pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0239445**
Facility Type	**Municipal**	APS ID	**1000513**
Major / Minor	**Minor**	Authorization ID	**1285751**

Applicant and Facility Information

Applicant Name	**Sugar Grove Area Sewer Authority**	Facility Name	**Sugar Grove Area STP**
Applicant Address	195 Creek Road	Facility Address	Dobson Road
	Sugar Grove, PA 16350-5803		Sugar Grove, PA 16350
Applicant Contact	Randal Brown	Facility Contact	
Applicant Phone	(814) 489-7809	Facility Phone	
Applicant E Mail	sugargrovetownship@yahoo.com	Applicant E Mail	
Client ID	216050	Site ID	627650
Municipality	Sugar Grove Borough	County	Warren
Ch 94 Load Status	Not Overloaded	Connection Status	No Limitations
Application Received	August 13, 2019	EPA Waived?	Yes
Application Accepted	September 11, 2019	If No, Reason	

Purpose of Application: NPDES permit renewal

Summary of Review

No listed open violations.

Minor occasional non-recurring high values have been reported.

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
X		William H Mentzer William H. Mentzer, P.E. Environmental Engineering Specialist	October 22, 2020
X		Justin C. Dickey Justin C. Dickey, P.E. Environmental Engineer Manager	November 9, 2020

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.2
Latitude NHD	41º 59' 7.05"	Longitude NHD	-79º 19' 8.82"
Latitude DP	41º 59' 7.08"	Longitude DP	-79º 19' 8.870"
Quad Name	Sugar Grove	Quad Code	0311

Wastewater Description: Treated municipal sanitary sewer wastewater

Receiving Waters	Stillwater Creek	Stream Code	56422
NHD Com ID	129447492	RMI	13.8600
Drainage Area	12.1	Yield (cfs/mi^2)	0.11
Q_{7-10} Flow (cfs)	1.27	Q_{7-10} Basis	Brokenstraw Creek
Elevation (ft)	1590.36	Slope (ft/ft)	0.00218
Watershed No.	16-B	Chapter 93 Class.	CWF
Existing Use	statewide	Existing Use Qualifier	none
Exceptions to Use	none	Exceptions to Criteria	none

Comments

Assessment Status: Impaired
Cause(s) of Impairment: Siltation
Source(s) of Impairment: Grazing Related Agriculture, Agriculture, Crop Related Agriculture
TMDL Status: pending Name

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

Nearest Downstream Public Water Supply Intake: State of New York

PWS Waters	Stillwater Creek	Flow at Intake (cfs)	1.92
PWS RMI	12.28	Distance from Outfall (mi)	1.76

Changes Since Last Permit Issuance: none

Other Comments: This discharge should not impact any downstream water use

Treatment Facility Summary

Treatment Facility Name: Sugar Grove Area STP

WQM Permit No.	Issuance Date
6208401	April 8, 2009
6208401 A1	November 18, 2010
6203418	October 22, 2008
6203418 A1	July 18, 2005
6203418	December 15, 2004

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary With Ammonia Reduction	Extended Aeration	Hypochlorite	0.2

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.2	316	Not Overloaded	Aerobic Digestion	Landfill

Changes Since Last Permit Issuance: none

Other Comments:

6203418 the application was dated 11/6/2004, revised on 6/28/2004, 8/18/2004, 9/28/2004, and 11/22/2004, and issued 12/15/2004 for 3 pump stations rated at 174, 225, and 450-gpm, 0.2-MGD hydraulic design, 0.2-MGD mean flow and 316-PPD organic load. Included was 6 and 8-inch sewers and 236-grinder pump units. Treatment proposed was: comminutor with bypass bar screen, 54 722-gallon aerated flow equalization tank, two 125,000 gallon aeration tanks, two 32,944-gallon secondary clarifiers, chlorination, 5,656-gallon chlorine contact tank, 1,480-gallon polishing clarifier, dechlorination, post-aeration, flow monitoring, two 46 455-gallon sludge holding tanks and three 2 480 square foot reed beds.

