pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**		Application No.	**PA0027022**
Facility Type	**Municipal**	**NPDES PERMIT FACT SHEET**	APS ID	**46313**
Major / Minor	**Major**	**INDIVIDUAL SEWAGE**	Authorization ID	**936189**

Applicant and Facility Information

Applicant Name	**Altoona Water Authority**	Facility Name	**Altoona West STP**
Applicant Address	900 Chestnut Avenue	Facility Address	144 Westerly Treatment Plant Road
	Altoona, PA 16601-4617		Duncansville, PA 16635-7814
Applicant Contact	Mark Perry	Facility Contact	Mark Perry
Applicant Phone	(814) 949-2222	Facility Phone	(814) 949-2222
Client ID	85897	Site ID	452081
Ch 94 Load Status	Not Overloaded	Municipality	Altoona City
Connection Status	No Limitations	County	Blair
Date Application Received	July 26, 2012	EPA Waived?	No
Date Application Accepted	July 27, 2012	If No, Reason	Major Facility, Pretreatment, Significant CB Discharge

Purpose of Application: NPDES permit renewal for discharge of treated sewage

Summary of Review

1.0 General Discussion

This fact sheet supports the renewal of an existing NPDES permit for discharge of treated sewage from Altoona Water Authority's Westerly wastewater treatment plant that serves portions of City of Altoona, Logan Township and Allegheny Township. The facility receives 14% of its flows from Logan Township, 7% of its flows from Allegheny Township and 79% of its flow from City of Altoona. Altoona Water Authority(Authority) owns, operates, and maintains the wastewater treatment plant, which is in Allegheny Township, Blair County. The treatment plant is designed to provide biological nutrient removal using either a hybrid of five stage Bardenpho and Virginia Initiative Process (VIP) or can be operated using MLE process. The facility discharges to Beaverdam Branch, Juniata River, which is classified for Trout Stocking at the discharge point at outfall 001. 35% of the collection system within Altoona City Authority service area is combined. Other permitted outfalls are a combined sewer overflow (CSO) outfall 002, that discharge to Mill Run and four storm water outfalls 003, 004, 005, and 006. The facility has a design annual flow of 10.8 MGD and hydraulic capacity of 16.2 MGD. The organic design capacity of the facility is 16,790 lbs BOD5/day. The existing NPDES permit was issued on January 29, 2008 with an effective date of February 1, 2008 and expiration date of January 31, 2013. The permit was amended on December 10, 2009 to revise construction schedule in the permit. The applicant submitted a timely NPDES renewal application to the Department and is currently operating under the terms and conditions in the existing permit under administrative extension provisions pending Department action on the renewal application. A topographic map showing the discharge location is presented in attachment A.

Approve	Deny	Signatures	Date
X		*J. Pascal Kwedza* J. Pascal Kwedza, P.E. / Environmental Engineer	June 22, 2021
X		Maria D. Bebenek for Daniel W. Martin Daniel W. Martin, P.E. / Environmental Engineer Manager	June 22, 2021
X		Maria D. Bebenek Maria D. Bebenek, P.E./ Program Manager	June 22, 2021

Summary of Review

1.1 Sludge use and disposal description and location(s):

The biosolids treatment system comprises of aerobic digesters, a gravity thickener, a belt filter press and a centrifuge for thickening/dewatering. The facility thickens waste sludge either by gravity thickener or centrifuge. Thickened sludge is pumped to aerobic digesters for digestion. Digested sludge is dewatered in either the centrifuge or by the belt press. The facility land applies dewatered sludge and can send to landfill if needed. The solids handling system is currently being upgraded to function as a resource recovery system utilizing anaerobic digestion with biogas collection units.

1.2 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.

1.3.0 Changes to the existing permit

- Monitoring requirement for Dissolved Iron, Total Iron, Total Lead, Total Zinc, Total Copper, Total Aluminum, Total Boron, Total Nickel, Total Arsenic, and UV dosage have been added to the current permit.
- Limitation has been imposed on Free Cyanide.
- E.coli monitoring has been added

1.3.1 Existing Limits and Monitoring Requirements

Discharge Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Monthly Average	Weekly Average	Minimum	Monthly Average	Weekly Average	Instantaneous 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
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/Day	Grab
TSS	2702	4053	XXX	30	45	60	1/Day	24-hr comp
$CBOD_5$	1801	2702	XXX	20	30	40	1/Day	24-hr comp
Ammonia Nov 1 - Apr 30	360	XXX	XXX	4.0	XXX	8	1/Day	24-hr comp
Ammonia May 1 - Oct 31	180	XXX	XXX	2.0	XXX	4	1/Day	24-hr comp
Total Copper	1.62	XXX	XXX	0.018	XXX	0.045	1/Week	24-hr comp
Fecal Coliform (5/1 to 9/30)[(5)]	XXX	XXX	XXX	200	XXX	XXX	1/Day	Grab
Fecal Coliform (10/1 to 4/30)	XXX	XXX	XXX	2,000	XXX	XXX	1/Day	Grab

Summary of Review

1.3.2 Chesapeake Bay Permit Requirements

Discharge Parameter	Effluent Limitations					Monitoring Requirements	
	Mass Load(lbs)		Concentrations (mg/l)			Minimum Measurement Frequency	Required Sample Type
	Monthly	Annual	Minimum	Monthly Average	Maximum		
Ammonia---N	Report	Report	XXX	Report	XXX	1/Day	24-hr Comp
Kjeldahl---N	Report	XXX	XXX	Report	XXX	1/Week	24-hr Comp
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	1/Week	24-hr Comp
Total Nitrogen	Report	Report	XXX	Report	XXX	1/Month	Calculate
Total Phosphorus	Report	Report	XXX	Report	XXX	1/Day	24-hr Comp
Net Total Nitrogen	Report	164,381	XXX	XXX	XXX	1/Month	Calculate
Net Total Phos.	Report	21,918	XXX	XXX	XXX	1/Month	Calculate

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	10.8
Latitude	40° 27' 17"	Longitude	78° 25' 35"
Quad Name	Hollidaysburg	Quad Code	1518
Wastewater Description:	Sewage		
Receiving Waters	Beaverdam Branch(TSF)	Stream Code	16137
NHD Com ID	65608670	RMI	5.21
Drainage Area	37.6	Yield (cfs/mi²)	0.162
Q_{7-10} Flow (cfs)	6.09	Q_{7-10} Basis	USGS Gage Station
Elevation (ft)		Slope (ft/ft)	
Watershed No.	11-A	Chapter 93 Class.	TSF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Cause Unknown, Organic Enrichment/Low D.O., Metals		
Source(s) of Impairment	Urban Runoff/Storm Sewers, Combined Sewer Overflow, Abandoned Mine Drainage		
TMDL Status	Final, 04/05/2007	Name	Beaverdam Branch Watershed
Background/Ambient Data		Data Source	
pH (SU)			
Temperature (°F)			
Hardness (mg/L)			
Other:			
Nearest Downstream Public Water Supply Intake		Mifflintown Municipal Authority	
PWS Waters	Juniata River	Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	>106

Changes Since Last Permit Issuance: None

1.4.1 Water Supply Intake

The nearest downstream water supply intake is approximately 93 miles downstream by Mifflintown Municipal Authority on Juniata River in Mifflintown, Mifflin County. Due to the distance and dilution, no impact is expected from this discharge.

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	002	Design Flow (MGD)	0
Latitude	40º 29' 33.598"	Longitude	-78º 24' 19.238"
Quad Name	Hollidaysburg	Quad Code	1518
Wastewater Description:	Combined Sewer Overflow		
Receiving Waters	Mill Run (CWF)	Stream Code	
NHD Com ID	61839177	RMI	
Drainage Area		Yield (cfs/mi²)	
Q_{7-10} Flow (cfs)		Q_{7-10} Basis	
Elevation (ft)		Slope (ft/ft)	
Watershed No.	8-C	Chapter 93 Class.	CWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Metals		
Source(s) of Impairment	Acid Mine Drainage		
TMDL Status	Final	Name	Clearfield Creek
Background/Ambient Data		Data Source	
pH (SU)			
Temperature (°F)			
Hardness (mg/L)			
Other:			
Nearest Downstream Public Water Supply Intake			
PWS Waters		Flow at Intake (cfs)	
PWS RMI		Distance from Outfall (mi)	

Changes Since Last Permit Issuance: None

Other Comment: Combined sewer overflow outfall see section 4.3.13 for additional information

Treatment Facility Summary				
Treatment Facility Name: Altoona West STP				
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage	Secondary	Activated Sludge	Ultraviolet	10.8
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
16.2	16,790	Not Overloaded	Drying	Combination of methods

WQM Permit No.	Issuance Date
0708404 A-3	7/21/2020
0708404 A-2	5/1/2020
0708404 A-1	8/24/2010

Changes Since Last Permit Issuance: The permit was amended two times during the last permit cycle to update solids handling facilities to resource recovery system and to construct and connect a pump station to the conveyance system.

2.1 Treatment Facility Description

The treatment plant consists of:

The facility consists of 2 fine screens, vortex grit units, 4 BNR reactors, 4 clarifiers, 2 aerobic digesters, a gravity thickener, a belt filter press, a centrifuge and 2 UV units. 2 sludge storage tanks (not in used)

The following new facilities are approved to be constructed:

- Construction of High Strength Organic Waste(HSOW) receiving station
- Conversion of one existing aerobic digester to a new HSOW and a thickened waste activated sludge blend tank.
- Construction of two (2) new anaerobic digesters.
- Convert an existing aerobic digester to a new digestate storage tank.
- New Biogas handling system.
- New Digestate Storage (repurpose of existing tank)
- Refurbishment of the existing gravity belt filter.
- Replacement of the existing belt filter press with a new, larger-capacity solids dewatering centrifuge.
- Addition of a new receiving bunker to accept cake biosolids.
- Addition of a new cake drying system, cake conveying, and pumping systems.
- Beneficial biogas utilization system including a biogas fired boiler, waste gas burner, and cake dryer heat recovery system.

2.2 Chemicals

Sodium aluminate is used for phosphorus precipitation, caustic soda for digesters and polymer for sludge dewatering in centrifuge

3.0 Compliance History

3.1 DMR Data for Outfall 001 (from May 1, 2020 to April 30, 2021)

Parameter	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20
Flow (MGD) Average Monthly	6.85	8.12	6.77	6.08	6.74	5.653	4.31	3.73	3.73	3.29	3.94	6.87
Flow (MGD) Daily Maximum	17.91	19.61	20.19	12.33	19.89	15.173	15.85	8.69	10.27	5.77	6.16	14.88
pH (S.U.) Minimum	6.65	6.57	6.42	6.48	6.5	6.68	6.67	6.76	6.77	6.87	6.86	6.44
pH (S.U.) Maximum	6.98	6.96	6.83	6.85	6.93	7.02	6.95	7.1	7.13	7.19	7.18	7.1
DO (mg/L) Minimum	6.08	6.22	6.86	7.2	6.49	6.33	6.25	6.58	6.18	6.43	6.62	6.79
CBOD5 (lbs/day) Average Monthly	250	323	235	< 168	< 198	< 148	< 107	< 87	< 106	68	< 97	< 188
CBOD5 (lbs/day) Weekly Average	362	428	358	< 216	< 410	< 182	< 165	111	192	74	< 119	< 236
CBOD5 (mg/L) Average Monthly	4	5	4	< 3	< 3	< 3	< 3	< 3	< 3	3	< 3	< 3
CBOD5 (mg/L) Weekly Average	5	6	5	4	< 4	< 4	< 4	< 3	4	3	< 3	< 4
BOD5 (lbs/day) Raw Sewage Influent Ave. Monthly	8065	8428	7168	7271	6931	5819	5571	4401	5092	5298	6309	5948
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	16992	17014	18332	25338	14751	15111	20905	7499	10018	11419	30312	11637
BOD5 (mg/L) Raw Sewage Influent Ave. Monthly	159	138	159	156	142	142	179	156	177	199	200	120
TSS (lbs/day) Average Monthly	< 278	510	< 339	< 181	< 244	< 181	< 113	< 89	< 124	< 89	142	< 207
TSS (lbs/day) Raw Sewage Influent Ave. Monthly	10218	11412	8119	7496	8375	8499	8042	5741	6230	8731	12373	6687
TSS (lbs/day) Raw Sewage Influent Daily Maximum	25362	27120	26959	28529	28123	22089	40979	8823	18565	52539	79704	13733
TSS (lbs/day) Weekly Average	415	718	< 623	< 178	< 650	< 382	< 236	< 122	< 256	< 94	184	222
TSS (mg/L) Average Monthly	< 5	7	< 6	< 4	< 3	< 3	< 3	< 3	< 4	< 3	4	< 4

TSS (mg/L) Raw Sewage Influent Ave. Monthly	204	189	172	161	168	206	253	202	212	328	382	132
TSS (mg/L) Weekly Average	6	7	< 6	< 4	< 5	< 4	< 3	< 3	< 6	< 3	5	< 4
Fecal Coliform (CFU/100 ml) Geometric Mean	< 5	< 10	< 8	23	< 5	< 1	< 2	< 1	< 1	< 3	< 3	< 3
Nitrate-Nitrite (mg/L) Average Monthly	1.63	8.13	7.47	15.91	13.84	4.11	2.85	3.05	1.59	< 2.07	< 4.36	15.72
Nitrate-Nitrite (lbs) Total Monthly	2968	16325	7255	22720	20558	6801	3004	2309	1429	< 1677	< 3956	25754
Total Nitrogen (mg/L) Average Monthly	3.36	806	10.24	20.57	16.83	< 5.39	< 4.03	4.31	< 2.83	< 3.66	< 6.07	18.11
Total Nitrogen (lbs) Effluent Net Total Monthly	6100	24984	10140	29070	24754	< 9041	< 4343	3259	< 2563	< 3021	< 5508	29785
Total Nitrogen (lbs) Total Monthly	6100	24984	10140	29070	24754	< 9041	< 4343	3259	< 2563	< 3021	< 5508	29785
Total Nitrogen (lbs) Effluent Net Total Annual								< 158856				
Total Nitrogen (lbs) Total Annual								< 158856				
Ammonia (lbs/day) Average Monthly	< 39	< 160	71	< 135	< 42	< 10	< 7	< 6	< 7	< 6	< 11	< 26
Ammonia (mg/L) Average Monthly	< 0.8	< 2.5	1.19	< 2.68	< 0.8	< 0.22	< 0.2	< 0.2	< 0.2	< 0.21	< 0.3	< 0.5
Ammonia (lbs) Total Monthly	< 1177	< 4953	1974	< 4181	< 1305	< 306	< 223	< 186	< 223	< 182	< 325	< 812
Ammonia (lbs) Total Annual								< 9275				
TKN (mg/L) Average Monthly	1.73	4.39	2.78	4.66	3	< 1.28	< 1.18	1.26	< 1.24	1.59	1.7	2.39
TKN (lbs) Total Monthly	3132	8659	2885	6349	4196	< 2240	< 1339	950	< 1135	1344	1552	4031
Total Phosphorus (mg/L) Ave. Monthly	0.65	< 0.45	0.72	< 0.43	< 0.72	0.74	0.98	1.4	0.44	0.37	0.96	0.71
Total Phosphorus (lbs) Effluent Net Total Monthly	1071	< 958	999	< 578	< 1052	951	894	1293	504	313	936	1128
Total Phosphorus (lbs) Total Monthly	1071	< 31	999	< 578	< 1052	951	894	1293	504	313	936	1128

Total Phosphorus (lbs) Effluent Net Total Annual								< 15039				
Total Phosphorus (lbs) Total Annual								< 11954				
Total Copper (lbs/day) Average Monthly	< 0.20	< 0.40	< 0.30	< 0.30	< 0.30	< 0.20	< 0.10	< 0.10	< 0.20	< 0.20	< 0.20	< 0.30
Total Copper (mg/L) Average Monthly	< 0.005	< 0.006	< 0.005	< 0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

3.2 Summary of Discharge Monitoring Reports (DMRs):

DMRs review for the facility for the last 12 months of operation, presented on the table above in section 3.1 indicate permit limits have been met consistently. No effluent violations noted on DMRs during the period reviewed.

3.3 Summary of Inspections:

The facility has been inspected a couple of times during last permit cycle. No effluent violations identified during plant inspections. The facility has been operated and maintained well.

4.0 Development of Effluent Limitations

Outfall No.	001	**Design Flow (MGD)**	10.8
Latitude	40º 27' 17"	**Longitude**	-78º 25' 35"
Wastewater Description:	Effluent		

4.1 Basis for Effluent Limitations

In general, the Clean Water Act (AWA) requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits

4.1.1 Technology-Based Limitations

The following technology-based limitations apply, subject to water quality analysis and BPJ where applicable:

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

Comments: UV is utilized at the facility , TRC limitation not required.

4.2 Mass-Based Limits

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, if possible. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass-based limits are expressed in pounds per day and are calculated as follows:

Mass based limit (lb/day) = concentration limit (mg/L) × design flow (mgd) × 8.34

4.3 Water Quality-Based Limitations

4.3.1 Receiving Stream

The receiving stream is the Beaverdam Branch. According to 25 PA § 93.9n, this stream is protected for Trout Stocking (TSF). It is located in Drainage List N and State Watershed 11-A. It has been assigned stream code 16137. According to eMapPA Beaverdam Branch. is impaired and not attaining its designated uses. A Total Maximum Daily Load (TMDL**)** was developed for Beaverdam Branch Watershed and was approved by EPA on April 5, 2007. See section 4.3.10 of the report for details.

4.3.2 Stream flows

The Technical Support Document for Water Quality-Based Toxics Control (TSD) (EPA, 1991) and the Pennsylvania Water Quality Standards PA WQS) recommend the flow conditions to use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD and the PA WQS state that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years ($Q_{7\text{-}10}$) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years ($Q_{1\text{-}10}$) for acute criteria. However, because the chronic criterion for ammonia is a 30-day average concentration not to be exceeded more than once every three years, EPA has used the $Q_{30\text{-}10}$ for the chronic ammonia criterion instead of the $Q_{7\text{-}10}$. The $Q_{30\text{-}10}$ is a biologically-based design flow intended to ensure an excursion frequency of once every three years for a 30-day average flow rate. Streamflows for the water quality analysis were determined by correlating with the yield of USGS gauging station No. 01556000 on Frankstown Branch Juniata River near Williamsburg. The $Q_{7\text{-}10}$ and drainage area at the gage is 47.2 ft3/s and 291mi^2 respectively. The resulting yields are as follows:

- $Q_{7\text{-}10}$ = (47.2 ft^3/s)/291 mi^2 = 0.162ft^3/s/ mi^2
- $Q_{30\text{-}10}$ / $Q_{7\text{-}10}$ = 1.15
- $Q_{1\text{-}10}$ / $Q_{7\text{-}10}$ = 0.90

The drainage area at discharge calculated utilizing USGS StreamStats = 37.6 mi^2

The $Q_{7\text{-}10}$ at discharge = 37.6mi^2 x 0.162ft^3/s/mi^2 = 6.09 ft^3/s.

4.3.3 NH_3-N Calculations

The NH_3-N calculations will be based on PA Chapter 93 regulations and the Division of Water Management's November 1997 NH_3-N Implementation Guideline. The following background information will be used to determine the instream NH_3-N criteria used in the attached computer model of the stream.

- STP pH = 6.77 (DMR Median)
- STP Temperature = 25 ^{o} C (default)
- Stream pH = 7.81 (WQN0224, at Williamsburg on Frankstown Br Juniata River)
- Stream Temperature = 22.35 ^{o}C (WQN0224,at Williamsburg on Frankstown Br Juniata River)
- Background NH_3-N = 0.0 (default)

4.3.4 $CBOD_5$

Due to the proximity of ST Product's discharge and that of Altoona Westerly discharge, both discharges are modeled together. The attached results of the WQM 7.0 stream model indicate that an average monthly limit of 25 mg/l is adequate to protect the water quality of the stream for the Altoona Westerly discharge. The results did not reveal any apparent interaction between the two discharges. The recommended limit is less stringent than the existing limit of 20mg/l and will not apply to the permit due to anti-backsliding restrictions. The existing average monthly limit(AML) of 20mg/l, average weekly limit(AWL) of 30mg/l and instantaneous maximum(IMAX) limit of 40mg/l will remain in the permit. Past DMRs and inspection reports show the facility has been complying with the limitation.

4.3.5 NH_3-N

The attached results of the WQM 7.0 stream model indicates also that a summer limit of 2 mg/l NH_3 (rounded) as a monthly average is necessary to protect the aquatic life from toxicity effects. This limitation is consistent with the existing permit, therefore, a summer limit of 2 mg/l and the existing winter limit of 4 mg/l will remain in the permit.

4.3.6 Dissolved Oxygen

The existing permit contains a limit of 5 mg/l for Dissolved Oxygen (DO). DEP's Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001, 10/97) suggests that either the adopted minimum stream D.O. criteria for the receiving stream or the effluent level determined through water quality modeling be used for the limit. Since the WQM 7.0 model was run using a minimum D.O. of 5.0 mg/l, this limit will be continued in the renewed permit with a daily monitoring requirement per DEP guidance.

4.3.7 Total Residual Chlorine:

The discharge does not have any reasonable potential to cause or contribute to a water quality standards violation for total residual chlorine since the permittee utilizes UV instead of chlorine for wastewater disinfection. Therefore, the proposed permit does not contain effluent limits for total residual chlorine. The permittee may use chlorine-based chemicals for cleaning and is required to optimize chlorine usage to prevent negative impacts on receiving stream. Daily UV dosage monitoring in (Milliwatt-Seconds per Square Centimeter) will be required in the permit to ensure efficiency of the UV unit.

4.3.8 Total Suspended Solids (TSS):

There is no water quality criterion for TSS. A limit of 30 mg/l AML in the existing permit which was based on the minimum level of effluent quality attainable by secondary treatment as defined in 40 CFR 133.102b(1) and 25 PA § 92a.47(a)(1) and an AWL of 45mg/l per 40CFR 133.102(b)(2) and 25 PA § 92a.47(a)(2) with associated mass limits will remain in the permit.

4.3.9 Toxics

A reasonable potential (RP) analysis was conducted for pollutant Groups 1 through 6 submitted with the application. All pollutants that were presented in the application sampling data were entered into DEP's Toxics Management Spreadsheet(TMS) which combines the logic in the previous Toxics Screening Analysis Spreadsheet and PENTOXSD Model to calculate WQBELs. The most stringent WQBELs recommended by the TMS are presented in attachment C. The discharge levels for all parameters analyzed in exception of Total Aluminum, Total Antimony, Total Arsenic, Total Boron, Total Silver, Total Copper, Total Mercury, Dissolved Iron, Total Lead, Free Cyanide, Total Nickel, Total Zinc, Carbon Tetrachloride, 1,2 Diphenylhydrazine and Bis(2-ethylhexyl) Phthalate were well below DEP's target quantitation limits(TQL) and calculated WQBELs therefore no limitation or monitoring is required for them in the permit. The permittee had an opportunity to re-sample Carbon Tetrachloride, Total Mercury, Total Silver and 1,2 Diphenylhydrazine which were reported as non-detect but used a less sensitive MDL for the analysis. The permittee submitted three 24-hour composite effluent samples for Total Silver and Total Mercury, collected at least one week apart and used DEP's target QLs, for analysis. The results were non-detect and have been added to the TMS for analysis. Bis(2-Ethylhexyl)Phthalate was resampled using glass bottle instead of plastic bottle and the results are added to the TMS for analysis. The permittee also submitted seven 24-hour composite effluent samples for Total Antimony, Total Arsenic, Total Boron, Total Copper, Dissolved Iron, Total Lead, Free Cyanide, Total Nickel, Total Zinc, Carbon Tetrachloride and 1,2 Diphenylhydrazine. The samples were analyzed in addition to the 3 original samples submitted for each of the pollutants re-sampled using DEP's TOXCON to determine Average Monthly Effluent Concentration (Amec) and a daily coefficient of variation(CV) for each pollutant and the result is presented in attachment E. The calculated Amec's were added to the TMS for analysis. The result of the TMS analysis is presented in attachment D. Monitoring was recommended for Total Aluminum, Total Arsenic, Total Boron, Total Copper, Dissolved Iron, Total Lead, Total Nickel and Total Zinc, and limitation was recommended for Fee Cyanide. No monitoring or limitation was recommended for Total Antimony, Total Mercury, Total Silver, Bis(2-Ethylhexyl)Phthalate, 1,2 Diphenylhydrazine and Carbon Tetrachloride. The existing Copper limit has been discontinued; treatment plant upgrade added significant equipment that justify relaxing the limit. The permittee indicated the facility can meet the proposed limitation on Free Cyanide.

The recommended limitations follow the logic presented in DEPs SOP, to establish limits in the permit where the maximum reported concentration exceeds 50% of the WQBEL, or for non-conservative pollutants to establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL, or to establish monitoring requirements for conservative pollutants where the maximum reported concentration is between 10% - 50% of the WQBEL.

4.3.10 Total Maximum Daily Load (TMDL)

A TMDL has been developed for Beaverdam Branch and approved on 04/05/2007 but the primary focus of the TMDL was to address AMD impairment. End points were developed for Total Aluminum and Total Iron however, sewage treatment facilities were not included in the TMDL development. To confirm that this discharge is not significantly contributing to the metals considered in the TMDL, weekly monitoring of Total Aluminum and Total Iron will be required in the permit to collect data.

4.3.11 Chesapeake Bay Strategy

The Department formulated a strategy in April 2007, to comply with the EPA and Chesapeake Bay Foundation requirements to reduce point source loadings of Total Nitrogen (TN) and Total Phosphorus (TP) to the Bay. In the Strategy, sewage dischargers have been prioritized based on their delivered TN loadings to the Bay. The highest priority (Phases 1, 2, and 3) dischargers received annual loading caps 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. Phase 4 (0.2 -0.4mgd) will be required to monitor and report TN and TP during permit renewal monthly and Phase 5(below 0.2mdg) will monitor during current permit renewal once a year unless two years of monitoring completed and documented. Any facility in Phases 4 and 5 that undergoes expansion is subjected to cap load right away.

EPA published the Chesapeake Bay TMDL in December of 2010. In order to address the TMDL, Pennsylvania developed Chesapeake Watershed Implementation Plan (WIP) Phase 1, Phase 2 and currently Phase 3 WIP and a supplement to the WIPs in addition to the original Chesapeake Bay Strategy. As outlined in the current Phase 3 WIP and supplement to the WIP, re-issuing permits for significant dischargers would follow the same phased approach formulated in the original Bay strategy and non-significant dischargers (phase 4 and 5) will monitor and report TN and TP throughout the permit cycle. This facility falls in phase 1 of the strategy and is required to meet a total maximum annual Total Nitrogen Cap load of 164,381 lbs/year based on a design annual wasteflow of 9MGD and 6 mg/l total nitrogen and a TP cap load of 21,918 lbs/year based on annual wasteflow of 9 MGD and 0.8 mg/l total phosphorus with twice per week monitoring of Total Phosphorus and Total Nitrogen series (Nitrate-Nitrite and Total Kjeldahl Nitrogen) to comply with the Chesapeake Bay load requirements.

The Department approved 2,000lbs of nitrogen offsets based on 80EDUs at 25lbs/EDU for the Altoona Water Authority's Westerly Plant during the previous permit cycle. The offsets are for 80 on-lot disposal systems that have been connected to the sewer conveyance system. These on-lot systems were put into use prior to January 1, 2003 and retired after January 1, 2003. The Department has approved additional 475lbs of nitrogen offsets based on 19EDUs at 25lbs/EDU for total of 2,475lb. The approved offsets are only for compliance purposes and are not available for trading or selling and will not be added to the base TN cap load. The permit will show the base cap load on the effluent page and show the offsets as a foot note with a language indicating the offsets may be applied throughout the compliance year or during the truing period. A complete list of addresses of the dwellings that were served by the retired on-lot systems that are now connected to the sewage conveyance system is presented in attachment F for the current approval and the previous approved list is on file.

4.3.12 Stormwater

The application listed outfalls 003 (40°27'28.3" / 78°25'33.52"), 004 (40°27'21.50" / 78°25'40.26") , 005 (40°27'15.45" / 78°25'35.38") and 006 (40°27'13.82" / 78°25'3253") as stormwater outfalls receiving stormwater runoff from the treatment plant site. To comply with stormwater requirements of 40CFR 122.26(b)(14)(ix), part C of the permit will require the permittee to comply with the standard requirements applicable to stormwater outfalls with BMP conditions.

