POLLUTANT REDUCTION PLAN

For:

UPPER NAZARETH TOWNSHIP

Northampton County, Pennsylvania

August 20, 2018
Revised June 27, 2019
Revised September 16, 2020

Prepared By:

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NARRATIVE:

Upper Nazareth Township is located centrally within Northampton County, Pennsylvania. The Township is partly developed including residential, commercial and industrial areas. The entire Township is located within an urbanized area as defined by the 2010 U.S. Census Bureau. The Township has a Municipal Separate Storm Sewer System (MS4) permit (NPDES No. PAI132234).

The Township's urbanized areas and storm sewer outfalls drain to the Monocacy Creek, Schoeneck Creek and its tributaries, which are impaired, for 'Urban Runoff/Storm Sewer – Siltation'. One outfall drains to the Bushkill Creek, which is impaired for Pathogens. Another cause of impairment to this watershed is Flow Alterations. The Schoeneck Creek and its tributaries are also designated as Warm Water Fisheries (WWF) and Migratory Fishes (MF). The Monocacy Creek and its tributaries are also designated as a High Quality Cold Water Fishery (HQ-CWF) and Migratory Fishes (MF). The Bushkill Creek and its tributaries are also designated as a High Quality Cold Water Fishery (HQ-CWF) and Migratory Fishes (MF. The Monocacy Creek, Schoeneck Creek and Bushkill Creek are located within the Delaware River Basin.

Due to the aforementioned impairments, the Township is required to develop a Pollutant Reduction Plan (PRP) for sediment removal. The requirements set forth in the Pennsylvania Department of Environmental Protection's National Pollutant Discharge Elimination System (NPDES) Stormwater Discharges from Small Municipal Separate Storm Sewer Systems Pollutant Reduction Plan (PRP) Instructions require a minimum 10% sediment reduction from current sediment loading volumes.

This Plan outlines the existing loading within the Township PRP areas, highlights proposed Best Management Practices (BMPs), and provides operation and maintenance schedules for short- and long-term maintenance of the proposed BMPs.

EXISTING SEDIMENT LOADING / METHODOLOGY:

The Township's existing storm sewer infrastructure has been mapped using information obtained through a hand-held GPS unit. From the mapped storm sewer inlets, pipes, swales and outfalls, the storm sewer shed tributaries to each regulated outfall have been mapped using LIDAR two-foot (2') contours.

Existing sediment loading was then calculated using the online-based Wiki Watershed program, as developed by the Stroud Water Research Center. The PRP planning areas are the areas within each storm sewer shed that are tributary to a regulated outfall. The areas outside the urbanized area boundary have been parsed out.

The outputs from Wiki Watershed provide the land cover areas from within each PRP area. The table included in this narrative then converts these land cover areas from square meters to acres. Based on these areas, the following assumptions, in accordance with the 2011 National Land Cover Database (NLCD 2011), are made to calculate the amount of impervious and pervious areas within each study area:

Developed, Open Space: 19% Impervious
Developed, Low Intensity: 49% Impervious
Developed, Medium Intensity: 79% Impervious

Developed, High Intensity: 100% Impervious

For Northampton County, per Attachment B (Developed Land Loading Rates for PA Counties) in the Pennsylvania Department of Environmental Protection's PRP Instructions, the Total Sediment (TSS) loading is calculated by multiplying the Developed Impervious rate by 1,839 lbs./acre/yr.; by multiplying the Developed Pervious rate by 264.96 lbs./acre/yr.; and by multiplying the Undeveloped rate by 234.6 lbs./acre/yr.

A total sediment loading, in lbs. per year, was calculated for each storm sewer shed. These totals were then added together to generate the existing sediment loading for the Monocacy Creek and Schoeneck Creek watersheds.

AREAS THAT HAVE BEEN PARSED (EXPLANATION FOR REMOVAL OF AREAS FROM PRP):

The following areas have been parsed out from the Upper Nazareth Township's PRP plan.

1. The Outfall Subarea #035 Discharges to the Bushkill creek located at the eastern most corner of the Township. The Bushkill Creek is impaired for Pathogens. All the requirement layout in Appendix B will be addressed for this Outfall. The Outfall and its watershed area are shown on the attached map.
2. The area located in the southeast corner of the Township (P002) drains to the Quarry owned by Lehigh Cement Company. The water that enters the property flows into the Quarry. The Quarry to the knowledge of the Township and after some site investigation does not
3. The area located in the southeast corner of the Township (P003) is owned by Nazareth Area School District. There are no Municipal owned flows that enter the property.
4. discharge to the surface waters of the Commonwealth.
5. The areas labeled (P004) are areas that are privately owned that flow to the surface waters of the Commonwealth with no Municipal storm water flows both over the land as sheet flows or by their own independent storm water system.
6. This area labeled (P005) is the property owned by C.F. Martin & Company. Their discharge points are shown on the map as private and there are no Municipal storm water flows.
7. The area labeled (P006) in the center of the Township is farm land and facility owned by Northampton County. The storm water discharge does not drain to the Municipal Storm Sewer System.
8. The area labeled (P007) located in the southern part of the Township along RT 946 is a development that all storm water from the roadway enters an infiltration basin and does not leave the property.
9. The area labeled (P008) that drains to the southeast corner of New England Drive drains to a basin that discharges to a level spreader then through a wooded area before it gets to the train tracks. During a site investigation, there was no channelized discharge point found.
10. The area labeled (P009) is Quarry owned property in the western side of the Township that discharges over land in the sheet flow to the surface waters of the Commonwealth. There are no Municipal Flows within this area.

EXISTING BEST MANAGEMENT PRACTICES (BMPS):

There are four basins located in Subarea's 002, 016 and 018. These basins are constructed to meet the requirements set forth for BMP 6.6.3 Dry Extended Detention Basin. All four basins were converted in 2018 and are part of the Eagles Landing Subdivision. The reduction credits are located on sheet >>>>>>>>>>

PROPOSED SEDIMENT REDUCTION BEST MANAGEMENT PRACTICES (BMPS):

To reduce the required sediment loading, a series of proposed BMPs are recommended to be implemented. The requirements of the proposed BMPs and their anticipated operation and maintenance schedule are described as follows:

1. **BMP 6.6.3 Dry Extended Detention Basin:**

   General design considerations:

   1. Storage Volume, Depth and Duration.
      a. Extended detention basins should be designed to mitigate runoff peak flow .rates.
      b. An emergency outlet or spillway which is capable of conveying the spillway design flood (SDF) should be included in the design. The SDF is usually equal to the 100-year design flood.
      c. Extended detention basins should be designed to treat the runoff volume produced by the water quality design storm.
      d. Extended Detention Basins are designed to achieve a specified detention time. Details on the detention time are outlined in Chapter 3.
      e. The lowest elevation within an extended dry detention basin should be at least 2 fee above the seasonal high water table. If high water table conditions are anticipated, then the design of a wet pond, constructed wetland or bioretention facility should be considered.
   2. Dry Extended Detention Basin Location
      a. disturbed or developed areas on the site. The basin should collect as much site runoff as possible, especially from the site's impervious surfaces (roads, parking, buildings, etc.).
      b. Extended detention basins should not be constructed on steep slopes, nor should slopes be significantly altered or modified to reduce the steepness of the existing slope, for the purpose of installing a basin.
      c. Extended detention basins should not worsen the runoff potential of the existing site by removal of trees for the purpose of installing a basin.
      d. Extended detention basins should not be constructed in areas with high quality and/or
      well draining soils, which are adequate for the installation of BMPs capable of achieving stormwater infiltration.
      e. Extended detention basins should not be constructed within jurisdictional waters, including wetlands.
   3. Basin Sizing and Configuration
      a. Basins should be shaped to maximize the length of stormwater flow pathways and

minimize short-circuited inlet-outlet systems. Basins should have a minimum width of 10
feet. A minimum length-to-width ratio of 2:1 is recommended to maximize sedimentation.
b. Irregularly shaped basins are encouraged and appear more natural.
c. If site conditions inhibit construction of a long, narrow basin, baffles constructed from
earthen berms or other materials can be incorporated into the pond design to "lengthen"
the stormwater flow path. Care should be taken to ensure the design storage capacity is
provided after baffle installation.
d. Low flow channels, if required, should always be vegetated with a maximum slope of 3 percent to encourage sedimentation. Alternatively, other BMPs may be considered such as wet ponds, constructed wetlands or bioretention.

4. Embankments
   a. Embankments should be less than 15 feet in height and should have side slopes no steeper than 3:1 (H:V).
   b. The basin should have a minimum freeboard of 1 foot above the SDF elevation.
5. Inlet Structures
   a. Inlet structures to basin should not be submerged at the normal pool depth.
   b. Erosion protection measures should be utilized to stabilize inflow structures and channels.
6. Outlet Design
   a. In order to meet designs storm requirements, dry extended detention basins should have a multistage outlet structure. Three elements are typically included in this design:
   1. A low-flow outlet that controls the extended detention and functions to slowly release the water quality design storm.
   2. A primary outlet the functions to attenuate the peak of larger design storms.
   3. An emergency overflow outlet/spillway.
   b. The primary outlet structure should incorporate weirs, orifices, pipes or a combination of
   these to control runoff peak rates for required design storms. Water quality storage should be provided below the invert of the primary outlet. When routing basins, the lowflow outlet should be included in the depth-discharge relationship.
   c. Energy dissipaters are to be placed at the end of the primary outlet to prevent er the basin discharges to a channel with dry weather flow, care should be taken to minimize tree clearing along the downstream channel and to reestablish a forested riparian zone between the outlet and natural channel. Where feasible, a multiple orifice outlet system is preferred to a single pipe.
   d. The orifice should typically be no smaller than 2.5 inches in diameter. However, the orifice diameter may be reduced to 1 inch if adequate protection from clogging is provided.
   e. The hydraulic design of all outlet structures should consider any tailwater effects of downstream waterways.
   The primary and low flow outlet should be protected from clogging by an external trash
   rack.
7. Sediment Forebay

a. Forebays should be incorporated into the extended detention design. The forebay storage volume is indicated for the water quality volume requirements.

b. Forebays should be vegetated to improve filtering of runoff, to reduce runoff velocity, and to stabilize soils against erosion. Forebays are typically constructed as shallow marsh areas and should adhere to the following design criteria:

1. It is recommended that forebays have a minimum length of 10 feet.

2. Storage should be provided to trap the anticipated sediment volume produced over a period of 2 years.

3. Forebays should be protected from the erosive force of the inflow to prevent resuspension of previously collected sediment during large storms (typically constructed offline).

8. Vegetation and Soils Protection
    a. Care should be taken to prevent compaction of in situ soils in the bottom of the extended detention basin in order to promote healthy plant growth and to encourage infiltration. If soils compaction is not prevented during construction, soils should be restored as discussed in BMP 6.7.3 - Soils Amendment & Restoration.
    b. It is recommended that basin bottoms be vegetated in a diverse native planting mix to reduce maintenance need, promote natural landscapes, and increase infiltration potential. Vegetation may include trees, woody shrubs and meadow/wetland herbaceous plants.
    c. Woody vegetation should not be planted on the embankments or within 25 feet of the emergency overflow spillway.
    d. Meadow grasses or other deeply rooted herbaceous vegetation is recommended on the interior slope of embankments.
    e. Fertilizers and pesticides should not be used

9. Special Design Considerations

    a. Ponds hat have embankments higher than 15 feet, have a drainage of more than 100 acres or will impound more that 50 acre-feet of runoff during the high-water condition will be regulated as dams by PADEP. The designer shall consult Pennsylvania Chapter 105 to determine which provisions may apply to the specific project in question.

    b. Extended detention ponds should not be utilized as recreation areas due to health and safety issues. Design features that discourage access are recommended.

Specific design considerations:

This PRP proposes the Conversion of an existing Detention/Retention Basin into a Dry Extended Basin within existing Township-owned land.

1. Basin #1 Conversion of a Detention/Retention Basin to BMP 6.6.3: Dry Extended Basin. The proposed basin is to be located in the water shed area for Outfall #027. The existing Basin will be converted in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.

