pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0205877**
Facility Type	**Municipal**	APS ID	**1091997**
Major / Minor	**Minor**	Authorization ID	**1445856**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Redstone Township Sewer Authority Fayette County**	Facility Name	**Redstone Township Sewer Authority WWTP**
Applicant Address	1010 Main Street PO Box 753	Facility Address	100 Treatment Plant Road
	Republic, PA 15475-0751		Allison, PA 15475
Applicant Contact	Francine Pavone	Facility Contact	Mike Cetera
Applicant Phone	(724) 246-8751	Facility Phone	724-246-8751
Client ID	155156	Site ID	271315
Ch 94 Load Status	Not Overloaded	Municipality	Redstone Township
Connection Status		County	Fayette
Date Application Received	June 29, 2023	EPA Waived?	Yes
Date Application Accepted	July 07, 2024	If No, Reason	

Purpose of Application: Renewal of existing NPDES permit for discharge treated sewage effluent from a POTW.

Summary of Review

The Redstone Township has applied for renewal of NPDES Permit No. PA0205877.

Operations staff reported that no open violations exist for this facility.

The permittee requested an increase of design flow from 0.45 MGD to 0.60 MGD upon construction of a fourth SBR Tank. The permittee submitted WQM application 2698401 A-2 on March 28, 2017 to construct the fourth SBR tank. During the previous NPDES permit term, the completion of construction was anticipated to be July 1, 2023 and phased 0.6 MGD allowance and associated permit limits went into effect on July 1, 2023. However, as a result of review of PENNVEST application requirements, the WQM permit was finally issued on July 17, 2024. The construction of the fourth SBR tank is still incomplete, and therefore, 0.6 MGD allowance does not apply from the effective date of the renewed NPDES permit. Phased limits have been developed again during this renewal with narrative compliance date. The permittee will be required to notify the Department 60 days prior to startup of operation of the upgraded facilities (see Part C.I.E of the Draft NPDES Permit). This change does not constitute backsliding and/or relaxation of permit limits or conditions.

Treatment at this facility consists of the following: sewage influent to this existing facility is treated in three sequencing batch reactor tanks and a UV disinfection tank. Waste sludge is directed to belt filter presses.

The Act 14-PL 834 Municipal Notification was provided in the May 5, 2023 Letters provided to Fayette County, Luzerne Township, and Redstone Township. No comments were received.

Sludge use and disposal description and location(s): Dewatered sludge is hauled to landfill.

Approve	Deny	Signatures	Date
X		John Price Jack Price / Environmental Engineering Specialist	September 24, 2024
X		Mahbuba Iasmin Mahbuba Iasmin Ph.D, P.E. / Environmental Engineering Manager	October 4, 2024

Summary of Review

Below is a summary of changes made to the permit for this facility:

- An updated model in WQM 7.0 was performed, resulting in water quality-based limits for summer $CBOD_5$ in the
- Several limits were properly rounded based on the guidance provided in the rounding off of several mathematical values for limits conforming to the permit writer's manual.
- E. Coli monitoring was added as required by the SOP for Effluent Development

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.

Treatment Facility Summary

Treatment Facility Name: Redstone Township Sewer Authority WWTP

WQM Permit No.	Issuance Date
2698401	03/10/1998
2698401 A-1	09/09/2002
2698401 A-2	07/17/2024

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary with Ammonia Reduction	Sequencing Batch Reactor	Ultraviolet	0.45 (0.60 Proposed)

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
1.125 (1.5 Proposed)	94.0 (125.0 Proposed)	Not Overloaded	Dewatering	Landfill

Changes Since Last Permit Issuance: WQM Permit 2698401 A-2 proposes a fourth SBR tank, and upgrades to aeration equipment to increase the capacity of the facility from 0.45 MGD to 0.60 MGD.

Other Comments: N/A

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.45 (0.60 Proposed)
Latitude	39º 59' 9.0"	Longitude	-79º 52' 17.0"
Quad Name	New Salem	Quad Code	39079H7
Wastewater Description:	Sewage Effluent		

Receiving Waters	Dunlap Creek (WWF)	Stream Code	40140
NHD Com ID	99412568	RMI	6.59
Drainage Area	32.2 mi2	Yield (cfs/mi^2)	0.0177
Q_{7-10} Flow (cfs)	0.571	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)		Slope (ft/ft)	0.041
Watershed No.	19-C	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	PATHOGENS		
Source(s) of Impairment	SOURCE UNKNOWN		
TMDL Status	N/A	Name	

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

Nearest Downstream Public Water Supply Intake	PA-American Water-Brownsville PWSID 5260005 (3 MGD)		
PWS Waters	Monongahela River	Flow at Intake (cfs)	550
PWS RMI	56.46	Distance from Outfall (mi)	8.54 River Miles 3.11 Linear Miles

Changes Since Last Permit Issuance: The previous permit issuance was the DEP-Initiated Major Amendment PA0205877 A-1. These are the following changes for this permit issuance:

- Permittee proposed increase in discharge following startup of a plant expansion.
- The discharge was modeled with WQM 7.0, resulting in more stringent $CBOD_5$ in the Summer.
- Mathematical values were properly rounded according to Department policy.
- Quarterly *E. Col*i Effluent Monitoring is now added according to Department policy.

Other Comments: N/A

Compliance History

DMR Data for Outfall 001 (from May 1, 2023 to April 30, 2024)