4.3.13 Combined Sewer Overflows (CSO'S)

There is one permitted CSO outfall(002) in the collection system for the Altoona Westerly Wastewater Treatment Plant. The facility is currently implementing the Nine Minimum Controls (NMC's) and the updated Long-Term Control Plan(LTCP) tentatively approved on September 20, 2020. A copy of the LTCP is presented in attachment G. The Authority has completed installation of CSO controls and have been operating these controls but did not check the effectiveness of these controls. The CSO controls for the Westerly plant consist of a mechanically actuated gate and screening unit at the CSO outfall, a 1.34 MG underground storage tank with a pinch valve, bar screen, pumping equipment, level sensor and control center that is connected to the SCADA system of the treatment plant. The underground storage tank captures and stores the first flush of wastewater during storm events and release it utilizing the pumping equipment to the treatment plant for treatment. CSO discharge starts when the underground tank and downstream sewer capacity reached full capacity. The Authority also completed some sewer rehabilitation and replacement work to reduce the amount of infiltration and inflow into the system. The design capacity of the facility was upgraded in 2010 to handle more flow during wet weather but due to limited carrying capacity of the combined sewers downstream of the underground storage tank, the full capacity of treatment facility is not being utilized prior to CSO discharge. The Authority's current LTCP update includes a post construction compliance monitoring (PCCM) plan and schedule to utilize the existing controls to demonstration compliance with Water Quality Standards(WQS) and to check the effectiveness of the CSO controls. The plan also include timeline to digitize, re-characterize, model, and calibrate the CSO system and also to develop and evaluate CSO control alternatives that will be utilized in the future if needed. The permit requires continued implementation of the NMCs and the tentative approved LTCP and the PCCM plan following the schedule in the LTCP as follows:

Milestone	Completion Date
Compile GIS sewer Map for CSO, Wastewater treatment plant(WWTP) and receiving water.	September 1. 2021
CSO water characterization.	May 1, 2022
CSO SWMM modelling and Calibration.	October 1, 2022
Evaluate and confirm WWTP wet weather capacity	July 1, 2024
Receiving stream water quality sampling	December 1, 2025
Receiving stream WASP modelling and Calibration	January 1, 2026
Develop and evaluate CSO control alternatives	April 1, 2026
*Submit final LTCP report	July 1, 2026

**The final LTCP report shall clearly indicate if the existing CSO controls are meeting WQS and if they are not what other controls are selected based on CSO control alternative analysis including timeline for construction to meet WQS or to demonstrate CSO compliance using presumptive approach.*

4.3.14 Influent BOD and TSS Monitoring

The permit has influent BOD5 and TSS monitoring at less frequency than is done for effluent. In order to implement Chapter 94.12 and assess percent removal requirements effectively, effluent monitoring frequency will be increase to the same frequency as the effluent during this permit renewal.

4.3.15 Industrial Users

Altoona Easterly wastewater treatment plant receives wastewater from some industrial users throughout its service area. The industrial users and a brief description are as follows:

Industrial Users*	Discharge Rate (GPD)					Significant Industrial User?
	Process	NCCW	Sanitary	Other	*Total*	
Alpha Altoona	20,000	-	1,500	5,000	265,500	Yes
ALBEMARLE Corporation	7,000	-	-	-	7,000	Yes
Laurel Highlands Landfill	60,000	-	-	-	60,000	Yes
James E. VanZandt VA Medical Center	20,000	-	-	-	20,000	Yes
Veeder-Root	20,000	-	10,000	-	30,000	Yes
UNIVAR USA Inc.	7500gal/quarter	-	600	-	683	No
Healthsouth Rehabilitation Hospital of Altoona	2,200	-	8,000	-	10,200	Yes
Electric Motor & Supply	1,500	-	500	-	2,000	Yes
Benzel's Bretzel Bakery	4,300	-	700	-	5,000	Yes

The Altoona Mirror	5,400	-	600	-	6,000	Yes
The Station Medical Center	10,000	-	2,000	-	12,000	Yes
General Cable	1,500	-	1,000	-	2,500	Yes
Reliable Tire and Auto	15,000	-	-	-	15,000	Yes
On the Spot Recycling	30	-	-	-	30	Yes
Cumberland County Landfill	4837	-		-	4837	Yes
Phoenix Landfill	144496	-		-	144496	Yes
Westmoreland County Landfill	53979	-		-	53979	Yes
Modern Landfill	13990	-		-	13990	Yes
Apex Landfill	6035	-		-	6035	Yes
Fairless Landfill	6141	-		-	6141	Yes
Fauquier Landfill	6203	-		-	6203	Yes
Hilltop Energy	12,953	-		-		Yes

*The facility is implementing an approved pretreatment program which is expected to address any negative impact from these industrial users.

4.3.16 Pretreatment Requirements

The design annual average flow of the treatment plant is 10.8 MGD and the facility receives flow from many significant industrial users as presented in section 4.3.13. EPA requires development and implementation of pretreatment program for this facility. Altoona Water Authority currently maintains and operates EPA-approved pretreatment program for the Westerly plant. Consequently, the Department will continue to include permit conditions that dictate the operation and implementation of a pretreatment program in Part C.III of the permit.

5.0 Other Requirements

5.1 The permit contains the following special conditions:

Stormwater Prohibition, Approval Contingencies, Solids Management, Restriction on receipt of hauled in waste under certain conditions, WET testing requirements, Stormwater conditions, Combined sewer overflow condition, and Pretreatment program implementation

5.2 Anti-backsliding

Total Copper was relaxed to monitoring in accordance with 40 CFR 122.44(l)(2)i(A) which stated that relaxed limitations may be allowed where there have been material and substantial alternations or additions to the permitted facility that justify the relaxation. The facility has been upgraded in 2010, and the treatment process has changed.

5.3 Antidegradation (93.4):

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. There is no apparent impact expected from the proposed downstream High-Quality(HQ) designation of the stream since the discharge predates the HQ designation. No Exceptional Value Waters are impacted by this discharge.

5.4 Class A Wild Trout Fisheries:

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

5.5 303d listed stream

The discharge is located on a 303d listed stream segment as impaired for aquatic life due to Organic Enrichment/Low D.O and metals. The sources of the impairment are AMD, Combined Sewer Overflow and Urban Run Off/Storm Sewers. A TMDL has been developed for Beaverdam Branch and approved on 04/05/2007 as discussed in section 4.3.10.

5.6 Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs).

5.7 Effluent Monitoring Frequency

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits are less than the effluent limits. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs

6.0 Whole Effluent Toxicity (WET)

Whole Effluent Toxicity (WET) is a term used to describe the aggregate toxic effect of an aqueous sample (i.e whole effluent wastewater discharge) as measured by an organism's response upon exposure to the sample (lethality, impaired growth or reproduction). WET tests replicate, to the greatest extent possible, the total effect and actual environmental exposure of aquatic life to toxic pollutants in an effluent without requiring the identification of the specific pollutants. WET testing is a vital component of the water quality standards implementation through the NPDES permitting process. EPA's promulgated WET test methods include acute and chronic tests.

6.1 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%, 87%, 74%, 37%, and 19%. The Target Instream Waste Concentration (TIWC) to be used for analysis of the results is: 74

6.2 Summary of Four Most Recent Test Results

The WET test submitted were conducted by QC laboratories/Eurofins QC, Inc which lost accreditation due to data quality issues with their WET tests, rendering all WET tests conducted by them since 2012 invalid. All 4 WET tests submitted were deemed invalid and were not reviewed. The permit will require 4 quarterly WET tests in the first year of the permit cycle. If all the 4 quarterly WET tests passed, implies there is no reasonable potential and the facility will proceed with annual WET tests as required in the permit. If there is a failure, a reasonable potential is implied, and the permittee will proceed to re-test and follow the WET test requirement failure in the permit.

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

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

[(10.8 MGD x 1.547) / ((6.09cfs x 1) + (10.8 MGD x 1.547))] x 100 = **73.3%**

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 Test**

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

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

[(10.8MGD x 1.547) / ((6.09 cfs x 1) + (10.8 MGD x 1.547))] x 100 = **73.2%**

3. Determine Dilution Series

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

Dilution Series = 100%, 87%, 73%, 37%, and 18%.

6.4 WET Limits

Has reasonable potential been determined? ☐ YES ☒ NO Tests not reviewed

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).

N/A

If WET limits will not be established, but reasonable potential was determined, indicate the rationale for not establishing WET limits:

N/A

No WETT limit or monitoring is deemed necessary. The standard Part C condition for WET testing will be included in the permit with quarterly testing for the first year and annual testing afterwards if all four quarterly tests passed.

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

Dilution Series = 100%, 87%, 73%, 36%, and 18%.

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	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	9.0 Max	XXX	1/day	Grab
DO	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
CBOD5	1801	2702 Wkly Avg	XXX	20	30 Wkly Avg	40	1/day	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	1/day	24-Hr Composite
TSS	2702	4053 Wkly Avg	XXX	30	45 Wkly Avg	60	1/day	24-Hr Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	1/day	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/day	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/day	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/month	Grab
Nitrate-Nitrite	XXX	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Nitrate-Nitrite (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	Calculation
Total Nitrogen (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation

fall 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 Nitrogen (lbs) Effluent Net	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Ammonia Nov 1 - Apr 30	360	XXX	XXX	4.0	XXX	8	1/day	24-Hr Composite
Ammonia May 1 - Oct 31	180	XXX	XXX	2.0	XXX	4	1/day	24-Hr Composite
Ammonia (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
TKN	XXX	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
TKN (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Phosphorus	XXX	XXX	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Total Phosphorus (lbs) Effluent Net	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Phosphorus (lbs)	Report Total Mo	XXX	XXX	XXX	XXX	XXX	1/month	Calculation
Total Aluminum	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite
Total Arsenic	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite
Total Boron	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite
Total Copper	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite
Free Cyanide	0.64	1.00	XXX	0.007	0.011	0.018	1/week	24-Hr Composite
Total Iron	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite
Dissolved Iron	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite
Total Lead	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite
Total Nickel	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite

fall 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 Zinc	Report	Report	XXX	Report	Report	XXX	1/week	24-Hr Composite

Compliance Sampling Location: At Outfall 001

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.

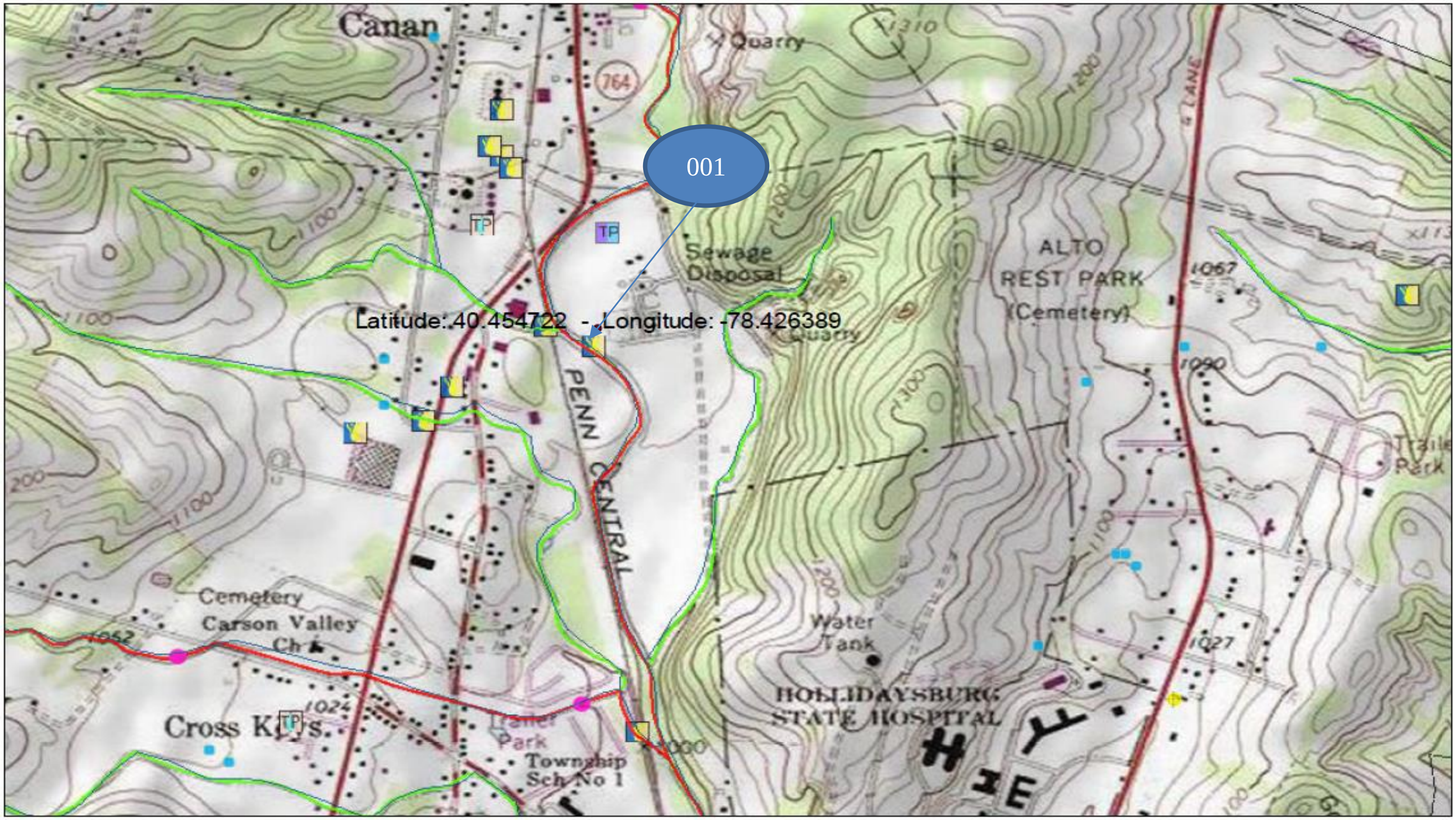
Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) [1]		Concentrations (mg/L)				Minimum [2] Measurement Frequency	Required Sample Type
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Total Nitrogen (lbs) Effluent Net	XXX	164,381 Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Nitrogen (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Ammonia (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Phosphorus (lbs) Effluent Net	XXX	21,918 Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation
Total Phosphorus (lbs)	XXX	Report Total Annual	XXX	XXX	XXX	XXX	1/year	Calculation

Compliance Sampling Location: At Outfall 001

8.0 Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment **B**)
☐	PENTOXSD for Windows Model (see Attachment)
☐	TRC Model Spreadsheet (see Attachment)
☐	Temperature Model Spreadsheet (see Attachment)
☒	Toxics Management Spreadsheet (see Attachment C)
☒	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: Establishing effluent limitations for individual sewage permit
☐	Other:

Attachment

A. Topographical Map



March 4, 2021

1:18,056

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

B. WQM Model Results

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
11A	16317	BEAVERDAM BRANCH

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)
5.210	Westerly STP	PA0027022	10.800	CBOD5	25		
				NH3-N	2.04	4.08	
				Dissolved Oxygen			5

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)
3.900	ST Products	PA0034886	0.228	CBOD5	25		
				NH3-N	20.77	41.54	
				Dissolved Oxygen			5

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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
11A	16317	BEAVERDAM BRANCH	5.210	1043.00	37.60	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	0.162	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.35	7.81	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
Westerly STP	PA0027022	10.8000	0.0000	0.0000	0.000	25.00	6.77

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

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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
11A	16317	BEAVERDAM BRANCH	3.900	988.50	42.60	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	0.162	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.35	7.81	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
ST Products	PA0034886	0.2276	0.2276	0.0000	0.000	25.00	7.20

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

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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
11A	16317	BEAVERDAM BRANCH	3.700	964.50	44.30	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	0.162	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.35	7.81	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	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	5.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

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WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
11A	16317	BEAVERDAM BRANCH

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
5.210	Westerly STP	12.87	17.09	12.87	17.09	0	0
3.900	ST Products	5.06	50	12.78	50	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
5.210	Westerly STP	1.49	2.11	1.49	2.04	2	3
3.900	ST Products	.91	21.5	1.48	20.77	2	3

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)		
5.21	Westerly STP	25	25	2.04	2.04	5	5	0	0
3.90	ST Products	25	25	20.77	20.77	5	5	0	0

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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	0.9	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.15	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

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WQM 7.0 D.O. Simulation

SWP Basin	Stream Code	Stream Name
11A	16317	BEAVERDAM BRANCH

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
5.210	10.800	24.292	6.891
Reach Width (ft)	Reach Depth (ft)	Reach WDRatio	Reach Velocity (fps)
50.240	0.802	62.645	0.566
Reach CBOD5 (mg/L)	Reach Kc (1/days)	Reach NH3-N (mg/L)	Reach Kn (1/days)
18.86	1.452	1.49	0.974
Reach DO (mg/L)	Reach Kr (1/days)	Kr Equation	Reach DO Goal (mg/L)
5.866	33.685	Tsivoglou	5
Reach Travel Time (days)			
0.141			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.014	18.39	1.47	6.23
0.028	17.93	1.45	6.47
0.042	17.49	1.43	6.63
0.057	17.06	1.41	6.74
0.071	16.64	1.39	6.83
0.085	16.23	1.37	6.90
0.099	15.83	1.36	6.95
0.113	15.44	1.34	7.00
0.127	15.05	1.32	7.04
0.141	14.68	1.30	7.07

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
3.900	11.028	24.237	6.907
Reach Width (ft)	Reach Depth (ft)	Reach WDRatio	Reach Velocity (fps)
43.469	0.892	48.742	0.618
Reach CBOD5 (mg/L)	Reach Kc (1/days)	Reach NH3-N (mg/L)	Reach Kn (1/days)
14.41	1.439	1.54	0.970
Reach DO (mg/L)	Reach Kr (1/days)	Kr Equation	Reach DO Goal (mg/L)
7.084	105.993	Tsivoglou	5
Reach Travel Time (days)			
0.020			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.002	14.36	1.54	7.27
0.004	14.31	1.54	7.42
0.006	14.26	1.53	7.54
0.008	14.21	1.53	7.64
0.010	14.16	1.53	7.64
0.012	14.11	1.52	7.64
0.014	14.06	1.52	7.64
0.016	14.01	1.52	7.64
0.018	13.96	1.52	7.64
0.020	13.92	1.51	7.64

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WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
11A	16317	BEAVERDAM BRANCH

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												
5.210	6.09	0.00	6.09	16.7076	0.00788	.802	50.24	62.65	0.57	0.141	24.29	6.89
3.900	6.90	0.00	6.90	17.0597	0.02273	.892	43.47	48.74	0.62	0.020	24.24	6.91
Q1-10 Flow												
5.210	5.48	0.00	5.48	16.7076	0.00788	NA	NA	NA	0.56	0.144	24.35	6.88
3.900	6.21	0.00	6.21	17.0597	0.02273	NA	NA	NA	0.61	0.020	24.29	6.90
Q30-10 Flow												
5.210	7.00	0.00	7.00	16.7076	0.00788	NA	NA	NA	0.58	0.138	24.22	6.91
3.900	7.94	0.00	7.94	17.0597	0.02273	NA	NA	NA	0.63	0.019	24.16	6.92

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C. Toxics Management Spreadsheet

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Toxics Management Spreadsheet
Version 1.2, February 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Altoona Westerly STP** NPDES Permit No.: **PA0027022** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Sewage**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
10.8	201	6.77						

Group	Discharge Pollutant	Units		Max Discharge Conc	Trib Conc (0 if left blank)	Stream Conc (0 if left blank)	Daily CV (0.5 if left blank)	Hourly CV (0.5 if left blank)	Stream CV (0 if left blank)	Fate Coeff (0 if left blank)	FOS (0 if left blank)	Criteria Mod (1 if left blank)	Chem Transl (1 if left blank)
Group 1	Total Dissolved Solids (PWS)	mg/L		564									
	Chloride (PWS)	mg/L		203									
	Bromide	mg/L		0.952									
	Sulfate (PWS)	mg/L		95									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		120									
	Total Antimony	µg/L		1									
	Total Arsenic	µg/L		5.6									
	Total Barium	µg/L		131									
	Total Beryllium	µg/L	<	0.676									
	Total Boron	µg/L		612									
	Total Cadmium	µg/L	<	0.123									
	Total Chromium (III)	µg/L		5.86									
	Hexavalent Chromium	µg/L	<	0.25									
	Total Cobalt	µg/L		2.25									
	Total Copper	µg/L		3.99									
	Free Cyanide	µg/L		12									
	Total Cyanide	µg/L		7									
	Dissolved Iron	µg/L		70									
	Total Iron	µg/L		130									
	Total Lead	µg/L		1.55									
	Total Manganese	µg/L		76.2									
	Total Mercury	µg/L	<	0.521									
	Total Nickel	µg/L		13.5									
	Total Phenols (Phenolics) (PWS)	µg/L	<	5									
	Total Selenium	µg/L	<	2									
	Total Silver	µg/L	<	1.37									
	Total Thallium	µg/L	<	0.068									
	Total Zinc	µg/L		55.7									
	Total Molybdenum	µg/L		5.54									
	Acrolein	µg/L	<	1.95									
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<	0.51									
	Benzene	µg/L	<	0.43									
	Bromoform	µg/L	<	0.34									

Group 3	Carbon Tetrachloride	µg/L	<	0.51									
	Chlorobenzene	µg/L		0.21									
	Chlorodibromomethane	µg/L	<	0.32									
	Chloroethane	µg/L	<	0.36									
	2-Chloroethyl Vinyl Ether	µg/L	<	4									
	Chloroform	µg/L	<	0.51									
	Dichlorobromomethane	µg/L	<	0.39									
	1,1-Dichloroethane	µg/L	<	0.42									
	1,2-Dichloroethane	µg/L	<	0.39									
	1,1-Dichloroethylene	µg/L	<	0.33									
	1,2-Dichloropropane	µg/L	<	0.42									
	1,3-Dichloropropylene	µg/L	<	0.26									
	1,4-Dioxane	µg/L		3.9									
	Ethylbenzene	µg/L	<	0.27									
	Methyl Bromide	µg/L	<	0.46									
	Methyl Chloride	µg/L	<	0.36									
	Methylene Chloride	µg/L	<	0.45									
	1,1,2,2-Tetrachloroethane	µg/L	<	0.36									
	Tetrachloroethylene	µg/L	<	0.39									
	Toluene	µg/L	<	0.33									
	1,2-trans-Dichloroethylene	µg/L	<	0.39									
	1,1,1-Trichloroethane	µg/L	<	0.38									
	1,1,2-Trichloroethane	µg/L	<	0.24									
	Trichloroethylene	µg/L	<	0.46									
	Vinyl Chloride	µg/L	<	0.46									
Group 4	2-Chlorophenol	µg/L	<	0.13									
	2,4-Dichlorophenol	µg/L	<	0.25									
	2,4-Dimethylphenol	µg/L	<	0.26									
	4,6-Dinitro-o-Cresol	µg/L	<	0.9									
	2,4-Dinitrophenol	µg/L	<	0.86									
	2-Nitrophenol	µg/L	<	0.25									
	4-Nitrophenol	µg/L	<	0.19									
	p-Chloro-m-Cresol	µg/L	<	0.4									
	Pentachlorophenol	µg/L	<	0.97									
	Phenol	µg/L	<	0.25									
	2,4,6-Trichlorophenol	µg/L	<	0.24									
Group 5	Acenaphthene	µg/L	<	0.26									
	Acenaphthylene	µg/L	<	0.22									
	Anthracene	µg/L	<	0.13									
	Benzidine	µg/L	<	0.35									
	Benzo(a)Anthracene	µg/L	<	0.21									
	Benzo(a)Pyrene	µg/L	<	0.29									
	3,4-Benzofluoranthene	µg/L	<	0.31									
	Benzo(ghi)Perylene	µg/L	<	0.32									
	Benzo(k)Fluoranthene	µg/L	<	0.4									
	Bis(2-Chloroethoxy)Methane	µg/L	<	0.15									
	Bis(2-Chloroethyl)Ether	µg/L	<	0.25									
	Bis(2-Chloroisopropyl)Ether	µg/L	<	0.34									
	Bis(2-Ethylhexyl)Phthalate	µg/L		2.9									
	4-Bromophenyl Phenyl Ether	µg/L	<	0.19									
	Butyl Benzyl Phthalate	µg/L	<	0.38									
	2-Chloronaphthalene	µg/L	<	0.28									
	4-Chlorophenyl Phenyl Ether	µg/L	<	0.29									
	Chrysene	µg/L	<	0.45									
	Dibenzo(a,h)Anthrancene	µg/L	<	0.28									
	1,2-Dichlorobenzene	µg/L	<	0.32									
	1,3-Dichlorobenzene	µg/L	<	0.19									
	1,4-Dichlorobenzene	µg/L	<	0.16									
	3,3-Dichlorobenzidine	µg/L	<	0.13									
	Diethyl Phthalate	µg/L	<	0.27									
	Dimethyl Phthalate	µg/L	<	0.23									
	Di-n-Butyl Phthalate	µg/L		1.3									
	2,4-Dinitrotoluene	µg/L	<	0.77									

	2,6-Dinitrotoluene	µg/L	<	0.32
	Di-n-Octyl Phthalate	µg/L		6.18
	1,2-Diphenylhydrazine	µg/L		0.23
	Fluoranthene	µg/L	<	0.35
	Fluorene	µg/L	<	0.25
	Hexachlorobenzene	µg/L	<	0.25
	Hexachlorobutadiene	µg/L	<	0.27
	Hexachlorocyclopentadiene	µg/L	<	0.22
	Hexachloroethane	µg/L	<	0.26
	Indeno(1,2,3-cd)Pyrene	µg/L	<	0.25
	Isophorone	µg/L	<	0.23
	Naphthalene	µg/L	<	0.25
	Nitrobenzene	µg/L	<	0.26
	n-Nitrosodimethylamine	µg/L	<	0.27
	n-Nitrosodi-n-Propylamine	µg/L	<	0.31
	n-Nitrosodiphenylamine	µg/L	<	0.4
	Phenanthrene	µg/L	<	0.21
	Pyrene	µg/L	<	0.16
	1,2,4-Trichlorobenzene	µg/L	<	0.17
Group 6	Aldrin	µg/L	<	0.0035
	alpha-BHC	µg/L	<	0.0061
	beta-BHC	µg/L	<	0.0113
	gamma-BHC	µg/L	<	0.0027
	delta BHC	µg/L	<	0.00605
	Chlordane	µg/L	<	0.125
	4,4-DDT	µg/L	<	0.0033
	4,4-DDE	µg/L	<	0.0049
	4,4-DDD	µg/L	<	0.0033
	Dieldrin	µg/L	<	0.0036
	alpha-Endosulfan	µg/L	<	0.0168
	beta-Endosulfan	µg/L	<	0.0017
	Endosulfan Sulfate	µg/L	<	0.0037
	Endrin	µg/L	<	0.0062
	Endrin Aldehyde	µg/L	<	0.013
	Heptachlor	µg/L	<	0.00555
	Heptachlor Epoxide	µg/L	<	0.00265
	PCB-1016	µg/L	<	0.208
	PCB-1221	µg/L	<	
	PCB-1232	µg/L	<	
	PCB-1242	µg/L	<	
	PCB-1248	µg/L	<	
	PCB-1254	µg/L	<	
	PCB-1260	µg/L	<	
	PCBs, Total	µg/L	<	
	Toxaphene	µg/L	<	
	2,3,7,8-TCDD	ng/L	<	
Group 7	Gross Alpha	pCi/L		
	Total Beta	pCi/L	<	
	Radium 226/228	pCi/L	<	
	Total Strontium	µg/L	<	
	Total Uranium	µg/L	<	
	Osmotic Pressure	mOs/kg		

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Toxics Management Spreadsheet
Version 1.2, February 2021

Stream / Surface Water Information

Altoona Westerly STP , NPDES Permit No. PA0027022, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: Beaverdam Branch

No. Reaches to Model: 1

◉ Statewide Criteria
◯ Great Lakes Criteria
◯ ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	016317	5.21	1043	37.6			Yes
End of Reach 1	016317	3.9	988.5	42.6			Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	5.21	0.162										100	7.81		
End of Reach 1	3.9	0.162													

