Pennsylvania Department of Environmental Protection

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

# NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

| | | | |
|---|---|---|---|
| Application Type | **Renewal** | Application No. | **PA0081787** |
| Facility Type | **Non-Municipal** | APS ID | **277295** |
| Major / Minor | **Minor** | Authorization ID | **1487636** |

## Applicant and Facility Information

| | | | |
|---|---|---|---|
| Applicant Name | **Telco Development Inc.** | Facility Name | **Gretna Springs MHP** |
| Applicant Address | 5 Maple Avenue | Facility Address | 5 Maple Avenue |
| | Manheim, PA 17545-8911 | | Manheim, PA 17545-8911 |
| Applicant Contact | Jamar Good | Facility Contact | Derek Hemler |
| Applicant Phone | (717) 272-1313 | Facility Phone | (717) 634-4017 |
| Client ID | 65475 | Site ID | 445620 |
| Ch 94 Load Status | Not Overloaded | Municipality | West Cornwall Township |
| Connection Status | | County | Lebanon |
| Date Application Received | June 4, 2024 | EPA Waived? | Yes |
| Date Application Accepted | | If No, Reason | |

Purpose of Application: NPDES permit renewal to discharge treated sewage

## Summary of Review

### 1.0 General Discussion

This fact sheet supports the renewal of an existing NPDES permit for discharge of treated domestic wastewater from Telco Development (Gretna Springs) adult/retirement community wastewater treatment plant located in West Cornwall Township, Lebanon County. The adult/retirement community was planned to contain 211 residential units with original designed capacity for 0.528 MGD to be built in two phases. The first phase for 0.0264 MGD was constructed and is now believed to be able to handle the entire development. Telco Developer Inc owns, and operates the wastewater treatment plant, which provides sanitary services for the adult/retirement community. The discharge goes to Chiques Creek which is classified for warm water fishes (WWF) and Migratory Fishes (MF). The existing NPDES permit was issued on October 30, 2019, with an effective date of November 1, 2019, and expiration date of October 31, 2024. The applicant submitted permit renewal application to the Department and is currently operating under the terms and conditions in the existing permit under administrative extension provisions pending Department action on the renewal application. A topographic map showing the discharge location is presented in attachment A.

### 1.1 Sludge use and disposal description and location(s):

Sludge is hauled out by a licensed hauler (Klines) periodically to Manheim.

| Approve | Deny | Signatures | Date |
|---|---|---|---|
| X | | *J. Pascal Kwedza*<br>J. Pascal Kwedza, P.E. / Environmental Engineer | May 7, 2025 |
| X | | *Daniel W. Martin*<br>Daniel W. Martin, P.E. / Environmental Engineer Manager | June 10, 2025 |

**Summary of Review**

**1.2 Public Participation**

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

**1.3 Changes to existing Permit**

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

## 1.4 Discharge, Receiving Waters and Water Supply Information

| | | | |
|---|---|---|---|
| Outfall No. | 001 | Design Flow (MGD) | .0264 |
| Latitude | 40º 14' 49.96" | Longitude | -76º 26' 37.54" |
| Quad Name | Manheim | Quad Code | 1734 |
| Wastewater Description: | Sewage Effluent | | |
| Receiving Waters | Chiques Creek (WWF, MF) | Stream Code | 07919 |
| NHD Com ID | 57461967 | RMI | 28.6 |
| Drainage Area | 0.4 sq mi | Yield (cfs/mi$^2$) | |
| $Q_{7-10}$ Flow (cfs) | 0.06 | $Q_{7-10}$ Basis | USGS 01576500 |
| Elevation (ft) | | Slope (ft/ft) | |
| Watershed No. | 7-G | Chapter 93 Class. | WWF, MF |
| Existing Use | | Existing Use Qualifier | |
| Exceptions to Use | | Exceptions to Criteria | |
| Assessment Status | Attaining Use(s) | | |
| Cause(s) of Impairment | | | |
| Source(s) of Impairment | | | |
| TMDL Status | | Name | |

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

| | | | |
|---|---|---|---|
| Nearest Downstream Public Water Supply Intake | Columbia Borough | | |
| PWS Waters | Susquehanna | Flow at Intake (cfs) | 3801 |
| PWS RMI | | Distance from Outfall (mi) | <41 |

Changes Since Last Permit Issuance: None

### 1.4.1 Water Supply Intake

The nearest water supply intake is 41 miles downstream at Columbia Borough, Lancaster County on the Susquehanna River by the Columbia Borough Water Company. No impact is expected from this discharge.

| 2.0 Treatment Facility Summary | | | | |
|---|---|---|---|---|
| **Treatment Facility Name:** Gretna Springs Adult Community | | | | |
| **WQM Permit No.** | **Issuance Date** | | | |
| | | | | |
| | | | | |
| **Waste Type** | **Degree of Treatment** | **Process Type** | **Disinfection** | **Avg Annual Flow (MGD)** |
| Sewage | | | Hypochlorite | 0.0264 |
| | | | | |
| **Hydraulic Capacity (MGD)** | **Organic Capacity (lbs/day)** | **Load Status** | **Biosolids Treatment** | **Biosolids Use/Disposal** |
| 0.0264 | | Not Overloaded | | |

