between point or nonpoint sources of conventional pollutants and known or suspected instream water quality problems. This survey was originally

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designed to also collect data for a Water Effects Ratio study (WER). The WER was a way to account for the difference between the toxicity of metals in the laboratory setting and its toxicity in streams. Updates to Pennsylvania Water Quality Standards as a result of the most recent triennial review, indicate that new or updated site-specific criteria for copper in freshwater systems shall be performed using the biotic ligand model (BLM). Copper is a toxic metal, is a metal of concern, and had to be addressed in previous permits for the applicant. Therefore, even though a WER may not be conducted, this stream study was still completed to determine if copper is a cause of impairment or if the Piney Fork STP discharge is causing or contributing to a localized impact or impairment.

On April 17, 2019, water quality (Tables 1, 2, & 3) and macroinvertebrates (Table 4) were examined at 3 locations within Piney Fork. The upstream site was located approximately 250 meters upstream of the location where the Piney Fork STP discharges to Piney Fork (Figures 3 & 4). The downstream location (within the plume) was approximately 250 meters downstream of the discharge (Figures 5 & 6). A third sample location was located approximately 2200 meters downstream of the discharge, after complete mixing (Figures 7 & 8). Water quality was sampled once a week, for a total of 8 weeks, with macroinvertebrates only being collected during the initial sample, which was taken on April 17, 2019. Since the criteria for copper is dependent on the hardness, the criteria for each sampling event and location differ from each other.

Basic water quality parameters were examined using a field meter and additional water chemistry and macroinvertebrates were collected and subsampled according to the Department's Water Quality Monitoring Protocols for Streams and Rivers 2021 (Monitoring Book), which can be found by following this link:

[https://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Technical%20Documentation/MONITORING\\_BOOK.pdf](https://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Technical%20Documentation/MONITORING_BOOK.pdf)

The results were analyzed according to the Department's Assessment Methodology for Rivers and Streams 2021 (Assessment Book), which can be found by following this link:

[https://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Methodology/2021%20Methodology/ASSESSMENT\\_BOOK\\_2021.pdf](https://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Methodology/2021%20Methodology/ASSESSMENT_BOOK_2021.pdf)

## RESULTS

### Upstream station

The lower limit of the upstream sample location was located approximately 250 meters upstream of the Piney Fork discharge. Macroinvertebrates were collected from a reach that began at the upstream end of the STP property and extended upstream, along a former railroad bed. The sewage treatment plant was located on the right descending bank.

At this location on April 17, 2019, pH taken with the field meter was 7.33, the temperature was 12.60°C, dissolved oxygen was 10.18 mg/L, and specific conductance was 1167 umhos/cm. Of the eight samples taken over 8 weeks, one sample had copper results over 4ug/L (the detection threshold), but no samples exceeded Chapter 93 Criteria for copper. Throughout the sampling period, specific conductance was very high (1030-1238 umhos/cm), possibly due to the high concentrations of sodium (87.68-117 mg/L) and chloride (152-226.52 mg/L). Total dissolved solids were also high at this location (622-764 mg/L).

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The habitat score was 114 (Table 5), which indicates impairment. The lowest score was due to disruptive pressure. Adding the scores for embeddedness and sediment deposition gives a total of 18 and adding the scores for the condition of banks and bank vegetative protection gives of 11. The couplet summations indicate impairment caused by siltation and habitat modification, respectively.

Of the subsample of 215 aquatic macroinvertebrates, the dominant taxa were Chironomids, with a total of 9 taxa being identified. Two genera of caddisflies were found in the subsample. No mayflies or stoneflies were found.

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The Index of Biotic Integrity (IBI) score was 16.3, which indicates that this section of Piney Fork is not attaining its aquatic life use.

#### Within Plume Station

The station located within the plume of the STP discharge was located 250 meters downstream from the location where the sewage discharge enters Piney Fork. The banks at this location were wooded and a former railroad bed paralleled the left descending bank. At this location on April 17, 2019, pH taken with the field meter was 7.21, the temperature was 12°C, dissolved oxygen was 10.05 mg/L, and specific conductance was 1268 umhos/cm. At this location, of the 8 water samples taken in 8 weeks, all of the samples had dissolved copper exceeding 4 ug/L, but none of the samples exceeded the Chapter 93 limit for copper. All of the samples taken at this location had higher copper than the upstream samples. Although no statistical analysis was performed, the results for dissolved nitrate and nitrite nitrogen, dissolved orthophosphorus, dissolved nitrogen as N, dissolved phosphorus as P, potassium, total nitrate and nitrite nitrogen, total nitrogen as N, total organic carbon, total orthophosphorus as P and total phosphorus as P were all consistently higher within the plume, compared to upstream of the discharge. The sampling effort also indicates that specific conductivity, sodium, chloride, and total dissolved solids are also high at this location.

The habitat score was 144 (Table 6). The lowest score was due to the condition of the banks. Adding the scores for embeddedness and sediment deposition gives a total of 18 and adding the scores for the condition of banks and bank vegetative protection gives a total of 12. The couplet summations indicate impairments caused by siltation and habitat modification, respectively.

The macroinvertebrate subsample contained 181 individuals. The dominant taxa were Chironomids, with a total of 6 taxa being identified. There were two caddisfly taxa, and no mayflies or stoneflies, found in the sample. The IBI score was 13.7, which indicates that this section of Piney Fork is not attaining its aquatic life use.

#### After complete mixing station

The station located after complete mixing was 2200 meters downstream from the location where the sewage discharge enters Piney Fork. The banks at this location alternate between a forested riparian zone and a high-power electricity line right-of-way. At this location on April 17, 2019, pH taken with the field meter was 7.51, temperature was 14.50°C, dissolved oxygen was 12.70 mg/L, and specific conductance was 1232 umhos/cm. Of the 8 water samples taken in 8 weeks, dissolved copper was above 4ug/L in all 8 samples and was higher than the upstream station result in all 8 samples. Although no statistical analysis was performed, all of the water quality parameters that increased downstream of the discharge (dissolved nitrate and nitrite nitrogen, dissolved orthophosphorus, dissolved nitrogen as N, dissolved phosphorus as P, potassium, total nitrate and nitrite nitrogen, total nitrogen as N, total organic carbon, total orthophosphorus as P and total phosphorus as P) were consistently still

elevated after complete mixing. Just as at the upstream station, sampling results indicate that specific conductivity, sodium, chloride, and total dissolved solids are high at this location.

The habitat score was 153 (Table 7). The lowest score was due to the condition of the banks. Adding the scores for embeddedness and sediment deposition gives a total of 23 and adding the scores for the condition of banks and bank vegetative protection gives of 15. The couplet summations indicate impairment caused by siltation and habitat modification, respectively.

The macroinvertebrate subsample contained 217 individuals. The dominant taxa were Chironomids, with a total of 4 taxa being identified. There were no mayflies or stoneflies, and there was 1 genus of caddisfly found in the sample. The IBI score was 11.1, which indicates that this section of Piney Fork is not attaining its aquatic life use.

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## DISCUSSION AND CONCLUSIONS

The objective of this survey was to determine if the levels of copper in Piney Fork exceed the Chapter 93 Water Quality Criteria; if the discharge from the Piney Fork STP is affecting the aquatic life, water quality, and/or physical characteristics of Piney Fork; and if Piney Fork is still not attaining its designated aquatic life use as defined by Chapter 93.

The results of the sampling effort indicate that levels of copper are higher, downstream from the Piney Fork STP. However, none of the samples exceeded the Chapter 93 Water Quality Criteria for copper. In an email received from Mathew Kundrat, Environmental Chemist 2 of the Department's Standards Section, states the following:

"Eight sets of samples were reported from one site upstream of the discharge, one in the plume, and one a mile downstream, with approximately 1 week between reported sampling dates between April and June 2019. Hardness varied from 281 to 366mg/L, yielding a max chronic criterion of 21.6ppb dissolved copper in the most restrictive case. The largest concentration of dissolved copper was measured in the plume as 10.300ppb. None of the measurements exceeded the copper criteria at the time and place they were measured."

