Pennsylvania Department of Environmental Protection

Southeast Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0053082**
Facility Type	**Non-Municipal**	APS ID	**1120366**
Major / Minor	**Minor**	Authorization ID	**1496760**

Applicant and Facility Information

Applicant Name	**Mendenhall Inn**	Facility Name	**Mendenhall Inn STP**
Applicant Address	P. O. Box 607	Facility Address	PO Box 607
	Concordville, PA 19331		Concordville, PA 19331
Applicant Contact	Alexander Hionis	Facility Contact	Alexander Hionis
Applicant Phone	(610) 506-8979	Facility Phone	(610) 506-8979
Client ID	2468	Site ID	452232
Ch 94 Load Status	Not Overloaded	Municipality	Kennett Township
Connection Status		County	Chester
Date Application Received	July 26, 2024	EPA Waived?	No
Date Application Accepted		If No, Reason	Christina TMDL

Purpose of Application: NPDES permit renewal.

Summary of Review

The Pa Department of Environmental Protection (PADEP/Department) received an NPDES permit renewal application from Clean Water, Inc. (consultant) on behalf of Mendenhall Inn (permittee) on July 26, 2024 for Permittee's Mendenhall Inn STP (facility). This is a minor sewage facility with a design flow of 0.0206 MGD that discharges into Craigs Mill Run (WWF, MF) in state watershed 3-H. The current permit will expire on January 31, 2025. The terms and conditions of the current permit is automatically extended since the renewal application was received at least 180 days prior to expiration date. Renewal NPDES permit application under Clean Water Program are not covered by PADEP's PDG per 021-2100-001. This fact sheet is developed in accordance with 40 CFR §124.56.

Changes to existing permit: Added: E. Coli.

Sludge use and disposal description and location(s): Digested sludge are hauled-off by licensed hauler.

Public Participation

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

Approve	Deny	Signatures	Date
√		Reza H. Chowdhury, E.I.T. / Project Manager	November 20, 2024
X		Pravin Patel Pravin C. Patel, P.E. / Environmental Engineer Manager	11/25/2024

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	0.0206
Latitude	39º 51' 17.36"	Longitude	-75º 38' 20.94"
Quad Name	Kennett Square	Quad Code	2040
Wastewater Description:	Sewage Effluent		
Receiving Waters	Craigs Mill Run (WWF, MF)	Stream Code	00023
NHD Com ID	26092224	RMI	2.5
Drainage Area	0.11 mi^2	Yield (cfs/mi^2)	0.21
Q_{7-10} Flow (cfs)	0.023	Q_{7-10} Basis	Previous permit
Elevation (ft)	320	Slope (ft/ft)	
Watershed No.	3-H	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Impaired		
Cause(s) of Impairment	SILTATION, SILTATION		
Source(s) of Impairment	AGRICULTURE, HABITAT MODIFICATION - OTHER THAN HYDROMODIFICATION		
TMDL Status	Final	Name	Christina River Basin

Background/Ambient Data		Data Source
pH (SU)	7.0	Default
Temperature (°C)	20	Default
Hardness (mg/L)	100	Default
Other:		

Nearest Downstream Public Water Supply Intake — None before PA-DE border

Changes Since Last Permit Issuance: None

Other Comments: Stream data were copied from previous permit's fact sheet. The yield and drainage area at the outfall 001 used in the previous permit was 0.21 cfs/mi^2 and 0.11 mi^2, respectively, which resulted in a Q_{7-10} of 0.023 cfs. The previous permit utilized WQM 7.0 modeling to calculate WQBELs for conventional pollutants. The assumptions in that modeling efforts are still valid, therefore, no new WQM 7.0 modeling is conducted for this renewal. A copy of previous modeling is attached with this fact sheet.

Default discharge pH of 7.0, temperature of 25°C, and hardness of 100 mg/l will be used in modeling, as appropriate.

Treatment Facility Summary

Treatment Facility Name: Mendenhall Inn STP

WQM Permit No.	Issuance Date

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Tertiary	Extended Aeration	Hypochlorite	0.0206

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.0206		Not Overloaded		

Changes Since Last Permit Issuance: None

Other Comments: The treatment facility consists of Grease Traps, Aerated Flow Equalization, Extended Aeration, Clarifier, Backwash Style Filter, Chlorine Contact Chamber, and Flow Meter.

