pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southeast Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0057991**
Facility Type	**Non-Municipal**	APS ID	**1029878**
Major / Minor	**Minor**	Authorization ID	**1338680**

Applicant and Facility Information

Applicant Name	**Rothstein Tract Homeowners Association**	Facility Name	**Rothstein Subdivision**
Applicant Address	1355 Pebble Hill Road	Facility Address	1355 Pebble Hill Road
	Doylestown, PA 18901-3008		Doylestown, PA 18901-3008
Applicant Contact	Matthew Zelesko	Facility Contact	Matthew Zelesko
Applicant Phone	(215) 534-2006	Facility Phone	(215) 534-2006
Client ID	149357	Site ID	466740
Ch 94 Load Status	Not Overloaded	Municipality	Doylestown Township
Connection Status	Not Limited	County	Bucks
Date Application Received	January 4, 2021	EPA Waived?	Yes
Date Application Accepted	Not Applicable	If No, Reason	

Purpose of Application: Permit Renewal.

Summary of Review

This permittee requests the renewal of NPDES permit PA0057991 to discharge 0.003 million gallons per day (mgd) from the Rothstein Tract sewage treatment plant (STP) to the Neshaminy Creek which is designated Trout Stock Fishes (TSF).

The treatment facility consists of individual Bio-Microbics® treatment systems with settling, aeration and fixed film media. The discharge from the individual home treatment systems flow to a common chlorinator/dechlorinator chamber and is then discharged. There are five homes in the Rothstein tract and in September 2020 the fifth home was placed on-line such that flows are nor estimated at 1,000 gallons per day (gpd). When four homes were connected the flow averaged 800 gpd. It was noted in the 2016 Fact Sheet that “the engineers design report specified 1,500-gallon treatment units; however, an inspection report indicated that the installed treatment units were 750-gallon”.

The reported annual average flows were 0.0008 mgd in 2018, 0.0008 mgd in 2019 and 0.00084 in 2020. The highest monthly average flow was 0.001 for the previous year. These flowrates are below the permitted annual average flow of 0.003 mgd.

The facility is in general compliance with the existing effluent limits. The recommendation is to carry over the existing effluent limits.

Act 14 Notifications:
Bucks County – Received 12/16/2020
Doylestown Township – Received 12/17/2020

Special Conditions:
- No Stormwater

Approve	Deny	Signatures	Date
X		Harmonie Hawley, PhD, PE / Environmental Engineering Specialist /s/	January 29, 2021
X		Pravin C. Patel, P.E. / Environmental Engineer Manager /s/	02/01/2021

Summary of Review

- Necessary Property Rights
- Proper Sludge Disposal
- Abandon STP when Municipal Sewers Available
- Chlorine Optimization
- Responsible Operator

Sludge use and disposal description and location(s): Hauled off-site as needed.

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.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	.003
Latitude	40º 16' 29"	Longitude	-75º 6' 20"
Quad Name	Buckingham	Quad Code	1645
Wastewater Description:	Sewage Effluent		

Receiving Waters	Neshaminy Creek (TSF, MF)	Stream Code	03125
NHD Com ID	25475972	RMI	30.73
Drainage Area	78.1	Yield (cfs/mi^2)	0.03
Q_{7-10} Flow (cfs)	2.43	Q_{7-10} Basis	USGS PA Streamstats
Elevation (ft)	180.12	Slope (ft/ft)	0.00065
Watershed No.	2-F	Chapter 93 Class.	TSF, MF
Existing Use	Aquatic Life, Recreational	Existing Use Qualifier	N/A
Exceptions to Use	None	Exceptions to Criteria	N/A
Assessment Status	Impaired		
Cause(s) of Impairment	Nutrients, Organic Enrichment, Pathogens, Siltation		
Source(s) of Impairment	Municipal Point Source Discharges, Source Unknown		
TMDL Status	Final - Withdrawn	Name	Neshaminy Creek

Background/Ambient Data		Data Source
pH (SU)	7	TRG WQM (391-2000-007 default data)
Temperature (°F)	68 (20 °C)	TRG WQM (391-2000-007 default data)

Nearest Downstream Public Water Supply Intake		Aqua PA	
PWS Waters	Neshaminy Creek	Flow at Intake (cfs)	Unknown
PWS RMI	~9.73	Distance from Outfall (mi)	~21 miles

Changes Since Last Permit Issuance: None

Other Comments: There was a nutrient TMDL for the Neshaminy Creek Basin that was withdrawn. A replacement TMDL is expected to be developed by the EPA sometime in the future

Treatment Facility Summary

Treatment Facility Name: Rothstein Tract STP

WQM Permit No.	Issuance Date
0901407	07/19/2001

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Tertiary	Aerobic	Hypochlorite	0.003

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.003	Unknown	Not Overloaded	N/A	N/A

Changes Since Last Permit Issuance: None

Other Comments: The treatment facility consists of individual Bio-Microbics® treatment systems with settling, aeration and fixed film media at the individual dwellings. The discharge from the individual home treatment systems flow to a common chlorinator/dechlorinator chamber then is discharged.