Freestone IBI scores at the upstream (16.3), within plume (13.1), and after complete mixing (11.1) stations are well below the attainment threshold (50). The differences in the IBI scores between the upstream station and the within plume station (3.2) and between the upstream station and the station downstream after complete mixing (5.2) are below method precision estimates, indicating a measurable change in water quality is not evident with the macroinvertebrate method. However, findings from the water quality sampling effort indicate that the water quality of Piney Fork is worse downstream of the Piney Fork discharge. Dissolved nitrate and nitrite nitrogen, dissolved orthophosphorus, dissolved nitrogen as N, dissolved phosphorus as P, potassium, total Nitrate and nitrite nitrogen, total nitrogen as N, total organic carbon, total orthophosphorus as P and total phosphorus as P are elevated within the plume of the discharge and do not fully recover downstream, after complete mixing. Therefore, the extremely impaired conditions of Piney Fork may be preventing the ability to isolate specific impacts from the Piney Fork STP discharge. A eutrophication study could determine if eutrophication is a cause of impairment and could determine if the Piney Fork STP discharge is further contributing to this impairment.

Specific conductivity, sodium, chloride, and total dissolved solids are elevated at all three stations, higher at stations downstream of the discharge and generally indicative of urban land cover.

Results from the macroinvertebrate survey indicate that Piney Fork is still not attaining its designated aquatic life use throughout the study reach. The total habitat scores, combined embeddedness and sediment deposition habitat scores, and condition of banks and bank vegetative protection habitat scores

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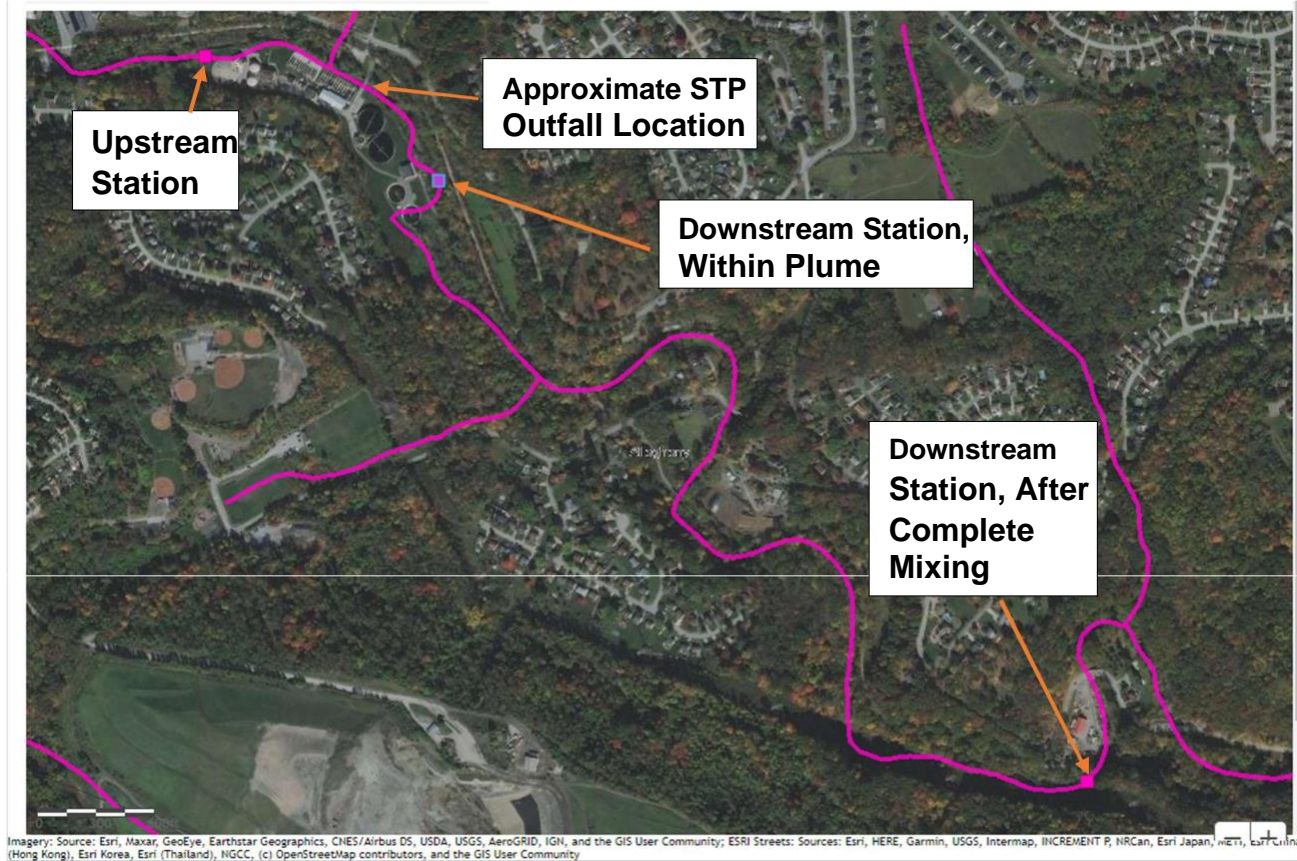
**Piney Fork STP**

are low throughout the reach. The cause is habitat alteration and siltation, the source is Urban Runoff/Stormsewers and Urban Development, respectively. Further research will need to be conducted to determine if eutrophication is also a cause, with the source being Municipal Point Source Discharges.

**cc: Stream File – Piney Fork  
Mahbuba Iasmin – SWRO, Environmental Group  
Manager Stacey Greenwald – SWRO, Environmental  
Group Manager Michael (Josh) Lookenbill – CO,  
Environmental Group Manager Christopher Kriley –  
SWRO, Environmental Program Manager**



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**Figure 1. Aerial Map showing the location of the Piney Fork STP, the STP outfall, and the sampling stations.**

## StreamStats Report

Region ID:

Workspace ID:

Clicked Point (Latitude, Longitude):

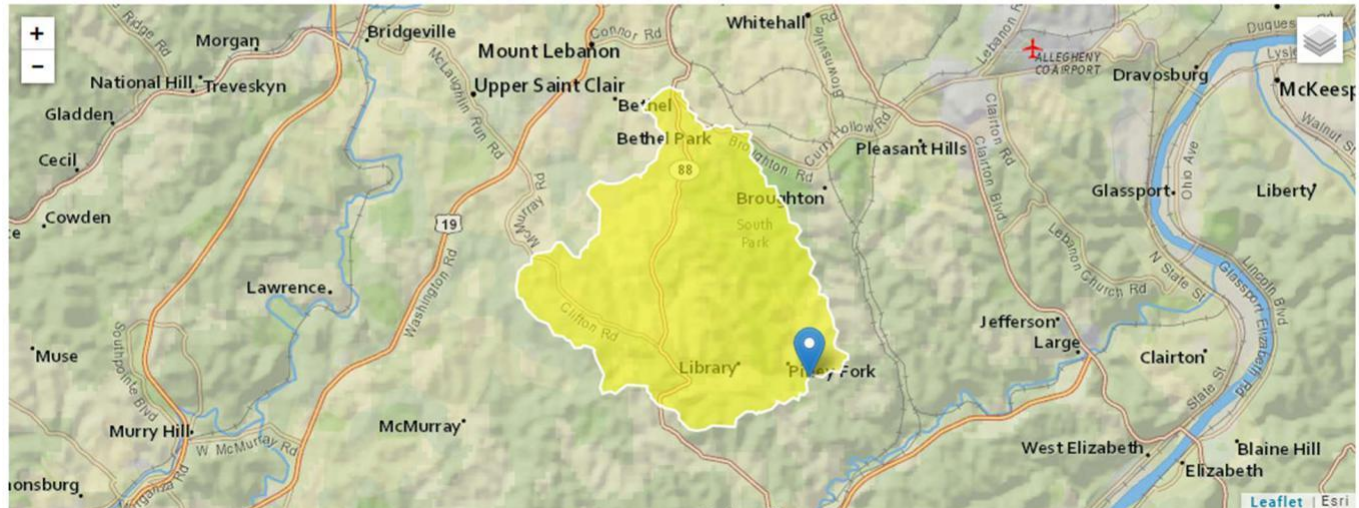
Time:

PA

PA20220131155153269000

40.28666, -79.99083

2022-01-31 10:52:13 -0500





**Figure 2. USGS Stream Stats Map of watershed of Piney Fork at the location where the drainage channel that carries the Piney Fork STP discharge enters Piney Fork.**

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Table 1. Water quality parameters from Piney Fork, upstream from the Piney Fork STP discharge.

Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard Deviation
pH, Field	pH units	7.33	7.39	7.56	7.9	8.05	8.17	7.84	NA	7.75	0.33
Temperature, Field	C	12.6	13.35	14.9	14.3	13	14.8	21.7	NA	14.95	3.11
Dissolved Oxygen, Field	mg/L	10.18	11.1	10.45	9.66	10.69	11.18	8.06	NA	10.19	1.08
Specific Conductivity, Field	umho/cm	1167	1177	1033	1238	1171	1173	1030	NA	1141.29	78.83
ALKALINITY AS CaCO <sub>3</sub> @ pH 4.5,	mg/L	170.8	179.6	181.6	204.2	200.8	198.4	181.8	189.6	188.35	11.84
ALUMINUM, DISSOLVED (WATER & WASTE) BY ICPMS	ug/L	97	130	134	113	90.3	94.4	150	84.9	111.70	23.88
ALUMINUM, TOTAL (WATER & WASTE) ICPMS	ug/L	362	251	367	289	247	180	277	271	280.50	61.40
AMMONIA DISSOLVED AS NITROGEN,	mg/L	0.02	<.02	<.02 a	0.03	0.05	0.04 b	0.09 c	0.04 c		
AMMONIA TOTAL AS NITROGEN,	mg/L	0.02	<.02	<.02	0.03	0.06	0.02 b	0.04 c	0.03 c		
BARIUM, TOTAL (WATER & WASTE) BY ICP	ug/L	66	72	67	78	69	167	68	76	82.88	34.26
BORON, TOTAL (WATER &	ug/L	<200.	<200.	<200.	<200.	<200.	<200.	<200.	<200.		

<b>WASTE) BY ICP</b>											
<b>CADMIUM, DISSOLVED (WATER &amp; WASTE) BY ICPMS</b>	<b>ug/L</b>	<b>&lt;0.20 0</b>	<b>&lt;0.20 0</b>	<b>&lt;0.20 0</b>	<b>&lt;0.20 0</b>	<b>&lt;0.20 0</b>	<b>&lt;0.20 0</b>	<b>&lt;0.20 0</b>	<b>&lt;0.20 0</b>		
<b>CALCIUM, TOTAL (WATER &amp; WASTE) BY ICP</b>	<b>mg/L</b>	<b>88.5</b>	<b>91.6</b>	<b>85.9</b>	<b>100.4</b>	<b>88.93</b>	<b>96.4</b>	<b>82.5</b>	<b>101</b>	<b>91.90</b>	<b>6.76</b>
<b>COPPER, DISSOLVED (WATER &amp; WASTE) BY ICPMS</b>	<b>ug/L</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>4.2</b>	<b>&lt;4.00</b>		
<b>COPPER, TOTAL (WATER &amp; WASTE) BY ICPMS</b>	<b>ug/L</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>&lt;4.00</b>	<b>4.12</b>	<b>&lt;4.00</b>		
<b>Dissolve Nitrate &amp; Nitrite Nitrogen,</b>	<b>mg/L</b>	<b>1</b>	<b>0.86</b>	<b>1.2</b>	<b>1.18</b>	<b>1.36</b>	<b>1.04</b>	<b>0.83</b>	<b>1.07</b>	<b>1.07</b>	<b>0.18</b>

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Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard Deviation
Dissolve Ortho Phosphorus,	mg/L	0.013	<.01	0.01	0.011	0.015	0.013	0.011	0.012	0.01	0.00
Dissolved Nitrogen as N,	mg/L	1.25	0.978	1.473	1.67	1.928	1.347	1.105	1.238	1.37	0.31
Dissolved Phosphorus as P,	mg/L	<0.01	<0.01	<0.01	0.011	<0.01	<0.01	0.015	0.019		
	d			d		d	d				24.6
HARDNESS, TOTAL (CALCULATED)	mg/L	320 f	335 f	307	361 f	320 f	356 f	304 f	366 f	333.63	6
IRON, DISSOLVED (WATER & WASTE) BY ICP	ug/L	100	<100.	<100.	<100.	<100.	<100.	<100.	<100.		
IRON, TOTAL (WATER & WASTE) BY ICP	ug/L	123	<100. 0	140	<100. 0	<100. 0	<100. 0	102	204		
LEAD, DISSOLVED (WATER & WASTE) BY ICPMS	ug/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00		
LEAD, TOTAL (WATER & WASTE) BY ICPMS	ug/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00		
LITHIUM, DISSOLVED (WATER & WASTE) BY ICP	ug/L	50	53	40	59	44	68	64	65	55.38	10.28
LITHIUM, TOTAL (WATER & WASTE) BY ICP	ug/L	50	54	40	58	44	68	65	68	55.88	10.78
Low Bromide by IC,	ug/L	51.91	53.73	48.78	47.88	54.46	56.6	53.98	64.24	53.95	5.08
MAGNESIUM,	mg/L	24.1	25.7	22.5	26.62	23.74	28	23.61	27.6	25.23	2.04

TOTAL (WATER & WASTE) BY ICP											
MANGANESE, DISSOLVED (WATER & WASTE) BY ICP	ug/L	133	105	84	80	86	62	36	79	83.13	28.46
MANGANESE, TOTAL (WATER & WASTE) BY ICP	ug/L	140	109	92	83	89	64	45	95	89.63	28.38
NICKEL, DISSOLVED (WATER & WASTE) BY ICP	ug/L	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0		
NICKEL, TOTAL (WATER & WASTE) BY ICP	ug/L	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0		
OSMOTIC PRESSURE	MOS/KG	18	18	15	18	18	17	15	17	17.00	1.31

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Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard Deviation
POTASSIUM, TOTAL (WATER & WASTE) BY ICP	mg/L	2.44	2.45	2.38	2.73	2.45	2.61	2.8	2.87	2.59	0.19
SELENIUM, TOTAL (WATER & WASTE) BY ICPMS	ug/L	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00		
SODIUM, TOTAL (WATER & WASTE) BY ICP	umh o s/cm	117	101	89	106.9	102.5	88.1	87.68	95.9	98.51	10.4 0
STRONTIUM, TOTAL (WATER & WASTE) BY ICP	C	534	573	496	620	558	634	557	626	574.75	48.7 6
Total Chloride- Ion Chromatograph ,	mg/L	226.5 2	201	181	201	189.9 7	187	152	199.8 2	192.29	21.2 6
TOTAL DISSOLVED SOLIDS @ 180C BY USGS-I- 1750,	mg/L	764	690	622	758	698	748	682	720	710.25	47.5 6
Total Nitrate & Nitrite Nitrogen,	mg/L	1	0.86	1.19	1.16	1.32	1.03	0.84	1.06	1.06	0.16
Total Nitrogen as N,	mg/L	1.04 d	0.98 1.74	1.36	1.36 d	1.97	1.73	1.01 e	1.21	1.33	0.36
Total Organic Carbon,	mg/L	1.83	h	2.13	1.75	2.04	2.08	2.7	1.86	2.02	0.31
Total Ortho Phosphorus as P,	mg/L	0.011	<0.01	0.01	0.011	0.015	0.012	0.013	0.01		
Total Phosphorus as P,	mg/L	0.015	<.01	0.019	0.016	0.014	<0.01 d	0.018	0.02		
Total Sulfate- Ion	mg/L	124.4 4	126	103	118	108.1 4	145	122.5 2	142.4 3	123.69	14.7 1

Chromatograph											
TOTAL SUSPENDED SOLIDS,	mg/L	<5	<5	6	<5	<5	<5	<5	<5		
ZINC,	ug/L	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0		
DISSOLVED (WATER & WASTE) BY ICP											
ZINC, TOTAL	ug/L	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0		
(WATER & WASTE) BY ICP											

< indicates result is below reporting

limit a = Possible Matrix interference

b = Dissolved Result > Total Result by more than 10%.Unable to rerun due to Laboratory Equipment failure. c = Dissolved Result > Total Result by more than 10% RPD. Unable to rerun.