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	5.21														
End of Reach 1	3.9														

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Toxics Management Spreadsheet
Version 1.2, February 2021

Model Results

Altoona Westerly STP , NPDES Permit No. PA0027022, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All ○ Inputs ○ Results ○ Limits

☐ *Hydrodynamics*

☑ *Wasteload Allocations*

☑ ***AFC*** CCT (min): 3.874 PMF: 1 Analysis Hardness (mg/l): 174.02 Analysis pH: 6.89

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	750	750	1,023	
Total Antimony	0	0		0	1,100	1,100	1,501	
Total Arsenic	0	0		0	340	340	464	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	28,656	
Total Boron	0	0		0	8,100	8,100	11,053	
Total Cadmium	0	0		0	3.450	3.75	5.11	Chem Translator of 0.921 applied
Total Chromium (III)	0	0		0	896.884	2,838	3,873	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	22.2	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	130	
Total Copper	0	0		0	22.649	23.6	32.2	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	30.0	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	117.389	165	226	Chem Translator of 0.71 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	2.25	Chem Translator of 0.85 applied
Total Nickel	0	0		0	748.173	750	1,023	Chem Translator of 0.998 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	8.341	9.81	13.4	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	88.7	
Total Zinc	0	0		0	187.372	192	261	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	4.09	

Acrylonitrile	0	0		0	650	650	887	
Benzene	0	0		0	640	640	873	
Bromoform	0	0		0	1,800	1,800	2,456	
Carbon Tetrachloride	0	0		0	2,800	2,800	3,821	
Chlorobenzene	0	0		0	1,200	1,200	1,637	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	24,562	
Chloroform	0	0		0	1,900	1,900	2,593	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	15,000	15,000	20,469	
1,1-Dichloroethylene	0	0		0	7,500	7,500	10,234	
1,2-Dichloropropane	0	0		0	11,000	11,000	15,010	
1,3-Dichloropropylene	0	0		0	310	310	423	
Ethylbenzene	0	0		0	2,900	2,900	3,957	
Methyl Bromide	0	0		0	550	550	751	
Methyl Chloride	0	0		0	28,000	28,000	38,208	
Methylene Chloride	0	0		0	12,000	12,000	16,375	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	1,365	
Tetrachloroethylene	0	0		0	700	700	955	
Toluene	0	0		0	1,700	1,700	2,320	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	9,279	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	4,094	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	4,640	
Trichloroethylene	0	0		0	2,300	2,300	3,139	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	560	560	764	
2,4-Dichlorophenol	0	0		0	1,700	1,700	2,320	
2,4-Dimethylphenol	0	0		0	660	660	901	
4,6-Dinitro-o-Cresol	0	0		0	80	80.0	109	
2,4-Dinitrophenol	0	0		0	660	660	901	
2-Nitrophenol	0	0		0	8,000	8,000	10,917	
4-Nitrophenol	0	0		0	2,300	2,300	3,139	
p-Chloro-m-Cresol	0	0		0	160	160	218	
Pentachlorophenol	0	0		0	7.817	7.82	10.7	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	460	460	628	
Acenaphthene	0	0		0	83	83.0	113	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	300	300	409	
Benzo(a)Anthracene	0	0		0	0.5	0.5	0.68	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	30,000	30,000	40,937	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	6,141	
4-Bromophenyl Phenyl Ether	0	0		0	270	270	368	
Butyl Benzyl Phthalate	0	0		0	140	140	191	

2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	820	820	1,119	
1,3-Dichlorobenzene	0	0		0	350	350	478	
1,4-Dichlorobenzene	0	0		0	730	730	996	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	4,000	4,000	5,458	
Dimethyl Phthalate	0	0		0	2,500	2,500	3,411	
Di-n-Butyl Phthalate	0	0		0	110	110	150	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	2,183	
2,6-Dinitrotoluene	0	0		0	990	990	1,351	
1,2-Diphenylhydrazine	0	0		0	15	15.0	20.5	
Fluoranthene	0	0		0	200	200	273	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	10	10.0	13.6	
Hexachlorocyclopentadiene	0	0		0	5	5.0	6.82	
Hexachloroethane	0	0		0	60	60.0	81.9	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	13,646	
Naphthalene	0	0		0	140	140	191	
Nitrobenzene	0	0		0	4,000	4,000	5,458	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	23,198	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	409	
Phenanthrene	0	0		0	5	5.0	6.82	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	177	
Aldrin	0	0		0	3	3.0	4.09	
alpha-BHC	0	0		0	N/A	N/A	N/A	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	0.95	0.95	1.3	
Chlordane	0	0		0	2.4	2.4	3.27	
4,4-DDT	0	0		0	1.1	1.1	1.5	
4,4-DDE	0	0		0	1.1	1.1	1.5	
4,4-DDD	0	0		0	1.1	1.1	1.5	
Dieldrin	0	0		0	0.24	0.24	0.33	
alpha-Endosulfan	0	0		0	0.22	0.22	0.3	
beta-Endosulfan	0	0		0	0.22	0.22	0.3	
Endrin	0	0		0	0.086	0.086	0.12	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.52	0.52	0.71	
Heptachlor Epoxide	0	0		0	0.5	0.5	0.68	

☑ *CFC* CCT (min): 3.874 PMF: 1 Analysis Hardness (mg/l): 174.02 Analysis pH: 6.89

Pollutants	Stream Conc	Stream	Trib Conc	Fate	WQC	WQ Obj	WLA (ug/L)	Comments

Pollutants	Conc (µg/L)	CV	(µg/L)	Coef	(µg/L)	(µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	300	
Total Arsenic	0	0		0	150	150	205	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	5,595	
Total Boron	0	0		0	1,600	1,600	2,183	
Total Cadmium	0	0		0	0.361	0.41	0.56	Chem Translator of 0.886 applied
Total Chromium (III)	0	0		0	116.666	136	185	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	14.2	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	25.9	
Total Copper	0	0		0	14.378	15.0	20.4	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	7.1	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	2,047	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	4.574	6.44	8.79	Chem Translator of 0.71 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	1.24	Chem Translator of 0.85 applied
Total Nickel	0	0		0	83.099	83.3	114	Chem Translator of 0.997 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	4.600	4.99	6.81	Chem Translator of 0.922 applied
Total Silver	0	0		0	N/A	N/A	N/A	Chem Translator of 1 applied
Total Thallium	0	0		0	13	13.0	17.7	
Total Zinc	0	0		0	188.905	192	261	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	4.09	
Acrylonitrile	0	0		0	130	130	177	
Benzene	0	0		0	130	130	177	
Bromoform	0	0		0	370	370	505	
Carbon Tetrachloride	0	0		0	560	560	764	
Chlorobenzene	0	0		0	240	240	327	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	4,776	
Chloroform	0	0		0	390	390	532	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	4,230	
1,1-Dichloroethylene	0	0		0	1,500	1,500	2,047	
1,2-Dichloropropane	0	0		0	2,200	2,200	3,002	
1,3-Dichloropropylene	0	0		0	61	61.0	83.2	
Ethylbenzene	0	0		0	580	580	791	
Methyl Bromide	0	0		0	110	110	150	
Methyl Chloride	0	0		0	5,500	5,500	7,505	
Methylene Chloride	0	0		0	2,400	2,400	3,275	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	287	

Tetrachloroethylene	0	0		0	140	140	191	
Toluene	0	0		0	330	330	450	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	1,910	
1,1,1-Trichloroethane	0	0		0	610	610	832	
1,1,2-Trichloroethane	0	0		0	680	680	928	
Trichloroethylene	0	0		0	450	450	614	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	150	
2,4-Dichlorophenol	0	0		0	340	340	464	
2,4-Dimethylphenol	0	0		0	130	130	177	
4,6-Dinitro-o-Cresol	0	0		0	16	16.0	21.8	
2,4-Dinitrophenol	0	0		0	130	130	177	
2-Nitrophenol	0	0		0	1,600	1,600	2,183	
4-Nitrophenol	0	0		0	470	470	641	
p-Chloro-m-Cresol	0	0		0	30	30.0	40.9	
Pentachlorophenol	0	0		0	5.997	6.0	8.18	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	124	
Acenaphthene	0	0		0	17	17.0	23.2	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	59	59.0	80.5	
Benzo(a)Anthracene	0	0		0	0.1	0.1	0.14	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	6,000	6,000	8,187	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	1,242	
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	73.7	
Butyl Benzyl Phthalate	0	0		0	35	35.0	47.8	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	160	160	218	
1,3-Dichlorobenzene	0	0		0	69	69.0	94.2	
1,4-Dichlorobenzene	0	0		0	150	150	205	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	800	800	1,092	
Dimethyl Phthalate	0	0		0	500	500	682	
Di-n-Butyl Phthalate	0	0		0	21	21.0	28.7	
2,4-Dinitrotoluene	0	0		0	320	320	437	
2,6-Dinitrotoluene	0	0		0	200	200	273	
1,2-Diphenylhydrazine	0	0		0	3	3.0	4.09	
Fluoranthene	0	0		0	40	40.0	54.6	
Fluorene	0	0		0	N/A	N/A	N/A	

Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	2	2.0	2.73	
Hexachlorocyclopentadiene	0	0		0	1	1.0	1.36	
Hexachloroethane	0	0		0	12	12.0	16.4	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	2,100	2,100	2,866	
Naphthalene	0	0		0	43	43.0	58.7	
Nitrobenzene	0	0		0	810	810	1,105	
n-Nitrosodimethylamine	0	0		0	3,400	3,400	4,640	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	59	59.0	80.5	
Phenanthrene	0	0		0	1	1.0	1.36	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	26	26.0	35.5	
Aldrin	0	0		0	0.1	0.1	0.14	
alpha-BHC	0	0		0	N/A	N/A	N/A	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	N/A	N/A	N/A	
Chlordane	0	0		0	0.0043	0.004	0.006	
4,4-DDT	0	0		0	0.001	0.001	0.001	
4,4-DDE	0	0		0	0.001	0.001	0.001	
4,4-DDD	0	0		0	0.001	0.001	0.001	
Dieldrin	0	0		0	0.056	0.056	0.076	
alpha-Endosulfan	0	0		0	0.056	0.056	0.076	
beta-Endosulfan	0	0		0	0.056	0.056	0.076	
Endrin	0	0		0	0.036	0.036	0.049	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.0038	0.004	0.005	
Heptachlor Epoxide	0	0		0	0.0038	0.004	0.005	

☑ ***THH*** CCT (min): 3.874 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	7.64	
Total Arsenic	0	0		0	10	10.0	13.6	
Total Barium	0	0		0	2,400	2,400	3,275	
Total Boron	0	0		0	3,100	3,100	4,230	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	

Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	140	140	191	
Dissolved Iron	0	0		0	300	300	409	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	1,365	
Total Mercury	0	0		0	0.050	0.05	0.068	
Total Nickel	0	0		0	610	610	832	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	0.24	0.24	0.33	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	6	6.0	8.19	
Acrylonitrile	0	0		0	N/A	N/A	N/A	
Benzene	0	0		0	N/A	N/A	N/A	
Bromoform	0	0		0	N/A	N/A	N/A	
Carbon Tetrachloride	0	0		0	N/A	N/A	N/A	
Chlorobenzene	0	0		0	130	130	177	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	N/A	N/A	N/A	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	N/A	N/A	N/A	
1,1-Dichloroethylene	0	0		0	33	33.0	45.0	
1,2-Dichloropropane	0	0		0	N/A	N/A	N/A	
1,3-Dichloropropylene	0	0		0	N/A	N/A	N/A	
Ethylbenzene	0	0		0	530	530	723	
Methyl Bromide	0	0		0	47	47.0	64.1	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	N/A	N/A	N/A	
1,1,2,2-Tetrachloroethane	0	0		0	N/A	N/A	N/A	
Tetrachloroethylene	0	0		0	N/A	N/A	N/A	
Toluene	0	0		0	1,300	1,300	1,774	
1,2-trans-Dichloroethylene	0	0		0	140	140	191	
1,1,1-Trichloroethane	0	0		0	N/A	N/A	N/A	
1,1,2-Trichloroethane	0	0		0	N/A	N/A	N/A	
Trichloroethylene	0	0		0	N/A	N/A	N/A	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	81	81.0	111	
2,4-Dichlorophenol	0	0		0	77	77.0	105	
2,4-Dimethylphenol	0	0		0	380	380	519	
4,6-Dinitro-o-Cresol	0	0		0	13	13.0	17.7	
2,4-Dinitrophenol	0	0		0	69	69.0	94.2	

2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	10,400	10,400	14,192	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Acenaphthene	0	0		0	670	670	914	
Anthracene	0	0		0	8,300	8,300	11,326	
Benzidine	0	0		0	N/A	N/A	N/A	
Benzo(a)Anthracene	0	0		0	N/A	N/A	N/A	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroisopropyl)Ether	0	0		0	1,400	1,400	1,910	
Bis(2-Ethylhexyl)Phthalate	0	0		0	N/A	N/A	N/A	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	150	150	205	
2-Chloronaphthalene	0	0		0	1,000	1,000	1,365	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	420	420	573	
1,3-Dichlorobenzene	0	0		0	420	420	573	
1,4-Dichlorobenzene	0	0		0	420	420	573	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	17,000	17,000	23,198	
Dimethyl Phthalate	0	0		0	270,000	270,000	368,436	
Di-n-Butyl Phthalate	0	0		0	2,000	2,000	2,729	
2,4-Dinitrotoluene	0	0		0	N/A	N/A	N/A	
2,6-Dinitrotoluene	0	0		0	N/A	N/A	N/A	
1,2-Diphenylhydrazine	0	0		0	N/A	N/A	N/A	
Fluoranthene	0	0		0	130	130	177	
Fluorene	0	0		0	1,100	1,100	1,501	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	N/A	N/A	N/A	
Hexachlorocyclopentadiene	0	0		0	40	40.0	54.6	
Hexachloroethane	0	0		0	N/A	N/A	N/A	
Indeno(1,2,3-cd)Pyrene	0	0		0	0.0038	0.004	0.005	
Isophorone	0	0		0	35	35.0	47.8	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	17	17.0	23.2	
n-Nitrosodimethylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	N/A	N/A	N/A	
Phenanthrene	0	0		0	N/A	N/A	N/A	

Pyrene	0	0		0	830	830	1,133	
1,2,4-Trichlorobenzene	0	0		0	35	35.0	47.8	
Aldrin	0	0		0	N/A	N/A	N/A	
alpha-BHC	0	0		0	N/A	N/A	N/A	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	0.098	0.098	0.13	
Chlordane	0	0		0	N/A	N/A	N/A	
4,4-DDT	0	0		0	N/A	N/A	N/A	
4,4-DDE	0	0		0	N/A	N/A	N/A	
4,4-DDD	0	0		0	N/A	N/A	N/A	
Dieldrin	0	0		0	N/A	N/A	N/A	
alpha-Endosulfan	0	0		0	62	62.0	84.6	
beta-Endosulfan	0	0		0	62	62.0	84.6	
Endrin	0	0		0	0.059	0.059	0.081	
Endrin Aldehyde	0	0		0	0.29	0.29	0.4	
Heptachlor	0	0		0	N/A	N/A	N/A	
Heptachlor Epoxide	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 14.564 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Barium	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	

Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	0.051	0.051	0.16	
Benzene	0	0		0	1.2	1.2	3.79	
Bromoform	0	0		0	4.3	4.3	13.6	
Carbon Tetrachloride	0	0		0	0.23	0.23	0.73	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.4	0.4	1.26	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	5.7	5.7	18.0	
Dichlorobromomethane	0	0		0	0.55	0.55	1.74	
1,2-Dichloroethane	0	0		0	0.38	0.38	1.2	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	N/A	N/A	N/A	
1,3-Dichloropropylene	0	0		0	0.34	0.34	1.07	
Ethylbenzene	0	0		0	N/A	N/A	N/A	
Methyl Bromide	0	0		0	N/A	N/A	N/A	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	4.6	4.6	14.5	
1,1,2,2-Tetrachloroethane	0	0		0	0.17	0.17	0.54	
Tetrachloroethylene	0	0		0	0.69	0.69	2.18	
Toluene	0	0		0	N/A	N/A	N/A	
1,2-trans-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,1,1-Trichloroethane	0	0		0	N/A	N/A	N/A	
1,1,2-Trichloroethane	0	0		0	0.59	0.59	1.86	
Trichloroethylene	0	0		0	2.5	2.5	7.89	
Vinyl Chloride	0	0		0	0.025	0.025	0.079	
2-Chlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dichlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dimethylphenol	0	0		0	N/A	N/A	N/A	
4,6-Dinitro-o-Cresol	0	0		0	N/A	N/A	N/A	
2,4-Dinitrophenol	0	0		0	N/A	N/A	N/A	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	0.270	0.27	0.85	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.4	1.4	4.42	
Acenaphthene	0	0		0	N/A	N/A	N/A	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	0.000086	0.00009	0.0003	
Benzo(a)Anthracene	0	0		0	0.0038	0.004	0.012	
Benzo(a)Pyrene	0	0		0	0.0038	0.004	0.012	
3,4-Benzofluoranthene	0	0		0	0.0038	0.004	0.012	

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Benzo(k)Fluoranthene	0	0		0	0.0038	0.004	0.012	
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	0.095	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	1.2	1.2	3.79	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	N/A	N/A	N/A	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	0.0038	0.004	0.012	
Dibenzo(a,h)Anthrancene	0	0		0	0.0038	0.004	0.012	
1,2-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,3-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,4-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
3,3-Dichlorobenzidine	0	0		0	0.021	0.021	0.066	
Diethyl Phthalate	0	0		0	N/A	N/A	N/A	
Dimethyl Phthalate	0	0		0	N/A	N/A	N/A	
Di-n-Butyl Phthalate	0	0		0	N/A	N/A	N/A	
2,4-Dinitrotoluene	0	0		0	0.05	0.05	0.16	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	0.16	
1,2-Diphenylhydrazine	0	0		0	0.036	0.036	0.11	
Fluoranthene	0	0		0	N/A	N/A	N/A	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	0.00028	0.0003	0.0009	
Hexachlorobutadiene	0	0		0	0.44	0.44	1.39	
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A	
Hexachloroethane	0	0		0	1.4	1.4	4.42	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	N/A	N/A	N/A	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	N/A	N/A	N/A	
n-Nitrosodimethylamine	0	0		0	0.00069	0.0007	0.002	
n-Nitrosodi-n-Propylamine	0	0		0	0.005	0.005	0.016	
n-Nitrosodiphenylamine	0	0		0	3.3	3.3	10.4	
Phenanthrene	0	0		0	N/A	N/A	N/A	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	N/A	N/A	N/A	
Aldrin	0	0		0	0.000049	0.00005	0.0002	
alpha-BHC	0	0		0	0.0026	0.003	0.008	
beta-BHC	0	0		0	0.0091	0.009	0.029	
gamma-BHC	0	0		0	N/A	N/A	N/A	
Chlordane	0	0		0	0.0008	0.0008	0.003	
4,4-DDT	0	0		0	0.00022	0.0002	0.0007	
4,4-DDE	0	0		0	0.00022	0.0002	0.0007	
4,4-DDD	0	0		0	0.00031	0.0003	0.001	
Dieldrin	0	0		0	0.000052	0.00005	0.0002	
alpha-Endosulfan	0	0		0	N/A	N/A	N/A	

beta-Endosulfan	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	N/A	N/A	N/A	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.000079	0.00008	0.0002	
Heptachlor Epoxide	0	0		0	0.000039	0.00004	0.0001	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		Concentration Limits						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Aluminum	Report	Report	Report	Report	Report	µg/L	750	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Antimony	Report	Report	Report	Report	Report	µg/L	7.64	THH	Discharge Conc > 10% WQBEL (no RP)
Total Arsenic	Report	Report	Report	Report	Report	µg/L	13.6	THH	Discharge Conc > 10% WQBEL (no RP)
Total Boron	Report	Report	Report	Report	Report	µg/L	2,183	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Copper	Report	Report	Report	Report	Report	µg/L	20.4	CFC	Discharge Conc > 10% WQBEL (no RP)
Free Cyanide	0.64	1.	7.1	11.1	17.7	µg/L	7.1	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Dissolved Iron	Report	Report	Report	Report	Report	µg/L	409	THH	Discharge Conc > 10% WQBEL (no RP)
Total Lead	Report	Report	Report	Report	Report	µg/L	8.79	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Mercury	0.006	0.01	0.068	0.11	0.17	µg/L	0.068	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Nickel	Report	Report	Report	Report	Report	µg/L	114	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Silver	Report	Report	Report	Report	Report	µg/L	9.81	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	192	AFC	Discharge Conc > 10% WQBEL (no RP)
Carbon Tetrachloride	0.065	0.1	0.73	1.13	1.82	µg/L	0.73	CRL	Discharge Conc ≥ 50% WQBEL (RP)
Bis(2-Ethylhexyl)Phthalate	0.34	0.53	3.79	5.91	9.47	µg/L	3.79	CRL	Discharge Conc ≥ 50% WQBEL (RP)
1,2-Diphenylhydrazine	0.01	0.016	0.11	0.18	0.28	µg/L	0.11	CRL	Discharge Conc ≥ 50% WQBEL (RP)

☐ ***Other Pollutants without Limits or Monitoring***

D. TMS for Resampled Data

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.2, February 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Altoona Westerly STP** NPDES Permit No.: **PA0027022** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Sewage**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
10.8	201	6.77						

	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
					0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
Group 1	Total Dissolved Solids (PWS)	mg/L											
	Chloride (PWS)	mg/L											
	Bromide	mg/L											
	Sulfate (PWS)	mg/L											
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		138									
	Total Antimony	µg/L		0.76									
	Total Arsenic	µg/L		3.94									
	Total Barium	µg/L											
	Total Beryllium	µg/L	<										
	Total Boron	µg/L		400.2									
	Total Cadmium	µg/L	<										
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L	<										
	Total Cobalt	µg/L											
	Total Copper	µg/L		6.42									
	Free Cyanide	µg/L		8.56									
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L		86.3									
	Total Iron	µg/L											
	Total Lead	µg/L		4.34									
	Total Manganese	µg/L											
	Total Mercury	µg/L	<	0.104									
	Total Nickel	µg/L		25.16									
	Total Phenols (Phenolics) (PWS)	µg/L	<										
	Total Selenium	µg/L	<										
	Total Silver	µg/L	<	0.274									
	Total Thallium	µg/L	<										
	Total Zinc	µg/L		69.27									
	Total Molybdenum	µg/L											
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

Group 3	Carbon Tetrachloride	µg/L	<	0.49									
	Chlorobenzene	µg/L											
	Chlorodibromomethane	µg/L	<										
	Chloroethane	µg/L	<										
	2-Chloroethyl Vinyl Ether	µg/L	<										
	Chloroform	µg/L	<										
	Dichlorobromomethane	µg/L	<										
	1,1-Dichloroethane	µg/L	<										
	1,2-Dichloroethane	µg/L	<										
	1,1-Dichloroethylene	µg/L	<										
	1,2-Dichloropropane	µg/L	<										
	1,3-Dichloropropylene	µg/L	<										
	1,4-Dioxane	µg/L											
	Ethylbenzene	µg/L	<										
	Methyl Bromide	µg/L	<										
	Methyl Chloride	µg/L	<										
	Methylene Chloride	µg/L	<										
	1,1,2,2-Tetrachloroethane	µg/L	<										
	Tetrachloroethylene	µg/L	<										
	Toluene	µg/L	<										
	1,2-trans-Dichloroethylene	µg/L	<										
	1,1,1-Trichloroethane	µg/L	<										
	1,1,2-Trichloroethane	µg/L	<										
	Trichloroethylene	µg/L	<										
	Vinyl Chloride	µg/L	<										
Group 4	2-Chlorophenol	µg/L	<										
	2,4-Dichlorophenol	µg/L	<										
	2,4-Dimethylphenol	µg/L	<										
	4,6-Dinitro-o-Cresol	µg/L	<										
	2,4-Dinitrophenol	µg/L	<										
	2-Nitrophenol	µg/L	<										
	4-Nitrophenol	µg/L	<										
	p-Chloro-m-Cresol	µg/L	<										
	Pentachlorophenol	µg/L	<										
	Phenol	µg/L	<										
	2,4,6-Trichlorophenol	µg/L	<										
Group 5	Acenaphthene	µg/L	<										
	Acenaphthylene	µg/L	<										
	Anthracene	µg/L	<										
	Benzidine	µg/L	<										
	Benzo(a)Anthracene	µg/L	<										
	Benzo(a)Pyrene	µg/L	<										
	3,4-Benzofluoranthene	µg/L	<										
	Benzo(ghi)Perylene	µg/L	<										
	Benzo(k)Fluoranthene	µg/L	<										
	Bis(2-Chloroethoxy)Methane	µg/L	<										
	Bis(2-Chloroethyl)Ether	µg/L	<										
	Bis(2-Chloroisopropyl)Ether	µg/L	<										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<	0.84									
	4-Bromophenyl Phenyl Ether	µg/L	<										
	Butyl Benzyl Phthalate	µg/L	<										
	2-Chloronaphthalene	µg/L	<										
	4-Chlorophenyl Phenyl Ether	µg/L	<										
	Chrysene	µg/L	<										
	Dibenzo(a,h)Anthrancene	µg/L	<										
	1,2-Dichlorobenzene	µg/L	<										
	1,3-Dichlorobenzene	µg/L	<										
	1,4-Dichlorobenzene	µg/L	<										
	3,3-Dichlorobenzidine	µg/L	<										
	Diethyl Phthalate	µg/L	<										
	Dimethyl Phthalate	µg/L	<										
	Di-n-Butyl Phthalate	µg/L											
	2,4-Dinitrotoluene	µg/L	<										

Discharge Information 6/21/2021 Pag

	2,6-Dinitrotoluene	µg/L	<										
	Di-n-Octyl Phthalate	µg/L											
	1,2-Diphenylhydrazine	µg/L	<	0.2									
	Fluoranthene	µg/L	<										

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.2, February 2021

Stream / Surface Water Information

Altoona Westerly STP , NPDES Permit No. PA0027022, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: **Beaverdam Branch**

No. Reaches to Model: 1

◉ Statewide Criteria
○ Great Lakes Criteria
○ ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	016317	5.21	1043	37.6			Yes
End of Reach 1	016317	3.9	988.5	42.6			Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	5.21	0.162										100	7.81		
End of Reach 1	3.9	0.162													

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	5.21														
End of Reach 1	3.9														

Model Results

Altoona Westerly STP , NPDES Permit No. PA0027022, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All ○ Inputs ○ Results ○ Limits

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 3.874 PMF: 1 Analysis Hardness (mg/l): 174.02 Analysis pH: 6.89

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	750	750	1,023	
Total Antimony	0	0		0	1,100	1,100	1,501	
Total Arsenic	0	0		0	340	340	464	Chem Translator of 1 applied
Total Boron	0	0		0	8,100	8,100	11,053	
Total Copper	0	0		0	22.649	23.6	32.2	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	30.0	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	117.389	165	226	Chem Translator of 0.71 applied
Total Mercury	0	0		0	1.400	1.65	2.25	Chem Translator of 0.85 applied
Total Nickel	0	0		0	748.173	750	1,023	Chem Translator of 0.998 applied
Total Silver	0	0		0	8.341	9.81	13.4	Chem Translator of 0.85 applied
Total Zinc	0	0		0	187.372	192	261	Chem Translator of 0.978 applied
Carbon Tetrachloride	0	0		0	2,800	2,800	3,821	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	6,141	
1,2-Diphenylhydrazine	0	0		0	15	15.0	20.5	

☑ ***CFC*** CCT (min): 3.874 PMF: 1 Analysis Hardness (mg/l): 174.02 Analysis pH: 6.89

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Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	300	
Total Arsenic	0	0		0	150	150	205	Chem Translator of 1 applied
Total Boron	0	0		0	1,600	1,600	2,183	
Total Copper	0	0		0	14.378	15.0	20.4	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	7.1	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	4.574	6.44	8.79	Chem Translator of 0.71 applied
Total Mercury	0	0		0	0.770	0.91	1.24	Chem Translator of 0.85 applied
Total Nickel	0	0		0	83.099	83.3	114	Chem Translator of 0.997 applied
Total Silver	0	0		0	N/A	N/A	N/A	Chem Translator of 1 applied
Total Zinc	0	0		0	188.905	192	261	Chem Translator of 0.986 applied
Carbon Tetrachloride	0	0		0	560	560	764	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	1,242	
1,2-Diphenylhydrazine	0	0		0	3	3.0	4.09	