Compliance History

DMR Data for Outfall 001 (from December 1, 2019 to November 30, 2020)

Parameter	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20	MAR-20	FEB-20	JAN-20	DEC-19
Flow (GPD) Average Monthly	1000	1000	1000	800	800	800	800	800	800	800	800	800
Flow (GPD) Daily Maximum	1000	1000	1000	800	800	800	800	800	800	800	800	800
pH (S.U.) Minimum	7.30	7.21	7.16	7.16	7.30	7.18	7.13	7.17	7.21	7.25	7.27	7.02
pH (S.U.) Maximum	7.45	7.31	7.31	7.34	7.46	7.45	7.34	7.31	7.44	7.41	7.52	7.34
DO (mg/L) Minimum	7.0	6.6	6.6	6.0	6.0	6.1	6.1	6.9	7.0	7.1	7.0	7.0
TRC (mg/L) Average Monthly	0.063	0.070	0.074	0.075	0.063	0.072	0.048	0.066	0.090	0.083	0.066	0.058
TRC (mg/L) Instantaneous Maximum	0.10	0.10	0.10	0.10	0.10	0.12	0.10	0.10	0.120	0.140	0.10	0.10
CBOD5 (mg/L) Average Monthly	< 2	< 2	< 2.0	2.6	< 2	< 2	5.8	< 2	2.3	< 2	< 2	3.2
TSS (mg/L) Average Monthly	8	5	7	20	13	< 5	< 5	6	9	7	< 5	< 5
Fecal Coliform (CFU/100 ml) Geometric Mean	122	< 1	< 1	< 1	1	1	2400	25	< 1	3	3	1
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	122	< 1	< 1	< 1	1	1	2400	25	< 1	3	3	1
Ammonia (mg/L) Average Monthly	< 0.1	< 0.1	< 0.1	0.16	0.21	< 0.1	1.85	2.56	4.05	< 0.1	3.19	< 0.1
Total Phosphorus (mg/L) Average Monthly	0.97	0.33	0.30	1.10	0.50	0.38	1.10	0.38	0.21	0.4	0.4	0.1

Compliance History

Effluent Violations for Outfall 001, from: January 1, 2020 To: November 30, 2020

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Fecal Coliform	05/31/20	Geo Mean	2400	CFU/100 ml	200	CFU/100 ml
Fecal Coliform	05/31/20	IMAX	2400	CFU/100 ml	1000	CFU/100 ml

Summary of Inspections: An inspection was conducted on January 30, 2018 and no violations were identified.

Other Comments: While there are two violations, the facility is in general compliance with the existing effluent limits.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .003
Latitude 40º 16' 29.00" **Longitude** -75º 6' 20.00"
Wastewater Description: Sewage 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)

Comments: Technology-Based limitations were evaluated during this review. The Technology-Based limitations were the same as the current permit for TSS and pH. These limitations were carried over into the renewed permit.

Total Phosphorous (TP) is in the current permit as “report” and it is recommended to continue this into the renewed permit.

Water Quality-Based Limitations

There was a TMDL for the Neshaminy Creek for nutrients; however, the TMDL was withdrawn in 2008 so it is not used in this permit renewal.

The Water Quality Management (WQM) model was run to determine effluent limitations for $CBOD_5$, NH_3-N and DO. The results (Attachment A) were the same limitations as the current permit. It is recommended to retain the limitations in the renewed permit. The $CBOD_5$ and NH_3-N have seasonal limitations which will be retained in the renewed permit.

The TRC spreadsheet was also run (Attachment B). The average monthly limit is 0.5 mg/l and the instantaneous maximum (IMAX) was 1.6 mg/l. The average monthly limit is the same is current permit; however, the IMAX is more stringent in the current permit (1.2 mg/l). It is recommended to use the limitations in the current permit in the renewed permit.

Best Professional Judgment (BPJ) Limitations

Comments: The Fact Sheet dated in 2016 that corresponded to the permit issued in 2016 notes that “effluent limits for this facility are based on the limits from the nearby BCWSA Kings Plaza STP, located approximately 1 mile upstream from this facility”.