Existing limits

The following effluent limits are currently applied at Outfall 001 for the period 02/01/2020 through 01/31/2025:

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	Metered
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	0.2	XXX	0.5	1/day	Grab
CBOD5 Nov 1 - Apr 30	3.42	XXX	XXX	20	XXX	40	2/month	24-Hr Composite
CBOD5 May 1 - Oct 31	1.71	XXX	XXX	10	XXX	20	2/month	24-Hr Composite
Total Suspended Solids	1.71	XXX	XXX	10	XXX	20	2/month	24-Hr Composite
Fecal Coliform (CFU/100 ml)	XXX	XXX	XXX	200	XXX	1000*	2/month	Grab
Total Nitrogen	3.436	XXX	XXX	Report	XXX	XXX	2/month	24-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	1.54	XXX	XXX	9.0	XXX	18	2/month	24-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	0.51	XXX	XXX	3.0	XXX	6	2/month	24-Hr Composite
Total Phosphorus	0.17	XXX	XXX	1.0	XXX	2	2/month	24-Hr Composite

*Not greater than 1,000/100 milliliters of fecal coliform organisms in more than 10 percent of the samples tested.

Compliance History

DMR Data for Outfall 001 (from October 1, 2023 to September 30, 2024)

Parameter	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23
Flow (MGD) Average Monthly	0.00873	0.00964	0.00977	0.00925	0.00863	0.00911	0.00739	0.00554	0.00782	0.0087	0.00955	0.00955
Flow (MGD) Daily Maximum	0.01870	0.01880	0.01650	0.01660	0.01610	0.01500	0.01020	0.00810	0.01650	0.01770	0.01750	0.01550
pH (S.U.) IMIN	7.13	7.15	7.06	7.13	7.04	7.04	7.03	7.04	7.03	7.09	7.13	7.10
pH (S.U.) IMAX	7.39	7.39	7.90	7.36	7.33	7.31	7.38	7.28	7.31	7.26	7.27	7.29
DO (mg/L) IMIN	7.0	7.0	6.8	6.8	7.0	7.0	7.0	7.0	7.0	6.5	7.0	7.0
TRC (mg/L) Average Monthly	0.021	0.025	0.021	0.033	0.018	0.022	0.015	0.019	0.013	0.015	0.017	0.016
TRC (mg/L) IMAX	0.07	0.06	0.05	0.12	0.04	0.08	0.05	0.04	0.04	0.04	0.04	0.04
CBOD5 (lbs/day) Average Monthly	< 0.098	< 0.118	< 0.103	< 0.126	< 0.151	< 0.149	< 0.114	< 0.047	0.164	< 0.142	0.121	< 0.141
CBOD5 (mg/L) Average Monthly	< 2	< 2	< 2	< 2	< 2.7	< 2.6	< 2	< 2	2.7	< 2	2.767	< 2.7
TSS (lbs/day) Average Monthly	0.202	0.587	0.103	0.279	0.241	0.231	0.124	0.073	< 0.128	0.473	0.183	0.149
TSS (mg/L) Average Monthly	4	10	2	4	4.5	5	3	3	< 3	6.5	4	3
Fecal Coliform (CFU/100 ml) Average Monthly	< 2	< 2	< 2	< 2	4732.9	< 4	< 2	< 2	< 2	< 2	< 2.3	< 3.7
Fecal Coliform (CFU/100 ml) IMAX	< 2	< 2	< 2	< 2	7000	8	< 2	< 2	< 2	< 2	3	7
Total Nitrogen (lbs/day) Average Monthly	< 1.255	< 1.772	< 0.707	< 1.873	< 1.291	< 1.810	< 1.207	< 0.769	< 1.453	< 1.443	< 1.206	< 0.607
Total Nitrogen (mg/L) Average Monthly	< 25.2	< 29.95	< 12.9	29.65	< 23	< 29.05	< 21.2	< 22.75	< 24.82	< 20.39	< 24.3	< 13.4
Ammonia (lbs/day) Average Monthly	0.0232	0.003	0.013	< 0.0032	0.0139	0.014	< 0.002	< 0.0007	0.0052	0.1072	0.0024	< 0.0016
Ammonia (mg/L) Average Monthly	0.545	0.05	0.21	< 0.045	0.275	0.215	< 0.03	< 0.03	0.085	1.415	0.053	< 0.035
Total Phosphorus (lbs/day) Average Monthly	0.019	0.015	0.01	0.015	0.012	0.016	0.006	0.004	0.015	0.018	0.011	0.017
Total Phosphorus (mg/L) Average Monthly	0.385	0.245	0.15	0.225	0.21	0.28	0.105	0.155	0.255	0.26	0.29	0.365

