pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0020893**
Facility Type	**Municipal**	APS ID	**18317**
Major / Minor	**Major**	Authorization ID	**937210**

Applicant and Facility Information

Applicant Name	**Manheim Area Water and Sewer Authority**	Facility Name	**Manheim STP**
Applicant Address	18 E High Street	Facility Address	Rettew Lane
	Manheim, PA 17545-1506		Manheim, PA 17545
Applicant Contact	Terry Shaffer	Facility Contact	Terry Shaffer
Applicant Phone	(717) 665-2737	Facility Phone	(717) 665-2737
Client ID	317228	Site ID	451759
Ch 94 Load Status	Not Overloaded	Municipality	Manheim Borough
Connection Status	No Limitations	County	Lancaster
Date Application Received	August 2, 2012	EPA Waived?	No
Date Application Accepted	August 10, 2012	If No, Reason	Major Facility, Significant CB Discharge

Purpose of Application: NPDES Renewal.

Summary of Review

Manheim Area Water and Sewer Authority (MAWSA) has applied to the Pennsylvania Department of Environmental Protection (DEP) for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit. The permit was issued on January 17, 2008 and became effective on February 1, 2008. The permit authorized discharge of treated sewage from the existing wastewater treatment plant (WWTP) located in Manheim Borough, Lancaster County into Chiques Creek. The existing permit expiration date was January 31, 2013, and the permit has been administratively extended since that time. A draft permit was last issued on September 26, 2013. As a considerable time has passed since then, this permit is being re-drafted.
Changes in this renewal: More stringent $CBOD_5$ and NH_3-N limits were added to the permit. Total Copper and Total Iron monitoring were added. Chesapeake Bay offsets have been listed separately from the Cap Load. TDS, Sulfate, Chloride, and Bromide monitoring was added. A more stringent TRC limit with compliance schedule was added to the permit. Fecal Coliform IMAX limits were added. Chronic WET testing limits were added.

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		Benjamin Lockwood Benjamin R. Lockwood / Environmental Engineering Specialist	August 6, 2020
		Daniel W. Martin, P.E. / Environmental Engineer Manager	
		Maria D. Bebenek, P.E. / Program Manager	

Summary of Review
Supplemental information is attached to this fact sheet.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	2.3
Latitude	40º 9' 9.6"	Longitude	76º 24' 16.3"
Quad Name	Manheim	Quad Code	1734
Wastewater Description:	Sewage Effluent		
Receiving Waters	Chiques Creek (WWF, MF)	Stream Code	07919
NHD Com ID	57462741	RMI	19.1
Drainage Area	36.2 mi^2	Yield (cfs/mi^2)	0.12
Q_{7-10} Flow (cfs)	4.34	Q_{7-10} Basis	USGS Gage #01576500
Elevation (ft)	379	Slope (ft/ft)	
Watershed No.	7-G	Chapter 93 Class.	WWF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Siltation, Siltation, Pathogens		
Source(s) of Impairment	Agriculture, Urban Runoff/Storm Sewers, Source Unknown		
TMDL Status	N/A	Name	N/A
Nearest Downstream Public Water Supply Intake	Columbia Borough		
PWS Waters	Susquehanna River	Flow at Intake (cfs)	
PWS RMI	42.8	Distance from Outfall (mi)	21

Changes Since Last Permit Issuance: A drainage area of 36.2 mi^2 and a Q_{7-10} flow of 4.34 cubic feet per second (cfs) were determined by establishing a correlation to the yield of USGS Gage Station #01576500 on the Conestoga River. The Q_{7-10} and drainage area at the gage are 38.6 cfs and 324 mi^2, respectively. These values are taken from the USGS document "Selected Streamflow Statistics for Streamgage Locations in and near Pennsylvania". The Q_{7-10} runoff rate at the gage station was calculated as follows:

Yield = (38.6 cfs)/ 324 mi^2 = 0.12 cfs/mi^2

The drainage area at the discharge point, taken from USGS PA StreamStats = 36.2 mi^2

The Q_{7-10} at the discharge point = 36.2 mi^2 x 0.12 cfs/mi^2 = 4.34 cfs

Other Comments: None

Treatment Facility Summary				
Treatment Facility Name: Manheim STP				
WQM Permit No.	**Issuance Date**			
3608408	2/20/2009			
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage	Secondary With Total Nitrogen Reduction	Oxidation Ditch	Gas Chlorine	2.3
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
2.3	6253	Not Overloaded	Combination	Combination of methods

Changes Since Last Permit Issuance: A new influent mechanical screen was installed.

Other Comments: A BNR facility upgrade was completed in 2011. The treatment process is as follows: Influent wet well/screening – 2 oxidation ditches – 4 secondary clarifiers – 2 chlorine contact tanks – 3 facultative digesters – 1 belt filter press – 1 sludge storage pad - Outfall 001 to Chiques Creek.

Compliance History	
Summary of DMRs:	A summary of the past 12-month DMR effluent data is presented on the next page of this fact sheet.
Summary of Inspections:	4/3/2013: An inspection was conducted by Heather Dock, DEP Water Quality Specialist to discuss the operation of the sludge digesters. A walkthrough of the treatment plant was conducted. One of the return lines on a clarifier had clogged overnight causing a plant upset. The return line was now operable. Heather returned on 4/4/2013 for a follow up inspection. The clarifiers were producing slightly cloudy effluent. The chlorine contact tank was producing slightly cloudy effluent, but the quality improved during the inspection. The chlorine contact tank effluent had a yellow tint with floating solids, and met field test parameters. Heather recommend that septage/hauled-in wastes not be accepted until the plant recovered from the upset, and during future upset. She also recommended solids be removed from the stream. 4/8/2013: A follow up inspection was conducted by Heather Dock. The oxidation ditch appeared to be operating as designed. The effluent appeared clear from both operating clarifiers. The chlorine contact tank on the right was producing a clear effluent. The other tank had a layer of scum. The stream discharge appeared clear. The stream had been cleaned, and a light dusting of solids remained. Hauled-in waste/septage was not being received that day. The plant appeared to be running well. 9/5/2013: A routine inspection was conducted by Heather Dock. It was noted that a new rotomat system was put online in July, consisting of a rotating screen and bar screen. A grab sample was collected from the chlorine contact tank, the effluent appeared clear and met field test parameters. 2/24/2014: Andrew Hall responded to an incident regarding a discharge of sludge solids to a stormwater inlet. Waste activated sludge (WAS) was discharging from an access lid on top of the sludge pump pit. WAS flowed to the stormwater inlet adjacent to the clarifiers. A stream of solids was present for approximately 100’ at Outfall 004. At the time of inspection, no surface waters were impacted. The discharge was caused by failure of the WAS valve for clarifier #3. Lime was added to the affected area. 4/29/2014: A routine inspection was conducted by Andrew Hall. Since the last inspection, Manheim had switched to liquid polymer and replaced the WAS valve. 2 of the 4 pumps at the influent wet well were running. A spray of utility water was added, as a crust was forming. 3 of the 4 clarifiers were operating. Light pinfloc was present, but the effluent was clear. Samples were taken at the effluent flume of the operating chlorine contact tank. The effluent looked clear. The outfall was inspected, and the stream was clear up and downstream. The effluent pipe is under construction due to a split in the pipe. 1/21/2015: A routine inspection was conducted by Bob Haines. An effluent grab sample was collected at the chlorine contact tank. The effluent was clear. The field test results were within the permitted range. The outfall area was clear. Most treatment units were online at the time of inspection. The overall treatment appeared to be good based on recent process control information, field test results and visual observation. The mixed liquor in the aeration tanks was medium brown in color with no foam and good floc formation. Settling in the clarifiers appeared to be good overall with some pin floc present. The plant appeared to be well maintained overall. During the inspection, the effluent composite sampler was not able to collect samples due to a blocked drain-back line. The issue was corrected. 9/23/2015: A routine inspection was conducted by Andrew Hall. A plant walkthrough revealed no concerns. Small pockets of light foam were present on the oxidation ditch. The clarifier effluent was clear, with some duckweed and light scum on the surface in both

