

Application Type Renewal  
Facility Type Municipal  
Major / Minor Minor

**NPDES PERMIT FACT SHEET  
INDIVIDUAL SEWAGE**

Application No. PA0232513  
APS ID 1012895  
Authorization ID 1308165

**Applicant and Facility Information**

Applicant Name	<u>Kelly Township Municipal Authority Union County</u>	Facility Name	<u>Kelly Crossroads Sanitary Sewer System</u>
Applicant Address	<u>405 Winter Farm Lane Lewisburg, PA 17837-6358</u>	Facility Address	<u>Fort Titzell Road Lewisburg, PA 17837</u>
Applicant Contact	<u>Matthew Koch</u>	Facility Contact	<u>Matthew Koch</u>
Applicant Phone	<u>(570) 523-3843</u>	Facility Phone	<u>(570) 523-3843</u>
Client ID	<u>78499</u>	Site ID	<u>781658</u>
Ch 94 Load Status	<u>Not Overloaded</u>	Municipality	<u>Kelly Township</u>
Connection Status	<u>No Limitations</u>	County	<u>Union</u>
Date Application Received	<u>March 4, 2020</u>	EPA Waived?	<u>Yes</u>
Date Application Accepted	<u>March 12, 2020</u>	If No, Reason	<u></u>
Purpose of Application	<u>.Renewal of an existing NPDES permit for the discharge of treated sewage.</u>		

**Summary of Review**

The above permittee has submitted an NPDES renewal application for their existing discharge from their sewage treatment plant that serves the Kelly Crossroads subdivision in Kelly Township, Union County. Based on the following review, it is recommended a permit be drafted in accordance with the public participation as outlined below. Unless otherwise noted, all applicable Department Standard Operating Procedures (SOPs) have been followed during the review of this application.

Public Participation

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

Approve	Deny	Signatures	Date
X		<i>Nicholas W. Hartranft</i> Nicholas W. Hartranft, P.E. / Environmental Engineer Manager	January 29, 2021
X		<i>Thomas M. Randis</i> Thomas M. Randis / Environmental Program Manager	January 29, 2021

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	<u>001</u>	Design Flow (MGD)	<u>.0135</u>
Latitude	<u>41° 1' 6.69"</u>	Longitude	<u>-76° 56' 16.40"</u>
Quad Name	<u>Allenwood</u>	Quad Code	<u>1030</u>
Wastewater Description: <u>Sewage Effluent</u>			
Receiving Waters	<u>Little Buffalo Creek (CWF, MF)</u>	Stream Code	<u>18924</u>
NHD Com ID	<u>66919841</u>	RMI	<u>4.4800</u>
Drainage Area	<u>8.69 mi<sup>2</sup></u>	Yield (cfs/mi <sup>2</sup> )	<u>0.125</u>
Q <sub>7-10</sub> Flow (cfs)	<u>1.09</u>	Q <sub>7-10</sub> Basis	<u>USGS Gage 01555000, Penns Creek at Penns Creek (1931-2008)</u>
Elevation (ft)	<u>501</u>	Slope (ft/ft)	<u>0.00219</u>
Watershed No.	<u>10-C</u>	Chapter 93 Class.	<u>CWF, MF</u>
Existing Use	<u>None</u>	Existing Use Qualifier	<u>N/A</u>
Exceptions to Use	<u>None</u>	Exceptions to Criteria	<u>N/A</u>
Assessment Status	<u>Impaired</u>		
Cause(s) of Impairment	<u>SILTATION</u>		
Source(s) of Impairment	<u>AGRICULTURE</u>		
TMDL Status	<u>None</u>	Name	<u>N/A</u>
Nearest Downstream Public Water Supply Intake	<u>Sunbury Municipal Water Authority</u>		
PWS Waters	<u>Susquehanna River</u>	Flow at Intake (cfs)	<u>679.7</u>
PWS RMI	<u>10.66</u>	Distance from Outfall (mi)	<u>17</u>

Comments: Stream flow has been based on data in the USGS publication *Selected Stream Flow Characteristics for Streamgage Locations in and near Pennsylvania* (see Appendix A). RMI, elevation, etc. were determined by interpolation of USGS topographic maps. Drainage area was determined by the USGS Streamstats website.

