

POLLUTANT REDUCTION PLAN

FOR

Moon Township

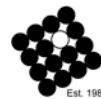
Situated In

Allegheny County, Pennsylvania

Prepared For

MOON TOWNSHIP
1000 Beaver Grade Road
Moon Township, Pennsylvania 15108

SEPTEMBER 2017



**Lennon, Smith, Souleret
Engineering, Inc.**

Civil Engineers and Surveyors

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POLLUTANT REDUCTION PLAN
MOON TOWNSHIP, ALLEGHENY COUNTY, PENNSYLVANIA

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SECTION A
PUBLIC PARTICIPATION

This Pollutant Reduction Plan was advertised in the Township's general circulation newspaper of record, to solicit public comment. The advertisement was placed on July 21, 2017 and identified a 30 day comment beginning on July 24, 2017 and ending August 24, 2017. A copy of proof of publication of the public notice is included as Attachment A-1. During the 30 day comment period, the draft PRP document was available for public review and comment at the Township Office. No comments were received.

The PRP was discussed as an agenda item at the regularly scheduled August 2, 2017 meeting of the Township Board of Supervisors. Notice of discussion of PRP at the August 2, 2017 Board of Supervisors meeting was included in the above noted public notice. No comments were received.

SECTION B MAPS

Comprehensive mapping of the Township's regulated MS4 was completed as part of compliance with Minimum Control Measure 3. Mapping has been completed to identify the complete network of stormwater collection and conveyance facilities to represent the tributary area to each regulated outfall as accurately as possible, and subsequently the PRP Planning Area. Attachment B-1 – MS4 Drainage Areas depicts the drainage areas tributary to each MS4 outfall.

Areas not collected or conveyed by the Township's regulated MS4 are not included in the planning area and appear as non-shaded areas on the MS4 Drainage Area map. In addition, tributary area within the rights-of-way of entities holding independent MS4 NPDES permits were parsed from the Planning Area. These areas, rights-of-way owned by the Pennsylvania Department of Transportation or Allegheny County, are depicted as bounded by a heavy red line on the Drainage Area map. Areas parsed assume a 50 foot right of way width for two lane roadways and an 80 foot right of way width for roadways exceeding two lanes.

Attachment B-2 – Land Cover depicts land cover conditions present within the Township. Land cover is based on National Land Cover Database data. Tributary or Planning Areas to each outfall as developed on Attachment B-1 are also shown on the Land Cover map.

Attachment B-3 –Proposed BMPs map depicts the location and tributary area for each of the proposed structural BMPs identified in this PRP.

Attachment B-4 Existing BMPs map depicts the location and tributary area for each of the existing structural BMPs accounted for in tabulation of the existing pollutant loading.

Base mapping used in the development of the above noted Attachments based on information obtained from the Pennsylvania Spatial Data Access (PASDA) and the following sources:

Surface Waters: National Hydrology Database (NHD) and Allegheny County Hydrology Data

Urbanized Area Boundary: 2010 United States Census

MS4 Infrastructure: Developed based on multiple sources including as-built construction drawings and field reviews of municipal staff, officials and consultants.

SECTION C
POLLUTANTS OF CONCERN

The Pennsylvania Department of Environmental (PADEP) Protection Pollutant Reduction Plan instructions identify sediment and nutrients as pollutants of concern to be addressed in the PRP for impaired local surface water. Determination of impaired waters requiring implementation of a PRP was based on a review eMapPA and the PADEP MS4 Requirements Table. An excerpt from the Requirements Table is provided below:

MOON TWP	McClarens Run	Appendix A-Metals (4a), Appendix E-Organic Enrichment/Low D.O., Siltation (5)
	Flaugherty Run	Appendix E-Organic Enrichment/Low D.O., Siltation (5)
	McCabe Run	Appendix E-Organic Enrichment/Low D.O., Siltation (5)
	Montour Run	Appendix A-Metals, pH (4a), Appendix E-Nutrients, Organic Enrichment/Low D.O., Siltation (5)
	Ohio River	Appendix C-PCB (4a), Appendix B-Pathogens (5)
	Spring Run	Appendix E-Organic Enrichment/Low D.O., Siltation (5)
	Unnamed Tributaries to Ohio River	Appendix E-Organic Enrichment/Low D.O., Siltation (5)

With regard to pollutants of concern requiring development of a PRP, a sediment impairment is noted for McClarens Run, Flaugherty Run, McCabe Run, Montour Run, Spring Run and Unnamed Tributaries to the Ohio River (Narrows Run). A nutrient impairment is also noted for each of these streams. Development of this PRP uses the presumptive approach for each impaired stream to assume the minimum reductions required for sediment impairments will also address the reduction requirement for organic enrichment/nutrients.

Additionally, though not specifically noted in the Requirements Table, the Township's regulated MS4 discharges to Trout Run and Meeks Run within 5 miles of the impaired Montour Run and as such these areas are included in the PRP Planning Area. The Township also has regulated MS4 outfalls that discharge to Shouse Run. Though not specifically identified as an impaired stream for Moon Township, area Tributary to Shouse Run has been included in the Planning Area.

SECTION D
DETERMINING EXISTING LOADING FOR POLLUTANTS OF CONCERN

The PADEP Simplified Method was implemented in determination of existing pollutant loading. Existing loading calculations, completed in accordance with the PADEP Simplified Method have an effective date of June 2017. Mapping of regulated MS4 infrastructure is presented with best available information as of June 2017 and land cover information used is from the most recent issuance of National Land Cover Database (NLCD) data, dated 2011.

Storm sewershed tributary areas were calculated using mapping presented in Section B and with sewershed boundaries delineated based on current topography and accounting for the presence of existing collection and conveyance facilities, including inlets, pipes, swales, curbs, etc.

GIS software was used to tabulate the land cover composition of each individual storm sewershed based on NLCD data. NLCD defines the following categories of developed land cover:

- Developed, Open Space – **Impervious surfaces account for less than 20% of total cover.** These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
- Developed, Low Intensity - **Impervious surfaces account for 20% to 49% percent of total cover.** These areas most commonly include single-family housing units.
- Developed, Medium Intensity - **Impervious surfaces account for 50% to 79% of the total cover.** These areas most commonly include single-family housing units.
- Developed High Intensity - **Impervious surfaces account for 80% to 100% of the total cover.** Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial properties.

Land Cover categories were converted to impervious and pervious areas to allow for application of the Simplified Method Loading Rates. Impervious/Pervious Area ratios were applied as follows based on the above noted NLCD descriptions. The most conservative (i.e. highest impervious area percentage) was used for each category. The following table presents impervious area ratios applied for developed land cover.

Land Cover	Impervious Area	Pervious Area
Developed, Open Space	19%	81%
Developed, High Intensity	100%	0%
Developed, Low Intensity	49%	51%
Developed, Medium Intensity	79%	21%

Undeveloped land (i.e. deciduous forest, evergreen forest, cultivated crops, etc) was assumed to be entirely pervious.

Following determination of impervious and pervious cover for each storm sewershed, pollutant loading were applied based on the values presented in Attachment B of the PADEP PRP Instructions, Developed Land Loading Rates for PA Counties. As Moon Township is located in Allegheny County, loadings listed for “All Other Counties” were used as noted in the following table:

Pollutant Loading Factors	Sediment (TSS)	Nutrients (TP)
Impervious Cover (lb/ac/yr)	1839.0	2.28
Pervious Cover (lb/ac/yr)	264.96	0.84
Non Urbanized Areas (lb/ac/yr)	234.6	0.033

Attachment D-1 provides a complete tabulation of the storm sewershed associated with each regulated MS4 Outfall including land cover composition, impervious and pervious area acreages and the calculated existing annual sediment loading.

Based on a review of eMapPA and the PADEP Pollutant Aggregation Suggestions for MS4 Municipal Requirement Table, each of the Township’s surface waters with an identified sediment and nutrient impairment is tributary to the Flaugherty Run, Kilbuck Run-Ohio River, McCabe Run-Ohio River, Montour Run HUC 12 watershed. As such, existing pollutant loadings have been aggregated to identify the Township’s total loading to be reduced.

