

# Eastern Delaware County Stormwater Collaborative Pollutant Reduction Plan

Date: September 7, 2017



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## Introduction

This Pollutant Reduction Plan (PRP) was developed for the Eastern Delaware County Stormwater Collaborative (EDCSC). The EDCSC is a partnership of 11 municipalities in the eastern part of Delaware County that are all located within the Darby and Cobbs Creek Watersheds. The EDCSC was created in 2010 to maximize resources, reduce redundancy, and allow the municipalities to better achieve the requirements of their MS4 permits. The member municipalities are committed to improving stormwater management as well as restore the health and vitality of the local waterways.

Of the 11-member municipalities, 10 have chosen to pursue the implementation of the PRP jointly. These communities all fall within the inner ring suburbs of Philadelphia and were developed in the early to mid-1900s at a time when stormwater management was neither required nor considered in development projects. The communities are all heavily urbanized, with little greenspace and parks, small lot sizes for homes, and few opportunities for development and redevelopment. This greatly limits their ability to fix the water quality problems created from past development. In addition to these physical limitations, the municipalities also face severe economic constraints. All but one of these communities is designated as an environmental justice community and all experience higher rates of poverty than the surrounding area. Budgets are further stressed by rapidly increasing financial burdens of police, emergency services, pension and insurance costs. These concerns coupled with the small size of the municipalities involved leads to serious technical and financial constraints in dealing with stormwater related regulatory requirements. The strategy of the EDCSC, is that by working together, the municipalities can more effectively use their limited resources to meet the expanded requirements of the MS4 Program. All EDCSC municipalities involved in this joint PRP have entered into a Pollution Reduction Plan Supplemental Intergovernmental Agreement that is included in Appendix C. The member municipalities involved in this project are as follows:

- Collingdale Borough (PAG130120)
- Darby Borough (PAG130127)
- Darby Township (PAG130088)
- East Lansdowne Borough (PAG130124)
- Glenolden Borough (PAG130092)
- Morton Borough (PAG130094)
- Norwood Borough (PAG130135)
- Sharon Hill Borough (PAG130014)
- Upper Darby Township (PAG130003)
- Yeadon Borough (PAG130128)

The PRP outlines the actions that the municipalities have taken or will take to address pollutant loads within the MS4 that drain to the Darby and Cobbs creeks. These actions include public participation, mapping of outfalls and other discharges, description of

pollutants of concern in the watershed as determined by PADEP pollutant load calculations, best management practices (BMPs) selection, identification of potential funding sources and partners, and operation and maintenance (O&M) activities.

LandStudies compiled this joint PRP from information provided by the following sources:

- All data regarding existing MS4 infrastructure was provided by the individual municipalities.
- All data regarding the existing load calculations was provided by Temple University College of Engineering and Center for Sustainable Communities.
- All data regarding the proposed BMP types and site-specific locations were provided by the EDCSC.
- All load reduction data per BMP was provided by Temple University College of Engineering and Center for Sustainable Communities.

## A. Public Participation

Public participation is an essential part of the PRP because it enhances buy-in from landowners that may have an impact on pollutant discharges, can uncover missing elements or errors in calculations, and builds cooperative partnerships among the municipality and other entities.

- **Advertising of the PRP** –The availability of the draft PRP was released via public notice on August 3, 2017 in the Delaware County Daily Times. A copy of the public notice is included in Appendix A as an item in A-1.
- **Public Comments Received** - The public was given 30 days to provide commentary on the contents of the PRP. The EDCSC held a public meeting on August 16, 2017 to receive verbal commentary on the contents of the PRP. No verbal comments were provided. One written comment was provided to the Morton Borough Council. The letter and a record of its consideration is included in Appendix A Item A-2. No changes were made to the plan as a result of the comment. No other written comments were received by other municipalities within the collaborative.

## B. Map

All of the participating municipalities are within the Cobbs and/or Darby Creek HUC 12 watershed basins which are tributaries of the Delaware River. Cobbs Creek is a tributary of Darby Creek. Collen Branch, Muckinipattis Creek, Shipley Branch, Stony Creek and Hermesprot Creek are also smaller tributaries of Darby Creek. Naylors Run is a tributary of Cobbs Creek.

All of the EDCSC municipalities are 100% within the 2010 Census UA. No parsing was used to reduce the existing load and the planning areas are simply the total acreage of these municipalities per watershed. Existing load was calculated for the entire acreage of each EDCSC municipality by watershed. The acreage breakout per municipality per watershed used in the STEPL (Spreadsheet Tool for Estimating Pollutant Load) watershed modeling program is shown in Table 1 below.



*Table 1. Municipality Acreage per Watershed*

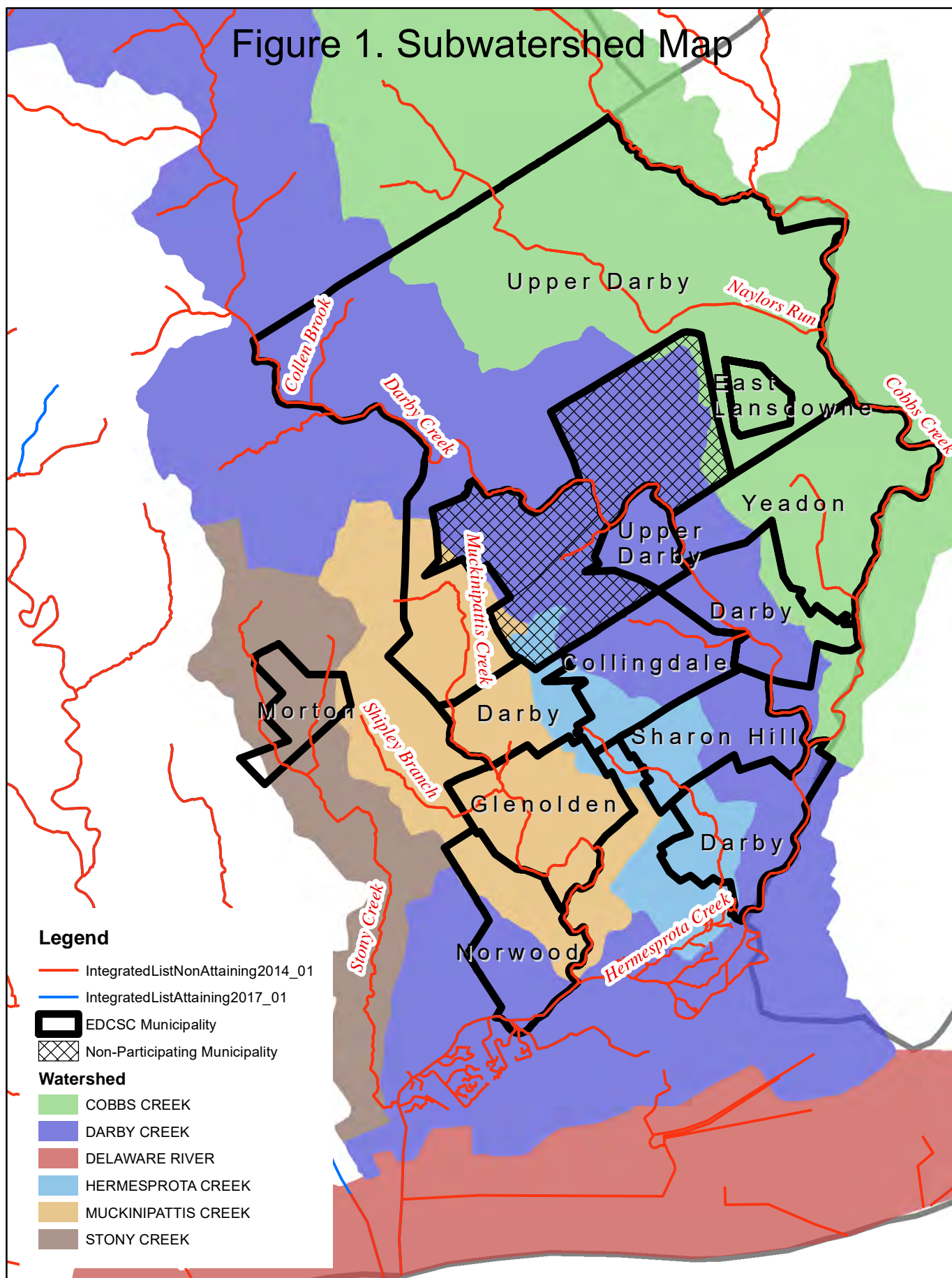
	<b>Total Acres</b>	<b>Cobbs Creek Acres</b>	<b>Darby Creek Acres</b>
Collingdale Boro	556.90		556.90
Darby Boro	535.00	152.00	383.00
Darby Twp	913.70		913.70
East Lansdowne Boro	131.60	131.60	
Glenolden Boro	624.80		624.80
Morton Boro	223.00		223.00
Norwood Boro	517.60		517.60
Sharon Hill Boro	489.90		489.90
Upper Darby Twp	5,013.70	2,706.80	2,306.90
Yeadon Boro	1,020.50	904.14	117.50
<b>TOTAL:</b>		<b>3,894.54</b>	<b>6,133.30</b>

\*NOTE: Approximately 9 acres of Morton Borough is located in the Crum Creek HUC12 that is outside of the Darby Creek HUC12. Acreage outside of the Darby Creek HUC 12 was not included herein and not part of the loading rates for Morton Borough because Crum Creek was not identified in the municipality's MS4 requirements table as described in Section C.

Figure 1 identifies the subwatershed basins within each municipality as well as impaired and attaining streams from the DEP 2014 Integrated List. Additional maps are provided in Appendix B. Map B1 identifies the Delaware Valley Regional Planning Commission land cover types throughout each municipality which was used to calculate the existing load and BMP load reductions in STEPL. Outfalls and the Cobbs Creek and Darby Creek Planning Areas are also shown on Map B1. Map B2 includes the outfalls and planning areas in addition to the proposed BMPs for both watershed planning areas.

Each municipality included in this PRP provided MS4 outfall data to be included in the PRP Maps B1 and B2. Due to the extent of the stormwater infrastructure data provided by Upper Darby Township, the outfall data for this municipality was not included in Maps B1 and B2. See Map B3 for Upper Darby Township's stormwater infrastructure. The specific outfall locations were not identified separate from the other stormwater infrastructure locations in the data provided by the municipality.

Figure 1. Subwatershed Map



### C. Pollutants of Concern

Because the EDCSC municipalities discharge stormwater to a local impaired water, they must reduce pollutant loads associated with those impairments. As shown in Figure 1, all streams within the municipalities are impaired or directly upstream of impaired waters.

Table 2 shows each of the affected subwatersheds within the EDCSC municipalities and the pollutant(s) that are of concern to that area as shown on the DEP MS4 requirements table revised 4/7/2017. In planning areas where sediment is listed as a concern the municipalities must reduce sediment loading by 10 percent. There are no nutrient impairments listed within the EDCSC watersheds.

*Table 2. Impaired Downstream Waters and Requirements*

<b>Watershed</b>	<b>Pollutant(s) of Concern</b>	<b>Municipal Requirement</b>
Darby Creek	Appendix C - PCB (5), Appendix E – Siltation (5)	Upper Darby, Darby Borough, Yeadon Borough, East Lansdowne, Sharon Hill, Collingdale
Darby Creek	Appendix C - PCB (5)	East Lansdowne, Darby Township, Norwood, Glenolden, Morton
Naylors Run	Appendix C - PCB (5), Appendix E – Siltation (5)	Upper Darby, East Lansdowne
Cobbs Creek	Appendix B–Pathogens(5), Appendix C - PCB (5), Appendix E –Siltation (5)	Upper Darby, Darby Borough, Yeadon Borough, East Landsdowne
Muckinipattis Creek	Appendix C - PCB (5), Appendix E – Siltation (5)	Upper Darby, Darby Township, Norwood, Glenolden, Morton
Hermesprotta Creek	Appendix C - PCB (5), Appendix E – Siltation (5)	Darby Township, Sharon Hill, Collingdale, Glenolden
Collen Brook	Appendix C - PCB (5), Appendix E – Siltation (5)	Upper Darby
Stony Creek	Appendix C - PCB (5), Appendix E – Siltation (5)	Morton
Shipley Branch	Appendix C - PCB (5), Appendix E – Siltation (5)	Glenolden, Morton
Delaware River	Appendix C – PCB (4a)	Upper Darby, Darby Township, Sharon Hill, Collingdale, Norwood, Glenolden, Morton

Details on Appendix B and Appendix C Pollutants are not included within the scope of this PRP. In accordance with DEP's PRP Instructions document (3800-PM-BCW0100K), this report is required specifically for stormwater discharges of nutrients and sediment to impaired waters (Appendix E). Separate from the PRP, Pollutant Control Measures (PCMs)

described in DEP's General Permit (3800-PMBCW0100d) are to be implemented for Appendix A, B, and/or C pollutants of concern identified in the MS4 Requirements Table.

For the subwatersheds identified as impaired for Polychlorinated Biphenyls (PCBs) in Table 2 above, PCMs in accordance with Appendix C must be completed for submittal to DEP along with the Annual MS4 Status Report by no later than September 30<sup>th</sup>, 2020 for existing permittees. For the subwatersheds identified as impaired for Pathogens, PCMs in accordance with Appendix B must be completed for submittal to DEP along with the Annual MS4 Status Report by no later than September 30<sup>th</sup>, 2020 for existing permittees.

#### **D. Existing Load for Pollutants of Concern**

The STEPL model was chosen for all modeling based on its use by Temple University College of Engineering and Center for Sustainable Communities utilizing the model as they develop the Delaware River Watershed Initiative (DRWI) Phase II plan. As Cobbs Creek is a watershed located within the Upstream Philadelphia Cluster, projects to be included in this plan were analyzed using STEPL. Temple University College of Engineering and Center for Sustainable Communities also received a Coastal Zone Management Grant to work with the EDCSC communities to create a GSI prioritization plan. To keep analysis consistent with the work of the EDCSC as well as much of the regional work occurring within this DRWI cluster, the STEPL model was chosen for use in this PRP. STEPL input summary tables, provided by Temple University College of Engineering and Center for Sustainable Communities, are located in Appendix D.

The EDCSC municipalities have two primary watersheds: the Darby and Cobbs, which are separate HUC12 watersheds. Loads with the Cobbs Creek watershed and its tributaries were aggregated within the Cobbs Creek HUC12 and loads within the Darby Creek Watershed and its tributaries were aggregated within the Darby Creek HUC12. The aggregation of these watersheds into the Cobbs Creek HUC12 and Darby Creek HUC12 was done in accordance with DEP guidance documents and as approved by DEP after detailed discussions on this level of aggregation. Documentation of DEP correspondence and approval of this approach is provided in the Appendix C Intergovernmental Agreement, Exhibit B.

The existing base loads and the anticipated reduction loads presented in the report were modeled utilizing STEPL, Version 4.2 developed by the USEPA. STEPL is a customizable spreadsheet-based pollutant loading model for use in Excel. Using simple algorithms, it calculates nutrient and sediment loads from different land uses and the load reductions from the implementation of BMPs. Annual nutrient loading (nitrogen, phosphorus and 5-day biological oxygen demand) is calculated based on the runoff volume and pollutant concentrations. Then annual sediment load from sheet and rill erosion is calculated based on the Universal Soil Loss Equation (USLE) and the sediment delivery ratio. Note that STEPL only uses USLE for non-urban runoff. For urban runoff, an event mean TSS concentration is used (see Appendix D for TSS concentration values for urban land uses).

STEPL uses Urban, Cropland, Pastureland, Forest, User Defined, and Feedlot land use types as basic land use type inputs as part of the load calculations. The program further breaks down the Urban land use type into: Commercial, Industrial, Institutional, Transportation, Multi-Family, Single-Family, Urban-Cultivated, Vacant-Developed, and Open Space. Loading rates are determined based on overland runoff per urban land use type, length of stream, and rate of streambank erosion. Unlike other watershed modeling programs, STEPL does not specify impervious and pervious percentage values per land use type.

Each EDCSC municipality is 100% within the 2010 Census UA. Outfalls are shown in the Map B1. Each municipality mapped their own outfalls which were provided to LandStudies in various formats and combined onto one map. No parsing was used to reduce the existing load, therefore MS4 planning areas are watershed based (Darby and/or Cobbs) within each municipality.

### D.1 Cobbs Creek Existing Load

Table 3 shows the total sediment load for the municipalities located in Cobbs Creek watershed as provided by Temple University College of Engineering and Center for Sustainable Communities. See Appendix D for STEPL input.

*Table 3. Cobbs Creek Planning Area Total Sediment Load*

Cobbs Creek Planning Area Total Sediment Load			
Municipality	Runoff Load (lbs)	Bank Erosion Load (lbs)	Total Load (lbs)
Darby Boro	69,754.44	4,536.00	74,290.44
East Lansdowne Boro	42,261.59	0.00	42,261.59
Upper Darby Twp	1,169,971.31	312,127.20	1,482,098.51
Yeadon Boro	368,415.97	115,340.40	483,756.37
<b>TOTAL:</b>	<b>1,650,403.32</b>	<b>432,003.60</b>	<b>2,082,406.91</b>
<b>10% Reduction Requirement:</b>			<b>208,240.69</b>

Based on these existing load calculations it was determined Cobb's Creek watershed existing loading is 2,082,407 lbs. No existing BMPs were utilized to reduce the existing load to the Cobb's Creek Planning Area. The minimum sediment reduction required in the Cobbs Creek Watershed is 208,241 lbs. (as shown in Table 3).

### D.2 Darby Creek Watershed Existing Load

Table 4 shows the total sediment load for the municipalities located in Darby Creek watershed as provided by Temple University College of Engineering and Center for Sustainable Communities. See Appendix D for STEPL input.

Table 4. Darby Creek Planning Area Total Sediment Load

Darby Creek Planning Area			
Municipality	Runoff Load (lbs)	Bank Erosion Load (lbs)	Total Load (lbs)
Collingdale Boro	238,982.97	72,424.80	311,407.77
Darby Boro	191,977.89	66,175.20	258,153.09
Darby Twp	472,333.37	125,092.80	597,426.66
Glenolden Boro	260,792.70	133,761.60	394,554.30
Morton Boro	89,588.77	39,564.00	129,152.77
Norwood Boro	283,170.24	28,022.40	311,192.64
Sharon Hill Boro	243,386.76	43,066.80	286,453.56
Upper Darby Twp	891,604.84	306,910.80	1,198,515.64
Yeadon Boro	63,901.20	11,264.40	75,165.60
<b>TOTAL:</b>	<b>2,735,738.75</b>	<b>826,282.80</b>	<b>3,562,022.04</b>
<b>10% Reduction Requirement:</b>			<b>356,202.20</b>

Based on these existing load calculations it was determined Darby Creek watershed existing loading is 3,562,022 lbs. No existing BMPs were utilized to reduce the existing load to the Darby Creek Planning Area. The minimum sediment reduction required in the Darby Creek Watershed is 356,202 lbs. (as shown in Table 4).