The discharge is not expected to have any impact on any downstream water supply.

Regarding the noted impairment due to siltation, it is not expected that the proposed discharge will cause or contribute any further impairment to the stream.

Changes Since Last Permit Issuance: Facility was constructed, was transferred to the current Permittee, and is now operational.

Treatment Facility Summary				
<b>Treatment Facility Name:</b> Kelly Crossroads Sanitary Sewer System				
<b>WQM Permit No.</b>		<b>Issuance Date</b>		
6014401		07/03/2014 (Transferred 09/18/2018)		
Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary With Total Nitrogen Reduction	Activated Sludge	Chlorine With Dechlorination	0.0135
Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.0135	28.1	Not Overloaded	Holding Tank	Offsite

Changes Since Last Permit Issuance: Facility was constructed, was transferred to the current Permittee, and is now operational.

Other Comments: Treatment system consists of package treatment plant consisting of a comminutor, bar screen, 6,040-gallon flow equalization, 4,430-gallon anoxic zone, 5,124-gallon aeration zone, Alum addition, 3,296-gallon clarifier, tablet chlorinator, 281-gallon chlorine contact tank, tablet dechlorinator, 141-gallon dechlorination tank and 2,842-gallon aerated sludge holding tank.

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**Compliance History**

<b>Summary of DMRs:</b>	The facility utilizes the Department's eDMR system. The facility had three (3) fecal coliform exceedances in the past 12 months, two (2) of which coincided in the month of June. Otherwise, a review of the eDMR data indicates compliance with the existing permit effluent limitations.
<b>Summary of Inspections:</b>	Four (4) inspection reports were developed in 2019. Fecal coliform violations were noted, elevated average ammonia concentrations were noted and concerns regarding foam on the aeration and anoxic treatment tanks were noted. Otherwise no other concerns or violations were noted.

**Effluent Violations for Outfall 001, from: January 1, 2020 To: November 30, 2020**

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
Fecal Coliform	06/30/20	Geo Mean	707	No./100 ml	200	No./100 ml
Fecal Coliform	05/31/20	Geo Mean	328	No./100 ml	200	No./100 ml
Fecal Coliform	06/30/20	IMAX	1203	No./100 ml	1000	No./100 ml

**DMR Data for Outfall 001 (from December 1, 2019 to November 30, 2020)**

Parameter	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20	MAR-20	FEB-20	JAN-20	DEC-19
Flow (MGD) Average Monthly	0.0028	0.0025	0.002	0.002	0.002	0.0021	0.0026	0.004	0.004	0.0031	0.003	0.0029
Flow (MGD) Daily Maximum	0.0045	0.0033	0.004	0.003	0.004	0.0033	0.004	0.008	0.006	0.0048	0.005	0.0059
pH (S.U.) Instantaneous Minimum	6.5	6.5	6.5	6.5	6.6	6.4	6.72	6.04	6.4	6.7	6.6	6.7
pH (S.U.) Instantaneous Maximum	7.1	7.1	7.5	7.2	7.2	7.2	7.11	7.0	7.1	7.4	7.7	7.8
DO (mg/L) Instantaneous Minimum	3.3	4.5	4.2	3.3	3.3	2.4	2.25	3.1	3.3	2.7	2.7	3.4

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Kelly Crossroads Sanitary Sewer System**