**d = Answer Rechecked By Analyst**

e = Answer Rechecked By Analyst; Refrigerator failed-Exceeded allowable

temperature at lab f = Accredited by NJ only - accreditation not available from PA

**g = Holding time exceeded**

**h = The Inorganic Laboratory Fortified Matrix Spiked sample failed QC acceptance criteria. The %RSD was 12.6%. An acceptable %RSD is less than 10%.**

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Table 2. Water quality parameters from Piney Fork, within the plume of the Piney Fork STP discharge.

Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard deviation
pH, Field	pH units	7.21	7.3	7.3	7.7	7.78	7.91	7.71	NA	7.56	0.28
Temperature, Field	C	12	12.9	13.7	14.3	13.9	15.1	21.3	NA	14.74	3.06
Dissolved Oxygen, Field	mg/L	10.05	10.76	10.11	9.41	9.82	10.65	7.83	NA	9.80	0.99
Specific Conductivity, Field	umhos/cm	1266	1267	1150	1257	1248	1112	1097	NA	1199.57	76.65
ALKALINITY AS CaCO3 @ pH 4.5,	mg/L	139.8	133	147.4	148.6	147.8	138.2	154.6	131	142.55	8.32
ALUMINUM, DISSOLVED (WATER & WASTE) BY ICPMS	ug/L	59.5	55.5	57.6	49.4	38.6	41.8	80.9	50	54.16	13.05
ALUMINUM, TOTAL (WATER & WASTE) ICPMS	ug/L	370	147	173	138	117	131	165	115	169.50	83.61
AMMONIA DISSOLVED AS NITROGEN, AMMONIA	mg/L	0.14 a	0.14	0.15	0.21 a	0.17	0.14	0.19	0.16	0.16	0.03
TOTAL AS NITROGEN,	mg/L	0.12 a	0.13	0.18	0.17 a	0.16	0.13	0.17	0.16	0.15	0.02
BARIUM, TOTAL (WATER & WASTE) BY ICP	ug/L	70	66	61	65	60	62	68	81	66.63	6.76
BORON, TOTAL (WATER & WASTE) BY ICP	ug/L	<200.	<200.	<200.	<200.	<200.	<200.	<200.	<200.		
CADMIUM, DISSOLVED (WATER & WASTE)	ug/L	<0.20 0	<0.20 0	<0.20 0	<0.20 0	<0.20 0	<0.20 0	<0.20 0	<0.20 0		



BY ICPMS CALCIUM, TOTAL (WATER & WASTE) BY ICP COPPER, DISSOLVED (WATER & WASTE) BY ICPMS COPPER, TOTAL (WATER & WASTE) BY ICPMS Dissolve Nitrate & Nitrite Nitrogen, Dissolve Ortho Phosphorus, Dissolved Nitrogen as N, Dissolved Phosphorus as P,	mg/L	89.3	87.9	84.1	88.69	87.1	85.3	86.34	101.7	88.80	5.49
	ug/L	4.18	9.05	5.67	8.32	5.86	10.3	5.69	7.85	7.12	2.08
	ug/L	7.67	14.2	9.17	16.4	12.7	16.5	8.28	12	12.12	3.49
	mg/L	8.82	11.69	9.06	9.6	12.24 b	13.8	6.04	14.67	10.74	2.88
	mg/L	0.681	1.063	0.833	1.003	0.917	1.359	0.574	0.883	0.91	0.24
	mg/L	9.835	12.27 4	9.646 c	11.08	12.63	15.76 8	7.332	15.39 9	11.75	2.89
	mg/L	0.739	1.158	0.896	1.107	0.967	1.55	0.669	1.014	1.01	0.27 d

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Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard dev
HARDNESS, TOTAL (CALCULATED)	mg/L	321 e	316 e	296 e	312 e	304 e	304 e	310 e	363 e	315.75	20.6
IRON, DISSOLVED (WATER & WASTE) BY ICP	ug/L	<100.	<100.	<100.	<100.	<100.	<100.	<100.	<100.		
IRON, TOTAL (WATER & WASTE) BY ICP	ug/L	322	106	116	110	136	151	116	146	150.38	71.3
LEAD, DISSOLVED (WATER & WASTE) BY ICPMS	ug/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00		
LEAD, TOTAL (WATER & WASTE) BY ICPMS	ug/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00		
LITHIUM, DISSOLVED (WATER & WASTE) BY ICP	ug/L	26	<25.0	<25.0	<25.0	<25.0	<25.0	39	34		
LITHIUM, TOTAL (WATER & WASTE) BY ICP	ug/L	28	<25.0	<25.0	<25.0	<25.0	<25.0	38	35		
Low Bromide by IC,	ug/L	102	100.27	88.14	154.54	79.08	<25.0	66.51	144.22		
MAGNESIUM, TOTAL (WATER & WASTE) BY ICP	mg/L	23.7	23.4	20.9	22.01	20.9	22	22.89	26.37	22.77	1.79
MANGANESE, DISSOLVED (WATER & WASTE) BY ICP	ug/L	81	50	49	43	39	31	38	49	47.50	15.0

												16.0
MANGANESE, TOTAL (WATER & WASTE) BY ICP	ug/L	106	67	60	61	70	78	55	77	71.75	3	
NICKEL, DISSOLVED (WATER & WASTE) BY ICP	ug/L	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0			
NICKEL, TOTAL (WATER & WASTE) BY ICP	ug/L	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0			
OSMOTIC PRESSURE, POTASSIUM, TOTAL (WATER & WASTE) BY ICP	MOS/K G	20	19	18	15	10	18	17	19	17.00	3.21	
SELENIUM, TOTAL (WATER & WASTE) BY ICP	mg/L	4.91	5.92	4.94	6.08	5.07	6.3	4.62	7.45	5.66	0.95	
SELENIUM, TOTAL (WATER & WASTE) BY ICPMS	ug/L	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00			
SODIUM, TOTAL (WATER & WASTE) BY ICP	umhos/cm	136	126	112	126.1	119	111	102.9	127.5	120.06	5	10.8
STRONTIUM, TOTAL (WATER & WASTE) BY ICP	C	549	533	471	515	483	514	563	631	532.38	1	50.4

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Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard deviation
Total Chloride-Ion Chromatograph,	mg/L	261	250	224	225	227.32	245	200	78.41	213.84	57.87
TOTAL DISSOLVED SOLIDS @ 180C BY USGS-I-1750,	mg/L	838	810	734	786	782	874	680	850	794.25	63.84
Total Nitrate & Nitrite Nitrogen,	mg/L	9.22	10.88	9.15	9.75	12.25	13.45	5.98	14.75	10.68	2.78
Total Nitrogen as N,	mg/L	10.93	11.1	10.38	11.26	14.5	15.77	7.4	16.04	12.17	3.00
Total Organic Carbon,	mg/L	5.04	6.56	5.53	6.02	5.69	7.27	5.01	6.15	5.91	0.77
Total Ortho Phosphorus as P,	mg/L	0.715	0.992	0.849	1.028	0.926	1.329	0.576	0.926	0.92	0.22
Total Phosphorus as P,	mg/L	0.898	1.54	1.011	1.268	1.183	1.734	0.725	1.073	1.18	0.33
Total Sulfate-Ion Chromatograph,	mg/L	122.37	107	90.74	97.23	92	104	110	116.95	105.04	11.38
TOTAL SUSPENDED SOLIDS, ZINC,	mg/L	8	<5	<5	18	8	18	14	6		
DISSOLVED (WATER & WASTE) BY ICP	ug/L	<30.0	<30.0	<30.0	36	<30.0	<30.0	<30.0	<30.0		
ZINC, TOTAL (WATER & WASTE) BY ICP	ug/L	<30.0	34	30	36	<30.0	33	<30.0	30		

&lt; indicates result is below reporting limit a

= Answer Rechecked By Analyst

b = Holding Time Exceeded

c = QC test(s) out of specification. Sample data not

affected d = Possible Matrix Interference

e = The Inorganic Laboratory Fortified Matrix Spiked sample failed QC acceptance criteria. The %RSD was 12.6%. An acceptable %RSD is less than 10%.

