PENNSYLVANIA TURNPIKE COMMISSION
POLLUTANT REDUCTION PLAN
FOR THE
CHESAPEAKE BAY DRAINAGE BASIN
NPDES PERMIT NO. PAI139602

PENNSYLVANIA TURNPIKE COMMISSION, PENNSYLVANIA

OCTOBER 2022
REVISED: FEBRUARY 2023
REVISED JULY 2023
REVISED OCTOBER 2023

PREPARED BY

SKELLY AND LOY, INC.
HARRISBURG, PENNSYLVANIA

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OCTOBER 25, 2022
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TABLE OF CONTENTS

PAGE

LIST OF FIGURES

PAGE

LIST OF TABLES

PAGE

LIST OF APPENDICES

LIST OF ACRONYMS

BMP	Best Management Practices
CAST	Chesapeake Assessment Scenario Tool
CBPRP	Chesapeake Bay Pollutant Reduction Plan
CWA	Clean Water Act
GIS	Geographic Information System
GWLF	Generalized Watershed Loading Function
HUC	Hydrologic Unit Code
ID	Identification
IDD&E	Illicit Discharge Detection and Elimination
lbs/yr	Pounds per Year
LF	Linear Feet
M&M	Maintenance and Monitoring
MS3	Municipal Separate Storm Sewer
MS4	Municipal Separate Storm Sewer System
NHD	National Hydrology Dataset
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PA DEP	Pennsylvania Department of Environmental Protection
PA DCNR	Pennsylvania Department of Conservation and Natural Resources
PennDOT	Pennsylvania Department of Transportation
PRP	Pollutant Reduction Plan
PTC	Pennsylvania Turnpike Commission
RES	Resource Environmental Solutions, LLC
SCM	Stormwater Control Measure
SPI	Site Protection Instrument
TMDL	Total Maximum Daily Load

TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids (Sediment)
UA	Urbanized Area
UNT	Unnamed Tributary
USGS	United States Geological Survey
WLA	Waste Load Allocation

1.0 EXECUTIVE SUMMARY

A. RESULTS

The pollutants of concern are sediment, phosphorus and nitrogen. Existing pollutant loads for the Pennsylvania Turnpike Commission (PTC) were estimated using the MapShed model. PA DEP declared that if the sediment (TSS) reduction goal is obtained, the permittee may presume that the total phosphorus (TP) and total nitrogen (TN) reduction goals are also met. Consequently, the PTC is reporting sediment reduction. A single Pollution Reduction Plan (PRP) Best Management Practice (BMP) is proposed to meet the PTC sediment reduction goal for the PTC's entire Chesapeake Bay Drainage Basin obligation. The originally planned pollution reduction project that was described in the October 25, 2022, version of this PRP was a restoration and floodplain reconnection of a 1,440-foot segment of an unnamed tributary (UNT) to the Susquehanna River located in Lower Swatara Township, Dauphin County, Pennsylvania. A new pollution reduction project, the Stony Run BMP, located in East Cocalico Township, Lancaster County, Pennsylvania, is replacing the originally planned site due to landowner complications.

The stream restoration project will encompass 1,370 LF of Stony Run plus four unnamed tributaries. The Stony Run BMP is being quantified using the Chesapeake Bay expert-panel protocols for urban stream restorations. DEP has a graduated scale for crediting the quantities of sediment reduction corresponding to the level of pre-implementation testing and pre- and post-monitoring of the BMP. The PTC's project has been subject to site assessment, testing, and one year of pre-implementation monitoring. The project will reduce sediment by 256,493 pounds per year (lbs/yr). Stony Run BMP will be monitored after it is constructed and is expected to qualify for additional sediment reduction credit at that time.

In the event that the Stony Run Project is less than the estimated sediment pollution reduction, the PRP includes a contingency Stormwater Control Measure (SCM) retrofit project to augment the stream restoration. PTC will retrofit a SCM serving the U.S. Route 15 Interchange if additional sediment pollution reduction is required. The existing SCM is an extended dry detention basin, ID # T-236.28-WB-0681-BED. The retrofit will add a sediment forebay into the SCM to maximize sediment pollutant reduction. Existing pollutant loads, required reduction targets, and achieved reductions are summarized in **Table 1** below.

TABLE 1
PTC CHESAPEAKE DRAINAGE BASIN: EXISTING POLLUTANT LOADS, REQUIRED REDUCTION TARGETS, AND ACHIEVED REDUCTIONS

POLLUNTANT	EXISTING LOAD	REQUIRED REDUCTION %	REQUIRED REDUCTION (LBS/YR)	ACHIEVED REDUCTION (LBS/YR)	EXCESS REDUCTION (LBS/YR)	CONTINGENCY SCM RETROFIT REDUCTION (LBS/YR)
Sediment (TSS)	2,475,903	10%	247,600	256,493	8,893	28,950
Phosphorus (TP)	659	5%	33	Presumed	Presumed	Presumed
Nitrogen (TN)	10,186	3%	306	Presumed	Presumed	Presumed

* *The sediment reduction total represents use of Chesapeake Bay Expert Panel Urban Stream Restoration Protocols 1 and 3 with pre-construction soils testing, stream assessment, and monitoring. A 75% efficiency rate is reported, and greater reductions are expected to be documentable following post-construction monitoring.*

B. PURPOSE

The Chesapeake Bay Pollutant Reduction Plan (CBPRP) was prepared to comply with Pennsylvania Department of Environmental Protection (PA DEP) National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. PAI139602, effective November 1, 2021, through October 31, 2026. The purpose of a PRP is to provide a basis for implementation of specific projects to capture and reduce pollutants conveyed by stormwater runoff before they reach streams, rivers, lakes, etc. (a.k.a., surface waters). Each PRP provides the background, assumptions, analysis, and methodology to establish a justifiable baseline of current pollutant load generation and then identifies BMPs with site locations, planning-level concept designs, costs, and implementation schedules. It also offers a framework for funding installation, operation, and maintenance activities that provides regulators with assurance that the identified project(s) will materialize within the scheduled timeframe. This PTC CBPRP assesses the urban watersheds within the Chesapeake Bay Drainage Basin through which the Pennsylvania Turnpike passes, regardless of the surface waters' water quality (attaining or non-attaining) designated use status.

C. PRP LAYOUT

The Executive Summary is followed by two sections. Section 2.0 (Introduction) describes the PTC's characteristics influencing PRP decisions. Topics within Section 2.0 include Hydrology, Topography and Geology, Soils, and Land Use.

Section 3.0 (Required PRP Components) provides technical data, analysis and substantiation, and proposed BMP specifics. It is organized and titled to match the titles and sequence of the PA DEP's PRP Instructions per the directions. The subsections are:

A. Public Participation

B. Map

C. Pollutants of Concern

D. Existing Loading for Pollutants of Concern

E. BMPs to Achieve the Minimum Required Reductions in Pollutant Loading

F. Funding Mechanism(s)

G. Responsible Parties for Operation and Maintenance (O&M) of BMPs

The PTC opted to use the presumptive approach to report pollutant reduction. Under this approach, it is assumed that if the required sediment reduction is achieved, phosphorus and nitrogen reductions are also reached. Therefore, only sediment load reduction is reported.

2.0 INTRODUCTION

A. LOCATION

1. Contextual Location

The Pennsylvania Turnpike is a limited-access toll road network that crosses the state from the Pennsylvania-Ohio border northwest of Pittsburgh to the Pennsylvania-New Jersey border east of Philadelphia. The network also serves regions north and south of Pittsburgh and north of Philadelphia and is comprised of the segments listed in **Table 2**, Turnpike System Roadways.

TABLE 2
PENNSYLVANIA TURNPIKE SYSTEM ROADWAYS

ROADWAY NAME	ROUTE NO.	DESCRIPTION	MILES
Turnpike Mainline	I-76/I-276	Ohio to New Jersey Connector	359
Beaver Valley Expressway	I-376	PA-51 to US-422	16.3
Southern Beltway	PA-576	South of Pittsburgh International Airport to I-79	5.7
Mon/Fayette Expressway	PA-43	Pittsburgh to Uniontown Connector	51.4
Amos K. Hutchinson Bypass (a.k.a., Greensburg Bypass)	PA-66	I-70 to US-22 Connector	13.3
Northeast Extension	I-476	Philadelphia-Allentown-Wilkes Barre-Scranton Connector	110.1
TOTAL LENGTH			**556**

2. MS4 Regulated Area

The MS4 NPDES Permit applies only to urban runoff from land within the Urbanized Areas (UAs), as defined by the 2010 Census, that flows through a municipally owned and operated stormwater system with an identifiable concentrated discharge (outfall) to a surface water. The MS4 Permit also applies to non-municipal entities specified by PA DEP that are public-sector organizations and function similarly to municipal governments relative to operations of stormwater infrastructure and contributing drainage areas. The PTC is one of the organizations within this group of non-traditional MS4s.

The MS4 regulated area for the PTC includes UAs as defined by the U.S. Census Bureau in its 2010 ten-year census plus the upland contributory drainage area that is within the jurisdiction of the PTC. The basis for the UA criteria, the 2010 Census, is specified in the PTC's MS4 Permit and the additional upgradient area contributing to the UA is stipulated in FAQ #10 of PA DEP's *MS4 NPDES Permits Frequently Asked Questions* (revised December 2, 2021).

The storm sewer system consists of the PTC-owned and -operated stormwater conveyance network, including the roadway, inlets/catch basins, curbs, gutters, ditches, man-made channels, or storm drains.

3. Chesapeake Bay Drainage Basin Location

This PRP is focused on the regulated portion of the 556-mile Pennsylvania Turnpike located in or contributing runoff to the UAs within the Chesapeake Bay Drainage Basin. Approximately 43 miles of the Turnpike Mainline roadway located in southcentral Pennsylvania, and 15 miles of the Northeast Extension in the Wilkes-Barre Scranton region (a total of 58 miles of the Turnpike corridor) are within the Chesapeake Bay MS4 regulated area. Of the 43 miles along the Turnpike Mainline's regulated area, approximately 29 miles are within the Harrisburg UA and 14 miles are within the Lancaster UA. All of the MS4-regulated area along the Northeast Extension within the Chesapeake Bay Basin is within the Scranton UA.

The following figures and tables provide locational detail from the regional to more-detailed perspective. **Figure 1** is a location map that identifies the PTC's Chesapeake Bay MS4-regulated portion of the Turnpike. The applicable roadway segments are highlighted on the Location Map. **Figure 2** identifies the Hydrologic Unit Code (HUC) 12 watersheds that the PTC's Chesapeake Bay MS4-regulated area passes through. **Table 3** provides locational references for PTC's Chesapeake Bay regulated roadway segments to the nearest intersecting road or stream as well as providing Turnpike roadway segment length, latitude, and longitude of the segment midpoint and references to the UA, county, and HUC 12 watershed the PTC regulated-MS4 traverses.

Scranton, PA

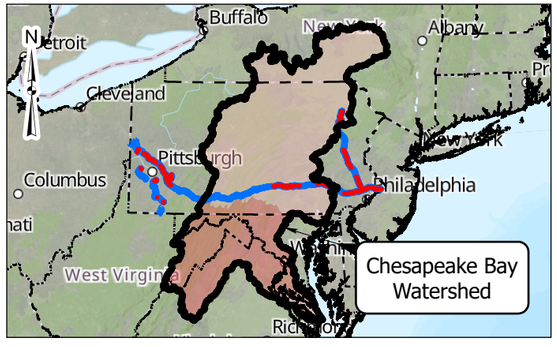
Susquehanna River Watershed

Harrisburg, PA

Lancaster, PA

Potomac River Watershed

PENNSYLVANIA



Legend

- Pennsylvania Turnpike Roadway
- Pennsylvania Turnpike Roadway in MS4 Areas
- State Boundary

Urban Areas

- Harrisburg, PA; Lancaster, PA; Scranton, PA;
- Other Urban Areas

- Chesapeake Bay Watershed
- Potomac River Watershed
- Susquehanna River Watershed

Miles

0 12.5 25 50

DATA SOURCES:
NatGeo World Map 2022, PTC 2021, US Census Bureau 2021, USGS 2022

Permit No.:	PAI139602
Date:	September 2022
Drawn By:	BSR
Reviewed By:	SEL

PENNA TURN PIKE

LOCATION MAP

PTC MS4 REGULATED AREA
CHESAPEAKE BAY WATERSHED
PENNSYLVANIA

Figure

1

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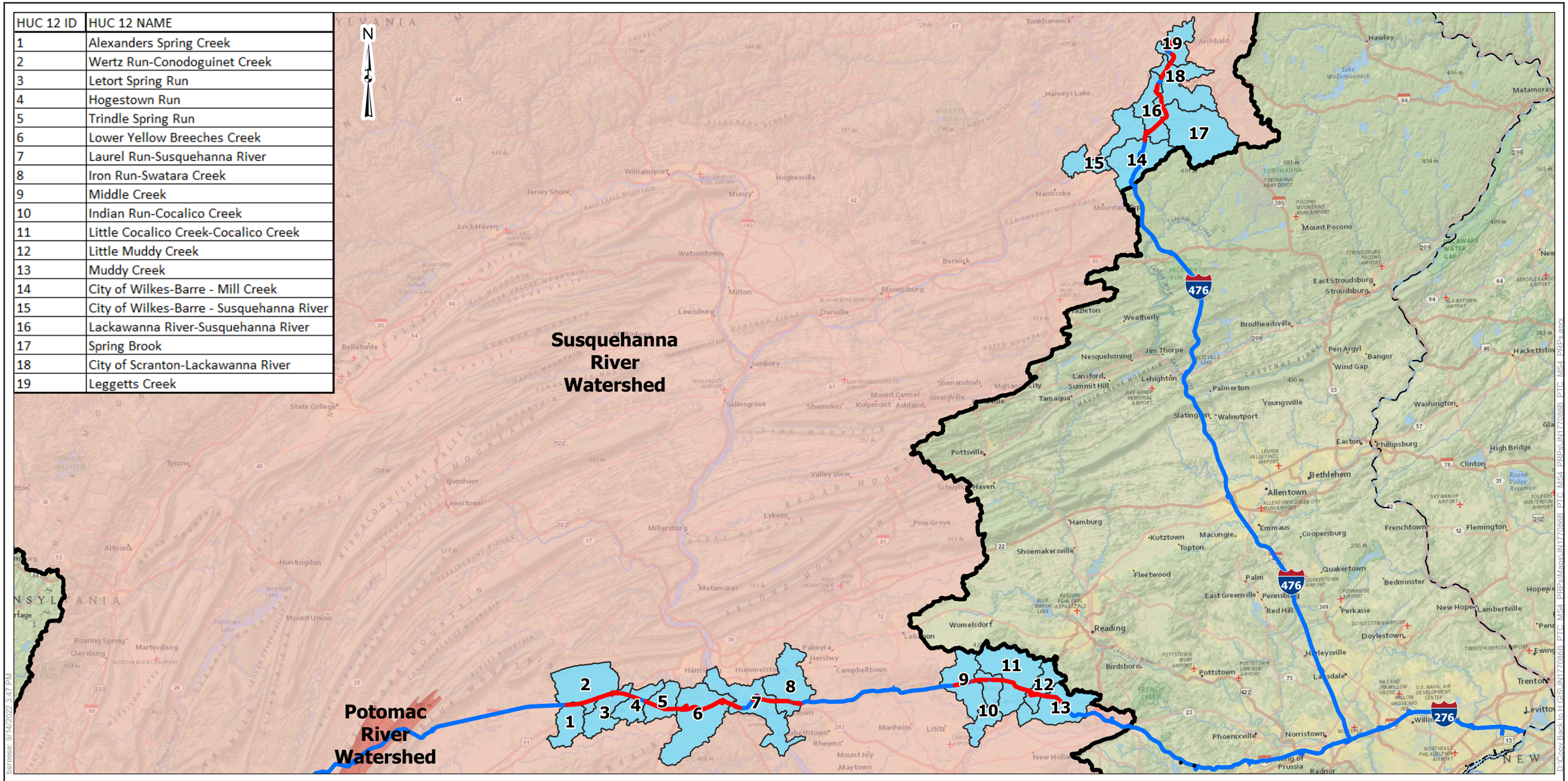
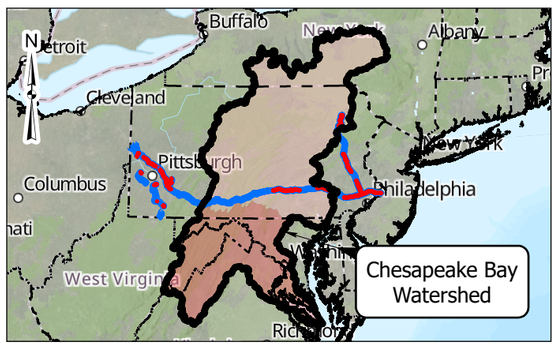
HUC 12 ID	HUC 12 NAME
1	Alexanders Spring Creek
2	Wertz Run-Conodoguinet Creek
3	Letort Spring Run
4	Hogestown Run
5	Trindle Spring Run
6	Lower Yellow Breeches Creek
7	Laurel Run-Susquehanna River
8	Iron Run-Swatara Creek
9	Middle Creek
10	Indian Run-Cocalico Creek
11	Little Cocalico Creek-Cocalico Creek
12	Little Muddy Creek
13	Muddy Creek
14	City of Wilkes-Barre - Mill Creek
15	City of Wilkes-Barre - Susquehanna River
16	Lackawanna River-Susquehanna River
17	Spring Brook
18	City of Scranton-Lackawanna River
19	Leggetts Creek





Legend

- Pennsylvania Turnpike Roadway
- Pennsylvania Turnpike Roadway in MS4 Areas
- State Boundary
- Chesapeake Bay Watershed
- Potomac River Watershed
- Susquehanna River Watershed
- MS4 Planning Area HUC 12 Watersheds

Miles
0 6.5 13 26

DATA SOURCES:
NatGeo World Map 2022, PTC 2021, US Census Bureau 2021, USGS 2022

Permit No.:	PAI139602
Date:	September 2022
Drawn By:	BSR
Reviewed By:	SEL

PENNA TURN PIKE

HUC 12 WATERSHEDS

PTC MS4 REGULATED AREA
CHESAPEAKE BAY WATERSHED
PENNSYLVANIA

Figure

2

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TABLE 3
PTC CHESAPEAKE BAY DRAINAGE BASIN REGULATED/PLANNING AREA MS4 SEGMENTS

PTC ROADWAY NAME	URBANIZED AREA	COUNTY	HUC12 NUMBER	HUC12 NAME	NEAREST CROSS-FEATURE BEGIN (WEST/SOUTH)	MILE POST BEGIN (WEST/SOUTH)	NEAREST CROSS-FEATURE END (EAST/NORTH)	MILE POST END (EAST/NORTH)	DISTANCE (MILES)	APPROXIMATE MIDPOINT (MILE POST)	LATITUDE	LONGITUDE
Turnpike Mainline	Harrisburg, Pennsylvania	Cumberland	020503050402	Alexanders Spring Creek	McAllister Church Road	219.9	Letort Spring Run	227.15	7.25	223.53	N 040°12'56.42"	W 077°12'23.06"
			020503050403	Wertz Run-Conodoguinet Creek								
			020503050404	Letort Spring Run	Interstate 81	227.45	Railroad	228.68	1.23	228.07	N 040°13'35.83"	W 077°7'23.34"
			020503050405	Hogestown Run	Appalachian Trail	229.18	Biddle Road	230.03	0.84	229.60	N 040°13'8.45"	W 077°5'44.12"
			020503050407	Trindle Spring Run	North Locust Point Road	231	None	233.2	2.2	232.10	N 040°12'20.84"	W 077°3'5.80"
		York	020503050505	Lower Yellow Breeches Creek	None	233.28	Marsh Run Road	244.5	11.22	238.89	N 040°11'44.26"	W 076°55'32.79"
			020503051011	Laurel Run-Susquehanna River								
		Dauphin			PA Route 230	246.79	PA Route 283	251.86	5.07	249.33	N 040°12'38.05"	W 076°45'3.01"
		Dauphin	020503050906	Swatara Creek-Susquehanna River	Roundtop Road	252.38	Schoolhouse Road	253.31	0.93	252.85	N 040°12'18.25"	W 076°41'4.35"
	Lancaster, Pennsylvania	Lancaster	020503060902	Middle Creek	Seglock Road	274.95	Kleinfeltersville Road	276.88	1.93	275.92	N 040°14'18.86"	W 076°15'47.45"
			020503060904	Cocalico Creek-Conestoga River	Forest Hill Road	277.52	Sandy Hill Road	279.35	1.83	278.44	N 040°14'45.41"	W 076°12'59.63"
					None	279.96	Swamp Bridge Road	280.92	0.96	280.44	N 040°14'43.81"	W 076°10'41.71"
			020503060901	Little Cocalico Creek-Cocalico Creek	Indian Run Tributary (Reach 02050306001409)	281.15	Stony Run	290.9	9.75	286.03	N 040°13'7.32"	W 076°4'59.91"
			020503061101	Little Muddy Creek								
			020503061102	Muddy Creek								
Subtotal Main Line MS4 Regulated/Planning Area Length									*43.2*			

TABLE 3
(CONTINUED)

PTC ROADWAY NAME	URBANIZED AREA	COUNTY	HUC12 NUMBER	HUC12 NAME	NEAREST CROSS-FEATURE BEGIN (WEST/SOUTH)	MILE POST BEGIN (WEST/SOUTH)	NEAREST CROSS-FEATURE END (EAST/NORTH)	MILE POST END (EAST/NORTH)	DISTANCE (MILES)	APPROXIMATE MIDPOINT (MILE POST)	LATITUDE	LONGITUDE
Northeast Extension	Scranton, Pennsylvania	Luzerne	020501070202	City of Wilkes-Barre-Mill Creek	Demark Road	113.34	North Keyser Avenue	122.07	8.73	117.71	N 041°20'14.66"	W 075°42'33.87"
			020501070205	City of Wilkes-Barre-Susquehanna River								
			020501070110	Lackawanna River-Susquehanna River								
			020501070108	Spring Brook								
		Lackawanna	020501070109	City of Scranton-Lackawanna River								
			020501070110	Lackawanna River-Susquehanna River								
					North Keyser Ave	122.12	None	122.51	0.39	122.32	N 041°23'52.22"	W 075°43'49.64"
			020501070109	City of Scranton-Lackawanna River	None	123.66	Newton Road	125.48	1.8	124.58	N 041°25'34.28"	W 075°42'34.11"
					None	125.7	None	127.5	1.8	126.60	N 041°27'0.08"	W 075°41'16.77"
			020501070105	Leggetts Creek								
					Morgan Highway (PA Route 307)	128.52	End PTC (U.S. Route 11)	130.97	2.45	129.75	N 041°29'2.98"	W 075°41'25.15"
Subtotal Northeast Extension – MS4 Regulated/Planning Area Length									*15.2*			
TOTAL CHESAPEAKE BAY DRAINAGE BASIN MS4 PLANNING AREA LENGTH									**58**			

B. HYDROLOGY

The United States Geological Survey (USGS) developed a hierarchical system to classify hydrology by the region size draining to the watercourse. The HUCs are comprised of 2 to 12 digits and include regions (2 digits), subregions (4 digits), basins (6 digits), subbasins (8 digits), watershed (10 digits), subwatershed (12 digits), and reach codes (14 digits). HUC14 watersheds, or reach codes, aid in identifying specific outfalls within the HUC12 watersheds. Coding of smaller drainage areas to tributaries continue the same pattern with reach codes (14 digits). The PRP has been prepared based on the subwatershed (HUC12) level. HUC12s are generally in the 40- to 60-square-mile size (but can be larger or smaller). The PTC MS4 is contributory to 68 HUC12 watersheds statewide. Of those, 19 HUC12 watersheds are located within the Chesapeake Bay Drainage Basin and PTC MS4 Outfalls are located on 72 Chesapeake Bay Drainage Basin Surface Waters. (See **Table 4** below and **Figure 2**, PTC MS4 HUC12 Watersheds, p. 7)

TABLE 4
PTC MS4 CHESAPEAKE BAY DRAINAGE BASIN
HUC12 WATERSHEDS AND SURFACE WATERS

HUC12 CODE	HUC12 WATERSHED NAME	SUBJECT SURFACE WATERS WITHIN HUC12 WATERSHED
020503050402	Alexanders Spring Creek	• Alexanders Spring Creek
020503050403	Wertz Run-Conodoguinet Creek	• Conodoguinet Creek • 3 Conodoguinet Creek Unnamed Tributaries
020503050404	Letort Spring Run	• Letort Spring Run • 1 Letort Spring Run Unnamed Tributary
020503050405	Hogestown Run	• Hogestown Run
020503050407	Trindle Spring Run	• Trindle Spring Run
020503050505	Lower Yellow Breeches Creek	• Cedar Run • 2 Cedar Run Tributaries • Yellow Breeches Creek • 9 Yellow Breeches Creek Unnamed Tributaries
020503051011	Laurel Run-Susquehanna River	• Marsh Run • Buser Run • Burd Run • 1 Burd Run Unnamed Tributary • 3 Susquehanna River Unnamed Tributaries
020503050906	Swatara Creek-Susquehanna River	• Swatara Creek • 2 Swatara Creek Unnamed Tributaries • Iron Run • 1 Iron Run Tributary
020503060902	Middle Creek	• Segloch Run • Middle Creek • 2-Middle Creek Unnamed Tributaries
020503060904	Cocalico Creek-Conestoga River	• Indian Run • 2 Indian Run Unnamed Tributaries
020503060901	Little Cocalico Creek-Cocalico Creek	• Cocalico Creek • Little Cocalico Creek • Stony Run
020503061101	Little Muddy Creek	• Little Muddy Creek
020503061102	Muddy Creek	• Muddy Creek • 3 Muddy Creek Unnamed Tributaries

TABLE 4
(CONTINUED)

HUC12 CODE	HUC12 WATERSHED NAME	SUBJECT SURFACE WATERS WITHIN HUC12 WATERSHED
020501070202	City of Wilkes-Barre-Mill Creek	• 1 Gardner Creek Unnamed Tributary
020501070205	City of Wilkes-Barre-Susquehanna River	• Susquehanna River
020501070110	Lackawanna River-Susquehanna River	• Mill Creek • Lidy Creek • Saint Johns Creek • 1 Saint Johns Creek Unnamed Tributary
020501070108	Spring Brook	• Spring Brook • Spring Brook Unnamed Tributary • Stafford Meadow Brook
020501070109	City of Scranton-Lackawanna River	• Lackawanna River • Lucky Run • Lindy Creek • 1 Lindy Creek Unnamed Tributary • Keyser Creek
020501070105	Leggetts Creek	• South Branch Leach Creek • Leach Creek • Lindy Creek • 1 Lindy Creek Unnamed Tributary • Summit Lake Creek • 2 Summit Lake Creek Unnamed Tributaries • Leggetts Creek • 1 Leggetts Creek Unnamed Tributary

Surface waters of Pennsylvania have been classified into four designated uses (aquatic life, fish consumption, potable water supply, and recreation), as found in Pennsylvania Title 25 Environmental Protection, Chapter 93 Water Quality Standards (Chapter 93). Every two years the surface waters are qualitatively evaluated and classified as having water quality supportive of their designated use (attaining) or having water quality deficient for support of the designated use (non-attaining). Non-attaining surface waters are tracked on the Clean Water Act (CWA) Section 303(d) List. The PTC's Permit stipulates use of the 2014 version as the basis for the PTC's pollutant load reductions.

Appendix B, PTC MS4 Chesapeake Bay Drainage Basin Receiving Surface Waters Table, identifies the PTC MS4 HUC14 receiving surface waters. Use of the HUC14 reach codes facilitates distinguishing one unnamed tributary from another one. The table provides outfalls, surface water name, reach code, the impairment status of the receiving surface water, and the cause of impairment if it is non-attaining. Of the 72 receiving surface waters, 15 are non-attaining due to sediment and/or nutrient impairment and are listed in **Table 5**, PTC MS4 Chesapeake Bay Drainage Basin Sediment and Nutrient Impaired Non-Attaining Receiving Surface Waters Summary (p. 12). Note that there are a number of surrogate names for sediments and nutrients. Surrogate names for sediments include Siltation, Suspended Solids, and Turbidity. Surrogate names for nutrients include Organic Enrichment/Low D.O. and Excessive Algal Growth. The Impairment Cause column also includes additional sources of impairment if identified on the CWA Section 303(d) List for the surface water.

TABLE 5
PTC MS4 CHESAPEAKE BAY DRAINAGE BASIN SEDIMENT AND NUTRIENT IMPAIRED NON-ATTAINING RECEIVING SURFACE WATERS SUMMARY

URBAN AREA	RECEIVING SURFACE WATER NAME	HUC12 CODE	HUC12 NAME	REACH CODE AT MOST DOWNSTREAM OUTFALL	CHAPTER 93 DESIGNATED USE	IMPAIRMENT CAUSE	SURFACE WATER NAME DOWNSTREAM OF RECEIVING SURFACE WATER
HARRISBURG, PENNSYLVANIA	Alexander Spring Creek	020503050402	Alexanders Spring Creek	02050305000347	CWF[1]	Siltation	Conodoguinet Creek
	Hogestown Run	020503050405	Hogestown Run	02050305000404	CWF[1]	Pathogens, Organic Enrichment/Low D.O., Siltation	Conodoguinet Creek
	Trindle Spring Run	020503050407	Trindle Spring Run	02050305000490	CWF[1]	PCB, Siltation	Conodoguinet Creek
	Cedar Run • Cedar Run, Unnamed Tributary	020503050505	Lower Yellow Breeches Creek	02050305000585	CWF[1]	Pathogens, Nutrients, Siltation	Lower Yellow Breeches Creek
				02050305000587	CWF[1]	Nutrients, Siltation	Cedar Run
	Marsh Run • Susquehanna River, Unnamed Tributary	020503051011	Laurel Run-Susquehanna River	02050305000580	WWF[2]	Siltation	Susquehanna River
				02050305003257	WWF[2]	Siltation	Susquehanna River
LANCASTER, PENNSYLVANIA	Cocalico Creek	020503060901	Little Cocalico Creek-Cocalico Creek	02050306000180	WWF[2]	Pathogens, Nutrients, Siltation	Conestoga River
	Stony Run • Muddy Creek, Unnamed Tributary			02050306000492	WWF[2]	Pathogens, Nutrients, Siltation	Cocalico Creek
				02050306001365	HQ-TSF[4]	Pathogens, Nutrients, Siltation	Muddy Creek
SCRANTON, PENNSYLVANIA	Lackawanna River	020501070109	City of Scranton-Lackawanna River	02050107000109	CWF[1]	pH, Metals, Pathogens, Siltation	Susquehanna River
	Saint Johns Creek	020501070110	Lackawanna River-Susquehanna River	02050107001015	CWF[1]	Siltation, Flow Alterations	Lackawanna River
	Summit Lake Creek	020501070105	Leggetts Creek	02050107002484	TSF[3]	Siltation, Thermal Modifications	Leggetts Creek
	Leggetts Creek • Leggetts Creek, Unnamed Tributary			02050107000305	CWF[1]	Siltation	Lackawanna River
				02050107000307	CWF[1]	Siltation	Leggetts Creek

1. CWF – Cold Water Fishes
2. WWF – Warm Water Fishes
3. TSF – Trout Stocking
4. HQ-TSF – High Quality Waters-Trout Stocking

The number of surface waters and the extent of the region covered preclude identification of all the individual surface waters on a small-scale report-sized exhibit. However, the HUC14 receiving waters are shown as lines on the MS4 maps for the entire PTC MS4-regulated area previously submitted to and on file at PA DEP (see Section 3.B, Map).

C. TOPOGRAPHY AND GEOLOGY

The Turnpike within the Chesapeake Bay is located in two physiographic provinces: the Ridge and Valley Province and the Piedmont Province. The PTC's Mainline lies in the Great Valley of the Ridge and Valley Province within Cumberland, Dauphin, and eastern Lancaster Counties. The Great Valley is characterized by undulating relatively flat topography with typical altitude of approximate 300 feet near streams and rivers and rising to 500 feet elevation above sea level at the high points along the Turnpike. This region has a strong tendency for sinkhole formation due to the dominance of the underlying limestone and its karst topography that has numerous enclosed depressions.

The Turnpike traverses the northern part of Lancaster County along the ridges of the Piedmont Province. Topographic relief is greater than the valley to the west, and the hills are comprised largely of conglomerate, sandstone shale, and diabase with elevations varying between 450 to 530 feet above sea level along the Turnpike that is situated between 800- to 1,000-foot ridges.

The northern part of the Turnpike's Northeast Extension lies in a unique section of the Ridge and Valley Province called the Anthracite Valley. True to the name, this area consists of coal-rich geology in high valleys between 1,200-foot-high mountain ridges. Due to the geology's metamorphic formation and its surrounding sandstone/conglomerate ridges, the coal fields of this formation are more resistant to erosion than other coal of Pennsylvania associated with finer-grained sedimentary rocks.

D. SOILS

This discussion is a generalized impression of the character of the PTC soils. Site-specific soils investigations will be required for design development.

Soils are foundational for stormwater pollution management. Well-drained soils with moderate permeability are ideal for successful implementation of infiltrative stormwater BMPs. Good soil fertility supports vigorous plant growth that is integral to infiltrative stormwater BMP effectiveness in pollution reduction. Soil characteristics along degraded streams guide the design response and are predictive of the effectiveness of sediment reduction. Soils with high levels of silt and very fine sand (loamy) tend to be more erodible. So, while loamy soils require careful management during construction to prevent sediment discharges, restorative projects that stabilize such soils can produce significant sediment reductions.

Soils of the Great Valley of Cumberland and Dauphin Counties are generally deep, moderately to well-drained, fine-textured silt loams and are limestone-based. The soils' fine-grained size aids in water retention, and their tendency toward alkalinity is conducive to plant growth. The loamy nature of the soils indicate that they are generally suitable for infiltrative BMPs and also suggests that stream stabilizing projects located in these soils can effectively reduce sediment pollution in the region.

In the northern part of Lancaster County (where the Turnpike crosses the Piedmont Province), the soils are sandy silt loams of the Ungers, Bucks, and Lansdale soil units. The soils have a good bit of variability; they are less fertile than the previously discussed soils, and their permeability fluctuates from very slow to very fast. The depth to bedrock also varies from deep to shallow. These soils tend to be easily eroded. Such variability underscores the need for thorough evaluation of soils to determine appropriate BMP selection and design response. The ease of soil erosion indicates that stream restoration/stabilization projects should be considered as an appropriate approach to sediment reduction.

The Anthracite Valley soils in the Wilke-Barre Scranton region have very poor fertility, often lacking any perceptible soil horizons. They are shallow, frequently less than two feet deep to a restrictive layer. An abundance of large surficial boulders hinders excavation. The over-whelming majority of soils in this area are Hydrologic Groups C and D. The lack of fertility and depth to limiting horizons suggest that restorative landscape and stream projects may be more effective than infiltrative BMPs for pollution reduction in the region.

E. LAND USE

The Turnpike is its own unique use. It is a limited-access road with user service and roadway maintenance support facilities. More than half of the corridor length traverses rural, agricultural, and forested land. The remainder crosses more metropolitan regions with urban character. New construction in the Chesapeake Bay Drainage Basin consists of bridge and infrastructure repair/replacement, roadway widening, and redevelopment of existing service plazas and maintenance facilities. Generally, the Turnpike is split evenly between impervious surfaces and pervious surfaces (vegetated). The ratio fluctuates to more strongly impervious where the roadway passes through urbanized environments and less impervious in rural and suburban settings.

The land uses depicted by the aerial photograph background of the MS4 maps are described below in **Table 6**, PTC MS4 Chesapeake Bay Land Use Distribution Table. The land uses were derived from the pollutant load estimating model (MapShed) utilized in preparation of the PRP (see **Appendix D**, Mapshed Urban Area Tool Results). The Land Use Distribution Table includes the Turnpike itself, but the reported categories reflect the land use through which the roadway passes. Mapshed names are cross-referenced to the Chesapeake Assessment Scenario Tool (CAST) program and are provided in accordance with the PA DEP PRP preparation instructions to refer to CAST names and definitions.

TABLE 6
PTC MS4 CHESAPEAKE BAY LAND USE DISTRIBUTION TABLE SUMMARY

LAND USE		CHESAPEAKE BAY DRAINAGE BASIN
MAPSHED NAME	CAST NAME	PLANNING AREA (ACRES)
Hay/Pasture	Pasture	36
Cropland	Double Cropped Land	11
Forest	True Forest	43
Wetland	Non-tidal Floodplain Wetland	0
Disturbed	Regulated Construction	2
Turfgrass (includes golf courses and large expanses of turf)	MS4 Turfgrass	0
Open Land	Mixed Open	187
Bare Rock	Non-Regulated Buildings and Other	0
Sandy Areas	Non-Regulated Buildings and Other	0
Unpaved Roads	No Equivalent	0
Low-Density (LD) Mixed	MS4 Buildings and Other	470
Medium Density (MD) Mixed	MS4 Buildings and Other	424
High-Density (HD) Mixed	MS4 Buildings and Other	488
Low-Density (LD) Residential	MS4 Buildings and Other	4
Medium Density (MD) Residential	MS4 Buildings and Other	13
High-Density (HD) Residential	MS4 Buildings and Other	2
Water	Water	0
TOTAL		1,680

3.0 REQUIRED PRP COMPONENTS

A. PUBLIC PARTICIPATION

The PTC invited public involvement and participation in the development of the Chesapeake Bay PRP as specified in their approved Permit and outlined below.

- The draft Chesapeake Bay PRP was posted on the PTC's Clean Water Website from September 24, 2022, to October 24, 2022.

- Notice of the draft Chesapeake Bay PRP was published in the *Pennsylvania Bulletin* on September 24, 2022. The announcement directed the public to its website to review the PRP, and a 30-day comment period was provided.

- A copy of public comments that were received are included in Appendix F, Public Review Comments.

- The PTC's representatives and East Cocalico Township, where the PTC's sole PRP project is located, are negotiating agreements to use Township property for the PTC's PRP project, restoration of a segment of Stony Run that crosses the Township's municipal property. On December 1, 2022, the Stony Run BMP was discussed as an agenda item at the East Cocalico Township's regularly scheduled public meeting. The Board of Supervisors publicly announced their intent to move forward with the Stony Run project and authorized the Township's MS4 Coordinator to work with the Township's legal counsel to review the contractual documents presented to the Township for the project. The Board of Supervisors December 1, 2022, meeting minutes are provided in **Appendix G**. The discussion of the Stony Run project is highlighted on Page 5 of the appendix.

- Following approval by PA DEP, a complete copy of the Chesapeake Bay PRP will be posted on the PTC's Clean Water Website www.paturnpike.com/responsibility-matters/clean-water and will continue to be published on the website for the duration of permit coverage.

Should there be revisions to the PTC's approved Chesapeake Bay PRP that modifies the location, type, or number of proposed BMPs, the PTC will identify the revision(s) on its website and provide a 30-day period for the acceptance of public comments. Subsequently, a copy of public comments received and the PTC's record of consideration of the comments will be provided with PTC's Chesapeake Bay PRP to PA DEP.

The verbiage of the Notification placed in the *Pennsylvania Bulletin* is presented below. A copy of the *Pennsylvania Bulletin* notification is provided in **Appendix A**.

***PENNSYLVANIA BULLETIN* NOTIFICATION FOR THE PENNSYLVANIA TURNPIKE COMMISSION CHESAPEAKE BAY DRAINAGE BASIN PRP**

Draft National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Pollution Reduction Plans for the Pennsylvania Turnpike Commission

Notice is hereby given that the Pennsylvania Turnpike Commission will receive public comment(s) on three proposed Pollution Reduction Plans (PRPs) required for their 2021-2026 National Pollutant Discharge Elimination System (NPDES) Individual Permit to discharge stormwater from Small Municipal Separate Storm Sewer Systems (MS4s) Permit No. PAI139602.

The Pennsylvania Turnpike Commission has developed PRPs for the Chesapeake Bay, Delaware River and Ohio River Watersheds. The PRPs determine existing sediment pollutant loadings associated with stormwater runoff and proposes potential Best Management Practices to reduce the pollutant loads to meet the requirements of the MS4 Permit, for each watershed.

The proposed PRPs can be reviewed online by visiting **https://www.paturnpike.com/responsibility-matters/clean-water** then selecting "MS4" at the top of the page and navigating to "MS4 Documentation" under "MS4 Resources". Written comments on the PRPs will be accepted for a period of 30 days from the date of this public notice by mail to Mr. James Kaiser, Pennsylvania Turnpike Commission,700 South Eisenhower Blvd., Middletown, PA 17057 or by e-mail at jkaiser@paturnpike.com. All comments will be tabulated and considered with the final PRPs.

B. MAP

The PTC's MS4 map that is the basis for the PRP was submitted as part of the MS4 Annual Report for the period ending June 30, 2018, and is on file as part of the publicly accessible record with PA DEP. The sidebar graphic on the next page summarizes the information provided narratively in the following section. The map is a Geographic Information System (GIS) product created using ESRi Arc Map and serves the following purposes:

1. Inventory of the PTC's existing stormwater network
2. Regulated area identification including delineation of the following components listed in the PA DEP PRP Instructions:
   a. Land uses and/or impervious and pervious surfaces
   b. Outfalls
   c. Storm sewershed boundaries
   d. Planning areas
   e. Locations of proposed BMPs
3. Framework for inspections and documenting maintenance practices and Illicit Discharge Detection and Elimination (IDD&E) activities

4. Future project identification that show the location of proposed pollutant-reducing projects

1. MS4 Base Map

The base map information was acquired from various publicly available sources including Bing Maps, County Parcel Information provided by the PTC, PA DEP, Pennsylvania Department of Conservation and Natural Resources (PA DCNR), Pennsylvania Department of Transportation (PennDOT), and the U.S. Census Bureau that are detailed in **Appendix C**, MS4 Map Layers and Data Sources. The information from these sources is shown on the map unedited. There are variations in the locations of duplicated information. However, the composite of the information sufficiently provides the required data elements including land uses, impervious/pervious surfaces, locations and names of surface waters that receive discharges from the MS4 outfalls, public and private property lines, municipal boundaries, and the UA boundary according to the 2010 Census. The PTC and its consultant, Skelly and Loy, Inc., *A Terracon Company* (Skelly and Loy) make no claims as to the accuracy of the public-source data.

MS4 MAP SUMMARY

Purposes
- Inventory
- Regulated area identification
- Framework for inspections
- Future project identification

MS4 Base Map
- GIS-Based
- Compiled from publicly available sources

Municipal Separate Storm Sewer System
- Digitized from PTC construction plan archive and aerial photographs

Outfalls and Sewersheds
- Produced by professionals
- Color-coded:
  - Green for Attaining
  - Red for Non-Attaining

Planning Areas
- Demarcated through GIS Analysis

2. Municipal Separate Storm Sewer System

The stormwater sewer collection system shown on the MS4 maps, consisting of the surface stormwater conveyances (PTC roadway, catch basins/inlets, pipes, manholes, intakes and discharges, ditches, swales, and similar municipally owned or PennDOT components that are connected to the system and located within the PTC property), was digitized based on historical PTC construction plans and desktop analysis of aerial photographs and topography. During the analysis, some segments of the Turnpike were under construction and other areas contained documented and/or aerial images that showed conflicting information. These areas were flagged as areas of “Insufficient Data” because positions of the stormwater sewer system could not be conclusively located using desktop source information.

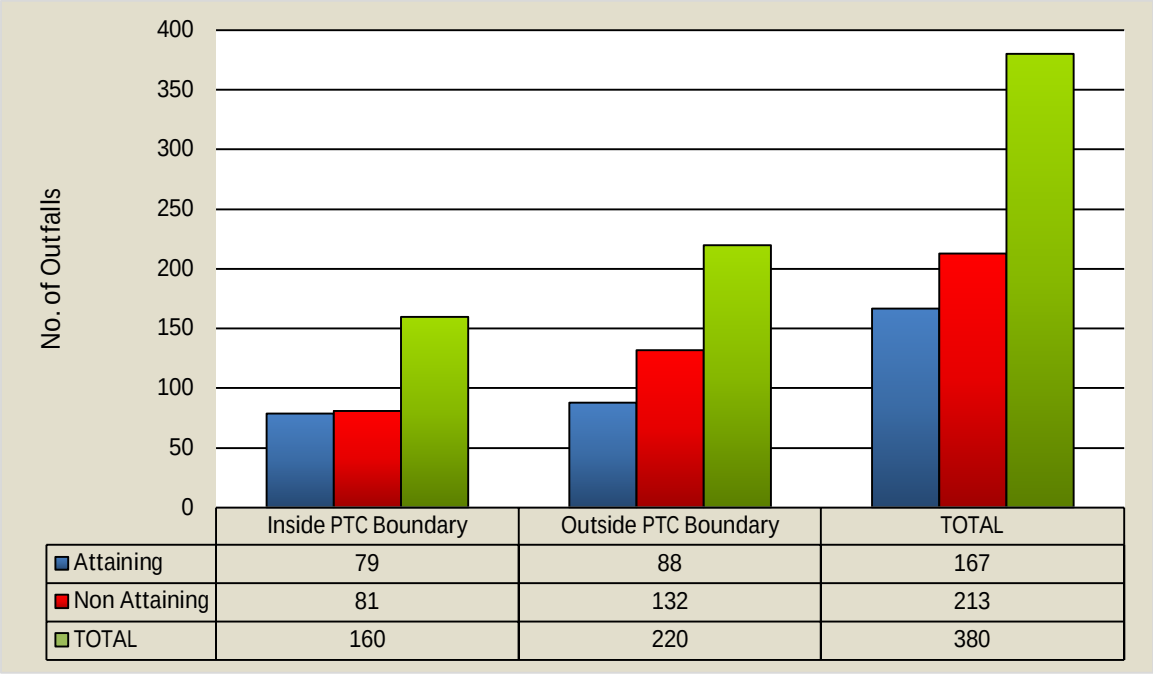
The stormwater sewer system and Insufficient Data areas will be updated on an ongoing basis, and updated mapping will be provided as part of Annual Reports during the permit term as required by the PTC’s approved MS4 Permit.

3. Outfalls

The outfalls were located by the PTC's consultant, Skelly and Loy, by plotting the path that storm runoff will follow by gravity between the PTC's MS4 and the receiving surface water (a.k.a., rain traces). In establishing rain traces, surface topography with enclosed depression characteristics (such as stormwater basins, sinkholes, and ponds) were ignored, in accordance with PA DEP directions, to assume flooded conditions.

Statewide, PTC discharges to 1,727 outfalls; 886 outfalls are located within the PTC boundary, and 841 are outside the PTC territory. (**Appendix B**, PTC MS4 Chesapeake Bay Drainage Basin Receiving Surface Waters Table, provides the comprehensive list of outfalls, receiving surface waters, and surface water statistics.) There are 380 outfalls within the Chesapeake Bay Drainage Basin. **Figure 3**, PTC Chesapeake Bay Outfall Summary, provides a synopsis of the outfalls by location within the PTC MS4 (or beyond) and by impairment status of the receiving surface waters at the outfall location.

FIGURE 3
PTC CHESAPEAKE BAY OUTFALL SUMMARY



	Inside PTC Boundary	Outside PTC Boundary	TOTAL
Attaining	79	88	167
Non Attaining	81	132	213
TOTAL	160	220	380

Of the 380 total outfalls, 160 are located within PTC-owned or -operated property; the remaining 220 outfalls discharge to surface waters beyond the PTC boundary and outside PTC purview. Outfalls within the PTC right-of-way have been field-verified during IDD&E screenings.

4. Storm Sewersheds

Storm sewersheds were produced by qualified staff using professional judgment to delineate contributory drainage area to each outfall. Sewersheds were color-coded to correspond to the impairment/attainment status (in accordance with PA DEP's Integrated Water Quality Monitoring and Assessment Report) of the receiving surface water at the PTC MS4 outfall location. Sewersheds discharging to surface waters attaining their designated Chapter 93 use are color-coded "green." Sewersheds discharging to non-attaining surface waters are color-coded "red with a yellow halo." (See Photograph 1 below.)

Photograph 1 – Sample from 500-scale PTC MS4 Map: The image shows green-colored sewersheds discharging to attaining surface waters at yellow-colored outfalls and red-colored sewersheds discharging to non-attaining surface waters at red-colored outfalls.

5. Numbering System

The numbering code has five digits. The first digit refers to the major drainage basin in which the outfall is located. The next number refers to the sewershed's UA. The final three digits are the sewershed identification (ID) number. (See **Table 7**, PTC Sewershed Numbering Code, below.)

TABLE 7
SEWERSHED NUMBERING CODE

DIGIT 1	MAJOR DRAINAGE BASIN	DIGIT 2	URBANIZED AREA	DIGITS 3 THROUGH 5 (SEQUENTIAL SEWERSHED ID)
1	Ohio River Basin	1	Pittsburgh	001 to 999
		2	Uniontown-Connellsville	
		3	California-Monessen	
2	Chesapeake Bay Drainage Basin	1	Harrisburg	
		2	Lancaster	
		3	Wilkes Barre-Scranton	
3	Delaware River Basin	1	Philadelphia	
		2	Allentown	

The three-digit outfall ID was generated using the latitude/longitude coordinates of the outfall locations relative to their geographic position within each UA. A numbering routine to assign a "next number" based on longitudinal values for west-east Turnpike segments and latitudinal values for the north-south segments, supplemented with operator input on curving and transitional Turnpike segments, resulted in Sewershed IDs that generally follow the Turnpike System Roadway mile marker direction as shown below (**Table 8**, Turnpike Milepost Direction). In areas where there are multiple roadway segments or particularly dramatic changes in direction, sequential numbering might have sequencing gaps. This is because the following east or south coordinate is located on another road segment or curve within the same UA. Out-of-sequence numbering may also occur to accommodate new outfalls discovered during outfall screenings.

TABLE 8
TURNPIKE MILEPOST DIRECTION

TURNPIKE ROADWAY NAME	ROUTE NUMBER	MILE POST DIRECTION (LOWEST TO HIGHEST VALUE)
Turnpike Mainline	I-76/I-276	West to East
Beaver Valley Expressway	I-376	**Nominally:** West to East **Geographically:** North to South
Southern Beltway	PA-576	**Nominally:** West to East **Geographically:** North to South
Mon/Fayette Expressway	PA-43	South to North
Amos K. Hutchinson Bypass (a.k.a., Greensburg Bypass)	PA-66	South to North
Northeast Extension	I-476	South to North

Sewersheds contain structures and conveyances. The numbers are not shown on the map to preserve map legibility, but these features are numbered, too. The first five numbers of each component of the storm sewer system within a sewershed uses that sewershed's ID number to tie those features to the sewershed. The number is followed by a period and suffix codes that identify the type of structure or conveyance, etc.

Once established, the numbering needs to remain constant so that activities occur at the same location and records stay connected perpetually. Newly discovered outfalls will most often result in splitting an established sewershed. Additionally, there are a few instances where the same sewershed identification number was inadvertently duplicated. In these cases, a prefix number "9" is added to one of the two sewersheds to differentiate them and their affiliated storm sewer components. For example, if an established sewershed with the number 22024 is split, one will retain 22024 and the other will become 922024.

6. Planning Areas

Planning Areas were derived through GIS analysis that merged and clipped the sewershed, the 2010 UA, and the upstream contributory area to the limits of the PTC right-of-way. Planning Areas represent the portion of the PTC where pollutant reduction is required. In the Chesapeake Bay Basin, the Planning Area includes all sewersheds regardless of if they are attaining or non-attaining relative to the pollutants of concern, because every sewershed ultimately discharges the Chesapeake Bay which is subject to a Total Maximum Daily Load (TMDL) for sediment and nutrients, so sediment reduction is restorative to the Chesapeake Bay.

C. POLLUTANTS OF CONCERN

Pollutants of concern within the overall PRP Planning Area are sediment, total phosphorus, and total nitrogen. PA DEP established pollutant removal targets in the PTC's approved permit. Pollutant removal goals for the Chesapeake Bay Drainage Basin are listed in **Table 9.**

TABLE 9
POLLUTANT REDUCTION TARGETS FOR THE
CHESAPEAKE BAY DRAINAGE BASIN IN PTC PERMIT PAI139602

POLLUTANT	REDUCTION TARGET
Sediment (TSS)	10%
Phosphorus (TP)	5%
Nitrogen (TN)	3%

1. MS4 Reduction Goals

The PTC has opted to use the presumptive approach. BMP projects to reduce pollutants will report only sediment reduction required to achieve 10% sediment reduction.

a. Presumptive Approach to Pollutant Reduction

In accordance with PA DEP's PRP Instructions (3800-PM-BCW0100k, Rev. 3/2017) Section I.B., a presumption of nutrient removal compliance may be assumed if the permit-required sediment removal is achieved (10% in the Chesapeake Bay Drainage Basin).

D. EXISTING LOADING FOR POLLUTANTS OF CONCERN

1. Synopsis

Existing loading totals for sediment, phosphorus, and nitrogen were calculated by HUC12 watershed using the MapShed model. Analysis at HUC12 watershed scale is consistent with the requirement to apply the MapShed model to sufficiently sized (>10-square-mile) watersheds.

Table 10 lists the existing pollutant loads for each of the UAs and HUC 12 watersheds where the PTC MS4 is located. (Also see MapShed Urban Area Tool Results, **Appendix D1**, Planning Area Existing Loads.) A detailed discussion of the approach, the computer model, and other supporting calculations are provided below.

TABLE 10
EXISTING POLLUTANT LOAD
BY URBANIZED AREA AND HUC12 WATERSHED FOR REGULATED PTC MS4

URBAN AREA	WATERSHED NAME (HUC CODE)		SEDIMENT TSS (LBS/YR)	PHOSPHORUS TP (LBS/YR)	NITROGEN TN (LBS/YR)
HARRISBURG, PENNSYLVANIA	Alexanders Spring Creek	(020503050402)	6,731.0	9.8	280.9
	Wertz Run-Conodoguinet Creek	(020503050403)	60,718.5	22.7	529.9
	Letort Spring Run	(020503050404)	26,266.5	23.8	591.0
	Hogestown Run	(020503050405)	976.5	1.0	48.4
	Trindle Spring Run	(020503050407)	17,480.6	13.8	391.1
	Lower Yellow Breeches Creek	(020503050505)	902,204.0	172.7	1,557.2
	Laurel Run-Susquehanna River	(020503051011)	772,096.4	135.4	1,082.4
	Swatara Creek-Susquehanna River	(020503050906)	57,941.2	17.6	288.5
	Subtotal – Harrisburg, Pennsylvania		**1,844,414.7**	**396.8**	**4,769.4**
LANCASTER, PENNSYLVANIA	Middle Creek	(020503060902)	10,827.9	6.5	199.7
	Cocalico Creek-Conestoga River	(020503060904)	36,519.8	17.2	362.2
	Little Cocalico Creek-Cocalico Creek	(020503060901)	71,231.7	28.9	735.3
	Little Muddy Creek	(020503061101)	59,867.4	41.9	920.3
	Muddy Creek	(020503061102)	69,910.9	30.4	835.4
	Subtotal – Lancaster, Pennsylvania		**248,357.7**	**124.9**	**3,052.9**
SCRANTON, PENNSYLVANIA	City of Wilkes-Barre-Mill Creek	(020501070202)	1,163.9	0.3	1.5
	City of Wilkes-Barre-Susquehanna River	(020501070205)	35,888.8	17.2	282.3
	Lackawanna River-Susquehanna River	(020501070110)	72,292.4	32.1	587.3
	Spring Brook	(020501070108)	42,631.1	18.8	455.1
	City of Scranton-Lackawanna River	(020501070109)	91,311.6	30.6	435.4
	Leggetts Creek	(020501070105)	139,842.7	38.6	602.3
	Subtotal – Scranton, Pennsylvania		**383,130.5**	**137.6**	**2,363.9**
CHESAPEAKE BAY DRAINAGE BASIN PTC MS4 TOTAL			**2,475,902.9**	**659.3**	**10,186.2**

2. Calculating MS4 Existing Pollutant Load

Calculating the existing pollutant load includes first determining what areas are regulated by the MS4 permit. The regulated portion of the PTC property includes the roadway and facilities that are in a UA or drain into a UA called planning areas. The initial planning area pollutant loads may be determined through accepted computer modeling (like MapShed) or by using the PA DEP Simplified Method (a spreadsheet application of generalized county-based pollutant loading rates that can be applied to planning areas to produce pollutant load estimates). The total pollutant load may be adjusted to recognize other conditions that could decrease MS4 pollutant- reduction obligations. Adjustments include 1) reducing the planning area through parsing and 2) reducing the modeled pollutant load equivalent to the capacity for pollution treatment in existing stormwater BMPs in excess of their required construction stormwater discharge NPDES Permit obligations.

The PTC used MapShed to generate pollutant loads and made no adjustments to decrease its MS4 pollutant load-reduction obligations.

a. MapShed Discussion

MapShed is a PA DEP- approved GIS-based modeling method. Data layers were downloaded from the MapShed website and serve as the basis for calculating existing pollutant loads. PTC performed Pollutant Load Calculations in 2017 to align with PA DEP instructions at the time and performed their pollutant modeling using MapShed. The results of the 2017 model represent identical criteria that municipal MS4 permittees applied.

i. MapShed Urban Area Tool

MapShed's Urban Area Tool analyzes the intensely developed portions of watershed to determine the existing pollutant loads generated by the PTC MS4 regulated area (Planning Area). The Urban Area Tool is reliant on access to a data layer and look-up table defining municipal boundaries referred to as the UA data layer. The turnpike is linear, and it crosses numerous municipalities. The PTC's boundaries do not coincide with municipal boundaries, and the MS4 Planning Area is only a portion of the entire PTC right-of-way. In order to access the underlying database, it was necessary to create and associate the PTC Planning Area as a substitution for MapShed's UA data layer.

In addition to the substitution for the built-in municipal layers that did not coincide with the planning area, limited adaptations were made to MapShed and are listed to the right.

MODIFICATIONS TO MAPSHED

- MapShed-provided data layers were re-projected and clipped to the municipal boundary to gain performance, reduce inconsistencies, and provide platform stability.
- Consultant-created Planning Areas were substituted for the MapShed-provided UA data layer.
- HUC12 watersheds from the USGS were substituted for MapShed-provided smaller watersheds.

The Urban Area Tool provides four categories of information:

1. **Watershed Total Pollutant Load** – The annual load of sediment, phosphorus, and nitrogen generated by the entire HUC12 watershed, expressed in pounds per year. Pollutant loading rates are generated at the HUC-12 watershed level.
2. **MS4 Total Pollutant Load** – The MS4 portion of the watershed's pollutant load. The MS4 Pollutant Load is the load generated when no adjustments are made to the planning area (planning area with no parsing).
3. **MS4 Regulated Pollutant Load** – Subset of MS4 total load reflecting any acreage reductions from the Planning Areas. This category would be used if parsing is applied to reduce the size of the planning area.
4. **Unregulated Pollutant Load** – Counterpart to the Regulated Pollutant Load that represents the portion of the pollutant load conveyed by another MS4 permittee (and not conveyed through the PTC MS4 stormwater sewer system).

The Regulated Pollutant Load portion of the Urban Area Tool allows the user to simulate parsing by inputting an adjusted percentage of land area within land use categories to reflect a smaller regulatory area resulting from exclusions (parsing). There was no parsing for the PTC (see Subsection d, Planning Area Deductions - Parsing, below).

GIS analysis was used to generate a substitute boundary for the Urban Area data layer. Therefore, the Regulated Pollutant Load and its counterpart, Unregulated Pollutant Load, categories of the Urban Area Tool were unnecessary. The Watershed Total Pollutant Load feature does not address PTC-relevant loading. The MS4 Total Pollutant Load feature of the Urban Area Tool is the only necessary Urban Area Tool feature that is needed for reporting.

b. Planning Area Determination

As stated in Section 3.B, Map (p. 17), the limits of the planning areas were created using GIS analysis to identify the portion of the PTC property within and contributing to the 2010 UA that is also served by the PTC separate storm sewer. In the Chesapeake Bay Drainage Basin, the planning area is synonymous with the regulated PTC MS4 because all sewersheds were included regardless of the impairment status of the receiving surface water. The PTC Planning Area was substituted for the Urban Area data layers in the MapShed model and consists of 1,678 acres.

c. Pollutant Load Calculation

Calculating the existing pollutant load includes determining which HUC12 watersheds require modeling. Applicable HUC12 watersheds are those containing planning areas (segments of the Turnpike that are in a UA or drain into the UA). MapShed analyzes data affecting pollution loads including streams, land cover, soils, topography/terrain, long-term precipitation data, and a few data sets like discharges from wastewater treatment plants and animal populations, that are not relevant to the PTC. Loading rates are generated for pollutants of concern based on the

character of the entire HUC12. The HUC12 loading rate is applied to the planning area(s) within the HUC12 to estimate the existing pollution generated by each planning area.

d. Planning Area Deductions - Parsing

Per the PA DEP PRP Instructions, it is acceptable to decrease the area from the first analysis by excluding/parsing areas that possess their own NPDES permit such as an industrial site covered by a PAG-03 permit, regions under the jurisdiction of another regulated MS4, and areas that do not contribute drainage to the permittee's Municipal Separate Storm Sewer (MS3). The smaller region remaining following the parsing exercise represents the MS4 Planning Area that is subject to pollutant reduction removal.

