Irwin Borough
Westmoreland County
Pennsylvania

NPDES
Municipal Separate Storm Sewer System
Pollutant Reduction Plan

Prepared for:
Irwin Borough Council
May 2017

Prepared by:
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Irwin Borough
Westmoreland County
Municipal Separate Storm Sewer System (MS4)
Pollutant Reduction Plan and Calculations

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April 2017

Section A. Public Participation.

- The Borough of Irwin has made a complete copy of the PRP available for public review.

- The Borough published, in a newspaper of general circulation in the area, a public notice containing a statement describing the plan, where it may be reviewed by the public, and the length of time the Borough will provide for the receipt of comments. The public notice must be published at least 45 days prior to the deadline for submission of the PRP to DEP. A copy of the public notice is attached as Exhibit A.

- The Borough shall accept written comments for a minimum of 30 days from the date of public notice. A copy of all written comments received from the public to the PRP will be attached as Exhibit B.

- The Borough shall accept comments from any interested member of the public at a regularly scheduled public meeting of the governing body of the Borough to be held May 10, 2017 at 6:00 PM. A transcript of the comments received at the meeting will be attached as Exhibit C.

- The Borough shall consider and make a record of the consideration of each timely comment received from the public during the public comment period concerning the plan, identifying any changes made to the plan in response to the comment. A copy of the Borough's record of consideration of all timely comments received during the public comment period to the PRP will be attached as Exhibit D.

Section B. Map.

- See attached copy of the Borough's MS4 Outfall Map.

Section C. Pollutants of Concern.

MS4 Name	NPDES ID
Irwin Borough	PAG36164

From page 152 of 164 of the Requirements Table

Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)
Coal Run	Appendix E-Siltation (5)
Brush Creek	Appendix A-Metals, pH (4a), Appendix E-Siltation (5)
Turtle Creek	Appendix A-Metals, pH (4a)
Tinkers Run	Appendix E-Siltation (5)

The Borough Boundary is near the confluence of Brush Creek and Coal Run. Therefore, Coal Run only drains a very small area of the Borough. Tinkers Run drains a larger area of the Borough; however, both Coal Run and Tinkers Run flow into Brush Creek within the Borough limits. The entire Borough falls under the requirements for Brush Creek which includes Siltation (Appendix E) and Metals (Appendix A). Brush Creek flows into Turtle Creek miles away from Irwin Borough. Turtle Creek requirements include only Metals (Appendix A). Therefore, the pollutants of concern for Irwin Borough are:

- Appendix A-Metals, pH (4a)
- Appendix E-Siltation (5)

Since the impairment is due to both siltation (Appendix E) and nutrients (Appendix A), both sediment (10% reduction) and TP (5% reduction) must be addressed.

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Section D. Determine existing loading for pollutants of concern.

Existing Loading Calculation

From DEP's "STATEWIDE MS4 LAND COVER ESTIMATES"

Municipality	UA % Impervious	UA % Pervious	UA Acres
Irwin Borough	40%	60%	538.9

Parsing

Within the UA of Irwin Borough, there are 1.86 miles of State Roads (Source: PennDOT Liquid Fuels Map) of which SR 0030 consists of 0.84 miles and SR's 4017, 4025 and 3020 consist of 1.02 miles. According to the DEP MS4 NPDES Permits - Frequently asked Questions - Revised 4-5-2017, the PennDOT roads and right-of-ways may be parsed out. The average right-of-way width for SR 0030 is 100 feet and for the other SR's is 33 feet. PennDOT has its own MS4 permit and therefore, we may deduct this area.

State Route	L (LF)	W (FT)	Acres
0030	4435.20	100	10.18
4017, 4025 & 3020	5385.60	33	4.08
	Parsing Area Deduction (Area of State Roads) =		14.26
		Therefore: Total UA Area =	524.64

Irwin Borough in Westmoreland County, PA has a total of 524.64 acres in a storm sewershed that drains to surface waters that are impaired for Metals and/or Ph associated with Abandoned Mine Drainage (AMD - category 4a) Appendix A and for nutrients and/or sediment (siltation - category 5) Appendix E. The MS4 Requirements Table specifies that a PRP for impaired waters (Appendix E) must be developed.

	Acres
Total UA Area	524.64
Impervious developed land	209.86
Pervious developed land	314.78

In this storm sewershed:	40%	209.86	acres are impervious developed land
and:	60%	314.78	acres are pervious developed land

Attachment B of the PRP Instructions includes the following Developed Land Loading Rate for All Other Counties:

Category	Sediment Loading Rate (lbs/acre/yr)	TP Loading Rate (lbs/acre/yr)
Impervious Developed	1,839	2.28
Pervious Developed	264.96	0.84

The existing loading using DEP simplified method is calculated as follows:

Existing Sediment Loading Calculation (Prior to Reductions allowed for Existing BMP's):

	Impervious @ 1,839 lbs/acre/yr	Pervious @ 264.96 lbs/acre/yr	Existing Sediment Loading	
Acres	209.86	314.78	469,329	lbs/yr

Existing TP Loading Calculation (Prior to Reductions allowed for Existing BMP's):

	Impervious @ 2.28 lbs/acre/yr	Pervious @ 0.84 lbs/acre/yr	Existing TP Loading	
Acres	209.86	314.78	743	lbs/yr

Existing Sediment Loading: (209.86 acres x 1,839 lbs/acre/yr) + (314.78 acres x 264.96 lbs/acre/yr) = 469,329 lbs/yr
Existing TP Loading: (209.86 acres x 2.28 lbs/acre/yr) + (316.78 acres x 0.84 lbs/acre/yr) = 743 lbs/yr

According to the DEP NPDES MS4 PRP Instructions Section I.C, an MS4 may use all BMP's installed prior to the date of the load calculation to reduce its estimate of existing pollutant loading.

Sediment and TP Load Reductions through Existing SWM Facilities:

- The Borough has 2 existing Dry Extended Stormwater Detention Basins located at the ends of Victoria Estates treating areas of 5.7 acres and 2.7 acres including Victoria Lane; 3 existing Dry Extended Stormwater Detention Tanks located in the Caruthers Lane Estates (now called Summerfield) along Barnes Lake Road and Caruthers Lane treating 4.3 acres of the development which includes Barnaby Court (see Figure 1); 1 existing Dry Extended Stormwater Detention Tank serving the Intervest Services (Antonelli's Event Center Overflow Parking Lot) Parking Lot treating 0.65 acres (see Figure 2); 1 existing Stormwater Detention Infiltration System serving Pasguarelli's Center Buildings and Parking Lots treating 1.0 acre (see Figure 3); 2 existing Dry Extended Stormwater Detention Infiltration Tanks located at the Norwin Library treating 1.75 acres (see Figure 4); and an existing grass-lined Stormwater Detention Infiltration Swale (Vegetated Open Channel in C/D Soil) located at the Presbyterian Church Parking Lot treating 0.3 acres (see Figure 5); (values are rounded):

- The total area treated by **Dry Extended Stormwater Detention Basins** is 16.1 acres.
  The DEP BMP Effectiveness Value for Dry Extended Stormwater Detention Basins is 60% for Sediment and 20% for TP

- The total area treated by **Vegetated Open Channels in C/D Soil** is 0.3 acres.
  The DEP BMP Effectiveness Value for Vegetated Open Channels in C/D Soil is 50% for Sediment and 10% for TP

Calculations of Sediment Reduction through Existing BMP's:

	Treated Acres	40% Impervious	60% Pervious
Dry Extended Stormwater Detention Basins	16.1	6.44	9.66

	Impervious @ 1,839 lbs/acre/yr	Pervious @ 264.96 lbs/acre/yr	Effectiveness Value	Sediment Reduction	
Acres	6.44	9.66	60%	8,642	lbs/yr

	Treated Acres	Impervious	Pervious
Vegetated Open Channels (C/D Soils)	0.3	0.12	0.18

	Impervious @ 1,839 lbs/acre/yr	Pervious @ 264.96 lbs/acre/yr	Effectiveness Value	Sediment Reduction	
Acres	0.12	0.18	50%	134	lbs/yr

The Sediment Reduction through the Existing BMP's is = **8,776** lbs/yr

Calculations of TP Reduction through Existing BMP's:

	Treated Acres	40% Impervious	60% Pervious
Dry Extended Stormwater Detention Basins	16.1	6.44	9.66

	Impervious @ 2.28 lbs/acre/yr	Pervious @ 0.84 lbs/acre/yr	Effectiveness Value	TP Reduction	
Acres	6.44	9.66	20%	4.56	lbs/yr

	Treated Acres	Impervious	Pervious
Vegetated Open Channels (C/D Soils)	0.3	0.12	0.18

	Impervious @ 2.28 lbs/acre/yr	Pervious @ 0.84 lbs/acre/yr	Effectiveness Value	TP Reduction	
Acres	0.12	0.18	10%	0.04	lbs/yr

The TP Reduction through the Existing BMP's is = **5** lbs/yr

Therefore:	Existing Load without Reductions for BMP's	Reductions (Exist. BMP's)		**Existing Sediment Load**	
Existing Sediment Load with Reductions =	469,329	-8,776	=	**460,553**	lbs/yr
Existing TP Load with Reductions =	743	-5	=	**738**	lbs/yr

Section E. Select BMP's To Achieve the Minimum Required Reductions in Pollutant Loading.