**Table 3. Water quality parameters from Piney Fork after complete mixing with the discharge from Piney Fork STP.**

Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard Deviation
pH, Field	pH units	7.51	7.31	7.53	8.14	8.01	7.9	7.57	NA	7.71	0.31
Temperature, Field	C	14.5	13	13.5	15.5	12.8	14.6	20.5	NA	14.91	2.64
Dissolved Oxygen, Field	mg/L	12.7	10.51	10.29	10.89	10.42	10.25	7.96	NA	10.43	1.39
	umhos/cm									1168.5	
Specific Conductivity, Field	m	1232	1263	1069	1205	1183	1178	1050	NA	7	80.14

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Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard Deviation
ALKALINITY AS CaCO <sub>3</sub> @ pH 4.5,	mg/L	137	149.6	147	167.6	160.8	154	137	138.4	148.93	11.43
ALUMINUM, DISSOLVED (WATER & WASTE) BY ICPMS	ug/L	75.9	78.5	69.5	111	60.7	61.7	81.5 a	58.6	74.68	17.03
ALUMINUM, TOTAL (WATER & WASTE) ICPMS	ug/L	560	219	246	185	177	234	130	117	233.50	139.79
AMMONIA DISSOLVED AS NITROGEN,	mg/L	0.06 b	0.02	0.04	0.09 b	0.05	0.06	0.32 b	0.08	0.09	0.10
AMMONIA TOTAL AS NITROGEN,	mg/L	0.06 b	0.02	0.04	0.05 b	0.05	0.07	0.11 b	0.08	0.06	0.03
BARIUM, TOTAL (WATER & WASTE) BY ICP	ug/L	71	65	58	67	56	59	62	69	63.38	5.48
BORON, TOTAL (WATER & WASTE) BY ICP	ug/L	<200.	<200.	<200.	<200.	<200.	<200.	<200.	<200.		
CADMIUM, DISSOLVED (WATER & WASTE) BY ICPMS	ug/L	<0.20 0	<0.20 0	<0.20 0	<0.20 0	<0.20 0	<0.20 0	<0.20 0	<0.20 0		
CALCIUM, TOTAL (WATER & WASTE) BY ICP	mg/L	87	88.5	82.3	93.1	80.74	84.1	77.6	87	85.04	4.88
COPPER, DISSOLVED	ug/L	5.1	6.2	4.14	7.27	4.82	7.58	7.97	9.32	6.55	1.78

(WATER & WASTE) BY ICPMS COPPER, TOTAL (WATER & WASTE) BY ICPMS	ug/L	7.14	8.6	5.87	8.21	7.18	9.41	8.65	9.53	8.07	1.26
Dissolve Nitrate & Nitrite Nitrogen,	mg/L	8.18	6.01	5.09	5.56	6.51 c	7.02	7.12	11.85	7.17	2.13
Dissolve Ortho Phosphorus,	mg/L	0.547	0.492	0.404	0.515	0.478	0.702	0.677	0.716	0.57	0.12
Dissolved Nitrogen as N,	mg/L	8.588	6.73	5.59	6.723	6.882	8.527	8.65	12.23 3	7.99	2.04
Dissolved Phosphorus as P,	mg/L	0.611	0.543	0.459	0.589	0.527	0.783	0.819	0.803	0.64	0.14
HARDNESS, TOTAL (CALCULATE D)	mg/L	313 d	323 d	292 d	332 d	288 d	306 d	281 d	320 d	306.88	18.32

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Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard Deviation
IRON, DISSOLVED (WATER & WASTE) BY ICP	ug/L	<100.	<100.	<100.	<100.	<100.	<100.	<100.	<100.		
IRON, TOTAL (WATER & WASTE) BY ICP	ug/L	631	100	140	<100. 0	106	214	<100. 0	116		
LEAD, DISSOLVED (WATER & WASTE) BY ICPMS	ug/L	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00		
LEAD, TOTAL (WATER & WASTE) BY ICPMS	ug/L	1.04	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00		
LITHIUM, DISSOLVED (WATER &WASTE) BY ICP	ug/L	28	29	<25.0	30	<25.0	33	34	31		
LITHIUM, TOTAL (WATER & WASTE) BY ICP	ug/L	28	30	<25.0	30	<25.0	33	36	33		
Low Bromide by IC,	ug/L	91.28 e	75.7	60.7	96.86	64.45	64.88	64.55	121.9 8	80.05	21.63
MAGNESIUM, TOTAL (WATER & WASTE) BY ICP	mg/L	23.2	24.7	20.9	24.22	21.05	23.3	21.2	25	22.95	1.69
MANGANESE , DISSOLVED (WATER & WASTE) BY ICP	ug/L	70	53	56	51	56	41	33	34	49.25	12.56
MANGANESE ,	ug/L	104	62	66	58	71	70	45	47	65.38	18.38



TOTAL (WATER & WASTE) BY ICP											
NICKEL, DISSOLVED (WATER & WASTE) BY ICP	ug/L	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	
NICKEL, TOTAL (WATER & WASTE) BY ICP	ug/L	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	
OSMOTIC PRESSURE,	MOS/K G	16	19	16	18	18	18	15	18	17.25	1.39
POTASSIUM, TOTAL	mg/L	4.85	4.39	3.96	4.45	4.27	4.77	5.41	6.62	4.84	0.84
(WATER & WASTE) BY ICP											
SELENIUM, TOTAL	ug/L	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	<7.00	

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Parameter, Notes	Units	4/17	4/24	5/01	5/08	5/15	5/22	5/29	6/05	Average	Standard Deviation
<b>(WATER &amp; WASTE) BY ICPMS</b>											
<b>SODIUM, TOTAL (WATER &amp; WASTE) BY ICP</b>	umhos/cm	131	116	98.8	115.1	115.1	99.7	101	102	109.84	11.37
<b>STRONTIUM, TOTAL (WATER &amp; WASTE) BY ICP</b>	C	539	566	473	575	496	549	510	576	535.50	38.62
<b>Total Chloride-Ion Chromatograph,</b>	mg/L	254	238	194	228	204.88	212	175	219.93	215.73	25.05
<b>TOTAL DISSOLVED SOLIDS @ 180C BY USGS-I-1750,</b>	mg/L	816	818	660	792	730	756	720	760	756.50	53.37
<b>Total Nitrate &amp; Nitrite Nitrogen,</b>	mg/L	7.86	6.11	5.16	5.49	6.52c	7.01	6.78	11.43	7.05	1.97
<b>Total Nitrogen as N,</b>	mg/L	8.8	6.84	5.72	6.59	6.83	8.28	8.48	11.32	7.86	1.76
<b>Total Organic Carbon,</b>	mg/L	4.63	4.28 f	4.51	4.22	4.1	4.73	5.58	5.38	4.68	0.54
<b>Total Ortho Phosphorus as P,</b>	mg/L	0.568	0.506	0.417	0.52	0.483	0.701	0.69	0.712	0.57	0.11
<b>Total Phosphorus as P,</b>	mg/L	0.697	0.608	0.514	0.63	0.598	0.828	0.815	0.828	0.69	0.12
<b>Total Sulfate-Ion Chromatograph,</b>	mg/L	127	121	97.8	112	97.16	126	109	122.98	114.12	12.06

TOTAL SUSPENDED SOLIDS,	mg/L	26	<5	6	<5	10	14	6	<5		
ZINC, DISSOLVED	ug/L	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0		
(WATER & WASTE) BY ICP											
ZINC, TOTAL	ug/L	30	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0	<30.0		
(WATER & WASTE) BY ICP											

< indicates result is below reporting limit

a = This is a revised report

b = Answer Rechecked By Analyst

c = Holding Time Exceeded

d = Accredited by NJ only - accreditation not

available from PA e = Possible Matrix Interference

f = The Inorganic Laboratory Fortified Matrix Spiked sample failed QC acceptance criteria.

The %RSD was 12.6%. An acceptable %RSD is less than 10%.