### D.3 Existing Load and Percent Share of Loading for Budget Ratios and Pollution Reduction Credit

In accordance with the PRP Supplemental Intergovernmental Agreement (Agreement), the individual municipalities have agreed to use their share of the existing load per watershed to identify their load reduction requirement. The percent share will also be used to calculate the budget ratios for the cost to implement and maintain the proposed BMPs, as described further in Section F.

Most of the municipalities in the Agreement currently implement street sweeping and plan to continue to street sweep as a proposed BMP in accordance with the guidance in DEP's BMP Effectiveness Values Table (3800-PM-BCW0100m). Although current street sweeping practices were not identified as a reduction to existing load per DEP's PRP Instructions, the amount of load reduction to be achieved by street sweeping in each municipality was subtracted from the existing load for those municipalities where street sweeping occurs in order to fairly account for this load reduction. This approach was agreed upon to maintain an equitable financial distribution in consideration of those municipalities who are funding their own street sweeping programs to the benefit of all participating municipalities. Street sweeping load reductions are discussed in Section E, and calculations are provided in Appendix F.



Tables 5 and 6 show the total sediment loads for the municipalities in Cobbs Creek and Darby Creek watersheds, respectively, and the percent share of the final loading used to calculate budget ratios and the percent share of the load reduction requirements. The last column in each table shows the specific load reduction requirement that each municipality must achieve to meet the collective 10 percent sediment reduction per watershed.

*Table 5. Cobbs Creek Planning Area % Share of Final Loading for Budget Ratios and Pollutant Reduction Credits*

<b>Municipality</b>	<b>Total Load (lb)</b>	<b>Reductions for % Share</b>	<b>Final Loadings for % Share</b>	<b>% Share</b>	<b>Load Reduction Requirement per % Share</b>
Darby Boro	74,290.44	2,161.56	72,128.88	3.56%	7,418.55
E Lansdowne Boro	42,261.59	0.00	42,261.59	2.09%	4,346.66
Upper Darby Twp	1,482,098.51	46,102.81	1,435,995.70	70.92%	147,694.04
Yeadon Boro	483,756.37	9,465.52	474,290.85	23.43%	48,781.44
<b>TOTAL:</b>	<b>2,082,406.92</b>	<b>57,729.89</b>	<b>2,024,677.03</b>		
<b>10% Reduction Requirement:</b>	<b>208,240.69</b>				

Table 6. Darby Creek Planning Area % Share of Final Loading for Budget Ratios and Pollutant Reduction Credits

Municipality	Total Load (lb)	Reductions for % Share	Final Loadings for % Share	% Share	Load Reduction Requirement per % Share
Collingdale Boro	311,407.77	13,572.00	297,835.77	8.55%	30,463.21
Darby Boro	258,153.09	4,527.00	253,626.09	7.28%	25,941.36
Darby Twp	597,426.66	4,740.00	592,686.66	17.02%	60,621.11
Glenolden Boro	394,554.30	13,100.00	381,454.30	10.95%	39,015.87
Morton Boro	129,152.77	0.00	129,152.77	3.71%	13,209.99
Norwood Boro	311,192.64	0.00	311,192.64	8.94%	31,829.37
Sharon Hill Boro	286,453.56	3,764.00	282,689.56	8.12%	28,914.02
Upper Darby Twp	1,198,515.64	38,744.00	1,159,771.64	33.30%	118,623.63
Yeadon Boro	75,165.60	1,021.00	74,144.60	2.13%	7,583.65
<b>TOTAL:</b>	<b>3,562,022.04</b>	<b>79,468.00</b>	<b>3,482,554.04</b>		
<b>10% Reduction Requirement:</b>	<b>356,202.20</b>				

\*NOTE: The loading values from STEPL provided in Tables 3, 4, 5, and 6 are not rounded to the nearest whole number so that the most accurate % Share value per municipality is identified.

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

### E.1. Background Information and Rationale

The communities participating in the EDCSC are a part of the inner ring of suburbs surrounding the City of Philadelphia and were developed in the early to mid-1900s, long before stormwater controls were developed. While each community now has a strict Stormwater Ordinance, these communities are built out, with few development and redevelopment opportunities. Additionally, each community has limited municipal parks and recreation areas with only 4% of the land within the EDCSC categorized as municipal parks and open space. Much of the streambank of the main stem of the Darby and Cobbs Creek and their tributaries flows through private lands, outside of municipal control. All of these situations create a challenging environment in which to install stormwater control mechanisms. Development consists largely of high density residential with a mixture of row homes, twin homes, and single family residential lots of less than ¼ acre. The majority of remaining land uses include mixed use, industrial and institutional. There are very few opportunities for large scale project implementation on municipal land, requiring multiple small-scale projects to be identified. While the communities are working to build relationships with private landowners to allow for restoration projects, these can take years

of work to create. Therefore, at this time the municipalities feel that it is best to focus opportunities on public municipal lands.

Along with limited opportunities for stormwater infrastructure, the costs associated with installation of such practices in an already urbanized watershed are high. This increases the challenges in these areas as municipal budgets have very little room for additional expenses and residents already bare a large tax burden for schools, local taxes, and county taxes. Municipalities also face increasing expenses associated with emergency services including their police force and fire departments and associated pension plans. Within the EDCSC the average millage rate is 56.33571 with the county average of 47.152119, residents of these communities are burdened with higher taxes than the rest of the county. In addition, with Delaware County having the 5<sup>th</sup> highest taxes in the state, the residents bear a greater tax burden than most Pennsylvanians. Furthermore, according to the 2015 census community data, the average poverty rate for the EDCSC communities is 14.55% while the average rate for Delaware County is 10.4%. This creates a challenging environment in which to raise funds for installation of stormwater best management practices through fees and tax increases. The reduced grant funding within the Commonwealth of Pennsylvania for environmental projects further creates stumbling blocks.

With these constraints in mind, the EDCSC municipalities are committed to making their best efforts to achieve the needed pollution reductions while not creating a financial crisis within their communities or increasing the strain on their residents regarding taxes. EDCSC municipalities evaluated approximately 90 BMP Projects in the Cobbs and Darby Creek Watersheds. Projects were evaluated based on:

- **Sediment reductions**
- **Cost per pound of pollutant reduction**
- **Ownership (public versus private land)**
- **Funding and Workforce availability**
- **Community benefit (site accessibility, visibility to the public, ability of public to experience benefits)**
- **Connectivity to other completed or proposed stormwater BMPs**
- **Timeframe to implement**

The Tables provided in Appendix E list and describe the potential BMP projects for implementation under this plan that could meet the 10% required sediment reduction target. Implementation of projects will require a more detailed analysis of sites including topography, soils, and underground infrastructure as well as a more detailed analysis of costs estimates. The PRP required reductions are slated to be completed within the 5 years following PA DEP approval of the Plan.

The EDCSC municipalities have signed an intergovernmental PRP agreement to work together to implement projects that will meet their sediment reduction requirements (Appendix C). According the agreement, pollutant reduction credits resulting from the PRP projects will be allocated among the municipalities based on the ratio that each

municipality's existing pollutant load bears to the aggregate pollutant load of these municipalities within each watershed as shown in Tables 5 and 6.

## **E.2. BMP Sediment Reduction Calculations**

STEPL inputs for BMP load reduction calculations are provided in Appendix F.

Since the existing sediment load in the Cobbs and Darby Creek watersheds were calculated using STEPL, the sediment reductions resulting from the proposed stormwater and riparian buffer BMPs were also calculated using STEPL. STEPL requires input of the BMP drainage area and the percent land cover types within the drainage area. The program calculates the total load delivered to the BMP using land use specific runoff concentrations and the annual rainfall. The program then calculates the sediment load reduction by applying the BMP specific, DEP recommended efficiency value (PADEP, 2016). STEPL assumes that the BMP will be designed appropriately to treat the assigned drainage area. STEPL input for BMP load reduction calculations are provided in Appendix F.

All BMP information provided in Appendix E is conceptual. Implementation of projects will require a more detailed analysis of sites including topography, soils, and underground infrastructure as well as a more detailed analysis of costs estimates.

Reductions resulting from stream stabilization projects used the DEP specified rate of 44.88 lbs. /LF sediment reduction. Until further evaluation of stream stabilization reaches is complete, this report assumes that both sides of the stream will be stabilized.

It should also be noted that the EDCSC received approval from DEP to use a narrower minimum buffer width of 17.5 feet due to heavily built up and narrow stream corridors common throughout these municipalities. The buffer widths that the load reduction calculations are based on are provided in the project descriptions in Appendix E. Buffers reductions based on 35' widths may need to be adjusted if that width cannot be achieved due to site constraints.

Several of the municipalities within the Cobbs Creek and Darby Creek watersheds have comprehensive street sweeping programs that they intend to continue to achieve sediment load reductions as part of EDCSC's load reduction requirements per watershed. The following municipalities plan to street sweep at least 25 times per year with mechanical broom technology:

- Collingdale Borough
- Darby Borough
- Darby Township
- Glenolden Borough
- Sharon Hill Borough
- Upper Darby Township
- Yeadon Borough

Load reductions for street sweeping were calculated in accordance with DEP's Effectiveness Values Table. See Appendix F for details on Proposed Load reductions from street sweeping.

### E.3. Cobbs Creek Watershed

The minimum sediment reduction required in the Cobbs Creek Watershed is 208,241 lbs. sediment (as shown in Table 3).

The EDCSC municipalities are committed to making their best efforts to achieve the needed pollution reductions while not creating a financial crisis within their communities or increasing the strain on their residents regarding taxes. The EDCSC municipalities propose the implementation of the street sweeping, riparian buffer, stream restoration, and urban stormwater BMPs listed in Appendix E to meet the required 10% reduction in the Cobbs Creek Watershed. Implementation of projects will require a more detailed analysis of sites including topography, soils, and underground infrastructure as well as a more detailed analysis of costs estimates. The PRP required reductions are slated to be completed within the 5 years following PA DEP approval of the Plan.

*Table 7. Summary of Load Reductions in the Cobbs Creek Watershed*

<b>Cobbs Creek Proposed BMPs</b>	<b>Sediment Removal (lb)</b>
Stream and Urban Stormwater BMPs	217,401.36
Street Sweeping	54,096.94
<b>Total Proposed BMP Reductions for Cobbs Creek</b>	<b>271,498.30</b>
<b>10% Reduction Requirement for Cobbs Creek</b>	<b>208,240.69</b>

### E.2. Darby Creek Watershed

The minimum sediment reduction required in the Darby Creek Watershed is 356,202 lbs. sediment (as shown in Table 4).

The EDCSC municipalities are committed to making their best efforts to achieve the needed pollution reductions while not creating a financial crisis within their communities or increasing the strain on their residents regarding taxes. The EDCSC municipalities propose the implementation of the street sweeping, riparian buffer, stream restoration, and urban stormwater BMPs listed in Appendix E to meet the required 10% reduction in the Darby Creek Watershed. Implementation of projects will require a more detailed analysis of sites including topography, soils, and underground infrastructure as well as a more detailed analysis of costs estimates. The PRP required reductions are slated to be completed within the 5 years following PA DEP approval of the Plan.

*Table 8. Summary of Load Reductions in the Darby Creek Watershed*

<b>Darby Creek Proposed BMPs</b>	<b>Sediment Removal (lb)</b>
Stream and Urban Stormwater BMPs	404,441.20
Street Sweeping	59,863.31
<b>Total Proposed BMP Reductions for Darby Creek</b>	<b>464,304.51</b>
<b>10% Reduction Requirement for Darby Creek</b>	<b>356,202.20</b>

## **F. Funding Mechanism Identification**

All Municipalities have entered into the Agreement that is included as Appendix C. The municipalities will fund the PRP BMP projects as described in Article IV “Finances.” This article provides detailed information about funding mechanisms and logistics, budget preparation and approval for implementation and operation and maintenance (O&M), administrative costs, payments, annual review/audits and funding of operation and maintenance of projects. As described in detail in Section D.3, the cost for the implementation and O&M is divided proportionally per percent share of the existing load of per municipality per watershed.

The EDCSC will apply for available grants through Growing Greener, NFWF, and other as identified. As stated in section E.1, the municipalities have limited financial resources with property owners burdened with already high property and school taxes, as well as increasing fees for services such as trash, water and sewage. Rates of poverty in these communities exceed the county average. While the communities will work to balance their budgets to include the increased costs of BMP implementation, this will have to be balanced with other pressing needs, such as maintaining police and fire services.

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

The EDCSC is committed to long-term operation and maintenance of the best management practices they install through this PRP. With each project installed, a percentage of the value of the engineering and construction costs will be set aside for long-term operation and maintenance. The EDCSC will use these funds to hire a contractor to inspect and do necessary maintenance on each BMP as needed. As stated in the PRP Agreement, each project will require a maintenance agreement be executed to allow for such practices to occur on this land. This maintenance agreement spells out the specifics of what activities will occur throughout the life of the BMP. See Table 12 for additional O&M information.



Table 12. BMP O&M Activities

BMP Type	O&M Activities	Frequency for O&M Activities
Bioswale	Inspect BMP, mow and weed, replace vegetation if necessary, cleanout trash and provide additional O&M as specified in design details	Mow BMP during the growing season as dictated by plant chosen during design; inspect BMP according to SWM ordinance/program, clean out all trash and debris. Additional O&M activities/frequency will be detailed in final design
Riparian Buffer	Inspect for stability following storm events, plant survival monitoring, mowing and weeding, plant replacement and additional O&M as specified in design details.	Provide biannual inspections for first three years and annual inspections thereafter. Additional inspections following large storm events; additional O&M activities will be detailed in the final design.
Streambank Stabilization	Inspection in accordance with stream restoration design details	Biannual inspections for first three years and annual inspections thereafter. Additional inspections following large storm events; additional O&M activities will be detailed in the final design
Underground Infiltration	Inspect inlet controls, outlet structures and storage areas for trash and sediment accumulation. Remove sediment and debris.	Inspect inlet, outlet and storage areas monthly for the first year to determine ongoing maintenance frequency.
Rain Garden	Inspection, vegetation management and invasive species control, plant replacement	Biannual inspections for first three years and annual inspections thereafter. Additional inspections following large storm events.
Basin Retrofit	Inspect BMP, mow and weed, replace vegetation if necessary, cleanout trash and provide additional O&M as specified in design details	Mow BMP during the growing season as dictated by plant chosen during design; inspect BMP according to SWM ordinance/program, clean out all trash and debris. Additional O&M activities/frequency will be detailed in final design

Curb Bump Out	Inspection, vegetation management and invasive species control, plant replacement	Vegetation management as needed during the growing season. Biannual inspections for first three years and annual inspections thereafter. Additional inspections following large storm events.
Wet Infiltration Basin	Inspect BMP, mow and weed, replace vegetation if necessary, cleanout trash and provide additional O&M as specified in design details	Mow non-saturated portions of BMP during the growing season as dictated by plant chosen during design; inspect BMP according to SWM ordinance/program, clean out all trash and debris. Additional O&M activities/frequency will be detailed in final design
Wetland/bio swale	Inspection, vegetation management and invasive species control, plant replacement	Vegetation management as needed during the growing season. Biannual inspections for first three years and annual inspections thereafter. Additional inspections following large storm events.
Stream Restoration	Inspection for bank stability following storm events, plant survival monitoring, mowing and weeding to ensure plant survival, plant replacement and additional O&M as specified in design details	Biannual inspections for first three years and annual inspections thereafter. Additional inspections following large storm events; additional O&M activities will be detailed in the final design.
Porous Paving	Inspections, vacuum sweeping	Quarterly inspections of the pervious pavement shall be conducted to verify that it is functioning as intended and no cracking is occurring. The pervious asphalt shall be vacuum swept at least once per year.
Infiltration Trench	Inspection, vegetation management and invasive species control, plant replacement	Biannual inspections for first three years and annual inspections thereafter. Additional inspections following large storm events.

## H. Works Cited

Integrated List Non-Attaining 2014\_01. Office of Water Management, Bureau of Water Supply & Wastewater Management, Water Quality Assessment and Standards Division.

Pennsylvania Department of Environmental Protection (PADEP). 2016. PRP / TMDL Plans MS4 Workshop. Harrisburg, PA.

PADEP. 2016. National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems BMP Effectiveness Values. Document No. 3800-PM-BCW0100m

## **Appendix A**

Public Participation: Item A1) Public Notice; Item A2) Written Public Comments  
and Record of Consideration

**AFFIDAVIT OF PUBLICATION**  
639 S. Chester Rd. • Swarthmore, PA 19081UPPER DARBY PUBLIC WORKS  
100 GARRETT ROAD

ROOM 301

UPPER DARBY, PA 19082

STATE OF PENNSYLVANIA,  
COUNTY OF DELAWARE

The undersigned *Deborah A. Bus*, being duly sworn the he/she is the principal clerk of Daily Times and Sunday Times, Daily & Sunday Times Digital, published in the English language for the dissemination of local or transmitted news and intelligence of a general character, which are duly qualified newspapers, and the annexed hereto is a copy of certain order, notice, publication or advertisement of:

**UPPER DARBY PUBLIC WORKS****Published in the following edition(s):**

Daily Times and Sunday Times	08/03/17
Daily & Sunday Times Digital	08/03/17

**PUBLIC NOTICE****Meeting Date Change:**

Please be advised that notice is hereby given that the Eastern Delaware County Stormwater Collaborative regular meeting date scheduled for **Wednesday, August 9, 2017 at 4:00 PM at the Darby Township Municipal Building** has been changed to **Wednesday, August 16, 2017 at 4:00 PM at the Darby Township Municipal Building at 21 Bartram Ave., Glenolden, PA 19036.**  
DCT, August 3, a-1

Affiant further deposes that she/he is not interested in the subject matter of the aforesaid notice of advertisement, and that all allegations in the foregoing statements as to time, place and character of publication are true:

Sworn to the subscribed before me this *August 4, 2017.*

*Dianne McCormick*  
Notary Public, State of Pennsylvania  
Acting in County of Delaware

COMMONWEALTH OF PENNSYLVANIA

NOTARIAL SEAL

Dianne McCormick, Notary Public  
Ridley Twp., Delaware County  
My Commission Expires April 20, 2020

MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

**Advertisement Information**

Client Id: 911536

Ad Id: 1399548

PO:

Sales Person: 066305

**AFFIDAVIT OF PUBLICATION**  
639 S. Chester Rd. • Swarthmore, PA 19081**UPPER DARBY PUBLIC WORKS**  
**100 GARRETT ROAD****ROOM 301****UPPER DARBY, PA 19082****STATE OF PENNSYLVANIA,**  
**COUNTY OF DELAWARE**

The undersigned *Diana P. Bies*, being duly sworn the he/she is the principal clerk of Daily Times and Sunday Times, Daily & Sunday Times Digital, published in the English language for the dissemination of local or transmitted news and intelligence of a general character, which are duly qualified newspapers, and the annexed hereto is a copy of certain order, notice, publication or advertisement of:

**UPPER DARBY PUBLIC WORKS****Published in the following edition(s):**

Daily Times and Sunday Times	08/03/17
Daily & Sunday Times Digital	08/03/17

Affiant further deposes that she/he is not interested in the subject matter of the aforesaid notice of advertisement, and that all allegations in the foregoing statements as to time, place and character of publication are true:

Sworn to the subscribed before me this *August 3, 2017.*

*Dianne McCormick*  
Notary Public, State of Pennsylvania

Acting in County of Delaware

COMMONWEALTH OF PENNSYLVANIA

NOTARIAL SEAL

Dianne McCormick, Notary Public  
Ridley Twp., Delaware County  
My Commission Expires April 20, 2020

MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

**Advertisement Information**

Client Id: 911536

Ad Id: 1399555

PO:

Sales Person: 066305

**NOTICE OF OPPORTUNITY FOR PUBLIC REVIEW AND COMMENT**

**PROPOSED SEDIMENT POLLUTANT REDUCTION PLAN (PRP)**

**OF THE GENERAL PERMIT FOR STORM WATER DISCHARGES FROM THE SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)**

For each of: the Borough of Collingdale; the Borough of Darby; the Township of Darby; the Borough of East Lansdowne; the Borough of Glenolden; the Borough of Morton; the Borough of Norwood; the Borough of Sharon Hill; Upper Darby Township; and the Borough of Yeadon

**NOTICE IS HEREBY GIVEN** that the Council of the Borough of Collingdale; the Borough of Darby; the Township of Darby; the Borough of East Lansdowne; the Borough of Glenolden; the Borough of Morton; the Borough of Norwood; the Borough of Sharon Hill; Upper Darby Township; and the Borough of Yeadon will receive public comment(s) on the proposed Sediment Pollutant Reduction Plan (PRP) as required for the 2018-2023 General MS4 Permit. The proposed PRP includes:

(1) Best Management Practices (BMPs) to reduce pollutant loadings and reductions;

(2) Calculations and methodology for determining loadings and reductions;

(3) Locations of local waterways with nutrients/sediment impairments.