The following determines the Minimum Sediment and Total Phosphorus (TP) loading (lbs/yr) that must be reduced within 5 years following DEP's approval of coverage:

The minimum percent reduction according to Appendix E is 10% for sediment and 5% for TP.

	Existing Loading	Reduction		lbs/yr
Minimum Sediment Reduction Required	460,553	10%	=	**46,055**
Minimum TP Reduction Required	738	5%	=	**37**

BMP Option 1

Bioretention Raingarden

At the time of the PRP Plan preparation, the construction of a Bioretention Rain Garden with an underdrain in C/D soil is being proposed for Snyder's Funeral Home Parking Lot Addition at the corner of Main St. & Fifth St.:

The total area treated by this BMP is 0.20 acres (See Figure 6). Of that, 0.08 acres is impervious and 0.12 acres is pervious

The DEP BMP Effectiveness Value for Bioretention/Raingarden (C/D soils w/ underdrain) is 55% for Sediment and 45% for TP

Bioretention/Raingarden (C/D soils with underdrain)

	Treated Acres	Impervious	Pervious
	0.2	0.08	0.12

Sediment Reduction Calculation

	Impervious @ 1,839 lbs/acre/yr	Pervious @ 264.96 lbs/acre/yr	Effectiveness Value	Sediment Reduction	
Acres	0.08	0.12	55%	98	lbs/yr

TP Reduction Calculation

	Impervious @ 2.28 lbs/acre/yr	Pervious @ 0.84 lbs/acre/yr	Effectiveness Value	TP Reduction	
Acres	0.08	0.12	45%	0.13	lbs/yr

Therefore:

Estimated Sediment Reduction, Impervious = 0.08 acres x 1,839 lbs/acre/yr x 0.55 (55%) = 81 lbs/yr
Estimated Sediment Reduction, Pervious = 0.12 acres x 264.96 lbs/acre/yr x 0.55 (55%) = 17 lbs/yr
98 lbs/yr

Estimated TP Reduction, Impervious = 0.08 acres x 2.28 lbs/acre/yr x 0.45 (45%) = 0.08 lbs/yr
Estimated TP Reduction, Pervious = 0.12 acres x 0.84 lbs/acre/yr x 0.45 (45%) = 0.05 lbs/yr
0.13 lbs/yr

	Required	Option 1 Reduction	Remaining
Sediment	46,055	98	**45,957**
TP	37	0	**37**

The minimum Sediment and TP loading reductions are not satisfied by BMP No. 1; Therefore, additional BMP's are needed.

BMP Option 2

Tree Planting

The Borough may be able to obtain funding for tree planting in Irwin Park and other areas under the Borough's control.
The estimated number of trees to be planted is: 100 Trees
Each tree provides pollutant load reductions for the equivalent of 0.01 acres, therefore the area is: 1 Acres

	Impervious @ 1,839 lbs/acre/yr	Pervious @ 264.96 lbs/acre/yr	Effectiveness Value	Sediment Reduction	
Acres	0.40	0.60	55%	492	lbs/yr

	Impervious @ 2.28 lbs/acre/yr	Pervious @ 0.84 lbs/acre/yr	Effectiveness Value	TP Reduction	
Acres	0.40	0.60	45%	0.64	lbs/yr

	Remaining from Opt.1	Option 2 Reduction	Remaining
Sediment	45,957	492	**45,465**
TP	37	1	**36**

The minimum Sediment and TP loading reductions are not satisfied by BMP's No. 1&2; Therefore, add'l. BMP's are needed.

BMP Option 3

Street Sweeping

The Borough conducts street sweeping at a frequency of twice per week on certain streets in the downtown area. The Borough Engineer proposes that street sweeping be expanded to include all other streets at a frequency of at least 25 times per year. The BMP effectiveness value for street sweeping 25 times per year (the same street) is 9% for Sediment and 3% for TP (see 3800-PM-BCW0100m). Of the 538.9 acres in the storm sewershed, 53.13 acres represent Borough streets that will be swept at the 25 times per year frequency. The following sediment loading reduction from expanded street sweeping is estimated as follows (values are rounded):

Length (miles)	Length (feet)	Average Width (feet)	SF	Acres
16.86	89,021	26	2,314,541	53.13

Estimated Sediment Reduction = 53.13 acres x 1,839 lbs/acre/yr x 0.09 (9%) = 8,794 lbs/yr
Estimated TP Reduction = 53.13 acres x 2.28 lbs/acre/yr x 0.03 (3%) = 4 lbs/yr

	Remaining from Opt.s 1&2	Option 3 Reduction	Remaining
Sediment	45,465	8,794	**36,671**
TP	36	4	**32**

The minimum Sediment and TP loading reductions are not satisfied by BMP's No. 1-3; Therefore, add'l. BMP's are needed.

BMP Option 4

Stream Restoration

Out of all of the BMP's listed in DEP Publication 3800-PM-BCW0100m "NPDES MS4 BMP Effectiveness Values, the Stream Restoration BMP is the most effective in reducing Sediment. It is obvious that stream erosion is a primary cause of Sedimentation. The east Branch of Tinkers Run flows through Irwin Borough along Irwin Park. Irwin Park is owned by the Irwin Neighborhood Association and the property is leased to the Borough under a 99-year lease. The banks of this stream are extensively eroded. A walk-bridge across the East Branch of Tinkers Run leading from the park to the Little Knights Kingdom play structure village recently had to be removed due to stream bank erosion which had undermined the bridge abutments. Stream Bank Erosion continues to cause problems such as loss of embankment and undermining of tree roots which causes the trees to collapse into the stream causing blockage. The loss of trees and tree roots along the stream banks contributes to the degrading cycle of accelerated and increased erosion. The Stream Bank Restoration will be in the form of Stabilization using Rock Rip Rap and/or other methods suitable for the flood flow velocity

Within Irwin Park property, there is 850 Linear Feet of Tinkers Run Tributary No. 1 (East Branch) Stream Bank which can be restored to reduce Erosion, Sedimentation and Stream Degradation.

Tinkers Run Trib. 1 Stream Bank Length	TP Effectiveness 0.068 lbs/ft/yr	Sediment Effectiveness 44.88 lbs/ft/yr
850	58	38,148

The minimum Sediment and TP loading reductions are satisfied by BMP Options 1, 2, 3 & 4; therefore, no additional BMP's are needed.

	Remaining from Opt.s 1-3	Option 4 Reduction	Remaining
Sediment	36,671	38,148	-1,477
TP	32	58	-26

Summary of Alternatives and Selection of BMP's

Selected BMP's	Estimated Sediment Load Reduction (lb.s /yr.)	Estimated TP Load Reduction (lb.s /yr.)	
Bioret. Raingarden	98	0.13	
Tree Planting	492	0.64	
Street Sweeping	8,794	4	
Stream Restoration	38,148	58	
Total:	**47,532**	**63**	OK
Minimum Required:	46,055	37	

Note: Complete or preliminary designs are not required as PRPs and TMDL Plans are planning level documents (MS4 NPDES Permits - Frequently asked Questions - Revised 4-5-2107)

Section F. Identify Funding Mechanism(s).