☑ ***THH*** CCT (min): 3.874 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	7.64	
Total Arsenic	0	0		0	10	10.0	13.6	
Total Boron	0	0		0	3,100	3,100	4,230	
Total Copper	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	140	140	191	
Dissolved Iron	0	0		0	300	300	409	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.050	0.05	0.068	
Total Nickel	0	0		0	610	610	832	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	
Carbon Tetrachloride	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	N/A	N/A	N/A	
1,2-Diphenylhydrazine	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 14.564 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	
Carbon Tetrachloride	0	0		0	0.23	0.23	0.73	
Bis(2-Ethylhexyl)Phthalate	0	0		0	1.2	1.2	3.79	
1,2-Diphenylhydrazine	0	0		0	0.036	0.036	0.11	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

Pollutants	*Mass Limits* AML (lbs/day)	*Mass Limits* MDL (lbs/day)	*Concentration Limits* AML	*Concentration Limits* MDL	*Concentration Limits* IMAX	*Concentration Limits* Units	Governing WQBEL	WQBEL Basis	Comments
Total Aluminum	Report	Report	Report	Report	Report	µg/L	750	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Arsenic	Report	Report	Report	Report	Report	µg/L	13.6	THH	Discharge Conc > 10% WQBEL (no RP)
Total Boron	Report	Report	Report	Report	Report	µg/L	2,183	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Copper	Report	Report	Report	Report	Report	µg/L	20.4	CFC	Discharge Conc > 10% WQBEL (no RP)
Free Cyanide	0.64	1.	7.1	11.1	17.7	µg/L	7.1	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Dissolved Iron	Report	Report	Report	Report	Report	µg/L	409	THH	Discharge Conc > 10% WQBEL (no RP)
Total Lead	Report	Report	Report	Report	Report	µg/L	8.79	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Nickel	Report	Report	Report	Report	Report	µg/L	114	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	192	AFC	Discharge Conc > 10% WQBEL (no RP)

E. TOXCON Results

Facility:	Altoona Westerly WWTP
NPDES #:	PA0027022
Outfall No:	001
n (Samples/Month):	4
Reviewer/Permit Engineer:	Pascal Kwedza

Parameter Name	Total Copper	Total Zinc	Total Aluminum	Total Antimony	Total Arsenic	Total Boron	Total Lead	Total Nickel	Dissolved Iron	2 Diphenylhydrazi	arbon Tetrachlorid	Free Cynanide
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Detection Limit												
Sample Date	*When entering values below the detection limit, enter "ND" or use the < notation (eg. <0.02)*											
4/7/2021	8.27	39.1	52.2	<0.536	2.5	519	1.15	9.64	61	<0.200	0.51	<4
3/31/2021	5.63	53.7	69.8	0.526	<2.5	176	3.98	5.14	<57	0.2	<0.510	<0.5
3/24/2021	4.77	62.2	56	<0.348	<0.73	177	2.51	5.93	64	<0.200	<0.510	8
3/17/2021	3.49	44.7	90	0.415	<0.4	37	0.539	6.86	<44	<0.200	0.51	<3
3/10/2021	2.46	37.7	17.2	0.386	<1.5	25.4	0.288	5.47	60	<0.200	<0.510	<5
3/3/2021	3.24	13.2	55.8	<0.348	<0.5	63.4	0.172	3.28	74	0.2	<0.510	<0.5
2/24/2021	4.27	39.6	112	<0.348	<1.5	29.3	0.999	5.86	60	<0.200	0.51	<5
12/15/2021	3.99	55.7	120	1	5.6	61.2	1.55	13.5	70	0.23	<0.510	<2
12/8/2021	3.01	33.2	40.4	0.522	3.6	36.2	1	50.2	62	<0.200	<0.510	12
12/4/2021	2.5	29	23.2	0.523	3	20.2	0.686	5.69	60	0.204	0.51	11

		Reviewer/Permit Engineer:	Pascal Kwedza
Facility:	Altoona Westerly WWTP		
NPDES #:	PA0027022		
Outfall No:	001		
n (Samples/Month):	4		

Parameter	Distribution Applied	Coefficient of Variation (daily)	Avg. Monthly
Total Copper (µg/L)	Lognormal	0.3897730	6.4198975
Total Zinc (µg/L)	Lognormal	0.4628339	69.2743665
Total Aluminum (µg/L)	Lognormal	0.7020980	138.2904074
Total Antimony (µg/L)	Delta-Lognormal	0.9303488	0.7647442
Total Arsenic (µg/L)	Delta-Lognormal	1.3481403	3.9383262
Total Boron (µg/L)	Lognormal	1.4109070	400.2408077
Total Lead (µg/L)	Lognormal	1.1982797	4.3399193
Total Nickel (µg/L)	Lognormal	0.8771333	25.1554652
Dissolved Iron (µg/L)	Delta-Lognormal	0.5079500	86.3213817
,2 Diphenylhydrazine (µg/	Delta-Lognormal	1.2293599	0.2018693
Carbon Tetrachloride (µg/L	Delta-Lognormal	1.2247449	0.4916900
Free Cynanide (µg/L)	Delta-Lognormal	1.5775702	8.5552366

F. Offsets Approved list

On-Lot Septic Systems Connected to Public Sewer					
Date- Connected	**Owner**	**Location**	**Facility**	**EDU's**	**On-lot Built Date**
5/15/2017	Ronald Eberhart	1041 Poland Avenue Altoona, PA 16601	West	1	11/30/1995
5/30/2017	Robert Stambugh	1037 Poland Avenue Altoona, PA 16601	West	1	8/31/1985
7/10/2017	Terrance Knob	577 Knob Lane, Altoona, PA 16601	West	1	8/31/1997
8/4/2017	Alfred Lachini	559 Knob Lane, Altoona, PA 16601	West	1	10/31/1985
11/8/2017		5126 W. Chestnut Avenue, Altoona, PA 16601	West	1	1980
7/8/2017		5144 W. Chestnut Avenue, Altoona, PA 16601	West	1	1980
9/8/2017		5125 W. Chestnut Avenue, Altoona, PA 16601	West	1	1980
12/5/2018	Rodney Mahue	2615 Robin Avenue, Altoona, PA 16602	West	1	2/28/1995
1/2/2019	Anthony Cannarsa	2627 Robin Avenue, Altoona, PA 16601	West	1	5/31/1997
4/1/2019	Brian Kormanski	325 Orchard Ave., Altoona, PA 16602	West	1	8/31/1992
4/3/2019	Patricia Gibson	2625 Robin Ave., Altoona, PA 16602	West	1	6/30/1976
7/24/2019	Gary Fredrick	1223 59th St., Altoona ,PA 16601	West	1	7/31/1986
8/12/2019	Kenneth Patterson	955 35th St., Altoona, PA 16601	West	1	10/19/1969
8/27/2019	Ronald Frye	956 35th St., Altoona, PA 16601	West	1	7/26/1973
8/27/2019	Marjorie Stacey	979 35th St., Altoona, PA 16601	West	1	5/31/1984
8/27/2019	Donald Myers	1005 36th St., Altoona, PA 16601	West	1	9/23/1962
8/28/2019	Naomi Dively	954 35th St., Altoona, PA 16601	West	1	6/30/1981
9/6/2019	Donal Breinich	1045 36th St., Altoona, PA 16601	West	1	12/31/1982
9/18/2019	Gregory Summers	965 35th St., Altoona, PA 16601	West	1	7/4/2001
			Total WP	**19**	

G. Long Term Control Plan Update

ALTOONA WATER AUTHORITY

WESTERLY WASTEWATER TREATMENT FACILITY
NPDES PERMIT NO. 0027022

WESTERLY COMBINED SEWER OVERFLOW
LONG-TERM CONTROL PLAN UPDATE

SEPTEMBER 2019
REVISED APRIL 2020

PREPARED BY:

GWIN, DOBSON & FOREMAN, INC.
ENGINEERS
ALTOONA, PA

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MARK V. GLENN
ENGINEER

04/28/2020

GD&F
GWIN
DOBSON &
FOREMAN
ENGINEERS

ALTOONA WATER AUTHORITY

WESTERLY WASTEWATER TREATMENT FACILITY
NPDES PERMIT NO. 0027022

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LONG-TERM CONTROL PLAN UPDATE

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WESTERLY COMBINED SEWER OVERFLOW
LONG-TERM CONTROL PLAN UPDATE
SEPTEMBER 2019
REVISED APRIL 2020

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ALTOONA WATER AUTHORITY
WESTERLY COMBINED SEWER OVERFLOW (CSO)
UPDATED LONG-TERM CONTROL PLAN (LTCP) STRATEGY
SEPTEMBER 2019

I LONG-TERM CONTROL PLAN STRATEGY AND PROCESS

A. CSO LTCP Development Process

The primary goal of the Westerly Altoona CSO LTCP is to develop a cost-effective solution to achieve water quality standards and maximizing the environmental benefits while considering the financial impacts to the member communities. The CSO LTCP will be developed using a two-phase process. The first phase will characterize the existing combined sewer system (CSS) and the water quality of the receiving waters. Baseline conditions are established, the second phase will identify and evaluate CSO control alternatives. The CSS characterization and the LTCP development process is shown below. The basis for this update is the 1994 USEPA CSO Control Policy, Subsection II, Long-Term Control Plan.

CSS CHARACTERIZATION

Receiving Waters Condition Assessment
Mapping, Database & Digitization
CSO Monitoring
CSS Model Development
Receiving Water Quality Model Development
WWTP Wet Weather Capacity Study

UPDATED LTCP DEVELOPMENT

Develop & Evaluate CSO Control Alternatives
Green Infrastructure Strategies
Financial Capability Assessment
CSO LTCP Program Schedule
CSO LTCP Program Implementation

The Altoona LTCP will consider and evaluate the cost effectiveness of a range of control options and strategies. The selected controls will be designed to allow cost effective facility operation or retrofitting of additional controls found to be necessary to meet water quality standards. This plan will also offer a realistic timetable for achieving cost-effective CSO control. Many elements of the Altoona LTCP include current tasks already performed by the Altoona Water Authority and which are described below.

II COMBINED SEWER SYSTEM AND RECEIVING WATER CHARACTERIZATION

A critical element in the planning and development of the Westerly Altoona CSO LTCP will be characterization of the CSS. It is essential to understand the existing systems response during dry weather and wet weather events, the frequency and volume of combined sewer overflows, and existing quality of the receiving waters prior to the development of strategies to minimize any potential impacts to the environment from CSOs.

1. Purpose:

   a. To effectively monitor events and conditions resulting in CSO discharges,
   b. To determine the nature and condition of the Altoona's combined sewer system and CSO control devices,
   c. To describe the receiving water quality and characterize the effect of CSO discharges on the receiving stream,
   d. To map CSO related features and conditions contributing to CSO discharges.

2. Structural Facilities Characterization

   a. Record and tabulate CSO occurrences, including their frequency, duration and volume. Altoona records these occurrences and submits them electronically in the supplemental form of the Discharge Monitoring Reports (DMRs) as required per Chapter 94.

A. Receiving Waters Conditions Assessment

According to Appendix A, a long-term sampling and monitoring effort will be performed which will include bacteriological, DO and conductivity monitoring (5 years) and an intensive SSO impact study assessment for the parameters including below.

A water quality sampling program will be implemented to develop an understanding of the water quality in the Beaverdam and Frankstown Branches of the Juniata River downstream of the Westerly CSO. The program will be based on a PADEP approved plan and will be limited to parameters where CSOs may cause or contribute to exceedances of water quality standards. Water quality data will be collected for the receiving water bodies during dry weather and during storm events in order to examine the potential effects of CSOs.

Dry weather samples will be collected to develop an understanding of specific background water quality parameters. Wet weather samples will be collected to ascertain the water quality impact of the wet weather events and CSOs on the receiving waters. Test parameters will include both fecal coliform and E-coli analyses in order to assess the data relative to the Ambient Water Quality criteria for protection of primary contact recreational use. Field measurements of general water quality physical chemical variables will also be made for temperature; specific conductance, pH and dissolved oxygen in order to assess the data relative to the existing PADEP standards.

During wet weather conditions, the samples at the CSO locations will be analyzed for fecal coliform, E-coli, total suspended solids (TSS), biological oxygen demand (BOD), Ammonia Nitrogen (NH_3), total Kjeldahl nitrogen (TKN) and total phosphorus (TP). Wet weather sampling will be selectively initiated at the activation of any one of the observed sites, depending on the overflow rate. These samples will be collected to determine the typical range of values for these parameters, and to verify that these values were consistent with expected values for combined sewage based upon published national averages and previous studies. Refer to Appendix A.

B. Mapping, Database and Digitization

A standard pre-requisite to the characterization of any system is the collection and organization of the available system data, information and mapping, Sewersheds, interceptors, WWTPs, CSO pumping and storage control structures, regulators, outfalls and major trunk sewers will be digitized into a geographic information system (GIS). In addition, field data and information will be compiled in a database and linked to the GIS. It is envisioned that the database and GIS layers will provide standards, protocols and templates that can be utilized to further build critical system information into the existing system-wide GIS.

The development and compilation of the existing infrastructure database and GIS information will be used to populate the CSS models and will provide Altoona additional long-term benefits (beyond the LTCP project) in regard to system operations and maintenance, planning and design support, and asset management. Much of the sewer system has been compiled and mapped by the Altoona Water Authority GIS Department.

C. CSO Impact Intensive Sampling and Monitoring Plan

A monitoring program, as detailed in Appendix A, will be conducted over an approved time frame to verify and supplement available CSS monitoring data. The monitoring program will include the installation of additional rain gauges and flow meters at key locations throughout the CSS. In addition, information from the existing flow monitoring program will be utilized. Permanently installed meters are located at the CSOs and wastewater treatment facility. Site installation reports and details, average conditions, data quality summaries, monthly scatter graphs, and monthly flow velocity and depth plots will be compiled for each of the metering locations.

Daily rainfall summaries and hyetographs will be compiled for the several rainfall monitoring locations. The collection of this data will provide valuable insights into the CSS response (during dry and wet periods), and aid in the overall system characterization and CSS model calibrations.

D. CSS Model Development

CSS models will be developed to characterize the systems, quantify CSO discharges and evaluate CSO control alternatives. This work will be done in accordance with protocols defined in a work plan to be approved by the PADEP. The CSS models will simulate conveyance of combined and sanitary flows through interceptor sewers, selected outfall sewers, CSO regulators and overflow conduits using USEPA Stormwater Management Model Version 5 (SWMM) modeling software.

The CSS model will be developed and calibrated to represent the systems tributary to the wastewater treatment facilities. The Westerly WWTF receives discharges from a combined sewer district comprised of a 2.2 square mile urban watershed (4th Sewer District, confined to the center City area) and separate sewer systems in Pleasant Valley, South Altoona, Garden Heights, Logan Boulevard and Logan and Allegheny Townships.

The CSS model will be developed for planning purposes and compiled to represent the interceptor sewers, regulator structures and overflow points. Record drawings, Altoona Water Authority GIS data, flow monitoring inspection reports and field surveys will be used, as applicable, to develop the geometry of the piping network.

Each model will be calibrated for dry weather flow, wet weather flow, and a multi-month continuous simulation using collected flow metering and rainfall data. To evaluate the existing system performance, a long-term simulation will be performed and checked against long-term WWTP data.

Baseline CSO statistics and percentage capture will be computed from the long-term simulation results.

E. Receiving Water Quality Model (RWQM) Development

A receiving water quality model will be developed to characterize the impacts of pollutants from each CSO discharge. The modeling will be designed to address the following questions:

- How far downstream are in-stream concentrations of dissolved oxygen sag, fecal coliform and E-coli bacteria likely to exceed water quality standards from the current CSO discharges (Existing Conditions)?
- What is the frequency of water quality standard exceedance for dissolved oxygen, fecal coliform and E-coli bacterial during the recreational season (Existing Conditions)?
- What are the improvements associated with in-stream levels of dissolved oxygen sag, fecal coliform and E-coli bacteria, and the reduction in the magnitude and extent (length) of receiving water impacts, associated with potential CSO control alternatives (Proposed Conditions)?
- How does the RWQM results compare to previous receiving water quality modeling performed by Altoona and what inferences may be ascertained based on stream improvements attained by existing CSO controls?

The USEPA Water Quality Analysis Simulation Program (WASP), Version 8.32 (release date April 2, 2019) will be used for the river hydrodynamics, dissolved oxygen, BOD, bacteria analysis, among others, as WASP will interface with the SWMM model for CSS data to simulate the rainfall-runoff process and the routing of flows through the sewer systems. For the receiving water modeling, the routing portion of SWMM will be used to simulate flow and hydraulics (depth and velocity). In addition, the model will use inputs from the downstream WWTPs and CSO discharges from the SWMM combined sewer system model. The model will be developed and compared with data previously developed in an earlier water quality model.

Available USGS stream gaging data will be obtained from the Williamsburg gaging station on the Frankstown Branch of the Juniata River and prorated to other areas of the watershed as applicable. Individual stream monitoring stations will be established during the study after an initial assessment is made of suitable stream monitoring locations.

For the Westerly CSO at Tuckahoe Park, the WASP model will be simulated for the maximum reach of the Beaverdam Branch and Frankstown Branch to its confluence with the Little Juniata River (41 miles) at Barree. Sampling data will ultimately guide the model boundaries.

1. RWQM Simulations

After establishing baseline conditions and depending on the results of in-stream sampling and testing, alternative control scenarios will be evaluated. This analysis will be done for each CSO system to develop a better understanding of the bacterial influences on the receiving streams and for identifying cost-effective CSO control strategies for achieving compliance with the water quality standards.

- Scenario 1 will assess conditions with all WWTPs providing seasonal disinfection to 200 cfu/100 ml from May 1 through October 30.

- Scenario 2 will assess the improvements included in Scenario 1 and stormwater headwater and tributary improvements to meet a water quality standard which is intended to isolate the contribution of CSOs to exceedance of the fecal coliform and E-coli bacteria primary contact recreational water quality standard.

- Scenario 3 will assess the improvements included in Scenario 1 and simulate combined sewer system improvements (additional storage, downstream treatment conveyance, disinfection options, etc.) to achieve compliance with the CSO Demonstration Approach. This scenario does not include improvement in storm sewer headwater or tributary bacteria concentrations.

- Scenario 4 will assess the benefits of only upgrading the combined sewer system to achieve and no improvement in stormwater headwater or tributary bacteria concentrations.

For all scenarios, model results will be compared to the baseline condition to assess the benefits of each scenario in reducing exceedance of the fecal and E-coli coliform bacteria standard and dissolved oxygen of the bacteria.

It should be noted that the Presumptive Approach (annual 85% CSO capture volume, limited to 4 and no more than 6 overflow events per year) is not a practicable CSO control strategy based on previous monitoring and modeling studies, current sampling and testing, previous alternatives evaluations and related cost-effectiveness studies.

G. WWTP Wet Weather Capacity Study

The CSO LTCP study will evaluate and confirm the wet weather treatment capacity of each CSO pumping/storage facility and WWTP using SWMM capabilities. The process and hydraulic capabilities of each plant's unit processes will be evaluated. The hydraulic capacity is defined as the maximum flow that can be passed through a unit process without exceeding a specific tank freeboard level.

The process capacity is defined as the maximum flow that can be treated in a unit process without exceeding treatment performance criteria. The treatment capacity will be determined as the flow that could successfully meet both the process and hydraulic criteria. For purposes of the evaluation, flow records and plant effluent data will be analyzed to determine treatment capacity effectiveness.

III LONG-TERM CONTROL PLAN DEVELOPMENT

General - The development of the Westerly Altoona CSO LTCP will consider the findings and conclusions of the RWQM for the achievement of CSO compliance.

Under the Presumptive Approach, the CSO control technologies must demonstrate an 85% capture of the annual CSO volume and be limited to 4-6 overflow events per year. Based on historic data and previous RWQM/CSO modeling studies, this approach is neither practicable nor feasible. An updated analysis for existing CSO control effectiveness is provided as an Appendix. **Therefore, the regulatory compliance strategy for the Westerly Altoona CSO system will utilize the Demonstrative Approach.**

This approach requires that Altoona demonstrate that the CSOs do not preclude the attainment of water quality standards or the designated uses of the receiving waters by a post-construction/post-stormwater BMP compliance monitoring program.

The assessment will consider both structural and non-structural technologies presented in EPA CSO guidance manuals and other appropriate stormwater BMP technologies to achieve LTCP goals and objectives. The SWMM program will be used as a technical resource to assess various control technologies.

To achieve compliance, CSO control technologies include a wide variety of options including WWTP improvements, stormwater best management practices, system optimization, limited sewer separation, floatables control, source treatment and tributaries enhancement. Specifically, the CSO control strategy will strive to:

- Achieve regulatory compliance as measured by the water quality standard for bacteria and dissolved oxygen.
- Optimize performance and capacity of existing infrastructure, wastewater conveyance and wastewater treatment facilities.
- Incorporate WWTP and system rehabilitation projects to address current needs and reduce risk of emergency repairs.
- Preserve capital for future operation and maintenance.

A. Develop and Evaluate CSO Control Alternatives

Ultimately, the Westerly Altoona CSO LTCP will take a build and measure approach to allow the Altoona Water Authority to cost-effectively address CSO related water quality compliance issues. The CSO LTCP will focus on the main contributors of the primary pollutions of concern (bacteria) and dissolved oxygen violations (if any) and then addresses other measures for improving system performance, reducing CSO discharges and controlling floatables in the overflows.

1. Identification and Screening of CSO Abatement Technologies

Specific factors that deem whether a technology is appropriate include: the water quality uses and goals, the current condition of the sewer system, the characteristics of the wet weather flow (peak flow rate, volume, frequency and duration), hydraulic and pollutant loading, climate, implementation requirements (land, neighborhood, noise, disruption), and maintenance requirements.

Each of the technologies to be evaluated are divided into two general categories, Best Management Practices (BMPs) and CSO Control Technologies. BMP Technologies are generally low-cost facilities or practices intended for reducing the volume of stormwater or the introduction of pollutants to the sewer system at the source. Many of the quantity and quality source control measures are already under consideration by the City of Altoona and Logan Township through their MS4 plans. An overview of these controls will be included as part of the LTCP evaluation process. Some of the BMPs are watershed/drainage basin-type controls that are complemented by general public housekeeping efforts (i.e., litter control, household hazardous waste collection, illegal dumping ordinances, etc.).

CSO Control Technologies consist of Collection System Controls, Storage Technologies and Treatment Technologies which generally address pollutants after they have been introduced to the sewer system. Collection System

Controls are utilized for the purposes of reducing inflow to the sewer system, maximizing capture of wastewater and improving overall sewer system conveyance capacity. Storage Technologies are used to reduce peak wet weather flows and improve CSO capture by the collection system. Treatment technologies provide either in-system or WWTP enhancements focused on the pollutants which are causing non-compliance with the water quality standards.

The following categories of CSO abatement technologies may be considered:

- Technology Not Feasible or Appropriate - These technologies are not considered appropriate for CSO control because they will not work effectively or will not reduce water quality impacts to the extent required. They may also include technologies that exceed the requirements for meeting water quality standards, but have been eliminated from consideration in favor of other technologies which are less costly to build or operate, require a smaller footprint, or have other features that make them better suited for the application.

- Continue Current Practice - These technologies are typically best management practices that will help to optimize system operations and minimize CSO discharges and impacts to receiving water bodies.

- LTCP Technology - These technologies are structural controls that may reduce and/or eliminate CSO discharges and impacts and are being carried forward for further evaluation as a LTCP technology. Many technologies may already be incorporated in the City of Altoona and Logan Township MS4 (Municipal Separate Storm Sewer System) Best Management Practices for Stormwater Control.

  Source Control Measures (in Conjunction with Municipal MS4 Plans)

  - Porous Pavement
  - Flow Detention or Retention of Stormwater
  - Disconnection of Stormwater Inflow Sources
  - Utilization of Pervious Areas for Infiltration
  - Catch Basin Modifications to Reduce Peak Discharges
  - Construction of Urban Parks and Green Spaces
  - Installation of Green Roofs
  - Bio-retention for Capture of Stormwater
  - Water Conservation to Reduce Wastewater Discharges
  - Infiltration Sumps for Stormwater Capture
  - Street Sweeping
  - Cleaning of Catch Basin Sumps
  - Catch Basin Modifications for Floatables Capture
  - Snow Removal and Deicing Practices
  - Soil Erosion Control
  - Commercial/Industrial Runoff Control

Collection System Controls

- Existing Collection System Management
- Regulator Modifications
- Sewer Cleaning/Flushing
- Sewer Separation
- Infiltration/Inflow Control
- Maximize Efficiency of Backwater Gates
- Remote Monitoring and Control/Flow Diversion

CSO Storage Technologies

- In-Line CSO Storage and Real Time Control Modifications
- Additional Off-line First-Flush Storage Capacity
- Large Diameter Conduit Tunnel Storage
- Other Alternatives

CSO Treatment Technologies

- Additional Conveyance and Pumping Capacity to Downstream Wastewater Treatment Facility
- CSO Screening & Floatables Removal
- CSO Source Disinfection Facilities and Strategies

B. Green Infrastructure Strategies

As part of CSO control strategies, green infrastructure tools and measures will be considered and incorporated into the proposed CSO control projects, to the greatest extent practicable. Incorporated green infrastructure elements include the reduction of inflow to the combined sewer systems and WWTP's; which results in a reduction of the energy usage and treatment costs and maximizes the CSO percent capture for the system.

In addition to defined projects, the Westerly Altoona CSO LTCP Program will review defined goals which include the specification and installation of energy efficient equipment; the promotion of green infrastructure practices within Municipal Capital Improvement Programs; and the promotion and enforcement of the BMP stormwater regulations for both public and private development projects.

C. Financial Capability Assessment

The EPA's guidance documents suggest that the LTCP include a financial capability assessment in order to assess the financial burden on both ratepayers and the municipalities and to aid in the development of an implementation schedule for the LTCP by balancing the pace of the construction with the financial and economic capability of the municipalities.

The goal of the process is to permit flexibility in the scheduling and completion of CSO compliance measures, based on the financial capabilities of the communities served.

1. Residential Indicator

   The Residential Indicator will be compared to EPA financial impact ranges provided in the EPA guidance document to assess the financial impact that wastewater treatment and LTCP costs may have on the communities' residential customers.

   However, due to the variability of income levels across the service area, some neighborhoods may experience more severe financial impacts and economic hardship as a result of implementation of the LTCP. These neighborhoods may face residential sewer rates, as a percentage of household income that are much greater than the median for the combined service areas.

   These areas are the core urban areas of Altoona which are the areas with the highest unemployment rates, lowest household incomes and greatest number of households with incomes below the poverty level.

2. Community Financial Capability Indicators

   The second phase of the financial capability assessment will involve calculating financial capability indicators. These indicators characterize the permittee's debt burden, socioeconomic conditions, financial operations and the ability to secure the funding necessary to implement the LTCP.

3. Rate Impact Analysis

   A rate impact analysis will be completed to assess the potential year-by-year sewer rate impacts associated with implementation of the LTCP. The fiscal constraints and economic realities that exist within the Altoona service area will dictate the length of the implementation schedule. This will allow the communities to achieve the water quality benefits while minimizing the financial impacts and the economic hardship within the communities.

D. CSO LTCP Program Schedule

In developing the implementation plan for the Westerly Altoona CSO LTCP, a schedule that provides the greatest water quality benefits, while maintaining affordability and a logical construction sequence to complete the recommended LTCP projects, will be considered. Further, other considerations included the time required to complete each individual project, water quality goals, regulatory drivers, sequencing logic and the findings of the affordability analysis.

E. CSO LTCP Program Implementation

The Westerly Altoona CSO LTCP will be developed in conjunction with the member municipalities to insure consistency and compatibility with MS4 strategies and stormwater BMP's. It is anticipated that source reduction strategies will be required along with any structural alternatives that may be undertaken by the Altoona Water Authority. As part of program implementation, the following public participation and information dissemination planning will be considered.