Parameter	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23	SEP-23	AUG-23	JUL-23	JUN-23	MAY-23
Flow (MGD) Average Monthly	0.226	0.377	0.154	0.281	0.17	0.181	0.172	0.156	0.176	0.191	0.180	0.156
pH (S.U.) Instantaneous Minimum	7.1	6.7	6.7	7.0	6.9	6.9	7.0	6.9	6.6	6.9	6.9	6.9
pH (S.U.) Instantaneous Maximum	7.9	7.6	7.3	7.0	7.1	7.1	7.0	7.0	7.0	7.0	7.0	7.0
DO (mg/L) Instantaneous Minimum	5.0	5.0	5.1	6.5	6.5	6.5	6.5	6.5	6.3	6.5	6.5	6.5
CBOD5 (lbs/day) Average Monthly	16.44	18.71	7.39	< 24.3	< 7.3	22.9	< 4.6	< 7.5	< 4.7	< 3.2	< 5.6	< 2.9
CBOD5 (lbs/day) Weekly Average	15.93	10.68	9.76	53.8	20.8	70.9	10.1	19.5	12.5	< 4.1	13.9	3.9
CBOD5 (mg/L) Average Monthly	8.72	5.95	5.75	< 7.8	< 5.3	12.5	< 4.3	< 6.0	< 4.2	< 2.0	< 2.4	< 3.3
CBOD5 (mg/L) Weekly Average	19.9	10.0	7.6	13.9	15.0	32.1	10.2	17.7	10.5	< 2.0	3.1	7.7
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	350.77	185	174.22	644.6	2372	409.6	251.6	263.2	154.1	328.6	327.5	205.4
BOD5 (lbs/day) Raw Sewage Influent Weekly Average	218.8	519	189.06	1067.9	369.3	640.9	399.0	348.6	384.9	395.6	608.0	305.6
BOD5 (mg/L) Raw Sewage Influent Average Monthly	186.1	136	135.65	218.8	167.3	272.6	223.7	206.5	156.5	225.2	197.5	187.4
TSS (lbs/day) Average Monthly	12.06	36.16	9.31	< 35.6	< 12.4	< 15.4	< 11.6	< 12.5	< 6.4	8.5	< 12.5	< 5.2
TSS (lbs/day) Raw Sewage Influent Average Monthly	416.2	190	367.65	421.1	230.6	328.3	153.4	306.7	134.1	250.1	246.5	184.0
TSS (lbs/day) Raw Sewage Influent Weekly Average	237.0	468	1184.18	718.4	427.3	552.5	313.1	426.3	346.1	348.7	412.8	379.0

TSS (lbs/day) Weekly Average	9.61	33.09	15.4	72.8	18.0	44.2	29.2	17.6	11.9	< 10.3	31.2	6.7
TSS (mg/L) Average Monthly	6.40	11.5	7.25	< 11.3	< 8.8	< 8.6	< 9.3	< 9.8	< 6.6	< 5.3	< 5.5	< 5.0
TSS (mg/L) Raw Sewage Influent Average Monthly	220.8	145	286.25	145	162	212	130	234	166	166	139	166
TSS (mg/L) Weekly Average	12.0	31.0	12.0	18.0	13.0	20.0	19.0	16.0	10.0	6.0	7.0	< 5.0
Fecal Coliform (No./100 ml) Geometric Mean	178	14.01	334.5	< 5	< 5	< 7	< 8	< 10	< 11	< 7	< 8	17
Fecal Coliform (No./100 ml) Instantaneous Maximum	330	172	5600	5	< 5	20	26	20	54	10	32	5600
UV Transmittance (%) Daily Minimum	0.2	0.2	0.2	0.3	0.7	0.7	0.7	0.7	0.4	0.7	0.7	0.7
Total Nitrogen (mg/L) Daily Maximum					55.9							
Ammonia (lbs/day) Average Monthly	18.4	17.23	11.21	21.7	< 5.0	11.3	< 5.5	< 4.5	< 4.7	< 0.8	< 3.4	0.7
Ammonia (lbs/day) Weekly Average	21.8	14.64	19.65	43.3	17.9	26.3	14.1	14.5	21.2	1.0	10.0	1.6
Ammonia (mg/L) Average Monthly	9.76	5.48	8.73	6.9	< 3.6	6.1	< 4.9	< 3.9	< 4.5	< 0.5	< 1.3	0.7
Ammonia (mg/L) Weekly Average	27.2	10.9	15.3	11.4	12.9	14.8	14.2	13.2	17.8	0.9	2.2	1.5
Total Phosphorus (mg/L) Daily Maximum					3.8							

Compliance History

Facility: **Redstone Township Sewer Authority WWTP**
NPDES Permit No.: PA0205877
Compliance Review Period: 01/2019 – 05/2024
Inspection Summary:

INSP ID	INSPECTED DATE	INSP TYPE	INSPECTION RESULT DESC
3160540	03/11/2021	Compliance Evaluation	No Violations Noted
3185814	04/29/2021	Complaint Inspection	No Violations Noted
3159187	03/09/2021	Administrative/File Review	Violation(s) Noted
3159348	03/09/2021	Routine/Partial Inspection	Administratively Closed

Violation Summary:

VIOLATION DATE	VIOLATION TYPE	VIOLATION TYPE DESC	RESOLVED DATE	INSP ID	INSPECTED DATE
03/09/2021	92A.44	NPDES - Violation of effluent limits in Part A of permit	05/20/2021	3159187	03/09/2021

Open Violations by Client ID:

None on record.

Enforcement Summary:

None opened within review period.

Effluent Violations for Outfall 001, from: June 1, 2023 To: April 30, 2024

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Ammonia	08/31/23	Wkly Avg	21.2	lbs/day	18.7	lbs/day
Ammonia	08/31/23	Avg Mo	< 4.5	mg/L	2.5	mg/L
Ammonia	10/31/23	Avg Mo	< 4.9	mg/L	2.5	mg/L
Ammonia	04/30/24	Avg Mo	9.76	mg/L	7.5	mg/L
Ammonia	02/29/24	Avg Mo	8.73	mg/L	7.5	mg/L
Ammonia	09/30/23	Avg Mo	< 3.9	mg/L	2.5	mg/L
Ammonia	11/30/23	Wkly Avg	14.8	mg/L	11.3	mg/L
Ammonia	02/29/24	Wkly Avg	15.3	mg/L	11.3	mg/L
Ammonia	04/30/24	Wkly Avg	27.2	mg/L	11.3	mg/L
Ammonia	01/31/24	Wkly Avg	11.4	mg/L	11.3	mg/L
Ammonia	10/31/23	Wkly Avg	14.2	mg/L	3.8	mg/L
Ammonia	12/31/23	Wkly Avg	12.9	mg/L	11.3	mg/L
Ammonia	09/30/23	Wkly Avg	13.2	mg/L	3.8	mg/L
Ammonia	08/31/23	Wkly Avg	17.8	mg/L	3.8	mg/L

Other Comments: The Compliance Status of the facility will be determined prior to the issuance of the final permit. At that time a fact sheet addendum will be issued with the compliance status determination.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.60
Latitude 39º 59' 9.00" **Longitude** -79º 52' 17.00"
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)
(Nov 1 to Apr 30)	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
Solids	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)
Total Nitrogen	Report	Average Monthly	-	92a.61
Total Phosphorus	Report	Average Monthly	-	92a.61
E. Coli (No./100 mL)	Report	IMAX	-	92a.61

Comments: The proposed discharge was evaluated using WQM 7.0 to evaluate CBOD5, Ammonia Nitrogen, and Dissolved Oxygen Parameters. The modeling results show technology based effluent limitations for CBOD5 (November 1st to April 30th) are more stringent than the water quality model based effluent limits. Therefore, the TBELs will be used for CBOD5 in winter months.