BMP No.	Description	Project Sponsor	Proposed Funding Source	Alternate Funding Source
1	Bioretention Rain Garden	Snyder Funeral Home	Private	N/A
2	Tree Planting	Irwin Borough	State Grants	PennVest Loan & Fee *
3	Street Sweeping	Irwin Borough	State Grants	PennVest Loan & Fee *
4	Stream Bank Restoration	Irwin Borough	State Grants	PennVest Loan & Fee *

* The PennVest Loan will require repayment. The Borough has no alternative funding source for the requirements under this plan nor for the MS4 requirements in general; therefore, if no grants are received, the cost will need to be covered through adoption of a stormwater fee. The fairest way to distribute the cost fee will be assigned to all developed properties based upon the number of sewer EDU's assigned to each property by the Borough. There are approximately 2,700 sewer EDU's in the Borough's sanitary sewer system. The number of sewer EDU's is a good approximation of the stormwater contribution from developed properties. Undeveloped properties usually have little to no impervious area and do not create a stormwater runoff impact on the MS4. Larger developed properties with multiple sewer EDU's usually have larger impervious areas and generate a larger stormwater runoff impact on the MS4.

Based upon information obtained at DEP sponsored Workshops, the estimated cost for sediment removal is $47 per pound of sediment to be removed. This figure is not considered to be unreasonable especially when the total cost of the MS4 Program and the implementing the PRP is calculated. Such costs include Property Value, Equipment, Manpower, Design, Plans & Specifications, Bidding Documents, Construction, Inspection and Administration. The estimated cost to purchase a used 2014 Vacuum Truck is $285,000 and the estimated cost to purchase a used 2010 Street Sweeper is $160,000.

According to the PRP calculations 46,362 pounds of sediment need to be removed. Therefore, the cost of the Pollutant Reduction Plan is estimated at $2,179,014 over a period of 5 years. The estimated cost of implementing the MCM's and all other MS4 requirements is estimated at approximately $50,000 per year bringing the total estimated 5 year cost to $2,429,014.

Estimated MS4 and PRP Cost for 2018 to 2022 Permit Cycle

Lb.s of Sediment	**Estimated Cost Per**	**5 Yr. Cost**
46,362	$47.00	$2,179,014.00
Permit Cycle (Yr.s)	**Est'd. MS4 Cost / Yr. ***	**5 Yr. Cost**
5	$50,000.00	$250,000.00
	Total 5 Yr. Cost =	**$2,429,014.00**

* Includes cost of all MCM's as well as the SWM Program cost

Therefore, the Municipal Separate Storm Sewer System fee is calculated as follows:

Cost	MS4 Users	Period (months)	Fee per MS4 User Monthly	Quarterly	Annually
$2,429,014.00	2,700	60	$14.99	$44.98	$179.93

NOTE: See Exhibit "C" - "Transcript of Public Meeting Comments" for additional information on costs and funding.

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Section G. Identify Responsible Parties for Operation and Maintenance (O&M) of BMP's.

BMP No.	Description	Responsible Parties for Operation and Maintenance (O&M) of BMP's
1	Bioretention Rain Garden	William Snyder Funeral Home
2	Tree Planting	Irwin Borough Public Works Department
3	Street Sweeping	Irwin Borough Public Works Department
4	Stream Bank Maintenance	Irwin Borough Public Works Department

BMP No.	Description	Activities involved with O&M of BMPs	Frequency
1	Bioretention Rain Garden	See "Rain Garden Maintenance" Attachment	
2	Tree Planting	Establish Mulch Ring to Protect Trunk	Upon Planting
		Check the Tree Planting	Once Weekly for the First Month
		Water As Needed	Once Weekly for the First Month
		Remove Weeds and Re-Mulch	Annually
		Prune Broken or Dead Branches	As Needed
3	Street Sweeping	Street Sweeping	Twice Weekly
		Weighing/Disposing of Sweepings	As Needed
		Maintenance of Street Sweeper	As Needed
4	Stream Bank Maintenance	Inspection of Banks	After Every Heavy Rain
		Remove Obstructing Trees/Debris	As Needed
		Repair/Replace Eroded Rock Lining	As Needed

The Borough will need to identify actual O&M activities in Annual MS4 Status Reports submitted under the General Permit.

EXHIBITS

Irwin Borough
Westmoreland County
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Exhibit "A"
Public Notice

TRIB TOTAL MEDIA

LEGAL ADVERTISING

Proof of Publication of Notice in The Tribune-Review

Under the Act of July 9, 1976, P.L. 877, No. 160

Commonwealth of Pennsylvania }
County of Allegheny } **SS:**

Patty Klingensmith,, Regional Multi-Media Advertising Manager of Trib Total Media, Inc., a corporation of the Commonwealth of Pennsylvania with place of business in Pittsburgh, Allegheny County, Pennsylvania, being duly sworn, deposes and says that the Tribune-Review is a daily newspaper in general circulation in Southwestern Pennsylvania. Said corporation was established in the year 1924. A copy of the printed notice of publication is attached hereto exactly as the same was printed and published in the regular editions of the said daily newspaper on the following dates, viz:
LEGAL# 6460463, RE: REVISED MAY 10TH PUBLIC MEETING; 29TH DAY OF APRIL, 2017.

Affiant further deposes that s/he is an officer duly Authorized by the Trib Total Media, Inc., publisher of the Tribune-Review, to verify the foregoing statement under oath and also declares that affiant is not interested in the subject matter of the aforesaid notice of publication, and that all allegations in the foregoing statement as to time, place and character of publication are true.

Regional Multi-Media Advertising Manager,
Trib Total Media, Inc.

Sworn to and subscribed before me this
1ST day of MAY, 2017

Notary Public

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
JoAnn M. Callahan, Notary Public
City of Greensburg, Westmoreland County
My Commission Expires July 1, 2020
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

Statement of Advertising Costs

VALERIE MORTON
BOROUGH OF IRWIN
424 MAIN STREET
IRWIN, PA 15642

To **Trib Total Media, Inc.**.

For Publishing the notice or advertisement attached hereto on the above stated dates	$90.30
Probating Same	$ 0
Total	$ **90.30**

Publisher's Receipt for Advertising Cost

The **Trib Total Media, Inc.**, publisher of the **Tribune-Revie** acknowledges a receipt of the aforesaid advertising and publication costs, a fully paid.

Trib Total Media Inc., Publisher
of the **Tribune-Review**, a Daily Newspaper.

By_____

BOROUGH OF IRWIN
WESTMORELAND COUNTY
Public Notice

Irwin Borough developed a Pollutant Reduction Plan (PRP) as required by DEP Municipal Separate Storm Sewer System permit. The PRP is available for public review at 424 Main Street, Irwin. The PRP involves calculations of pollutants, proposed Best Management Practices and the funding mechanism for construction, operation and maintenance. Written public comments will be accepted for a period of 30 days. Verbal comments will be accepted at a public meeting May 10, 2017 at 6 PM in Council Chambers at 1 First Street, Irwin.
6460463(4-29-17)

Irwin Borough
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Exhibit "B"
Written Comments

Note:
- As per the advertisement dated April 29, 2017, written comments will be received for a period of 30 days.
- As of May 31, 2017, no written comments were received by the Borough.

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Exhibit "C"
Transcript of Public Meeting Comments

Notes:

- There were no public comments received at the meeting.
- The Borough Solicitor noted that Borough's in Pennsylvania are currently not able to assess Stormwater Management Fees. Therefore, unless the state statutes are changed, the Borough will need to rely on Grants as the primary funding source. The only alternate funding source available to the Borough would be in the form of increased taxes. Based upon the estimated cost, the Borough would need to nearly double their current 18 mill tax rate. 18 mills for Irwin generates nearly $500,000 per year. The maximum millage rate for Borough's in Pennsylvania is 30. Boroughs can levy an additional 5 mills with court approval. To get court approval, they have to show the additional millage is necessary to meet the needs of an approved budget. In 2016 the Borough raised the tax millage rate from 15 mills to 18 mills, therefore, future tax increases will most likely not be met with great enthusiasm.
- Based upon this discussion, it was made clear to the Council and Staff present at the meeting that Grants will need to be the primary funding source and that conentrated efforts will need to be made to keep the cost of this program to the absolute minimum. Creativity in design and implementation will be required so as not to require tax increases which would have detrimental effects on the Community.

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Exhibit "D"
Borough's Response to Public Comments

Note:
- No written public comments regarding the proposed PRP were received during the 30 day comment period.
- No public comments regarding the proposed PRP were made during the public meeting.

Therefore:
- The Borough has no public comment response.