Attachment D-2 provides a complete tabulation of existing loading reductions achieved by existing maintained BMPs implemented within the Planning Area since 2003. Continued proper operation and maintenance of existing BMPs is confirmed by regular inspections performed by the Township per MCM #5 of the MS4 Permit. Existing loading to each BMP has been calculated based on tributary areas for each as depicted on Attachment B-4 and the methodology described above. As existing BMPs were implemented at the time of development of each site, BMP efficiencies for existing reductions are presented based on the type of BMP and the efficiencies noted in Table B-5: *Approved CBP Efficiency Rates for Stormwater BMP Analysis of the Chesapeake Bay Recommendations of the Expert Panel to Define Removal Rates for New State Stormwater Performance Standards.*

As shown on the Attachment D-1, the total existing sediment loaded from Planning Area for Moon Township’s regulated MS4 is 1,672,474 pounds per year prior to accounting for existing BMPs. Existing BMPs account for a reduction of 18,958 pounds per year, resulting in an adjusted existing loading of 1,653,516 pounds per year.

SECTION E
SELECTION OF BMPS TO ACHIEVE REQUIRED REDUCTIONS IN POLLUTANT
LOADING

A reduction of 10% of the existing sediment loading is required in the PRP Instructions to MS4 Permit applicants. Based on an existing loading of 1,672,474 pounds per year and existing BMP reduction of 18,958 pounds per year as noted in Section D, the Township minimum pollutant reduction is 165,352 pounds per year.

The Township will implement Best Management Practice (BMPs) during the five-year permit period to achieve the required reduction. The Township intends to implement a combination of BMPs during this permit period as described below. Calculations have been provided to demonstrate feasibility of the pollutant reduction potential for each selected BMP option. These calculations assume that new and existing retrofits will utilize filtration practices to achieve pollutant reductions. As this PRP is intended to be a planning document, final design of BMPs has not been completed. Existing field conditions, detailed surveys, geotechnical investigations and other information will dictate the type of BMPs selected to achieve pollutant reduction and the Township reserves the right to alter BMP types as needed in implementation of the PRP. For example, if infiltration testing yields favorable infiltration rates, infiltration practices may be implemented in lieu of the assumed filtration practices. At the time of final design, the BMP type that best suits the existing conditions will be selected. BMP names and descriptions that may be implemented, as identified in the Chesapeake Bay Program Model are identified as follows:

Dry Extended Detention Basins - Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness.

Infiltration Practices w/ Sand or Vegetation - A depression to form an infiltration basin where sediment is trapped and water infiltrates the soil. No underdrains are associated with infiltration basins and trenches, because by definition these systems provide complete infiltration. Design specifications require infiltration basins and trenches to be built in good soil, they are not constructed on poor soils, such as C and D soil types. Engineers are required to test the soil before approval to build is issued. To receive credit over the longer term, jurisdictions must conduct yearly inspections to determine if the basin or trench is still infiltrating runoff.

Filtering Practices - Practices that capture and temporarily store runoff and pass it through a filter bed of either sand or an organic media. There are various sand filter designs, such as above ground, below ground, perimeter, etc. An organic media filter

uses another medium besides sand to enhance pollutant removal for many compounds due to the increased cation exchange capacity achieved by increasing the organic matter. These systems require yearly inspection and maintenance to receive pollutant reduction credit.

Bioretention/Rain Gardens –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.

Stream 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.

Attachment E-1 provides a listing of proposed potential BMPs, in the locations that were depicted on Attachment B-3, Proposed BMPs. Final design will determine the actual pollutant reduction of each selected BMP, however, Attachment E-1 provides planning level design and pollutant loading information for each BMP to demonstrate feasibility of achieving the required reductions. Attachment E-1 provides a tabulation of tributary area and land covers to calculate exiting pollutant loading to the BMPs using the methodology described in Section D, above.

No new development is proposed as part of PRP implementation. Therefore, determination of BMP efficiency was completed using the methodology identified in the *Chesapeake Bay Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects*.

BMP efficiencies were determined using the Retrofit Removal Adjustor Curve for Sedimentation in Chapter 4 for the above noted Expert Panel Report. Attachment E-1 provides tabulation of the anticipated capture/storage volume for each BMP based on planning-level BMP sizing. The runoff depth is calculated using the following Expert Panel Report equation;

$$\text{Runoff Depth (in)} = \frac{\text{Runoff Storage Volume (ac – ft)} \times 12}{\text{Impervious Area (ac)}}$$

This runoff depth value is then used as the x-axis value of the Retrofit Removal Adjustor Curve to determine the BMP efficiency. For calculations in this PRP, all proposed BMPs have been considered Stormwater Treatment BMPs, and as such, efficiency values are taken from the ST curve, rather than the Runoff Reduction (RR) curve. If final selection and design of BMPs meet criteria for consideration as Runoff Reduction BMPs, the RR curve may be used in reporting of actual efficiency and reductions achieved. Further,

dependent of the nature and final design of the implemented BMP, the Township reserves the right to assign efficiencies as noted on the PADEP Effectiveness Values Table (3800-PM-BCW0100M), as permitted by the PADEP PRP Instructions. The final column of Attachment E-1 notes the anticipated pollutant reduction associated with each BMP, calculated by multiplying the BMP efficiency by the existing loading tributary to the BMP.

Calculation of pollutant reductions associated with proposed stream restoration projects utilized a reduction factor of 44.88 pounds per year linear foot restored, as provided in the *Chesapeake Bay Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects*. A tabulation of anticipated reduction due to stream restoration projects is included in Attachment E-1.

As proposed, the BMPs noted on Attachment E-1 should result in a total sediment reduction in excess of the required 10% reduction. Because actual reductions will be impacted by final design considerations, additional options for pollutant reductions have been included in this plan. It is not the intent of the Township to construct all of the proposed BMPs noted in this plan. It is the intent of the Township to construct BMPs as required to achieve the minimum reduction required. Additional BMPs have been included as contingency in event that final design considerations or as-built performance of BMPs negatively impact the feasibility or effectiveness of proposed BMPs. In the event that the total required pollutant reduction is achieved with implementation of fewer BMPs than proposed, construction of the remaining BMPs will be held for consideration as part of a future PRP. Further, it is anticipated that additional opportunities for pollutant reduction will be discovered during the five-year permit cycle. The Township reserves the right to amend or revise this PRP to add or remove proposed BMPs as needed to best achieve the required pollutant reduction.

The following presents a general description of BMPs noted in Attachment E-1. As noted above, however, the Township reserves the right to amend BMP types to best fit field conditions evaluated at the time of final design:

- **BMP Type: Existing Retrofits**
 - Potential Proposed BMPs:
 - As generally depicted on Attachment C-3 and detailed in Attachment E-1.
 - Description – BMP implementation consists of alteration of an existing dry detention basins to provide additional treatment capability. Sample feasibility calculations included in this Plan assume treatment will be achieved through engineered filtering media practices. Final design for new retrofits will be dependent upon field conditions, detailed surveys, geotechnical investigations and other information and in consideration of the above qualifying BMPs options, the optimal BMP type will be designs, constructed and implemented.

- **BMP Type:** Stream Restoration
 - Locations:
 - Olson Park
 - Description – BMP implementation consists of implementation of streambank restoration projects at areas of known streambank erosion.

SECTION F. FUNDING

The Township intends to budget costs associated with implementation of the PRP as part of their annual general fund budget, including costs associated with design, permitting, property acquisition, construction and maintenance. Other funding considerations including PENNVEST and/or establishing a stormwater fee if statutorily permissible will be explored during this permit cycle.

Preliminary Opinions of Probable Cost have been prepared for each proposed BMP and are summarized below. The following table provides a summary of anticipated implementation costs for each BMP:

ITEM NO.	DESCRIPTION	Preliminary Cost	Approx. Sediment Removal	Approx. Price Per Pound of Sediment Removed
Filtering Practices - Rain Garden/Detention Basin with Focal Point				
1	Whispering Woods - Flaugherly Run	\$45,000	5,043	\$8.92
2	Whispering Woods - Hawthorn	\$73,000	12,995	\$5.62
3	Broad Hill Farms - Minton Drive	\$51,000	7,880	\$6.47
5	Broad Hill Farms - Barnes Drive	\$82,000	7,486	\$10.95
6	Broad Hill Court	\$85,000	4,589	\$18.52
7	Harvest Court	\$70,000	7,790	\$8.99
8	Riverdale Church	\$74,000	5,567	\$13.29
9	Shelbourne	\$136,000	21,029	\$6.47
10	Madison	\$101,000	12,350	\$8.18
	Subtotal	\$717,000	\$4,730	\$8.46
Stream Restoration				
11	Stream Restoration (2000 linear feet)	\$1,400,000	89,760	\$15.60
	Preliminary Total Implementation Cost 2018-2023	\$2,120,000.00		
	Preliminary Annual PRP Budget	\$424,000.00		

As noted summarized above, the total anticipated cost for implementation is estimated at approximately \$2,120,000, or an annual budget of \$425,000 through the 5-year permit period. Preliminary opinions of probable cost, as summarized above have been provided to establish initial budgeting ranges only. It is anticipated that final design and value engineering of each pollutant reduction BMP will impact final implementation cost. Note that it is the Township's intent to achieve the required pollutant reduction as cost-effectively as possible and the above noted budgets should not necessarily be considered final budgetary commitments to PRP implementation if savings can be achieved.