	clarifiers. The chlorine contact tank had some bulking sludge present at the front end of the tank as well as light surface scum. The effluent was clear at Outfall 001, and no downstream water quality concerns were observed. 1/13/2016: An inspection was conducted by Sheena Ripple. The stormwater outfalls were checked. There was not any evidence of an overflow. The discharge from Outfall 001 was clear, and solids were not seen near the outfall. A walkthrough of the treatment units was conducted, and there was no evidence of a sewer overflow. 7/28/2016: A routine inspection was conducted by Sheena Ripple. The original clarifier, bio filter, and two clarifiers were offline. The forward flow pump for the oxidation ditch is being rebuilt. No other issues were noted. 3/6/2017: An incident inspection was conducted by Kevin Buss. The gate actuator for the oxidation ditch failed, which dropped the gate approximately 10" and caused a mixed liquor overflow at 2 clarifier splitter boxes. The gate was being ratcheted back into position during the inspection. The paths of the overflows were traced, and there was no apparent discharge to Chiques Creek. Lime had been applied to some areas impacted by the overflow; additional lime was recommended. 3/28/2017: A Notice of Violation (NOV) was issued as a follow-up to the March 6, 2017 investigation, and requested a full report of Manheim's investigation into the discharge of partially treated sewage. 5/4/2017: A routine inspection was conducted by Kevin Buss. All treatment units were operating normally. There were light accumulations of foam in the oxidation ditches. The clarifiers had mostly clear supernatant, with some pin floc. No other issues were noted. 7/18/2018: A routine inspection was conducted by Kevin Buss. Field samples were taken, and results were within the permitted limits. A new mixer in the anoxic chamber 2 will be operational in 4-6 weeks. Utility water VFDs had been installed. A new actuators weir, thrust bearing on 210, influent effluent flow meter, sampler, and mixer influent chamber have been installed. No other issues were noted. 12/7/2018: A routine inspection was conducted by Tracy Tomtishen. A walkthrough of the facility was conducted. A layer of grease and floatables was visible in the wet well. The clarifiers had a small amount of pin floc with no surface scum. Very little surface scum was present on the chlorine contact tanks. Field and lab samples were collected. Field results were within permitted limits. The stormwater outfalls were observed, and no concerns were noted. The outfalls were well maintained. 7/3/2019: An incident inspection was conducted by Tracy Tomtishen. A sanitary sewer overflow was reported on 7/2. The SSO was a result of a monitoring well installation. The well installation had been installed 2-3 weeks prior. During the drilling for the well installation, an 8" sewer pipe was clipped. The overflow traveled approximately 15' through a small forested area. Hay bales had been put into place to prevent additional runoff. Hydrated lime had been added to areas impacted. A report was received on 7/8 which confirmed that repairs had been completed. 1/3/2020: An incident inspection was conducted by Tracy Tomtishen in response to a sewage overflow on 1/2. The overflow was the result of a malfunction of the shutoff mechanism with the grit removal system at the septage receiving station. Lime application was visible on the ground surface. Solids and/or debris were not visible. Haybales were still present to contain the spill. The overflow did not appear to have entered any waterways. A temporary fix had been put in place within the grit removal system. 1/23/2020: A routine inspection was conducted by Tracy Tomtishen. Upon arrival, STP personnel were repairing a water main break. A site visit was conducted. Released water

	entered stormwater drains and discharged to a nearby field. Sheet flow dispersed and did not enter the stream. The facility inspection began with a site walkthrough. A layer of grease and floatables was visible in the wet well. The clarifiers had light ashing and some solids accumulation in the center well. Clarifier #3 was offline during inspection due to a gear box failure and paint repairs. Field results were collected, and were within permitted limits. The stormwater outfalls were observed, and no concerns were noted. The outfalls were well maintained. 4/30/2020: An administrative inspection was conducted to determine the current status of operations. All treatment units are operable, and no treatment units other than clarifier #3 have been offline since the last inspection. No emergency conditions have been experienced. No other issues were noted.

Other Comments: There are currently no open violations associated with the permittee or the facility.

Compliance History

DMR Data for Outfall 001 (from July 1, 2019 to June 30, 2020)

Parameter	JUN-20	MAY-20	APR-20	MAR-20	FEB-20	JAN-20	DEC-19	NOV-19	OCT-19	SEP-19	AUG-19	JUL-19
Flow (MGD) Average Monthly	0.6199	1.601	1.0658	0.794	0.8978	0.9209	0.9	0.9091	0.7139	0.587163	0.663	0.8703
Flow (MGD) Daily Maximum	0.875	2.8717	2.8189	1.6252	1.3015	2.2451	1.1031	1.9747	1.8561	0.8423	1.0867	1.8912
pH (S.U.) Minimum	7.27	7.34	7.31	7.38	7.38	7.37	7.41	7.46	7.52	7.48	7.39	7.26
pH (S.U.) Maximum	7.87	7.77	7.77	7.88	7.74	7.98	7.74	7.8	7.87	7.8	7.76	7.79
DO (mg/L) Minimum	7.15	7.9	8.48	8.86	8.99	9.17	9.38	8.27	5.93	7.38	6.4	6.69
TRC (mg/L) Average Monthly	0.24	0.28	0.26	0.30	0.30	0.31	0.32	0.29	0.33	0.31	0.27	0.15
TRC (mg/L) Instantaneous Maximum	0.41	0.4	0.51	0.3	1.02	0.63	0.65	0.46	0.59	0.53	0.53	0.41
CBOD5 (lbs/day) Average Monthly	< 21	39	34	< 24	< 19	< 15	< 22	< 16	< 15	< 14	< 18	< 29
CBOD5 (lbs/day) Weekly Average	38	63	59	27	24	< 20	< 35	< 20	< 23	< 15	< 22	41
CBOD5 (mg/L) Average Monthly	< 4	4	4	< 3	< 2	< 2	< 3	< 2	< 2	< 3	< 3	< 3
CBOD5 (mg/L) Weekly Average	6	7	5	4	3	< 2	3	2	< 3	3	< 4	4
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	2100	2126	2911	4069	4381	1227	1688	2422	2829	1209	1154	2280
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	5658	2805	6472	15482	10929	2635	4282	6639	5404	1963	2136	5250
BOD5 (mg/L) Raw Sewage Influent Average Monthly	254	187	233	455	413	139	168	286	396	180	139	212
TSS (lbs/day) Average Monthly	< 12	33	< 26	22	< 17	< 17	< 14	< 25	19	< 15	< 24	65

TSS (lbs/day) Raw Sewage Influent Average Monthly	1664	1194	1556	2209	5181	944	1105	2554	3351	1729	1706	2114
TSS (lbs/day) Raw Sewage Influent Daily Maximum	2837	2238	2414	3696	21226	3061	2798	7402	6655	3587	3760	3065
TSS (lbs/day) Weekly Average	15	68	60	24	< 22	20	< 23	51	42	19	34	111
TSS (mg/L) Average Monthly	< 2	3	< 3	3	< 2	< 2	< 2	< 3	2	< 3	< 4	7
TSS (mg/L) Raw Sewage Influent Average Monthly	201	108	129	233	512	108	106	296	465	265	225	205
TSS (mg/L) Weekly Average	3	5	6	4	< 3	4	< 4	6	3	4	6	12
Fecal Coliform (CFU/100 ml) Geometric Mean	< 6	13	13	< 15	< 7	< 10	10	23	< 11	< 12	< 56	270
Nitrate-Nitrite (mg/L) Average Monthly	0.54	0.44	< 0.28	0.36	0.24	0.16	0.32	< 0.52	0.37	0.67	< 0.71	0.68
Nitrate-Nitrite (lbs) Total Monthly	91	120	< 101	70	56	37	79	< 115	91	106	< 135	170
Total Nitrogen (mg/L) Average Monthly	1.25	1.21	< 1.09	1.45	1.04	< 0.79	1.12	< 1.14	1.28	< 1.6	< 2.29	2.21
Total Nitrogen (lbs) Effluent Net Total Monthly	212	306	< 381	284	232	< 177	275	247	284	< 246	< 440	604
Total Nitrogen (lbs) Total Monthly	212	306	< 381	284	232	< 177	275	< 247	284	< 246	< 440	604
Total Nitrogen (lbs) Effluent Net Total Annual										< 10088		
Total Nitrogen (lbs) Total Annual										< 10088		
Ammonia (lbs/day) Average Monthly	< 0.8	< 1	< 1	< 2	< 0.8	< 0.9	< 1	< 0.8	< 0.7	< 0.5	< 0.6	< 0.8
Ammonia (mg/L) Average Monthly	< 0.15	< 0.14	< 0.1	< 0.28	< 0.1	< 0.12	< 0.12	< 0.1	< 0.1	< 0.1	< 0.11	< 0.1
Ammonia (lbs) Total Monthly	< 25	< 42	< 33	< 64	< 23	< 28	< 32	< 23	< 21	< 16	< 20	< 25
Ammonia (lbs) Total Annual										< 2222		