1. Public Participation

A public participation program will be established to facilitate public participation and involvement in the CSO LTCP. A Public Participation Plan (PPP) will be developed to outline the goals and objectives of the program, recommend a structure to assist in the process and outline strategies for the distribution of project information and solicitation of comments from the general public. The objectives may include:

- Provide municipal officials with a better sense of public perspective on issues that affect their communities.
- Establish early communication with affected public; including a wide array of key stakeholders and interested organizations as well as regulatory agencies.
- Solicit opinions and address issues and concerns from the affected public, stakeholders and interested parties during the development of the LTCP.
- Make the technical aspects of the project clean and understandable to the public.
- Build awareness of the issues associated with CSOs; while gaining support for the LTCP by involving the public throughout the development process.

APPENDIX A

COMBINED SEWER OVERFLOW & RECEIVING WATER QUALITY PROPOSED SAMPLING & TESTING PLAN

APPENDIX A

ALTOONA WATER AUTHORITY
COMBINED SEWER OVERFLOW & RECEIVING WATER QUALITY
PROPOSED SAMPLING & TESTING PLAN
SEPTEMBER 2019, REVISED APRIL 2020

General - As part of the Altoona Long-Term Control Plan, sampling of CSO discharges and receiving streams is required. The intent is to generate sufficient data for future modeling and to assess the impact of CSO controls on receiving water quality. These work elements are all part of the Demonstration Approach to achieve compliance with the DEP/EPA National CSO Control Policy.

The attached sampling and testing plan have been developed to achieve these initial objections and to provide a data base for further analysis and assessment in 2020-25. Maps are also attached for various sample locations including the Westerly (Tuckahoe Park) CSO, wastewater treatment plant (Westerly Altoona, Duncansville, Hollidaysburg, Cove Forge and Williamsburg) and along the Beaverdam Branch/Frankstown Branch of the Juniata River. The stream impact areas are assumed to extend from the CSO to the junction with the Little Juniata River near Barree, Huntingdon County.

CSO Impact Intensive Sampling Plan - First, we propose to do intensive sampling of each CSO discharge (8-10 events) along a 3 to 4-mile downstream reach to assess the impact of the CSO control system. An automatic sampler would be set at CSO manholes (on box culverts below the storage tank diversions) to collect the first 2-hours of wet weather discharge (5-minute intervals).

This CSO sampling would be initiated by a wet-weather bypass in the outlet box culvert. It is important that Authority have the CSO control system in a fully function mode at all times during the sampling period. These facilities would include the diversion system, pinch valve, coarse screens, interceptor sewer and tank volume availability. Long range weather forecasting will be used so sampling technicians may be alerted sufficiently in advance of major storm events.

At the same time, grab samples will be received at several downstream bridges (per the sample map) over a 2-hour time-of-travel period. All samples (including automatic samples from the CSO bypass) will be tested for basic analytical parameters such as BOD, TSS, TKN, PO4 and fecal coliform/E. coli. Dissolved oxygen measurements (through a portable DO meter) would also be obtained in the field. The necessary compositing of samples would be as directed by supervisory personnel.

Receiving Water Quality Sampling Plan - The second part of the program involves measuring dissolved oxygen and taking fecal coliform, E-coli and conductivity samples at various locations on the receiving streams. The downstream sampling areas are shown on the attached map along the study reach of the river. An extensive background sampling program will identify bacteriological levels from major downstream river tributaries and wastewater treatment plants.

In order for AWA to demonstrate that the CSO controls will meet Water Quality Standards (WQS) for bacteria in particular, the monitoring plan should adhere to the WQS for E. coli and fecal coliform:

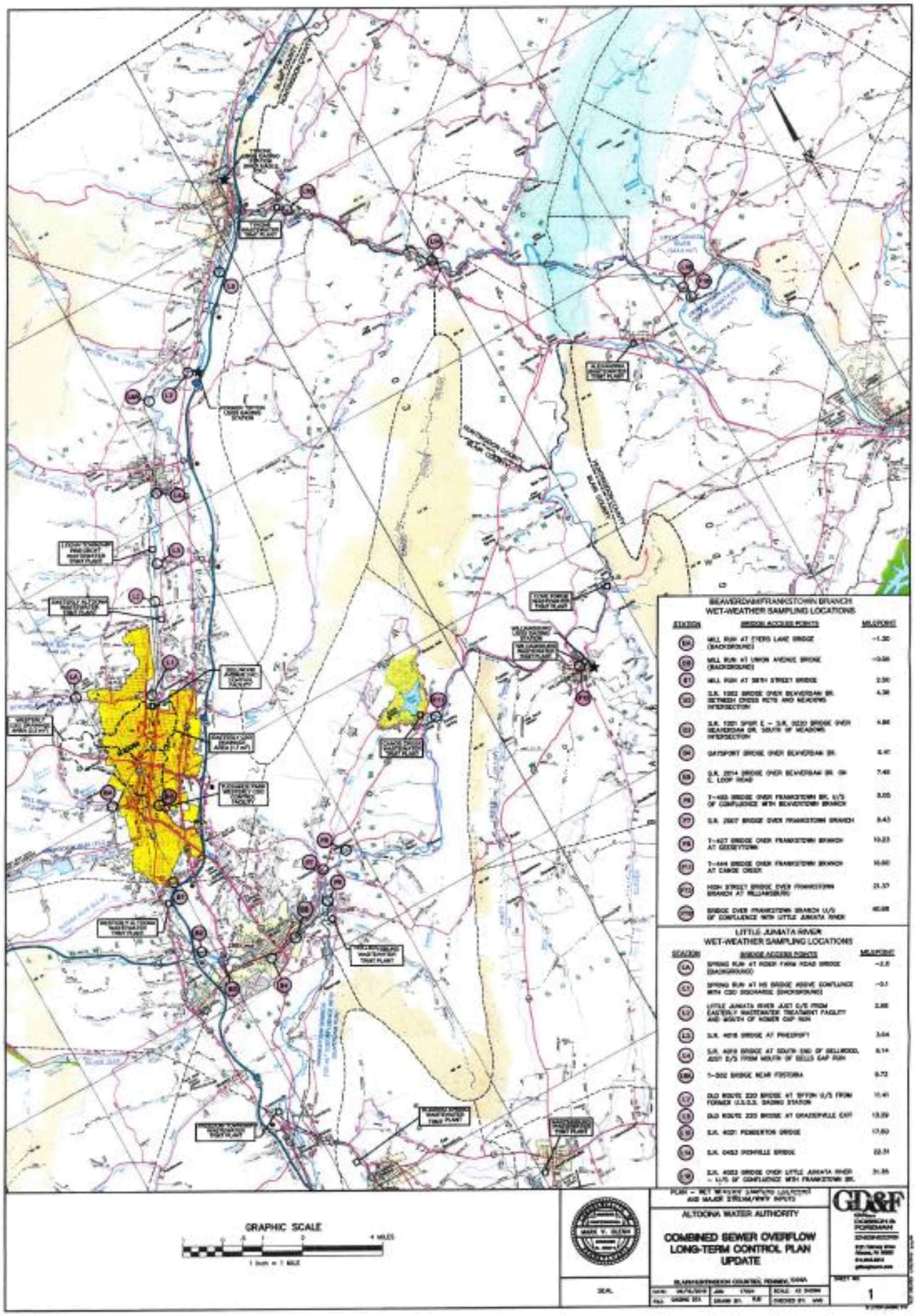
- During the swimming season (May 1 through September 30), the maximum E. coli level shall be a geometric mean of 126 per 100 ml based on consecutive samples, each sample collected on different days, during a 30-day period. No more than 10% of the total samples taken during a 30-day period may exceed 410 per 100 ml.

- For the remainder of the year, the maximum fecal coliform level shall be a geometric mean of 2,000 per 100 ml based on a minimum of five (5) consecutive samples collected on different days during a 30-day period.

For the above CSO impact intensive sampling events, individuals will be required to follow the peak discharge downstream and measure DO at selected bridge locations. The goal is to measure the "DO Sag" (or lowest DO measurement obtained) as peak flow makes its way progressively downstream. The estimated time-of-travel is much greater for this sampling effort, totaling 10-12 hours in most cases. Bacteriological samples would be taken concurrently with the portable DO measurements. The sampling period will extend five (5) years.

The goal is to obtain to calibrate the receiving water quality model, principally for the bacteriological impact. Minimizing bacteriological impact is a major focus point of the Demonstrative Approach for Long-Term Control Plan compliance.

Schedule – The LTCP schedule (Appendix D) indicates when proposed water quality monitoring and sampling will be performed. The overall monitoring period will be for a period of five (5) years.


BEAVERDAM/FRANKSTOWN BRANCH
WET-WEATHER SAMPLING LOCATIONS
LITTLE JUNIATA RIVER
WET-WEATHER SAMPLING LOCATIONS
GRAPHIC SCALE
ALTOONA WATER AUTHORITY
COMBINED SEWER OVERFLOW
LONG-TERM CONTROL PLAN
UPDATE
GD&F
1

Appendix B

Existing Westerly CSO Control Assessment

APPENDIX B

EXISTING WESTERLY CSO CONTROL ASSESSMENT

General - The Altoona CSO control systems have been in continuous operation for almost 30 years. Their design was based on PADEP criteria established after an extensive CSO modeling and monitoring program by the Altoona Water Authority. The following assessment of current CSO control operations is made for the Authority's Long-Term Control Plan (LTCP) update.

Planning - In response to regulatory directives, the Authority conducted an extensive combined sewer overflow characterization program in the 1980's. This data was later used in a receiving water quality modeling study.

Based on this data, DEP issued CSO control parameters in a May 6, 1983 letter with an emphasis on significantly reducing CSO impact on the receiving stream. Control efforts were focused on reducing dissolved oxygen (DO) violations caused by "first flush" organic loadings from the combined sewer system (CSS) - typically the first 1-2 hours of overflow. DEP stipulated the following storage volume:

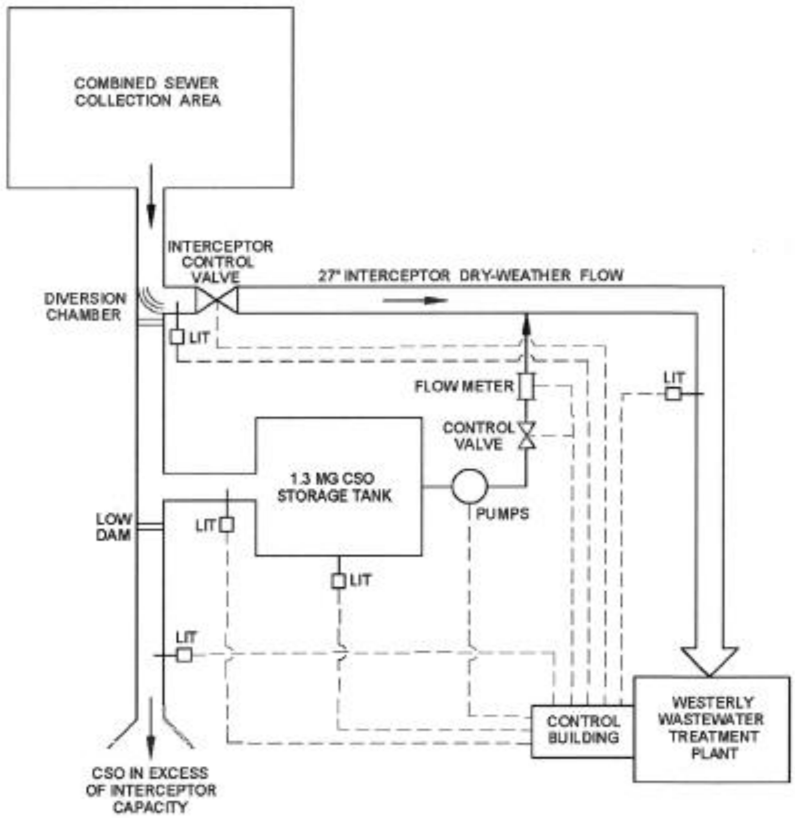
Westerly CSO (Tuckahoe Park) - A CSO diversion operation for the initial "first flush" capture of 1.34 million gallons followed by overflow to the receiving stream. The storage volume is equivalent to a discharge of 50 cubic feet per second (cfs) for one (1) hour. A peak flow of 50 cfs (32 mgd) would account for 80% of all annual precipitation events and reduce DO violations from 22 to 10 annually in the Beaverdam Branch of the Frankstown Branch of the Juniata River

Design - Based on the above Department guidance, Gwin, Dobson & Foreman designed CSO control facilities with the following features, operating conditions and flow schematic.

Westerly CSO (Tuckahoe Park) Control Facilities

- Underground storage tank with a capacity of 1.34 million gallons provided with bar screens and mixers to keep contents in a suspended, non-septic condition.
- Pumping system with a total capacity of 15 million gallons per day (MGD)
- Control center for processing input from level sensors in the storage tank and interceptor for controlling the regulator valve and pumps.
- CSO regulator (pinch valve) with control features permitting the complete shutoff of combined sewer flow to the 27-inch diameter Westerly outfall sewer.
- The capacity of the 27-inch Westerly outfall sewer downstream of Tuckahoe Park is 8 MGD which limits the outflow from the CSO storage tank. At full tank capacity (1.34 MG), 4 hours is required to empty tank contents. The capacity of the Westerly outfall also limits the flow from the combined sewer system that could be conveyed directly to the Westerly wastewater plant for treatment.

SCHEMATIC FLOW DIAGRAM AND PROPOSED OPERATIONAL SEQUENCE FOR THE TUCKAHOE PARK STORAGE FACILITY



1. At the beginning of increased flow, the interceptor control valve is in the open position. When the interceptor reaches its maximum allowable capacity, the control valve will begin to close and the storage tank will begin to fill.
2. As the storage tank fills, the interceptor control valve remains closed. The valve may eventually be opened and throttled in order to balance both the downstream flow in the interceptor with the flow upstream of the storage tank to prevent it from backing-up.
3. At the end of the increased flow event, the interceptor control valve is fully opened, the pumps are started and the storage tank is completely pumped down and sent to the interceptor at a tolerable rate.
4. A visual display and manual control of the storage tank operations is located in the control room of the Westerly Wastewater Treatment Plant.

Figure 1 - Westerly CSO Flow Control Diagram & Operational Sequence

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Typical operations involve the monitoring and operation of CSS flow at Tuckahoe Park. Flow to the Westerly outfall sewer is controlled by a pinch control valve which closes when flows exceed 8 MGD. CSS "first flush" flow is then diverted to the off-line underground tank for screening and storage. When downstream sewer capacity becomes available, the contents of the tank are pumped out for treatment at the Westerly Wastewater Treatment Facility

Operations - During wet-weather periods, the Authority integrates operation of the CSO facilities with its wastewater treatment plants. The goal is to capture the high pollutant "first flush" from the CSS in an off-line storage tank and pumping the contents to the treatment facility when capacity is available.

The basic operation is to divert and screen the CSS "first-flush" in an off-line storage tank, monitor downstream sewer capacity and treatment plant status (reactor or step-feed flow); release stored flow to interceptor sewer when capacity permits; pump-out tank contents and clean sediment and debris from the CSO forebay and intake screens. A detailed description of the operational sequence of current CSO control is as follows:

1. At the beginning of increased sewer flow, the interceptor sewer control valve will be open. When the interceptor reaches allowable capacity, the control valve will begin to close, and the storage tank will begin to fill.

2. At a preset level in the storage tank, the control valve will close completely, and the pump(s) may be activated concurrently. The pumping rate will be controlled by the available capacity in the interceptor sewer via a level sensor.

3. Tank pumping may occur as the storage tank fills. When the tank reaches capacity, the excess flow will be discharged to a receiving stream via the existing CSO conduit.

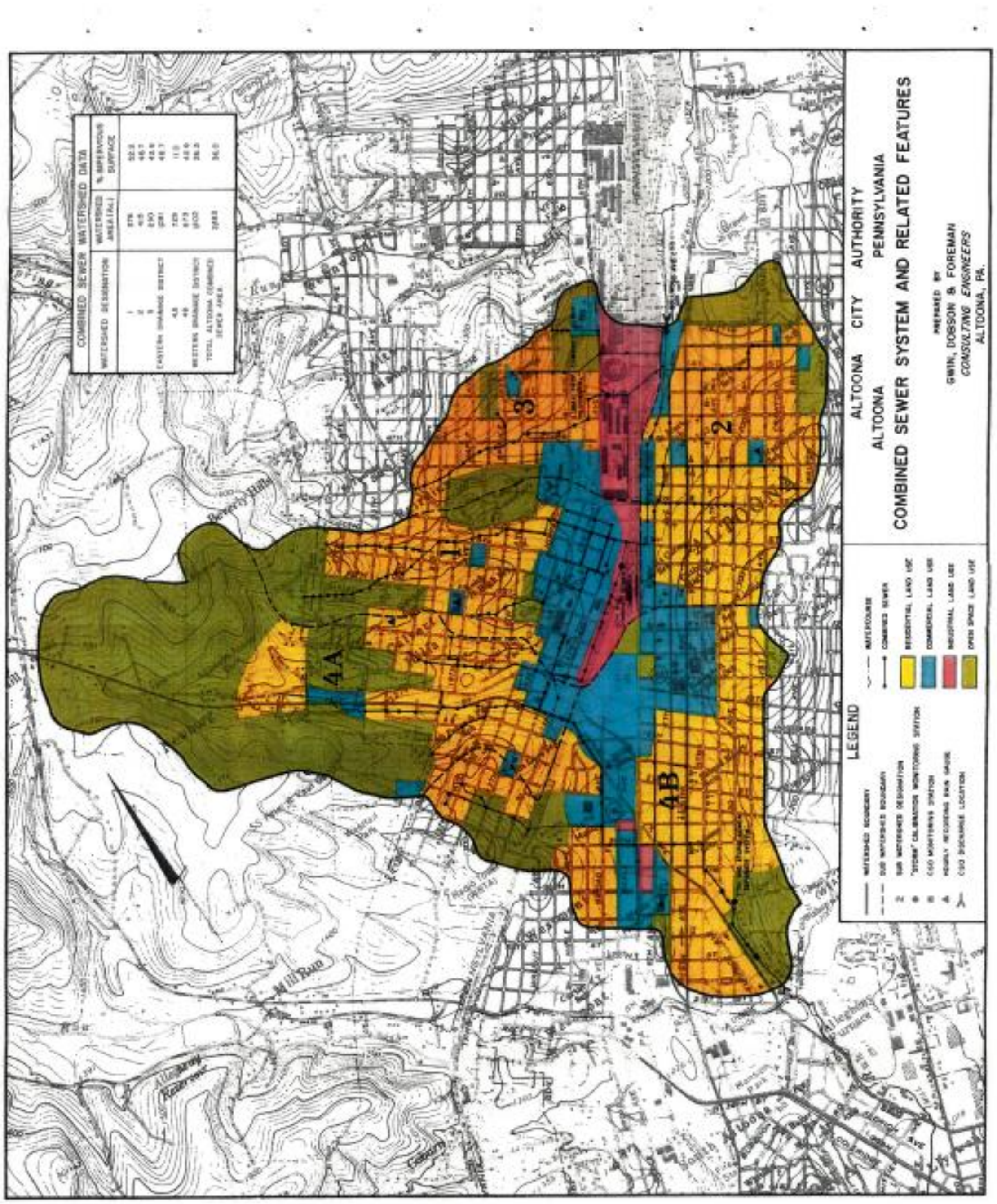
4. At the end of an event, a decrease in flow will result in the storage tank being pumped to a level where the pumps will be shut-off. The control valve will open and normal gravity flow to the treatment plant will resume.

5. The Supervisory Control and Data Acquisition (SCADA) system at the treatment plant monitors the status of the CSO control facility including all level and flow data and the run status of mechanical equipment. Operation can be performed remotely at the treatment plant via telemetry equipment or via on-site manual control.

CSS Characterization - In the 1890's, open drainage ditches and streams located within the original Altoona city limits were enclosed by combined sewers for collection of sewage and stormwater. This was a common sewerage practice at the time. What was not common was the Altoona combined sewer system was located at the headwaters of the Little Juniata and Beaverdam Branch/Frankstown Branch. In what was an open sewer, the high pollutant load was not only a nuisance, but jeopardized the health of downstream residents. A land use and watershed area map of the Westerly CSO is shown on the following page.

As opposed to most major cities with CSS, receiving streams in Altoona had little assimilative capacity and the later construction of wastewater treatment facilities in the early 20th century did little to address the wet weather impact of this pollutant load. It was only in the 1980's, when CSO storage/pumping facilities were built to control the worst effects ("first flush") of the overflow.

A land use and watershed area map of the Westerly CSO is shown on the following page.


ALTOONA CITY AUTHORITY
ALTOONA PENNSYLVANIA
COMBINED SEWER SYSTEM AND RELATED FEATURES
PREPARED BY
GWIN, DOBSON & FOREMAN
CONSULTING ENGINEERS
ALTOONA, PA.
LEGEND
COMBINED SEWER WATERSHED DATA
1
2
3
4A
4B

The combined sewer systems are characterized by the following physical parameters. Photos of the Westerly CSO and receiving stream discharge are shown below.

Table 1 - Combined Sewer System Area Characteristics

CSS System Designation	CSO Discharge Location	Drainage Area	Impervious Surfaces	Conduit Capacity	Conduit Capacity	Connected Population	Average Dry Weather Flow
Westerly	Tuckahoe Park	2.2 mi^2 (1402 ac)	26.3%	1,400 CFS	900 MGD	12,660	1.9 MGD
Easterly	Bellwood Ave.	1.8 mi^2 (1081 ac)	48.7%	1,150 CFS	740 MGD	14,340	1.8 MGD
Total		4.0 mi^2 (2,483 ac)	36.0%	2,550 CFS	1,640 MGD	27,000	3.7 MGD

Photo No. 1 - Westerly CSO Discharge to Mill Run

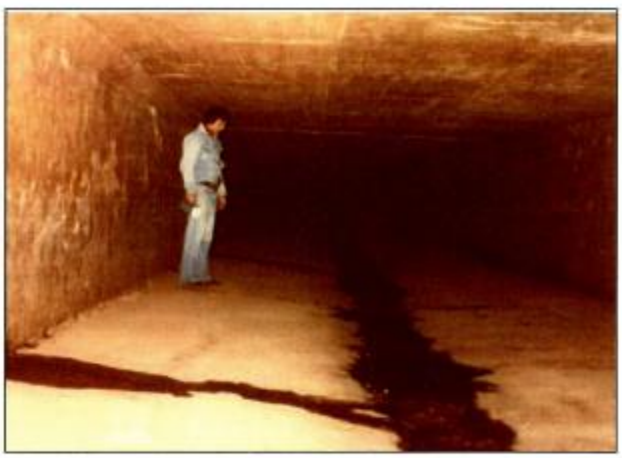


Photo No. 2 - Tuckahoe Park CSO Box Sewer

Dimensions of the rectangular box culvert are shown in the following figures. The rating curve for the CSO discharge is also provided.

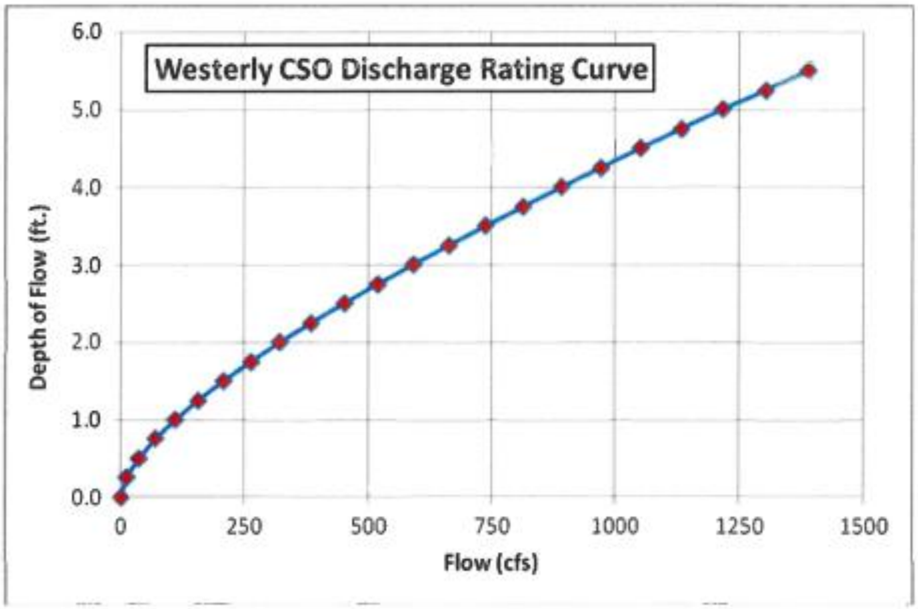


Figure 2 - Westerly CSO Discharge Rating Curve at Tuckahoe Park Culvert

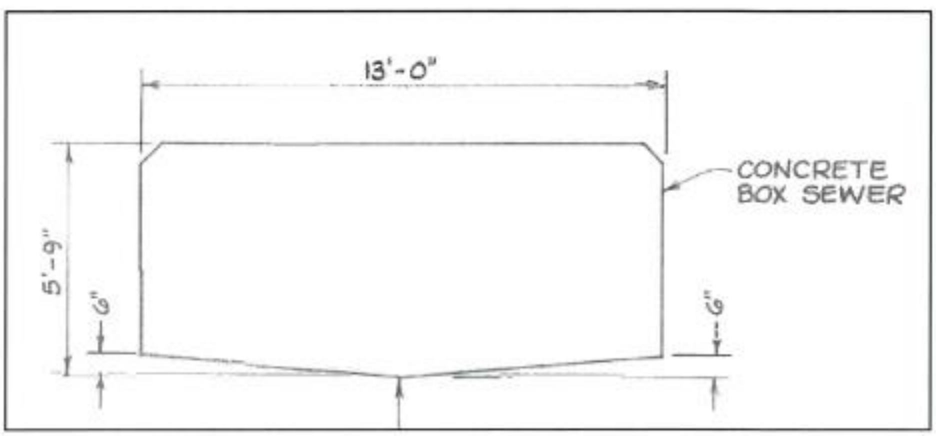


Figure 3 - Tuckahoe Park CSO Box Culvert (Manning's "n" = 0.012, s = 0.57%)

