pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

**Southcentral Regional Office**
**CLEAN WATER PROGRAM**

| | | | |
|---|---|---|---|
| Application Type | **Renewal** | Application No. | **PA0083470** |
| Facility Type | **Municipal** | APS ID | **1012328** |
| Major / Minor | **Minor** | Authorization ID | **1308273** |

# NPDES PERMIT FACT SHEET
# INDIVIDUAL SEWAGE

## Applicant and Facility Information

| | | | |
|---|---|---|---|
| Applicant Name | **Paradise Township Sewer Authority** | Facility Name | **Paradise Township Sewer Authority WWTP** |
| Applicant Address | 2 Township Drive, PO Box 40 | Facility Address | 33 Singer Avenue |
| | Paradise, PA 17562 | | Paradise, PA 17562 |
| Applicant Contact | Dennis Groff | Facility Contact | Brian Norris |
| Applicant Phone | (717) 768-8222 | Facility Phone | (610) 593-5710 |
| Client ID | 161642 | Site ID | 450340 |
| Ch 94 Load Status | Not Overloaded | Municipality | Paradise Township |
| Connection Status | No Limitations | County | Lancaster |
| Date Application Received | August 4, 2017 | EPA Waived? | No |
| Date Application Accepted | March 11, 2020 | If No, Reason | Pequea Creek TMDL, Expanding WWTP with new Cap Loads |

Purpose of Application: NPDES permit renewal and amendment

## Summary of Review

Paradise Township Sewer Authority (PTSA) has applied to the Pennsylvania Department of Environmental Protection (DEP) for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit. The permit was issued January 28, 2013 and became effective on February 1, 2013, authorizing discharge of treated sewage from the existing wastewater treatment plant (WWTP) located in Paradise Township, Lancaster County into Pequea Creek. The existing permit expiration date was January 31, 2018, and the permit has been administratively extended since that time. An NPDES Renewal Application was submitted to DEP on August 4, 2017.

An Act 537 Plan Update for PTSA was approved on December 12, 2019. The 537 Plan included a proposal for an upgrade to PTSA's WWTP, consisting of membrane bioreactor treatment, with a new annual average design flow of 0.22 million gallons per day (mgd). PTSA is anticipating growth in the service area with increased wastewater flows. The 537 Approval required an NPDES permit for the proposed effluent discharge, and a Water Quality Management (WQM) permit for the construction and operation of the propose sewage facilities. On January 24, 2020, DEP received an NPDES permit amendment application for the WWTP upgrade. It was anticipated that the WQM permit application would be submitted in March 2020. An overview of the WWTP expansion based on the information in the permit amendment is provided below.

Existing WWTP Description

The existing extended aeration WWTP was constructed in 1989, and was designed for an annual average daily flow of 0.12 mgd, and a $BOD_5$ loading of 240 lbs/day. The existing WWTP consists of influent pumping, manual screening, equalization, extended aeration, ferric chloride dosing for phosphorus removal, final clarification, sodium hypochlorite disinfection, sludge storage and disposal, and discharge of treated effluent to Pequea Creek. The WWTP finished grade elevation was at 350',

| Approve | Deny | Signatures | Date |
|---|---|---|---|
| | | Benjamin R. Lockwood / Environmental Engineering Specialist | April 17, 2019 |
| | | Daniel W. Martin, P.E. / Environmental Engineer Manager | |
| | | Maria D. Bebenek, P.E. / Program Manager | |

**Summary of Review**

which is above the 100-yr floodplain elevation of 348'. The influent pump station was designed for a peak flow of 0.3 mgd, and contains two submersible pumps. The headworks structure contains two manual bar screens. Equalization consists of six 15'-8" x 6'-10" equalization tanks. Air is provided to these tanks to prevent settling. Three air lift pumps distribute the flow to the three aeration treatment trains. Each treatment train consists of six 15'-8" x 6'-10" aeration tanks for a total of 18 aeration tanks. Air is provided to the tanks using a coarse bubble diffuser system and three blowers. Ferric chloride is added to the fifth tank in each train. The effluent flows from the aeration tanks to six 15'-8" x 6'-10" final clarifiers, which discharge to the chlorine contact tank. One tank is used for disinfection with liquid sodium hypochlorite. Five sludge holding tanks are used to store sludge before it is hauled off site for final treatment. Air is provided to these tanks to prevent septic conditions.

WWTP Upgrade Description

PTSA is proposing construction of a WWTP with the following design criteria:

Annual Average Daily Flow: 0.22 mgd
Maximum Monthly Average Flow: 0.2433 mgd
Peak Flow: 0.55 mgd
Organic Loading: 513 lbs/day

PTSA evaluated several alternatives for the WWTP upgrade, and determined to pursue a membrane bioreactor (MBR) system using existing tankage due to the lowest 20-year present worth, lower operations costs, use of existing tankage, and elimination of final clarifiers.

The MBR system will consist of nine or twelve 6,800 gallon EQ tanks, three 7,000 gallon pre-anoxic tanks, nine 7,000 gallon aeration tanks, three 7,000 gallon post anoxic tanks, and three 3,700 gallon membrane tanks. These will all use existing tankage. Three or six new EQ tanks would need to be installed. Three of the existing aeration tanks would be retrofitted as pre-anoxic tanks, three as post-anoxic tanks, and three as membrane tanks. The existing final clarifiers may be demolished. The MBR system will use positive displacement pumps for permeate withdrawal, which are also capable of backwashing the membranes. Sodium hypochlorite and citric acid will be used to remove biofilm and inorganic scaling from the membrane. The membrane system will be aerated. The new WWTP is designed for two of the three treatment trains to be capable of treating the AADF of 0.22 mgd, allowing for cleaning without disruption.

The upgrade will replace the influent pump station pumps with new pumps capable of a higher flow. The manual screen will be replaced with a weatherproof mechanical screen in the existing headworks structure. Equalization volume will be increased. The air lift system in the EQ tanks will be removed. One sludge holding tank will be converted to a second chlorine contact tank. The chlorine dosing system and chemical phosphorus removal system will be upgraded.

Changes in this Renewal

All parameters with an 8-Hr Composite sample type were changed to 24-Hr Composite. Mass load limits were revised using the new annual average design flow of 0.22 mgd. A more stringent Total Phosphorus limit was added to the permit. An ammonia limit was added to the permit. Monitoring requirements for Total Dissolved Solids, Sulfate, Chloride, and Bromide were added to the permit. Cap Loads for Total Nitrogen and Total Phosphorus were added to the permit.

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.

Supplemental information for this fact sheet is attached.

| **Discharge, Receiving Waters and Water Supply Information** | | | |
|---|---|---|---|
| Outfall No. | 001 | Design Flow (MGD) | 0.22 |
| Latitude | 40º 0' 45.6" | Longitude | 76º 7' 55.6" |
| Quad Name | Leola | Quad Code | 1836 |
| Wastewater Description: | Sewage Effluent | | |
| Receiving Waters | Pequea Creek (WWF, MF) | Stream Code | 7450 |
| NHD Com ID | 57464003 | RMI | 30.01 |
| Drainage Area | 65.7 $mi^2$ | Yield ($cfs/mi^2$) | 0.125 |
| $Q_{7-10}$ Flow (cfs) | 8.22 | $Q_{7-10}$ Basis | USGS PA StreamStats |
| Elevation (ft) | 334 | Slope (ft/ft) | |
| Watershed No. | 7-K | Chapter 93 Class. | WWF, MF |
| Existing Use | N/A | Existing Use Qualifier | N/A |
| Exceptions to Use | N/A | Exceptions to Criteria | N/A |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Pathogens, Siltation, Nutrients, Organic Enrichment, Habitat Alterations, Siltation | | |
| Source(s) of Impairment | Source Unknown, Habitat Modification – Other than Hydromodification, Agriculture, Agriculture, Habitat Modification – Other Than Hydromodification, Agriculture | | |
| TMDL Status | Final, 04/09/2001 | Name | Pequea Creek TMDL |
| Nearest Downstream Public Water Supply Intake | Chester Water Authority | | |
| PWS Waters | Susquehanna River | Flow at Intake (cfs) | |
| PWS RMI | | Distance from Outfall (mi) | 43 |

Changes Since Last Permit Issuance: USGS PA StreamStats is showing a drainage area of 65.7 $mi^2$ and a $Q_{7-10}$ flow of 8.22 cfs.

