

UNION TOWNSHIP

Washington County, Pennsylvania

**NATIONAL POLLUTANT DISCHARGE ELIMINATION
SYSTEM (NPDES) STORMWATER DISCHARGES FROM
SMALL MUNICIPAL SEPARATE STORM SEWER
SYSTEMS (MS4)**

PERMIT NO. PAI136131

POLLUTANT REDUCTION PLAN AMENDMENT

December 7, 2023

DRAFT



BANKSON ENGINEERS, INC.
267 Blue Run Road, Suite 200
Cheswick, PA 15024

412-767-5100

UNION TOWNSHIP
Washington County, Pennsylvania

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM
SEWER SYSTEMS (MS4)**

POLLUTION REDUCTION PLAN (PRP) AMENDMENT

December 7, 2023

TABLE OF CONTENTS

	<u>PAGE</u>
SUMMARY	1
LOCATION	1
PURPOSE	2
PRP PROGRESS SUMMARY	2
Table 1: Summary of Inlet Filter Collection Data	3
Table 2: Union Township MS4 PRP Summary Table	3
A. PUBLIC PARTICIPATION	4
PUBLIC PARTICIPATION SUMMARY	4
PUBLIC PARTICIPATION DOCUMENTATION	4
LIST OF PROPERTY OWNERS POTENTIALLY IMPACTED BY PROPOSED BMP CONSTRUCTION	5
PROOF OF PUBLIC NOTICE REGARDING THE POLLUTANT REDUCTION PLAN	6
PUBLIC MEETING DOCUMENTS	7
Agenda	
Meeting Minutes	
PUBLIC MEETING SIGN-IN SHEET (January 2024)	8
DEED OF EASEMENT TEMPLATE	9
COPY OF WRITTEN COMMENTS RECEIVED AND CONCERNING THE PRP AMENDMENT	10
UNION TOWNSHIP'S RECORD OF CONSIDERATION OF PUBLIC COMMENTS	11
OFFICIAL ADOPTION OF POLLUTION REDUCTION PLAN AMENDMENT VIA RESOLUTION	12
B. PRP MAPPING	13
MAPPING SUMMARY	13
C. POLLUTANTS OF CONCERN	14
POLLUTANTS OF CONCERN SUMMARY	14

	<u>PAGE</u>
D. EXISTING LOADING FOR POLLUTANTS OF CONCERN	15
EXISTING LOADING FOR POLLUTANTS OF CONCERN SUMMARY	15
E. SELECTED BMPs TO ACHIEVE MINIMUM REDUCTION IN POLLUTANT LOADING	16
SELECTED BMPs SUMMARY	16
PROPOSED BMPs AND SUPPORTING CALCULATIONS	17
Piney Fork	17
Peters Creek	18
Unnamed Tributaries to the Monongahela River	19
F. IDENTIFY FUNDING MECHANISM(S)	20
IDENTIFY FUNDING MECHANISM(S) SUMMARY	20
COST ESTIMATES FOR EACH BMPs	20
Table 4: Carbox Road Rain Garden Cost Estimate	21
Table 5: Pleasant Stream Park Streambank Restoration Cost Estimate	22
Table 6: Giant Eagle Stormwater Pond Retrofit Cost Estimate	23
Table 7: Elrama Central Park Bioswale Cost Estimate	24
Table 8: Circle Avenue Bioswale Cost Estimate	25
G. RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE (O&M) OF BMPs	26
RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE (O&M) OF BMPs	26
TYPICAL OPERATION AND MAINTENANCE SCHEDULES	26
Typical Operation and Maintenance Schedule for Rain Garden	27
Typical Operation and Maintenance Schedule for Streambank Restoration Areas	27
Typical Operation and Maintenance Schedule for Retrofitted Pond	27
Typical Operation and Maintenance Schedule for Bioswale	27
H. APPENDIX	28
Union Township Inlet Filter Collection Tracking Sheet	
Union Township PRP Amendment BMP Calculations	
Drawings Numbered 1-439-1-1 thru 1-439-1-4 – Location Maps	
Drawings Numbered 2-439-10-1 thru 2-439-10-5 – Stormwater System And MS4 Outfall Location Maps and MS4 Outfall Table and BMP Table	

LISTING OF ACRONYMS AND ABBREVIATIONS USED IN THIS PLAN:

NPDES	-	National Pollutant Discharge Elimination System
MS4	-	Municipal Separate Storm Sewer Systems
PRP	-	Pollutant Reduction Plan
PA DEP	-	Pennsylvania Department of Environmental Protection
PA DCNR	-	Pennsylvania Department of Conservation and Natural Resources
US EPA	-	United States Environmental Protection Agency
PENNDOT	-	Pennsylvania Department of Transportation
NOI	-	Notice of Intent
TN	-	Total Nitrogen
TP	-	Total Phosphorous
TS	-	Total Sediment
LBS/YR	-	Pounds Per Year
BMPs	-	Best Management Practices
O&M	-	Operations and Maintenance
USGS	-	United States Geological Survey
ESRI	-	Environmental Systems Research Institute (GIS Software Company)
GIS	-	Geographic Information Systems
PENNVEST	-	Pennsylvania Infrastructure Investment Authority

UNION TOWNSHIP
Washington County, Pennsylvania

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM
SEWER SYSTEMS (MS4)**

POLLUTION REDUCTION PLAN (PRP) AMENDMENT
December 7, 2023

SUMMARY

Union Township, located in Washington County, Pennsylvania, has prepared this Pollution Reduction Plan (PRP) Amendment to mitigate stormwater discharges of sediment and nutrients to surface waters of the Commonwealth of Pennsylvania, and to satisfy the requirements of its National Pollutant Discharge Elimination System permit (NPDES ID PAI136131). Specifically, stormwater discharges in Union Township eventually flow to the Ohio River via the Monongahela River watershed. The Ohio River generally flows west from Pittsburgh to its terminus at the Mississippi River, which subsequently drains to the Gulf of Mexico. Union Township owns and operates a separate storm sewer system and is considered a Small Municipal Separate Storm Sewer Systems (MS4) Community. However, stormwater discharges to surface waters for the Township are not tributary to the Chesapeake Bay. This Plan Amendment was prepared on behalf of Union Township by Bankson Engineers, Inc., located in Cheswick, Pennsylvania.

LOCATION

Union Township is situated in the northeast corner of Washington County, Pennsylvania. Per the United States Census Bureau, the Township has a total land area of 15.75 square miles. The Township has a total population of 5,367 people, according to the US Census of 2020. Union Township borders Peters Township and Nottingham Township to the west and Carroll Township to the south. On its eastern side, the Township borders the Monongahela River.

PURPOSE

This PRP Amendment was prepared to meet the requirements set forth by the Pennsylvania Department of Environmental Protection (PA DEP) for MS4 discharges to impaired surface waters. This Plan includes the following required sections:

- A) Public Participation
- B) PRP Mapping
- C) Pollutants of Concern
- D) Existing Loading for Pollutants of Concern
- E) Selected BMPs to Achieve Minimum Reduction in Pollutant Loading
- F) Identify Funding Mechanism(s)
- G) Identify Responsible Parties for Operation and Maintenance (O&M) of BMPs

Per the requirements of the Individual NPDES Permit Renewal Process, this Plan shall be submitted to the PA DEP for review.

PRP PROGRESS SUMMARY

On January 12, 2019, the MS4 Pollution Reduction Plan (PRP) for Union Township, prepared by the Harshman CE Group, LLC was adopted by the Township. The PRP was reviewed and approved by the Pennsylvania Department of Environmental Protection (PA DEP) in June 2019. The PRP focused on the implementation of inlet filtering practices at nine (9) existing catch basins throughout Union Township as Best Management Practices (BMPs) to achieve sediment and nutrient removal.

The Township's MS4 Permit states that pollutant removal must be achieved by the end of the 5-year permit period on June 30, 2024. The inlet filters were installed in July 2023. Data gathering began immediately, by the Township Road Crew, no less than twice monthly and after each major precipitation event, clearing any accumulated solids from the bag and weighing the solids. These weights are then entered into the PRP Sediment Removal Tracker, with the most updated version attached.

Table 1: Summary of Inlet Filter Collection Data

Impaired Area	Total Sediment Collected to Date (lbs)	Estimated Annual Collection (lbs/yr)	Estimated Total Annual Phosphorus Removal (lbs/yr)	Pollutant Removal Requirement (lbs/yr)	Requirement Met?
Piney Fork	174.25	460.88	0.2765	0.54012 TP	No
Peters Creek	98.5	265.03	0.1590	23.05764 TP	No
UNTs to Monongahela River	4	10.58	N/A	2,759.6118 Sediment	No

Based on the trend of the data so far, it can be predicted that the inlet filters, as installed, will not achieve the required annual sediment and pollutant removal. The Township recognizes that additional measures must be taken to achieve the required annual removal. Union Township is proposing to amend the current PRP to include additional BMPs that will achieve the required removal rates. While additional measures are being proposed, until these additional measures are implemented, Union Township will continue to carry out the pollutant removal according to the approved PRP.

A summary table below demonstrates the characteristics of each impaired watershed area, the removal requirement, the proposed BMPs Project(s), and the amount of sediment projected to be removed as a result of their installation.

Table 2: Union Township MS4 PRP Summary Table

Impaired Area	Total Pollutant Generated (lbs/yr)	Minimum Removal Requirement (lbs/yr)	Proposed BMPs Project	Pollutant Removed (lbs/yr)	Requirement Met?
Piney Fork	10.8024 TP	0.54012 TP	Bioretention – Rain Garden	5.143 TP	Yes
Peters Creek	461.1528 TP	23.05764 TP	Streambank Restoration & Stormwater Pond Retrofit	31.689 TP	Yes
UNTs to Monongahela River	27,596.118 Sediment	2,759.6118 Sediment	Bioswales	2,887.085 Sediment	Yes

A. PUBLIC PARTICIPATION

PUBLIC PARTICIPATION SUMMARY

This section of the PRP Amendment includes the following items: Proof of public notice, a copy of all written comments received from the public regarding and concerning the PRP Amendment, Union Township's Record of Consideration of each timely comment, and identification of any changes made to the Plan as a result of the public input.