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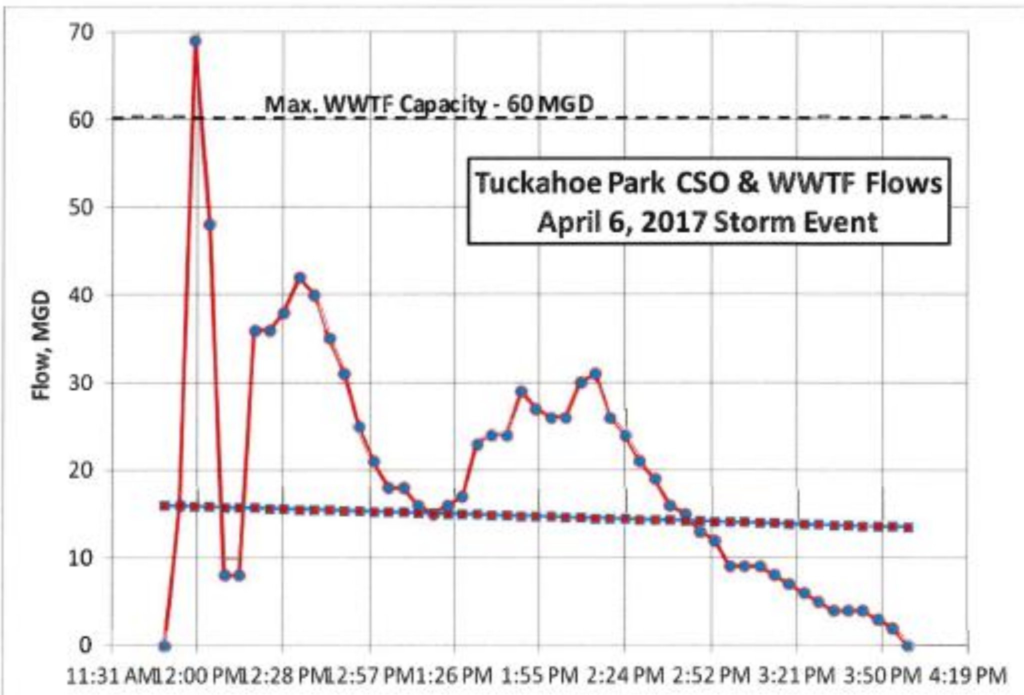
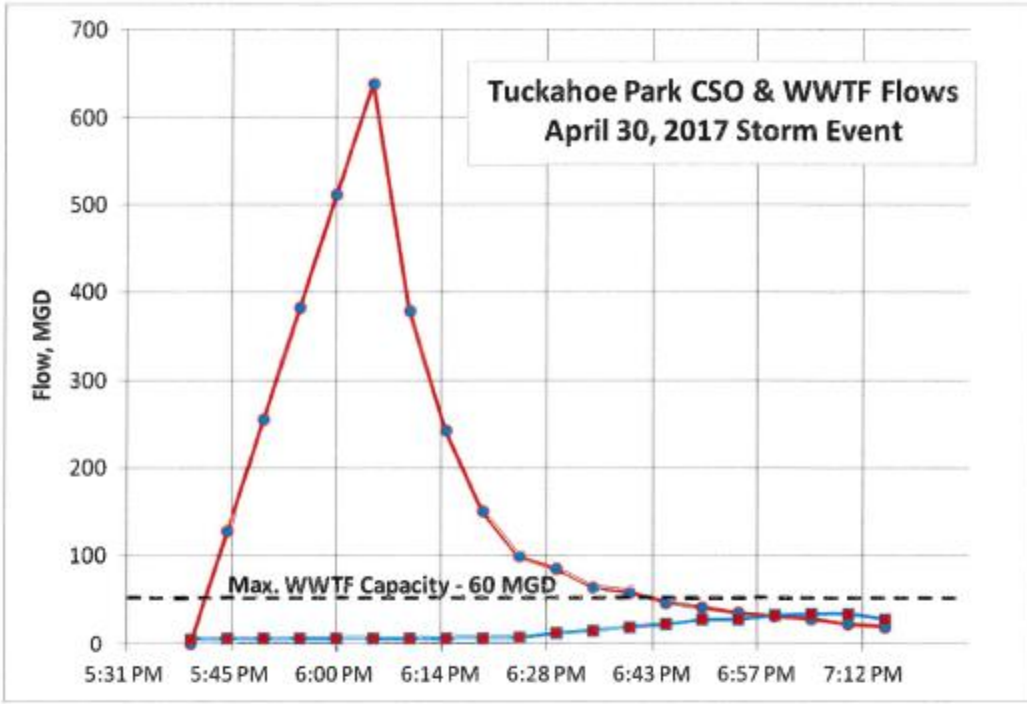
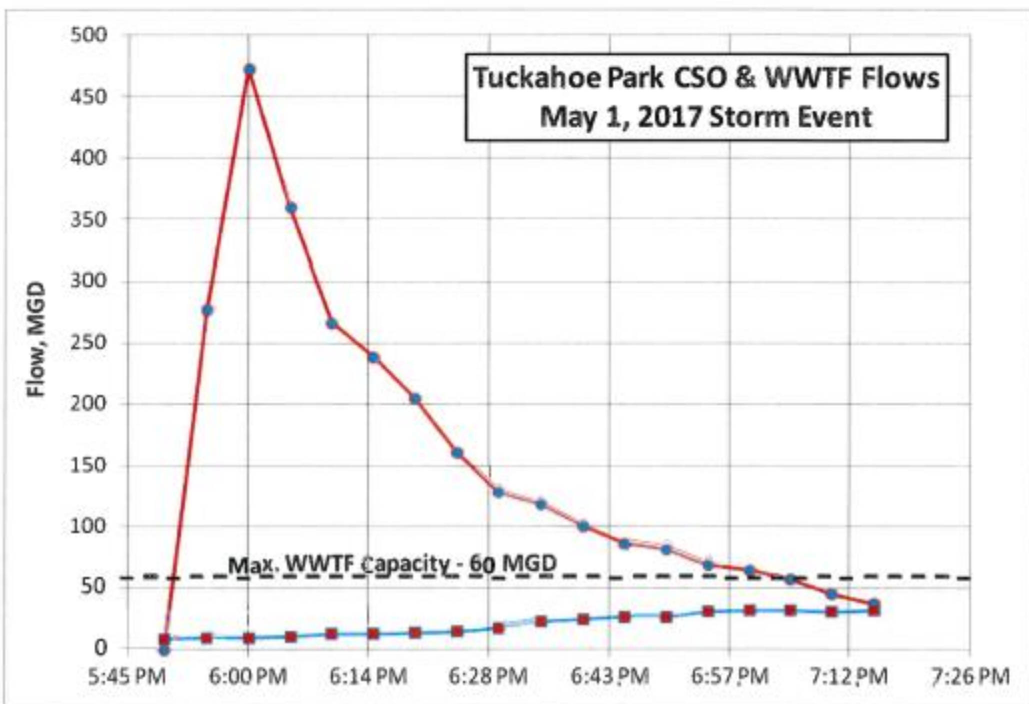
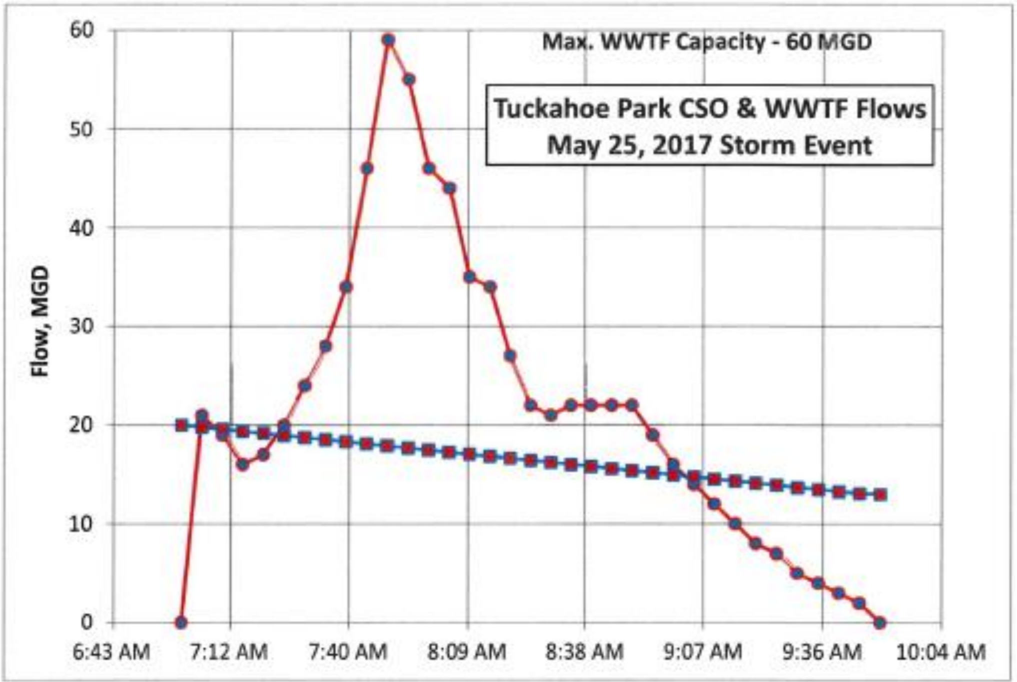
Flow Analysis - Flow generated by the combined sewer systems consists of a mixture of sewage and stormwater which varies in concentration according to rainfall intensity, storm duration, antecedent moisture conditions and the time since the last precipitation event. Because of the densely developed and impervious nature of the CSS drainage areas, large runoff volumes with high peak flows are regularly experienced.

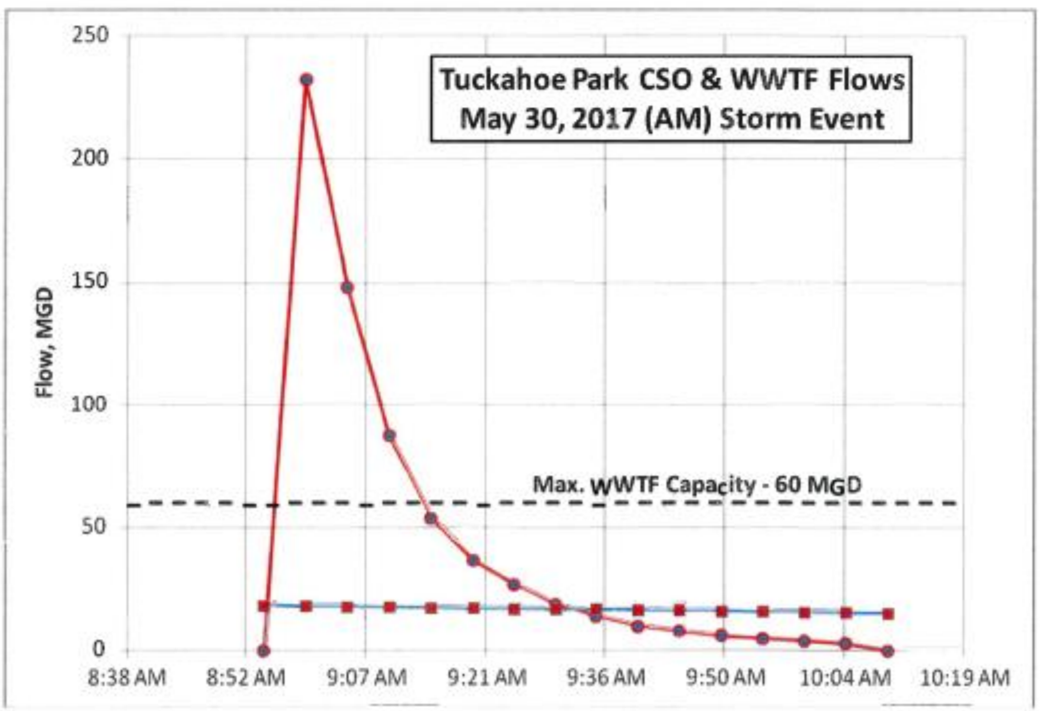
This high volume/high peak flow nature is best illustrated by hydrographs generated at the Westerly CSO at Tuckahoe Park. The hydrographs selected are for these events exceeding 50 MGD in magnitude.

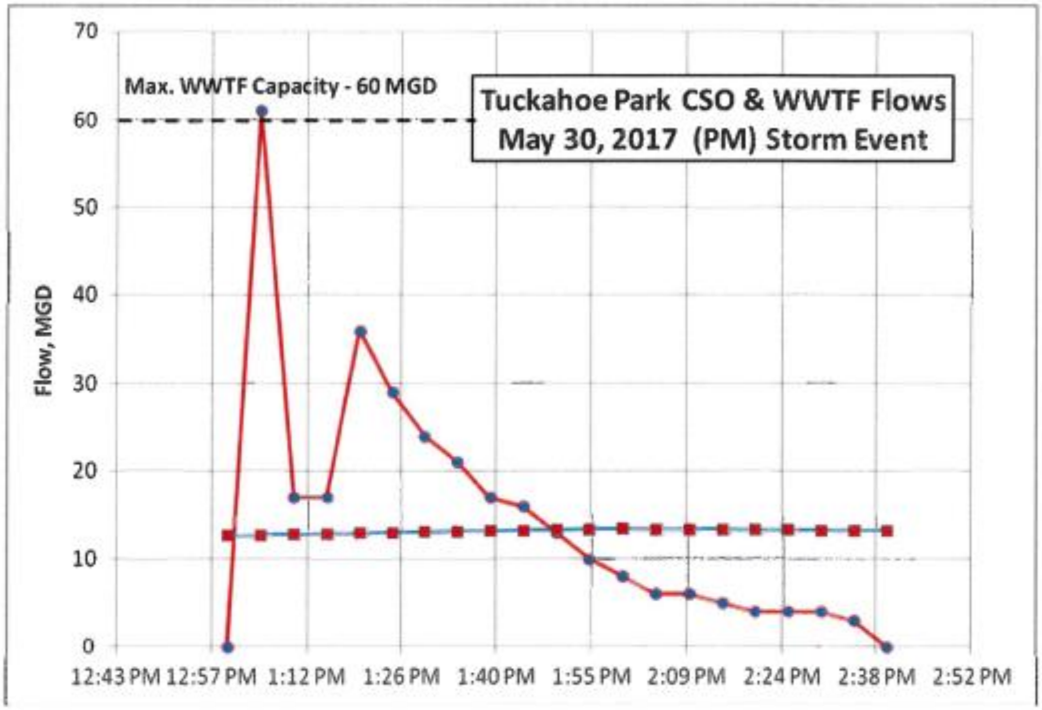


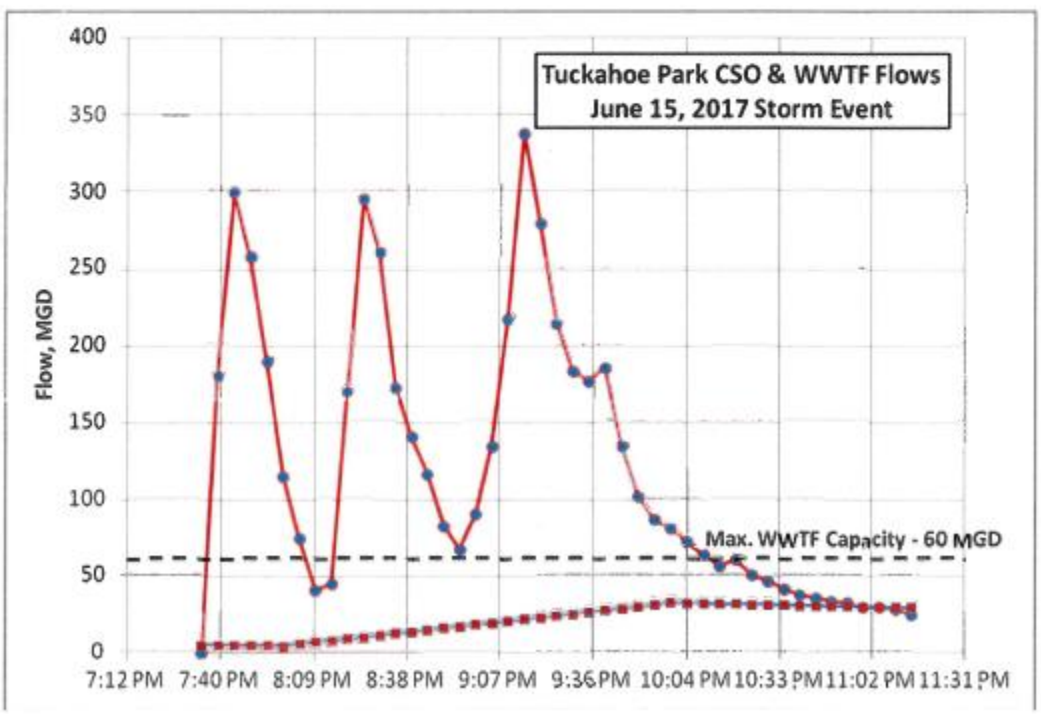

Tuckahoe Park CSO & WWTF Flows
April 30, 2017 Storm Event
Flow, MGD
700
600
500
400
300
200
100
0
Max. WWTF Capacity - 60 MGD
5:31 PM
5:45 PM
6:00 PM
6:14 PM
6:28 PM
6:43 PM
6:57 PM
7:12 PM


Tuckahoe Park CSO & WWTF Flows
May 1, 2017 Storm Event
Flow, MGD
500
450
400
350
300
250
200
150
100
50
0
Max. WWTF Capacity - 60 MGD
5:45 PM
6:00 PM
6:14 PM
6:28 PM
6:43 PM
6:57 PM
7:12 PM
7:26 PM


Max. WWTF Capacity - 60 MGD
Tuckahoe Park CSO & WWTF Flows
May 25, 2017 Storm Event
Flow, MGD
60
50
40
30
20
10
0
6:43 AM
7:12 AM
7:40 AM
8:09 AM
8:38 AM
9:07 AM
9:36 AM
10:04 AM


Tuckahoe Park CSO & WWTF Flows
May 30, 2017 (AM) Storm Event
Max. WWTF Capacity - 60 MGD
Flow, MGD
250
200
150
100
50
0
8:38 AM
8:52 AM
9:07 AM
9:21 AM
9:36 AM
9:50 AM
10:04 AM
10:19 AM





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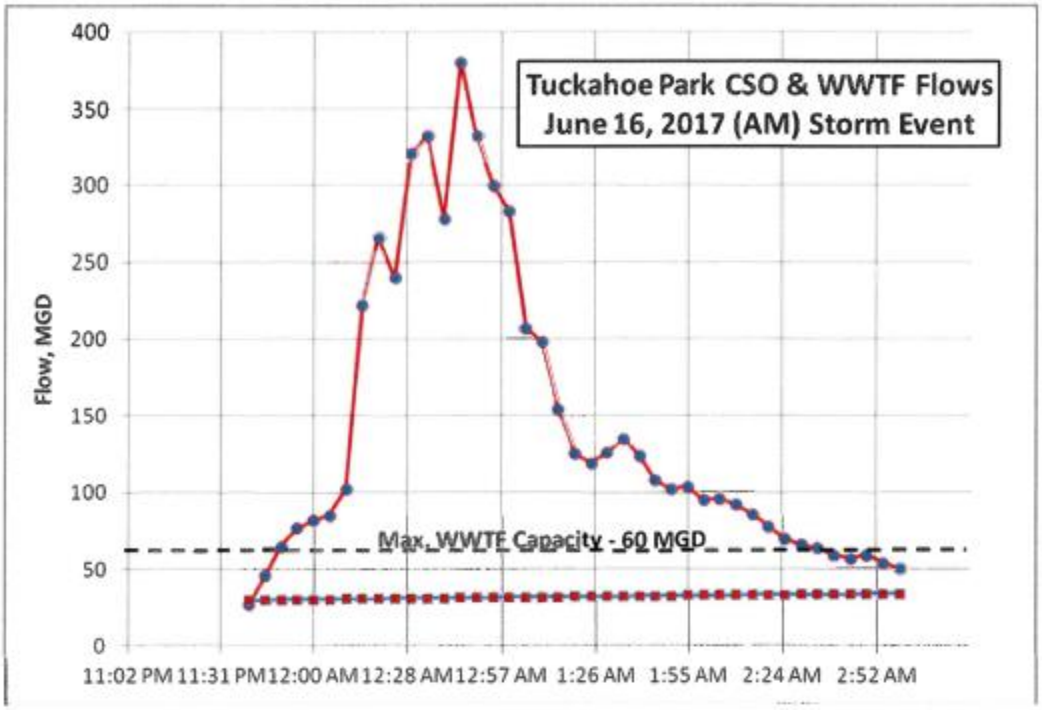
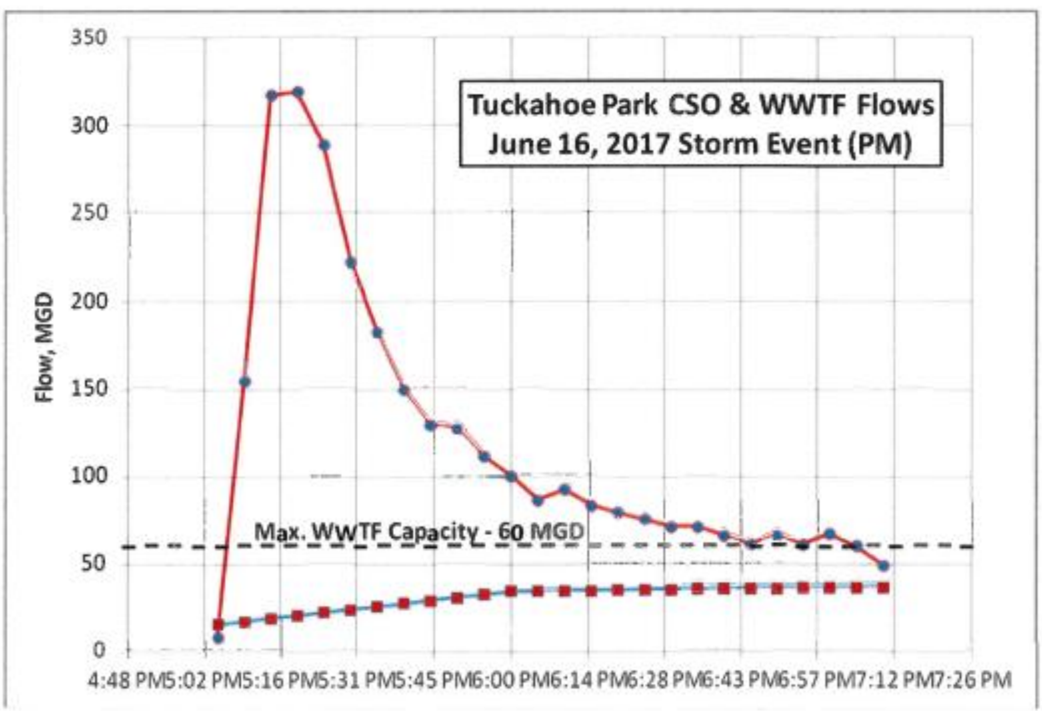
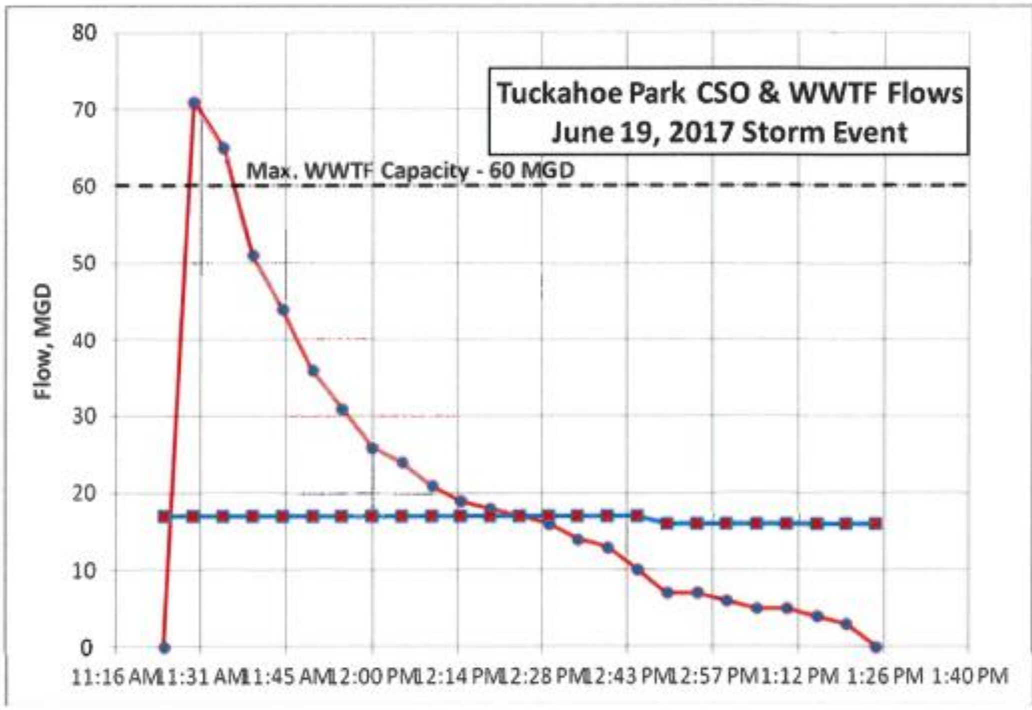
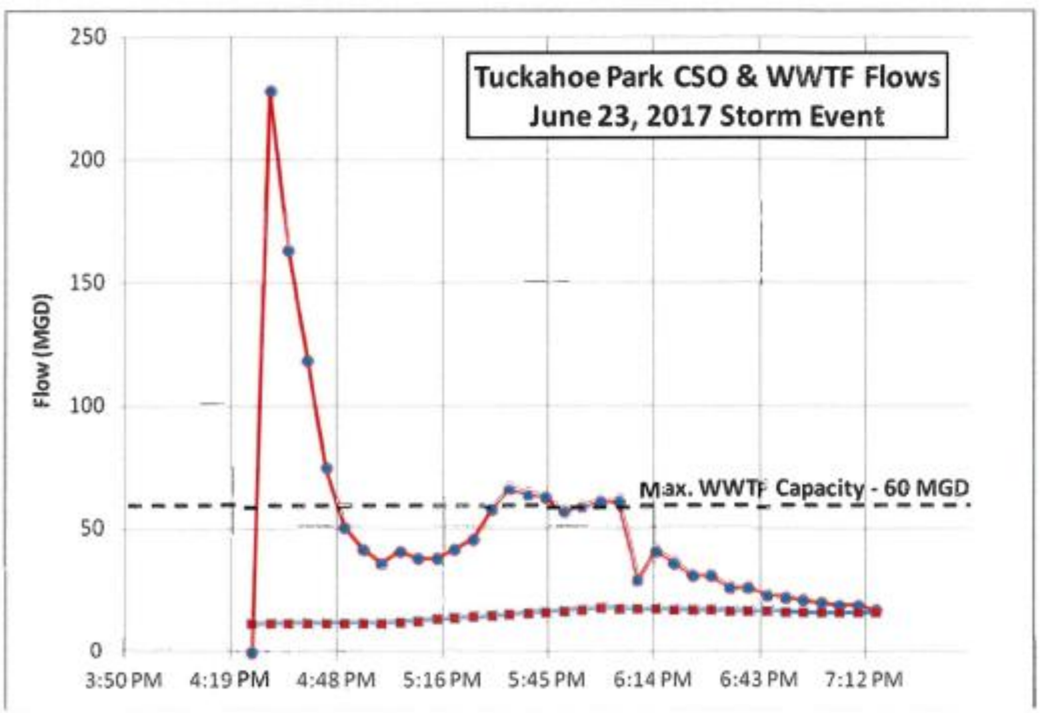

Tuckahoe Park CSO & WWTF Flows
June 16, 2017 (AM) Storm Event
Max. WWTF Capacity - 60 MGD
Flow, MGD
400
350
300
250
200
150
100
50
0
11:02 PM 11:31 PM 12:00 AM 12:28 AM 12:57 AM 1:26 AM 1:55 AM 2:24 AM 2:52 AM


Tuckahoe Park CSO & WWTF Flows
June 16, 2017 Storm Event (PM)
Max. WWTF Capacity - 60 MGD
Flow, MGD
350
300
250
200
150
100
50
0
4:48 PM 5:02 PM 5:16 PM 5:31 PM 5:45 PM 6:00 PM 6:14 PM 6:28 PM 6:43 PM 6:57 PM 7:12 PM 7:26 PM