Photograph taken August 30, 2018 (Existing Basin proposed for Dry Extended Basin Conversion).

2. Basin #2 Conversion of a Detention/Retention Basin to BMP 6.6.3: Dry Extended Basin. The proposed basin is to be located in the water shed area for Outfall #017. The existing Basin will be converted in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.

Photograph taken August 30, 2018 (Existing Basin proposed for Dry Extended Basin Conversion).

3. Basin #3 Conversion of a Detention/Retention Basin to BMP 6.6.3: Dry Extended Basin. The proposed basin is to be located in the water shed area for Check Point #001. The existing Basin will be converted in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.

Photograph taken from GIS (Existing Basin proposed for Dry Extended Basin Conversion).

2. BMP 6.4.8 Vegetated Swale:

General design considerations:

1. Vegetated Swales are sized to temporarily store and infiltrate the 1-inch storm event, while providing conveyance for up to the 10-year storm with freeboard; flows for up to the 10-year storm are to be accommodated without causing erosion. Swales should maintain a maximum ponding depth of 18 inches at the end point of the channel, with a 12-inch average maintained throughout. Six inches of freeboard is recommended for the 10-year storm. Residence times between 5 and 9 minutes are acceptable for swales without check-dams. The maximum ponding time is 48 hours, though 24 hours is more desirable (minimum of 30 minutes). Studies have shown that the maximum amount of swale filtering occurs for water depths below 6 inches. It is critical that swale vegetation not be submerged, as it could cause the vegetation to bend over with the flow. This would naturally lead to reduced roughness of the swale, higher flow velocities, and reduced contact filtering opportunities.
2. Longitudinal slopes between 1% and 3% are generally recommended for swales. If the
topography necessitates steeper slopes, check dams or TRM's are options to reduce the energy gradient and erosion potential.
3. Check dams are recommended for vegetated swales with longitudinal slopes greater than 3%. They are often employed to enhance infiltration capacity, decrease runoff volume, rate, and velocity, and promote additional filtering and settling of nutrients and other pollutants. In effect, check-dams create a series of small, temporary pools along the length of the swale, which shall drain down within a maximum of 72 hours. Swales with check-dams are much more effective at mitigating runoff quantity and quality than those without. The frequency and design of check-dams in a swale will depend on the swale length and slope, as well as the desired amount of storage/treatment volume. Care must be taken to avoid erosion around the ends of the check dams. Check-dams shall be constructed to a height of 6 to 12 in and be regularly spaced. The following materials have been employed for check-dams: natural wood, concrete, stone, and earth. Earthen
check-dams however, are typically not recommended due to their potential to erode. A
weep hole(s) may be added to a check-dam to allow the retained volume to slowly drain out. Care should be taken to ensure that the weep hole(s) is not subject to clogging. In the case of a stone am, a better approach might be to allow low flows (2-year storm) to drain through the stone, while allowing higher flows (10-year storm) drain through a weir in the center of the dam. Flows through a stone check-dam are a function of stone size, flow depth, flow width, and flow path length through the dam. The following equation can be used to estimate the flow through a stone check dam up to 6 feet long:

$$q = h^{1.5} / (L/D + 2.5 + L_2)^{0.5}$$

where:

q = flow rate exiting check dam (cfs/ft)

h = flow depth (ft)
L = length of flow (ft)
D = average stone diameter (ft) (more uniform gradations are preferred)

For low flows, check-dam geometry and swale width are actually more influential on flow than stone size. The average flow length through a check-dam as a function of flow depth can be determined by the following equation:

$$L = (ss) \times (2d - h)$$

where:

ss = check dam side slope (maximum 2:1)
d = height of dam (ft)
h = flow depth (ft)

When swale flows overwhelm the flow-through capacity of a stone check-dam, the top of the dam shall act as a standard weir (use standard weir equation). (Though a principal spillway, 6 inches below the height of the dam, may also be required depending on flow conditions.) If the check-dam is designed to be overtopped, appropriate selection of aggregate will ensure stability during flooding events. In general, one stone size for a dam is recommended for ease of construction. However, two or more stone sizes may be used, provided a larger stone (e.g. R-4) is placed on the downstream side, since flows are concentrated at the exit channel of the weir. Several feet of smaller stone (e.g. AASHTO #57) can then be placed on the upstream side. Smaller stone may also be more appropriate at the base of the dam for constructability purposes.

4. The effectiveness of a vegetated swale is directly related to the contributing land use, the size of the drainage area, the soil type, slope, drainage area imperviousness, proposed vegetation, and the swale dimensions. Use of natural low points in the topography may be suited for swale location, as are natural drainage courses although infiltration capability may also be reduced in these situations. The topography of a site should allow for the design of a swale with sufficiently mild slope and flow capacity. Swales are impractical in areas of extreme (very flat or steep) slopes. Of course, adequate space is needed for vegetated swales. Swales are ideal as an alternative to curbs and gutters along parking lots and along small roads in gently sloping terrain.

   Sitting of vegetated swales should take into account the location and function of other site features (buffers, undisturbed natural areas, etc.). Siting should also attempt to aesthetically fit the swale into the landscape as much as possible. Sharp bends in swales should be avoided.

   Implementing vegetated swales is challenging when development density exceeds four dwelling units per acre, in which case the number of driveway culverts often increases to the point where swales essentially become broken-pipe systems.

   Where possible construct swales in areas of uncompacted cut. Avoid constructing side slopes in fill material. Fill slopes can be prone to erosion and/or structural damage by burrowing animals.
5. Soil Testing is required when infiltration is planned (see Appendix C).
6. Guidelines for Infiltration Systems should be met as necessary (see Appendix C).

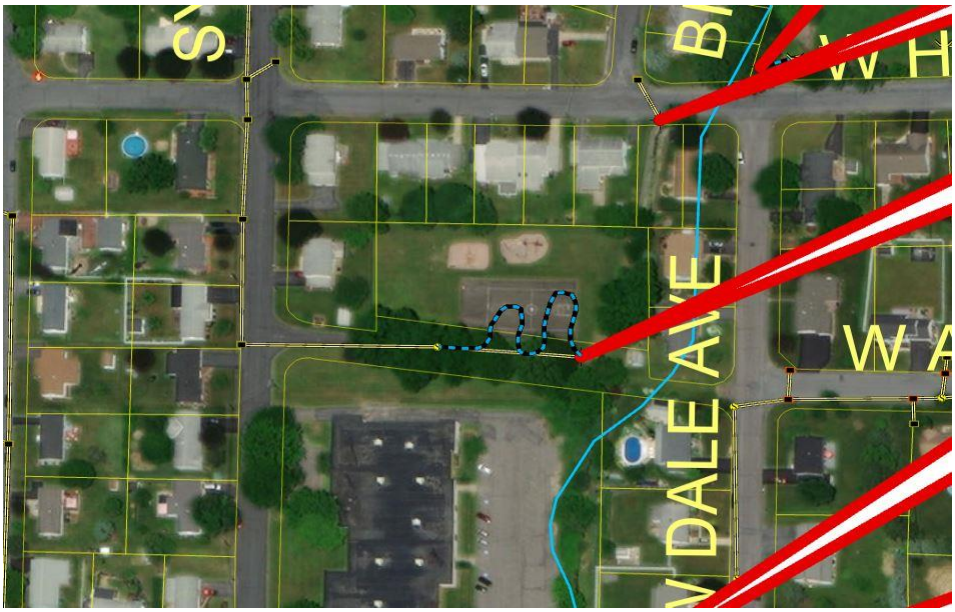
7. Swales are typically most effective, when treating an area of 1 to 2 acres although vegetated swales can be used to treat and convey runoff from an area of 5 to 10 acres in size. Swale serving greater than 10-acre drainage areas will provide a lesser degree water quality treatment, unless special provisions are made to manage the increased flows.
8. Runoff can be directed into Vegetated Swales either as concentrated flows or as lateral sheet flow drainage. Both are acceptable provided sufficient stabilization or energy dissipation is included (see #6). If flow is to be directed into a swale via curb cuts, provide a 2 to 3 inch drop at the interface of pavement and swale. Curb cuts should be at least 12 inches wide to prevent clogging and should be spaced appropriately.
9. Vegetated swales are sometimes used as pretreatment devices for other structural BMPs especially roadway runoff. However, when swales themselves are intended to effectively treat runoff from highly impervious surfaces, pretreatment measures are recommended to enhance swale performance. Pretreatment can dramatically extend the functional life of any BMP, as well as increase its pollutant removal efficiency by settling out some of the heavier sediments. This treatment volume is typically obtained by installing check dams at pipe inlet and/or driveway crossings. Pretreatment options include a vegetated filter strip, a sediment forebay (or plunge pool) for concentrated flows, or a pea gravel diaphragm (or alternative) with a 6-inchdrop where parking lot sheet flow is directed into a swale.

And all other requirements set forth in the DEP Pennsylvania Stormwater Best Management Practices Manual.

Specific design considerations:

This PRP proposes the construction of a vegetated swale with an infiltration trench within existing Township-owned land.

1. Construction of a BMP 6.4.8 Vegetated swale with an infiltration trench. The proposed vegetated swale is to be located in the water shed area for Outfall #032. The existing area is park and the storm sewer pipe that runs through the property on its way to the creek will be disconnected and a Vegetated swale with be constructed in accordance with the recommendations outlined in the December 30, 2006 Pennsylvania Stormwater Best Management Practices manual.



Photograph taken from GIS (Construction of the Vegetated swale within Sycamore Park).

FUNDING MECHANISMS:

BMPs will be funded by the Township's general fund. Additional resources that may be pursued include grant funding through sources such as PennVEST or DEP Growing Greener.

ESTIMATE OF PROBABLE COSTS:

1. Dry Extended Basin #1: Based on an estimated cost of $60.00 per Square Yard for construction, design and permitting, the total construction cost for the basin conversion is approximately **$207,947.50.**
2. Dry Extended Basin #2: Based on an estimated cost of $60.00 per Square Yard for construction, design and permitting, the total construction cost for the basin conversion is approximately **$190,295.00.**
3. Dry Extended Basin #3: Based on an estimated cost of $60.00 per Square Yard for construction, design and permitting, the total construction cost for the basin conversion is approximately **$131,629.00.**
4. Vegetated swale: Based on the estimated cost for construction, design and permitting, the total construction cost for the Vegetated swale is approximately **$216,550.00**.

RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE (O&M) OF BMPs:
Upper Township will be responsible for the operation and maintenance of the proposed BMPs in accordance with the following schedule:

Inspection Activity	Frequency	Maintenance Action
Dry Extended Basin and Vegetated Swale		
Inspect for erosion, damage to vegetation, and sediment and debris accumulation	Annually and after every major rainfall event (>2 inches in 24 hours)	Correct erosive conditions and re-stabilize. Remove debris and sediment and dispose of in accordance with all federal, state and local laws.
Inspect vegetation on side slopes for erosion and formation of rill and gullies	Annually and after every major rainfall event (>2 inches in 24 hours)	Correct erosive conditions and re-stabilize as needed.
Inspect for pools of standing water	Annually and after every major rainfall event (>2 inches in 24 hours)	Dewater and discharge to an approved location. Restore and re-stabilize to design grades.
Mow and trim vegetation to ensure safety, aesthetics, proper swale construction or to suppress weeds and invasive vegetation	Annually in early spring	Dispose of cutting in a local composting facility. Mow only when swale is dry to avoid rutting.
Inspect for litter	Annually and prior to mowing	Remove litter and dispose accordingly.
Inspect for uniformity in cross-section and longitudinal slope	Annually and after every major rainfall event (>2 inches in 24 hours)	Correct as needed. Immediately stabilize disturbed areas.
Inspect vegetation for uniform establishment	Annually	Plant alternative grass species as needed. Immediately stabilize disturbed areas.
Inspect basin for bare areas	Annually	Re-seed bare areas. Install appropriate erosion control measures when native soil is exposed or erosion channels are forming.
Inspect for areas of standing water that dewater in greater than 48 hours	Annually and after every major rainfall event (>2 inches in 24 hours)	Rototill and re-plant swale as needed. Restore to design grades.
Inspect basin vegetation	During extreme dry periods	Water, fertilize and/or apply pesticide only when absolutely necessary.