Other Comments: None

| **Treatment Facility Summary** | | | | |
|---|---|---|---|---|
| **Waste Type** | **Degree of Treatment** | **Process Type** | **Disinfection** | **Avg Annual Flow (MGD)** |
| Sewage | Secondary With Ammonia And Phosphorus | Membrane Bioreactor | Sodium Hypochlorite | 0.22 |
| | | | | |
| **Hydraulic Capacity (MGD)** | **Organic Capacity (lbs/day)** | **Load Status** | **Biosolids Treatment** | **Biosolids Use/Disposal** |
| 0.243 | 513 | Not Overloaded | Aerobic Digestion | Other WWTP |

Other Comments: None

| Compliance History | |
|---|---|
| | |
| **Summary of DMRs:** | A summary of past DMR effluent data is presented on the next page of this fact sheet. |
| **Summary of Inspections:** | 5/17/2016: A routine inspection was conducted by Sheena Ripple, DEP Water Quality Specialist. All treatment units were online. The outfall was observed, and the effluent was clear. All field readings were within permit limits.<br><br>1/17/2019: A routine inspection was conducted by Tracy Tomtishen, DEP Water Quality Specialist. A walkthrough of the facility was performed. There was very little rag and grit accumulation present on the bar screens. The clarifiers had varying degrees of surface scum and solids in the effluent troughs. The chlorine contact tank weir was free of solids. The tank had a minimal amount of surface scum. Field results were within permit limits. The outfall was observed. Pequea Creek was turbid due to recent rainfall. The stream bed was not visible. |

Other Comments: There are currently no open violations associated with the permittee or facility.

## Compliance History

**DMR Data for Outfall 001 (from March 1, 2019 to February 29, 2020)**

| Parameter | FEB-20 | JAN-20 | DEC-19 | NOV-19 | OCT-19 | SEP-19 | AUG-19 | JUL-19 | JUN-19 | MAY-19 | APR-19 | MAR-19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow (MGD) Average Monthly | 0.101440 | 0.105170 | 0.103710 | 0.103630 | 0.100450 | 0.09981 | 0.101040 | 0.10330 | 0.101330 | 0.10084 | 0.100380 | 0.108940 |
| Flow (MGD) Daily Maximum | 0.13030 | 0.12390 | 0.11580 | 0.12080 | 0.11850 | 0.11510 | 0.11950 | 0.11990 | 0.11420 | 0.11580 | 0.11480 | 0.13830 |
| pH (S.U.) Minimum | 7.17 | 7.24 | 7.27 | 7.24 | 7.25 | 7.30 | 7.29 | 7.34 | 7.30 | 7.19 | 7.21 | 7.10 |
| pH (S.U.) Maximum | 7.56 | 7.51 | 7.45 | 7.55 | 7.77 | 7.60 | 7.54 | 7.52 | 7.48 | 7.49 | 7.84 | 7.42 |
| DO (mg/L) Minimum | 7.1 | 7.2 | 7.0 | 7.3 | 7.2 | 7.2 | 7.0 | 7.0 | 7.0 | 7.1 | 7.2 | 7.0 |
| TRC (mg/L) Average Monthly | 0.358 | 0.410 | 0.423 | 0.407 | 0.414 | 0.438 | 0.381 | 0.480 | 0.432 | 0.438 | 0.453 | 0.445 |
| TRC (mg/L) Instantaneous Maximum | 0.50 | 0.54 | 0.51 | 0.53 | 0.54 | 0.55 | 0.63 | 0.66 | 0.60 | 0.56 | 0.59 | 0.52 |
| CBOD5 (lbs/day) Average Monthly | < 1.782 | < 1.763 | < 2.774 | < 1.769 | < 1.727 | < 2.345 | < 2.019 | < 1.742 | < 1.888 | < 2.25 | < 2.094 | < 3.617 |
| CBOD5 (lbs/day) Weekly Average | 1.89 | < 1.78 | 4.72 | 2.07 | < 1.86 | 2.98 | 2.33 | < 1.95 | 2.4 | 2.9 | 2.58 | 4.58 |
| CBOD5 (mg/L) Average Monthly | < 2.13 | < 2 | < 3.1 | < 2.08 | < 2 | < 2.75 | < 2.38 | < 2 | < 2.25 | < 2.5 | < 2.6 | < 4 |
| CBOD5 (mg/L) Weekly Average | 2.5 | < 2 | 5.4 | 2.3 | < 2 | 3.5 | 2.7 | < 2 | 3 | 3 | 3 | 5 |
| BOD5 (lbs/day) Raw Sewage Influent <br/> Average Monthly | 176.8 | 181.8 | 289.9 | 253.9 | 232.1 | 193.0 | 146.9 | 175.1 | 247 | 276.9 | 213.0 | 256.2 |
| BOD5 (lbs/day) Raw Sewage Influent <br/> Daily Maximum | 189.8 | 199.0 | 370.1 | 298.9 | 304.8 | 226.3 | 202.3 | 210.0 | 298.6 | 306.7 | 273.2 | 329.3 |
| BOD5 (mg/L) Raw Sewage Influent <br/> Average Monthly | 210 | 206.0 | 321.0 | 297.3 | 270.4 | 223.0 | 172.0 | 201.8 | 295.8 | 309.8 | 263.4 | 281.3 |
| TSS (lbs/day) Average Monthly | 4.41 | < 2.66 | 5.25 | 2.55 | 2.74 | 8.32 | 2.96 | 2.29 | < 3.24 | 2.98 | < 2.81 | 4.35 |
| TSS (lbs/day) Raw Sewage Influent <br/> Average Monthly | 93.1 | 100.0 | 177.5 | 208.8 | 245.3 | 194.2 | 167.3 | 194.7 | 248.7 | 267.6 | 212.1 | 233.7 |
| TSS (lbs/day) Raw Sewage Influent <br/> Daily Maximum | 150.5 | 163.4 | 257.9 | 267.6 | 324.9 | 211.2 | 206.0 | 234.2 | 312.6 | 306.6 | 287.5 | 276.7 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TSS (lbs/day) Weekly Average | 10.57 | 4.45 | 8.41 | 2.7 | 5.02 | 14.46 | 5.02 | 3.9 | 7.21 | 5.52 | 9.3 | 7.33 |
| TSS (mg/L) Average Monthly | 5.5 | < 3 | 5.8 | 3 | 3.2 | 10 | 3.5 | 2.6 | < 4 | 3.3 | < 3.4 | 4.8 |
| TSS (mg/L) Raw Sewage Influent <br/> Average Monthly | 109.5 | 113.3 | 194.4 | 244.0 | 283.0 | 225.5 | 196.8 | 223.2 | 297.5 | 296.5 | 263.4 | 257.5 |
| TSS (mg/L) Weekly Average | 14 | 5 | 9 | 3 | 6 | 18 | 6 | 4 | 9 | 6 | 11 | 8 |
| Fecal Coliform (CFU/100 ml) Geometric Mean | < 7 | < 6.3 | < 31.6 | < 6.2 | < 2.8 | < 2.2 | < 3.6 | < 4.9 | < 2.8 | 7.1 | < 9.4 | < 7.1 |
| Fecal Coliform (CFU/100 ml) Instantaneous Maximum | 33 | 20 | 200 | 18 | 10 | 3 | 21 | 18 | 5 | 8 | 42 | 300 |
| Total Phosphorus (lbs/day) Average Monthly | 0.321 | 0.244 | 0.266 | 0.326 | 0.29 | 0.713 | 0.368 | 0.318 | 0.236 | 0.252 | 0.263 | 0.267 |
| Total Phosphorus (mg/L) Average Monthly | 0.375 | 0.275 | 0.292 | 0.375 | 0.336 | 0.843 | 0.43 | 0.366 | 0.28 | 0.28 | 0.328 | 0.295 |
| Total Phosphorus (lbs) Total Annual | | | < 113.91 | | | | | | | | | |

## Existing Effluent Limitations and Monitoring Requirements

The tables below summarize the effluent limits and monitoring requirements implemented in the existing NPDES permit.