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TRC (mg/L) Average Monthly	0.3	0.2	0.4	0.3	0.3	0.12	0.09	0.12	0.1	0.14	0.2	0.2
TRC (mg/L) Instantaneous Maximum	0.8	0.5	1.2	1.5	1.1	0.86	0.28	0.29	0.5	0.29	0.47	0.9
CBOD5 (lbs/day) Average Monthly	0.06	0.04	0.09	0.1	0.2	0.2	0.2	0.2	0.06	0.2	0.09	0.2
CBOD5 (mg/L) Average Monthly	2	2	4	7	9	11	10.3	3.2	3.2	9	5.2	10
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	7	6	5	9	5	14	12	22	6	6	6	7
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	11	6	5	12	6	21	16	36	9	7	7	8
BOD5 (mg/L) Raw Sewage Influent Average Monthly	305	284	263	492	262	915	513	413	245	294	350	323
TSS (lbs/day) Average Monthly	0.09	0.07	0.08	0.08	0.1	0.1	0.4	0.2	0.08	0.1	0.1	0.1
TSS (lbs/day) Raw Sewage Influent Average Monthly	8	6	5	10	4	5	11	31	5	5	5	9
TSS (lbs/day) Raw Sewage Influent Daily Maximum	13	6	5	13	6	7	15	53	8	5	7	12
TSS (mg/L) Average Monthly	4	4	4	4	8	6	18	4.0	4	4	8	6
TSS (mg/L) Raw Sewage Influent Average Monthly	348	250	269	509	238	318	471	548	181	230	299	401
Fecal Coliform (No./100 ml) Geometric Mean	121	1	53	5	44	<b>707</b>	<b>328</b>	145	13	5	401	134
Fecal Coliform (No./100 ml) Instantaneous Maximum	1986	1	68	28	93	<b>1203</b>	601	816	179	20	2420	2420
Nitrate-Nitrite (mg/L) Average Monthly	10	3	14	8	3	0.3	0.8	1.7	2.4	5	16.4	11
Nitrate-Nitrite (lbs) Total Monthly	4	2	8	4	2	0.1	0.5	3	2	3	9	7
Total Nitrogen (mg/L) Average Monthly	14	6	16	10	6	24.6	8.9	5.6	11.2	10	23.2	31

**NPDES Permit Fact Sheet  
Kelly Crossroads Sanitary Sewer System**

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Total Nitrogen (lbs) Effluent Net   Total Monthly	6	4	10	6	4	24.6	6	8	8	6	12	21
Total Nitrogen (lbs) Total Monthly	6	4	10	6	4	11	6	8	8	6	12	21
Total Nitrogen (lbs) Effluent Net   Total Annual			00									
Total Nitrogen (lbs) Total Annual			106									
Ammonia (lbs/day) Average Monthly	0.02	0.02	0.002	0.005	0.01	0.002	0.02	0.1	0.04	0.02	0.06	0.1
Ammonia (mg/L) Average Monthly	1	1	0.1	0.3	1	0.2	0.8	3.1	1.8	1	4	6
Ammonia (lbs) Total Monthly	1	0.6	0.05	0.2	0.3	0.07	0.5	4	1	0.6	2	4
Ammonia (lbs) Total Annual			18									
TKN (mg/L) Average Monthly	4	3	1.8	3	3	24.3	8.2	3.9	8.8	4	6.8	19
TKN (lbs) Total Monthly	2	2	1	2	1	11	6	5	6	3	3	13
Total Phosphorus (lbs/day) Average Monthly	0.04	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.07	0.2
Total Phosphorus (mg/L) Average Monthly	3	7	8.5	8	8	6.9	4.2	6.5	4.6	5	4.3	8
Total Phosphorus (lbs) Effluent Net Total Monthly	1	4	5	5	5	3	3	9	4	3	2	5
Total Phosphorus (lbs) Total Monthly	1	4	5	5	5	3	3	9	4	3	2	5
Total Phosphorus (lbs) Effluent Net Total Annual			00									
Total Phosphorus (lbs) Total Annual			50									

**Development of Effluent Limitations**

<b>Outfall No.</b> <u>001</u>	<b>Design Flow (MGD)</b> <u>.0135</u>
<b>Latitude</b> <u>41° 1' 7.00"</u>	<b>Longitude</b> <u>-76° 56' 16.00"</u>
<b>Wastewater Description:</b> <u>Sewage Effluent</u>	

**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 <sub>5</sub>	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

**Water Quality-Based Limitations**

*CBOD<sub>5</sub>, DO, and NH<sub>3</sub>-N:*

The WQM7.0 model allows the Department to evaluate point source discharges of dissolved oxygen (DO), carbonaceous BOD (CBOD<sub>5</sub>), and ammonia nitrogen (NH<sub>3</sub>-N) into free-flowing streams and rivers. To accomplish this, the model simulates two basic processes: the mixing and degradation of NH<sub>3</sub>-N in the stream and the mixing and consumption of DO in the stream due to the degradation of CBOD<sub>5</sub> and NH<sub>3</sub>-N. WQM7.0 modeling was performed for the discharge and showed that the secondary treatment limits listed above are adequate to protect the receiving stream. See the attached modeling inputs/outputs (Appendix B). DO monitoring will be included in the permit consistent with Department SOPs.