Inspect basin	Immediately after spring melt	Remove residuals (e.g. sand or cinders) and replace damaged vegetation without disturbed remaining vegetation.
Restore soil structure and moisture capacity of the basin	Immediately after spring melt	Mulching and/or soil aeration/manipulation may be required to restore soil structure and moisture capacity and to reduce impacts of deicing agents.
Inspect basin inlet and outlet for signs of erosion or blockage	Annually and after every major rainfall event (>2 inches in 24 hours)	Remove debris and sediment and dispose of in accordance with all federal, state, and local laws.

SCHEDULE OF THE IMPLEMENTATION OF THE PROPOSED BMPs:

The following schedule will outline the implementation of the proposed BMPs:

1. **During 2021 the Township is planning to complete the following:**
    1. Studies, design and submit for permits for Basin 1 Conversion.
2. **During 2022 the Township is planning to complete the following:**
    1. Studies, design and submit for permits for Basin 2 Conversion.
    2. Start and complete the conversion for Basin #1.
3. **During 2023 the Township is planning to complete the following:**
    1. Studies, design and submit for permits for Basin 3 Conversion.
    2. Start and complete the conversion for Basin #2.
4. **During 2024 the Township is planning to complete the following:**
    1. Studies, design and submit for permits for Vegetated Swale construction.
    2. Start and complete the conversion for Basin #3.
5. **During 2025 the Township is planning to complete the following:**
    1. Start and complete the construction of the Vegetated Swale.

SOILS MAP

United States Department of Agriculture

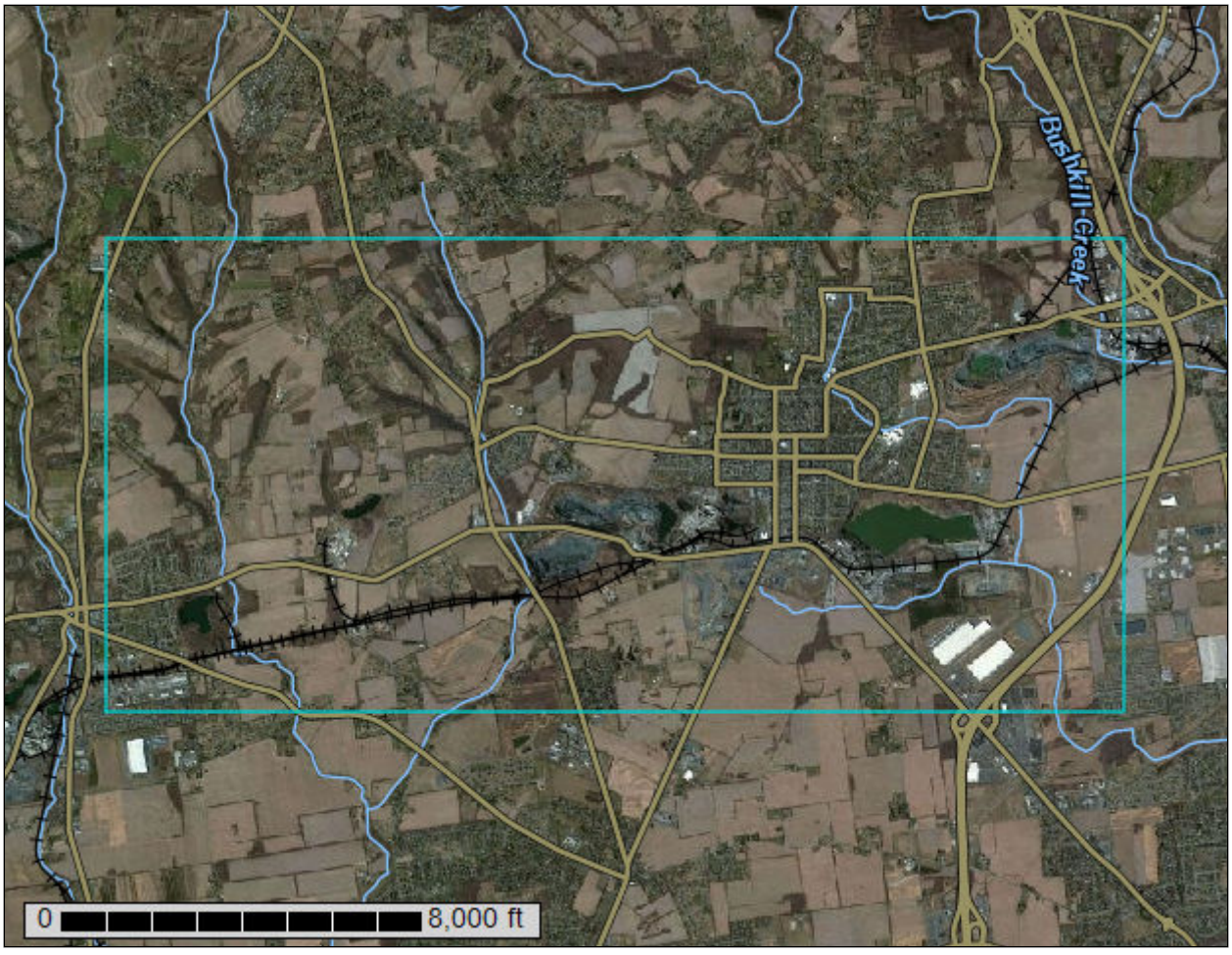
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Northampton County, Pennsylvania

Upper Nazareth Township



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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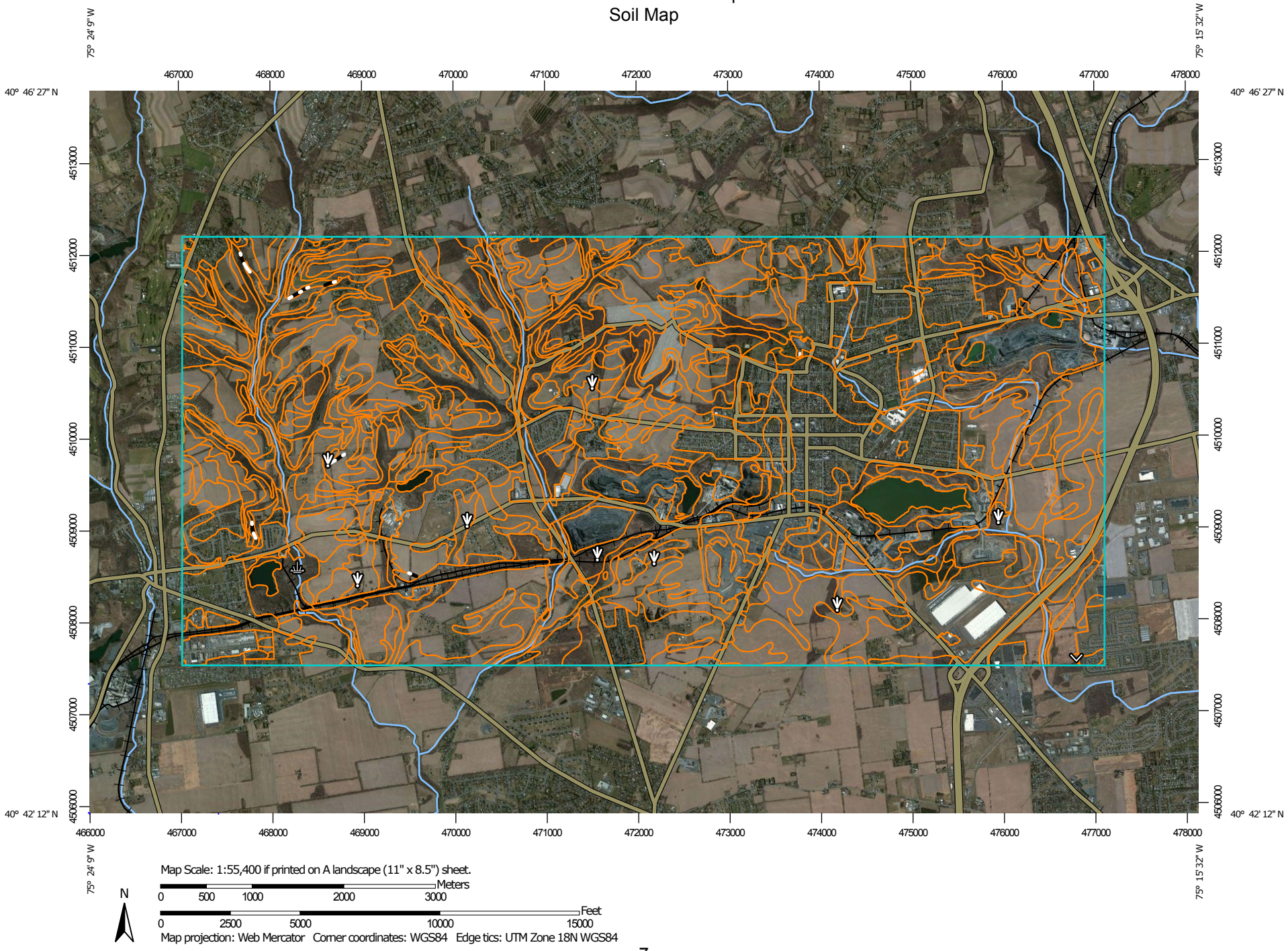
Contents

Custom Soil Resource Report

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Northampton County, Pennsylvania
Survey Area Data: Version 9, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 20, 2011—May 10, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AfB	Allenwood silt loam, 3 to 8 percent slopes	28.7	0.2%
BfA	Bedington-Berks complex, 0 to 3 percent slopes	13.2	0.1%
BfB	Bedington-Berks complex, 3 to 8 percent slopes	33.4	0.3%
BkA	Berks-Weikert complex, 0 to 3 percent slopes	142.2	1.2%
BkB	Berks-Weikert complex, 3 to 8 percent slopes	1,186.8	10.2%
BkC	Berks-Weikert complex, 8 to 15 percent slopes	908.7	7.8%
BkD	Berks-Weikert complex, 15 to 25 percent slopes	334.1	2.9%
BkF	Berks-Weikert complex, 25 to 60 percent slopes	405.6	3.5%
BtA	Brinkerton-Comly silt loams, 0 to 3 percent slopes	33.5	0.3%
BtB	Brinkerton-Comly silt loams, 3 to 8 percent slopes	99.7	0.9%
ClA	Clarksburg silt loam, 0 to 3 percent slopes	443.7	3.8%
ClB	Clarksburg silt loam, 3 to 8 percent slopes	534.5	4.6%
CpA	Comly silt loam, 0 to 3 percent slopes	222.7	1.9%
CpB	Comly silt loam, 3 to 8 percent slopes	224.3	1.9%
DaA	Delaware fine sandy loam, 0 to 3 percent slopes	3.3	0.0%
DuA	Duffield silt loam, 0 to 3 percent slopes	85.1	0.7%
DuB	Duffield silt loam, 3 to 8 percent slopes	437.1	3.7%
DvC	Duffield-Ryder silt loams, 8 to 15 percent slopes	68.3	0.6%
Ho	Holly silt loam	138.6	1.2%
PQ	Pits, quarry	497.4	4.3%
RyB	Ryder-Duffield silt loams, 3 to 8 percent slopes	177.5	1.5%
UbB	Udorthents, limestone, 0 to 8 percent slopes	480.2	4.1%
UfB	Udorthents, sanitary landfill	13.3	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UhD	Udorthents, shale and sandstone, 8 to 25 percent slopes	3.4	0.0%
UkaB	Urban land, 0 to 8 percent slopes	524.9	4.5%
UlB	Urban land-Berks complex, 0 to 8 percent slopes	173.7	1.5%
UlD	Urban land-Berks complex, 8 to 25 percent slopes	63.9	0.5%
UoB	Urban land-Duffield complex, 0 to 8 percent slopes	1,103.0	9.4%
UoD	Urban land-Duffield complex, 8 to 25 percent slopes	158.7	1.4%
UudB	Urban land-Udorthents, limestone complex, 0 to 8 percent slopes	413.8	3.5%
UudD	Urban land-Udorthents, limestone complex, 8 to 25 percent slopes	8.3	0.1%
UusB	Urban land-Udorthents, shale and sandstone complex, 0 to 8 percent slopes	39.6	0.3%
UusD	Urban land-Udorthents, shale and sandstone complex, 8 to 25 percent slopes	52.5	0.4%
W	Water	186.0	1.6%
WaA	Washington silt loam, 0 to 3 percent slopes	453.3	3.9%
WaB	Washington silt loam, 3 to 8 percent slopes	1,558.9	13.4%
WaC	Washington silt loam, 8 to 15 percent slopes	168.7	1.4%
WaD	Washington silt loam, 15 to 25 percent slopes	6.7	0.1%
WkB	Weikert-Berks complex, 3 to 8 percent slopes	28.8	0.2%
WkC	Weikert-Berks complex, 8 to 15 percent slopes	69.8	0.6%
WkD	Weikert-Berks complex, 15 to 25 percent slopes	149.6	1.3%
Totals for Area of Interest		**11,675.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

Custom Soil Resource Report

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps.