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) | | Concentrations (mg/L) | | | | Minimum Measurement Frequency | Required Sample Type |
| | Average Monthly | Daily Maximum | Minimum | Average Monthly | Weekly Average | Instant. Maximum | | |
| Flow (MGD) | Report | Report | XXX | XXX | XXX | XXX | Continuous | Measured |
| pH (S.U.) | XXX | XXX | 6.0 | XXX | XXX | 9.0 | 1/day | Grab |
| DO | XXX | XXX | 5.0 | XXX | XXX | XXX | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.50 | XXX | 1.6 | 1/day | Grab |
| CBOD5 | 25 | 40 Wkly Avg | XXX | 25 | 40 | 50 | 1/week | 8-Hr Composite |
| BOD5 Raw Sewage Influent | Report | Report | XXX | Report | XXX | XXX | 1/week | 8-Hr Composite |
| TSS Raw Sewage Influent | Report | Report | XXX | Report | XXX | XXX | 1/week | 8-Hr Composite |
| TSS | 30 | 45 Wkly Avg | XXX | 30 | 45 | 60 | 1/week | 8-Hr Composite |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1,000 | 1/week | Grab |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2,000 Geo Mean | XXX | 10,000 | 1/week | Grab |
| Total Phosphorus | 2.0 | XXX | XXX | 2.0 | XXX | XXX | 1/week | 8-Hr Composite |
| Total Phosphorus | XXX | 731 Total Annual | XXX | XXX | XXX | XXX | 1/year | Calculation |

## Development of Effluent Limitations

**Outfall No.** 001 **Design Flow (MGD)** .22
**Latitude** 40º 0' 45.6" **Longitude** 76º 7' 55.6"
**Wastewater Description:** Effluent

### Technology-Based Limitations

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

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

### Water Quality-Based Limitations

$CBOD_5$, $NH_3$-N

Pursuant to 40 CFR § 122.44(d)(1)(i), more stringent requirements should be considered when pollutants are discharged at the levels which have the reasonable potential to cause or contribute to excursions above water quality standards.

WQM 7.0 ver. 1.0b is a water quality model designed to assist DEP in determining appropriate water quality based effluent limits (WQBELs) for carbonaceous biochemical oxygen demand ($CBOD_5$), $NH_3$-N and dissolved oxygen (D.O.). DEP's Technical Guidance No. 391-2000-007 provides the technical methods contained in WQM 7.0 for determining wasteload allocations and for determining recommended NPDES effluent limits for point source discharges. The model was utilized for this permit renewal, and the output indicated a $CBOD_5$ average monthly limit of 25 mg/l, an $NH_3$-N average monthly limit of 15.06 mg/l, and a D.O. minimum limit of 5.0 mg/l were protective of water quality for the expanded WWTP. For the existing WWTP before the new limits take effect, the output indicated a $CBOD_5$ average monthly limit of 25 mg/l, an $NH_3$-N average monthly limit of 23.17 mg/l, and a D.O. minimum limit of 5.0 mg/l were protective of water quality.

The flow data used to run the model was acquired from USGS PA StreamStats and is included in the attachment. Stream pH and temperature inputs for this model run were based on data acquired from the National Water Quality Monitoring Council website. Data was analyzed from the Water Quality Network (WQN) Station ID 284 on Pequea Creek from November 2012 to December 2017. DEP's Standard Operating Procedure (SOP) No. BPNPSM-PMT-033 (Establishing Effluent Limitations for Individual Sewage Permits) recommends using the 90$^{th}$ percentile of long-term data for background and discharge characteristics when using WQM 7.0. A 90$^{th}$ percentile analysis was performed on the data and resulted in a Stream pH of 8.3 and a Stream Temperature of 22.1°C. Based on the round-off guidelines from Chapter 5 of the Technical Guidance for the Development and Specification of Effluent Limitations (Guidance No. 362-0400-001), a $CBOD_5$ limit of 25 mg/l and a $NH_3$-N limit of 23 mg/l are necessary to protect water quality for the existing WWTP before the new limits take effect. The $CBOD_5$ limit is the same as the existing limit and will remain in the permit. There is no $NH_3$-N limit in the existing permit, so the $NH_3$-N limit of 23 mg/l will be a new limit added to the permit. For the expanded WWTP, a $CBOD_5$ limit of 25 mg/l and a $NH_3$-N limit of 15 mg/l are necessary to protect water quality. Mass loading limits for CBOD5 and $NH_3$-N were based off of these limits and the new design flow of 0.22 mgd.

Toxics

Effluent sample results for toxic pollutants reported on the renewal application were entered into DEP's Toxics Screening Analysis worksheet and PENTOXSD to develop appropriate permit requirements for toxic pollutants of concern. A default analysis hardness value of 100 mg/l was used in the Toxics Screening Analysis. Based on effluent sample results reported on the application, there are no pollutants which are candidates for PENTOXSD modeling.

Best Professional Judgement (BPJ) Limitations

*Dissolved Oxygen*

A minimum D.O. limit of 5.0 mg/L is a D.O. water quality criterion found in 25 Pa. Code § 93.7(a). This limit is included in the existing NPDES permit based BPJ. It is still recommended to include this limit in the draft permit to ensure that the facility continues to achieve compliance with DEP water quality standards.

*Total Residual Chlorine*

The attached computer printout utilizes the equations and calculations as presented in the Department's May 1, 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID No. 391-2000-015) for developing chlorine limitations. The Guidance references Chapter 92, Section 92.2d (3) which establishes a standard BAT limit of 0.5 mg/l unless a facility-specific BAT has been developed. The attached printout indicates that a water quality limit of 0.5 mg/l would be needed to prevent toxicity concerns. It is recommended that a TRC limit of 0.5 mg/l monthly average and 1.6 mg/l instantaneous maximum be applied this permit cycle, the same as the existing limit.

*Total Phosphorus*

For Total Phosphorus (TP), the current NPDES permit requires the permittee to comply with average monthly limit of 2.0 mg/L, and were established due to the Pequea Creek TMDL. The TMDL allocated 731 lbs/yr TP to this facility, which corresponds to a monthly average limit of 2.0 mg/l. For the existing WWTP before the new limits take effect, the TP limit of 2.0 mg/l will remain. As discussed below, due to the requirements of the Chesapeake Bay TMDL, a more stringent TP Cap Load of 368 lbs/yr will be added to the permit for the expanded WWTP. This corresponds to a monthly average limit of 0.5 mg/l, which will be added to the permit, which will take effect once the new WWTP is constructed.

## Additional Considerations

Chesapeake Bay Total Maximum Daily Load (TMDL)

DEP developed a strategy to comply with the EPA and Chesapeake Bay Foundation requirements by reducing point source loadings of Total Nitrogen (TN) and Total Phosphorus (TP). This strategy can be located in the *Pennsylvania Chesapeake Watershed Implementation Plan* (WIP), dated January 11, 2011. Subsequently, an update to the WIP was published as the Phase 2 WIP. As part of the Phase 2 WIP, a *Phase 2 Watershed Implementation Plan Wastewater Supplement* (Phase 2 Supplement) was developed, providing an update on TMDL implementation for point sources and DEP's current implementation strategy for wastewater. A new update to the WIP was published as the Phase 3 WIP in August 2019. As part of the Phase 3 WIP, a *Phase 3 Watershed Implementation Plan Wastewater Supplement* (Phase 3 Supplement) was developed, and was most recently revised on December 17, 2019, and is the basis for the development of any Chesapeake Bay related permit parameters. Sewage discharges have been prioritized based on their design flow to the Bay. The highest priority (Phases 1, 2, and 3) dischargers will receive annual Cap Loads based on their design flow on August 29, 2005 and concentrations of 6 mg/l TN and 0.8 mg/l TP. These limits may be achieved through a combination of treatment technology, credits, or offsets. For Phase 4 and 5 facilities, Cap Loads are not currently being implemented for renewed or amended permits for facilities that do not increase design flow. For renewed or amended permits that do include an increase in design flow, Cap Loads will be based on the lesser of: existing TN and TP concentrations at current design average annual flow or 7,306 lbs/yr TN and 974 lbs/yr TP. A zero nutrient load for the Chesapeake Bay will be assigned for new sewage discharges from industrial and/or domestic sources. Point source growth may be addressed by the purchase of nutrient credits or by the use of offsets.

The existing Paradise Township Sewer Authority is considered a Phase 5 facility. According to DEP's latest-revised Phase 3 Supplement, issuance of permits with monitoring and reporting for TN and TP is recommended for any Phase 5 non-significant sewage facilities (i.e., facilities with average annual design flows on August 29, 2005 less than 0.2 MGD but greater than 0.002 MGD). Furthermore, DEP's SOP No. BCW-PMT-033 states that in general, at a minimum, monitoring

for TN and TP should be included in new and reissued permits for sewage discharges with design flows > 2,000 gpd. Therefore, TN and TP monitoring will be included in the renewed permit.