*Total Residual Chlorine (TRC):*

The above Total Residual Chlorine limit from 92a.48(b)(2) is applicable to the facility and should easily be met with the proposed inclusion of de-chlorination. The Department uses a modeling spreadsheet to determine necessary WQBELs for discharges of TRC. The attached (Appendix C) modeling results show that the limit of 0.5 mg/l is adequate to protect the receiving stream at this time.

*Toxic Pollutants:*

No "Reasonable Potential Analysis" was performed to determine additional parameters as candidates for limitations for this minor municipal sewage treatment facility. No commercial or industrial facilities discharge to this system and as such no additional monitoring for any toxic or other emerging pollutants are proposed in the renewed NPDES permit.

*Chesapeake Bay Requirements:*

A portion of the Chesapeake Bay and many of its tidal tributaries have been listed as impaired under Section 303(d) of the Water Pollution Control Act, 33 U.S.C. §1313(d). Total Nitrogen and Total Phosphorus cap loads have been established for significant dischargers in Pennsylvania in order to reduce the total nutrient load to the Bay and meet State of Maryland Water Quality Standards. The Kelly Crossroads treatment plant was originally considered a new Phase 5, significant Chesapeake Bay discharger per the Phase II Watershed Implementation Plan (WIP). Because it was classified as a new facility, nutrient cap loadings of 0 pounds per year for both total nitrogen and total phosphorus must be established for the facility pursuant to the WIP. Kelly Township will need to meet the cap loads through the use of a combination of nutrient removal, offsets, and the purchase of credits. In a letter dated April 3, 2019, 1200 lbs of nitrogen offsets were approved by the Department. These offsets will be noted as a footnote in the proposed NPDES permit.

*Best Professional Judgment (BPJ) Limitations:*  
No BPJ limitations are proposed.

*Anti-Backsliding:*  
This draft permit does not propose to relax or make less stringent any of the existing effluent limitations.

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**Existing and 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) <sup>(1)</sup>		Concentrations (mg/L)				Minimum <sup>(2)</sup> Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	Report Inst Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	2.8	XXX	XXX	25	XXX	50	2/month	Grab
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/month	Grab
TSS	3.3	XXX	XXX	30	XXX	60	2/month	Grab
TSS Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/month	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/month	Grab
Ammonia-Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab
Total Phosphorus	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab

Compliance Sampling Location: Outfall 001

Other Comments: Influent sampling for BOD5 and TSS are included for consistency with Department policy for POTWs

**Proposed Effluent Limitations and Monitoring Requirements**

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

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

Parameter	Effluent Limitations					Monitoring Requirements	
	Mass Units (lbs)		Concentrations (mg/L)			Minimum <sup>(2)</sup> Measurement Frequency	Required Sample Type
	Monthly	Annual	Minimum	Monthly Average	Maximum		
Ammonia – Nitrogen	Report	Report		Report		1/month	Grab
Kjeldahl - Nitrogen	Report			Report		1/month	Grab
Nitrate – Nitrite as Nitrogen	Report			Report		1/month	Grab
Total Nitrogen	Report	Report		Report		1/month	Calculation
Total Phosphorus	Report	Report		Report		1/month	Grab
Net Total Nitrogen	Report	0				1/month	Calculation
Net Total Phosphorus	Report	0				1/month	Calculation

Compliance Sampling Location: Outfall 001

Other Comments: None

# **APPENDIX A**

## **Q7-10 ANALYSIS AND STREAM DATA**



**Prepared in cooperation with the Pennsylvania Department of Environmental Protection**

## **Selected Streamflow Statistics for Streamgauge Locations in and near Pennsylvania**



Open-File Report 2011–1070

**U.S. Department of the Interior  
U.S. Geological Survey**

Table 1 13

**Table 1.** List of U.S. Geological Survey streamgage locations in and near Pennsylvania with updated streamflow statistics.—Continued