Changes Since Last Permit Issuance: None

## 2.1 Treatment Facility

Treatment units are:

- EQ tank
- 4 aeration tanks in series
- 2 clarifiers
- Tablet chlorinator w/CCT
- Tablet dechlorinator w/contact tank
- 2 sludge holding tanks

EQ tank receives wastewater from 2 pump stations, influent is pumped from EQ tank to the 1st of the 4 aeration tanks in series. Lime is manually added as needed to the 2nd aeration tank for pH control, Delpac is added to 3rd aeration tank at set daily dose, RAS to returned to 1st and 2nd aeration tanks. Effluent from the 4th aeration tank is divided equally to the two clarifiers. WAS is sent to 2 holding tanks. Chlorinated effluent goes through 2 contact tanks, dechlorinated at end of the 2nd contact tank prior to discharge. Pump stations have alarms, emergency generator powers plant community building and pump stations, 2 blowers for plant w/1 as back-up, 1 small blower for holding tanks, composite sampler uses peristaltic pump & can be set for 24 hr. sampling.

## 3.0 Existing Effluent Limitations and Monitoring Requirements

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) (1) | | Concentrations (mg/L) | | | | Minimum (2) Measurement Frequency | Required Sample Type |
| | Average Monthly | Average Weekly | Minimum | Average Monthly | Maximum | Instant. Maximum | | |
| Flow (MGD) | Report | Report Daily Max | XXX | XXX | XXX | XXX | Continuous | Measured |
| pH (S.U.) | XXX | XXX | 6.0 Daily Min | XXX | 9.0 Daily Max | XXX | 1/day | Grab |
| DO | XXX | XXX | 5.0 Daily Min | XXX | XXX | XXX | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.22 | XXX | 0.73 | 1/day | Grab |
| CBOD5 | XXX | XXX | XXX | 25 | XXX | 50 | 2/month | 24-Hr Composite |
| TSS | XXX | XXX | XXX | 30 | XXX | 60 | 2/month | 24-Hr Composite |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2000 Geo Mean | XXX | 10000 | 2/month | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1000 | 2/month | Grab |
| Nitrate-Nitrite | XXX | XXX | XXX | XXX | Report Daily Max | XXX | 1/6 months | 24-Hr Composite |
| Total Nitrogen | XXX | XXX | XXX | XXX | Report Daily Max | XXX | 1/6 months | Calculation |
| Ammonia Nov 1 - Apr 30 | XXX | XXX | XXX | 7.5 | XXX | 15 | 2/month | 24-Hr Composite |
| Ammonia May 1 - Oct 31 | XXX | XXX | XXX | 2.5 | XXX | 5 | 2/month | 24-Hr Composite |
| TKN | XXX | XXX | XXX | XXX | Report Daily Max | XXX | 1/6 months | 24-Hr Composite |
| Total Phosphorus | XXX | XXX | XXX | 2.0 | XXX | 4 | 2/month | 24-Hr Composite |

## 3.1 Compliance History

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

| Parameter | FEB-25 | JAN-25 | DEC-24 | NOV-24 | OCT-24 | SEP-24 | AUG-24 | JUL-24 | JUN-24 | MAY-24 | APR-24 | MAR-24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow (MGD) Average Monthly | 0.019 | 0.017 | 0.018 | 0.016 | 0.016 | 0.016 | 0.018 | 0.017 | 0.016 | 0.017 | 0.019 | 0.019 |
| Flow (MGD) Daily Maximum | 0.027 | 0.025 | 0.031 | 0.02 | 0.02 | 0.021 | 0.023 | 0.021 | 0.022 | 0.02 | 0.036 | 0.027 |
| pH (S.U.) Daily Minimum | 7.39 | 7.31 | 7.34 | 7.39 | 7.37 | 7.28 | 7.26 | 7.22 | 7.23 | 7.12 | 7.35 | 7.31 |
| pH (S.U.) Daily Maximum | 8.0 | 7.78 | 7.68 | 7.54 | 7.97 | 7.62 | 7.86 | 7.71 | 7.64 | 7.53 | 7.56 | 7.65 |
| DO (mg/L) Minimum | 10.2 | 10.3 | 9.1 | 8.2 | 8.2 | 7.4 | 7.1 | 7.2 | 7.4 | 7.3 | 7.90 | 8.9 |
| TRC (mg/L) Average Monthly | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 | 0.02 | 0.03 | 0.03 | 0.04 | 0.04 |
| TRC (mg/L) Instantaneous Maximum | 0.07 | 0.11 | 0.07 | 0.07 | 0.07 | 0.05 | 0.06 | 0.05 | 0.05 | 0.06 | 0.07 | 0.11 |
| CBOD5 (mg/L) Average Monthly | 4.6 | 5.7 | 4.4 | 2.7 | 3.3 | < 2.5 | 4.1 | < 2.4 | 3.5 | 3.1 | 3.7 | 6.8 |
| TSS (mg/L) Average Monthly | 3.0 | 2 | 2 | 3 | 2 | 2 | 3 | 1 | 1 | 1 | 2 | 2 |
| Fecal Coliform (No./100 ml) Geometric Mean | < 1 | < 1 | < 1 | < 3 | < 1 | < 1 | < 1 | < 1 | 1 | 8 | < 1 | < 1 |
| Fecal Coliform (No./100 ml) Instantaneous Maximum | < 1 | < 1 | 2 | 7 | < 1 | 2 | < 1 | < 1 | 1 | 12 | 1 | 2 |
| Nitrate-Nitrite (mg/L) Daily Maximum | | | < 30.4 | | | | | | < 31.4 | | | |
| Total Nitrogen (mg/L) Daily Maximum | | | 30 | | | | | | 31 | | | |
| Ammonia (mg/L) Average Monthly | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.16 | < 0.1 | < 0.1 | < 0.19 | < 0.1 | < 0.6 |
| TKN (mg/L) Daily Maximum | | | < 0.5 | | | | | | < 0.5 | | | |
| Total Phosphorus (mg/L) Average Monthly | 0.15 | 0.27 | 0.45 | 0.63 | 0.75 | 0.5 | 0.86 | 0.75 | 0.61 | 0.45 | 0.21 | 0.2 |