6203418 A1 the application was dated 4/11/05 and issued 7/18.2005 for Pump Station #1 with a 155-gpm design flow and #2 with a 450-gpm design flow. Included is 1500 feet 8 inch diameter and 10 inch diameter sewers and 150000 feet of low pressure sewers. Pump Stations 1 and 2 are replaced by new Pump Station #1 and a new Pump Station #2 has been added.

6203418 the application was dated August 25, 2008 and issued on October 22, 2009 as a revision not labelled as such. This is for a comminutor and bar screen by pass for odor control. Approved was a subsurface 30-ft long by 2-ft wide by 2.5-ft deep French drain system connected by a 4-inch diameter perforated pipe. This is an air pollution control proposal.

6208401 A1 the application was dated July 2010 and issued on November 18, 2010 for a pump station serving 8 EDU (24-gpm duplex). This is referred to a Phase III Pump Station #1.

6208401 for a SuGASA Phase III Wastewater Collection Project, application dated February 10, 2009, revised on March 18, 2009 and April 1, 2009, and issued on April 8, 2009. For a split low pressure collection system with 118 units to SuGASA and 19 units to Brokenstraw Valley (total 137 units).

WQG028304 issued on November 8. 2006 for sewers and pump station serving the Overlook. Design is for 30-grinder pump units (low pressure sewers)

WLMR 2013
Sugar Grove Borough and portion of Sugar Grove Township

Hydraulic Design 2.0 MGD Maximum 0.09 MGD in July
Organic Load 316-PPD Maximum 243-PPD in July
No future additions expected.

Changes:
Main line head of plant diverter removed

Seven certified operators retained.
Weekly influent manual composite sampling provided. This matches the effluent sampling and the proposed NPDES influent monitoring.
Effluent metering is provided.
The collection system is mostly low-pressure sewers.

Duplex Pump Stations with auxiliary power. Four installed with no design or actual flows provided. Maximum pump rates reported

1	P1 230-gpm	P2 234-gpm	155-gpm WQM 6203418 A1
2	P1 544-gpm	P2 540-gpm	450-gpm WQM 6203418 A1
3	P1 68-gpm	P2 66-gpm	450-gpm WQM 6203418
4	P1 23-gpm	P2 23-gpm	24-gpm WQM 6208401 A1

Flow metering is tank capacity and pumping based.

Compliance History

DMR Data for Outfall 001 (from August 1, 2018 to July 31, 2019)