Union Township releases this PRP Amendment as an official public document and shall make a complete copy of the Plan, in its entirety, available for public review at the Union Township Office, located at 3904 Finleyville-Elrama Road, Finleyville, PA 15332.

PUBLIC PARTICIPATION DOCUMENTATION

The following documents related to the public participation component of the Union Township Pollution Reduction Plan Amendment are as follows:

- List of Property Owners Impacted by Proposed BMP Construction
- Proof of Public Notice Regarding Public Participation in PRP Amendment
- Meeting Agenda
- Meeting Minutes
- Public Meeting Sign-In Sheet
- Deed of Easement Template
- Copy of Written Comments Concerning the PRP Amendment
- Union Township's Record of Consideration of Public Comments
- Official Adoption of Pollution Reduction Plan Amendment Via Resolution

LIST OF PROPERTY OWNERS POTENTIALLY IMPACTED BY PROPOSED BMP CONSTRUCTION

1. Landowner: Samuel Cant
Tax Parcel ID: 640-001-00-00-0011-00
Address: 67 Cardox Road, Finleyville, PA 15332
Proposed BMP: Cardox Road Rain Garden (Piney Fork Watershed)

2. Landowner: Charles E. Trax, Sr.
Tax Parcel ID: 640-001-00-00-0009-00
Address: 87 Cardox Road, Finleyville, PA 15332
Owner's Address: 6394 State Route 88, Finleyville, PA 15332
Proposed BMP: Cardox Road Rain Garden (Piney Fork Watershed)

3. Landowner: Stephen and Bethany Reynolds
Tax Parcel ID: 640-003-03-06-0031-01
Address: 4001 Jason Drive, Finleyville, PA 15332
Proposed BMP: Pleasant Stream Park Streambank Restoration (Peters Creek Watershed)

4. Landowner: Terrence and Mary Black
Tax Parcel ID: 640-003-03-06-0031-00
Address: 4000 Jason Drive, Finleyville, PA 15332
Proposed BMP: Pleasant Stream Park Streambank Restoration (Peters Creek Watershed)

5. Landowner: Bartolotta Properties, LLC
Tax Parcel ID: 640-010-00-00-0020-08
Address: 3701 PA-88, Finleyville, PA 15332
Owner's Address: 1300 Country Club Road, Monongahela, PA 15063
Proposed BMP: Giant Eagle Stormwater Pond Retrofit (Peters Creek Watershed)

6. Landowner: Elrama Park Cooperative Association
Tax Parcel ID: 640-007-01-01-0009-00
Address: No Address
Owner's Address: 3904 Finleyville-Elrama Road, Finleyville, PA 15332
Proposed BMP: Circle Avenue Bioswale (UNTs to Monongahela River Watershed)

7. Landowner: Pennsylvania-American Water Company
Tax Parcel ID: 640-007-01-01-0010-00
Address: No Address
Owner's Address: P.O. Box 2738, Camden, NJ 08101
Proposed BMP: Circle Avenue Bioswale (UNTs to Monongahela River Watershed)

**PROOF OF PUBLIC NOTICE REGARDING THE
POLLUTANT REDUCTION PLAN**

PUBLIC NOTICE

Union Township has prepared a Pollutant Reduction Plan (PRP) Amendment as required by the Pennsylvania Department of Environmental Protection (PA DEP), National Pollution Discharge Elimination System (NPDES), and Municipal Separate Storm Sewer System (MS4) Permit, that outlines potential activities and projects that reduce pollutants caused by sediment and/or nutrients in receiving streams. The PRP Amendment is available for public review and comment at the Union Township Municipal Building, located at 3904 Finleyville-Elrama Road, Finleyville, PA 15332 beginning February 12, 2024 through and including March 13, 2024 on weekdays during regular business hours of 9:30 a.m. until 3:30 p.m. The PRP Amendment is also available for review beginning February 12, 2024 on the Township's website at <https://uniontwp.com/>. Written comments will be accepted in person or by mail at the Municipal Building address above no later than close of business on March 13, 2024. Public comments concerning the PRP Amendment will also be accepted at a public meeting to be held on March 13, 2024, at 6:30 p.m. at the Municipal Building. The proposed adoption of the PRP Amendment by the Township Supervisors will be considered at the first regularly scheduled Board Meeting following the conclusion of the 30-day public comment period.

Michalle Dupree
Chairperson
Union Township

Publish February 8 and February 15, 2024

PUBLIC MEETING DOCUMENTS

- **Agenda**
- **Meeting Minutes**

PUBLIC MEETING SIGN-IN SHEET

DEED OF EASEMENT TEMPLATE

DEED OF EASEMENT

THIS DEED OF EASEMENT, made this _____ day of _____,
20__ , by and between _____,
(Property Owner(s) Name(s) and Address)

whether a natural person, corporation, or other entity, and whether one or more, hereinafter referred to as the "Grantor,"

AND

Union Township, Union Township Municipal Building, 3904 Finleyville-Elrama Road, Finleyville, PA 15332, a municipal corporation organized under the laws of the Commonwealth of Pennsylvania, hereinafter referred to as the "Grantee,"

WITNESSETH, that the Grantor, for and in consideration of the sum of One Dollar (\$1.00) in hand paid, the receipt of which is hereby acknowledged, by these presents does grant and convey to the said Grantee, its successors and assigns, a permanent and temporary right of way or easement for the construction, installation, operation, inspection, repair, maintenance, replacement, and removal of Municipal Separate Storm Sewer Systems (MS4) Pollution Reduction Plan storm water management facilities including but not limited to drainage channels, pipes and outlet structures, basins, tanks, inlets, headwalls, endwalls, riprap, fences, vegetation, plantings, access drives, storm water basin retrofitting activities, grading, regrading, removing sediment, mowing and clearing, and the necessary appurtenances in, under, and through, all that certain piece, parcel, or lot of land situate in the Township of Union, County of Washington, Commonwealth of Pennsylvania, Tax Map-Parcel I.D. Number _____, as more fully described in Washington County Instrument _____.

For the location of the easement or right of way, refer to Bankson Engineers, Inc. Drawing(s) attached hereto and made a part hereof.

Together with free ingress, egress, and regress to and for the Grantee, its successors and assigns, at all times, hereafter, into, upon, and out of said lands.

By accepting this right of way or easement, Grantee covenants to restore the surface of the land itself to its same or similar condition whenever it is disturbed in the exercise of any rights granted hereunder. It is understood by the parties that this Deed of Easement is not a release for damage caused by the careless, negligent or reckless acts of the Grantee or any contractor employed by the Grantee. It is understood that Grantee will replace decorative trees, shrubs, grass, and other vegetation damaged in accessing the easement area, but will not replace any damaged trees, shrubs, or other vegetation which lies within the easement area.

To have and to hold all and singular the rights and privileges aforesaid, to the only proper use and behoof of the Grantee, its successors and assigns forever.

IN WITNESS WHEREOF, the Grantor has set the Grantor’s hand and seal or caused this instrument to be executed the day and year first above written.

Signed, sealed and delivered
in the presence of

(Witness)

(Property Owner)

(Witness)

(Property Owner)

COMMONWEALTH OF PENNSYLVANIA]
COUNTY OF WASHINGTON]

On this ____ day of _____, 20__, at _____ a.m./p.m., before me, a notary public, in and for said County and State, personally appeared _____, (Property Owner(s) Name(s)) from _____, PA, who acknowledged the foregoing Deed of Easement to be (City) his/her/their act(s) and deed(s) to the end that the same may be recorded as such.

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

Notary Public

Type of Notary Act
 Acknowledgment (1)
 Signature Witnessing (3)

Identification Method
 Personal Knowledge
 Acceptable ID _____ (ID Type and Issue/Expiration Dates)
 Credible Witness _____ (Name of Credible Witness)

**COPY OF WRITTEN COMMENTS RECEIVED AND
CONCERNING THE PRP AMENDMENT**

**UNION TOWNSHIP'S RECORD OF
CONSIDERATION OF PUBLIC COMMENTS**

**OFFICIAL ADOPTION OF POLLUTION
REDUCTION PLAN AMENDMENT VIA RESOLUTION**

B. PRP MAPPING

MAPPING SUMMARY

This Amendment to Union Township's Pollution Reduction Plan was generated on behalf of the Township by Bankson Engineers, Inc. using the ESRI ArcGIS Desktop software suite. Included in this Plan are maps that encompass the entirety of Union Township as an overall demonstration of the Urbanized Areas, Impaired and Unimpaired Streams, MS4 Outfalls and Planning Areas. Also included are maps specific to each of the proposed BMPs which show specific locations, surrounding pervious and impervious areas, and the general layout of each BMP.

The following Bankson Engineers, Inc. Drawings are included in the Plan, intended to support the BMPs that have been proposed in this PRP Amendment. All drawings below are included and shall be recognized as an integral part of the PRP Amendment.

Drawing List

Title

- 1-439-1-1 – Stormwater System and MS4 Outfall Location Map Sheet 1
- 1-439-1-2 – Stormwater System and MS4 Outfall Location Map Sheet 2
- 1-439-1-3 – Stormwater System and MS4 Outfall Location Map Sheet 3
- 1-439-1-4 – Stormwater System and MS4 Outfall Location Map Sheet 4

- 2-439-10-1 – MS4 Pollutant Reduction Plan Cardox Road Rain Garden
- 2-439-10-2 – MS4 Pollutant Reduction Plan Streambank Restoration Project
- 2-439-10-3 – MS4 Pollutant Reduction Plan Giant Eagle Stormwater Pond Retrofit
- 2-439-10-4 – MS4 Pollutant Reduction Plan Elrama Central Park Bioswale
- 2-439-10-5 – MS4 Pollutant Reduction Plan Circle Avenue Bioswale

C. POLLUTANTS OF CONCERN

POLLUTANTS OF CONCERN SUMMARY

The following summary of streams within the Township, outlined in the table below, are impaired per Appendix E of the individual NPDES permit, and must meet the minimum pollution removal requirements:

Table 3: Union Township MS4 Requirements Table (Municipal)

Name	Impairment(s)	Required Reduction(s)
Piney Fork	Appendix E - Nutrients	0.54 lbs/yr of Total Phosphorus
Peters Creek	Appendix E - Nutrients	23.05 lbs/yr of Total Phosphorus
UNTs to the Monongahela River	Appendix E - Siltation	2,759.61 lbs/yr of Sediment

All other streams within the Township which are not classified as impaired specifically according to Appendix E were omitted from this PRP Amendment, as they do not have pollution reduction requirements.