### 3.1.2 Summary of DMRs:

DMRs review for the facility for the last 12 months of operation, presented on the table above in section 3.1.1 indicates permit limits have been met consistently. No effluent violations noted during the period reviewed.

### 3.1.3 Summary of Inspections:

The facility has been inspected a couple of times during the previous permit cycle. No effluent violations were found during plant inspections. The facility is operated and maintained well. It was recommended that the certified operator develop a standard operation procedure for the site to replace the old one. Non-compliance with monitoring Total Nitrogen series for the second half of 2019 and 2020 was noted.

## 4.0 Development of Effluent Limitations

**Outfall No.** 001 **Design Flow (MGD)** .0264
**Latitude** 40º 14' 48.00" **Longitude** -76º 26' 37.00"
**Wastewater Description:** Sewage Effluent

### 4.1 Basis for Effluent Limitations

In general, the Clean Water Act (CWA) requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits.

### 4.2 Technology-Based Limitations

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

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

Comments: Weekly averages are not applicable to this discharge.

### 4.3 Water Quality-Based Limitations

#### 4.3.1 WQM 7.0 Stream Model

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

#### 4.3.2 Streamflows

Streamflows for the water quality analysis were determined by correlating with the yield of USGS gauging station No. Streamflow will be correlated with past streamflow records taken from the nearby USGS gage station on the Conestoga River at Lancaster City. The drainage area at the discharge point taken from previous factsheet = 0.4 $mi^2$. The resulting streamflows at the point of first use at the confluence of Chiques creek are as follows:

$Q_{7\text{-}10}$ = 0.4 $mi^2$ x 0.16 $cfs/mi^2$ = 0.06 cfs
$Q_{30\text{-}10}/ Q_{7\text{-}10}$ = 1.36

$Q_{7\text{-}10}$ (winter) / $Q_{7\text{-}10}$ = 1.17
$Q_{1\text{-}10}$/ $Q_{7\text{-}10}$ = 0.64

**4.3.3 $NH_3N$ Calculations**

$NH_3N$ calculations will be based on the Department's Implementation Guidance of Section 93.7 Ammonia Criteria, dated 11/4/97 (ID #391-2000-013). The following data is necessary to determine the instream $NH_3N$ criteria used in the attached computer model of the stream:

| | | | |
|---|---|---|---|
| STP pH | = | 7.25 | ( DMR median between July – September) |
| STP Temp | = | 25°C | (Default) |
| Stream pH | = | 7.85 | (Taken from the Chiques Creek WQN station at the stream mouth) |
| Stream Temp | = | 20°C | (Taken from the Chiques Creek WQN station at the stream mouth) |
| Background $NH_3N$ | = | 0.0 | (Assumed) |

**4.3.4 $CBOD_5$ :**

Gretna Springs MHP's discharge, the discharge from PA Dutch Country Golf course and the discharge from Pinch Pond Campground were modelled together due to their proximity to each other. The attached result of WQM 7.0 stream model (attachment B) indicates that, for Gretna Springs' discharge of 0.026MGD, a limitation of 25 mg/l CBOD5 as a monthly average limit (AML) and 50 mg/l as instantaneous maximum (IMAX) is adequate to protect the water quality of the stream. This limit is consistent with the existing permit and the STP has been complying with this limitation. Therefore, a limit of 25mg/l AML, and 50 mg/l IMAX is again recommended for this permit cycle.