While the Township may seek grant funding as opportunities are available, annual general fund budgeting is anticipated to account for anticipated implementation costs.

SECTION G. RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE

Moon Township will be responsible for operation and maintenance of each proposed BMP. Detailed O&M Plans will be developed with the final design of each BMP. Typical O&M procedures are noted below. Routine inspections of all BMPs will be conducted annually and after rainfall events in excess of one inch.

The following is a list of items that shall be inspected and corrective action taken:

1. Monitor accumulation of debris within structural BMPs.
2. Monitor the mulch layer in bio-filtration/rain gardens.
3. Monitor the condition of the filter media within the water quality filters.
4. Monitor growth of vegetation.

The following actions will be taken to help ensure the implemented BMPs are in working order:

1. Replace or repair facilities so as to function as intended.
2. Remove silt debris and trash accumulated within the BMP.
3. Disposal of collected silt, debris and trash in a manner which will not adversely affect the environment.
4. Replace eroded material and re-vegetate eroded areas.
5. Monitor the condition of the bio-filtration/rain garden areas. Remove and replace the mulch material every three years and additionally as needed. Remove and replace soils as necessary to function properly.
6. Replace dead and dying plantings within the bio-filtration/rain garden areas yearly.
7. When ponding of water is observed in the vicinity of infiltration or filtration BMPs, replace media as necessary to function as intended.

ATTACHMENT A-1
PROOF OF PUBLICATION

ACCOUNT #	INVOICE DATE	DESCRIPTION	LINES	TIMES	PROOF	TOTAL CHARGES
41226217C	7/26/2017	PRP PUBLIC COMMENT ADVERTIS	1.00 x 34Lines	1	\$ 18.00	\$ 179.30
7/21/2017						
DATES APPEARED						

PROOF OF PUBLICATION

The Beaver County Times, Ellwood City Ledger

a daily newspaper of general circulation, published by BEAVER NEWSPAPERS, INC., a Pennsylvania corporation, 400 Fair Avenue, West Bridgewater, Beaver County, Pennsylvania, was established in 1946, and has been issued regularly, except legal holidays since said date.

The attached advertisement, which is exactly as printed and published, appeared in the regular issue on 7/21/2017

BEAVER NEWSPAPERS, INC.

By

Lori L. Holtz

STATE OF PENNSYLVANIA,
COUNTY OF BEAVER,

} SS:

Before me, a Notary Public in and for such county and state, personally appeared LORI L. HOLTZ, who being duly sworn according to law says that she is CONTROLLER of BEAVER NEWSPAPERS, INC.; that neither affiant nor said corporation is interested in the subject matter of the attached advertisement; and that all of the allegations of the foregoing statement including those as to the time, place and character of publication are true.

Sworn to and subscribed before me
this 26th day of July 2017

The costs of advertising and proof,
has been paid.

\$ 179.30

BEAVER NEWSPAPERS, INC.

By

400 FAIR AVE.

BEAVER, PA. 15009

PRP PUBLIC COMMENT ADVERTISEMENT

As part of compliance with the Moon Township's Municipal Separate Storm Sewer System (MS4) Permit, a Pollutant Reduction Plan (PRP) has been developed for submission to the Pennsylvania Department of Environmental Protection. The PRP proposes implementation of Best Management Practices to reduce discharge of sediment and/or nutrients to impaired surface waters within the municipality. The PRP will be available for public review and comment at the Moon Township Municipal Building, 1000 Beaver Grade Road, Moon Township, Pennsylvania beginning July 24, 2017, Monday through Friday from 8:30 AM to 4:00 PM. Written comments on the PRP will be accepted through August 24. Comments will also be accepted at the Board of Supervisors Meeting held August 2, 2017 at 7:00 PM at the Moon Township Municipal Building.

7/21/17

COMMONWEALTH OF PENNSYLVANIA

NOTARIAL SEAL

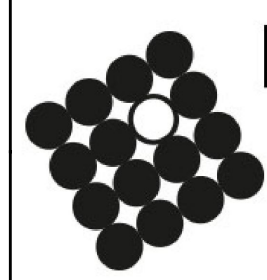
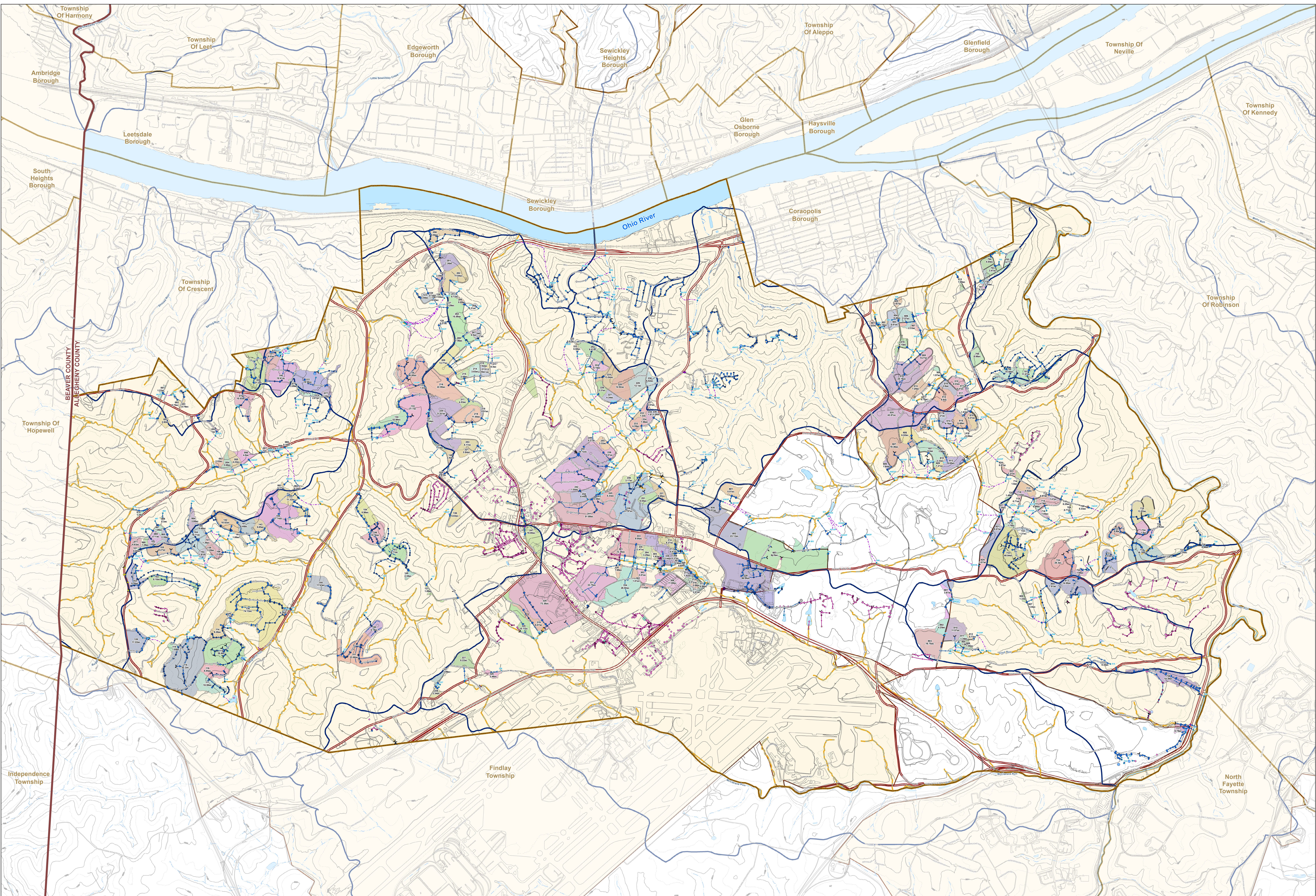
Susan K. Miller, Notary Public
Bridgewater Boro, Beaver County
My Commission Expires Oct. 1, 2018

MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

BEAVER NEWSPAPERS INC.