Water Quality-Based Limitations

The following limitations were determined through water quality modeling (output files attached in Attachments #3 through Attachment #6 for the 0.45 MGD phase of the permit cycle and the 0.60 MGD phase of the permit cycle.):

For 0.45 MGD

Parameter	Limit (mg/L)	SBC	Model
Ammonia Nitrogen (May 1 to Oct 31)	3.35	Average Monthly	WQM 7.0 Version 1.1
Ammonia Nitrogen (Nov 1 to Apr 30)	13.17	Average Monthly	WQM 7.0 Version 1.1
CBOD5 (May 1 to Oct 31)	15.67	Average Monthly	WQM 7.0 Version 1.1
CBOD5 (May 1 to Oct 31)	25.0 (TBEL)	Average Monthly	WQM 7.0 Version 1.1
Dissolved Oxygen	4.0 (min)	Average Monthly	WQM 7.0 Version 1.1

For 0.60 MGD

Parameter	Limit (mg/L)	SBC	Model
Ammonia Nitrogen (May 1 to Oct 31)	2.99	Average Monthly	WQM 7.0 Version 1.1
Ammonia Nitrogen (Nov 1 to Apr 30)	7.5	Average Monthly	WQM 7.0 Version 1.1
CBOD5 (May 1 to Oct 31)	15.97	Average Monthly	WQM 7.0 Version 1.1
CBOD5 (May 1 to Oct 31)	25.0 (TBEL)	Average Monthly	WQM 7.0 Version 1.1
Dissolved Oxygen	4 (min)	Average Monthly	WQM 7.0 Version 1.1

Comments: The ammonia-nitrogen limits developed in the tables above are less stringent than the existing limits. Therefore, in accordance with anti-backsliding regulations, the previously imposed average monthly ammonia nitrogen limits (2.5 mg/L Summer and 7.5 mg/L Winter) will be reimposed for both 0.45 MGD and 0.60 MGD rather than the limits developed through WQM 7.0 v. 1.1, model results referenced above.
The CBOD5 limit will be rounded according to 386-0400-001 Chapter 5 C.2.

DMR data from the past year indicates that the plant is having difficulty meeting the Ammonia-Nitrogen limits. WQM Permit Application 2698401 A-2 includes a fourth SBR Tank, upgrades to aeration equipment, and control equipment.

$CBOD_5$ for summer at the 0.45 MGD flow rate and 0.60 mgd flow rate will round down to 15.0 mg/L in accordance with the rounding guidance in Chapter 5 C.2 of PADEP's *Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits* (Document No. 386-0400-001; June 28, 2023). For winter CBOD5, TBELs are more stringent than WQBELs, and therefore, the TBELs will be applied and $CBOD_5$ will remain the same throughout the permit cycle.

Anti-Backsliding

Section 402(o) of the Clean Water Act (CWA), enacted in the Water Quality Act of 1987, establishes anti-backsliding rules governing two situations. The first situation occurs when a permittee seeks to revise a Technology-Based effluent limitation based on BPJ to reflect a subsequently promulgated effluent guideline which is less stringent. The second situation addressed by Section 402(o) arises when a permittee seeks relaxation of an effluent limitation which is based upon a State treatment standard of water quality standard.

Previous limits can be used pursuant to EPA's anti-backsliding regulation. Reissued permits. (1) Except as provided in paragraph (l)(2) of this section when a permit is renewed or reissued. Interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under §122.62). (2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.

(40 CFR 122.44 (l)(2) Establishing limitations, standards, and other permit conditions., 40 CFR Ch. I (7-1-21 Edition))

No permits limits have been made less stringent in the renewal draft permit.

Best Professional Judgment (BPJ) Limitations

Comments: N/A

Disinfection

Ultraviolet (UV) disinfection is used, and therefore, Total Residual Chlorine (TRC) limits are not applicable. Routine monitoring of UV intensity is imposed at the same monitoring frequency that is used for TRC.

(*Section I.A, Note 4, SOP for Clean Water Program, Establishing Effluent Limitations for Individual Sewage Permits, Final November 9, 2012, Revised March 24, 2021, Version 1.9* and *25 PA Code 92a.61(b)*.)

Mass Loadings

Mass loading limits are applicable for publicly owned treatment works (POTWs). Current policy requires average monthly mass loading limits be established for CBOD5, TSS, and NH_3-N and average weekly mass loading limits be established for CBOD5 and TSS.

Average monthly mass loading limits (lbs./day) are based on the formula: design flow (MGD) x concentration limit (mg/L) x conversion factor (8.34).

(*Section IV, SOP for Clean Water Program, Establishing Effluent Limitations for Individual Sewage Permits, Final November 9, 2012, Revised March 24, 2021, Version 1.9*)

Influent Monitoring

For POTWs with design flows greater than 2,000 GPD, influent BOD5 and TSS monitoring must be established in the permit, and the monitoring should be consistent with the same frequency and sample type as is used for other effluent parameters. BOD5 and TSS influent loads will once again be reported for monthly average and daily maximum values in lbs/day and monthly average concentrations in mg/L.

(Section *IV.E.8. SOP – New and Reissuance Individual Sewage NPDES Permits Final November 9, 2012, Revised February 3, 2022, Version 2.0.)*

Additional Considerations

Nutrient monitoring is required by the SOP for Effluent Limitations for Individual Sewage Permits. Monitoring is included to establish the nutrient load from the wastewater treatment facility and the impacts that load may have on the quality of the receiving stream(s). Dunlap Creek is not listed as impaired for nutrients, therefore at the discretion of the application manager, a monitoring frequency less than the equivalent of conventional pollutants in Table 6-3 of the Permit Writer's Manual may be selected. Therefore, annual monitoring will be continued for Total Nitrogen and Total Phosphorus.

(*Section I.A, Note 7 & 8, SOP for Clean Water Program, Establishing Effluent Limitations for Individual Sewage Permits, Final November 9, 2012, Revised March 24, 2021, Version 1.9* and *25 PA Code 92a.61(b)*.)

Sewage discharges will include monitoring, at a minimum, for *E. Coli*, in new and reissued permits, with a monitoring frequency of 1/quarter for design flows between 0.05 and 1.0 MGD.

(*Note 12 SOP-Establishing Effluent Limitations for Individual Sewage Permits Final November 9, 2012, Revised March 24, 2021, Version 1.9.* and *25 PA Code 92a.61(b).)*

Rounding-Off Mathematical Values. Section 5 C.2. of the Permit Writers Manual contains general guidelines for rounding conventional and toxic pollutants, with instructions to round down to the nearest decimal place indicated.