TKN (mg/L) Average Monthly	0.72	0.77	< 0.81	1.08	0.79	< 0.63	0.81	< 0.62	0.91	< 0.93	1.58	1.53
TKN (lbs) Total Monthly	122	187	< 280	214	176	< 140	196	< 132	192	< 140	304	433
Total Phosphorus (lbs/day) Average Monthly	4	1	1	1	1	1	1	2	3	6	10	7
Total Phosphorus (mg/L) Average Monthly	0.82	0.14	0.12	0.16	0.14	0.13	< 0.13	0.3	0.52	1.11	1.63	0.86
Total Phosphorus (lbs) Effluent Net Total Monthly	123	40	37	34	32	30	33	69	89	179	314	220
Total Phosphorus (lbs) Total Monthly	123	40	37	34	32	30	< 33	69	89	179	314	220
Total Phosphorus (lbs) Effluent Net Total Annual										< 1639		
Total Phosphorus (lbs) Total Annual										< 1639		

Existing Effluent Limitations and Monitoring Requirements

The tables below summarize the effluent limits and monitoring requirements implemented in the existing NPDES permit.

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
Influent (BOD_5 and TSS)	Report	Report Daily Max	XXX	Report	XXX	XXX	2/week	24-Hr Composite
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.46	XXX	1.5	1/day	Grab
TSS	285	428	XXX	30	45	60	2/week	24-Hr Composite
$CBOD_5$	238	380	XXX	25	40	50	2/week	24-Hr Composite
Ammonia May 1 - Oct 31	38	XXX	XXX	4.0	XXX	8.0	2/week	24-Hr Composite
Ammonia Nov 1 - Apr 30	114	XXX	XXX	12	XXX	24	2/week	24-Hr Composite
Total Phosphorus	19	XXX	XXX	2.0	XXX	4.0	2/week	24-Hr Composite
Fecal Coliform (5/1 to 9/30)	XXX	XXX	XXX	200	XXX	XXX	2/week	Grab
Fecal Coliform (10/1 to 4/30)	XXX	XXX	XXX	2,000	XXX	XXX	2/week	Grab

Parameter	Effluent Limitations					Monitoring Requirements	
	Mass Units (lbs)		Concentrations (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Monthly	Annual	Minimum	Monthly Average	Maximum		
Ammonia-N	Report	Report	XXX	Report	XXX	2/week	24-Hr Composite
Kjeldahl-N	Report	XXX	XXX	Report	XXX	1/week	24-Hr Composite
Nitrate-Nitrogen as N	Report	XXX	XXX	Report	XXX	1/week	24-Hr Composite
Total Nitrogen	Report	Report	XXX	Report	XXX	1/month	Calculate
Total Phosphorus	Report	Report	XXX	Report	XXX	2/week	24-Hr Composite
Net Total Nitrogen	Report	21,847	XXX	XXX	XXX	1/month	Calculate
Net Total Phosphorus	Report	2,776	XXX	XXX	XXX	1/month	Calculate

Compliance Sampling Location: At discharge from facility

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 2.3
Latitude 40º 9' 9.6" **Longitude** 76º 24' 16.3"
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)

Water Quality-Based Limitations

$CBOD_5$, NH_3-N

Pursuant to 40 CFR § 122.44(d)(1)(i), more stringent requirements should be considered when pollutants are discharged at the levels which have the reasonable potential to cause or contribute to excursions above water quality standards.

WQM 7.0 ver. 1.0b is a water quality model designed to assist DEP in determining appropriate water quality based effluent limits (WQBELs) for carbonaceous biochemical oxygen demand ($CBOD_5$), ammonia (NH_3-N), and dissolved oxygen (D.O.). DEP's Technical Guidance No. 391-2000-007 provides the technical methods contained in WQM 7.0 for determining wasteload allocations and for determining recommended NPDES effluent limits for point source discharges. The model was utilized for this permit application.

The flow data used to run the model was acquired from USGS PA StreamStats and USGS Gage # 01576500 on the Conestoga River, and is included in the attachment. Stream pH and temperature inputs for this model run were based on data acquired from the National Water Quality Monitoring Council website. Data was analyzed from the Water Quality Network (WQN) Station ID 206 on Chiques Creek from October 1998 to March 2019 for pH, and from October 1998 to October 2017 for temperature. DEP's Standard Operating Procedure (SOP) No. BPNPSM-PMT-033 (Establishing Effluent Limitations for Individual Sewage Permits) recommends using the 90th percentile of long-term data for background and discharge characteristics when using WQM 7.0. A 90th percentile analysis was performed on the data and resulted in a Stream pH of 8.3 and a Stream Temperature of 21°C.The model output indicated a $CBOD_5$ average monthly limit of 16.28 mg/l, an NH_3-N average monthly limit of 2.59 mg/l, and a D.O. minimum limit of 5.0 mg/l were protective of water quality. These limits were rounded in accordance with DEP's Guidance 362-0400-001 "Technical Guidance for the Development and Specification of Effluent Limitations" to a $CBOD_5$ average monthly limit of 16 mg/l, and an NH_3-N average monthly limit of 2.5 mg/l. These limits are more stringent than the existing limits, and will be included in the permit. These limits are more stringent as a result of the increase of design flow from 1.14 mgd to 2.3 mgd. A review of the past year DMR data shows the facility will be capable of meeting these limits.

Toxics

Effluent sample results for toxic pollutants reported on the renewal application were entered into DEP's Toxics Screening Analysis worksheet and PENTOXSD to develop appropriate permit requirements for toxic pollutants of concern. Based on effluent sample results reported on the application, Total Copper and Total Iron are candidates for PENTOXSD modeling as these pollutants are discharged at levels that have the reasonable potential to cause excursions above the state water quality criteria. A stream hardness value of 250.9 mg/l was used in modeling. This value was based off a 90th percentile analysis of the stream hardness data from the WQN Station ID 206 from October 1998 to March 2019. A discharge hardness of 295 mg/l was used in modeling. The resulting WQBEL from PENTOXSD for Total Copper was 42.463 µg/l and for Total Iron was 3329.628. When the WQBELs produced from PENTOXSD were entered into the Toxics Screening Analysis, the worksheet recommended monitoring for Total Copper and Total Iron. This data was analyzed based on the guidelines found in DEP's Water Quality Toxics Management Strategy (Document No. 361-0100-003) and DEP's SOP No. BPNPSM-PMT-033. PENTOXSD Model Results are attached to this fact sheet. The Toxics Screening Analysis uses the following logic:

a. Establish average monthly and instantaneous maximum (IMAX) limits in the draft permit where the maximum reported concentration exceeds 50% of the WQBEL.
b. For non-conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL.
c. For conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 10%-50% of the WQBEL.

Since the reported maximum concentrations for Total Copper and Total Iron were greater than 10% of its respective WQBEL, per DEP's SOP No. BPNPSM-PMT-033, monitoring will be required for these parameters. Accordingly, Total Copper and Total Iron monitoring requirements will be added to the permit.

Best Professional Judgement (BPJ) Limitations

Dissolved Oxygen
A minimum D.O. limit of 5.0 mg/L is a D.O. water quality criterion found in 25 Pa. Code § 93.7(a). This limit is included in the existing NPDES permit based BPJ. It is still recommended to include this limit in the draft permit to ensure that the facility continues to achieve compliance with DEP water quality standards.

Total Phosphorus
For Total Phosphorus (TP), the current NPDES permit requires the permittee to comply with average monthly and IMAX limits of 2.0 mg/L and 4.0 mg/L, respectively. These existing limits will remain unchanged in the permit to protect the local watershed. The most recent year of DMR data indicate an average phosphorus concentration of 0.51 mg/l, which is below the average monthly limit.