The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Northampton County, Pennsylvania

AfB—Allenwood silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l785
Elevation: 300 to 1,600 feet
Mean annual precipitation: 35 to 65 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Allenwood and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Allenwood

Setting

Landform: Valley sides
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Old till derived from sedimentary rock

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 42 inches: gravelly clay loam
C - 42 to 69 inches: very gravelly clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 60 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Berks

Percent of map unit: 2 percent
Landform: Ridges, valleys
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Brinkerton

Percent of map unit: 1 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Comly

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Weikert

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

BfA—Bedington-Berks complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: l78q
Elevation: 300 to 1,600 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bedington and similar soils: 60 percent
Berks and similar soils: 30 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bedington

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Acid residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 43 inches: channery silt loam
C - 43 to 63 inches: extremely channery silt loam
R - 63 to 73 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges, valleys
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery loam
Bw - 10 to 26 inches: very channery silt loam
C - 26 to 33 inches: very channery loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 6 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Brinkerton

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Weikert

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

BfB—Bedington-Berks complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l78r
Elevation: 300 to 1,600 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Bedington and similar soils: 55 percent
Berks and similar soils: 35 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bedington

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery silt loam
Bt - 10 to 43 inches: channery silt loam
C - 43 to 63 inches: extremely channery silt loam
R - 63 to 73 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges, valleys
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery loam
Bw - 10 to 26 inches: very channery silt loam
C - 26 to 33 inches: extremely channery loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Brinkerton

Percent of map unit: 3 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Weikert

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

BkA—Berks-Weikert complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2sgbf
Elevation: 310 to 960 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Berks and similar soils: 70 percent
Weikert and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam
Bw1 - 7 to 14 inches: very channery loam
Bw2 - 14 to 21 inches: very channery silt loam
C - 21 to 30 inches: extremely channery loam
R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0

Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)
Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw - 8 to 15 inches: very channery silt loam
C - 15 to 18 inches: extremely channery silt loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Brinkerton

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: Yes

BkB—Berks-Weikert complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2sgbh
Elevation: 250 to 1,740 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Berks and similar soils: 65 percent
Weikert and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam
Bw1 - 7 to 14 inches: channery silt loam
Bw2 - 14 to 21 inches: very channery silt loam
C - 21 to 30 inches: extremely channery loam
R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)
Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw - 8 to 15 inches: very channery silt loam
C - 15 to 18 inches: extremely channery silt loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to very high (0.00 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 6 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Brinkerton

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: Yes

BkC—Berks-Weikert complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2sgbj
Elevation: 210 to 3,270 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Berks and similar soils: 65 percent
Weikert and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam

Bw1 - 7 to 14 inches: channery loam
Bw2 - 14 to 21 inches: very channery silt loam
C - 21 to 30 inches: extremely channery loam
R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)
Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw - 8 to 15 inches: very channery silt loam
C - 15 to 18 inches: extremely channery silt loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.28 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)

Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 6 percent
Landform: Ridges
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Brinkerton

Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

BkD—Berks-Weikert complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2wkdr
Elevation: 230 to 1,240 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 155 to 177 days
Farmland classification: Not prime farmland

Map Unit Composition

Berks and similar soils: 65 percent
Weikert and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam
Bw1 - 7 to 15 inches: very channery silt loam
Bw2 - 15 to 22 inches: very channery silt loam
C - 22 to 37 inches: extremely channery silt loam
R - 37 to 47 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Weikert

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery silt loam
Bw - 7 to 14 inches: very channery silt loam
C - 14 to 18 inches: extremely channery silt loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Minor Components

Comly
Percent of map unit: 6 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: No

Brinkerton
Percent of map unit: 4 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

BkF—Berks-Weikert complex, 25 to 60 percent slopes

Map Unit Setting
National map unit symbol: 2sgcr
Elevation: 220 to 1,300 feet
Mean annual precipitation: 29 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Not prime farmland

Map Unit Composition
Berks and similar soils: 65 percent
Weikert and similar soils: 25 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Berks

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Acid brown residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 5 inches: channery loam
Bw1 - 5 to 15 inches: very channery silt loam
Bw2 - 15 to 22 inches: very channery silt loam
C - 22 to 37 inches: extremely channery silt loam
R - 37 to 47 inches: bedrock

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Acid Soils (RA3)
Hydric soil rating: No

Description of Weikert

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Acid brown residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 5 inches: channery silt loam
Bw - 5 to 18 inches: very channery loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: 8 to 19 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Other vegetative classification: Not Suited (NS)
Hydric soil rating: No

Minor Components

Bedington

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Comly

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Brinkerton

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

BtA—Brinkerton-Comly silt loams, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: l790
Elevation: 300 to 1,400 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Brinkerton and similar soils: 75 percent
Comly and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brinkerton

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Fine-silty colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 9 inches: silt loam
Bt - 9 to 16 inches: silty clay loam
Bx - 16 to 42 inches: channery clay loam
C - 42 to 61 inches: channery loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 11 to 30 inches to fragipan; 60 to 99 inches to lithic bedrock
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Hydric soil rating: Yes

Description of Comly

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Acid fine-loamy colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 25 inches: channery silty clay loam
Btx - 25 to 52 inches: channery loam
C - 52 to 61 inches: very channery silt loam
R - 61 to 72 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 35 inches to fragipan; 60 to 96 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

BtB—Brinkerton-Comly silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l791
Elevation: 300 to 1,400 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Brinkerton and similar soils: 75 percent
Comly and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brinkerton

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Fine-silty colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 9 inches: silt loam
Bt - 9 to 16 inches: silty clay loam
Bx - 16 to 42 inches: channery clay loam
C - 42 to 61 inches: channery loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 11 to 30 inches to fragipan; 60 to 99 inches to lithic bedrock
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Hydric soil rating: Yes

Description of Comly

Setting

Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Acid fine-loamy colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 25 inches: channery silty clay loam
Btx - 25 to 52 inches: channery loam
C - 52 to 61 inches: very channery silt loam
R - 61 to 72 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 36 inches to fragipan; 60 to 96 inches to lithic bedrock
Natural drainage class: Moderately well drained

Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

ClA—Clarksburg silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 21xwj
Elevation: 200 to 1,500 feet
Mean annual precipitation: 32 to 48 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Clarksburg and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clarksburg

Setting
Landform: Valley flats
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Residuum weathered from limestone

Typical profile
Ap - 0 to 8 inches: silt loam
Bt - 8 to 27 inches: silt loam
Btx - 27 to 51 inches: silt loam
C - 51 to 84 inches: silt loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 36 inches to fragipan; 60 to 99 inches to
Natural drainage class: Moderately well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Thorndale

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

ClB—Clarksburg silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 21xwk
Elevation: 200 to 1,500 feet
Mean annual precipitation: 32 to 48 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Clarksburg and similar soils: 90 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clarksburg

Setting

Landform: Valley flats
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Residuum weathered from limestone

Typical profile

Ap - 0 to 8 inches: silt loam

Bt - 8 to 27 inches: silt loam
Btx - 27 to 51 inches: silt loam
C - 51 to 84 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 36 inches to fragipan; 60 to 99 inches to
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Thorndale

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

CpA—Comly silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: l79l
Elevation: 300 to 1,400 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 120 to 214 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Comly and similar soils: 90 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Comly

Setting

Landform: Valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Acid fine-loamy colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 25 inches: channery silty clay loam
Btx - 25 to 52 inches: channery loam
C - 52 to 61 inches: very channery silt loam
R - 61 to 80 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 35 inches to fragipan; 60 to 96 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Brinkerton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

CpB—Comly silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l79m
Elevation: 300 to 1,400 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 120 to 214 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Comly and similar soils: 90 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Comly

Setting

Landform: Valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Parent material: Acid fine-loamy colluvium derived from shale and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 25 inches: channery silty clay loam
Btx - 25 to 52 inches: channery loam
C - 52 to 61 inches: very channery silt loam
R - 61 to 80 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 35 inches to fragipan; 60 to 96 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Brinkerton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

DaA—Delaware fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: l79w
Elevation: 0 to 910 feet
Mean annual precipitation: 28 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 110 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Delaware and similar soils: 90 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delaware

Setting

Landform: Terraces
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Postglacial alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw - 10 to 40 inches: very fine sandy loam
C - 40 to 87 inches: loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 72 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare

Frequency of ponding: None
Available water storage in profile: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Alton

Percent of map unit: 5 percent
Landform: Alluvial fans, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Conotton

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hatboro

Percent of map unit: 1 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

Nanticoke

Percent of map unit: 1 percent
Landform: Tidal flats
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

DuA—Duffield silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 21xx1

Elevation: 200 to 1,500 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Duffield and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Duffield

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from limestone and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 53 inches: silty clay loam
C - 53 to 72 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 48 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Ryder

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Clarksburg

Percent of map unit: 3 percent

Landform: Valley flats
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Thorndale

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Penlaw

Percent of map unit: 2 percent
Landform: Swales
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

DuB—Duffield silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 21xx2
Elevation: 200 to 1,500 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Duffield and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Duffield

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from limestone and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 53 inches: silty clay loam
C - 53 to 72 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 48 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clarksburg

Percent of map unit: 5 percent
Landform: Valley flats
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Ryder

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Thorndale

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

DvC—Duffield-Ryder silt loams, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 23dvt
Elevation: 200 to 1,500 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Duffield and similar soils: 60 percent
Ryder and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Duffield

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Residuum weathered from limestone and siltstone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 53 inches: silty clay loam
C - 53 to 72 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 48 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Custom Soil Resource Report

Description of Ryder

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Residuum weathered from limestone

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 30 inches: silt loam
C - 30 to 38 inches: very channery silt loam
R - 38 to 48 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clarksburg

Percent of map unit: 4 percent
Landform: Valley flats
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Thorndale

Percent of map unit: 3 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Penlaw

Percent of map unit: 3 percent
Landform: Swales

Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Ho—Holly silt loam

Map Unit Setting

National map unit symbol: l7bn
Elevation: 100 to 1,300 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Holly and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holly

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bg - 7 to 26 inches: silty clay loam
Cg - 26 to 44 inches: silty clay loam
2Cg - 44 to 62 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Frequent
Frequency of ponding: Occasional
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Linden

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Gibraltar

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Brinkerton

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

PQ—Pits, quarry

Map Unit Setting

National map unit symbol: l7c6
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 161 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, quarries: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Quarries

Setting

Landform: Hills
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Pits

Minor Components

Waste areas

Percent of map unit: 10 percent
Hydric soil rating: No

RyB—Ryder-Duffield silt loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l7cl
Elevation: 300 to 1,000 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ryder and similar soils: 65 percent
Duffield and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ryder

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Residuum weathered from shaly limestone

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 34 inches: channery silt loam
C - 34 to 38 inches: very channery silt loam
R - 38 to 48 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 24 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Duffield