**4.3.5 $NH_3$-N:**

The attached result of the WQM 7.0 stream model (attachment B) also indicates that a limitation of 2.5mg/l $NH_3$-N as a monthly average is necessary to protect the aquatic life from toxicity effects during the summer months. This limit is consistent with the existing permit and the facility is complying with the limit. The existing winter months limit of 3 times the summer limit(7.5mg/L) will remain for the permit cycle.

**4.3.6 Dissolved Oxygen**

The existing permit contains a limit of 5 mg/l for Dissolved Oxygen (DO). DEP's Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001, 10/97) suggests that either the adopted minimum stream D.O. criteria for the receiving stream or the effluent level determined through water quality modeling be used for the limit. Since the WQM 7.0 model was run using a minimum D.O. of 5.0 mg/l, this limit will be continued in the renewed permit with a daily monitoring requirement.

**4.3.7 Total Suspended Solids (TSS):**

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

**4.3.8 Total Residual Chlorine:**

The attached TRC results presented in attachment C utilizes the equations and calculations as presented in the Department's May 1, 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID No. 391-2000-015) for developing chlorine limitations. The Guidance references Chapter 92a, Section 92a.48 (b) which establishes a standard BAT limit of 0.5 mg/l unless a facility-specific BAT has been developed. The results presented in attachment C indicates that a water quality limit of 0.22 mg/l monthly average and IMAX of 0.73 mg/l would be needed to prevent toxicity concerns. The limitation recommended is consistent with the existing permit. DMR and inspection report indicate the facility is meeting the permit requirement.

### 4.3.9 Toxics

A reasonable potential (RP) analysis was done for pollutants in the discharge. The discharge consists entirely of domestic wastewater with no pollutants of concern that need further analysis.

### 4.3.10 Chesapeake Bay Strategy:

The Department formulated 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). Sewage discharges have been prioritized based on their delivered TN and TP loadings to the Bay. The highest priority (Phases 1, 2, and 3) dischargers received annual loading caps based on their design flow on August 29, 2005 and concentrations of 6 mg/l TN and 0.8 mg/l TP. These limits may be achieved through a combination of treatment technology, credits, or offsets if approved by DEP. Phase 4 (0.2 - 0.4mgd) and Phase 5(below 0.2mdg) are required to monitor and report TN series and TP during permit renewal. Any facility in Phases 4 and 5 that undergoes expansion is subjected to cap load right away. This facility is, classified as a phase 5, and has been monitoring and will continue monitoring Nitrate-Nitrite as N, Total Kjeldahl Nitrogen and Total Nitrogen semi-annually throughout the next permit cycle to collect data. There is limitation on Total Phosphorus, monitoring is not required.

### 4.3.11 Phosphorus

The average monthly limit of 2mg/l phosphorus in the existing permit, based on the requirement of 25 Pa. Code § 96.5(c) will remain in the permit.

### 4.3.12 Fecal Coliform and E. Coli

The existing Fecal Coliform limit is consistent with the technology limits recommended in 92a.47(a)(4) and (a)(5) and will remain in the permit. In March of 2021, EPA approved DEP's Triennial Review of Water Quality Standards, which included a new swimming season criterion for E. coli. As a result, DEP is including monitoring requirements for E. Coli in new and renewed sewage permits above 2000gpd. Monitoring frequency is based on annual average flow as follows: 1/month for design flows >= 1 MGD, 1/quarter for design flows >= 0.05 and < 1 MGD and 1/year for design flows of 0.002 and < 0.05 MGD. Your discharge of 0.0264 MGD requires 1/year monitoring as included in the permit.

## 5.0 Other Requirements

### 5.1 Anti-backsliding

Not applicable to this permit

### 5.2 Stormwater:

No storm water outfall is associated with this facility

### 5.3 Anti-Degradation (93.4)

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

### 5.4 Class A Wild Trout Fisheries

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

### 5.5 303d Listed Streams:

The facility discharges to Chiques Creek which is listed on the impaired waters list due to nutrient and Suspended solids/siltation impairments. A TMDL for the Chiques Creek Watershed was approved on April 9, 2001. However, due to several deficiencies within the TMDL, it was withdrawn with approval from EPA on October 28, 2015. DEP, Susquehanna River Basin Commission and watershed stakeholders are developing a monitoring and restoration plan for the Chiques Creek Watershed. The goal of this Alternate Restoration Plan (ARP) is to address impacts to the Chiques Creek Watershed

due to suspended solids/siltation and nutrient pollution. Prior to completion of the ARP development, the permit has been renewed and will be renewed again with the existing Total Phosphorus limit of 2.0 mg/L which is based on the requirement of 25 Pa. Code § 96.5(c). No further action is warranted at this time.