The required reductions above correspond with the Commonwealth's required removal rates for each pollutant: 10% of the impaired streams' current annual load for sediment, 5% of the impaired streams' current annual load for total phosphorus (TP), and 3% of the impaired streams' current annual load for total nitrogen (TN).

D. EXISTING LOADING FOR POLLUTANTS OF CONCERN

EXISTING LOADING FOR POLLUTANTS OF CONCERN SUMMARY

This PRP Amendment does not revise the existing loading for pollutants of concern. The existing loading for these pollutants, which establishes the minimum pollutant removal requirements and quantities, has already been calculated for the permittee as part of the PRP that was approved in June 2019. For the purposes of preparing this PRP Amendment, it is assumed that the existing loading for the pollutants of concern are correct and valid.

For additional information related to this section and the associated calculation methodology, reference the Township's Pollution Reduction Plan, which can be found at the Township Office.

E. SELECTED BMPs TO ACHIEVE MINIMUM REDUCTION IN POLLUTANT LOADING

SELECTED BMPs SUMMARY

As part of this PRP Amendment, Union Township is proposing to implement a number of additional BMPs in each of the impaired stream's watersheds that will achieve the required pollutant reductions for their respective impaired streams. The proposed BMPs have been selected to best suit the conditions and challenges in each watershed, and include a bioretention – rain garden facility, a streambank restoration, and stormwater pond retrofit, and two bioswales.

The following sections are divided by impaired streams, and each section lays out the proposed BMPs for those impaired streams, their estimated pollution reductions, and how they achieve the required pollutant reduction for that impaired stream.

Given the unique timeframe in which this PRP Amendment is being implemented, each of these proposed BMPs will be implemented as soon as possible once all funding, planning, design, and necessary permitting can be completed.

The project design concepts outlined below are preliminary and are subject to revision as necessary during the process of implementing the Township's Pollution Reduction Plan Amendment.

Until these additional measures are implemented, Union Township will continue to carry out the pollutant removal practice of inlet filtration through the use of inlet filter bags according to the approved PRP. In the future, a full assessment of the effectiveness of the inlet filter bags will be conducted, at which time it will be decided whether the practice should be continued alongside the implemented BMPs from this PRP Amendment. Discontinuation of inlet filtration will only be considered once the proposed BMPs, as described herein, have been successfully and fully implemented.

PROPOSED BMPs AND SUPPORTING CALCULATIONS

PINEY FORK

BEI Drawing Number: 2-439-10-1

Piney Fork is impaired for nutrients according to Appendix E of the Township's individual NPDES permit. To accomplish the required reductions of 5% of total phosphorus (TP) per year for this watershed, 0.54 lbs./year must be removed using BMPs.

In Sub-Sewer Shed 4, it has been proposed to construct a bioretention – rain garden facility at the roadway catch basin near 67 Cardox Road, where an inlet filter bag is currently installed. The rain garden will be constructed on private property adjacent to the Cardox Road right of way. Negotiation with the property owner of the proposed location of the rain garden will be required. The rain garden will manage the solids and pollutants entering the catch basin pollutant removal similar to the inlet filter bag. The PA DEP Effectiveness Value of a bioretention – rain garden is 45%. This pollutant removal efficiency will achieve the required reduction in total phosphorus required for Piney Fork.

The implementation of a bioretention – rain garden facility on this Sub-Sewer Shed will achieve an annual reduction in the total phosphorus (TP) loading of 5.143 lbs./year according to the DEP's Effectiveness Values Table and current loading analysis.

Refer to the table "Piney Fork Required Pollutant Reductions" in the Union Township PRP Amendment BMP Calculations in the Appendix for the specific calculations of pollutant reduction.

PETERS CREEK

BEI Drawings Numbered: 2-439-10-2 and 2-439-10-3

Peters Creek Watershed makes up the majority of the land area in Union Township and is classified as a Trout Stocked Fishery. It is currently considered impaired for nutrients according to Appendix E of the Township's individual NPDES permit. To accomplish the required reductions of 5% of total phosphorus (TP) per year for this Watershed, 23.05 lbs./year must be removed using BMPs.

Pleasant Stream Park is a municipally owned park located in Sub-Sewer Shed 38. The Park is on Jason Drive near the intersection of S.R. 88 and Brownsville Road Extension. The Unnamed Tributary in Pleasant Stream Park is a 2nd order stream that does not have an adequate Riparian buffer and has been experiencing streambank erosion. It has been proposed to implement a streambank restoration project of approximately 350 linear feet in order to achieve the required total phosphorus reductions. The PA DEP Effectiveness Value for TP removal rates from a streambank restoration project is 0.068 lbs./feet/year. Therefore, conducting a streambank restoration project of 350 linear feet would have an overall annual TP removal rate of 23.8 lbs./year.

In Sub-Sewer Shed 65, a proposed retrofit of the Giant Eagle Stormwater Pond could be considered. The Township could collaborate with the property owner to install the retrofit. A concrete baffle could be installed within the pond which would divide the inlet pipe from the discharge pipe to create a sediment forebay area. The baffle would be 1.5 feet high. The area required would be 6,437 square feet. The forebay would have a TP removal efficiency of approximately 43% and would remove 7.889 lbs./year of TP. Improving the hydraulic residence time would encourage greater sediment and nutrient removal.

The combination of the streambank restoration and retrofit of the Giant Eagle stormwater pond would achieve an annual reduction in total phosphorus (TP) loading of 28.753 lbs./year according to the DEP's Effectiveness Values Table and current loading analysis. This pollutant reduction exceeds the minimum requirement.

The streambank restoration would be sufficient on its own to achieve the minimum pollutant reduction requirements but contains multiple factors, including project costs, that could require a reduction in length in the project. To account for any potential change in scale of the streambank restoration project, the Giant Eagle stormwater pond retrofit was also proposed. This will provide the Township with multiple pathways to achieving the minimum required pollutant reduction without having to propose additional projects for this watershed in the future.

Refer to the table "Peters Creek Required Pollutant Reductions" in the Union Township PRP Amendment BMP Calculations in the Appendix for the specific calculations of pollutant reduction.

UNNAMED TRIBUTARIES TO THE MONONGAHELA RIVER

BEI Drawing Number: 2-439-10-4

The Unnamed Tributaries to the Monongahela River are classified as a Warm Water Fisheries and are considered impaired according to Appendix E for Siltation/Sediments. Therefore a 10% annual reduction in the sediment is required based on the existing loading, which means the required annual reduction is 2,759.61 lbs./year of sediment.

In the Village of Elrama, in Sub-Sewer Sheds 87 and 88, it has been proposed to install two bioswales, one on Union Township Park property, and the other on property owned by the Elrama Park Cooperative Association. One of the bioswales will be installed at Elrama Central Park and the other will be installed to the east of Circle Avenue. These bioswales' primary function will be to reduce the amount of sediment from the contributing sub-sewer sheds that are reaching the Monongahela River and its tributaries.

A bioswale is similar in principle and appearance to other open-channel vegetated detention but is designed to function as a bioretention area. Pollutants are removed not only by the construction of the bioswale, but the surrounding soils are also incorporated into the design to assist in the removal of pollutants. This diversion of pollutants to the bioswale and the surrounding soils prevents them from reaching the impaired waterways.

The implementation of these bioswales in Elrama would achieve an annual reduction in sediment loading of 2,887.085 lbs./year according to the DEP's Effectiveness Values Table and current loading analysis.

Refer to the table "Unnamed Tributaries to the Monongahela River Required Pollutant Reductions" in the Union Township PRP Amendment BMP Calculations in the Appendix for the specific calculations of pollutant reduction.

F. IDENTIFY FUNDING MECHANISM(S)

IDENTIFY FUNDING MECHANISM(S) SUMMARY

Union Township recognizes that an integral component of a successful Pollutant Reduction Plan Amendment is the ability to adequately fund the proposed sediment removal projects. The financial feasibility of each of the proposed BMPs projects was a crucial aspect of the development of the conceptual plan.

All of the projects proposed in the PRP Amendment were selected with cost-effectiveness as a significant consideration, both in terms of initial construction cost and long-term operation and maintenance. This was done to maximize the likelihood that outside funding could be secured for the proposed BMPs and to minimize the financial and resource burden placed on the Township to implement and maintain the BMPs.

The Township intends to solicit outside funding sources as a means of financing the proposed construction projects. These projects will be required for the Township to comply with the requirements of the NPDES MS4 Permit. The Township may plan to apply for funding through the Pennsylvania Infrastructure Investment Authority (PENNVEST).

The Township has already submitted two grant applications for the streambank restoration project at Pleasant Stream Park. One of the applications was submitted to the Washington County Local Share Account (LSA), and the other application was submitted to the Statewide LSA.

The Township may utilize existing General Funds or consider implementing a marginal stormwater management fee, which would generate revenue from the public taxpayers and residents, as a means to offset the capital costs of completing the requirements of the Pollutant Reduction Plan Amendment.

COST ESTIMATES FOR EACH BMPs

An initial project cost estimate has been prepared for each of the proposed BMPs and has been included herein.