**DOCUMENT AVAILABILITY**

The proposed PRP is available for review at each municipal office listed during normal business hours.

Collingdale Borough: 800 MacDade Blvd Collingdale, PA 19023

Darby Borough: 1020 Ridge Ave., Darby, PA 19023

Darby Township: 21 Bartram Ave., Glenolden, PA 19036

East Lansdowne Borough: 155 E. Lexington Ave., Lansdowne, PA 19050

Glenolden Borough: 36 Boon Ave., Glenolden, PA 19036

Morton Borough: 500 Highland Ave., Morton, PA 19070

Norwood Borough: 10 W. Cleveland Ave., Norwood, PA 19074

Sharon Hill Borough: 250 Sharon Ave., Sharon Hill, PA 19079

Upper Darby Township: 100 Garret Rd., Upper Darby, PA 19082

Yeadon Borough: 600 Church Ln., Yeadon, PA 19050

The proposed PRP is available to view or download at [www.edcsc.org](http://www.edcsc.org).

**SUBMISSION OF COMMENTS**

The Municipalities shall accept written comments for a minimum of 30 days from the date of publication of this public notice. Interested parties may submit written comments electronically, by mail, or hand delivery. All comments must be received by 12:00 noon on September 1, 2017 and addressed to:

Eastern Delaware County Stormwater Collaborative  
P.O. Box 315  
Morton, PA 19070

Comments may be submitted electronically, in PDF text format, to [edcscprp@gmail.com](mailto:edcscprp@gmail.com) via email. Please also indicate in the subject line, "Comments-EDCSC PRP."

Comments may also be submitted in person at a public meeting of the Eastern Delaware County Stormwater Collaborative to be held on August 16, 2017 at 4:00 pm at the Darby Township Municipal Building located at 21 Bartram Ave., Glenolden, PA 19036.  
DCT, August 3, a-1



Ad ID: 1399555  
Cost: \$462.43  
Start: 08/03/17  
Stop: 08/03/17  
Class: 1201, Legal Notices

**NOTICE OF OPPORTUNITY FOR  
PUBLIC REVIEW AND COMMENT**

**PROPOSED SEDIMENT POLLUTANT REDUCTION PLAN  
(PRP)**

**OF THE GENERAL PERMIT FOR  
STORM WATER DISCHARGES FROM THE SMALL  
MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)**

For each of: the Borough of Collingdale; the Borough of Darby; the Township of Darby; the Borough of East Lansdowne; the Borough of Glenolden; the Borough of Morton; the Borough of Norwood; the Borough of Sharon Hill; Upper Darby Township; and the Borough of Yeadon

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Glenolden Borough: 36 Boon Ave., Glenolden, PA 19036

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Comments may also be submitted in person at a public meeting of the Eastern Delaware County Stormwater Collaborative to be held on August 16, 2017 at 4:00 pm at the Darby Township Municipal Building located at 21 Bartram Ave., Glenolden, PA 19036.  
DCT, August 3, a-1

August 7, 2017

Morton Borough Council  
Highland & Sycamore Avenues  
Morton, Pennsylvania 19070



RE: Storm/Rain Water Collaborative

Members of Council:

The municipal members in the Eastern Delaware County Storm Water Collaborative, except the Borough of Morton, have neighboring geographical boundaries. And have a common interest in that they have rain water flow coming from or going into their respective municipalities. Which ultimately flow into Darby and Cobbs Creek.

Do not agree to pay for a "percentage" of an unknown total cost of a program. Remember this. DELCORA was forced into an agreement to pay for 10% of the City of Philadelphia Long Term Control Plan. Inclusive of an open end, unrestricted cost escalation clause. In 2011 the estimated total cost was \$2.8 billion. On December 15, 2016, just before the end of the previous administration's term the USEPA unilaterally changed the agreement that they had dictated via a Consent Decree which increased the projected cost of the City of Philadelphia Long Term Control Plan to \$4.5 billion. DELCORA's 10% share is \$450 million. CDCA's share of the \$450 million is \$150 million. All payments are what they refer to as back end loaded. Meaning that starting somewhere within the years of 2018-2020 Morton Borough will be billed, on average, about \$200,000.00 per year. Just for its share of the Philadelphia Long Term Control Plan. Plus, what CDCA will finally be charged for the City of Chester Long Term Control Plan.

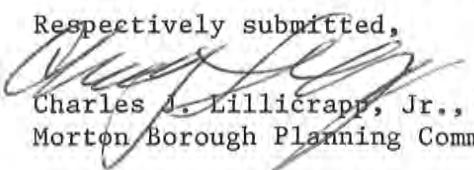
The Pollutant Reduction Plan estimates a percent of a municipality's share of an unknown total cost.

EXHIBIT "A" DEP Policy on Collaboration and Pollutant Reduction Plans. "DEP encourages neighboring MS4 permittees to collaborate in the development and implementation of their Pollutant Reduction Plan/TMDL Plan, and the O&M of any structural BMPs installed as part of such plans. As long as BMPs are implemented in MS4 planning area(s) and address the pollutant(s) of concern, the pollutant reductions afforded by the BMPs may be shared between the collaborating MS4s".

Morton Borough neighboring MS4 permittees would be the Townships of Springfield and Ridley and the Boroughs of Rutledge, Prospect Park and Ridley Park.

Be wary of modeled "customizable spreadsheet-based pollutant loading model. Using "simple algorithms" to calculate nutrient and sediment loads from different land uses and the load reductions from the implementation of BMPs". Page 6 Pollutant Reduction Plan.

Respectively submitted,

  
Charles J. Lilliecrapp, Jr., Chairman  
Morton Borough Planning Commission

## **Appendix Item A2**

### **EDCSC Public Comment**

### **Record of Consideration**

Morton Borough and the EDCSC reviewed the letter submitted by Mr. Charles Lillicrapp. The Borough has taken his concerns under consideration and will continue to move forward with the PRP as written. Mr. Lillicrapp's individual concerns are addressed by the bullet points below.

- While Morton Borough does not share geographic boundaries with the other participating municipalities the approach was accepted by Morton Borough council and the multi-municipal approach was accepted by PADEP as documented in Appendix C "PRP Agreement" Exhibit B.
- While Mr. Lillicrapp's financial comments are understandable, Morton Borough determined that this was the best approach in order to meet the PRP requirements with limited resources. As indicated throughout the PRP, all of the municipalities in the EDCSC face severe economic constraints. Every effort will be made by Morton Borough and the Collaborative to implement cost effective projects with the most sediment reduction benefits. Although not included in the PRP, preliminary cost estimates have been taken under consideration, however more detailed conceptual designs are necessary before a more accurate cost opinion can be provided.
- There are a limited number of acceptable options to document existing load and sediment load reductions for the PRP. The STEPL model was chosen for many reasons as documented in Section D of the PRP. The model was run by Temple University College of Engineering and Center for Sustainable Communities, who is experienced with the STEPL methodology.

## **Appendix B**

Maps:

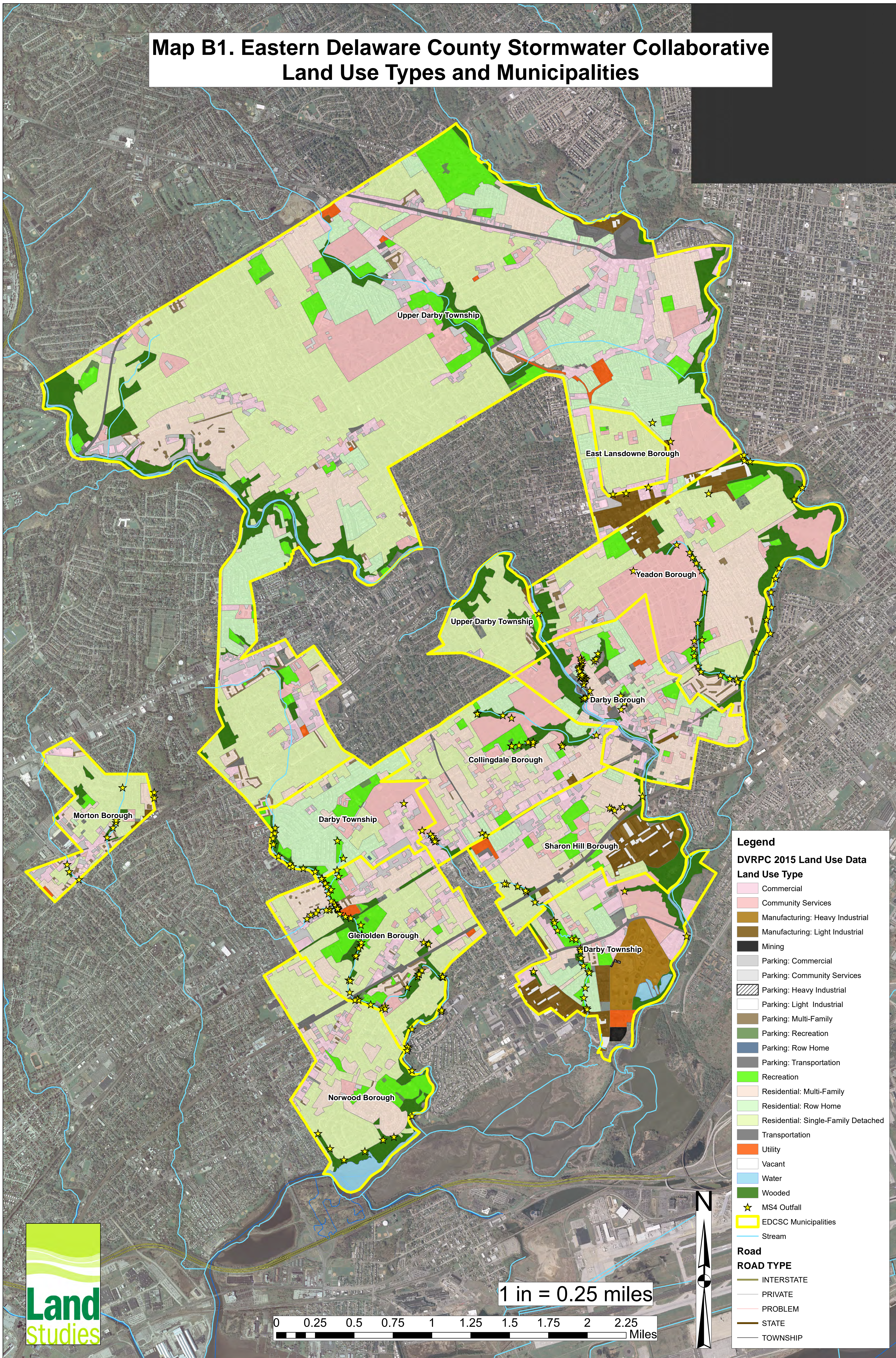
B1) EDCSC Land Use Types;

B2) MS4 PRP Map;

B3) Upper Darby Township Stormwater Infrastructure  
Map

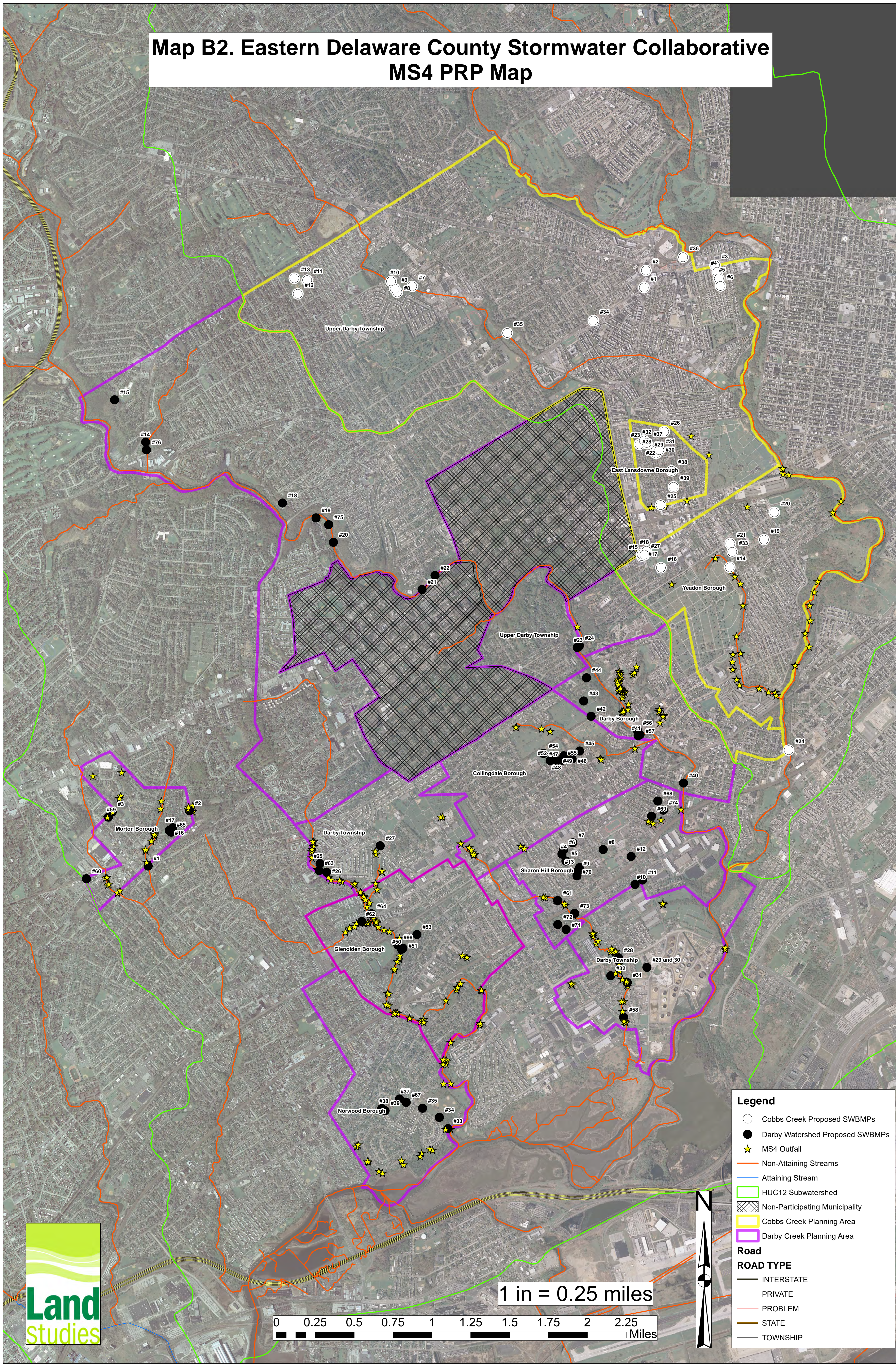


# Map B1. Eastern Delaware County Stormwater Collaborative Land Use Types and Municipalities





# Map B2. Eastern Delaware County Stormwater Collaborative MS4 PRP Map



**Legend**

- Cobbs Creek Proposed SWBMPs
- Darby Watershed Proposed SWBMPs
- ★ MS4 Outfall
- Non-Attaining Streams
- Attaining Stream
- HUC12 Subwatershed
- ▨ Non-Participating Municipality
- Cobbs Creek Planning Area
- Darby Creek Planning Area