Setting
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy residuum weathered from impure limestone and calcareous siltstone

Typical profile
Ap - 0 to 10 inches: silt loam
Bt - 10 to 53 inches: silt loam
C - 53 to 72 inches: channery silt loam

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: 48 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

UbB—Udorthents, limestone, 0 to 8 percent slopes

Map Unit Setting
National map unit symbol: 23f03

Elevation: 300 to 900 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 160 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Udorthents, limestone, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Limestone

Setting
Landform: Hills
Landform position (three-dimensional): Interfluve, side slope, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Graded areas of argillaceous limestone

Typical profile
A/B - 0 to 6 inches: silty clay loam
C - 6 to 60 inches: clay

Properties and qualities
Slope: 0 to 8 percent
Depth to restrictive feature: 40 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 60 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.2 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

UfB—Udorthents, sanitary landfill

Map Unit Setting
National map unit symbol: 23f2l
Elevation: 100 to 1,600 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 110 to 190 days
Farmland classification: Not prime farmland

Custom Soil Resource Report

Map Unit Composition

Udorthents, sanitary landfill, and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Sanitary Landfill

Setting

Landform: Upland slopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Mixed fill

Typical profile

A - 0 to 24 inches: gravelly loam
C - 24 to 70 inches: variable

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 10 to 70 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Croton

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

UhD—Udorthents, shale and sandstone, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 23dzp
Elevation: 200 to 1,000 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 160 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, shale and sandstone, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Shale And Sandstone

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope, nose slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Graded areas of sandstone and shale

Typical profile

A - 0 to 6 inches: silt loam
C - 6 to 60 inches: very channery silt loam

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 20 to 99 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 6.00 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A/D
Hydric soil rating: No

Minor Components

Croton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Penn

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Abbottstown

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Bowmansville

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

UkaB—Urban land, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 23f0k
Elevation: 800 to 1,500 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent

Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting
Parent material: Pavement, buildings and other artifically covered areas human transported material

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Udorthents, unstable fill
Percent of map unit: 10 percent
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

UIB—Urban land-Berks complex, 0 to 8 percent slopes

Map Unit Setting
National map unit symbol: l7d7
Elevation: 300 to 1,500 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 44 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 65 percent
Berks and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting
Landform: Ridges, hills, valleys
Landform position (two-dimensional): Summit, footslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas

Properties and qualities
Slope: 0 to 8 percent
Depth to restrictive feature: 10 to 100 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges, valleys
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery loam
Bw - 10 to 26 inches: very channery silt loam
C - 26 to 33 inches: extremely channery loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Brinkerton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Hydric soil rating: Yes

UID—Urban land-Berks complex, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: l7d6
Elevation: 300 to 1,500 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 44 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent
Berks and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Ridges, hills, valleys
Landform position (two-dimensional): Summit, footslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 10 to 100 inches to lithic bedrock
Runoff class: Very high
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges, valleys
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery loam
Bw - 10 to 26 inches: very channery silt loam
C - 26 to 33 inches: extremely channery loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave, linear
Hydric soil rating: No

Brinkerton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

UoB—Urban land-Duffield complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 23f21
Elevation: 200 to 1,500 feet

Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 44 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent
Duffield and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 to 100 inches to lithic bedrock
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Duffield

Setting

Landform: Valleys
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from limestone

Typical profile

Ap - 0 to 10 inches: silt loam
Bt - 10 to 53 inches: silty clay loam
C - 53 to 72 inches: silt loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 48 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clarksburg

Percent of map unit: 4 percent
Landform: Valley flats
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Penlaw

Percent of map unit: 4 percent
Landform: Swales
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Thorndale

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

UoD—Urban land-Duffield complex, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 23f24
Elevation: 200 to 1,500 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 44 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent
Duffield and similar soils: 25 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Ridges, hills, valleys
Landform position (two-dimensional): Summit, footslope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pavement, buildings and other artifically covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 10 to 100 inches to lithic bedrock
Runoff class: Very high
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Duffield

Setting

Landform: Valleys
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Residuum weathered from limestone

Typical profile

Ap - 0 to 10 inches: silt loam
B - 10 to 53 inches: silty clay loam
C - 53 to 72 inches: silt loam

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 48 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clarksburg

Percent of map unit: 4 percent
Landform: Valley flats
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Penlaw

Percent of map unit: 4 percent
Landform: Swales
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Thorndale

Percent of map unit: 2 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: Yes

UudB—Urban land-Udorthents, limestone complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 227x6
Elevation: 300 to 1,000 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Udorthents, limestone, and similar soils: 15 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Urban Land

Setting

Landform: Hills, valleys
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Interfluve, side slope, nose slope, head slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Pavement, buildings and other artifically covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 to 99 inches to lithic bedrock
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Udorthents, Limestone

Setting

Landform: Hills, valleys
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Interfluve, side slope, nose slope, head slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Graded areas of argillaceous limestone

Typical profile

A/B - 0 to 6 inches: clay loam
C - 6 to 60 inches: clay

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 99 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Duffield

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

UudD—Urban land-Udorthents, limestone complex, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 227x7
Elevation: 300 to 1,000 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Udorthents, limestone, and similar soils: 15 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Ridges, hills, valleys
Landform position (two-dimensional): Backslope, shoulder, footslope, summit
Landform position (three-dimensional): Interfluve, side slope, nose slope, head slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Pavement, buildings and other artifically covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 10 to 99 inches to lithic bedrock
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Udorthents, Limestone

Setting

Landform: Ridges, hills, valleys
Landform position (two-dimensional): Backslope, footslope, shoulder, summit
Landform position (three-dimensional): Interfluve, side slope, nose slope, head slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Graded areas of limestone and dolomite

Typical profile

A/B - 0 to 6 inches: clay loam
C - 6 to 60 inches: clay

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 20 to 99 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Duffield

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

UusB—Urban land-Udorthents, shale and sandstone complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 227xb
Elevation: 250 to 950 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 161 to 215 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Udorthents, shale and sandstone, and similar soils: 15 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills
Parent material: Pavement, buildings and other artifically covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 10 to 99 inches to lithic bedrock
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Udorthents, Shale And Sandstone

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, nose slope, interfluve
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Graded areas of sandstone and shale

Typical profile

A - 0 to 6 inches: very channery loam
C - 6 to 60 inches: very channery silt loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 20 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Penn

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

UusD—Urban land-Udorthents, shale and sandstone complex, 8 to 25 percent slopes

Map Unit Setting

National map unit symbol: 227xc
Elevation: 250 to 950 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 160 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 80 percent
Udorthents, shale and sandstone, and similar soils: 15 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Pavement, buildings and other artifically covered areas

Typical profile

C - 0 to 6 inches: variable

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 10 to 99 inches to lithic bedrock
Available water storage in profile: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Udorthents, Shale And Sandstone

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Graded areas of sandstone and shale

Typical profile

Ap - 0 to 6 inches: very channery loam
C - 6 to 60 inches: very channery silty clay loam

Properties and qualities

Slope: 8 to 25 percent
Depth to restrictive feature: 20 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Penn

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, side slope, nose slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: l7ds
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Parent material: Rivers streams ponds

Properties and qualities

Runoff class: Negligible
Frequency of ponding: Frequent

WaA—Washington silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: l7dt
Elevation: 200 to 1,500 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Washington and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Washington

Setting

Landform: Valleys
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from limestone and/or old glacial drift

Typical profile

Ap - 0 to 9 inches: silt loam
Bt - 9 to 42 inches: clay loam
C - 42 to 61 inches: gravelly loam
R - 61 to 71 inches: bedrock

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clarksburg

Percent of map unit: 5 percent
Landform: Valley flats
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Ryder

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex, linear

Across-slope shape: Linear, convex
Hydric soil rating: No

Thorndale

Percent of map unit: 1 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Penlaw

Percent of map unit: 1 percent
Landform: Swales
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

WaB—Washington silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l7dv
Elevation: 200 to 1,500 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Washington and similar soils: 90 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Washington

Setting

Landform: Valleys
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from limestone and/or old glacial drift

Typical profile

Ap - 0 to 9 inches: silt loam
Bt - 9 to 42 inches: clay loam
C - 42 to 61 inches: silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clarksburg

Percent of map unit: 2 percent
Landform: Valley flats
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Ryder

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Thorndale

Percent of map unit: 1 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Loudonville

Percent of map unit: 1 percent
Landform: Till plains
Landform position (three-dimensional): Head slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

WaC—Washington silt loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: l7dw
Elevation: 300 to 1,500 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 133 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Washington and similar soils: 90 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Washington

Setting

Landform: Valleys
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from limestone and/or old glacial drift

Typical profile

Ap - 0 to 9 inches: silt loam
Bt - 9 to 42 inches: clay loam
C - 42 to 61 inches: silt loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clarksburg

Percent of map unit: 3 percent
Landform: Valley flats
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Loudonville

Percent of map unit: 2 percent
Landform: Till plains
Landform position (three-dimensional): Head slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Ryder

Percent of map unit: 1 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

WaD—Washington silt loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: l7dx
Elevation: 200 to 1,500 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Washington and similar soils: 90 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Washington

Setting

Landform: Valleys
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Colluvium derived from limestone and/or old glacial drift

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 42 inches: clay loam
C - 42 to 61 inches: gravelly loam
R - 61 to 63 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 60 to 99 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clarksburg

Percent of map unit: 3 percent
Landform: Valley flats
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Ryder

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Thorndale

Percent of map unit: 1 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

WkB—Weikert-Berks complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2v4w4
Elevation: 230 to 980 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Weikert and similar soils: 50 percent
Berks and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw - 8 to 15 inches: very channery silt loam
C - 15 to 18 inches: extremely channery silt loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.28 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D

Other vegetative classification: Droughty Shales (SD2)
Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam
Bw1 - 7 to 14 inches: very channery loam
Bw2 - 14 to 21 inches: very channery silt loam
C - 21 to 30 inches: extremely channery loam
R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 2.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: No

Brinkerton

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

WkC—Weikert-Berks complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 23f2j
Elevation: 500 to 1,600 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 214 days
Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 70 percent
Berks and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 8 inches: channery silt loam
Bw - 8 to 15 inches: very channery silt loam
R - 15 to 25 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges, valleys
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Acid brown residuum weathered from shale and siltstone

Typical profile

Ap - 0 to 10 inches: channery loam
Bt - 10 to 26 inches: very channery loam
C - 26 to 33 inches: very channery loam
R - 33 to 43 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

WkD—Weikert-Berks complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2v4w3
Elevation: 210 to 1,090 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 47 to 56 degrees F
Frost-free period: 148 to 192 days
Farmland classification: Not prime farmland

Map Unit Composition

Weikert and similar soils: 50 percent
Berks and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Weikert

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Gray and brown acid residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery silt loam
Bw - 7 to 12 inches: very channery silt loam
C - 12 to 15 inches: extremely channery silt loam
R - 15 to 25 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Available water storage in profile: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Other vegetative classification: Droughty Shales (SD3)
Hydric soil rating: No

Description of Berks

Setting

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale and siltstone and/or fine grained sandstone

Typical profile

Ap - 0 to 7 inches: channery loam

Bw1 - 7 to 14 inches: very channery loam
Bw2 - 14 to 21 inches: very channery silt loam
C - 21 to 30 inches: extremely channery loam
R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.16 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline (0.0 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 1.0
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Other vegetative classification: Very Rocky, Acid Soils (RA2), Very Rocky, Acid Soils (RA3)
Hydric soil rating: No

Minor Components

Comly

Percent of map unit: 5 percent
Landform: Ridges on hills
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Hydric soil rating: No

Brinkerton

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

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EXISTING SEDIMENT LOAD CALCULATIONS