The PTC PRP did not perform any parsing.

e. Existing Stormwater Facility Pollutant Load Adjustments

In addition to land area excluded from the MS4 planning area, the pollutant load baseline is permitted to be further decreased to reflect the runoff pollution treatment provided by the PTC's existing stormwater management facilities in excess of the pollutant reduction required by their respective NPDES permits for construction stormwater discharges.

The PTC's PRP does not quantify/take reduction credit for pollutant removal accomplished by existing facilities to reduce the sediment reduction target. Therefore, the pollutant loads generated by the MapShed model represent the existing load baseline used to generate pollutant reduction targets. It is noted that currently PTC has more than 450 basin and basin-like SCMs widely disbursed across the Turnpike's roadway system that remove sediment and other pollutants from stormwater. The decision to not quantify reductions achieved by the existing SCM facilities is a very conservative approach and means that the proposed PRP project results in pollution reduction significantly exceeding the PTC's MS4 minimum compliance threshold. Consistent with PTCs sustainability goals and in support of permit compliance, PTC also continues to construct water-quality-enhancing SCMs as part of new construction of its bridges, parking, buildings, and roadways.

Table 10, Existing Pollutant Load By Urbanized Area and HUC12 Watershed for Regulated PTC MS4 (page 23) presents the results from MapShed's Urban Area Tool. The results tables generated by the model are provided in **Appendix D**.

E. BMPs TO ACHIEVE THE MINIMUM REQUIRED REDUCTIONS IN POLLUTANT LOADING

The PTC is planning a single BMP project to meet the required sediment reduction target. The project is a stream floodplain restoration of the 1,370-LF Stony Run main stream channel plus four (4) small unnamed tributaries. A second project, a SCM retrofit at the U.S. Route 15 Interchange, is included in the PRP as a contingency project that can optionally be implemented to augment sediment pollution reduction if the Stony Run stream restoration project is less than the sediment reduction goals. The contingency project is an existing extended dry detention basin

that could be modified to incorporate a sediment forebay. The anticipated sediment reduction is summarized in **Table 11**, Proposed Chesapeake Bay Drainage Basin BMPs, below.

TABLE 11
PROPOSED CHESAPEAKE BAY DRAINAGE BASIN BMPs

BMP OPTIONS	TREATED	SEDIMENT REDUCTION (LBS/YR)
Stream Restoration	1,370 LF + 4 UNT	256,493
Contingent U.S. Route 15 SCM Retrofit (T-236.28-WB-0681-BED)	14.6 Ac	28,950

* *The sediment reduction total represents use of Chesapeake Bay Expert Panel Urban Stream Restoration Protocols 1 and 3 with pre-construction soils testing, stream assessment and monitoring. A 75% efficiency rate is reported, and greater reductions are expected to be documentable following post-construction monitoring*.

PTC and PennDOT collaboratively contracted a full-delivery vendor, Resource Environmental Solutions, LLC (RES) to locate PA DEP-acceptable pollution reduction projects; obtain required permits and approvals; and construct, operate, and maintain the project(s) perpetually to meet PTC's sediment reduction obligation in the Chesapeake Bay Drainage Basin.

1. Stony Run Stream and Floodplain Restoration

RES originally identified the UNT to Susquehanna River Project to meet PTC's reduction goal. The original BMP that was reported in the October 25, 2022, version of this PRP was located just north of Lake Drive in Lower Swatara Township, Dauphin County, Pennsylvania. However, landowner complications resulted in selection of a new BMP, the Stony Run BMP situated in East Cocalico Township, Pennsylvania. The Stony Run BMP is located northwest of the intersection of Reading Road (S.R. 0272) and Hill Road and situated on the south side of Hill Road in East Cocalico Township. The project area is bordered to the north by a residential subdivision. The BMP is approximately 1,280 feet (0.24 mile) north of the PTC MS4 boundary (See **Figure 4**, Stony Run BMP Location). The Stony Run BMP meets PA DEP's site location criteria for stream restoration as outlined in the response to Question 69 on *PA DEP's MS4 NPDES Permits Frequently Asked Questions (FAQ) Version 1.6* (Revised September 23, 2022). The project 1) is located in the same HUC-12 watershed as the PTC MS4; 2) is within one mile of the PTC's planning area boundary; and 3) requires that PTC will have the legal rights to the project site (RES is negotiating a land-option agreement with the landowner, East Cocalico Township, to secure the legal rights to perpetual use of the land for PTC's PRP project). On December 1, 2022, East Cocalico Township Board of Supervisors voted to move forward with the Stony Run BMP agreements pending their legal counsel's input on the documents.

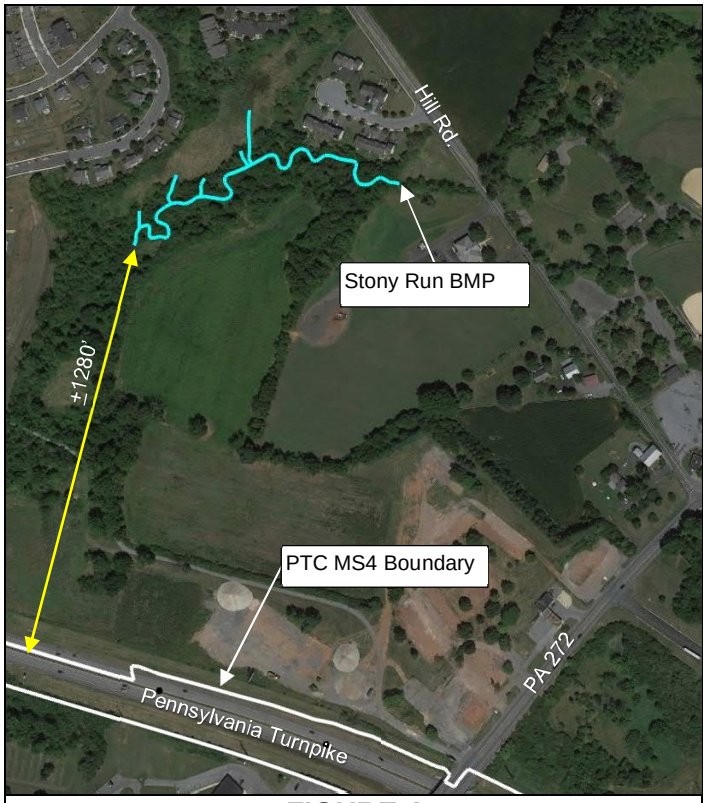


FIGURE 4
STONY RUN BMP LOCATION

Existing land cover within the proposed BMP project limits consists of maintained lawn areas, agricultural fields, the East Cocalico Township Municipal Building, roadways, and residential development. The roughly 1,370 LF of Stony Run flows through the site from east to west. Four unnamed tributaries (UNT) to Stony Run, which drain from the north, are also included within the proposed restoration project. The project reach of the main stem of Stony Run is listed as non-attaining for the following causes: pathogens, siltation, habitat alterations, and nutrients. The stream's designated use is listed as Warm Water Fisheries (2020 Integrated Report: Ch. 93 Designated Use). The stream is deeply entrenched with vertical banks up to six feet in areas and minimal bank protection/vegetation. The banks are undercut along

outer curves, and the channel is over widening rapidly. RES proposes to utilize floodplain restoration for the majority of the reaches to maximize sediment reduction potential.

The proposal meets the eligibility requirements listed in PA DEP's *Considerations of Stream Restoration Projects in Pennsylvania for Eligibility as an MS4 Best Management Practice* (May 11, 2018) and as itemized below and detailed in **Appendix E**.

1. *Siting:*

   - *Permittee must document existing channel or streambank erosion and an actively enlarging or incising urban stream condition prior to restoration (an existing problem).*

     The stream was evaluated using the Bank Erosion Hazard Index (BEHI) and Near Bank Stress (NBS). The BEHI and NBS scores ranged and averaged from moderate to high. The assessment sheets and summary are provided in **Appendix E**.

   - *Effectiveness is most readily demonstrated for projects in 1st-3rd order streams (small). Larger-scale projects will require additional documentation.*

     The selected stream segment is a 1st-order reach.

   - *The project must address at least 100 linear feet of stream channel.*

     The selected stream segment exceeds 100 linear feet.

   - *Impervious areas upstream of the project must be sufficiently treated to address peak flows that may exceed engineering design thresholds or compromise channel form and function.*

     The first step in the design process is an existing conditions watershed assessment which accounts for the drainage area and difference in land cover within and upstream of the project area. In the 2D modeling, steady-state peak flow is determined from the watershed assessment to design for the worst-case scenario 100-year event. By nature, the floodplain designs act in such a way that peak flows are attenuated during storm events relative to the pre-design conditions. Easier access to a wide and hydraulically rough floodplain decreases flow velocity which, in turn, increases residence time within the project area. This increased residence time flattens the runoff hydrograph relative to the existing conditions. Model results are also used to design grade and erosion-control structures in areas that demonstrate high shear stresses to ensure that the integrity of the channel's form and function is maintained even during strong storm events.

   - *The project must address both sides of the channel on sites where a need to do so is evident.*

     The RES design will address both banks of the channel.

2. *Techniques:*

- *The goal is to apply a comprehensive approach that may employ a mix of techniques appropriate to the site, creating long-term stability of the streambed, streambanks, and floodplain.*

  The project maximizes floodplain reconnection through the regrading of the floodplain and a combination of approaches to either raise the floodplain and channel elevation through valley fill or to lower them to reconnect the stream to the groundwater table (where appropriate).

- *Streambank or streambed armoring may be used where necessary to maintain channel stability, but the length of stream that is armored (such as with riprap and gabions) may not be included in the load reduction calculation.*

  Indiscriminate bank armoring is not proposed.

- *Projects should maximize floodplain reconnection, with a minimal channel invert elevation increase required to achieve this objective. Restoration bank height ratios must be 1.0 or less.*

  The restored bank heights are designed to be very low (6-12 inches) in order to maximize overbank flooding events into the floodplain.

- *A permanent 35-foot minimum riparian buffer.*

  A minimum permanent 35-foot riparian buffer will be installed on the site. The nature of the stream valleys varies across the BMP, but the floodplain width varies from approximately 80 to 120 feet. The conservation boundaries will be left intact indefinitely to provide buffer for the streams, and replanting will occur within the entire restored floodplain regardless of width.

RES applied Protocols 1 and 3 outlined by the Chesapeake Bay Program *Expert Panel to Define Removal Rates for Individual Stream Restoration Projects* reports as required when seeking sediment reduction credit above the default planning value. Pre-construction soils bulk density testing was completed. Erosion bank pins were set. Pre-construction monitoring, including measurements of bank pins, occurred multiple times over the course of a year. The various pre-development testing and one-year monitoring fulfill the outlined DEP criteria to allow use of a 75% efficiency for calculating sediment reduction achieved through implementation of the expert-panel protocols for urban stream restoration. Surveying and post-construction monitoring are planned. It is believed that the Stony Run BMP will qualify to apply the maximum allowable 90% sediment reduction efficiency to allow increased sediment reductions to be credited following the post-construction monitoring period. A PTC sediment (TSS) reduction of 256,493 lbs/yr is currently projected based on a 75% sediment reduction efficiency corresponding to the level of assessment, testing, and pre-implementation monitoring. **Table 12** summarizes current and future sediment pollution reduction PTC is providing for MS4 pollutant reduction compliance.

TABLE 12
ANTICIPATED SEDIMENT REDUCTION SUMMARY FOR STONY RUN BMP

VARIABLES		TOTAL STONY RUN PROJECT
Sediment (TSS) Delivered Loading (lbs/yr)		223,458
Protocol 1: Annual TSS Reduction (lbs/yr)	**Interim 75% Efficiency**	**167,594**
	Post-monitoring 90% Efficiency (future)	201,112
Protocol 3: Additional TSS Reduction (lbs/yr)		**88,899**
Total Annual TSS Reduction (lbs/yr)	**Interim 75% Efficiency**	**256,493**
	Post-monitoring 90% Efficiency (future)	290,011

The following Stony Run BMP information is located in **Appendix E**:

- (E1) *Chesapeake Bay Watershed Sediment Reduction Project – PA Turnpike Commission Pollutant Reduction Plan Amendment Stony Run BMP, East Cocalico Township, Lancaster County,* First Pennsylvania Resource, LLC, January 2023

  The report includes the following information in its Appendices

  - Project Location
  - 2019 Land Cover
  - BEHI Ratings
  - NBS Ratings
  - Erosion Rates
  - Erosion Pin Locations
  - Example Site Protection Instrument
  - Design Plans
  - Supporting Data: Baseline Data; Bank Pin Change Summary; Photographs Supporting Erosion Data; Post-Construction Sediment Load and Efficiency Summary; BEHI Rating Details; and Protocol 3 Sediment Reduction Calculations
  - Soil Bulk Density Lab Results.

- (E2) Anticipated Project Schedule

In addition to the project's sediment reduction effectiveness, the project was selected for the following reasons:

1. **Prevents Stream Degradation/Restores Stream Health**: The ultimate purpose of the MS4 program is to ensure that surface waters are healthy. Whether the stream is classified as attaining, or it is non-attaining like the one proposed by the Stony Run BMP and already on the integrated 303.D list, stream restoration provides meaningful sediment reduction. Additionally, the practices required by PA DEP to ensure eligibility for pollution reduction credits for stream restoration mandate introducing biodiversity and eco-system sustainability. While it is true that implementation of widely distributed new and retrofit SCMs will also improve stream health, benefits will be incremental, necessitate many projects, and require a long period of time to realize desired pollutant reductions in comparison to a single stream restoration project. The outcome of stream restoration is that more streams will attain or preserve their designated use more effectively than possible through implementation of other types of projects.
2. **Achievable implementation schedule**: PTC adheres to internal procedures for capital budget planning and a structured bid and procurement process for outsourcing of design, permitting, and construction. PTC has been making accommodations to prioritize expenditures for the capital investment so the allocation for the Stony Run BMP is in the current budget. However, typical timing for a single uncontroversial contract from inception through construction is three to six years. The turnaround time is dependent on many factors (e.g., regulatory approvals) outside PTC's control. The variables and number of projects could destroy the schedule if PTC needed to process hundreds of smaller projects to meet its pollutant reduction obligations. A single, meaningful pollution reduction project adds predictability to the schedule.
3. **Effective**: The PTC is sensitive to budget because of its fiduciary responsibility to Turnpike users. It is important that projects perform well and are constructed for the best price, since ultimately it is Turnpike travelers who pay for improvements.
4. **Environmentally Sensitive**: A single construction site minimizes the overall amount of disturbed land and concentrates fewer construction vehicles and equipment at a single area. The simplicity minimizes potential for sediment releases from construction activity and air pollution and automotive fluid

JUSTIFICATION FOR SELECTED POLLUTION REDUCTION PROJECT

- Prevents Stream Degradation/Restores Stream Health
- Achievable implementation schedule
- Effective
- Environmentally Sensitive
- Safety
- Potential flood alleviation for downstream neighbors
- Environmental Justice Benefits
- Consistent with PTC Sustainability Plan and Clean Water Initiative
- Diversification of PTC's Stormwater Management Response

discharges from construction vehicles/equipment that multiply when construction takes place at numerous widely distributed construction locations. Additionally, stream restorations are designed to be self-sustaining, and therefore require fewer site visits for maintenance and less use of herbicides, pesticides, etc. over their life cycle. Finally, the habitat created by the restoration itself is environmentally beneficial.

5. **Safety**: Construction activity for a stream restoration project like the Stony Run BMP is off the roadway. Generally, Stormwater Control Measures (SCMs) that capture and treat stormwater are located in close proximity to the travel lanes. As previously expressed, in order to be as effective for pollution reduction, many SCMs would be required to be constructed or renovated. Even though jersey barriers direct traffic and provide a protected area for contractors, each construction site would create safety hazards for both the Turnpike travelers and for construction contractors due to the disruptive traffic patterns. The proposed project selection eliminates hundreds of opportunities for traffic accidents because the project is separated from the active roadway.
6. **Consistent with PTC Sustainability Plan and Clean Water Initiative**: The previous bullets exemplify the PTC's mission to incorporate the organization's economic, environmental, and social impact in decision making and to implement sustainable practices throughout the PTC system.
7. **Diversification of PTC's Stormwater Management Response**: The Turnpike already supports an inventory of approximately 430 widely dispersed SCMs that attenuate runoff and pollution from the roadway. These SCMs are engineered structures or devices designed to slow down, hold, infiltrate, and/or treat stormwater runoff before it enters waterbodies and groundwater. Stream restorations add diversity to the PTC stormwater management response.

2. Contingency Project: U.S. Route 15 Interchange SCM Retrofit (SCM ID T-236.28-WB-0681-BED)

The PTC's total sediment reduction goal is achieved by the Stony Run Project. However, PTC identified a SCM retrofit of the existing extended dry detention basin located the U.S. Route 15 Interchange as a contingency project in case the Stony Run Project cannot fulfill the entire sediment reduction necessary for permit compliance. The existing basin is located southeast of the toll collections building, totally within the PTC MS4 regulated area. The SCM is in Upper Allen Township, Cumberland County, Pennsylvania, at the U.S. Route 15 Interchange (see Figure 5).

The basin at the U.S. Route 15 Interchange was constructed in 2006. Discharge from the basin is via a multi-stage concrete riser. The 12-inch primary orifice invert is flush with the basin floor. Impounded stormwater drops in the riser structure and flows through an 18-inch reinforced concrete pipe, discharging to a swale east of the basin that continues to a pipe network and exits the PTC property to the north. A 27-foot-wide emergency spillway is located along the southern

basin embankment in the southeast corner of the facility and discharges to the same system described above. The contributing drainage area to the basin is approximately 14.6 acres.

As stated in Section 2. e. Existing Stormwater Facility Pollutant Load Adjustments, PTC did not quantify deductions for any of its existing SCMs, so SCM retrofit quantification includes the entire pollutant reduction achieved by the retrofit project. If required, the extended dry detention dry detention basin could be retrofitted with a sediment forebay. Based on the existing sediment loading rate for the Lower Yellow Breeches Creek watershed (HUC-12 Code: 020503050505), in which the SCM is located, and applying the effectiveness rate values from *PADEP's National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems BMP Effectiveness Value* (3800-PM-BCW0100m Rev 6/2018) to the treated drainage area, the retrofit could reduce the annual sediment load by and estimated 28,950 pounds.

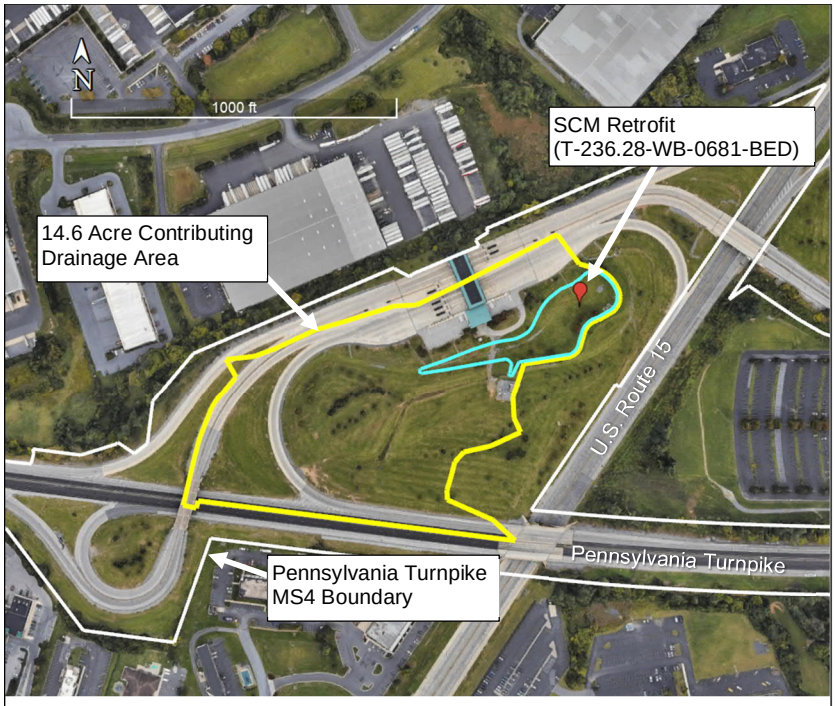


FIGURE 5
U.S. ROUTE 15 INTERCHANGE SCM RETROFIT BMP

Photograph No. 2 – Existing Stormwater Basin for retrofit: A sediment forebay could be added to the extended dry detention basin at the U.S. Route 15 Interchange, if needed, to provide supplemental sediment reduction.

3. Alternatives Considered

The PTC considered an abundance of options to accomplish pollution reduction. PTC initially analyzed sediment reduction through modifications of existing stormwater management facilities and capitalizing on landforms within the right-of-way that had spatial and physical characteristics that could be modified to hold runoff, allow sediment to settle, and provide infiltration. A list of criteria used to search and evaluate potential locations for PRP Projects is listed in the sidebar to the right. A total of 138 opportunity sites were identified. In order to achieve the same volume of sediment reduction accomplished by the selected BMP-4 stream restoration, PTC identified that 89 projects would be required. The projects included 1 dry detention basin, 40 extended-dry detention basins, and 48 swales. Some of the projects included treatment trains consisting of multiple SCM types at a single project location. The estimated cost was over $47 million.

CRITERIA USED TO SEARCH AND EVALUATE PRP PROJECTS

- Simplicity of ownership
  - o 1st PTC-owned properties
  - o 2nd Land owned by an adjacent MS4
- Spatial and physical characteristics to support appropriately responsive BMP
- Modifications to existing stormwater management facilities
  - o 1st Facilities constructed prior to 2003
  - o 2nd Facilities constructed between 2003 and 2010
- Ease of Access
- Simplicity of Permitting
- Project achievable within time frame established by permit

A significant determinative factor in project selection is achievability with the permit's time frame. While individual projects were achievable within the time frame established by the permit, collectively the time to design, permit, and construct the projects exceeded the schedule. (See the section on Impacts to Project Schedule provided below.)

The PTC also identified a potential stream restoration project in collaboration with municipal MS4s. The project is located in East Cocalico Township, Lancaster County. While the project meets the PTC reduction and location criteria, the schedules and legal complexities surrounding the collaboration in addition to schedule misalignment for the various partners, tipped the decsion in favor of the Stony Run BMP in East Cocalico Township.

a. Impacts to Project Schedule

There are two significant factors to project schedule: 1) internally required PTC procedures and 2) design/permitting timing. The second item has been previously discussed in this report. While PTC can prioritize design schedules, once the pre-construction permit applications are initiated, schedules are heavily influenced by the regulatory approval process and often include delays beyond PTC's control. As previously stated, the larger the number of projects, the greater the uncertainty for the schedule. The focus of the discussion below provides some of the internal complexities of scheduling within the PTC.

The PTC is a State Commission; its primary purpose is to construct, finance, and maintain the Pennsylvania Turnpike. It is an independent commission, not part of another state agency.

It operates under the leadership of a five-member board (four members are appointed by the Governor with $^2/_3$ Senate approval, and one member is the current Secretary of PennDOT).

The PTC planning process intertwines time frame and costs. The cost of new construction activity is tied to its projected schedule for allocating funds. According to PTC Policy and Procedure [(PTC 502005539(02/01)]:

> "The Ten-Year Capital Plan ("Capital Plan") is the process for identifying both short and long-term needs, establishing priorities and examining long-term financial implications and the overall effectiveness of funding such long-term needs and debt."

The Capital Plan is updated annually, allowing for modification based on new conditions/ information. Projects are generally coordinated by matching their priority and available funds. Typically, a capital project will methodically move from long-term planning (10+ years) to construction.

The PTC outsources design, permitting, and construction services and has a structured bid and procurement process it follows to employ consultants and contractors. The procurement process is managed by PTC staff. The process ensures project quality as well as compliance with all ancillary regulation pertaining to the Commission's actions as a public governmental body. The integration of these requirements causes all but the most urgent emergency response activities to be completed more slowly than projects managed by local municipal governments or completed by the private-market sector.

Typical timing for a single uncontroversial contract from inception through construction is provided in **Table 13**, below. (Complex projects can require a longer time frame.)

TABLE 13
PTC MS4 TYPICAL BID PROCESS

ID	DESCRIPTION	TIME EXPENDED
Project origination	Project added to Capital Plan	Varies (1 to 10+ years)
Project initiation	Project moved from planning to Request for Proposal (RFP) for Design	12 months
Design and Permitting	Notice to Proceed to shovel-ready bid package	12-24 months
Construction	Bidding through Final Construction	12-36 months
TOTAL		**36 to 72 months (excluding time on Capital Plan prior to bid process)**

If the Chesapeake Bay Drainage Basin PRP proposed 89 projects, some, but not all, could be processed simultaneously. This PRP focuses solely on the Chesapeake Bay Drainage Basin. The Turnpike also traverses the Ohio River Basin and the Delaware River Basin, which are included under the jurisdiction of the same MS4 permit with the same deadlines. The sheer number of projects; the extent of geographic regions involved; the number of projects (including those in the other major drainage basins); and the number of agencies, authorizations, and

approvals realistically make use of widely dispersed small-scale pollution-reduction projects unrealistic. The only reasonable solution is to focus on a few large and effective stream restoration projects. The benefits of stream restoration as a solution for sediment pollution are itemized starting on page 32.

F. FUNDING MECHANISM(S)

The PTC contracted RES as part of an agreement for full-delivery of pollution-reducing projects in collaboration with PennDOT. The contract includes locating and selecting project(s), securing land and easements or rights required for project implementation, designing the project, obtaining required permits and approvals, justifying project eligibility and pollution reduction credits including pre- and post-construction testing and monitoring, constructing the project, and providing for perpetual operations and maintenance (O&M) of the project. When complete the project will meet PTC's sediment reduction obligation in the Chesapeake Bay Drainage Basin. Since the preconstruction monitoring and design are underway but not finalized, the quote for the ultimate price is not yet available.

PTC reserved adequate funds, including a contingency buffer, in its capital budget in anticipation of this obligation. The organization will pay for the project from the Commission's general funds. The contract contains contract payment milestones; when the contractor satisfies that portion of work, PTC will release payment. The structure of the contract provides legal protections for PTC to compel work completion tied both to work quality and adherence to schedule. The PTC is confident in its capability to fund the project.

G. RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE OF BMPs

As stated in the previous section, RES will be responsible for providing ongoing O&M. The following excerpt is taken from the *Chesapeake Bay Watershed Sediment Reduction Project Conceptual Pollutant Reduction Plan*, First Pennsylvania Resources, LLC, January 2023. (The table numbering and appendix reference in the excerpt were revised to be consistent with this document.)

Per the excerpt below, RES is responsible for maintenance during the Maintenance and Monitoring (M&M) period associated with Chapter 105 permit conditions, which includes fixing damage to the stream banks due to flood events, invasive species control, and performing inspections after major flood events that have the potential to damage the stream system during the establishment period covered by the permit. Following the M&M period, when the long-term O&M period begins, RES will act as the initial long-term steward unless responsibility is formally and legally delegated to another qualified, watershed-focused entity to assume long-term stewardship responsibilities. PTC can use legal remedies to enforce these contractual O&M obligations.

A copy of the Example Site Protection Instrument (SPI) is located in **Appendix E1**.

BMP Operations and Maintenance (O&M)

(Excerpted from *Chesapeake Bay Watershed Sediment Reduction Project PA Turnpike Commission Pollutant Reduction Plan Amendment Stony Run BMP*, First Pennsylvania Resources, LLC, January 2022)

With regard to the land acquisition, RES identifies potential BMPs and contacts the landowners of the potential BMP. Regardless of ownership type (private or public), RES negotiates a site protection instrument (SPI) such as a declaration of restrictive covenant for conservation (DRC), and an agreement with the landowner which provides for the execution of the SPI upon the closing of the agreement. A memorandum of this agreement is recorded at the county courthouse to give public notice of the agreement. The agreement also provides an inspection period which typically consists of an initial 12-month term with two 6-month extensions for a total of 24 months until closing must be initiated, or the contract expires. During the inspection period, RES conducts due diligence on the property and confirms title to the subject property, acquires title insurance and addresses concerns with the title, such as pre-existing easements, or liens. During this time, RES also conducts physical inspections like surveys and RES completes the engineering and permitting of the project. Finally, necessary 'Secondary Agreements' for situations such as spoil stockpiles, access, staging, etc. are negotiated with the landowner during the inspection period. Upon closing, the landowner executes the DRC and the Secondary Agreements.

As described above, the SPI will be placed on the property parcels in advance of the proposed restoration activities, thereby ensuring the long-term protection of the site. The SPI restricts activities that are incompatible with the objectives of the project site. The SPI will be recorded within 60 days at the county courthouse after receipt of all required permits, clearances, approvals and authorizations and prior to project implementation. Recording the SPI after all necessary permits are approved avoids creating irreversible encumbrances on the land title until there is minimal risk of project modification. An example copy of an SPI that would be filed upon project authorization is included as Appendix B: Site Protection Instrument. The final SPI may be subject to review and approval by all parties.

Following construction, RES will perform the maintenance and monitoring (M&M) responsibilities for a period of five years, as required by the Chapter 105 permit conditions. RES will inspect the BMPs annually to perform monitoring and all necessary maintenance needed for the continued viability of the project for the M&M period. The need to perform maintenance will be assessed during annual visits, and if deemed necessary, appropriate remedial action will be performed to repair deficient areas. This includes fixing damage to the stream banks due to flood events. Maintenance events will also be used for invasive species control to promote the success of the riparian plantings. RES will also perform inspections after major flood events that have the potential to damage the stream system. Once the long- term operations and maintenance (O&M) period begin, RES will act as the initial long-term steward until another qualified, watershed-focused entity is willing to assume long-term stewardship responsibilities. Coordination with other potential organizations has been initiated and is ongoing.

Following construction at each BMP, RES will complete an as-built survey of the relocated stream to include a full longitudinal profile illustrating the channel restoration. One permanent monitoring location will be installed as a reference at each site to illustrate post-construction conditions. For projects claiming Protocol 3 credits, HOBO water gauge data loggers will be installed at this location within the stream and floodplain to gather hydrologic data. The as built reports will be submitted to PA DEP and USACE following construction and planting completion. During the five-year maintenance and monitoring period, annual monitoring reports will be submitted to PA DEP and USACE by December 31 each year monitoring occurs. At a minimum, monitoring reports will include:

- Photos taken from ground level at each permanent photo monitoring location
- Assessment of vegetative cover in reestablished wetland corridor (if Protocol 3 credits are claimed)
- BEHI and NBS assessments for the restored stream channel to validate nutrient reduction efficiency
- Hydrologic data from the stream channel and wetlands to record real time water
- surface elevations throughout the growing season and validate the reconnection of the stream to the floodplain (if Protocol 3 credits are claimed)
- Discussion of the maintenance and monitoring activities conducted, and
- Proposed maintenance schedule for the following year based upon the results of the
- annual monitoring.

A summary of the proposed performance standards for the sites is summarized in **Table 14**. The anticipated schedule for the implementation of the final PRP is included as **Appendix E2**.

TABLE 14
RES PERFORMANCE STANDARDS SUMMARY TABLE

Resource Type	Performance Standard Type	Evaluation	Performance Standard Value	Unit
Streams	Bank Stability	BEHI Score	<Low	---
	Geomorphic Stability	Visual Observation	No observed vertical or horizontal instability	---
	Large Woody Debris	Cubic meter per Acre	>25% increase	%
	Stream Hydrology	Channel/Floodplain Connectivity	Bankfull event per year	# (Count)
	Substrate	Pebble Count	D50 particle size remains in the same size class or larger as noted in As-Built	
	Vegetation	Plot Assessment	Prevalence index value <3.0	---
	Groundwater Hydrology	Soil Saturation	Saturation within the upper 1' for 12.5% of the growing season	%

APPENDICES

APPENDIX A
PUBLIC NOTICE COPY OF PA BULLETIN

From: Bulletin
To: McLaughlin, Jeanmarie
Cc: Noss, Nicholas; Hoffman, Nathan; Kaiser, James
Subject: RE: PA Turnpike Commission -- Public Notice (Draft PRP Plans - MS4 Permit)
Date: Tuesday, September 13, 2022 11:19:06 AM

Hello Ms. McLaughlin:
Thank you for sending notice PRP Plans – MS4 Permits. As requested, we will publish this in the September 24, 2022 issue of the *Pennsylvania Bulletin.* Take care and have a great day!

Corinne Marut
Editorial Assistant
Legislative Reference Bureau
Pennsylvania Code & Bulletin Office
647 Main Capitol Building
Harrisburg, PA 17120-0033
717-783-1530
cmarut@palrb.us

From: McLaughlin, Jeanmarie <jmclaugh@paturnpike.com>
Sent: Tuesday, September 13, 2022 10:58 AM
To: Bulletin <bulletin@palrb.us>
Cc: Noss, Nicholas <nnoss@paturnpike.com>; Hoffman, Nathan <nhoffman@paturnpike.com>; Kaiser, James <jkaiser@paturnpike.com>
Subject: PA Turnpike Commission -- Public Notice (Draft PRP Plans - MS4 Permit)

Ms. Marut,

Please find attached the Pennsylvania Turnpike Commission's Public Notice for its "Draft National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Pollution Reduction Plans for the Pennsylvania Turnpike Commission" to be published in the September 24, 2022 issue of the Pennsylvania Bulletin. If you have any questions regarding the Notice, please feel free to contact Nick Noss (717-831-7129) or Nate Hoffman (717-831-7119), I have copied them on this email as well. I believe you spoke with them this morning. We greatly appreciate your help and assistance. If you require any additional information, please let us know.

Jeanmarie McLaughlin
Assistant Counsel IV

Pennsylvania Turnpike Commission
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700 S. Eisenhower Blvd. I Middletown, PA 17057
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Draft National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Pollution Reduction Plans for the Pennsylvania Turnpike Commission

Notice is hereby given that the Pennsylvania Turnpike Commission will receive public comment(s) on three proposed Pollution Reduction Plans (PRPs) required for their 2021-2026 National Pollutant Discharge Elimination System (NPDES) Individual Permit to discharge stormwater from Small Municipal Separate Storm Sewer Systems (MS4s) Permit No. PAI139602.

The Pennsylvania Turnpike Commission has developed PRPs for the Chesapeake Bay, Delaware River and Ohio River Watersheds. The PRPs determine existing sediment pollutant loadings associated with stormwater runoff and proposes potential Best Management Practices to reduce the pollutant loads to meet the requirements of the MS4 Permit, for each watershed.

The proposed PRPs can be reviewed online by visiting **https://www.paturnpike.com/responsibility-matters/clean-water** then selecting “MS4” at the top of the page and navigating to “MS4 Documentation” under “MS4 Resources”.

Written comments on the PRPs will be accepted for a period of 30 days from the date of this public notice by mail to Mr. James Kaiser, Pennsylvania Turnpike Commission,700 South Eisenhower Blvd., Middletown, PA 17057 or by e-mail at jkaiser@paturnpike.com. All comments will be tabulated and considered with the final PRPs.

APPENDIX B
PTC MS4 Chesapeake Bay Drainage Basin
Receiving Surface Waters Table

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
21001	40.20871145	-77.24668992	Alexander Spring Creek	CWF	No	457	382	Non-Attaining	Agriculture - Siltation ; Construction - Siltation	Harrisburg, PA	Alexanders Spring Creek	020503050402	02050305000347	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21002	40.20724309	-77.24662864	Alexander Spring Creek	CWF	Yes	456	382	Non-Attaining	Agriculture - Siltation ; Construction - Siltation	Harrisburg, PA	Alexanders Spring Creek	020503050402	02050305000347	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21003	40.20786858	-77.24660842	Alexander Spring Creek	CWF	No	457	382	Non-Attaining	Agriculture - Siltation ; Construction - Siltation	Harrisburg, PA	Alexanders Spring Creek	020503050402	02050305000347	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21004	40.20767281	-77.24656676	Alexander Spring Creek	CWF	Yes	457	382	Non-Attaining	Agriculture - Siltation ; Construction - Siltation	Harrisburg, PA	Alexanders Spring Creek	020503050402	02050305000347	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21005	40.20879504	-77.24628601	Alexander Spring Creek	CWF	No	457	382	Non-Attaining	Agriculture - Siltation ; Construction - Siltation	Harrisburg, PA	Alexanders Spring Creek	020503050402	02050305000347	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21006	40.20897679	-77.24549559	Alexander Spring Creek	CWF	No	457	382	Non-Attaining	Agriculture - Siltation ; Construction - Siltation	Harrisburg, PA	Alexanders Spring Creek	020503050402	02050305000347	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21007	40.21698762	-77.21852172	Conodoguinet Creek	WWF	No	<Null>	383	Non-Attaining	N/A	Non-Urban	Wertz Run-Conodoguinet Creek	020503050403	02050305000213	N/A	N/A	N/A	N/A	N/A	N/A
21008	40.2206874	-77.20531914	UNT to Conodoguinet Creek	WWF	No	<Null>	383	Non-Attaining	N/A	Harrisburg, PA	Wertz Run-Conodoguinet Creek	020503050403	02050305003515	N/A	N/A	N/A	N/A	N/A	N/A
21009	40.2211367	-77.19395374	Conodoguinet Creek	WWF	No	463	383	Non-Attaining	N/A	Harrisburg, PA	Wertz Run-Conodoguinet Creek	020503050403	02050305000843	N/A	N/A	N/A	N/A	N/A	N/A
21010	40.22099492	-77.19341329	Conodoguinet Creek	WWF	No	463	383	Non-Attaining	N/A	Harrisburg, PA	Wertz Run-Conodoguinet Creek	020503050403	02050305000843	N/A	N/A	N/A	N/A	N/A	N/A
21011	40.22086153	-77.19247709	Conodoguinet Creek	WWF	No	463	383	Non-Attaining	N/A	Harrisburg, PA	Wertz Run-Conodoguinet Creek	020503050403	02050305000843	N/A	N/A	N/A	N/A	N/A	N/A
21012	40.22097703	-77.19087099	Conodoguinet Creek	WWF	No	463	383	Non-Attaining	N/A	Harrisburg, PA	Wertz Run-Conodoguinet Creek	020503050403	02050305000843	N/A	N/A	N/A	N/A	N/A	N/A
21013	40.22201819	-77.18969701	Conodoguinet Creek	WWF	No	463	383	Non-Attaining	N/A	Harrisburg, PA	Wertz Run-Conodoguinet Creek	020503050403	02050305000843	N/A	N/A	N/A	N/A	N/A	N/A
21014	40.22256356	-77.18939821	Conodoguinet Creek	WWF	No	<Null>	383	Non-Attaining	N/A	Harrisburg, PA	Wertz Run-Conodoguinet Creek	020503050403	02050305000843	N/A	N/A	N/A	N/A	N/A	N/A
21015	40.22612426	-77.1757654	UNT to Conodoguinet Creek	WWF	No	<Null>	384	Non-Attaining	N/A	Harrisburg, PA	Wertz Run-Conodoguinet Creek	020503050403	02050305000844	N/A	N/A	N/A	N/A	N/A	N/A
21016	40.2312393	-77.16926277	UNT to Conodoguinet Creek	WWF	No	<Null>	384	Non-Attaining	N/A	Harrisburg, PA	Wertz Run-Conodoguinet Creek	020503050403	02050305000844	N/A	N/A	N/A	N/A	N/A	N/A
21017	40.21967592	-77.15762588	Letort Spring Run	CWF	No	<Null>	384	Non-Attaining	N/A	Harrisburg, PA	Letort Spring Run	020503050404	02050305000421	N/A	N/A	N/A	N/A	N/A	N/A
21018	40.22500113	-77.14757839	Letort Spring Run	CWF	No	<Null>	384	Attaining	N/A	Harrisburg, PA	Letort Spring Run	020503050404	02050305000421	N/A	N/A	N/A	N/A	N/A	N/A
21019	40.22594688	-77.14618132	Letort Spring Run	CWF	No	<Null>	384	Non-Attaining	N/A	Harrisburg, PA	Letort Spring Run	020503050404	02050305000421	N/A	N/A	N/A	N/A	N/A	N/A
21020	40.22806086	-77.14082562	Letort Spring Run	CWF	Yes	469	385	Non-Attaining	N/A	Non-Urban	Letort Spring Run	020503050404	02050305000421	N/A	N/A	N/A	N/A	N/A	N/A
21021	40.22823011	-77.14059619	Letort Spring Run	CWF	Yes	469	385	Non-Attaining	N/A	Non-Urban	Letort Spring Run	020503050404	02050305000421	N/A	N/A	N/A	N/A	N/A	N/A
21022	40.22824212	-77.14043876	Letort Spring Run	CWF	Yes	469	385	Non-Attaining	N/A	Non-Urban	Letort Spring Run	020503050404	02050305000421	N/A	N/A	N/A	N/A	N/A	N/A
21023	40.22854488	-77.14024958	Letort Spring Run	CWF	Yes	469	385	Non-Attaining	N/A	Non-Urban	Letort Spring Run	020503050404	02050305000421	N/A	N/A	N/A	N/A	N/A	N/A
21024	40.2290063	-77.13952866	Letort Spring Run	CWF	Yes	469	385	Non-Attaining	N/A	Non-Urban	Letort Spring Run	020503050404	02050305000421	N/A	N/A	N/A	N/A	N/A	N/A
21025	40.23311022	-77.13696575	Letort Spring Run	CWF	No	<Null>	385	Non-Attaining	N/A	Harrisburg, PA	Letort Spring Run	020503050404	02050305000421	N/A	N/A	N/A	N/A	N/A	N/A
21026	40.22823748	-77.132212	UNT to Letort Spring Run	CWF	Yes	469	385	Non-Attaining	N/A	Harrisburg, PA	Letort Spring Run	020503050404	02050305003413	N/A	N/A	N/A	N/A	N/A	N/A
21027	40.22824816	-77.13215457	UNT to Letort Spring Run	CWF	Yes	469	385	Non-Attaining	N/A	Harrisburg, PA	Letort Spring Run	020503050404	02050305003413	N/A	N/A	N/A	N/A	N/A	N/A
21028	40.22780267	-77.13201617	UNT to Letort Spring Run	CWF	Yes	469	385	Non-Attaining	N/A	Harrisburg, PA	Letort Spring Run	020503050404	02050305003413	N/A	N/A	N/A	N/A	N/A	N/A
21029	40.22783127	-77.13198017	UNT to Letort Spring Run	CWF	Yes	469	385	Non-Attaining	N/A	Harrisburg, PA	Letort Spring Run	020503050404	02050305003413	N/A	N/A	N/A	N/A	N/A	N/A
21030	40.22644	-77.13142314	UNT to Letort Spring Run	CWF	No	470	385	Non-Attaining	N/A	Harrisburg, PA	Letort Spring Run	020503050404	02050305003413	N/A	N/A	N/A	N/A	N/A	N/A
21031	40.21314441	-77.09820383	Hogestown Run	CWF	No	<Null>	387	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Hogestown Run	020503050405	02050305000404	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21032	40.214856	-77.09176108	Hogestown Run	CWF	No	<Null>	387	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Hogestown Run	020503050405	02050305000404	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21033	40.25183966	-77.08957173	Trib to Conodoguinet Creek	WWF	No	<Null>	386	Non-Attaining	N/A	Non-Urban	Hogestown Run	020503050406	02050305003245	N/A	N/A	N/A	N/A	N/A	N/A
21034	40.21499495	-77.08309222	Hogestown Run	CWF	No	475	387	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Hogestown Run	020503050405	02050305000404	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
21035	40.22130939	-77.03512408	Trindle Spring Run	CWF	No	<Null>	389	Non-Attaining	Agriculture - Siltation ; Construction - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Trindle Spring Run	020503050407	02050305000490	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21036	40.1997828	-77.03198935	Trindle Spring Run	CWF	No	481	388	Non-Attaining	Agriculture - Siltation ; Construction - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Non-Urban	Trindle Spring Run	020503050407	02050305000490	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21037	40.19980247	-77.03193087	Trindle Spring Run	CWF	No	481	388	Non-Attaining	Agriculture - Siltation ; Construction - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Non-Urban	Trindle Spring Run	020503050407	02050305000490	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21038	40.20118664	-77.03153074	Trindle Spring Run	CWF	No	481	388	Non-Attaining	Agriculture - Siltation ; Construction - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Trindle Spring Run	020503050407	02050305000490	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21039	40.20605436	-77.02818931	Trindle Spring Run	CWF	No	<Null>	388	Non-Attaining	Agriculture - Siltation ; Construction - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Trindle Spring Run	020503050407	02050305000490	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21040	40.20293551	-77.02800863	Trindle Spring Run	CWF	No	<Null>	388	Non-Attaining	Agriculture - Siltation ; Construction - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Trindle Spring Run	020503050407	02050305000490	Yes	Conodoguinet Creek Watershed	Nutrients ; Siltation ; Organic Enrichment/Low D.O. ; Suspended Solids	Yes	N/A	No WLA for PTC
21041	40.20445088	-76.98646836	UNT to Cedar Run	CWF	No	<Null>	390	Non-Attaining	Urban Runoff/Storm Sewers - Nutrients ; Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Other Habitat Alterations ; Habitat Modification - Flow Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000587	N/A	N/A	N/A	N/A	N/A	N/A
21042	40.19599402	-76.98213988	UNT to Cedar Run	CWF	Yes	487	390	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003475	N/A	N/A	N/A	N/A	N/A	N/A
21043	40.19599617	-76.98208502	UNT to Cedar Run	CWF	Yes	487	390	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003475	N/A	N/A	N/A	N/A	N/A	N/A
21044	40.19648871	-76.98127253	UNT to Cedar Run	CWF	No	487	390	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003475	N/A	N/A	N/A	N/A	N/A	N/A
21045	40.19655612	-76.98111598	UNT to Cedar Run	CWF	No	487	390	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003475	N/A	N/A	N/A	N/A	N/A	N/A
21046	40.19717817	-76.98041475	UNT to Cedar Run	CWF	No	487	390	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003475	N/A	N/A	N/A	N/A	N/A	N/A
21047	40.19884595	-76.97973587	UNT to Cedar Run	CWF	No	<Null>	390	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003475	N/A	N/A	N/A	N/A	N/A	N/A
21048	40.20010731	-76.97620367	UNT to Cedar Run	CWF	No	487	390	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003475	N/A	N/A	N/A	N/A	N/A	N/A
21049	40.20663296	-76.96769964	UNT to Cedar Run	CWF	No	<Null>	391	Non-Attaining	Urban Runoff/Storm Sewers - Nutrients ; Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Other Habitat Alterations ; Habitat Modification - Flow Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000587	N/A	N/A	N/A	N/A	N/A	N/A
21050	40.19402964	-76.94887018	Cedar Run	CWF	No	<Null>	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000585	N/A	N/A	N/A	N/A	N/A	N/A
21051	40.20036345	-76.94713029	UNT to Cedar Run	CWF	Yes	491	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003401	N/A	N/A	N/A	N/A	N/A	N/A
21052	40.19989292	-76.94648913	UNT to Cedar Run	CWF	Yes	491	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003401	N/A	N/A	N/A	N/A	N/A	N/A
21053	40.19965417	-76.94557847	UNT to Cedar Run	CWF	No	491	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003401	N/A	N/A	N/A	N/A	N/A	N/A
21054	40.19640817	-76.94526323	Cedar Run	CWF	No	<Null>	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000585	N/A	N/A	N/A	N/A	N/A	N/A
21055	40.19938248	-76.94416529	Cedar Run	CWF	No	491	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000585	N/A	N/A	N/A	N/A	N/A	N/A
21056	40.19950883	-76.94415946	Cedar Run	CWF	Yes	491	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000585	N/A	N/A	N/A	N/A	N/A	N/A
21057	40.19950703	-76.94408659	Cedar Run	CWF	Yes	491	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000585	N/A	N/A	N/A	N/A	N/A	N/A
21058	40.20015096	-76.94391506	Cedar Run	CWF	Yes	491	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000585	N/A	N/A	N/A	N/A	N/A	N/A
21059	40.20012278	-76.94378211	Cedar Run	CWF	Yes	491	391	Non-Attaining	Agriculture - Nutrients ; Agriculture - Siltation ; Agriculture - Other Habitat Alterations	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000585	N/A	N/A	N/A	N/A	N/A	N/A
21060	40.19719593	-76.93681365	UNT to Yellow Breeches Creek	CWF	Yes	492	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003442	N/A	N/A	N/A	N/A	N/A	N/A
21061	40.1971905	-76.93672166	UNT to Yellow Breeches Creek	CWF	Yes	492	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003442	N/A	N/A	N/A	N/A	N/A	N/A
21062	40.19764273	-76.93623657	UNT to Yellow Breeches Creek	CWF	Yes	492	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003442	N/A	N/A	N/A	N/A	N/A	N/A
21063	40.19769977	-76.93603507	UNT to Yellow Breeches Creek	CWF	No	492	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003442	N/A	N/A	N/A	N/A	N/A	N/A
21064	40.19808739	-76.93583321	UNT to Yellow Breeches Creek	CWF	No	492	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003442	N/A	N/A	N/A	N/A	N/A	N/A
21065	40.19725411	-76.93077058	Yellow Breeches Creek	CWF	No	492	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000289	N/A	N/A	N/A	N/A	N/A	N/A
21066	40.19547881	-76.93063551	UNT to Yellow Breeches Creek	CWF	Yes	493	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003449	N/A	N/A	N/A	N/A	N/A	N/A
21067	40.19541959	-76.93034693	UNT to Yellow Breeches Creek	CWF	No	493	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003449	N/A	N/A	N/A	N/A	N/A	N/A
21068	40.19597829	-76.92997429	UNT to Yellow Breeches Creek	CWF	Yes	493	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003449	N/A	N/A	N/A	N/A	N/A	N/A

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21069	40.19595953	-76.92991626	UNT to Yellow Breeches Creek	CWF	Yes	493	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003449	N/A	N/A	N/A	N/A	N/A	N/A
21070	40.19691285	-76.92806195	Yellow Breeches Creek	CWF	No	493	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000289	N/A	N/A	N/A	N/A	N/A	N/A
21071	40.19754502	-76.92702049	Yellow Breeches Creek	CWF	No	493	391	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000289	N/A	N/A	N/A	N/A	N/A	N/A
21072	40.19740546	-76.92345619	Yellow Breeches Creek	CWF	No	493	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000289	N/A	N/A	N/A	N/A	N/A	N/A
21073	40.19782456	-76.91788139	Yellow Breeches Creek	CWF	No	494	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000289	N/A	N/A	N/A	N/A	N/A	N/A
21074	40.19802092	-76.91781683	Yellow Breeches Creek	CWF	No	494	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000289	N/A	N/A	N/A	N/A	N/A	N/A
21075	40.19731829	-76.91732908	Yellow Breeches Creek	CWF	No	494	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000289	N/A	N/A	N/A	N/A	N/A	N/A
21076	40.19735384	-76.91684737	Yellow Breeches Creek	CWF	No	494	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000289	N/A	N/A	N/A	N/A	N/A	N/A
21077	40.19909678	-76.91350856	UNT to Yellow Breeches Creek	CWF	Yes	494	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000665	N/A	N/A	N/A	N/A	N/A	N/A
21078	40.19903065	-76.91348973	UNT to Yellow Breeches Creek	CWF	Yes	494	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000665	N/A	N/A	N/A	N/A	N/A	N/A
21079	40.19867891	-76.9133462	UNT to Yellow Breeches Creek	CWF	Yes	494	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000665	N/A	N/A	N/A	N/A	N/A	N/A
21080	40.20194852	-76.90695593	UNT to Yellow Breeches Creek	CWF	No	495	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003373	N/A	N/A	N/A	N/A	N/A	N/A
21081	40.20118096	-76.90659051	UNT to Yellow Breeches Creek	CWF	Yes	495	392	Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003373	N/A	N/A	N/A	N/A	N/A	N/A
21082	40.20116833	-76.90663476	UNT to Yellow Breeches Creek	CWF	Yes	495	392	Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003373	N/A	N/A	N/A	N/A	N/A	N/A
21083	40.20072546	-76.90640673	UNT to Yellow Breeches Creek	CWF	Yes	495	392	Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003373	N/A	N/A	N/A	N/A	N/A	N/A
21084	40.20080463	-76.90637626	UNT to Yellow Breeches Creek	CWF	Yes	495	392	Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003373	N/A	N/A	N/A	N/A	N/A	N/A
21085	40.20256447	-76.90294252	UNT to Yellow Breeches Creek	CWF	No	496	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003355	N/A	N/A	N/A	N/A	N/A	N/A
21086	40.20266861	-76.90209658	UNT to Yellow Breeches Creek	CWF	Yes	496	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003355	N/A	N/A	N/A	N/A	N/A	N/A
21087	40.20269228	-76.90196356	UNT to Yellow Breeches Creek	CWF	Yes	496	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003355	N/A	N/A	N/A	N/A	N/A	N/A
21088	40.21203773	-76.90176559	Yellow Breeches Creek	CWF	No	<Null>	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000288	N/A	N/A	N/A	N/A	N/A	N/A
21089	40.20247535	-76.90120781	UNT to Yellow Breeches Creek	CWF	Yes	496	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003355	N/A	N/A	N/A	N/A	N/A	N/A
21090	40.20249066	-76.90111989	UNT to Yellow Breeches Creek	CWF	Yes	496	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003355	N/A	N/A	N/A	N/A	N/A	N/A
21091	40.20692577	-76.89190272	UNT to Yellow Breeches Creek	CWF	Yes	497	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003340	N/A	N/A	N/A	N/A	N/A	N/A
21092	40.20696497	-76.89188891	UNT to Yellow Breeches Creek	CWF	No	497	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003340	N/A	N/A	N/A	N/A	N/A	N/A
21093	40.20645006	-76.89164563	UNT to Yellow Breeches Creek	CWF	Yes	497	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003340	N/A	N/A	N/A	N/A	N/A	N/A
21094	40.20988431	-76.88827607	UNT to Yellow Breeches Creek	CWF	No	498	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003340	N/A	N/A	N/A	N/A	N/A	N/A
21095	40.20997138	-76.88465748	Yellow Breeches Creek	CWF	No	498	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003323	N/A	N/A	N/A	N/A	N/A	N/A
21096	40.20936819	-76.88462403	UNT to Yellow Breeches Creek	CWF	Yes	498	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003323	N/A	N/A	N/A	N/A	N/A	N/A
21097	40.20939375	-76.88461579	UNT to Yellow Breeches Creek	CWF	Yes	498	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003323	N/A	N/A	N/A	N/A	N/A	N/A
21098	40.21465402	-76.88427093	Yellow Breeches Creek	CWF	No	<Null>	392	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000287	N/A	N/A	N/A	N/A	N/A	N/A
21099	40.21617529	-76.87431147	Yellow Breeches Creek	CWF	No	<Null>	393	Non-Attaining	Other - Pathogens	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000287	N/A	N/A	N/A	N/A	N/A	N/A
21100	40.21538555	-76.8719512	Yellow Breeches Creek	CWF	No	<Null>	393	Non-Attaining	Other - Pathogens	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000287	N/A	N/A	N/A	N/A	N/A	N/A
21101	40.20994254	-76.86804696	UNT to Yellow Breeches Creek	CWF	No	500	393	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000666	N/A	N/A	N/A	N/A	N/A	N/A
21102	40.20996572	-76.86800902	UNT to Yellow Breeches Creek	CWF	No	500	393	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000666	N/A	N/A	N/A	N/A	N/A	N/A
21103	40.21072043	-76.86739897	UNT to Yellow Breeches Creek	CWF	No	500	393	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305000666	N/A	N/A	N/A	N/A	N/A	N/A
21104	40.21148344	-76.85839809	UNT to Yellow Breeches Creek	CWF	No	<Null>	393	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003298	N/A	N/A	N/A	N/A	N/A	N/A
21105	40.20651899	-76.85825799	UNT to Yellow Breeches Creek	CWF	Yes	501	393	Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003329	N/A	N/A	N/A	N/A	N/A	N/A

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
921105	40.20647017	-76.85839095	UNT to Yellow Breeches Creek	CWF	Yes	501	393	Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003329	N/A	N/A	N/A	N/A	N/A	N/A
21106	40.21113007	-76.8580285	UNT to Yellow Breeches Creek	CWF	No	<Null>	393	Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003298	N/A	N/A	N/A	N/A	N/A	N/A
21107	40.20673531	-76.85486833	UNT to Yellow Breeches Creek	CWF	No	501	393	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003329	N/A	N/A	N/A	N/A	N/A	N/A
21108	40.20606734	-76.85365061	UNT to Yellow Breeches Creek	CWF	No	502	393	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003302	N/A	N/A	N/A	N/A	N/A	N/A
21109	40.20569626	-76.85355016	UNT to Yellow Breeches Creek	CWF	Yes	502	393	Non-Attaining	N/A	Harrisburg, PA	Lower Yellow Breeches Creek	020503050505	02050305003302	N/A	N/A	N/A	N/A	N/A	N/A
21110	40.20559777	-76.85180419	Marsh Run	WWF	No	502	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503050505	02050305003341	N/A	N/A	N/A	N/A	N/A	N/A
21111	40.20516676	-76.8510998	Marsh Run	WWF	No	502	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003341	N/A	N/A	N/A	N/A	N/A	N/A
21112	40.20510834	-76.85094244	Marsh Run	WWF	No	502	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003341	N/A	N/A	N/A	N/A	N/A	N/A
21113	40.2050228	-76.85024242	Marsh Run	WWF	No	502	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003341	N/A	N/A	N/A	N/A	N/A	N/A
21114	40.20502215	-76.85015889	Marsh Run	WWF	No	502	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003341	N/A	N/A	N/A	N/A	N/A	N/A
21115	40.20472639	-76.84950692	Marsh Run	WWF	No	502	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21116	40.20441393	-76.84849126	Marsh Run	WWF	No	502	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21117	40.2041454	-76.84786383	Marsh Run	WWF	No	502	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21118	40.20395421	-76.84728793	Marsh Run	WWF	No	502	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21119	40.20352658	-76.8462423	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21120	40.20325364	-76.84554123	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21121	40.20305176	-76.84501899	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21122	40.20285401	-76.84359635	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21123	40.20257086	-76.84329886	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21124	40.20246067	-76.84293588	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21125	40.20238082	-76.84246663	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000579	N/A	N/A	N/A	N/A	N/A	N/A
21126	40.2021043	-76.84150567	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21127	40.20201112	-76.84078978	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21128	40.2020357	-76.83966557	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21129	40.20188165	-76.83905568	Marsh Run	WWF	No	503	393	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21130	40.20149893	-76.83813534	Marsh Run	WWF	No	503	394	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21131	40.20120814	-76.83742744	Marsh Run	WWF	No	504	394	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21132	40.20107475	-76.83702942	Marsh Run	WWF	No	504	394	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21133	40.20071193	-76.83616759	Marsh Run	WWF	No	504	394	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21134	40.20034175	-76.83539443	Marsh Run	WWF	No	504	394	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21135	40.19969446	-76.83359806	Marsh Run	WWF	No	504	394	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21136	40.19951331	-76.83241328	Marsh Run	WWF	No	504	394	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21137	40.19917206	-76.83103392	Marsh Run	WWF	No	504	394	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Source Unknown - Siltation	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305000578	N/A	N/A	N/A	N/A	N/A	N/A
21138	40.21439926	-76.79450284	Buser Run	WWF	Yes	509	395	Non-Attaining	N/A	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305004404	N/A	N/A	N/A	N/A	N/A	N/A