[Latitude and Longitude in decimal degrees; mi<sup>2</sup>, square miles]

Streamgage number	Streamgage name	Latitude	Longitude	Drainage area (mi <sup>2</sup> )	Regulated <sup>1</sup>
01541303	West Branch Susquehanna River at Hyde, Pa.	41.005	-78.457	474	Y
01541308	Bradley Run near Ashville, Pa.	40.509	-78.584	6.77	N
01541500	Clearfield Creek at Dimeling, Pa.	40.972	-78.406	371	Y
01542000	Moshannon Creek at Osceola Mills, Pa.	40.850	-78.268	68.8	N
01542500	WB Susquehanna River at Karthaus, Pa.	41.118	-78.109	1,462	Y
01542810	Waldy Run near Emporium, Pa.	41.579	-78.293	5.24	N
01543000	Driftwood Branch Sinnemahoning Creek at Sterling Run, Pa.	41.413	-78.197	272	N
01543500	Sinnemahoning Creek at Sinnemahoning, Pa.	41.317	-78.103	685	N
01544000	First Fork Sinnemahoning Creek near Sinnemahoning, Pa.	41.402	-78.024	245	Y
01544500	Kettle Creek at Cross Fork, Pa.	41.476	-77.826	136	N
01545000	Kettle Creek near Westport, Pa.	41.320	-77.874	233	Y
01545500	West Branch Susquehanna River at Renovo, Pa.	41.325	-77.751	2,975	Y
01545600	Young Womans Creek near Renovo, Pa.	41.390	-77.691	46.2	N
01546000	North Bald Eagle Creek at Milesburg, Pa.	40.942	-77.794	119	N
01546400	Spring Creek at Houserville, Pa.	40.834	-77.828	58.5	N
01546500	Spring Creek near Axemann, Pa.	40.890	-77.794	87.2	N
01547100	Spring Creek at Milesburg, Pa.	40.932	-77.786	142	N
01547200	Bald Eagle Creek below Spring Creek at Milesburg, Pa.	40.943	-77.786	265	N
01547500	Bald Eagle Creek at Blanchard, Pa.	41.052	-77.604	339	Y
01547700	Marsh Creek at Blanchard, Pa.	41.060	-77.606	44.1	N
01547800	South Fork Beech Creek near Snow Shoe, Pa.	41.024	-77.904	12.2	N
01547950	Beech Creek at Monument, Pa.	41.112	-77.702	152	N
01548005	Bald Eagle Creek near Beech Creek Station, Pa.	41.081	-77.549	562	Y
01548500	Pine Creek at Cedar Run, Pa.	41.522	-77.447	604	N
01549000	Pine Creek near Waterville, Pa.	41.313	-77.379	750	N
01549500	Blockhouse Creek near English Center, Pa.	41.474	-77.231	37.7	N
01549700	Pine Creek below Little Pine Creek near Waterville, Pa.	41.274	-77.324	944	Y
01550000	Lycoming Creek near Trout Run, Pa.	41.418	-77.033	173	N
01551500	WB Susquehanna River at Williamsport, Pa.	41.236	-76.997	5,682	Y
01552000	Loyalsock Creek at Loyalsockville, Pa.	41.325	-76.912	435	N
01552500	Muncy Creek near Sonestown, Pa.	41.357	-76.535	23.8	N
01553130	Sand Spring Run near White Deer, Pa.	41.059	-77.077	4.93	N
01553500	West Branch Susquehanna River at Lewisburg, Pa.	40.968	-76.876	6,847	Y
01553700	Chillisquaque Creek at Washingtonville, Pa.	41.062	-76.680	51.3	N
01554000	Susquehanna River at Sunbury, Pa.	40.835	-76.827	18,300	Y
01554500	Shamokin Creek near Shamokin, Pa.	40.810	-76.584	54.2	N
01555000	Penns Creek at Penns Creek, Pa.	40.867	-77.048	301	N
01555500	East Mahantango Creek near Dalmatia, Pa.	40.611	-76.912	162	N
01556000	Frankstown Branch Juniata River at Williamsburg, Pa.	40.463	-78.200	291	N
01557500	Bald Eagle Creek at Tyrone, Pa.	40.684	-78.234	44.1	N
01558000	Little Juniata River at Spruce Creek, Pa.	40.613	-78.141	220	N
01559000	Juniata River at Huntingdon, Pa.	40.485	-78.019	816	LF
01559500	Standing Stone Creek near Huntingdon, Pa.	40.524	-77.971	128	N
01559700	Sulphur Springs Creek near Manns Choice, Pa.	39.978	-78.619	5.28	N
01560000	Dunning Creek at Belden, Pa.	40.072	-78.493	172	N