Table 4: Cardox Road Rain Garden Cost Estimate

Quantity	Unit	Description	Unit Price	Amount
100	C.Y.	Rough Grading to Form Rain Garden	\$40.00	\$4,000.00
100	C.Y.	Excavation (Total) Unclassified	\$40.00	\$4,000.00
500	S.F.	Reseeding of Disturbed Areas	\$15.00	\$7,500.00
20	Each	Selected Rain Garden Plantings	\$20.00	\$400.00
30	C.Y.	Rain Garden Soil Mixture	\$75.00	\$2,250.00
30	C.Y.	Course Stone Aggregate	\$50.00	\$1,500.00
5	L.F.	4-inch Diameter Underdrain	\$50.00	\$250.00
1	Each	Nyoplast Riser Outlet Control	\$700.00	\$700.00
20	L.F.	HDPE Drain Pipe	\$100.00	\$2,000.00
1	Each	Concrete Endwall	\$2,500.00	\$2,500.00
1	Each	Rip Rap Energy Dissipator	\$500.00	\$500.00
1	L.S.	Soil Erosion and Sedimentation Controls	\$10,000.00	\$10,000.00
1	L.S.	Permitting	\$15,000.00	\$15,000.00
1	L.S.	Property Acquisition	\$5,000.00	\$5,000.00
1	L.S.	Excavator Access	\$1,000.00	\$1,000.00
1	Each	Mobilization	\$5,000.00	\$5,000.00
1	L.S.	Legal Fees, O&M Agreement, Recording	\$5,000.00	\$5,000.00
			Subtotal	\$66,600.00
			Contingency (10%)	\$6,660.00
			Total	\$73,260.00

Table 5: Pleasant Stream Park Streambank Restoration Cost Estimate

Quantity	Unit	Description	Unit Price	Amount
350	L.F.	Regrading of Bank Areas	\$150.00	\$52,500.00
100	C.Y.	Excavation (Total) Unclassified	\$40.00	\$4,000.00
350	L.F.	Reseeding of Disturbed Areas	\$15.00	\$5,250.00
3,500	S.F.	Coconut Matting/Live Stakes	\$20.00	\$70,000.00
1	L.S.	Soil Erosion and Sedimentation Controls	\$10,000.00	\$10,000.00
1	L.S.	Permitting	\$15,000.00	\$15,000.00
1	L.S.	Property Acquisition	\$5,000.00	\$5,000.00
1	L.S.	Excavator Access to Streambank	\$1,000.00	\$1,000.00
1	Each	Mobilization	\$5,000.00	\$5,000.00
1	L.S.	Legal Fees, O&M Agreement, Recording	\$5,000.00	\$5,000.00
			Subtotal	\$172,750.00
			Contingency (10%)	\$17,275.00
			Total	\$190,025.00

Table 6: Giant Eagle Stormwater Pond Retrofit Cost Estimate

Quantity	Unit	Description	Unit Price	Amount
1	L.S.	General Grading/Sediment Removal	\$5,000.00	\$5,000.00
20	C.Y.	Miscellaneous Excavation (Unclassified)	\$40.00	\$800.00
70	L.F.	Concrete Block Baffle Wall	\$70.00	\$4,900.00
20	L.F.	4-inch Diameter Perforated Underdrain	\$50.00	\$1,000.00
1	L.S.	Soil Erosion and Sedimentation Controls	\$5,000.00	\$5,000.00
1	L.S.	Property Acquisition	\$5,000.00	\$5,000.00
1	L.S.	Excavator Access to Pond	\$1,000.00	\$1,000.00
5	C.Y.	Course Stone Aggregate	\$50.00	\$250.00
1	Each	Mobilization	\$1,000.00	\$1,000.00
1	L.S.	Landscaping and Restoration	\$3,000.00	\$3,000.00
1	L.S.	Legal Fees, O&M Agreement, Recording	\$5,000.00	\$5,000.00
			Subtotal	\$31,950.00
			Contingency (10%)	\$3,195.00
			Total	\$35,145.00

Table 7: Elrama Central Park Bioswale Cost Estimate

Quantity	Unit	Description	Unit Price	Amount
150	C.Y.	Rough Grading to Form Bioswale	\$40.00	\$6,000.00
150	C.Y.	Excavation (Total) Unclassified	\$40.00	\$6,000.00
2,000	S.F.	Reseeding of Disturbed Areas	\$15.00	\$30,000.00
20	Each	Selected Bioswale Plantings	\$20.00	\$400.00
30	C.Y.	Bioswale Soil Mixture	\$75.00	\$2,250.00
30	C.Y.	Course Stone Aggregate	\$50.00	\$1,500.00
15	L.F.	4-inch Diameter Underdrain	\$50.00	\$750.00
1	Each	Nyoplast Riser Outlet Control	\$700.00	\$700.00
225	L.F.	HDPE Drain Pipe	\$100.00	\$22,500.00
1	Each	Concrete Endwall	\$2,500.00	\$2,500.00
1	Each	Rip Rap Energy Dissipator	\$500.00	\$500.00
1	L.S.	Soil Erosion and Sedimentation Controls	\$10,000.00	\$10,000.00
1	L.S.	Permitting	\$15,000.00	\$15,000.00
1	L.S.	Excavator Access	\$1,000.00	\$1,000.00
1	Each	Mobilization	\$5,000.00	\$5,000.00
1	L.S.	Legal Fees, O&M Agreement, Recording	\$5,000.00	\$5,000.00
			Subtotal	\$109,100.00
			Contingency (10%)	\$10,910.00
			Total	\$120,010.00

Table 8: Circle Avenue Bioswale Cost Estimate

Quantity	Unit	Description	Unit Price	Amount
150	C.Y.	Rough Grading to Form Bioswale	\$40.00	\$6,000.00
150	C.Y.	Excavation (Total) Unclassified	\$40.00	\$6,000.00
2,000	S.F.	Reseeding of Disturbed Areas	\$15.00	\$30,000.00
20	Each	Selected Bioswale Plantings	\$20.00	\$400.00
30	C.Y.	Bioswale Soil Mixture	\$75.00	\$2,250.00
30	C.Y.	Course Stone Aggregate	\$50.00	\$1,500.00
15	L.F.	4-inch Diameter Underdrain	\$50.00	\$750.00
1	Each	Nyoplast Riser Outlet Control	\$700.00	\$700.00
300	L.F.	HDPE Drain Pipe	\$100.00	\$30,000.00
4	Each	Catch Basin	\$2,000.00	\$8,000.00
1	Each	Concrete Endwall	\$2,500.00	\$2,500.00
1	Each	Rip Rap Energy Dissipator	\$500.00	\$500.00
1	L.S.	Soil Erosion and Sedimentation Controls	\$10,000.00	\$10,000.00
1	L.S.	Permitting	\$15,000.00	\$15,000.00
1	L.S.	Property Acquisition	\$5,000.00	\$5,000.00
1	L.S.	Excavator Access	\$1,000.00	\$1,000.00
1	Each	Mobilization	\$5,000.00	\$5,000.00
1	L.S.	Legal Fees, O&M Agreement, Recording	\$5,000.00	\$5,000.00
			Subtotal	\$129,600.00
			Contingency (10%)	\$12,960.00
			Total	\$142,560.00

G. RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE (O&M) OF BMPs

RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE (O&M) OF BMPs

Union Township will be primarily responsible for the operation and maintenance of all BMPs that are proposed for installation in this PRP Amendment.

Once installed, the BMPs must be properly maintained in order to continue to remove the pollutants at their optimal rates. It is anticipated that some of the proposed BMPs will be located on Union Township property. In the event that BMPs need to be constructed on private property, Union Township will enter into an Easement Agreement and an Operation and Maintenance Agreement (O&M Agreement) with the Landowner in which the BMP is to be installed.

The O&M Agreement will serve as a binding contractual agreement signed by all parties involved and will clearly demonstrate the maintenance responsibilities associated with each of the BMPs facilities and who is responsible for conducting said maintenance. The O&M Agreement will also clearly demonstrate the frequency in which maintenance shall be performed (i.e., monthly, annually, etc.).

A copy of the Operation and Maintenance Agreements for each of the BMPs will be kept permanently at the Union Township Office.

MS4 permittees and communities will need to identify actual O&M activities in Annual MS4 Status Reports. Permanent recordkeeping, including dates in which inspections were performed and notes identifying what maintenance activities occurred shall be maintained by the responsible party and shall be available for future reporting, as necessary.

TYPICAL OPERATION AND MAINTENANCE SCHEDULES

The following table outlines the standard operation and maintenance procedures to be used to ensure the bioretention – rain garden, streambank restoration areas, retrofitted ponds, and bioswales continue to perform as designed and ensure the optimal pollutant removal rates with the BMPs.

These are typical maintenance schedules. A detailed Operation and Maintenance Plan for each of the BMPs to be installed by the Township will be generated as part of the design and permitting process. The parties responsible for conducting and completing operation and maintenance duties, as outlined in their respective O&M Plans, will be identified in the O&M Agreement for each of the BMPs.

Typical Operation and Maintenance Schedule for Rain Garden

Maintenance Activity	Maintenance Schedule	Notes
Mowing	Monthly	Mow when dry.
Removal of accumulated sediment/cattails	Annually	Remove material when completely dry.
Correct erosion problems	As needed	
Remove invasive species	As needed	

Typical Operation and Maintenance Schedule for Streambank Restoration Areas

Maintenance Activity	Maintenance Schedule	Notes
Mowing	Twice annually until tree canopy is established	Mow when streambanks are dry.
Replant dead live stakes and plants	As needed	If live stakes can be gently pulled from the ground, they must be replaced.
Correct erosion problems	As needed	
Remove invasive species	As needed	
Stabilize eroding or undercut portions of the bank	As needed	

Typical Operation and Maintenance Schedule for Retrofitted Pond

Maintenance Activity	Maintenance Schedule	Notes
Mowing	Twice annually	Mow when basin is dry.
Removal of accumulated sediment/cattails	Annually	Remove sediment at a time when the basin is completely dry. Basin should be returned to original lines and grades. Dispose of sediment at a DEP approved facility.
Cleaning outlet control structure and discharge culvert	Monthly	Dispose of sediment at a DEP approved facility.
Correct erosion problems	As needed	
Repair forebay concrete wall, riprap, etc.	As needed	
Remove invasive species	As needed	

Typical Operation and Maintenance Schedule for Bioswale

Maintenance Activity	Maintenance Schedule	Notes
Mowing	Monthly	Mow when dry.
Removal of accumulated sediment/cattails	Annually	Remove material when completely dry.
Correct erosion problems	As needed	
Remove invasive species	As needed	