General Magnitude	Conventional Pollutants	Toxic Pollutants
<0.01	to nearest 0.001	to nearest 0.001
0.01 - 0.1	to nearest 0.01	to nearest 0.01
0.1 - 1.0	to nearest 0.1	to nearest 0.01
1.0 - 10.0	to nearest 0.5	to nearest 0.01
10.0 - 60.0	to nearest 1.0	to nearest 0.01
60.0 or greater	to nearest 5.0	to nearest 0.10

(Department Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits, Updated June 28, 2023 (Document No. 362-0400-001))

Section 2.C of the Permit Writers Manual contains the procedure for converting average monthly effluent limitations to average weekly, maximum daily, and instantaneous maximum effluent limitations. The average monthly limit is multiplied according to the following chart:

Discharge Solution	Parameters	Average Weekly	Maximum Daily	Instantaneous Maximum Multiplier
Sewage	All	1.5		2.0
Industrial	All		2.0	2.5*

(Department Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits, Updated June 28, 2023 (Document No. 362-0400-001))

Monitoring frequency for the proposed effluent limits are based upon Table 6-3, Self-Monitoring Requirements for Sewage Dischargers.

Table 6-3 – Self-Monitoring Requirements for SEWAGE Discharges

Plant Design Flow (MGD)	Flow Monitoring	C-BOD_5 or BOD_5	Suspended Solids	pH	Fecal Coliform	Chlorine Residual	NH_3-N	Phosphorus	DO	Toxics
Single Residence (Individual Permit)	2/year by estimate	2/year*	2/year*	1/month*	2/year*	1/month*	2/year*	2/year*	2/year*	N/A
.0005 to .002	weekly, using average pump rate or weir (a)	1/month*	1/month*	daily*	1/month*	daily*	1/month*	1/month*	daily*	N/A
.002 to .01	weekly, using average pump rate or weir (a)	2/month*	2/month*	daily*	2/month*	daily*	2/month*	2/month*	daily*	N/A
0.01 to 0.1	weekly, using average pump rate or weir (a)	2/month*	2/month*	daily*	2/month*	daily*	2/month*	2/month*	Daily*	1/week*
0.1 to 1.0	meter	1/week**	1/week**	daily*	1/week*	daily*	1/week**	1/week**	daily*	1/week****
1.0 to 5.0	meter	2/week***	2/week***	daily*	2/week*	daily*	2/week***	2/week***	daily*	1/week****
5.0 to 25.0	meter	daily***	daily***	daily*	daily*	1/shift*	daily***	daily***	daily*	1/week****
over 25.0	meter	daily***	daily***	1/shift*	daily*	1/shift*	1/shift***	1/shift***	1/shift*	1/week****

* Grab sample-these should be most representative of the effluent and are to be taken at a time when the normal daily maximum flow would reach the sampling point.

** 8-hour composite sample.

*** 24-hour composite sample.

**** Same sample type as for Industrial Process Wastewater (See Table 6-4).

Changes to Effluent Limitations

The following changes have been made to the discharge limitations:

For 0.45 MGD.

	Parameter Statistical Basis	Proposed Change	Previous Permit	New Permit	Reason for Change
CBOD5	Summer $CBOD_5$ (mg/L) Average Monthly	More stringent (lower) effluent limitation.	25.0	15.0	WQM 7.0 Model Results
	Summer $CBOD_5$ (mg/L) Average Weekly	More stringent (lower) effluent limitation.	40.0	22.0	WQM 7.0 Model Results
	Summer $CBOD_5$ (mg/L) Instantaneous Max	More stringent (lower) effluent limitation.	50.0	30.0	WQM 7.0 Model Results
	Summer $CBOD_5$ (lbs/day) Average Monthly	More stringent (lower) effluent limitation.	125.1	56.0	WQM 7.0 Model Results
	Summer $CBOD_5$ (lbs/day) Average Weekly	More stringent (lower) effluent limitation.	187.6	80.0	WQM 7.0 Model Results
	Winter $CBOD_5$ (lbs/day) Average Monthly	Adjust mass loading down based on flow rate.	125.1	90.0	Permit Writer's Manual Chapter 2.B.1.a.
	Winter $CBOD_5$ (lbs/day) Average Weekly	Adjust mass loading down based on flow rate.	187.6	150.0	Permit Writer's Manual Chapter 2.B.1.a.
TSS	Total Suspended Solids (lbs/day) Average Monthly	Adjust mass loading down based on flow rate.	150.1	110.0	Permit Writer's Manual Chapter 2.B.1.a.
	Total Suspended Solids (lbs/day) Average Weekly	Adjust mass loading down based on flow rate.	225.1	165.0	Permit Writer's Manual Chapter 2.B.1.a.
Ammonia-Nitrogen	Summer Ammonia Nitrogen (mg/L) Average Weekly	Round down effluent limitation.	11.3	11.0	Permit Writer's Manual Chapter 5.C.2.
	Summer Ammonia Nitrogen (lbs/day) Average Monthly	Adjust mass loading down based on flow rate.	37.5	9.0	Permit Writer's Manual Chapter 2.B.1.a.
	Summer Ammonia Nitrogen (lbs/day) Average Weekly	Adjust mass loading down based on flow rate..	56.2	13.0	Permit Writer's Manual Chapter 2.B.1.a.
	Winter Ammonia Nitrogen (mg/L) Average Weekly	Round down effluent limitation.	3.8	3.5	Permit Writer's Manual Chapter 5.C.2.
	Winter Ammonia Nitrogen (lbs/day) Average Monthly	Adjust mass loading down based on flow rate.	12.5	28.0	Permit Writer's Manual Chapter 2.B.1.a.
	Winter Ammonia Nitrogen (lbs/day) Average Weekly	Adjust mass loading down based on flow rate..	18.7	9.0	Permit Writer's Manual Chapter 2.B.1.a.
	Dissolved Oxygen (mg/L) Minimum	Increase monitoring frequency.	5/week	1/day	Permit Writer's Manual Table 6-3
	E. Coli (No./100 mL) Daily Max	Add quarterly *E. Coli* monitoring.	N/A	Report	BCW-PMT-033 Table I.A.