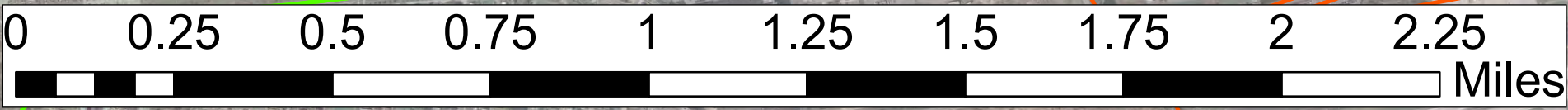
**Road**

**ROAD TYPE**

- INTERSTATE
- PRIVATE
- PROBLEM
- STATE
- TOWNSHIP

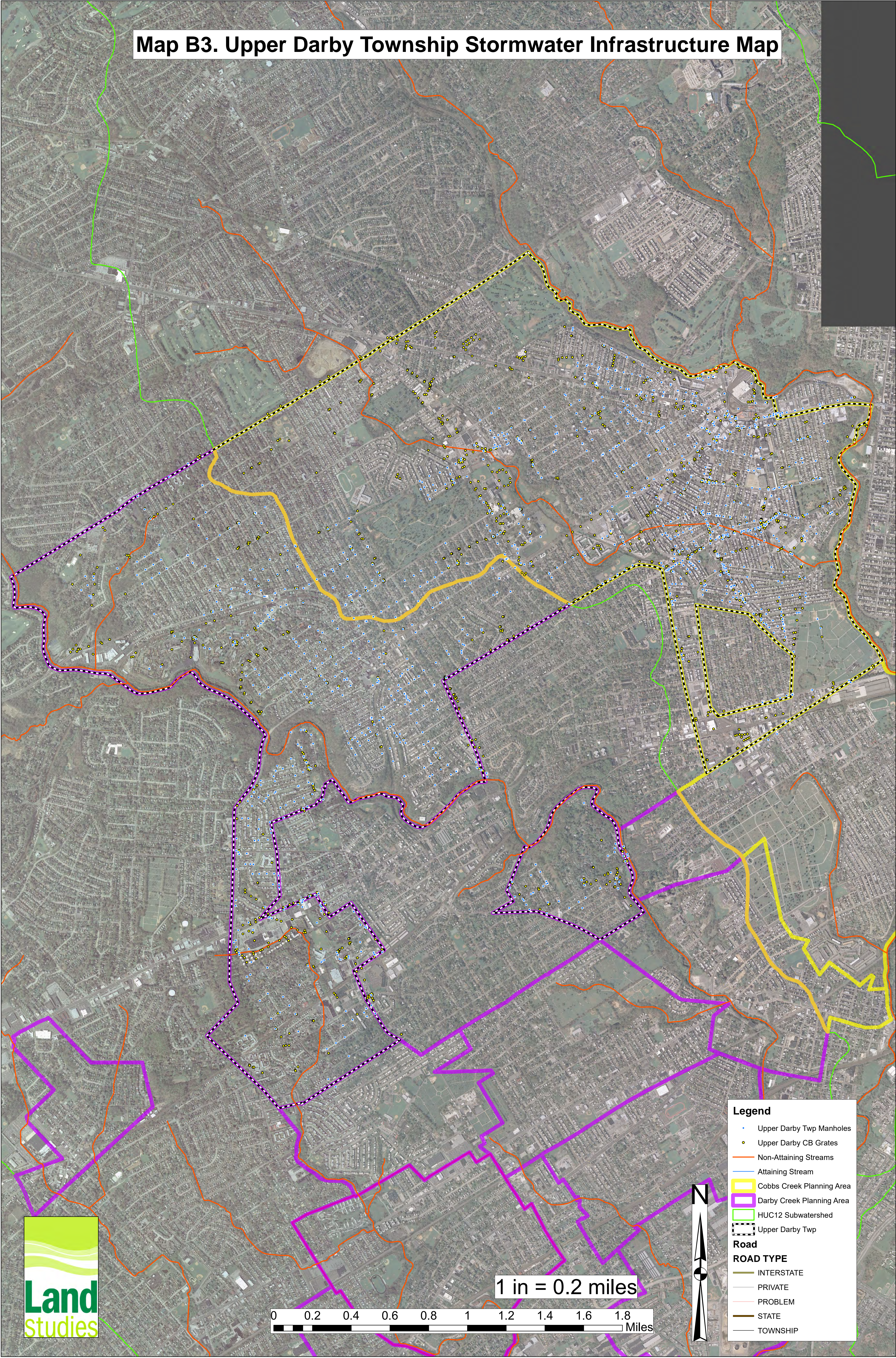


1 in = 0.25 miles

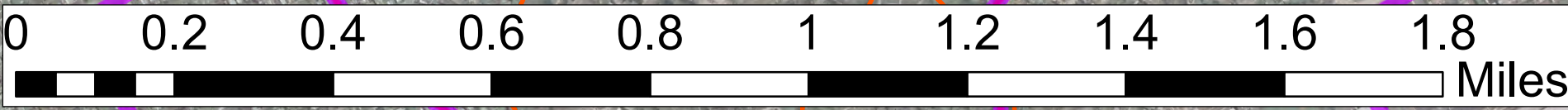




# Map B3. Upper Darby Township Stormwater Infrastructure Map



1 in = 0.2 miles



**Legend**

- Upper Darby Twp Manholes
- Upper Darby CB Grates
- Non-Attaining Streams
- Attaining Stream
- Cobbs Creek Planning Area
- Darby Creek Planning Area
- HUC12 Subwatershed
- Upper Darby Twp

**Road**

**ROAD TYPE**

- INTERSTATE
- PRIVATE
- PROBLEM
- STATE
- TOWNSHIP



**Appendix C**  
Draft Pollutant Reduction Plan Supplemental Intergovernmental  
Agreement

## **PRP Agreement**

### **EASTERN DELAWARE COUNTY STORMWATER COLLABORATIVE POLLUTANT REDUCTION PLAN SUPPLEMENTAL INTERGOVERNMENTAL AGREEMENT**

This Pollutant Reduction Plan Supplemental Intergovernmental Agreement, dated [New Agreement Date,] 2017, is entered into by and among the following municipal governments in Delaware County, Pennsylvania: the Borough of Collingdale; the Borough of Darby; the Township of Darby; the Borough of East Lansdowne; the Borough of Glenolden; the Borough of Morton; the Borough of Norwood; the Borough of Sharon Hill; Upper Darby; and the Borough of Yeadon; (the “Municipalities,” as further defined below) pursuant to the Intergovernmental Cooperation Act of Pennsylvania (53 Pa. C.S.A. Sections 2301 to 2315) and ordinances duly adopted by the Municipalities, each of which intends to be legally bound hereby.

### **BACKGROUND**

The background of this Agreement is as follows:

1. The Municipalities are located within the watersheds of the Darby and Cobbs Creeks and have been designated as urbanized municipalities under the stormwater regulations of the U.S. Environmental Protection Agency (MS4 Municipalities), and as such they must apply for and obtain MS4 Permits from the Pennsylvania Department of Environmental Protection (“DEP”).
2. The Municipalities have entered into an Amended and Restated Intergovernmental Agreement dated as of the date hereof (the “Amended and Restated Intergovernmental Agreement”) pursuant to which the Municipalities and the Township of Haverford (“Haverford”) have formed the Collaborative (as hereinafter defined) to work collaboratively to undertake their MS4 Permit requirements. While Haverford is a party to the Amended and Restated Intergovernmental Agreement and a member of the Collaborative, Haverford has elected not to be a party to this PRP Agreement.
3. The 2018 MS4 Permit requires, by September 16, 2017, submission of a Notice of Intent for the permit, which is to include necessary Pollutant Reduction Plans and documentation of public review.
4. The long-term implementation of such Pollutant Reduction Plans will create additional permit responsibilities on the part of the municipalities, which will necessitate additional collaborative activities in compliance with the Permit at a greater long-term cost.
5. The Pennsylvania DEP has created a policy to allow for municipalities to work on the Pollutant Reduction Plans in a collaborative fashion (Exhibit “A”) and has approved the Collaborative to complete two individual Pollutant Reduction Plans, one for the Darby Creek, and one for the Cobbs Creek, and written confirmation of such DEP approval is attached as Exhibit “B.”

6. The representatives of the member Municipalities of the Collaborative have met on these matters and have received an opinion from independent counsel recommending that a supplemental agreement for the purpose of implementing the Pollutant Reduction Plan requirements of the municipalities' MS4 Permits is in conformity with the Intergovernmental Cooperation Act, the applicable municipal codes, and the administrative codes of their general codes.
7. The form of this Agreement has been distributed to the governing bodies of the Municipalities, and such governing bodies have adopted ordinances authorizing execution of this Agreement by their respective officers.

## **ARTICLE I DEFINITIONS**

In addition to definitions contained in the Amended and Restated Intergovernmental Cooperative Agreement, the following definitions shall apply unless the context requires otherwise:

“Best Management Practice” shall mean schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce pollutant loading to surface waters of this Commonwealth.

“Collaborative” shall have the same meaning as “Eastern Delaware County Stormwater Collaborative,” as defined below.

“Eastern Delaware County Stormwater Collaborative,” (EDCSC) shall mean a limited purpose intermunicipal entity created under the Intergovernmental Cooperation Act pursuant to a certain Intergovernmental Agreement dated as of June 1, 2011, as amended and restated by the Amended and Restated Intergovernmental Agreement.

“Green Stormwater Infrastructure,” also referred to as “GSI” shall include a range of soil-water-plant systems that intercept stormwater, infiltration a portion of it into the ground, evaporate a portion into the air, and in some cases release a portion of it slowly back into the sewer system.

“Long-term Maintenance” shall mean the routine inspection, maintenance, repair, or replacement of a BMP to ensure proper function for the duration of time that the BMP is needed.

“Management Committee” shall mean the Management Committee of the Eastern Delaware County Stormwater Collaborative.

“Pollutant Reduction Plan” shall mean the required plan creation to reduce pollutant load to streams as found in DEP document 3800-PM-BCW0100k Rev 3/2017.

“Pollutant Reduction Plan Coordinator,” also referred to as the “PRP Coordinator,” shall

mean the person responsible for implementation of the Pollutant Reduction Plan, including coordination with consultants responsible for design, construction, and long-term management and maintenance of best management practices. This may also be a function of the EDCSC Program Coordinator.

“PRP Coordinator” shall mean the person or entity appointed and servicing pursuant to Article III of this Agreement.

“PRP Implementation Fund” shall be the segregated bank account of the EDCSC for funds to be collected and expended for the purpose of Pollutant Reduction Plan implementation.

“PRP Project” shall mean any capital project intended for pollutant reduction purposes including but not limited to, a rain garden, retention basin, streambank stabilization project

“PRP Project and O&M Costs” shall have the meaning set forth in Section 4.3 hereof.

“Program Coordinator” shall mean the person or entity appointed and serving pursuant to Article VI of the Amended and Restated Intergovernmental Agreement.

## **ARTICLE II COLLABORATIVE IMPLEMENTATION OF POLLUTANT REDUCTION PLAN REQUIREMENTS**

**Section 2.1. Pollutant Reduction Plan Requirements.** The Municipalities agree that certain actions required in order to fulfill their obligations under the Pollutant Reduction Plan Requirements associated with MS4 Regulations will be undertaken by them collaboratively through the operation of the EDCSC. The functions which will be performed by the EDCSC with regard to the Pollutant Reduction Plan Requirements are identified in Exhibit “C” attached hereto. Such jointly administered functions may be changed from time to time by action of the Management Committee. In order to implement the Pollution Reduction Plan, the Municipalities shall consider and approve specific PRP Projects from time to time, as further described in Section 4.4 hereof. Such PRP Projects are anticipated to be located on real property owned by one or more of the Municipalities or by School Districts located in one or more of the Municipalities.

**Section 2.2. Separate Applications.** Without limiting the foregoing, each Municipality also agrees that it will file in proper form and at the appropriate time a separate application for MS4 Permits and will deliver to the Collaborative a copy of such application. Each Municipality shall set forth in its respective MS4 Permit application a pollutant reduction credit that has been calculated in accordance with Section 2.3 hereof.

**Section 2.3. Allocation of Pollutant Reduction Credits.** Pollutant reduction credits resulting from any and all PRP Projects undertaken pursuant to this Agreement shall be allocated among the Municipalities based on the ratio that each Municipality’s existing pollutant load bears to the aggregate pollutant load of all Municipalities that are parties to the PRP and located in such watershed, as set forth on Exhibit “D” attached hereto and made a part hereof.

**Section 2.4. Indemnification.** Each Municipality will indemnify the Collaborative and the other Municipalities and defend them against claims asserted by third persons based upon the separate activities and obligations of such Municipality under the MS4 Regulations and this Agreement.

### **ARTICLE III CONSULTANTS**

**Section 3.1. Pollutant Reduction Plan Consultants.** The Management Committee of the Eastern Delaware County Stormwater Collaborative shall appoint the following consultants that will report to the EDSC Program Coordinator with respect to the Pollutant Reduction Plan. These consultants may be the same consultants as the Management Committee appoints under the Amended and Restated Intergovernmental Agreement for projects or work conducted under and pursuant to such Agreement:

- A. Pollutant Reduction Plan Coordinator (“PRP Coordinator”);
- B. GSI Design Consultant/Engineer;
- C. GSI Construction Contractor;
- D. GSI Maintenance Contractor;

**Section 3.2. Qualifications of PRP Coordinator.** The PRP Coordinator shall be a person or entity experienced in the design, construction, and management and maintenance of stormwater best management practices/green stormwater infrastructure projects and related regulatory agencies, who shall be selected by the Management Committee, in consultation with the Program Coordinator, based upon the professional qualifications of such person or entity. The PRP Coordinator shall be a person or entity which is not an employee of or an appointed consultant of a Municipality.

**Section 3.3. Duties of PRP Coordinator.** The PRP Coordinator shall act as a consultant and not an employee. Subject to that status, and in cooperation with the Program Coordinator, the PRP Coordinator shall carry out the Management Committee’s directives and policies for implementing the joint Pollutant Reduction Program of the EDCSC. The PRP Coordinator shall be responsible for assisting the Program Coordinator in timely preparing the preliminary annual budget and PRP work plan for review and approval by the Management Committee, and shall regularly communicate all matters of importance, financial or otherwise, to the Management Committee.

### **ARTICLE IV FINANCES**

**Section 4.1. Pollutant Reduction Program Fees:** The Municipalities will be responsible for payment of an equitable share of all elements of PRP Projects undertaken jointly in association

with the Collaborative's Pollutant Reduction Program in a manner as described in Section 4.4.

**Section 4.2 Fund Accounting: Fiscal Year:** A separate fund entitled "PRP Implementation Fund" into which shall be deposited all municipal shares of PRP implementation costs, as well as all grant proceeds and other revenues related to implementation of the PRP will be maintained by the EDCSC. The books of the PRP Implementation Fund shall be based on fund accounting, and revenues and expenses shall be allocated to the respective PRP Projects for which the funds are created. The Fiscal Year for the PRP Program activities shall begin on January 1 and end on December 31.

**Section 4.3. Preparation and Approval of Budget:** On or before October 1 of each year, the PRP Coordinator, in consultation with the Program Coordinator, shall prepare and present a budget for PRP Projects, BMP maintenance, and other expenses (insurance, audits, etc.) associated with implementation of the PRP Program for the succeeding year, to the Management Committee. Each annual budget shall break out for such year: (i) aggregate administrative costs, including, without limitation, the costs for preparing, updated and coordinating the PRP and personnel costs related thereto and costs of auditing or reviewing the PRP Implementation Fund pursuant to Section 4.7 hereof (the "Administrative Costs"); and (ii) aggregate PRP Project and operation and maintenance costs (the "PRP Project and O&M Costs"). On or before November 15 of each year the Management Committee shall approve the proposed budget with such modifications as it desires and shall forward the approved budget promptly to the Municipalities for review. The budget will become effective and binding for all Municipalities on January 1 of the following year unless before such date one or more Municipalities have given notice of withdrawal from the Collaborative PRP Program pursuant to Section 5.2 hereof, in which case a revised budget will be prepared and approved in similar manner; and provided that no such review shall be required by the Municipalities so long as the budget includes revenues derived solely from grants or other revenues of the Collaborative without any contribution by the Municipalities.

**Section 4.4. Project Approval; Weighted Voting.** Prior to commencing the construction or installation of any PRP Project, the Management Committee shall submit any proposed PRP Project to a vote of the Municipalities located within the watershed in which such PRP Project is proposed to be constructed or installed. Notwithstanding anything contained in the Amended and Restated Intergovernmental Agreement to the contrary, each such PRP Project proposed by the Management Committee shall require the approval of Municipalities holding at least seventy-five percent (75%) of the pollutant loads of the applicable watershed as set forth on Exhibit "D" attached hereto.

**Section 4.5. Shares of Municipalities.** Expenses for the PRP Implementation shall be allocated among the Municipalities as follows:

- Administrative Costs will be divided equally among the Municipalities.
- PRP Project and O&M Costs will be prorated based on the ratio that each Municipality's existing pollutant load within a watershed bears to the aggregate pollutant load of all Municipalities that are parties to the PRP and located within such watershed, as set forth on Exhibit "D" attached hereto.



**Section 4.6. Payment of Contributions:** Subject to the provisions of Section 4.5 hereof, each Municipality agrees to pay the share of expenses allocated to it not later than May 30 of each year in which this Agreement remains in effect. Any allocation of expenses which is not paid by a Municipality prior to such May 30 will be subject to a payment of a 10-percent penalty if it remains unpaid for a period of more than thirty (30) days thereafter. In addition, after such May 30, the defaulting Municipality shall not be entitled to receive any services from the Collaborative until it has paid its allocation and penalty. The Collaborative or any Municipality authorized by it to act on behalf of the Collaborative may enforce the obligations of a defaulting Municipality pursuant to Section 9 of the Intergovernmental Cooperation Act.

**Section 4.7. Modification of PRP Budget:** If it becomes necessary to amend a budget during a Fiscal Year, such amendment may be approved by the Management Committee. Each budget modification requiring an additional payment by any Municipality shall be subject to approval by such Municipality and by all other Municipalities adversely affected by such modification.

**Section 4.8. Annual Review/Audit:** The books of the PRP Implementation Fund shall be reviewed or audited for each Fiscal Year by an independent certified public accountant at the expense of the Collaborative. Each annual review or audit shall be approved by the Management Committee and a copy of the reviewed or audited financial statements shall be sent to each Municipality. The Management Committee may cause interim financial statements to be prepared which will not be audited.

**Section 4.9. Funding of Operations and Maintenance of PRP Projects.** On or prior to completion of any PRP Project required in order to implement the Pollutant Reduction Plan pursuant to Section 2.1 above, the Collaborative will cause all current members of the Collaborative to execute a perpetual Maintenance Agreement, which shall be recorded against the real property on which a PRP Project has been constructed or installed. The Maintenance Agreement shall require that the Municipalities share in the future operation and maintenance costs of the PRP Project on an allocated basis as set forth in Section 4.5 above. The Maintenance Agreement shall be substantially in the form attached hereto as Exhibit "E."

## **ARTICLE V ADDITIONS; WITHDRAWAL; AMENDMENTS**

**Section 5.1. Additional Municipalities:** Additional municipalities may not be added as parties to this Agreement during the five-year term of the Pollutant Reduction Plan and this Agreement. At the end of the term of this Agreement, any general-purpose municipal government within Delaware County may be added as a party to any successor Agreement upon application by the governing body of the entity applying to become a member, and approval of the application by a majority vote of the member Municipalities. The Management Committee may impose a joinder fee for any new municipality in such amount as the Management Committee may determine. The action of the applicant entity shall be by ordinance of its governing body. Any new municipality that is admitted as a party to any successor PRP Agreement pursuant to this Section 5.1 shall become a party to such successor Agreement by executing and delivering a counterpart of the Joinder to Agreement attached hereto as Exhibit "F."