Parameter	JUL-19	JUN-19	MAY-19	APR-19	MAR-19	FEB-19	JAN-19	DEC-18	NOV-18	OCT-18	SEP-18	AUG-18
Flow (MGD) Ave Mon	0.107	0.110	0.086	0.097	0.09	0.105	0.1	0.095	0.111	0.1	**0.086**	0.1
Flow (MGD) Daily Max	0.167	0.234	0.162	0.142	0.175	0.168	0.238	0.153	0.207	0.273	**0.206**	0.175
pH (S.U.) Minimum	6.3	6.4	6.4	6.7	6.9	7.2	6.9	7.1	7.2	7.1	**6.9**	6.8
pH (S.U.) Maximum	7.0	7.2	6.9	7.0	7.4	7.6	7.4	7.5	7.5	7.6	**7.3**	8.5
DO (mg/L) Minimum	6.8	5.0	6.7	8.9	9.3	9.1	8.7	8.7	6.1	6.0	**5.9**	5.9
TRC (mg/L) Ave Mon	0.12	0.13	0.16	0.16	0.07	0.13	0.13	0.14	0.15	0.15	**0.1**	0.15
CBOD5 (PPD) Ave Mo	< 3	8	< 3	< 3	3	5	< 4	< 3	< 4	< 2	**< 3**	< 2
CBOD5 (PPD) Wk Ave	5	19	3	4	5	6	8	3	5	< 4	**< 4**	< 2
CBOD5 (mg/L) Average Monthly	< 3.86	7.75	< 3.57	< 3.69	3.86	5.38	< 4.45	< 3.48	< 4.15	< 3	**< 3.12**	< 3
CBOD5 (mg/L) Weekly Average	5.28	15.3	4.26	4.43	4.44	6.29	8.06	4.62	5.58	< 3	**3.46**	< 3
BOD5 (PPD) Influent Aver Monthly	149	149	117	131	126	136	101	139	113	114	**120**	133
BOD5 (mg/L) Influent Ave Monthly	171	166	154	161	162	163	113.2	177	135.4	150.3	**148**	183
TSS PPD) Ave Mon	5	14	8	9	7	7	9	3	4	< 4	**19**	7
TSS (lbs/day) Influent Ave Monthly	110	114	96	73	78	93	78	60	61	83	**113**	107
TSS (PPD Weekly Ave	6	24	14	10	12	10	21	4	5	9	**58**	10
TSS (mg/L) Average Monthly	5.3	14.5	10.8	10.7	7.9	8.4	11	4	5.2	< 5	**21.2**	9.1
TSS (mg/L) Influent Ave Monthly	128	124	132	88	99	116	89	75	72	82	**130**	148
TSS (mg/L) Weekly Average	5.3	19.2	12.8	13.6	11.6	11.2	29.6	5.2	6.8	7.6	**66**	13.6
Fecal Coliform (#/100 ml) Geomean	< 36	< 219	< 17	< 26	< 34	40	38	518	245	< 54	**< 43**	< 10
Fecal Coliform (#/100 ml) Instant Maximum	315	4721	20	40	82	104	102	4028	7701	3873	**1780**	< 10
Total Nitrogen (mg/L) Average Monthly	48.02	33.52	44.52	35.49	34.74	31.45	30.32	33.32	29.51	32.91	**41.8**	36.97
Ammonia (lbs/day) Average Monthly	< 0.1	< 3.0	< 0.08	< 0.08	0.08	< 0.09	0.09	0.08	< 0.09	0.1	**0.08**	< 0.2
Ammonia (mg/L) Average Monthly	< 0.116	< 3.10	< 0.1	< 0.1	< 0.1	< 0.11	< 0.1	< 0.1	< 0.1	< 0.1	**< 0.1**	< 0.228
Tl Phosphorus (mg/L) Average Monthly	5.0	4.77	5.67	3.56	2.64	3.01	3.11	3.61	3.92	3.36	**3.89**	6.59

Potential high flows in

DMR Data for Outfall 001 (from September 1, 2019 to August 31, 2020)