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
21139	40.21323826	-76.79385833	Buser Run	WWF	Yes	509	395	Non-Attaining	N/A	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305004404	N/A	N/A	N/A	N/A	N/A	N/A
21140	40.21321577	-76.79384403	Buser Run	WWF	Yes	509	395	Attaining	N/A	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305004404	N/A	N/A	N/A	N/A	N/A	N/A
21141	40.21638484	-76.78318331	UNT to Burd Run	WWF	No	511	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003180	N/A	N/A	N/A	N/A	N/A	N/A
21142	40.21420009	-76.78271697	UNT to Burd Run	WWF	No	511	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003180	N/A	N/A	N/A	N/A	N/A	N/A
21143	40.21478759	-76.78270071	UNT to Burd Run	WWF	Yes	511	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003180	N/A	N/A	N/A	N/A	N/A	N/A
21144	40.21566361	-76.78260125	UNT to Burd Run	WWF	Yes	511	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003180	N/A	N/A	N/A	N/A	N/A	N/A
21145	40.21483654	-76.78252435	UNT to Burd Run	WWF	Yes	511	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003180	N/A	N/A	N/A	N/A	N/A	N/A
21146	40.21563961	-76.78242077	UNT to Burd Run	WWF	Yes	511	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003180	N/A	N/A	N/A	N/A	N/A	N/A
21147	40.21459808	-76.77943884	Burd Run	WWF	No	511	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003181	N/A	N/A	N/A	N/A	N/A	N/A
21148	40.21462729	-76.77888187	Burd Run	WWF	Yes	511	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003181	N/A	N/A	N/A	N/A	N/A	N/A
21149	40.21505289	-76.77812331	Burd Run	WWF	No	511	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003181	N/A	N/A	N/A	N/A	N/A	N/A
21150	40.20954886	-76.76349453	UNT to Susquehanna River	WWF	No	<Null>	395	Non-Attaining	N/A	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003232	N/A	N/A	N/A	N/A	N/A	N/A
21151	40.21154108	-76.76235012	UNT to Susquehanna River	WWF	No	513	395	Non-Attaining	N/A	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003232	N/A	N/A	N/A	N/A	N/A	N/A
21152	40.21170565	-76.76206242	UNT to Susquehanna River	WWF	Yes	513	395	Non-Attaining	N/A	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003232	N/A	N/A	N/A	N/A	N/A	N/A
21153	40.20963241	-76.75483534	UNT to Susquehanna River	WWF	No	514	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Habitat Modification - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003194	N/A	N/A	N/A	N/A	N/A	N/A
21154	40.21054358	-76.75422326	UNT to Susquehanna River	WWF	Yes	514	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Habitat Modification - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003194	N/A	N/A	N/A	N/A	N/A	N/A
21155	40.21097834	-76.75401675	UNT to Susquehanna River	WWF	Yes	514	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Habitat Modification - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003194	N/A	N/A	N/A	N/A	N/A	N/A
21156	40.21098037	-76.75388551	UNT to Susquehanna River	WWF	Yes	514	395	Non-Attaining	Urban Runoff/Storm Sewers - Cause Unknown ; Habitat Modification - Cause Unknown	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003194	N/A	N/A	N/A	N/A	N/A	N/A
21157	40.20927913	-76.74925757	UNT to Susquehanna River	WWF	No	515	396	Non-Attaining	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Other Habitat Alterations	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003257	N/A	N/A	N/A	N/A	N/A	N/A
21158	40.21022093	-76.7486959	UNT to Susquehanna River	WWF	Yes	515	396	Non-Attaining	Urban Runoff/Storm Sewers - Siltation ; Urban Runoff/Storm Sewers - Other Habitat Alterations	Harrisburg, PA	Laurel Run-Susquehanna River	020503051011	02050305003257	N/A	N/A	N/A	N/A	N/A	N/A
21159	40.20971442	-76.73036126	UNT to Swatara Creek	WWF	Yes	517	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003167	N/A	N/A	N/A	N/A	N/A	N/A
21160	40.2097306	-76.73028331	UNT to Swatara Creek	WWF	Yes	517	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003167	N/A	N/A	N/A	N/A	N/A	N/A
21161	40.2101373	-76.73016133	UNT to Swatara Creek	WWF	Yes	517	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003167	N/A	N/A	N/A	N/A	N/A	N/A
21162	40.21014609	-76.73006765	UNT to Swatara Creek	WWF	Yes	517	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003167	N/A	N/A	N/A	N/A	N/A	N/A
21163	40.21391802	-76.72190195	Swatara Creek	WWF	No	<Null>	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305000005	N/A	N/A	N/A	N/A	N/A	N/A
21164	40.21045662	-76.71862869	Swatara Creek	WWF	No	518	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305000005	N/A	N/A	N/A	N/A	N/A	N/A
21165	40.21020741	-76.71824576	Swatara Creek	WWF	No	518	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305000005	N/A	N/A	N/A	N/A	N/A	N/A
21166	40.20879601	-76.71659663	Swatara Creek	WWF	No	518	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305000004	N/A	N/A	N/A	N/A	N/A	N/A
21167	40.20997205	-76.71650523	Swatara Creek	WWF	Yes	518	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305000004	N/A	N/A	N/A	N/A	N/A	N/A
21168	40.20955941	-76.71617583	Swatara Creek	WWF	No	518	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003150	N/A	N/A	N/A	N/A	N/A	N/A
21169	40.20936929	-76.71482398	UNT to Swatara Creek	WWF	No	518	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003150	N/A	N/A	N/A	N/A	N/A	N/A
21170	40.20963064	-76.71317756	UNT to Swatara Creek	WWF	Yes	518	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003150	N/A	N/A	N/A	N/A	N/A	N/A
21171	40.20959253	-76.71283865	UNT to Swatara Creek	WWF	Yes	518	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003150	N/A	N/A	N/A	N/A	N/A	N/A
21172	40.209463	-76.71239219	UNT to Swatara Creek	WWF	No	519	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003150	N/A	N/A	N/A	N/A	N/A	N/A
21173	40.2096649	-76.71104561	UNT to Swatara Creek	WWF	Yes	519	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003150	N/A	N/A	N/A	N/A	N/A	N/A
21174	40.21006033	-76.70984851	UNT to Swatara Creek	WWF	Yes	519	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003150	N/A	N/A	N/A	N/A	N/A	N/A
21175	40.2100672	-76.70889838	UNT to Swatara Creek	WWF	No	519	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305003150	N/A	N/A	N/A	N/A	N/A	N/A

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
21176	40.20404573	-76.70673818	Iron Run	WWF	No	<Null>	396	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305000418	N/A	N/A	N/A	N/A	N/A	N/A
21177	40.20365195	-76.7013019	Iron Run	WWF	No	<Null>	397	Non-Attaining	N/A	Non-Urban	Swatara Creek-Susquehanna River	020503050906	02050305000418	N/A	N/A	N/A	N/A	N/A	N/A
21178	40.20562883	-76.69230789	Iron Run	WWF	Yes	521	397	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305000419	N/A	N/A	N/A	N/A	N/A	N/A
21179	40.20646489	-76.69141465	Iron Run	WWF	No	521	397	Non-Attaining	N/A	Non-Urban	Swatara Creek-Susquehanna River	020503050906	02050305000419	N/A	N/A	N/A	N/A	N/A	N/A
21180	40.20171384	-76.68541677	UNT to Iron Run	WWF	No	<Null>	397	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305001088	N/A	N/A	N/A	N/A	N/A	N/A
21181	40.2034937	-76.68107197	UNT to Iron Run	WWF	No	522	397	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305001088	N/A	N/A	N/A	N/A	N/A	N/A
21182	40.20362482	-76.68093009	UNT to Iron Run	WWF	No	522	397	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305001088	N/A	N/A	N/A	N/A	N/A	N/A
21183	40.20429285	-76.67933118	UNT to Iron Run	WWF	Yes	522	397	Non-Attaining	N/A	Harrisburg, PA	Swatara Creek-Susquehanna River	020503050906	02050305001088	N/A	N/A	N/A	N/A	N/A	N/A
21184	40.20476447	-76.6792734	UNT to Iron Run	WWF	Yes	522	397	Non-Attaining	N/A	Non-Urban	Swatara Creek-Susquehanna River	020503050906	02050305001088	N/A	N/A	N/A	N/A	N/A	N/A
22001	40.23650325	-76.28105497	Segloch Run	EV (EXCEPTIONAL VALUE)	Yes	567	399	Non-Attaining	N/A	Non-Urban	Middle Creek	020503060902	02050306001416	N/A	N/A	N/A	N/A	N/A	N/A
22002	40.2359767	-76.28073057	Segloch Run	EV (EXCEPTIONAL VALUE)	Yes	567	399	Non-Attaining	N/A	Non-Urban	Middle Creek	020503060902	02050306001416	N/A	N/A	N/A	N/A	N/A	N/A
22003	40.23337754	-76.27890714	Segloch Run	EV (EXCEPTIONAL VALUE)	No	<Null>	399	Non-Attaining	N/A	Lancaster, PA	Middle Creek	020503060902	02050306001416	N/A	N/A	N/A	N/A	N/A	N/A
22004	40.22988191	-76.2589149	Middle Creek	TSF	No	<Null>	399	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Middle Creek	020503060902	02050306000453	N/A	N/A	N/A	N/A	N/A	N/A
22005	40.24116265	-76.25227026	Middle Creek Trib	TSF	No	570	400	Attaining	N/A	Lancaster, PA	Middle Creek	020503060902	02050306001413	N/A	N/A	N/A	N/A	N/A	N/A
22006	40.24082339	-76.25025541	Middle Creek Trib	TSF	Yes	571	400	Non-Attaining	N/A	Non-Urban	Middle Creek	020503060902	02050306001413	N/A	N/A	N/A	N/A	N/A	N/A
22007	40.24039362	-76.24879054	Middle Creek Trib	TSF	No	571	400	Non-Attaining	N/A	Non-Urban	Middle Creek	020503060902	02050306001413	N/A	N/A	N/A	N/A	N/A	N/A
22008	40.23977062	-76.24795674	Middle Creek Trib	TSF	No	571	400	Non-Attaining	N/A	Non-Urban	Middle Creek	020503060902	02050306001413	N/A	N/A	N/A	N/A	N/A	N/A
22009	40.23915988	-76.24673849	Middle Creek Trib	TSF	No	<Null>	400	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Middle Creek	020503060902	02050306000453	N/A	N/A	N/A	N/A	N/A	N/A
22010	40.24101696	-76.24491	Middle Creek	TSF	No	571	400	Attaining	N/A	Non-Urban	Middle Creek	020503060902	02050306000454	N/A	N/A	N/A	N/A	N/A	N/A
22011	40.24375201	-76.23563389	Middle Creek Trib	TSF	Yes	572	400	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Middle Creek	020503060902	02050306004501	N/A	N/A	N/A	N/A	N/A	N/A
22012	40.2462276	-76.21394721	Indian Run	TSF	Yes	575	400	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306000509	N/A	N/A	N/A	N/A	N/A	N/A
22013	40.2457717	-76.21393589	Indian Run	TSF	Yes	575	400	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306000509	N/A	N/A	N/A	N/A	N/A	N/A
22014	40.24504266	-76.21384362	Indian Run	TSF	No	575	400	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306000509	N/A	N/A	N/A	N/A	N/A	N/A
22015	40.24628748	-76.21379664	Indian Run	TSF	No	575	400	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Cocalico Creek-Conestoga River	020503060904	02050306000509	N/A	N/A	N/A	N/A	N/A	N/A
22016	40.24343966	-76.2114515	Indian Run	TSF	No	<Null>	401	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306000509	N/A	N/A	N/A	N/A	N/A	N/A
22017	40.24530713	-76.18622863	UNT to Indian Run	TSF	No	578	401	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306004495	N/A	N/A	N/A	N/A	N/A	N/A
22018	40.24534462	-76.18575159	UNT to Indian Run	TSF	Yes	578	401	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306004495	N/A	N/A	N/A	N/A	N/A	N/A
22019	40.24533597	-76.18457496	UNT to Indian Run	TSF	Yes	578	401	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306004495	N/A	N/A	N/A	N/A	N/A	N/A
22020	40.24537066	-76.18377303	UNT to Indian Run	TSF	Yes	578	401	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306004495	N/A	N/A	N/A	N/A	N/A	N/A
22021	40.24099679	-76.16553864	UNT to Indian Run	TSF	No	<Null>	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306001409	N/A	N/A	N/A	N/A	N/A	N/A
22022	40.24417108	-76.16264915	UNT to Indian Run	TSF	Yes	580	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306001409	N/A	N/A	N/A	N/A	N/A	N/A
22023	40.24456256	-76.16244213	UNT to Indian Run	TSF	Yes	580	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306001409	N/A	N/A	N/A	N/A	N/A	N/A
922023	40.24455362	-76.16241828	UNT to Indian Run	TSF	Yes	580	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Cocalico Creek-Conestoga River	020503060904	02050306001409	N/A	N/A	N/A	N/A	N/A	N/A
22024	40.24067591	-76.14285896	Cocalico Creek	WWF	No	583	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000181	N/A	N/A	N/A	N/A	N/A	N/A
22025	40.24097255	-76.14176106	Cocalico Creek	WWF	Yes	583	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000181	N/A	N/A	N/A	N/A	N/A	N/A
22026	40.24121963	-76.1416171	Cocalico Creek	WWF	Yes	583	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000181	N/A	N/A	N/A	N/A	N/A	N/A
22027	40.24143398	-76.14118609	Cocalico Creek	WWF	No	583	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000181	N/A	N/A	N/A	N/A	N/A	N/A
22028	40.24217076	-76.14075879	Cocalico Creek	WWF	No	583	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000181	N/A	N/A	N/A	N/A	N/A	N/A
22029	40.23120707	-76.13164623	Little Cocalico Creek	TSF	No	<Null>	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000516	N/A	N/A	N/A	N/A	N/A	N/A

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
22030	40.22550132	-76.1315426	Cocalico Creek	WWF	No	<Null>	402	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000180	N/A	N/A	N/A	N/A	N/A	N/A
22031	40.23584871	-76.1310078	Little Cocalico Creek	TSF	No	584	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000516	N/A	N/A	N/A	N/A	N/A	N/A
22032	40.23716389	-76.13067183	Little Cocalico Creek	TSF	Yes	584	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000516	N/A	N/A	N/A	N/A	N/A	N/A
22033	40.23769771	-76.13065399	Little Cocalico Creek	TSF	Yes	584	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000516	N/A	N/A	N/A	N/A	N/A	N/A
22034	40.23696234	-76.13062829	Little Cocalico Creek	TSF	No	584	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000516	N/A	N/A	N/A	N/A	N/A	N/A
22035	40.2365803	-76.13049906	Little Cocalico Creek	TSF	No	584	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000516	N/A	N/A	N/A	N/A	N/A	N/A
22036	40.23824407	-76.13033717	Little Cocalico Creek	TSF	Yes	584	402	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000516	N/A	N/A	N/A	N/A	N/A	N/A
22037	40.22982159	-76.13033785	Little Cocalico Creek	TSF	No	<Null>	402	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000516	N/A	N/A	N/A	N/A	N/A	N/A
22038	40.22369633	-76.12976694	Cocalico Creek	WWF	No	<Null>	402	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000180	N/A	N/A	N/A	N/A	N/A	N/A
22039	40.22485066	-76.10893495	Stony Run	WWF	No	587	403	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000492	N/A	N/A	N/A	N/A	N/A	N/A
22040	40.22484027	-76.10757766	Stony Run	WWF	No	587	403	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000492	N/A	N/A	N/A	N/A	N/A	N/A
22041	40.22466146	-76.10613909	Stony Run	WWF	No	587	403	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000492	N/A	N/A	N/A	N/A	N/A	N/A
22042	40.22479565	-76.10499408	Stony Run	WWF	No	587	403	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000492	N/A	N/A	N/A	N/A	N/A	N/A
22043	40.22475748	-76.10474632	Stony Run	WWF	No	587	403	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000492	N/A	N/A	N/A	N/A	N/A	N/A
22044	40.22466673	-76.10403446	Stony Run	WWF	No	588	403	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000492	N/A	N/A	N/A	N/A	N/A	N/A
22045	40.22487207	-76.10203105	Stony Run	WWF	Yes	588	403	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Lancaster, PA	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000492	N/A	N/A	N/A	N/A	N/A	N/A
22046	40.22524591	-76.10179665	Stony Run	WWF	Yes	588	403	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Non-Urban	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000492	N/A	N/A	N/A	N/A	N/A	N/A
22047	40.22531898	-76.10173391	Stony Run	WWF	Yes	588	403	Non-Attaining	Crop Related Agric - Nutrients ; Grazing Related Agric - Siltation ; Urban Runoff/Storm Sewers - Cause Unknown	Non-Urban	Little Cocalico Creek-Cocalico Creek	020503060901	02050306000492	N/A	N/A	N/A	N/A	N/A	N/A
22048	40.21188738	-76.09188778	UNT to Little Muddy Creek	WWF	No	<Null>	403	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Muddy Creek	020503061101	02050306004518	N/A	N/A	N/A	N/A	N/A	N/A
22049	40.21130237	-76.08980257	UNT to Little Muddy Creek	WWF	No	<Null>	403	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Muddy Creek	020503061101	02050306004518	N/A	N/A	N/A	N/A	N/A	N/A
22050	40.21506262	-76.07194012	Little Muddy Creek	WWF	No	591	404	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Muddy Creek	020503061101	02050306004499	N/A	N/A	N/A	N/A	N/A	N/A
22051	40.2150497	-76.07175568	Little Muddy Creek	WWF	Yes	591	404	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Muddy Creek	020503061101	02050306004499	N/A	N/A	N/A	N/A	N/A	N/A
22052	40.21525516	-76.07119474	Little Muddy Creek	WWF	Yes	591	404	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Little Muddy Creek	020503061101	02050306001371	N/A	N/A	N/A	N/A	N/A	N/A
22053	40.21591681	-76.07049998	Little Muddy Creek	WWF	Yes	591	404	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Little Muddy Creek	020503061101	02050306004499	N/A	N/A	N/A	N/A	N/A	N/A
22054	40.21588284	-76.07043283	Little Muddy Creek	WWF	Yes	591	404	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Little Muddy Creek	020503061101	02050306001371	N/A	N/A	N/A	N/A	N/A	N/A
22055	40.21656171	-76.06974707	Little Muddy Creek	WWF	No	592	404	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Little Muddy Creek	020503061101	02050306001371	N/A	N/A	N/A	N/A	N/A	N/A
22056	40.21224181	-76.05510442	UNT to Muddy Creek	WWF	Yes	593	404	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306001370	N/A	N/A	N/A	N/A	N/A	N/A
22057	40.20910815	-76.03482848	UNT to Muddy Creek	WWF	No	595	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22058	40.20908192	-76.0318395	UNT to Muddy Creek	WWF	No	596	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22059	40.20942194	-76.03042816	UNT to Muddy Creek	WWF	No	596	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22060	40.20956318	-76.02975392	UNT to Muddy Creek	WWF	Yes	596	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22061	40.20952269	-76.02926384	UNT to Muddy Creek	WWF	Yes	596	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22062	40.20950857	-76.02867417	UNT to Muddy Creek	WWF	Yes	596	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22063	40.20933584	-76.02751996	UNT to Muddy Creek	WWF	No	596	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22064	40.20939596	-76.02640836	UNT to Muddy Creek	WWF	Yes	596	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22065	40.20922558	-76.02557757	UNT to Muddy Creek	WWF	Yes	596	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22066	40.2088134	-76.0251567	UNT to Muddy Creek	WWF	No	597	405	Non-Attaining	Source Unknown - Pathogens	Non-Urban	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22067	40.20770884	-76.02194246	UNT to Muddy Creek	WWF	Yes	597	405	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
22068	40.2076464	-76.0217779	UNT to Muddy Creek	WWF	Yes	597	405	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306004498	N/A	N/A	N/A	N/A	N/A	N/A
22069	40.20344287	-76.02159309	Muddy Creek	TSF	No	<Null>	405	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306000466	N/A	N/A	N/A	N/A	N/A	N/A
22070	40.20737741	-76.02148975	UNT to Muddy Creek	TSF	Yes	597	405	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306000466	N/A	N/A	N/A	N/A	N/A	N/A
22071	40.20784314	-76.02118057	Muddy Creek	TSF	Yes	597	405	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306000466	N/A	N/A	N/A	N/A	N/A	N/A
22072	40.20780303	-76.02117265	Muddy Creek	TSF	Yes	597	405	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306000466	N/A	N/A	N/A	N/A	N/A	N/A
22073	40.2067052	-76.02107611	Muddy Creek	TSF	No	597	405	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306000466	N/A	N/A	N/A	N/A	N/A	N/A
22074	40.1961937	-76.02127241	Muddy Creek	TSF	No	<Null>	405	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306000464	N/A	N/A	N/A	N/A	N/A	N/A
22075	40.20084864	-76.02093009	Muddy Creek	TSF	No	<Null>	405	Non-Attaining	Source Unknown - Pathogens	Lancaster, PA	Muddy Creek	020503061102	02050306000466	N/A	N/A	N/A	N/A	N/A	N/A
22076	40.18951611	-76.01629501	UNT to Muddy Creek	HQ-CWF (HIGH QUALITY-COLD WATER FISHES)	No	<Null>	405	Non-Attaining	Grazing Related Agric - Nutrients ; Grazing Related Agric - Siltation	Non-Urban	Muddy Creek	020503061102	02050306001365	N/A	N/A	N/A	N/A	N/A	N/A
22077	40.1904687	-76.00318634	UNT to Muddy Creek	HQ-TSF (HIGH QUALITY-TROUT STOCKING)	No	600	405	Attaining	Grazing Related Agric - Nutrients ; Grazing Related Agric - Siltation	Non-Urban	Muddy Creek	020503061102	02050306001365	N/A	N/A	N/A	N/A	N/A	N/A
23001	41.29338327	-75.77113907	UNT to Gardner Creek	CWF	No	<Null>	407	Non-Attaining	N/A	Non-Urban	City of Wilkes-Barre-Mill Creek	020501070202	02050107002745	Yes	Susquehanna River Metals	Metals	Yes	N/A	No WLA for PTC
23002	41.31198882	-75.74951192	Mill Creek	CWF	No	1123	407	Non-Attaining	Urban Runoff/Storm Sewers - Flow Alterations ; Road Runoff - Cause Unknown	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004157	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23003	41.31334145	-75.748656	Mill Creek	CWF	Yes	1123	407	Non-Attaining	Urban Runoff/Storm Sewers - Flow Alterations ; Road Runoff - Cause Unknown	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004157	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23004	41.31962047	-75.80061341	Susquehanna River	WWF	No	<Null>	408	Non-Attaining	Abandoned Mine Drainage - Metals	Scranton, PA	City of Wilkes-Barre-Susquehanna River	020501070205	02050107001373	N/A	Susquehanna River PCB	PCB	N/A	N/A	N/A
23005	41.32091697	-75.74868809	Mill Creek	CWF	No	<Null>	409	Non-Attaining	Urban Runoff/Storm Sewers - Flow Alterations ; Road Runoff - Cause Unknown	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004157	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23006	41.32454672	-75.73658525	Lidy Creek	CWF	No	<Null>	409	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107001014	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23007	41.32492522	-75.73510638	Lidy Creek	CWF	No	<Null>	409	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107001014	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23008	41.32767025	-75.72487663	Lidy Creek	CWF	Yes	1127	409	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107001014	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23009	41.32769095	-75.72487144	Lidy Creek	CWF	Yes	1127	409	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107001014	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23010	41.32795658	-75.72562013	Lidy Creek	CWF	Yes	1127	409	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107001014	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23011	41.32817734	-75.72695592	Lidy Creek	CWF	No	1127	409	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107001014	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23012	41.32824225	-75.7278375	Lidy Creek	CWF	No	1126	409	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107001014	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23013	41.33626961	-75.71134013	UNT to Spring Brook	HQ-CWF (HIGH QUALITY-COLD WATER FISHES)	Yes	1129	409	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107002698	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23014	41.33656172	-75.71063595	UNT to Spring Brook	HQ-CWF (HIGH QUALITY-COLD WATER FISHES)	Yes	1129	409	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107002698	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23015	41.34035926	-75.70647977	UNT to Spring Brook	HQ-CWF (HIGH QUALITY-COLD WATER FISHES)	Yes	1129	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107002698	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23016	41.3421708	-75.70648823	Spring Brook	CWF	Yes	1130	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23017	41.3444766	-75.70801971	Spring Brook	CWF	Yes	1130	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23018	41.34644723	-75.70928783	Spring Brook	CWF	Yes	1130	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23019	41.34654898	-75.70929008	Spring Brook	CWF	Yes	1130	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23020	41.34680901	-75.70937721	Spring Brook	CWF	Yes	1130	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23021	41.34706408	-75.7094578	Spring Brook	CWF	Yes	1130	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23022	41.3472884	-75.70962358	Spring Brook	CWF	Yes	1130	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23023	41.34751866	-75.70990532	Spring Brook	CWF	Yes	1130	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23024	41.34774313	-75.71023301	Spring Brook	CWF	Yes	1130	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23025	41.34955464	-75.71181158	Spring Brook	CWF	No	1131	410	Non-Attaining	N/A	Scranton, PA	Spring Brook	020501070108	02050107000363	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
23026	41.35111338	-75.70934497	Stafford Meadow Brook	CWF	No	1131	410	Non-Attaining	Land Development - Water/Flow Variability ; Upstream Impoundment - Cause Unknown	Scranton, PA	Spring Brook	020501070108	02050107004154	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23027	41.3521703	-75.71156705	Stafford Meadow Brook	CWF	No	1131	410	Non-Attaining	Land Development - Water/Flow Variability ; Upstream Impoundment - Cause Unknown	Scranton, PA	Spring Brook	020501070108	02050107004154	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23028	41.35259424	-75.7133569	Stafford Meadow Brook	CWF	No	1131	410	Non-Attaining	Land Development - Water/Flow Variability ; Upstream Impoundment - Cause Unknown	Scranton, PA	Spring Brook	020501070108	02050107000362	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23029	41.35260454	-75.7121873	Stafford Meadow Brook	CWF	Yes	1131	410	Non-Attaining	Land Development - Water/Flow Variability ; Upstream Impoundment - Cause Unknown	Scranton, PA	Spring Brook	020501070108	02050107004154	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23030	41.3530093	-75.71384029	Stafford Meadow Brook	CWF	No	1131	410	Non-Attaining	Source Unknown - Cause Unknown	Scranton, PA	Spring Brook	020501070108	02050107000362	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23031	41.35328889	-75.71454169	Stafford Meadow Brook	CWF	No	1131	410	Non-Attaining	Land Development - Water/Flow Variability ; Upstream Impoundment - Cause Unknown	Scranton, PA	Spring Brook	020501070108	02050107000362	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23032	41.35387894	-75.71460996	Stafford Meadow Brook	CWF	No	1131	410	Non-Attaining	Source Unknown - Cause Unknown	Scranton, PA	Spring Brook	020501070108	02050107000362	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23033	41.35406089	-75.71490478	Stafford Meadow Brook	CWF	No	1131	410	Non-Attaining	Source Unknown - Cause Unknown	Scranton, PA	Spring Brook	020501070108	02050107000362	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23034	41.35440835	-75.71539496	Stafford Meadow Brook	CWF	No	1132	410	Non-Attaining	Source Unknown - Cause Unknown	Scranton, PA	Spring Brook	020501070108	02050107000362	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23035	41.36024535	-75.72373252	Lackawanna River	CWF	No	<Null>	410	Non-Attaining	Urban Runoff/Storm Sewers - Pathogens ; Combined Sewer Overflow - Pathogens	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000109	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23036	41.36132568	-75.72404648	Lackawanna River	CWF	No	<Null>	410	Non-Attaining	Urban Runoff/Storm Sewers - Pathogens ; Combined Sewer Overflow - Pathogens	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000109	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23037	41.36508726	-75.72345507	Lackawanna River	CWF	No	<Null>	410	Non-Attaining	Urban Runoff/Storm Sewers - Pathogens ; Combined Sewer Overflow - Pathogens	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000109	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23038	41.36848689	-75.72183844	Lackawanna River	CWF	No	1134	410	Non-Attaining	Urban Runoff/Storm Sewers - Pathogens ; Combined Sewer Overflow - Pathogens	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000109	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23039	41.36918596	-75.72190937	Lackawanna River	CWF	No	1134	410	Non-Attaining	Urban Runoff/Storm Sewers - Pathogens ; Combined Sewer Overflow - Pathogens	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000109	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23040	41.37235644	-75.72212377	Lackawanna River	CWF	No	1134	411	Non-Attaining	Urban Runoff/Storm Sewers - Pathogens ; Combined Sewer Overflow - Pathogens	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000109	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23041	41.37509823	-75.72027098	Lackawanna River	CWF	Yes	1135	411	Non-Attaining	Urban Runoff/Storm Sewers - Pathogens ; Combined Sewer Overflow - Pathogens	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000109	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23042	41.37598421	-75.71941853	Lackawanna River	CWF	No	1135	411	Non-Attaining	Urban Runoff/Storm Sewers - Pathogens ; Combined Sewer Overflow - Pathogens	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000109	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23043	41.38533566	-75.73121649	UNT to Saint Johns Creek	CWF	No	1136	411	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107002604	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23044	41.38562479	-75.73157626	UNT to Saint Johns Creek	CWF	No	1136	411	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107002604	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23045	41.38622362	-75.73228204	UNT to Saint Johns Creek	CWF	No	1137	411	Non-Attaining	N/A	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107002604	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23046	41.3869649	-75.73349343	Saint Johns Creek	CWF	No	1137	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107001015	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23047	41.38864783	-75.73377659	Saint Johns Creek	CWF	Yes	1137	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107001015	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23048	41.39067864	-75.73346609	Saint Johns Creek	CWF	Yes	1137	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23049	41.39123245	-75.73306918	Saint Johns Creek	CWF	Yes	1137	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23050	41.39185223	-75.73282333	Saint Johns Creek	CWF	Yes	1137	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23051	41.39245768	-75.73257717	Saint Johns Creek	CWF	Yes	1137	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23052	41.39255154	-75.7324997	Saint Johns Creek	CWF	Yes	1137	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23053	41.39300493	-75.73162462	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23054	41.39378039	-75.73133839	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23055	41.39400162	-75.7320743	UNT to Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Non-Urban	Lackawanna River-Susquehanna River	020501070110	02050107001017	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23056	41.39406293	-75.73127935	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23057	41.39452648	-75.7312284	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Non-Urban	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23058	41.39514286	-75.73097848	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
23059	41.3959389	-75.73076979	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23060	41.39619143	-75.73070809	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23061	41.39645742	-75.7306318	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23062	41.39651307	-75.7306074	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23063	41.39732956	-75.72997943	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23064	41.39753126	-75.72972442	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23065	41.39778052	-75.7293056	Saint Johns Creek	CWF	No	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23066	41.39832446	-75.72899531	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23067	41.39849686	-75.72900953	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23068	41.39936358	-75.72913083	Saint Johns Creek	CWF	Yes	1138	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23069	41.3996943	-75.72888393	Saint Johns Creek	CWF	Yes	1139	411	Non-Attaining	Abandoned Mine Drainage - Siltation ; Abandoned Mine Drainage - Flow Alterations	Scranton, PA	Lackawanna River-Susquehanna River	020501070110	02050107004153	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23070	41.41468456	-75.70985827	Lucky Run	CWF	No	<Null>	412	Non-Attaining	N/A	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107001011	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23071	41.41550978	-75.71031181	Lucky Run	CWF	No	<Null>	412	Non-Attaining	N/A	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107001011	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23072	41.41645004	-75.71285518	Lucky Run	CWF	No	<Null>	412	Non-Attaining	N/A	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107001011	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23073	41.41709974	-75.7137402	Lucky Run	CWF	No	1142	412	Non-Attaining	N/A	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107001011	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23074	41.41927585	-75.71631901	Lucky Run	CWF	Yes	1142	412	Non-Attaining	N/A	Non-Urban	City of Scranton-Lackawanna River	020501070109	02050107001011	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23075	41.41931215	-75.71625141	Lucky Run	CWF	Yes	1142	412	Non-Attaining	N/A	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107001011	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23076	41.42232325	-75.69208712	Keyser Creek	CWF	No	<Null>	412	Non-Attaining	Abandoned Mine Drainage - Cause Unknown ; Abandoned Mine Drainage - Metals ; Abandoned Mine Drainage - pH	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000298	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23077	41.42499331	-75.71030116	Lindy Creek	CWF	Yes	1143	412	Non-Attaining	N/A	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107001010	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23078	41.42530788	-75.71099681	Lindy Creek	CWF	Yes	1143	412	Non-Attaining	N/A	Non-Urban	City of Scranton-Lackawanna River	020501070109	02050107001010	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23079	41.42531654	-75.71098389	Lindy Creek	CWF	Yes	1143	412	Non-Attaining	N/A	Non-Urban	City of Scranton-Lackawanna River	020501070109	02050107001010	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23080	41.42555337	-75.71062321	UNT to Lindy Creek	CWF	Yes	1143	412	Non-Attaining	N/A	Non-Urban	City of Scranton-Lackawanna River	020501070109	02050107002552	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23081	41.42578288	-75.71038894	UNT to Lindy Creek	CWF	Yes	1143	412	Non-Attaining	N/A	Non-Urban	City of Scranton-Lackawanna River	020501070109	02050107002552	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23082	41.42584879	-75.71031666	UNT to Lindy Creek	CWF	Yes	1143	412	Non-Attaining	N/A	Non-Urban	City of Scranton-Lackawanna River	020501070109	02050107002552	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23083	41.43527524	-75.69917598	Keyser Creek	CWF	No	1145	412	Non-Attaining	Abandoned Mine Drainage - Cause Unknown ; Abandoned Mine Drainage - Metals ; Abandoned Mine Drainage - pH	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000298	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23084	41.42844234	-75.68996448	Keyser Creek	CWF	No	<Null>	412	Non-Attaining	Abandoned Mine Drainage - Cause Unknown ; Abandoned Mine Drainage - Metals ; Abandoned Mine Drainage - pH	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000298	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23085	41.43380291	-75.69574693	Keyser Creek	CWF	No	<Null>	412	Non-Attaining	Abandoned Mine Drainage - Cause Unknown ; Abandoned Mine Drainage - Metals ; Abandoned Mine Drainage - pH	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000298	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23086	41.42711178	-75.68780718	Keyser Creek	CWF	No	<Null>	412	Non-Attaining	Abandoned Mine Drainage - Cause Unknown ; Abandoned Mine Drainage - Metals ; Abandoned Mine Drainage - pH	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000298	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23087	41.43637556	-75.70065663	Keyser Creek	CWF	No	1145	412	Non-Attaining	Abandoned Mine Drainage - Cause Unknown ; Abandoned Mine Drainage - Metals ; Abandoned Mine Drainage - pH	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000298	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23088	41.43752469	-75.70173465	Keyser Creek	CWF	Yes	1145	412	Non-Attaining	Abandoned Mine Drainage - Cause Unknown ; Abandoned Mine Drainage - Metals ; Abandoned Mine Drainage - pH	Scranton, PA	City of Scranton-Lackawanna River	020501070109	02050107000298	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23090	41.45148667	-75.6857994	South Branch Leach Creek	TSF	No	1147	413	Non-Attaining	N/A	Scranton, PA	Leggetts Creek	020501070105	02050107002504	N/A	N/A	N/A	N/A	N/A	N/A
23091	41.45151385	-75.68573197	South Branch Leach Creek	TSF	No	1147	413	Non-Attaining	N/A	Scranton, PA	Leggetts Creek	020501070105	02050107002504	N/A	N/A	N/A	N/A	N/A	N/A
23092	41.45167321	-75.68600033	South Branch Leach Creek	TSF	No	1147	413	Non-Attaining	N/A	Scranton, PA	Leggetts Creek	020501070105	02050107002504	N/A	N/A	N/A	N/A	N/A	N/A
23093	41.45173719	-75.68713694	South Branch Leach Creek	TSF	Yes	1147	413	Non-Attaining	N/A	Non-Urban	Leggetts Creek	020501070105	02050107002504	N/A	N/A	N/A	N/A	N/A	N/A
23094	41.45174508	-75.68721235	South Branch Leach Creek	TSF	Yes	1147	413	Non-Attaining	N/A	Non-Urban	Leggetts Creek	020501070105	02050107002504	N/A	N/A	N/A	N/A	N/A	N/A

PTC MS4
Chesapeake Bay Drainage Basin
RECEIVING WATERS TABLE
8/31/2022

SEWERSHED NUMBER	OUTFALL LATITUDE (Decimal Degrees)	OUTFALL LONGITUDE (Decimal Degrees)	STREAM NAME	DESIGNATED USE (Chapter 93)	WITHIN PTC BOUNDARY	MAP NUMBER (100 Scale)	MAP NUMBER (500 Scale)	NON-ATTAINING STATUS	POLLUTANT NAME (Source-Cause)	URBANIZED AREA (2010)	HUC12 NAME	HUC12 CODE	REACH CODE	Approved TMDL	TMDL NAME	TMDL CAUSE	TMDL SPECIFIC	TMDL GENERAL	WLA
23095	41.45746017	-75.68334478	Leach Creek	TSF	No	<Null>	413	Non-Attaining	N/A	Scranton, PA	Leggetts Creek	020501070105	02050107002502	N/A	N/A	N/A	N/A	N/A	N/A
23096	41.45772529	-75.68365936	Leach Creek	TSF	No	1148	413	Non-Attaining	N/A	Scranton, PA	Leggetts Creek	020501070105	02050107002504	N/A	N/A	N/A	N/A	N/A	N/A
23097	41.45783762	-75.68374693	Leach Creek	TSF	No	1148	413	Non-Attaining	N/A	Scranton, PA	Leggetts Creek	020501070105	02050107002502	N/A	N/A	N/A	N/A	N/A	N/A
23098	41.45797131	-75.68382417	Leach Creek	TSF	No	1148	413	Non-Attaining	N/A	Scranton, PA	Leggetts Creek	020501070105	02050107002502	N/A	N/A	N/A	N/A	N/A	N/A
23099	41.4580517	-75.68373771	Leach Creek	TSF	No	1148	413	Non-Attaining	N/A	Scranton, PA	Leggetts Creek	020501070105	02050107002502	N/A	N/A	N/A	N/A	N/A	N/A
23100	41.47111415	-75.70050507	Summit Lake Creek	TSF	No	1151	414	Non-Attaining	Highway, Road, Bridge Const. - Siltation ; Upstream Impoundment - Thermal Modifications	Non-Urban	Leggetts Creek	020501070105	02050107002484	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23101	41.4717569	-75.70257768	Summit Lake Creek	TSF	No	1151	414	Non-Attaining	Highway, Road, Bridge Const. - Siltation ; Upstream Impoundment - Thermal Modifications	Scranton, PA	Leggetts Creek	020501070105	02050107002484	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23102	41.47230035	-75.70308695	Summit Lake Creek	TSF	No	1151	414	Non-Attaining	Highway, Road, Bridge Const. - Siltation ; Upstream Impoundment - Thermal Modifications	Non-Urban	Leggetts Creek	020501070105	02050107002484	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23103	41.47253219	-75.70305258	Summit Lake Creek	TSF	No	1151	414	Non-Attaining	Highway, Road, Bridge Const. - Siltation ; Upstream Impoundment - Thermal Modifications	Non-Urban	Leggetts Creek	020501070105	02050107002484	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23104	41.4729003	-75.70330314	Summit Lake Creek	TSF	Yes	1151	414	Non-Attaining	Highway, Road, Bridge Const. - Siltation ; Upstream Impoundment - Thermal Modifications	Scranton, PA	Leggetts Creek	020501070105	02050107002484	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23105	41.47324709	-75.70438628	Summit Lake Creek	TSF	Yes	1151	414	Non-Attaining	Highway, Road, Bridge Const. - Siltation ; Upstream Impoundment - Thermal Modifications	Non-Urban	Leggetts Creek	020501070105	02050107002484	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23106	41.47327167	-75.70439613	Summit Lake Creek	TSF	Yes	1151	414	Non-Attaining	Highway, Road, Bridge Const. - Siltation ; Upstream Impoundment - Thermal Modifications	Scranton, PA	Leggetts Creek	020501070105	02050107002486	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23107	41.47435748	-75.70385069	UNT to Summit Lake Creek	TSF	No	1151	414	Non-Attaining	N/A	Scranton, PA	Leggetts Creek	020501070105	02050107002486	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23108	41.47961774	-75.68698057	UNT to Summit Lake Creek	TSF	Yes	1156	414	Non-Attaining	Urban Runoff/Storm Sewers - Water/Flow Variability ; Small Residential Runoff - Flow Alterations ; Hydromodification - Cause Unknown	Scranton, PA	Leggetts Creek	020501070105	02050107002476	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23109	41.48092516	-75.68236164	Leggetts Creek	CWF	No	1156	414	Non-Attaining	Urban Runoff/Storm Sewers - Siltation	Scranton, PA	Leggetts Creek	020501070105	02050107000305	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23110	41.48149857	-75.68195562	Leggetts Creek	CWF	No	1156	414	Non-Attaining	Urban Runoff/Storm Sewers - Siltation	Scranton, PA	Leggetts Creek	020501070105	02050107000306	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23111	41.48267835	-75.68119058	Leggetts Creek	CWF	No	1155	414	Non-Attaining	Urban Runoff/Storm Sewers - Siltation	Scranton, PA	Leggetts Creek	020501070105	02050107000306	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23112	41.48375676	-75.69052635	UNT to Summit Lake Creek	TSF	Yes	1153	414	Non-Attaining	Urban Runoff/Storm Sewers - Water/Flow Variability ; Small Residential Runoff - Flow Alterations ; Hydromodification - Cause Unknown	Scranton, PA	Leggetts Creek	020501070105	02050107002471	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23113	41.4838149	-75.69056755	UNT to Summit Lake Creek	TSF	Yes	1153	414	Non-Attaining	Urban Runoff/Storm Sewers - Water/Flow Variability ; Small Residential Runoff - Flow Alterations ; Hydromodification - Cause Unknown	Scranton, PA	Leggetts Creek	020501070105	02050107002471	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23114	41.48458622	-75.68038153	UNT to Leggetts Creek	CWF	No	1155	414	Non-Attaining	Urban Runoff/Storm Sewers - Siltation	Scranton, PA	Leggetts Creek	020501070105	02050107000307	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23115	41.48562763	-75.6804673	UNT to Leggetts Creek	CWF	No	1155	414	Non-Attaining	Urban Runoff/Storm Sewers - Siltation	Scranton, PA	Leggetts Creek	020501070105	02050107000307	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23116	41.48640918	-75.68043214	UNT to Leggetts Creek	CWF	No	1155	414	Non-Attaining	Urban Runoff/Storm Sewers - Siltation	Scranton, PA	Leggetts Creek	020501070105	02050107000307	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23117	41.48738754	-75.68031012	UNT to Leggetts Creek	CWF	No	1155	414	Non-Attaining	Urban Runoff/Storm Sewers - Siltation	Scranton, PA	Leggetts Creek	020501070105	02050107000307	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC
23118	41.48928041	-75.68127669	UNT to Leggetts Creek	CWF	No	1154	414	Non-Attaining	Urban Runoff/Storm Sewers - Siltation	Scranton, PA	Leggetts Creek	020501070105	02050107000307	Yes	Lackawanna River Watershed	Metals ; pH	Yes	N/A	No WLA for PTC

APPENDIX C
MAP LAYERS AND DATA SOURCES

PENNSYLVANIA TURNPIKE COMMISSSION

MS4 Map Layers and Data Sources

LAYER	SOURCE
2010 Urbanized Area	PA DEP (Referenced to US Census Bureau)
Basemap	Microsoft Bing Aerial photography
BMP -Existing	Skelly and Loy, Inc.
Discharge Point	Skelly and Loy, Inc.
Discharge Point Other	Skelly and Loy, Inc.
Elevation Data (contours)	PA DCNR
Flow Arrows	Skelly and Loy, Inc.
Inlets	PTC Record Drawings, Skelly and Loy, Inc.
Inlets - Other	PTC Record Drawings, Skelly and Loy, Inc.
Intake Points	PTC Record Drawings, Skelly and Loy, Inc.
Intake Points-Other	PTC Record Drawings, Skelly and Loy, Inc.
Lakes	Pennsylvania Fish and Boat Commission
Manholes	PTC Record Drawings, Skelly and Loy, Inc.
PTC Boundary	PTC Record Drawings, Skelly and Loy, Inc.
Municipal Boundaries	Penn DOT
NWI (Wetlands)	US Fish and Wildlife Service
Observation Points	Skelly and Loy, Inc.
Outfall - Impaired	PTC Record Drawings, Skelly and Loy, Inc.
Outfall - Unimpaired	PTC Record Drawings, Skelly and Loy, Inc.
Parcels	PTC
Pipes	PTC Record Drawings, Skelly and Loy, Inc.
Pipes-Other	PTC Record Drawings, Skelly and Loy, Inc.
Planning Area	Skelly and Loy, Inc.
Proposed BMPs	Skelly and Loy, Inc.
Proposed Drainage Area	Skelly and Loy, Inc.
Rain Traces	Skelly and Loy, Inc.
Storm Sewershed - Impaired	Skelly and Loy, Inc.
Storm Sewershed - Unimpaired	Skelly and Loy, Inc.
Stream	PA DEP
Stream Impaired	PA DEP
Surface Water Conveyance	PTC Record Drawings, Skelly and Loy, Inc.

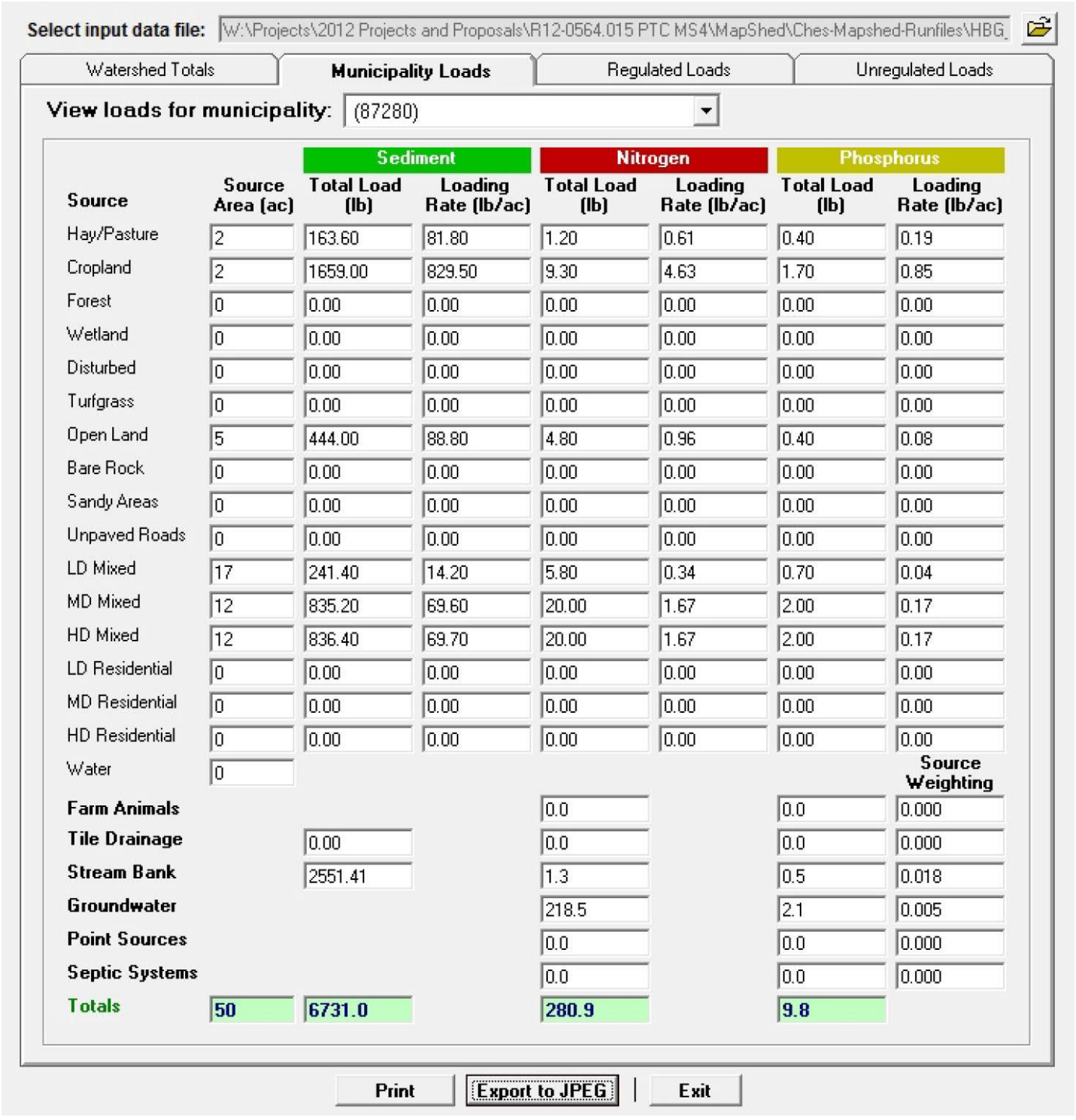
1. The projection of information shown on the Maps is NAD 1983 State Plane Pennsylvania South US Feet

APPENDIX D
MAPSHED URBAN AREA TOOL RESULTS

APPENDIX D1
PLANNING AREA LOADS

MapShed Results

ALEXANDERS SPRING CREEK PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

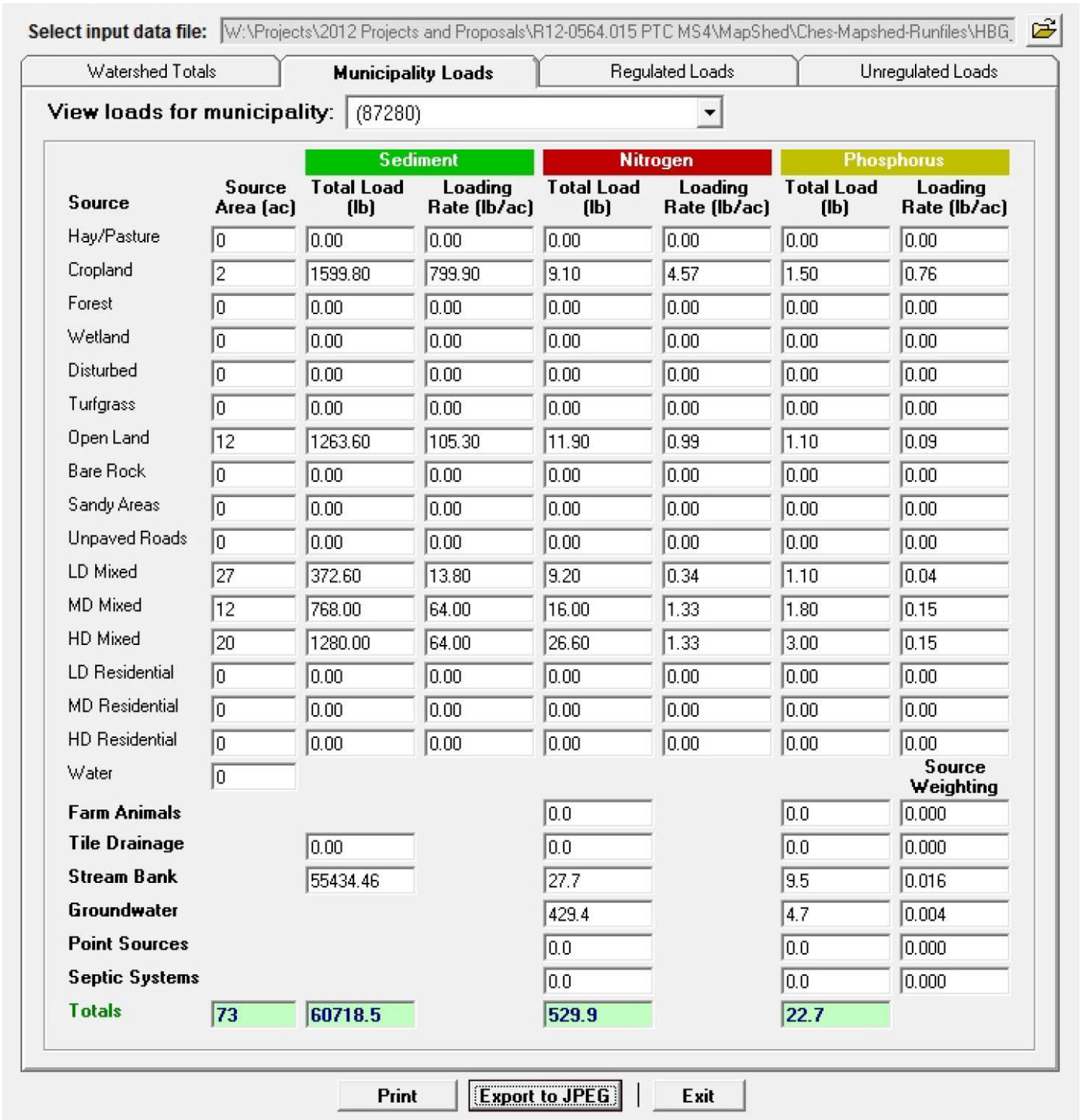
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	2	163.60	81.80	1.20	0.61	0.40	0.19
Cropland	2	1659.00	829.50	9.30	4.63	1.70	0.85
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	5	444.00	88.80	4.80	0.96	0.40	0.08
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	17	241.40	14.20	5.80	0.34	0.70	0.04
MD Mixed	12	835.20	69.60	20.00	1.67	2.00	0.17
HD Mixed	12	836.40	69.70	20.00	1.67	2.00	0.17
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		2551.41		1.3		0.5	0.018
Groundwater				218.5		2.1	0.005
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	50	6731.0		280.9		9.8	

Print | Export to JPEG | Exit

MapShed Results

WERTZ – CONODOGUINET CREEK
PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	2	1599.80	799.90	9.10	4.57	1.50	0.76
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	12	1263.60	105.30	11.90	0.99	1.10	0.09
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	27	372.60	13.80	9.20	0.34	1.10	0.04
MD Mixed	12	768.00	64.00	16.00	1.33	1.80	0.15
HD Mixed	20	1280.00	64.00	26.60	1.33	3.00	0.15
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		55434.46		27.7		9.5	0.016
Groundwater				429.4		4.7	0.004
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	73	60718.5		529.9		22.7	

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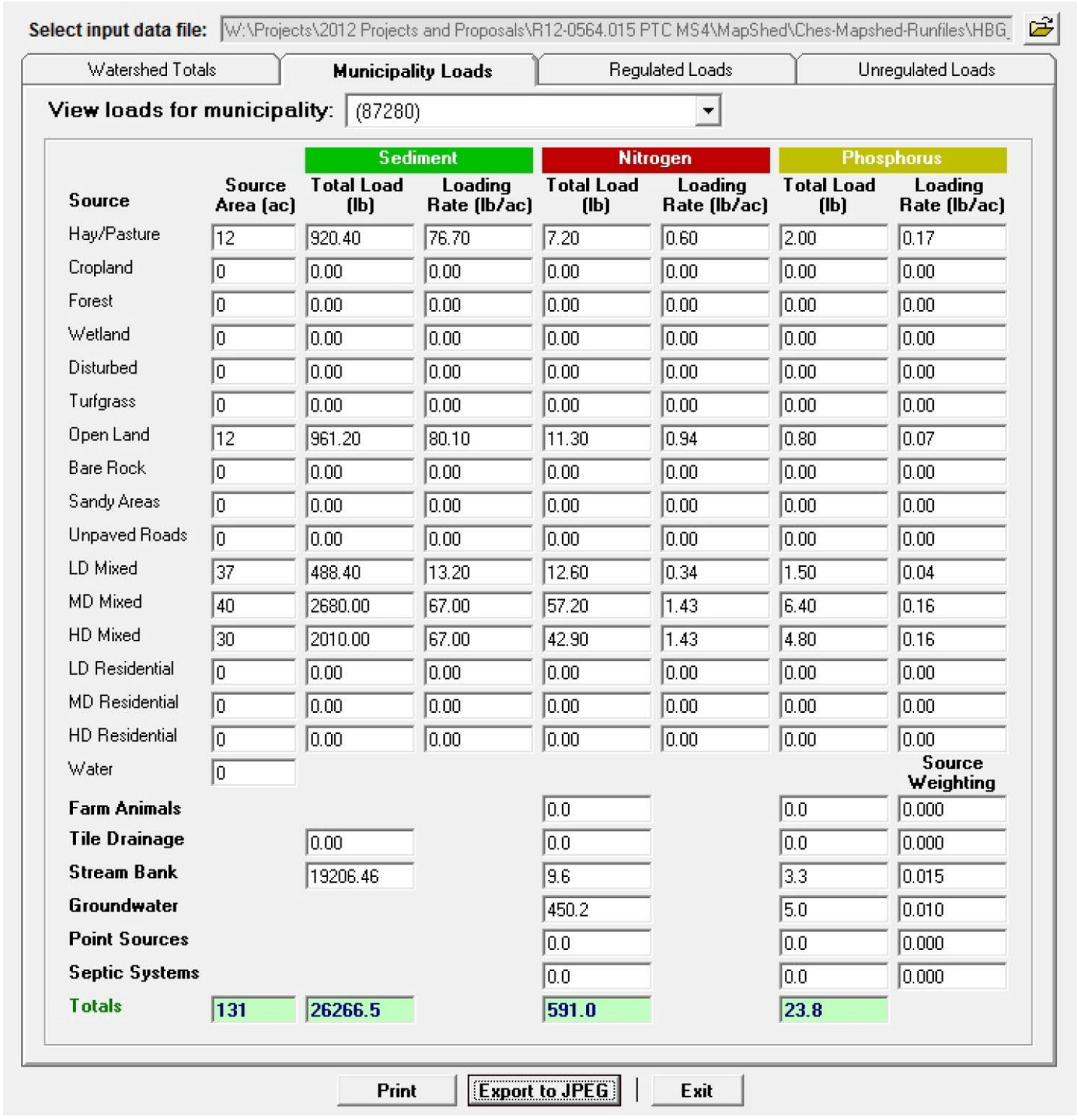
MapShed Results

LETORT SPRING RUN PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

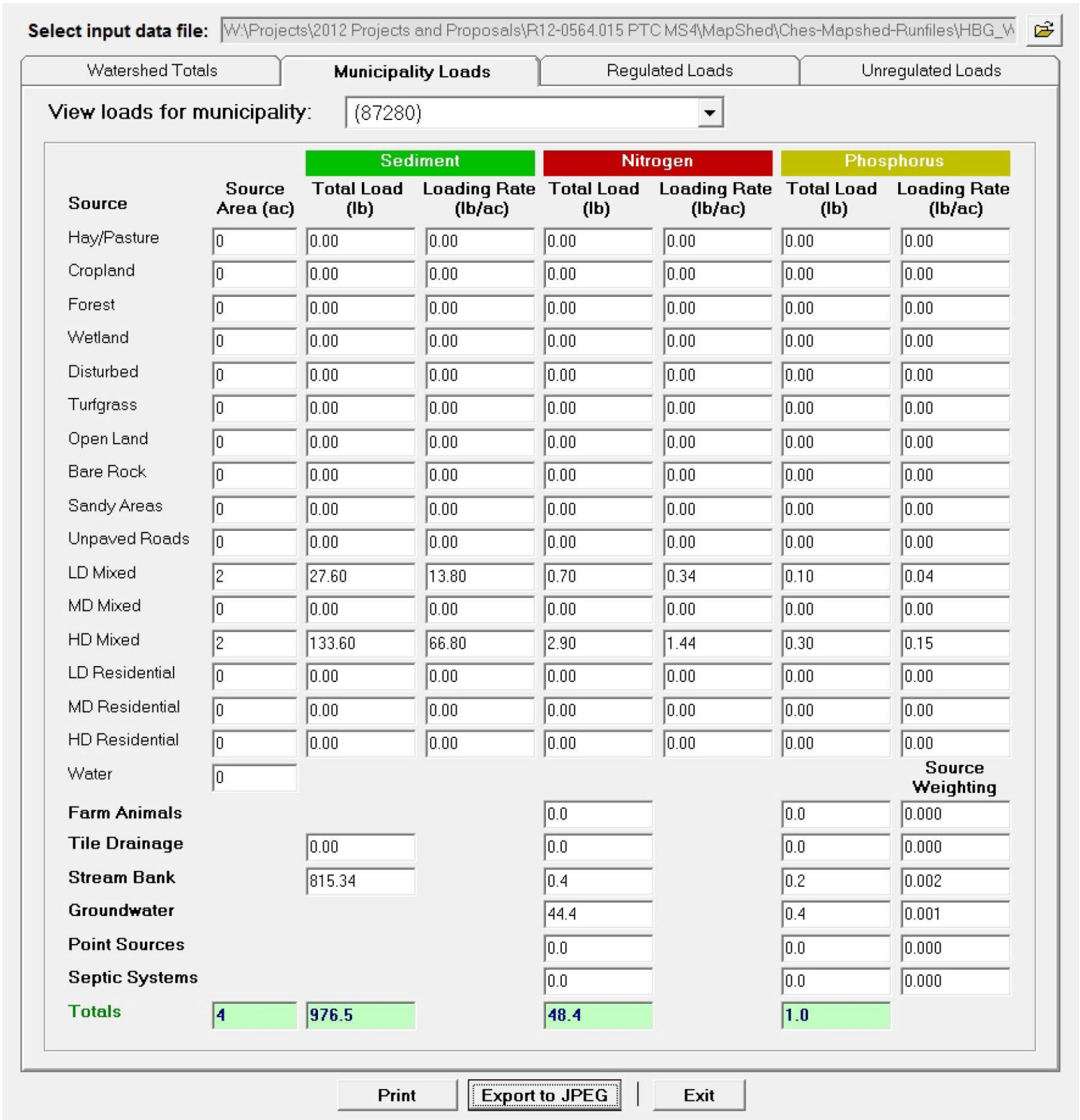
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	12	920.40	76.70	7.20	0.60	2.00	0.17
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	12	961.20	80.10	11.30	0.94	0.80	0.07
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	37	488.40	13.20	12.60	0.34	1.50	0.04
MD Mixed	40	2680.00	67.00	57.20	1.43	6.40	0.16
HD Mixed	30	2010.00	67.00	42.90	1.43	4.80	0.16
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		19206.46		9.6		3.3	0.015
Groundwater				450.2		5.0	0.010
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	131	26266.5		591.0		23.8	