Additional Considerations

Chesapeake Bay Total Maximum Daily Load (TMDL)

DEP developed a strategy to comply with the EPA and Chesapeake Bay Foundation requirements by reducing point source loadings of Total Nitrogen (TN) and Total Phosphorus (TP). This strategy can be located in the Pennsylvania Chesapeake Watershed Implementation Plan (WIP), dated January 11, 2011. Subsequently, an update to the WIP was published as the Phase 2 WIP. As part of the Phase 2 WIP, a *Phase 2 Watershed Implementation Plan Wastewater Supplement* (Phase 2 Supplement) was developed, providing an update on TMDL implementation for point sources and DEP's current implementation strategy for wastewater. A new update to the WIP was published as the Phase 3 WIP in August 2019. As part of the Phase 3 WIP, a *Phase 3 Watershed Implementation Plan Wastewater Supplement* (Phase 3 Supplement) was developed, and was most recently revised on December 17, 2019, and is the basis for the development of any Chesapeake Bay related permit parameters. Sewage discharges have been prioritized based on their design flow to the Bay. The highest priority (Phases 1, 2, and 3) dischargers will receive annual Cap Loads based on their design flow on August 29, 2005 and concentrations of 6 mg/l TN and 0.8 mg/l TP. These limits may be achieved through a combination of treatment technology, credits, or offsets. For Phase 4 and 5 facilities, Cap Loads are not currently being implemented for renewed or amended permits for facilities that do not increase design flow.

Manheim WWTP is a Phase 1 significant discharger. The facility's waste load allocation (WLA) is tracked under an individual WLA as a significant discharger in the Phase 3 Supplement. The following Cap Loads specified in the current Phase 3 Supplement will be included in the draft permit:

NPDES Permit No.	Phase	Facility	Latest Permit Issuance Date	Permit Expiration Date	Cap Load Compliance Start Date	TN Cap Load (lbs/yr)	TN Offsets Included in Cap Load (lbs/yr)	TP Cap Load (lbs/yr)	TN Delivery Ratio	TP Delivery Ratio
PA0002893	1	Manheim Borough Authority	1/17/2008	1/31/2013	10/1/2011	21,847	1,025	2,776	0.97	0.436

These Cap Loads were based on the previous design flow of 1.14 mgd with a TN concentration of 6.0 mg/l and TP concentration of 0.8 mg/l. The Phase 3 Supplement states that "the minimum monitoring frequency for TN species and TP in new or renewed NPDES permits for significant sewage dischargers will be 2/week." Therefore, the monitoring frequency for TN species and TP is being increased to 2/week. DEP'S SOP New and Reissuance Sewage Individual NPDES Permit Applications states that 24-hour composite sampling is recommended as a minimum for Chesapeake Bay sewage discharger nutrient requirements. This sample type will be included in the permit for all nutrient parameters.

The Phase 3 Supplement states that "the minimum monitoring frequency for TN species and TP in new or renewed NPDES permits for significant sewage dischargers will be 2/week." Therefore, the monitoring frequency for TN species and TP is being increased to 2/week. DEP no longer offers any tools to calculate monthly loads for Net TN and Net TP, and it is no longer needed since offsets and credits are applied annually. Therefore, this reporting requirement is no longer needed and will be removed from the permit.

The previous permit included a list of 41 on-lot disposal systems (OLDS) which were permitted/installed prior to January 1, 2003 and were retired by connection to the collection system after January 1, 2003. Based on the Chesapeake Bay Strategy, the offset load was calculated at 25 lbs TN/year, which increased the CAP Load by 1,025 lbs/year. In the existing permit, the 1,025 lbs/year offset was included as a mass load effluent limitation for net total nitrogen. The Phase 3 Supplement states that from this point forward, permits will be issued with the wasteload allocations (WLAs) as cap loads and will identify offsets separately to facilitate nutrient trading activities and compliance with the TMDL. Therefore, the proposed effluent limits will contain a net total nitrogen limit of 20,822 lbs/year, to reflect the Cap Loads required by the WIP Supplement.

Additionally, MAWSA has requested offsets for the receipt of septage. The Phase 3 Supplement states the facility may have "Receipt of hauled-in septage at the permittee's facility from residential sources within the municipal Act 537 planning area. Three pounds (3 lbs) of TN Offsets per year may be approved per 1,000 gallons of septage accepted and processed at the facility. Offsets may be approved for the acceptance of residential septage only. For the purpose of these Offsets, septage is defined as material removed from a septic tank by pumping. No other hauled-in wastes, including but not limited to holding tank wastes, solids and sludges generated at other facilities, may be approved. Such approved Offsets may only be applied in the Compliance Year in which the septage was accepted, and are not cumulative. This information will be included in the NPDES permit.

Chiques Creek Alternate Restoration Plan

This facility discharges to Chiques Creek. Chiques Creek was included on Pennsylvania's 1996 303(d) List of Impaired Waters due to nutrient impairments. A Total Maximum Daily Load (TMDL) for the Chiques Creek Watershed was approved by the United States Environmental Protection Agency (EPA) on April 9, 2001. Due to several deficiencies within the TMDL, it was withdrawn with approval from EPA on October 28, 2015. DEP, Susquehanna River Basin Commission (SRBC) and watershed stakeholders have been in the process of developing a large scale monitoring and restoration plan. The goal of this Alternate Restoration Plan (ARP) is to address impacts to the Chiques Creek Watershed due to suspended solids/siltation and nutrient pollution. During the ongoing ARP development, this discharge permit will be renewed to conform with existing guidance. This permit will include a Total Phosphorus (TP) limit of 2.0 mg/l. The TP limit of 2.0 mg/l is derived from 25 Pa. Code § 96.5(c). This section states that "when it is determined that the discharge of phosphorus, alone or in combination with the discharge of other pollutants, contributes or threatens to impair existing or designated uses in a free flowing surface water, phosphorus discharges from point source discharges shall be limited to an average monthly concentration of 2 mg/l." This is consistent with existing limits for other dischargers to the Chiques Creek Watershed. This limit is included in the existing permit, and will remain in the renewal. A continued evaluation of dischargers to Chiques Creek will be performed as described in the NPDES Part C Conditions.

Total Dissolved Solids (TDS)

Total Dissolved Solids and its major constituents including Bromide, Chloride, and Sulfate have become statewide pollutants of concern and threats to DEP's mission to prevent violations of water quality standards. The requirement to monitor these pollutants must be considered under the criteria specified in 25 Pa. Code § 95.10 and the following January 23, 2014 DEP Central Office Directive:

For point source discharges and upon issuance or reissuance of an individual NPDES permit:

- Where the concentration of TDS in the discharge exceeds 1,000 mg/L, or the net TDS load from a discharge exceeds 20,000 lbs/day, and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for TDS, sulfate, chloride, and bromide. Discharges of 0.1 MGD or less should monitor and report for TDS, sulfate, chloride, and bromide if the concentration of TDS in the discharge exceeds 5,000 mg/L.

- Where the concentration of bromide in a discharge exceeds 1 mg/L and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for bromide. Discharges of 0.1 MGD or less should monitor and report for bromide if the concentration of bromide in the discharge exceeds 10 mg/L.

- Where the concentration of 1,4-dioxane (CAS 123-91-1) in a discharge exceeds 10 µg/l and the discharge flow exceeds 0.1 mgd, Part A of the permit should include monitor and report for 1,4-dioxane. Discharges of 0.1 mgd or less should monitor and report for 1,4-dioxane if the concentration of 1,4-dioxane in the discharge exceeds 100 µg/l.

Manheim WWTP reported the maximum effluent TDS concentration of 671 mg/l. Based upon the data provided in the application, monitoring will be necessary for TDS, sulfate, chloride, and bromide. A monitoring frequency of 1/month will be used for these parameters.

Total Residual Chlorine

The attached computer printout utilizes the equations and calculations as presented in the Department's May 1, 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID No. 391-2000-015) for developing chlorine limitations. The Guidance references Chapter 92, Section 92.2d (3) which establishes a standard BAT limit of 0.5 mg/l unless a facility-specific BAT has been developed. The attached printout indicates that a water quality limit of 0.18 mg/l would be needed to prevent toxicity concerns. It is recommended that a TRC limit of 0.18 mg/l monthly average and 0.61 mg/l instantaneous maximum be applied this permit cycle. These limits are more stringent than the existing permit, and based on the past year of DMR data, the facility is not capable of meeting them. A compliance schedule has been included in the permit for TRC.