UPPER NAZARETH TOWNSHIP - EXISTING SEDIMENT LOADING

STORM SEWER SHED NUMBER	DEVELOPED, OPEN SPACE (SQ. METERS)	DEVELOPED, OPEN SPACE (ACRES)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACES) (19% OF TOTAL AREA) (A)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACES) (81% OF TOTAL AREA) (B)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACE - SEDIMENT LOADING)(A*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACE - SEDIMENT LOADING) (B*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (SQ. METERS)	DEVELOPED, LOW INTENSITY (ACRES)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACES) (49% OF TOTAL AREA) (C)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACES) (51% OF TOTAL AREA) (D)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (C*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (D*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (SQ. METERS)	DEVELOPED, MEDIUM INTENSITY (ACRES)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACES) (79% OF TOTAL AREA) (E)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACES) (21% OF TOTAL AREA) (F)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (E*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (F*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, HIGH INTENSITY (SQ. METERS)	DEVELOPED, HIGH INTENSITY (ACRES)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACES) (100% OF TOTAL AREA) (G)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (G*1893 LBS/ACRE/YR) (LBS/YR)	UNDEVELOPED LANDS (SQ. METERS)	UNDEVELOPED LANDS (ACRES) (H)	UNDEVELOPED LANDS - SEDIMENT LOADING (H*234.6 LBS/ACRE/YR) (LBS/YR)	TOTAL SEDIMENT LOADING (LBS/YR)	TOTAL STORM SEWERSHED AREA (ACRES)
001	24223.03	5.99	1.14	4.85	2091.43	1284.62	1794.3	0.44	0.22	0.23	399.53	59.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	174944.13	43.23	10141.63	**13977.13**	**49.66**
001A	46651.74	11.53	2.19	9.34	4027.95	2474.08	30503.06	7.54	3.69	3.84	6792.06	1018.53	1794.30	0.44	0.35	0.09	644.15	24.67	0.00	0.00	0.00	0.00	202755.64	50.10	11753.88	**26735.32**	**69.61**
002	64594.71	15.96	3.03	12.93	5577.16	3425.65	66389	16.41	8.04	8.37	14782.72	2216.80	22428.72	5.54	4.38	1.16	8051.81	308.38	2691.45	0.67	0.67	1223.06	739250.53	182.67	42854.86	**78440.45**	**221.25**
002A	14354.38	3.55	0.67	2.87	1239.37	761.26	3588.6	0.89	0.43	0.45	799.07	119.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	186606.96	46.11	10817.73	**13737.25**	**50.55**
003	25120.17	6.21	1.18	5.03	2168.89	1332.20	6280.04	1.55	0.76	0.79	1398.37	209.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	148926.74	36.80	8633.39	**13742.54**	**44.56**
004	6280.04	1.55	0.29	1.26	542.22	333.05	29605.89	7.32	3.58	3.73	6592.29	988.57	42165.96	10.42	8.23	2.19	15137.40	579.75	3588.59	0.89	0.89	1630.74	173149.59	42.79	10037.60	**35841.64**	**62.96**
005	62800.33	15.52	2.95	12.57	5422.23	3330.49	33194.46	8.20	4.02	4.18	7391.35	1108.40	10765.77	2.66	2.10	0.56	3864.87	148.02	7177.18	1.77	1.77	3261.49	112143.45	27.71	6501.03	**31027.88**	**55.87**
006	6280.04	1.55	0.29	1.26	542.22	333.05	4485.74	1.11	0.54	0.57	998.83	149.78	1794.3	0.44	0.35	0.09	644.15	24.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2692.70**	**3.10**
007	17045.81	4.21	0.80	3.41	1471.75	903.99	16148.66	3.99	1.96	2.04	3595.79	539.22	43960.25	10.86	8.58	2.28	15781.54	604.42	4485.74	1.11	1.11	2038.43	40371.65	9.98	2340.37	**27275.52**	**30.15**
008	6280.03	1.55	0.29	1.26	542.22	333.05	4485.74	1.11	0.54	0.57	998.83	149.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	71771.79	17.74	4160.66	**6184.55**	**20.40**
009	897.15	0.22	0.04	0.18	77.46	47.58	22428.69	5.54	2.72	2.83	4994.16	748.92	1794.3	0.44	0.35	0.09	644.15	24.67	0.00	0.00	0.00	0.00	157897.98	39.02	9153.45	**15690.39**	**45.22**
010	17045.8	4.21	0.80	3.41	1471.75	903.99	31400.16	7.76	3.80	3.96	6991.82	1048.49	4485.74	1.11	0.88	0.23	1610.36	61.68	897.15	0.22	0.22	407.69	2691.44	0.67	156.02	**12651.79**	**13.97**
011	9868.62	2.44	0.46	1.98	852.06	523.36	2691.44	0.67	0.33	0.34	599.30	89.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51137.42	12.64	2964.47	**5029.07**	**15.74**
012	2691.44	0.67	0.13	0.54	232.38	142.74	3588.59	0.89	0.43	0.45	799.07	119.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	143543.56	35.47	8321.32	**9615.33**	**37.02**
013	2691.44	0.67	0.13	0.54	232.38	142.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47548.82	11.75	2756.44	**3131.55**	**12.41**
014	1794.29	0.44	0.08	0.36	154.92	95.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8074.32	2.00	468.07	**718.15**	**2.44**
015	897.15	0.22	0.04	0.18	77.46	47.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	897.15	0.22	52.01	**177.05**	**0.44**
016	55623.1	13.74	2.61	11.13	4802.54	2949.86	97789.01	24.16	11.84	12.32	21774.51	3265.28	10765.76	2.66	2.10	0.56	3864.86	148.02	0.00	0.00	0.00	0.00	196475.16	48.55	11389.80	**48194.87**	**89.12**
017	23325.81	5.76	1.10	4.67	2013.97	1237.04	83434.62	20.62	10.10	10.51	18578.24	2785.98	34988.71	8.65	6.83	1.82	12560.80	481.07	897.15	0.22	0.22	407.69	7177.17	1.77	416.07	**38480.84**	**37.02**
018	18840.08	4.66	0.88	3.77	1626.67	999.15	29605.84	7.32	3.58	3.73	6592.28	988.57	9868.61	2.44	1.93	0.51	3542.79	135.69	0.00	0.00	0.00	0.00	81640.33	20.17	4732.75	**18617.89**	**34.58**
019	8971.46	2.22	0.42	1.80	774.60	475.78	32297.27	7.98	3.91	4.07	7191.58	1078.44	3588.59	0.89	0.70	0.19	1288.29	49.34	0.00	0.00	0.00	0.00	1794.29	0.44	104.02	**10962.05**	**11.53**
020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	897.15	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**334.41**	**0.22**
021	0.00	0.00	0.00	0.00	0.00	0.00	897.15	0.22	0.11	0.11	199.77	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**229.72**	**0.22**
022	15251.47	3.77	0.72	3.05	1316.82	808.83	70874.50	17.51	8.58	8.93	15781.50	2366.58	16148.62	3.99	3.15	0.84	5797.29	222.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**26293.05**	**25.27**
023	0.00	0.00	0.00	0.00	0.00	0.00	9868.61	2.44	1.19	1.24	2197.43	329.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**2526.95**	**2.44**
024	10765.75	2.66	0.51	2.15	929.52	570.94	45754.43	11.31	5.54	5.77	10188.06	1527.79	12560.04	3.10	2.45	0.65	4509.00	172.69	0.00	0.00	0.00	0.00	1794.29	0.44	104.02	**18002.02**	**17.51**
025	15251.47	3.77	0.72	3.05	1316.82	808.83	73565.92	18.18	8.91	9.27	16380.79	2456.45	13457.18	3.33	2.63	0.70	4831.07	185.03	0.00	0.00	0.00	0.00	6280.02	1.55	364.06	**26343.05**	**26.82**
026	34988.67	8.65	1.64	7.00	3020.95	1855.55	57417.31	14.19	6.95	7.24	12785.01	1917.23	16148.62	3.99	3.15	0.84	5797.29	222.03	0.00	0.00	0.00	0.00	154309.01	38.13	8945.40	**34543.46**	**64.95**
027	149923.20	37.05	7.04	30.01	12944.48	7950.87	195577.59	48.33	23.68	24.65	43548.92	6530.55	22428.62	5.54	4.38	1.16	8051.78	308.38	897.14	0.22	0.22	407.68	81640.19	20.17	4732.74	**84475.40**	**111.31**
028	7177.16	1.77	0.34	1.44	619.68	380.63	19737.20	4.88	2.39	2.49	4394.85	659.05	8971.45	2.22	1.75	0.47	3220.71	123.35	1794.29	0.44	0.44	815.37	0.00	0.00	0.00	**10213.64**	**9.31**
029	34091.51	8.42	1.60	6.82	2943.49	1807.97	59211.56	14.63	7.17	7.46	13184.53	1977.14	11662.88	2.88	2.28	0.61	4186.92	160.36	0.00	0.00	0.00	0.00	8074.30	2.00	468.07	**24728.49**	**27.93**
030	0.00	0.00	0.00	0.00	0.00	0.00	3588.58	0.89	0.43	0.45	799.06	119.83	897.15	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1253.30**	**1.11**
031	16148.61	3.99	0.76	3.23	1394.28	856.41	46651.55	11.53	5.65	5.88	10387.82	1557.75	5382.87	1.33	1.05	0.28	1932.43	74.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**16202.70**	**16.85**
032	23325.76	5.76	1.10	4.67	2013.96	1237.03	27811.49	6.87	3.37	3.50	6192.74	928.66	2691.43	0.67	0.53	0.14	966.21	37.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**11375.61**	**13.30**
033	3588.58	0.89	0.17	0.72	309.84	190.31	17942.90	4.43	2.17	2.26	3995.31	599.13	4485.72	1.11	0.88	0.23	1610.35	61.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6766.63**	**6.43**
034	15251.46	3.77	0.72	3.05	1316.82	808.83	50240.11	12.41	6.08	6.33	11186.88	1677.57	8971.45	2.22	1.75	0.47	3220.71	123.35	897.14	0.22	0.22	407.68	0.00	0.00	0.00	**18741.85**	**18.62**
036	0.00	0.00	0.00	0.00	0.00	0.00	5382.87	1.33	0.65	0.68	1198.59	179.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1378.33**	**1.33**
037	2691.43	0.67	0.13	0.54	232.38	142.73	3588.58	0.89	0.43	0.45	799.06	119.83	897.14	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1628.41**	**1.77**
038	2691.43	0.67	0.13	0.54	232.38	142.73	9868.59	2.44	1.19	1.24	2197.42	329.52	2691.43	0.67	0.53	0.14	966.21	37.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**3905.28**	**3.77**
039	12560.02	3.10	0.59	2.51	1084.44	666.09	17942.89	4.43	2.17	2.26	3995.31	599.13	1794.29	0.44	0.35	0.09	644.14	24.67	2691.43	0.67	0.67	1223.05	0.00	0.00	0.00	**8236.85**	**8.65**
040	1794.29	0.44	0.08	0.36	154.92	95.16	8971.44	2.22	1.09	1.13	1997.65	299.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8074.30	2.00	468.07	**3015.37**	**4.66**
Sheet Flow 001	18840.09	4.66	0.88	3.77	1626.67	999.15	4485.74	1.11	0.54	0.57	998.83	149.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56520.27	13.97	3276.52	**7050.95**	**19.73**
Sheet Flow 002	1794.29	0.44	0.08	0.36	154.92	95.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8074.32	2.00	468.07	**718.15**	**2.44**
Sheet Flow 003	12650.06	3.13	0.59	2.53	1092.22	670.87	897.15	0.22	0.11	0.11	199.77	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3588.59	0.89	208.03	**2200.84**	**4.23**
Sheet Flow 004	1794.29	0.44	0.08	0.36	154.92	95.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**250.08**	**0.44**