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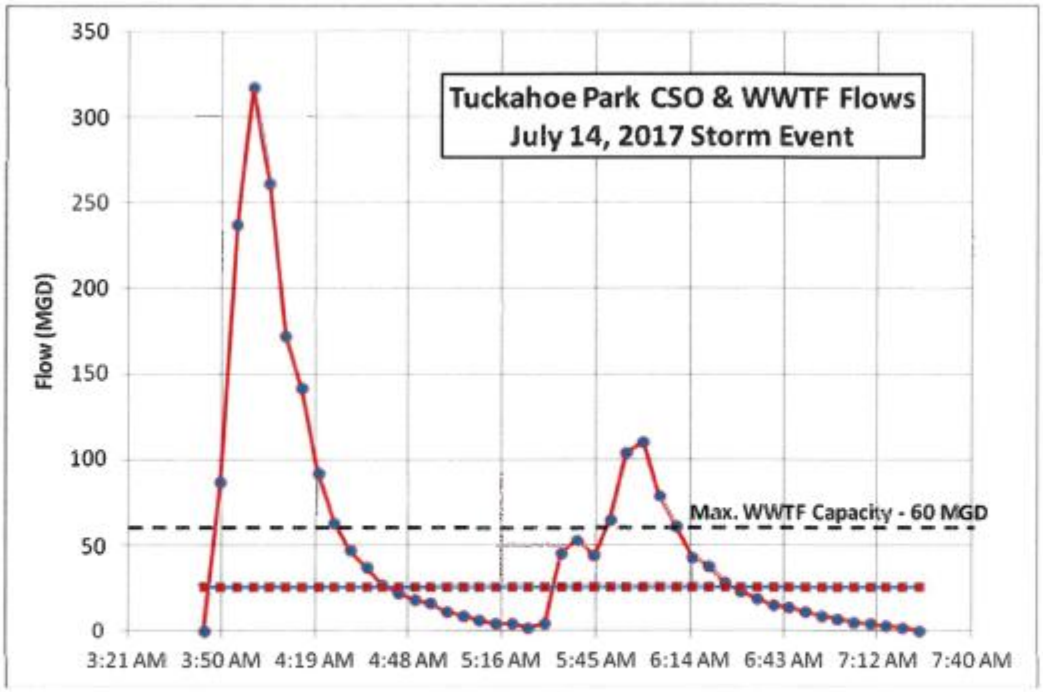
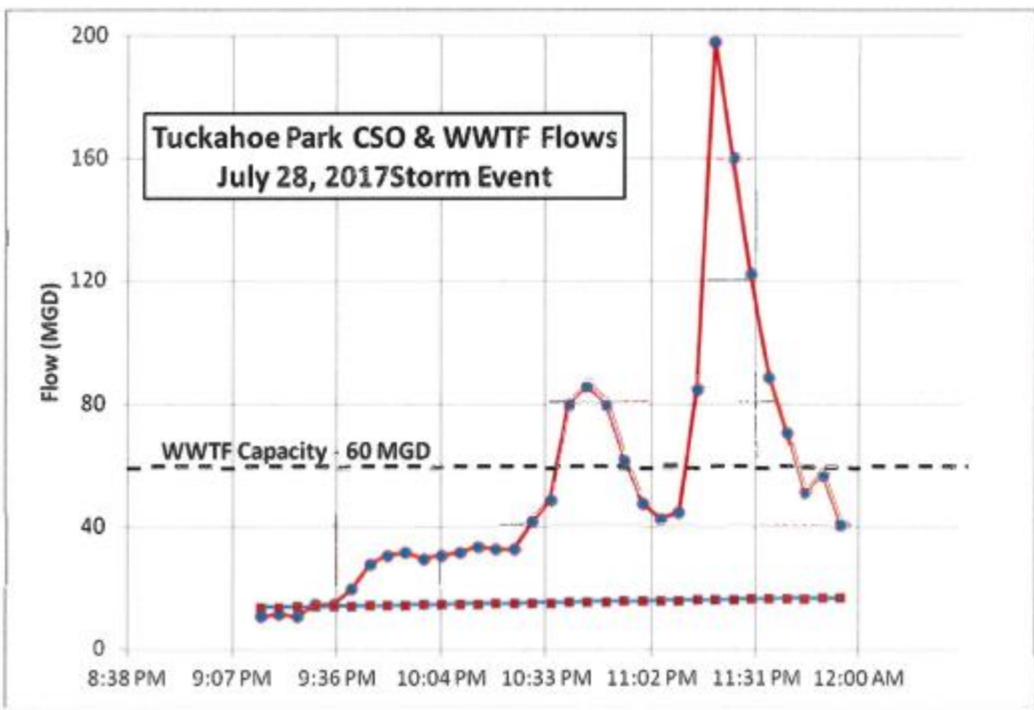
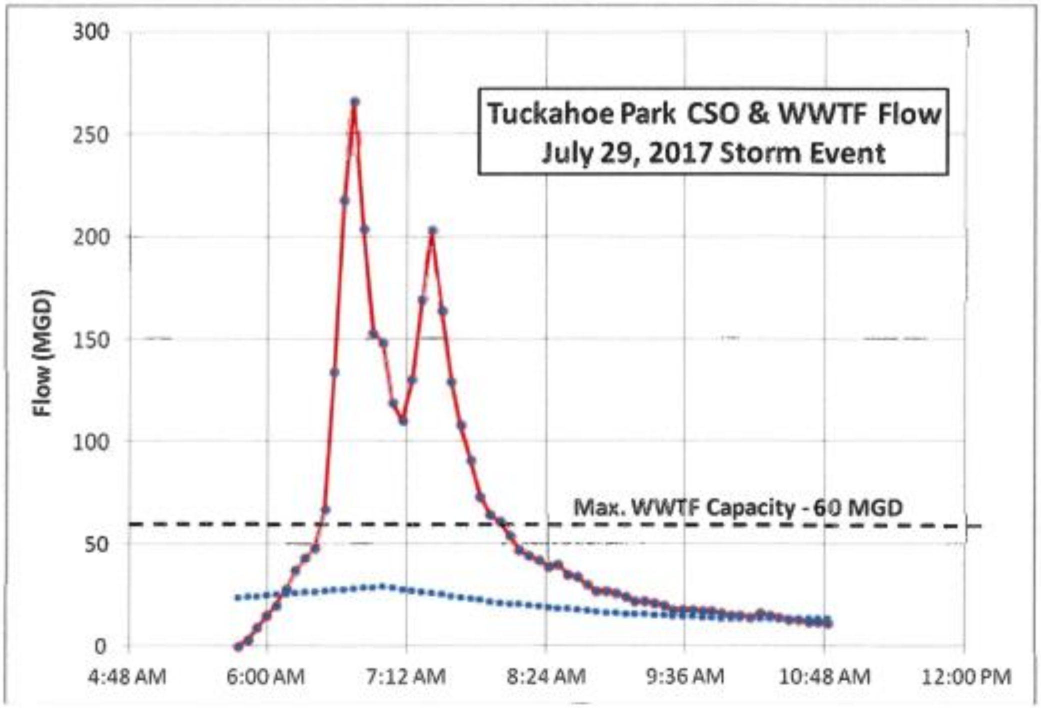
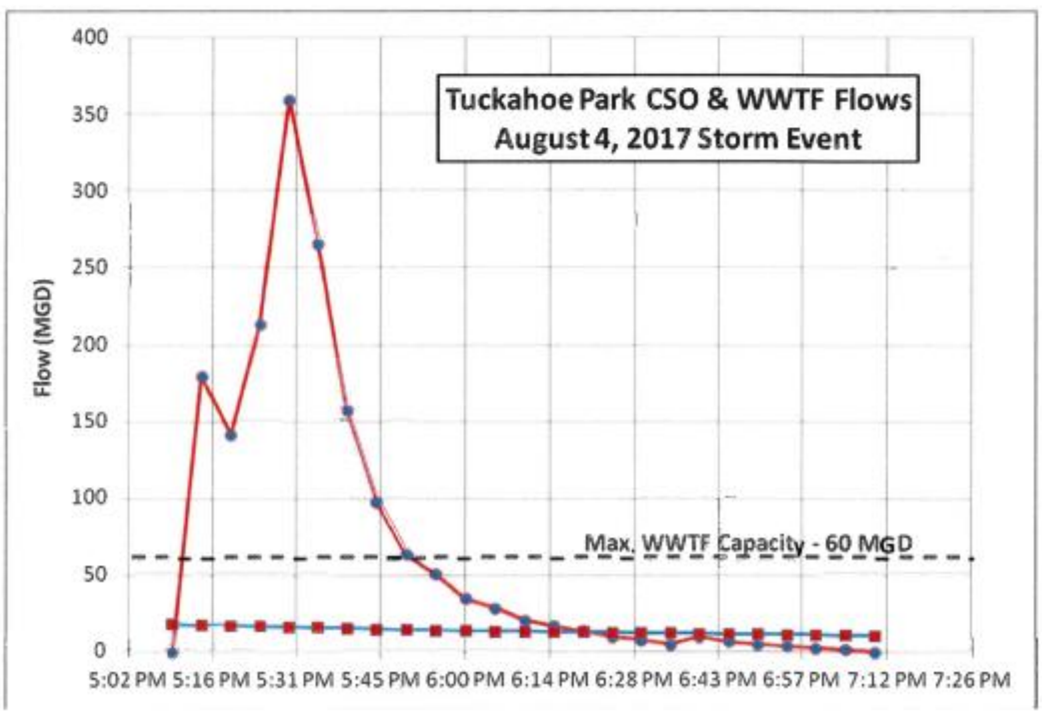
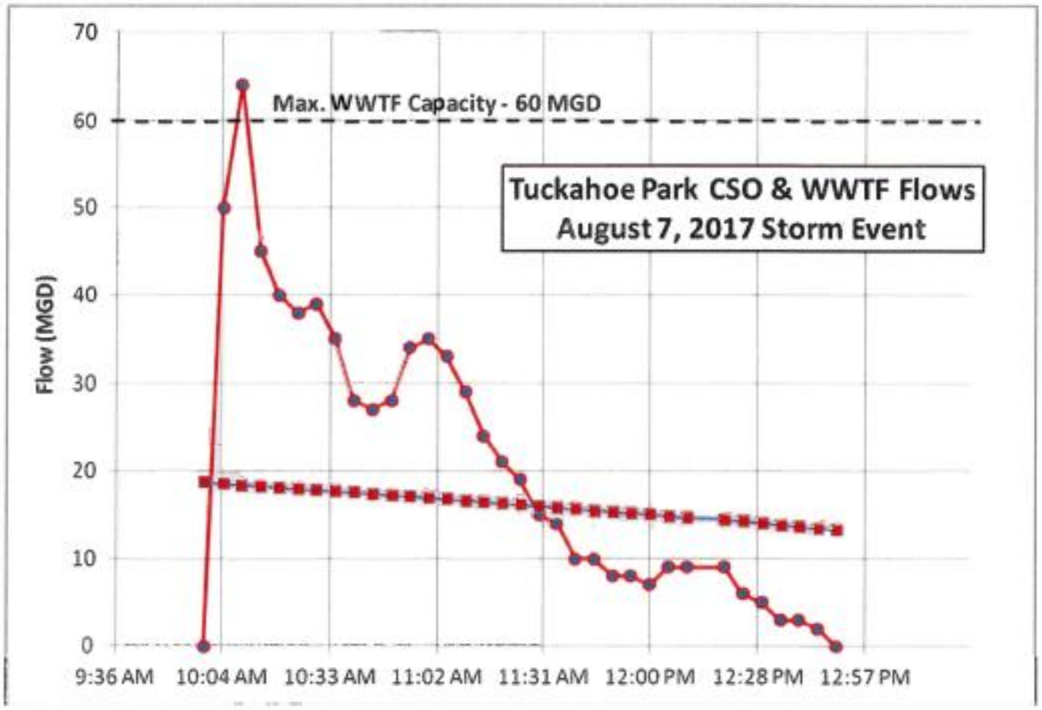
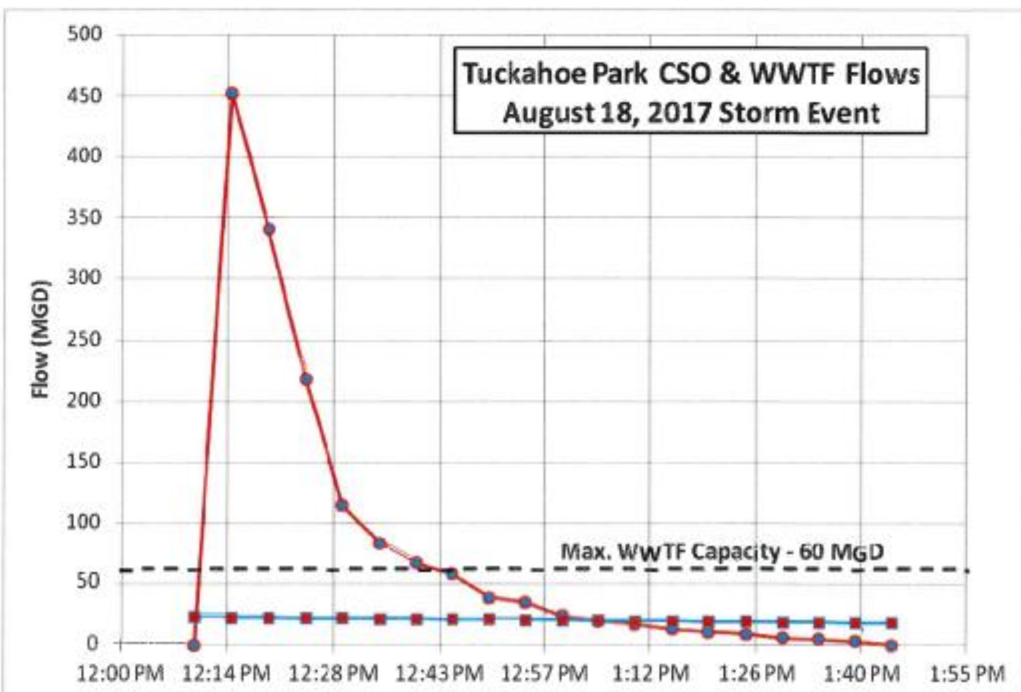

Tuckahoe Park CSO & WWTF Flows
July 14, 2017 Storm Event
Flow (MGD)
350
300
250
200
150
100
50
0
Max. WWTF Capacity - 60 MGD
3:21 AM 3:50 AM 4:19 AM 4:48 AM 5:16 AM 5:45 AM 6:14 AM 6:43 AM 7:12 AM 7:40 AM


Tuckahoe Park CSO & WWTF Flows
July 28, 2017Storm Event
Flow (MGD)
200
160
120
80
40
0
WWTF Capacity - 60 MGD
8:38 PM 9:07 PM 9:36 PM 10:04 PM 10:33 PM 11:02 PM 11:31 PM 12:00 AM


Tuckahoe Park CSO & WWTF Flow
July 29, 2017 Storm Event
Max. WWTF Capacity - 60 MGD
Flow (MGD)
300
250
200
150
100
50
0
4:48 AM
6:00 AM
7:12 AM
8:24 AM
9:36 AM
10:48 AM
12:00 PM


Tuckahoe Park CSO & WWTF Flows
August 4, 2017 Storm Event
Max. WWTF Capacity - 60 MGD
Flow (MGD)
400
350
300
250
200
150
100
50
0
5:02 PM 5:16 PM 5:31 PM 5:45 PM 6:00 PM 6:14 PM 6:28 PM 6:43 PM 6:57 PM 7:12 PM 7:26 PM


Tuckahoe Park CSO & WWTF Flows
August 7, 2017 Storm Event
Max. WWTF Capacity - 60 MGD
Flow (MGD)
70
60
50
40
30
20
10
0
9:36 AM
10:04 AM
10:33 AM
11:02 AM
11:31 AM
12:00 PM
12:28 PM
12:57 PM


Tuckahoe Park CSO & WWTF Flows
August 18, 2017 Storm Event
Max. WWTF Capacity - 60 MGD
Flow (MGD)
500
450
400
350
300
250
200
150
100
50
0
12:00 PM
12:14 PM
12:28 PM
12:43 PM
12:57 PM
1:12 PM
1:26 PM
1:40 PM
1:55 PM

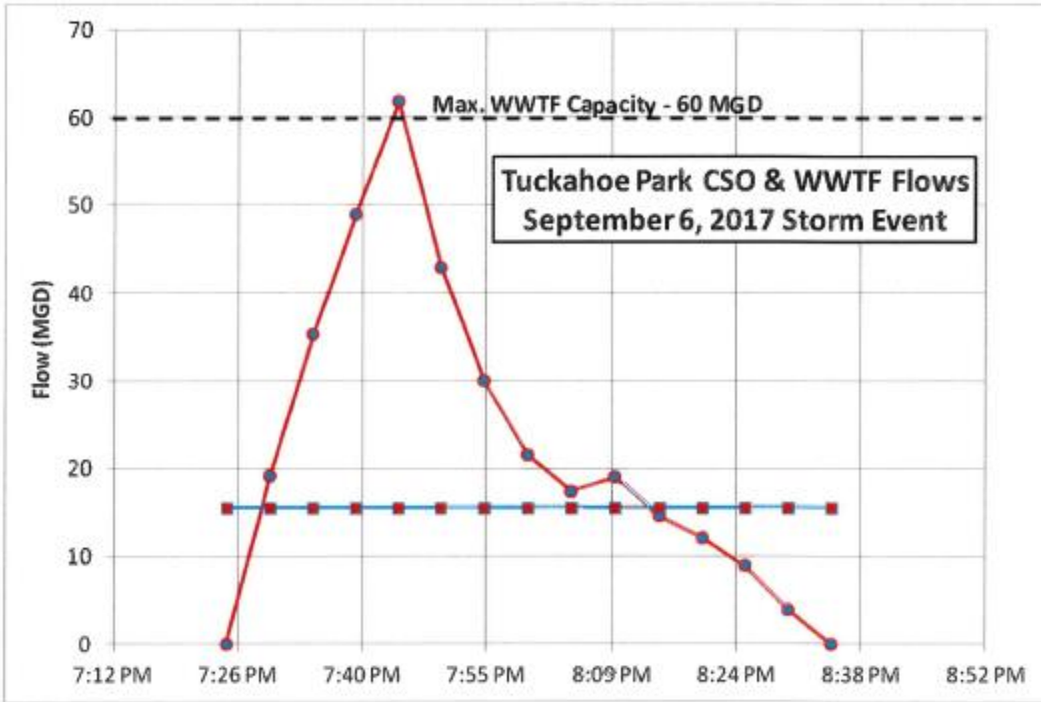

Tuckahoe Park CSO & WWTF Flows
September 6, 2017 Storm Event
Max. WWTF Capacity - 60 MGD
Flow (MGD)
70
60
50
40
30
20
10
0
7:12 PM
7:26 PM
7:40 PM
7:55 PM
8:09 PM
8:24 PM
8:38 PM
8:52 PM

Table 2 - Summary of 2017 High Peak Flow Events at the Westerly CSO Control Facility (Above 50 MGD)

[illegible]	6-Apr-17	30-Apr-17	1-May-17	25-May-17	29-May-17	30-May-17	15-Jun-17	16-Jun-17	18-Jun-17	19-Jun-17
Peak CSO Flow Rate (mgd)	69	638	472	59	236	61	337	380	319	71
Peak WWTF Flow Rate (mgd)	16.0	34.0	32.0	20.0	27.0	13.4	32.8	20.3	37.3	17.0
Event Duration (hrs)	4.17	1.25	1.42	2.00	4.67	1.67	3.67	3.33	2.08	2.00
Total Rainfall (in.)	0.50	0.36	0.98	1.02	0.62		2.06	0.94	0.98	0.56
Peak Rainfall (in/hr)	1.92	0.34	5.51	0.16	1.08		2.40	1.20	3.12	0.48
Total Event Wastewater (mg)	6.00	18.29	10.80	4.59	19.46	1.99	21.92	24.80	13.49	3.20
Total CSO Volume (mg)	3.50	16.74	9.56	2.62	14.52	1.05	18.66	20.30	10.73	1.78
CSO Volume of Total (%)	57.5%	91.5%	88.5%	57.1%	74.6%	52.8%	85.1%	81.9%	79.5%	55.6%
WWTF Volume (mg)	2.59	1.55	1.24	1.97	4.94	0.94	3.26	4.50	2.76	1.42
WWTF Volume of Total (%)	42.5%	8.5%	11.5%	42.9%	25.4%	47.2%	14.9%	18.1%	20.5%	44.4%
Unused WWTF Volume (mg)*	7.8	1.58	2.31	3.03	6.74	3.26	5.92	3.83	2.44	3.58
Unused WWTF Volume of Total (%)	126.7%	8.6%	21.4%	66.0%	34.6%	163.8%	27.0%	15.4%	18.1%	111.9%
Available WWTF Volume (mg)	10.4	3.13	3.55	5.00	11.68	4.2	9.18	8.33	5.20	5.00
Available WWTF Volume-CSO Vol (%)	298.0%	18.7%	37.1%	190.8%	80.4%	400.0%	49.2%	41.0%	48.3%	280.9%

[illegible]	20-Jun-17	14-Jul-17	28-Jul-17	29-Jul-17	4-Aug-17	7-Aug-17	18-Aug-17	6-Sep-17	Total	Average**	Item
Peak CSO Flow Rate (mgd)	228	317	198	266	359	64	452	51.8		325.25	Peak CSO Flow Rate (mgd)
Peak WWTF Flow Rate (mgd)	17.7	25.5	17.1	29.1	18.3	18.8	23	15.5		24.16	Peak WWTF Flow Rate (mgd)
Event Duration (hrs)	2.08	2.75	1.67	4.00	1.08	2.83	0.83	1.17		2.22	Event Duration (hrs)
Total Rainfall (in.)	0.54	0.88	1.24	0.90	0.28	0.72	0.84	0.48		0.82	Total Rainfall (in.)
Peak Rainfall (in/hr)	0.36	1.68	1.56	0.72	0.72	0.48	2.16	0.24		1.60	Peak Rainfall (in/hr)
Total Event Wastewater (mg)	7.90	12.13	7.86	19.08	7.73	4.09	6.67	1.95	192.04	13.09	Total Peak Event Wastewater (mg)
Total CSO Volume (mg)	6.11	8.19	6.10	12.6	5.91	2.31	5.27	1.17	147.12	10.36	Total CSO Volume (mg)
CSO Volume of Total (%)	77.3%	67.5%	77.6%	66.0%	76.5%	56.5%	79.0%	60.0%	76.6%	79.2%	CSO Volume of Total (%)
WWTF Volume (mg)	1.79	3.94	1.76	6.48	1.82	1.78	1.4	0.78	44.92	2.73	WWTF Volume (mg)
WWTF Volume of Total (%)	22.7%	32.5%	22.4%	34.0%	23.5%	43.5%	21.0%	40.0%	23.4%	20.8%	WWTF Volume of Total (%)
Unused WWTF Volume (mg)*	3.41	2.94	2.42	3.52	0.88	5.3	0.68	2.15	61.89	2.82	Unused WWTF Volume (mg)*
Unused WWTF Volume of Total (%)	43.2%	24.2%	30.8%	18.4%	11.4%	129.6%	10.2%	110.3%	32.2%	21.6%	Unused WWTF Volume of Total (%)
Available WWTF Volume (mg)	5.20	6.88	4.18	10	2.7	7.08	2.08	2.93	106.75	5.56	Available WWTF Volume (mg)
Available WWTF Volume-CSO Vol (%)	85.1%	84.0%	68.5%	79.4%	45.7%	306.5%	39.5%	250.4%	72.6%	53.6%	Available WWTF Volume-CSO Vol (%)

In addition, modeling results from the previous analysis provided combined sewer overflow data based on a continuous 30-year simulation record. Developed by the Corps of Engineers Hydrologic Engineering Center, the Storage-Treatment-Overflow-Runoff Model (STORM) was used to simulate the interaction of precipitation, pollutant accumulation and street wash-off, dry weather flow, runoff and overflow. Model results were calibrated with actual sampling and flow monitoring data from the Altoona CSS system. The following annual statistics were generated:

Table 3 - STORM Model CSO Simulation: Average Annual Statistics

Combined Sewer Area	Rainfall (in.)	Runoff		Dry Weather Flow		Overflow		First Flush (1st 2 hrs)		First Flush Overflow	Avg. No. of Events
		(in.)	(MG)	(in.)	(MG)	(in.)	(mg)	(in.)	(MG)		
Altoona Easterly Bellwood Ave CSO	35.8	15.3	450	1.54	45	15.9	466	9.33	274	59%	90
Altoona Westerly Tuckahoe Park CSO	35.8	7.35	280	0.99	38	7.76	295	4.58	161	55%	70

A statistical analysis of over two years of CSO flow records was also performed. The Tuckahoe Park CSO system has the potential to store and pump peak flows up to 50 cfs (32.2 MGD) without overflow. These conditions represent over 80% of all storm events. This potential capacity assumes there is sufficient pumping and downstream sewer capacity to convey the wastewater to the treatment plants at the specified flow rates. At present, no such capacity exists.

Flow Analysis Summary - Based on current data and previous modeling and monitoring studies, the following conclusions can be drawn:

1. Severe storm events can generate high peak flows and significant volumes of combined sewer overflow. For instance, the Westerly CSO had 18 peak flow events in 2017 ranging from 59 to 638 MGD with total volumes from 2 to 22 million gallons. These flows were far in excess of treatment, CSO storage and conveyance system capacities. The number of events (18) alone would have violated the EPA Presumptive Approach criteria which allow no more than 4-6 overflow events per year.

2. Based on the data, the average Westerly CSO event was 2.2 hours with a total rainfall of 0.82 inches and peak rainfall intensity of 1.60 in/hour producing a total event volume of 13.09 MG. Of this total volume, 2.73 MG was treated (20.8%) while the remainder was combined sewer overflow (10.36 MG or 79.2%).

3. For the 2017 storm events, treatment plant capacity was not maximized. On average, 21.6% of the total Westerly CSO volume could have been treated at the Westerly plant but for limitations on outfall sewer capacity (8 MGD for 27-in. outfall sewer).

4. Based on previous modeling work and before the installation of the existing CSO control system, the total annual Westerly CSO overflow volume was 281 MG of which 161 MG was the "first flush" volume (55%).

5. At the time, "first flush" was defined for a 2-hour period. The storage system, as designed, provided for a one (1) hour capture. The corrected "first flush" fraction for the CSO system is estimated to be 40-50% of the total annual overflow volume.

6. The existing CSO control facilities have the potential to store and pump up to 80% of all storm events. This potential capacity assumes there is sufficient pumping and downstream sewer capacity to convey the wastewater to the treatment plants at the specified flow rates. At present, no such capacity exists. However, peak flow events (20% of all annual events) produce volumes far in excess of treatable capacity.

7. As has been demonstrated, the existing CSO control system cannot meet the EPA Presumptive Approach criteria which stipulates, "... *the elimination or capture for minimum treatment (primary treatment, screening and disinfection) of no less than 85% by volume of the combined sewage collected on an annual average basis...*"

Water Quality Analysis - An assessment of the combined sewer overflow water quality, both from current sampling and previous monitoring studies, was performed. For NPDES reporting purposes, the Authority collects overflow samples for basic water quality analysis including bacteriological testing. The following results are indicated of sampling for the years 2014 to 2016 at the West CSO location. The analytical results do not specify when the samples were collected, for instance either during or after the "first flush" event.

Table 4 - Westerly Combined Sewer Overflow Water Quality Data at Bellwood Avenue

Storm Event	Bacteriological Analysis	Concentration (mg/l)			
Date	Max. Fecal Coli (cfu/100 ml)	BOD_5	Susp. Solids	Tot. Nitrogen	Total P
2/21/2014	90,000	33	114	6.54	0.83
3/12/2014	130,000	46	2052	6.93	1.50
4/4/2014	39,000	55	59	9.79	
5/16/2014	100,000	24	38	5.26	0.72
6/12/2014	32,000	40	43	8.14	0.99
7/14/2014	100,000	20	69	1.76	0.28
10/14/2014	310,000	15	46	4.20	0.56
3/11/2015	140,000	42	44	8.67	0.94
4/20/2015	200,000	42	71	10.2	2.00
9/30/2015	580,000	6	61	10.6	1.41
10/28/2015	156,500	17	37	3.93	0.60
12/2/2015	99,000	12	37	3.66	0.47
2/3/2016	104,600	12	121	2.64	0.46
4/4/2016	344,800	40	83	11.9	0.88
5/13/2016	218,700	29	98	7.73	0.92
9/29/2016	416,000	21	56	5.33	0.66
10/21/2016	410,600	21	72	6.03	0.68
Average	**204,188**	**28**	**182**	**6.66**	**0.87**

Recent bacteriological sampling shows the receiving water quality data both upstream and downstream of the CSO discharge. The timing of the sampling in relation to the "first flush" is unknown. Additional water quality data from this sampling program is in the Appendix.