Compliance Schedule

A compliance schedule is necessary to meet the TRC limit. The following conditions will be incorporated into Part C of the NPDES permit:

1. If the permittee decides to conduct site-specific studies, the permittee shall notify DEP in writing within 60 days of permit issuance and submit the study results within 18 months of permit issuance.

2. If DEP agrees that, as a result of the studies, modifications to the WQBELs for TRC are appropriate, DEP will prepare and issue a draft permit amendment to the permittee, publish notice of the draft permit in the Pennsylvania Bulletin, and following the comment period issue a final permit amendment. DEP may also amend the schedule to achieve compliance with final TRC limits in the permit amendment.

3. If the permittee decides not to conduct site-specific studies, the permittee shall achieve compliance with the final TRC limits thirty six months (three years) following the permit effective date.

Optional Site-Specific Data Collection

If the permittee elects to evaluate chlorine demand concentrations, the study shall be performed in accordance with DEP's guidance, "Implementation Guidance Total Residual Chlorine (TRC) Regulation" (DEP ID 391-2000-015), Appendix B, or subsequent guidance published by DEP. In developing the final WQBELs for TRC, DEP has assumed in-stream and discharge chlorine demands of 0.3 mg/l and 0 mg/l, respectively.

Fecal Coliform

PA Code § 92a.47.(a)(4) requires a monthly average limit of 200/100 mL as a geometric mean and an instantaneous maximum limit not greater than 1,000/100 mL from May through September for fecal coliform. PA Code § 92a.47.(a)(5) requires a monthly average limit of 2,000/100 mL as a geometric mean and an instantaneous maximum limit not greater than 10,000/100 mL from October through April for fecal coliform. The instantaneous maximum fecal coliform limits have been included in the permit.

Sampling Frequency & Sample Type

The monitoring requirements were established based on the Best Professional Judgment (BPJ), Table 6-3, and/or Table 6-4 of DEP's Technical Guidance No. 362-0400-001.

Flow Monitoring

Flow monitoring is recommended by DEP's technical guidance and is also required by 25 PA Code §§ 92a.27 and 92a.61.

Influent BOD_5 and Total Suspended Solids (TSS) Monitoring

As a result of negotiation with US EPA, influent monitoring of TSS and BOD_5 are required for any publicly owned treatment works (POTWs); therefore, influent sampling of BOD_5 and TSS will remain in the permit. A 24-hr composite sample type will be required to be consistent with the existing sampling frequency for effluent TSS and $CBOD_5$.

Anti-Degradation

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

303(d) Listed Streams

The discharge is located on a stream segment that is designated on the 303(d) list as impaired. There is a recreational impairment due to pathogens from an unknown source. There is an aquatic life impairment due to siltation from agriculture and urban runoff/storm sewers.

Class A Wild Trout Fisheries

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

Anti-Backsliding

Pursuant to 40 CFR § 122.44(l)(1), all proposed permit requirements addressed in this fact sheet are at least as stringent as the requirements implemented in the existing NPDES permit unless any exceptions addressed by DEP in this fact sheet.

Whole Effluent Toxicity (WET)

For Outfall 001, ☐ **Acute** ☒ **Chronic** WET Testing was completed:

☒ For the permit renewal application (4 tests).
☐ Quarterly throughout the permit term.
☐ Quarterly throughout the permit term and a TIE/TRE was conducted.
☐ Other:

The dilution series used for the tests was: 100%, 63%, 39.7%, 25%, and 15.8%. The Target Instream Waste Concentration (TIWC) to be used for analysis of the results is: 39.7.

Summary of Four Most Recent Test Results

(NOTE – Enter results into one table, depending on which data analysis method was used).

NOEC/LC50 Data Analysis

Test Date	*Ceriodaphnia* Results (% Effluent)			*Pimephales* Results (% Effluent)			Pass? *
	NOEC Survival	NOEC Reproduction	LC50	NOEC Survival	NOEC Growth	LC50	
3/26/12 – 3/30/12	100	100	>100	100	100	>100	Yes
5/30/12 – 6/4/12	100	100	>100	100	100	>100	Yes
8/13-17 2012	63	100	>100	100	100	>100	Yes
11/5/12 – 11/9/12	15.8	15.8	19.9	39.7	39.7	49.8	No

***** *A "passing" result is that which is greater than or equal to the TIWC value.*

Is there reasonable potential for an excursion above water quality standards based on the results of these tests? (*NOTE – In general, reasonable potential is determined anytime there is at least one test failure in the previous four tests).*

☒ **YES** ☐ **NO**

Comments: *Ceriodaphnia dubia* test failures

Evaluation of Test Type, IWC and Dilution Series for Renewed Permit

Acute Partial Mix Factor (PMFa): **0.675** Chronic Partial Mix Factor (PMFc): **1**

1. Determine IWC – Acute (IWCa):

$(Q_d \times 1.547) / ((Q_{7\text{-}10} \times PMFa) + (Q_d \times 1.547))$

[(2.3 MGD x 1.547) / ((4.34 cfs x 0.675) + (2.3 MGD x 1.547))] x 100 = **54.8%**

Is IWCa < 1%? ☐ **YES** ☒ **NO** **(YES - Acute Tests Required OR NO - Chronic Tests Required)**

If the discharge is to the tidal portion of the Delaware River, indicate how the type of test was determined:

N/A

Type of Test for Permit Renewal: **Chronic**

2a. Determine Target IWCa (If Acute Tests Required)

TIWCa = IWCa / 0.3 = **%**

2b. Determine Target IWCc (If Chronic Tests Required)

$(Q_d \times 1.547) / (Q_{7\text{-}10} \times PMFc) + (Q_d \times 1.547)$

[(2.3 MGD x 1.547) / ((4.34 cfs x 1) + (2.3 MGD x 1.547))] x 100 = **45.1%**

3. Determine Dilution Series

(NOTE – check Attachment C of WET SOP for dilution series based on TIWCa or TIWCc, whichever applies).

Dilution Series = 100%, 73%, 45%, 23%, and 11%.

WET Limits

Has reasonable potential been determined? ☒ YES ☐ NO

Will WET limits be established in the permit? ☒ YES ☐ NO

If WET limits will be established, identify the species and the limit values for the permit (TU).

Ceriodaphnia dubia failed all end points in test #4 and a limit of 2.2 (1/0.45) is required. Testing is required for both species starting with quarterly WET testing upon permit renewal.

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 3 years from permit issuance.

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	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.46	XXX	1.5	1/day	Grab
CBOD5	306	460	XXX	16	24	32	2/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/week	24-Hr Composite
TSS	575	863	XXX	30	45	60	2/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Fecal Coliform (CFU/100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2,000 Geo Mean	XXX	10,000	2/week	Grab
Fecal Coliform (CFU/100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1,000	2/week	Grab
Ammonia Nov 1 - Apr 30	143	XXX	XXX	7.5	XXX	15	2/week	24-Hr Composite
Ammonia May 1 - Oct 31	47	XXX	XXX	2.5	XXX	5.0	2/week	24-Hr Composite
Total Phosphorus	38	XXX	XXX	2.0	XXX	4.0	2/week	24-Hr Composite
Total Copper	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2)	Required
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum	Measurement Frequency	Sample Type
Total Iron	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
TDS	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Sulfate	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Chloride	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Bromide	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Chronic WET - Ceriodaphnia Survival (TUc)	XXX	XXX	XXX	XXX	2.2 Daily Max	XXX	See Permit	24-Hr Composite
Chronic WET - Ceriodaphnia Reproduction (TUc)	XXX	XXX	XXX	XXX	2.2 Daily Max	XXX	See Permit	24-Hr Composite

Compliance Sampling Location: Outfall 001

Other Comments: None

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: 3 years from permit issuance 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	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.18	XXX	0.61	1/day	Grab
CBOD5	306	460	XXX	16	24	32	2/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/week	24-Hr Composite
TSS	575	863	XXX	30	45	60	2/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Fecal Coliform (CFU/100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2,000 Geo Mean	XXX	10,000	2/week	Grab
Fecal Coliform (CFU/100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1,000	2/week	Grab
Ammonia Nov 1 - Apr 30	143	XXX	XXX	7.5	XXX	15	2/week	24-Hr Composite
Ammonia May 1 - Oct 31	47	XXX	XXX	2.5	XXX	5.0	2/week	24-Hr Composite
Total Phosphorus	38	XXX	XXX	2.0	XXX	4.0	2/week	24-Hr Composite

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Total Copper	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Iron	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
TDS	XXX	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Sulfate	XXX	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Chloride	XXX	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Bromide	XXX	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Chronic WET - Ceriodaphnia Survival (TUc)	XXX	XXX	XXX	XXX	2.2 Daily Max	XXX	See Permit	24-Hr Composite
Chronic WET - Ceriodaphnia Reproduction (TUc)	XXX	XXX	XXX	XXX	2.2 Daily Max	XXX	See Permit	24-Hr Composite

Compliance Sampling Location: Outfall 001

Other Comments: None

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, to comply with Pennsylvania's Chesapeake Bay Tributary Strategy.