**Section 5.2. Withdrawal:** Any Municipality may withdraw from membership in Collaborative's PRP Program at the end of the five (5) year MS4 permit cycle upon enactment of an ordinance by the governing body of such Municipality and fulfillment of the requirements of this Section. Notice of intent to withdraw and a copy of such ordinance shall be delivered to the Management Committee by the withdrawing Municipality before November 1 of the Fiscal Year at the end of which such withdrawal is intended to become effective. The withdrawal shall become effective at the end of such Fiscal Year upon payment by the Municipality of all contributions and other amounts owed by the Municipality to the Collaborative.

Municipalities that are party to this Supplemental Agreement that leave the Collaborative and/or the joint PRP Implementation Program are still responsible for long-term management and maintenance of BMPs constructed while a participating member, as set forth in the Maintenance Agreements described in Section 4.9 above. Municipalities will be responsible for an estimated ten (10) year cost of such maintenance adjusted for inflation. In addition, any municipality that withdraws from the PRP Program shall assume exclusive responsibility for the management and maintenance of any BMPs constructed within the boundaries of such withdrawing municipality during the term or any renewal term of this Supplemental Agreement. The withdrawing municipality's exclusive management and maintenance obligation shall commence on the date such withdrawal becomes effective.

**Section 5.3 Amendments.** This Agreement may be amended only by **resolutions** of the governing bodies of all the Municipalities and a writing executed by their respective authorized officers.

## **ARTICLE VI MISCELLANEOUS**

**Section 6.1 Term of Agreement:** This Agreement shall extend for a term of five years from the date first set forth above. It may be extended for an additional period of five years upon approval of such extensions by **resolutions** of the governing bodies of all the Municipalities electing to be parties to such extended Agreement.

**Section 6.2 Interpretation:** This Agreement shall be governed and construed in accordance with the law of the Commonwealth of Pennsylvania.

**Section 6.3 Effectiveness:** This Agreement shall become effective upon approval by ordinances enacted by the Municipalities identified in the heading of this Agreement followed by execution of this Agreement as set forth below.

**Section 6.4 Execution:** This Agreement may be executed in separate counterparts, and shall become effective when all counterparts taken together have been appropriately executed.

**Section 6.5. Incorporation of Amended and Restated Intergovernmental Agreement.** To the extent that the Amended and Restated Intergovernmental Agreement contains terms that are not inconsistent with the terms of this Supplemental Agreement, those terms are hereby incorporated

into this Agreement as though set forth here in full. To the extent that the terms of this Supplemental Agreement conflict with the terms of the Amended and Restated Intergovernmental Agreement, the terms of this Supplemental Agreement shall prevail and govern.

IN WITNESS WHEREOF, THIS AGREEMENT has been executed by the duly authorized officers of each above named Municipality on behalf of their respective Municipalities as of the date first set forth above.

BOROUGH OF COLLINGDALE

SEAL:

\_\_\_\_\_  
By: Borough Council President

\_\_\_\_\_  
Attest: Borough Secretary

BOROUGH OF DARBY

SEAL:

\_\_\_\_\_  
By: Borough Council President

\_\_\_\_\_  
Attest: Borough Secretary

TOWNSHIP OF DARBY

SEAL:

\_\_\_\_\_  
By: Township Board of Commissioners

\_\_\_\_\_  
Attest: Township Secretary

BOROUGH OF EAST LANSDOWNE

SEAL:

\_\_\_\_\_  
By: Borough Council President

\_\_\_\_\_  
Attest: Borough Secretary

BOROUGH OF GLENOLDEN

SEAL:

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By: Borough Council President

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Attest: Borough Secretary

BOROUGH OF MORTON

SEAL:

---

By: Borough Council President

---

Attest: Borough Secretary

BOROUGH OF NORWOOD

SEAL:

---

By: Borough Council President

---

Attest: Borough Secretary

BOROUGH OF SHARON HILL

SEAL:

---

By: Borough Council President

---

Attest: Borough Secretary

UPPER DARBY TOWNSHIP

SEAL:

---

By: Township Council President

---

Attest: Township Secretary

BOROUGH OF YEADON

SEAL:

---

By: Borough Council President

---

Attest: Borough Secretary

**EXHIBIT “A”**  
**DEP Policy on Collaboration and Pollutant Reduction Plans**

**General Guidelines for MS4 Collaborative Efforts**

September 2016

DEP encourages neighboring MS4 permittees to collaborate in the development and implementation of their Pollutant Reduction Plan / TMDL Plan, and the O&M of any structural BMPs installed as part of such plans. As long as BMPs are implemented in MS4 planning area(s) and address the pollutant(s) of concern, the pollutant reductions afforded by the BMPs may be shared between the collaborating MS4s.\*

It is not necessary for participating permittees to be joint permittees. It is however expected that there will be a written agreement among the collaborating permittees (whether they are joint permittees or not) to ensure implementability. DEP recommends all such agreements include the following topics:

Scope of the Agreement

- o Complete Pollutant Reduction Plan implementation (or individual BMP implementation)

Roles and Responsibilities

- o How projects will be selected
- o Selection of engineering and other contracted services
- o Long-term O&M
- o Adaptive management of the PRP (or the individual BMPs) over the permit period
- o Commitment to using the Plan (or to implementing the individual BMPs)

Allocations of cost and pollutant reduction

- o Methodology for sharing the cost
- o Methodology for distributing the pollutant reductions

Timeline for implementation

- o Schedule of milestones to complete and implement the plan (or the individual BMPs)

\* MS4s that use BMPs to treat stormwater flows which do not pass through the urban area and/or utilize non-urban stormwater BMPs (e.g. agricultural BMPs), and wish to receive credit in a PRP must first obtain an Individual Permit which addresses the concept. Pollutant reductions from non-urban BMPs (e.g. agricultural) can only be credited to urban stormwater responsibilities to the degree that their pollutant load reductions exceed the non-urban stormwater sector baseline.

## EXHIBIT “B”

### DEP Confirmation for EDCSC to Complete a Darby Creek PRP and a Cobbs Creek PRP

**Subject:** RE: MS4 Collaborative Efforts  
**From:** Dudley, Keith (kdudley@pa.gov)  
**To:** jamiea98@yahoo.com;  
**Cc:** jefields@pa.gov; prpatel@pa.gov; leemurph@pa.gov;  
**Date:** Monday, February 6, 2017 3:48 PM

Greetings Jamie,

Thank you for forwarding the map of the Eastern Delaware County Stormwater Collaborative (EDCSC) members and their relation to both the Darby Creek and Cobbs Creek watersheds. DEP has reviewed your proposal to have the EDCSC focus on two larger watersheds (Darby & Cobbs) and develop two representative PRP's, one for each watershed, as opposed to multiple small PRP's from each municipality. DEP supports this approach and you may consider this email as approval to proceed.

The two PRP's in addition to the EDCSC MS4 Agreement and any supporting documentation should be included as part of the NOI submissions by the current 8 members (plus any members that join/sign on before the September 16, 2017 deadline).

Please contact me if you have any questions.

Sincerely,

Keith Dudley, P.E. | Chief, Municipal Planning & Finance Section  
Department of Environmental Protection | Clean Water Program  
Southeast Regional Office  
2 East Main Street | Norristown, PA 19401  
Phone: 484.250.5190 | Fax: 484.250.5971  
[www.dep.pa.gov](http://www.dep.pa.gov)

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## **EXHIBIT “C”**

### **EDCSC Duties regarding the Pollutant Reduction Plans**

- Public Participation - for plan and updates and coordination of these activities
- Coordinate final site design for each BMP, oversee and confirm final pollutant reduction
- Construct, bid, and installation oversight
- Hire and maintain an operation and maintenance coordinator and maintain records
- Assist with Project selection guidelines
- Review PRP project list annually, ID and/or modify the list of projects as necessary
- Review and budget annually for PRP updates, project design, and implementation of Operation and Maintenance.

# EXHIBIT “D”

## Percentage Allocation of Costs/Credits and Voting for PRP Project Approval among Municipalities

COBBS WATERSHED				
Municipality	Existing Load	Credit for Street Sweeping	Final Load Share	% Share
Darby Borough	74,290.44	2161.56	72,128.88	3.56%
East Lansdowne Borough	42,261.59	0	42,261.59	2.09%
Upper Darby Township	1,482,098.51	46,102.81	1,435,995.70	70.92%
Yeadon Borough	483,756.37	9,465.52	474,290.85	23.43%
Totals	2,082,407	57,730	2,024,677	
10 % Required Reduction	208,241			
DARBY WATERSHED				
Collingdale Borough	311,407.77	13,572	297,835.77	8.55%
Darby Borough	258,153.09	4,527	253,626.09	7.28%
Darby Township	597,426.66	4,740	592,686.66	17.09%
Glenolden Borough	394,554.30	13,100	381,454.30	10.95%
Morton Borough	129,152.77	0	129,152.77	3.71%
Norwood Borough	311,192.64	0	311,192.64	8.94%
Sharon Hill Borough	286,453.56	3,764	282,689.56	8.12%
Upper Darby Township	1,198,515.64	38,744	1,159,771.64	33.30%
Yeadon Borough	75,165.60	1,021	74,144.60	2.13%
Totals	3,562,022	79,486.00	3,482,554.04	
10 % Required Reduction	356,202			

**EXHIBIT "E"**  
**FORM OF MAINTENANCE AGREEMENT**

**Record and Return to:**  
**Robert W. Scott, Esquire**  
**205 North Monroe Street**  
**P.O. Box 468**  
**Media, PA 19063**

**EASTERN DELAWARE COUNTY STORMWATER COLLABORATIVE  
STORMWATER CONTROLS AND BEST MANAGEMENT PRACTICES  
OPERATIONS AND MAINTENANCE AGREEMENT**

**THIS AGREEMENT** is made and entered into the \_\_\_\_\_ day of \_\_\_\_\_, 2016, by and among \_\_\_\_\_ [Borough][Township] (hereinafter the "Landowner"), the Eastern Delaware County Stormwater Collaborative (hereinafter "Collaborative") and each of the signatory municipalities that are members of Collaborative.

**WITNESSETH**

**WHEREAS**, the Landowner is the owner of certain real property identified as Folio No. \_\_\_\_\_, Tax Map No. \_\_\_\_\_, located in the [Borough][Township] of \_\_\_\_\_, known as \_\_\_\_\_ Avenue, \_\_\_\_\_, Pennsylvania \_\_\_\_\_, comprised of approximately \_\_\_\_\_ acres (the "Property"); and

**WHEREAS**, Landowner is a member of the Collaborative, and a party to a certain Pollutant Reduction Plan Supplemental Intergovernmental Agreement dated \_\_\_\_\_, 2017 (the "PRP Supplemental Agreement"), by and among Landowner and each of the signatory municipalities that are members of the Collaborative; and

**WHEREAS**, the Collaborative has caused the stormwater management BMP facility described in Exhibit "A" hereto (the "BMPs") to be constructed and installed on the Property for purposes of satisfying the obligation of each of the signatory municipalities to obtain an MS4 permit from the Pennsylvania Department of Environmental Protection; the BMP is located within the municipal boundaries of \_\_\_\_\_ [Township][Borough] (the "Host Municipality"); and

**WHEREAS**, the Property is more fully described in the legal description attached hereto as Exhibit "B;" and

**WHEREAS**, the Collaborative has approved the Post Construction Stormwater Operation and Maintenance Plan for the BMPs prepared by \_\_\_\_\_ dated \_\_\_\_\_, 20\_\_\_\_, (the "Maintenance Plan") and incorporated herein by reference, which provides for management of stormwater within the confines of the Property through the use of Best Management Practices (BMPs), as required by the [Borough][Township] of \_\_\_\_\_ Stormwater Management Ordinance (the "Stormwater Ordinance"); and

**WHEREAS**, the Collaborative and the Landowner, its administrators, executors, assigns, heirs, and any other successors in interest, agree that the health, safety, and welfare of the residents of the Darby Creek watershed and the protection and maintenance of water quality require that the BMPs be maintained on the Property; and

**NOW, THEREFORE**, in consideration of the foregoing promises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto, intending to be legally bound, agree as follows:

1. The Collaborative shall cause the BMPs to be maintained in accordance with the specifications identified in the Maintenance Plan.
2. The Collaborative shall operate and maintain the BMPs as shown on the Plan and as required by the Stormwater Ordinance in good working order acceptable to the Collaborative and in accordance with the specific maintenance requirements noted below:
  - a) BMPs shall be inspected by the Collaborative, or responsible entity, on the following basis:
    - (1) At least annually.
    - (2) Following every large storm.
    - (3) Upon notification from the Collaborative.
  - b) The entity conducting the inspection shall be required to submit a written report to the Collaborative regarding the condition of the BMPs with recommendations and a schedule for necessary repairs, if needed.
3. The Landowner hereby grants permission to the Collaborative, its authorized agents, and employees to enter upon the Property, at reasonable times and upon presentation of proper identification, to inspect the BMPs whenever it deems necessary. Periodic inspections will be performed by the Collaborative in compliance with the [Borough][Township] of \_\_\_\_\_ Stormwater Management Ordinance. Whenever possible, the Collaborative shall notify the Landowner prior to entering the Property.
4. In the event that the Collaborative, pursuant to this Agreement, performs work of any nature or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, each of the signatory municipalities shall reimburse the Collaborative for its proportionate share of all expenses (direct and indirect) incurred within thirty (30) days of receipt of an invoice from the Collaborative. The proportionate share of each municipality shall be as set forth in the PRP Supplemental Agreement.
6. The intent and purpose of this Agreement is to ensure the proper maintenance of the on-site BMPs by the Collaborative; provided, however, that this Agreement shall not be deemed to create or affect any additional liability on any party for damage alleged to result from or be caused by stormwater runoff.
7. In the event that the Host Municipality withdraws from the Collaborative or the Collaborative's PRP Program or in the event that the Collaborative dissolves, then the Host Municipality shall assume exclusive responsibility for the operation and maintenance of the BMPs and any other

obligations of the Collaborative hereunder. The Host Municipality's exclusive operation and maintenance obligation shall commence on the date such withdrawal becomes effective, and the obligations hereunder of the Collaborative and the municipality members of the Collaborative other than the Host Municipality shall terminate as of such effective date.

8. This Agreement shall be recorded at the Office of the Recorder of Deeds of the County of Delaware, Pennsylvania, and shall constitute a covenant running with the Property and/or equitable servitude and shall be binding on the Landowner, the Collaborative and the signatory municipalities, and their respective administrators, executors, assigns, heirs, and any other successors in interest, in perpetuity.

**WHEREFORE** the undersigned duly authorized officer have executed this Agreement as of the date set forth below.

[LANDOWNER MUNICIPALITY]

By:\_\_\_\_\_

EATERN DELAWARE COUNTY  
STORMWATER COLLABORATIVE

By:\_\_\_\_\_

[MUNICIPALITY]

By:\_\_\_\_\_

[MUNICIPALITY]

By:\_\_\_\_\_

[MUNICIPALITY]

By:\_\_\_\_\_

[MUNICIPALITY]

By:\_\_\_\_\_

[MUNICIPALITY]

By:\_\_\_\_\_

[illegible]

On this, the \_\_\_\_\_ day of \_\_\_\_\_, 2014, before me, the undersigned officer, personally appeared \_\_\_\_\_, who acknowledged himself to be the \_\_\_\_\_ of \_\_\_\_\_, a party to the foregoing Stormwater Agreement and that he as such officer, being authorized to do so, executed the same for the purposes therein contained by signing the name of \_\_\_\_\_ by himself as \_\_\_\_\_.

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

Notary Public



**EXHIBIT “A” TO MAINTENANCE AGREEMENT**  
**Project Area**

**[Intentionally Blank]**

**EXHIBIT “B” TO MAINTENANCE AGREEMENT**  
**Legal Description**

**[Intentionally Blank]**

**EXHIBIT “F”**

**ADDITIONAL MUNICIPALITY JOINDER AND SIGNATURE PAGE**

In accordance with the terms of the Pollutant Reduction Plan Supplemental Intergovernmental Agreement dated \_\_\_\_\_, 2017, as the same may be amended and/or restated from time to time (the “Agreement”), the undersigned municipality has agreed to join in and be bound by the terms and conditions of the Agreement and has, intending to be legally bound thereby, caused this Additional Municipality Joinder and Signature Page to the Agreement, to be executed by its duly authorized officers, under seal, the day and year set forth below.