FIGURES


Area: 5.70 ac
Perimeter: 2,190.66 ft
Area: 4.30 ac
Perimeter: 1,732.54 ft
Area: 2.70 ac
Perimeter: 1,385.99 ft

Figure 1

Figure 2


WARDEN
PLAN
NUMBER 2
4-265
280.64
135.18
138.5
56.8
69
31.1
31.1
70
62.2
62.5
41.5
60.4
93.5
Area: 1.00 ac
Perimeter: 896.08 ft
PASQUARELLI CONSOLIDATION PLAN
20110228003560
62
65
92
96
99

Figure 3

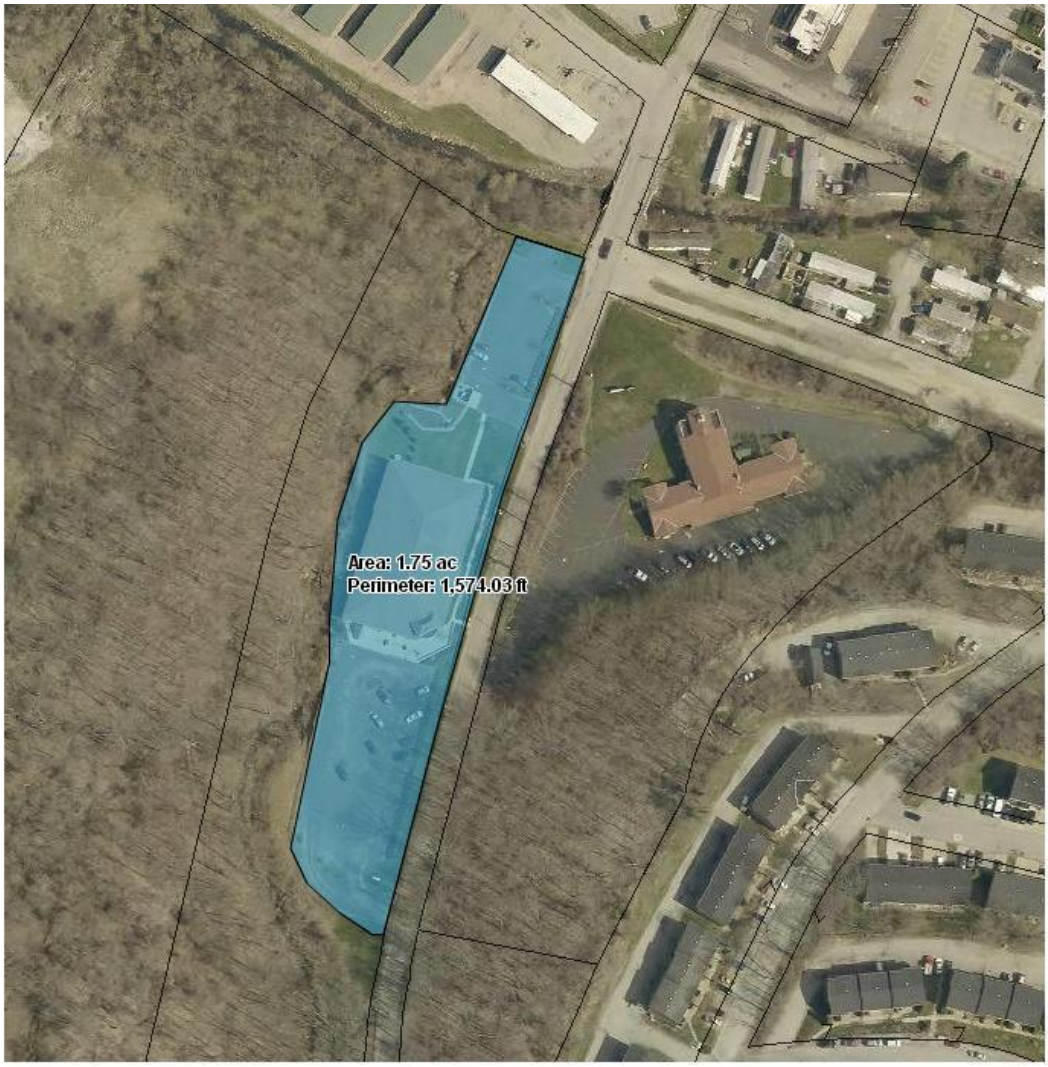


Figure 4

170
161
108
170
50
78
171
50
100
90
65.5
100.88
171
172
174
Area: 0.30 ac
Perimeter: 511.77 ft
163
58
162
90.29
173
60
349
50
348
351
347
87.2
95
144.2
45.5
140
140
140

Figure 5


WARD 1
WARD 2
Area: 0.20 ac
Perimeter: 554.01 ft
Holy Trinity
81
82
83
84
85
90

Figure 6

ATTACHMENTS

MS4 OUTLETS

LETTER	DESCRIPTION
A–	12" HDPE OUTLET TO LEVEL SPREADER & VEGETATED HILLSIDE
B–	12" RCP OUTLET TO GRASS SLOPE & VEGETATED HILLSIDE
C–	18" RCP OUTLET TO DITCH (WOODED HILLSIDE)
D–	4" PVC OUTLET TO GRASS LINED DITCH (CEMETERY)
E–	±15" PIPE CONNECTS TO NORTH HUNTINGDON TWP. SYSTEM
F–	15" HDPE OUTLET TO GRASS SWALE IN CEMETERY
G–	18" HDPE OUTLET TO WET WEATHER DITCH
H–	36" HDPE OUTLET TO WET WEATHER DITCH
I–	24" RCP CONNECTS TO NORTH HUNTINGDON TWP. SYSTEM
J–	?" PIPE CONNECTS TO NORTH HUNTINGDON TWP. SYSTEM
K–	24" CMP OUTLET TO WET WEATHER STREAM
L–	18" HDPE & 36" RCP OUTLETS TO STREAM
M–	OUTLET UNKNOWN
N–	18" HDPE CONNECTS TO NORTH HUNTINGDON TWP. SYSTEM
O–	?" PIPE CONNECTS TO NORTH HUNTINGDON TWP. SYSTEM
P–	15" RCP OUTLET TO WOODED HILLSIDE (LOCATION UNKNOWN)
Q–	15" PVC OUTLET TO STEEP WOODED SLOPE