ATTACHMENT B-1

MS4 DRAINAGE AREAS

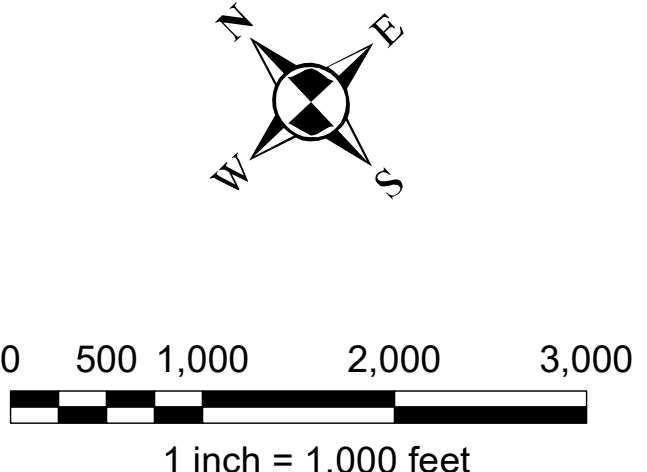


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email: info@lsse.com

- | | | | | |
|-----------------------|-----------------------|---------------------|--------------------|---|
| Storm Outfalls | Storm Manholes | Storm Inlets | Storm Lines | Headwall/Endwall |
| • Municipal | • Municipal | • Municipal | — Municipal | --- Natural Channel |
| • State | • State | • State | — State | --- Streams |
| • County | • County | • County | — County | --- Streams Impaired for Pollutants of Concern (Sediment or Nutrients) or within 5 Miles Upstream of Impairment |
| • Private | • Private | • Private | — Private | |

- | | | |
|----------------------------|------------------------|------------------------|
| PCSM BMPs | County Boundary | Contours |
| • Municipal Retention Pond | — Municipal Boundary | --- Index (100') |
| • Private Retention Pond | — Watersheds | --- Intermediate (50') |
| • Private Underground Tank | — State/County ROW | |
| | — Urban Area | |

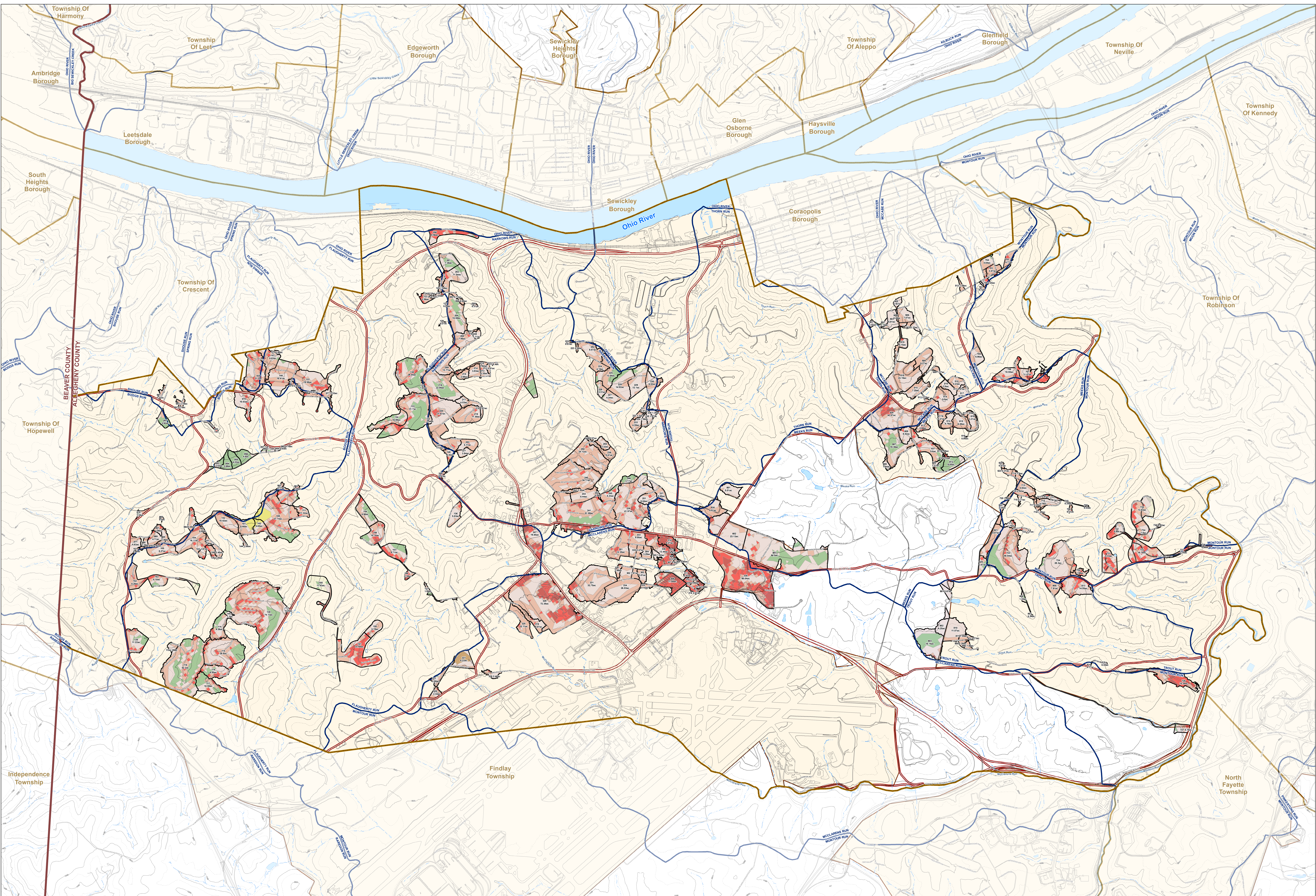
* Information provided is subject to update/revisions as the mapping process is completed. Storm System designation, connectivity and locations approximate only, based on best available data.
Base map data was provided by PASDA. LSSE provides no guarantee, expressed or implied, regarding the timeliness, accuracy or use of these data nor does the act of distribution constitute or imply any such warranty.



Attachment B-1
MS4 Drainage Areas
Moon Township
1000 Beaver Grade Road
Moon Township, PA 15108

ATTACHMENT B-2

LAND COVER





Lennon, Smith, Souleret

Engineering, Inc.

840 4th Avenue

Coraopolis, Pennsylvania 15108

Phone: 412-264-4400

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email: info@lsse.com

- Land Cover (NLCD 2011)

Developed, Open Space

Developed, Low Intensity

Developed, Medium Intensity

Developed, High Intensity

Barren Land (Rock/Sand/Clay)

Deciduous Forest

Evergreen Forest

Grassland/Herbaceous

Pasture/Hay

Cultivated Crops

Drainage Areas

Watersheds

State/County ROW

County Boundary

Municipal Boundary

Urban Area

Streams

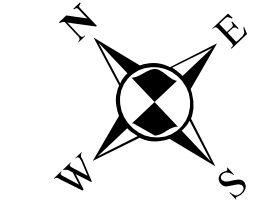
Contours

Index (100')

Intermediate (50')

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0 500 1,000 2,000 3,000

1 inch = 1,000 feet

Attachment B-2
Land Cover
Moon Township
1000 Beaver Grade Road
Moon Township, PA 15108

ATTACHMENT B-3

PROPOSED BMPs



Lennon, Smith, Souleret

Engineering, Inc.