Print | Export to JPEG | Exit

MapShed Results

HOGESTOWN RUN PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

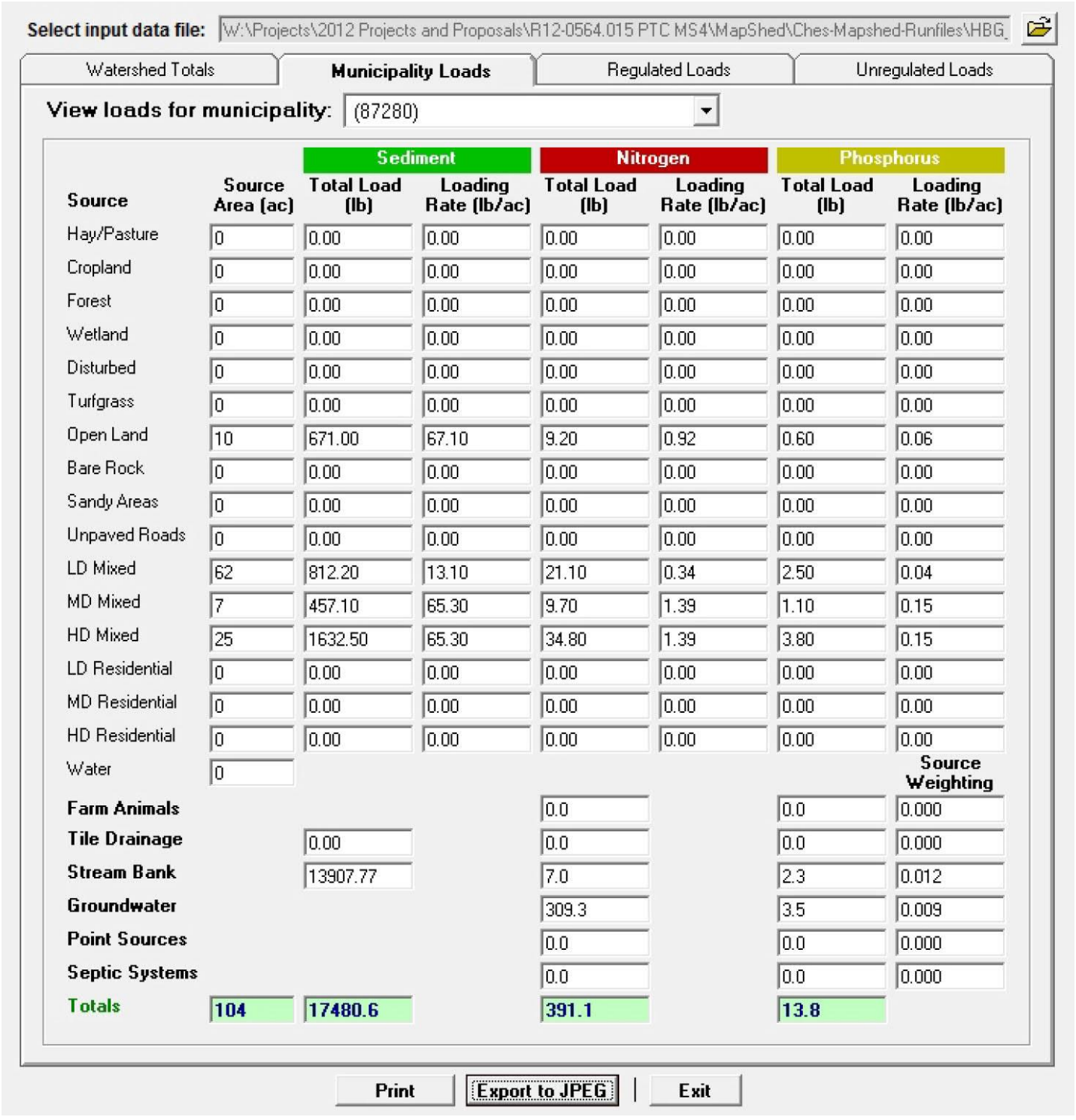
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	0	0.00	0.00	0.00	0.00	0.00	0.00
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	2	27.60	13.80	0.70	0.34	0.10	0.04
MD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Mixed	2	133.60	66.80	2.90	1.44	0.30	0.15
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		815.34		0.4		0.2	0.002
Groundwater				44.4		0.4	0.001
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	4	976.5		48.4		1.0	

Print | Export to JPEG | Exit

MapShed Results

TRINDLE SPRING RUN PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

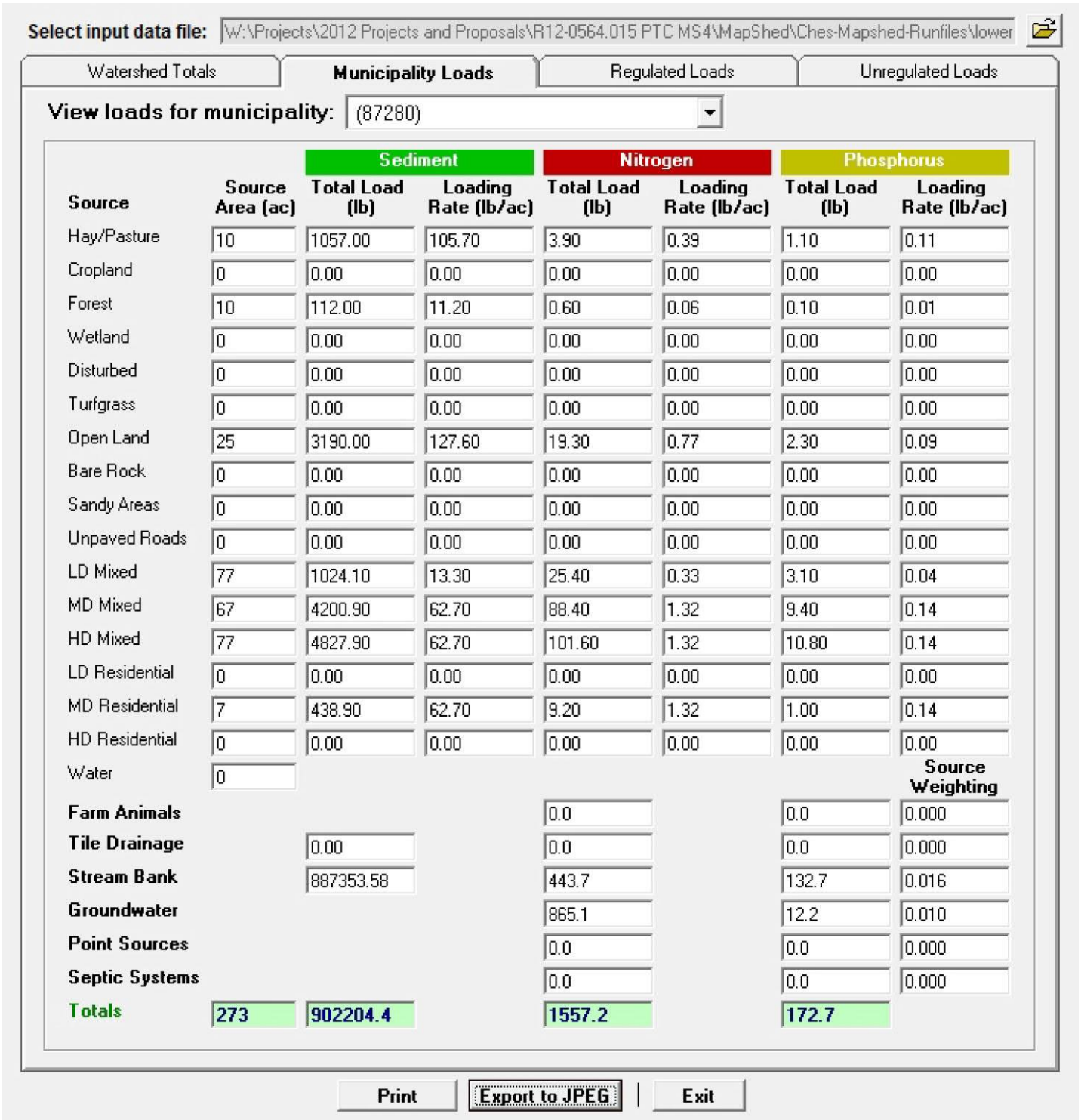
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	10	671.00	67.10	9.20	0.92	0.60	0.06
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	62	812.20	13.10	21.10	0.34	2.50	0.04
MD Mixed	7	457.10	65.30	9.70	1.39	1.10	0.15
HD Mixed	25	1632.50	65.30	34.80	1.39	3.80	0.15
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		13907.77		7.0		2.3	0.012
Groundwater				309.3		3.5	0.009
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	104	17480.6		391.1		13.8	

Print | Export to JPEG | Exit

MapShed Results

LOWER YELLOW BREECHES CREEK PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	10	1057.00	105.70	3.90	0.39	1.10	0.11
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	10	112.00	11.20	0.60	0.06	0.10	0.01
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	25	3190.00	127.60	19.30	0.77	2.30	0.09
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	77	1024.10	13.30	25.40	0.33	3.10	0.04
MD Mixed	67	4200.90	62.70	88.40	1.32	9.40	0.14
HD Mixed	77	4827.90	62.70	101.60	1.32	10.80	0.14
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	7	438.90	62.70	9.20	1.32	1.00	0.14
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		887353.58		443.7		132.7	0.016
Groundwater				865.1		12.2	0.010
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	273	902204.4		1557.2		172.7	

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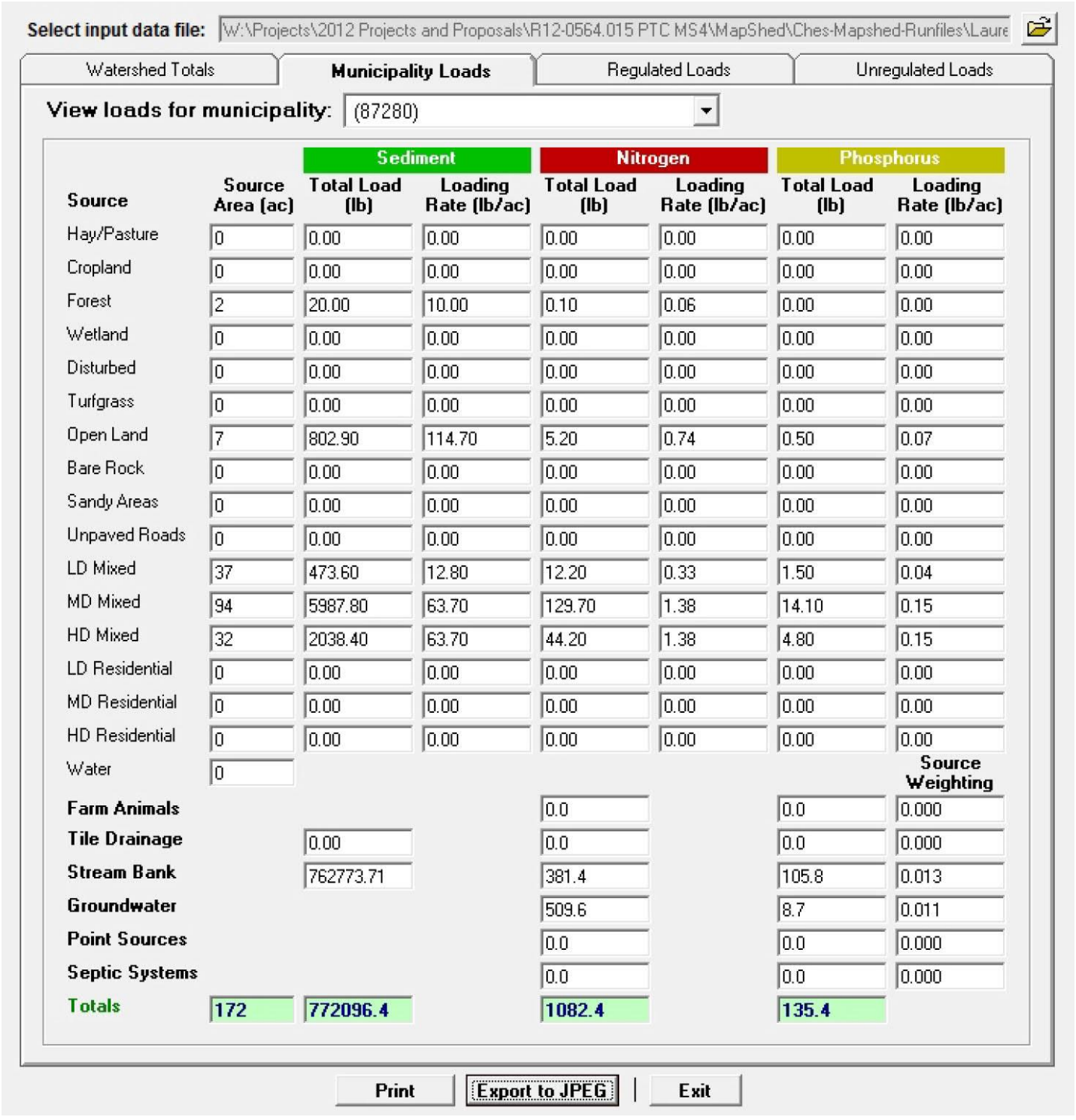
MapShed Results

LAUREL RUN – SUSQUEHANNA RIVER PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

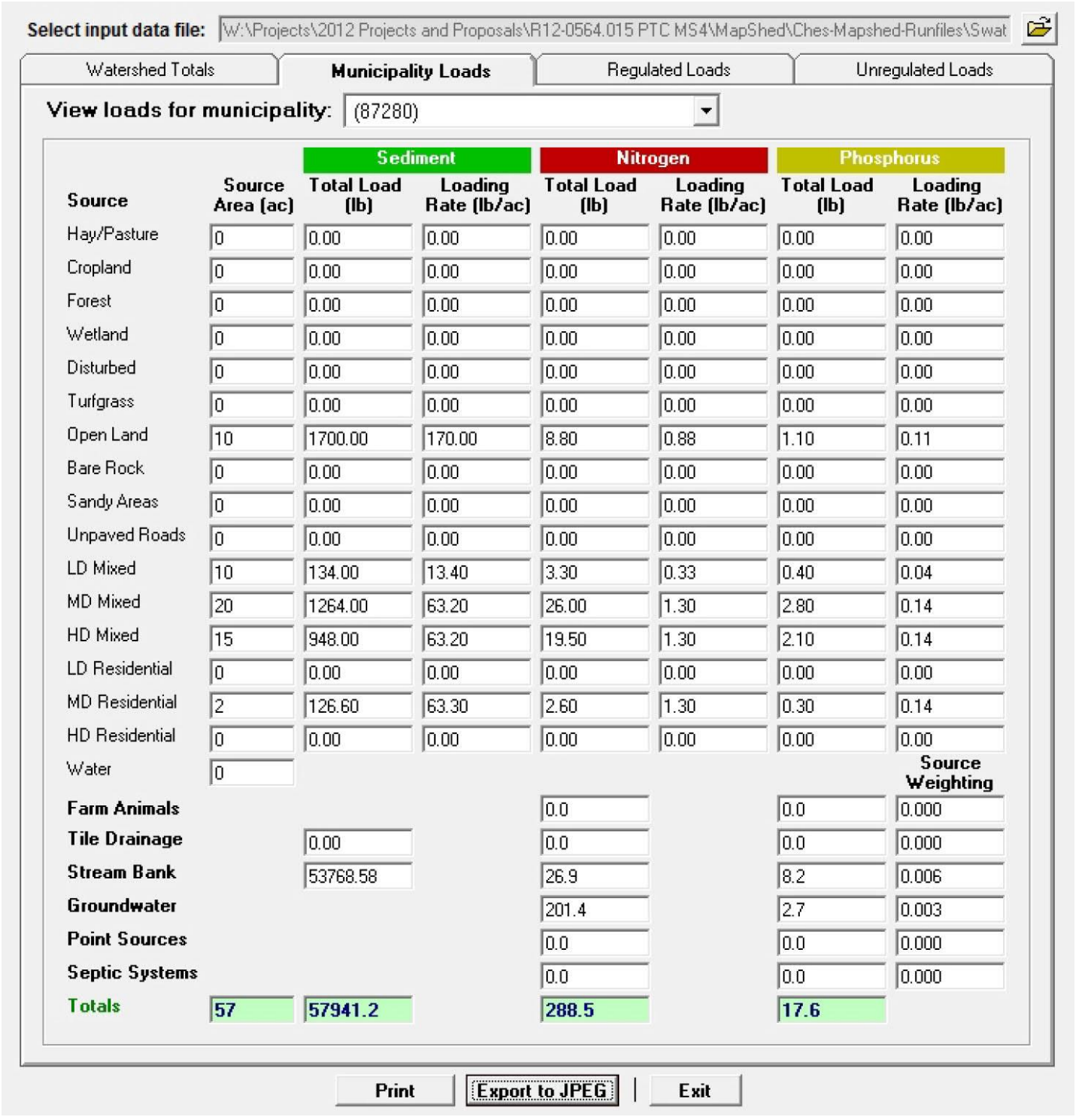
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	2	20.00	10.00	0.10	0.06	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	7	802.90	114.70	5.20	0.74	0.50	0.07
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	37	473.60	12.80	12.20	0.33	1.50	0.04
MD Mixed	94	5987.80	63.70	129.70	1.38	14.10	0.15
HD Mixed	32	2038.40	63.70	44.20	1.38	4.80	0.15
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		762773.71		381.4		105.8	0.013
Groundwater				509.6		8.7	0.011
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	172	772096.4		1082.4		135.4	

Print | Export to JPEG | Exit

MapShed Results

SWATARA CREEK – SUSQUEHANNA RIVER PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

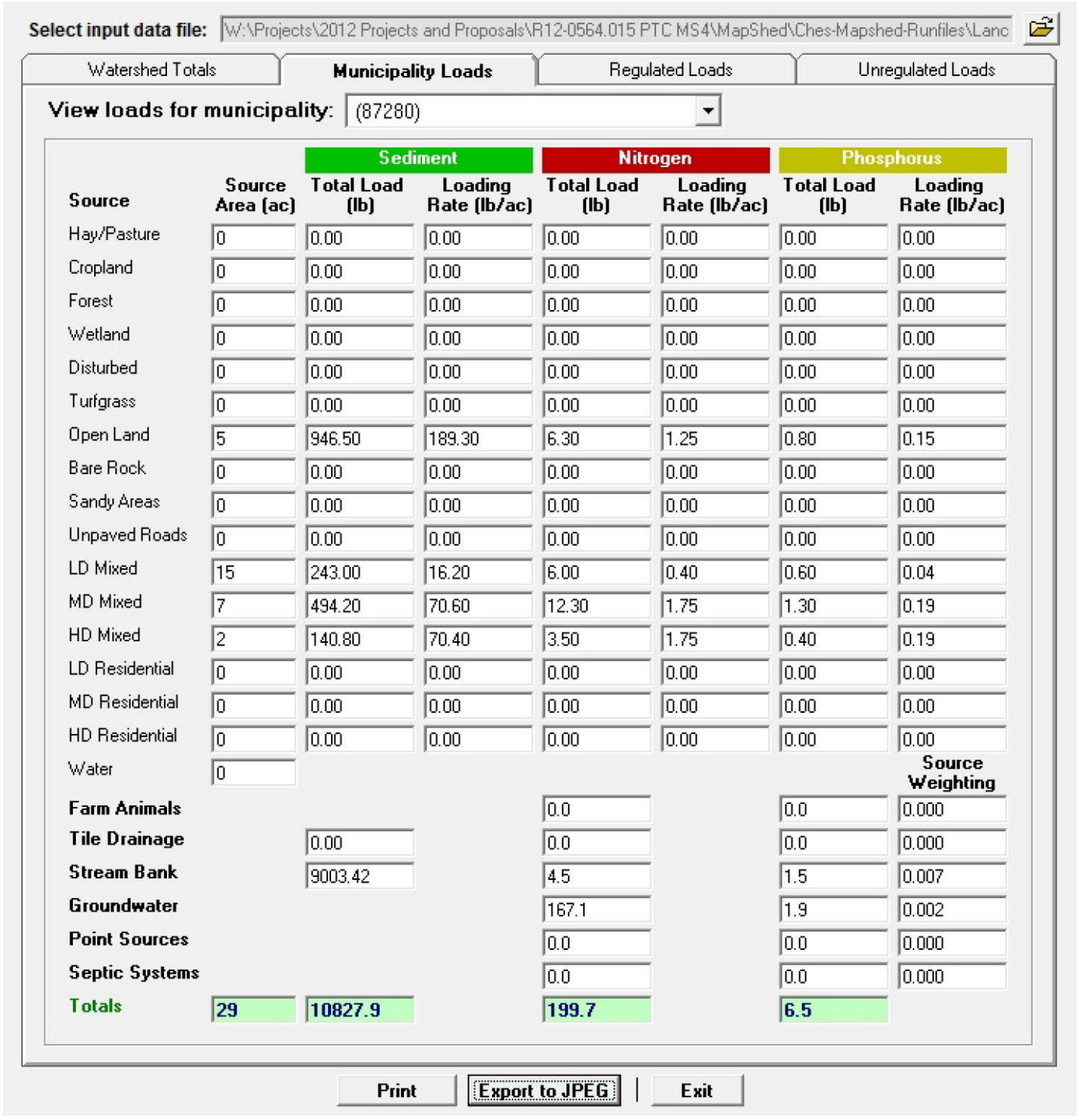
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	10	1700.00	170.00	8.80	0.88	1.10	0.11
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	10	134.00	13.40	3.30	0.33	0.40	0.04
MD Mixed	20	1264.00	63.20	26.00	1.30	2.80	0.14
HD Mixed	15	948.00	63.20	19.50	1.30	2.10	0.14
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	2	126.60	63.30	2.60	1.30	0.30	0.14
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		53768.58		26.9		8.2	0.006
Groundwater				201.4		2.7	0.003
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	57	57941.2		288.5		17.6	

Print | Export to JPEG | Exit

MapShed Results

MIDDLE CREEK PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

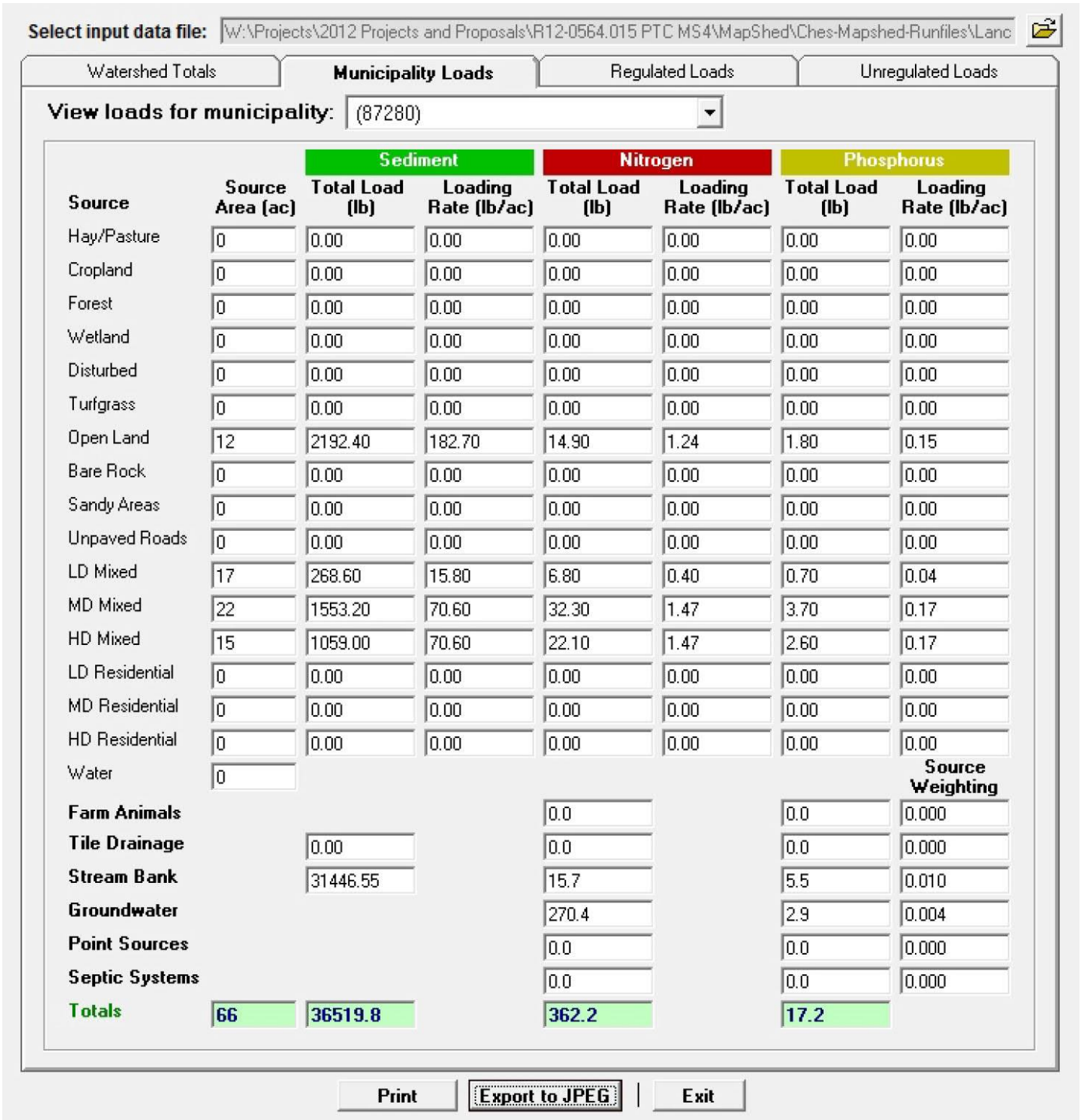
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	5	946.50	189.30	6.30	1.25	0.80	0.15
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	15	243.00	16.20	6.00	0.40	0.60	0.04
MD Mixed	7	494.20	70.60	12.30	1.75	1.30	0.19
HD Mixed	2	140.80	70.40	3.50	1.75	0.40	0.19
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		9003.42		4.5		1.5	0.007
Groundwater				167.1		1.9	0.002
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	29	10827.9		199.7		6.5	

Print | Export to JPEG | Exit

MapShed Results

COCALICO CREEK – CONESTOGA RIVER PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

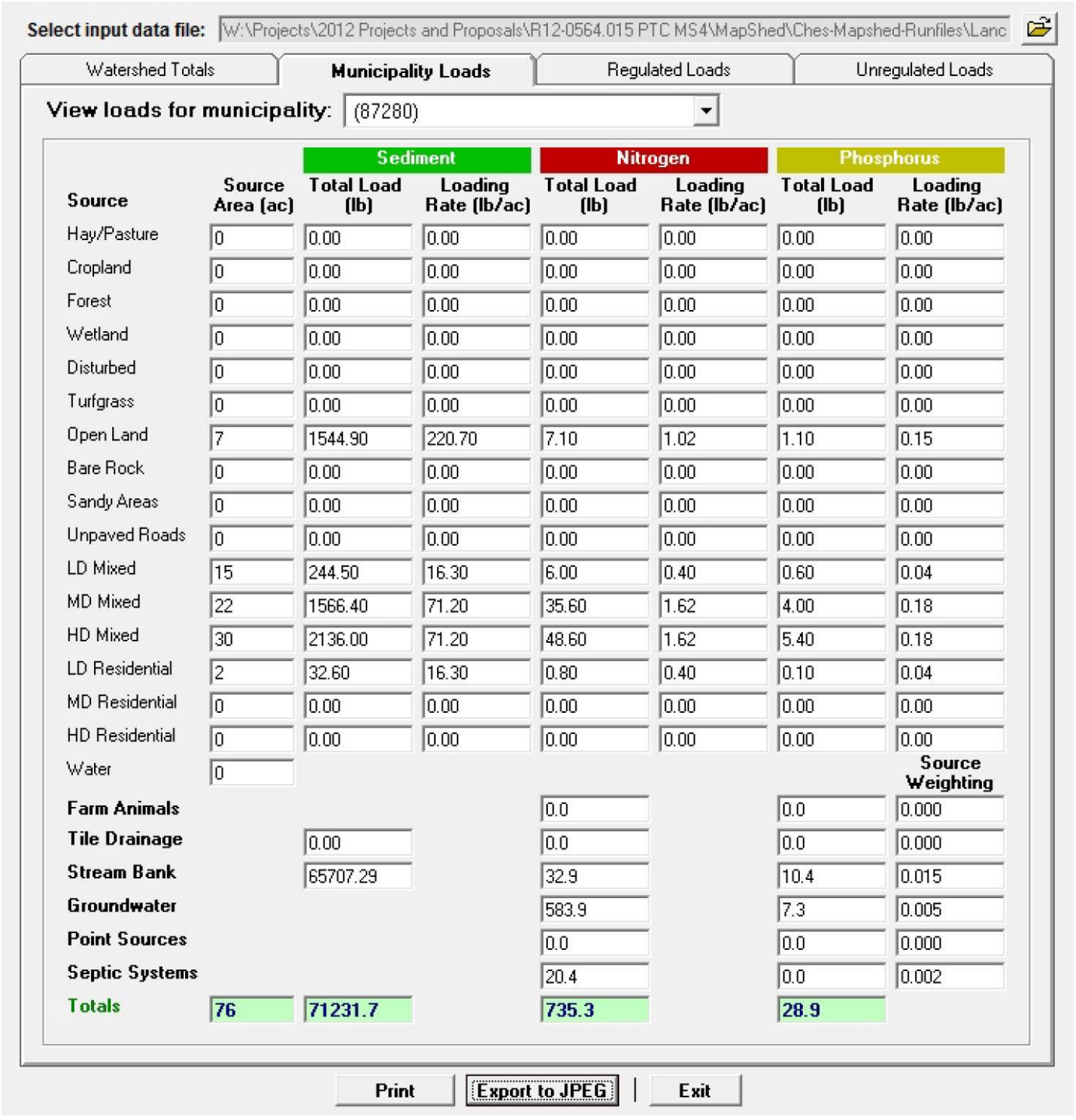
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	12	2192.40	182.70	14.90	1.24	1.80	0.15
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	17	268.60	15.80	6.80	0.40	0.70	0.04
MD Mixed	22	1553.20	70.60	32.30	1.47	3.70	0.17
HD Mixed	15	1059.00	70.60	22.10	1.47	2.60	0.17
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		31446.55		15.7		5.5	0.010
Groundwater				270.4		2.9	0.004
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	66	36519.8		362.2		17.2	

Print | Export to JPEG | Exit

MapShed Results

LITTLE COCALICO CREEK – COCALICO CREEK PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	7	1544.90	220.70	7.10	1.02	1.10	0.15
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	15	244.50	16.30	6.00	0.40	0.60	0.04
MD Mixed	22	1566.40	71.20	35.60	1.62	4.00	0.18
HD Mixed	30	2136.00	71.20	48.60	1.62	5.40	0.18
LD Residential	2	32.60	16.30	0.80	0.40	0.10	0.04
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		65707.29		32.9		10.4	0.015
Groundwater				583.9		7.3	0.005
Point Sources				0.0		0.0	0.000
Septic Systems				20.4		0.0	0.002
Totals	76	71231.7		735.3		28.9	

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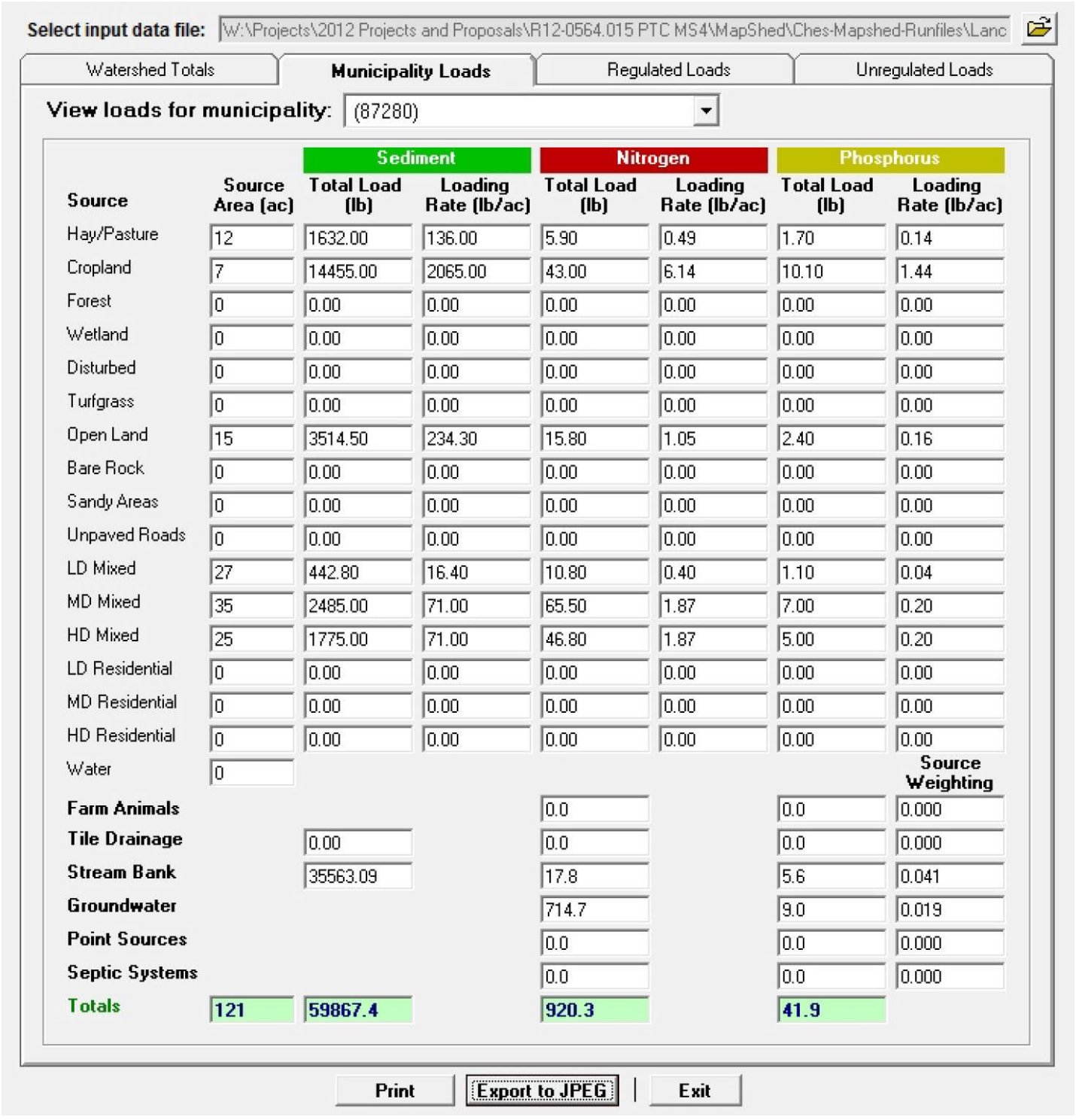
MapShed Results

LITTLE MUDDY CREEK PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	12	1632.00	136.00	5.90	0.49	1.70	0.14
Cropland	7	14455.00	2065.00	43.00	6.14	10.10	1.44
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	15	3514.50	234.30	15.80	1.05	2.40	0.16
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	27	442.80	16.40	10.80	0.40	1.10	0.04
MD Mixed	35	2485.00	71.00	65.50	1.87	7.00	0.20
HD Mixed	25	1775.00	71.00	46.80	1.87	5.00	0.20
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		35563.09		17.8		5.6	0.041
Groundwater				714.7		9.0	0.019
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	121	59867.4		920.3		41.9	

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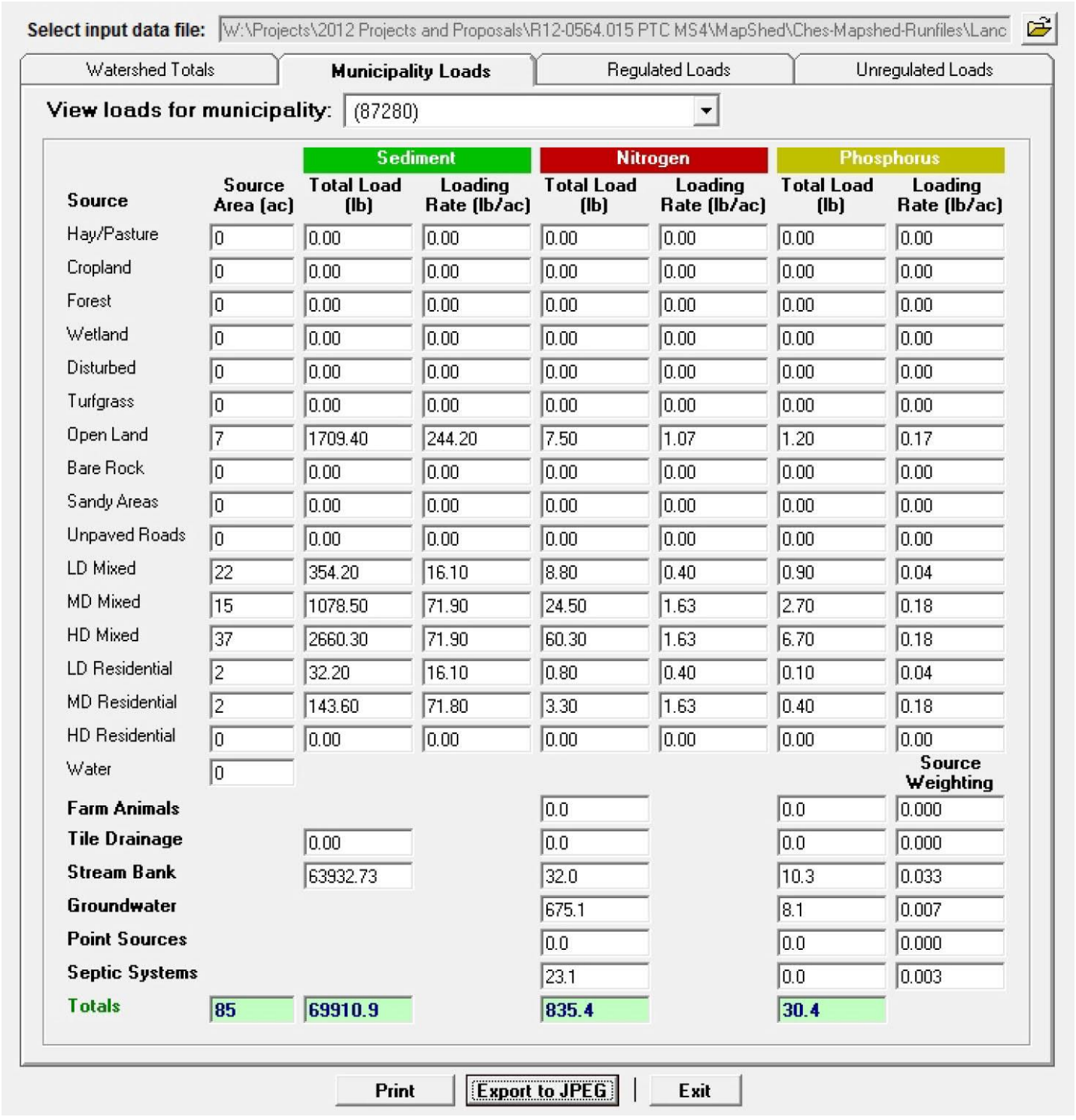
MapShed Results

MUDDY CREEK PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

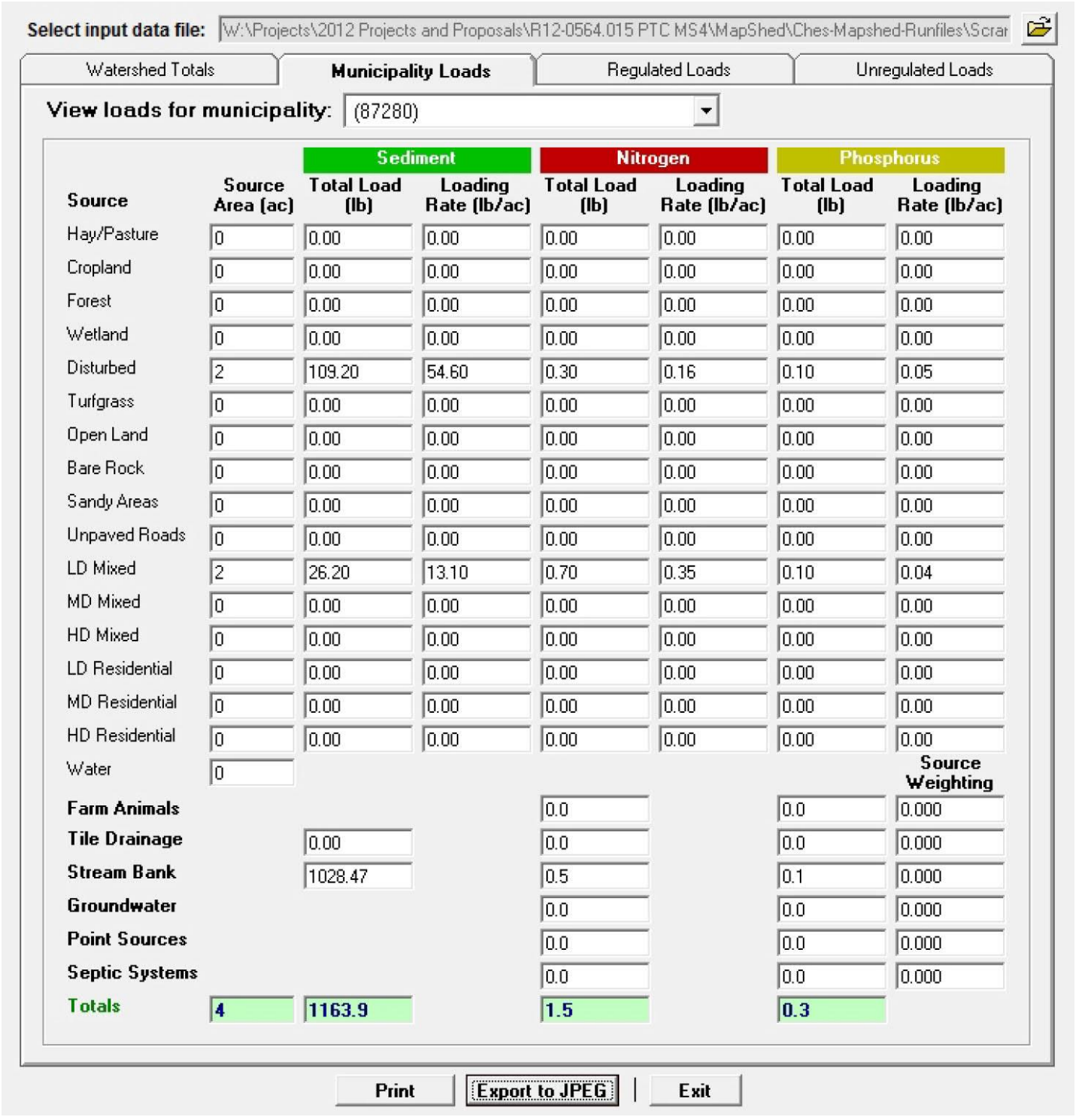
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	7	1709.40	244.20	7.50	1.07	1.20	0.17
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	22	354.20	16.10	8.80	0.40	0.90	0.04
MD Mixed	15	1078.50	71.90	24.50	1.63	2.70	0.18
HD Mixed	37	2660.30	71.90	60.30	1.63	6.70	0.18
LD Residential	2	32.20	16.10	0.80	0.40	0.10	0.04
MD Residential	2	143.60	71.80	3.30	1.63	0.40	0.18
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		63932.73		32.0		10.3	0.033
Groundwater				675.1		8.1	0.007
Point Sources				0.0		0.0	0.000
Septic Systems				23.1		0.0	0.003
Totals	85	69910.9		835.4		30.4	

Print | Export to JPEG | Exit

MapShed Results

CITY OF WILKES BARRE – MILL CREEK
PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

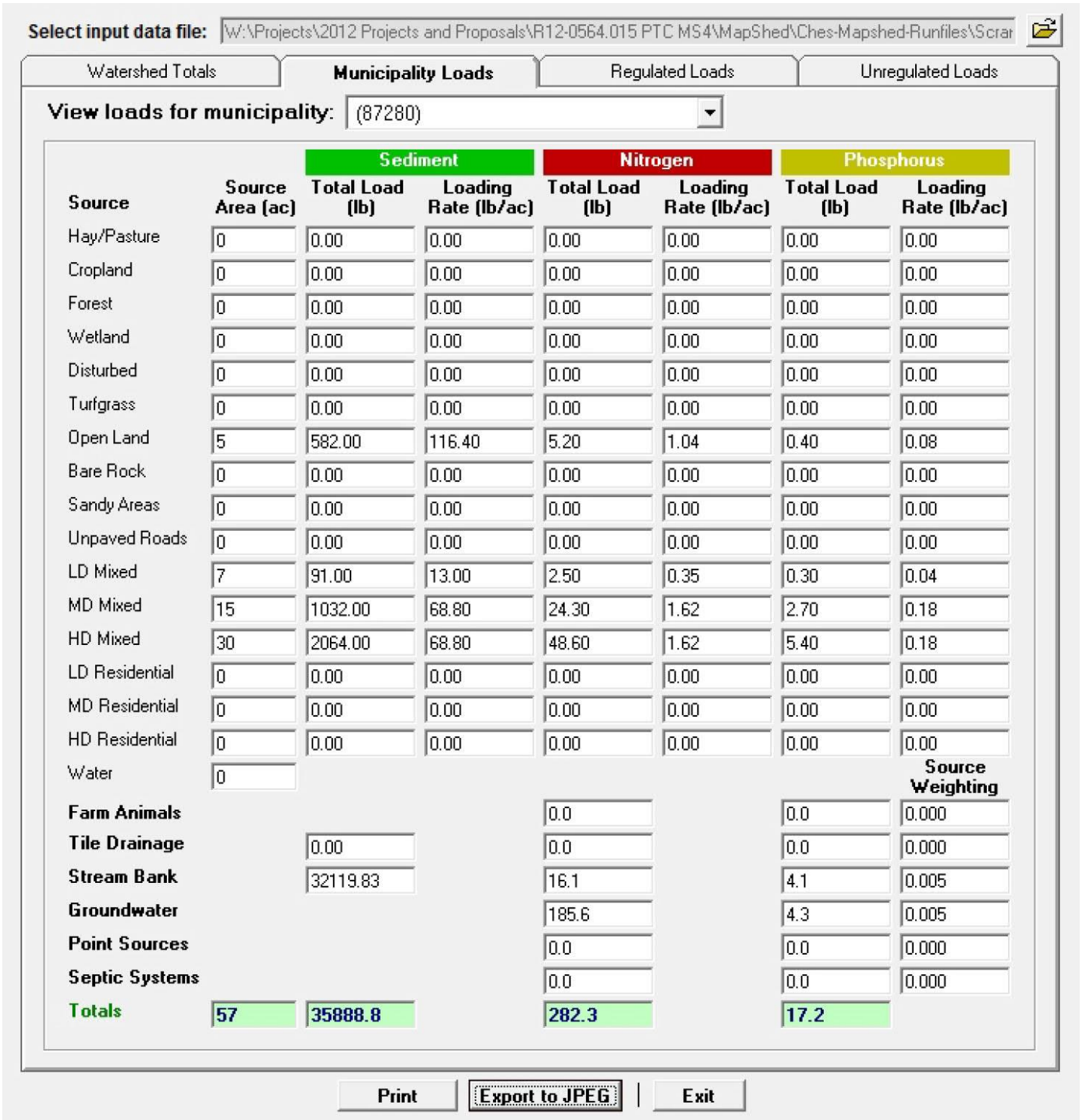
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	2	109.20	54.60	0.30	0.16	0.10	0.05
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	0	0.00	0.00	0.00	0.00	0.00	0.00
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	2	26.20	13.10	0.70	0.35	0.10	0.04
MD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Mixed	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		1028.47		0.5		0.1	0.000
Groundwater				0.0		0.0	0.000
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	4	1163.9		1.5		0.3	

Print | Export to JPEG | Exit

MapShed Results

CITY OF WILKES BARRE – SUSQUEHANNA RIVER PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

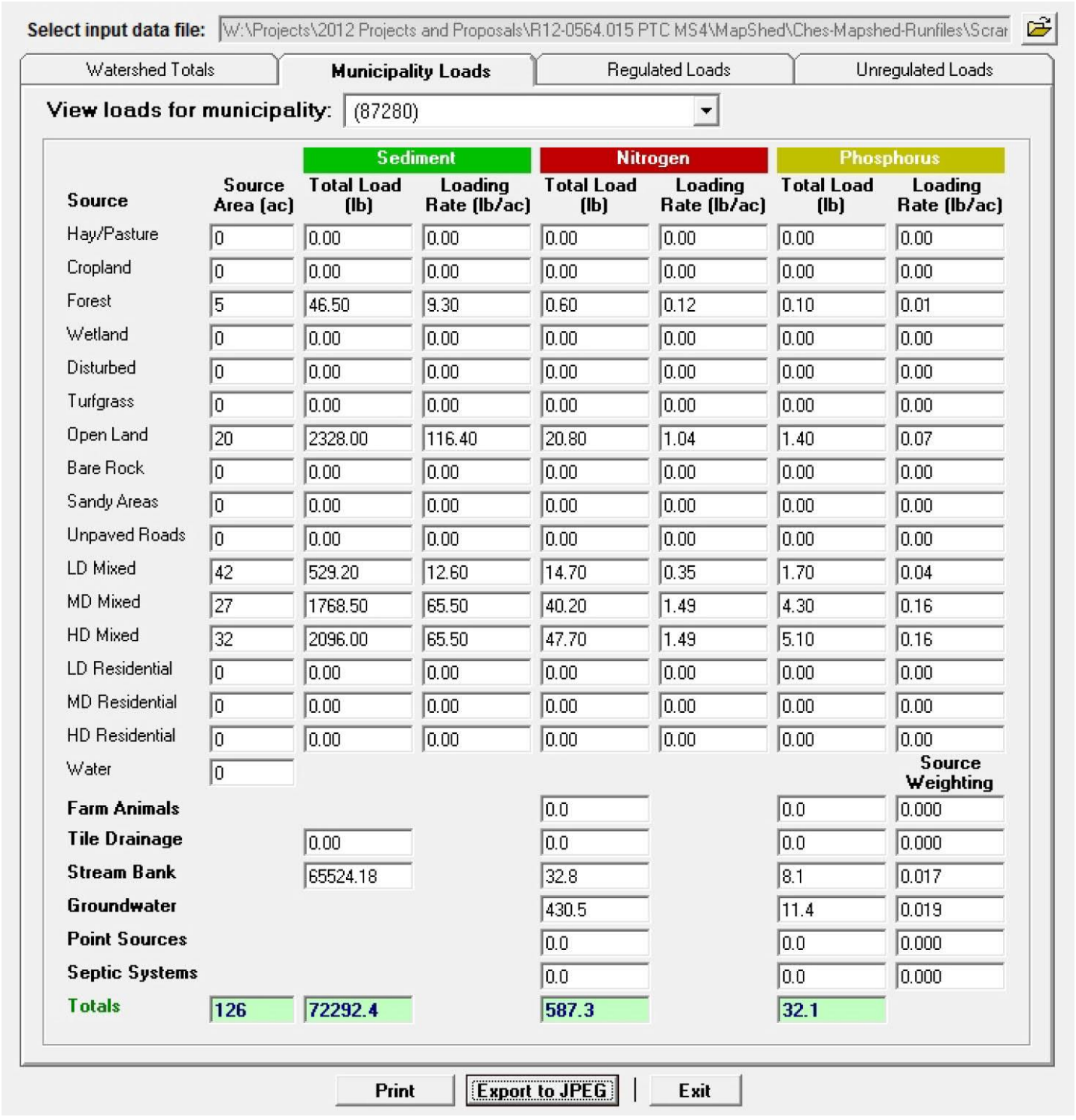
View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	0	0.00	0.00	0.00	0.00	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	5	582.00	116.40	5.20	1.04	0.40	0.08
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	7	91.00	13.00	2.50	0.35	0.30	0.04
MD Mixed	15	1032.00	68.80	24.30	1.62	2.70	0.18
HD Mixed	30	2064.00	68.80	48.60	1.62	5.40	0.18
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		32119.83		16.1		4.1	0.005
Groundwater				185.6		4.3	0.005
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	57	35888.8		282.3		17.2	

Print | Export to JPEG | Exit

MapShed Results

LACKAWANNA RIVER – SUSQUEHANNA RIVER PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	5	46.50	9.30	0.60	0.12	0.10	0.01
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	20	2328.00	116.40	20.80	1.04	1.40	0.07
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	42	529.20	12.60	14.70	0.35	1.70	0.04
MD Mixed	27	1768.50	65.50	40.20	1.49	4.30	0.16
HD Mixed	32	2096.00	65.50	47.70	1.49	5.10	0.16
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		65524.18		32.8		8.1	0.017
Groundwater				430.5		11.4	0.019
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	126	72292.4		587.3		32.1	

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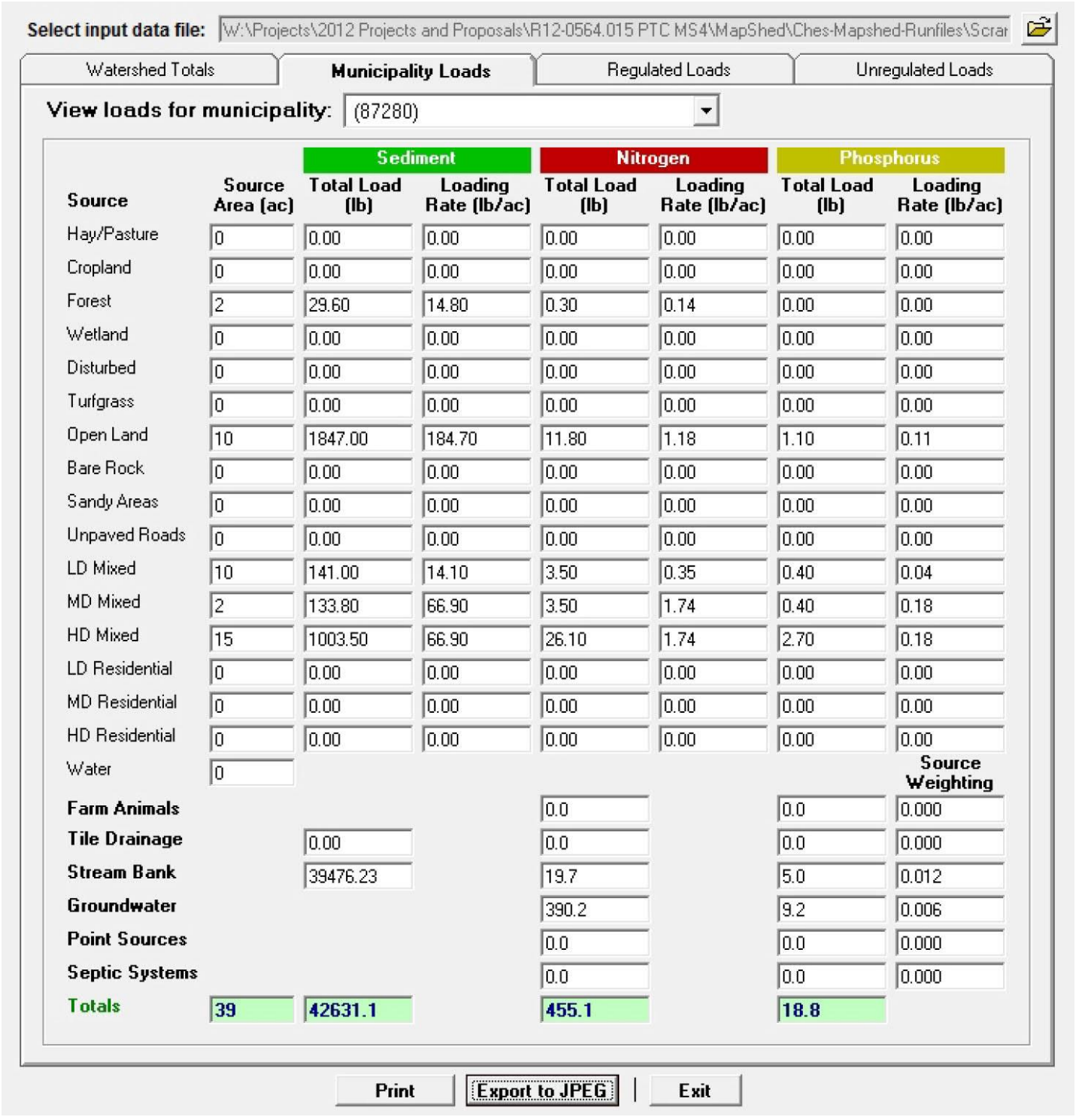
MapShed Results

SPRING BROOK PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	2	29.60	14.80	0.30	0.14	0.00	0.00
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	10	1847.00	184.70	11.80	1.18	1.10	0.11
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	10	141.00	14.10	3.50	0.35	0.40	0.04
MD Mixed	2	133.80	66.90	3.50	1.74	0.40	0.18
HD Mixed	15	1003.50	66.90	26.10	1.74	2.70	0.18
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		39476.23		19.7		5.0	0.012
Groundwater				390.2		9.2	0.006
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	39	42631.1		455.1		18.8	

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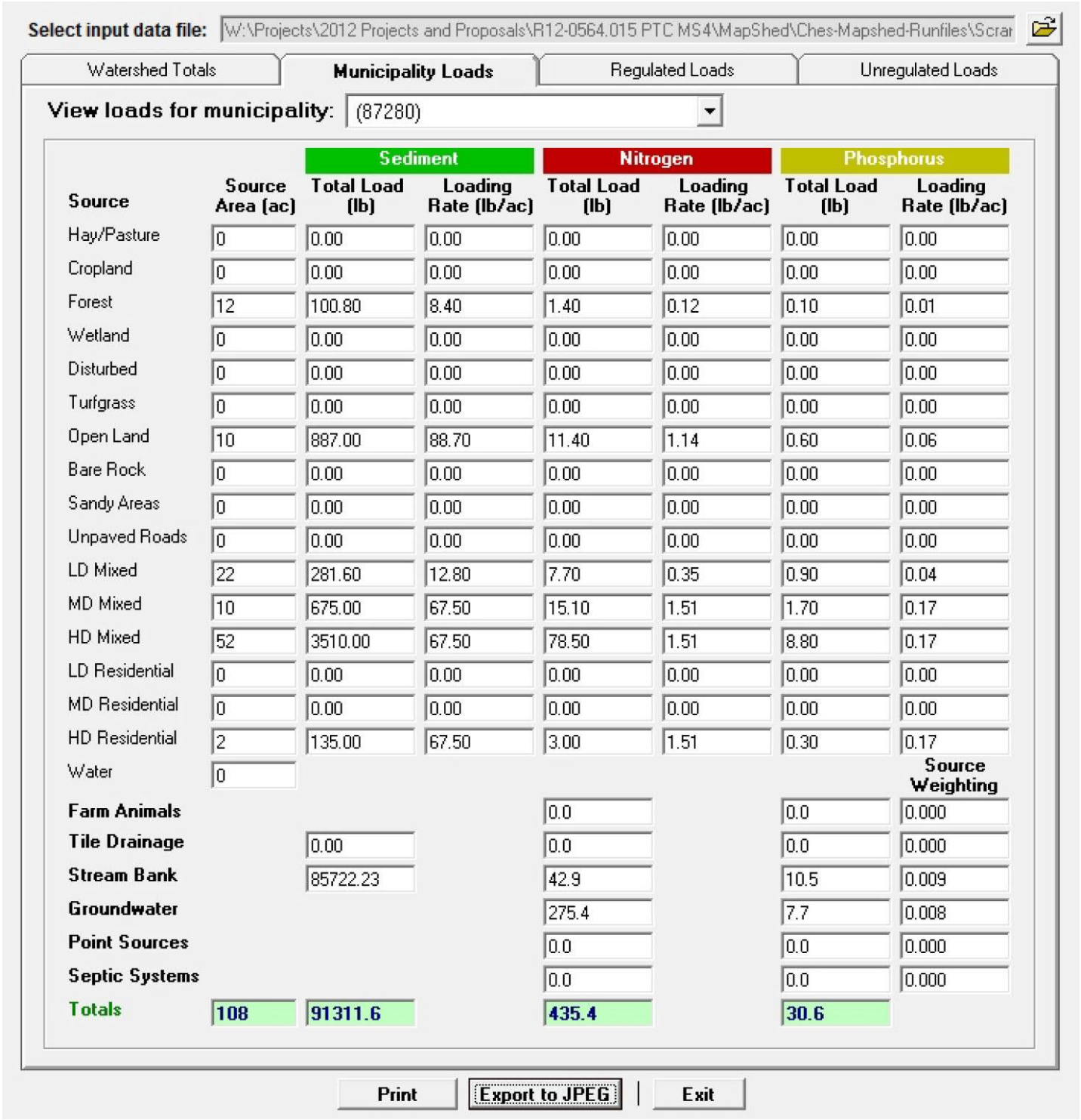
MapShed Results

CITY OF SCRANTON – LACKAWANNA RIVER PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	12	100.80	8.40	1.40	0.12	0.10	0.01
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	10	887.00	88.70	11.40	1.14	0.60	0.06
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	22	281.60	12.80	7.70	0.35	0.90	0.04
MD Mixed	10	675.00	67.50	15.10	1.51	1.70	0.17
HD Mixed	52	3510.00	67.50	78.50	1.51	8.80	0.17
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
HD Residential	2	135.00	67.50	3.00	1.51	0.30	0.17
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		85722.23		42.9		10.5	0.009
Groundwater				275.4		7.7	0.008
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	108	91311.6		435.4		30.6	

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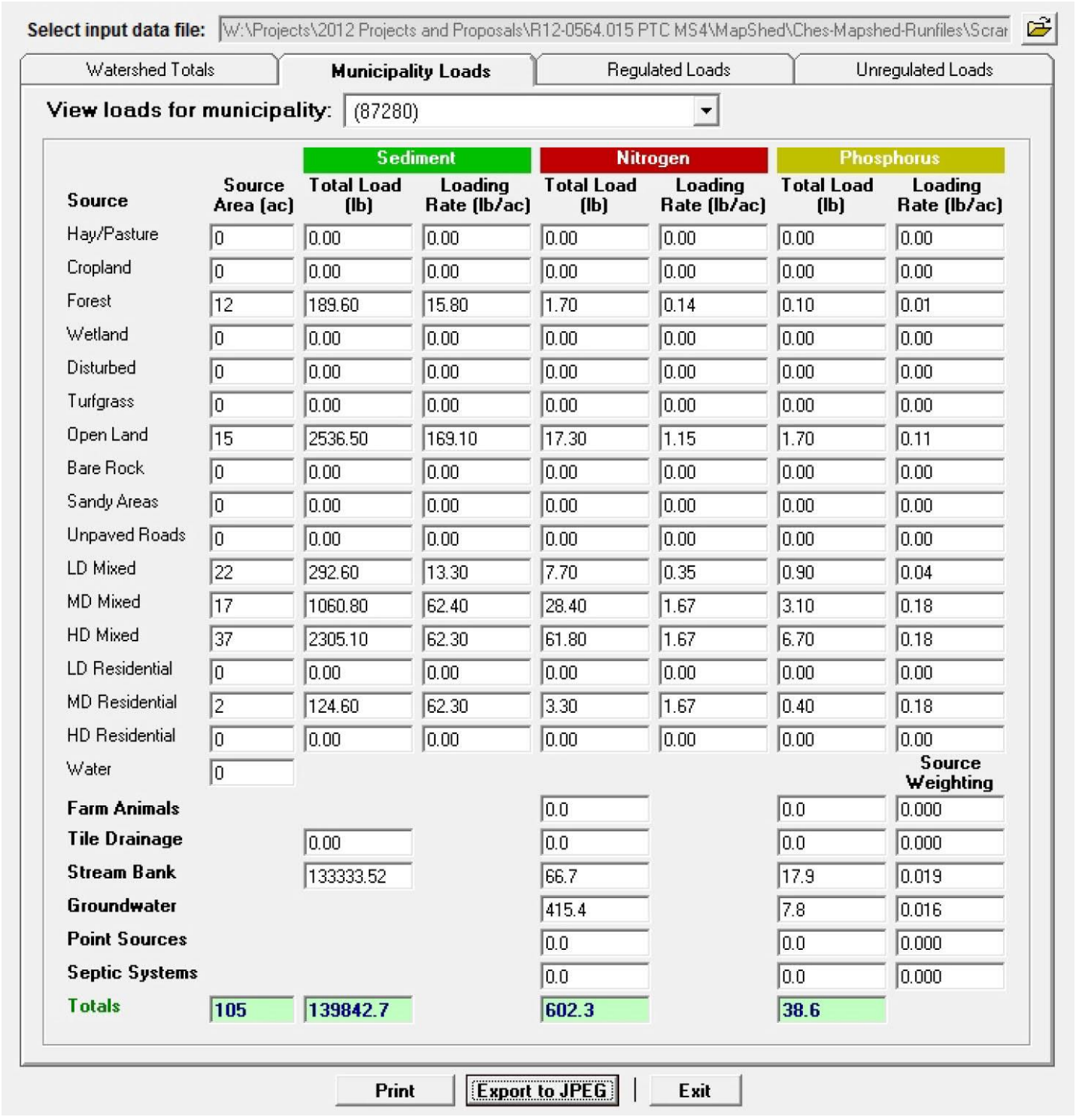
MapShed Results

LEGGETTS CREEK PLANNING AREA



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Watershed Totals | **Municipality Loads** | Regulated Loads | Unregulated Loads

View loads for municipality: (87280)

Source	Source Area (ac)	Sediment Total Load (lb)	Sediment Loading Rate (lb/ac)	Nitrogen Total Load (lb)	Nitrogen Loading Rate (lb/ac)	Phosphorus Total Load (lb)	Phosphorus Loading Rate (lb/ac)
Hay/Pasture	0	0.00	0.00	0.00	0.00	0.00	0.00
Cropland	0	0.00	0.00	0.00	0.00	0.00	0.00
Forest	12	189.60	15.80	1.70	0.14	0.10	0.01
Wetland	0	0.00	0.00	0.00	0.00	0.00	0.00
Disturbed	0	0.00	0.00	0.00	0.00	0.00	0.00
Turfgrass	0	0.00	0.00	0.00	0.00	0.00	0.00
Open Land	15	2536.50	169.10	17.30	1.15	1.70	0.11
Bare Rock	0	0.00	0.00	0.00	0.00	0.00	0.00
Sandy Areas	0	0.00	0.00	0.00	0.00	0.00	0.00
Unpaved Roads	0	0.00	0.00	0.00	0.00	0.00	0.00
LD Mixed	22	292.60	13.30	7.70	0.35	0.90	0.04
MD Mixed	17	1060.80	62.40	28.40	1.67	3.10	0.18
HD Mixed	37	2305.10	62.30	61.80	1.67	6.70	0.18
LD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
MD Residential	2	124.60	62.30	3.30	1.67	0.40	0.18
HD Residential	0	0.00	0.00	0.00	0.00	0.00	0.00
Water	0						
							Source Weighting
Farm Animals				0.0		0.0	0.000
Tile Drainage		0.00		0.0		0.0	0.000
Stream Bank		133333.52		66.7		17.9	0.019
Groundwater				415.4		7.8	0.016
Point Sources				0.0		0.0	0.000
Septic Systems				0.0		0.0	0.000
Totals	105	139842.7		602.3		38.6	

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APPENDIX D2
LAND USE AREA DISTRIBUTION SUMMARIES

LAND USE DISTRIBUTION SUMMARY

PTC MS4 PLANNING AREA

(ACRES)

LAND USE		WATERSHED NAME																				
MAPSHED NAME	**CAST NAME**	**Alexanders Spring Creek**	**Wertz Run-Conodoguinet Creek**	**Letort Spring Run**	**Hogestown Run**	**Trindle Spring Run**	**Lower Yellow Breeches Creek**	**Laurel Run-Susquehanna River**	**Swatara Creek-Susquehanna River**	**Middle Creek**	**Cocalico Creek-Conestoga River**	**Little Cocalico Creek-Cocalico Creek**	**Little Muddy Creek**	**Muddy Creek**	**City of Wilkes-Barre-Mill Creek**	**City of Wilkes-Barre-Susquehanna River**	**Lackawanna River-Susquehanna River**	**Spring Brook**	**City of Scranton-Lackawanna River**	**Leggetts Creek**	**Total Chesapeake Bay Basin**
Hay/Pasture	Pasture	2	0	12	0	0	10	0	0	0	0	0	12	0	0	0	0	0	0	0	**36**
Cropland	Double Cropped Land	2	2	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	**11**
Forest	True Forest	0	0	0	0	0	10	2	0	0	0	0	0	0	0	0	5	2	12	12	**43**
Wetland	Non-tidal Floodplain Wetland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Disturbed	Regulated Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	**2**
Turfgrass	MS4 Turfgrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Open Land	Mixed Open	5	12	12	0	10	25	7	10	5	12	7	15	7	0	5	20	10	10	15	**187**
Bare Rock	Non-Regulated Buildings and Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Sandy Areas	Non-Regulated Buildings and Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Unpaved Roads	No Equivalent	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Low-Density (LD) Mixed	MS4 Buildings and Other	17	27	37	2	62	77	37	10	15	17	15	27	22	2	7	42	10	22	22	**470**
Medium Density (MD) Mixed	MS4 Buildings and Other	12	12	40	0	7	67	94	20	7	22	22	35	15	0	15	27	2	10	17	**424**
High-Density (HD) Mixed	MS4 Buildings and Other	12	20	30	2	25	77	32	15	2	15	30	25	37	0	30	32	15	52	37	**488**
Low-Density (LD) Residential	MS4 Buildings and Other	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	**4**
Medium Density (MD) Residential	MS4 Buildings and Other	0	0	0	0	0	7	0	2	0	0	0	0	2	0	0	0	0	0	2	**13**
High-Density (HD)Residential	MS4 Buildings and Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	**2**
Water	Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
TOTAL		**50**	**73**	**131**	**4**	**104**	**273**	**172**	**57**	**29**	**66**	**76**	**121**	**85**	**4**	**57**	**126**	**39**	**108**	**105**	**1680**

APPENDIX E –
BMP CONCEPT DESIGN AND SUPPORT INFORMATION

E1

Chesapeake Bay Watershed Sediment Reduction Project – PA Turnpike Commission Pollutant Reduction Plan Amendment Stony Run BMP, East Cocalico Township, Lancaster County

Chesapeake Bay Watershed
Sediment Reduction Project

PA Turnpike Commission
Pollutant Reduction Plan Amendment
Stony Run BMP

East Cocalico Township
Lancaster County

Prepared For:
Pennsylvania Turnpike Commission

Prepared By:
First Pennsylvania Resource, LLC
a wholly owned subsidiary of RES, LLC
317 East Carson Street, Suite 242
Pittsburgh, PA 15219

Revised August 2023

TABLE OF CONTENTS

LIST OF TABLES

LIST OF GRAPHS

LIST OF APPENDICES

Executive Summary

First Pennsylvania Resource, LLC ("FPR"), a wholly owned subsidiary of Resource Environmental Solutions, LLC (RES) has prepared a Pollutant Reduction Plan (PRP) Amendment for the PA Turnpike Commission (PTC) for the Stony Run BMP (Project, BMP, Site), as a component of the larger PennDOT facilitated Chesapeake Bay Watershed Sediment Reduction Project. The Stony Run site, located in East Cocalico Township, Lancaster County, Pennsylvania is replacing the originally proposed Rosedale Ave site due to landowner complications. The purpose of the Project is to provide sediment reduction toward the PTC to reduce sediment as required by their MS4 permit.