For 0.60 MGD

	Parameter Statistical Basis	Proposed Change	Previous Permit	New Permit	Reason for Change
CBOD5	Summer $CBOD_5$ (mg/L) Average Monthly	More stringent (lower) effluent limitation.	25.0	15.0	WQM 7.0 Model Results
	Summer $CBOD_5$ (mg/L) Average Weekly	More stringent (lower) effluent limitation.	40.0	22.0	WQM 7.0 Model Results
	Summer $CBOD_5$ (mg/L) Instantaneous Max	More stringent (lower) effluent limitation.	50.0	30.0	WQM 7.0 Model Results
	Summer $CBOD_5$ (lbs/day) Average Monthly	Round down effluent limitation.	125.1	125.0	Permit Writer's Manual Chapter 5.C.2.
	Summer $CBOD_5$ (lbs/day) Average Weekly	Round down effluent limitation.	187.6	185.0	Permit Writer's Manual Chapter 5.C.2.
	Winter $CBOD_5$ (lbs/day) Average Monthly	Round down effluent limitation.	125.1	125.0	Permit Writer's Manual Chapter 5.C.2.
	Winter $CBOD_5$ (lbs/day) Average Weekly	Round down effluent limitation.	187.6	185.0	Permit Writer's Manual Chapter 5.C.2.
TSS	Total Suspended Solids (lbs/day) Average Monthly	Round down effluent limitation.	150.1	150.0	Permit Writer's Manual Chapter 5.C.2.
	Total Suspended Solids (lbs/day) Average Weekly	Round down effluent limitation.	225.1	225.0	Permit Writer's Manual Chapter 5.C.2.
Ammonia-Nitrogen	Summer Ammonia Nitrogen (mg/L) Average Weekly	Round down effluent limitation.	11.3	11.0	Permit Writer's Manual Chapter 5.C.2.
	Summer Ammonia Nitrogen (lbs/day) Average Monthly	Round down effluent limitation.	37.5	37.0	Permit Writer's Manual Chapter 5.C.2.
	Summer Ammonia Nitrogen (lbs/day) Average Weekly	Round down effluent limitation.	56.2	56.0	Permit Writer's Manual Chapter 5.C.2.
	Winter Ammonia Nitrogen (mg/L) Average Weekly	Round down effluent limitation.	3.8	3.5	Permit Writer's Manual Chapter 5.C.2.
	Winter Ammonia Nitrogen (lbs/day) Average Monthly	Round down effluent limitation.	37.5	37.0	Permit Writer's Manual Chapter 5.C.2.
	Winter Ammonia Nitrogen (lbs/day) Average Weekly	Round down effluent limitation.	56.2	56.0	Permit Writer's Manual Chapter 5.C.2.
	Dissolved Oxygen (mg/L) Minimum	Increase monitoring frequency.	5/week	1/day	Permit Writer's Manual Table 6-3
	E. Coli (No./100 mL) Daily Max	Add quarterly *E. Coli* monitoring.	N/A	Report	BCW-PMT-033 Table I.A.

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: Startup of Plant Expansion 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	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Carbonaceous Biochemical Oxygen Demand (CBOD5) Nov 1 - Apr 30	125.0	200.0	XXX	25.0	40.0	50	1/week	24-Hr Composite
Carbonaceous Biochemical Oxygen Demand (CBOD5) May 1 - Oct 31	75.0	110.0	XXX	15.0	22.0	30	1/week	24-Hr Composite
Total Suspended Solids	150.0	225.0	XXX	30.0	45.0	60	1/week	24-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	37.0	55.0	XXX	7.5	11.0	15	1/week	24-Hr Composite
Ammonia-Nitrogen May 1 - Aug 31, Oct 1 - 31	12.0	17.0	XXX	2.5	3.5	5	1/week	24-Hr Composite

Compliance Sampling Location: Outfall 001

Other Comments: N/A

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 Startup of Plant Expansion.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Carbonaceous Biochemical Oxygen Demand (CBOD5) Nov 1 - Apr 30	90.0	150.0	XXX	25.0	40.0	50	1/week	24-Hr Composite
Carbonaceous Biochemical Oxygen Demand (CBOD5) May 1 - Oct 31	56.0	80.0	XXX	15.0	22.0	30	1/week	24-Hr Composite
Total Suspended Solids	110.0	165.0	XXX	30.0	45.0	60	1/week	24-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	28.0	41.0	XXX	7.5	11.0	15	1/week	24-Hr Composite
Ammonia-Nitrogen May 1 - Aug 31, Oct 1 - 31	9.0	13.0	XXX	2.5	3.5	5	1/week	24-Hr Composite

Compliance Sampling Location: Outfall 001

Other Comments: N/A

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.

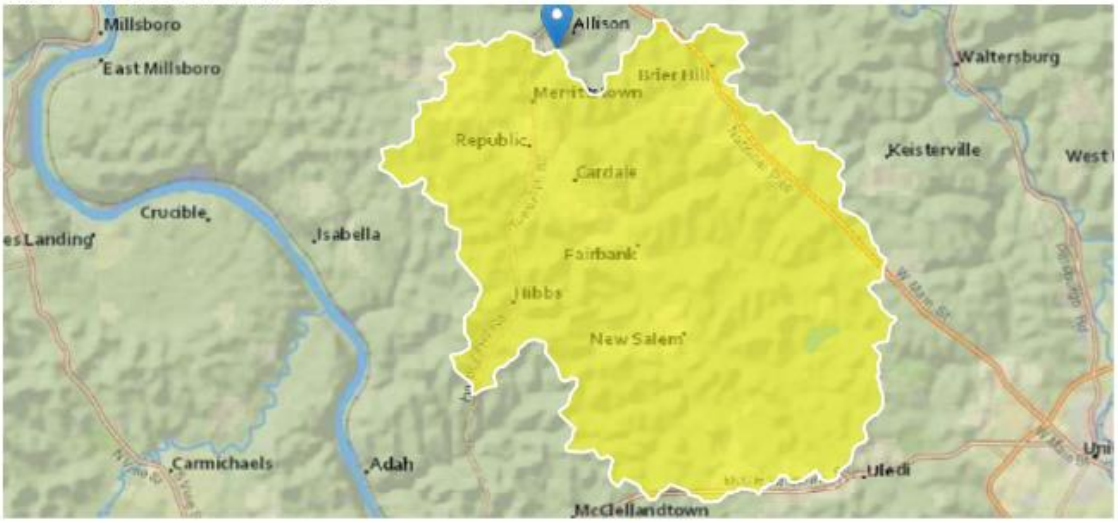
Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	XXX	XXX	XXX	XXX	XXX	XXX	Continuous	Recorded
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	4.0 Inst Min	XXX	XXX	XXX	1/day	Grab
CBOD5 Nov 1 - Apr 30	125.0	185.0	XXX	25.0	40.0	50.0	1/week	24-Hr Composite
CBOD5 May 1 - Oct 31	75.0	110.0	XXX	15.0	22.0	30.0	1/week	24-Hr Composite
TSS	110.0	165.0	XXX	30.0	45.0	60.0	1/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	1/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/quarter	Grab
UV Transmittance (%)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Measured
Total Nitrogen	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	24-Hr Composite