Parameter	AUG-20	JUL-20	JUN-20	MAY-20	APR-20	MAR-20	FEB-20	JAN-20	DEC-19	NOV-19	OCT-19	SEP-19
Flow (MGD) A Mon	0.111	0.124	0.122	0.140	0.109	0.124	0.104	0.110	0.072	0.063	0.083	0.087
Flow (MGD) D Max	0.143	0.157	0.164	0.99	0.179	0.232	0.179	196	0.177	0.218	0.13	0.123
pH (S.U.) Minimum	6.8	6.8	6.8	6.7	6.9	7.0	6.9	6.7	7.1	7.1	6.9	6.3
pH (S.U.) Maximum	7.5	7.8	7.6	7.1	7.4	7.7	7.6	7.6	7.4	7.4	7.5	7.1
DO (mg/L) Minimum	5.9	6.1	7.2	5.3	8.1	7.6	7.6	6.1	6.7	6.7	6.4	6.3
TRC (mg/L) A Monthly	0.2	0.31	0.23	0.47	0.2	0.15	0.17	0.16	0.11	0.11	0.12	0.12
CBOD5 (lbs/day) Average Monthly	< 4	< 4	< 8	5	6	7	6	< 3	< 5	2	< 3	3
CBOD5 (lbs/day) Weekly Average	4	7	18	7	9	12	11	< 4	10	3	3	4
CBOD5 (mg/L) Average Monthly	< 3.62	< 4.25	< 8.14	5.37	5.91	6.36	7.6	< 3.69	< 5.48	< 5.14	< 3.81	4.04
CBOD5 (mg/L) W Ave	4.16	5.74	17.2	6.32	6.92	8.51	11.1	5.28	10.1	7.8	4.34	5.09
BOD5 (ppd) Influent Average Monthly	225	176	226	176	186	211	130	152	138	99	129	149
BOD5 (mg/L) Influent Average Monthly	230	175	220	193	198	194	161.9	163	161	209	195	201
TSS (ppd) A Monthly	4	6	12	10	12	10	6	6	12	24	11	9
TSS (ppd) Influent Average Monthly	127	154	142	100	103	97	60	85	97	1528	66	129
TSS (ppd) W Average	5	7	16	14	24	28	9	9	18	**76**	17	14
TSS (mg/L) A Monthly	4	5.7	11.4	11.6	10.6	9.1	7.6	6.6	16.8	**52**	16.4	12.6
TSS (mg/L) Influent Average Monthly	129	154	139	107	102	92	73	92	129	3447	96	172
TSS (mg/L) W Ave	6	6.4	15.6	14	16	20	12.8	8.4	27.6	172	23.2	18
Fecal Coliform (#/100 ml) Geometric Mean	14	11	31	< 33	80	37	740	79	< 68	76	< 29	< 86
Fecal Coliform (#/100 ml) Instant Maximum	38.8	23.1	146.6	187	228	86	3256	201	6510	512	63	268
T Nitrogen (mg/L) Average Monthly	48.41	40.89	33.71	40.49	29.34	30.14	25.94	26.22	28	34.18	43.47	47.1
Ammonia (ppd) A Mon	< 0.1	< 2.0	< 2.0	< 0.09	< 0.1	< 0.1	< 0.5	2	< 0.2	0.05	< 0.07	< 0.2
Ammonia (mg/L) Average Monthly	< 0.1	< 1.4	< 1.4	< 0.1	< 0.111	< 0.1	< 0.49	0.603	< 0.215	< 0.1	< 0.1	< 0.255
T Phosphorus (mg/L) Average Monthly	5.83	5	5.0	4.57	4.93	3.77	4.39	3.71	4.41	3.63	5.49	4

Compliance History

Effluent Violations for Outfall 001, from: September 1, 2018 To: July 31, 2019

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
TSS	09/30/18	Wkly Avg	66	mg/L	45	mg/L
Fecal Coliform	06/30/19	Geo Mean	< 219	CFU/100 ml	200	CFU/100 ml
Fecal Coliform	09/30/18	IMAX	1780	CFU/100 ml	1000	CFU/100 ml
Fecal Coliform	06/30/19	IMAX	4721	CFU/100 ml	1000	CFU/100 ml

Effluent Violations for Outfall 001, from: October 1, 2019 To: August 31, 2020

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
TSS	11/30/19	Wkly Avg	76	lbs/day	75	lbs/day
TSS	11/30/19	Avg Mo	52	mg/L	30	mg/L
TSS	11/30/19	Wkly Avg	172	mg/L	45	mg/L

High maximum flows in November

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .2
Latitude 41º 59' 7.08" **Longitude** -79º 19' 8.76"
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)
DO	4.0	Daily Minimum		BPJ

Comments: None

Water Quality-Based Limitations

A Sewerage program based “Reasonable Potential Analysis” determined CBOD5, TSS ammonia, DO and pH cannidates for limitations:

The following limitations were determined through water quality modeling (output files attached):

Parameter		Limit (mg/l)			SBC		Model	
ammonia	summer		6.5	13.0			6.11	12.22
DO		5.0				5.0		

Comments: Ammonia was rounded up to the nearest half milligram.

Anti-Backsliding

There are no backsliding limitations being proposed.

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	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	41.0	65.0	XXX	25.0	40.0	50.0	1/week	8-Hr Composite
TSS	50.0	75.0	XXX	30.0	45.0	60.0	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	XXX	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Ammonia Nov 1 - Apr 30	32	XXX	XXX	19.5	XXX	39.0	1/week	8-Hr Composite
Ammonia May 1 - Oct 31	15.8	XXX	XXX	6.5	XXX	13.0	1/week	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite

Compliance Sampling Location: Outfall 001 after disinfection

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
56422	STILLWATER CREEK	**13.860**	1590.36	12.10	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 (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.110	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.80	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 (ºC)	Disc pH
Sugar Grove	PA0239445	0.2000	0.2000	0.2000	0.000	25.00	7.78