Sheet Flow 005	2691.44	0.67	0.13	0.54	232.38	142.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	897.15	0.22	52.01	**427.12**	**0.89**
Sheet Flow 006	2691.44	0.67	0.13	0.54	232.38	142.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3588.59	0.89	208.03	**583.15**	**1.55**
Sheet Flow 007	3588.59	0.89	0.17	0.72	309.84	190.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31400.13	7.76	1820.29	**2320.44**	**8.65**
Sheet Flow 008	5382.88	1.33	0.25	1.08	464.76	285.47	1794.29	0.44	0.22	0.23	399.53	59.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6280.03	1.55	364.06	**1573.73**	**3.33**
Sheet Flow 009	6280.03	1.55	0.29	1.26	542.22	333.05	2691.44	0.67	0.33	0.34	599.30	89.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13457.20	3.33	780.12	**2344.56**	**5.54**
Sheet Flow 010	2691.45	0.67	0.13	0.54	232.38	142.74	1794.30	0.44	0.22	0.23	399.53	59.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**834.56**	**1.11**
Sheet Flow 011	17045.85	4.21	0.80	3.41	1471.75	903.99	18840.15	4.66	2.28	2.37	4195.10	629.09	897.15	0.22	0.18	0.05	322.07	12.34	0.00	0.00	0.00	0.00	10765.80	2.66	624.10	**8158.45**	**11.75**
Sheet Flow 012	53828.98	13.30	2.53	10.77	4647.63	2854.71	7177.20	1.77	0.87	0.90	1598.13	239.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2691.45	0.67	156.03	**9496.16**	**15.74**
Sheet Flow 013	4485.75	1.11	0.21	0.90	387.30	237.89	1794.30	0.44	0.22	0.23	399.53	59.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	897.15	0.22	52.01	**1136.65**	**1.77**
Sheet Flow 014	3588.59	0.89	0.17	0.72	309.84	190.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1794.30	0.44	104.02	**604.17**	**1.33**
Sheet Flow 015	2691.45	0.67	0.13	0.54	232.38	142.74	897.15	0.22	0.11	0.11	199.77	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	897.15	0.22	52.01	**656.85**	**1.11**
Sheet Flow 016	36783.14	9.09	1.73	7.36	3175.88	1950.72	17943.00	4.43	2.17	2.26	3995.34	599.14	1794.30	0.44	0.35	0.09	644.15	24.67	0.00	0.00	0.00	0.00	106760.82	26.38	6189.00	**16578.89**	**40.35**
Sheet Flow 017	2691.45	0.67	0.13	0.54	232.38	142.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29605.94	7.32	1716.28	**2091.39**	**7.98**
Sheet Flow 018	8074.33	2.00	0.38	1.62	697.14	428.21	8074.33	2.00	0.98	1.02	1797.90	269.61	2691.44	0.67	0.53	0.14	966.22	37.01	0.00	0.00	0.00	0.00	11662.92	2.88	676.11	**4872.19**	**7.54**
Sheet Flow 019	13457.17	3.33	0.63	2.69	1161.90	713.67	897.14	0.22	0.11	0.11	199.76	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19737.18	4.88	1144.18	**3249.47**	**8.42**
Sheet Flow 020	1794.29	0.44	0.08	0.36	154.92	95.16	10765.73	2.66	1.30	1.36	2397.19	359.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1794.29	0.44	104.02	**3110.76**	**3.55**
Sheet Flow 021	2691.43	0.67	0.13	0.54	232.38	142.73	2691.43	0.67	0.33	0.34	599.30	89.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4485.72	1.11	260.04	**1324.32**	**2.44**
Sheet Flow 022	8074.30	2.00	0.38	1.62	697.14	428.20	34988.65	8.65	4.24	4.41	7790.86	1168.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2691.43	0.67	156.02	**10240.54**	**11.31**
Sheet Flow 023	897.15	0.22	0.04	0.18	77.46	47.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**125.04**	**0.22**
Sheet Flow 024	4485.73	1.11	0.21	0.90	387.30	237.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**625.19**	**1.11**
Sheet Flow 025	5382.88	1.33	0.25	1.08	464.76	285.47	897.15	0.22	0.11	0.11	199.77	29.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**979.96**	**1.55**
Sheet Flow Outfall #001	150721.15	37.24	7.08	30.17	13013.38	7993.19	17045.84	4.21	2.06	2.15	3795.57	569.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	200064.37	49.44	11597.87	**36969.18**	**90.89**
Check Point #001	139057.71	34.36	6.53	27.83	12006.35	7374.64	231463.80	57.20	28.03	29.17	51539.64	7728.84	61005.96	15.07	11.91	3.17	21900.88	838.79	27811.54	6.87	6.87	12638.26	76257.46	18.84	4420.70	**118448.08**	**132.35**

TOTAL EXISTING SEDIMENT LOAD 950089.34

Model My Watershed

About Help Projects MSchallock

Outfall#001-UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

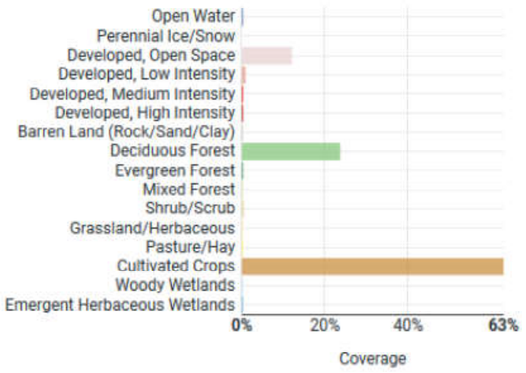
Selected Area 206,270 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	24,223.03	12.1
Developed, Low Intensity	1,794.30	0.9
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	47,548.92	23.7
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets
Satellite
Satellite with Roads
Terrain

Leaflet | Map data from ESRI

6:05 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#001A_Upper Na... Details

Analyze Monitor Model Share New Project

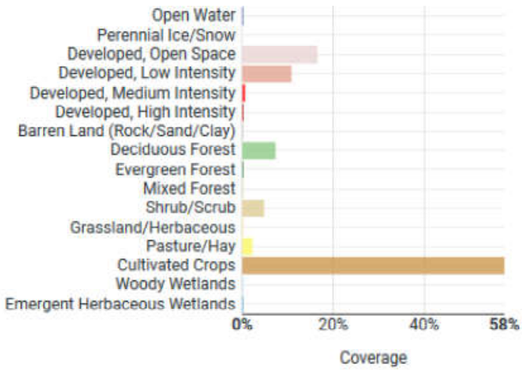
Selected Area 280,072 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	46,651.74	16.6
Developed, Low Intensity	30,503.06	10.8
Developed, Medium Intensity	1,794.30	0.6
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	20,634.42	7.3
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

Leaflet | Map data from ESRI

6:09 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall #002_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

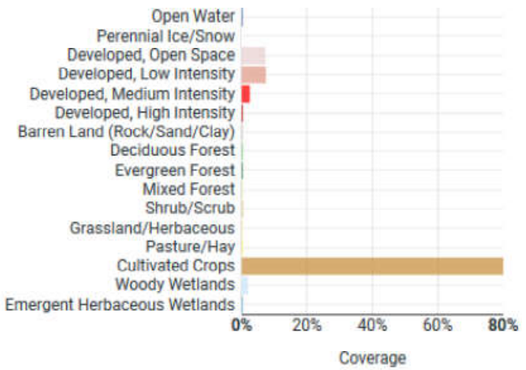
Selected Area 897,892 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	64,594.71	7.2
Developed, Low Intensity	66,389.00	7.4
Developed, Medium Intensity	22,428.72	2.5
Developed, High Intensity	2,691.45	0.3
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

Leaflet | Map data from ESRI

6:12 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall #002A _ UpperN... Details

Analyze Monitor Model Share New Project

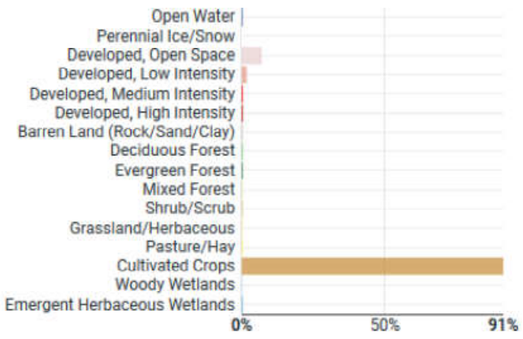
Selected Area 205,593 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	14,354.38	7.0
Developed, Low Intensity	3,588.60	1.8
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

Leaflet | Map data from ESRI

6:15 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#003_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

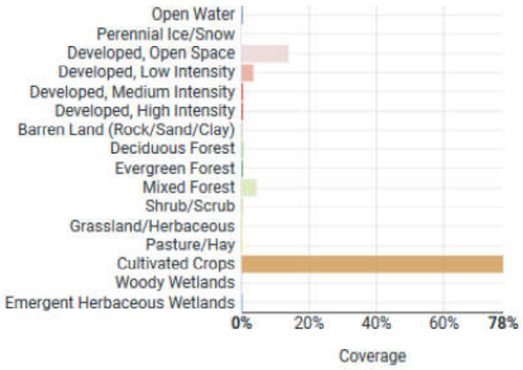
Selected Area 180,290 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	25,120.17	13.9
Developed, Low Intensity	6,280.04	3.5
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	897.15	0.5
Evergreen Forest	0.00	0.0
Mixed Forest	8,074.34	4.5

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

Leaflet | Map data from ESRI

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6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#004_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

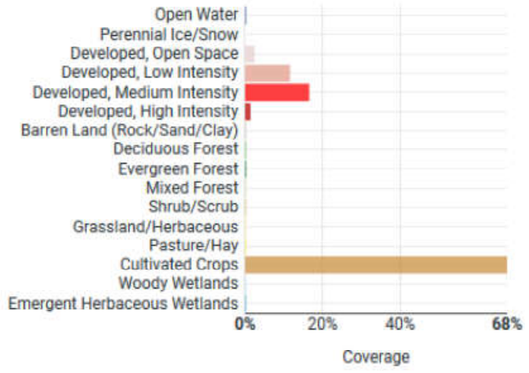
Selected Area 257,048 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	6,280.04	2.5
Developed, Low Intensity	29,605.89	11.6
Developed, Medium Intensity	42,165.96	16.5
Developed, High Intensity	3,588.59	1.4
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	897.15	0.4
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

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6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#005_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

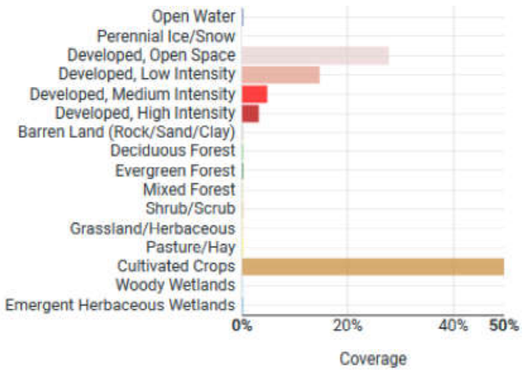
Selected Area 221,828 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	62,800.33	27.8
Developed, Low Intensity	33,194.46	14.7
Developed, Medium Intensity	10,765.77	4.8
Developed, High Intensity	7,177.18	3.2
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

Leaflet | Map data from ESRI

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Model My Watershed

About Help Projects MSchallock

Outfall#006_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

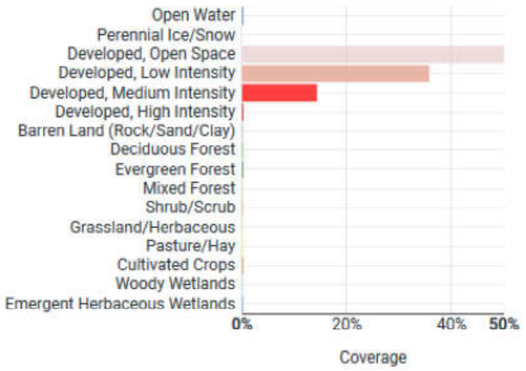
Selected Area 15,338 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	6,280.04	50.0
Developed, Low Intensity	4,485.74	35.7
Developed, Medium Intensity	1,794.30	14.3
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

Leaflet | Map data from ESRI

6:24 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#007_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