## 5.6 Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs).

## 5.7 Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits are less than the effluent limits. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

## 6.0 Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (386-0400-001), SOPs and/or BPJ.

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

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) (1) | | Concentrations (mg/L) | | | | Minimum (2) Measurement Frequency | Required Sample Type |
| | Average Monthly | Average Weekly | Minimum | Average Monthly | Maximum | Instant. Maximum | | |
| Flow (MGD) | Report | Report Daily Max | XXX | XXX | XXX | XXX | Continuous | Measured |
| pH (S.U.) | XXX | XXX | 6.0 Daily Min | XXX | 9.0 Daily Max | XXX | 1/day | Grab |
| DO | XXX | XXX | 5.0 Daily Min | XXX | XXX | XXX | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.22 | XXX | 0.73 | 1/day | Grab |
| CBOD5 | XXX | XXX | XXX | 25 | XXX | 50 | 2/month | 24-Hr Composite |
| TSS | XXX | XXX | XXX | 30 | XXX | 60 | 2/month | 24-Hr Composite |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2000 Geo Mean | XXX | 10000 | 2/month | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1000 | 2/month | Grab |
| E. Coli (No./100 ml) | XXX | XXX | XXX | XXX | XXX | Report | 1/year | Grab |
| Nitrate-Nitrite | XXX | XXX | XXX | XXX | Report Daily Max | XXX | 1/6 months | 24-Hr Composite |
| Total Nitrogen | XXX | XXX | XXX | XXX | Report Daily Max | XXX | 1/6 months | Calculation |
| Ammonia Nov 1 - Apr 30 | XXX | XXX | XXX | 7.5 | XXX | 15 | 2/month | 24-Hr Composite |
| Ammonia May 1 - Oct 31 | XXX | XXX | XXX | 2.5 | XXX | 5 | 2/month | 24-Hr Composite |

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

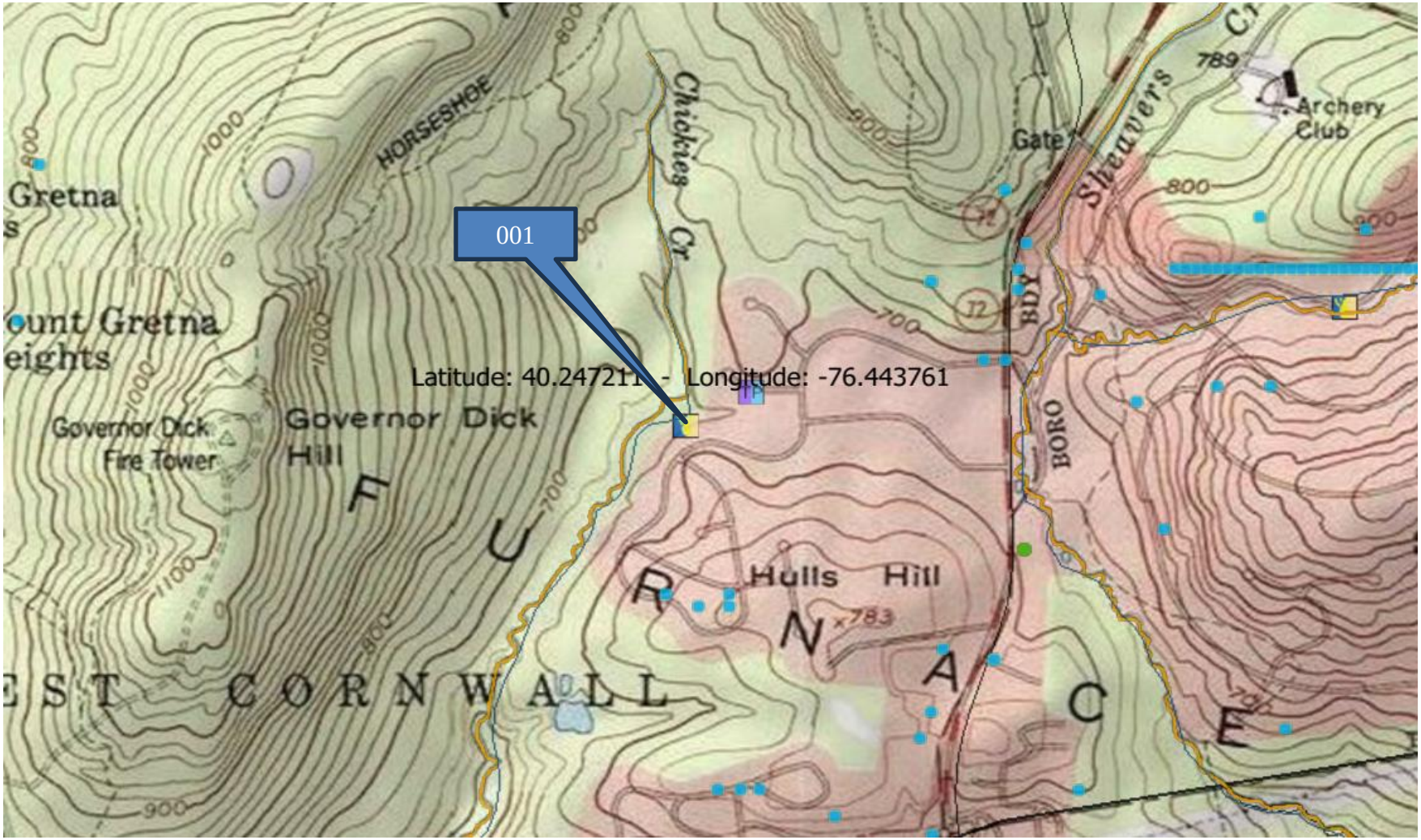
| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) (1) | | Concentrations (mg/L) | | | | Minimum (2) Measurement Frequency | Required Sample Type |
| | Average Monthly | Average Weekly | Minimum | Average Monthly | Maximum | Instant. Maximum | | |
| TKN | XXX | XXX | XXX | XXX | Report Daily Max | XXX | 1/6 months | 24-Hr Composite |
| Total Phosphorus | XXX | XXX | XXX | 2.0 | XXX | 4 | 2/month | 24-Hr Composite |