As the facility is expanding to a design flow of 0.22 mgd, it will be considered a Phase 4 facility upon completion of construction. ( flow ≥ 0.2 MGD and < 0.4 MGD). The Phase 3 Supplement was used to determine the new WWTP Cap Loads as follows:

*Cap Loads using existing TN and TP conc. at current design annual average flow:*

TN Cap Load: 0.12 mgd x 37.8 mg/l x 8.34 x 365 days/yr = 13,808 lbs/day
TP Cap Load: 0.12 mgd x 1.01 mg/l x 8.34 x 365 days/yr = 368 lbs/day

The TN Cap Load of 7,306 lbs/yr is more stringent, and will be used in the permit. The calculated TP Cap Load of 368 lbs/day using existing data is more stringent than the TP Cap Load of 974 lbs/yr, and will be used in the permit. A monitoring frequency of 1/week as 24-Hr Composites will be used. These Cap Loads will take effect once the new WWTP is constructed.

Total Dissolved Solids (TDS)

Total Dissolved Solids and its major constituents including Bromide, Chloride, and Sulfate have become statewide pollutants of concern and threats to DEP's mission to prevent violations of water quality standards. The requirement to monitor these pollutants must be considered under the criteria specified in 25 Pa. Code § 95.10 and the following January 23, 2014 DEP Central Office Directive:

For point source discharges and upon issuance or reissuance of an individual NPDES permit:

- Where the concentration of TDS in the discharge exceeds 1,000 mg/L, or the net TDS load from a discharge exceeds 20,000 lbs/day, and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for TDS, sulfate, chloride, and bromide. Discharges of 0.1 MGD or less should monitor and report for TDS, sulfate, chloride, and bromide if the concentration of TDS in the discharge exceeds 5,000 mg/L.

- Where the concentration of bromide in a discharge exceeds 1 mg/L and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for bromide. Discharges of 0.1 MGD or less should monitor and report for bromide if the concentration of bromide in the discharge exceeds 10 mg/L.

- Where the concentration of 1,4-dioxane (CAS 123-91-1) in a discharge exceeds 10 µg/l and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for 1,4-dioxane. Discharges of 0.1 MGD or less should monitor and report for 1,4-dioxane if the concentration of 1,4-dioxane in the discharge exceeds 100 µg/l.

Paradise Township Sewer Authority reported a maximum effluent TDS concentration of 1,372 mg/l and Bromide concentration of <2.0 mg/l. Based upon the data provided in the application, monitoring will be necessary for TDS, sulfate, chloride, and bromide. A monitoring frequency of 1/week will be used for these parameters.

Fecal Coliform

PA Code § 92a.47.(a)(4) requires a monthly average limit of 200/100 mL as a geometric mean and an instantaneous maximum limit not greater than 1,000/100 mL from May through September for fecal coliform. PA Code § 92a.47.(a)(5) requires a monthly average limit of 2,000/100 mL as a geometric mean and an instantaneous maximum limit not greater than 10,000/100 mL from October through April for fecal coliform. These limits were included in the existing permit and will remain in the renewal.

Compliance Schedule

A compliance schedule is necessary for the construction of the WWTP. The following conditions will be incorporated into Part C of the NPDES permit:

A. The permittee shall achieve compliance with Cap Loads in accordance with the following schedule:

| | | |
|---|---|---|
| 1. | Award Construction Contract | April 2021 |
| 2. | Progress report(s) | Quarterly |
| 3. | Construction Final Completion | August 2022 |
| 4. | Compliance with effluent limitations | Permit Effective Date |
| 5. | Compliance with Cap Loads | 10/1/2022 |

B. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit to DEP a written notice of compliance or non-compliance with the specific schedule requirement. Each notice of non-compliance shall include the following information:

1. A short description of the non-compliance.
2. A description of any actions taken or proposed by the permittee to comply with the elapsed schedule requirement.
3. A description of any factors which tend to explain or mitigate the non-compliance.
4. An estimate of the date that compliance with the elapsed schedule requirement will be achieved and an assessment of the probability that the next scheduled requirement will be met on time.

PTSA will be required to comply with all other effluent limitations on the permit effective date.

Sampling Frequency & Sample Type

The monitoring requirements were established based on BPJ and/or Table 6-3 of DEP's Technical Guidance No. 362-0400-001. DEP's SOP No. BCW-PMT-002 states that for new or expanding facilities with a design flow ≥ 0.1 mgd, 24-Hr composite sampling will be used for conventional and toxic pollutants, except where grab sampling is appropriate.

Flow Monitoring

Flow monitoring is recommended by DEP's technical guidance and is also required by 25 PA Code §§ 92a.27 and 92a.61.

Influent $BOD_5$ and Total Suspended Solids (TSS) Monitoring

As a result of negotiation with US EPA, influent monitoring of TSS and $BOD_5$ are required for any publicly owned treatment works (POTWs); therefore, influent sampling of $BOD_5$ and TSS will remain in the permit.

Mass Loading Limitation

All mass loading effluent limitations recommended in the draft permit are concentration-based, calculated using a formula: design flow (MGD) x concentration limit (mg/l) x conversion factor of 8.34.

Anti-Degradation

The effluent limits for this discharge have been developed to ensure that existing instream water uses and the level of water quality necessary to protect the existing uses are maintained and protected. No High Quality Waters are impacted by this discharge. No Exceptional Value Waters are impacted by this discharge.

303(d) Listed Streams

The discharge is located on a stream segment that is designated on the 303(d) list as impaired. There is a recreational impairment due to pathogens from an unknown source. There is an aquatic life impairment due to siltation and habitat alterations from habitat modification – other than hydromodification; nutrients, siltation, and organic enrichment from agriculture. The permit has limits for fecal coliform and nutrients, and will not contribute to the other impairments. A TMDL existing for Pequea Creek for phosphorus and sediment. The TMDL was completed and approved on April 9, 2001 and was revised in 2006. The TMDL established a TP mass loading of 731 lbs/year for this facility.

Class A Wild Trout Fisheries

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

Anti-Backsliding

Pursuant to 40 CFR § 122.44(l)(1), all proposed permit requirements addressed in this fact sheet are at least as stringent as the requirements implemented in the existing NPDES permit unless any exceptions addressed by DEP in this fact sheet.

## 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 September 30, 2022**.

**Outfall 001, Continued (from Permit Effective Date through September 30, 2022)**

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) | | Concentrations (mg/L) | | | | Minimum Measurement Frequency | Required Sample Type |
| | Average Monthly | Weekly Average | Minimum | Average Monthly | Weekly Average | Instant. Maximum | | |
| Flow (MGD) | Report | Report Daily Max | XXX | XXX | XXX | XXX | Continuous | Measured |
| pH (S.U.) | XXX | XXX | 6.0 Inst Min | XXX | XXX | 9.0 | 1/day | Grab |
| DO | XXX | XXX | 5.0 Inst Min | XXX | XXX | XXX | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.50 | XXX | 1.6 | 1/day | Grab |
| CBOD5 | 25 | 40 | XXX | 25 | 40 | 50 | 1/week | 8-Hr Composite |
| BOD5 Raw Sewage Influent | Report | Report Daily Max | XXX | Report | XXX | XXX | 1/week | 8-Hr Composite |
| TSS Raw Sewage Influent | Report | Report Daily Max | XXX | Report | XXX | XXX | 1/week | 8-Hr Composite |
| TSS | 30 | 45 | XXX | 30 | 45 | 60 | 1/week | 8-Hr Composite |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2,000 Geo Mean | XXX | 10,000 | 1/week | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1,000 | 1/week | Grab |
| TDS | XXX | XXX | XXX | Report | Report Daily Max | XXX | 1/week | 8-Hr Composite |
| Sulfate | XXX | XXX | XXX | Report | Report Daily Max | XXX | 1/week | 8-Hr Composite |
| Chloride | XXX | XXX | XXX | Report | Report Daily Max | XXX | 1/week | 8-Hr Composite |
| Bromide | XXX | XXX | XXX | Report | Report Daily Max | XXX | 1/week | 8-Hr Composite |