846 4th Avenue

Coraopolis, Pennsylvania 15108

Phone: 412-264-4400

Fax: 412-264-1200

email: info@lsse.com

- Storm Outfalls

 - Municipal
 - State
 - County
 - Private

Storm Manholes

 - Municipal
 - State
 - County
 - Private

Storm Inlets

 - Municipal
 - State
 - County
 - Private

Storm Lines

 - Municipal
 - State
 - County
 - Private

Headwall/Endwall

 - Natural Channel
 - Streams
 - Stream Bank Restoration
 - Proposed BMPs
 - Watersheds

County Boundary

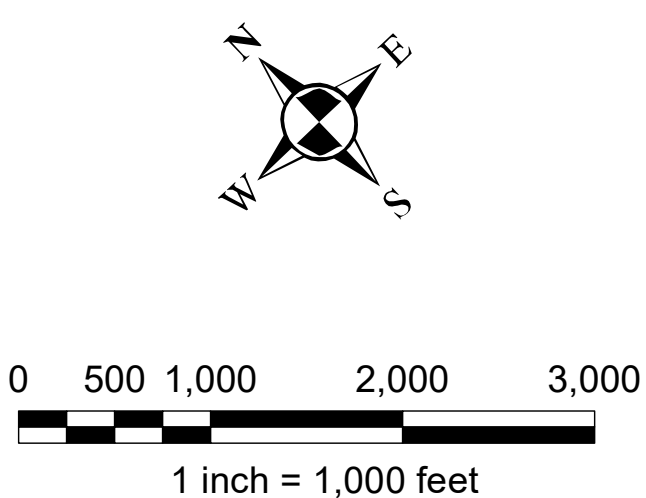
 - Municipal Boundary
 - State/County ROW
 - Urban Area

Contours

 - Index (100')
 - Intermediate (50')

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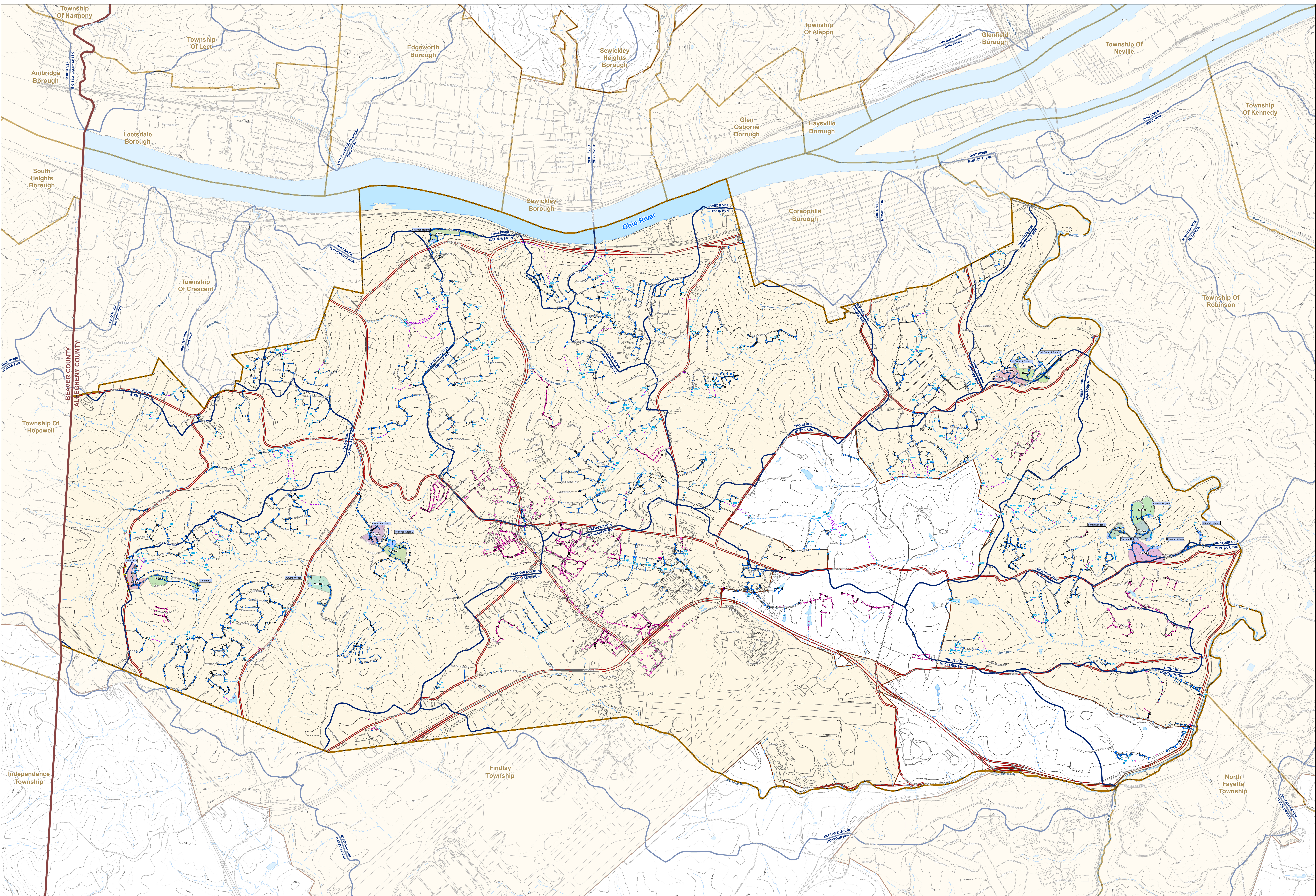
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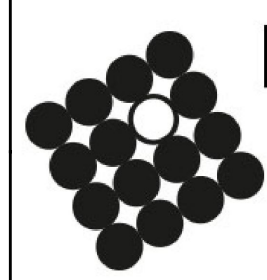
Attachment B-3
Proposed BMPs
Moon Township
1000 Beaver Grade Road
Moon Township, PA 15108

ATTACHMENT B-4

EXISTING BMPs



Path: M:\PROJECTS\15-118454-1\Map\PRF Existing BMPs.mxd

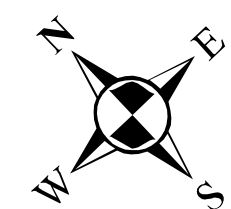


**Lennon, Smith, Souleret
Engineering, Inc.**
846 4th Avenue
Coraopolis, Pennsylvania 15108
Phone: 412-264-4400
Fax: 412-264-1200
email: info@lsse.com

- | | | | | | |
|-----------------------|-----------------------|---------------------|--------------------|-------------------------|------------------------|
| Storm Outfalls | Storm Manholes | Storm Inlets | Storm Lines | Headwall/Endwall | County Boundary |
| • Municipal | • Municipal | • Municipal | — Municipal | — Natural Channel | — Municipal Boundary |
| • State | • State | • State | — State | — Streams | — State/County ROW |
| • County | • County | • County | — County | — PCSM BMPs | — Watersheds |
| • Private | • Private | • Private | — Private | | — Urban Area |

- Contours**
- <all other values>
 - Index (100')
 - Intermediate (50')

* Information provided is subject to update/revisions as the mapping process is completed. Storm System designation, connectivity and locations approximate only, based on best available data.
Base map data was provided by PASDA. LSSE provides no guarantee, expressed or implied, regarding the timeliness, accuracy or use of these data nor does the act of distribution constitute or imply any such warranty.



0 500 1,000 2,000 3,000
1 inch = 1,000 feet

**Attachment B-4
Existing BMPs**
Moon Township
1000 Beaver Grade Road
Moon Township, PA 15108

ATTACHMENT D-1

**EXISTING LOADING
WATERSHED:
FLAUGHERTY RUN,
KILBUCK RUN-OHIO RIVER,
MCCABE RUN-OHIO RIVER,
MONTOUR RUN**

ATTACHMENT D-1

Moon Township
Pollutant Reduction Plan
Existing Loading

Watershed: Flaugherly Run, Kilbuck Run-Ohio River, McCabe Run-Ohio River, Montour Run

NLCD Land Cover ²	Impervious Area	Pervious Area
Barren Land	0%	100%
Cultivated Crops	0%	100%
Deciduous Forest	0%	100%
Developed, High Intensity	100%	0%
Developed, Low Intensity	49%	51%
Developed, Medium Intensity	79%	21%
Developed, Open Space	19%	81%
Evergreen Forest	0%	100%
Grassland/Herbaceous	0%	100%
Pasture/Hay	0%	100%

Pollutant Loading Factors ¹	Sediment (TSS)
Impervious Cover (lb/ac/yr)	1,839.00
Pervious Cover (lb/ac/yr)	264.96
Non Urbanized Areas (lb/ac/yr)	234.60