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

Parameter	Effluent Limitations					Monitoring Requirements	
	Mass Units (lbs)		Concentrations (mg/L)			Minimum Measurement Frequency	Required Sample Type
	Monthly	Annual	Minimum	Monthly Average	Maximum		
Ammonia--N	Report	Report	XXX	Report	XXX	2/week	24-Hr Composite
Kjeldahl--N	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Nitrite-Nitrate as N	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Total Nitrogen	Report	Report	XXX	Report	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	2/week	24-Hr Composite
Net Total Nitrogen	XXX	20,822	XXX	XXX	XXX	1/month	Calculation
Net Total Phosphorus	XXX	2,776	XXX	XXX	XXX	1/month	Calculation

Compliance Sampling Location: Outfall 001

Other Comments: On-lot disposal system offsets are 1,025 lbs/year based on 41 OLDs. Any additional offsets claimed during the permit term must be reported as outlined in PART C of this permit.

Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment)
☒	PENTOXSD for Windows Model (see Attachment)
☒	TRC Model Spreadsheet (see Attachment)
☐	Temperature Model Spreadsheet (see Attachment)
☒	Toxics Screening Analysis Spreadsheet (see Attachment)
☐	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☒	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
☐	Pennsylvania CSO Policy, 385-2000-011, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
☒	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
☐	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
☒	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
☒	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
☐	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999.
☐	Design Stream Flows, 391-2000-023, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☐	SOP:
☐	Other:

Enter report title:

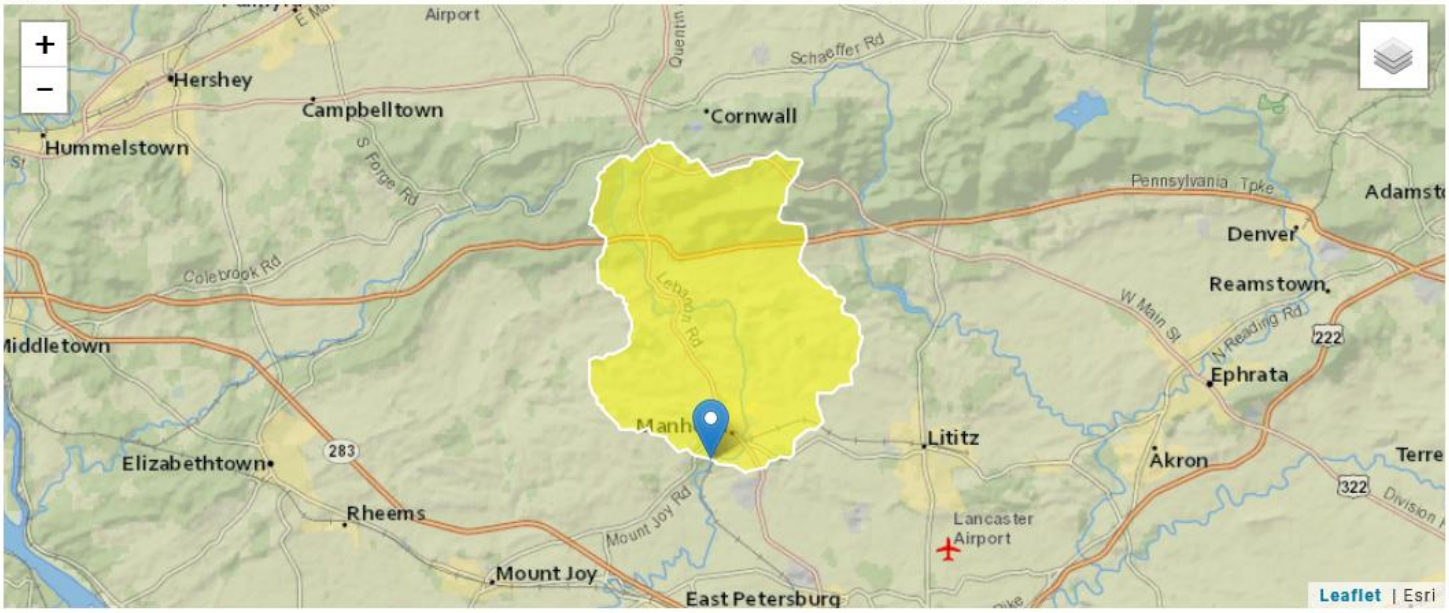
Manheim Borough Authority Outfall 001

Enter comments:

Some comments here

Manheim Borough Authority Outfall 001

Region ID:	PA
Workspace ID:	PA20200602152716138000
Clicked Point (Latitude, Longitude):	40.15260, -76.40466
Time:	2020-06-02 11:27:33 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	36.2	square miles
BSLOPD	Mean basin slope measured in degrees	4.5	degrees
ROCKDEP	Depth to rock	4	feet
URBAN	Percentage of basin with urban development	6	percent

Low-Flow Statistics Parameters[100 Percent (36.1 square miles) Low Flow Region 1]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	36.2	square miles	4.78	1150
BSLOPD	Mean Basin Slope degrees	4.5	degrees	1.7	6.4
ROCKDEP	Depth to Rock	4	feet	4.13	5.21
URBAN	Percent Urban	6	percent	0	89

Low-Flow Statistics Disclaimers[100 Percent (36.1 square miles) Low Flow Region 1]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report[100 Percent (36.1 square miles) Low Flow Region 1]

Statistic	Value	Unit
7 Day 2 Year Low Flow	3.74	ft^3/s
30 Day 2 Year Low Flow	5.34	ft^3/s
7 Day 10 Year Low Flow	1.59	ft^3/s
30 Day 10 Year Low Flow	2.36	ft^3/s
90 Day 10 Year Low Flow	4.07	ft^3/s

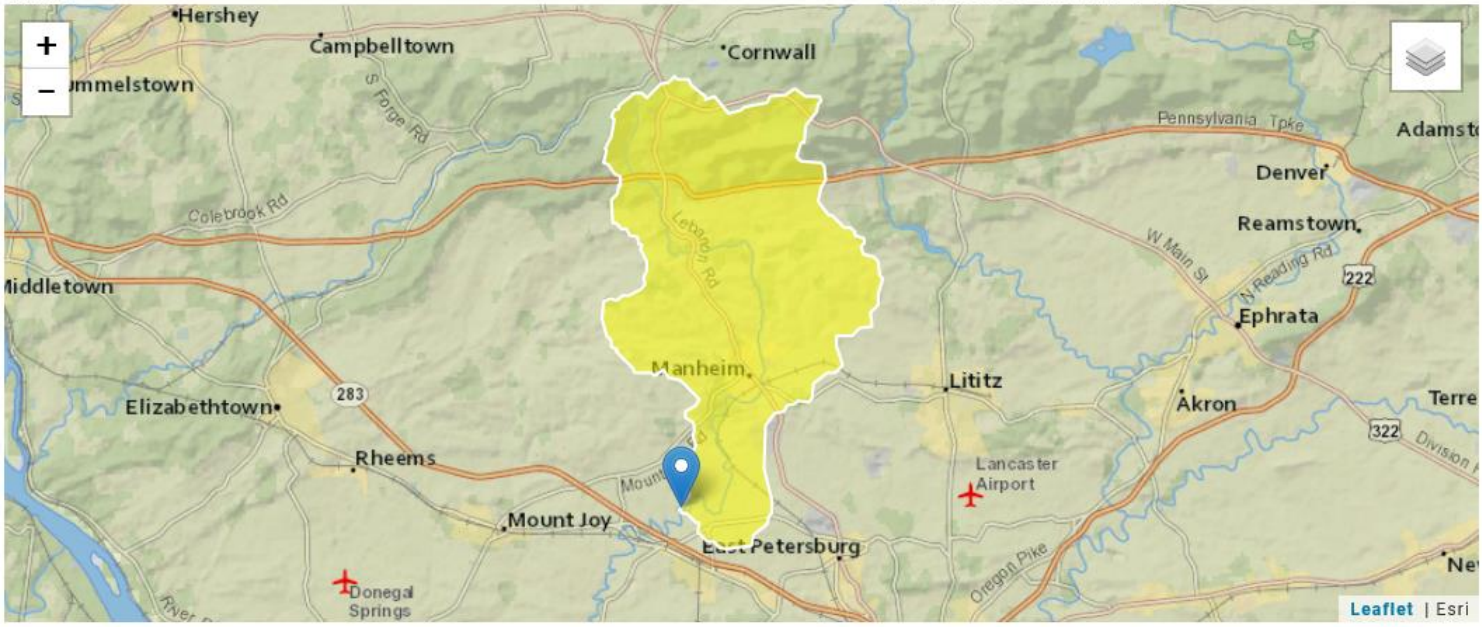
Manheim Borough Authority Downstream Point