**Outfall 001, Continued (from Permit Effective Date through September 30, 2022)**

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) | | Concentrations (mg/L) | | | | Minimum Measurement Frequency | Required Sample Type |
| | Average Monthly | Weekly Average | Minimum | Average Monthly | Weekly Average | Instant. Maximum | | |
| Ammonia<br>Nov 1 - Apr 30 | Report | XXX | XXX | Report | XXX | XXX | 1/week | 8-Hr Composite |
| Ammonia<br>May 1 - Oct 31 | 23 | XXX | XXX | 23 | XXX | 46 | 1/week | 8-Hr Composite |

Compliance Sampling Location: Outfall 001

Other Comments: None

## Proposed Effluent Limitations and Monitoring Requirements

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

**Outfall 001, Effective Period: Permit Effective Date through September 30, 2022**.

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) | | Concentrations (mg/L) | | | | Minimum Measurement Frequency | Required Sample Type |
| | Average Monthly | Weekly Average | Minimum | Average Monthly | Weekly Average | Instant. Maximum | | |
| TKN | XXX | XXX | XXX | Report | XXX | XXX | 1/week | 8-Hr Composite |
| Nitrate-Nitrite | XXX | XXX | XXX | Report | XXX | XXX | 1/week | 8-Hr Composite |
| Total Nitrogen | XXX | XXX | XXX | Report | XXX | XXX | 1/month | Calculation |
| Total Phosphorus | 2.0 | XXX | XXX | 2.0 | XXX | XXX | 1/week | 8-Hr Composite |
| Total Phosphorus | XXX | 731 Total Annual | XXX | XXX | XXX | XXX | 1/year | Calculation |

Other Comments: None

## 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: October 1, 2022 through Permit Expiration Date**.

**Outfall 001, Continued (from October 1, 2022 through Permit Expiration Date)**

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) | | Concentrations (mg/L) | | | | Minimum Measurement Frequency | Required Sample Type |
| | Average Monthly | Weekly Average | Minimum | Average Monthly | Weekly Average | Instant. Maximum | | |
| Flow (MGD) | Report | Report Daily Max | XXX | XXX | XXX | XXX | Continuous | Measured |
| pH (S.U.) | XXX | XXX | 6.0 Inst Min | XXX | XXX | 9.0 | 1/day | Grab |
| DO | XXX | XXX | 5.0 Inst Min | XXX | XXX | XXX | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.50 | XXX | 1.6 | 1/day | Grab |
| CBOD5 | 45 | 73 | XXX | 25 | 40 | 50 | 1/week | 24-Hr Composite |
| BOD5 Raw Sewage Influent | Report | Report Daily Max | XXX | Report | XXX | XXX | 1/week | 24-Hr Composite |
| TSS Raw Sewage Influent | Report | Report Daily Max | XXX | Report | XXX | XXX | 1/week | 24-Hr Composite |
| TSS | 55 | 82 | XXX | 30 | 45 | 60 | 1/week | 24-Hr Composite |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2,000 Geo Mean | XXX | 10,000 | 1/week | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1,000 | 1/week | Grab |
| Ammonia Nov 1 - Apr 30 | 82 | XXX | XXX | 45 | XXX | 90 | 1/week | 24-Hr Composite |
| Ammonia May 1 - Oct 31 | 27 | XXX | XXX | 15 | XXX | 30 | 1/week | 24-Hr Composite |
| Total Phosphorus | 0.9 | XXX | XXX | 0.5 | XXX | 1.0 | 1/week | 24-Hr Composite |
| TDS | XXX | XXX | XXX | Report | Report Daily Max | XXX | 1/week | 24-Hr Composite |

**Outfall 001, Continued (from October 1, 2022 through Permit Expiration Date)**

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) | | Concentrations (mg/L) | | | | Minimum Measurement Frequency | Required Sample Type |
| | Average Monthly | Weekly Average | Minimum | Average Monthly | Weekly Average | Instant. Maximum | | |
| Sulfate | XXX | XXX | XXX | Report | Report Daily Max | XXX | 1/week | 24-Hr Composite |
| Chloride | XXX | XXX | XXX | Report | Report Daily Max | XXX | 1/week | 24-Hr Composite |
| Bromide | XXX | XXX | XXX | Report | Report Daily Max | XXX | 1/week | 24-Hr Composite |

Compliance Sampling Location: Outfall 001

Other Comments: None

## Proposed Effluent Limitations and Monitoring Requirements

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

**Outfall 001, Effective Period: October 1, 2022 through Permit Expiration Date**.

| Parameter | Effluent Limitations | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|
| | Mass Units (lbs) | | Concentrations (mg/L) | | | Minimum Measurement Frequency | Required Sample Type |
| | Monthly | Annual | Minimum | Monthly Average | Instant. Maximum | | |
| Ammonia | Report | Report | XXX | Report | XXX | 1/week | 24-Hr Composite |
| TKN | Report | XXX | XXX | Report | XXX | 1/week | 24-Hr Composite |
| Nitrate-Nitrite | Report | XXX | XXX | Report | XXX | 1/week | 24-Hr Composite |
| Total Nitrogen | Report | Report | XXX | Report | XXX | 1/month | Calculation |
| Total Phosphorus | Report | Report | XXX | Report | XXX | 1/week | 24-Hr Composite |
| Net Total Nitrogen | XXX | 7,306 | XXX | XXX | XXX | 1/year | Calculation |
| Net Total Phosphorus | XXX | 368 | XXX | XXX | XXX | 1/year | Calculation |