NAME OF MUNICIPALITY:

Signature: \_\_\_\_\_

Name:

Title:

Date: \_\_\_\_\_

ATTEST:

By: \_\_\_\_\_

Title:

Acknowledged and Accepted by:

EASTERN DELAWARE COUNTY STORMWATER COLLABORATIVE

By: \_\_\_\_\_

Name:

Title:

Dated:

## **Appendix D**

### **Existing Sediment Load STEPL Input**

TSS concentrations used in the STEPL model for runoff from various urban land uses

#### 1. Urban pollutant concentration in runoff (mg/l)

Landuse	Commercial	Industrial	Institutional	Transportation	Multi-Family	Single-Family	Urban-Cultivated	Vacant (developed)	Open Space
TSS	75	120	67	150	100	100	150	70	70

Land Use for EDCSC municipalities in the Cobbs Creek watershed

8. Input or modify urban land use distribution											
Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total % Area
Darby Boro	W1	0	0	0	0	0	0	0	0	0	0
	W2	148.235	37.18	1.02	0	3.18	49.37	1.85	3.26	4.14	100
	W3	0	0	0	0	0	0	0	0	0	0
E Lansdowne Boro	W4	131.57	9.03	0.95	0	0.87	0.61	87.95	0	0.59	100
	W5	0	0	0	0	0	0	0	0	0	0
Upper Darby Twp	W6	2561.685	23.5	2.93	0	7.59	28.02	29.97	0.48	7.51	100
Yeadon Boro	W7	751.71	30.52	6.17	0	4.2	25.61	27.46	1.24	4.8	100

Summary table of impaired streambanks in the EDCSC municipalities in the Cobbs Creek watershed

2. Impaired streambank dimensions in the different watersheds											
Watershed	Strm Bank	Length (ft)	Height (ft)	Lateral Recession	Rate Range (ft/yr)	Rate (ft/yr)	BMP Efficiency (0-1)	Soil Textural Class	Soil Dry Weight (ton/ft3)	Nutrient Correction Factor	Annual Load (ton)
Darby Boro	W1 Bank1		0	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	0.0000
	W2 Bank2	180	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	2.2680
	W3 Bank3		3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	0.0000
E Lansdowne Boro	W4 Bank4	0	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	0.0000
	W5 Bank5	0	0	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	0.0000
Upper Darby Twp	W6 Bank6	12386	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	156.0636
Yeadon Boro	W7 Bank7	4577	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	57.6702

Summary table of initial TSS loads (combined bank erosion and overland runoff) for each EDCSC municipality in the Cobbs Creek watershed

#### 1. Total load by subwatershed(s)

Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	% Sed Reduction
	t/year	t/year	t/year	%
Darby Boro	W1	0.0	0.0	0.0
	W2	37.1	0.0	0.0
	W3	0.0	0.0	0.0
E Lansdowne Boro	W4	21.1	0.0	0.0
	W5	0.0	0.0	0.0
Upper Darby Twp	W6	741.0	0.0	0.0
Yeadon Boro	W7	241.9	0.0	0.0
Total	1041.2	0.0	1041.2	0.0

## Summary of land uses in EDCSC municipalities in the Darby Creek watershed

	8. Input or modify urban land use distribution											
	Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total % Area
Collingdale Boro	W1	527.561	29.44	0.42	0	4.65	43.21	16.68	0	0.65	4.95	100
	W2	0	0	0	0	0	0	0	0	0	0	0
Darby Boro	W3	336.146	29.78	0.64	0	7.06	46.73	3.31	0	9.4	3.08	100
Darby Twp	W4	837.39	26.28	17.65	0	5.24	30.41	9.37	0	4.8	6.25	100
Glenolden Boro	W5	574.349	11.68	1.01	0	9.52	25.24	41.6	0	0.98	9.97	100
	W6	0	0	0	0	0	0	0	0	0	0	0
Morton Boro	W7	213.843	13.51	1.53	0	8.33	13.83	60.29	0	1.23	1.28	100
Norwood Boro	W8	435.012	7.01	0	0	4.29	22.97	56.8	0	0.64	8.29	100
Sharon Hill Boro	W9	448.078	11.82	16.77	0	10.68	33.29	20.45	0	1.25	5.74	100
Upper Darby Twp	W10	2042.636	8.8	0.25	0	5.94	22.62	59.56	0	0.81	2.02	100
Yeadon Boro	W11	96.777	26.19	0	0	16.21	8.57	48.27	0	0.76	0	100

## Summary table of impaired streambanks in the EDCSC municipalities in the Darby Creek watershed

2. Impaired streambank dimensions in the different watersheds													
	Watershed	Strm Bank	Length (ft)	Height (ft)	Lateral Recession	Rate Range (ft/yr)	Rate (ft/yr)	BMP Efficiency (0-1)	Soil Textural Class	Soil Dry Weight (ton/ft3)	Nutrient Correction Factor	Annual Load (ton)	Load Reduction (ton)
Collingdale Boro	W1	Bank1	2874	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	36.2124	0.0000
	W2	Bank2	0	0	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	0.0000	0.0000
Darby Boro	W3	Bank3	2626	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	33.0876	0.0000
Darby Twp	W4	Bank4	5089	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	64.1214	0.0000
Glenolden Boro	W5	Bank5	5308	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	66.8808	0.0000
	W6	Bank6	0	0	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	0.0000	0.0000
Morton Boro	W7	Bank7	1570	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	19.7820	0.0000
Norwood Boro	W8	Bank8	1112	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	14.0112	0.0000
Sharon Hill Boro	W9	Bank9	1709	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	21.5334	0.0000
Upper Darby Twp	W10	Bank10	12179	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	153.4554	0.0000
Yeadon Boro	W11	Bank11	447	3	2. Moderate	0.06 - 0.2	0.08	0	Sandy loam	0.0525	0.85	5.6322	0.0000

## Summary table of initial TSS loads (combined bank erosion and overland runoff) for each EDCSC municipality in the Darby Creek watershed

1. Total load by subwatershed(s)					
	Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction
		t/year	t/year	t/year	%
Collingdale Boro	W1	155.7	0.0	155.7	0.0
	W2	0.0	0.0	0.0	0.0
Darby Boro	W3	129.0	0.0	129.0	0.0
Darby Twp	W4	298.7	0.0	298.7	0.0
Glenolden Boro	W5	197.3	0.0	197.3	0.0
	W6	0.0	0.0	0.0	0.0
Morton Boro	W7	64.6	0.0	64.6	0.0
Norwood Boro	W8	155.6	0.0	155.6	0.0
Sharon Hill Boro	W9	143.2	0.0	143.2	0.0
Upper Darby Twp	W10	599.3	0.0	599.3	0.0
Yeadon Boro	W11	37.6	0.0	37.6	0.0
	Total	1780.9	0.0	1780.9	0.0

**Appendix E**  
Proposed BMP Project List, Descriptions, and Load Reductions for Cobbs  
Creek and Darby Creek Watersheds

**Appendix E. Proposed BMP List for the Cobbs Creek Watershed**

Project ID#	Municipality	Sub-watershed	Location	Project Type	Latitude	Longitude	Sediment Reduction (LBS/YEAR)	BMP Size / Input Information	Unit	Project Description
24	Darby Borough	Cobbs	1,3,5 Main Street	riparian buffer	39.9169	-75.24712	65.00	100.00	LF	Implement riparian buffer. Load reduction calculation assumes 35' buffer width.
22	E. Lansdowne	Cobbs	E. Lansdowne School	bioswale along Hirst Ave.	39.9458	-75.26415	174.00	160.00	LF	Implement bioswale along Hirst Ave.
23	E. Lansdowne	Cobbs	E. Lansdowne School	bioswale	39.9456	-75.26139	81.00	100.00	LF	Retrofit existing concrete swale.
25	E. Lansdowne	Cobbs	500 Block of Baltimore Ave	infiltration trench	39.9406	-75.26139	237.00	0.04	Ac	Implement infiltration trench at rear alley and parking lot, bed sized to treat 2.5" max rainfall.
26	E. Lansdowne	Cobbs	200 Block of Penn Blvd.	bioswale	39.9469	-75.2611	346.00	300.00	LF	Create 300 LF bioswale at 200 block of Penn Blvd.
28	E. Lansdowne	Cobbs	Firehouse	infiltration trench	39.9453	-75.26194	117.00	60.00	LF	Trench will treat the first 2.5" of rain from 50,000ft2 and 21,000ft2 buildings.
29	E. Lansdowne	Cobbs	Firehouse	bioswale	39.945	-75.2625	27.00	300.00	LF	Construct bioswale in south side yard. Divert southeast/southwest roof leaders to bioswale.
30	E. Lansdowne	Cobbs	Municipal Building	porous paving	39.9453	-75.26194	108.00	0.18	Ac	Install porous paving at the municipal building.
31	E. Lansdowne	Cobbs	Municipal Building	infiltration trench	39.9453	-75.26194	71.00	100.00	LF	Implement infiltration trench to collect runoff from both buildings (sizes are 135'x50' and 60'x 28.5'). Bed will treat 2.5" max rainfall
32	E. Lansdowne	Cobbs	E. Lansdowne School	rain garden	39.9456	-75.26333	71.00	300.00	sq ft	Divert RWCs and parking lot runoff to rain garden
37	E. Lansdowne	Cobbs	E. Lansdowne School	bioswale	39.9459	-75.26323	5.00	100.00	LF	Implement bioswale at E Lansdowne School at Melrose Ave.
38	E. Lansdowne	Cobbs	100 Block of Penn Blvd.	bioswale	39.9117	-75.2606	291.00	300.00	LF	Implement bioswale along 100 block of Penn Boulevard.
39	E. Lansdowne	Cobbs	Unit Block of Penn Blvd.	bioswale	39.9419	-75.2603	679.00	300.00	LF	Implement bioswale to treat runoff at Unit Block of Penn Boulevard
1	Upper Darby	Cobbs	Garrett Road Municipal Lot	infiltration trench	39.964	-75.26306	522.00	400.00	LF	Create tree trench along the edges of the parking lot with large shade trees.
2	Upper Darby	Cobbs	Brief Road Municipal Lot	infiltration trench	39.962	-75.26277	487.00	640.00	LF	Create tree trench along the edges of the parking lot with large shade trees.
3	Upper Darby	Cobbs	Wellington Road - Municipal Lot adjacent to Maket Street	infiltration trench	39.9623	-75.25436	36.00	70.00	LF	Create tree trench at Wellington Rd
4	Upper Darby	Cobbs	Wellington Road - Municipal Lot adjacent to Maket Street	bioswale 1	39.9617	-75.25412	322.00	210.00	LF	Create Bioswale in the median along Wellington Road from Market Street to Chestnut Street.
5	Upper Darby	Cobbs	Wellington Road - Municipal Lot adjacent to Maket Street	bioswale 2	39.9611	-75.25396	380.00	185.00	LF	Create Bioswale in the median along Wellington Road from Market Street to Chestnut Street.
6	Upper Darby	Cobbs	Wellington Road - Municipal Lot adjacent to Maket Street	bioswale 3	39.9604	-75.25379	410.00	200.00	LF	Create Bioswale in the median along Wellington Road from Market Street to Chestnut Street.
7	Upper Darby	Naylors Run	Drexel Gardens Park	stream stabilization and riparian buffer	39.9611	-75.29111	103,224.00	2,300.00	LF	Restore 2300 LF of streambank at Drexel Gardens Park (2300 LF*44.88lb/ft)
8	Upper Darby	Naylors Run	Drexel Gardens Park	bioinfiltration/retention/wetland	39.9606	-75.29111	14,426.00	1.75	Ac	Remove outfall on Fern Run and instead discharge stormwater into a bioinfiltration/created wetland in grassy area of park.
9	Upper Darby	Naylors Run	Drexel Gardens Park	bioswale	39.9617	-75.29324	420.00	125.00	LF	Create Bioswale treats runoff from the ball fields.
10	Upper Darby	Naylors Run	Drexel Gardens Park	rain garden	39.9617	-75.29367	520.00	0.03	Ac	Implement rain garden at Drexel Gardens Park off of Bond Ave.
11	Upper Darby	Naylors Run	Dermond Fields	bioswale	39.9607	-75.30383	269.00	225.00	LF	Along entrance driveway - GSI 296LF - Will capture flow from the parking lots and the driveway



Appendix E. Proposed BMP List for the Cobbs Creek Watershed

Project ID#	Municipality	Sub-watershed	Location	Project Type	Latitude	Longitude	Sediment Reduction (LBS/YEAR)	BMP Size / Input Information	Unit	Project Description
12	Upper Darby	Naylor's Run	Dermond Fields	rain garden w/underdrain	39.9607	-75.30499	61.00	70.00	sq ft	On the Drexel Hill Little League Side
13	Upper Darby	Naylor's Run	Dermond Fields	infiltration/retention underground	39.9622	-75.30537	164.00	0.08	Ac	Under ball fields intercept stormwater into underground infiltration/retention (depending on soils).
34	Upper Darby	Cobbs	Garrett Road and Bywood Ave.	bioswale	39.9545	-75.2755	4,138.00	5,000.00	LF	Construct approx. 5000LF of bioswales along the trolley tracks from Lansdowne Ave. to Fairfield Ave
35	Upper Darby	Cobbs	Naylor's Run Park	bioswale	39.9567	-75.27996	36.00	146.00	LF	Implement bioswale to treat drainage from upper parking lot.
36	Upper Darby	Cobbs	SEPTA Western Loop Outfall C190 Reconstruction	rock swale and stream stabilization	39.9634	75.25789	17,233.92	384.00	LF	Reconstruction of existing 60" RCP outfall and outlet area/Rock Swale and stabilize 384 LF of stream
14	Yeadon Borough	Cobbs	Holy Cross Cemetary/Blunston Run	stream restoration	39.9622	-75.30537	71,269.44			Restore 1588LF of streambank.
15	Yeadon Borough	Cobbs	Yeadon Community Park	bioswale 1	39.9354	-75.26424	103.00	200.00	LF	Implement 200LF X 4' wide bioswale along S. Union Ave.
16	Yeadon Borough	Cobbs	Yeadon Community Park	bioswale 2	39.9356	-75.26195	294.00	700.00	LF	Implement 700LF x 4' wide bioswale along E. Providence Rd.
17	Yeadon Borough	Cobbs	Yeadon Community Park	rain garden	39.9356	-75.26424	52.00	0.01	Ac	Create rain garden 150LF x 4' wide along S Union Ave.
18	Yeadon Borough	Cobbs	Yeadon Community Park	bioswale 3	39.9359	-75.26365	450.00	400.00	LF	Implement 400LF x 4' wide bioswale along back property line of park to capture runoff from the large building.
19	Yeadon Borough	Cobbs	Longacre Blvd Circle	bioretention – raingarden(C/D soils w/	39.9366	-75.24939	13.00	200.00	sq ft	Implement rain garden at Longacre Blvd. Circle
20	Yeadon Borough	Cobbs	Kerr Field	bioswale	39.9391	-75.24805	51.00	200.00	sq ft	Implement 200 sq ft bioswale at Kerr Field.
27	Yeadon Borough	Cobbs	Yeadon Community Park	rain garden	39.9359	-75.26365	103.00	426.00	sq ft	Implement rain garden that will treat runoff from the parking lot.
21	Yeadon Borough	Cobbs	Borough Hall	rain garden	39.9364	-75.25348	31.00	0.02	Ac	Implement a rain garden in the front of Borough Hall to capture runoff from half the roof area of the building.
33	Yeadon Borough	Cobbs	700 - 709 Redwood Ave.	Rain Garden	39.9355	-75.25347	114.00	0.02	Ac	Implement rain garden at Redwood Ave.
Total Stream/Stormwater BMP Sediment Reductions							217,401.36			
Subtotal Street Sweeping Sediment Reductions							54,097.00			
Total Sediment Reductions from all Potential BMPs							271,498.36			
Cobbs Required Reduction							208,240.69			

**Appendix E. Proposed BMP List for the Darby Creek Watershed**

Project ID	Municipality	Sub-watershed	Location	Project Type	Latitude	Longitude	Sediment Reduction (lbs/yr)	BMP Size	Unit	Project Description
#45	Collingdale Borough	UNT Darby Creek	Collingdale Park	bioswale	39.91728	-75.2768	225.00	140.00	LF	There are several exiting drainage swale planted with turf. These could be deepened and widened, planted with natives to slow, filter and infiltrate water.
#46	Collingdale Borough	UNT Darby Creek	Collingdale Park	bioswale	39.91658	-75.27603	18.00	40.00	LF	Capture drain pipe on hill from parking to that go towards creek. Can also pull back the storm pipe into a bioswale.
#47	Collingdale	UNT Darby	Collingdale Park	riparian buffer	39.917	-75.27434	123.00	0.17	Ac	Remove turf and create meadow filter strip adjacent to the pond.
#48	Collingdale Borough	UNT Darby Creek	Collingdale Park	streambank stabilization	39.91684	-75.27747	22,440.00	500.00	LF	Stabilize 500 LF of the stream near bridge downhill from parking lot (500 LF@44.88lb/ft).
#49	Collingdale Borough	UNT Darby Creek	Collingdale Park	Underground infiltration/ storage	39.91654	-75.27513	264.00	0.10	Ac	Capture runoff to the parking lot in underground storage and infiltration.
#52	Collingdale Borough	Muckinipattis Creek	Collingdale Park	bioswale	39.91741	-75.27241	749.00	100.00	LF	Stabilize outfall off of Roberts Avenue where gully has been formed. Create a bioswale of rocks with some vegetation on the side.
#53	Collingdale Borough	UNT Darby Creek	Collingdale Park	bioswale	39.9167	-75.27337	982.00	160.00	LF	Stabilized outfall off of Beachwood Rd where erosion is occuring. Create a bioswale of rocks with some vegetation on the side.
#54	Collingdale Borough	UNT Darby Creek	Collingdale Park	riparian buffer	39.91684	-75.27554	329.00	200.00	LF	Establish 200 LF of riparian buffer near the bridge downhill from parking lot. Load reduction assumes 35' buffer width.
#40	Darby Borough	Darby Creek	Pine Street and Spruce Street	riparian buffer	39.91416	-75.25997	627.00	600.00	LF	Establish a 600 LF riparian buffer near Pine and Spruce Streets. Load reduction assumes 35' buffer width.
#41	Darby Borough	Darby Creek	933-947 Springfield Road	riparian buffer	39.91416	-75.25997	221.00	100.00	LF	Establish 100LF of riparian buffer within open lots along the stream. Load reduction assumes 35' buffer width.
#42	Darby Borough	Darby Creek	Little Flower Manor	bioswale	39.92062	-75.27092	1,595.00	825.00	LF	Construct 825 LF bioswale.
#43	Darby Borough	Darby Creek	Little Flower Manor	underground infiltration/	39.92205	-75.27092	1,752.00	1.00	Ac	Take runoff from Springfield road into underground storage infiltration.
#44	Darby Borough	Darby Creek	Little Flower Manor	rain garden	39.92421	-75.27134	111.00	0.02	Ac	Construct a rain garden that will receive drainage from the mansion
#55	Darby Borough	Darby Creek	Darby Borough Town Center	streambank stabilization	39.91902	-75.26528	33,660.00	750.00	LF	Stabilize 750 LF (750 LF @ 44.884 lb/LF) of stabilization behind the Town Center.