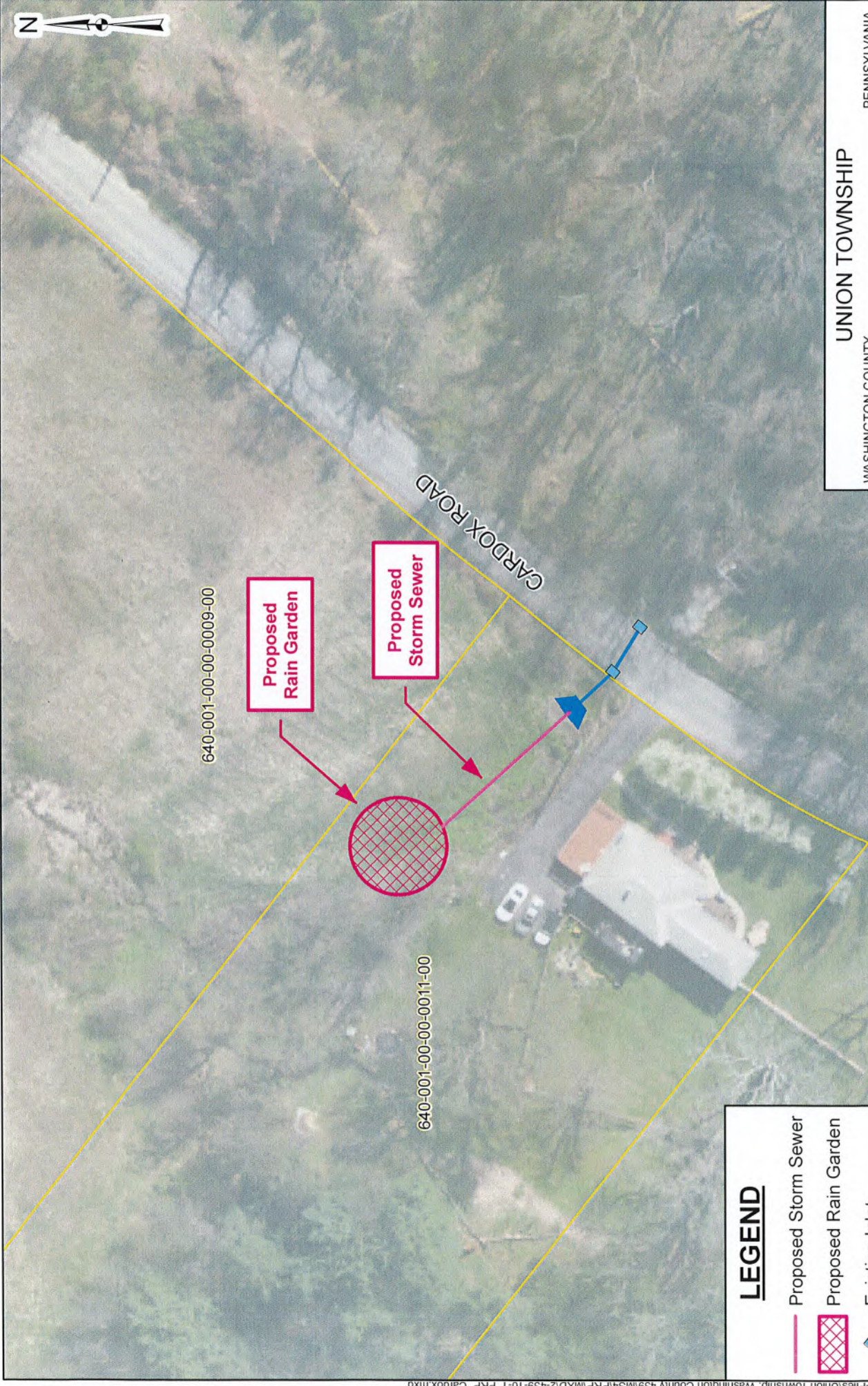
APPENDIX

UNION TOWNSHIP PRP AMENDMENT BMP CALCULATIONS

PINEY FORK REQUIRED POLLUTANT REDUCTIONS												
BMP Name	BMP Description	BMP Effectiveness Values			Proposed Sewer Shed For BMP	Proposed BMP Description	Category	Acreage	Sediment Loading Rate	TP Loading Rate (lbs/acre/yr)	Estimated Sediment Reduction (lbs/yr)	Estimated TP Reduction (lbs/yr)
		TN	TP	Sediment								
Bioretention - Rain Garden (1 inlet)	An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants. This BMP has an underdrain and is in C or D soil.	25%	45%	55%	4	Install a rain garden prior to or surrounding the existing catch basin. Would require excavation and backfilled with engineered media, topsoil, and vegetation.	Impervious	0.61	1839	2.28	616.985	0.626
								11.95	264.96	0.84	1741.45	4.517
TOTAL:										2358.435	5.143	
MINIMUM REQUIRED:										Non Impaired	0.54012	
REMAINING REDUCTION REQUIRED:										0	Requirement Met	

PETERS CREEK REQUIRED POLLUTANT REDUCTIONS												
BMP Name	BMP Description	BMP Effectiveness Values			Proposed Sewer Shed For BMP	Proposed BMP Description	Category	Acreage/L. F.	Sediment Loading Rate	TP Loading Rate (lbs/acre/yr)	Estimated Sediment Reduction (lbs/yr)	Estimated TP Reduction (lbs/yr)
		TN	TP	Sediment								
Streambank Restoration	An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.	0.075 lbs/ft/yr	0.068 lbs/ft/yr	44.88 lbs/ft/yr	38	At Pleasant Stream Park, a 350 linear foot streambank restoration on the park's Unnamed Tributary to Peters Creek.	N/A	350 L.F.	N/A	N/A	15708	23.8
Stormwater Pond Retrofit	A stormwater pond retrofit is an enhancement of the stormwater treatment capabilities of an existing stormwater pond by increasing the storage volume or the hydraulic residence time of the facility. This increase in storage volume or hydraulic residence time results in increased sediment and nutrient removal rates.	27%	43%	56%	65	Retrofit the existing Giant Eagle Stormwater Pond with a concrete block baffle wall that would improve hydraulic residence time in the facility.	Impervious	4.87	1839	2.28	5015.321	4.775
							Pervious	8.62	264.96	0.84	1279.015	3.114
TOTAL:										22002.336	31.689	
MINIMUM REQUIRED:										Non Impaired	23.05764	
REMAINING REDUCTION REQUIRED:										0	Requirement Met	

UNNAMED TRIBUTARIES TO THE MONONGAHELA RIVER REQUIRED POLLUTANT REDUCTIONS												
BMP Name	BMP Description	BMP Effectiveness Values			Proposed Sewer Shed For BMP	Proposed BMP Description	Category	Acreage	Sediment Loading Rate	TP Loading Rate (lbs/acre/yr)	Estimated Sediment Reduction (lbs/yr)	Estimated TP Reduction (lbs/yr)
		TN	TP	Sediment								
Bioswale	With a bioswale, the load is reduced because, like other open channel designs, there is now treatment through the soil. A bioswale is designed to function as a bioretention area.	70%	75%	80%	88	At the edge of Elrama Central Park that borders Fairview Street on Union Township Park land.	Impervious	0.945	1839	2.28	1390.284	1.616
							Pervious	1.210	264.96	0.84	256.481	0.762
Bioswale	With a bioswale, the load is reduced because, like other open channel designs, there is now treatment through the soil. A bioswale is designed to function as a bioretention area.	70%	75%	80%	87	On the northeast edge of Circle Avenue, on land owned by Unon Township Parks.	Impervious	0.734	1839	2.28	1079.860	1.255
							Pervious	0.757	264.96	0.84	160.460	0.477
TOTAL:										2887.085	4.11	
MINIMUM REQUIRED:										2759.6118	Non Impaired	
REMAINING REDUCTION REQUIRED:										Requirement Met	0	