Compliance Sampling Location: - Outfall 001

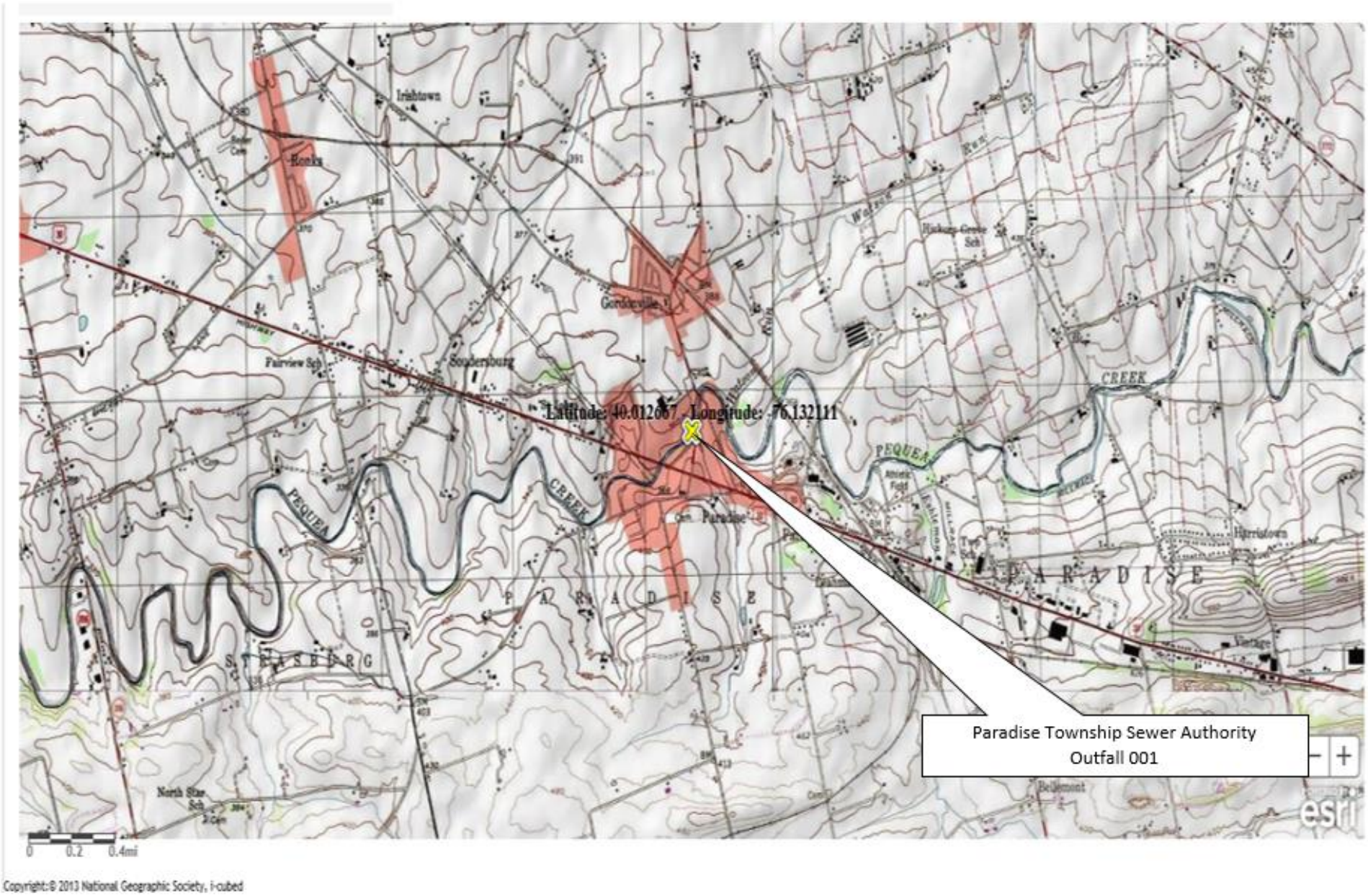
Other Comments: None

| Tools and References Used to Develop Permit | |
|---|---|
| | |
| ☒ | WQM for Windows Model (see Attachment ) |
| ☐ | PENTOXSD for Windows Model (see Attachment ) |
| ☒ | TRC Model Spreadsheet (see Attachment ) |
| ☐ | Temperature Model Spreadsheet (see Attachment ) |
| ☒ | Toxics Screening Analysis Spreadsheet (see Attachment ) |
| ☒ | Water Quality Toxics Management Strategy, 361-0100-003, 4/06. |
| ☒ | Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97. |
| ☐ | Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98. |
| ☐ | Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96. |
| ☐ | Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97. |
| ☐ | Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97. |
| ☐ | Pennsylvania CSO Policy, 385-2000-011, 9/08. |
| ☐ | Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03. |
| ☐ | Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97. |
| ☒ | Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97. |
| ☐ | Implementation Guidance Design Conditions, 391-2000-006, 9/97. |
| ☒ | Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004. |
| ☐ | Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997. |
| ☐ | Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99. |
| ☐ | Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004. |
| ☐ | Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97. |
| ☐ | Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008. |
| ☐ | Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994. |
| ☐ | Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09. |
| ☐ | Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97. |
| ☐ | Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97. |
| ☐ | Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99. |
| ☐ | Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999. |
| ☐ | Design Stream Flows, 391-2000-023, 9/98. |
| ☐ | Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98. |
| ☐ | Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97. |
| ☐ | Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07. |
| ☐ | SOP: |
| ☐ | Other: |

**Permit No. PA0083470**

| | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | **TRC EVALUATION** | | | | | | |
| 2 | Input appropriate values in A3:A9 and D3:D9 | | | | | | |
| 3 | 8.22 | = Q stream (cfs) | | 0.5 | = CV Daily | | |
| 4 | 0.22 | = Q discharge (MGD) | | 0.5 | = CV Hourly | | |
| 5 | 30 | = no. samples | | 1 | = AFC_Partial Mix Factor | | |
| 6 | 0.3 | = Chlorine Demand of Stream | | 1 | = CFC_Partial Mix Factor | | |
| 7 | 0 | = Chlorine Demand of Discharg | | 15 | = AFC_Criteria Compliance Time (min) | | |
| 8 | 0.5 | = BAT/BPJ Value | | 720 | = CFC_Criteria Compliance Time (min) | | |
| 9 | 0 | = % Factor of Safety (FOS) | | | =Decay Coefficient (K) | | |
| 10 | Source | Reference | AFC Calculations | | Reference | CFC Calculations | |
| 11 | TRC | 1.3.2.iii | WLA afc = 7.724 | | 1.3.2.iii | WLA cfc = 7.522 | |
| 12 | PENTOXSD TRG | 5.1a | LTAMULT afc = 0.373 | | 5.1c | LTAMULT cfc = 0.581 | |
| 13 | PENTOXSD TRG | 5.1b | LTA_afc= 2.878 | | 5.1d | LTA_cfc = 4.373 | |
| 14 | | | | | | | |
| 15 | Source | | Effluent Limit Calculations | | | | |
| 16 | PENTOXSD TRG | 5.1f | AML MULT = 1.231 | | | | |
| 17 | PENTOXSD TRG | 5.1g | AVG MON LIMIT (mg/l) = 0.500 | | BAT/BPJ | | |
| 18 | | | INST MAX LIMIT (mg/l) = 1.635 | | | | |
| 19 | | | | | | | |
| 20 | | | | | | | |
| 21 | | | | | | | |
| 22 | WLA afc | | **(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...** | | | | |
| 23 | | | **...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)** | | | | |
| 24 | LTAMULT afc | | EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5) | | | | |
| 25 | LTA_afc | | wla_afc*LTAMULT_afc | | | | |
| 26 | | | | | | | |
| 27 | **WLA_cfc** | | **(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc) )...** | | | | |
| 28 | | | **...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)** | | | | |
| 29 | LTAMULT_cfc | | EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5) | | | | |
| 30 | **LTA_cfc** | | wla_cfc*LTAMULT_cfc | | | | |
| 31 | | | | | | | |
| 32 | AML MULT | | EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1)) | | | | |
| 33 | AVG MON LIMIT | | MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT) | | | | |
| 34 | INST MAX LIMIT | | **1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)** | | | | |
| 35 | | | | | | | |
| 36 | | | | | | | |
| 37 | | | | | | | |
| 38 | | | | | | | |
| 39 | | | | | | | |
| 40 | | | | | | | |
| 41 | **(0.011/EXP(-K*CFC_tc/1440))+(((CFC_Yc*Qs*0.011)/(1.547*Qd)....** | | | | | | |
| 42 | **....*EXP(-K*CFC_tc/1440)))+Xd+(CFC_Yc*Qs*Xs/1.547*Qd))*(1-FOS/100)** | | | | | | |
| 43 | | | | | | | |
| 44 | | | | | | | |
| 45 | | | | | | | |
| 46 | | | | | | | |
| 47 | | | | | | | |

Instructions | TRC_CALC


Latitude: 40.012067 Longitude: -76.132111
Paradise Township Sewer Authority
Outfall 001
PEQUEA CREEK
PARADISE
STRASBURG
Irishtown
Ronks
Gordonville
Fairview Sch
Soudersburg
Harristown
Belgmont
North Star Sch
0 0.2 0.4mi
esri
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# Paradise Township Sewer Authority

# PA0083470 Outfall 001

**Region ID:** PA
**Workspace ID:** PA20200406153439373000
**Clicked Point (Latitude, Longitude):** 40.01267, -76.13232
**Time:** 2020-04-06 11:34:57 -0400


Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| DRNAREA | Area that drains to a point on a stream | 65.7 | square miles |
| BSLOPD | Mean basin slope measured in degrees | 3.4 | degrees |
| ROCKDEP | Depth to rock | 5.4 | feet |

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| URBAN | Percentage of basin with urban development | 2 | percent |

Low-Flow Statistics Parameters[Low Flow Region 1]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|---|---|---|---|---|---|
| DRNAREA | Drainage Area | 65.7 | square miles | 4.78 | 1150 |
| BSLOPD | Mean Basin Slope degrees | 3.4 | degrees | 1.7 | 6.4 |
| ROCKDEP | Depth to Rock | 5.4 | feet | 4.13 | 5.21 |
| URBAN | Percent Urban | 2 | percent | 0 | 89 |

Low-Flow Statistics Disclaimers[Low Flow Region 1]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[Low Flow Region 1]

| Statistic | Value | Unit |
|---|---|---|
| 7 Day 2 Year Low Flow | 16 | ft^3/s |
| 30 Day 2 Year Low Flow | 20.3 | ft^3/s |
| 7 Day 10 Year Low Flow | 8.22 | ft^3/s |
| 30 Day 10 Year Low Flow | 10.4 | ft^3/s |
| 90 Day 10 Year Low Flow | 16.5 | ft^3/s |

*Low-Flow Statistics Citations*

**Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)**

Application Version: 4.3.11

# Paradise Township Sewer Authority WWTP PA0083470 Downstream Pt.

**Region ID:** PA
**Workspace ID:** PA20200406172729298000
**Clicked Point (Latitude, Longitude):** 40.00314, -76.17149
**Time:** 2020-04-06 13:27:47 -0400


Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| DRNAREA | Area that drains to a point on a stream | 70.7 | square miles |
| BSLOPD | Mean basin slope measured in degrees | 3.4 | degrees |
| ROCKDEP | Depth to rock | 5.4 | feet |

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| URBAN | Percentage of basin with urban development | 3 | percent |

Low-Flow Statistics Parameters[Low Flow Region 1]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|---|---|---|---|---|---|
| DRNAREA | Drainage Area | 70.7 | square miles | 4.78 | 1150 |
| BSLOPD | Mean Basin Slope degrees | 3.4 | degrees | 1.7 | 6.4 |
| ROCKDEP | Depth to Rock | 5.4 | feet | 4.13 | 5.21 |
| URBAN | Percent Urban | 3 | percent | 0 | 89 |

Low-Flow Statistics Disclaimers[Low Flow Region 1]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[Low Flow Region 1]

| Statistic | Value | Unit |
|---|---|---|
| 7 Day 2 Year Low Flow | 17.5 | ft^3/s |
| 30 Day 2 Year Low Flow | 22.2 | ft^3/s |
| 7 Day 10 Year Low Flow | 9.1 | ft^3/s |
| 30 Day 10 Year Low Flow | 11.5 | ft^3/s |
| 90 Day 10 Year Low Flow | 18.2 | ft^3/s |

*Low-Flow Statistics Citations*

**Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)**

Application Version: 4.3.11

**Permit No. PA0083470**

## Input Data WQM 7.0

| SWP Basin | Stream Code | Stream Name | RMI | Elevation (ft) | Drainage Area (sq mi) | Slope (ft/ft) | PWS Withdrawal (mgd) | Apply FC |
|---|---|---|---|---|---|---|---|---|
| 07K | 7450 | PEQUEA CREEK | 30.010 | 334.00 | 65.70 | 0.00000 | 0.00 | ☑ |

### Stream Data

| Design Cond. | LFY (cfsm) | Trib Flow (cfs) | Stream Flow (cfs) | Rch Trav Time (days) | Rch Velocity (fps) | WD Ratio | Rch Width (ft) | Rch Depth (ft) | Tributary Temp (°C) | Tributary pH | Stream Temp (°C) | Stream pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q7-10 | 0.100 | 0.00 | 8.22 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.00 | 22.10 | 8.30 |
| 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 |
|---|---|---|---|---|---|---|---|
| Paradise WWTP | PA0083470 | 0.1200 | 0.1200 | 0.1200 | 0.000 | 25.00 | 7.00 |

### Parameter Data

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

**Permit No. PA0083470**

## Input Data WQM 7.0

| SWP Basin | Stream Code | Stream Name | RMI | Elevation (ft) | Drainage Area (sq mi) | Slope (ft/ft) | PWS Withdrawal (mgd) | Apply FC |
|---|---|---|---|---|---|---|---|---|
| 07K | 7450 | PEQUEA CREEK | 26.190 | 320.00 | 70.70 | 0.00000 | 0.00 | ☑ |

### Stream Data

| Design Cond. | LFY (cfsm) | Trib Flow (cfs) | Stream Flow (cfs) | Rch Trav Time (days) | Rch Velocity (fps) | WD Ratio | Rch Width (ft) | Rch Depth (ft) | Tributary Temp (°C) | Tributary pH | Stream Temp (°C) | Stream pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q7-10 | 0.100 | 0.00 | 9.10 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.00 | 22.10 | 8.30 |
| Q1-10 | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |
| Q30-10 | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |

### Discharge Data

| Name | Permit Number | Existing Disc Flow (mgd) | Permitted Disc Flow (mgd) | Design Disc Flow (mgd) | Reserve Factor | Disc Temp (°C) | Disc pH |
|---|---|---|---|---|---|---|---|
| | | 0.0000 | 0.0000 | 0.0000 | 0.000 | 0.00 | 7.00 |

### Parameter Data

| Parameter Name | Disc Conc (mg/L) | Trib Conc (mg/L) | Stream Conc (mg/L) | Fate Coef (1/days) |
|---|---|---|---|---|
| CBOD5 | 25.00 | 2.00 | 0.00 | 1.50 |
| Dissolved Oxygen | 3.00 | 6.24 | 0.00 | 0.00 |
| NH3-N | 25.00 | 0.00 | 0.00 | 0.70 |

**Permit No. PA0083470**

# WQM 7.0 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

| RMI | Stream Flow (cfs) | PWS With (cfs) | Net Stream Flow (cfs) | Disc Analysis Flow (cfs) | Reach Slope (ft/ft) | Depth (ft) | Width (ft) | W/D Ratio | Velocity (fps) | Reach Trav Time (days) | Analysis Temp (°C) | Analysis pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Q7-10 Flow** | | | | | | | | | | | | |
| 30.010 | 8.22 | 0.00 | 8.22 | .1856 | 0.00069 | .768 | 46.76 | 60.87 | 0.23 | 0.998 | 22.16 | 8.15 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 30.010 | 5.26 | 0.00 | 5.26 | .1856 | 0.00069 | NA | NA | NA | 0.18 | 1.272 | 22.20 | 8.08 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 30.010 | 11.18 | 0.00 | 11.18 | .1856 | 0.00069 | NA | NA | NA | 0.28 | 0.843 | 22.15 | 8.18 |

**Permit No. PA0083470**

## WQM 7.0 Modeling Specifications

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

**Permit No. PA0083470**

# WQM 7.0 Wasteload Allocations

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

## NH3-N Acute Allocations

| RMI | Discharge Name | Baseline Criterion (mg/L) | Baseline WLA (mg/L) | Multiple Criterion (mg/L) | Multiple WLA (mg/L) | Critical Reach | Percent Reduction |
|---|---|---|---|---|---|---|---|
| 30.010 | Paradise WWTP | 1.93 | 50 | 1.93 | 50 | 0 | 0 |

## NH3-N Chronic Allocations

| RMI | Discharge Name | Baseline Criterion (mg/L) | Baseline WLA (mg/L) | Multiple Criterion (mg/L) | Multiple WLA (mg/L) | Critical Reach | Percent Reduction |
|---|---|---|---|---|---|---|---|
| 30.010 | Paradise WWTP | .38 | 23.17 | .38 | 23.17 | 0 | 0 |

## Dissolved Oxygen Allocations

| RMI | Discharge Name | CBOD5 | | NH3-N | | Dissolved Oxygen | | Critical Reach | Percent Reduction |
|---|---|---|---|---|---|---|---|---|---|
| | | Baseline (mg/L) | Multiple (mg/L) | Baseline (mg/L) | Multiple (mg/L) | Baseline (mg/L) | Multiple (mg/L) | | |
| 30.01 | Paradise WWTP | 25 | 25 | 23.17 | 23.17 | 5 | 5 | 0 | 0 |

**Permit No. PA0083470**

# WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 30.010 | 0.120 | 22.164 | 8.148 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 46.764 | 0.768 | 60.867 | 0.234 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 2.51 | 0.178 | 0.51 | 0.827 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 8.171 | 1.624 | Tsivoglou | 5 |
| **Reach Travel Time (days)** | | | |
| 0.998 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.100 | 2.46 | 0.47 | 7.92 |
| 0.200 | 2.41 | 0.43 | 7.92 |
| 0.299 | 2.36 | 0.40 | 7.84 |
| 0.399 | 2.32 | 0.37 | 7.79 |
| 0.499 | 2.27 | 0.34 | 7.76 |
| 0.599 | 2.23 | 0.31 | 7.74 |
| 0.698 | 2.19 | 0.29 | 7.73 |
| 0.798 | 2.14 | 0.26 | 7.74 |
| 0.898 | 2.10 | 0.24 | 7.75 |
| 0.998 | 2.06 | 0.22 | 7.77 |

**Permit No. PA0083470**

## WQM 7.0 Effluent Limits

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

| RMI | Name | Permit Number | Disc Flow (mgd) | Parameter | Effl. Limit 30-day Ave. (mg/L) | Effl. Limit Maximum (mg/L) | Effl. Limit Minimum (mg/L) |
|---|---|---|---|---|---|---|---|
| 30.010 | Paradise WWTP | PA0083470 | 0.120 | CBOD5 | 25 | | |
| | | | | NH3-N | 23.17 | 46.34 | |
| | | | | Dissolved Oxygen | | | 5 |