Storm Sewershed	Tributary Area - Total (Ac)	Tributary Area - NLCD Land Cover (ac)										Impervious/Pervious Areas (ac)			Existing Sediment (TSS) Loading (lb/yr)
		Barren Land (Rock/Sand/ Clay)	Cultivated Crops	Deciduous Forest	Developed, High Intensity	Developed, Low Intensity	Developed, Medium Intensity	Developed, Open Space	Evergreen Forest	Grassland/ Herbaceous	Pasture/ Hay	Urbanized Area - Impervious	Urbanized Area - Pervious	Tributary Area - Non-Urbanized	
1	1.22					0.963	0.027	0.228				0.54	0.68	0.00	1,167
2	0.75					0.639	0.012	0.103				0.34	0.41	0.00	738
3	0.79					0.793						0.39	0.40	0.00	822
25	21.20			0.319		11.488	3.992	5.398				9.81	11.39	0.00	21,055
51	3.92			2.72		0.903		0.297				0.50	3.42	0.00	1,824
52	1.00					0.451	0.553					0.66	0.35	0.00	1,302
53	2.53			1.514		0.235		0.782				0.26	2.27	0.00	1,086
54	3.66			3.541				0.114				0.02	3.63	0.00	1,003
55	4.22			4.164				0.057				0.01	4.21	0.00	1,135
56	4.90			4.179		0.136		0.585				0.18	4.72	0.00	1,578
57	1.00			0.345		0.259		0.392				0.20	0.79	0.00	581
58	1.12			0.233		0.079		0.812				0.19	0.93	0.00	602
59	0.63			0.16				0.474				0.09	0.54	0.00	310
60	0.17			0.041				0.124				0.02	0.14	0.00	81
62	0.35					0.081	0.271	0.001				0.25	0.10	0.00	493
63	0.77					0.462	0.049	0.26				0.31	0.46	0.00	699
64	3.88			0.224		2.296	0.44	0.918				1.65	2.23	0.00	3,620
65	2.36					1.401	0.098	0.856				0.93	1.43	0.00	2,082
66	0.30					0.175		0.121				0.11	0.19	0.00	250
67	1.86					1.042	0.264	0.549				0.82	1.03	0.00	1,788
68	1.29					0.683	0.081	0.528				0.50	0.79	0.00	1,128
69	4.11					1.707	0.337	2.068				1.50	2.62	0.00	3,444
70	1.28					0.448		0.692	0.138			0.35	0.93	0.00	891
71	4.83			0.062		1.589	0.096	3.082				1.44	3.39	0.00	3,546
75	2.09					1.81	0.274	0.005				1.10	0.98	0.00	2,292
76	2.81					1.587	0.936	0.288				1.57	1.24	0.00	3,219
77	3.33			0.025		2.035	0.466	0.804				1.52	1.81	0.00	3,272
78	10.03			0.016		2.666	1.48	5.868				3.59	6.44	0.00	8,309
101	0.48					0.425		0.057				0.22	0.26	0.00	473
102	1.63					1.454	0.172	0				0.85	0.78	0.00	1,766
103	1.91					0.88	0.366	0.667				0.85	1.07	0.00	1,840
104	16.11					9.091	1.693	5.324				6.80	9.30	0.00	14,977
105	8.27					4.156	1.126	2.989				3.49	4.78	0.00	7,691
106	2.45					1.211	0.012	1.231				0.84	1.62	0.00	1,967
107	8.48			0.33		3.864	0.499	1.496			2.291	2.57	5.91	0.00	6,295
108	37.74			4.708		15.438	5.222	7.564			4.807	13.13	24.61	0.00	30,662
111	11.32			0.332		5.627	2.278	3.08				5.14	6.17	0.00	11,092
113	0.25					0.012		0.24				0.05	0.20	0.00	148
114	9.26			1.985		3.178	0.677	3.42				2.74	6.52	0.00	6,769
115	29.80			4.837		9.336	3.205	12.425				9.47	20.34	0.00	22,799
116	8.85			1.512		2.446	1.9	2.99				3.27	5.58	0.00	7,488
117	10.59			4.261		2.611	1.345	2.376				2.79	7.80	0.00	7,204
118	52.20			16.215		20.517	3.329	12.134				14.99	37.21	0.00	37,422
119	1.89			0.09		0.701	0.017	1.081				0.56	1.33	0.00	1,386
120	11.22			2.198		3.701	1.137	4.183				3.51	7.71	0.00	8,492
121	0.46					0.071	0.007	0.382				0.11	0.35	0.00	300
122	19.58			0.186		8.372	2.639	8.38				7.78	11.80	0.00	17,432
123	2.58					1.796	0.785	0				1.50	1.08	0.00	3,045
124	0.18					0.082	0.094					0.11	0.06	0.00	227
125	2.59			0.034		2.35	0.207	0				1.32	1.28	0.00	2,756
126	0.43					0.421	0.009					0.21	0.22	0.00	450
127	0.29					0.291		0.003				0.14	0.15	0.00	303
128	1.04					0.759	0.284					0.60	0.45	0.00	1,215
129	0.27					0.207	0.049	0.016				0.14	0.13	0.00	297
130	26.05			8.372		7.167	3.971	6.544				7.89	18.16	0.00	19,326
131	1.03					0.889	0.065	0.079				0.50	0.53	0.00	1,064
132	1.04					0.763		0.279				0.43	0.62	0.00	948
133	31.70			13.046		9.437	3.425	5.789				8.43	23.27	0.00	21,667
134	10.99			2.636		3.818	1.21	3.328				3.46	7.53	0.00	8,357
135	1.74					1.42		0.323				0.76	0.99	0.00	1,654
136	5.83			0.057		1.545	0.375	3.852				1.79	4.04	0.00	4,354
137	1.89			0.444		0.49		0.953				0.42	1.47	0.00	1,163
138	74.13			13.302	1.54	20.897	9.57	28.819				24.82	49.31	0.00	58,701
139	2.26					1.285	0.702	0.27				1.24	1.02	0.00	2,543
140	0.68					0.547	0.014	0.12				0.30	0.38	0.00	656
141	1.36					0.853		0.502				0.51	0.84	0.00	1,167
142	10.52			0.004		6.077	1.036	3.399				4.44	6.07	0.00	9,778
143	5.85			0.004		2.308	0.88	1.012			1.642	2.02	3.83	0.00	4,726
144	1.09			0.032		0.852	0.089	0.112				0.51	0.58	0.00	1,089
145	1.30			0.274		0.143		0.88				0.24	1.06	0.00	717
146	2.42					1.166	0.15	1.103				0.90	1.52	0.00	2,057
147	9.63			0.197		5.832	0.738	2.867				3.99	5.65	0.00	8,826
148	19.41			0.383		10.057	1.136	7.769			0.062	7.30	12.11	0.00	16,635
149	2.38			0.089	0.208	0.658	0.839	0.58							

ATTACHMENT D-1

Moon Township
Pollutant Reduction Plan
Existing Loading

Watershed: Flaugherly Run, Kilbuck Run-Ohio River, McCabe Run-Ohio River, Montour Run