The Project proposes to use stream restoration with a floodplain restoration approach at the Stony Run BMP in the Upper Chesapeake Bay Watershed (4-Digit HUC #0206) (Appendix A. Figures). The BMP is located on East Cocalico Township municipal property on the west of Hill Road, north of Reading Road (S.R. 0272). The BMP is located within the PTC Planning Area and is owned by East Cocalico Township. RES is in the process of negotiating a land option agreement with the landowner for the areas included within the BMP footprint.

The chosen streams are unstable with incised channels due to stormwater impacts and historic and ongoing land uses. The proposed floodplain restorations are designed to be self-sustaining, highly functioning floodplain systems that will reduce pollutant loadings by stabilizing eroding streambanks and reconnecting the stream with its historic floodplain. Restoration efforts will utilize a combination of channel restoration, floodplain grading, subsurface grade control structures, and habitat structural improvements to restore the channel pattern and floodplain. The floodplain restoration approach aims to spread high flow storm events across a larger re-established floodplain area, reducing shear stresses within the channel. A combination of subsurface logs and rocks will be used to provide grade control and long-term vertical bed stability. The resulting stream complexes are designed to have low bank heights and low to very low streambank erosion rates. Where site conditions will not accommodate floodplain restoration, a natural channel design approach will be used to repair and stabilize the eroded stream channels.

This PRP and associated baseline sediment loading, reduction, and effectiveness calculations were prepared in accordance with the PA DEP MS4 Checklist Series (2020) , PA DEP guidance document 3800-PM-BCW0100k - National Pollutant Discharges Elimination Systems (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions (3/2017), Consensus Recommendation for Improving the Application of the Prevented Sediment Protocol for Urban Stream Restoration Projects Built for Pollutant Removal Credit (02/2020), Consensus Recommendations to Improve Protocols 2 and 3 for Defining Stream Restoration Pollutant Removal Credits (10/2020), and the Credit Determination Protocols 1 and 3 of the "Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects (09/2014) (collectively referred to as the Updated Expert Panel Documents)."

The results of the investigation indicate that the proposed Stony Run BMP could be employed to achieve and/or exceed the contracted sediment reduction target of 270,000 lbs/year, as well as substantially reduce nitrogen and phosphorus loading. The site-specific reduction totals for sediment, or total suspended solids (TSS), are provided. These calculations demonstrate a direct nexus between the restoration effort and improved water quality in the Chesapeake Bay Watershed.

A. Pollutants of Concern

The proposed Project consists of one BMP within the Chesapeake Bay. As a project within the Chesapeake Bay, the pollutants of concern are sediment and nutrients (Total Phosphorus [TP] and Total Nitrogen [TN]). The PA DEP's Pollutant Aggregation Suggestions for MS4 Requirements Table (Municipal) (rev. 3/5/2018), indicates that the applicable requirements include Appendix D - Siltation/Nutrients and Appendix E – Excessive Algal Growth and Siltation. According to the PRP instructions, the assumption can be made that meeting the sediment reduction goals for the watershed will also accomplish nutrient reduction goals. For this project, sediment will be discussed as the primary pollutant of concern (POC), but TP and TN reduction estimates will also be provided.

B. MS4 Eligibility

The PTC has Pollutant Reduction Plan (PRP) obligations in the National Pollutant Discharge Elimination System (NPDES) under their individual MS4 permits with sediment reduction requirements. Information regarding the specified planning area, implementation timeframe, and method for calculating loading and load reductions is provided below in Table 1. PTC MS4 Permit Details.

Table 1: PTC MS4 Permit Detailsails

Stakeholder	Permit Issuance/ Renewal Date	Implementation Date	Planning Area	Methods used for Calculating:	
				Sediment Loading	Sediment Load Reduction
PTC	October 29, 2021	October 2026	PTC properties + 1-mile buffer	MapShed	Default Rate (115 lb/ft) or Expert Panel Protocols

Figures detailing the location of the BMP, the immediate surroundings, and visual representations of baseline data collected are provided in Appendix A: Figures. Figures include Figure 1: Project Location Map, Figure 2: 2011 National Land Use Map, Figure 3: Bank Erosion Hazard Index (BEHI) Ratings Map, Figure 4: Near Bank Stress (NBS) Ratings Map, Figure 5: Erosion Rate Map, and Figure 6: Erosion Pin Locations. The proposed restoration approach is shown in Appendix C: Design Plans. The BMP-specific loading and reduction values are summarized in Sections C and D below and in Appendix D: Supporting Documentation. Photographs documenting the active erosion and a snapshot of bank pin erosion data are also included in Appendix D.

B.1 BMP

The Stony Run BMP is located north of the intersection of Reading Road (S.R. 0272) and Hill Road on the west side of Hill Road in East Cocalico Township. The project area is bordered to the north by a residential subdivision. The project is located within the PTC Planning Area. RES is in the process of negotiating a land option agreement with the landowner for the areas included within the BMP footprint. Land cover within the proposed BMP limits is mostly maintained lawn areas, agricultural fields, the East Cocalico Township Municipal Building, roadways, and residential development. The roughly 1,370 LF of Stony Run flows through the site from east to west. Four (4) unnamed tributaries (UNT) to Stony Run, which drain from the north are also included within the proposed restoration project. The main stream reach is listed as non-attaining for pathogens, and its designated use is listed as Warm Water Fisheries (2020 Integrated Report; Ch. 93 Designated Use). The stream is deeply entrenched with

vertical banks up to 6 feet in areas, and minimal bank protection/vegetation. The banks are undercut along outer curves and the channel is over widening rapidly. RES proposes to utilize floodplain restoration to maximize sediment reduction potential.

B.2 MS4 Eligibility

This BMP meets the minimum eligibility criteria summarized in the "Considerations of Stream Restoration Projects in Pennsylvania for Eligibility as an MS4 Best Management Practice" Document. These minimum criteria include:

- Documented existing and active streambank erosion (Section C, Appendices A and D);
- A minimum of 100 linear feet of stream channel (Table 2, Appendices A and D);
- Impervious areas upstream of the project must be sufficiently treated to address peak flows that may exceed engineering design thresholds or compromise channel form and function;
    - The first step in the design process is an existing conditions watershed assessment which accounts for the drainage area and difference in land cover within and upstream of the project area. In the 2D modeling, steady-state peak flow are determined from the watershed assessment to design for the worst case scenario 100-year event. By nature, the floodplain designs act in such a way that peak flows are attenuated during storm events relative to the pre-design conditions. Easier access to a wide and hydraulically rough floodplain decreases flow velocity, which in turn increases residence time within the project area. This increased residence time flattens the runoff hydrograph relative to the existing conditions. Model results are also used to design grade and erosion control structures in areas that demonstrate high shear stresses to ensure that the integrity of the channel's form and function is maintained even during strong storm events (Appendix C).
- The project addresses both sides of the channel
- The project maximizes floodplain reconnection through the regrading of the floodplain and a combination of approaches to either raise the floodplain and channel elevation through valley fill or to lower them to reconnect the stream to the groundwater table (where appropriate). The restored bank heights are designed to be very low (6"-12") in order to maximize overbank flooding events into the floodplain; and,
- A minimum permanent 35' riparian buffer on all sites. The nature of the stream valleys varies across the BMP but the floodplain width varies from approximately 80' to 120'. The conservation boundaries as shown in Appendix A and C will be left intact indefinitely to provide buffer for the streams and replanting will occur within the entire restored floodplain regardless of width.

C. Determine Existing Loading for Pollutants of Concern

Extensive baseline site investigations were conducted at the BMP by RES staff to evaluate existing sediment loads and erosion rates, following protocols established in the Updated Expert Panel Documents, and to guide restoration design.

C.1 Baseline Data Collection

Within the study area for the BMP, the streams were walked to identify restoration potential and identify unique reaches. Reaches with full restoration potential were subdivided into

unique categories based on land cover type, land use type, vegetation status, and bank erosion severity/frequency. One Bank Erosion Hazard Index (BEHI) Assessment and Near Bank Stress (NBS) Assessment was completed at a representative eroding bank in each of the assessment reaches. NBS was estimated following procedures outlined by Rosgen using a Level II – General Prediction estimation described in Method 1: Rapid Visual Assessment. Upon the completion of the evaluations, each reach was walked again to verify the assessment results, record the average height of each study bank and determine the start and endpoints of the banks using a Trimble Geo7 Hand Held GPS Unit.

Soil bulk density samples were collected at a rate of approximately 1/500 linear feet using standard core sampling methods at a range of depths. These samples were analyzed by Geotechnical Testing Services, Inc., the results are summarized in Table 2. Baseline Data Summary and in Appendix E. Soil Bulk Density Sampling Results. The average of all of the samples was used as the bulk density value in the Protocol 1 calculations.

Although bank erosion pins can be unreliable, as they fail to accurately account for the many causes of erosion and are often washed away, they are widely used to give a "snapshot" of lateral erosion occurring at set locations within a streambank. Bank erosion pins were installed at representative locations within the main stem of the BMP. The date and bank height were noted, and measurements were taken from the end of the pin to the streambank. The measurements were collected multiple times over the course of the year. The locations of the erosion pins which have already been installed are shown in the Figure 6 (Appendix A. Figures). This data is provided in Appendix D for results collected to date, for a minimum of 12 months worth of measurements.

Acute bank slumping, or mass wasting, a substantial mechanism contributing to sediment loss from the site, was also observed. This data is very important because in portions of the BMP it accounts for the majority of erosion observed and is either not captured at snapshot locations by bank pin measurements or is misrepresenting bank pin measurements as though the bank is aggrading when it is in fact buried by material slumping on top of them. In addition, bank pin data cannot provide estimates of the sediment being lost as a result of vertical instability, in all locations, or in major storm events.

Stream substrate was noted during the baseline data collection. A majority of the bottom substrate consists of silt, sand and gravel with small areas of larger cobble and boulders observed in the upstream portion of the proposed restoration area.

C.2 Data Analysis

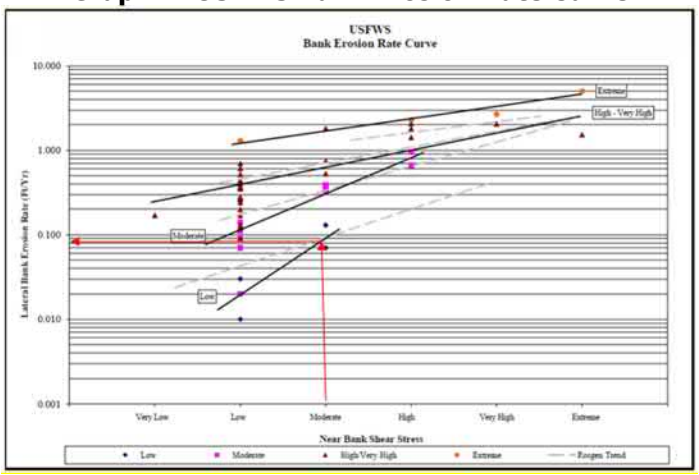
Data analysis was completed using the field assessment data and surveyed stream data in ESRI ArcGIS ArcMap and Microsoft Excel. For the BMP, a detailed attribute table was created for the entirety of the surveyed stream layer using the BEHI and NBS evaluation data gathered during the field investigation. Bank heights were adjusted using the GPS data to account for the variation in bank height throughout each assessment reach. The final attribute table included the following: Reach ID, Restoration Type, Study Bank Height, Bank Full Height, Bank Angle, Root Depth, Root Density, Surface Protection, Bank Full Width, and Stream Length.

The attribute table was then exported to Microsoft Excel to complete the analyses. BEHI data was analyzed and values were generated following procedures established in David L.

Rosgen's "*A Practical Method of Computing Streambank Erosion Rate (2001).*" NBS Ratings were generated again using best fit polynomial equations extracted from scatter plots created in excel using Rosgen's established values and ratings converted to numeric values.

Bank erosion rates were then calculated following procedures outlined in Rosgen's Bank and Nonpoint Source Consequences of Sediment (BANCS) Method with the incorporation of Bank Erosion Curves created by the U.S. Fish & Wildlife Service Chesapeake Bay Field Office Coastal Program (Graph 1). For a more accurate and rapid calculation of erosion rate, values were plotted in excel on a scatter plot where linear equations were later developed. The generated graph is provided below.

Graph 1: USFWS Bank Erosion Rate Curve



C.3 Results

The baseline data are summarized in Table 2. BEHI and NBS scores ranged from moderate to high, with an average ranging from moderate to moderate-high. All BMPs have areas with severe erosion and high bank heights. These data can be assessed visually in Figures 4-6.

Based upon these data, the annual sediment loads were calculated. The default concentrations of TP (1.05 lb TP/ton TSS) and TN (2.28 lb TN/ton TSS), as described in the Updated Expert Panel Documents, were then used to estimate existing TP and TN loading at the project site.

Table 2: Baseline Data Summary		
Variables		
Stream Length		1,370
Average	**Bank Height (ft, weighted ave)**	3.37
	BEHI	High
	NBS	Mod-High
	Erosion Rate (weighted ave)	0.58
	Soil Bulk Density	101.50 (6 Samples)

The land-river sediment delivery factors (Chesapeake Community Modeling Program's (CCMP) Phase 5.3 Data Library) were then applied to determine the rates of pollutants arriving at the Chesapeake Bay from these BMPs. These data and the calculated erosion rates indicate highly

unstable streambanks at this BMP are resulting in large volumes of existing pollutant loading (Table 3: Existing Pollutant Loads at BMP).

Table 3: Existing Pollutant Loads		
Variables		
Total Annual Load (Lbs/Year)		617,287
Delivery Factor	**TSS**	0.362
	TP	0.516
	TN	0.581
Bulk Density (Lbs/CF)		101.50
Delivered TSS (Lbs/Year)		223,458

D. BMP to Achieve Reductions in Pollutant Loading

To estimate the pollutant reduction directly attributable to the proposed stream restoration BMP using the Expert Panel Protocols (Appendix C: Design Plans), the total loads (tons/yr) were converted to the unit loads (lbs/ft/yr) by dividing the total load by the linear footage of stream, which was calculated as half of total streambank lengths and multiplying by 2,000 to convert into lbs.

The Protocol 1 calculations result in the projected sediment reduction yield achieved through direct prevention of sediment loss using calculated existing loads. In accordance with the PRP Instructions for such stream restoration BMPs, the total load reductions were calculated using the applicable sediment delivery ratio. The restoration efficiency uncertainties were calculated at the interim 75% and at 90%, based upon the mathematical relationship of high existing and low proposed bank heights as observed on similar floodplain restoration projects.

Recent PA DEP guidance has indicated that restoration efficiencies up to 90% may be used with: 1) adequate documentation of a secondary method to validate the BANCS assessment, 2) pre-construction monitoring data, 3) a post-construction monitoring plan, and 4) a minimum of 1 year of post-construction monitoring data to justify the results.

As described above, pre-construction data collected for this purpose include DoD Modeling, surveyed cross sections of the existing stream condition across the sites, quantitative bank pin and mass wasting observations, and calculations of existing substrate and woody debris. (Appendix D. Supporting Data)

A simplified version of the updated Protocol 3 methodology from *Consensus Recommendations to Improve Protocols 2 and 3 for Defining Stream Restoration Pollutant Removal Credits* was used to determine the suspended sediment load reductions as a result of the Project conceptual restoration designs. The USGS Groundwater Toolbox and USGS StreamStats were used to determine each site's 50% recurrence interval baseflow and annual flow exceedance interval curve. That flow data was used to define the Floodplain Trapping Zone (FTZ) in both the existing and proposed conditions, and to determine the net percentage of flows treated in the conceptual floodplain design. The USDA Cross-Section Analyzer was used to complete the conceptual-level modeling whereas final calculations will be performed using a coupled 1D/2D HEC-RAS model.

The entirety of the floodplain was assumed to be non-tidal wetland (NTW) restoration. The specific steps of Protocol 3 were then followed to determine each site's P6 Land-River Segment ID, unit sediment load delivered to the site using the Chesapeake Bay CAST tool, and final sediment load reduction in units of [lbs TSS/yr]. The summary of Protocol 3 results are included in Table 4 below and in greater detail in Appendix D.

The results sediment reduction calculations are summarized below in Table 4: Anticipated BMP Load Reductions. The total indicates potential reduction generation for the BMP in its entirety; however, actual reduction generated will be determined by the extents of the constructed BMP and through 12-month post construction validation.

Table 4. Anticipated Sediment Reduction		
TSS Delivered Load (Lbs/Yr)		223,458
Protocol 1: Annual TSS Reduction (Lbs/Yr)	**Interim 50% Efficiency**	111,729
	Interim 75% Efficiency	167,594
	90% Efficiency	201,112
Protocol 3: Additional TSS Reduction (Lbs/Yr)		88,899
Total Annual TSS Reduction (Lbs/Yr)	**Interim 50% Efficiency**	200,628
	Interim 75% Efficiency	256,493
	90% Efficiency	**290,011**
	115 lb/ft Default	157,550
Total Annual TN Reduction (Lbs/Yr)		525
Total Annual TP Reduction (Lbs/Yr)		198

Notes:
1. Per PA DEP Guidance, the MMW may claim either 115 lb/ft or the Expert Panel Efficiency value. Both totals are show above.
2. It is understood that only 75% efficiency will be granted until the 1-year post-construction validation monitoring even provides data justifying the capped 90% efficiency. The 50% efficiency is also described as an interim value until the full 12-month pre-construction data can be provided.
4. The totals above indicate potential reduction generation for the BMP in its entirety. Actual reduction generated will be determined by the extents of the constructed BMP and through 12-month post construction validation.

E. BMP Operations and Maintenance (O & M)

With regard to the land acquisition, RES identifies potential BMPs and contacts the landowners of the potential BMP. Regardless of ownership type (private or public), RES negotiates a site protection instrument (SPI) such as a declaration of restrictive covenant for conservation (DRC), and an agreement with the landowner which provides for the execution of the SPI upon the closing of the agreement. A memorandum of this agreement is recorded at the county courthouse to give public notice of the agreement. The agreement also provides an inspection period which typically consists of an initial 12-month term with two 6-month extensions for a total of 24 months until closing must be initiated, or the contract expires. During the inspection period, RES conducts due diligence on the property and confirms title to the subject property, acquires title insurance and addresses concerns with the title, such as pre-existing easements, or liens. During this time, RES also conducts physical inspections surveys and RES completes the engineering and permitting of the project. Finally, necessary 'Secondary Agreements' for situations such as spoil stockpiles,

access, staging, etc. are negotiated with the landowner during the inspection period. Upon closing, the landowner executes the DRC and the Secondary Agreements

As described above, the SPI will be placed on the property parcels in advance of the proposed restoration activities, thereby ensuring the long-term protection of the site. The SPI restricts activities that are incompatible with the objectives of the project site. The SPI will be recorded within 60 days at the county courthouse after receipt of all required permits, clearances, approvals and authorizations, and prior to project implementation. Recording the SPI after all necessary permits are approved avoids creating irreversible encumbrances on the land title until there is minimal risk of project modification. An example copy of an SPI that would be filed upon project authorization is included as Appendix B: Site Protection Instrument. The final SPI may be subject to review and approval by all parties.

Following construction, RES will perform the maintenance and monitoring (M&M) responsibilities for a period of five years, as required by the Chapter 105 permit conditions. RES will inspect the BMPs annually to perform monitoring and all necessary maintenance needed for the continued viability of the project for the M&M period. The need to perform maintenance will be assessed during annual visits, and if deemed necessary, appropriate remedial action will be performed to repair deficient areas. This includes fixing damage to the stream banks due to flood events. RES will also perform inspections after major flood events that have the potential to damage the stream system.

Following construction at each BMP, RES will complete an as-built survey of the relocated stream to include a full longitudinal profile illustrating the channel restoration. One permanent monitoring location will be installed for every thousand feet of stream as a reference at each site to illustrate post-construction conditions. For projects claiming Protocol 3 credits, HOBO water gauge data loggers will be installed at this location within the stream and floodplain to gather hydrologic data. The as-built reports will be submitted to PA DEP and USACE following construction and planting completion.

During the five-year maintenance and monitoring period, annual monitoring reports will be submitted to PA DEP and USACE by December 31 each year monitoring occurs. At a minimum, monitoring reports will include:

- Visual observations of stream banks and channel/floodplain geometric stability
- Description of the general condition of restored wetland and upland areas
- Photos taken from ground level at each permanent photo monitoring location
- Assessment of vegetative cover in reestablished wetland corridor (if Protocol 3 credits are claimed)
- BEHI and NBS assessments for the restored stream channel to validate nutrient reduction efficiency
- Hydrologic data from the stream channel and wetlands to record real time water surface elevations throughout the growing season and validate the reconnection of the stream to the floodplain (if Protocol 3 credits are claimed)
- Discussion of the maintenance and monitoring activities conducted, and
- Proposed maintenance schedule for the following year based upon the results of the annual monitoring.

A summary of the proposed performance standards for the sites is summarized in Table 5.

Table 5: Performance Standards Summary				
Resource Type	**Performance Standard Type**	**Evaluation**	**Performance Standard Value**	**Unit**
Streams	Bank Stability	BEHI Score	<Low	---
	Geomorphic Stability	Visual Observation	No observed vertical or horizontal instability	---
	Large Woody Debris	Cubic meter per Acre	>25% increase	%
	Stream Hydrology	Channel/Floodplain Connectivity	≥1 Bankfull event per year	# (Count)
	Substrate	Pebble Count	D50 particle size remains in the same size class or larger as noted in As-Built	
Wetlands	Vegetation	Plot Assessment	Prevalence index value <3.0	---
	Groundwater Hydrology	Soil Saturation	Saturation within the upper 1' for ≥12.5% of the growing season	%

F. Summary and Conclusions

According to the results generated, this proposed BMP will meet (or exceed) the 270,000 lb/yr goal for PTC (Stony Run BMP). The actual size of the project and resulting sediment reductions will be based final design calculations to ensure that the needs of the PTC are met.

Based on anticipated post-construction stream conditions, including low bank heights and low-very low erosion rates resulting from the floodplain restoration approach to stream restoration, a preliminary calculation of delivered nutrient loading from the BMP would estimate a delivered TSS loading of greater than or equal to than 90%. In accordance with agency coordination and PA DEP recommendations, RES has been directed to assume only a 50% efficiency initially and then validate the actual post-restoration condition, which RES has calculated on similar projects to be above 96% (PA DEP caps at 90%). These calculations demonstrate a direct nexus between the potential Chesapeake Bay Watershed BMP and improved water quality improvements in the downstream Chesapeake Watershed. They also confirm that, amongst the various studied BMPs, RES can provide a viable and feasible mechanism to provide PTC with the contracted sediment reduction.

APPENDIX A
FIGURES

Figure 1
Project Location

Stony Run BMP
East Cocalico Twp., Lancaster Co.

76.0977°W 40.2287°N

- Contour (1ft)
- Project Streams (±1,808 LF)
- Non-Project Streams
- Conservation Area (±5.20 AC)

N

1 in = 75 ft *when printed at 11x17"*

0 25 50 75
Feet

Reference: Stream lengths and conservation area acreage are preliminary and subject to field verification and survey.
Data Source: PEMA 6in-resolution aerial imagery (2018); USGS 3DEP PA North Central LiDAR (2019)
Spatial Reference: NAD83 StatePlane PA South (ft)
Date Exported: 1/27/2023
Project Number: 105247

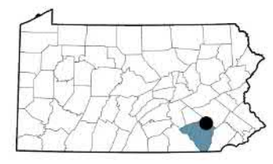


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Figure 2
Land Cover

Stony Run BMP
East Cocalico Twp., Lancaster Co.

76.0977°W 40.2287°N

Project Location

2019 NLCD

- Open Water
- Developed (Open Space)
- Developed (Low Intensity)
- Developed (Med. Intensity)
- Developed (High Intensity)
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herb. Wetlands

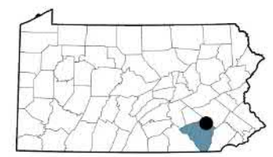
N

1 in = 0.5 mi *when printed at 11x17"*

0 0.13 0.25 0.5

Miles

Reference: Conservation area acreage is preliminary and subject to field verification and survey.
Data Source: USGS 30m-resolution NLCD (2019)
Spatial Reference: NAD83 StatePlane PA South (ft)
Date Exported: 1/27/2023
Project Number: 105247



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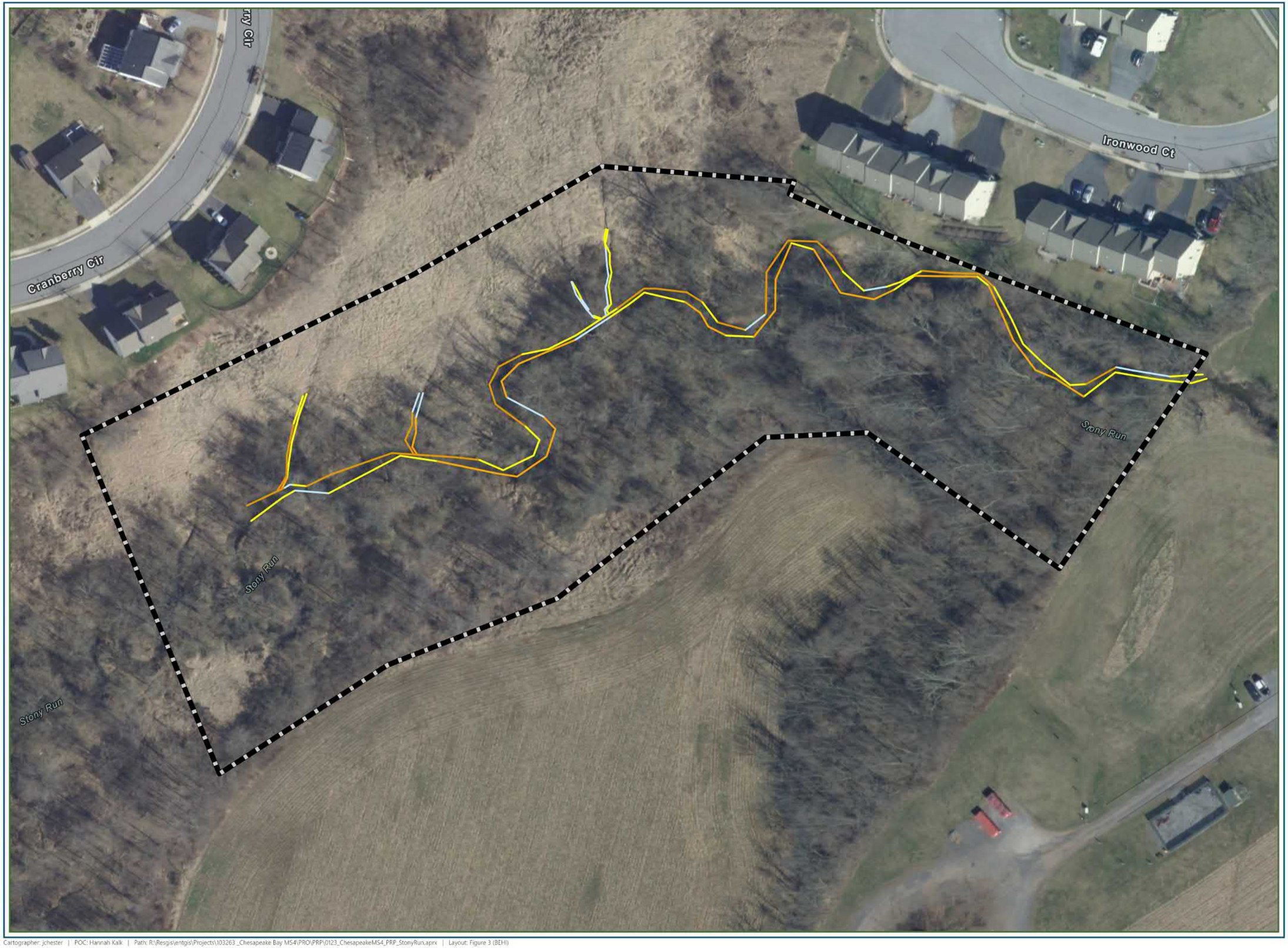


Figure 3
BEHI Rating

Stony Run BMP
East Cocalico Twp., Lancaster Co.

76.0977°W 40.2287°N

Conservation Area (±5.20 AC)

BEHI Rating

- Very Low (N/A)
- Low
- Moderate
- High
- Very High (N/A)
- Extreme (N/A)

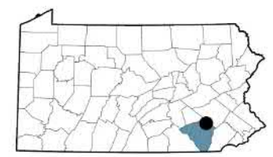
N

1 in = 75 ft *when printed at 11x17"*

0 25 50 75

Feet

Reference: Conservation area acreage is preliminary and subject to field verification and survey.
Data Source: PEMA 6in-resolution aerial imagery (2018)
Spatial Reference: NAD83 StatePlane PA South (ft)
Date Exported: 1/27/2023
Project Number: 105247



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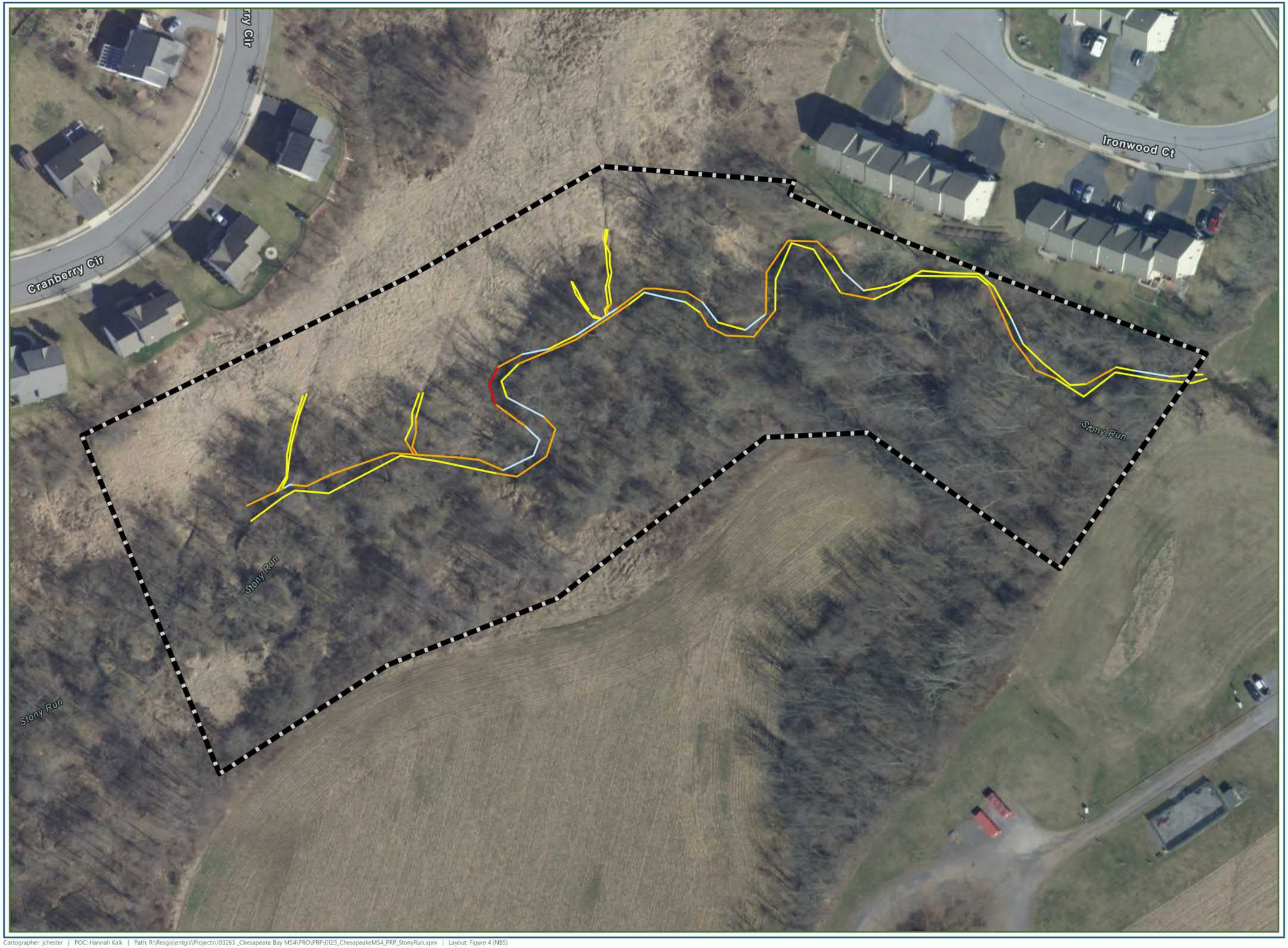


Figure 4
NBS Rating

Stony Run BMP
East Cocalico Twp., Lancaster Co.

76.0977°W 40.2287°N

Conservation Area (±5.20 AC)

NBS Rating

- Very Low (N/A)
- Low
- Moderate
- High
- Very High
- Extreme (N/A)

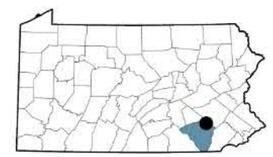
N

1 in = 75 ft *when printed at 11x17"*

0 25 50 75

Feet

Reference: Conservation area acreage is preliminary and subject to field verification and survey.
Data Source: PEMA 6in-resolution aerial imagery (2018)
Spatial Reference: NAD83 StatePlane PA South (ft)
Date Exported: 1/27/2023
Project Number: 105247



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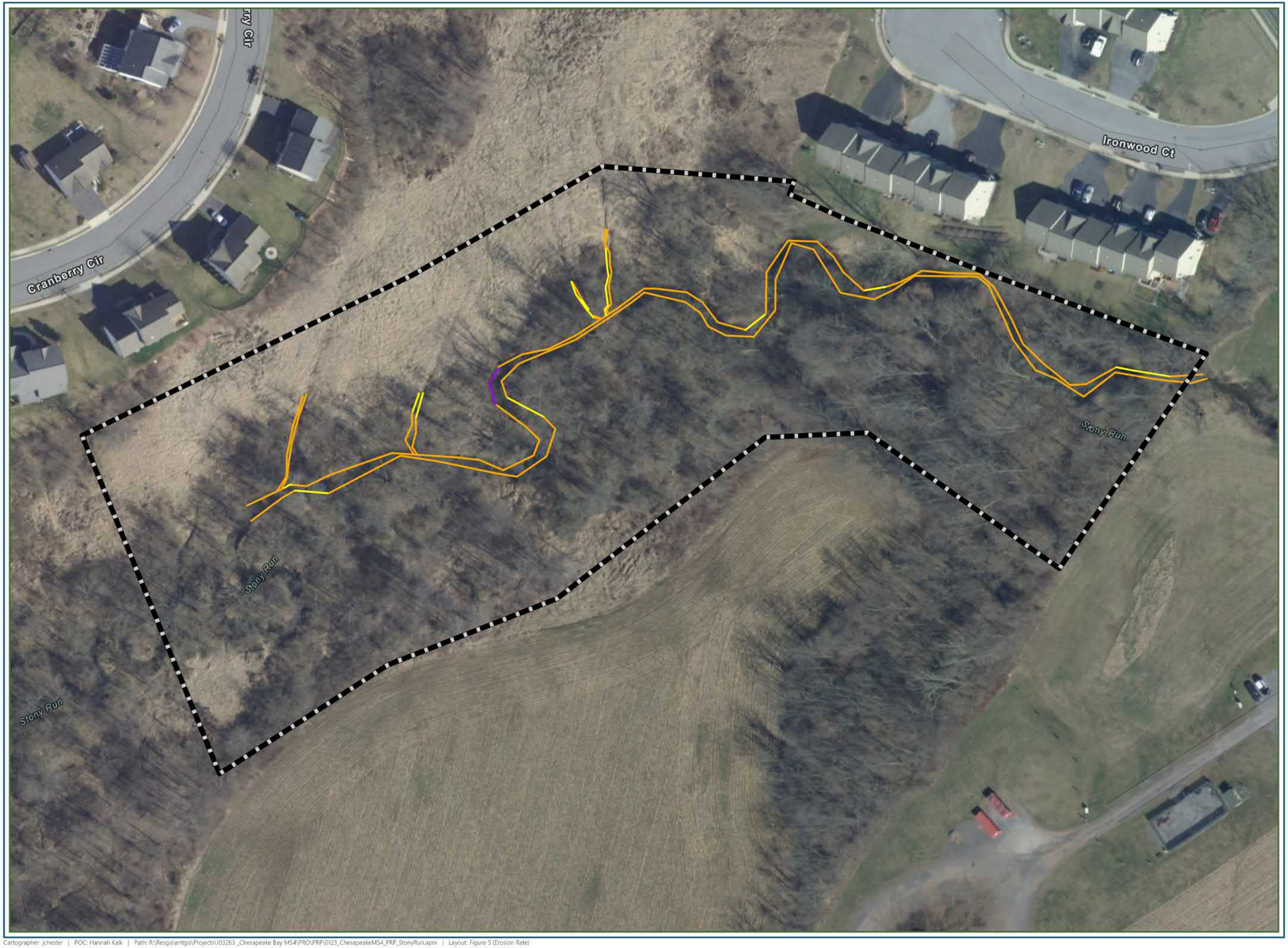

Figure 5
Erosion Rate

Stony Run BMP
East Cocalico Twp., Lancaster Co.

76.0977°W 40.2287°N

Conservation Area (±5.20 AC)

Erosion Rate (ft/yr)

- < 0.10 (Low)
- 0.10 - 1.00 (Moderate)
- 1.00 - 1.10 (High-Very High)
- > 1.10 (Extreme)

N

1 in = 75 ft *when printed at 11x17"*

0 25 50 75

Feet

Reference: Conservation area acreage is preliminary and subject to field verification and survey.
Data Source: PEMA 6in-resolution aerial imagery (2018)
Spatial Reference: NAD83 StatePlane PA South (ft)
Date Exported: 1/27/2023
Project Number: 105247

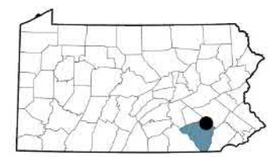

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Figure 6
Erosion Pins

Stony Run BMP
East Cocalico Twp., Lancaster Co.

76.0977°W 40.2287°N

Conservation Area (±5.20 AC)

Erosion Pins

Erosion Rate (ft/yr)

- < 0.10 (Low)
- 0.10 - 1.00 (Moderate)
- 1.00 - 1.10 (High-Very High)
- > 1.10 (Extreme)
- Non-Project Bank

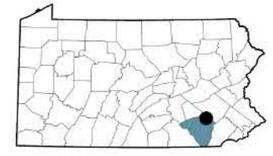
N

1 in = 75 ft *when printed at 11x17"*

0 25 50 75

Feet

Reference: Conservation area acreage is preliminary and subject to field verification and survey.
Data Source: PEMA 6in-resolution aerial imagery (2018)
Spatial Reference: NAD83 StatePlane PA South (ft)
Date Exported: 1/27/2023
Project Number: 105247



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APPENDIX B
Example Site Protection Instrument

DECLARATION OF RESTRICTIVE COVENANT FOR CONSERVATION

This DECLARATION OF RESTRICTIVE COVENANTS FOR CONSERVATION ("Declaration") is made and entered into as of [date] by and between FIRST PENNSYLVANIA RESOURCE, L.L.C., a Pennsylvania limited liability company, with a business address at 33 Terminal Way, Pittsburgh, PA 15219 ("Grantee") and_____, an [individual/ corporation/other organization] with a mailing address at [_____] ("Grantor").

RECITALS

WHEREAS, Grantor owns certain real estate located in _____ County(ies), Pennsylvania, consisting of _____ acres, more or less, as described more specifically in **Exhibit A** hereto (the "Property"); and

WHEREAS, Grantee is a Pennsylvania company in the business of stream and wetland mitigation in the Commonwealth of Pennsylvania; and

WHEREAS, the Grantor has agreed to make a _____ acre portion of the Property, delineated in **Exhibit B**, where certain [stream and/or] wetland resources exist or may be created and/or enhanced (the "Conservation Area"), subject to this Declaration; and

WHEREAS, the Grantor agrees to the creation of the Conservation Area described herein and intends that the Conservation Area shall be preserved and maintained in perpetuity in an enhanced or natural condition, which will include functioning [streams and/or] wetlands; and

WHEREAS, the Conservation Area, or a portion thereof, is intended to be used in the future as mitigation for impacts to waters of the United States and/or waters of the Commonwealth of Pennsylvania authorized under U.S. Army Corps of Engineers ("Corps" to include any successor agency) or Pennsylvania Department of Environmental Protection ("PADEP" to include any successor agency) permit(s). Before, or at the time a Corps or PADEP permit or verification or a Mitigation Banking Instrument approves using this Conservation Area as mitigation: (1) the Mitigation Plan approved/required by such permit or Banking Instrument must contain a legal description of the portion of the Conservation Area to be used as mitigation or a Mitigation Bank; and (2) Grantee must record an addendum to this Declaration containing a legal description of the portion of the Conservation Area associated with each permit or Mitigation Bank, which references the applicable Corps and/or PADEP permit/verification number(s) or Mitigation Bank Site Name and any associated Corps/PADEP authorization/approval number(s). A form of the addendum to be used is attached to this Declaration as **Exhibit C**; and

WHEREAS, in recognition of the continuing benefit to the Property, and for the protection of waters of the United States and scenic, resource, environmental, and general property values, the Grantor and Grantee have agreed to place certain restrictive covenants on the Property, in order that the Conservation Area shall remain substantially in its natural condition forever; and

WHEREAS, the Grantor and Grantee agree and acknowledge that this Declaration, including the rights authorized to Grantee herein, shall be assignable and transferrable to Grantee's subsequent heirs, successors, and assigns, [if Holder known: including the _____]; and

[If Holder known: WHEREAS, the _____, a 501(c)(3) tax-exempt entity registered with the Bureau of Charitable Organizations of the Pennsylvania Department of State, is a holder of this Declaration] and

WHEREAS, this Declaration is constructed and covenanted to meet the requirements for conservation easements under the Pennsylvania Conservation and Preservation Easements Act, Act 29 of 2001, and as amended thereafter; and

NOW, THEREFORE, for good and valuable consideration and in consideration of the mutually held interests in enhancement and preservation of the environment, as well as the terms, conditions, and restrictions contained herein, and pursuant to the laws of the Commonwealth of Pennsylvania, Grantor does agree to the following terms and conditions:

A. **PURPOSE**

The purpose of this Declaration is:

(1) To preserve, protect, and enhance the native flora, fauna, soils, water table, aquifer, drainage patterns, wetland resources and other related environmental functions and values of the Conservation Area;

(2) To maintain the natural view shed of the Conservation Area in its native, enhanced, scenic and open condition;

(3) To assure that the Conservation Area, including its air space, streams and other aquatic resources on or beneath the Conservation Area, and including, but not limited to, subsurface aquifers, springs, and the water table, will be maintained in perpetuity in its natural condition, as that may be enhanced, as provided herein; and

(4) To prevent any use of the Conservation Area that threatens to or will impair, interfere with, or otherwise negatively affect its natural resource functions and values.

Grantor and Grantee [If known: and Holder] intend and agree that this Declaration will confine the use of the Conservation Area to such activities as are consistent with the purposes set forth herein.

B. **ACCESS**

In order to achieve the purposes of this Declaration, the following rights are created in accordance with Pennsylvania law:

(1) The Grantee shall have the right and Grantor acknowledges the right of [the holder(s) of this Declaration,] the Corps, the PADEP, and other government agencies with legal authority to enter upon the Property for purposes related to this Declaration, to inspect the Conservation Area at reasonable times to monitor compliance with this Declaration. Except in cases of a threat of a physical or public safety emergency, such entry shall, when practicable, be upon reasonable prior notice to Grantor or its successors and assigns, and such entry shall not unreasonably interfere with the Grantor's or its successors' and assigns' use and quiet enjoyment of the Property.

(2) The Grantor, Grantee, [holder(s) of this Conservation Declaration,] the Corps, the PADEP and other government agencies with legal authority to enter upon the Property for purposes related to this Declaration, each shall have the right to enter upon the Property to access the Conservation Area at reasonable times and upon prior notice to the Grantor; and upon notice and written approval by the Corps may take appropriate environmental or conservation management measures within the Conservation Area consistent with the terms and purposes of this Declaration, including, but not limited to:

(a) planting of native vegetation (i.e. trees, shrubs, grasses, and forbs); and

(b) restoring, altering or maintaining the topography, hydrology, drainage, structural integrity, streambed(s), streambank(s), water quantity, water quality, any relevant feature of a stream, wetland, water body, or vegetative buffer within the Conservation Area.

(3) The Grantor and Grantee, [holder(s) of this Declaration], the Corps, PADEP, and other government agencies with legal authority to enter upon the Property for purposes related to this Declaration, shall each have the right to enforce the terms of this Declaration by appropriate legal proceedings in accordance with applicable law so as to prevent any activity on or use of the Property that is inconsistent with the purposes of this Declaration and to require the restoration of such areas or features of the Conservation Area that may be impaired or damaged by an inconsistent activity or use.

C. DURATION

This Declaration shall remain in effect in perpetuity, shall run with the land regardless of ownership or use, and is binding upon and shall inure to the benefit of the Grantor and Grantee's [if known – and holder's] heirs, executors, administrators, successors, representatives, devisees, and assigns, as the case may be, as long as said party shall have any interest in any portion(s) of the Conservation Area.

D. RESTRICTIONS

Any activity in or use of the Conservation Area that is inconsistent with the purposes of this Declaration by the Grantor; subsequent property owner(s); and the personal representatives, heirs, successors, and assigns of either the Grantor or subsequent property owner(s), is prohibited. Without limiting the generality of the foregoing, and except when an approved purpose under B.(2) above, or as necessary to accomplish mitigation approved under the any permit(s) reliant upon this Declaration, the following activities and uses are expressly prohibited in, on, over, or under the Conservation Area, subject to the express terms and conditions below:

(1) **Structures**. The construction of man-made structures including, but not limited to, the construction, removal, placement, preservation, maintenance or alteration of any buildings, roads, utility lines, billboards, or other advertising. This restriction does not include deer stands, bat boxes, bird nesting boxes, bird feeders, duck blinds, and the placement of signs for safety purposes or boundary demarcation.

(2) **Demolition**. The demolition of fencing structures constructed by the Grantee for the purpose of demarcation of the Conservation Area or for public safety.

(3) **Soils**. The removal, excavation, disturbance, or dredging of soil, sand, peat, gravel, or aggregate material of any kind; or any change in the topography of the land, including any discharges of dredged or fill material, ditching, extraction, drilling, driving of piles, mining or excavation of any kind.

(4) **Drainage**. The drainage or disturbance of any aquifer, the surface water level or the water table.

(5) **Waste or Debris**. The storage, dumping, depositing, abandoning, discharging, or releasing of any gaseous, liquid, solid, or hazardous waste substance, materials or debris of whatever nature on, in, over, or underground or into surface or ground water.

(6) **Non-Native Species**. The planting or introduction of non-native or invasive species.

(7) **Herbicides, Insecticides, and Pesticides**. The use of herbicides, insecticides, or pesticides, or other chemicals, except for as may be necessary to control invasive species that threaten the natural character of the Conservation Area. State-approved municipal application programs necessary to protect public health and welfare are not included in this prohibition.

(8) **Removal of Vegetation**. The mowing, cutting, pruning, removal; disturbance, destruction, or collection of any trees, shrubs, or other vegetation, except for pruning, cutting or removal for:

a) safety; or
b) control in accordance with accepted scientific forestry management practices for diseased or dead vegetation; or
c) control of non-native species and noxious weeds; or
d) scientific nature study.

(9) **Agricultural Activities**. Unless currently used for agricultural or similarly related purposes, the conversion of, or expansion into, any portion of the Conservation Area for use of agricultural, horticultural, aquacultural, silvicultural, livestock production or grazing activities. This prohibition also includes conversion from one type of these activities to another (e.g. from agricultural to silvicultural).

(10) **Subdivision of Conservation Area**. Subdivision of real property within the Conservation Area into multiple parcels.

(11) **Other**. Other acts, uses, excavation, or discharges, which adversely affect fish or wildlife habitat or the preservation of lands, waterways, or other aquatic resources mentioned herein and located within the Conservation Area.

E. INSPECTION, ENFORCEMENT AND ACCESS RIGHTS

As set forth in Section B, above, the Grantee, holder(s) of this Declaration, the Corps, PADEP and other government agencies with legal authority to enter upon the Property for purposes related to this Declaration have the right to enter the Property to observe the Conservation Area and to take actions necessary to verify compliance with and to enforce this Declaration. When practicable, such entry shall be upon prior reasonable notice to the property owner. No violation of this Declaration shall result in a forfeiture or reversion of title. In any enforcement action, an enforcing agency shall be entitled to a complete restoration for any violation, as well as other authorized judicial remedies such as civil penalties. Nothing herein shall be interpreted to limit the right of the Corps to modify, suspend, or revoke any permit issued or authorized by Corps.

F. RECORDING AND EXECUTION BY PARTIES

Within thirty (30) calendar days of execution of this Agreement, the Grantee shall record this Declaration in the County office where land records are retained and shall provide proof of recordation to Grantor, the Corps, and PADEP within ten (10) business days of execution. Further, if anticipated activities in the Conservation Area are agreed upon for future phases of the site, as set forth in Section H (Reserved Rights) herein, the Grantee must submit plans to the Corps and PADEP for review and approval prior to any work in the Conservation Area.

G. NOTICE OF TRANSFER OF PROPERTY INTERESTS

No transfer of the rights set forth in this Declaration, or action to void or modify this Declaration, including transfer of title to or establishment of any other legal claims over the Conservation Area or the underlying Property it occupies, shall occur without sixty (60) calendar days' prior written notice to the Corps and the PADEP.

H. RESERVED RIGHTS

(1) This Declaration will not prevent the Grantor, or any subsequent owner of the Property and/or portions of the Property, from making use of the area(s) outside of the Conservation Area or from uses that are consistent with the purposes of this Declaration, including, but not limited to the following:

(a) **Existing Agreements**. Uses that Grantor is required to allow under valid, existing, recorded agreements are permitted, to the extent they do not interfere with, threaten, or degrade the Conservation Area and only to the extent they are consistent with the purposes of this Declaration. The Grantor[, holder(s) hereof,] and any holders of easements or other property rights for the operation and maintenance of pre-existing or project-related structures or infrastructure, such as roads, utilities, drainage ditches, or stormwater facilities that are present on, over, or under the Conservation Area, reserve the right, within the terms and conditions of their permits, agreements, and the law, to continue with such operation and maintenance. All pre-existing or approved project-related structures or infrastructure, if any, shall be shown on the accompanying plat map or approved plan and attached to this Declaration as **Exhibit D**.

(b) **Subsequent Agreements Allowing Subsurface Activity**. Subject to review by Grantee [if holder known – and holder of this Declaration], and only to the extent they are consistent with the purposes of this Declaration, agreements for the extraction of natural gas (regardless of source) or oil, and injection or release of water and other substances to facilitate such extraction, but excluding injection wells subject to state or federal underground injection control programs. The activities subject to such agreement may only occur at subterranean depths at which there can be no impairment of or detectable impact to water quality or quantity, native flora, fauna, soils, water table, aquifer, drainage patterns, and other related environmental functions and values of the Property, or on other resources described in this Declaration. No surface activities or uses, incident to such extraction are permitted in the Conservation Area. Grantor and Grantee shall provide the Corps and PADEP notice of Grantor's intent to enter into an agreement allowing subsurface activities at least sixty (60) days prior to executing the agreement.

(2) If the success of a compensatory mitigation project required or authorized by the Corps and PADEP requires any related or unanticipated infrastructure modifications, utility relocation, drainage ditches, or stormwater controls within the identified Conservation Area, or if a situation requires measures to remove threat to life or property within the identified Conservation Area, said activities must be approved in writing by the Corps and PADEP subject to terms and conditions set forth in the written approval. Approval is subject to the Corps's and PADEP's discretion. If approved, said activities must be identified on an amended **Exhibit D** and must be recorded and specifically noted as an "amendment" and copies of the recorded **Amended Exhibit D** must be provided to the Corps and PADEP within sixty (60) days of Corps approval. Approval of said activity by the Corps is in addition to any Clean Water Act, Section 404 permit, or other authorization, which may be required in order to legally implement said activity. The Grantor and Grantee accept the obligation to place any other and/or subsequent responsible party on reasonable prior notice of their need to request such Corps approval.