**Permit No. PA0083470**

## Input Data WQM 7.0

| SWP Basin | Stream Code | Stream Name | RMI | Elevation (ft) | Drainage Area (sq mi) | Slope (ft/ft) | PWS Withdrawal (mgd) | Apply FC |
|---|---|---|---|---|---|---|---|---|
| 07K | 7450 | PEQUEA CREEK | 30.010 | 334.00 | 65.70 | 0.00000 | 0.00 | ☑ |

### Stream Data

| Design Cond. | LFY (cfsm) | Trib Flow (cfs) | Stream Flow (cfs) | Rch Trav Time (days) | Rch Velocity (fps) | WD Ratio | Rch Width (ft) | Rch Depth (ft) | Tributary Temp (°C) | Tributary pH | Stream Temp (°C) | Stream pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q7-10 | 0.100 | 0.00 | 8.22 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.00 | 22.10 | 8.30 |
| 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 |
|---|---|---|---|---|---|---|---|
| Paradise WWTP | PA0083470 | 0.2200 | 0.2200 | 0.2200 | 0.000 | 25.00 | 7.00 |

### Parameter Data

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

**Permit No. PA0083470**

## Input Data WQM 7.0

| SWP Basin | Stream Code | Stream Name | RMI | Elevation (ft) | Drainage Area (sq mi) | Slope (ft/ft) | PWS Withdrawal (mgd) | Apply FC |
|---|---|---|---|---|---|---|---|---|
| 07K | 7450 | PEQUEA CREEK | 26.190 | 320.00 | 70.70 | 0.00000 | 0.00 | ☑ |

### Stream Data

| Design Cond. | LFY (cfsm) | Trib Flow (cfs) | Stream Flow (cfs) | Rch Trav Time (days) | Rch Velocity (fps) | WD Ratio | Rch Width (ft) | Rch Depth (ft) | Tributary Temp (°C) | Tributary pH | Stream Temp (°C) | Stream pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q7-10 | 0.100 | 0.00 | 9.10 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.00 | 22.10 | 8.30 |
| 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 |

**Permit No. PA0083470**

# WQM 7.0 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

| RMI | Stream Flow (cfs) | PWS With (cfs) | Net Stream Flow (cfs) | Disc Analysis Flow (cfs) | Reach Slope (ft/ft) | Depth (ft) | Width (ft) | W/D Ratio | Velocity (fps) | Reach Trav Time (days) | Analysis Temp (°C) | Analysis pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Q7-10 Flow** | | | | | | | | | | | | |
| 30.010 | 8.22 | 0.00 | 8.22 | .3403 | 0.00069 | .77 | 47.05 | 61.13 | 0.24 | 0.988 | 22.22 | 8.06 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 30.010 | 5.26 | 0.00 | 5.26 | .3403 | 0.00069 | NA | NA | NA | 0.19 | 1.252 | 22.28 | 7.97 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 30.010 | 11.18 | 0.00 | 11.18 | .3403 | 0.00069 | NA | NA | NA | 0.28 | 0.836 | 22.19 | 8.11 |

**Permit No. PA0083470**

## WQM 7.0 Modeling Specifications

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

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**Permit No. PA0083470**

# WQM 7.0 Wasteload Allocations

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

## NH3-N Acute Allocations

| RMI | Discharge Name | Baseline Criterion (mg/L) | Baseline WLA (mg/L) | Multiple Criterion (mg/L) | Multiple WLA (mg/L) | Critical Reach | Percent Reduction |
|---|---|---|---|---|---|---|---|
| 30.010 | Paradise WWTP | 2.37 | 39.03 | 2.37 | 39.03 | 1 | 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 |
|---|---|---|---|---|---|---|---|
| 30.010 | Paradise WWTP | .44 | 15.06 | .44 | 15.06 | 0 | 0 |

## Dissolved Oxygen Allocations

| RMI | Discharge Name | CBOD5 | | NH3-N | | Dissolved Oxygen | | Critical Reach | Percent Reduction |
|---|---|---|---|---|---|---|---|---|---|
| | | Baseline (mg/L) | Multiple (mg/L) | Baseline (mg/L) | Multiple (mg/L) | Baseline (mg/L) | Multiple (mg/L) | | |
| 30.01 | Paradise WWTP | 25 | 25 | 15.06 | 15.06 | 5 | 5 | 0 | 0 |

**Permit No. PA0083470**

# WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 30.010 | 0.220 | 22.215 | 8.056 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 47.052 | 0.770 | 61.127 | 0.236 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 2.91 | 0.294 | 0.60 | 0.830 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 8.114 | 1.643 | Tsivoglou | 5 |
| **Reach Travel Time (days)** | | | |
| 0.988 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.099 | 2.82 | 0.55 | 7.89 |
| 0.198 | 2.73 | 0.51 | 7.72 |
| 0.296 | 2.65 | 0.47 | 7.59 |
| 0.395 | 2.56 | 0.43 | 7.50 |
| 0.494 | 2.48 | 0.40 | 7.44 |
| 0.593 | 2.40 | 0.37 | 7.40 |
| 0.691 | 2.33 | 0.34 | 7.38 |
| 0.790 | 2.25 | 0.31 | 7.38 |
| 0.889 | 2.18 | 0.29 | 7.39 |
| 0.988 | 2.11 | 0.26 | 7.41 |

**Permit No. PA0083470**

# WQM 7.0 Effluent Limits

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

| RMI | Name | Permit Number | Disc Flow (mgd) | Parameter | Effl. Limit 30-day Ave. (mg/L) | Effl. Limit Maximum (mg/L) | Effl. Limit Minimum (mg/L) |
|---|---|---|---|---|---|---|---|
| 30.010 | Paradise WWTP | PA0083470 | 0.220 | CBOD5 | 25 | | |
| | | | | NH3-N | 15.06 | 30.12 | |
| | | | | Dissolved Oxygen | | | 5 |

**Permit No. PA0083470**

## TOXICS SCREENING ANALYSIS
## WATER QUALITY POLLUTANTS OF CONCERN
## VERSION 2.7

Facility: **Paradise Township Sewer Authority** NPDES Permit No.: **PA0083470** Outfall: **001**

Analysis Hardness (mg/L): **100** Discharge Flow (MGD): **0.22** Analysis pH (SU): **7**

Stream Flow, $Q_{7-10}$ (cfs): **8.22**

| | Parameter | | Maximum Concentration in Application or DMRs (µg/L) | Most Stringent Criterion (µg/L) | Candidate for PENTOXSD Modeling? | Most Stringent WQBEL (µg/L) | Screening Recommendation |
|---|---|---|---|---|---|---|---|
| Group 1 | Total Dissolved Solids | | 1372000 | 500000 | Yes | | Monitor |
| | Chloride | | 530000 | 250000 | Yes | | Monitor |
| | Bromide | < | 2000 | N/A | No | | Monitor |
| | Sulfate | | 70000 | 250000 | No | | Monitor |
| Group 2 | Total Aluminum | | | 750 | | | |
| | Total Antimony | | | 5.6 | | | |
| | Total Arsenic | | | 10 | | | |
| | Total Barium | | | 2400 | | | |
| | Total Beryllium | | | N/A | | | |
| | Total Boron | | | 1600 | | | |
| | Total Cadmium | | | 0.271 | | | |
| | Total Chromium | | | N/A | | | |
| | Hexavalent Chromium | | | 10.4 | | | |
| | Total Cobalt | | | 19 | | | |
| | Total Copper | | 3 | 9.3 | No | | |
| | Free Available Cyanide | | | 5.2 | | | |
| | Total Cyanide | | | N/A | | | |
| | Dissolved Iron | | | 300 | | | |
| | Total Iron | | | 1500 | | | |
| | Total Lead | < | 0.3 | 3.2 | No (Value < QL) | | |
| | Total Manganese | | | 1000 | | | |
| | Total Mercury | | | 0.05 | | | |
| | Total Nickel | | | 52.2 | | | |
| | Total Phenols (Phenolics) | | | 5 | | | |
| | Total Selenium | | | 5.0 | | | |
| | Total Silver | | | 3.8 | | | |
| | Total Thallium | | | 0.24 | | | |
| | Total Zinc | | 25 | 119.8 | No | | |
| | Total Molybdenum | | | N/A | | | |
| | Acrolein | < | | 3 | | | |

... Major Sewage | Industrial | Other Discharges | Reference