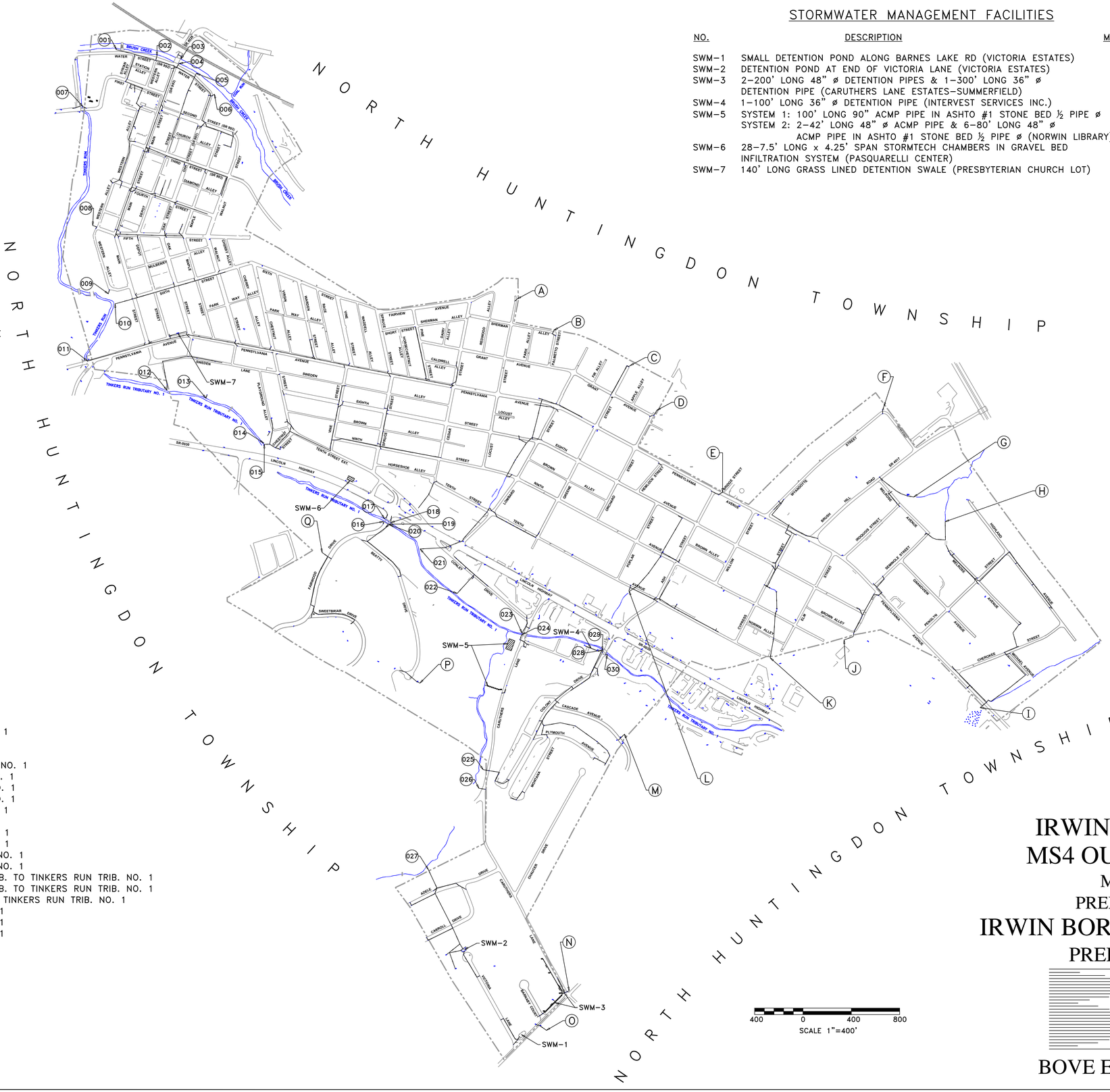
MS4 OUTFALLS

NO.	DESCRIPTION
001 –	24" TCP FROM WATER STREET TO BRUSH CREEK
002 –	12" RCP FROM WESTERN ALLEY TO BRUSH CREEK
003 –	18" RCP FROM MAIN STREET TO BRUSH CREEK
004 –	18" RCP FROM MAIN STREET TO BRUSH CREEK
005 –	10" PVC TO BRUSH CREEK
006 –	15" HDPE FROM OAK STREET TO BRUSH CREEK
007 –	8" HDPE FROM FIRST STREET TO TINKERS RUN
008 –	10" CMP FROM WESTERN ALLEY TO TINKERS RUN
009 –	12" TCP FROM WESTERN ALLEY TO TINKERS RUN
010 –	18" HDPE FROM SIXTH TO TINKERS RUN
011 –	24" HDPE FROM PENNSYLVANIA AVE. TO TINKERS RUN
012 –	15" HDPE FROM SWEDEN LANE TO TINKERS RUN TRIB. NO. 1
013 –	12" CMP FROM PARK CB TO TINKERS RUN TRIB. NO. 1
014 –	15" HDPE FROM CB TO TINKERS RUN TRIB. NO. 1
015 –	24" HDPE FROM CHESTNUT STREET TO TINKERS RUN TRIB. NO. 1
016 –	10" PVC FROM FAIRWOOD DRIVE TO TINKERS RUN TRIB. NO. 1
017 –	18" CMP FROM FAIRWOOD DRIVE TO TINKERS RUN TRIB. NO. 1
018 –	18" CMP FROM FAIRWOOD DRIVE TO TINKERS RUN TRIB. NO. 1
019 –	8" PVC FROM FAIRWOOD DRIVE TO TINKERS RUN TRIB. NO. 1
020 –	18" RCP FROM BEATTY DRIVE TO TINKERS RUN TRIB. NO. 1
021 –	24" HDPE FROM CONLEY DRIVE TO TINKERS RUN TRIB. NO. 1
022 –	15" HDPE FROM CONLEY DRIVE TO TINKERS RUN TRIB. NO. 1
023 –	18" HDPE FROM CARUTHERS LANE TO TINKERS RUN TRIB. NO. 1
024 –	18" HDPE FROM CARUTHERS LANE TO TINKERS RUN TRIB. NO. 1
025 –	24" HDPE FROM CARUTHERS LANE TO UNNAMED CREEK TRIB. TO TINKERS RUN TRIB. NO. 1
026 –	24" HDPE FROM CARUTHERS LANE TO UNNAMED CREEK TRIB. TO TINKERS RUN TRIB. NO. 1
027 –	36" RCP FROM ADELE DRIVE TO UNNAMED CREEK TRIB. TO TINKERS RUN TRIB. NO. 1
028 –	36" RCP FROM COLONY DRIVE TO TINKERS RUN TRIB. NO. 1
029 –	10" PVC FROM COLONY DRIVE TO TINKERS RUN TRIB. NO. 1
030 –	15" RCP FROM COLONY DRIVE TO TINKERS RUN TRIB. NO. 1

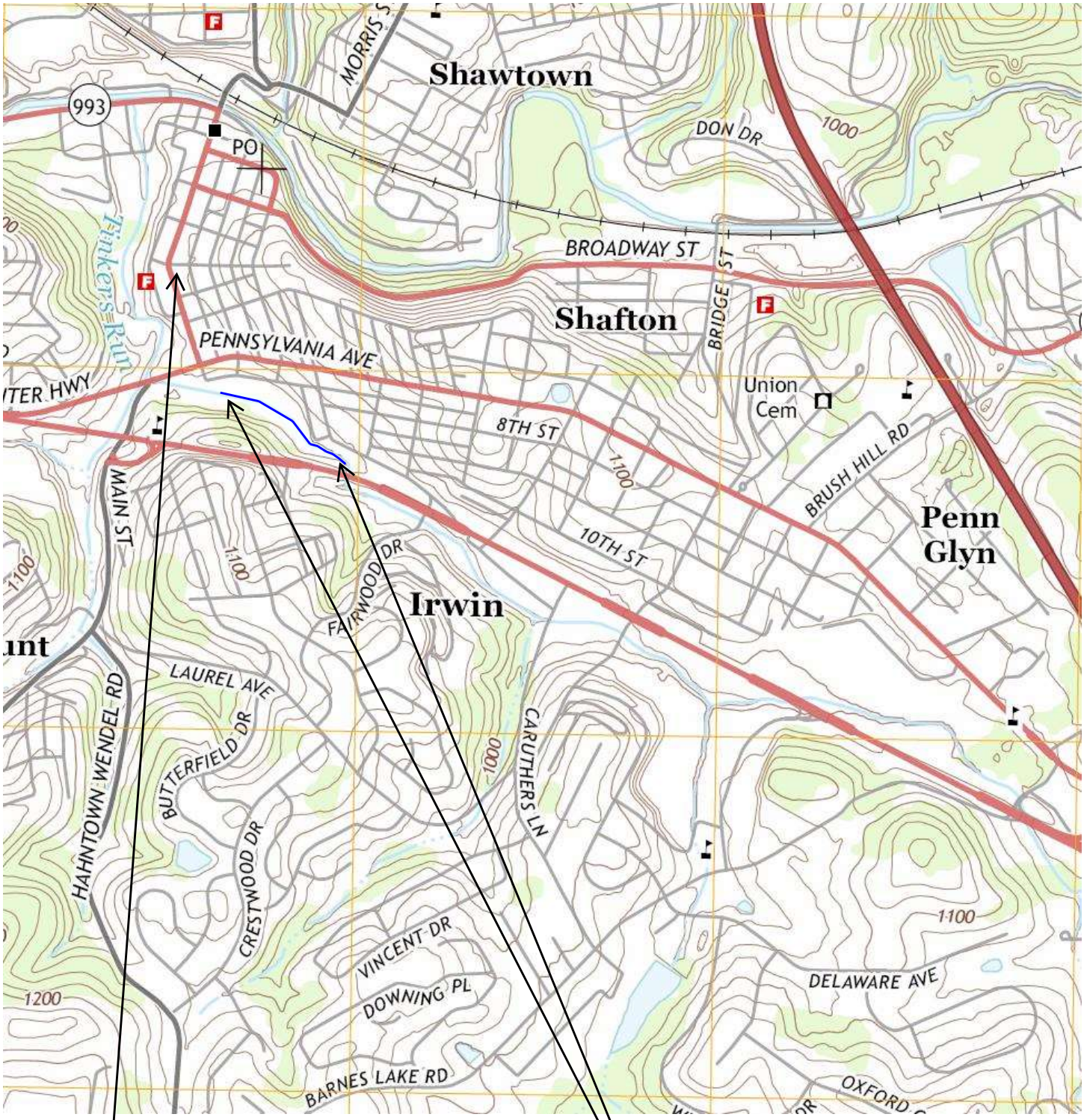
NOTES:
–PIPE SIZES, LOCATIONS AND MATERIALS ARE APPROXIMATE.
–ONLY POINT SOURCE OUTFALLS WHICH DRAIN THE MS4 TO SURFACE WATERS WHICH ARE IDENTIFIED BY DEP ARE SHOWN.
–PIPES WHICH OUTLET TO SURFACE WATERS WHICH ARE NOT IDENTIFIED BY DEP ARE NOT SHOWN.
–OUTLETS TO GRASSY AREAS OR GRASS LINED SWALES OR SLOPES ARE NOT SHOWN.
–CONNECTIONS TO OTHER MS4'S ARE NOT SHOWN.