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	0.10	0.00	0.70

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
56422	STILLWATER CREEK	**12.280**	1566.63	18.46	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 (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.110	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.80	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 (ºC)	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
16B	56422	STILLWATER 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 (ºC)	Analysis pH
Q7-10 Flow												
13.860	1.33	0.00	1.33	.3094	0.00284	.56	19.17	34.25	0.15	0.632	20.94	7.80
Q1-10 Flow												
13.860	0.85	0.00	0.85	.3094	0.00284	NA	NA	NA	0.13	0.767	21.33	7.79
Q30-10 Flow												
13.860	1.81	0.00	1.81	.3094	0.00284	NA	NA	NA	0.18	0.547	20.73	7.80

WQM 7.0 Modeling Specifications

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

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
16B	56422	STILLWATER 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
13.860	Sugar Grove	NA	50	3.41	12.54	1	75

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
13.860	Sugar Grove	NA	25	.98	6.11	1	76

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)		
13.86	Sugar Grove	25	25	6.11	6.11	4	4	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
16B	56422	STILLWATER CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
13.860	0.200	20.943	7.796
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
19.172	0.560	34.246	0.153
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
6.34	0.955	1.23	0.753
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.443	4.131	Tsivoglou	5
Reach Travel Time (days)			
0.632			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.063	5.95	1.18	7.06
0.126	5.59	1.12	6.81
0.190	5.25	1.07	6.65
0.253	4.93	1.02	6.57
0.316	4.63	0.97	6.54
0.379	4.34	0.93	6.55
0.442	4.08	0.88	6.59
0.505	3.83	0.84	6.65
0.569	3.60	0.80	6.73
0.632	3.38	0.77	6.81

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
16B	56422	STILLWATER 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)
13.860	Sugar Grove	PA0239445	0.200	CBOD5	25		
				NH3-N	6.11	12.22	
				Dissolved Oxygen			5

Discharger	Sugar Grove MA	Wednesday, October 21, 2020
Site	Sugar Grove STP	Revised Tuesday, November 10, 2020
Municipality	Sugar Grove Borough	
County	Warren	
NPDES Permit	PA0239445	

TRC EVALUATION

Input appropriate values in B4:B8 and E4:E7

1.3310	**= Q stream (cfs)**	**0.5**	**= CV Daily**
0.2000	**= Q discharge (MGD)**	**0.5**	**= CV Hourly**
30	**= no. samples**	**1**	**= AFC_Partial Mix Factor**
0.4	**= 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 = 1.821	**1.3.2.iii**	WLA cfc = 1.779
PENTOXSD TRG	**5.1a**	LTAMULT afc = 0.373	**5.1c**	LTAMULT cfc = 0.581
PENTOXSD TRG	**5.1b**	LTA_afc= 0.679	**5.1d**	LTA_cfc = 1.034

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	LIMIT (mg/l) = 0.500	BAT/BPJ
		X 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)**

(0.011/EXP(-K*CFC_tc/1440))+(((CFC_Yc*Qs*0.011)/(1.547*Qd)....
....*EXP(-K*CFC_tc/1440)))+Xd+(CFC_Yc*Qs*Xs/1.547*Qd))*(1-FOS/100)

Chlorine Required = perennial Chlorine Demand + Chlorine Residual

Stream	Reach/Node		1	1
Stream	Flow	Conditions		perennial
Stream	Code			56422
	Function			
Samples				30
reach	outfall		RMI	13.86
	Reach End		RMI	12.28
reach			feet	8342.4
drainage			sq miles	12.1
TRC	limitation	average	mg/L	0.500
		maximum	mg/L	1.635
elevation		modelled	feet	1590.36
elevation		modelled	feet	1566.63
slope		modelled	foot/foot	0.003
low flow			cfs/sq mi	0.110
discharge			mgd	0.2000
Runoff	Period		hours	24.000