**26 Selected Streamflow Statistics for Streamgage Locations in and near Pennsylvania**

**Table 2. Selected low-flow statistics for streamgage locations in and near Pennsylvania.—Continued**

[ft<sup>3</sup>/s; cubic feet per second; —, statistic not computed; <, less than]

Streamgage number	Period of record used in analysis <sup>1</sup>	Number of years used in analysis	1-day, 10-year (ft <sup>3</sup> /s)	7-day, 10-year (ft <sup>3</sup> /s)	7-day, 2-year (ft <sup>3</sup> /s)	30-day, 10-year (ft <sup>3</sup> /s)	30-day, 2-year (ft <sup>3</sup> /s)	90-day, 10-year (ft <sup>3</sup> /s)
01546000	1912–1934	17	1.8	2.2	6.8	3.7	12.1	11.2
01546400	1986–2008	23	13.5	14.0	19.6	15.4	22.3	18.7
01546500	1942–2008	67	26.8	29.0	41.3	31.2	44.2	33.7
01547100	1969–2008	40	102	105	128	111	133	117
01547200	1957–2008	52	99.4	101	132	106	142	115
01547500	<sup>2</sup> 1971–2008	38	28.2	109	151	131	172	153
01547500	<sup>3</sup> 1956–1969	14	90.0	94.9	123	98.1	131	105
01547700	1957–2008	52	.5	.6	2.7	1.1	3.9	2.2
01547800	1971–1981	11	1.6	1.8	2.4	2.1	2.9	3.5
01547950	1970–2008	39	12.1	13.6	28.2	17.3	36.4	23.8
01548005	<sup>2</sup> 1971–2000	25	142	151	206	178	241	223
01548005	<sup>3</sup> 1912–1969	58	105	114	147	125	165	140
01548500	1920–2008	89	21.2	24.2	50.1	33.6	68.6	49.3
01549000	1910–1920	11	26.0	32.9	78.0	46.4	106	89.8
01549500	1942–2008	67	.6	.8	2.5	1.4	3.9	2.6
01549700	1959–2008	50	33.3	37.2	83.8	51.2	117	78.4
01550000	1915–2008	94	6.6	7.6	16.8	11.2	24.6	18.6
01551500	<sup>2</sup> 1963–2008	46	520	578	1,020	678	1,330	919
01551500	<sup>3</sup> 1901–1961	61	400	439	742	523	943	752
01552000	1927–2008	80	20.5	22.2	49.5	29.2	69.8	49.6
01552500	1942–2008	67	.9	1.2	3.1	1.7	4.4	3.3
01553130	1969–1981	13	1.0	1.1	1.5	1.3	1.8	1.7
01553500	<sup>2</sup> 1968–2008	41	760	838	1,440	1,000	1,850	1,470
01553500	<sup>3</sup> 1941–1966	26	562	619	880	690	1,090	881
01553700	1981–2008	28	9.1	10.9	15.0	12.6	17.1	15.2
01554000	<sup>2</sup> 1981–2008	28	1,830	1,990	3,270	2,320	4,210	3,160
01554000	<sup>3</sup> 1939–1979	41	1,560	1,630	2,870	1,880	3,620	2,570
01554500	1941–1993	53	16.2	22.0	31.2	25.9	35.7	31.4
01555000	1931–2008	78	33.5	37.6	58.8	43.4	69.6	54.6
01555500	1931–2008	78	4.9	6.5	18.0	9.4	24.3	16.6
01556000	1918–2008	91	43.3	47.8	66.0	55.1	75.0	63.7
01557500	1946–2008	63	2.8	3.2	6.3	4.2	8.1	5.8
01558000	1940–2008	69	56.3	59.0	79.8	65.7	86.2	73.7
01559000	1943–2008	66	104	177	249	198	279	227
01559500	1931–1958	28	9.3	10.5	15.0	12.4	17.8	15.8
01559700	1963–1978	16	.1	.1	.2	.1	.3	.2
01560000	1941–2008	68	8.5	9.4	15.6	12.0	20.2	16.2
01561000	1932–1958	27	.4	.5	1.6	.8	2.5	1.7
01562000	1913–2008	96	64.1	67.1	106	77.4	122	94.5
01562500	1931–1957	27	1.1	1.6	3.8	2.3	5.4	3.7
01563200	<sup>2</sup> 1974–2008	35	—	—	—	112	266	129
01563200	<sup>3</sup> 1948–1972	25	10.3	28.2	86.1	64.5	113	95.5
01563500	<sup>2</sup> 1974–2008	35	384	415	519	441	580	493
01563500	<sup>3</sup> 1939–1972	34	153	242	343	278	399	333
01564500	1940–2008	69	3.6	4.2	10.0	6.2	14.4	10.6