Compliance Sampling Location: At Outfall 001.

| **7.0 Tools and References Used to Develop Permit** | |
|---|---|
| | |
| ☒ | WQM for Windows Model (see Attachment **B**) |
| ☐ | Toxics Management Spreadsheet (see Attachment ) |
| ☒ | TRC Model Spreadsheet (see Attachment **C**) |
| ☐ | Temperature Model Spreadsheet (see Attachment ) |
| ☒ | Water Quality Toxics Management Strategy, 361-0100-003, 4/06. |
| ☐ | Technical Guidance for the Development and Specification of Effluent Limitations, 386-0400-001, 10/97. |
| ☐ | Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98. |
| ☐ | Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96. |
| ☐ | Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97. |
| ☐ | Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97. |
| ☐ | Pennsylvania CSO Policy, 386-2000-002, 9/08. |
| ☐ | Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03. |
| ☐ | Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97. |
| ☒ | Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97. |
| ☐ | Implementation Guidance Design Conditions, 386-2000-007, 9/97. |
| ☒ | Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004. |
| ☐ | Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997. |
| ☐ | Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99. |
| ☐ | Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004. |
| ☒ | Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97. |
| ☐ | Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008. |
| ☒ | Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994. |
| ☐ | Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09. |
| ☒ | Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 10/97. |
| ☐ | Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 386-2000-020, 10/97. |
| ☐ | Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 3/99. |
| ☐ | Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 386-2000-010, 3/1999. |
| ☐ | Design Stream Flows, 386-2000-003, 9/98. |
| ☐ | Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 386-2000-006, 10/98. |
| ☐ | Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97. |
| ☒ | Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07. |
| ☒ | SOP: Establishing effluent limits for individual sewage permits. |
| ☐ | Other: |

**Attachments**

**A. Topographical Map**



## B. WQM Model Results

### WQM 7.0 Effluent Limits

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07G | 7919 | CHICKIES 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) |
|---|---|---|---|---|---|---|---|
| 28.600 | Telco Dev Inc | PA0081787 | 0.026 | CBOD5 | 25 | | |
| | | | | NH3-N | 2.88 | 5.76 | |
| | | | | Dissolved Oxygen | | | 5 |

| RMI | Name | Permit Number | Disc Flow (mgd) | Parameter | Effl. Limit 30-day Ave. (mg/L) | Effl. Limit Maximum (mg/L) | Effl. Limit Minimum (mg/L) |
|---|---|---|---|---|---|---|---|
| 27.800 | PA Dutch Countr | PA0081191 | 0.025 | CBOD5 | 10 | | |
| | | | | NH3-N | 5.72 | 11.44 | |
| | | | | Dissolved Oxygen | | | 5 |

| RMI | Name | Permit Number | Disc Flow (mgd) | Parameter | Effl. Limit 30-day Ave. (mg/L) | Effl. Limit Maximum (mg/L) | Effl. Limit Minimum (mg/L) |
|---|---|---|---|---|---|---|---|
| 27.300 | Pinch Pond | PA0086461 | 0.017 | CBOD5 | 25 | | |
| | | | | NH3-N | 16.77 | 33.54 | |
| | | | | Dissolved Oxygen | | | 5 |

## Input Data WQM 7.0

| SWP Basin | Stream Code | Stream Name | RMI | Elevation (ft) | Drainage Area (sq mi) | Slope (ft/ft) | PWS Withdrawal (mgd) | Apply FC |
|---|---|---|---|---|---|---|---|---|
| 07G | 7919 | CHICKIES CREEK | **28.600** | 625.00 | 0.40 | 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** | 0.160 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.85 | 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 |
|---|---|---|---|---|---|---|---|
| Telco Dev Inc | PA0081787 | 0.0260 | 0.0260 | 0.0260 | 0.000 | 25.00 | 7.25 |

**Parameter Data**

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

## Input Data WQM 7.0

| SWP Basin | Stream Code | Stream Name | RMI | Elevation (ft) | Drainage Area (sq mi) | Slope (ft/ft) | PWS Withdrawal (mgd) | Apply FC |
|---|---|---|---|---|---|---|---|---|
| 07G | 7919 | CHICKIES CREEK | **27.800** | 580.00 | 1.20 | 0.00000 | 0.00 | ☑ |