**Appendix E. Proposed BMP List for the Darby Creek Watershed**

Project ID	Municipality	Sub-watershed	Location	Project Type	Latitude	Longitude	Sediment Reduction (lbs/yr)	BMP Size	Unit	Project Description
#56	Darby Borough	Darby Creek	Upstream of Chester Pike	streambank stabilization	39.91878	-75.26512	6,732.00	150.00	LF	150LF (150LF @44.88 lb/LF) near vacant lots on Springfield Road
#25	Darby Township	Muckinipattis Creek	Westbridge Playground	rain garden	39.9076	-75.30422	25.00	0.04	Ac	Construct a 0.4 ac rain garden at Westbridge Playground.
#26	Darby Township	Muckinipattis Creek	Westbridge Playground	riparian buffer	39.90679	-75.26843	121.00	400.00	LF	Implement 400 LF buffer along Muckinapates Creek. Load reduction assumes a 35' buffer width.
#27	Darby Township	Muckinipattis Creek	Darby Township Schools	rain garden	39.9091	-75.29687	568.00	0.14	Ac	Potential to create a large rain garden in the front to capture runoff from the school parking lot.
#28	Darby Township	Hermesprot Creek	Conway Park Playground	riparian buffer	39.89804	-75.26843	216.00	1390.00	LF	Implement riparian buffer along stream at Conway Park Playground. Load reduction assumes a 35' buffer width.
#29	Darby Township	Hermesprot Creek	Calcon Hook Fields	bioswale	39.89708	-75.265	271.00	500.00	LF	Create a bioswale along Calcon Hook Road - Intercept water before it enters the storm inlets.
#30	Darby Township	Hermesprot Creek	Calcon Hook Fields	rain garden	39.89828	-75.2688	35.00	0.02	Ac	Create a rain garden at bottom of the swale to hold and infiltrate rain water. Can use the existing inlet as an overflow
#31	Darby Township	Hermesprot Creek	Burton Ave Field	riparian buffer	39.89572	-75.26745	58.00	260.00	LF	Implement 260 LF riparain buffer along stream at Burton Avenue Field. Load reduction assumes a 35' buffer width.
#32	Darby Township	Hermesprot Creek	Burton Ave Field	meadow	39.89639	-75.26941	334.00	2.00	Ac	Create an approximately 2 acre meadow in the park.
#57	Darby Township	Stony Creek	Upstream of Tribbett Ave.	streambank stabilization	39.89209	-75.26786	96,492.00	2150.00	LF	Proposposed stabilization of 2150 LF of both banks of the Hermesprot Creek (2150 LF @44.88 lb/LF).
#61	Darby Township	Shipley Branch	Upstream of MacDade Blvd.	Streambank Stabilization	39.90199	-75.29914	33,211.20	740.00	LF	Restore both sides of 740 LF of the Shipley Branch (740 LF@44.88 lbs/ft)
#62	Darby Township	Stony Creek	Westbridge Playground	Streambank Stabilization	39.90679	-75.30345	17,952.00	400.00	LF	Restore both sides of 400 LF of the Muckinipates Creek (400 LF@44.88 lbs/ft)
#63	Darby Township	Muckinipates Creek	Hibbs Avenue	streambank stabilization	39.90241	-75.29828	32,762.40	730.00	LF	Stabilize 730 LF of eroding stream banks of the Muckinipates Creek at Hibbs Avenue (730 LF@44.88 lbs/LF)
#50	Glenolden Borough	Muckinipattis Creek	Glenolden Park	riparian buffer	39.8994	-75.29463	392.00	400.00	LF	Create 400LF of riparian buffer within Glendolden Park. Sediment reduction assumes 35' buffer width.
#51	Glenolden Borough	Muckinipattis Creek	Glenolden Park	bioswale	39.8995	-75.29447	1,454.00	250.00	LF	Pull back storm pipe to the outfall near the bridge. Create a bioswale in place of pipe approximately 250'x15'.
#52	Glenolden Borough	UNT Darby Creek	Glenolden Park	bioswale	39.90074	-75.29273	221.00	0.03	Ac	Create a rain garden/bioswale in the park near the bathrooms. Need to know were the sanitary lines are in the park
#65	Glenolden Borough	Muckinipattis Creek	Glenolden Park	streambank stabilization	39.8994	-75.29463	29,172.00	650.00	LF	Stabilize 650 LF (650 @ 44.88 lb/LF) of stabilization behind the Town Center.
#1	Morton Borough	Stony Creek	Silver Lake Terrace (Townhomes/condo	riparian buffer	39.90782	-75.32503	297.00	320.00	LF	Create a Riparian Buffer along the stream. Sediment load reduction assumes a 17.5' buffer width. May be opportunity to create a few infiltration basins/rain gardens to

**Appendix E. Proposed BMP List for the Darby Creek Watershed**

Project ID	Municipality	Sub-watershed	Location	Project Type	Latitude	Longitude	Sediment Reduction (lbs/yr)	BMP Size	Unit	Project Description
#16	Morton Borough	Stony Creek	Borough Hall – 500 Highland Ave.	rain garden	39.01109	-75.322358	24.00	100.00	LF	Construct a rain garden along the back to capture runoff from back of roof of building.
#17	Morton Borough	Stony Creek	Borough Hall - 500 Highland Ave	rain garden	39.91132	-75.3219	26.00	0.01	Ac	Construct rain garden in front of the municipal building to capture runoff from buliding roof.
#2	Morton Borough	Muckinipattis Creek	Country Lane Basin	basin retrofit	39.91285	-75.31985	946.00	0.23	Ac	Retrofit basin to wet pond or infiltration basin depending on soils
#3	Morton Borough	Stony Creek	end of Harding Ave	bioswale	39.91297	-75.32918	803.00	0.04	Ac	Infiltration Basin/Bioswale/Rain Garden in ROW between homes approximately 85'x20'. There are no sewers in the older part of Morton. Water sheetflows to these
#58	Morton Borough	Stony Creek	end of Pennington Ave	bioswale	39.91246	-75.3298	1,058.00	0.05	Ac	Infiltration Basin/Bioswale/Rain Garden in ROW between homes approximately 90'x20'. There are no sewers in the older part of Morton. Water sheetflows to these two roads and then is piped directly to the creeks.
#59	Morton Borough	Stony Creek	Delaware County Intermediate Unit	bioswale	39.90676	-75.3325	2,300.00	180.00	LF	Potential Bioswale/Infiltration from parking lots in grassy areas surrounding the buildings.
#64	Morton Borough	Stony Creek	Borough Hall - 500 Highland Ave	infiltration bed	39.91085	-75.32214	269.00	0.13	Ac	Reconfigure inlets in parking lot and near fire hall to flow into a rain garden or underground infiltration bed.
#33	Norwood Borough	Muckinipattis Creek	Amosland Park	bioswale	39.88257	-75.28963	3,267.00	100.00	LF	Pipe along trail between park and Morton House is broken. Repair outfall and stabilize with a bioswale.
#34	Norwood Borough	Muckinipattis Creek	Amosland Park	rain garden location 1	39.88364	-75.29062	185.00	0.15	Ac	Construct 0.15 ac rain garden in Amosland Park.
#35	Norwood Borough	Muckinipattis Creek	Amosland Park	bioswale	39.88454	-75.29264	332.00	300.00	LF	Create bioswales in 3' wide grassy strip between the park and Amosland Road and E. Winona Ave.
#37	Norwood Borough	Darby Creek	Norwood Elementary School	bioswale 1	39.8844	-75.29718	267.00	200.00	LF	Bioswale off of parking lot
#38	Norwood Borough	Darby Creek	Norwood Elementary School	bioswale 2	39.88546	-75.29539	678.00	90.00	LF	Construct bioswale to treat runoff from parking lot.
#39	Norwood Borough	Darby Creek	Norwood Elementary School	bioswale 3	39.88461	-75.29758	36.00	100.00	LF	Construct bioswale to treat runoff from parking lot.
#66	Norwood Borough	Darby Creek	Norwood Elementary School	rain garden	39.88479	-75.29513	75.00	0.02	Ac	The rear of the elementary school and the back of the homes on Tasker Ave. have stormwater issues. With the cooperation of the school district, put a rain garden or
#10	Sharon Hill	Darby Creek	Weiderwax Field	rain garden	39.90483	-75.26616	95.00	0.01	Ac	Implement rain garden to treat runoff from parking lot. If lot is repaved, slope so all water drains towards the rain garden. If not repaved, could intercept the pipe at the
#11	Sharon Hill	Darby Creek	Weiderwax Field	rain garden	39.90504	-75.26569	79.00	0.01	Ac	Construct rain garden next to borough storage facility
#12	Sharon Hill	Darby Creek	Basin at the corner of Calcon Hook Road	wet/ infiltration	39.90746	-75.26655	615.00	0.21	Ac	Retrofit current basin that is not functioning. Drainage area is .5 acres, could possibly increase this to 1 to 4 acres depending on modifications to system near school and
#13	Sharon Hill	Hermesprot Creek	230 Sharon Ave	bioswale	39.90655	75.27281	80.00	175.00	sq ft	Create bioswale between the library and firehouse at Sharon Ave. Additionally, could potentially create a rain garden in front of the library. Pipes go into the ground.
#4	Sharon Hill	Hermesprot Creek	Chester Pike in front of Memorial Park	curb bump out	39.90785	-75.27492	491.00	320.00	sq ft	Construct a curb bump out approximately 8'x40' along Chester Pike in front of Memorial Park.

**Appendix E. Proposed BMP List for the Darby Creek Watershed**

Project ID	Municipality	Sub-watershed	Location	Project Type	Latitude	Longitude	Sediment Reduction (lbs/yr)	BMP Size	Unit	Project Description
#5	Sharon Hill	Hermesprot Creek	South End of Memorial Park along	bioswale	39.90719	-75.27445	78.00	150.00	LF	Construct bioswale in grass strip between road and the sidewalk.
#6	Sharon Hill	Hermesprot Creek	1130 Chester Pike	bioswale	39.90887	-75.27471	302.00	300.00	LF	Construct 300 LF bioswale.
#60	Sharon Hill	Hermesprot Creek	Branerd Blvd Cul de Sac	curb bump out	39.90369	-75.27489	454.00	100.00	sq ft	5'wide x 20 long curb bump out
#67	Sharon Hill	Darby Creek	Cherry Street	curb bump out	39.91246	-75.26315	232.00	90.00	sq ft	Install approximately 6'wide x 15'long curb bump out on Cherry Street.
#68	Sharon Hill	Darby Creek	Garvin Blvd.	curb bump out	39.90108	-75.26384	46.00	45.00	sq ft	Construct curb bump out at Garvin Blvd. 3'wide x 15' long.
#69	Sharon Hill	Hermesprot Creek	Clifton Ave	curb bump out	39.90572	-75.27327	37.00	45.00		Construct curb bump out at Clifton Ave. 3'wide x 15' long.
#7	Sharon Hill	Hermesprot Creek	100 Chester Pike in Front of Wells Fargo	bioswale	39.90887	-75.27355	236.00	100.00	LF	Construct 100 LF bioswale.
#70	Sharon Hill	Hermesprot Creek	Melrose Ave	curb bump out	39.90136	-75.27489	28.00	45.00	sq ft	Construct curb bump out at Melrose Ave. 3'wide x 15' long.
#71	Sharon Hill	Hermesprot Creek	Elmwood Ave	curb bump out	39.90136	-75.2756	28.00	45.00	sq ft	Construct curb bump out at Elwood Ave. 3'wide x 15' long.
#72	Sharon Hill	Hermesprot Creek	elmwood Ave 2	curb bump out	39.90198	-75.27422	65.00	120.00	sq ft	Install curb bump out along Elmwood Ave. 8'wide x 15' long.
#73	Sharon Hill	Darby Creek	Laurel Road	curb bump out	39.91155	-75.26255	37.00	90.00	sq ft	Construct curb bump out along Laurel Road 6'wide x 15'long
#8	Sharon Hill	Hermesprot Creek	Terminus of Ridley Ave at Sharon Hill Recreation Complex	rain garden/ bioswale	39.90817	-75.26991	291.00	0.01	Ac	Create a rain garden or bioswlae at terminus of Ridley Ave at Sharon Hill Recreation Complex.
#9	Sharon Hill	Hermesprot Creek	Borough Hall Public Works Yard – rear of	rain garden/ bioswale	39.90622	-75.27306	130.00	174.00	sq ft	Create a small rain garden or bioswlae at the Borough public works yard.
#14	Upper Darby	Collen Brook	Collenbrook Church – 5290 Township	bioswale	39.94732	-75.32392	200.00	0.03	Ac	Construct bioswale to treat runoff from upper parking lot, increased riparian buffer along parking lot side and State road.
#15	Upper Darby	Darby Creek	Pilgram Park - Aronomink Outfall –	wet basin/ bioswale	39.95133	-75.32754	40,200.00	0.20	Ac	Capture flows from large outfall draining the neighborhood into a created wetland/impoundment/detention area.
#18	Upper Darby	Darby Creek	Huey Park – Bloomfield and Rosemont Aves.	bioswale	39.94129	-75.30755	2,800.00	270.00	LF	Create a linear swale system along Rosemont Ave approximately 270'x20'. This would intercept an existing stormwater pipe and could overflow back into a larger SW interceptor. Increase/create riparian buffer along Bloomfield. Also the potential
#19	Upper Darby	Darby Creek	Gillespie Park – Sycamore Ave,	bioswale	39.93981	-75.30354	1,200.00	50.00	LF	Create approximately 50'x15' bioswale where outfall comes in N. of the Parking lot.

Appendix E. Proposed BMP List for the Darby Creek Watershed

Project ID	Municipality	Sub-watershed	Location	Project Type	Latitude	Longitude	Sediment Reduction (lbs/yr)	BMP Size	Unit	Project Description
#20	Upper Darby	Darby Creek	Gillespie Park – Sycamore Ave,	streambank stabilization	39.9375	-75.30152	44,880.00	1000.00	LF	Streambank stablization is proposed for both banks (1000 LF@44.88 lb/LF reduction), extending past the Swedish Cabin. The Swedish cabin is concerned about
#21	Upper Darby	Darby Creek	Kent Park	streambank stabilization	39.93289	-75.29095	14,361.60	320.00	LF	Stablize 320 LF (320 @44.88 lb/LF) of streambank north of dog park along parking lot.
#22	Upper Darby	Darby Creek	Kent Park	riparian buffer	39.9414	-7528934	200.00	1400.00	LF	Expand riparian buffer from dog park down to the end of park. Sediment load reduction assumes a 35' buffer width.
#23	Upper Darby	Darby Creek	Penn Pines Park – Providence Road	wetland/ bioswale	39.92706	-75.27235	3,000.00	0.03	Ac	At discharge pipe from the Lansdowne Tower Apartments, create an approximately 75'x20' bioswale or wetland to capture runoff. This land is not a part of the park coordination would be needed with the apartment complex owners.
#24	Upper Darby	Darby Creek	Penn Pines Park – Providence Road	riparian buffer	39.97724	-75.27209	200.00	500.00	LF	Create a riparian buffer; Possible to create a bioinfiltration area to capture runoff from the parking lot and roadway. Sediment load reduction assumes a 35' buffer width.
#74	Upper Darby	Darby Creek	Gillespie Park – Sycamore Ave, Clifton Heights, PA	riparian buffer	39.9375	-75.30152	200.00	1000.00	LF	Implement 1000 LF of riparian buffer at Gillespie Park. Remove knotweed, replace with native trees, shrubs, and herbceous vegetation. Sediment load reduction assumes a 35' buffer width.
#75	Upper Darby	Collen Brook	Collenbrook Church – 5290 Township Line Rd., Drexel Hill,	riparian buffer	39.94647	-75.32391	200.00	0.11	Ac	Plan riparian buffer along the parking lot side of the stream and State Rd. Sediment load reduction assumes a 35' buffer width.
Subtotal Sediment Reduction Stream/Stormwater BMPs							404,441.20			
Subtotal Sediment Reduction From Street Sweeping							59,863.00			
Total Sediment Reductions from all Potential BMPs							464,304.20			
Darby Creek Watershed Required Reduction							356,202.20			

## **Appendix F**

### **Proposed BMP Calculations and STEPL Input**

## Darby Borough

### Projects and land use

	Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total % Area
1, 3, 5 Main Street Riparian Buffer	W1	0.27	100	0	0	0	0	0	0	0	0	100

### TSS loads and reductions

#### 1. Total load by subwatershed(s)

	Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction
		t/year	t/year	t/year	%
1, 3, 5 Main Street Riparian Buffer	W1	0.1	0.0	0.0	55.0

## East Lansdowne

### Projects and land use

	8. Input or modify urban land use distribution											
	Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total % Area
E Lansdowne E. Lansdowne School Hirst Ave Bioswale 1	W1	0.6174	64.2	0	0	0	0	0	0	0	35.8	100
E Lansdowne E Lansdowne School Rain Garden	W2	0.1738	1.81	0	0	58.8	0	0	0	0	39.39	100
E Lansdowne E Lansdowne School Melrose Ave Bioswale 2	W3	0.032	5.56	0	0	0	0	0	0	0	94.44	100
E Lansdowne E Lansdowne School replace concrete with Bioswale 3	W4	0.2322	100	0	0	0	0	0	0	0	0	100
E Lansdowne 200 Block Penn Ave Bioswale	W5	1.445	0	0	0	0	0	100	0	0	0	100
E Lansdowne Municipal Building Porous Pavement	W6	0.1697	0	0	0	100	0	0	0	0	0	100
E Lansdowne Municipal Building Infiltration Trench	W7	0.1721	100	0	0	0	0	0	0	0	0	100
E Lansdowne Firehouse Infiltration Trench	W8	0.2796	100	0	0	0	0	0	0	0	0	100
E Lansdowne Firehouse Bioswale	W9	0.1121	76.49	0	0	0	0	23.51	0	0	0	100
E Lansdowne 100 Block Penn Blvd Bioswale	W10	1.216	0	0	0	0	0	100	0	0	0	100
E Lansdowne Unit Block Penn Blvd Bioswale	W11	2.73	9.26	0	0	0	0	90.74	0	0	0	100
E Lansdowne 500 Baltimore Ave Infiltration Trench	W12	0.7272	77.07	0	0	0	0	22.93	0	0	0	100

### TSS loads and reductions

#### 1. Total load by subwatershed(s)

	Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction
		t/year	t/year	t/year	%
E Lansdowne E. Lansdowne School Hirst Ave Bioswale 1	W1	0.1	0.1	0.0	80.5
E Lansdowne E Lansdowne School Rain Garden	W2	0.1	0.0	0.0	53.5
E Lansdowne E Lansdowne School Melrose Ave Bioswale 2	W3	0.0	0.0	0.0	70.0
E Lansdowne E Lansdowne School replace concrete with Bioswale 3	W4	0.1	0.0	0.0	79.2
E Lansdowne 200 Block Penn Ave Bioswale	W5	0.2	0.2	0.0	80.3
E Lansdowne Municipal Building Porous Pavement	W6	0.1	0.1	0.0	55.1
E Lansdowne Municipal Building Infiltration Trench	W7	0.0	0.0	0.0	93.8
E Lansdowne Firehouse Infiltration Trench	W8	0.1	0.1	0.0	95.1
E Lansdowne Firehouse Bioswale	W9	0.0	0.0	0.0	58.6
E Lansdowne 100 Block Penn Blvd Bioswale	W10	0.2	0.1	0.0	80.3
E Lansdowne Unit Block Penn Blvd Bioswale	W11	0.4	0.3	0.1	80.0
E Lansdowne 500 Baltimore Ave Infiltration Trench	W12	0.1	0.1	0.0	80.2





## TSS loads and reductions

1. Total load by subwatershed(s)					
	Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction
		t/year	t/year	t/year	%
Yeadon Comm Park Bioswale1 S UnionAve	W1	0.1	0.1	0.0	79.8
Yeadon Comm Park Bioswale2 E Providence Rd	W2	0.2	0.1	0.0	80.0
Yeadon Comm Park Bioswale3 Back Property Line	W3	0.3	0.2	0.1	79.8
Yeadon Comm Park Raingarden S Union St	W4	0.0	0.0	0.0	55.3
Yeadon Comm Park Raingarden ParkingLot	W5	0.1	0.1	0.0	53.5
Yeadon Longacre Blvd Raingarden	W6	0.0	0.0	0.0	59.8
Yeadon Kerr Field Bioswale	W7	0.0	0.0	0.0	80.4
Yeadon Boro Hall rainGarden	W8	0.0	0.0	0.0	78.7
Yeadon 707-709 Redwood Ave	W9	0.1	0.1	0.0	80.1
Holy Cross Cemetary/Blunston Run Streambank Restoration	W10	20.0	17.8	2.2	89.0