STORMWATER MANAGEMENT FACILITIES

NO.	DESCRIPTION	MAINTENANCE
SWM–1	SMALL DETENTION POND ALONG BARNES LAKE RD (VICTORIA ESTATES)	PUBLIC
SWM–2	DETENTION POND AT END OF VICTORIA LANE (VICTORIA ESTATES)	PUBLIC
SWM–3	2–200' LONG 48" ø DETENTION PIPES & 1–300' LONG 36" ø DETENTION PIPE (CARUTHERS LANE ESTATES–SUMMERFIELD)	PUBLIC
SWM–4	1–100' LONG 36" ø DETENTION PIPE (INTERVEST SERVICES INC.)	PRIVATE
SWM–5	SYSTEM 1: 100' LONG 90" ACMP PIPE IN ASHTO #1 STONE BED ½ PIPE ø SYSTEM 2: 2–42' LONG 48" ø ACMP PIPE & 6–80' LONG 48" ø ACMP PIPE IN ASHTO #1 STONE BED ½ PIPE ø (NORWIN LIBRARY)	PRIVATE
SWM–6	28–7.5' LONG x 4.25' SPAN STORMTECH CHAMBERS IN GRAVEL BED INFILTRATION SYSTEM (PASQUARELLI CENTER)	PRIVATE
SWM–7	140' LONG GRASS LINED DETENTION SWALE (PRESBYTERIAN CHURCH LOT)	PRIVATE



IRWIN BOROUGH
MS4 OUTFALL MAP
MAY 2017
PREPARED FOR
IRWIN BOROUGH COUNCIL
PREPARED BY
BOVE ENGINEERING



IRWIN BOROUGH
WESTMORELAND COUNTY
MS4 PRP PLAN
LOCATION MAP

Scale: 1" = 1,450'

Statewide MS4 Land Cover Estimates

County	Municipality	UA % Impervious	UA % Pervious	Outside of UA % Impervious	Outside of UA % Pervious	UA Acres
Allegheny	HOMESTEAD BORO	68%	32%	67%	33%	416.9
Beaver	HOMEWOOD BORO	19%	81%	17%	83%	98.4
Chester	HONEY BROOK BORO	42%	58%	43%	57%	298.5
Chester	HONEY BROOK TWP	8%	92%	6%	94%	3,191.2
Beaver	HOPEWELL TWP	18%	82%	16%	84%	8,149.2
Montgomery	HORSHAM TWP	37%	63%	37%	63%	11,094.9
Washington	HOUSTON BORO	47%	53%	45%	55%	234.8
Luzerne	HUGHESTOWN BORO	27%	73%	27%	73%	582.6
Bucks	HULMEVILLE BORO	35%	65%	35%	65%	253.6
Dauphin	HUMMELSTOWN BORO	53%	47%	49%	51%	789.6
Westmoreland	HUNKER BORO	7%	93%	6%	94%	124.2
Westmoreland	HYDE PARK BORO	14%	86%	12%	88%	160.4
Allegheny	INDIANA TWP	12%	88%	8%	92%	5,885.5
Indiana	INDIANA BORO	57%	43%	56%	44%	1,130.0
Beaver	INDUSTRY BORO	46%	54%	6%	94%	198.2
Allegheny	INGRAM BORO	60%	40%	60%	40%	277.5
Westmoreland	IRWIN BORO	40%	60%	39%	61%	538.9
Bucks	IVYLAND BORO	44%	56%	44%	56%	227.5
Butler	JACKSON TWP	13%	87%	6%	94%	1,173.2
Cambria	JACKSON TWP	13%	87%	3%	97%	464.5
Lebanon	JACKSON TWP	15%	85%	9%	91%	4,411.3
Luzerne	JACKSON TWP	12%	88%	5%	95%	1,626.0
Monroe	JACKSON TWP	20%	80%	5%	95%	92.7
York	JACKSON TWP	17%	83%	8%	92%	3,306.2
York	JACOBUS BORO	37%	63%	28%	72%	407.4
Westmoreland	JEANNETTE CITY	52%	48%	52%	48%	1,537.9
Butler	JEFFERSON TWP	10%	90%	4%	96%	1,096.8
Allegheny	JEFFERSON HILLS BORO	14%	86%	13%	87%	8,538.3
Luzerne	JENKINS TWP	33%	67%	12%	88%	2,557.6
Montgomery	JENKINTOWN BORO	63%	37%	63%	37%	372.7
Lackawanna	JERMYN BORO	39%	61%	39%	61%	489.8
Lackawanna	JESSUP BORO	46%	54%	17%	83%	1,078.5
Cambria	JOHNSTOWN CITY	49%	51%	49%	51%	3,880.0
Lebanon	JONESTOWN BORO	28%	72%	28%	72%	408.1
Blair	JUNIATA TWP	26%	74%	2%	98%	135.5
Berks	KENHORST BORO	53%	47%	53%	47%	372.0
Allegheny	KENNEDY TWP	22%	78%	22%	78%	3,536.8
Chester	KENNETT TWP	18%	82%	12%	88%	5,663.4
Chester	KENNETT SQUARE BORO	52%	48%	52%	48%	683.6
Allegheny	KILBUCK TWP	7%	93%	7%	93%	1,690.4
Luzerne	KINGSTON BORO	68%	32%	68%	32%	1,395.8
Luzerne	KINGSTON TWP	26%	74%	10%	90%	2,575.2
Armstrong	KISKIMINETAS TWP	20%	80%	2%	98%	173.0
Schuylkill	KLINE TWP	30%	70%	4%	96%	415.6
Beaver	KOPPEL BORO	46%	54%	41%	59%	323.1
Luzerne	LAFLIN BORO	27%	73%	27%	73%	862.5
Erie	LAKE CITY BORO	33%	67%	29%	71%	966.0
Lancaster	LANCASTER CITY	63%	37%	63%	37%	4,706.6
Lancaster	LANCASTER TWP	31%	69%	29%	71%	3,378.2
Bucks	LANGHORNE BORO	45%	55%	44%	56%	316.3
Bucks	LANGHORNE MANOR BORO	39%	61%	39%	61%	384.9
Montgomery	LANSDALE BORO	65%	35%	65%	35%	1,915.5

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Westmoreland County						
HUNKER BORO	PAG136167*			Sewickley Creek	Appendix A-Metals, pH (4a)	
HYDE PARK BORO				Kiskiminetas River	Appendix A-Metals, pH (4a), Appendix E-Suspended Solids (4a)	
IRWIN BORO	PAG136164			Coal Run	Appendix E-Siltation (5)	
				Brush Creek	Appendix A-Metals, pH (4a), Appendix E-Siltation (5)	
				Turtle Creek	Appendix A-Metals, pH (4a)	
				Tinkers Run	Appendix E-Siltation (5)	
JEANNETTE CITY	PAG136299			Unnamed Tributaries to Brush Creek	Appendix E-Nutrients (5)	
				Brush Creek	Appendix A-Metals, pH (4a), Appendix E-Siltation (5)	
LATROBE BORO	PAG136329	No		Kiskiminetas-Conemaugh River Watersheds TMDL	Appendix A-Metals, pH (4a)	
				Unity Run	Appendix E-Suspended Solids (4a)	
				Saxman Run	Appendix E-Suspended Solids (4a)	
				Loyalhanna Creek	Appendix E-Siltation, Suspended Solids (4a)	Flow Alterations (4c)
LIGONIER TWP	PAG136333*	Yes	SP	Hannas Run	Appendix E-Siltation (4a)	
				Kiskiminetas-Conemaugh River Watersheds TMDL	Appendix A-Metals, pH (4a)	
				Coalpit Run	Appendix E-Siltation (4a)	
				Loyalhanna Creek	Appendix E-Siltation, Suspended Solids (4a)	Flow Alterations (4c)
				Naugle Run	Appendix E-Nutrients, Organic Enrichment/Low D.O. (5)	
LOWER BURRELL CITY	PAG136180			Pucketa Creek	Appendix E-Siltation (5)	
				Allegheny River	Appendix C-Chlordane, PCB (4a)	
MANOR BORO	PAG136294			Bushy Run	Appendix E-Siltation (5)	
				Brush Creek	Appendix A-Metals, pH (4a), Appendix E-Siltation (5)	
				Turtle Creek	Appendix A-Metals, pH (4a)	
MONESSEN CITY	PAG136283			Unnamed Tributaries to Monongahela River	Appendix E-Siltation (5)	
				Speers Run	Appendix A-Metals, pH (5), Appendix E-Siltation (5)	
				Monongahela River	Appendix C-PCB (4a)	
MOUNT PLEASANT BORO	PAG136179			Unnamed Tributaries to Jacobs Creek	Appendix A-Metals (5)	
				Shupe Run	Appendix A-Metals (5), Appendix E-Siltation (5)	
				Jacobs Creek	Appendix E-Siltation (5)	Other Habitat Alterations (4c)