BAT is adequate

stream	flow		cfs	1.33100
stream	flow		MGD	0.860248
stream	flow	total	MGD	1.060248
stream	chlorine	demand	mg/L	0.4
discharge	discharge	demand	mg/L	
stream	Total Stream/Waste		ratio	5.3

permitted	TRC	mean	BAT	0.5
permitted	TRC	maximum	BAT	1.6
		AFC	WLA	**PA0239445**

Model Set-Up

				G	H	I	J	K	L	M	N
Reach	Number			1	2	3	4	6	6	7	8
Stream	Name			Stillwater							
Stream	Code			56422							
Stream	Function			Outfall							
Stream	Flow	Condition		perennial							
Stream	Reach	Start	miles	13.86							
Stream	Elevation	Start	feet	1590.36							
Stream	Reach			End				miles			12.28
Stream	Elevation			End				feet			1566.63
Stream	Discharge			Drainage			sq		miles		12.1
Stream	Basin			Yield				cfs			0.1100
Public Water	Supply			Name					New		York
Public Water	Supply			Downstream				miles			1.76
Public Water	Supply Location miles	12.28									

Stream Flow

	References	Reserve %	Drainage sq mi		low flow cfs	yield cfs/sq mi	yield MGD		period period
low flow	Stillwater		100		11	0.110	0.071095		
					18				1940-72
	yield					0.11	0.071095		
	yield	75				0.0275	0.017774		

Low Flow Estimate

	Reserve %	Drainage Sq mile	Drainage Sq mile	low flow cfs	yield cfs/sq mi	MGD
	NA				0.11	
	NA				0.11	
Total Area	NA	0	0	NA	0.11	

Adjusted Low Flow Estimate

	Reserve %	Drainage Sq mile	Drainage Sq mile	low flow cfs	yield cfs/sq mi	MGD
	25					
	25					
Total Area at main stem	25	0				

													median		average		tss/bod
Parameter	**June**	**May**	**April**	**March**	**February**	**January**	**December**	**November**	**October**	**September**	**August**	**July**	**annually**	**summer**	**annually**	**summer**	
Flow (MGD)																	
Flow (MGD)																	
pH (S.U.)	6.4	6.4	6.7	6.9	7.2	6.9	7.1	7.2	7.1	6.9	6.8	6.3	7.05	6.95	7.08	7.13	
	2511886	2511886	5011872	7943282	15848932	7943282	12589254	15848932	12589254	7943282	6309573	1995262	11,294,627	8971641.17	26,253,046	60404751.21	
pH (S.U.)	7.2	6.9	7	7.4	7.6	7.4	7.5	7.5	7.6	7.3	8.5	7	7.05	6.95	7.42	7.78	
	15848932	7943282	10000000	25118864	39810717	25118864	31622777	31622777	39810717	19952623	316227766	10000000					
DO (mg/L)																	
TRC (mg/L)																	
TRC (mg/L)																	
CBOD5 (mg/L)													#NUM!	#NUM!	#DIV/0!		#NUM!
TSS (mg/L)													#NUM!	#NUM!	#DIV/0!		
Fecal Coliform (#/100 ml)																	
Fecal Coliform (#/100 ml)																	
Total Nitrogen (mg/L)																	
Ammonia (mg/L)													#NUM!	#NUM!	#DIV/0!		
Total Phosphorus (mg/L)																	

Parameter	**19-Jul**	**19-Jun**	**19-May**	**19-Apr**	**19-Mar**	**19-Feb**	**19-Jan**	**18-Dec**	**18-Nov**	**18-Oct**	**18-Sep**	**18-Aug**
Flow (MGD) Ave Mon	0.107	0.11	0.086	0.097	0.09	0.105	0.1	0.095	0.111	0.1	**0.086**	0.1
Flow (MGD) Daily Max	0.167	0.234	0.162	0.142	0.175	0.168	0.238	0.153	0.207	0.273	**0.206**	0.175
pH (S.U.) Minimum	6.3	6.4	6.4	6.7	6.9	7.2	6.9	7.1	7.2	7.1	**6.9**	6.8
pH (S.U.) Maximum	7	7.2	6.9	7	7.4	7.6	7.4	7.5	7.5	7.6	**7.3**	8.5