(3) **Enhancements, Maintenance and Repair**. This Declaration is not intended to prohibit future necessary or desired maintenance, repair, or enhancements to the

Property, where such actions are approved by the Corps and PADEP as appropriate, either through an approved mitigation plan (Section K below) or by a separate permit.

[I. The Grantor has mortgaged the Property subject to this Declaration. The lender has executed Subordination of Mortgage instruments related to the parcels subject of this Declaration for the sole purpose of subordinating their respective liens, dignity and priority interests to this Declaration. The executed Subordination of Mortgage instruments are attached hereto as **Exhibit E**: Mortgage Subordination Documents, and incorporated fully herein.]

J. **SEVERABILITY**

If any portion of this Declaration, or the application thereof to any person or circumstance, is found to be invalid, the remainder of the provisions of this instrument, or application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

K. **MITIGATION**

If the work required by a mitigation plan approved by the Corps and PADEP, including maintenance or remedial work, occurs within the Conservation Area, then the Grantee is allowed to construct and undertake the mitigation work in accordance with an authorized mitigation plan.

L. **ASSIGNMENT**

The Grantee [If Holder exists: and/or Holder each] is authorized to assign or transfer its rights and obligations under this Declaration to an organization that is a qualified organization under Section 170(h) of the Internal Revenue Code at the time of transfer.

M. **COAL RIGHTS NOTICE**

The following notice is given to and accepted by Grantor for the purpose and with the intention of compliance with the requirements of the Pennsylvania Conservation and Preservation Easements Act. Nothing herein shall imply the presence or absence of workable coal seams or the severance of coal interests from the Property.

NOTICE:

THIS DECLARATION may impair the development of coal interests including workable coal seams or coal interests which have been severed from the Property.

IN WITNESS WHEREOF, intending to be legally bound, the Parties have executed this Declaration the day and year first above written.

GRANTOR:

_____

WITNESS:

_____

GRANTEE :

First Pennsylvania Resource, L.L.C.
a Pennsylvania limited liability company

By: Resource Environmental Solutions, LLC, its sole manager

By: _____
Name: _____
Title: _____

WITNESS:

_____

HOLDER:

_____

By: _____

WITNESS:

_____

COMMONWEALTH OF PENNSYLVANIA :
: SS
COUNTY OF _____ :

On _____, before me, a Notary Public for the Commonwealth aforesaid, personally appeared _____, known to me or satisfactorily proven to be the person whose name is subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I have set my hand and official seal.

_____
Notary Public
My commission expires:
_____

[SEAL]

COMMONWEALTH OF PENNSYLVANIA :
: SS
COUNTY OF _____ :

On _____, before me, a Notary Public for the Commonwealth aforesaid, personally appeared _____, who acknowledged himself/herself to be the _____of the _____known to me or satisfactorily proven to be the person whose name is subscribed to the within instrument, and acknowledged that he executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I have set my hand and official seal.

_____
Notary Public
My commission expires:
_____

[SEAL]

COMMONWEALTH OF PENNSYLVANIA :
: SS
COUNTY OF _____ :

On _____, before me, a Notary Public for the Commonwealth aforesaid, personally appeared _____, who acknowledged himself/herself to be the _____ of Resource Environmental Solutions, LLC, as manager of First Pennsylvania Resource, L.L.C., a Pennsylvania limited liability company, and that s/he, in the capacity set forth above, on behalf of the Grantee, being authorized to do so, executed, in my presence, the foregoing Declaration for the purposes herein contained.

IN WITNESS WHEREOF, I have set my hand and official seal.

_____
Notary Public
My commission expires:
_____

[SEAL]

APPENDIX C
Design Plans

CHESAPEAKE BAY MS4 SEDIMENT REDUCTION PROJECT
STONY RUN BMP DESIGN PLAN

EAST COCALICO TOWNSHIP, LANCASTER COUNTY, PENNSYLVANIA

1. PROJECT DESCRIPTION:

FIRST PENNSYLVANIA RESOURCE, LLC (FPR), IS PROPOSING STREAM AND WETLAND RESTORATION AT THE STONY RUN BMP (BEST MANAGEMENT PRACTICE) IN ASSOCIATION WITH THE GREATER CHESAPEAKE BAY WATERSHED SEDIMENT REDUCTION PROJECT (PROJECT) IN LANCASTER COUNTY, PA. THE PROJECT PROPOSES TO USE STREAM RESTORATION AS A SEDIMENT AND NUTRIENT LOAD REDUCTION (COLLECTIVELY, LOAD REDUCTION) BEST MANAGEMENT PRACTICE (BMP) WITH A FLOODPLAIN RESTORATION APPROACH TO RESTORE STREAM AND FLOODPLAIN AREAS WITHIN THE CHESAPEAKE BAY WATERSHED.

THE BMP IS LOCATED WITHIN A DEGRADED WETLAND AND SHRUBLAND COMPLEX ABUTTING A HOUSING DEVELOPMENT. THE RESULTING STREAMS ARE UNSTABLE AND INCISED WITH MINIMAL CONNECTION TO THEIR HISTORIC FLOODPLAINS. RESTORATION EFFORTS WILL UTILIZE A COMBINATION OF CHANNEL RELOCATION, CHANNEL FILLING, FLOODPLAIN GRADING, SUBSURFACE GRADE CONTROL STRUCTURES, AND HABITAT STRUCTURAL IMPROVEMENTS TO RESTORE THE CHANNEL PATTERN AND FLOODPLAIN. THE FLOODPLAIN RESTORATION APPROACH WILL SPREAD HIGH FLOW STORM EVENTS ACROSS THE LARGER RE-ESTABLISHED FLOODPLAINS, REDUCING SHEAR STRESSES WITHIN THE CHANNEL. A COMBINATION OF SUBSURFACE LOG AND ROCK WILL BE USED TO PROVIDE GRADE CONTROL AND ADD LONG-TERM VERTICAL BED STABILITY.

2. SPONSOR:

FIRST PENNSYLVANIA RESOURCES, LLC.
ATTN: HANNAH KALK
317 EAST CARSON ST, SUITE 242
PITTSBURGH, PA 15219
EMAIL: HKALK@RES.US
PHONE: (412) 249-2435

3. SITE COORDINATES:

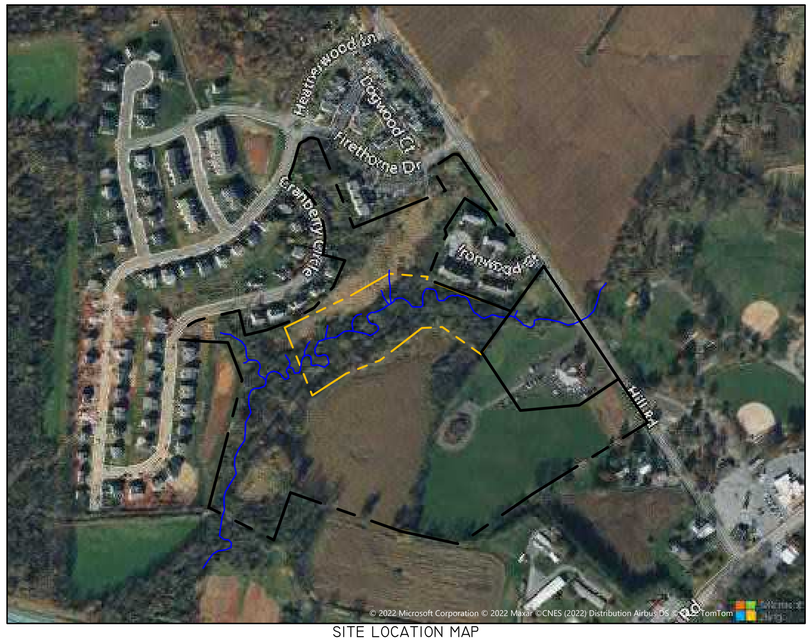
LATITUDE: 40° 13' 44.1" N (40.228929)
LONGITUDE: 76° 05' 47.8" W (-76.096606)

4. LANDOWNERS:

4.1. EAST COCALICO TOWNSHIP
EAST COCALICO TWP MUNICIPAL BUILDING
100 HILL ROAD, DENVER, PA 17517

5. SURVEY INFORMATION:

EXISTING SURFACE CONTOUR DATA AND PARCEL DATA ACQUIRED FROM PASDA IMAGERY NAVIGATOR, WWW.PASDA.PSU.EDU



SITE LOCATION MAP

0 300 600 1200 FEET

SCALE: 1" = 300'

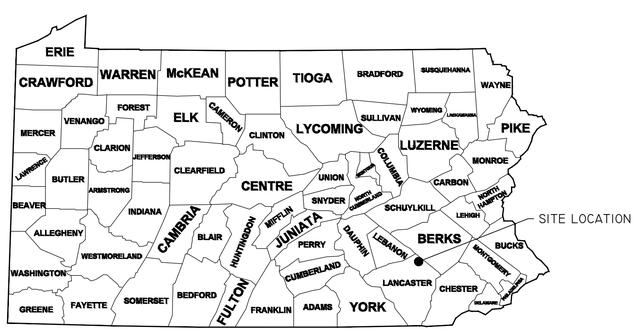
MAP LEGEND	
PROPERTY BOUNDARY	
SITE PROTECTION BOUNDARY	
EXISTING THALWEG	

PROJECT LOCATION MAP

0 5000 10000 20000 FEET

SCALE: 1" = 5000'

SHEET INDEX	
SHEET #	SHEET TITLE
C00	TITLE SHEET
C100	EXISTING CONDITIONS
C200	SITE OVERVIEW
C300	PROPOSED GRADING
C301	PROPOSED GRADING
C500	GEOTECHNICAL CROSS SECTIONS
C501	GEOTECHNICAL CROSS SECTIONS
C502	GEOTECHNICAL CROSS SECTIONS
C600	EXISTING THALWEG PROFILES
C601	PROPOSED CROSS SECTIOS
C800	CONSTRUCTION DETAILS
C801	CONSTRUCTION DETAILS
C900	SITE RESTORATION PLAN
C901	SITE RESTORATION DETAILS
C902	PLANTING LIST
S100	STREAM S-1 2-YEAR MODELED SHEAR STRESS
S101	STREAM S-1 10-YEAR MODELED SHEAR STRESS
S102	STREAM S-1 100-YEAR MODELED SHEAR STRESS



FIRST PENNSYLVANIA RESOURCE, LLC.

ATTN: HANNAH KALK
317 EAST CARSON ST, SUITE 242
PITTSBURGH, PA 15219
EMAIL: HKALK@RES.US
PHONE: (412) 249-2435

REVISIONS			
NO.	DESCRIPTION	DATE	BY

CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

PENNSYLVANIA — LANCASTER COUNTY — EAST COCALICO TOWNSHIP

DRAWN BY: AS
CHECKED BY: NH
APPROVED BY: MK
DATE: AUGUST 4, 2022

SHEET: C000
PROJECT NO: 106922

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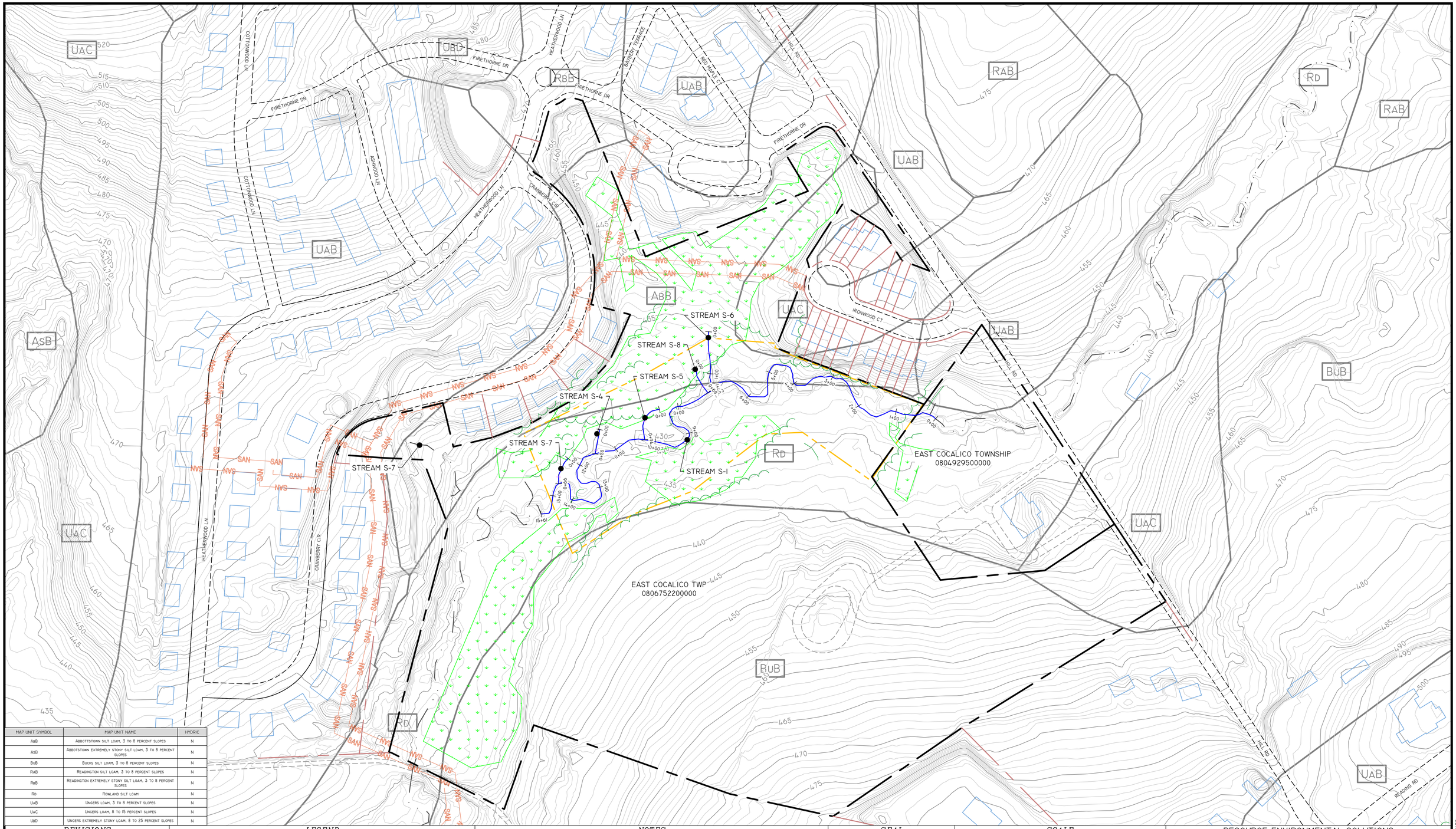

MAP UNIT SYMBOL	MAP UNIT NAME	HYDRIC
AaB	Abbottstown silt loam, 3 to 8 percent slopes	N
AsB	Abbottstown extremely stony silt loam, 3 to 8 percent slopes	N
BuB	Bucks silt loam, 3 to 8 percent slopes	N
RaB	Readington silt loam, 3 to 8 percent slopes	N
RbB	Readington extremely stony silt loam, 3 to 8 percent slopes	N
Rd	Rowland silt loam	N
UaB	Ungers loam, 3 to 8 percent slopes	N
UaC	Ungers loam, 8 to 15 percent slopes	N
UbD	Ungers extremely stony loam, 8 to 25 percent slopes	N

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- RESERVED RIGHTS BOUNDARY
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
- ACCESS PATH
- TREE LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- SOIL TYPE BOUNDARY
- SANITARY ROW

NOTES

SEAL

SCALE

0 100 200 400 FEET

SCALE: 1" = 100'

RESOURCE ENVIRONMENTAL SOLUTIONS
317 East Carson St, Suite 242
Pittsburgh PA 15219
Telephone: (412) 249-2435
www.res.us
Email: hkalk@res.us

Chesapeake Bay MS4 Sediment Reduction
Project Stony Run BMP Design Plan

Existing Conditions

DRAWN BY:	WP	Pennsylvania	
CHECKED BY:	NH	Lancaster County	East Cocalico Township
APPROVED BY:	HK	SHEET: C100	PROJECT NO: 106922
DATE:	August 4, 2023		

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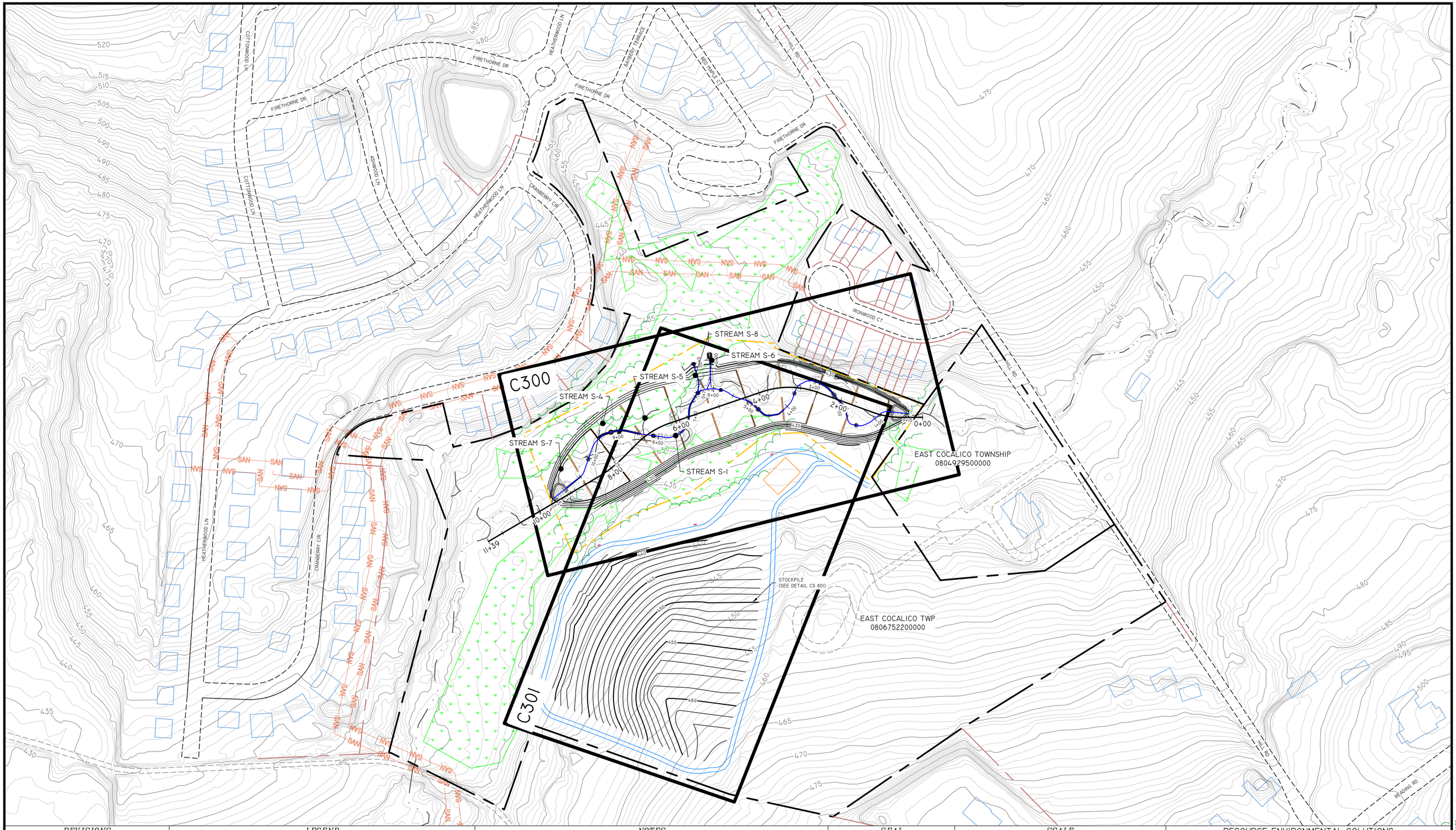

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- RESERVED RIGHTS BOUNDARY
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- EXISTING STRUCTURES
- ROAD
- ACCESS PATH
- TREE LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED BASELINE ALIGNMENT
- PROPOSED THALWEG ALIGNMENT
- PROPOSED GRADE LOG
- PROPOSED INTEGRATED RS ROCK
- PROPOSED WALKING TRAIL
- PROPOSED BENCHES
- PROPOSED SIGN
- PROPOSED PICNIC AREA

NOTES

SEAL

SCALE

0 100 200 400 FEET

SCALE: 1" = 100'

RESOURCE ENVIRONMENTAL SOLUTIONS
317 East Carson St, Suite 242
Pittsburgh PA 15219
www.res.us
Telephone: (412) 249-2435
Email: hkalk@res.us

Chesapeake Bay MS4 Sediment Reduction Project Stony Run BMP Design Plan

Site Overview

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C200	PROJECT NO: 106922
DATE:	August 4, 2023		

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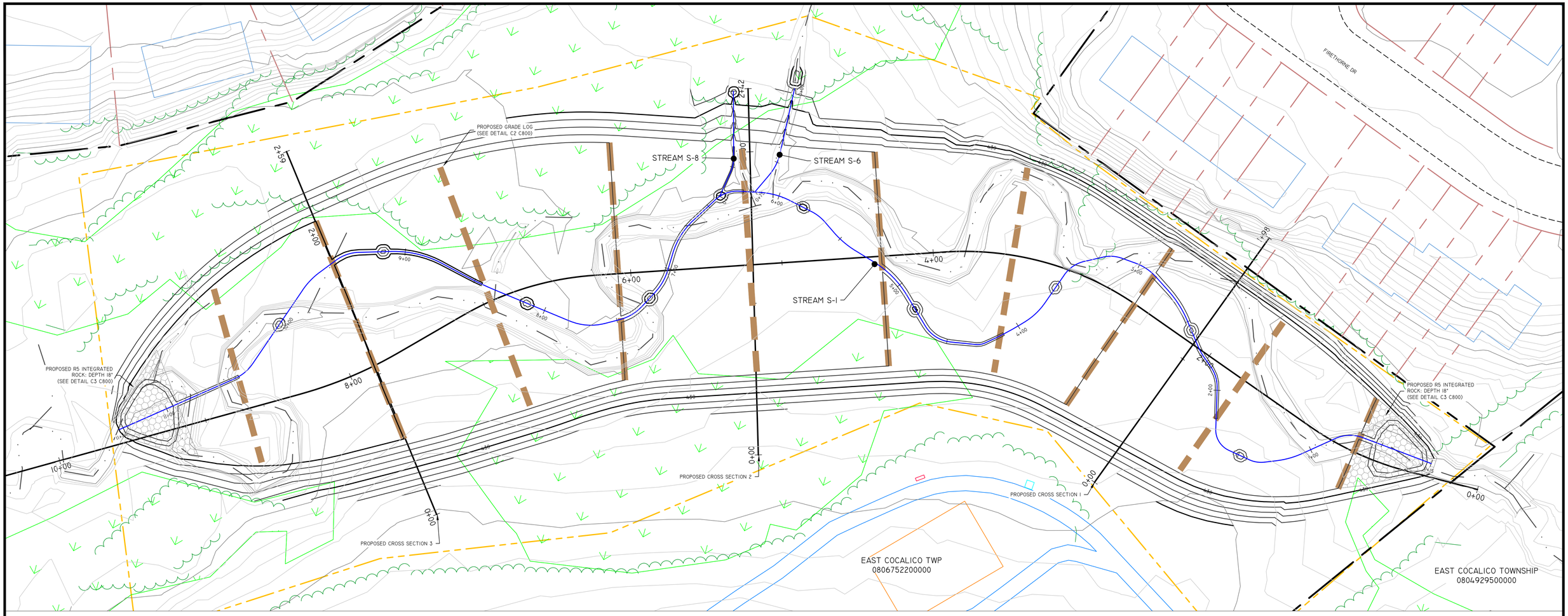

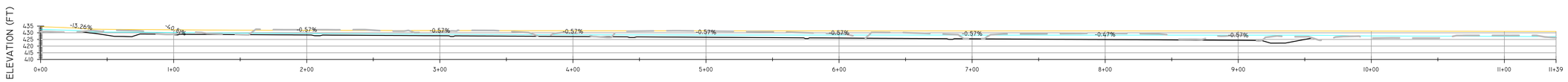

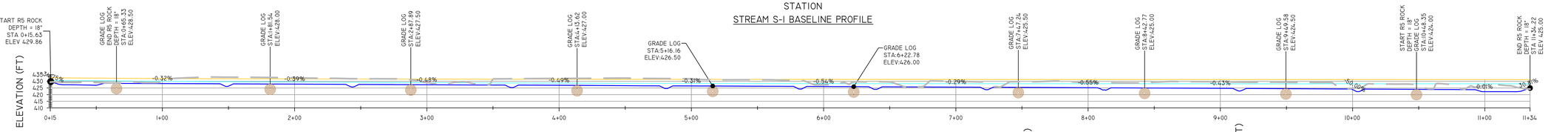

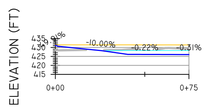

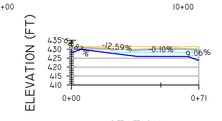

STREAM S-1 LOGS			
LOG NUMBER	STATION	ELEVATION	DESCRIPTION
1	0+65.33	428.500'	GRADE LOG
2	1+81.54	428.000'	GRADE LOG
3	2+87.89	427.500'	GRADE LOG
4	4+13.62	427.000'	GRADE LOG
5	5+16.16	426.500'	GRADE LOG
6	6+22.78	426.000'	GRADE LOG
7	7+47.24	425.500'	GRADE LOG
8	8+42.77	425.000'	GRADE LOG
9	9+49.58	424.500'	GRADE LOG
10	10+48.35	424.000'	GRADE LOG

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- RESERVED RIGHTS BOUNDARY
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
- ACCESS PATH
- TREE LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED BASELINE ALIGNMENT
- PROPOSED THALWEG ALIGNMENT
- PROPOSED CROSS SECTION ALIGNMENT
- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- PROPOSED THALWEG PROFILE
- PROPOSED 2YR WSE PROFILE
- PROPOSED 100YR WSE PROFILE

NOTES

SEAL

SCALE

0 30 60 120 Feet

SCALE: 1" = 30'

RESOURCE ENVIRONMENTAL SOLUTIONS
317 EAST CARSON ST, SUITE 242
PITTSBURGH PA 15219
TELEPHONE: (412) 249-2435
WWW.RES.US
EMAIL: HKALK@RES.US

CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

PROPOSED GRADING STREAM S-1 (0+00-11+34), STREAM S-6(0+00-0+75), STREAM S-8(0+00-0+71)

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C300	PROJECT NO: 106922
DATE:	AUGUST 4, 2023		

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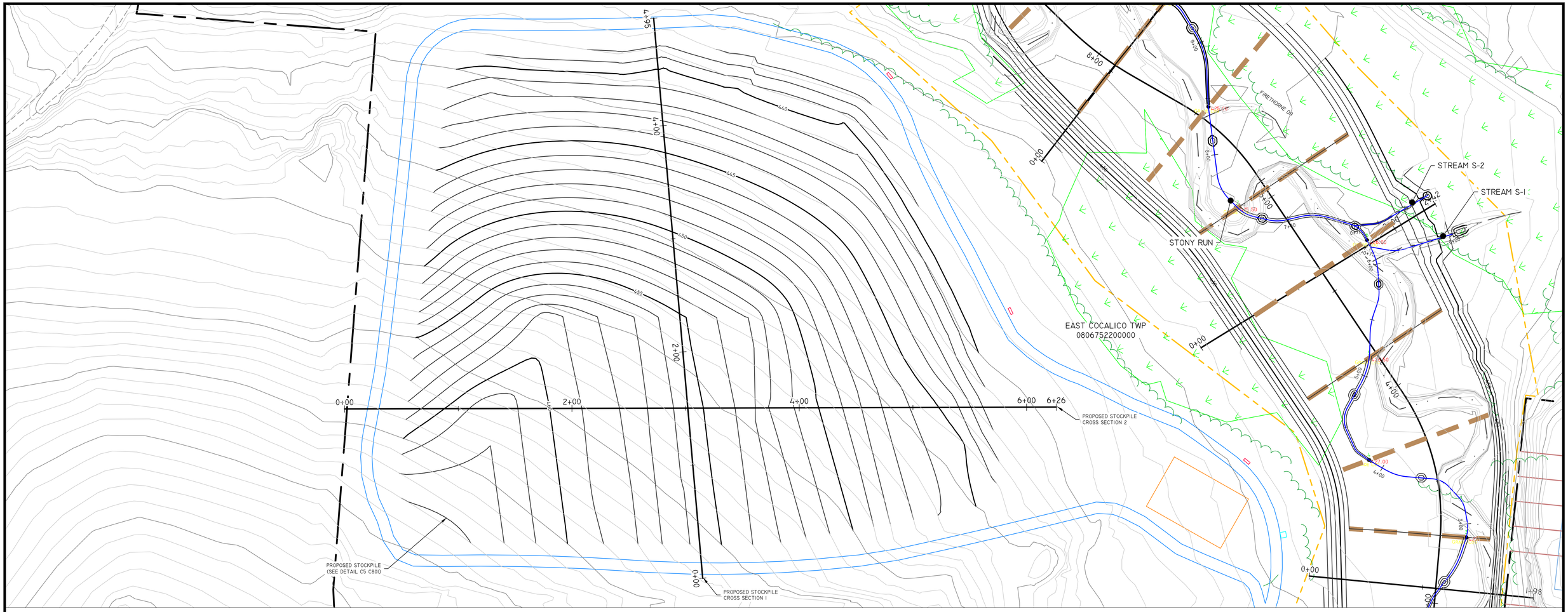
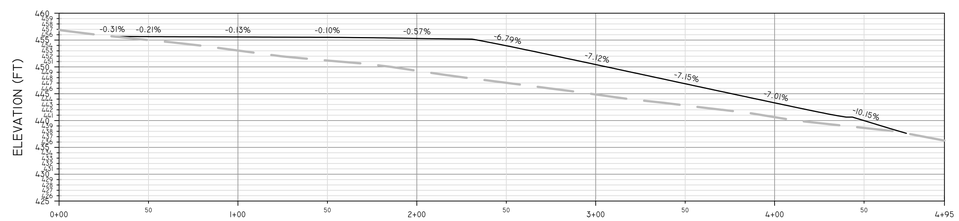
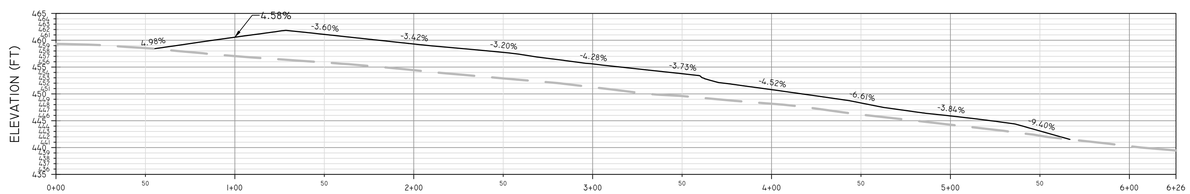




STATION

STONY RUN STOCKPILE CROSS SECTION 1



STATION

STONY RUN STOCKPILE CROSS SECTION 2

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- RESERVED RIGHTS BOUNDARY
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
- ACCESS PATH
- TREE LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED BASELINE ALIGNMENT
- PROPOSED THALWEG ALIGNMENT
- PROPOSED CROSS SECTION ALIGNMENT
- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- PROPOSED THALWEG PROFILE
- PROPOSED 2YR WSE PROFILE
- PROPOSED 100YR WSE PROFILE

NOTES

SEAL

SCALE

0 40 40 160 Feet

SCALE: 1" = 40'

RESOURCE ENVIRONMENTAL SOLUTIONS
317 EAST CARSON ST, SUITE 242
PITTSBURGH PA 15219
WWW.RES.US
TELEPHONE: (412) 249-2435
EMAIL: HKALK@RES.US

CHESAPEAKE BAY MS4 SEDIMENT REDUCTION PROJECT STONY RUN BMP DESIGN PLAN

PROPOSED STOCKPILE GRADING

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C301	PROJECT NO: 106922
DATE:	AUGUST 4, 2023		

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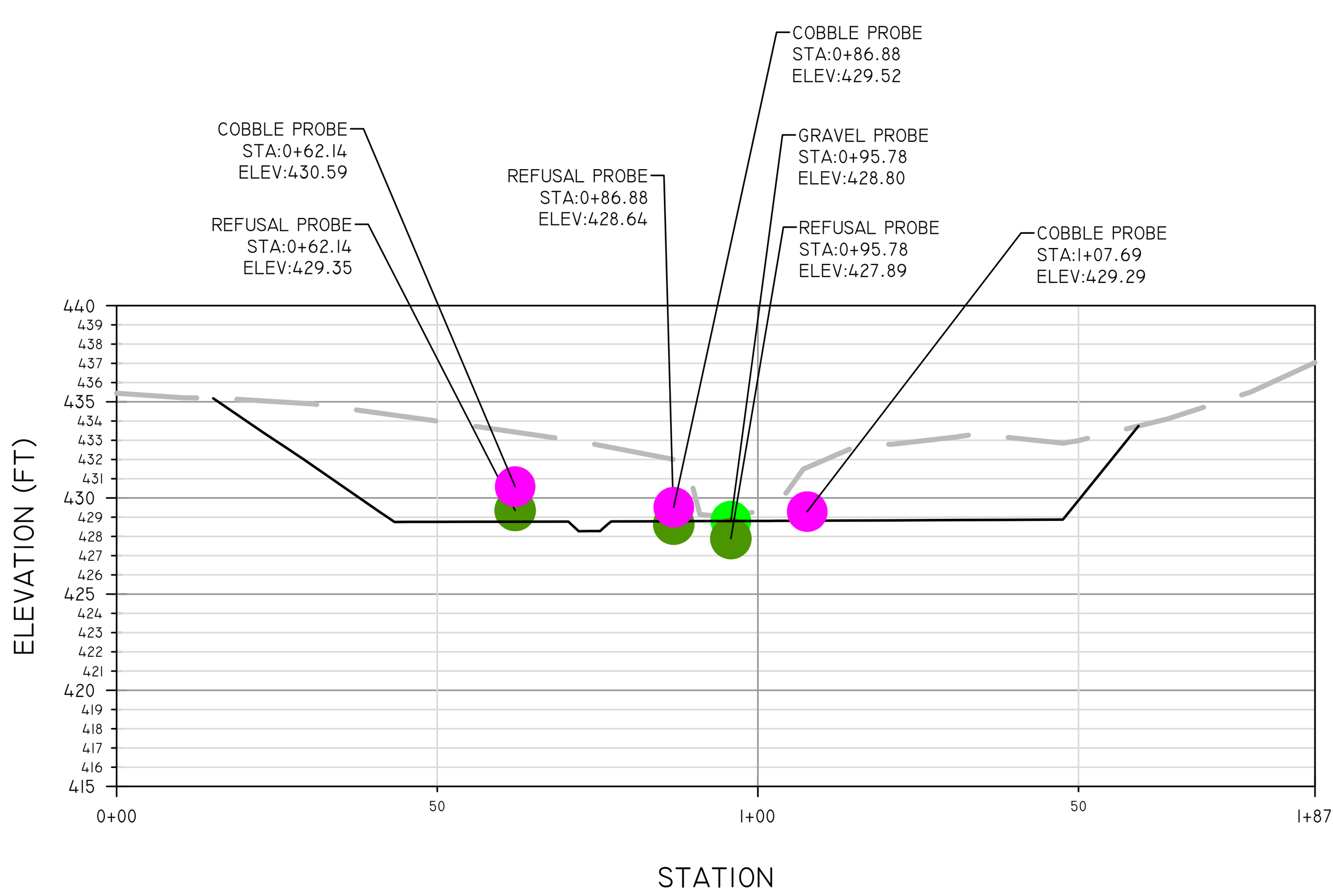
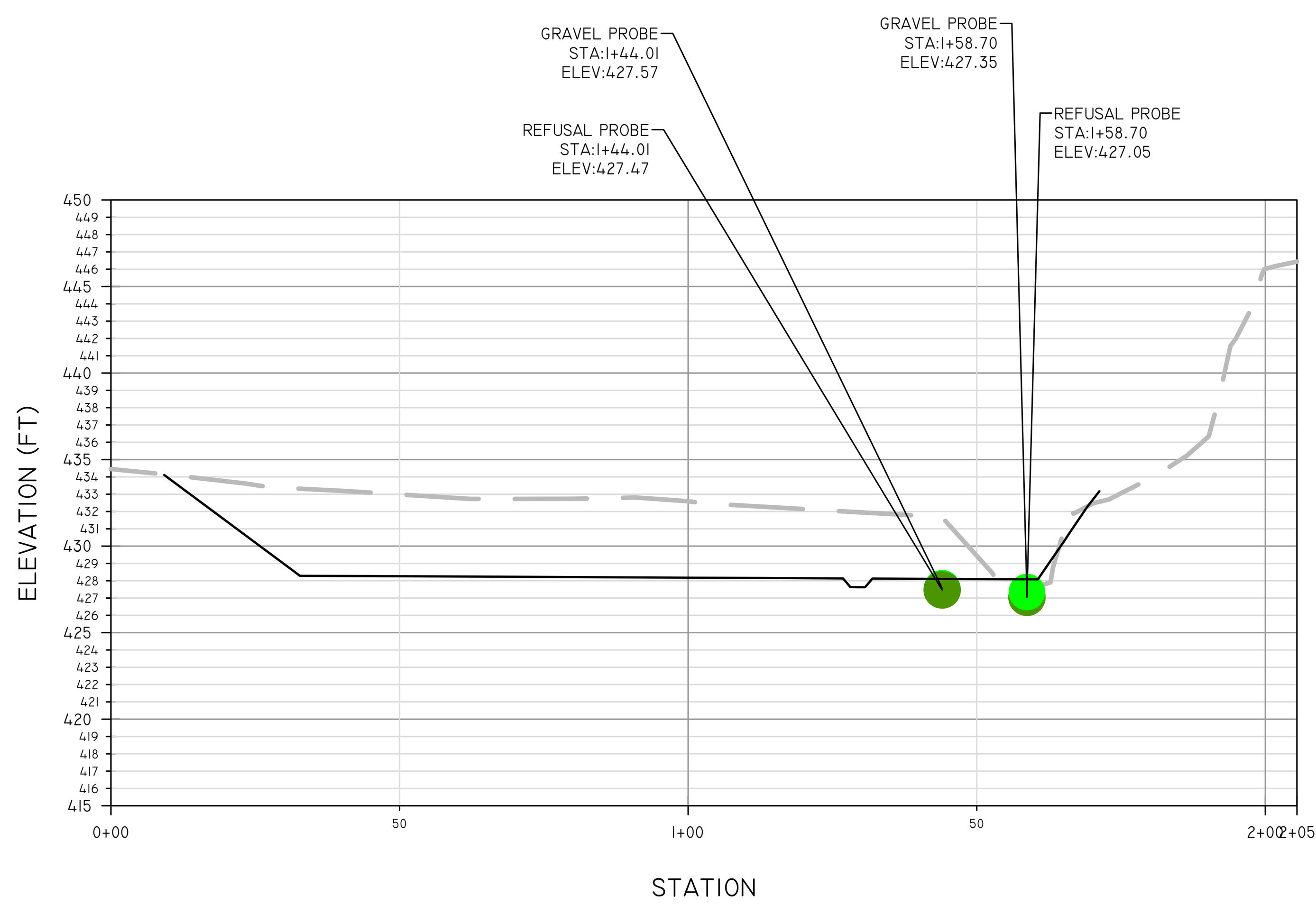
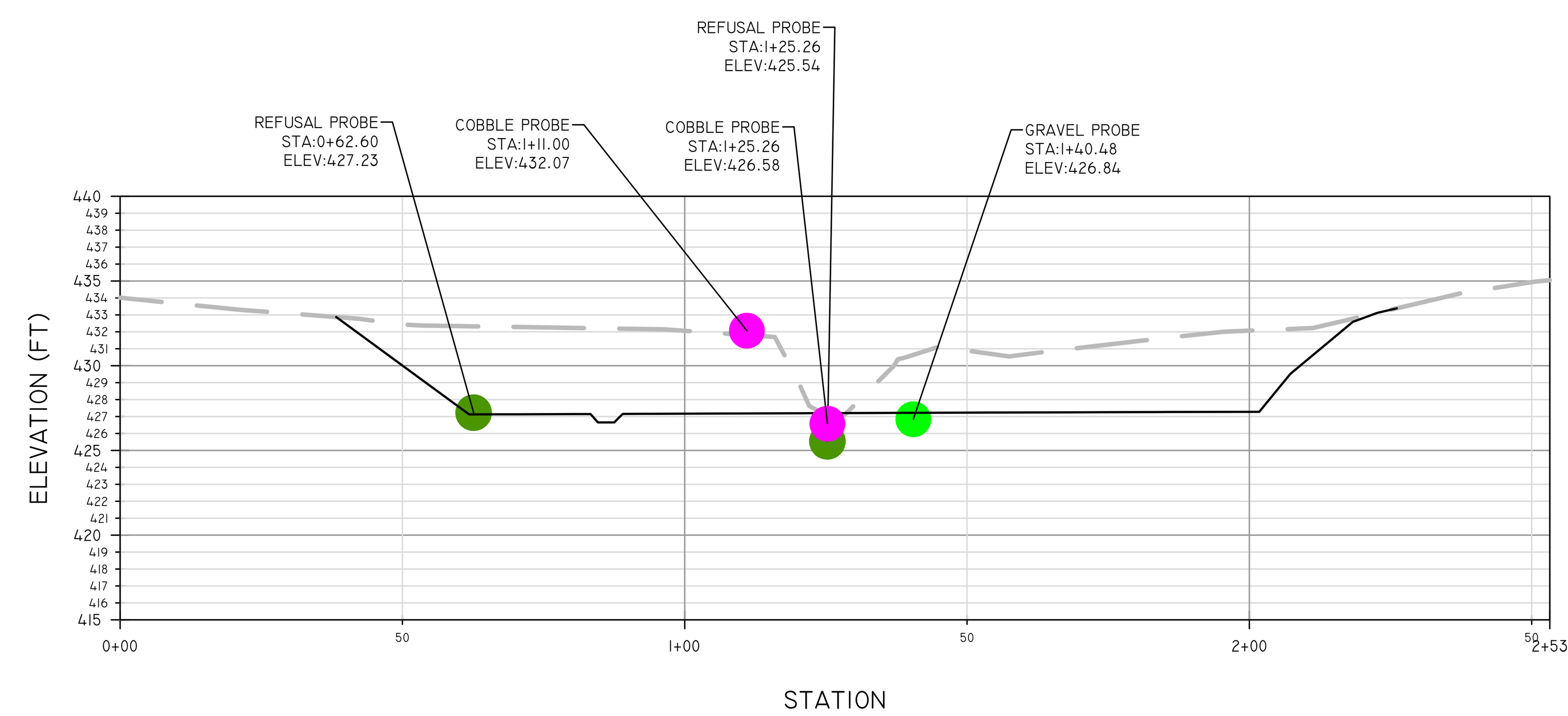


GEOTECH CROSS SECTION 1



GEOTECH CROSS SECTION 2



GEOTECH CROSS SECTION 3

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

PROPERTY BOUNDARY		PROPOSED MAJOR CONTOUR	
ADJACENT PROPERTY BOUNDARY		PROPOSED MINOR CONTOUR	
SITE PROTECTION BOUNDARY		PROPOSED BASELINE ALIGNMENT	
RESERVED RIGHTS BOUNDARY		PROPOSED RELOCATION ALIGNMENT	
EXISTING THALWEG		GEOTECHNICAL CROSS SECTION	
EXISTING WETLANDS		SOIL PROBE LOCATION	SP
EXISTING STRUCTURES		EXISTING GROUND PROFILE	
ROAD		PROPOSED GROUND PROFILE	
ACCESS PATH		GRAVEL PROBE	
TREE LINE		COBBLE PROBE	
EXISTING MAJOR CONTOUR		REFUSAL PROBE	
EXISTING MINOR CONTOUR			

NOTES

SEAL

SCALE

0 40 80 160 Feet

SCALE: 1" = 40'

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WWW.RES.US
EMAIL: HKALK@RES.US

CHESAPEAKE BAY MS4 SEDIMENT REDUCTION PROJECT STONY RUN BMP DESIGN PLAN

GEOTECHNICAL CROSS SECTIONS

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C500	PROJECT NO: 106922 PA83-SF
DATE:	AUGUST 4, 2023		

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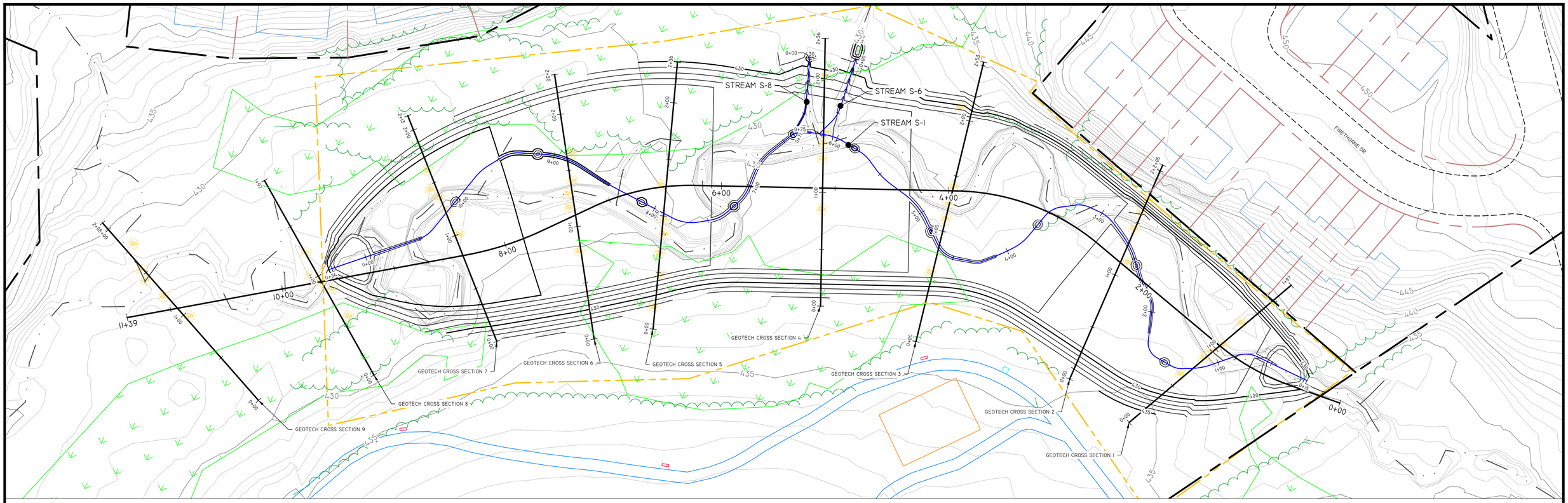
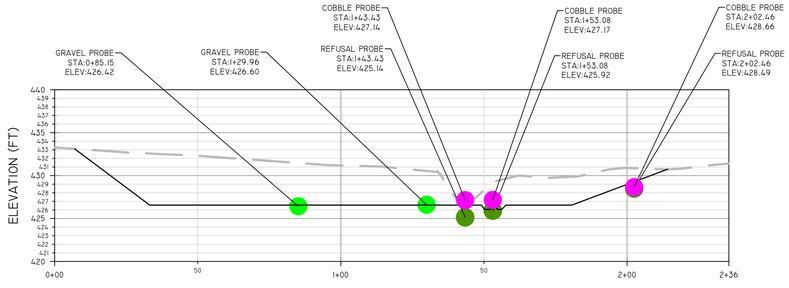
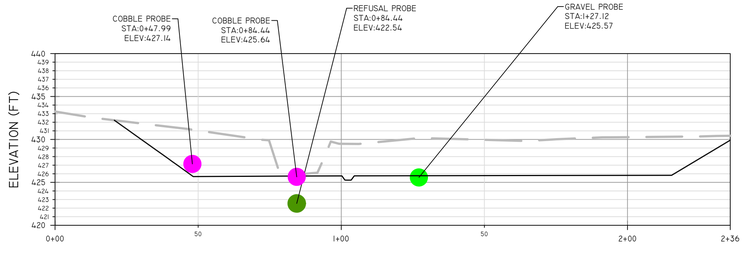
10:00 AM AUGUST 23
COORDINATE SYSTEM: PA83-SF





GEOTECH CROSS SECTION 4



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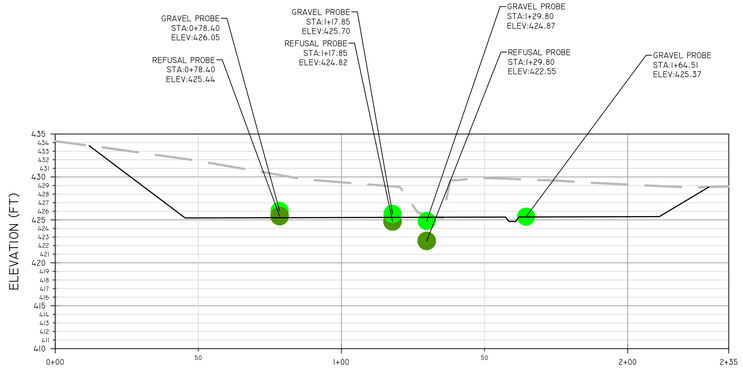

GEOTECH CROSS SECTION 6

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- RESERVED RIGHTS BOUNDARY
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
- ACCESS PATH
- TREE LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED BASELINE ALIGNMENT
- PROPOSED RELOCATION ALIGNMENT
- GEOTECHNICAL CROSS SECTION
- SOIL PROBE LOCATION (SP)
- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- GRAVEL PROBE
- COBBLE PROBE
- REFUSAL PROBE

NOTES

SEAL

SCALE

0 40 80 160 Feet

SCALE: 1" = 40'

RESOURCE ENVIRONMENTAL SOLUTIONS
317 East Carson St, Suite 242
Pittsburgh PA 15219
www.res.us
Telephone: (412) 249-2435
Email: hkalk@res.us

CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

GEOTECHNICAL CROSS SECTIONS

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C501	PROJECT NO: 106922
DATE:	August 4, 2023		PA83-SF

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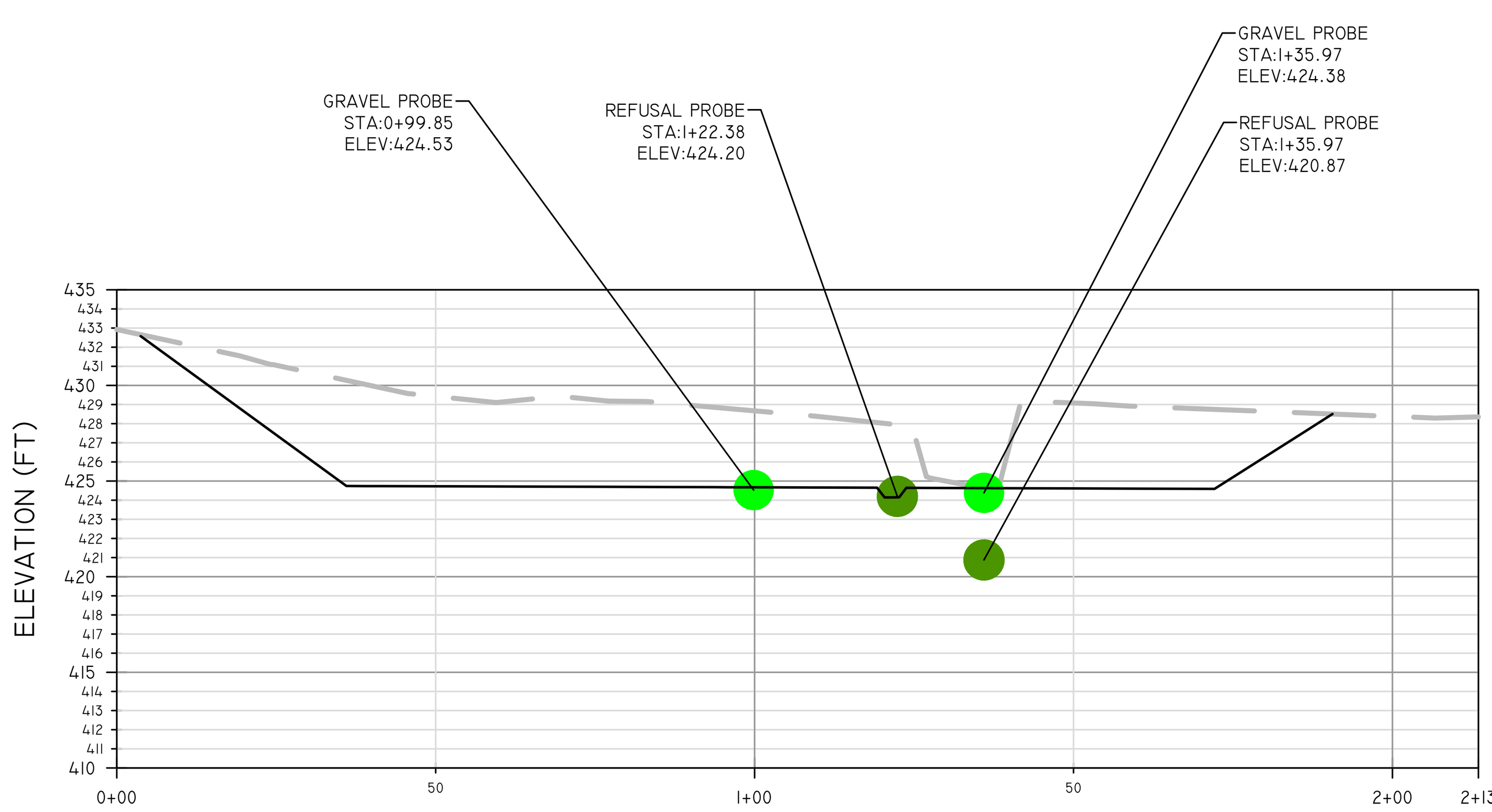
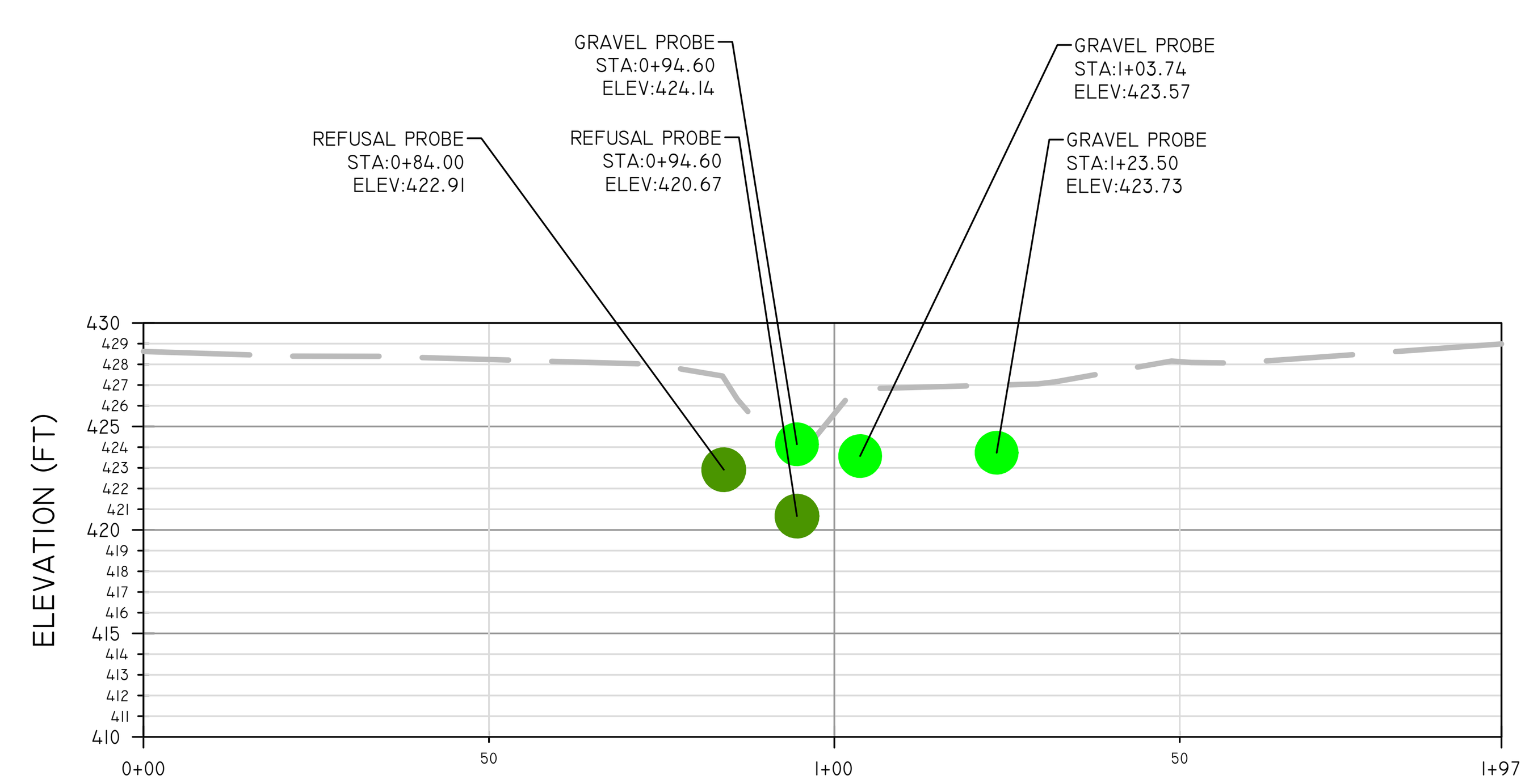
COORDINATE SYSTEM: PA83-SF



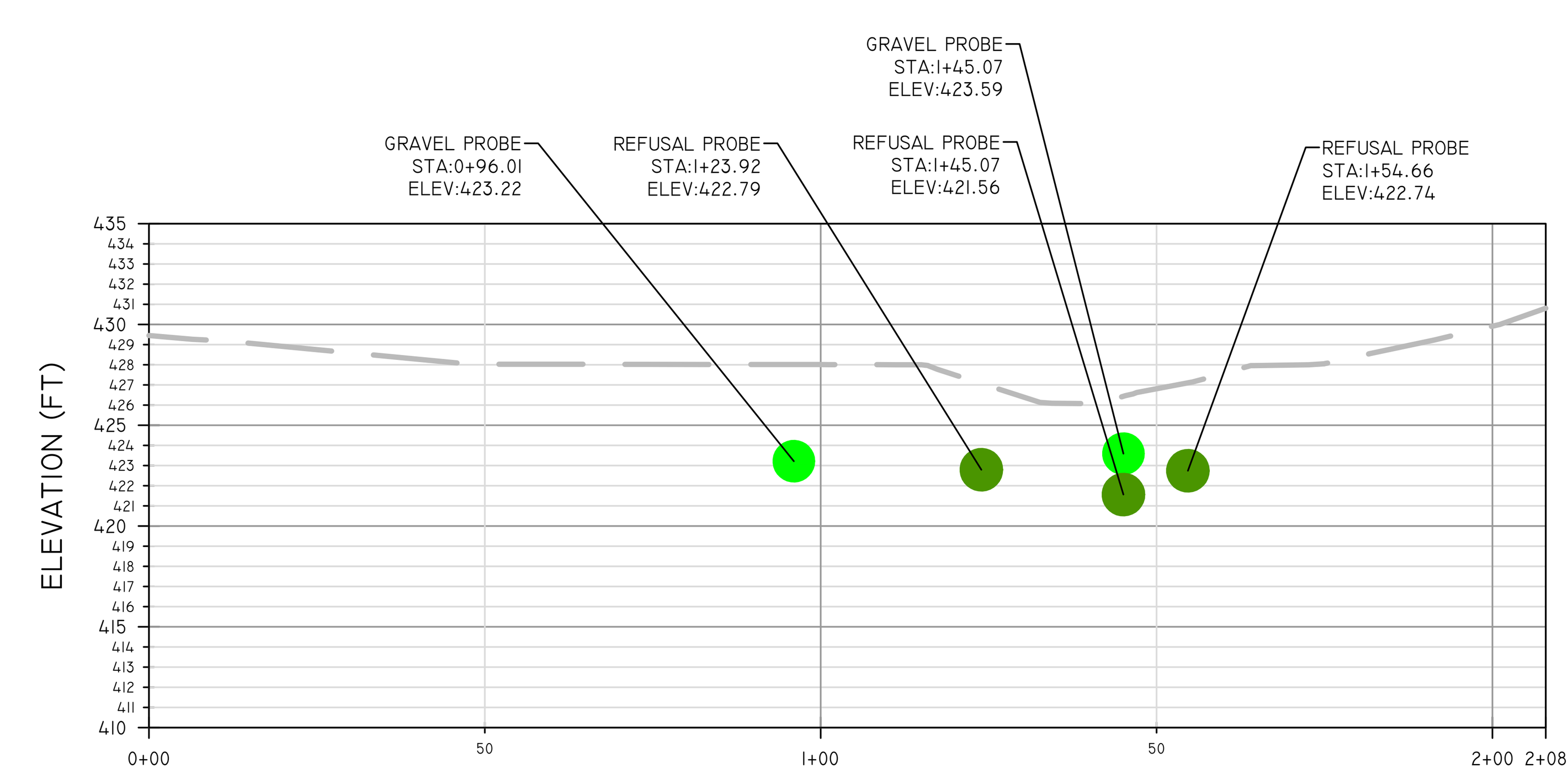
STATION

GEOTECH CROSS SECTION 7



STATION

GEOTECH CROSS SECTION 8



STATION

GEOTECH CROSS SECTION 9

REVISIONS			
NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- RESERVED RIGHTS BOUNDARY
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
- ACCESS PATH
- TREE LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED BASELINE ALIGNMENT
- PROPOSED RELOCATION ALIGNMENT
- GEOTECHNICAL CROSS SECTION
- SOIL PROBE LOCATION
- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- GRAVEL PROBE
- COBBLE PROBE
- REFUSAL PROBE