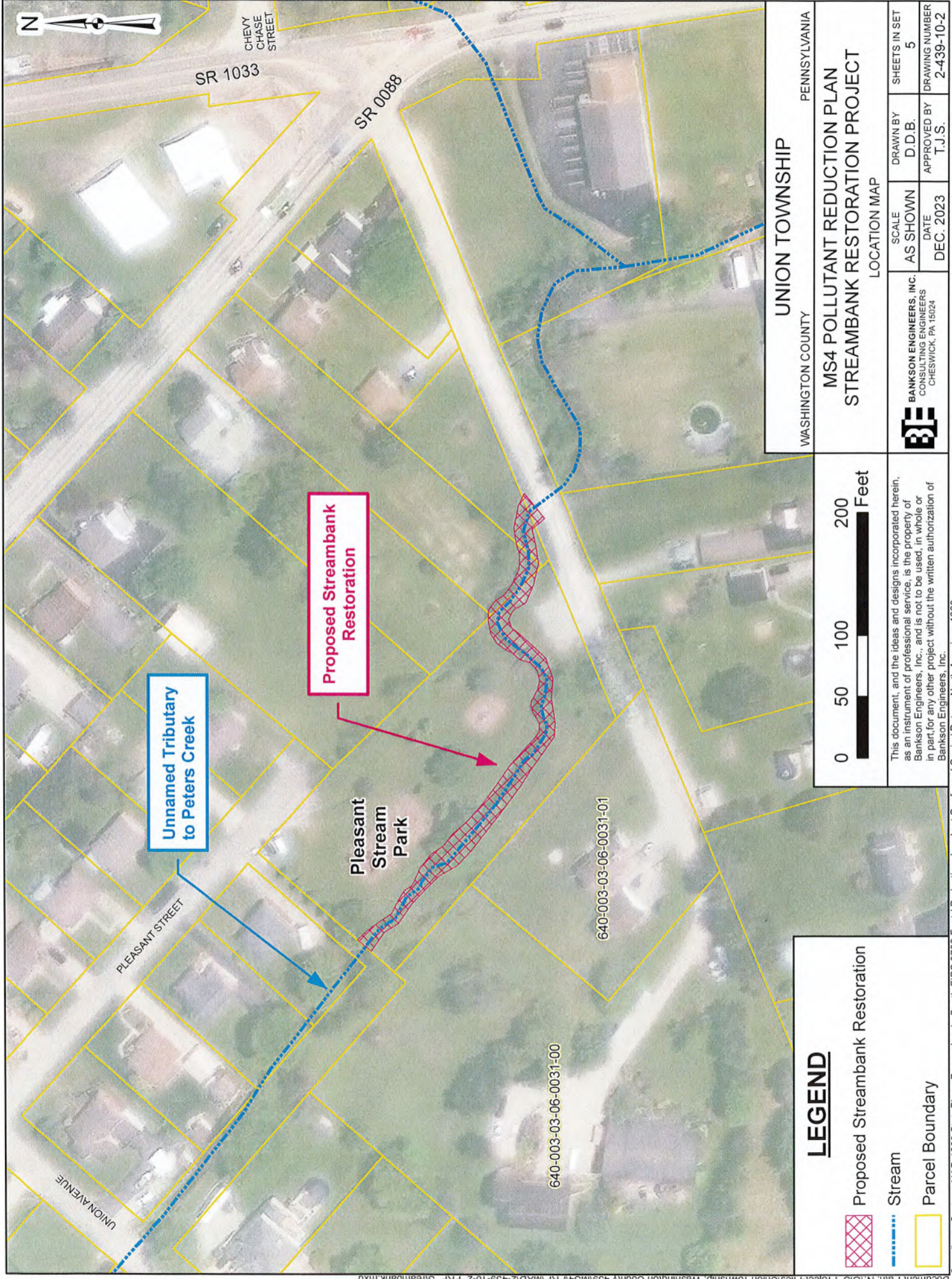
LEGEND

- Proposed Storm Sewer
- Proposed Rain Garden
- Existing Inlet
- Existing Rip Rap
- Existing Storm Sewer
- Parcel Boundary



This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Bankson Engineers, Inc., and is not to be used, in whole or in part, for any other project without the written authorization of Bankson Engineers, Inc.

WASHINGTON COUNTY		UNION TOWNSHIP		PENNSYLVANIA	
MS4 POLLUTANT REDUCTION PLAN					
CARDON ROAD RAIN GARDEN					
LOCATION MAP					
BANKSON ENGINEERS, INC. CONSULTING ENGINEERS CHESWICK, PA 15024		SCALE	DRAWN BY	SHEETS IN SET	DRAWING NUMBER 2-439-10-1
		AS SHOWN	D.I.B.	5	
BANKSON ENGINEERS, INC.		DATE	APPROVED BY		
		DEC. 2023	T.J.S.		



CHEVY CHASE STREET

SR 1033

SR 0088

Unnamed Tributary to Peters Creek

PLEASANT STREET

UNION AVENUE




Proposed Streambank Restoration

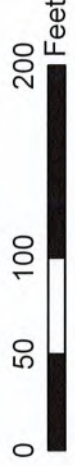
Pleasant Stream Park

640-003-03-06-0031-00


640-003-03-06-0031-01

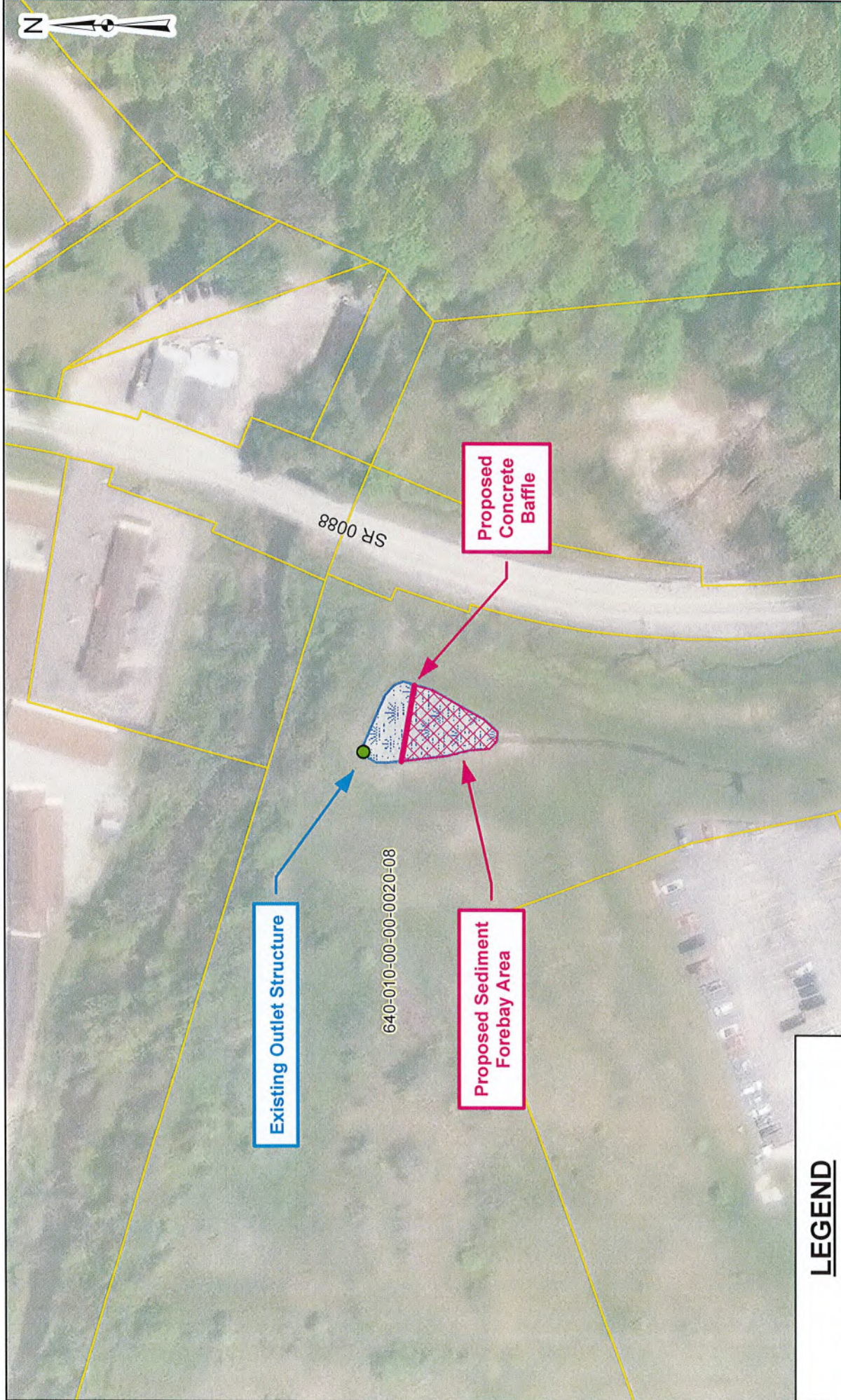
LEGEND

-  Proposed Streambank Restoration
-  Stream
-  Parcel Boundary



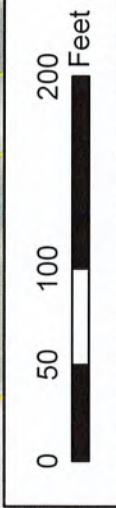
This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Bankson Engineers, Inc., and is not to be used, in whole or in part, for any other project without the written authorization of Bankson Engineers, Inc.

WASHINGTON COUNTY		UNION TOWNSHIP		PENNSYLVANIA	
MS4 POLLUTANT REDUCTION PLAN					
STREAMBANK RESTORATION PROJECT					
LOCATION MAP					
BANKSON ENGINEERS, INC. CONSULTING ENGINEERS CHESWICK, PA 15024		SCALE AS SHOWN	DRAWN BY D.D.B.	SHEETS IN SET 5	
		DATE DEC. 2023	APPROVED BY T.J.S.	DRAWING NUMBER 2-439-10-2	



LEGEND


-  Proposed Concrete Baffle
-  Proposed Sediment Forebay Area
-  Existing Outlet Structure
-  Existing Giant Eagle Pond
-  Parcel Boundary