Compliance Sampling Location: Outfall 001
Other Comments: N/A

Attachment #1-USGS StreamStats Report Upstream

StreamStats Report

Region ID: PA
Workspace ID: PA20230803183210299000
Clicked Point (Latitude, Longitude): 39.98334, -79.87119
Time: 2023-08-03 14:32:32 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	32.2	square miles
ELEV	Mean Basin Elevation	1115	feet

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	32.2	square miles	2.26	1400
ELEV	Mean Basin Elevation	1115	feet	1050	2580

Low-Flow Statistics Flow Report [Low Flow Region 4]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	1.36	ft^3/s	43	43
30 Day 2 Year Low Flow	2.25	ft^3/s	38	38
7 Day 10 Year Low Flow	0.571	ft^3/s	66	66
30 Day 10 Year Low Flow	0.935	ft^3/s	54	54
90 Day 10 Year Low Flow	1.59	ft^3/s	41	41

Low-Flow Statistics Citations

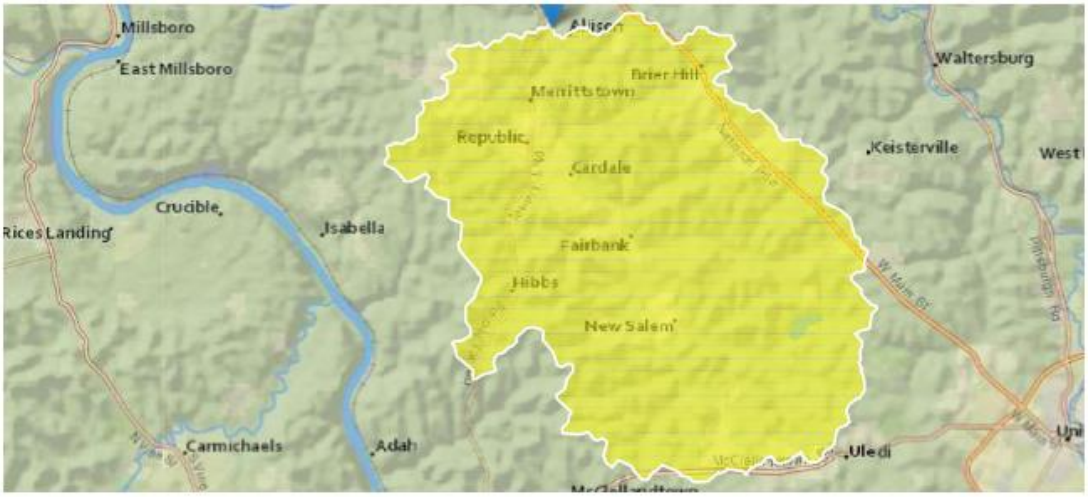
Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

Application Version: 4.16.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Attachment #2-USGS StreamStats Report Downstream

StreamStats Report

Region ID: PA
Workspace ID: PA20230803184537977000
Clicked Point (Latitude, Longitude): 39.98825, -79.87164
Time: 2023-08-03 14:45:59 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	33.1	square miles
ELEV	Mean Basin Elevation	1114	feet

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	33.1	square miles	2.26	1400
ELEV	Mean Basin Elevation	1114	feet	1050	2580

Low-Flow Statistics Flow Report [Low Flow Region 4]

PII: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	1.42	ft^3/s	43	43

Statistic	Value	Unit	SE	ASEp
30 Day 2 Year Low Flow	2.32	ft^3/s	38	38
7 Day 10 Year Low Flow	0.59	ft^3/s	66	66
30 Day 10 Year Low Flow	0.964	ft^3/s	54	54
90 Day 10 Year Low Flow	1.64	ft^3/s	41	41

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: 4.16.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Attachment #3-WQM 7.0 Report-Summer for 0.45 MGD

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**6.590**	903.12	32.20	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	0.018	0.00	0.00	0.000	0.000	10.0	0.00	0.00	25.00	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
Redstone WWTP	PA0205877	0.4500	0.4500	0.4500	0.000	20.00	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	4.00	8.38	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**6.210**	894.91	32.21	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	0.018	0.00	0.00	0.000	0.000	10.0	0.00	0.00	25.00	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	4.00	8.38	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**5.830**	887.12	32.22	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	0.018	0.00	0.00	0.000	0.000	10.0	0.00	0.00	25.00	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	4.00	8.38	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**5.450**	874.60	32.23	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	0.018	0.00	0.00	0.000	0.000	10.0	0.00	0.00	25.00	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	4.00	8.38	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
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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WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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												
6.590	0.57	0.00	0.57	.6962	0.00409	1.074	10.74	10	0.11	0.211	22.25	7.00
6.210	0.57	0.00	0.57	.6962	0.00388	1.076	10.76	10	0.11	0.212	22.25	7.00
5.830	0.57	0.00	0.57	.6962	0.00624	1.055	10.55	10	0.11	0.204	22.25	7.00
Q1-10 Flow												
6.590	0.36	0.00	0.36	.6962	0.00409	NA	NA	NA	0.10	0.233	21.72	7.00
6.210	0.36	0.00	0.36	.6962	0.00388	NA	NA	NA	0.10	0.234	21.72	7.00
5.830	0.36	0.00	0.36	.6962	0.00624	NA	NA	NA	0.10	0.225	21.72	7.00
Q30-10 Flow												
6.590	0.78	0.00	0.78	.6962	0.00409	NA	NA	NA	0.12	0.194	22.63	7.00
6.210	0.78	0.00	0.78	.6962	0.00388	NA	NA	NA	0.12	0.195	22.63	7.00
5.830	0.78	0.00	0.78	.6962	0.00624	NA	NA	NA	0.12	0.188	22.63	7.00

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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
6.590	Redstone WWTP	8.54	13.02	8.54	13.02	0	0
6.210		NA	NA	8.54	NA	NA	NA
5.830		NA	NA	8.54	NA	NA	NA

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
6.590	Redstone WWTP	1.59	3.35	1.59	3.35	0	0
6.210		NA	NA	1.59	NA	NA	NA
5.830		NA	NA	1.59	NA	NA	NA

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)		
6.59	Redstone WWTP	15.67	15.67	3.35	3.35	4	4	0	0
6.21		NA	NA	NA	NA	NA	NA	NA	NA
5.83		NA	NA	NA	NA	NA	NA	NA	NA