NOTES

SEAL

SCALE

0 40 80 160 Feet

SCALE: 1" = 40'

RESOURCE ENVIRONMENTAL SOLUTIONS
317 EAST CARSON ST, SUITE 242
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CHESAPEAKE BAY MS4 SEDIMENT REDUCTION PROJECT STONY RUN BMP DESIGN PLAN

GEOTECHNICAL CROSS SECTIONS

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C502	PROJECT NO: 106922 PA83-SF
DATE:	AUGUST 4, 2023		

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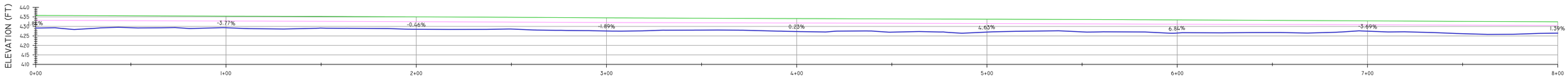
COORDINATE SYSTEM: PA83-SF

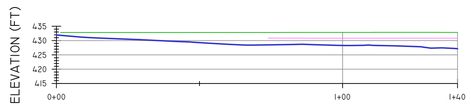


STATION

STREAM S-1 THALWEG PROFILE STATION 0+00 TO 8+00

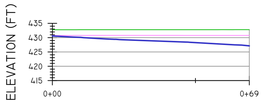
STATION

STREAM S-1 THALWEG PROFILE STATION 8+00 TO 15+61



STATION

STREAM S-6 EXISTING THALWEG PROFILE



STATION

STREAM S-8 EXISTING THALWEG PROFILE

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

EXISTING THALWEG PROFILE

EXISTING 2-YR WSE PROFILE

EXISTING 100-YR WSE PROFILE

NOTES

SEAL

SCALE

0 25 50 100 Feet

SCALE: 1" = 25'

RESOURCE ENVIRONMENTAL SOLUTIONS
317 East Carson St, Suite 242
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Telephone: (412) 249-2435
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Chesapeake Bay MS4 Sediment Reduction
Project Stony Run BMP Design Plan

Existing Thalweg Profiles

DRAWN BY:	WP	Pennsylvania	
CHECKED BY:	NH	Lancaster County	East Cocalico Township
APPROVED BY:	MK	SHEET: C600	PROJECT NO: 106922
DATE:	August 4, 2023		COORDINATE SYSTEM: PA83-SF

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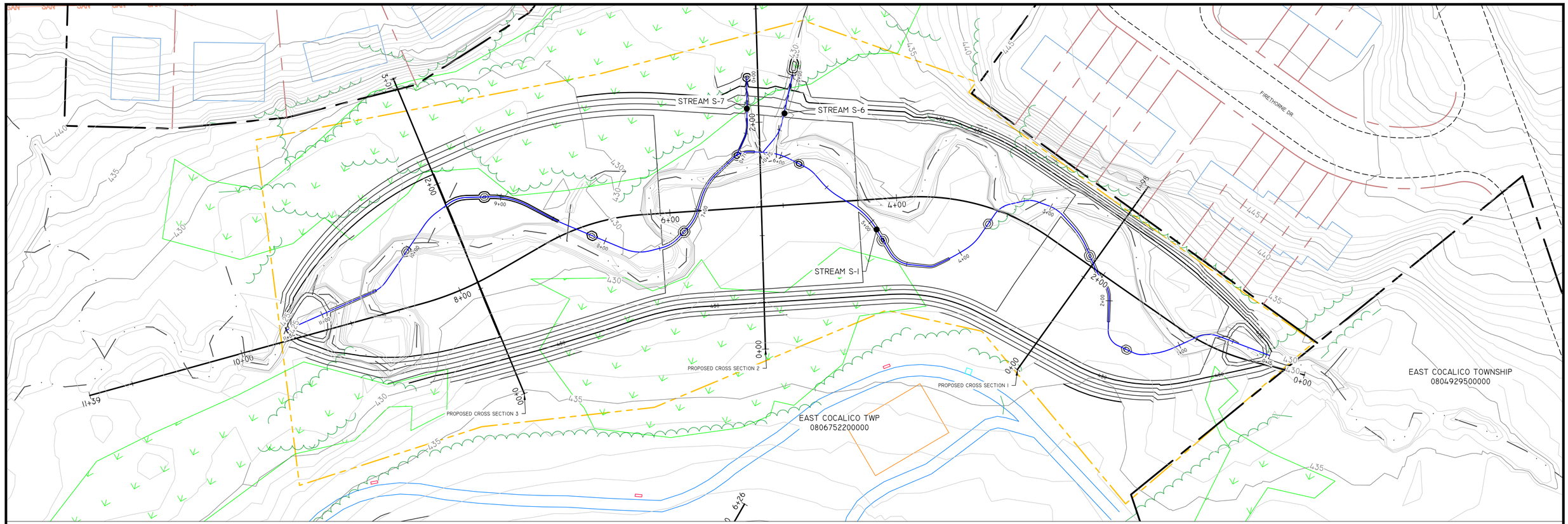
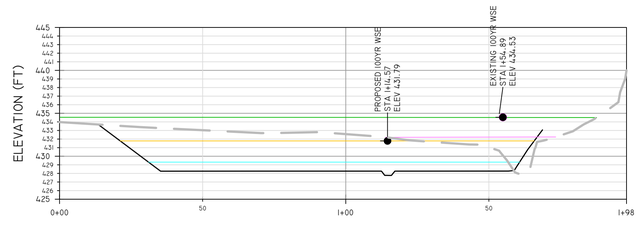
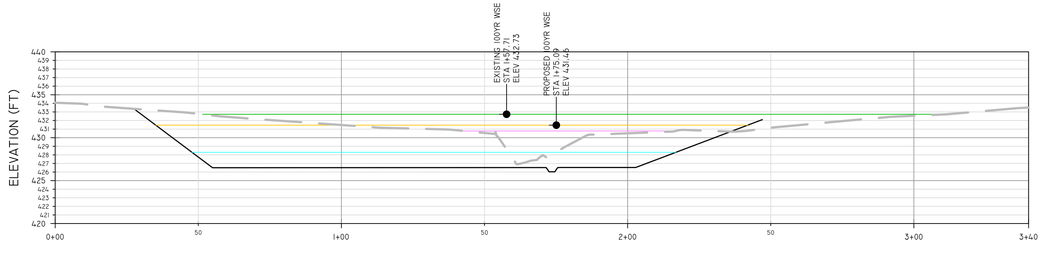
COORDINATE SYSTEM: PA83-SF



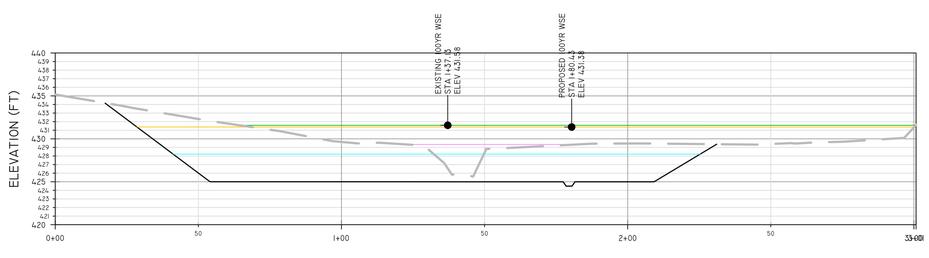
100 YEAR WATER SURFACE ELEVATION SUMMARY					
CROSS SECTION	EXISTING THALWEG STATION	PROPOSED THALWEG STATION	EXISTING 100YR WSE	PROPOSED 100YR WSE	DIFFERENCE
STONY RUN CROSS SECTION 1	1+54.89	1+14.57	434.53	431.79	-2.74
STONY RUN CROSS SECTION 2	1+57.71	1+75.09	432.73	431.46	-1.27
STONY RUN CROSS SECTION 3	1+37.13	1+80.43	431.58	431.38	-0.2



STREAM S-I CROSS SECTION 1



STREAM S-I CROSS SECTION 2



STREAM S-I CROSS SECTION 3

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- ADJACENT PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- RESERVED RIGHTS BOUNDARY
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
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- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED BASELINE ALIGNMENT
- PROPOSED THALWEG ALIGNMENT
- PROPOSED CROSS SECTION ALIGNMENT
- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- PROPOSED THALWEG PROFILE
- EXISTING 2YR WSE PROFILE
- EXISTING 100YR WSE PROFILE
- PROPOSED 2YR WSE PROFILE
- PROPOSED 100YR WSE PROFILE

NOTES

SEAL

SCALE

0 40 40 160 Feet

SCALE: 1" = 40'

RESOURCE ENVIRONMENTAL SOLUTIONS
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CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

PROPOSED CROSS SECTION

DRAWN BY:	WP
CHECKED BY:	NH
APPROVED BY:	HK
DATE:	AUGUST 4, 2023

PENNSYLVANIA
LANCASTER COUNTY EAST COCALICO TOWNSHIP

SHEET: C601 PROJECT NO: 106922

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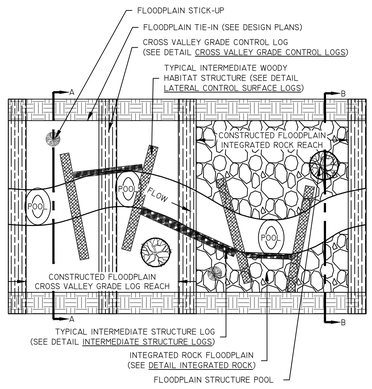
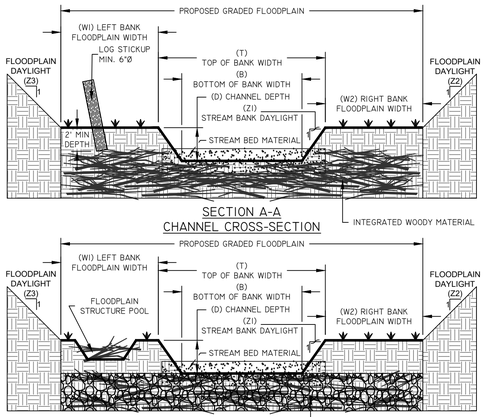


FLOODPLAIN DESIGN TOP VIEW



SECTION A-A
CHANNEL CROSS-SECTION

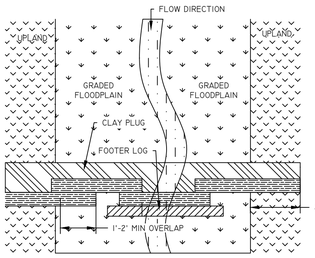
(SECTION B-B)
CHANNEL CROSS-SECTION W/ INTEGRATED ROCK

NOTES:
1. ALL PROPOSED DESIGN ELEVATIONS WILL BE HELD TO A 0.3' DEVIATION FROM DESIGN DURING CONSTRUCTION.
2. EXISTING STREAMBED MATERIAL WILL STOCKPILED AND RE-UTILIZED INTO PROPOSED CHANNEL CONSTRUCTION.
3. WHEN PARENT STREAMBED MATERIAL IS NOT EXISTING ONSITE IT WILL BE IMPORTED AND UTILIZED IN PROPOSED CHANNEL CONSTRUCTION.
4. INTEGRATE WOODY MATERIAL WILL BE HARVESTED ONSITE A UTILIZED INTO CHANNEL AND FLOODPLAIN CONSTRUCTION. WHEN EXISTING WOODY MATERIAL ONSITE IS LIMITED ONLY INTEGRATE THE WOODY MATERIAL WITHIN A 6' BUFFER AROUND THE PROPOSED CHANNEL.
5. INTEGRATED ROCK SECTIONS WILL ALSO UTILIZE INTEGRATED WOODY MATERIAL WHERE POSSIBLE.
6. EXCESS WOODY MATERIAL WILL BE UTILIZED FOR STICKUPS AND FLOODPLAIN STRUCTURE POOLS AT THE DISCRETION OF THE CONSTRUCTION MANAGER OR CONTRACTOR.
7. FLOODPLAIN STICKUPS AND STRUCTURE POOL LOCATIONS WILL BE DETERMINED BY THE CONSTRUCTION MANAGER OR CONTRACTOR.
8. FLOODPLAIN MUST HAVE A MIN OF 0.5 (FT) OF CLEAN FILL ON TOP OF ALL OTHER MATERIALS.
9. SEE DESIGN PLANS FOR STREAM POOL LOCATIONS.

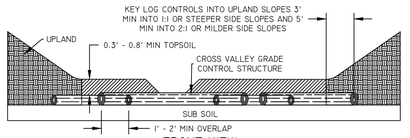
CHANNEL DESIGN SIZE

CHANNEL	THALWEG STATIONS	B (FT)	D (FT)	T (FT)	Z1 (FT)	POOL DEPTH (FT)	STREAMBED MATERIAL (EXISTING/IMPORTED)
MAIN STEM	0+00 - 12+11	4.00	0.50	4.00	2.00	2.00	EXISTING
S-1	0+00 - 0+41	1.00	0.50	3.00	2.00	2.00	EXISITNG
S-2	0+00 - 0+40	1.00	0.50	3.00	2.00	2.00	EXISITNG

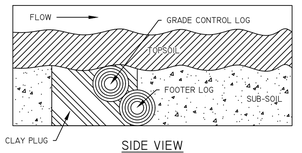
C-1 / C800 FLOODPLAIN (TYP)
NOT TO SCALE



TOP VIEW



FRONT VIEW



SIDE VIEW

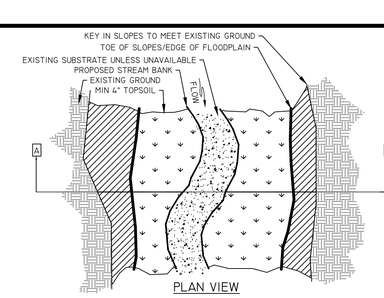
ACTIVE GRADE LOG PLACEMENT

BRANCH PACKING W/ GRADE LOG

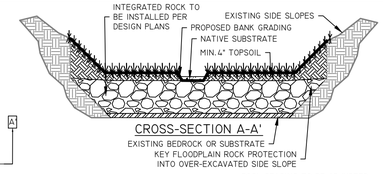
FAIL GRADE LOG

NOTES:
1. ALL MATERIAL IS TO BE APPROVED BY THE DESIGN ENGINEER OR CONSTRUCTION MANAGER PRIOR TO INSTALLATION ON-SITE
2. WOODY MATERIAL IS TO BE BETWEEN 12"-16" AND RELATIVELY STRAIGHT; HIGHLY VARIABLE OR CURVED TRUNKS ARE NOT TO BE USE
3. ALL STRUCTURES ARE TO BE PLACED ON BEDROCK OR SIMILAR NON-EROSIVE BASE SUCH AS A DENSE CLAY. IF BEDROCK OR A NON-EROSIVE FOUNDATION IS NOT AVAILABLE A SPLASH LOG MUST BE INSTALLED DOWNSTREAM OF THE GRADE CONTROL LOGS AS SHOWN ON THE DESIGN PLANS
4. LOGS WITHIN THE FLOODPLAIN ARE TO BE OVERLAPPED BY A MINIMUM OF 1.5 '; WHERE THE LOGS ARE TOED INTO THE VALLEY SIDE SLOPES, ARE TO BE TOED IN A MINIMUM OF 3 – 5', IF INSUFFICIENT MATERIAL IS AVAILABLE TO TOE IN THE WOODY MATERIAL IT IS TO BE ANCHORED IN PLACE USING MINING LAG BOLTS DRILLED INTO THE BEDROCK OR LOGS WILL BE KEYED INTO THE BEDROCK A MINIMUM OF 3 INCHES.
5. MATERIAL WITH A HEAVY CLAY OR CLAYEY SILT CONTENT SHALL BE USED TO CONSTRUCT A CLAY PLUG ON THE UPSTREAM SIDE OF THE LOG SILL. THE CLAY PLUG SHALL BE TIED INTO BEDROCK OR OTHER NON-PERMEABLE MATERIAL AT THE BASE OF THE STRUCTURE AND SHALL EXTEND UPWARDS TO WITHIN 2 INCHES OF THE TOP OF THE STRUCTURE. THE CLAY PLUG SHALL HAVE A WIDTH OF 5 FEET UPSTREAM OF THE LOG SILL AND EXTEND ACROSS THE ENTIRE VALLEY BOTTOM IN ORDER TO PREVENT WATER-PIPING THROUGH THE STRUCTURE. MATERIAL EXCAVATED FOR THE LOG SILLS MAY BE USED AT THE DISCRETION OF THE ENGINEER OR CONSTRUCTION MANAGER TO CONSTRUCT THE CLAY PLUG.
6. FINAL STRUCTURE ALIGNMENT AND LOCATION MAY BE ADJUSTED BY DESIGN ENGINEER OR CONSTRUCTION MANAGER IN THE FIELD AS NEEDED

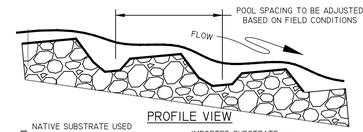
C-2 / C800 CROSS VALLEY GRADE CONTROL LOGS
NOT TO SCALE



PLAN VIEW



CROSS-SECTION A-A'



PROFILE VIEW

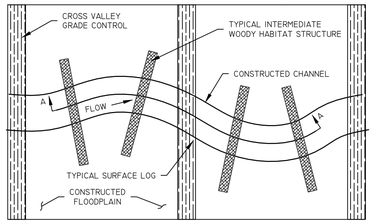
ACTIVE CONSTRUCTION REACH

NATIVE STREAM SUBSTRATE

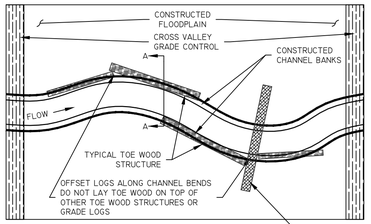
IMPORTED STREAM SUBSTRATE

NOTES:
1. NATIVE BACKFILL MATERIAL AND FILL TO BE COMBINED WITH RIPRAP FOR THE INTEGRATED ROCK COMPACTED LAYER SHALL BE FREE OF RUBBISH, STONES GREATER THAN 6", FROZEN MATERIAL, OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL MUST BE APPROVED BY THE CONSTRUCTION MANAGER PRIOR TO PLACEMENT AND SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH, OR CL AND MUST HAVE AT LEAST 30% PASSING THE #200 SIEVE.
2. COMPACTION - THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE TREAD TRACK OF HEAVY EQUIPMENT OR COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMPLETE PASSES OF A SHEEPSFOOT ROLLER, RUBBER TIRED ROLLER, VIBRATORY ROLLER, OR EARTHMOVING EQUIPMENT CAPABLE OF APPLYING SUFFICIENT GROUND PRESSURE. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DEGREE OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE, YET NOT BE SO WET THAT WATER CAN BE SQUEEZED OUT. WHEN REQUIRED BY THE REVIEWING AGENCY THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN +/-2% OF THE OPTIMUM. EACH LAYER OF FILL SHALL BE COMPACTED AS NECESSARY TO OBTAIN THAT DENSITY, AND IS TO BE CERTIFIED BY THE CONSTRUCTION MANAGER AT THE TIME OF CONSTRUCTION. ALL COMPACTION IS TO BE DETERMINED BY AASHTO METHOD T-99 (STANDARD PROCTOR).
3. EXISTING STREAM SUBSTRATE SHOULD BE REUSED IN CONSTRUCTED CHANNEL UNLESS NO SUBSTRATE IS AVAILABLE.

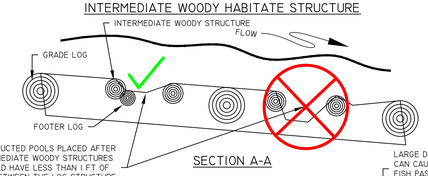
C-3 / C800 INTEGRATED ROCK DETAIL
NOT TO SCALE



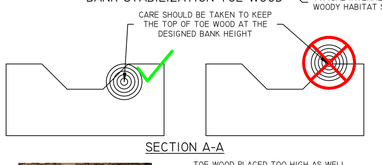
INTERMEDIATE WOODY HABITATE STRUCTURE



BANK STABILIZATION TOE WOOD



SECTION A-A



SECTION A-A

CORRECT PLACEMENT

INCORRECT PLACEMENT

CORRECT PLACEMENT

INCORRECT PLACEMENT

LARGE DROP AFTER STRUCTURE CAN CAUSE UNDERCUTTING FISH PASSAGE NEEDS TO BE LESS THAN 1' OF DROP

TOE WOOD PLACED TOO HIGH AS WELL AS ON TOP OF OTHER STRUCTURES. CAN CAUSE TOE WOOD TO UNDERCUT AND LIMIT FLOODING OUTSIDE OF THE LEFT SIDE BANK.

NOTES:
1. IF THE SIZE, LOCATION, AND ORIENTATION OF PROPOSED TOE WOOD AND INTERMEDIATE WOODY STRUCTURES ARE NOT CALLED OUT ON THE APPROVED DESIGN PLANS, LOCATIONS WILL BE DETERMINED BY THE ENGINEER OR CONSTRUCTION MANAGER BASED ON SITE CONDITIONS.
2. TOE WOOD SHOULD BE PLACED ON THE SIDE OF BANK WHERE FLOW CONCENTRATES MOST.
3. TOE WOOD LOGS SHALL BE CONSTRUCTED OF LOGS STORED ON-SITE. LOGS MAY BE HARVESTED ON-SITE IF NECESSARY WITHIN THE LIMITS OF DISTURBANCE.
4. 12" (MIN) LOGS WILL BE USED FOR TOE WOOD.
5. CARE SHOULD BE TAKEN TO KEEP THE TOP OF TOE WOOD AT THE DESIGNED BANK HEIGHT .
6. TOE WOOD SHOULD NOT BE INSTALLED OVERTOP OF OTHER WOODY STRUCTURES SUCH AS GRADE LOGS, INTERMEDIATE WOODY STRUCTURES, OR OTHER TOE WOOD.
7. CONSTRUCTED POOLS PLACED AFTER INTERMEDIATE WOODY STRUCTURES SHOULD HAVE LESS THAN 1 FT OF DROP BETWEEN THE LOG STRUCTURE AND DESIGNED THALWEG ELEVATION. THIS HELPS PREVENT UNDERCUTTING OF LOG AS WELL AND ALLOWS FOR EASIER FISH PASSAGE.
8. FOOTER LOGS SHOULD BE INSTALLED WITH INTERMEDIATE WOODY STRUCTURES.
9. A FOCUS SHOULD BE TAKEN ON IMPLEMENTING INTERMEDIATE WOODY STRUCTURES IN DESIGNED INTEGRATED ROCK REACHES WITH SLOPES GREATER THAN 3%

C-4 / C800 BANK STABILIZATION TOE WOOD & INTERMEDIATE WOODY HABITAT STRUCTURES
NOT TO SCALE

PENNDOT PUBLICATION 584

TABLE 8.11 ALLOWABLE SHEAR STRESSES FOR VARIOUS LINNGS

LINING CATEGORY	LINING TYPE	ALLOWABLE INIT SHEAR STRESS PA	LB/SQ.FT.
UNLINED - EASILY ERODID SOILS (1)	SILTS, FINE-MEDIUM SANDS	1.4	0.03
	COARSE SANDS	1.9	0.04
	VERY COARSE SANDS	2.4	0.05
	FINE GRAVEL	4.8	0.1
UNLINED - EROSION RESISTANT SLILS (2)	CLAY LOAM	12	0.25
	SILTY CLAY LOAM	8.6	0.18
	SANDY CLAY LOAM	4.8	0.1
	LOAM	3.4	0.07
	SILT LOAM	5.7	0.12
	SANDY LOAM	1	0.02
	GRAVELY, STONY, CHANNERY LOAM	2.4	0.05
	STONY OR CHANNERY SILT LOAM	3.4	0.07
NON-REINFORCED VEGETATION	CLASS A	177.2	3.7
	CLASS B	100.6	2.1
	CLASS C	47.9	1
	CLASS D	28.7	0.6
	CLASS E	16.8	0.35
TEMPORARY RECP'S (3/4)	MULCH CONTROL NETTING (3)	SEE TABLE 8.15	
	NETLESS ROLLED EROSION CONTROL BLANKET (5)		
	OPEN WEAVE TEXTILE		
	SINGLE-NET EROSION CONTROL BLANKET		
	DOUBLE-NET EROSION CONTROL BLANKET		
PERMANENT RECP'S (3/4)	TURF REINFORCMENT MAT - TYPE 5.A	288	6
	TURF REINFORCMENT MAT - TYPE 5.B	384	8
	TURF REINFORCMENT MAT - TYPE 5.C	480	10
RIPRAP LINIG	R-3	48	1
	R-4	96	2
	R-5	144	3
	R-6	192	4
	R-7	240	5
	R-8	384	8
	GABION - 305 mm (12 in)	225	4.7
	GABION - 457 mm (18 in)	249	5.2
	GABION - 914 mm (36 in)	397	8.3
	RENO MATTRESS - 152 mm (6 in)	206	4.3
	RENO MATTRESS - 229 mm (9 in)	220	4.6

1 SOILS HAVING AN ERODIBILITY K FACTOR GREATER THAN 0.37
2 SOILS HACING AN ERODIBILITY K FACTOR LESS THAN OR EQUAL TO 0.37
CATERGORIES ARE BASED ON FHWA CLASSIFICATION SYSTEM FOR RECP'S
4 THE DIFFERENCE BETWEEN THE THREE TYPES OF TRM'S IS THE MINIMUM TENSILE STRENGTH
5 FEW, IF ANY, OF THESE ARE APPROVED FOR PENNDOT USE

ROCK SIZING & GRADATION FROM PENNDOT PUBLICATION 408

PERCENT PASSING (SQUARE OPENINGS)

CLASS, SIZE NO. (NCSA)	R-8	R7	R6	R5	R4	R3
ROCK SIZE, INCHES						
42	100*					
30		100*				
24	15-50					
18		15-50	100*	100*		
15	0-15					
12		0-15	15-50		100*	
9				15-50		
6			0-15		15-50	100*
4				0-15		
3					0-15	15-50
2						0-15
NOMINAL PLACEMENT THICKNESS, INCHES	48	36	30	24	18	12

* MAXIMUM ALLOWABLE ROCK SIZE

REVISIONS			
NO.	DESCRIPTION	DATE	BY

LEGEND

NOTES

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CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

CONSTRUCTION DETAILS

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C800	PROJECT NO: 106922
DATE:	August 4, 2023		

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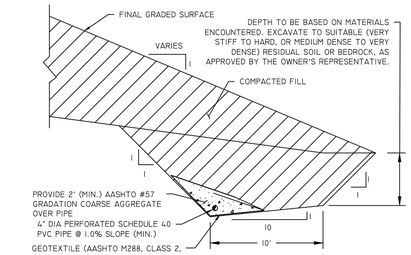
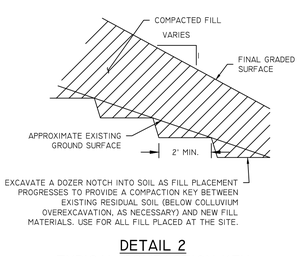


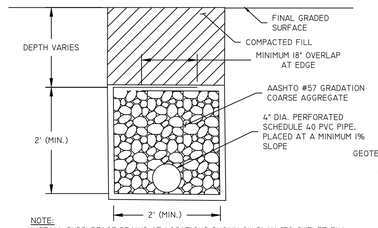
NOTES:

1. OUTLET FILL FOUNDATION KEY DRAIN BEYOND THE LIMITS OF NEW FILL USING SUBSURFACE DRAIN INSTALLED AT LOCATIONS SHOWN ON PLAN.
2. DEEPER FILL KEYS (IF REQUIRED) SHOULD TRANSITION GRADUALLY INTO SHALLOWER FILL KEYS.
3. KEY DRAINS SHOULD OUTLET BEYOND THE LIMITS OF THE NEW FILL AND TO A STABLE AREA.

DETAIL 1
TYPICAL FILL FOUNDATION KEY

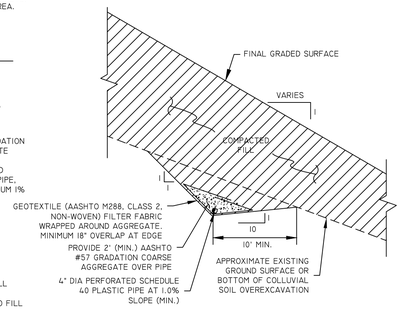


DETAIL 2
TYPICAL COMPACTION KEY



NOTE:
INSTALL SUBSURFACE DRAINS AT LOCATIONS SHOWN ON PLAN (TO OUTLET FILL FOUNDATION KEY DRAINS) AND AT SEEPAGE AREAS ENCOUNTERED DURING CONSTRUCTION. OUTLET DRAINS BEYOND LIMITS OF NEW FILL OR CONNECT TO FILL KEY DRAINS.

DETAIL 3
TYPICAL SUBSURFACE DRAIN



DETAIL 4
TYPICAL INTERMEDIATE KEY

EARTHWORK NOTES:

1. CONSTRUCT FILL FOUNDATION AND INTERMEDIATE KEYS AS NEEDED FOR SIGNIFICANT FILLS AND IN ACCORDANCE WITH DETAIL 1 & 4. OUTLET FILL FOUNDATION AND INTERMEDIATE KEY DRAIN USING THE SUBSURFACE DRAIN INSTALLED AT LOCATIONS SHOWN ON PLAN AND IN ACCORDANCE WITH DETAIL 3. INSTALL ADDITIONAL SUBSURFACE DRAINS, AS NECESSARY, IN ACCORDANCE WITH DETAIL 3. FINAL KEY AND DRAIN LOCATIONS MAY BE MODIFIED BY THE OWNER'S REPRESENTATIVE BASED ON CONDITIONS ENCOUNTERED.
2. REFER TO EROSION AND SEDIMENTATION CONTROL PLAN CONSTRUCTION SEQUENCE FOR REMOVAL OF TOPSOIL PRIOR TO FILL PLACEMENT.
3. NEW FILL SHALL BE FREE OF TOPSOIL, ROOTS, ROOT BALLS, BRUSH, GRASS, AND OTHER DELETERIOUS MATERIALS.
4. SOIL FILL MATERIALS FOR BULK EARTHWORK STOCKPILES AND FILL FOUNDATION KEY CONSTRUCTION AT LOCATIONS SHOWN SHOULD CLASSIFY AS GW, GP, GM, GC, SW, SP, SM, SC, ML, OR CL ACCORDING TO THE UNITED SOILS CLASSIFICATION SYSTEM (USCS). USCS CLASSIFICATION CH (FAT CLAY) SOIL SHALL BE BLENDED WITH ROCK OR AMENDED WITH LIME PRIOR TO PLACING AS NEW FILL. PLACE SOIL FILL IN MAXIMUM 8 INCH LOOSE LIFTS, AND COMPACTED TO VISIBLE NON-MOVEMENT USING A HEAVY SEGMENTED PAD COMPACTION EQUIPMENT. THE FILL THE FILL SHOULD BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY UNIT WEIGHT AND WITHIN 3% OF THE OPTIMUM MOISTURE CONTENT ACCORDING TO THE MODIFIED PROCTOR TEST (ASTM 1557). BLEND SOIL WITH LIME AS NECESSARY TO REDUCE THE MOISTURE CONTENT.
5. FIELD MODIFY FINAL GRADES BASED ON FIELD CONDITIONS TO ACHIEVE A BALANCED SITE AS DIRECTED BY OWNER'S FIELD REPRESENTATIVE.

C-5
C801

GEOTECHNICAL DETAILS

NOT TO SCALE

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

NOTES

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CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

CONSTRUCTION DETAILS

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C801	PROJECT NO: 106922
DATE:	August 4, 2023		

STREAM S-8

STREAM S-6

STREAM S-1

EAST COCALICO TWP
0806752200000

EAST COCALICO TOWNSHIP
0804929500000

FIRETHORNE DR

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
- ACCESS PATH
- TREE LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- WETLAND RESTORATION PLANTING
- WETLAND RESTORATION SEEDING
- LIVE STAKING
- WETLAND ENHANCEMENT PLANTING
- UPLAND RESTORATION SEEDING

NOTES

SEAL

SCALE

0 30 60 120 Feet

SCALE: 1" = 30'

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Chesapeake Bay MS4 Sediment Reduction Project Stony Run BMP Design Plan

Site Restoration Plan

DRAWN BY:	WP	Pennsylvania	
CHECKED BY:	NH	Lancaster County	East Cocalico Township
APPROVED BY:	HK	SHEET: C900	PROJECT NO: 106922
DATE:	August 4, 2023		

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PLANTING DETAIL NOTES:

A. GENERAL:

1. PLANT DETAILS ARE INCORPORATED INTO THIS SPECIFICATION BY REFERENCE.

2. QUALITY ASSURANCE
   2.1. SUPPLIER CERTIFICATION: THE SUPPLIER OF ALL SEEDS AND/OR VEGETATION SHALL CERTIFY THAT ORIGIN OF THE SEEDS FROM WHICH THE PLANTS OR SEEDS WERE PRODUCED IS FROM THE EASTERN OR CENTRAL PORTIONS OF THE U.S. PRIOR TO PLANTING.
   2.2. INSTALLER QUALIFICATIONS: ENGAGE AN EXPERIENCED INSTALLER, WHO HAS SUCCESSFULLY COMPLETED RESTORATION PLANTING PROJECTS SIMILAR IN SIZE AND COMPLEXITY TO THIS PROJECT.
   2.3. INSTALLER'S FIELD SUPERVISION: INSTALLER TO MAINTAIN AN EXPERIENCED FULL-TIME SUPERVISOR ON THE PROJECT SITE WHEN PLANTING IS IN PROGRESS.

3. PLANT MATERIALS
   3.1. PROVIDE PLANT MATERIALS OF QUANTITY, SIZE, GENUS AND SPECIES INDICATED ON THE CONSTRUCTION DRAWINGS.

4. ALL PLANT MATERIALS AND WORK SHALL COMPLY WITH RECOMMENDATIONS AND REQUIREMENTS OF ANSI Z60.1 2004 AMERICAN STANDARD FOR NURSERY STOCK. ALL SEEDS MUST MEET APPLICABLE STATE AND FEDERAL REGULATIONS AND MUST INCLUDE LABELING INDICATING SUPPLIER, FORMULATION, GERMINATION RATES AND SEED DATE. LABELS FROM ALL SEED INSTALLED ARE TO BE KEPT AND SUPPLIED TO OWNER AT COMPLETION OF PROJECT.

DO NOT MAKE SUBSTITUTIONS UNLESS APPROVED BY THE PROJECT MANAGER. REQUESTS FOR SUBSTITUTIONS MUST BE MADE IN WRITING TO THE PROJECT MANAGER AND APPROVED TO INSTALLATION. INCLUDE REASONS WHY THE SUBSTITUTIONS ATE BEING REQUESTED.

6. PROJECT ENGINEER MAY INSPECT PLANT MATERIALS EITHER AT PLACE OF GROWTH OR ON SITE DURING PLANTING ACTIVITIES, FOR COMPLIANCE WITH REQUIREMENTS FOR GENUS, SPECIES, VARIETY, SIZE, AND QUALITY. MATERIAL FOUND TO BE UNACCEPTABLE WILL BE REJECTED AND THE CONTRACTOR WILL BE REQUIRED TO SUPPLY REPLACEMENT MATERIAL WITHIN TIME FRAME (I.E., 1 WEEK). REJECTED MATERIAL SHALL BE IMMEDIATELY REMOVED FROM PROJECT SITE. UNACCEPTABLE MATERIAL IS DEFINED AS THE FOLLOWING:
   6.1. PLANTS WITH BENT TRUNKS OR MULTIPLE LEADERS, UNLESS CHARACTERISTIC FOR THE SPECIES;
   6.2. PLANTS WITH DISEASED TRUNKS, STEMS, OR LEAVES;
   6.3. PLANTS WITH PEST-INFESTED TRUNKS, STEMS, OR LEAVES;
   6.4. PLANTS OF INSUFFICIENT SIZE;
   6.5. PLANTS WITH WRONG SPECIES/SUB-SPECIES; AND
   6.6. PLANTS HAVING ROOT GIRDLING IN THE CONTAINER.

7. DELIVERY, STORAGE, AND HANDLING
   7.1. PROTECT BARK, BRANCHES, AND ROOT SYSTEMS FROM SUN SCALD, DRYING, SWEATING, WHIPPING, AND OTHER HANDLING AND TYING DAMAGE. DO NOT BEND OR BIND-TIE TREES OR SHRUBS IN SUCH A MANNER AS TO DESTROY THEIR NATURAL SHAPE. PROVIDE PROTECTIVE COVERING OF PLANTS DURING DELIVERY. DO NOT DROP PLANTS DURING DELIVERY.
   7.2. DELIVER PLANT MATERIALS AFTER PREPARATIONS FOR PLANTING HAVE BEEN COMPLETED AND PLANT IMMEDIATELY. IF PLANTING IS DELAYED MORE THAN 6 HOURS AFTER DELIVERY, FOLLOW STORAGE INSTRUCTIONS AS SHOWN IN TUBELING TREE PLANTING DETAIL.
   7.3. DO NOT REMOVE CONTAINER-GROWN STOCK FROM CONTAINERS UNTIL PLANTING TIME.
   7.4. SEED: SEED SHOULD BE CLEAN AND DRY. DO NOT USE SEED THAT HAS BECOME MOIST DURING DELIVERY OR STORAGE. IF SEED NEEDS TO BE TEMPORALLY STORED IT SHOULD BE STORED IN A COOL, DRY PLACE.

8. PROJECT CONDITIONS
   8.1. EXAMINE THE SUB-GRADE AND TOPSOIL, AND VERIFY THE ELEVATIONS PRIOR TO INSTALLING PLANT ON SEED MATERIAL. ALL SOIL AMENDMENTS AND CONDITIONING SHALL BE COMPLETED PRIOR TO SEEDING AND PLANT MATERIAL INSTALLATION. DO NOT PROCEED WITH THE WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED IN A MANNER ACCEPTABLE TO THE INSTALLER.
   8.2. CALL PENNSYLVANIA ONE CALL SYSTEM AT 1-800-242-1776, 72 HOURS PRIOR TO ANY EXCAVATION. DETERMINE LOCATION OF UNDERGROUND UTILITIES AND PERFORM WORK IN A MANNER WHICH WILL AVOID POSSIBLE DAMAGE. HAND EXCAVATE AS REQUIRED.

9. PLANTING AND SEEDING RESTRICTIONS
   9.1. PLANTS SHALL BE PLANTED DURING UNFROZEN SOIL CONDITIONS SEPTEMBER 15TH - MAY 15TH. PLANT INSTALLATION OUTSIDE OF THIS TIME PERIOD SHALL NOT OCCUR UNLESS APPROVED BY THE PROJECT CONSTRUCTION MANAGER AND MAY REQUIRE ADDITIONS TO THE SCOPE OF WORK, SUCH AS WATERING REGIMES, AND ADDITIONAL PLANT QUANTITIES.
   9.2. SEEDING SHALL BE COMPLETED DURING SEPTEMBER 15-MAY 15 TO THE GREATEST EXTENT POSSIBLE. DORMANT WINTER SEEDING SHALL NOT BE CONDUCTED WITH MORE THAN 2" OF SNOW ON THE GROUND AT THE TIME OF SEEDING. DUE TO THE SCHEDULE OF THE PROJECT, SOME PERMANENT SEEDING OUTSIDE THIS TIME PERIOD WILL BE NECESSARY. THE CONTRACTOR WILL BE RESPONSIBLE FOR REMEDIAL SEEDING IN UNDER-PERFORMING AREAS DUE TO SEEDING OUTSIDE OF THIS TIME PERIOD. A COVER CROP SHALL BE SOWN AT THE TIME OF PERMANENT SEEDING TO PROVIDE QUICKER GERMINATION AND STABILIZATION PER THE PLAN SHEETS.
   9.3. THESE LIMITS MAY NOT BE MODIFIED UNLESS APPROVED BY THE PROJECT ENGINEER IN ADVANCE, WITH THE RISK OF SURVIVAL BORNE SOLELY BY THE CONTRACTOR.

10. WARRANTY
   10.1. WARRANTY PERIOD IS FOR ONE (1) YEAR AFTER DATE OF FINAL ACCEPTANCE AND COVERS DEFECTS INCLUDING DEATH AND UNSATISFACTORY GROWTH, EXCEPT FOR DEFECTS RESULTING FROM NEGLECT BY OWNER, ABUSE OR DAMAGE BY OTHERS, OR UNUSUAL PHENOMENA OR INCIDENTS WHICH ARE BEYOND CONTRACTOR'S CONTROL.
   10.2. CONTRACTOR SHALL GUARANTEE A MINIMUM SURVIVAL RATE FOR THE WARRANTY PERIOD OF 85% FOR BALLED AND BURLAPPED, CONTAINER GROWN, AND TUBELINGS, AND 75% FOR BARE ROOT AND LIVE STAKES.
   10.3. IF SURVIVAL RATES ARE LESS THAN THE ABOVE WARRANTY RATES, THE CONTRACTOR SHALL REPLACE THE QUANTITY OF DEFECTIVE OR DEAD PLANTS UP TO THE ORIGINAL CONSTRUCTION DRAWING SPECIFIED PLANT QUANTITY. WARRANTY PLANTINGS SHALL OCCUR WITHIN THE NEXT PLANTING WINDOW (SEPTEMBER 15TH -JUNE 15TH, EXCLUDING FROZEN SOIL CONDITIONS) FOLLOWING THE END OF THE APPLICABLE WARRANTY PERIOD.
   10.4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY DURING THE WARRANTY PERIOD TO PROVIDE WRITTEN NOTICE OF ANY MAINTENANCE PRACTICE TO THE OWNER, WHICH IN THEIR OPINION WILL AFFECT THE GUARANTEE IF NOT REMEDIED PROMPTLY. THE PROJECT ENGINEER WILL RENDER AN OPINION OF ANY CONFLICT IF NECESSARY.

11. MAINTENANCE
   11.1. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL PLANT MATERIAL THROUGH FINAL ACCEPTANCE AND WARRANTY PERIOD.

B. EXECUTION:

INSTALL PLANT MATERIALS IN ACCORDANCE WITH THE SPECIFICATIONS AND DETAILS OF THE CONSTRUCTION DRAWINGS FOLLOWING THE ADDITION OF SOIL AMENDMENTS, SEEDING, AND INSTALLATION OF APPLICABLE EROSION CONTROL FABRIC.

1. CONTAINER GROWTH MATERIAL
   1.1. PLANTING OF CONTAINER GROWN MATERIAL SHALL OCCUR IN ACCORDANCE WITH LOCATIONS AND/OR PATTERNS SPECIFIC TO THE CONSTRUCTION DRAWINGS.
   1.2. PLANTING HOLES SHALL BE AT LEAST TWICE THE DIAMETER AND DUG TO THE SAME DEPTH AS THE CONTAINER IN WHICH THEY ARE GROWN. DO NOT REMOVE PLANT MATERIAL FROM CONTAINER UNTIL IMMEDIATELY BEFORE INSTALLATION. EXAMINE THE ROOTS TO SEE IF THEY ARE POT BOUND. CAREFULLY SEPARATE ANY POT BOUND OR CRAMPED ROOTS AND SPREAD THEM OUT WHEN PLACING THE PLANT WITHIN THE HOLE SO THAT THE ROOTS CAN GROW WITHOUT FURTHER CONSTRICTION OF THE ROOT BALL.
   1.3. SET PLANT MATERIALS PLUMB AND CENTERED WITHIN HOLE, ENSURING THAT THE TOP OF THE ROOT BALL IS SLIGHTLY ELEVATED ABOVE THE SURROUNDING SOIL ELEVATIONS. BACKFILL AROUND ROOT BALL WITH SUITABLE NATIVE SOIL, MAINTAINING PLUMB, AND GENTLY TAMPING BACKFILL LAYERS TO ELIMINATE VOIDS. WATER IS BACKFILL LAYERS TO THE POINT OF SOIL SATURATION.
   1.4. FOLLOWING THE BACKFILLING, ADD EXISTING SOIL TO BRING THE FINAL GRADE IN THE PLANTING HOLE TO THE SURROUNDING SOIL SURFACE. RAKE THE UNUSED EXISTING SOIL OUTSIDE THE PLANTING HOUSE, TAKING CARE NOT TO MOUND THE SOIL OR TO SIGNIFICANTLY ALTER THE EXISTING GRADES.

2. BAREROOT AND TUBELING MATERIAL
   2.1. IT SHOULD BE ANTICIPATED THAT THE SOIL MAY BE COMPACTED MORE THAN OPTIMAL FOR PLANTING AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO RIP SOIL TO ASSURE OPTIMAL PLANTING CONDITION. SOIL SHALL BE RIPPED TO A DEPTH OF 9-12".
   2.2. BAREROOT MATERIAL SHALL BE TREATED WITH ROOT DIP ACCORDING TO THE MANUFACTURERS RECOMMENDATION PRIOR TO PLANTING. MATERIALS SHALL BE PLANTED IMMEDIATELY OR OTHERWISE STORED PER THE MANUFACTURER'S RECOMMENDATIONS.

3. LIVE STAKE MATERIAL
   3.1. LIVE STAKE MATERIAL SHALL BE KEPT MOIST ACCORDING TO MANUFACTURES RECOMMENDATIONS. DO NOT ALLOW THE LIVE STAKES TO DRY OUT PRIOR TO INSTALLATION.
   3.2. MATERIAL SHALL BE PLANTED ACCORDING TO THE DETAIL PROVIDED. THE USE OF A PUNCH/PLANTING BAR, AUGER, REBAR, OR WATER-JET MAY BE USED TO PRE-DRILL HOLE IF NECESSARY.TAMP SOIL AROUND STAKE FOLLOWING INSTALL.

4. SEEDING
   4.1. SEEDING SHALL OCCUR AS SHOWN ON THE PLANTING PLAN. IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION EROSION AND SEDIMENT POLLUTION CONTROL PROGRAM MANUAL SEED SHALL BE APPLIED PRIOR TO INSTALLATION OF ANY EROSION CONTROL FABRIC. AREAS APPLIED WITH HERBICIDE MAY BE SEEDED 7 DAYS AFTER APPLICATION.
   4.2. SOW SEED WITH A SPREADER OR A HYDROSEED MACHINE WITH MANUFACTURER RECOMMENDED BINDING AGENT. IN AREAS WITH DENSE EXISTING VEGETATION, INSTALL SEED WITH A NATIVE NO-TILL DRILL SEEDER. DO NOT BROADCAST DROP SEED WHEN WIND VELOCITY EXCEEDS 5 MPH. EVENLY DISTRIBUTE SEED BY SOWING EQUAL QUANTITIES IN TWO DIRECTIONS AT RIGHT ANGLES TO EACH OTHER.
   4.3. DO NOT USE WET SEED OR SEED THAT IS MOLDY OR OTHERWISE DAMAGED IN TRANSIT OR STORAGE.
   4.4. SOW SEED PRIOR TO INSTALLATION OF EROSION CONTROL FABRIC WHERE APPLICABLE.
   4.5. IF BROADCAST, ROLL SEEDED AREAS LIGHTLY, AND WATER WITH A FINE SPRAY.
   4.6. PROTECT SEEDED AREAS AGAINST EROSION BY SPREADING STRAW MULCH IMMEDIATELY FOLLOWING COMPLETION OF SEEING OPERATIONS IF OTHER EROSION CONTROL MEASURES ARE NOT OTHERWISE SPECIFIED. SPREAD UNIFORMLY AT A RATE OF 2 TONS PER ACRE (90 LB. PER 1,000 S.F.) TO FORM A CONTINUOUS BLANKET OVER SEEDED AREAS. SPREAD BY HAND, BLOWER, OR OTHER SUITABLE EQUIPMENT. ANCHOR STRAW MULCH BY CRIMPING INTO TOPSOIL BY SUITABLE MECHANICAL EQUIPMENT.
   4.7 STRAW EROSION CONTROL BLANKET IS A SUITABLE ALTERNATIVE TO BE USED INSTEAD OF BLOWN OR CRIMPED STRAW.

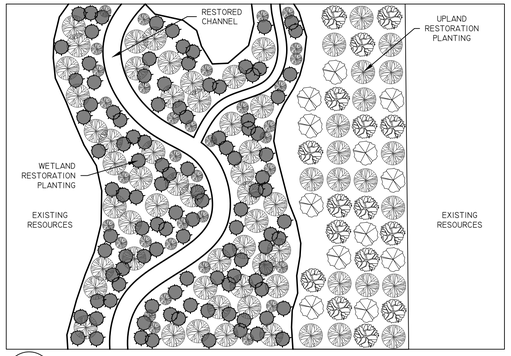
5. LOCATION
   5.1. ALL PLANT MATERIAL IS TO BE INSTALLED AS SHOWN ON THE PLANTING PLANS FOR THE PROTOTYPE.
   5.2. UPLAND TREE PLANTINGS ARE TO BE INSTALLED IN A 9X9 GRID PATTERN.
   5.3. FLOODPLAIN PLANTINGS ARE TO BE INSTALLED IN A CLUMPED FASHION WITH A MINIMUM OF 3' SPACING BETWEEN PLANTS. PLANTS ARE TO BE INSTALLED BASED UPON THE HYDROLOGIC TOLERANCES AND SITE CONDITIONS AFTER CONSTRUCTION IS COMPLETED.
   5.4. ALL LIVE STAKES ARE TO BE INSTALLED ALONG STREAM BANKS, POOLS, AND FLOODPLAIN POOLS BASED UPON SPACING INDICATED IN THE PLANTING PLAN SPECIES LIST.

CARE OF SEEDLING UNTIL PLANTED

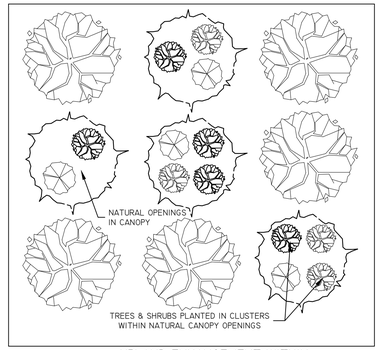
SEEDLINGS SHOULD BE PLANTED IMMEDIATELY. IF IT IS NECESSARY TO STORE MOSS-PACKED SEEDLINGS FOR MORE THAN 2 WEEKS, ONE PINT OF WATER PER PKG. SHOULD BE ADDED. IF CLAY-TREATED, DO NOT ADD WATER TO PKG. PACKAGES MUST BE SEPARATED TO PROVIDE VENTILATION TO PREVENT "HEATING". SEPARATING PACKAGES WITH WOOD STRIPS AND STORE OUT OF THE WIND IN A SHADED, COOL, (NOT FREEZING) LOCATION.

CARE OF SEEDLING DURING PLANTING

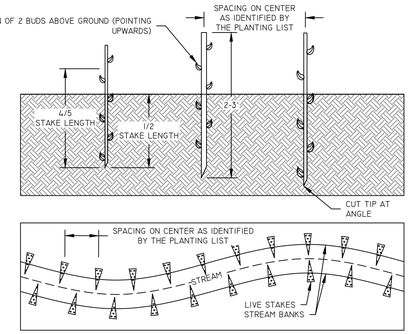
WHEN PLANTING, ROOTS MUST BE KEPT MOIST UNTIL TREES ARE IN THE GROUND. DO NOT CARRY SEEDLINGS IN YOUR HAND EXPOSED TO THE AIR AND SUN. KEEP MOSS-PACKED SEEDLINGS IN A CONTAINER PACKED WITH WET MOSS OR FILLED WITH THICK MUDDY WATER. COVER CLAY-TREATED SEEDLINGS WITH WET BURLAP ONLY.



PL-1 C901 — RESTORATION PLANTING DETAIL
NOT TO SCALE

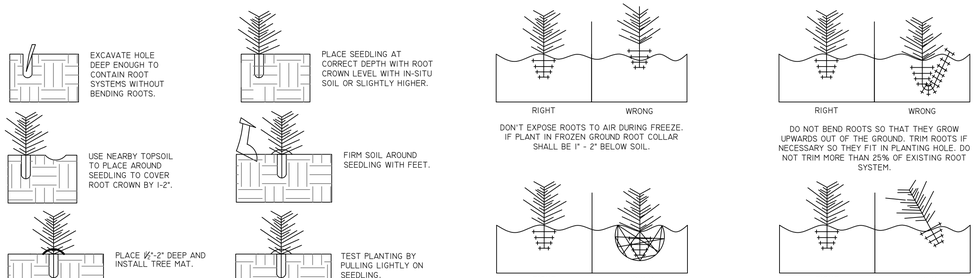


PL-2 C901 — UPLAND ENHANCEMENT WITHIN EXISTING FORESTED AREA DETAIL
NOT TO SCALE

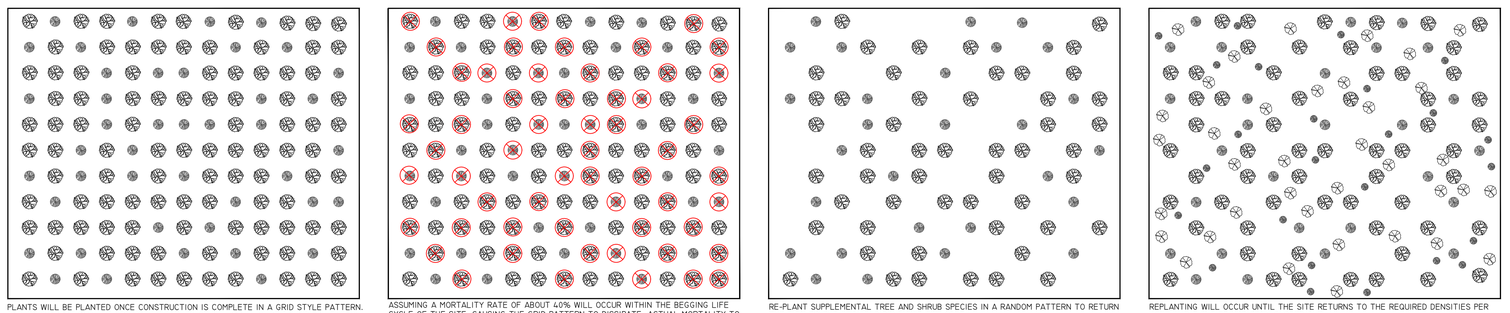


NOTES:
1. LIVE STAKES MUST BE BETWEEN ¾" TO 2" IN DIAMETER AND MUST BE 2' TO 3' LONG.
2. CUT THE STAKES WITH AN ANGLE ON THE BOTTOM AND SQUARE ON THE TOP, WITH THE BUDS POINTING UPWARD.
3. TRIM ALL SIDE BRANCHES CLEANLY SO THE CUTTING IS ONE STEM.
4. STAKES MUST BE STORED IN A COOL AND MOIST PLACE TO KEEP THEM ALIVE AND DORMANT.
5. DRIVE STAKES PERPENDICULAR TO THE GROUND WITH RUBBER HAMMER AT LEAST ½ TO ⅔ OF THE TOTAL STAKE LENGTH. KEEP AT LEAST 2 BUDS ABOVE GROUND SURFACE.
6. DO NOT USE SPLIT STAKES.

PL-3 C901 — LIVE STAKES
NOT TO SCALE



PL-4 C901 — CONTAINER & TUBELING PLANTING DETAIL
NOT TO SCALE



PLANTS WILL BE PLANTED ONCE CONSTRUCTION IS COMPLETE IN A GRID STYLE PATTERN. PLANTING LOCATIONS ARE APPROXIMATE, THE ACTUAL LOCATION OF PLANTS ON THE SITE WILL BE SUBJECT TO SITE CONDITIONS AT THE TIME OF PLANTING.

ASSUMING A MORTALITY RATE OF ABOUT 40% WILL OCCUR WITHIN THE BEGGING LIFE CYCLE OF THE SITE, CAUSING THE GRID PATTERN TO DISSIPATE. ACTUAL MORTALITY TO BE VERIFIED DURING MONITORING.

RE-PLANT SUPPLEMENTAL TREE AND SHRUB SPECIES IN A RANDOM PATTERN TO RETURN THE SITE TO THE REQUIRED DENSITIES PER ACRE.