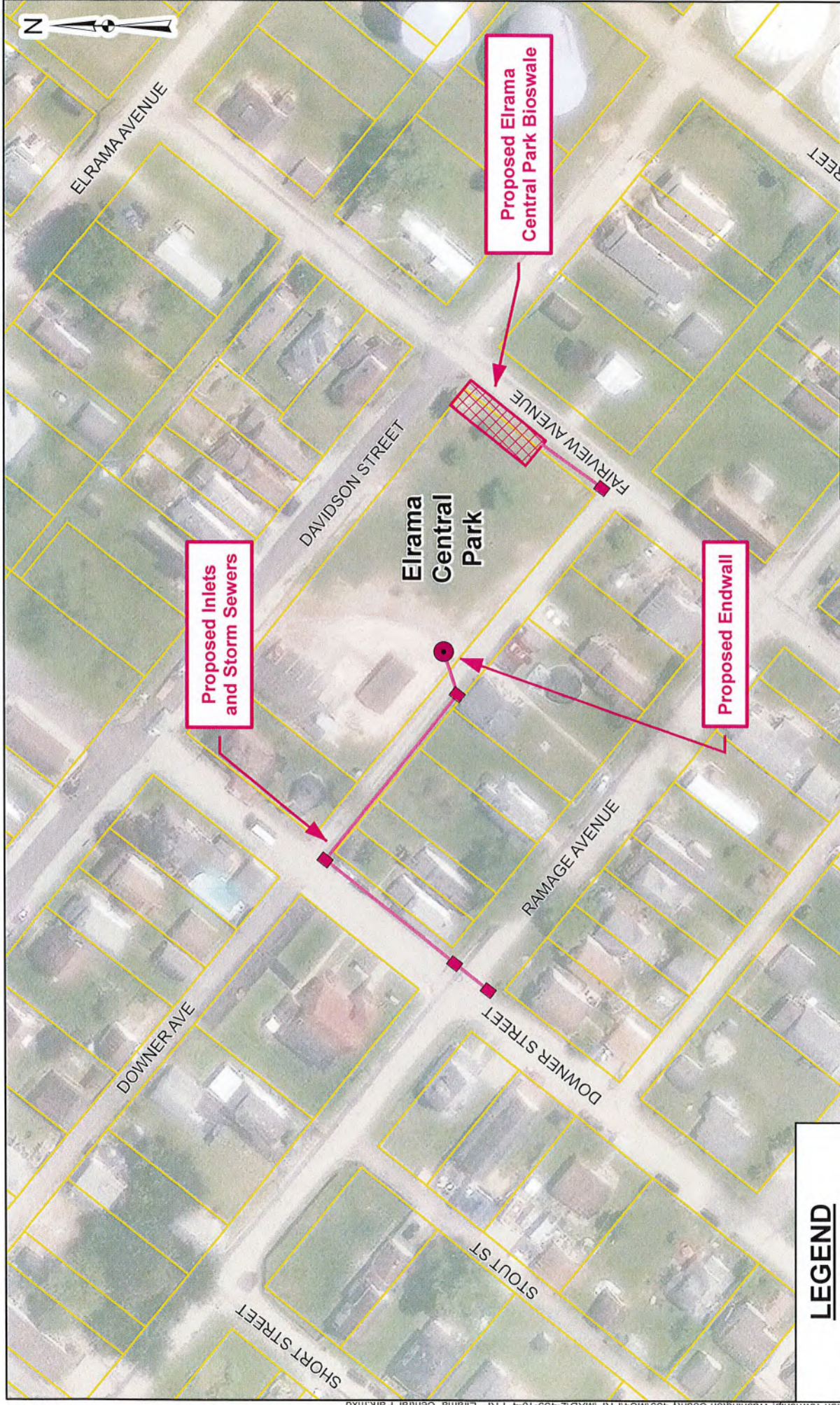


This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Bankson Engineers, Inc., and is not to be used, in whole or in part, for any other project without the written authorization of Bankson Engineers, Inc.





WASHINGTON COUNTY UNION TOWNSHIP PENNSYLVANIA

MS4 POLLUTANT REDUCTION PLAN
GIANT EAGLE POND RETROFIT
LOCATION MAP

	BANKSON ENGINEERS, INC. CONSULTING ENGINEERS CHESWICK, PA 15024	SCALE AS SHOWN	DRAWN BY D.D.B.	SHEETS IN SET 5
		DATE DEC. 2023	APPROVED BY T.J.S.	DRAWING NUMBER 2-439-10-3




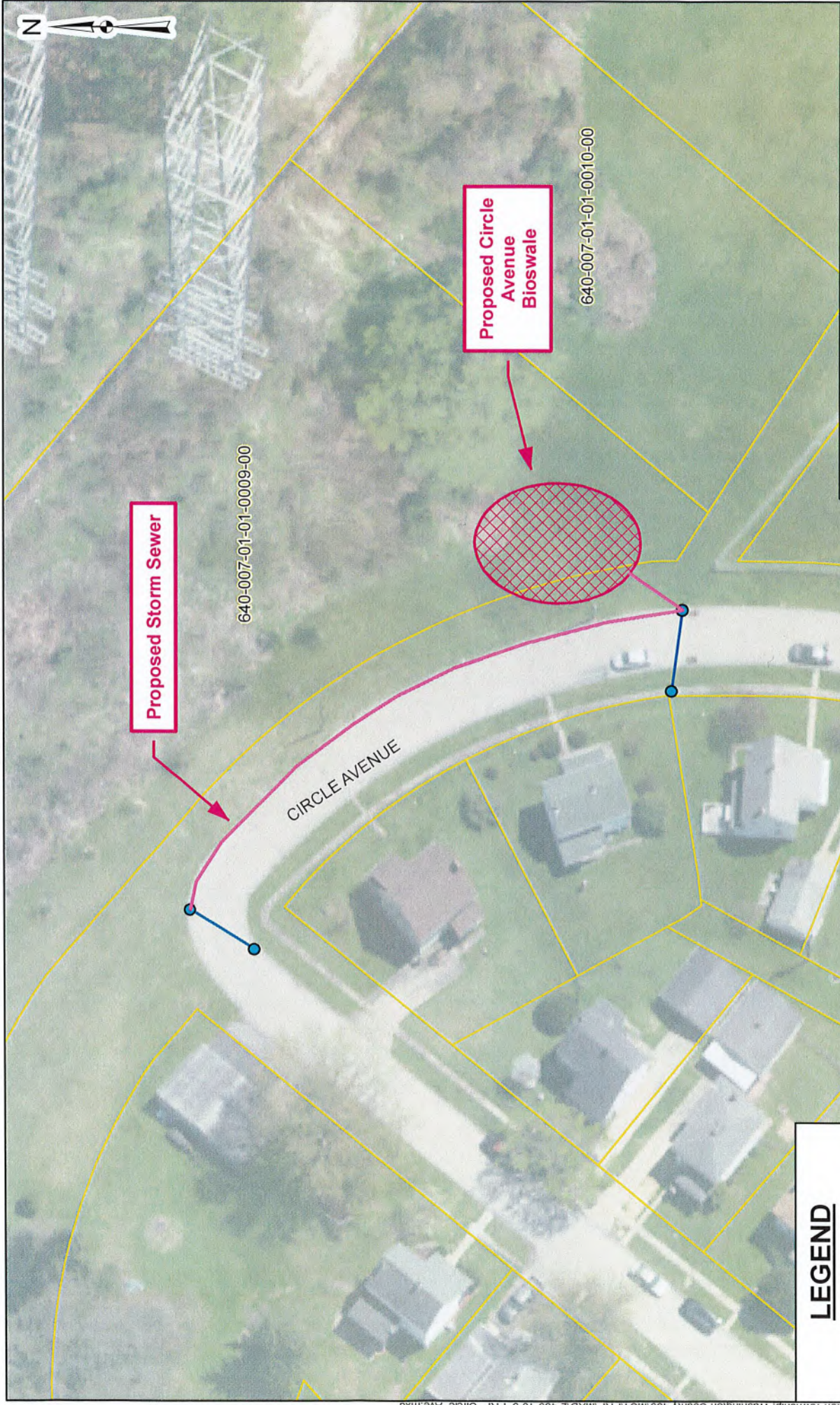
LEGEND

-  Proposed Inlet
-  Proposed Storm Sewer
-  Proposed Bioswale
-  Parcel Boundary



This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Bankson Engineers, Inc., and is not to be used, in whole or in part, for any other project without the written authorization of Bankson Engineers, Inc.

WASHINGTON COUNTY		UNION TOWNSHIP		PENNSYLVANIA	
MS4 POLLUTANT REDUCTION PLAN					
ELRAMA CENTRAL PARK BIOSWALE					
LOCATION MAP					
	BANKSON ENGINEERS, INC. CONSULTING ENGINEERS CHESWICK, PA 15024		SCALE AS SHOWN	DRAWN BY D.D.B.	SHEETS IN SET 5
			DATE DEC. 2023	APPROVED BY T.J.S.	DRAWING NUMBER 2-439-10-4



LEGEND

- Proposed Storm Sewer
- Proposed Bioswale
- Existing Inlet
- Existing Storm Sewer
- Parcel Boundary

0 25 50 100 Feet

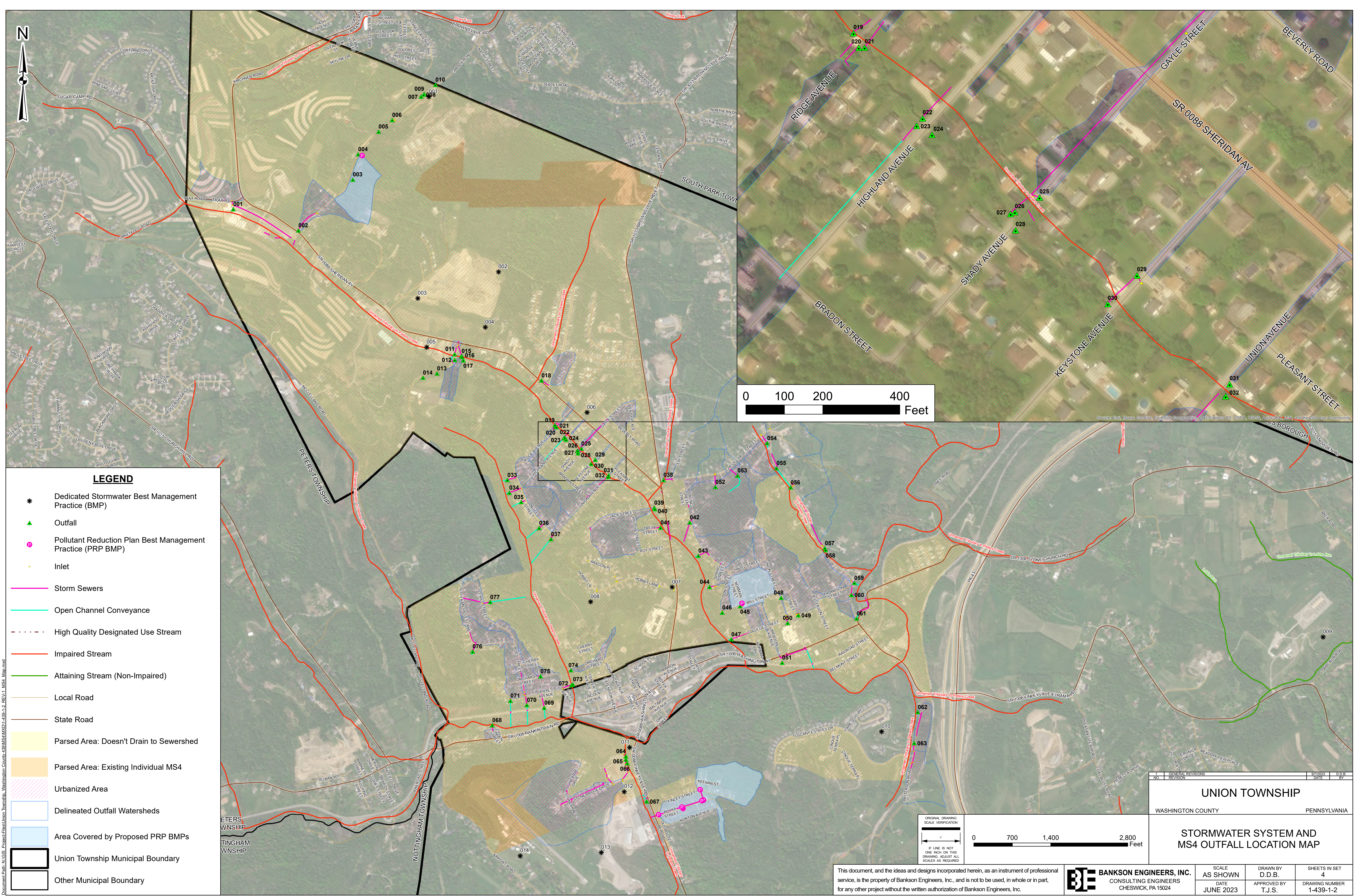
This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Bankson Engineers, Inc., and is not to be used, in whole or in part, for any other project without the written authorization of Bankson Engineers, Inc.