BRUSH CREEK WATERSHED TMDL
Westmoreland County

For Acid Mine Drainage Affected Segments

Prepared by:

Pennsylvania Department of Environmental Protection

January 28, 2005

TURTLE CREEK WATERSHED TMDL

Allegheny and Westmoreland Counties

For Mine Drainage Affected Segments

Prepared by:

Pennsylvania Department of Environmental Protection

June 29, 2009

Rain Garden Maintenance

First Season:

Caring for your garden the first season after planting is critical to its success. The most important tasks during the first year are watering and weeding. Young establishing plants need about an inch of rainfall or water per week.

Long-term Watering:

By the second or third season, your plants should be fairly well established and most of the plants will be able to handle short periods of drought. During longer periods, you may need to water your garden, as you would any other landscape bed. Plants need moisture well into the fall, especially shrubs and trees.

Watering Tips:

The best way to water is to use a hose to water around the base of each plant, preferably in the morning. This is a more time-consuming method of watering, but it is best for the plant (keeps foliage dry which helps prevent disease) and for the environment (wastes the least amount of water).

Weeds and Mulch:

Plants compete with each other for nutrients, light, water and space. Weeds, when given a chance, will almost always win. If weeds are rampant in your garden, your ornamental plants will suffer and your garden will look messy and unkempt. The easiest solution to control weeds is to maintain a 3 inch layer of mulch. Shredded bark mulch is the best mulch for rain gardens.

Mulching Tips:

It is important to use a shredded bark mulch because it will knit together and stay in place when the garden fills with rainfall, whereas wood chips tend to float and clog the overflow drain.

Shredded bark mulch does break down and will need to be replaced every year or two, but as your plants grow and fill in, less mulch will be necessary to keep weeds down.

Fertilizing and Compost:

The plants selected for your rain garden do not require rich, fertile soil or lots of fertilizer to grow. You may not need to fertilize, but if growth appears poor, or if plants are yellowing or discolored, you may want to consider fertilizing.

To use a fertilizer:

1. Test the soil. Ideally, a fertilizer should be chosen to match whatever may be deficient in the soil. The Penn State Extension Service provides a testing kit for a minimal cost. Their phone number in Westmoreland County is 724-837-1402.
2. Select the right fertilizer. A soil test will tell you what nutrients need to be added and in what quantities.

a. Nitrogen rich fertilizers should be applied in the spring when plant growth starts for maximum effectiveness.

b. Phosphorus and potassium can be applied in the spring or fall.

c. Slow-release fertilizers, which release nutrients over a period of weeks or months, are best for shrubs and perennials to reduce the risk of 'burning' your plants.

d. Well-composted yard waste, applied regularly, can add nutrients and structure to soil, and may be adequate for fertilization.

3. Apply fertilizer properly. Always read and follow labels properly when using fertilizers to prevent over application. Using too much fertilizer or applying it incorrectly can damage plants and degrade the environment.

Fertilizer Tips:

The nutrients plants need in the greatest quantities are nitrogen (N), phosphorus (P) and potassium (K). A bag of fertilizer will have 3 numbers on it which relate to the percentage of each nutrient in the mix. For instance, 20-10-15 indicates 20% nitrogen, 10% phosphorus and 15% potassium.

Compost Tips:

There are a variety of methods that can be used to recycle your yard waste into healthy compost that can be used to add nutrients back into your garden. Westmoreland Cleanways, a non-profit corporation, provides programs and assistance with composting. They can be contacted by phone at 724-879-4020, or through their website www.westmorelandcleanways.org .

Leaf Litter:

Leaves are a natural mulch and are good for your rain garden in limited quantities. A 2 inch to 3 inch layer of leaves in the garden is plenty.

- Because the rain garden is a depressed garden, it tends to collect leaves and debris and should be cleaned out in the fall and spring.
- The rain garden should not be used as a place to dump leaves.
- The overflow outlet pipe with the basket grate should be kept clear of leaves and other debris.
- Shredded leaves (created by running a lawn mower over 2 inch to 4 inch thick piles) will decompose faster and are better as mulch than whole leaves, but care must be taken to keep them from floating and entering the outlet pipe.

Annual Maintenance Schedule:

Tasks for early spring (before new growth is 3 inches high):

- Cut and remove dead stalks and seed heads remaining from previous season.
- Remove sticks and debris.
- Prune shrubs if necessary (see Shrub Pruning section).
- Divide and move perennials if they are too crowded (see Perennial Care section).
- Replenish mulch layer to maintain a 3 inch layer of shredded bark.

Tasks for late spring and summer:

- Remove weeds.
- Water as needed during periods of drought.

Tasks for fall:

- Remove weeds and diseased plants.
- Remove excess leaves.
- If fall is dry, continue to water trees and shrubs until the ground begins to freeze (late October). These woody plants need moisture entering winter to ensure survival.

Maintenance Issues

Properly designed and installed Bioretention areas require some regular maintenance.

While vegetation is being established, pruning and weeding may be required.

Detritus may also need to be removed every year. Perennial plantings may be cut down at the end of the growing season.

Mulch should be re-spread when erosion is evident and be replenished as needed. Once every 2 to 3 years the entire area may require mulch replacement.

Bioretention areas should be inspected at least two times per year for sediment buildup, erosion, vegetative conditions, etc.

During periods of extended drought, Bioretention areas may require watering.

Trees and shrubs should be inspected twice per year to evaluate health.

Cost Issues

Rain Gardens often replace areas that would have been landscaped and are maintenance-intensive so that the net cost can be considerably less than the actual construction cost. In addition, the use of Rain Gardens can decrease the cost for stormwater conveyance systems at a site. Rain Gardens cost approximately $5 to $7 (2005) per cubic foot of storage to construct.

Specifications

The following specifications are provided for informational purposes only. These specifications include information on acceptable materials for typical applications, but are by no means exclusive or limiting. The designer is responsible for developing detailed specifications for individual design projects in accordance with the project conditions.

1Vegetation - See Appendix B

2 Execution

a. Subgrade preparation

1. Existing sub-grade in Bioretention areas shall NOT be compacted or subject to excessive construction equipment traffic.
2. Initial excavation can be performed during rough site grading but shall not be carried to within one feet of the final bottom elevation. Final excavation should not take place until all disturbed areas in the drainage area have been stabilized.
3. Where erosion of sub-grade has caused accumulation of fine materials and/or surface ponding in the graded bottom, this material shall be removed with light