NLCD Land Cover ²	Impervious Area	Pervious Area
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Pervious Cover (lb/ac/yr)	264.96
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Storm Sewershed	Tributary Area - Total (Ac)	Tributary Area - NLCD Land Cover (ac)										Impervious/Pervious Areas (ac)			Existing Sediment (TSS) Loading (lb/yr)
		Barren Land (Rock/Sand/ Clay)	Cultivated Crops	Deciduous Forest	Developed, High Intensity	Developed, Low Intensity	Developed, Medium Intensity	Developed, Open Space	Evergreen Forest	Grassland/ Herbaceous	Pasture/ Hay	Urbanized Area - Impervious	Urbanized Area - Pervious	Tributary Area - Non-Urbanized	
244	8.44					4.016	0.248	4.174				2.96	5.48	0.00	6,890
245	5.33			0.504		1.741	0.69	2.396				1.85	3.48	0.00	4,330
246	3.17			1.906		0.581		0.682				0.41	2.75	0.00	1,492
247	16.47			3.275	3.396	0.812	4.129	4.861				7.98	8.49	0.00	16,925
248	1.71					0.239		1.473				0.40	1.32	0.00	1,078
249	0.27					0.133		0.138				0.09	0.18	0.00	216
250	24.12					18.739	0.434	4.949				10.47	13.66	0.00	22,864
251	6.04					1.683	0.222	4.132				1.79	4.25	0.00	4,409
252	8.57					5.347	0.137	3.089				3.32	5.26	0.00	7,490
253	5.17					3.166	0.222	1.786				2.07	3.11	0.00	4,623
254	0.91				0.133	0.344	0.316	0.116				0.57	0.34	0.00	1,143
255	3.32					1.768	0.034	1.515				1.18	2.14	0.00	2,738
256	8.56			0.175	0.465	0.706	5.365	1.847				5.40	3.16	0.00	10,768
301	12.35					8.962	1.994	1.396				6.23	6.12	0.00	13,082
302	1.81					1.735	0.006	0.071				0.87	0.94	0.00	1,847
303	3.01					1.564		1.449				1.04	1.97	0.00	2,438
304	3.29					1.923		1.368				1.20	2.09	0.00	2,764
305	1.82					0.42		1.398				0.47	1.35	0.00	1,224
306	11.88				2.952	1.527	6.314	1.089				8.90	2.99	0.00	17,150
307	0.84					0.363	0.451	0.029				0.54	0.30	0.00	1,073
308	0.37				0.006	0.181	0.179					0.24	0.13	0.00	469
309	0.65				0.05	0.373	0.199	0.032				0.40	0.26	0.00	797
311	1.52				0.892	0.034	0.595	0				1.38	0.14	0.00	2,573
313	0.47				0.447		0.022					0.46	0.00	0.00	855
314	6.27				3.946	0.323	1.76	0.238				5.54	0.73	0.00	10,381
315	2.37				0.112	0.396	1.859					1.77	0.59	0.00	3,421
316	2.06				0.074	0.921	0.946	0.116				1.29	0.76	0.00	2,583
317	0.86				0.477	0	0.379					0.78	0.08	0.00	1,449
318	2.01				0.237	0.529	1.24					1.48	0.53	0.00	2,854
319	6.07					4.379	0.242	1.452				2.61	3.46	0.00	5,722
320	10.11					9.164	0.524	0.421				4.98	5.12	0.00	10,524
326	2.46				0.14	0.824	0.001	1.496				0.83	1.63	0.00	1,957
327	3.99		0.068	0.124		2.037		1.761				1.33	2.66	0.00	3,155
328	2.34					1.248	0.122	0.974				0.89	1.45	0.00	2,027
329	72.38				8.1	24.204	13.574	26.499				35.72	36.66	0.00	75,399
330	1.69					0.887	0.283	0.519				0.76	0.93	0.00	1,639
331	33.75				1.025	16.567	1.634	14.52				13.19	20.55	0.00	29,707
332	1.43					1.201		0.232				0.63	0.80	0.00	1,375
333	9.05					4.801	0.908	3.342				3.70	5.35	0.00	8,230
334	26.93					15.482	0.072	11.374				9.80	17.12	0.00	22,567
335	2.47					2.242		0.227				1.14	1.33	0.00	2,451
336	13.44				1.799	3.125	5.225	3.289				8.08	5.36	0.00	16,283
337	8.22		3.862			1.472		2.89				1.27	6.95	0.00	4,179
338	56.04				5.284	11.442	21.486	8.173				29.42	16.97	9.66	60,860
501	1.02			0.162		0.025		0.832				0.17	0.85	0.00	538
502	1.18			0.227				0.949				0.18	1.00	0.00	595
503	5.82					0.476	0	5.339				1.25	4.57	0.00	3,505
504	0.46					0.349		0.113				0.19	0.27	0.00	425
505	1.67					0.174		1.493				0.37	1.30	0.00	1,022
506	7.07					3.058	0.017	3.99				2.27	4.80	0.00	5,445
507	2.33					0.709	0.051	1.572				0.69	1.65	0.00	1,698
508	9.27					6.317		2.953				3.66	5.61	0.00	8,211
509	1.57					1.356		0.215				0.71	0.87	0.00	1,526
510	4.23					2.766		1.461				1.63	2.59	0.00	3,690
511	0.47					0.15		0.319				0.13	0.33	0.00	335
512	1.09					0.998	0.033	0.063				0.53	0.57	0.00	1,119
513	0.78					0.77	0.012	0.001				0.39	0.40	0.00	817
514	9.90					5.231	0.222	4.451				3.58	6.32	0.00	8,266
515	7.29					4.097		3.191				2.61	4.67	0.00	6,045
516	3.80					0.9		2.902				0.99	2.81	0.00	2,569
517	4.72					0.913		3.805				1.17	3.55	0.00	3,092
518	24.16				0.387	11.378	0.564	11.827				8.65	15.50	0.00	20,024
519	4.15					1.711	0.274	2.163				1.47	2.68	0.00	3,406
520	42.87			0.024	1.112	15.823	4.799	21.11				16.67	26.20	0.00	37,593
601	5.51					0.56		4.947				1.21	4.29	0.00	3,371
602	23.13				0.092	3.517	0.854	18.655				6.03	17.08	0.01	15,627
603	64.90			14.854		7.676	2.278	35.496				12.31	48.00	4.60	36,426
606	1.64			0.223		0.253		1.167				0.35	1.30	0.00	979
607	19.36			5.268		4.78	0.391	8.922				4.35	15.01	0.00	11,971
608	8.52			0.01		2.586	0.944	4.977				2.96	5.56	0.00	6,914
609	1.21			0.31		0.429		0.466				0.30	0.91	0.00	790
610	2.33			1.591		0.26	0	0.481				0.22	2.11	0.00	962
611	1.49					0.857	0.578	0.054							

ATTACHMENT D-1
Moon Township
Pollutant Reduction Plan
Existing Loading

Watershed: Flaugherty Run, Kilbuck Run-Ohio River, McCabe Run-Ohio River, Montour Run

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Pervious Cover (lb/ac/yr)	264.96
Non Urbanized Areas (lb/ac/yr)	234.60

Storm Sewershed	Tributary Area - Total (Ac)	Tributary Area - NLCD Land Cover (ac)										Impervious/Pervious Areas (ac)			Existing Sediment (TSS) Loading (lb/yr)
		Barren Land (Rock/Sand/ Clay)	Cultivated Crops	Deciduous Forest	Developed, High Intensity	Developed, Low Intensity	Developed, Medium Intensity	Developed, Open Space	Evergreen Forest	Grassland/ Herbaceous	Pasture/ Hay	Urbanized Area - Impervious	Urbanized Area - Pervious	Tributary Area - Non-Urbanized	
803	18.75					0.277		0.2				0.17	0.30	18.27	4,686
805	1.26					1.256	0.002					0.62	0.64	0.00	1,305
806	1.46					1.319	0.07	0.068				0.71	0.74	0.00	1,511
807	0.34			0.111		0.017		0.125	0.083			0.03	0.30	0.00	140
808	7.91					4.059	1.158	1.528				3.19	3.55	1.16	7,087
809	1.33			0.469		0.057		0.793	0.015			0.18	1.16	0.00	635
810	11.07					1.614		9.202				2.54	8.28	0.25	6,922
811	1.34					0.979		0.363				0.55	0.79	0.00	1,219
812	0.73					0.578		0.153				0.31	0.42	0.00	685
813	14.06				0.126	4.166	2.754	7.009				5.67	8.38	0.00	12,656
814	0.17				0.063		0.099	0.004				0.14	0.02	0.00	267
815	0.35				0.152	0.021	0.173					0.30	0.05	0.00	562
617A	3.21					2.95		0.256				1.49	1.71	0.00	3,201
Total:	1,985.76	0.73	3.93	175.60	39.01	771.78	225.90	702.71	0.24	11.23	8.80	729.15	1,210.77	45.83	1,672,474

Note 1: Pollutant Loading Factors Based on Appendix B of PADEP PRP Instructions dated 3/2017
Note 2: Impervious Area coverages based on 2011 NLCD data
N:\PROJ\120\120-113\PRP\PRP Plan - Pollutant Calculations

ATTACHMENT D-2

EXISTING BMPS

WATERSHED:

**FLAUGHERTY RUN,
KILBUCK RUN-OHIO RIVER,
MCCABE RUN-OHIO RIVER,
MONTOUR RUN**

Attachment D-2
Moon Township
Pollutant Reduction Plan
Existing BMPs

Watershed: Flaugherty Run, Kilbuck Run-Ohio River, McCabe Run-Ohio River, Montour Run

NLCD Land Cover ²	Impervious Area	Pervious Area
Deciduous Forest	0%	100%
Developed, High Intensity	100%	0%
Developed, Low Intensity	49%	51%
Developed, Medium Intensity	79%	21%
Developed, Open Space	19%	81%