Table 5 - Westerly CSO Receiving Water Quality Sampling at Mill Run Discharge

Storm Event Date	Mill Run Above Fecal Coli (cfu/100 ml)	West CSO Discharge Fecal Coli (cfu/100 ml)	Mill Run Below Fecal Coli (cu/100 ml)
2/21/2014	1,000	220,000	51,000
3/12/2014	1,100	47,000	21,000
4/4/2014	1,500	330,000	320,000
5/16/2014	2,100	100,000	39,500
6/12/2014	1,600	340,000	77,500
7/14/2014	28,000	340,000	60,000
10/14/2014	9,450	75,500	57,000
3/11/2015	600	55,500	25,500
4/20/2015	100	150,000	19,000
10/28/2015	7,800	98,800	46,400
12/2/2015	14,390	83,600	31,700
2/3/2016	1,090	85,700	35,000
5/13/2016	20,980	261,300	88,400
9/29/2016	24,810	104,300	73,800
10/21/2016	8,840	410,600	88,000
Average	8,224	180,153	68,920
Data Point Not Plotted			
9/30/2015	7000	1170000	600000

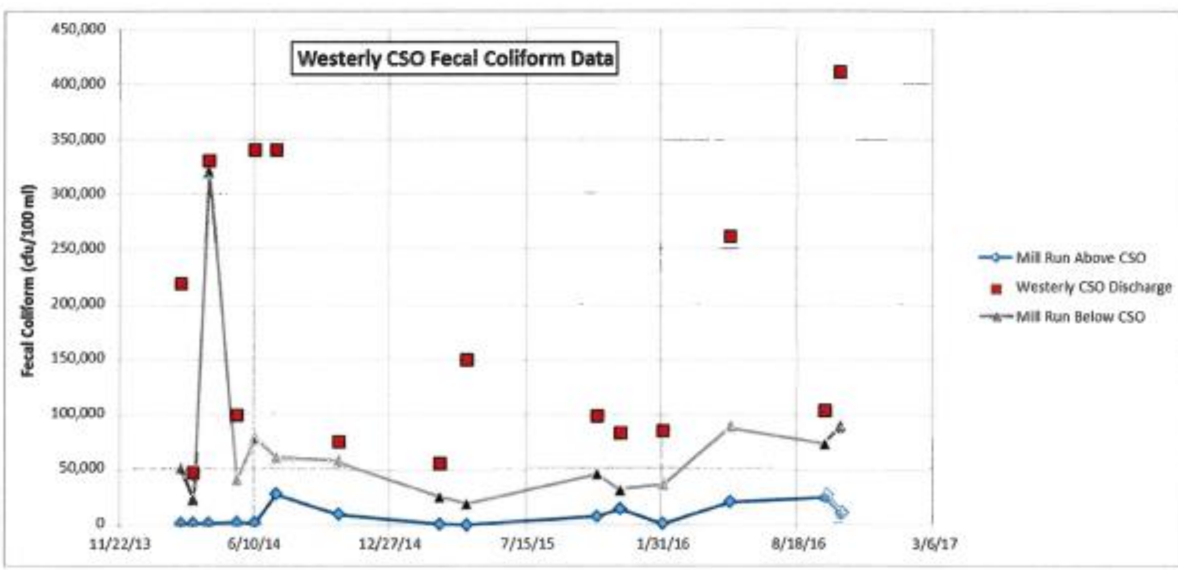


Figure 4 - Westerly CSO Receiving Water Quality Data at Mill Run (2013-2016)

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Water quality data obtained from previous monitoring shows the maximum pollutant levels of the CSO "first flush" prior to installation of the control facilities.

Table 6 - Westerly CSO Maximum "First Flush" Pollutant Levels

Storm Event	Storm Event Rainfall/Runoff Parameters			Bacteriological Analysis	Maximum Concentration (mg/l)			
Date	Peak Flow (MGD)	Total Rainfall (in.)	Max. Rainfall Intensity	Max. Fecal Coli (cfu/100 ml)	BOD5	Susp Sol	Total N	PO4
3/17/1980	19	0.40	0.08	16,800	64	690	7.48	1.20
4/8/1980	164	1.37	0.37	120,000	95	330	9.40	2.20
6/3/1980	288	0.73	0.59	153,000	50	2048	10.5	0.22
6/9/1980	80	0.85	0.32	1,523,000	177	409	12.0	22.1
7/8/1980	54	1.08	0.26	1,134,000	181	602	22.2	1.10
Average	**121**	**0.89**	**0.32**	**589,360**	**113.4**	**815.8**	**12.3**	**5.36**

Note: Maximum concentrations generally occurred within the first hour of overflow (first flush)

Previous studies also examined the pollutant impact of separate stormwater discharges that were used in the STORM model CSO analysis. Analysis was also performed of street sweepings and pollutant accumulation in the modeling study. The results showed a sizeable pollutant impact from stormwater entirely unrelated to combined sewage. The 7th Avenue storm sewer was monitored for 9 months with a drainage area of 257 acres and 33% impervious surfaces. The drainage area encompasses the former 17th Street Redevelopment zone from 12th Street to Dysart Avenue and 1st and 7th Avenues including the UPMC complex at the old Station Mall.

Table 7 - Stormwater Water Quality Analysis, 7th Avenue Storm Sewer (3rd & Dysart Avenues)

Storm Event	Storm Event Rainfall/Runoff Parameters			Bacteriological Analysis	Average Concentration (mg/l)			
Date	Peak Flow (MGD)	Total Rainfall (in.)	Max. Rainfall Intensity	Max. Fecal Coli (cfu/100 ml)	BOD5	Susp Sol	Total N	PO4
3/17/1980	5.6	0.40	0.08	1,400	42	315	3.29	0.16
6/3/1980	130	0.73	0.59	40,000	29	584	3.08	0.06
6/9/1980	41	0.85	0.32	6,000	8	128	2.26	0.04
7/8/1980	61	1.08	0.26	68,000	16	129	3.43	0.10
7/22/1980	21	0.37	0.19	102,000	5	46	2.52	0.06
7/28/1980	64	1.07	0.18	730,000	6	131	2.68	0.04
8/2/1980	86	0.38	0.28	572,000	19	410	1.91	0.02
Average	**58**	**0.70**	**0.27**	**217057**	**18**	**249**	**2.74**	**0.07**

Sensitive Area Analysis - According to the its national Combined Sewer Overflow Control Policy (FRL-4732-7), "*...EPA gives the highest priority to controlling overflows to sensitive areas such as waters with threatened or endangered species and their habitat, waters with primary contact recreation, public drinking water intakes or their designated protection areas...*"

Assessment Area - Based on previous studies, the downstream zone of potential CSO influence extended to Barree at the confluence of the Juniata River. For the Westerly CSO, the distance is 41 miles for the Westerly CSO on the Beaverdam Branch/Frankstown Branch of the Little Juniata River (395 sq. mi.).

Threatened or Endangered Species - The PA Fish and Boat Commission was contacted to discuss the Altoona LTCP/CSO issues. Kris Kuhn, PAF&BC Fisheries Management Section Manager (District 7), was very familiar with the Altoona treatment plants/CSOs and the receiving streams. Mr. Kuhn was instrumental in having the Little Juniata River recently reclassified as a Class A trout

stream from the Logan Township Pinecroft WWTF to the PA Route 220 Bridge near Bellwood. That section of stream is currently being reclassified by DEP through amendment of their Chapter 93 designation to a High Quality - Cold Water Fishery (HQ-CWF). He indicated that there was no known threatened or endangered species in either receiving stream.
Mr. Kuhn stated the positive benefits of the storage and treatment of the CSO "first flush" on the receiving streams. He stated that sewer separation may result in degradation of stream quality by eliminating the capture of high sediment loads that are currently stored during the first flush. This sediment can cover stream beds leading to habitat loss.

Public Water Supply - The nearest downstream public water supply intake is at Newport Borough. The intake is located on the Juniata River, approximately 143 miles downstream. As stated in the PADEP public notice for the Altoona NPDES permits, the effluent discharge will have no impact on this public water supply.

Primary Contact Recreation - Primary contact recreation includes swimming, bathing, surfing, water skiing, tubing, water play by children, and similar water contact activities where a high degree of bodily contact with the water, immersion and ingestion are likely. Noncontact recreation is defined as aquatic recreational pursuits not involving a significant risk of water ingestion, including fishing, commercial and recreational boating, and limited body contact incidental to shoreline activity.

In 2012, EPA issued recommendations intended as guidance to states in developing water quality standards to protect swimmers from exposure to water that contains organisms that indicate the presence of fecal contamination. DEP recommended state-wide application of these nationally recommended recreational use bacteria criteria to provide an appropriate level of protection for Pennsylvania's surface waters.

The following water quality criteria have been presented to the PA Environmental Quality Board for adoption. These standards are expected to be adopted this year.

- During the swimming season (May 1 through September 30), the maximum E. coli level shall be a geometric mean of 126 per 100 ml based on consecutive samples, each sample collected on different days, during a 30-day period. No more than 10% of the total samples taken during a 30-day period may exceed 410 per 100 ml.

- For the remainder of the year, the maximum fecal coliform level shall be a geometric mean of 2,000 per 100 ml based on a minimum of five (5) consecutive samples collected on different days during a 30-day period.

The US EPA is currently conducting research in developing criteria to protect secondary contact recreation. This would be for non-immersive activities such as rowing, power boating and fishing. EPA is also considering the redefinition of primary contact recreation to include canoeing, whitewater kayaking and rafting that involves a significant risk of water ingestion. DEP has stated it will evaluate any EPA recommendations and propose adoption if they are appropriate for Pennsylvania.

As currently defined, no primary contact recreation areas, including public beaches, state parks or public swimming areas, are located in the potential CSO influence zone.

Sensitive Area Summary - There are currently no threatened or endangered species, public water supply intakes or primary contact recreation areas that quality as "sensitive areas" within the Altoona CSO zone of influence.

However, future regulatory changes may alter the definition of contact recreation and required bacteriological standards in the zone of influence. Current activities such as kayaking, rafting and canoeing may qualify as future "sensitive areas" with a potential impact on CSO control.

Water Quality Analysis Summary - Based on current data and previous modeling and monitoring studies, the following conclusions can be drawn:

1. Based on recent CSO discharge sampling, organic (BOD_5) and suspended solid concentrations are generally low. At the Westerly CSO, BOD_5 and suspended solids have averaged 28 mg/l and 182 mg/l, respectively since 2013. Recent CSO discharge quality data appears to approach previous analytical data for stormwater quality (BOD_5 - 18 mg/l and suspended solids - 249 mg/l).

2. Historical sampling of the "first flush" CSO discharges averaged: BOD_5 - 114 mg/l and suspended solids - 816 mg/l at the Tuckahoe Park CSO.

3. A significant improvement in overall water quality has resulted from the installation of the CSO "first flush" control system. Compared to recent sampling at Tuckahoe Park, a 75% and 87% reduction in BOD_5 and suspended solids, respectively, is noted.

4. Recent bacteriological sampling for the Westerly CSO discharge has averaged 180,000 cfu/100 ml. The historical CSO "first flush" concentrations was 589,000 cfu/100 ml. Regardless of the inherent limitations of accurate fecal coliform testing, the order of magnitude reduction is significant.

5. Further evidence of stream improvements resulting from the Altoona CSO control system and upgraded WWTF's are enhanced recreational opportunities and stream designations. An active kayaking and rafting area is noted on the Frankstown Branch between Canoe Creek and Williamsburg, something that had not existed 40 years ago.

6. No "sensitive areas," as currently defined by EPA, exist within the potential CSO impact area. This has implications on the practical extent of additional CSO controls in Altoona. A regulatory refocus on municipal MS-4 stormwater control may be more appropriate.

7. Additional modeling and monitoring data in an LTCP update is required to further support the above observations.

Previous CSO Control Alternatives Evaluation - As has been noted, an extensive alternatives evaluation was performed for the previous CSO program. It is interesting to note that the same CSO site constraints and limitations exist now as they did then.

The existing Westerly CSO control system is located in a densely populated residential area of Altoona. Additional control in the form of more storage and preliminary treatment is not feasible at the Westerly CSO since it would encroach on neighborhood properties and a City park.

Relative to previous alternatives evaluations, the following structural alternatives were considered for CSO control. Based on a cost-effectiveness evaluation, the Offline Storage alternative was adopted for implementation as the CSO control mechanism for Altoona.

1. Offline Storage: Basic unit operations comprised a diversion/inlet structure, screening, storage tank and pumping system.

2. Swirl Primary Separator: Basic unit operations comprised a diversion/inlet structure, screening, swirl separator and pumping stations for the foul sewer concentrate and the treated discharge.

3. Combination Storage/Sedimentation: Basic unit operations comprised a diversion/inlet structure, screening, influent pumping, storage tank/clarifier and pumping station for clarifier underflow.

4. Dissolved Air Flotation: Basic unit operations included a diversion/inlet structure, screening, influent pumping, dissolved oxygen air flotation units, treated effluent channel and pump station for concentrated pollutant waste stream.

Existing CSO Control Summary - Because of excessively high storage and capture requirements, none of the alternatives will provide a source solution that will comply with the Presumptive Approach for CSO control.

Additional monitoring, modeling and evaluation in an LTCP update may yield alternatives that could be appropriate under the Nine Minimum Control Plan. These may include enhanced disinfection and floatables removal at the existing control structure, conveyance of additional CSO flow to the treatment plants to take advantage of unused wet-weather WWTF capacity (possibly as a 9 Minimum Control), source control through municipal MS-4 stormwater regulation and no-action alterative, among others.

The Demonstration Approach is recommended for further evaluation in the LTCP update.

APPENDIX C

NINE MINIMUM CONTROL PLAN - WESTERLY COMBINED SEWER OVERFLOW

APPENDIX C

NINE MINIMUM CONTROL PLAN - WESTERLY COMBINED SEWER OVERFLOW

The Nine Minimum Control Plan (NMCP) for the Westerly Combined Sewer Overflow is designed to allow cost-effective facility operation or retrofitting of additional controls found to be necessary to meet water quality standards. The elements of the Altoona Water Authority Westerly CSO NMCP are described below.

1. Proper Operation and Regular Maintenance Programs

   a. Purpose:

      The CSO Operations and Regular Maintenance (O&M) Program goal is to reduce the magnitude, duration and frequency of CSOs in the collection system. The intent is to establish written procedures for CSO O&M management activities throughout the entire collection system and to incorporate procedures into the overall CSO Master Operation and Management Program.

   b. Method:

      The Authority performs daily operation and maintenance work at the Tuckahoe Park CSO control facility and upstream collection system. During precipitation events above 0.25 inches, the Wastewater Operations Director (or a designee) checks the CSOs and diversion structures to insure they are functioning properly. The systems are continuously monitored from the Westerly plant SCADA system during wet weather events. The pump systems are checked each Friday by Authority maintenance personnel. Employees of the sewer maintenance crew are placed on-call for non-routine, emergency situations.

      The sewer maintenance crew also performs routine maintenance at the CSO. The CSO influent channels are cleaned of debris, at least semi-annually or as conditions dictate. The forebay to the CSO storage/pumping facility is cleaned of debris after major storm events and removed by the Authority Vac truck. To keep the screening equipment functioning properly, the plant maintenance personnel test the bar screens, conveyor belts and pumps as well as lubrication of all moving parts. Records of these maintenance operations are kept by the Wastewater Operations Director in a master maintenance log.

      In 2017, the Authority invested $450,000 in a new Vac Truck Model 2100 Plus by Vactor Manufacturing, Streator, Illinois. This equipment is used to clean lines using high pressure water, remove CSO forebay and inlet channel debris and perform inlet cleaning by a 180-degree rotating vacuum boom. This vehicle provides maintenance personnel with an efficient and more productive means of CSO cleaning.

      A detailed schedule exists for maintaining the collection system as well as the CSO. Sewer maintenance personnel perform daily cleaning and debris removal to ensure adequate hydraulic capacity and storage in the sewage collection system. The Vac truck water is used for annual cleaning of small diameter lines while larger sewers are cleaned by dragging equipment. The Authority annually cleans known problem areas that have a history of grease build-up or solids and debris deposition.

During periods of substantial wet weather events (>0.25 in.), the Authority conducts manhole inspections downstream of the CSO discharge to insure proper unimpeded outfall conditions to the treatment plant.

The Authority uses a sewer televising system for evaluating the condition of the collection system. This diagnostic tool identifies deficient sewer mains for replacement/ rehabilitation in future budgets. As part of the Chapter 94 Report, the Authority also performs routine smoke testing of sewer systems most susceptible to excessive inflow and infiltration.

In 2018, the Authority implemented a sewer surcharge in addition to its normal sewer rate schedule as a dedicated fund for the ongoing maintenance, repair and replacement of the collection system. This surcharge will provide additional funds to address chronic system failures and areas of excessive inflow and infiltration.

2. Maximum Use of the Collection System for Storage

a. Purpose:

This control feature is meant to enhance the available storage capacity of wet weather flows until the downstream sewer system and other facilities can hydraulically convey for treatment at the wastewater plant.

b. Method:

To properly maximize the use of collection system storage, the Authority utilizes an underground storage tank overflow near the outlet of the combined sewer system. The Tuckahoe Park (Westerly) CSO Facility has a capacity of 1.3 million gallons. As explained in the LTCP update, this storage tank captures the first flush from the combined sewer system which is later pumped back into the conveyance system for treatment. The treatment facility utilizes a unique step-feed system that can treat wet-weather flow up to the capacity of the plant (60 MGD). Regular inspections are performed as part of the CSO inspections to ensure that pumps and control valves are functioning properly.

The Authority has an aggressive maintenance program to maximize the use of the collection system. As previously discussed, regular cleaning of the collection system helps maximize capacity via removal of accumulated debris.

The Authority has significantly reduced infiltration and inflow in the Westerly collection system as evidenced by recent Chapter 94 reporting. The Authority performs ongoing smoke testing to find direct inflow sources along with televising work to identify areas of excessive infiltration. Elimination of excessive inflow and infiltration provides for greater storage of combined sewer flow.

In recent years, over $15 million has been invested in upgrades to the Westerly outfall sewers, Pleasant Valley interceptor sewers/pumping facility and large interceptor sewers in the Eldorado area to ensure system hydraulic capacity (up to 70 MGD).

In 2019-2020, the Authority plans to invest $12 million in the rehabilitation and repairs of deficient sewers, including cleaning and spray-on lining (guniting) combined sewers in the 4th Sewer District. Originally installed from 1885-1895, the brick sewers are egg-shaped with sizes ranging up to 84-inch equivalent diameter. This project will restore the structural integrity of the lines along with reducing sources of inflow and infiltration.

3. Review and Modification of Pretreatment Requirements

a. Purpose:

This control feature assesses and controls the impact of the regulated industrial and commercial users in terms of stormwater flow and pollutant loadings. Potentially significant, unregulated industrial or commercial users are identified and monitored under the Authority Pretreatment Program.

b. Method:

The Authority requires permitting for storm water discharges to the combined sewer system, including pretreatment and retention. The City of Altoona also provides control of stormwater discharges through its MS4 program. The following discharger is the only entity currently permitted by the Authority for stormwater discharges in the Westerly CSO drainage area: UPMC Station Medical Center, 1516 9th Avenue.

Designated commercial and industrial customers have stormwater permits which require biannual reporting. The permittee is required to conduct bimonthly inspections, provide dates of cleaning and use of detention facility and provide statements of detention facility maintenance. Also, the number of septic haulers is restricted which reduces debris discharged to the combined sewer system.

The Authority rules and regulations, along with its EPA-approved pretreatment program, prohibit the discharge of fats, oils and greases (FOG) stormwater along with any discharges considered detrimental to the wastewater system. Stormwater catch basins and FOG traps are required at local food industries and restaurants. Industrial user discharges are limited during wet weather events and the Authority reserves the right to assess fines and penalties to violators.

4. Maximization of Flow to the POTW for Treatment

a. Purpose:

This control feature implements practices, procedures and modifications to the CSO, and publicly owned treatment works to maximize the treatment of combined sewer flow while reducing the rate and volume of overflow.

b. Method:

Per the Long-Term Control Plan Update, the capacity of the Westerly wastewater treatment plant is not fully utilized during combined sewer overflows at the Westerly CSO control facility. It is estimated that 21% of treatment plant capacity (60 MGD) is not utilized, on an annual basis, during CSO events. Further, it is believed that 80% of the precipitation events leading to a combined sewer overflow could be fully treated at the Westerly plant. The restriction is downstream interceptor sewer capacity (8 MGD). The 2011 plant upgrade project provided for additional wet-weather treatment capacity. After screening and grit removal, a step-feed system conveys this CSO-wet weather to the last treatment zone of the nutrient removal process. This is done so to preserve the nutrient-rich biomass in the BNR process. Biological treatment ("contact stabilization") of wet weather flow is provided in the last oxic zone which is followed by final clarification and UV disinfection. Complete process evaluations (BioWin modeling studies and the Part II permit design engineers report) are attached (digitally) to the LTCP update.

Concurrent with the LTCP sampling and testing program (Demonstration Approach), a hydraulic model evaluation will determine the conveyance needs at the Westerly CSO control facility. This analysis will review peak flows and treatment volumes that can be conveyed to the Westerly plant for treatment. Additional CSO flow monitoring data will be evaluated (along with historical data) to ensure a complete data record in 2022. Peak flow records (2014-2024) at the Westerly plant will also be analyzed. Gravity sewer/ force main options will be assessed in a cost-effectiveness evaluation. See Appendix D for a complete LTCP update schedule.

The CSO treatment/conveyance analysis will be performed with the LTCP stream & CSO sampling in 2021 as set forth in the LTCP update and Appendices A and D. By July 2026, a final report on the monitoring and modeling results and recommended conveyance/treatment options will be submitted to DEP for review and approval. Reference Appendix D – LTCP Schedule.

5. Elimination of CSOs during Dry Weather

a. Purpose:

This control feature is meant to closely monitor overflows and implement all measures necessary to ensure there are no CSOs occurring during dry weather periods. Since the NPDES program prohibits dry weather over flows, the requirement for dry weather overflow elimination is enforceable independently of any programs for the control of CSO's.

b. Inspection Methods:

Although an overflow is unlikely to occur during dry weather periods, the Authority maintains continuous control and surveillance of the CSO by virtue of the plant SCADA system and daily physical inspections of the CSO facilities.

c. Debris and Floatables Reduction Methods:

The Authority maintains controls which are meant to reduce, if not eliminate, floatables are conveyed to the CSO's. New stormwater pretreatment and retention systems are designed to keep floatables from entering the combined sewer system. City permits are required for the discharge of storm water to the CSS. Reduction of floatables are key to prevent clogging of regulators.

1) The Westerly CSO storage control facility captures floatable debris during the "first flush" from the combined sewer system. Bar screens allow for the floatables to be removed and deposited into a dumpster for landfill disposal. These mechanisms are inspected daily to keep the floatable removal system functioning properly.

2) The City of Altoona Public Works Department and Altoona Water Authority are responsible for the removal of debris from all stormwater inlets within the combined sewer area along with street sweeping to assist in grit removal. These efforts are coordinated on a continuous basis between the City and the Authority.

3) For discharges at the Mill Run CSO outfall (near the Altoona Bible Church) a course screen swing-gate captures floatables prior to discharge to the receiving stream. This gate is inspected daily and cleaned as required by Authority maintenance personnel.

4) The Authority has implemented a program of requiring the City of Altoona and Logan Township to install trash racks or screens at the end of culverts which is intended to capture additional floatables that could be discharged after the Westerly CSO storage tanks are filled. Reference is made to Logan Township CSO stream inlets on Dry Gap Run at 32nd Avenue & 18th Street; 31st Avenue & 18th Street (Agudath Achim Branch) and 17th Avenue & 23rd Street. Recent evidence of screens being removed to allow debris into the combined sewer system has been noted and Logan Township has been notified to perform corrective action and provide adequate maintenance thereafter.

d. Dry Weather Overflow Control Measures

1) Dry weather overflows caused by operational problems can generally be alleviated by one of the following methods:

- Adjustment of Regulator Settings - To more properly match increased dry weather flow or changes in seasonal day - weather flow, adjustment of regulators by Authority personnel can be performed manually or by automatic SCADA controls.

- Repair/Rehabilitation of Regulators - Frequently, regulators with hydraulically or mechanically actuated gates can become stuck in the bypassing position because of impact damage which may allow dry weather flow to enter the bypass sewer. Repair parts and duplicate equipment held in stock will provide for quick change-out of defective parts by AWA personnel.

- Maintenance of Regulators - The opening through which dry weather flows pass from the regulator to the interceptor can become blocked with trash and refuse and result in a dry weather overflow. Routine inspection and maintenance by AWA personnel will eliminate such blockages. Debris and relatively large items will be removed manually while pressure flushing by the Authority VAC track will remove grease, sediment, and fiber buildup from these locations.

- Interceptor Cleaning - Sediments, tree roots, and other items can restrict flow and result in dry weather overflows at upstream locations in interceptors. Frequent CCTV sewer inspections by Authority personnel detect such restrictions and said restrictions are removed through sewer flushing, power rodding, balling, jetting, bucket machines, or other common maintenance methods of the Authority.

- Sewer Repair - Ground water can enter the sewer system by infiltration and, when combined with peak sanitary sewage flow, can exceed the capacity of the CSO regulator. Where specific dry weather overflow problem locations can be linked to defects in localized sewer segments, repairs are expeditiously performed by Authority personnel as a minimum control measure. For widespread infiltration problems, a comprehensive infiltration/inflow (I/I) control program will be initiated by the Authority to control or abatement excessive I/I.

6. Pollution Prevention Program

a. Purpose:

This control feature is meant to reduce, to the greatest extent possible, contaminants and nuisance vectors from entering the sewer system.

b. Method:

As previously discussed, the City of Altoona Public Works Department and the Altoona Water Authority are responsible for the removal of debris from all storm sewers and inlets within the City. Street sweeping is completed on a regular basis by the City.

The Authority conducts public tours of its treatment plant and provides information on its website (www.altoonawater.com) and social media sites on ways to prevent pollution. Separate mailings are sent to industrial and commercial users (restaurants) on procedures for the disposal of fats, oils and grease. Further elimination of pollutants is achieved by retention and control of site storm water from new developments in the combined sewer area.

7. Public Notification of Overflow Occurrences and their Impacts

   a. Purpose:

      This control feature is meant to develop a communication strategy to notify the public of hazards and impact of CSO discharges.

   b. Method:

      The Authority posts public notification at the Mill Run CSO outfall on potential hazards during wet weather periods. The signs read "DANGER - COMBINED SEWER OVERFLOW - NO SWIMMING."

      As noted above, important public information on combined sewer overflows is made available on the Authority's website which is also linked to social media sites. Information about the purpose of the CSOs and their function is provided.

8. Monitoring to Characterize CSO Impacts and the Efficacy of Controls

   a. Purpose:

      This control feature involves visual inspections and other simplified methods to determine the occurrence and apparent impacts of CSOs.

   b. Method:

      The Westerly CSO control facility monitors the daily flow of the downstream 27" interceptor sewer and transmits this data to the SCADA system of Westerly treatment plant.

      The following water quality sampling is performed during wet weather events that cause a combined sewer overflow.

      1. Sampling occurs only when the CSOs are bypassing.
      2. Samples are taken above and below discharge points of the receiving streams.
      3. Sampling is accomplished Monday thru Friday during daylight hours.

      The following is a list of sample locations:

      1. On Mill Run at the 31st Street/Union Avenue Bridge upstream of the Mill Run CSO outfall.
      2. At the Mill Run CSO discharge of the Tuckahoe Park box sewer (rear of Altoona Bible Church).
      3. Downstream of the Mill Run CSO discharge on Mill Run near Fort Roberdeau Avenue on Union Avenue.

Samples are analyzed for the following constituents:

1. NH_3
2. Total Kheldahl Nitrogen
3. BOD_5
4. COD
5. Total Phosphorous
6. Total Suspended Solids
7. pH
8. Fecal Coliform
9. E. coli

The Authority electronically submits CSO discharge events in Discharge Monitoring Reports (DMRs) required for Chapter 94 reporting.

The results characterize the baseline CSO water quality and the pollution loadings resulting from these discharges. A comprehensive evaluation of historic data is provided in the LTCP update. This analysis documents the effectiveness of the CSO control facility in the reduction of "first flush" CSO pollutant organic loads and fecal coliform levels.

APPENDIX D

CSO LONG-TERM CONTROL PLAN UPDATE SCHEDULE

APPENDIX D

WESTERLY COMBINED SEWER OVERFLOW
LONG-TERM CONTROL PLAN UPDATE SCHEDULE
SEPTEMBER 2019
APRIL 2020

Initiate LTCP Update Evaluation:	October 1, 2020
Begin WWTF/CSO Flow Monitoring of Wet Weather Events:	November 1, 2020
Develop CSO & Receiving Stream Water Quality Sampling Program:	December 1, 2020
Begin CSO & Receiving Stream Water Quality Sampling:	January 1, 2021
Compile GIS Sewer Map CSO, WWTF & Receiving Stream Data Base:	September 1, 2021
Complete CSO Water Characterization:	May 1, 2022
Complete CSO SWMM Modeling and Calibration:	October 1, 2022
Evaluate and Confirm WWTF Wet Weather Capacity Study:	July 1, 2024
Complete Receiving Stream Water Quality Sampling:	December 1, 2025
Complete Receiving Stream WASP Modeling & Calibration	January 1, 2026
Develop & Evaluate CSO Control Alternatives	April 1, 2026
Complete Final LTCP Report, Submit to PADEP	July 1, 2026