# **APPENDIX B**

## WQM 7.0 MODEL INPUT/OUTPUT

**WQM 7.0 Effluent Limits**

<u>SWP Basin</u>		<u>Stream Code</u>		<u>Stream Name</u>			
10C		18924		LITTLE BUFFALO CREEK			
RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
4.800	Kelly Crossroad	PA0232513	0.014	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			3



**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
10C	18924	LITTLE BUFFALO CREEK	4.800	501.00	8.59	0.00000	0.00	<input checked="" type="checkbox"/>

**Stream Data**

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time	Rch Velocity	WD Ratio	Rch Width	Rch Depth	Tributary Temp	Tributary pH	Stream Temp	Stream pH
	(cfsm)	(cfs)	(cfs)	(days)	(fps)		(ft)	(ft)	(°C)		(°C)	
Q7-10	0.125	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

**Discharge Data**

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Kelly Crossroad	PA0232513	0.0135	0.0135	0.0135	0.000	25.00	7.00

**Parameter Data**

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

**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
10C	18924	LITTLE BUFFALO CREEK	2.720	477.00	11.10	0.00000	0.00	<input checked="" type="checkbox"/>

**Stream Data**

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time	Rch Velocity	WD Ratio	Rch Width	Rch Depth	Tributary Temp	Tributary pH	Stream Temp	Stream pH
	(cfsm)	(cfs)	(cfs)	(days)	(fps)		(ft)	(ft)	(°C)		(°C)	
Q7-10	0.125	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

**Discharge Data**

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

**Parameter Data**

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

### WQM 7.0 Hydrodynamic Outputs

<u>SWP Basin</u>		<u>Stream Code</u>				<u>Stream Name</u>						
10C		18924				LITTLE BUFFALO CREEK						
RMI	Stream Flow	PWS With	Net Stream Flow	Disc Analysis Flow	Reach Slope	Depth	Width	W/D Ratio	Velocity	Reach Trav Time	Analysis Temp	Analysis pH
	(cfs)	(cfs)	(cfs)	(cfs)	(ft/ft)	(ft)	(ft)		(fps)	(days)	(°C)	
<b>Q7-10 Flow</b>												
4.800	1.07	0.00	1.07	.0209	0.00219	.528	16.12	30.51	0.13	0.989	20.10	7.00
<b>Q1-10 Flow</b>												
4.800	0.69	0.00	0.69	.0209	0.00219	NA	NA	NA	0.10	1.262	20.15	7.00
<b>Q30-10 Flow</b>												
4.800	1.46	0.00	1.46	.0209	0.00219	NA	NA	NA	0.15	0.835	20.07	7.00

## WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	<input checked="" type="checkbox"/>
WLA Method	EMPR	Use Inputted W/D Ratio	<input type="checkbox"/>
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	<input type="checkbox"/>
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	<input checked="" type="checkbox"/>
D.O. Saturation	90.00%	Use Balanced Technology	<input checked="" type="checkbox"/>
D.O. Goal	6		

### WQM 7.0 Wasteload Allocations

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>
10C	18924	LITTLE BUFFALO CREEK

#### NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
4.800	Kelly Crossroad	9.57	50	9.57	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
4.800	Kelly Crossroad	1.91	25	1.91	25	0	0

#### Dissolved Oxygen Allocations

RMI	Discharge Name	<u>CBOD5</u>		<u>NH3-N</u>		<u>Dissolved Oxygen</u>		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
4.80	Kelly Crossroad	25	25	25	25	3	3	0	0

### WQM 7.0 D.O. Simulation

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>		
10C	18924	LITTLE BUFFALO CREEK		
<hr/>				
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>	<u>Analysis pH</u>	
4.800	0.014	20.095	7.000	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>	<u>Reach Velocity (fps)</u>	
16.118	0.528	30.512	0.129	
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>	<u>Reach Kn (1/days)</u>	
2.44	0.165	0.48	0.705	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>	<u>Reach DO Goal (mg/L)</u>	
8.143	2.675	Tsvoglou	6	
<u>Reach Travel Time (days)</u>				
0.989				
	<u>Subreach Results</u>			
	<u>TravTime</u>	<u>CBOD5</u>	<u>NH3-N</u>	<u>D.O.</u>
	(days)	(mg/L)	(mg/L)	(mg/L)
	0.099	2.40	0.44	8.19
	0.198	2.36	0.41	8.23
	0.297	2.32	0.39	8.23
	0.396	2.28	0.36	8.23
	0.494	2.25	0.34	8.23
	0.593	2.21	0.31	8.23
	0.692	2.17	0.29	8.23
	0.791	2.14	0.27	8.23
	0.890	2.10	0.25	8.23
	0.989	2.07	0.24	8.23

# **APPENDIX C**

## TRC ANALYSIS SPREADSHEET

<b>TRC EVALUATION</b>				
Input appropriate values in A3:A9 and D3:D9				
1.09	= Q stream (cfs)	0.5	= CV Daily	
0.0135	= Q discharge (MGD)	0.5	= CV Hourly	
30	= no. samples	1	= AFC_Partial Mix Factor	
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor	
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)	
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)	
0	= % Factor of Safety (FOS)	0	= Decay Coefficient (K)	
Source	Reference	AFC Calculations		Reference
TRC	1.3.2.iii	WLA_afc = 16.668		1.3.2.iii
PENTOXSD TRG	5.1a	LTAMULT_afc = 0.373		5.1c
PENTOXSD TRG	5.1b	LTA_afc = 6.211		5.1d
				WLA_cfc = 16.243
				LTAMULT_cfc = 0.581
				LTA_cfc = 9.443
Source	Effluent Limit Calculations			
PENTOXSD TRG	5.1f	AML_MULT = 1.231		
PENTOXSD TRG	5.1g	AVG_MON_LIMIT (mg/l) = 0.500		BAT/BPJ
		INST_MAX_LIMIT (mg/l) = 1.635		
WLA_afc	$(.019/e(-k*AFC\_tc)) + [(AFC\_Yc*Qs*.019/Qd*e(-k*AFC\_tc))... \\ ...+ Xd + (AFC\_Yc*Qs*Xs/Qd)]*(1-FOS/100)$			
LTAMULT_afc	$EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)$			
LTA_afc	$wla\_afc*LTAMULT\_afc$			
WLA_cfc	$(.011/e(-k*CFC\_tc)) + [(CFC\_Yc*Qs*.011/Qd*e(-k*CFC\_tc)) ... \\ ...+ Xd + (CFC\_Yc*Qs*Xs/Qd)]*(1-FOS/100)$			
LTAMULT_cfc	$EXP((0.5*LN(cvd^2/no\_samples+1))-2.326*LN(cvd^2/no\_samples+1)^0.5)$			
LTA_cfc	$wla\_cfc*LTAMULT\_cfc$			
AML_MULT	$EXP(2.326*LN((cvd^2/no\_samples+1)^0.5)-0.5*LN(cvd^2/no\_samples+1))$			
AVG_MON_LIMIT	$MIN(BAT\_BPJ,MIN(LTA\_afc,LTA\_cfc)*AML\_MULT)$			
INST_MAX_LIMIT	$1.5*((av\_mon\_limit/AML\_MULT)/LTAMULT\_afc)$			