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**Table 4. Aquatic macroinvertebrates observed the sampling Stations upstream, within the plume, and after complete mixing of the Piney Fork STP discharge.**

<b>TAXA</b>	<b>Family</b>	<b>Upstream</b>	<b>Downstream, within plume</b>	<b>Downstream, after complete mixing</b>
<b>Cheumatopsyche</b>	<b>Hydropsychidae (Net Spinning Caddisflies)</b>	<b>5</b>	<b>1</b>	<b>3</b>
<b>Hydropsyche</b>	<b>Hydropsychidae (Net Spinning Caddisflies)</b>	<b>5</b>	<b>3</b>	
<b>Stenelmis</b>	<b>Elmidae (Riffle Beetles)</b>	<b>4</b>	<b>1</b>	<b>1</b>
<b>Chironomidae</b>	<b>Chironomidae (Non-Biting Midges)</b>	<b>185</b>	<b>145</b>	<b>210</b>
<b>Psychoda</b>	<b>Psychodidae (Dance Flies)</b>	<b>1</b>	<b>3</b>	
<b>Antocha</b>	<b>Tipulidae (Crane Flies)</b>	<b>1</b>		
<b>Harlomillsia</b>	<b>Colembolla (Spring Tails)</b>	<b>1</b>		
<b>Gammarus</b>	<b>Gammaridae (Scuds)</b>	<b>2</b>		
<b>Oligochatea</b>	<b>Oligochaeta (Segmented Worms)</b>	<b>11</b>	<b>28</b>	<b>3</b>
<b>Total</b>		<b>215</b>	<b>181</b>	<b>217</b>
<b>Grids picked</b>		<b>15</b>	<b>5</b>	<b>4</b>
<b># of taxa</b>		<b>9</b>	<b>6</b>	<b>4</b>
<b>IBI Score (Small Stream)</b>		<b>16.3</b>	<b>13.1</b>	<b>11.1</b>

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**Figure 3. Sampling location located upstream of the Piney Fork Sewage Treatment Plant discharge, facing upstream.**



**Figure 4. Sampling location located upstream of the Piney Fork Sewage Treatment Plant discharge, facing downstream.**



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**Figure 5. Sampling location located downstream, within the plume of the Piney Fork Sewage Treatment Plant discharge, facing upstream.**



**Figure 6. Sampling location located downstream, within the plume of Piney Fork Sewage Treatment Plant discharge, facing downstream.**

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**Figure 7. Sampling location located downstream, after complete mixing with the Piney Fork Sewage Treatment Plant discharge.**



**Figure 8. Sampling location located downstream, after complete mixing with the Piney Fork Sewage Treatment Plant discharge.**



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Table 5. Bureau of Clean Water Macroinvertebrate Sample Summary for the station upstream of the Piney Fork STP discharge.

BUREAU OF CLEAN WATER  
MACROINVERTEBRATE SAMPLE SUMMARY

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SAMPLE SUMMARY				
STATION ID: 20190417-1100-jadetweile	SECONDARY STATION ID:	LATITUDE: 40.28701890	LONGITUDE: -79.99365120	
STREAM NAME: Piney Fork (01183937)		HUC8 05020005 Lower Monongahela, Pennsylvania, West Virginia.		
SURVEY ID: 71736		METHOD: 6-Dframe Composite, 200 subsample		
SUBSAMPLED BY:	IDENTIFIED BY: Jamie Detweiler	QUALITY ASSURED: N	QUALITY ASSURED BY:	PASSED QUALITY ASSURANCE: N
STATION LOCATION COMMENT: Station is located just upstream of the Piney Fork STP, along the Montour Run Trail. This stretch of stream has a riparian buffer, but the upper part of the watershed is very developed. There was trash in the stream channel on the day of sampling.				
BIOLOGY / HABITAT COMMENT:				
LAND USE COMMENT: the upper part of the watershed appears to be heavily developed with housing. There also appears to be construction companies (with laydown areas) and a golf course that abuts the stream.				
IMPAIRMENT COMMENT: The upper part of this watershed is very developed. there appears to be some industry within the watershed.				

TAXA					
	# grids from first pan = 15	# grids from second pan = 0		Subsample Size =	215
TAXA NAME	INDIVIDUALS	PTV	FFG	BCG COLD	BCG WARM
Collembola	1	9	CG		
Hydropsychidae	5	5	FC		
Cheumatopsyche	5	6	FC	5	5
Stenelmis	4	5	SC	5	5
Psychoda	1	10	CG	5	5
Antocha	1	3	CG	4	4
Chironomidae	185	6	CG	5	5
Oligochaeta	11	10	CG	5	5
Gammarus	2	4	CG	4	4



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STATION ID: 20190417-1100-jadetweile

METRICS							
Freestone Riffle-Run 6D200							
METRIC NAME	RAW VALUE	2013 SMALL	2013 LARGE	2D100	MULTIHABITAT POOL GLIDE	LIMESTONE 2009	
Total Richness	9	27.3	29.0		29.0	50.0	
Ephemeroptera Richness	0				0.0		
Trichoptera Richness	2				18.2		
EPT Richness	2			13.1	11.8	25.0	
Trichoptera Richness (PTV 0-4)	0			0.0			
EPT Richness (PTV 0-4)	0	0.0	0.0				
Becks Index (version 3)	0	0.0	0.0				
Becks Index (version 4)	2			10.1	9.1	16.7	
FC + PR + SH Richness	2			17.2			
Hilsenhoff Biotic Index	6.16	47.3	55.3	57.0		62.3	
% Sensitive Individuals (PTV 0-3)	0.50	0.6	0.7				
% Tolerant Individuals (PTV 7-10)	6					95.4	
Shannon Diversity	0.65	22.7	22.7		26.7	30.5	
IBI SCORE		16.3	18.0	19.5	15.8	46.7	
% Ephemeroptera	0.0	% Ephemeroptera (PTV 0-4)	0.0	% Dominant Taxon	86.0	BCG Richness Ratio	
% Plecoptera	0.0	Ephemeroptera Richness (PTV 0-4)	0	% Chironomidae	86.0	BCG Individuals Ratio	
% Trichoptera	4.7	Plecoptera Richness	0	% Simuliidae	0.0		
IMPAIRMENT							
Not Impaired	Y	Insufficient Data	Y				
HABITAT							
Instream Cover	7	Substrate / Cover		Frequency of Riffles	14	Bank Vegetation	6
Epifaunal Substrate	8	Velocity/Depth Regimes	16	Channel Flow Status	15	Disruptive Pressure	6
Embeddedness	10	Pool Variability		Channel Alteration	11	Riparian Zone	8
Pool Substrate		Sediment Deposition	8	Condition of Banks	5		
Pool-Glide Assessment? N		Instream Score = 33		Riparian Score = 19		Total Score = 114	
FIELD MEASUREMENTS							
Temperature (°C)	12.60	Dissolved Oxygen (mg/L)	10.18	Flow (CFS)			
pH	7.33	Total Alkalinity (mg/L as CaCO3)		Conductivity (uS/cm)	1167		
WATER CHEMISTRY							
Collector ID	2597		Sequence Number		080		

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**Table 6. Bureau of Clean Water Macroinvertebrate Sample Summary for the station downstream, within the plume of the Piney Fork STP discharge.**



**BUREAU OF CLEAN WATER  
MACROINVERTEBRATE SAMPLE SUMMARY**

2/3/2020 3:52:36 PM

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SAMPLE SUMMARY				
<b>STATION ID:</b> 20190417-1000-jadetweile	<b>SECONDARY STATION ID:</b>	<b>LATITUDE:</b> 40.28525490	<b>LONGITUDE:</b> -79.98934030	
<b>STREAM NAME:</b> Piney Fork (01183937)	<b>HUC8</b> 05020005 Lower Monongahela, Pennsylvania, West Virginia.			
<b>SURVEY ID:</b> 71734	<b>METHOD:</b> 6-Dframe Composite, 200 subsample			
<b>SUBSAMPLED BY:</b>	<b>IDENTIFIED BY:</b> Jamie Detweiler	<b>QUALITY ASSURED:</b> N	<b>QUALITY ASSURED BY:</b>	<b>PASSED QUALITY ASSURANCE:</b> N
<b>STATION LOCATION COMMENT:</b> Station is located within the plume of the Piney Fork STP outfall.				
<b>BIOLOGY / HABITAT COMMENT:</b> Trash was observed within the stream channel.				
<b>LAND USE COMMENT:</b> While the corridor of the stream seems to have a healthy riparian zone, there is much suburban development within the watershed.				
<b>IMPAIRMENT COMMENT:</b>				