Pollutant Loading Factors ¹	Sediment (TSS)
Impervious Cover (lb/ac/yr)	1,839.00
Pervious Cover (lb/ac/yr)	264.96
Non Urbanized Areas (lb/ac/yr)	234.60

BMP Description	BMP Type	Storm Sewershed	Year Constructed	Latitude	Longitude	Tributary Area - Total (Ac)	Tributary Area - NLCD Land Cover (ac)								Impervious/Pervious Area (ac)			Existing Sediment Loading No BMP (lb/yr)	BMP Efficiency	Existing Loading Reduction (lb/yr)
							Barren Land (Rock.Sand/Clay)	Cultivated Crops	Deciduous Forest	Developed, High Intensity	Developed, Low Intensity	Developed, Medium Intensity	Developed, Open Space	Grassland/Herbaceous	Urbanized Area - Impervious	Urbanized Area - Pervious	Non-Urbanized			
Autumn Woods	Dry Detention Basin	155	2011	40d31m38s	80d14m43s	11.43			1.03		1.83	0.64	1.63	6.30	1.71	9.72	0.00	5,721	10%	572
Cimarron 1	Dry Extended Detention Basin	152	2013	40d32m02s	80d15m40s	8.26					6.18	1.04	1.04		4.04	4.21	0.00	8,554	60%	5,132
Cimarron 2	Dry Extended Detention Basin	153	2013	40d32m02s	80d15m26s	8.18			0.98		2.20	1.38	2.23	1.39	2.59	5.59	0.00	6,247	60%	3,748
Foxwood Knolls 1	Dry Detention Basin	156	2006	40d31m34s	80d14m10s	10.16			1.54	0.63	3.43	1.91	2.65		4.32	5.83	0.00	9,495	10%	949
Foxwood Knolls 2	Dry Detention Basin	157	2006	40d31m26s	80d14m5s	9.71			2.46	0.37	1.24	2.53	3.10		3.57	6.14	0.00	8,194	10%	819
McCormick Farms 1	Dry Detention Basin	706	2003	40d29m42s	80d09m30s	10.55			0.01		4.81	1.96	3.78		4.62	5.93	0.00	10,070	10%	1,007
McCormick Farms 2	Dry Detention Basin	707	2003	40d29m35s	80d09m43s	11.08					4.65	3.97	2.46		5.88	5.19	0.00	12,192	10%	1,219
Sonoma Ridge A	Dry Detention Basin	733	2005	40d28m22s	80d09m51s	16.79				0.10	5.35	4.78	6.56		7.75	9.05	0.00	16,640	10%	1,664
Sonoma Ridge C	Dry Detention Basin	732	2007	40d28m34s	80d10m02s	5.60					1.05	2.80	1.75		3.06	2.54	0.00	6,298	10%	630
Sonoma Ridge D	Dry Detention Basin	734	2006	40d28m24s	80d09m41s	7.90					3.04	0.96	3.91		2.99	4.91	0.00	6,798	10%	680
Sonoma Ridge E	Dry Detention Basin	737	2006	40d28m14s	80d09m30s	3.35				0.08	1.13	1.28	0.87		1.80	1.54	0.00	3,725	10%	373
Sonoma Ridge F	Dry Detention Basin	735	2008	40d27m33s	80d10m39s	13.83	0.73			0.22	3.96	1.88	4.90	2.13	4.58	9.25	0.00	10,872	10%	1,087
Staunton Heights	Dry Detention Basin	255	2006	40d32m34s	80d12m15s	8.56			0.18	0.47	0.71	5.37	1.85		5.40	3.16	0.00	10,768	10%	1,077
Total:						125.381	0.733	0.000	6.198	1.872	39.542	30.501	36.717	9.818	52.320	73.061	0.000	115,574		18,958

Note 1: Pollutant Loading Factors Based on Appendix B of PADEP PRP Instructions dated 3/2011
Note 2: Impervious Area coverages based on 2011 NLCD data

ATTACHMENT E-1

PROPOSED BMPs

WATERSHED:

**FLAUGHERTY RUN,
KILBUCK RUN-OHIO RIVER,
MCCABE RUN-OHIO RIVER,
MONTOUR RUN**

Attachment E-1
Moon Township
Pollutant Reduction Plan
Proposed BMPs
Watershed: Flaugherty Run, Kilbuck Run-Ohio River, McCabe Run-Ohio River, Montour Run

Pollutant Loading Factors ²	Impervious Area	Pervious Area
Deciduous Forest	0%	100%
Developed, High Intensity	100%	0%
Developed, Low Intensity	49%	51%
Developed, Medium Intensity	79%	21%
Developed, Open Space	19%	81%
Pasture/Hay	0%	100%

Pollutant Loading Factors ¹	Sediment (TSS)
Impervious Cover (lb/ac/yr)	1,839.00
Pervious Cover (lb/ac/yr)	264.96
Non Urbanized Areas (lb/ac/yr)	234.60

Pollutant Reduction Summary	lb/year
Required Pollutant Reduction (lb/yr)	165,352
Potential Reduction of Identified Potential BMPs	174,490

BMP Description	BMP Type	Tributary Area - NLCD Land Cover (ac)							Impervious/Pervious Area Tabulation (ac)			Existing Sediment (TSS) Loading (lb/yr)	Capture/ Treatment Volume (ac-ft)	Capture/ Treatment Volume (cf)	X - Runoff Depth Captured (in)	BMP Surface Area (sf)	BMP Depth (ft)	BMP Storage Capacity (cf)	Focal Point (Filtration BMP) Area (sf)	BMP Efficiency Values	BMP Sediment Removal (lbs/yr)
		Total	Deciduous Forest	Developed, High Intensity	Developed, Low Intensity	Developed, Medium Intensity	Developed, Open Space	Pasture/ Hay	Urbanized Area - Impervious	Urbanized Area Pervious	Tributary Area - Non-Urbanized										
Whispering Woods - Flaugherty Run	Filtering Practices	10.59	4.26		2.61	1.35	2.38		2.79	7.80	0.00	7,204	0.233	10140	1.00	12,000	0.50	6,000	40	70%	5,043
Whispering Woods Hawthorn	Filtering Practices	29.80	4.84		9.34	3.21	12.43		9.47	20.34	0.00	22,799	0.473	20620	0.60	6,500	1.50	9,750	105	57%	12,995
Broad Hill Farms Minton Drive	Filtering Practices	13.89	0.17		6.63	1.90	5.19		5.74	8.16	0.00	12,710	0.335	14575	0.70	6,000	1.25	7,500	60	62%	7,880
Broad Hill Farms Barnes Drive	Filtering Practices	19.41	0.38		10.06	1.14	7.77	0.06	7.30	12.11	0.00	16,635	0.243	10602	0.40	2,500	1.50	3,750	130	45%	7,486
Broad Hill Court	Filtreing Practices	9.63	0.20		5.83	0.74	2.87		3.99	5.65	0.00	8,826	0.166	7234	0.50	1,700	1.50	2,550	130	52%	4,589
Harvest Court	Filtering Practices	21.20	0.32		11.49	3.99	5.40		9.81	11.39	0.00	21,055	0.245	10681	0.30	3,200	1.25	4,000	110	37%	7,790
Riverdale Church	Filtering Practices	10.03	0.02		2.67	1.48	5.87		3.59	6.44	0.00	8,309	0.269	11730	0.90	4,500	1.00	4,500	110	67%	5,567
Shelbourne Drive	Filtering Practices	71.30	13.27	1.54	20.55	9.45	26.49		24.11	47.19	0.00	56,834	0.603	26251	0.30	7,000	1.50	10,500	225	37%	21,029
Madison Drive	Filtering Practices	31.70	13.05		9.44	3.43	5.79		8.43	23.27	0.00	21,667	0.421	18360	0.60	7,500	1.00	7,500	145	57%	12,350
Total:		217.55	36.50	1.54	78.61	26.67	74.18	0.06	75.22	142.34	0.00	176,039									84,730

BMP Description	Sediment Removal Rate (lbs/lf/yr)	Length of Restoration (lf)	BMP Sediment Removal (lbs/yr)
Stream Restoration	44.88	2000	89,760

Note 1: Pollutant Loading Factors Based on Appendix B of PADEP PRP Instructions dated 3/2017
Note 2: Impervious Area coverages based on 2011 NLCD data