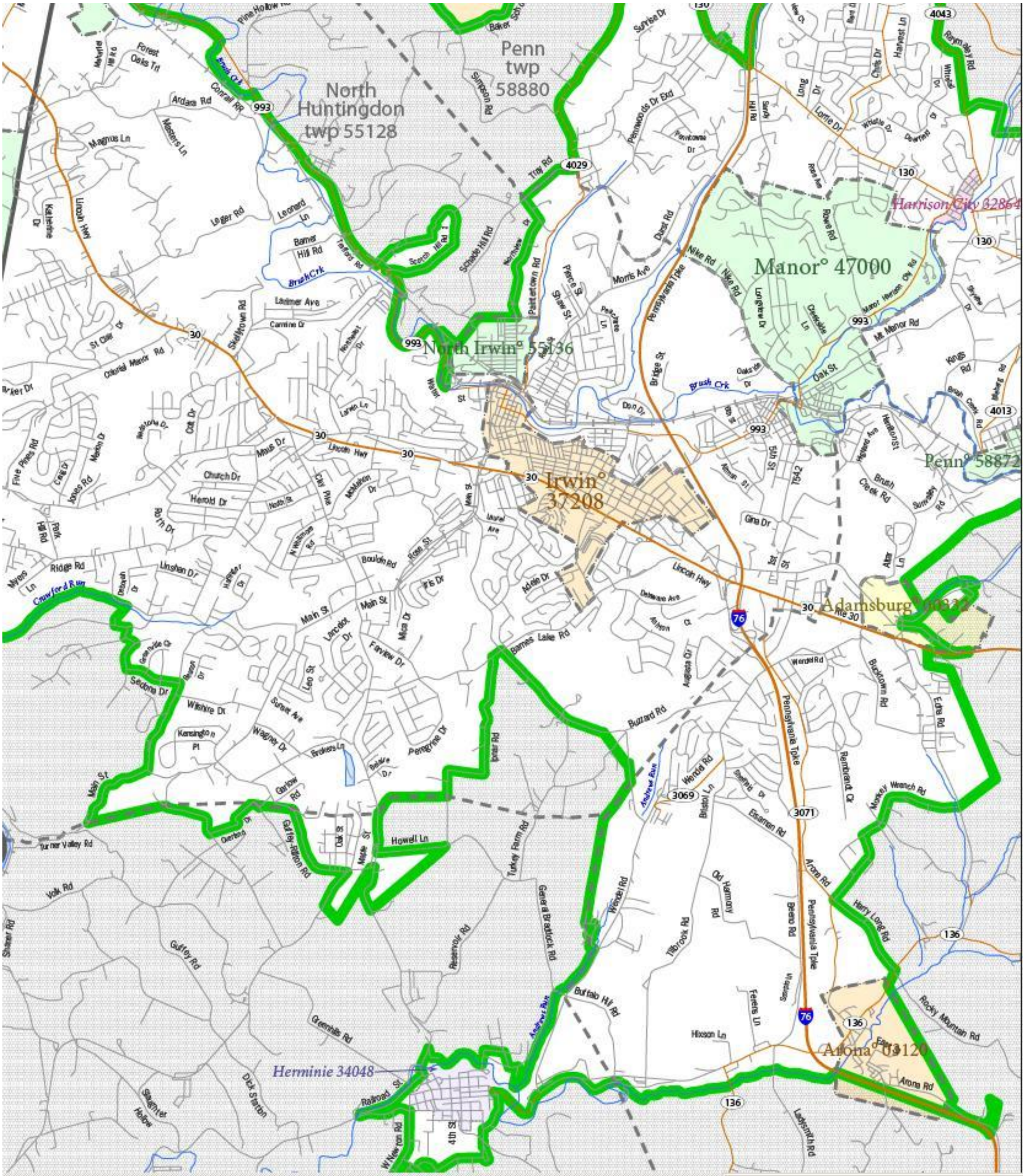
equipment and the underlying soils scarified to a minimum depth of 6 inches with a York rake or equivalent by light tractor.

4. Bring sub-grade of bioretention area to line, grade, and elevations indicated. Fill and lightly regrade any areas damaged by erosion, ponding, or traffic compaction. All bioretention areas shall be level grade on the bottom.
5. Halt excavation and notify engineer immediately if evidence of sinkhole activity or pinnacles of carbonate bedrock are encountered in the bioretention area.

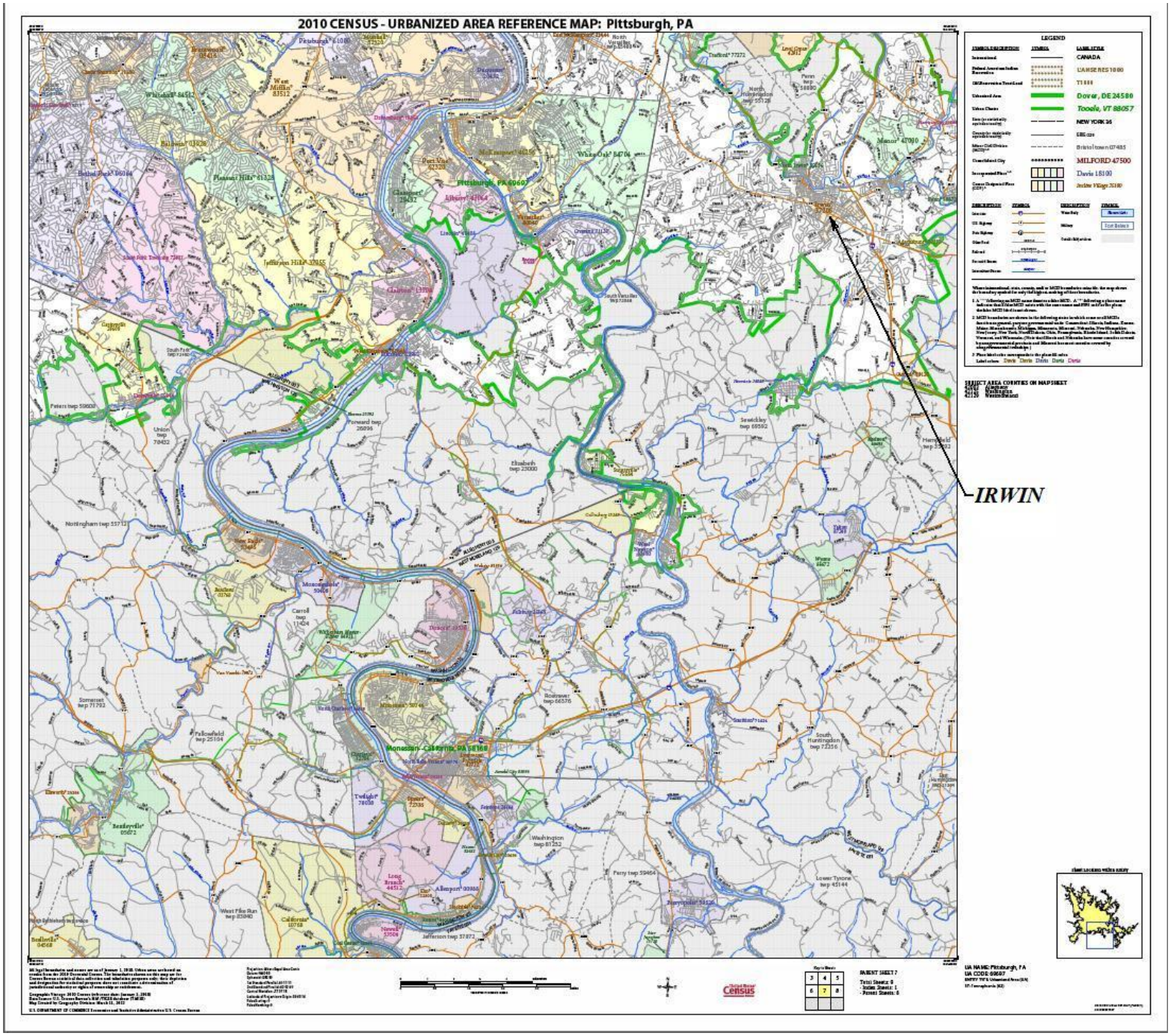
b. Rain Garden Installation

1. Upon completion of sub-grade work, the Engineer shall be notified and shall inspect at his/her discretion before proceeding with bioretention installation.
2. For the subsurface storage/infiltration bed installation, amended soils should be placed on the bottom to the specified depth.
3. Planting soil shall be placed immediately after approval of sub-grade preparation/bed installation. Any accumulation of debris or sediment that takes place after approval of sub-grade shall be removed prior to installation of planting soil at no extra cost to the Owner.
4. Install planting soil (exceeding all criteria) in 18-inch maximum lifts and lightly compact (tamp with backhoe bucket or by hand). Keep equipment movement over planting soil to a minimum – **do not over compact**. Install planting soil to grades indicated on the drawings.
5. Plant trees and shrubs according to supplier's recommendations and only from mid-March through the end of June or from mid-September through mid-November.
6. Install 2-3" shredded hardwood mulch (minimum age 6 months) or compost mulch evenly as shown on plans. Do not apply mulch in areas where ground cover is to be grass or where cover will be established by seeding.
7. Protect Rain Gardens from sediment at all times during construction. Hay bales, diversion berms and/or other appropriate measures shall be used at the toe of slopes that are adjacent to Rain Gardens to prevent sediment from washing into these areas during site development.
8. When the site is fully vegetated and the soil mantle stabilized the plan designer shall be notified and shall inspect the Rain Garden drainage area at his/her discretion before the area is brought online and sediment control devices removed.
9. Water vegetation at the end of each day for two weeks after planting is completed.

Contractor should provide a one-year 80% care and replacement warranty for all planting beginning after installation and inspection of all plants.



Irwin Urbanized Area Map



Pittsburgh Urbanized Area Map – Sheet 7