TAXA					
	# grids from first pan = 5	# grids from second pan =		Subsample Size =	181
TAXA NAME	INDIVIDUALS	PTV	FFG	BCG COLD	BCG WARM
Hydropsychidae	3	5	FC		
Cheumatopsyche	1	6	FC	5	5
Stenelmis	1	5	SC	5	5
Psychoda	3	10	CG	5	5
Chironomidae	145	6	CG	5	5
Oligochaeta	28	10	CG	5	5

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STATION ID: 20190417-1000-jadetweile

METRICS							
		Freestone Riffle-Run 6D200					
METRIC NAME	RAW VALUE	2013 SMALL	2013 LARGE	2D100	MULTIHABITAT POOL GLIDE	LIMESTONE 2009	
Total Richness	6	18.2	19.4		19.4	33.3	
Ephemeroptera Richness	0				0.0		
Trichoptera Richness	2				18.2		
EPT Richness	2			13.1	11.8	25.0	
Trichoptera Richness (PTV 0-4)	0			0.0			
EPT Richness (PTV 0-4)	0	0.0	0.0				
Becks Index (version 3)	0	0.0	0.0				
Becks Index (version 4)	0			0.0	0.0	0.0	
FC + PR + SH Richness	2			17.2			
Hilsenhoff Biotic Index	6.66	41.2	48.1	49.6		54.2	
% Sensitive Individuals (PTV 0-3)	0	0.0	0.0				
% Tolerant Individuals (PTV 7-10)	17.10					84.1	
Shannon Diversity	0.66	23.1	23.1		27.2	31.0	
IBI SCORE		13.7	15.1	16.0	12.7	37.9	
% Ephemeroptera	0.0	% Ephemeroptera (PTV 0-4)	0.0	% Dominant Taxon	80.1	BCG Richness Ratio	
% Plecoptera	0.0	Ephemeroptera Richness (PTV 0-4)	0	% Chironomidae	80.1	BCG Individuals Ratio	
% Trichoptera	2.2	Plecoptera Richness	0	% Simuliidae	0.0		
IMPAIRMENT							
Not Impaired	Y	Insufficient Data	Y				
HABITAT							
Instream Cover	10	Substrate / Cover		Frequency of Riffles	12	Bank Vegetation	7
Epifaunal Substrate	12	Velocity/Depth Regimes	18	Channel Flow Status	13	Disruptive Pressure	19
Embeddedness	9	Pool Variability		Channel Alteration	17	Riparian Zone	13
Pool Substrate		Sediment Deposition	9	Condition of Banks	5		
Pool-Glide Assessment? N		Instream Score = 40		Riparian Score = 25		Total Score = 144	
FIELD MEASUREMENTS							
Temperature (°C)	12	Dissolved Oxygen (mg/L)	10.05	Flow (CFS)			
pH	7.21	Total Alkalinity (mg/L as CaCO3)		Conductivity (uS/cm)	1268		
WATER CHEMISTRY							
Collector ID	2597		Sequence Number		081		

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**Table 7. Bureau of Clean Water Macroinvertebrate Sample Summary for the location downstream, after complete mixing with the Piney Fork STP discharge.**

**BUREAU OF CLEAN WATER  
MACROINVERTEBRATE SAMPLE SUMMARY**

2/3/2020 3:51:40 PM

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SAMPLE SUMMARY				
<b>STATION ID:</b> 20190417-1215-jadetweille	<b>SECONDARY STATION ID:</b>	<b>LATITUDE:</b> 40.276824	<b>LONGITUDE:</b> -79.97737160	
<b>STREAM NAME:</b> Piney Fork (01183937)		<b>HUC8</b> 05020005 Lower Monongahela, Pennsylvania, West Virginia.		
<b>SURVEY ID:</b> 71735		<b>METHOD:</b> 6-Dframe Composite, 200 subsample		
<b>SUBSAMPLED BY:</b>	<b>IDENTIFIED BY:</b> Jamie Detweiler	<b>QUALITY ASSURED:</b> N	<b>QUALITY ASSURED BY:</b>	<b>PASSED QUALITY ASSURANCE:</b> N
<b>STATION LOCATION COMMENT:</b> Station is located along the Montour run trail, in back of a laydown area for construction material. there is a powerline Right of way near the site. the site is located approximately 1 mile downstream of the Piney Fork STP outfall.				
<b>BIOLOGY / HABITAT COMMENT:</b>				
<b>LAND USE COMMENT:</b> This stretch of the stream appears to have a healthy riparian buffer. However, the upper portion of the watershed is heavily developed with suburban housing developments.				
<b>IMPAIRMENT COMMENT:</b>				

TAXA					
	# grids from first pan = 4	# grids from second pan =		Subsample Size =	217
TAXA NAME	INDIVIDUALS	PTV	FFG	BCG COLD	BCG WARM
Cheumatopsyche	3	6	FC	5	5
Stenelmis	1	5	SC	5	5
Chironomidae	210	6	CG	5	5
Oligochaeta	3	10	CG	5	5



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STATION ID: 20190417-1215-jadetweile

METRICS							
Freestone Riffle-Run 6D200							
METRIC NAME	RAW VALUE	2013 SMALL	2013 LARGE	2D100	MULTIHABITAT POOL GLIDE	LIMESTONE 2009	
Total Richness	4	12.1	12.9		12.9	22.2	
Ephemeroptera Richness	0				0.0		
Trichoptera Richness	1				9.1		
EPT Richness	1			6.5	5.9	12.5	
Trichoptera Richness (PTV 0-4)	0			0.0			
EPT Richness (PTV 0-4)	0	0.0	0.0				
Becks Index (version 3)	0	0.0	0.0				
Becks Index (version 4)	0			0.0	0.0	0.0	
FC + PR + SH Richness	1			8.6			
Hilsenhoff Biotic Index	6.05	48.7	56.8	58.6		64.1	
% Sensitive Individuals (PTV 0-3)	0	0.0	0.0				
% Tolerant Individuals (PTV 7-10)	1.40					100.1	
Shannon Diversity	0.17	5.9	5.9		7.0	8.0	
IBI SCORE		11.1	12.6	14.8	5.8	34.5	
% Ephemeroptera	0.0	% Ephemeroptera (PTV 0-4)	0.0	% Dominant Taxon	96.8	BCG Richness Ratio	
% Plecoptera	0.0	Ephemeroptera Richness (PTV 0-4)	0	% Chironomidae	96.8	BCG Individuals Ratio	
% Trichoptera	1.4	Plecoptera Richness	0	% Simuliidae	0.0		
IMPAIRMENT							
Not Impaired	Y	Insufficient Data	Y				
HABITAT							
Instream Cover	20	Substrate / Cover		Frequency of Riffles	15	Bank Vegetation	8
Epifaunal Substrate	17	Velocity/Depth Regimes	13	Channel Flow Status	8	Disruptive Pressure	15
Embeddedness	11	Pool Variability		Channel Alteration	12	Riparian Zone	15
Pool Substrate		Sediment Deposition	12	Condition of Banks	7		
Pool-Glide Assessment? N		Instream Score = 60		Riparian Score = 30		Total Score = 153	
FIELD MEASUREMENTS							
Temperature (°C)	14.50	Dissolved Oxygen (mg/L)	12.70	Flow (CFS)			
pH	7.51	Total Alkalinity (mg/L as CaCO3)		Conductivity (uS/cm)	1232		
WATER CHEMISTRY							
Collector ID	2597	Sequence Number	082				

## **Whole Effluent Toxicity Test Summary**

NPDES Permit No. PA0027618

Piney Fork STP

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet					
Type of Test	Chronic		Facility Name		
Species Tested	Ceriodaphnia				
Endpoint	Survival		Bethel Park Piney Fork STP		
TIWC (decimal)	0.9		Permit No.	PA0027618	
No. Per Replicate	1				
TST b value	0.75				
TST alpha value	0.2				

Test Completion Date			Test Completion Date		
12/18/2019			2/4/2020		
Replicate No.	Control	TIWC	Replicate No.	Control	TIWC
1	1	1	1	1	1
2	1	0	2	1	1
3	1	1	3	1	1
4	1	1	4	1	1
5	1	1	5	1	1
6	1	1	6	1	1
7	1	1	7	1	1
8	1	1	8	1	1
9	1	1	9	1	1
10	1	1	10	1	1
11			11		
12			12		
13			13		
14			14		
15			15		