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
6.590	0.450	22.251	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
10.735	1.074	10.000	0.110
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
9.52	0.842	1.84	0.832
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.972	4.506	Tsivoglou	5
Reach Travel Time (days)			
0.211			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.021	9.33	1.81	5.82
0.042	9.15	1.78	5.69
0.063	8.97	1.75	5.58
0.085	8.80	1.72	5.49
0.106	8.62	1.69	5.41
0.127	8.45	1.66	5.35
0.148	8.29	1.63	5.30
0.169	8.13	1.60	5.26
0.190	7.97	1.57	5.23
0.211	7.81	1.55	5.21

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
6.210	0.450	22.251	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
10.759	1.076	10.000	0.109
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
7.81	0.821	1.54	0.832
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.215	4.257	Tsivoglou	5
Reach Travel Time (days)			
0.212			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.021	7.66	1.52	5.19
0.042	7.52	1.49	5.18
0.064	7.37	1.47	5.17
0.085	7.23	1.44	5.17
0.106	7.09	1.41	5.17
0.127	6.96	1.39	5.18
0.149	6.82	1.37	5.19
0.170	6.69	1.34	5.21
0.191	6.57	1.32	5.24
0.212	6.44	1.29	5.26

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
5.830	0.450	22.252	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
10.550	1.055	10.000	0.114
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
6.44	0.796	1.29	0.832
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.262	7.116	Tsivoglou	5
Reach Travel Time (days)			
0.204			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.020	6.32	1.27	5.49
0.041	6.21	1.25	5.68
0.061	6.10	1.23	5.86
0.082	5.99	1.21	6.01
0.102	5.88	1.19	6.15
0.122	5.78	1.17	6.28
0.143	5.68	1.15	6.39
0.163	5.57	1.13	6.49
0.184	5.48	1.11	6.58
0.204	5.38	1.09	6.66

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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)
6.590	Redstone WWTP	PA0205877	0.450	CBOD5	15.67		
				NH3-N	3.35	6.7	
				Dissolved Oxygen			4

Attachment #4-WQM 7.0 Report-Winter for 0.45 MGD

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**6.590**	903.12	32.20	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	0.035	0.00	0.00	0.000	0.000	10.0	0.00	0.00	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Redstone WWTP	PA0205877	0.4500	0.4500	0.4500	0.000	15.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	4.00	12.80	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**6.210**	894.91	32.21	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	0.035	0.00	0.00	0.000	0.000	10.0	0.00	0.00	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	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	4.00	12.80	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**5.830**	887.12	32.22	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	0.035	0.00	0.00	0.000	0.000	10.0	0.00	0.00	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	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	4.00	12.80	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**5.450**	874.60	32.23	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	0.035	0.00	0.00	0.000	0.000	10.0	0.00	0.00	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	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	4.00	12.80	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
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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WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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												
6.590	1.14	0.00	1.14	.6962	0.00409	1.165	11.65	10	0.14	0.172	8.79	7.00
6.210	1.14	0.00	1.14	.6962	0.00388	1.168	11.68	10	0.13	0.172	8.79	7.00
5.830	1.14	0.00	1.14	.6962	0.00624	1.145	11.45	10	0.14	0.166	8.79	7.00
Q1-10 Flow												
6.590	0.73	0.00	0.73	.6962	0.00409	NA	NA	NA	0.12	0.198	9.88	7.00
6.210	0.73	0.00	0.73	.6962	0.00388	NA	NA	NA	0.12	0.199	9.88	7.00
5.830	0.73	0.00	0.73	.6962	0.00624	NA	NA	NA	0.12	0.191	9.88	7.00
Q30-10 Flow												
6.590	1.55	0.00	1.55	.6962	0.00409	NA	NA	NA	0.15	0.153	8.10	7.00
6.210	1.55	0.00	1.55	.6962	0.00388	NA	NA	NA	0.15	0.154	8.10	7.00
5.830	1.55	0.00	1.55	.6962	0.00624	NA	NA	NA	0.16	0.148	8.10	7.00

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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
6.590	Redstone WWTP	20.59	42.16	20.59	42.16	0	0
6.210		NA	NA	20.59	NA	NA	NA
5.830		NA	NA	20.59	NA	NA	NA

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
6.590	Redstone WWTP	4.08	13.17	4.08	13.17	0	0
6.210		NA	NA	4.08	NA	NA	NA
5.830		NA	NA	4.08	NA	NA	NA

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)		
6.59	Redstone WWTP	25	25	13.17	13.17	4	4	0	0
6.21		NA	NA	NA	NA	NA	NA	NA	NA
5.83		NA	NA	NA	NA	NA	NA	NA	NA

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
6.590	0.450	8.792	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
11.650	1.165	10.000	0.135
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
10.72	1.314	4.99	0.295
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
9.463	4.032	Tsivoglou	5
Reach Travel Time (days)			
0.172			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.017	10.58	4.97	9.29
0.034	10.44	4.94	9.12
0.051	10.30	4.92	8.98
0.069	10.16	4.89	8.84
0.086	10.02	4.87	8.72
0.103	9.89	4.84	8.61
0.120	9.76	4.82	8.51
0.137	9.62	4.79	8.41
0.154	9.50	4.77	8.33
0.172	9.37	4.75	8.26

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
6.210	0.450	8.791	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
11.676	1.168	10.000	0.135
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
9.37	1.287	4.75	0.295
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.260	3.809	Tsivoglou	5
Reach Travel Time (days)			
0.172			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.017	9.24	4.72	8.19
0.034	9.12	4.70	8.12
0.052	9.00	4.67	8.06
0.069	8.88	4.65	8.01
0.086	8.77	4.63	7.96
0.103	8.65	4.60	7.92
0.121	8.54	4.58	7.88
0.138	8.42	4.56	7.85
0.155	8.31	4.53	7.83
0.172	8.20	4.51	7.80

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
5.830	0.450	8.790	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
11.449	1.145	10.000	0.140
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
8.20	1.258	4.51	0.295
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.805	6.368	Tsivoglou	5
Reach Travel Time (days)			
0.166			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.017	8.10	4.49	7.94
0.033	8.00	4.46	8.07
0.050	7.90	4.44	8.19
0.066	7.80	4.42	8.29
0.083	7.71	4.40	8.39
0.099	7.61	4.38	8.48
0.116	7.52	4.36	8.57
0.133	7.42	4.34	8.65
0.149	7.33	4.31	8.72
0.166	7.24	4.29	8.78