Enter comments:

Some comments here

Manheim Borough Authority Downstream Point

Region ID:	PA
Workspace ID:	PA20200805150723042000
Clicked Point (Latitude, Longitude):	40.11713, -76.42526
Time:	2020-08-05 11:07:44 -0400



Basin Characteristics

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	41.9	square miles
BSLOPD	Mean basin slope measured in degrees	4.2	degrees
ROCKDEP	Depth to rock	4.2	feet
URBAN	Percentage of basin with urban development	6	percent

Low-Flow Statistics Parameters[100 Percent (41.8 square miles) Low Flow Region 1]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	41.9	square miles	4.78	1150
BSLOPD	Mean Basin Slope degrees	4.2	degrees	1.7	6.4
ROCKDEP	Depth to Rock	4.2	feet	4.13	5.21
URBAN	Percent Urban	6	percent	0	89

Low-Flow Statistics Flow Report[100 Percent (41.8 square miles) Low Flow Region 1]

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

Statistic	Value	Unit	SE	SEp
7 Day 2 Year Low Flow	4.9	ft^3/s	46	46
30 Day 2 Year Low Flow	6.89	ft^3/s	38	38
7 Day 10 Year Low Flow	2.14	ft^3/s	51	51
30 Day 10 Year Low Flow	3.1	ft^3/s	46	46
90 Day 10 Year Low Flow	5.34	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.

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
07G	7919	CHICKIES CREEK	19.100	379.00	36.20	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	0.100	0.00	4.34	0.000	0.000	0.0	0.00	0.00	20.00	7.00	21.00	8.30
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
Manheim STP	PA0020893	2.3000	2.3000	2.3000	0.000	25.00	7.00

Parameter Data

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

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
07G	7919	CHICKIES CREEK	13.960	349.00	41.90	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	5.03	0.000	0.000	0.0	0.00	0.00	20.00	7.00	21.00	8.30
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	0.00	7.00

Parameter Data

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

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
07G	7919	CHICKIES CREEK

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
19.100	4.34	0.00	4.34	3.5581	0.00111	.728	40.51	55.63	0.27	1.173	22.80	7.32
Q1-10 Flow												
19.100	2.78	0.00	2.78	3.5581	0.00111	NA	NA	NA	0.24	1.327	23.25	7.23
Q30-10 Flow												
19.100	5.90	0.00	5.90	3.5581	0.00111	NA	NA	NA	0.30	1.060	22.50	7.39

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		

Wednesday, August 5, 2020 Version 1.0b Page 1 of 1

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
07G	7919	CHICKIES CREEK

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
19.100	Manheim STP	6.32	11.25	6.32	11.25	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
19.100	Manheim STP	1.28	3.39	1.28	3.39	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)		
19.10	Manheim STP	15.64	15.64	3.39	3.39	5	5	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07G	7919	CHICKIES CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
19.100	2.300	22.802	7.321
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
40.509	0.728	55.626	0.268
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
8.14	0.721	1.53	0.868
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.782	3.005	Tsivoglou	5
Reach Travel Time (days)			
1.173			

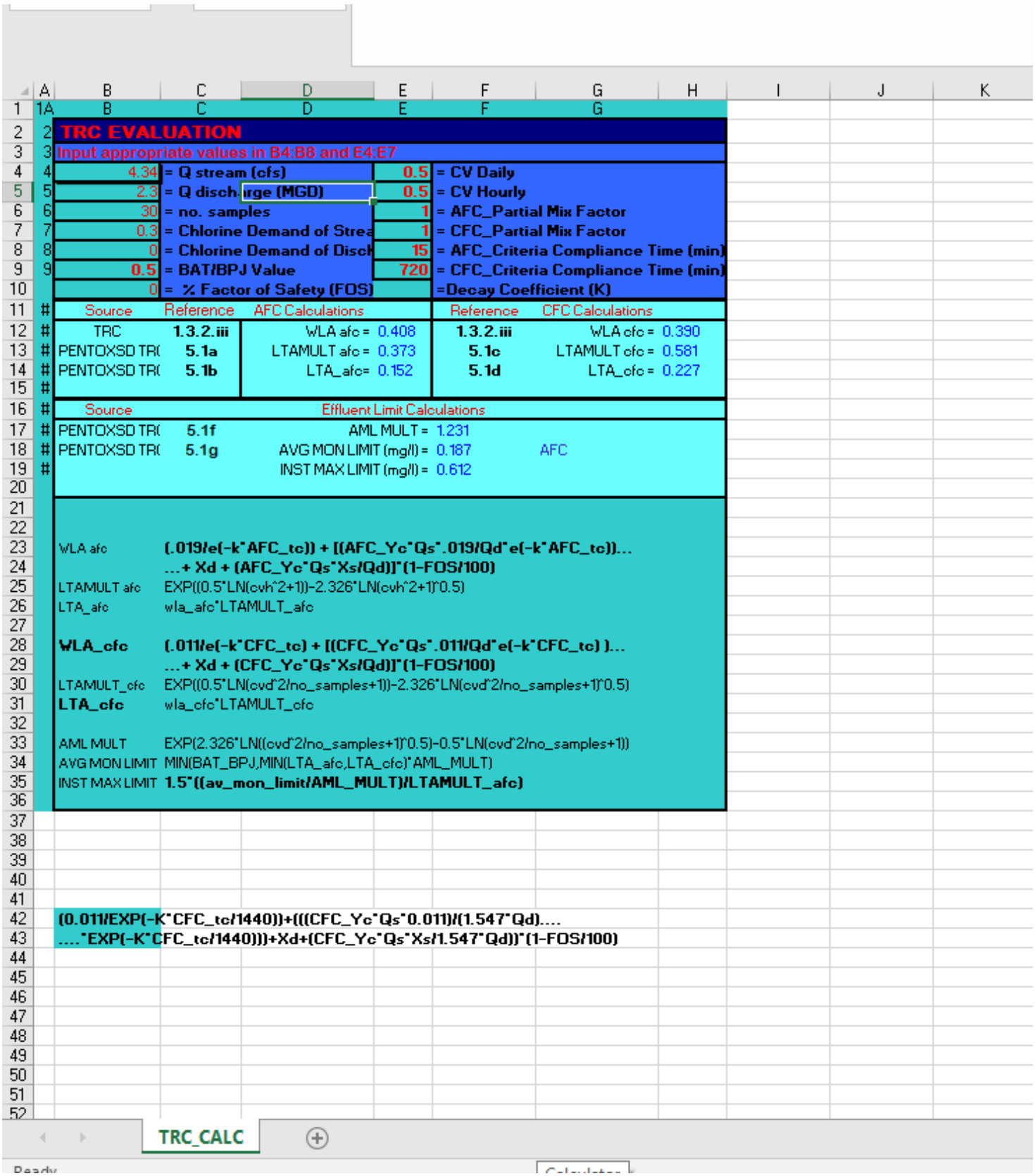
Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.117	7.40	1.38	5.84
0.235	6.72	1.25	5.32
0.352	6.10	1.13	5.09
0.469	5.54	1.02	5.04
0.587	5.04	0.92	5.11
0.704	4.57	0.83	5.25
0.821	4.15	0.75	5.44
0.939	3.77	0.68	5.65
1.056	3.43	0.61	5.87
1.173	3.11	0.55	6.09