**Stream Data**

| Design Cond. | LFY (cfsm) | Trib Flow (cfs) | Stream Flow (cfs) | Rch Trav Time (days) | Rch Velocity (fps) | WD Ratio | Rch Width (ft) | Rch Depth (ft) | Tributary Temp (°C) | Tributary pH | Stream Temp (°C) | Stream pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Q7-10** | 0.160 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.85 | 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 |
|---|---|---|---|---|---|---|---|
| PA Dutch Countr | PA0081191 | 0.0250 | 0.0250 | 0.0250 | 0.000 | 25.00 | 7.60 |

**Parameter Data**

| Parameter Name | Disc Conc (mg/L) | Trib Conc (mg/L) | Stream Conc (mg/L) | Fate Coef (1/days) |
|---|---|---|---|---|
| CBOD5 | 10.00 | 2.00 | 0.00 | 1.50 |
| Dissolved Oxygen | 5.00 | 8.24 | 0.00 | 0.00 |
| NH3-N | 10.00 | 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 |
|---|---|---|---|---|---|---|---|---|
| 07G | 7919 | CHICKIES CREEK | 27.300 | 540.00 | 2.36 | 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 | 0.160 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.85 | 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 |
|---|---|---|---|---|---|---|---|
| Pinch Pond | PA0086461 | 0.0172 | 0.0017 | 0.0172 | 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 |

## 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 |
|---|---|---|---|---|---|---|---|---|
| 07G | 7919 | CHICKIES CREEK | **26.250** | 490.00 | 3.80 | 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** | 0.160 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.85 | 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 |
|---|---|---|---|---|---|---|---|
| Mazza Vyrd | PA0086428 | 0.0650 | 0.0650 | 0.0650 | 0.000 | 25.00 | 7.00 |

**Parameter Data**

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

# WQM 7.0 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07G | 7919 | CHICKIES 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** | | | | | | | | | | | | |
| 28.600 | 0.06 | 0.00 | 0.06 | .0402 | 0.01065 | .358 | 3.77 | 10.52 | 0.08 | 0.634 | 21.93 | 7.52 |
| 27.800 | 0.19 | 0.00 | 0.19 | .0789 | 0.01515 | .41 | 6.21 | 15.14 | 0.11 | 0.287 | 21.46 | 7.66 |
| 27.300 | 0.38 | 0.00 | 0.38 | .1055 | 0.00902 | .447 | 8.89 | 19.88 | 0.12 | 0.528 | 21.09 | 7.63 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 28.600 | 0.04 | 0.00 | 0.04 | .0402 | 0.01065 | NA | NA | NA | 0.07 | 0.729 | 22.48 | 7.46 |
| 27.800 | 0.12 | 0.00 | 0.12 | .0789 | 0.01515 | NA | NA | NA | 0.09 | 0.338 | 21.96 | 7.61 |
| 27.300 | 0.24 | 0.00 | 0.24 | .1055 | 0.00902 | NA | NA | NA | 0.10 | 0.635 | 21.52 | 7.57 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 28.600 | 0.09 | 0.00 | 0.09 | .0402 | 0.01065 | NA | NA | NA | 0.09 | 0.567 | 21.58 | 7.56 |
| 27.800 | 0.26 | 0.00 | 0.26 | .0789 | 0.01515 | NA | NA | NA | 0.12 | 0.253 | 21.16 | 7.69 |
| 27.300 | 0.51 | 0.00 | 0.51 | .1055 | 0.00902 | NA | NA | NA | 0.14 | 0.460 | 20.85 | 7.67 |

## WQM 7.0 Modeling Specifications

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

# WQM 7.0 Wasteload Allocations

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07G | 7919 | CHICKIES 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 |
|---|---|---|---|---|---|---|---|
| 28.600 | Telco Dev Inc | 8.02 | 16.2 | 8.02 | 16.2 | 0 | 0 |
| 27.800 | PA Dutch Countr | 5.33 | 20 | 6.63 | 20 | 0 | 0 |
| 27.300 | Pinch Pond | 7.05 | 50 | 7.29 | 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 |
|---|---|---|---|---|---|---|---|
| 28.600 | Telco Dev Inc | 1.19 | 3.76 | 1.19 | 2.88 | 3 | 23 |
| 27.800 | PA Dutch Countr | .96 | 7.48 | 1.07 | 5.72 | 3 | 24 |
| 27.300 | Pinch Pond | 1.08 | 21.91 | 1.11 | 16.77 | 3 | 23 |

### 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) | | |
| 28.60 | Telco Dev Inc | 25 | 25 | 2.88 | 2.88 | 5 | 5 | 0 | 0 |
| 27.80 | PA Dutch Countr | 10 | 10 | 5.72 | 5.72 | 5 | 5 | 0 | 0 |
| 27.30 | Pinch Pond | 25 | 25 | 16.77 | 16.77 | 5 | 5 | 0 | 0 |

# WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07G | 7919 | CHICKIES CREEK |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 28.600 | 0.026 | 21.930 | 7.517 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 3.770 | 0.358 | 10.523 | 0.077 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 10.88 | 1.229 | 1.11 | 0.812 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 6.991 | 27.252 | Owens | 5 |
| **Reach Travel Time (days)** | | | |
| 0.634 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.063 | 9.99 | 1.06 | 7.76 |
| 0.127 | 9.17 | 1.00 | 7.96 |
| 0.190 | 8.42 | 0.95 | 7.96 |
| 0.254 | 7.74 | 0.91 | 7.96 |
| 0.317 | 7.11 | 0.86 | 7.96 |
| 0.380 | 6.53 | 0.82 | 7.96 |
| 0.444 | 5.99 | 0.78 | 7.96 |
| 0.507 | 5.50 | 0.74 | 7.96 |
| 0.570 | 5.06 | 0.70 | 7.96 |
| 0.634 | 4.64 | 0.66 | 7.96 |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 27.800 | 0.051 | 21.456 | 7.659 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 6.205 | 0.410 | 15.137 | 0.106 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 4.16 | 0.908 | 1.07 | 0.783 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 7.670 | 26.076 | Owens | 5 |
| **Reach Travel Time (days)** | | | |
| 0.287 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.029 | 4.04 | 1.05 | 8.02 |
| 0.057 | 3.93 | 1.03 | 8.02 |
| 0.086 | 3.83 | 1.00 | 8.02 |
| 0.115 | 3.72 | 0.98 | 8.02 |
| 0.143 | 3.62 | 0.96 | 8.02 |
| 0.172 | 3.52 | 0.94 | 8.02 |
| 0.201 | 3.42 | 0.92 | 8.02 |
| 0.230 | 3.33 | 0.90 | 8.02 |
| 0.258 | 3.24 | 0.88 | 8.02 |
| 0.287 | 3.15 | 0.86 | 8.02 |

# WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07G | 7919 | CHICKIES CREEK |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 27.300 | 0.068 | 21.092 | 7.634 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 8.889 | 0.447 | 19.877 | 0.122 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 3.91 | 0.746 | 1.40 | 0.761 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 7.942 | 24.046 | Owens | 5 |
| **Reach Travel Time (days)** | | | |
| 0.528 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.053 | 3.75 | 1.35 | 8.08 |
| 0.106 | 3.60 | 1.30 | 8.08 |
| 0.158 | 3.45 | 1.24 | 8.08 |
| 0.211 | 3.31 | 1.20 | 8.08 |
| 0.264 | 3.18 | 1.15 | 8.08 |
| 0.317 | 3.05 | 1.10 | 8.08 |
| 0.370 | 2.93 | 1.06 | 8.08 |
| 0.422 | 2.81 | 1.02 | 8.08 |
| 0.475 | 2.69 | 0.98 | 8.08 |
| 0.528 | 2.58 | 0.94 | 8.08 |

## C. TRC Calculations

**TRC EVALUATION**

Input appropriate values in A3:A9 and D3:D9

| | | | |
|---|---|---|---|
| 0.06 | = Q stream (cfs) | 0.5 | = CV Daily |
| 0.026 | = Q discharge (MGD) | 0.5 | = CV Hourly |
| 30 | = no. samples | 1 | = AFC_Partial Mix Factor |
| 0.3 | = Chlorine Demand of Stream | 1 | = CFC_Partial Mix Factor |
| 0 | = Chlorine Demand of Discharge | 15 | = AFC_Criteria Compliance Time (min) |
| 0.5 | = BAT/BPJ Value | 720 | = CFC_Criteria Compliance Time (min) |
| 0 | = % Factor of Safety (FOS) | 0 | =Decay Coefficient (K) |

| Source | Reference | AFC Calculations | Reference | CFC Calculations |
|---|---|---|---|---|
| TRC | 1.3.2.iii | WLA afc = 0.495 | 1.3.2.iii | WLA cfc = 0.475 |
| PENTOXSD TRG | 5.1a | LTAMULT afc = 0.373 | 5.1c | LTAMULT cfc = 0.581 |
| PENTOXSD TRG | 5.1b | LTA_afc= 0.184 | 5.1d | LTA_cfc = 0.276 |

| Source | | Effluent Limit Calculations | |
|---|---|---|---|
| PENTOXSD TRG | 5.1f | AML MULT = 1.231 | |
| PENTOXSD TRG | 5.1g | AVG MON LIMIT (mg/l) = 0.227 | AFC |
| | | INST MAX LIMIT (mg/l) = 0.742 | |

| | |
|---|---|
| WLA afc | **(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...** **...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)** |
| LTAMULT afc | EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5) |
| LTA_afc | wla_afc*LTAMULT_afc |
| **WLA_cfc** | **(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc) )...** **...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)** |
| LTAMULT_cfc | EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5) |
| **LTA_cfc** | wla_cfc*LTAMULT_cfc |
| AML MULT | EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1)) |
| AVG MON LIMIT | MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT) |
| INST MAX LIMIT | **1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)** |