Anti-Backsliding

The TRC IMAX of 1.2 mg/l is carried over into the renewed permit.

Proposed Effluent Limitations and Monitoring Requirements

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

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (GPD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/week	Grab
DO	XXX	XXX	5.0 Inst Min	XXX	XXX	XXX	1/week	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.2	1/week	Grab
CBOD5 Nov 1 - Apr 30	XXX	XXX	XXX	25	XXX	50	1/month	Grab
CBOD5 May 1 - Oct 31	XXX	XXX	XXX	15	XXX	30	1/month	Grab
TSS	XXX	XXX	XXX	30	XXX	60	1/month	Grab
Fecal Coliform (No./100 ml)	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/month	Grab
Ammonia Nov 1 - Apr 30	XXX	XXX	XXX	6.0	XXX	12	1/month	Grab
Ammonia May 1 - Oct 31	XXX	XXX	XXX	2.0	XXX	4	1/month	Grab
Total Phosphorus	XXX	XXX	XXX	Report	XXX	XXX	1/month	Grab

Compliance Sampling Location: Outfall 001

Other Comments: None

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment **A**)
☐	PENTOXSD for Windows Model (see Attachment)
☐	TRC Model Spreadsheet (see Attachment **B**)
☐	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: SOP for Establishing Effluent Limitations for Individual sewage Permits, SOP No. BCW-PMT-033; Final November 9, 2012; Revised October 1, 2020; Version 1.8 SOP New and Reissuance Sewage Individual NPDES Permit Applications, SOP No. BCW-PMT-002, Final November 9, 2012; Revised, January 6, 2020; Version 1.9
☐	Other: None

Permit No. PA0057991

Attachment A

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
02D	3125	DEEP RUN

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)
30.730	Rothstein Tract	PA0057991	0.003	CBOD5	15		
				NH3-N	2	4	
				Dissolved Oxygen			5

Friday, January 22, 2021 Version 1.0b Page 1 of 1

Permit No. PA0057991

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
02D	3125	DEEP RUN	30.730	180.12	78.10	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	2.43	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Rothstein Tract	PA0057991	0.0030	0.0000	0.0030	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	15.00	2.00	0.00	1.50
Dissolved Oxygen	5.00	8.24	0.00	0.00
NH3-N	2.00	0.00	0.00	0.70

Permit No. PA0057991

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
02D	3125	DEEP RUN	29.900	177.25	84.70	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	2.73	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	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	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Permit No. PA0057991

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
02D	3125	DEEP RUN

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												
30.730	2.43	0.00	2.43	.0046	0.00065	.681	31.94	46.92	0.11	0.453	20.01	7.00
Q1-10 Flow												
30.730	1.56	0.00	1.56	.0046	0.00065	NA	NA	NA	0.09	0.581	20.01	7.00
Q30-10 Flow												
30.730	3.30	0.00	3.30	.0046	0.00065	NA	NA	NA	0.13	0.382	20.01	7.00

Permit No. PA0057991

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
02D	3125	DEEP RUN

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
30.730	Rothstein Tract	9.66	4	9.66	4	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
30.730	Rothstein Tract	1.92	2	1.92	2	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)		
30.73	Rothstein Tract	15	15	2	2	5	5	0	0

Permit No. PA0057991

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
02D	3125	DEEP RUN

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
30.730	0.003	20.010	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach W/DRatio**	**Reach Velocity (fps)**
31.944	0.681	46.921	0.112
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.02	0.015	0.00	0.701
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.237	0.694	Tsivoglou	6
Reach Travel Time (days)			
0.453			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.045	2.02	0.00	8.24
0.091	2.02	0.00	8.24
0.136	2.02	0.00	8.24
0.181	2.02	0.00	8.24
0.227	2.02	0.00	8.24
0.272	2.02	0.00	8.24
0.317	2.01	0.00	8.24
0.362	2.01	0.00	8.24
0.408	2.01	0.00	8.24
0.453	2.01	0.00	8.24

Permit No. PA0057991

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	6		

Friday, January 22, 2021 Version 1.0b Page 1 of 1

Permit No. PA0057991

Attachment B

Copy of TRC_CALC

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

2.43	= Q stream (cfs)	0.5	= CV Daily
0.003	= 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)		=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 167.046	1.3.2.iii	WLA cfc = 162.849
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 62.245	5.1d	LTA_cfc = 94.673

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500	BAT/BPJ
		INST MAX LIMIT (mg/l) = 1.635	

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)