Compliance History

Effluent Violations for Outfall 001, from: November 1, 2023 To: September 30, 2024

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Fecal Coliform	05/31/24	Avg Mo	4732.9	CFU/100 ml	200	CFU/100 ml
Fecal Coliform	05/31/24	IMAX	7000	CFU/100 ml	1000	CFU/100 ml

Summary of Inspections:
02/09/2022: CEI conducted. No violations noted. The inspector couldn't access the site, outfall was assessed, and the effluent was clear.

04/22/2020: Admin review conducted. No violations noted. Due to COVID-19, the restaurant was shut down which reduced the flow to an average of 200-300 GPD.

Other Comments: None

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .0206
Latitude 39º 51' 17.45" **Longitude** -75º 38' 20.81"
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: The above technology-based limitations were evaluated and compared against other criteria for this permit renewal. Other criteria which were more stringent, were retained or added to this permit renewal. The pH will remain 6.0 to 9.0 as shown in the above table. The fecal coliform limit is retained from the existing permit and is an effluent concentration not greater than 200/100 milliliters of fecal coliform organisms as a geometric mean value and not greater than 1,000/100 milliliters of fecal coliform organisms in more than 10 percent of the samples tested.

As stated in page 2 of this report, no WQM modeling was conducted for $CBOD_5$, NH_3-N and DO. The previous model data is attached.

The Christina River Basin TMDL of Nutrients and Dissolved Oxygen Under Low-Flow Condition was issued by the Environmental Protections Agency (EPA) on January 19, 2001 and subsequently revised in October 2002 and April 2006. Subsequently, DEP prepared, and EPA acknowledged, an Alternative Reduction Scenario for the Christina River Basin for Low Flow TMDL dated June 27, 2012 which reassigned some of the allocations within the discharges but kept the total load to the basin the same. Mendenhall Inn STP is part of an Alternative Reduction Scenario TMDL (Summary Table 15) for parameters: $CBOD_5$, NH_3N, Dissolved Oxygen, Total Nitrogen (TN), and Total Phosphorus (TP). The loadings are 1.719 (10), 0.516 (3), 0.860 (5), 3.436 (10), and 0.344 (2) lb/d (mg/l), respectively. Besides TN (discussed below), the current permit meets these limitations or is more stringent than the Waste Load Allocations (WLA).

The Christina River Basin also has approved High-Flow TMDLs for Bacteria and Sediment (dated September 2006) for Fecal Coliform, enterococci, and TSS, and for Nutrients and Dissolved Oxygen (dated September 2006) loads for phosphorus, ammonia-N, and $CBOD_5$. The limits for Total Suspended Solids (10 mg/l) and Fecal Coliform (200 No./100ml) will continue in this permit renewal and it is consistent with the High Flow TMDL for Bacteria and Sediment. Seasonal limitations are also consistent with the TMDLs. The high flow TMDL allocations were not adjusted at the time when low flow TMDL allocations were adjusted under the “Alternative Reduction Scenario”. Since, the Christina River Low-Flow TMDL is the driver for the Christina River High-Flow TDML, especially for nutrients, it is assumed that compliance with the low flow TMDL, satisfies the compliance of the high flow TMDL.

TP was set to 1 mg/l, which is lower than the standard practices and the TMDL WLA, and is retained in this permit. The limit was set several permit renewals ago due to stream impairment. The permittee is meeting the limit.

In order to comply with the Low Flow TMDL Alterative Reduction Scenario, a loading limit of 3.436 lb/d as a monthly average was applied in previous permit cycle and will be carried over. Existing concentration-based monitoring will also carried over.

Pa Code 25 § 92a. 61 requires monitoring of E. Coli. DEP's SOP titled "Establishing Effluent Limitations for Individual Sewage Permits (BCW-PMT-033, revised March 24, 2021) recommends annual E. Coli monitoring for facilities with design flow between 2,000 GPD to 50,000 GPD. This requirement will be applied from this permit term.

Total Nitrogen monitoring frequency is changed from 2/month to 1/month.