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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)
6.590	Redstone WWTP	PA0205877	0.450	CBOD5	25		
				NH3-N	13.17	26.34	
				Dissolved Oxygen			4

Attachment #5-WQM 7.0 Report-Summer for 0.60 MGD

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**6.590**	903.12	32.20	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	0.018	0.00	0.00	0.000	0.000	10.0	0.00	0.00	25.00	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
Redstone WWTP	PA0205877	0.0000	0.6000	0.6000	0.000	20.00	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	4.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**6.210**	894.91	32.21	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	0.018	0.00	0.00	0.000	0.000	10.0	0.00	0.00	25.00	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	4.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
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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WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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												
6.590	0.57	0.00	0.57	.9282	0.00409	1.114	11.14	10	0.12	0.192	21.90	7.00
Q1-10 Flow												
6.590	0.36	0.00	0.36	.9282	0.00409	NA	NA	NA	0.11	0.209	21.41	7.00
Q30-10 Flow												
6.590	0.78	0.00	0.78	.9282	0.00409	NA	NA	NA	0.13	0.179	22.28	7.00

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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
6.590	Redstone WWTP	8.73	12.17	8.73	12.17	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
6.590	Redstone WWTP	1.63	2.99	1.63	2.99	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)		
6.59	Redstone WWTP	15.97	15.97	2.99	2.99	4	4	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
6.590	0.600	21.902	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
11.140	1.114	10.000	0.121
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
10.65	0.883	1.85	0.810
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.613	4.910	Tsivoglou	5
Reach Travel Time (days)			
0.192			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.019	10.46	1.82	5.50
0.038	10.27	1.79	5.40
0.058	10.08	1.77	5.32
0.077	9.89	1.74	5.26
0.096	9.71	1.71	5.20
0.115	9.53	1.68	5.16
0.135	9.36	1.66	5.13
0.154	9.19	1.63	5.11
0.173	9.02	1.61	5.09
0.192	8.85	1.58	5.08

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WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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)
6.590	Redstone WWTP	PA0205877	0.000	CBOD5	15.97		
				NH3-N	2.99	5.98	
				Dissolved Oxygen			4

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Attachment #6-WQM 7.0 Report-Winter 0.60 MGD

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**6.590**	903.12	32.20	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	0.036	0.00	0.00	0.000	0.000	10.0	0.00	0.00	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Redstone WWTP	PA0205877	0.0000	0.6000	0.6000	0.000	15.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	4.00	12.51	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
19C	40140	DUNLAP CREEK	**6.210**	894.91	32.21	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	0.036	0.00	0.00	0.000	0.000	10.0	0.00	0.00	5.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

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

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	4.00	12.51	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
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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WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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												
6.590	1.14	0.00	1.14	.9282	0.00409	1.196	11.96	10	0.14	0.160	9.48	7.00
Q1-10 Flow												
6.590	0.73	0.00	0.73	.9282	0.00409	NA	NA	NA	0.13	0.182	10.59	7.00
Q30-10 Flow												
6.590	1.55	0.00	1.55	.9282	0.00409	NA	NA	NA	0.16	0.145	8.74	7.00

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WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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
6.590	Redstone WWTP	19.65	35.14	19.65	35.14	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
6.590	Redstone WWTP	4.08	10.92	4.08	10.92	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)		
6.59	Redstone WWTP	25	25	10.92	10.92	4	4	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
6.590	0.600	9.481	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
11.963	1.196	10.000	0.145
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
12.31	1.356	4.89	0.312
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.696	4.385	Tsivoglou	5
Reach Travel Time (days)			
0.160			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.016	12.14	4.87	8.53
0.032	11.98	4.84	8.39
0.048	11.82	4.82	8.25
0.064	11.66	4.79	8.13
0.080	11.51	4.77	8.03
0.096	11.35	4.75	7.93
0.112	11.20	4.72	7.84
0.128	11.05	4.70	7.76
0.144	10.91	4.68	7.69
0.160	10.76	4.65	7.63

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WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
19C	40140	DUNLAP 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)
6.590	Redstone WWTP	PA0205877	0.000	CBOD5	25		
				NH3-N	10.92	21.84	
				Dissolved Oxygen			4

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Attachment #7 Post-Construction Performance as submitted in WQM Application

Sequencing Batch Reactor
Design Calculations
BOD Removal and Nitrification Process

Redstone Township Sewer Authority
Design to add 1 new SBR to Existing System

Influent Conditions:		**Current**	**Projected**
ADF = Average Daily Flow		450,000 GPD	600,000 GPD
PDWF = Peak Dry Weather Flow		490,500 GPD	654,000 GPD
PWWF = Peak Wet Weather Flow		1,125,000 GPD	1,500,000 GPD
BOD_5 (20^0C)		751 lbs/day	1,001 lbs/day
TSS = Total Suspended Solids		200 mg/l	240 mg/l
NH_3-N		24 mg/l	25 mg/l
Water Temperature		50-70 ^{0}F	50-70 ^{0}F
Ambient Air Temperature		20-90 ^{0}F	20-90 ^{0}F
Site Elevation		932 ft	932 ft
Calculated			
Q = Avg. Dry Weather Flow / Basin		150,000 GPD/basin	150,000 GPD/basin
PDWF = Peak Dry Weather Flow		163,500 GPD/basin	163,500 GPD/basin
PWWF = Peak Wet Weather Flow		375,000 GPD/basin	375,000 GPD/basin
BODin (Converted per avg daily)		250.33 lbs/basin	250.25 lbs/basin
BODin **converted**		199.98 mg/l	199.91 mg/l

Effluent Conditions:		**Current**	**Projected**
$CBOD_5$ (20^0C) **converted**		93.89 lbs/day	125.18 lbs/day
$CBOD_5$ (20^0C)		25.00 mg/l	25.00 mg/l
TSS = Total Suspended Solids	**converted**	112.66 lbs/day	150.22 lbs/day
TSS = Total Suspended Solids		30.00 mg/l	30.00 mg/l
NH_3-N	Nov 1 - Apr 30	7.50 mg/l	7.50 mg/l
	May 1 - Oct 31	2.50 mg/l	2.50 mg/l

Process Design Criteria:		
F/M =	0.062 lb BOD_5/lb MLSS/day	
SVI = (after 60 minutes settling)	150 ml/g	
Number of Basins	3 Each	4 Each
Top Water Level	15.5 Feet	15.5 Feet

Cycle	Aeration	Settle	Decant	Total
Dry	120 min	60 min	60 min	4 hr
Storm	90 min	45 min	45 min	3 hr