## Collingdale Boro

### Projects and land use

8. Input or modify urban land use distribution											
Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total % Area
Collingdale Collingdale Park Roberts Ave Outfall stabilization Bioswale	W1	2.03	0	0	0	0	100	0	0	0	100
Collingdale Collingdale Park Beechwood Outfall Bioswale	W2	2.662	0	0	0	0	100	0	0	0	100
Collingdale Collingdale Park turf swales to Bioswales	W3	1.389	4.38	0	0	0	0	0	0	95.62	100
Collingdale Collingdale Park Infiltration	W4	0.2468	0	0	0	98.27	0	0	0	1.73	100
Collingdale Collingdale Park Riparian Buffer	W5	1.81	0	0	0	14.16	0	0	0	85.84	100
Collingdale Collingdale Park Drain Pipe from parking lot Bioswale	W6	0.1168	0	0	0	0	0	0	0	100	100
Collingdale Collingdale Park Meadow Filter strip (or Riparian Buffer)	W7	1.148	0	0	0	0	0	0	0	100	100
Collingdale Park Streambank Restoration	W8	0	0	0	0	0	0	0	0	0	0

### TSS loads and reductions

1. Total load by subwatershed(s)					
Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction	
	t/year	t/year	t/year	%	
Collingdale Collingdale Park Roberts Ave Outfall stabilization Bioswale	W1	0.5	0.4	0.1	77.9
Collingdale Collingdale Park Beechwood Outfall Bioswale	W2	0.6	0.5	0.1	79.9
Collingdale Collingdale Park turf swales to Bioswales	W3	0.1	0.1	0.0	80.0
Collingdale Collingdale Park Infiltration	W4	0.1	0.1	0.0	93.7
Collingdale Collingdale Park Riparian Buffer	W5	0.3	0.2	0.1	55.3
Collingdale Collingdale Park Drain Pipe from parking lot Bioswale	W6	0.0	0.0	0.0	82.2
Collingdale Collingdale Park Meadow Filter strip (or Riparian Buffer)	W7	0.1	0.1	0.1	54.2
Collingdale Park Streambank Restoration	W8	2.5	2.2	0.3	89.0

## Darby Borough

### Projects and land use

8. Input or modify urban land use distribution											
Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total % Area
Darby Boro 933-947 Springfield Rd (Location is off Pine) Riparian Buffer	W1	1.447	0	0	0	0	30.72	0	0	69.28	100
Darby Boro Little Flower Manor Bioswale	W2	4.541	98.88	0	0	0	1.12	0	0	0	100
Darby Boro Little Flower Manor Infiltration Storage	W3	4.211	100	0	0	0	0	0	0	0	100
Darby Boro Little Flower Manor Mansion Rain Garden	W4	0.4564	100	0	0	0	0	0	0	0	100
Darby Boro Pine and Spruce Riparian Buffer	W5	3.596	0	0	0	0	37.35	0	0	62.65	100

### TSS loads and reductions

1. Total load by subwatershed(s)					
Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction	
	t/year	t/year	t/year	%	
Darby Boro 933-947 Springfield Rd (Location is off Pine) Riparian	W1	1.0	0.1	0.8	11.3
Darby Boro Little Flower Manor Bioswale	W2	7.4	0.8	6.6	10.8
Darby Boro Little Flower Manor Infiltration Storage	W3	0.9	0.9	0.0	95.0
Darby Boro Little Flower Manor Mansion Rain Garden	W4	0.1	0.1	0.0	55.4
Darby Boro Pine and Spruce Riparian Buffer	W5	4.2	0.3	3.9	6.9
Darby Borough Town Center Streambank Stabilization	W6	9.5	8.4	1.0	89.0
Darby Boro Streambank Stabilization	W7	1.9	1.7	0.2	89.0

# Darby Township

## Projects and land use

8. Input or modify urban land use distribution											
Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total % Area
Darby Twp Burton Ave Field Meadow	W1	2.18				11.8				88.2	100
Darby Twp Burton Fields Riparian Buffer	W2	0.61								100	100
Darby Twp Calcon Hook Fields Bioswale	W3	0.64	85.2							14.8	100
Darby Twp Calcon Hook Fields Rain Garden	W4	0.33								100	100
Darby Twp Conway Park Playground Riparian Buffer	W5	3.24				27.9				72.1	100
Darby Twp School Parking Lot Rain Garden	W6	1.48		55.5	44.5						100
Darby Twp Westbridge Park Playground Rain Garden	W7	0.24				1.4				98.6	100
Darby Twp Westbridge ParkPlayground Riparian Buffer	W8	2.19				2.8				97.2	100

## TSS loads and reductions

1. Total load by subwatershed(s)					
Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction	
	t/year	t/year	t/year	%	
Darby Twp Burton Ave Field Meadow	W1	0.3	0.2	0.1	55.1
Darby Twp Burton Fields Riparian Buffer	W2	0.1	0.0	0.0	50.0
Darby Twp Calcon Hook Fields Bioswale	W3	0.2	0.1	0.0	80.4
Darby Twp Calcon Hook Fields Rain Garden	W4	0.0	0.0	0.0	55.0
Darby Twp Conway Park Playground Riparian Buffer	W5	0.4	0.1	0.3	25.0
Darby Twp School Parking Lot Rain Garden	W6	0.5	0.3	0.2	55.1
Darby Twp Westbridge Park Playground Rain Garden	W7	0.0	0.0	0.0	53.9
Darby Twp Westbridge ParkPlayground Riparian Buffer	W8	0.2	0.1	0.2	25.0

# Glenolden Borough

## Projects and land use

8. Input or modify urban land use distribution											
Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total % Area
Glenolden Glenolden Park Riparian Buffer	W1	4.084	0	0	0	0	0	0	0	100	100
Glenolden Glenolden Park Storm Pipe Bioswale	W2	6.05	0	0	0	0	100	0	0	0	100
Gleolden Glenolden Park Bioswale/Rain Garden near bathrooms	W3	2.073	0	0	0	0	0	0	0	100	100
Glenolden Park Streambank Restoration	W4	0	0	0	0	0	0	0	0	0	0

## TSS loads and reductions

Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction	
	t/year	t/year	t/year	%	
Glenolden Glenolden Park Riparian Buffer	W1	0.4	0.2	0.2	54.9
Glenolden Glenolden Park Storm Pipe Bioswale	W2	0.9	0.7	0.2	80.0
Gleolden Glenolden Park Bioswale/Rain Garden near bathr	W3	0.2	0.2	0.0	79.9
Glenolden Park Streambank Restoration	W4	7.6	6.7	0.8	89.0

# Morton Borough

## Projects and land use

	Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total %
Morton Boro Boro Hall Back Roof Bioswale	W1	0.09			100							100
Morton Boro Boro Hall Parking Lot inlets to Rain Garden or infiltration bed	W2	0.28			16.2	83.8						100
Morton Boro Harding Ave Bioswale	W3	2.52	4.3			0.9	53.5	41.3				100
Morton Boro Pennington Ave Bioswale	W4	3.22					27.4	34.8			37.8	100
Morton Boro County Lane Basin Wet Pond Retrofit (half credit)	W5	7.55					66.3	33.7				100
Morton Boro Boro Hall Front Roof Rain Garden	W6	0.13			100							100
Morton Boro DCIU 218 Yale Ave Bioswale	W7	3.6	50.1			49.9						100
Morton Boro Silver Lake Terrace Riparian Buffer (half width, half credit)	W8	2.02	1.6			18.9	68.7	10.8				100

## TSS loads and reductions

1. Total load by subwatershed(s)					
Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	% Sed Reduction	
	t/year	t/year	t/year	%	
Morton Boro Boro Hall Back Roof Bioswale	W1	0.0	0.0	0.0	80.0
Morton Boro Boro Hall Parking Lot inlets to Rain Garden or infiltration bed	W2	0.1	0.1	0.0	93.7
Morton Boro Harding Ave Bioswale	W3	0.5	0.4	0.1	79.9
Morton Boro Pennington Ave Bioswale	W4	0.7	0.5	0.1	80.0
Morton Boro County Lane Basin Wet Pond Retrofit (half credit)	W5	1.6	0.5	1.1	30.0
Morton Boro Boro Hall Front Roof Rain Garden	W6	0.0	0.0	0.0	55.0
Morton Boro DCIU 218 Yale Ave Bioswale	W7	1.4	1.1	0.3	80.1
Morton Boro Silver Lake Terrace Riparian Buffer (half width, half credit)	W8	0.6	0.1	0.4	25.6

# Norwood Borough

## Projects and land use

8. Input or modify urban land use distribution												
	Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated	Vacant (developed)	Open Space %	Total %
Amosland Park Morton House Bioswale	W1	8.848	0	0	0	0	97.4	0	0	0	2.6	100
Amosland Park Rain Garden	W2	1.206	0	0	0	0	0	0	0	0	100	100
Amosland Park Amosland Rd and E Winona Ave	W3	1.793	0	0	0	15.08	0	0	0	0	84.92	100
Norwood Elementary School Rain Garden	W4	0.2148	97.05	0	0	0	0	0	0	0	2.95	100
Norwood Elementary School Bioswale 1	W5	0.3473	27.46	0	0	72.54	0	0	0	0	0	100
Norwood Elementary School Bioswale 2	W6	0.9601	29.69	0	0	63.41	0	0	0	0	6.9	100
Norwood Elementary School Bioswale 3	W7	0.1543	0	0	0	0	0	100	0	0	0	100

## TSS loads and reductions

1. Total load by subwatershed(s)					
Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	% Sed Reduction	
	t/year	t/year	t/year	%	
Amosland Park Morton House Bioswale	W1	2.1	1.6	0.4	78.2
Amosland Park Rain Garden	W2	0.1	0.1	0.0	80.3
Amosland Park Amosland Rd and E Winona Ave	W3	0.3	0.2	0.1	54.9
Norwood Elementary School Rain Garden	W4	0.0	0.0	0.0	81.2
Norwood Elementary School Bioswale 1	W5	0.2	0.1	0.0	79.9
Norwood Elementary School Bioswale 2	W6	0.4	0.3	0.1	80.4
Norwood Elementary School Bioswale 3	W7	0.0	0.0	0.0	77.8

## Darby Creek Watershed

# Sharon Hill Borough

## Projects and land use

8. Input or modify urban land use distribution											
Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated %	Vacant (developed)	Open Space %	Total % Area
Sharon Hill 100 Chester Pike Bioswale	W1	0.51	79.7		20.3						100
Sharon Hill 1130 Chester Pike Bioswale	W2	0.4	30.3		69.7						100
Sharon Hill 230 Sharon Ave Library Bioswale	W3	0.23		88	12						100
Sharon Hill Branerd Blvd Curb Bumpout Bioswale	W4	0.49			100						100
Sharon Hill Calcon Hook and Woodland Ave Infiltration Basin (currently failed basin)	W5	1.98		99.3		0.09	0.61				100
Sharon Hill Cherry St Bumpout Bioswale	W6	0.25			100						100
Sharon Hill Chester Pike Memorial Park Bumpout Bioswale	W7	0.53			100						100
Sharon Hill Clifton Ave Bumpout Bioswale	W8	0.04			100						100
Sharon Hill Elmwood Ave 2 Bumpout Bioswale	W9	0.07			100						100
Sharon Hill Elmwood Ave Bumpout Bioswale	W10	0.03			100						100
Sharon Hill Garvin Blvd Bumpout Bioswale	W11	0.05			100						100
Sharon Hill Laurel Blvd Bumpout Bioswale	W12	0.04			100						100
Sharon Hill Melrose Ave Bumpout Bioswale	W13	0.03			100						100
Sharon Hill Public Works Rain Garden	W14	0.47		77.8	22.2						100
Sharon Hill Ridley Ave Rain Garden.Bioswale	W15	1.12			2.3	95				2.7	100
Sharon Hill South End Memorial Park Clifton Ave Bioswale	W16	0.51								100	100
Sharon Hill Weiderwax Field Parking Lot RainGarden	W17	0.19			73.8					26.2	100
Sharon Hill weiderwax Field Storage Facility RainGarden	W18	0.75								100	100

## TSS loads and reductions

1. Total load by subwatershed(s)					
Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction	
	t/year	t/year	t/year	%	
Sharon Hill 100 Chester Pike Bioswale	W1	0.1	0.1	0.0	79.3
Sharon Hill 1130 Chester Pike Bioswale	W2	0.2	0.2	0.0	80.2
Sharon Hill 230 Sharon Ave Library Bioswale	W3	0.0	0.0	0.0	81.6
Sharon Hill Branerd Blvd Curb Bumpout Bioswale	W4	0.3	0.2	0.1	80.0
Sharon Hill Calcon Hook and Woodland Ave Infiltration Basin (currently failed basin)	W5	0.3	0.3	0.0	95.0
Sharon Hill Cherry St Bumpout Bioswale	W6	0.1	0.1	0.0	80.0
Sharon Hill Chester Pike Memorial Park Bumpout Bioswale	W7	0.3	0.2	0.1	80.0
Sharon Hill Clifton Ave Bumpout Bioswale	W8	0.0	0.0	0.0	80.0
Sharon Hill Elmwood Ave 2 Bumpout Bioswale	W9	0.0	0.0	0.0	80.0
Sharon Hill Elmwood Ave Bumpout Bioswale	W10	0.0	0.0	0.0	80.0
Sharon Hill Garvin Blvd Bumpout Bioswale	W11	0.0	0.0	0.0	80.0
Sharon Hill Laurel Blvd Bumpout Bioswale	W12	0.0	0.0	0.0	80.0
Sharon Hill Melrose Ave Bumpout Bioswale	W13	0.0	0.0	0.0	80.0
Sharon Hill Public Works Rain Garden	W14	0.1	0.1	0.1	54.2
Sharon Hill Ridley Ave Rain Garden.Bioswale	W15	0.3	0.1	0.1	55.3
Sharon Hill South End Memorial Park Clifton Ave Bioswale	W16	0.0	0.0	0.0	80.0
Sharon Hill Weiderwax Field Parking Lot RainGarden	W17	0.1	0.0	0.0	54.9
Sharon Hill weiderwax Field Storage Facility RainGarden	W18	0.1	0.0	0.0	55.0

# Upper Darby Township

## Projects and land use

	8. Input or modify urban land use distribution											
	Watershed	Urban Area (ac.)	Commercial %	Industrial %	Institutional %	Transportation %	Multi-Family %	Single-Family %	Urban-Cultivated %	Vacant (developed)	Open Space %	Total % Area
Collenbrook Church Rain Garden	W1	0.4235	37.85	0	0	62.15	0	0	0	0	0	100
Collenbrook Church Riparian Buffer	W2	0.2929	27.75	0	0	72.25	0	0	0	0	0	100
Pilgram Park Wet Basin/Bioswale	W3	134	5.25	0	0	8.65	0	80.75	0	0	5.35	100
Huey Park Bioswale	W4	7.96	0	0	0	0	90.78	3.14	0	0	6.08	100
Gillespie Park Riparian Buffer	W5	6.585	0	0	0	1.53	57.21	2.39	0	0	38.87	100
Penn Pines Park Bioswale/Wetland	W6	5.512	0	0	0	34.54	58.16	4.99	0	0	2.31	100
Penn Pines Park Riparian Buffer	W7	0.5072	0	0	0	38.32	4.86	0	0	0	56.82	100
Kent Park	W8	1.64	0	0	0	0	0	0	0	47.76	52.24	100
Gillespie Park Riparian Buffer	W9	0.8352	0	0	0	0	93.35	6.65	0	0	0	100
Kent Park Streambank Stabilization	W10	0	0	0	0	0	0	0	0	0	0	0
Gillespie Park Streambank Stabilization	W11	0	0	0	0	0	0	0	0	0	0	0

## TSS loads and reductions

	1. Total load by subwatershed(s)				
	Watershed	Sediment Load (no BMP)	Sediment Reduction	Sediment Load (with BMP)	%Sed Reduction
		t/year	t/year	t/year	%
Collenbrook Church Rain Garden	W1	0.2	0.1	0.1	54.1
Collenbrook Church Riparian Buffer	W2	0.2	0.1	0.1	50.6
Pilgram Park Wet Basin/Bioswale	W3	25.2	20.1	5.1	79.6
Huey Park Bioswale	W4	2.2	1.4	0.8	63.6
Gillespie Park Riparian Buffer	W5	1.7	0.7	1.1	38.2
Penn Pines Park Bioswale/Wetland	W6	2.1	1.5	0.6	72.7
Penn Pines Park Riparian Buffer	W7	0.3	0.1	0.2	24.2
Kent Park	W8	0.3	0.1	0.2	29.2
Gillespie Park Riparian Buffer	W9	10.7	0.1	10.6	1.0
Kent Park Streambank Stabilization	W10	3.8	3.4	0.4	89.0
Gillespie Park Streambank Stabilization	W11	25.2	22.4	2.8	89.0

Proposed BMP: Street Sweeping in Cobbs Creek Watershed - Sediment Reduction Calculations*			
Municipality	Acres of Street Swept	Sediment Load (lbs)**	Sediment Removal (lbs)
Darby Boro	8.98	16,514.22	1,486.28
Upper Darby Twp	278.55	512,253.45	46,102.81
Yeadon Boro	39.32	72,309.48	6,507.85
		<b>Total Reduction:</b>	<b>54,097</b>
*Sediment Load Reductions Calculated based on PADEP's BMP Effectiveness Values Table			

**Loading Rates from DEP PRP Instructions, Attachment B "Developed Land Loading Rates for PA Counties" May, 2016; All Other Counties values used	
	<b>TSS</b>
<b>Impervious Surface Loading (lb/ac/yr)=</b>	1,839.00



Proposed BMP: Street Sweeping in Darby Watershed - Sediment Reduction Calculations*			
Municipality	Acres of Street Swept	Sediment Load (lbs)**	Sediment Removal (lbs)
Collingdale Boro	26.12	48,034.68	4,323.12
Darby Boro	18.80	34,573.20	3,111.59
Darby Twp	28.64	52,668.96	4,740.21
Glenolden Boro	27.06	49,763.34	4,478.70
Sharon Hill Boro	22.74	41,818.86	3,763.70
Upper Darby Twp	234.09	430,491.51	38,744.24
Yeadon Boro	4.24	7,797.36	701.76
		<b>Total Reduction:</b>	<b>59,863</b>
*Sediment Load Reductions Calculated based on PADEP's BMP Effectiveness Values Table			

**Loading Rates from DEP PRP Instructions, Attachement B "Developed Land Loading Rates for PA Counties" May, 2016; All Other Counties values used	
	<b>TSS</b>
<b>Impervious Surface Loading (lb/ac/yr)=</b>	<b>1,839.00</b>