Sampling frequencies are the retained from the existing permit. While the sampling frequencies are lower than those in Table 6-3 in DEP's Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001), per standard practice the frequencies can be retained if the permittee is meeting the limits (SOP New and Reissuance Sewage Individual NPDES Permit Applications).

Best Professional Judgment (BPJ) Limitations

Comments: No comment

Anti-Backsliding

Anti-backsliding prohibition is justified in sections where an exception is justified for the affected pollutant(s). For remaining pollutants, this prohibition isn't applicable since the proposed limits are at least as stringent as were in current 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" (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	Metered
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	0.2	XXX	0.5	1/day	Grab
CBOD5 Nov 1 - Apr 30	3.42	XXX	XXX	20	XXX	40	2/month	24-Hr Composite
CBOD5 May 1 - Oct 31	1.71	XXX	XXX	10	XXX	20	2/month	24-Hr Composite
TSS	1.71	XXX	XXX	10	XXX	20	2/month	24-Hr Composite
Fecal Coliform (No./100 ml)	XXX	XXX	XXX	200	XXX	1000*	2/month	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/year	Grab
Total Nitrogen	3.436	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Ammonia Nov 1 - Apr 30	1.54	XXX	XXX	9.0	XXX	18	2/month	24-Hr Composite
Ammonia May 1 - Oct 31	0.51	XXX	XXX	3.0	XXX	6	2/month	24-Hr Composite
Total Phosphorus	0.17	XXX	XXX	1.0	XXX	2	2/month	24-Hr Composite

*Not greater than 1,000/100 milliliters of fecal coliform organisms in more than 10 percent of the samples tested.

Compliance Sampling Location: At Outfall 001

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☐	Toxics Management Spreadsheet (see Attachment)
☐	TRC Model Spreadsheet (see Attachment)
☐	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:
☐	Other:

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
03H		23 Trib 00023 to Brandywine Creek	2.500	320.00	0.11	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	0.02	0.00	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
Mendenhall Inn	PA0053082	0.0206	0.0206	0.0206	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	10.00	2.00	0.00	1.50
Dissolved Oxygen	5.00	8.24	0.00	0.00
NH3-N	3.00	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
03H	23	Trib 00023 to Brandywine Creek	0.200	160.00	0.58	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	0.11	0.00	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	25.00	7.00

Parameter Data

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

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
03H	23	Trib 00023 to Brandywine 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												
2.500	0.02	0.00	0.02	.0319	0.01318	.34	2.16	6.36	0.07	1.992	23.07	7.00
Q1-10 Flow												
2.500	0.01	0.00	0.01	.0319	0.01318	NA	NA	NA	0.06	2.166	23.57	7.00
Q30-10 Flow												
2.500	0.03	0.00	0.03	.0319	0.01318	NA	NA	NA	0.08	1.852	22.70	7.00

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		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
03H	23	Trib 00023 to Brandywine 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
2.500	Mendenhall Inn	7.48	6	7.48	6	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
2.500	Mendenhall Inn	1.58	2.93	1.58	2.93	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)		
2.50	Mendenhall Inn	10	10	2.93	2.93	5	5	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
03H	23	Trib 00023 to Brandywine Creek

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
2.500	0.021	23.072	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
2.163	0.340	6.364	0.071
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
6.92	0.541	1.80	0.887
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.250	29.092	Owens	6
Reach Travel Time (days)			
1.992			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.199	6.11	1.51	7.80
0.398	5.40	1.26	7.80
0.598	4.77	1.06	7.80
0.797	4.21	0.89	7.80
0.996	3.72	0.74	7.80
1.195	3.29	0.62	7.80
1.394	2.90	0.52	7.80
1.594	2.56	0.44	7.80
1.793	2.26	0.37	7.80
1.992	2.00	0.31	7.80

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
03H	23	Trib 00023 to Brandywine 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)
2.500	Mendenhall Inn	PA0053082	0.021	CBOD5	10		
				NH3-N	2.93	5.86	
				Dissolved Oxygen			5

Copy of TRC_CALC

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.0226	= Q stream (cfs)	0.5	= CV Daily
0.0206	= 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 = 0.245	1.3.2.iii	WLA cfc = 0.232
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.091	5.1d	LTA_cfc = 0.135

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.112	AFC
		INST MAX LIMIT (mg/l) = 0.368	

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)

Mendenhall Inn Wastewater Treatment Plant

Treatment Plant Schematic