WASHINGTON COUNTY UNION TOWNSHIP PENNSYLVANIA

MS4 POLLUTANT REDUCTION PLAN
CIRCLE AVENUE BIOSWALE
LOCATION MAP

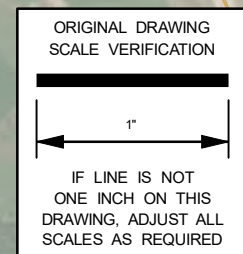
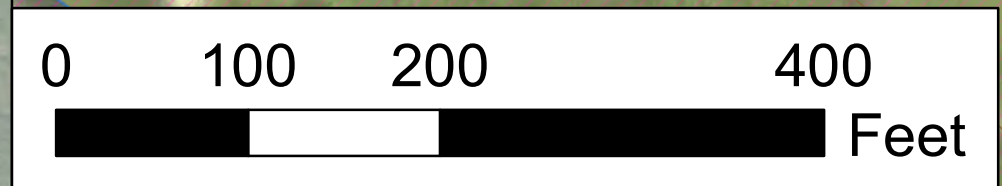
BANKSON ENGINEERS, INC.
CONSULTING ENGINEERS
CHESWICK, PA 15024

SCALE AS SHOWN DATE DEC. 2023 DRAWN BY D.D.B. APPROVED BY T.J.S. SHEETS IN SET 5 DRAWING NUMBER 2-439-10-5



LEGEND

- * Dedicated Stormwater Best Management Practice (BMP)
- ▲ Outfall
- Pollutant Reduction Plan Best Management Practice (PRP BMP)
- Inlet
- Storm Sewers
- Open Channel Conveyance
- - - - High Quality Designated Use Stream
- Impaired Stream
- Attaining Stream (Non-Impaired)
- Local Road
- State Road
- Parsed Area: Doesn't Drain to Sewershed
- Parsed Area: Existing Individual MS4
- Urbanized Area
- Delineated Outfall Watersheds
- Area Covered by Proposed PRP BMPs
- Union Township Municipal Boundary
- Other Municipal Boundary



UNION TOWNSHIP	
WASHINGTON COUNTY	PENNSYLVANIA
STORMWATER SYSTEM AND MS4 OUTFALL LOCATION MAP	
ORIGINAL DRAWING SCALE VERIFICATION	IF LINE IS NOT ONE INCH ON THIS DRAWING, ADJUST ALL SCALES AS REQUIRED

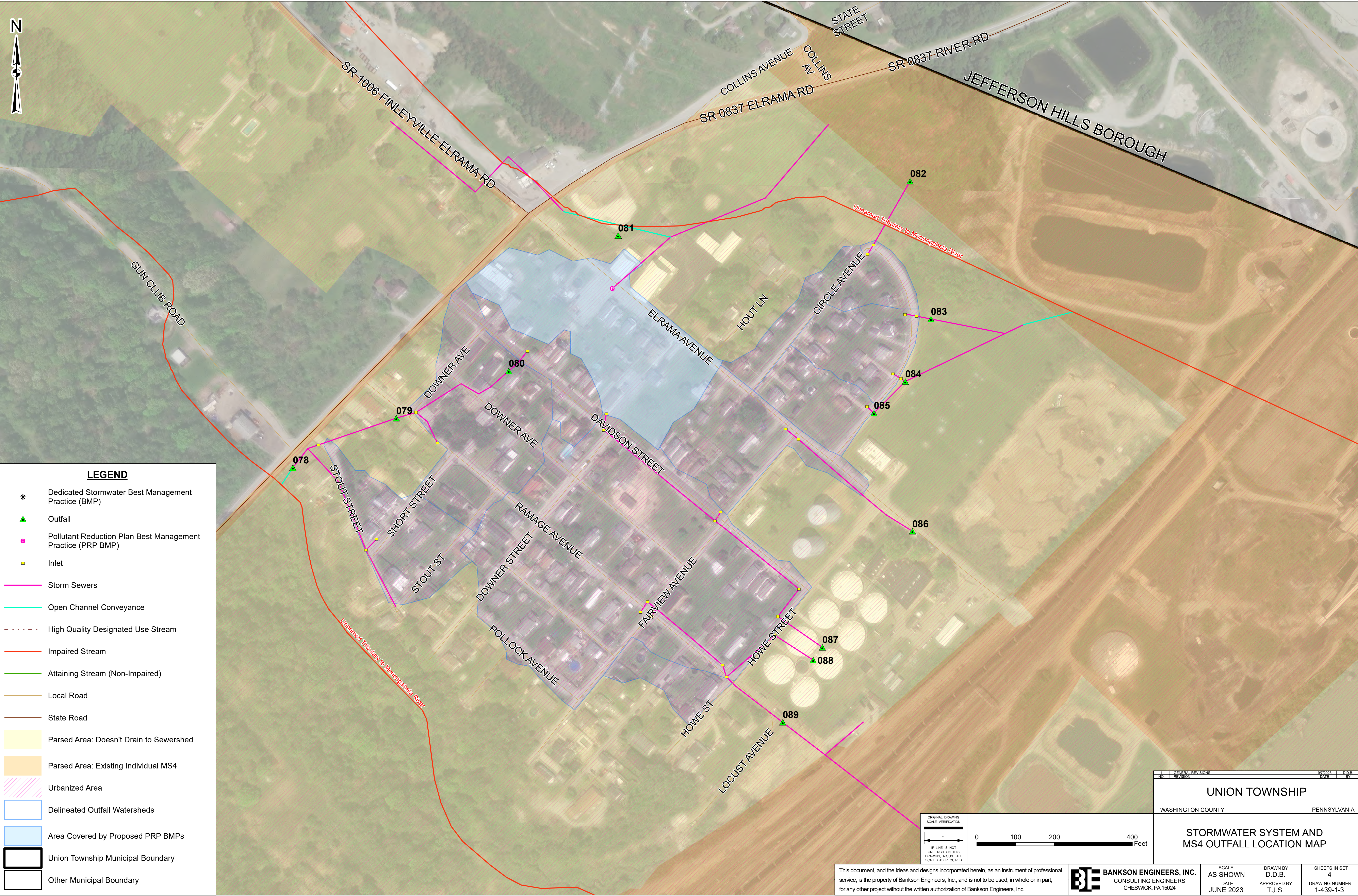
This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Bankson Engineers, Inc., and is not to be used, in whole or in part, for any other project without the written authorization of Bankson Engineers, Inc.

BE BANKSON ENGINEERS, INC.
CONSULTING ENGINEERS
CHESWICK, PA 15024

SCALE AS SHOWN	DRAWN BY D.D.B.	SHEETS IN SET 4
DATE JUNE 2023	APPROVED BY T.J.S.	DRAWING NUMBER 1-439-1-2

Document Path: N:\GIS - Project-Files\Union_Township_Washington_County_SBM\MS4\MS4_1-439-1-2_REV1.1_MS4_Map.mxd

Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet / Projection: Lambert Conformal Conic / Datum: North American 1983



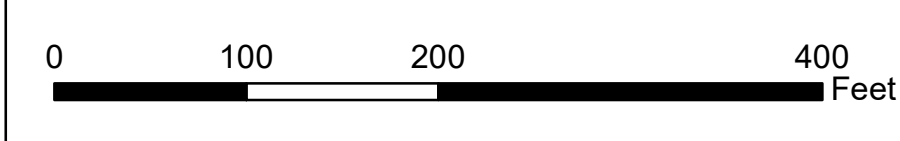
LEGEND

- Dedicated Stormwater Best Management Practice (BMP)
- Outfall
- Pollutant Reduction Plan Best Management Practice (PRP BMP)
- Inlet
- Storm Sewers
- Open Channel Conveyance
- High Quality Designated Use Stream
- Impaired Stream
- Attaining Stream (Non-Impaired)
- Local Road
- State Road
- Parsed Area: Doesn't Drain to Sewershed
- Parsed Area: Existing Individual MS4
- Urbanized Area
- Delineated Outfall Watersheds
- Area Covered by Proposed PRP BMPs
- Union Township Municipal Boundary
- Other Municipal Boundary

ORIGINAL DRAWING
SCALE VERIFICATION

1" = 100'

IF LINE IS NOT ONE INCH ON THIS DRAWING, ADJUST ALL SCALES AS REQUIRED



GENERAL REVISIONS		DATE	BY
1		07/2023	D.D.B.

UNION TOWNSHIP

WASHINGTON COUNTY PENNSYLVANIA

STORMWATER SYSTEM AND MS4 OUTFALL LOCATION MAP

This document, and the ideas and designs incorporated herein, as an instrument of professional service, is the property of Bankson Engineers, Inc., and is not to be used, in whole or in part, for any other project without the written authorization of Bankson Engineers, Inc.



SCALE AS SHOWN	DRAWN BY D.D.B.	SHEETS IN SET 4
DATE JUNE 2023	APPROVED BY T.J.S.	DRAWING NUMBER 1-439-1-3

Document Path: N:\GIS\ProjectFiles\Union_Township_439-1-3\439-1-3_REV1-1-23_1-3_REV1-1-23_MS4_Elrama_Map.mxd

Coordinate System: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet / Projection: Lambert Conformal Conic / Datum: North American 1983