Mean	1.000	0.900	Mean	1.000	1.000
Std Dev.	0.000	0.316	Std Dev.	0.000	0.000
# Replicates	10	10	# Replicates	10	10

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

Test Completion Date			Test Completion Date		
11/9/2020			11/23/2021		
Replicate No.	Control	TIWC	Replicate No.	Control	TIWC
1	1	1	1	1	1
2	1	1	2	1	1
3	1	1	3	1	1
4	1	1	4	1	1
5	1	1	5	1	1
6	1	1	6	1	1
7	1	1	7	1	1
8	1	1	8	1	1
9	1	1	9	1	1
10	1	1	10	1	1
11			11		
12			12		
13			13		
14			14		
15			15		

Mean	1.000	1.000	Mean	1.000	1.000
Std Dev.	0.000	0.000	Std Dev.	0.000	0.000
# Replicates	10	10	# Replicates	10	10

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

NPDES Permit No. PA0027618

Piney Fork STP

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet					
Type of Test	Chronic		Facility Name		
Species Tested	Ceriodaphnia				
Endpoint	Survival				
TIWC (decimal)	0.9				
No. Per Replicate	1		Permit No.	PA0027618	
TST b value	0.75				
TST alpha value	0.2				

Test Completion Date			Test Completion Date		
12/18/2019			2/4/2020		
Replicate No.	Control	TIWC	Replicate No.	Control	TIWC
1	1	1	1	1	1
2	1	0	2	1	1
3	1	1	3	1	1
4	1	1	4	1	1
5	1	1	5	1	1
6	1	1	6	1	1
7	1	1	7	1	1
8	1	1	8	1	1
9	1	1	9	1	1
10	1	1	10	1	1
11			11		
12			12		
13			13		
14			14		
15			15		

Mean	1.000	0.900	Mean	1.000	1.000
Std Dev.	0.000	0.316	Std Dev.	0.000	0.000
# Replicates	10	10	# Replicates	10	10

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

Test Completion Date			Test Completion Date		
11/9/2020			11/23/2021		
Replicate No.	Control	TIWC	Replicate No.	Control	TIWC
1	1	1	1	1	1
2	1	1	2	1	1
3	1	1	3	1	1
4	1	1	4	1	1
5	1	1	5	1	1
6	1	1	6	1	1
7	1	1	7	1	1
8	1	1	8	1	1
9	1	1	9	1	1
10	1	1	10	1	1
11			11		
12			12		
13			13		
14			14		
15			15		

Mean	1.000	1.000	Mean	1.000	1.000
Std Dev.	0.000	0.000	Std Dev.	0.000	0.000
# Replicates	10	10	# Replicates	10	10

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



NPDES Permit No. PA0027618

Piney Fork STP

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet					
Type of Test	Chronic		Facility Name		
Species Tested	Pimephales		Bethel Park Piney Fork STP		
Endpoint	Survival		Permit No.		
TIWC (decimal)	0.9		PA0027618		
No. Per Replicate	1				
TST b value	0.75				
TST alpha value	0.25				

Test Completion Date			Test Completion Date		
12/11/2018			12/17/2019		
Replicate No.	Control	TIWC	Replicate No.	Control	TIWC
1	1	0.8	1	1	0.5
2	1	0.9	2	0.9	0.5
3	1	0.8	3	0.8	0.9
4	1	1	4	0.9	0.6
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

Mean	1.000	0.875	Mean	0.900	0.625
Std Dev.	0.000	0.096	Std Dev.	0.082	0.189
# Replicates	4	4	# Replicates	4	4
T-Test Result	7.9838		T-Test Result	0.4644	
Deg. of Freedom	3		Deg. of Freedom	4	
Critical T Value	0.7649		Critical T Value	0.7407	
Pass or Fail	PASS		Pass or Fail	FAIL	

Test Completion Date			Test Completion Date		
11/10/2020			11/10/2021		
Replicate No.	Control	TIWC	Replicate No.	Control	TIWC
1	0.8	0.8	1	1	1
2	1	0.8	2	1	0.9
3	1	1	3	1	1
4	0.9	0.7	4	1	0.8
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

Mean	0.925	0.825	Mean	1.000	0.925
Std Dev.	0.096	0.126	Std Dev.	0.000	0.096
# Replicates	4	4	# Replicates	4	4
T-Test Result	5.0496		T-Test Result	6.8733	
Deg. of Freedom	5		Deg. of Freedom	3	
Critical T Value	0.7267		Critical T Value	0.7649	
Pass or Fail	PASS		Pass or Fail	PASS	

NPDES Permit No. PA0027618

Piney Fork STP

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet					
Type of Test	Chronic		Facility Name		
Species Tested	Pimephales				
Endpoint	Growth				
TIWC (decimal)	0.9				
No. Per Replicate	1		Permit No.	PA0027618	
TST b value	0.75				
TST alpha value	0.25				

Test Completion Date			Test Completion Date		
12/11/2018			12/17/2019		
Replicate No.	Control	TIWC	Replicate No.	Control	TIWC
1	0.3789	0.31	1	0.303	0.2956
2	0.379	0.372	2	0.256	0.245
3	0.335	0.282	3	0.281	0.253
4	0.282	0.29	4	0.254	0.212
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

Mean	0.344	0.309	Mean	0.289	0.251
Std Dev.	0.046	0.047	Std Dev.	0.023	0.034
# Replicates	4	4	# Replicates	4	4
T-Test Result	1.7460		T-Test Result	2.5958	
Deg. of Freedom	5		Deg. of Freedom	4	
Critical T Value	0.7267		Critical T Value	0.7407	
Pass or Fail	PASS		Pass or Fail	PASS	

Test Completion Date			Test Completion Date		
11/10/2020			11/23/2021		
Replicate No.	Control	TIWC	Replicate No.	Control	TIWC
1	0.349	0.34	1	0.271	0.311
2	0.367	0.365	2	0.297	0.284
3	0.45	0.507	3	0.245	0.31
4	0.371	0.292	4	0.255	0.274
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		

Mean	0.384	0.376	Mean	0.267	0.290
Std Dev.	0.045	0.092	Std Dev.	0.023	0.024
# Replicates	4	4	# Replicates	4	4
T-Test Result	1.7853		T-Test Result	6.0327	
Deg. of Freedom	4		Deg. of Freedom	5	
Critical T Value	0.7407		Critical T Value	0.7267	
Pass or Fail	PASS		Pass or Fail	PASS	

NPDES Permit No. PA0027618

Piney Fork STP

## WET Summary and Evaluation

Facility Name	Bethel Park Piney Fork STP
Permit No.	PA0027618
Design Flow (MGD)	4.92
Q <sub>7-10</sub> Flow (cfs)	0.8125
PMF <sub>a</sub>	1
PMF <sub>c</sub>	1

Species	Endpoint	Test Results (Pass/Fail)			
		Test Date	Test Date	Test Date	Test Date
Ceriodaphnia	Survival	12/18/19	2/4/20	11/9/20	11/23/21
		PASS	PASS	PASS	PASS

Species	Endpoint	Test Results (Pass/Fail)			
		Test Date	Test Date	Test Date	Test Date
Ceriodaphnia	Reproduction	12/18/19	2/4/20	11/9/20	11/23/21
		FAIL	PASS	PASS	PASS

Species	Endpoint	Test Results (Pass/Fail)			
		Test Date	Test Date	Test Date	Test Date
Pimephales	Survival	12/11/18	12/17/19	11/10/20	11/10/21
		PASS	FAIL	PASS	PASS

Species	Endpoint	Test Results (Pass/Fail)			
		Test Date	Test Date	Test Date	Test Date
Pimephales	Growth	12/11/18	12/17/19	11/10/20	11/23/21
		PASS	PASS	PASS	PASS

Reasonable Potential? YES

Permit Recommendations

Test Type Chronic  
 TIWC 90 % Effluent  
 Dilution Series 23, 45, 90, 95, 100 % Effluent  
 Permit Limit 1.1 TUc  
 Permit Limit Species Ceriodaphnia dubia, Pimephales promelas