REPLANTING WILL OCCUR UNTIL THE SITE RETURNS TO THE REQUIRED DENSITIES PER ACRE AND THE SITE HAS BEEN CLOSED OUT

PL-5 C901 — MATRIX PLANTING PLAN DETAIL
NOT TO SCALE

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

TUBELING
SHRUB
REPLANTED TUBELING
REPLANTED SHRUB

NOTES

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RESOURCE ENVIRONMENTAL SOLUTIONS
317 EAST CARSON ST, SUITE 242
PITTSBURGH PA 15219
WWW.RES.US
TELEPHONE: (412) 249-2435 EMAIL: HKALK@RES.US

CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

SITE RESTORATION DETAILS

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C901	PROJECT NO: 106922
DATE:	AUGUST 4, 2023		

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10:05 AM August 23

PLANTING LIST

ZONE	SCIENTIFIC NAME	COMMON NAME	INDICATOR STATUS	NUMBER PER ACRE	TOTAL PLANTS (2.65 AC)
WETLAND RESTORATION PLANTINGS	*Quercus bicolor*	Swamp White Oak	FACW	50	133
	Platanus occidentalis	American Sycamore	FACW	75	199
	Acer saccharinum	Silver Maple	FACW	75	199
	Viburnum dentatum	Southern Arrow-Wood	FAC	50	133
	Physocarpus opulifolius	Atlantic Ninebark	FACW	25	66
	Betula nigra	River Birch	FACW	25	66
	Lindera benzoin	Northern Spicebush	FACW	75	199
	Quercus palustris	Pin Oak	FACW	75	199
	Cephalanthus occidentalis	Common Buttonbush	OBL	50	133
			TOTAL	500	1325
ZONE	*SCIENTIFIC NAME*	COMMON NAME	INDICATOR STATUS	NUMBER PER ACRE	TOTAL PLANTS (0.3872 AC)
WETLAND ENHANCEMENT PLANTINGS	*Quercus bicolor*	Swamp White Oak	FACW	20	8
	Platanus occidentalis	American Sycamore	FACW	10	4
	Acer saccharinum	Silver Maple	FACW	10	4
	Physocarpus opulifolius	Atlantic Ninebark	FACW	20	8
	Betula nigra	River Birch	FACW	10	4
	Lindera benzoin	Northern Spicebush	FACW	10	4
	Viburnum dentatum	Southern Arrow-Wood	FAC	10	4
	Ulmus rubra	Slippery Elm	FAC	10	4
			TOTAL	100	39
ZONE	*SCIENTIFIC NAME*	COMMON NAME	INDICATOR STATUS	SPACING O.C.	TOTAL PLANTS (1265 LF)
LIVE STAKES	*Salix nigra*	Black Willow	OBL	4	316
	Cornus amomum	Silky Dogwood	FACW	4	316
	Platanus occidentalis	American Sycamore	FACW	4	316
	Sambucus nigra	Black Elder	FACW	4	316
				TOTAL	1265

SEEDING LIST

ZONE	SCIENTIFIC NAME	COMMON NAME	INDICATOR STATUS	MIX DENSITY	SEEDING RATE (20 LBS/2.65 AC)
WETLAND MIX-ERNMX 154	*Carex vulpinoidea*	Common Fox Sedge	OBL	23.00%	12.19
	Dichanthelium clandestinum	Deer-Tongue Rosette Grass	FACW	21.50%	11.40
	Elymus virginicus	Virginia Wild Rye	FACW	20.00%	10.60
	Andropogon gerardii	Big Bluestem	FACU	10.00%	5.30
	Carex lupulina	Hop Sedge	OBL	8.20%	4.35
	Carex scoparia	Pointed Broom Sedge	FACW	4.30%	2.28
	Juncus effusus	Lamp Rush	OBL	3.00%	1.59
	Verbena hastata	Simpler's-Joy	FACW	3.00%	1.59
	Heliopsis helianthoides	Smooth Oxeye	FACU	2.00%	1.06
	Asclepias incarnata	Swamp Milkweed	OBL	1.00%	0.53
	Cinna arundinacea	Sweet Wood-Reed	FACW	1.00%	0.53
	Eupatorium perfoliatum	Common Boneset	FACW	0.60%	0.32
	Symphyotrichum lateriflorum	Farewell-Summer	FAC	0.40%	0.21
	Doellingeria umbellata	Parasol White-Top	FACW	0.40%	0.21
	Alisma subcordatum	American Water-Plantain	OBL	0.30%	0.16
	Helenium autumnale	Fall Sneezeweed	FACW	0.30%	0.16
	Monarda fistulosa	Oswego-Tea	FACU	0.30%	0.16
	Scirpus cyperinus	Cottongrass Bulrush	OBL	0.30%	0.16
	Penthorum sedoides	Ditch-Stonecrop	OBL	0.20%	0.11
	Carex stricta	Uptight Sedge	OBL	0.10%	0.05
	Lobelia siphilitica	Great Blue Lobelia	FACW	0.10%	0.05
			Total	100%	53.00
ZONE	*SCIENTIFIC NAME*	COMMON NAME	INDICATOR STATUS	MIX DENSITY	SEEDING RATE (20 LBS/0.4922 AC)
UPLAND WILDLIFE FORAGE & COVER MEADOW MIX-ERNMX 123	*Andropogon gerardii*	Big Bluestem	FACU	34.90%	3.44
	Panicum virgatum	Switchgrass	FAC	27.00%	2.66
	Elymus virginicus	Virginia Wild Rye	FACW	21.00%	2.07
	Sorghastrum nutans	Yellow Indian Grass	FACU	9.00%	0.89
	Rudbeckia hirta	Black-Eyed-Susan	FACU	3.00%	0.30
	Chamaecrista fasciculata	Sleepingplant	FACU	2.00%	0.20
	Heliopsis helianthoides	Smooth Oxeye	FACU	1.50%	0.15
	Coreopsis tinctoria	Golden Tickseed	FACU	1.00%	0.10
	Desmodium canadense	Showy Tick-Trefoil	FAC	0.40%	0.04
	Asclepias syriaca	Common Milkweed	UPL	0.10%	0.01
	Monarda fistulosa	Oswego-Tea	FACU	0.10%	0.01
			Total	100%	9.83

REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

NOTES

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317 East Carson St, Suite 242
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Telephone: (412) 249-2435
www.res.us
Email: hkalk@res.us

CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

PLANTING LIST

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: C902	PROJECT NO: 106922
DATE:	August 4, 2023		

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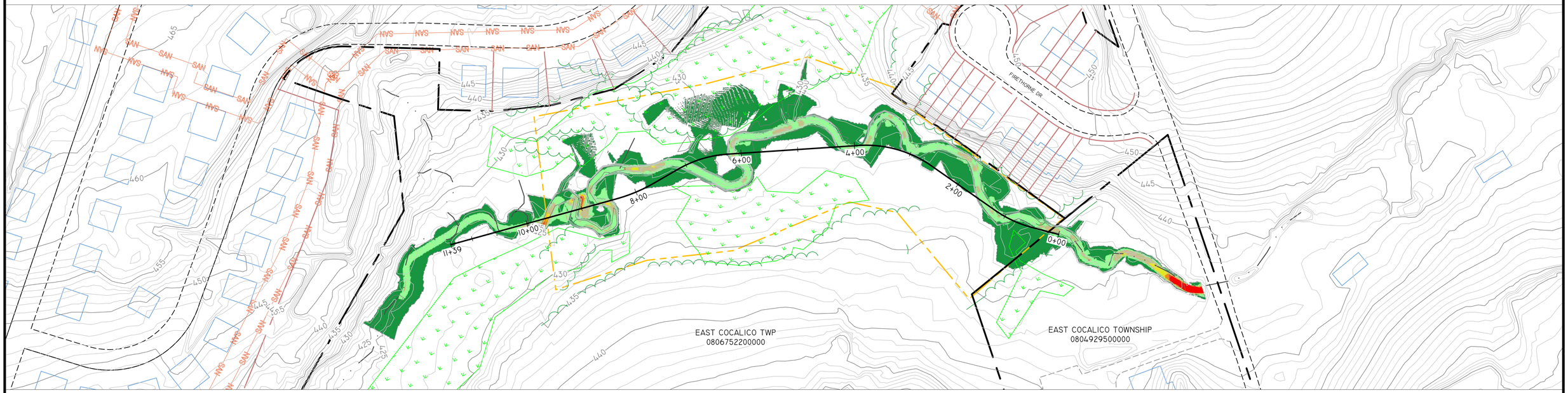
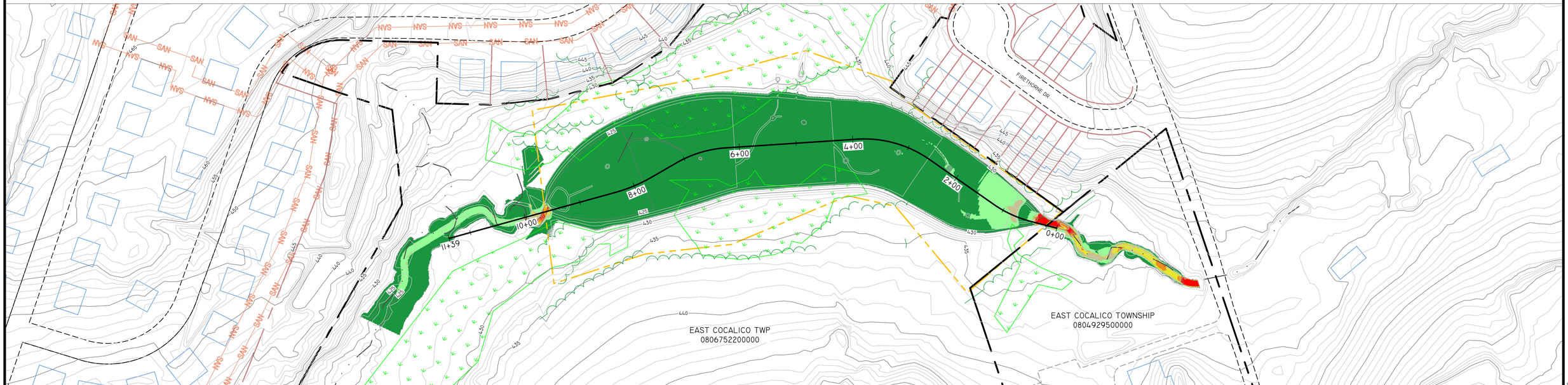
EXISTING 2-YR MODELED SHEAR STRESS



PROPOSED 2-YR MODELED SHEAR STRESS



REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- BASELINE ALIGNMENT
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
- TREE LINE
- MAJOR CONTOUR
- MINOR CONTOUR

SHEAR STRESS TABLE

MINIMUM STRESS [PSF]	MAXIMUM STRESS [PSF]	COLOR
0.0	0.5	
0.5	1.0	
1.0	1.5	
1.5	2.0	
2.0	2.5	
2.5	3.0	
3.0	>3.0	

NOTES

SEAL

SCALE

0 30 60 120 Feet

SCALE: 1" = 30'

RESOURCE ENVIRONMENTAL SOLUTIONS
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Email: hkalk@res.us

CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

STREAM S-1
2-YEAR MODELED SHEAR STRESS

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: S100	PROJECT NO: 106922
DATE:	August 4, 2023		

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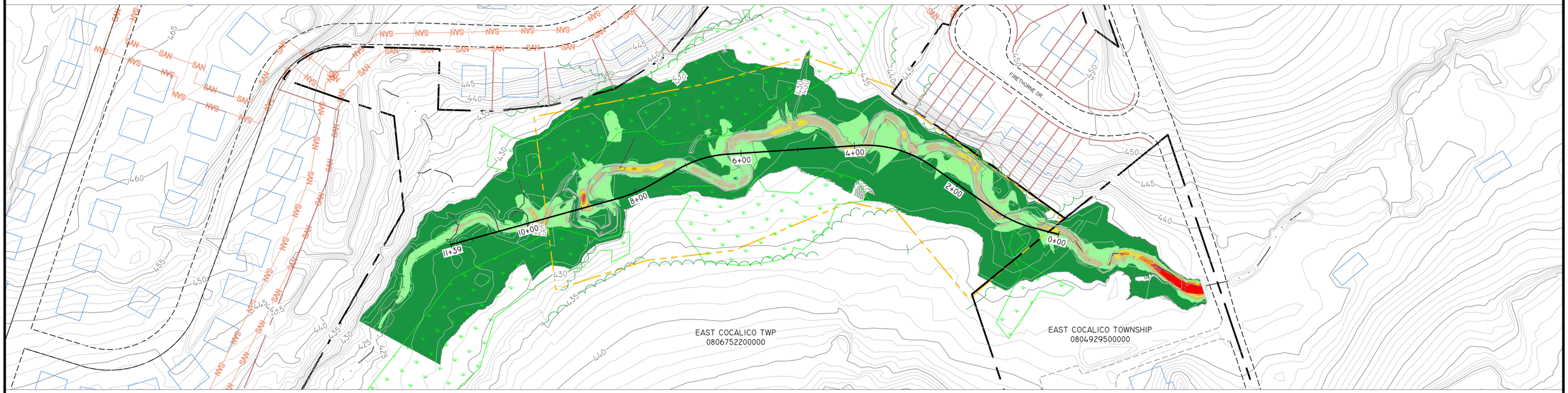
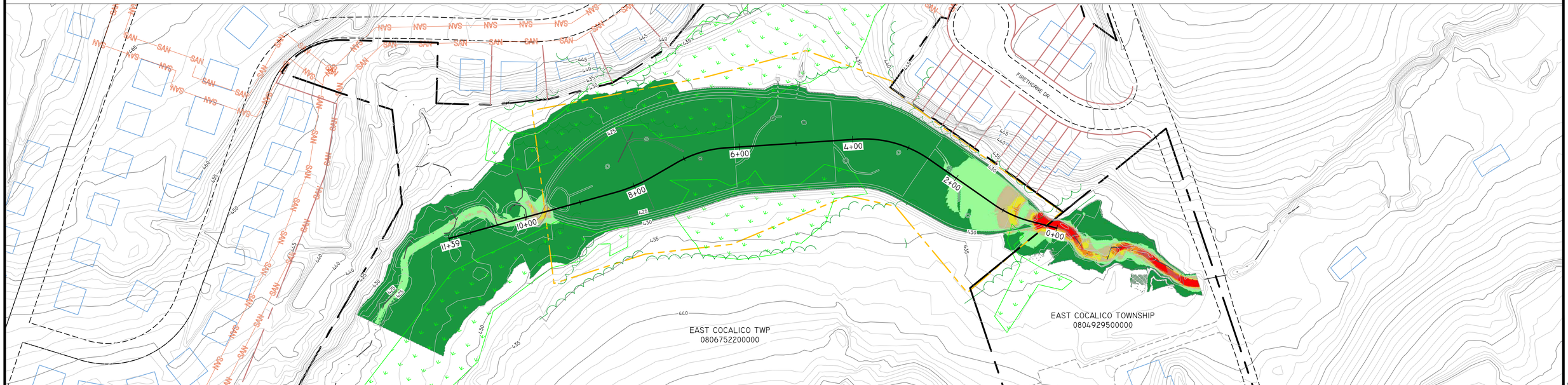
EXISTING 10-YR MODELED SHEAR STRESS



PROPOSED 10-YR MODELED SHEAR STRESS



REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- BASELINE ALIGNMENT
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
- TREE LINE
- MAJOR CONTOUR
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SHEAR STRESS TABLE

MINIMUM STRESS [PSF]	MAXIMUM STRESS [PSF]	COLOR
0.0	0.5	
0.5	1.0	
1.0	1.5	
1.5	2.0	
2.0	2.5	
2.5	3.0	
3.0	>3.0	

NOTES

SEAL

SCALE

0 30 60 120 Feet

SCALE: 1" = 30'

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CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

STREAM S-1
10-YEAR MODELED SHEAR STRESS

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: S101	PROJECT NO: 106922
DATE:	August 4, 2023		

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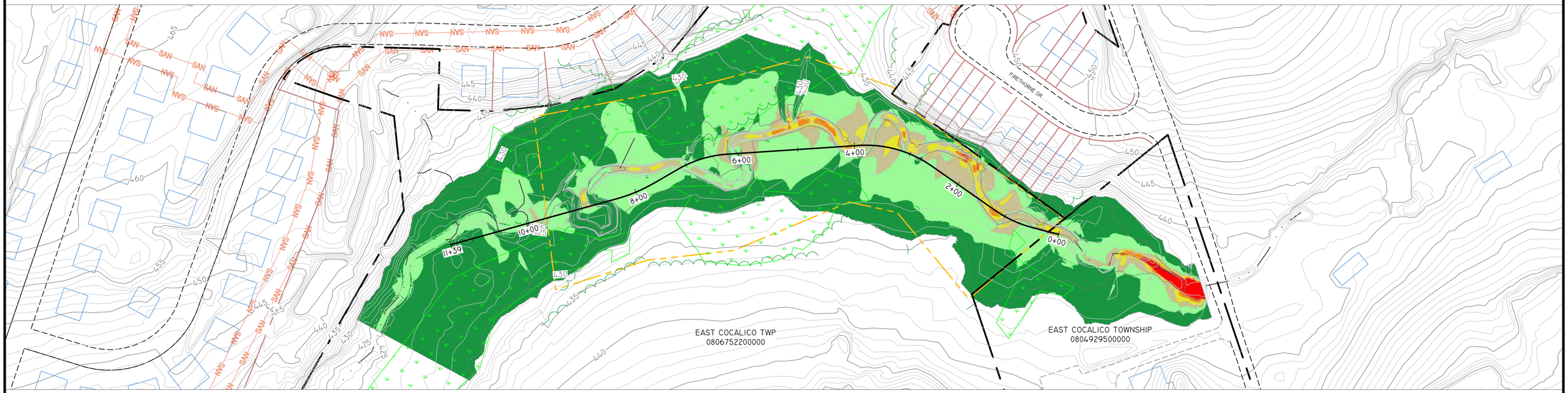
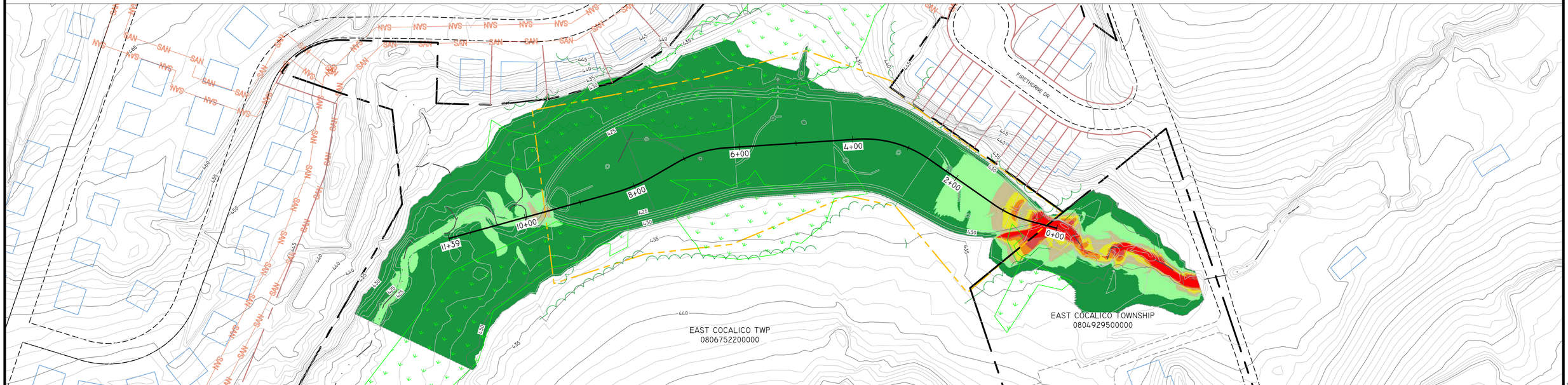
EXISTING 100-YR MODELED SHEAR STRESS



PROPOSED 100-YR MODELED SHEAR STRESS



REVISIONS

NO.	DESCRIPTION	DATE	BY

LEGEND

- PROPERTY BOUNDARY
- SITE PROTECTION BOUNDARY
- BASELINE ALIGNMENT
- EXISTING THALWEG
- EXISTING WETLANDS
- EXISTING STRUCTURES
- ROAD
- TREE LINE
- MAJOR CONTOUR
- MINOR CONTOUR

SHEAR STRESS TABLE

MINIMUM STRESS [PSF]	MAXIMUM STRESS [PSF]	COLOR
0.0	0.5	
0.5	1.0	
1.0	1.5	
1.5	2.0	
2.0	2.5	
2.5	3.0	
3.0	>3.0	

NOTES

SEAL

SCALE

0 30 60 120 Feet

SCALE: 1" = 30'

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CHESAPEAKE BAY MS4 SEDIMENT REDUCTION
PROJECT STONY RUN BMP DESIGN PLAN

STREAM S-1
10-YEAR MODELED SHEAR STRESS

DRAWN BY:	WP	PENNSYLVANIA	
CHECKED BY:	NH	LANCASTER COUNTY	EAST COCALICO TOWNSHIP
APPROVED BY:	HK	SHEET: S101	PROJECT NO: 106922
DATE:	August 4, 2023		

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APPENDIX D
Supporting Data

Stony BMP – Baseline Data

Metric

	Enter Values Here!	BankHt/ Bankfull Ht	Root Depth/ BankHt	Root Density	Bank Angle	Surface Protection
Bank Height (ft)	3.50	1.75	0.37	40.00	80.00	20.00
Bankfull Height (ft)	2.00	6.71	5.19	5.11	5.90	7.22
Root Depth (ft)	1.30					
Root Density (%)	40					
Bank Angle (degree)	80					
Surface Protection (%)	20					
Section 1 Score:	30.1					

Bank Material	Gravel
	0
Stratification	0

*Add 5-10 points depending on position

Bank Material Guide	
Bedrock	Low
Boulders	Low
Cobble	(- 10)
Gravel	(+ 5-10)
Sand	(+ 10)
Silt Clay	(+ 0)

Total	30.1 HIGH

Representative High BEHI field data

Metric

	Enter Values Here!	BankHt/ Bankfull Ht	Root Depth/ BankHt	Root Density	Bank Angle	Surface Protection
Bank Height (ft)	3.00	1.50	0.50	60.00	65.00	70.00
Bankfull Height (ft)	2.00	5.90	3.90	3.50	4.40	2.71
Root Depth (ft)	1.50					
Root Density (%)	60					
Bank Angle (degree)	65					
Surface Protection (%)	70					
Section 1 Score:	20.4					

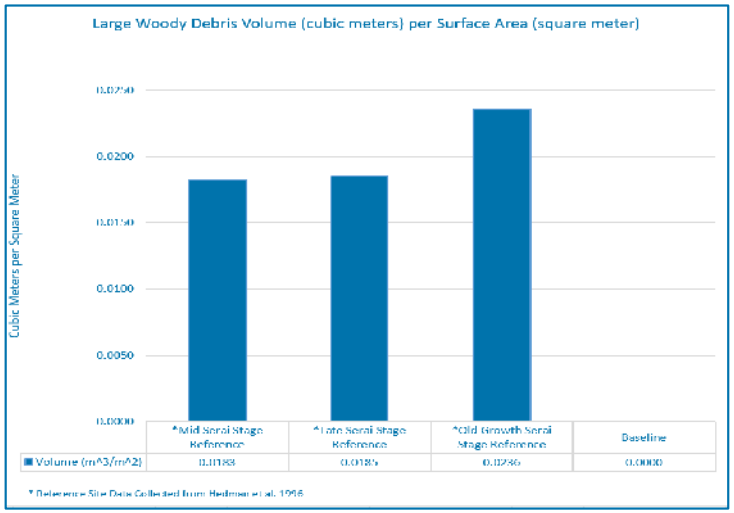
Bank Material	Gravel
	0
Stratification	0

*Add 5-10 points depending on position

Bank Material Guide	
Bedrock	Low
Boulders	Low
Cobble	(- 10)
Gravel	(+ 5-10)
Sand	(+ 10)
Silt Clay	(+ 0)

Total	20.4 MODERATE

Representative Moderate BEHI field data



Stony Run BMP Supporting Erosion Data

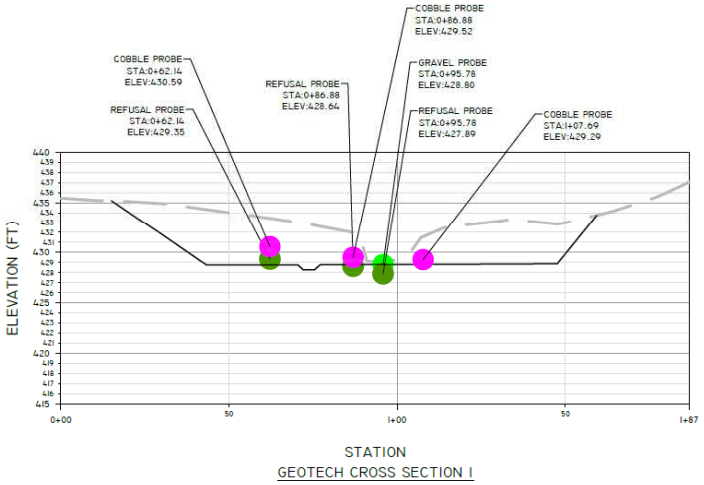
Stony Run Bank Pin Change Summary								
Name	Bank	Starting Length (inches)	Date/ Collector	Length 1	Date/ Collector	Length 2	Date/ Collector	14 Month Change
1	Right	5.28	6/24/2022 RM	5.5	12/9/2022 HK	9.72	8/16/2023 ES	4.44
2	Right	6.24		7.25		6.72		0.48
3	Left	4.32		4.75		4.92		0.6
4	Right	4.8		5.3		6.36		1.56
5	Right	5.16		5.7		9.84		4.68
6	Right	5.88		5.4		8.16		2.28
7	Left	4.38		5.5		9.72		5.34
8	Left	5.16		5.75		5.52		0.36
9	Right	4.2		N/A		N/A		N/A
10	Right	4.68		N/A		N/A		N/A
11	Right	5.64		N/A		N/A		N/A

Observation of Mass Wasting/Acute Bank Slumping (Observed throughout the entire proposed restoration reach)	Volume of Mass Wasting (cubic feet)
	19.8
	21.6
	227.5
	103.8
	80
	50
	36.1
	99.1
	27
	4.9

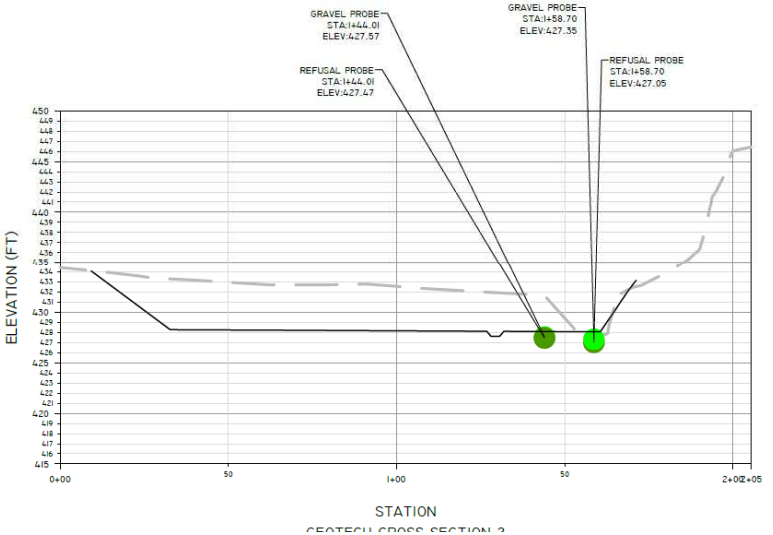
Bank Pin Change Summary Data

Stony Run BMP – Photographs Supporting Erosion Data

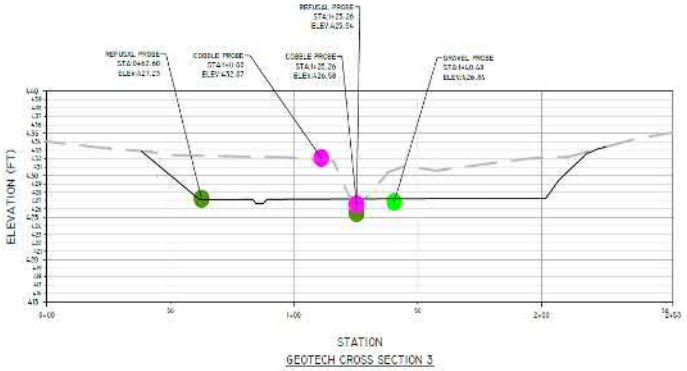
Stony BMP – Cross-Section and Geotechnical Baseline Data
(See Design Plans for additional data)



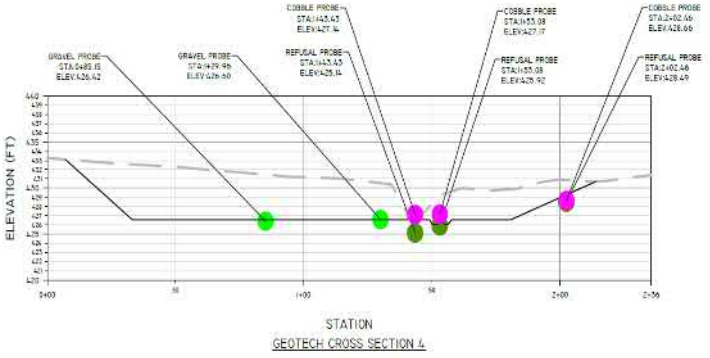
GEOTECH CROSS SECTION 1



GEOTECH CROSS SECTION 2



GEOTECH CROSS SECTION 3



GEOTECH CROSS SECTION 4

Project:	Chesapeake Bay MS4 - Stony Run_RED	**Checked By: PGHK**
Calculated By:	RB/HK	
Date:	7.6.2022	

RES Project No: 105247
Client: PennDOT
MS4/TMDL: MS4

Project Description

Basin Location Information

HUC-12 Code
HUC-12 Name

Project Reach Information

Reach Length	1,370.00	LF
Corridor Width	Variable	

Protocol 1 Summary - Credit for Prevented Sediment During Storm Flow

Stream Length	1370	LF
Eroding Banks	2740	LF
Weighted Average Bank Height	3.37	FT
Weighted Average Erosion Rate	0.58	FT/Year
Total Reach Erosion Tons	308.64	Tons/Year, TSS
Total Reach Erosion LBS	617,287	LBS/Year, TSS
SDR for TSS	0.36	
Delivered Load Tons	111.73	Tons/Year, TSS
Delivered Load LBS	223458	Lbs/Year, TSS
Reach Erosion by Foot	163	Lbs/Year/Foot
TN Delivered	408.85	LBs/Year

Protocol 3 Summary - Credit for Floodplain Reconnection Volume

Total Sediment Reduced	88,899	Lbs/Year

Sediment Load Reduction & Efficiency Summary

	Baseline Conditions	Post-restoration Condition
Stream Length (ft)	1,370	
Stream Banks (ft)	2,740	
Bank Height (ft, weighted ave)	3.37	
Erosion Rate (ft/yr)	0.58	
Total Reach Erosion (lbs/yr)	617,287	
SDR for TSS	0.36	
Delivered Load (lbs/yr)	223,458	

Protocol 1: Annual TSS Reduction (lbs/yr)	201,112
Estimated Reduction Efficiency	90%
Protocol 3: Additional TSS Reduction (lbs/yr)	88,899
Total Annual TSS Reduction (lbs/yr) Requested	290,011

Calculated by: HKPGRB Checked by: Date: 09/2/2021

Side	Study Bank Height (ft)	Associated BEHI	BEHI Rating	NBS Score	Numeric NBS	Length (ft)	Erosion Rate	Bank Area	CF/Year	Tons/Year	Tons/FT/Year	LBS/FT/YR
Right	2.5	B	low	Low	2	31.45	0.030	78.614	2.354	0.119	0.004	7.60
Right	2.5	D	high	High	4	8.99	1.044	22.473	23.462	1.191	0.132	264.93
Right	2.5	C	moderate	Moderate	3	9.34	0.311	23.341	7.255	0.368	0.039	78.87
Right	1.5	B	low	Moderate	3	14.95	0.070	22.421	1.567	0.080	0.005	10.64
Right	2	C	moderate	moderate	3	25.60	0.311	51.200	15.914	0.808	0.032	63.10
Right	2.5	D	high	moderate	3	25.80	0.641	64.500	41.362	2.099	0.081	162.72
Right	2.5	D	high	moderate	3	17.88	0.641	44.700	28.665	1.455	0.081	162.72
Right	2.5	D	high	moderate	3	15.16	0.641	37.900	24.304	1.233	0.081	162.72
Right	5.5	D	high	high	4	35.20	1.044	193.600	202.127	10.258	0.291	582.84
Right	1.8	B	low	Low	2	7.96	0.030	14.320	0.429	0.022	0.003	5.47
Right	5.0	C	moderate	High	4	11.23	0.786	56.132	44.135	2.240	0.200	399.04
Right	5	D	high	High	4	22.80	1.044	113.991	119.011	6.040	0.265	529.85
Right	4.5	D	high	High	4	108.34	1.044	487.527	509.000	25.832	0.238	476.87
Right	4.0	D	high	High	4	19.91	1.044	79.654	83.162	4.220	0.212	423.88
Right	0	C	moderate	High	4	21.69	0.786	0.000	0.000	0.000	0.000	0.00
Right	3.5	C	moderate	Low	2	42.19	0.123	147.669	18.144	0.921	0.022	43.65
Right	5.0	D	high	High	4	31.57	1.044	157.854	164.806	8.364	0.265	529.85
Right	5.5	D	high	Very High	5	34.18	1.700	187.967	319.503	16.215	0.474	948.91
Right	5.5	D	high	High	4	22.54	1.044	123.972	129.432	6.569	0.291	582.84
Right	3.0	C	moderate	Low	2	22.78	0.123	68.338	8.397	0.426	0.019	37.41
Right	3	C	moderate	Moderate	3	25.77	0.311	77.309	24.029	1.219	0.047	94.64
Right	3.0	C	moderate	Low	2	41.60	0.123	124.794	15.333	0.778	0.019	37.41
Right	3.5	D	high	High	4	64.12	1.044	224.410	234.295	11.890	0.185	370.90
Right	3.5	D	high	High	4	15.45	1.044	54.064	56.445	2.865	0.185	370.90
Right	3.5	C	moderate	Low	2	21.27	0.123	74.452	9.148	0.464	0.022	43.65
Right	4.0	D	high	Moderate	3	24.06	0.641	96.247	61.721	3.132	0.130	260.36
Right	3.5	B	low	Low	2	21.65	0.030	75.759	2.269	0.115	0.005	10.64
Right	4.0	D	high	High	4	35.07	1.044	140.278	146.456	7.433	0.212	423.88
Right	5.0	D	high	High	4	32.10	1.044	160.523	167.593	8.505	0.265	529.85
Right	4.5	D	high	High	4	43.41	1.044	195.362	203.967	10.351	0.238	476.87
Right	4	D	high	Moderate	3	14.90	0.641	59.597	38.218	1.940	0.130	260.36
Right	3.0	B	low	Moderate	3	19.83	0.070	59.498	4.157	0.211	0.011	21.28
Right	4.5	C	moderate	Moderate	3	32.53	0.311	146.373	45.496	2.309	0.071	141.97
Right	5.0	D	high	Moderate	3	19.50	0.641	97.515	62.534	3.174	0.163	325.45
Right	4	C	moderate	Low	2	23.71	0.123	94.835	11.652	0.591	0.025	49.88
Right	3.0	D	high	Moderate	3	45.51	0.641	136.521	87.548	4.443	0.098	195.27
Right	2.0	C	moderate	Moderate	3	30.00	0.311	60.001	18.649	0.946	0.032	63.10
Right	3	C	moderate	Low	2	23.54	0.123	70.625	8.678	0.440	0.019	37.41
Right	3	C	moderate	Moderate	3	23.53	0.311	70.577	21.937	1.113	0.047	94.64
Right	3.0	C	moderate	Moderate	3	29.13	0.311	87.387	27.162	1.378	0.047	94.64
Right	2.5	C	moderate	Moderate	3	13.38	0.311	33.438	10.393	0.527	0.039	78.87
Right	3	D	high	High	4	29.07	1.044	87.224	91.066	4.622	0.159	317.91
Right	3	B	low	Moderate	3	14.79	0.070	44.375	3.101	0.157	0.011	21.28
Right	3.0	C	moderate	Moderate	3	27.39	0.311	82.172	25.541	1.296	0.047	94.64
Right	1	B	low	Moderate	3	9.72	0.070	9.717	0.679	0.034	0.004	7.09
Right	1.0	B	low	Moderate	3	15.25	0.070	15.246	1.065	0.054	0.004	7.09
Right	1.0	B	low	Moderate	3	10.01	0.070	10.013	0.700	0.036	0.004	7.09
Right	1	B	low	Moderate	3	8.91	0.070	8.914	0.623	0.032	0.004	7.09
Right	1.5	B	low	Moderate	3	14.19	0.070	21.288	1.487	0.075	0.005	10.64
Right	3.0	C	moderate	Moderate	3	7.22	0.311	21.659	6.732	0.342	0.047	94.64
Right	2	C	moderate	Moderate	3	5.97	0.311	11.939	3.711	0.188	0.032	63.10
Right	1.5	B	low	Moderate	3	11.44	0.070	17.158	1.199	0.061	0.005	10.64
Right	1.5	B	low	Moderate	3	9.26	0.070	13.889	0.970	0.049	0.005	10.64
Right	1.5	B	low	Moderate	3	17.45	0.070	26.169	1.828	0.093	0.005	10.64
Right	2.5	D	high	Moderate	3	10.07	0.641	25.173	16.143	0.819	0.081	162.72
Right	3.0	D	high	Moderate	3	13.92	0.641	41.748	26.772	1.359	0.098	195.27
Right	2.5	D	high	High	4	8.20	1.044	20.503	21.406	1.086	0.132	264.93
Right	3	C	moderate	Low	2	16.32	0.123	48.972	6.017	0.305	0.019	37.41
Left	4.0	D	high	High	4	55.84	1.044	223.347	233.184	11.834	0.212	423.88
Left	2	D	high	High	4	13.12	1.044	26.239	27.395	1.390	0.106	211.94
Left	1.5	C	moderate	Moderate	3	6.92	0.311	10.382	3.227	0.164	0.024	47.32
Left	2	C	moderate	Moderate	3	15.22	0.311	30.440	9.461	0.480	0.032	63.10
Left	2.0	C	moderate	Moderate	3	17.80	0.311	35.600	11.065	0.562	0.032	63.10
Left	2.0	C	moderate	Moderate	3	24.56	0.311	49.120	15.267	0.775	0.032	63.10
Left	2.5	C	moderate	Moderate	3	15.60	0.311	39.000	12.122	0.615	0.039	78.87
Left	3	C	moderate	moderate	3	15.20	0.311	45.600	14.173	0.719	0.047	94.64
Left	3.0	D	high	moderate	3	9.22	0.641	27.660	17.738	0.900	0.098	195.27
Left	3.5	C	moderate	moderate	3	11.93	0.311	41.755	12.978	0.659	0.055	110.42
Left	3.5	C	moderate	moderate	3	33.03	0.311	115.605	35.932	1.824	0.055	110.42
Left	3.5	B	low	Moderate	3	28.45	0.070	99.576	6.957	0.353	0.012	24.82
Left	3.5	C	moderate	Moderate	3	25.93	0.311	90.742	28.204	1.431	0.055	110.42
Left	2.6	C	moderate	Moderate	3	42.11	0.311	109.474	34.027	1.727	0.041	82.03
Left	3.5	C	moderate	Moderate	3	31.62	0.311	110.666	34.397	1.746	0.055	110.42
Left	4.5	D	high	Moderate	3	50.77	0.641	228.443	146.494	7.435	0.146	292.90
Left	6	D	high	High	4	17.51	1.044	105.057	109.684	5.566	0.318	635.82
Left	4.5	D	high	High	4	29.99	1.044	134.964	140.908	7.151	0.238	476.87
Left	5.5	D	high	High	4	24.17	1.044	132.926	138.781	7.043	0.291	582.84
Left	4.5	D	high	High	4	14.53	1.044	65.366	68.245	3.463	0.238	476.87
Left	3.2	B	low	Low	2	34.82	0.030	111.422	3.336	0.169	0.005	9.73
Left	3.5	D	high	Moderate	3	14.35	0.641	50.209	32.198	1.634	0.114	227.81
Left	3	D	high	Moderate	3	20.64	0.641	61.929	39.713	2.015	0.098	195.27
Left	4.5	D	high	High	4	51.81	1.044	233.138	243.407	12.353	0.238	476.87
Left	4.0	B	low	High	4	34.80	0.163	139.189	22.692	1.152	0.033	66.19
Left	3.5	C	moderate	High	4	19.41	0.786	67.918	53.402	2.710	0.140	279.33
Left	3.5	C	moderate	Moderate	3	16.13	0.311	56.470	17.552	0.891	0.055	110.42
Left	3.5	C	moderate	Low	2	35.28	0.123	123.478	15.171	0.770	0.022	43.65
Left	4	D	high	Moderate	3	15.51	0.641	62.058	39.796	2.020	0.130	260.36
Left	4	D	high	High	4	13.41	1.044	53.620	55.982	2.841	0.212	423.88
Left	4.0	D	high	High	4	16.73	1.044	66.901	69.848	3.545	0.212	423.88
Left	4	C	moderate	High	4	23.49	0.786	93.948	73.869	3.749	0.160	319.23
Left	3.5	D	high	High	4	28.66	1.044	100.302	104.720	5.315	0.185	370.90
Left	3.0	D	high	Moderate	3	25.69	0.641	77.076	49.427	2.508	0.098	195.27
Left	3.5	D	high	Moderate	3	33.49	0.641	117.226	75.174	3.815	0.114	227.81
Left	3	C	moderate	Moderate	3	19.53	0.311	58.597	18.213	0.924	0.047	94.64
Left	3	D	high	Moderate	3	42.85	0.641	128.546	82.433	4.183	0.098	195.27
Left	4.5	D	high	High	4	28.64	1.044	128.859	134.534	6.828	0.238	476.87
Left	3.0	D	high	Moderate	3	18.99	0.641	56.978	36.539	1.854	0.098	195.27
Left	2.5	C	moderate	Moderate	3	20.47	0.311	51.173	15.905	0.807	0.039	78.87
Left	4.0	D	high	Moderate	3	53.00	0.641	211.988	135.942	6.899	0.130	260.36
Left	3.0	C	moderate	Moderate	3	12.06	0.311	36.168	11.242	0.571	0.047	94.64
Left	4	D	high	High	4	25.86	1.044	103.452	108.009	5.481	0.212	423.88
Left	3	C	moderate	Moderate	3	13.20	0.311	39.602	12.309	0.625	0.047	94.64
Left	3.0	C	moderate	Moderate	3	21.06	0.311	63.170	19.634	0.996	0.047	94.64
Left	3.5	C	moderate	Moderate	3	13.67	0.311	47.860	14.876	0.755	0.055	110.42
Left	2.5	C	moderate	Moderate	3	30.09	0.311	75.218	23.379	1.186	0.039	78.87
Left	3	C	moderate	Moderate	3	33.54	0.311	100.616	31.273	1.587	0.047	94.64
Left	3.5	D	high	Moderate	3	28.21	0.641	98.723	63.309	3.213	0.114	227.81
Left	3.5	D	high	High	4	18.24	1.044	63.834	66.645	3.382	0.185	370.90
Left	1.5	C	moderate	Moderate	3	12.02	0.311	18.029	5.604	0.284	0.024	47.32
Left	1	C	moderate	Moderate	3	8.76	0.311	8.759	2.722	0.138	0.016	31.55
Left	1.5	C	moderate	Moderate	3	9.62	0.311	14.436	4.487	0.228	0.024	47.32
Left	1.5	C	moderate	Moderate	3	6.65	0.311	9.971	3.099	0.157	0.024	47.32
Left	1.5	C	moderate	Moderate	3	11.71	0.311	17.565	5.460	0.277	0.024	47.32
Left	2.0	C	moderate	High	4	10.10	0.786	20.202	15.884	0.806	0.080	159.61
Left	1	C	moderate	Moderate	3	9.84	0.311	9.836	3.057	0.155	0.016	31.55
Left	1	C	moderate	Moderate	3	7.19	0.311	7.187	2.234	0.113	0.016	31.55
Left	1.5	B	low	Moderate	3	10.09	0.070	15.134	1.057	0.054	0.005	10.64
Left	1.5	C	moderate	Moderate	3	6.81	0.311	10.215	3.175	0.161	0.024	47.32
Left	1.5	B	low	Moderate	3	22.33	0.070	33.491	2.340	0.119	0.005	10.64
Left	2	D	high	High	4	11.16	1.044	22.314	23.297	1.182	0.106	211.94
Left	3.5	D	high	High	4	7.86	1.044	27.501	28.712	1.457	0.185	370.90
Totals						**2739.990**		**9238.158**	**6081.647**	**308.644**	**11.326**	**22651.040**
3.04					3.21	1370.00	0.40				0.09	187.20

Step 1	
StreamStats Percent Exceedence [%]	Discharge [cfs]
50.00%	346
20.00%	604
10.00%	820
4.00%	1140
2.00%	1410
1.00%	1700
0.50%	2020
0.20%	2490

Step 2		
Baseflow [cfs]		
Source	50% Baseflow [cfs]	DA Adjusted Baseflow (Eqn. 11 Roland & Stuckey 2019) [cfs]
Gage 01573849 DA = 10.2 sq.mi. - HYSEP FIXED	8.32	2.471
Gage 01573849 DA = 10.2 sq.mi. - HYSEP LOCAL MIN	7.9	2.347
Gage 01573849 DA = 10.2 sq.mi. - HYSEP SLIDE	8.37	2.486
Gage 015765185 DA = 1.1 sq.mi. - HYSEP FIXED	0.49	0.692
Gage 015765185 DA = 1.1 sq.mi. - HYSEP LOCAL MIN	0.46	0.649
Gage 015765185 DA = 1.1 sq.mi. - HYSEP SLIDE	0.49	0.692
Gage 015765195 DA = 1.7 sq.mi. - HYSEP FIXED	1.87	1.946
Gage 015765195 DA = 1.7 sq.mi. - HYSEP LOCAL MIN	1.83	1.905
Gage 015765195 DA = 1.7 sq.mi. - HYSEP SLIDE	1.87	1.946
Gage 01780400 DA = 4.55 sq.mi. - HYSEP FIXED	3.67	1.918
Gage 01780400 DA = 4.55 sq.mi. - HYSEP LOCAL MIN	3.3	1.725
Gage 01780400 DA = 4.55 sq.mi. - HYSEP SLIDE	3.66	1.913
Gage 01571005 DA = 11.6 sq.mi. - HYSEP FIXED	7.18	1.949
Gage 01571005 DA = 11.6 sq.mi. - HYSEP LOCAL MIN	6.45	1.751
Gage 01571005 DA = 11.6 sq.mi. - HYSEP SLIDE	7.16	1.944

Step 3				
StreamStats Percent Exceedence [%]	Discharge [cfs]	Area	Existing Treatment Area	Proposed Treatment Area
100.00%	1.76	-	-	-
99.99%	1.81	86.0575	0.0000	86.0303
50.00%	346	54.6762	0.0000	54.6686
36.00%	438.6	79.8086	0.0000	67.7025
20.50%	594.7	2.9880	0.0232	2.1839
20.00%	604	71.0244	11.7300	43.6790
10.00%	820	19.7120	6.0743	10.0462
7.70%	897.6	37.6306	11.2073	16.1612
4.00%	1140	25.4649	6.0580	8.7358
2.00%	1410	15.5324	3.0290	4.3679
1.00%	1700	9.2912	1.5145	2.1840
0.50%	2020	6.7597	0.9087	1.3104
0.20%	2490	4.9765	0.6058	0.8736
		Total Area		
		413.922	41.151	297.943

Step 3						
	Design Channel Dishcarge [cfs]	Design Dishcarge at 1' Floodplain Depth (V = 1.6fps) [cfs]	Disharge at Floddplain V = 2fps [cfs] @ Depth 1.4'	Channel Discharge Exceedance (Taken from Figure)	Floodplain Discharge Exceedance (Taken from Figure)	Percent Flow Treated [%]	
	1.81	249	438.6	99.99%	36.00%	71.98%	
	Existing Channel Dishcarge [cfs]	Existing Dishcarge at 1' Floodplain Depth (V = xxfps) [cfs]	Existing Q Floodplain (V = 2fps) [cfs]	Channel Discharge Exceedance (Taken from Figure)	Floodplain Discharge Exceedance (Taken from Figure)	Percent Flow Treated [%]	Percent Flow Treated Increase [%]
	594.7	897.6	NA	20.50%	7.70%	9.94%	62.04%

	Total Length of all Mapped streams in basin (StreamStats) [mi]	1.44				
Step 4	2021 Progress_SLoadRateEOS	Sediment Load Delivered to Project [lbs/yr]	Treatable Load [lbs/yr]	Pollutant Removal Rate (NTW Restoration)	TSS Removed [lbs/yr]	TSS Removed [Ton/yr]
	321004.309	462246.21	286772.06	31%	88899.34	44.45
	2021 Progress_NLoadRateEOS	Nitrogen Load Delivered to Project [lbs/yr]	Treatable Load [lbs/yr]	Pollutant Removal Rate (Nitrogen)	TN Removed [lbs/yr]	TN Removed [ton/yr]
	310.244	446.75	277.16	42%	116.41	0.06
	2021 Progress_PLoadRateEOS	Phosphorus Load Delivered to Project [lbs/yr]	Treatable Load [lbs/yr]	Pollutant Removal Rate (Phosphorus)	TP Removed [lbs/yr]	TP Removed [ton/yr]
	87.180	125.54	77.88	40%	31.15	0.02

APPENDIX E
Soil Bulk Density Lab Results

ACKENHEIL ENGINEERS, INC.
GEOTECHNICAL · CIVIL · INSPECTION · TESTING
1000 Banksville Road, Pittsburgh, Pennsylvania 15216
Phone 412-531-7111 · Fax 412-531-4334 · www.ackenheil.com

Unit Weight of Density

AASHTO T233

Project: RES - East Cocalico Township **Date:** 7/6/2022

AE Client: RES **Project No.:** 22304

Boring	Sample Number	Moisture Content	Average Length (in)	Average Diameter (in)	Volume (ft^3)	Weight (lb)	Wet Unit Weight (pcf)	Unit Weight (pcf)
FT	XS-1T	11.6%	1.955	1.828	0.0030	0.290	97.7	87.6
FT	XS-1B	21.9%	1.955	1.850	0.0030	0.390	128.3	105.3
FT	XS-2T	18.6%	1.977	1.845	0.0031	0.370	121.0	102.0
FT	XS-2B	21.3%	1.980	1.853	0.0031	0.392	126.9	104.6
FT	XS-3T	15.8%	1.970	1.827	0.0030	0.328	109.8	94.8
FT	XS-3B	20.8%	1.974	1.843	0.0030	0.422	138.5	114.7

APPENDIX F –
PUBLIC REVIEW COMMENTS

Notice of the draft Chesapeake Bay PRP was published in the *Pennsylvania Bulletin* on September 24, 2022. The announcement directed the public to its website to review the PRP, and a 30-day comment period was provided. The public-comment period ended on October 24, 2022.

No comments were received during the Public Comment Period.

APPENDIX G –
EAST COCALICO TOWNSHIP BOARD OF SUPERVISORS 12/1/2022 MEETING MINUTES

EAST COCALICO TOWNSHIP
BOARD OF SUPERVISORS MEETING
AGENDA

THURSDAY, DECEMBER 1, 2022 AT 7:00 P.M.

Held in person and held via "live" Zoom at the
East Cocalico Township Municipal Building, 100 Hill Road, Denver

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1) **MEETING CALLED TO ORDER - PLEDGE OF ALLEGIANCE**

2) **REINHOLDS AMBULANCE STATION 9 PRESENTATION:** REPRESENTATIVE JESSICA NIŃO

3) **ANNOUNCEMENT OF EXECUTIVE SESSIONS HELD**

4) **PAST MEETING MINUTES APPROVAL:**
   a) **THURSDAY, NOVEMBER 17, 2022**: BOARD OF SUPERVISORS MEETING MINUTES

5) **ACTION ITEMS:**
   a) **LAND PLANNING ENGINEER:**
      - **36 MUDDY CREEK CHURCH ROAD:** CONDITIONAL APPROVAL
      - **BLACKHORSE WAREHOUSE/WRIGHT PARTNERS:** DISCUSSIONS
      - **9 WHITETAIL DRIVE SWM PLAN:** FINANCIAL SECURITY REDUCTION
      - **RED RUN EXHAUST:** FINANCIAL SECURITY REDUCTION
      - **FOXES SIDING:** FINANCIAL SECURITY REDUCTION
   b) **FS4 AGREEMENT:** 2023 GROWING SEASON
   c) **POLICE:** PENSION COST OF LIVING ADJUSTMENT (COLA)
   d) **HALLER ENTERPRISES:** ZONE DAMPER REPLACEMENT

6) **DEPARTMENT REPORTS:**
   a) **POLICE DEPARTMENT:**
   b) **DIRECTOR OF COMMUNITY DEVELOPMENT:**
   c) **FINANCIAL ADMINISTRATOR:** BOARD OF ASSESSMENT APPEALS - MILLAGE RATES
   d) **MS4 COORDINATOR: RESTORATION PROJECT:** STONY RUN DISCUSSION

7) **TREASURERS REPORT:**

a) **LIST OF BILLS:** AUTHORIZE LIST OF BILLS FOR PAYMENT

8) **MANAGEMENT ITEMS / INFORMATIONAL:**

a) **EMERGENCY SERVICES POTENTIAL ARPA REIMBURSEMENT:** LETTERS MAILED

b) **FARMING LEASE:** ANDY RUTT

c) **LERTA EXTENSION:** UPDATE

d) **RESIGNATION ACCEPTANCE:** SHARYN YOUNG

9) **OLD BUSINESS:**

a) **LIABILITY / INSURANCE PROPOSAL:** MCGOWAN GOVERNMENTAL UNDERSWRITERS

10) **PUBLIC COMMENT:**

a) **PUBLIC COMMENT:** NON-AGENDA ITEMS ONLY (STATE YOUR NAME)

11) **ANNOUNCEMENTS:**

a) **THURSDAY, DECEMBER 15, 2022 AT 7:00 PM:** BOARD OF SUPERVISORS MEETING

12) **EXECUTIVE SESSION:**

13) **ADJOURNMENT**

BOARD OF SUPERVISORS MEETING
THURSDAY, DECEMBER 1, 2022

The advertised meeting of the East Cocalico Township Board of Supervisors was called to order on Thursday, December 1, 2022 at 7:00 p.m., held at the East Cocalico Township Municipal Building, 100 Hill Road, Denver, PA 17517.

Supervisors: Chairman Romao Carrasco, Vice Chairman Lorenzo Bonura, Secretary Jeffrey W. Mitchell

Twp. Staff: Police Chief Keppley, MS4 Technician Ken McCrea, and Recording Secretary Lisa A. Kashner (via Zoom)

Consultants: Township Solicitor Bernadette McKeon Hohenadel from Nikolaus & Hohenadel

Visitors in Attendance: Chad Weaver, Kim Weaver, Lorraine Kulp, Alan & Monica Fry, Brian Wise, Lonnie L. Fasnacht, Donny Stover, Jim Black, Wes Hoover, Ross Rhoades, Justin Birchard, Gerald Hartranft, Jessica Nino, Don Miller, Stephanie Santoro

Visitors via Zoom:* Jill, Suzie, Allen Maxwell, GalaxyS8, iphone, iPhone

*Visitors via Zoom are as shown as exactly as displayed on the Zoom call list.

CALL TO ORDER, PLEDGE OF ALLEGIANCE: Chairman Carrasco asked everyone in attendance to pledge allegiance to the Flag. Chairman Carrasco stated that this meeting was duly advertised in accordance with the second-class Township code in the Lancaster Newspaper on December 1, 2021.

REINHOLDS AMBULANCE STATION 9 PRESENTATION – REPRESENTATIVE JESSICA NINO: Jessica Nino was in attendance to discuss the Reinholds Ambulance financials, how the current times are affecting the station, and discussed a substantial purchase that they are planning in the near future. Jessica Nino discussed the financial aid for a new ambulance and necessary life-saving equipment. Discussions continued. Questions and comments were asked which were answered.

ANNOUNCEMENTS OF EXECUTIVE SESSIONS HELD: Chairman Carrasco announced the Executive Sessions held: (1) November 18, 2022 from 1pm-2:30pm for personnel matters and the Township Manager search, (2) November 28, 2022 from 1pm-3:25pm for personnel matters and the Township Manager search, (3) December 1, 2022 from 6pm-6:35pm for the Township Manager search

PAST MEETING MINUTES APPROVAL: Thursday, November 17, 2022 Board of Supervisor Meeting.

MOTION: Vice Chairman Bonura made a motion, seconded by Secretary Mitchell, to approve the Thursday, November 17, 2022 Board of Supervisor Meeting Minutes. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried (3/0).

ACTION ITEMS: LAND PLANNING ENGINEER:

36 MUDDY CREEK CHURCH ROAD – CONDITIONAL APPROVAL: No one was present for this plan. Casey Kerschner highlighted.

MOTION: Vice Chairman Bonura made a motion, seconded by Chairman Carrasco, to grant a 1-year time extension for the applicant of the 36 Muddy Creek Road to satisfy the prior Conditions of Final Plan approval, thereby extending the new expiration date to December 16, 2023. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried (3/0).

ACTION ITEMS: LAND PLANNING ENGINEER: *(CONTINUED)*

BLACKHORSE WAREHOUSE/WRIGHT PARTNERS – PRELIMINARY/FINAL LAND SUBDIVISION AND DEVELOPMENT PLAN: Casey Kerschner stated that the Representatives could not make tonight's meeting.

9 WHITETAIL DRIVE SWM PLAN – FINANCIAL SECURITY RELEASE: No one was present for this plan. Casey Kerschner highlighted.

MOTION: Vice Chairman Bonura made a motion, seconded by Secretary Mitchell, to authorize a full release of the remaining financial security for the 9 Whitetail Drive SWM Plan, conditioned upon the updated Storm Water Maintenance & Easement Agreement being recorded as noted in the Becker Engineering e-mail dated November 21, 2022. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried (3/0).

RED RUN EXHAUST – FINANCIAL SECURITY REDUCTION: No one was present for this plan. Casey Kerschner highlighted.

MOTION: Chairman Carrasco made a motion, seconded by Vice Chairman Bonura, to (1) authorize a $72,708.42 reduction in the remaining financial security for the Red Run Exhaust of Reamstown - Preliminary/Final Land Development Plan, resulting in the remaining financial security being reduced to $2,000 be contingent upon the satisfaction of the Township Engineer for all fees paid to the Township, and (2) authorize a full release of the remaining financial security for the Red Run Exhaust of Reamstown - Preliminary/Final Land Development Plan, conditioned upon the items being completed per Becker Engineering's e-mail dated November 25, 2022. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried (3/0).

FOXES SIDING – FINANCIAL SECURITY RELEASE: No one was present for this plan. Casey Kerschner highlighted.

MOTION: Chairman Carrasco made a motion, seconded by Vice Chairman Bonura, to authorize a full release of the remaining financial security for the Foxes Siding, Inc. – SWM Plan, conditioned upon the items being completed per Becker Engineering's e-mail dated November 25, 2022. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried (3/0).

FS4 AGREEMENT – 2023 GROWING SEASON: Secretary Mitchell and Ken McCrea highlighted noting that a few minor changes are reflected in the program. Discussions were held. Comments and questions were asked which were answered.

MOTION: Secretary Mitchell made a motion, seconded by Vice Chairman Bonura, to approve the FS4 Agreement for the 2023 growing season and to send the Agreement out to the participants as was directed in the year 2022. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried (3/0).

POLICE – PENSION COST OF LIVING ADJUSTMENT (COLA): Chairman Carrasco highlighted. Discussions were held. Comments and questions were asked which were answered.

MOTION: Chairman Carrasco made a motion, seconded by Vice Chairman Bonura, to approve the Police Pension automatic cost of living adjustment at the maximum allowable increase of 3% in accordance with the side letter agreement with East Cocalico Township and the East Cocalico Township Police Officers Association dated December 16, 2022, the aforementioned agreement modifies the Police Pension Ordinance Section 1, Article 4A and agrees to grant an automatic cost of living adjustment for the Police Pension Fund at 90%. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried (3/0).

ACTION ITEMS: *(CONTINUED)*

HALLER ENTERPRISES – ZONE DAMPER REPLACEMENT: Chief Keppley discussed. Discussions were held. Comments and questions were asked which were answered. Chief Keppley to reach out to Haller tomorrow to get them on the schedule.

MOTION: Vice Chairman Bonura made a motion, seconded by Secretary Mitchell, to approve the Haller Enterprises estimate #462236855 in the amount of $2,973.00. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried (3/0).

DEPARTMENT REPORTS:

POLICE DEPARTMENT: Chief Keppley discussed the K9 Unit. The Supervisors highlighted and discussed their thoughts on the K9 Unit. Lengthy discussions were held. Comments and questions were asked which were answered.

FINANCIAL ADMINISTRATOR – BOARD OF ASSESSMENT OF APPEALS – MILLAGE RATES: Chairman Carrasco highlighted, noting that a letter was received from the Board of Assessment Appeals stating that the Township's 2023 tax rate (millage) is needed to them by 12/16/2022. The current draft 2023 budget shows a 2.5% tax increase. Lengthy discussions were held. Comments and questions were asked which were answered.

MS COORDINATOR – RESTORATION PROJECT – STONY RUN DISCUSSIONS: Ken McCrea discussed. Comments and questions were asked which were answered. The Supervisors discussed, noting to let Counsel review the documents.

MOTION: Chairman Carrasco made a motion, seconded by Vice Chairman Bonura, to approve the Township MS4 Coordinator (Ken McCrea) work with the Township Council in reviewing the Stony Run Contracts that were submitted to the Township, and to express to the individuals to whom submitted the documents that the Township is interested in moving forward pending the review of the Township Council. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried (3/0).

Ken McCrea stated that DEP notified the Township saying that the Township's MS4 Annual Report was accepted.

TREASURERS REPORT:

LIST OF BILLS, AUTHORIZE LIST OF BILLS FOR PAYMENT: Secretary Mitchell highlighted the List of Bills presented for approval.

MOTION: Secretary Mitchell made a motion, seconded by Vice Chairman Bonura, to approve the check payments for the "General Fund Bank Account" List of Bills in the amount of $201,557.12 minus check #63233 (starting date 11/23/2022 – ending date 11/23/2022). Chairman Carrasco asked if there were any comments or questions; there were some, which were answered. No other questions were asked. Motion carried. (3/0)

MANAGEMENT ITEMS / INFORMATIONAL:

EMERGENCY SERVICES POTENTIAL ARPA REIMBURSEMENT – LETTERS MAILED: Chairman Carrasco noted that this is an informational item, stating to the Emergency Services to continue to submit what they have until the end of the year of 2022.

FARMING LEASE (ANDY RUTT) – EXTENDING LEASE DISCUSSION (TO EXPIRE 12/31/2022): Secretary Mitchell highlighted, and discussed the construction that could take place in the field that is being farmed. The language was changed slightly in the Farming Lease to adjust for the upcoming construction. The refund of last years' payment, will be presented at the next Board of Supervisors Meeting.

MANAGEMENT ITEMS / INFORMATIONAL: FARMING LEASE ***(CONTINUED)***

MOTION: Secretary Mitchell made a motion, seconded by Chairman Carrasco, to approve the revised Farmers Lease to be sent out as presented. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried. (3/0)

LERTA EXTENSION – UPDATE: Chairman Carrasco noted that himself and Solicitor Creme attended the County's Meeting on the LERTA Extension. Chairman Carrasco highlighted their discussions, noting that it has been extended until November 26, 2027. A letter to be sent to the County Commissioners as well as the Cocalico School thanking them. The Supervisors agreed.

RESIGNATION ACCEPTANCE – SHARYN YOUNG: Chairman Carrasco read the letter from Sharyn Young received November 22, 2022, noting her resignation.

MOTION: Vice Chairman Bonura made a motion, seconded by Secretary Mitchell, to accept the letter of resignation from Sharyn Young as the East Cocalico Township Director of Community Development with her last day of employment being Friday, December 9, 2022. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried. (3/0)

OLD BUSINESS:

LIABILITY / INSURANCE PROPOSAL – McGOWAN GOVERNMENTAL UNDERWRITERS: Chairman Carrasco highlighted, stating that this is an action item for him to follow through on.

PUBLIC COMMENT: Ross Rhoades noted speeding issues on Ridge Road. Discussions continued. ▪ Allen Maxwell asked about the Township Managers search, and the loss of another employee. Discussions continued.

Secretary Mitchell discussed some pending grant agreements, and other pending items. Secretary Mitchell proposed to schedule another Board of Supervisors Meeting to be held on Thursday, December 29, 2022 at 7pm. The Supervisors agreed to advertise for this meeting.

MOTION: Secretary Mitchell made a motion, seconded by Chairman Carrasco, to advertise for a Board of Supervisors Meeting to be held Thursday, December 29, 2022 at 7pm to be held at the Township Municipal Building. Chairman Carrasco asked if there were any comments or questions; there were none. Motion carried. (3/0)

ANNOUNCEMENTS: Chairman Carrasco announced the upcoming meetings to be held at the East Cocalico Township Municipal Building, 100 Hill Road, Denver held Thursday, December 15, 2022 at 7pm.

EXECUTIVE SESSION: None.

ADJOURNMENT:

MOTION: There being no further business to come before the Board, Vice Chairman Bonura made a motion seconded by Secretary Mitchell to adjourn the meeting at 8:52 p.m. Chairman Carrasco asked if there were any questions. There were none. Motion carried. (3/0)

Respectfully submitted,

Lisa A. Kashner
Township Recording Secretary

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