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
07G	7919	CHICKIES CREEK

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
19.100	Manheim STP	PA0020893	2.300	CBOD5	15.64		
				NH3-N	3.39	6.78	
				Dissolved Oxygen			5



TRC EVALUATION

Input appropriate values in B4:B8 and E4:E7

4.34	= Q stream (cfs)	0.5	= CV Daily
2.3	= Q disch. rge (MGD)	0.5	= CV Hourly
30	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Strea	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Disch	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 =	0.408	1.3.2.iii	WLA cfc =	0.390
#	PENTOXSD TR(	5.1a	LTAMULT afc =	0.373	5.1c	LTAMULT cfc =	0.581
#	PENTOXSD TR(	5.1b	LTA_afc=	0.152	5.1d	LTA_cfc =	0.227

#	Source	Effluent Limit Calculations		
#	PENTOXSD TR(5.1f	AML MULT =	1.231	
#	PENTOXSD TR(5.1g	AVG MON LIMIT (mg/l) =	0.187	AFC
#		INST MAX LIMIT (mg/l) =	0.612	

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)

TRC_CALC

TOXICS SCREENING ANALYSIS
WATER QUALITY POLLUTANTS OF CONCERN
VERSION 2.6

CLEAR FORM

Facility: **Manheim Borough Authority** NPDES Permit No.: **PA0020893** Outfall: **001**
Analysis Hardness (mg/L): **275** Discharge Flow (MGD): **2.3** Analysis pH (SU): **7.618**
Stream Flow, Q_{7-10} (cfs): **4.34**

	Parameter		Maximum Concentration in Application or DMRs (µg/L)	Most Stringent Criterion (µg/L)	Candidate for PENTOXSD Modeling?	Most Stringent WQBEL (µg/L)	Screening Recommendation
Group 1	Total Dissolved Solids		671000	500000	Yes		
	Chloride			250000			
	Bromide			N/A			
	Sulfate			250000			
	Fluoride			2000			
Group 2	Total Aluminum		150	750	No		
	Total Antimony			5.6			
	Total Arsenic			10			
	Total Barium		20	2400	No		
	Total Beryllium			N/A			
	Total Boron		240	1600	No		
	Total Cadmium			0.278			
	Total Chromium			N/A			
	Hexavalent Chromium			10.4			
	Total Cobalt			19			
	Total Copper		12	9.6	Yes	42.463	Monitor
	Total Cyanide			N/A			
	Total Iron		940	1500	Yes	3329.628	Monitor
	Dissolved Iron		68	300	No		
	Total Lead			3.3			
	Total Manganese		15	1000	No		
	Total Mercury			0.05			
	Total Molybdenum			N/A			
	Total Nickel			53.7			
	Total Phenols (Phenolics)			5			
	Total Selenium			5.0			
	Total Silver			4.0			
	Total Thallium			0.24			
	Total Zinc		51	123.4	No		
	Acrolein	<		3			
	Acrylamide	<		0.07			
	Acrylonitrile	<		0.051			
	Benzene	<		1.2			
	Bromoform	<		4.3			
	Carbon Tetrachloride	<		0.23			
	Chlorobenzene	<		130			

Instructions | Major Sewage | Industrial | Other Discharges | Reference

PENTOXSD

Modeling Input Data

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
7919	19.10	379.00	36.20	0.00000	0.00	☑

Stream Data

	LFY	Trib Flow	Stream Flow	WD Ratio	Rch Width	Rch Depth	Rch Velocity	Rch Trav Time	Tributary Hard	Tributary pH	Stream Hard	Stream pH	Analysis Hard	Analysis pH
	(cfsm)	(cfs)	(cfs)		(ft)	(ft)	(fps)	(days)	(mg/L)		(mg/L)		(mg/L)	
Q7-10	0.1	0	4.34	0	0	0	0	0	100	7	250.9	8.3	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard (mg/L)	Disc pH
Manheim STP	PA002089	2.3	2.3	2.3	0	0	0	0	0	295	7.4

Parameter Data

Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Steam Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)
COPPER	100	0	0.5	0.5	0	0	0	0	1	0
TOTAL IRON	4000	0	0.5	0.5	0	0	0	0	1	0

Stream Code	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope	PWS With (mgd)	Apply FC
7919	13.96	349.00	41.90	0.00000	0.00	☑

Stream Data

	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Rch Velocity (fps)	Rch Trav Time (days)	Tributary Hard (mg/L)	Tributary pH	Stream Hard (mg/L)	Stream pH	Analysis Hard (mg/L)	Analysis pH
Q7-10	0.1	0	5.03	0	0	0	0	0	100	7	250.9	8.3	0	0
Qh		0	0	0	0	0	0	0	100	7	0	0	0	0

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	AFC PMF	CFC PMF	THH PMF	CRL PMF	Disc Hard (mg/L)	Disc pH
		0	0	0	0	0	0	0	0	100	7

Parameter Data

Parameter Name	Disc Conc (µg/L)	Trib Conc (µg/L)	Disc Daily CV	Disc Hourly CV	Steam Conc (µg/L)	Stream CV	Fate Coef	FOS	Crit Mod	Max Disc Conc (µg/L)
COPPER	0	0	0.5	0.5	0	0	0	0	1	0
TOTAL IRON	0	0	0.5	0.5	0	0	0	0	1	0

PENTOXSD Analysis Results

Hydrodynamics

SWP Basin	Stream Code:	Stream Name:
07G	7919	CHICKIES CREEK

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope	Depth (ft)	Width (ft)	WD Ratio	Velocity (fps)	Reach Trav Time (days)	CMT (min)
Q7-10 Hydrodynamics											
19.100	4.34	0	4.34	3.55809	0.0011	0.7282	40.509	55.626	0.2677	1.1732	32.869
13.960	5.03	0	5.03	NA	0	0	0	0	0	0	NA
Qh Hydrodynamics											
19.100	26.801	0	26.801	3.55809	0.0011	1.3169	40.509	30.76	0.5691	0.552	34.884
13.960	30.490	0	30.490	NA	0	0	0	0	0	0	NA

PENTOXSD Analysis Results

Wasteload Allocations

RMI	Name	Permit Number
19.10	**Manheim STP**	**PA002089**

AFC

Q7-10: **CCT (min)** 15 **PMF** 0.675 **Analysis pH** 7.618 **Analysis Hardness** 275.077

Parameter	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
COPPER	0	0	0	0	34.868	36.321	66.248
Dissolved WQC. Chemical translator of 0.96 applied.							
TOTAL IRON	0	0	0	0	NA	NA	NA

CFC

Q7-10: **CCT (min)** 32.869 **PMF** 1 **Analysis pH** 7.684 **Analysis Hardness** 270.767

Parameter	Stream Conc. (µg/L)	Stream CV	Trib Conc. (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
COPPER	0	0	0	0	20.978	21.852	48.505
Dissolved WQC. Chemical translator of 0.96 applied.							
TOTAL IRON	0	0	0	0	1500	1500	3329.628
WQC = 30 day average. PMF = 1.							

THH

Q7-10: **CCT (min)** 32.869 **PMF** NA **Analysis pH** NA **Analysis Hardness** NA

Parameter	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
COPPER	0	0	0	0	NA	NA	NA
TOTAL IRON	0	0	0	0	NA	NA	NA

CRL

Qh: **CCT (min)** 34.884 **PMF** 1

Parameter	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)
COPPER	0	0	0	0	NA	NA	NA
TOTAL IRON	0	0	0	0	NA	NA	NA

PENTOXSD Analysis Results

Recommended Effluent Limitations

SWP Basin	Stream Code:	Stream Name:
07G	7919	CHICKIES CREEK

RMI	Name	Permit Number	Disc Flow (mgd)
19.10	Manheim STP	PA002089	2.3000

Parameter	Effluent Limit (µg/L)	Governing Criterion	Max. Daily Limit (µg/L)	Most Stringent WQBEL (µg/L)	Most Stringent WQBEL Criterion
COPPER	42.463	AFC	66.248	42.463	AFC
TOTAL IRON	3329.628	CFC	5194.755	3329.628	CFC