Back Calculations

Secondary Waters

Parameter	Symbol	Equation					
Downstream Concentration	C_0		3.45	3.45		3.45	3.45
Nitrogen decay factor	k_n		0.70	0.70		0.70	0.70
Reach Travel Time	T_t		0.33	0.33		0.33	0.33
exponential factor	e		**2.72**	**2.72**		**2.72**	2.72
Upstream Concentration 1	C_t	$C_0e^{(k_n*T_t)}$	4.33	4.33		4.33	4.33
Upstream Concentration 2	C_t	$C_0e^{(k_n*T_t)}$	4.33	4.33		4.33	4.33
Downstream check 1	C_0	$C_t/e^{(k_n*T_t)}$	3.45	3.45		3.45	3.45
Downstream check 2	C_0	$C_t/e^{(k_n*T_t)}$	3.45	3.45		3.45	3.45

Input data is from WQM 7 report; The default nitrogen decay factor is 0.7

First Upstream Node

Downstream Concentration	C_0		4.33	4.33		4.33	4.33
Nitrogen decay factor	k_n		0.70	0.70		0.70	0.70
Reach Travel Time	T_t		0.00	0.00		0.00	
exponential factor	e		**2.72**	**2.72**		**2.72**	**2.72**
Upstream Concentration 1	C_t	$C_0e^{(k_n*T_t)}$	4.33	4.33		4.33	4.33
Upstream Concentration 2			4.33	4.33		4.33	4.33
Downstream check 1	C_0	$C_t/e^{(k_n*T_t)}$	4.33	4.33		4.33	4.33
Downstream check 2			4.33	4.33		4.33	4.33

Second Upstream Node

Downstream Concentration	C_0		4.33	4.33		4.33	4.33
Nitrogen decay factor	k_n		0.70	0.70		0.70	0.70
Reach Travel Time	T_t		0.00	0.00		0.00	
exponential factor	e		**2.72**	**2.72**		**2.72**	**2.72**
Upstream Concentration 1	C_t	$C_0e^{(k_n*T_t)}$	4.33	4.33		4.33	4.33
Upstream Concentration 2			4.33	4.33		4.33	4.33
Downstream check 1	C_0	$C_t/e^{(k_n*T_t)}$	4.33	4.33		4.33	4.33
Downstream check 2			4.33	4.33		4.33	4.33

Third Upstream Node

Downstream Concentration	C_0		4.33	4.33		4.33	4.33
Nitrogen decay factor	k_n		0.00	0.00		0.00	
Reach Travel Time	T_t		0.00	0.00		0.00	
exponential factor	e		**2.72**	**2.72**		**2.72**	**2.72**
Upstream Concentration 1	C_t	$C_0e^{(k_n*T_t)}$	4.33	4.33		4.33	4.33
Upstream Concentration 2			4.33	4.33		4.33	4.33
Downstream check 1	C_0	$C_t/e^{(k_n*T_t)}$	4.33	4.33		4.33	4.33
Downstream check 2			4.33	4.33		4.33	4.33

Summary

	ammonia	summer	4.0	8.5		4.0	8.5
		winter	12.0	25.0		12.0	25.0
	Multipiers	winter	**3.0**			**3.0**	
		maximum	**2.0**			**2.0**	

Ammonia Limitations

	downstream	kn	travel time	e Factor	30 day average	1 day maximum	notes pH
summer				2.7182818	0.00	0.00	7.74
winter	0	NA	NA	2.718282	0.00	0.00	
summer				2.718282	0.00	0.00	7.4
winter	0	NA	NA	2.718282	0.00	0.00	
summer				2.718282	0.00	0.00	6.82
winter	0	NA	NA	2.718282	0.00	0.00	
summer		0.7	0.33	2.7182818	0.00	0.00	7.74
winter	0	0.7	0.33	2.718282	0.00	0.00	
summer		0.7	0.33	2.718282	0.00	0.00	7.4
winter	0	0.7	0.33	2.718282	0.00	0.00	
summer		0.7	0.33	2.718282	0.00	0.00	6.82
winter	0	0.7	0.33	2.718282	0.00	0.00	