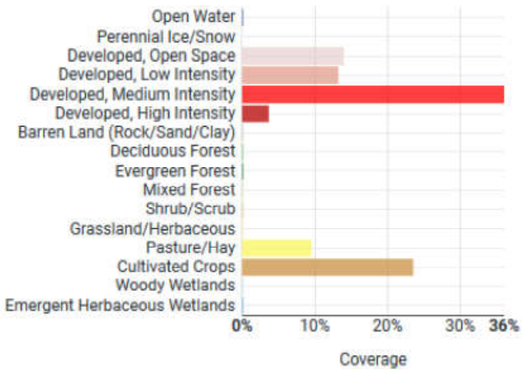
Selected Area 122,024 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	17,045.81	14.0
Developed, Low Intensity	16,148.66	13.2
Developed, Medium Intensity	43,960.25	36.0
Developed, High Intensity	4,485.74	3.7
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:27 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#008_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

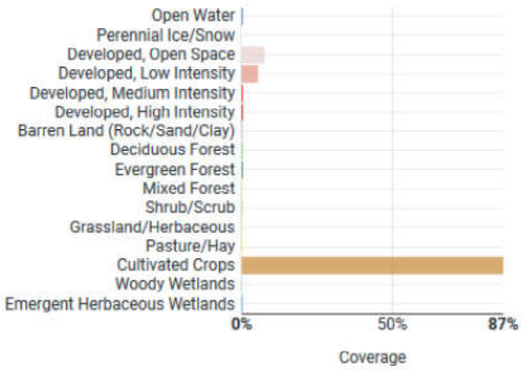
Selected Area 83,307 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	6,280.03	7.6
Developed, Low Intensity	4,485.74	5.4
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:28 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#009_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

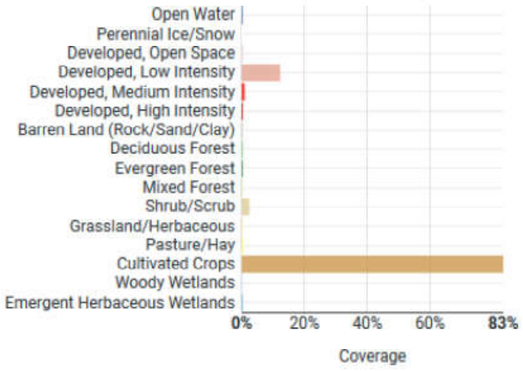
Selected Area 182,263 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	897.15	0.5
Developed, Low Intensity	22,428.69	12.3
Developed, Medium Intensity	1,794.30	1.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:31 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#010_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

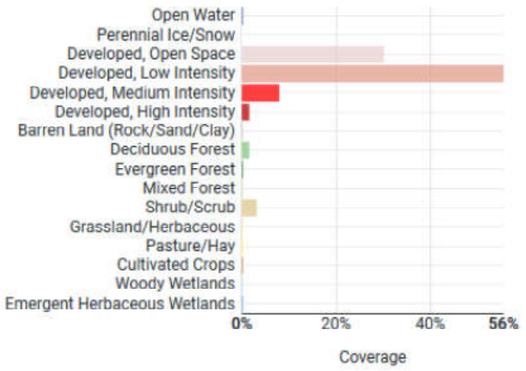
Selected Area 57,584 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	17,045.80	30.2
Developed, Low Intensity	31,400.16	55.6
Developed, Medium Intensity	4,485.74	7.9
Developed, High Intensity	897.15	1.6
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	897.15	1.6
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:36 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#011_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

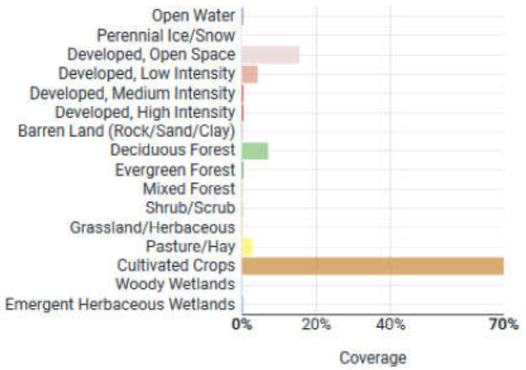
Selected Area 63,972 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	9,868.62	15.5
Developed, Low Intensity	2,691.44	4.2
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	4,485.74	7.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:37 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#012_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

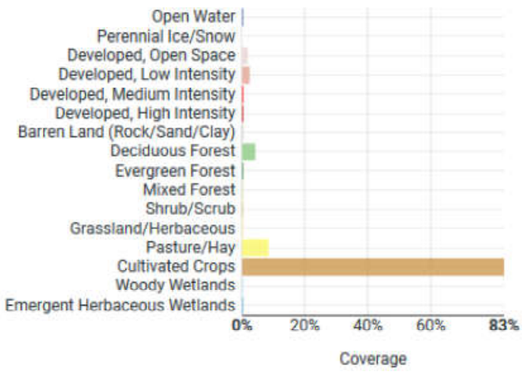
Selected Area 150,237 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.44	1.8
Developed, Low Intensity	3,588.59	2.4
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	6,280.03	4.2
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:39 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#013_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

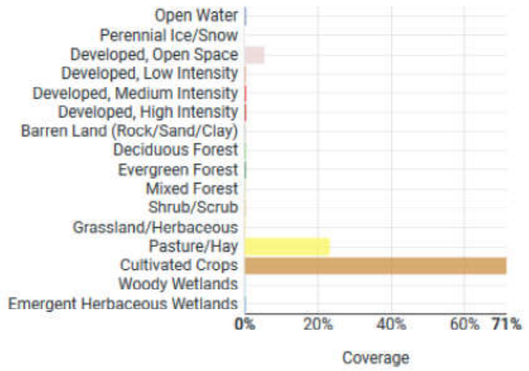
Selected Area 50,267 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.44	5.4
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:41 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#014_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

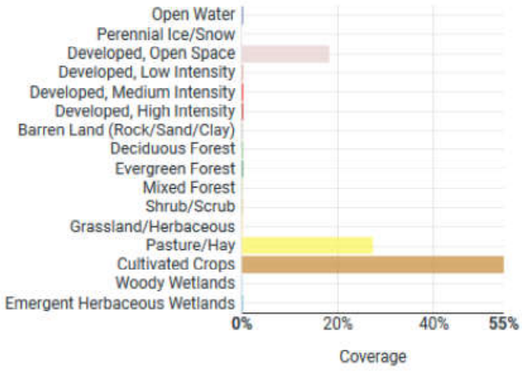
Selected Area 11,761 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	1,794.29	18.2
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:43 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#015_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

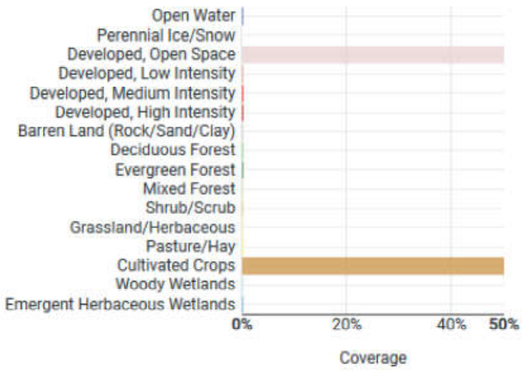
Selected Area 2,645 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	897.15	50.0
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:44 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#016_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

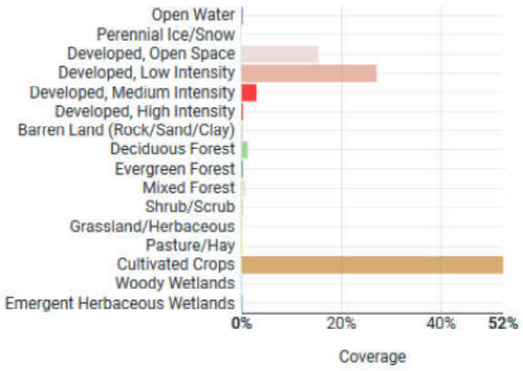
Selected Area 364,083 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	55,623.10	15.4
Developed, Low Intensity	97,789.01	27.1
Developed, Medium Intensity	10,765.76	3.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	4,485.73	1.2
Evergreen Forest	0.00	0.0
Mixed Forest	2,691.44	0.7

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:47 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#017_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

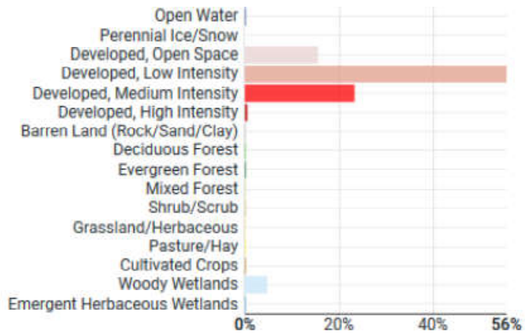
Selected Area 153,088 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	23,325.81	15.6
Developed, Low Intensity	83,434.62	55.7
Developed, Medium Intensity	34,988.71	23.4
Developed, High Intensity	897.15	0.6
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:49 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#018_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

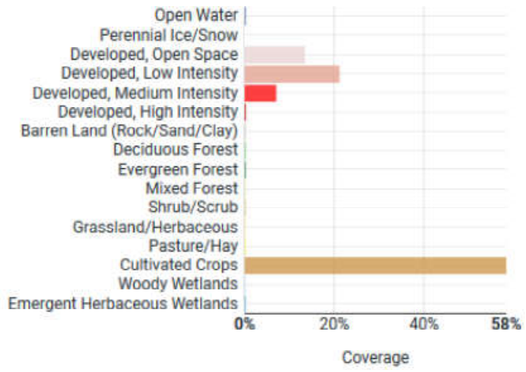
Selected Area 142,026 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	18,840.08	13.5
Developed, Low Intensity	29,605.84	21.2
Developed, Medium Intensity	9,868.61	7.1
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:51 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#019_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

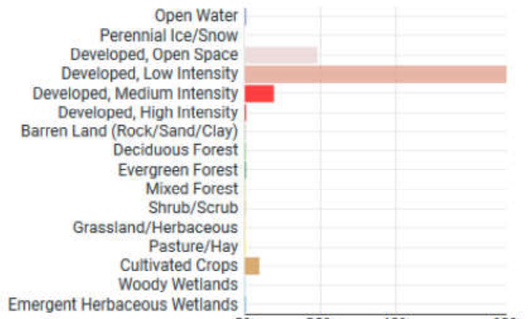
Selected Area 45,440 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	8,971.46	19.2
Developed, Low Intensity	32,297.27	69.2
Developed, Medium Intensity	3,588.59	7.7
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:53 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#020_UpperNaz Details

Analyze Monitor Model Share New Project

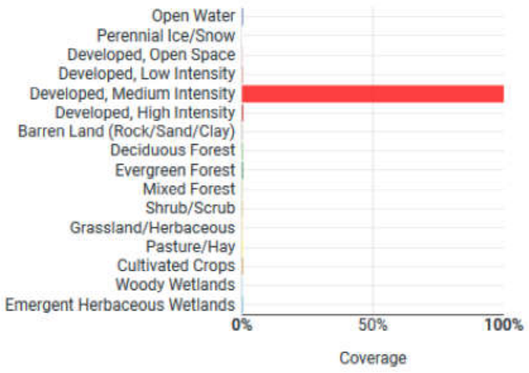
Selected Area 523 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	0.00	0.0
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	897.15	100.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

6:59 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#021_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

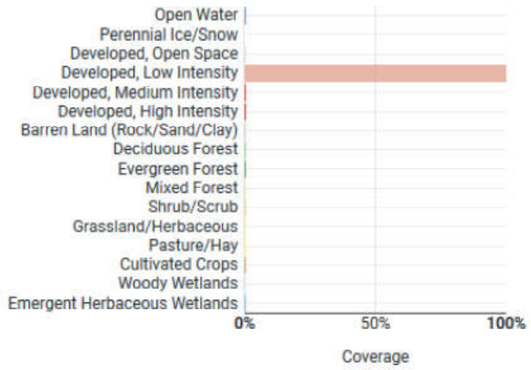
Selected Area 422 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	0.00	0.0
Developed, Low Intensity	897.15	100.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

7:01 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#022_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

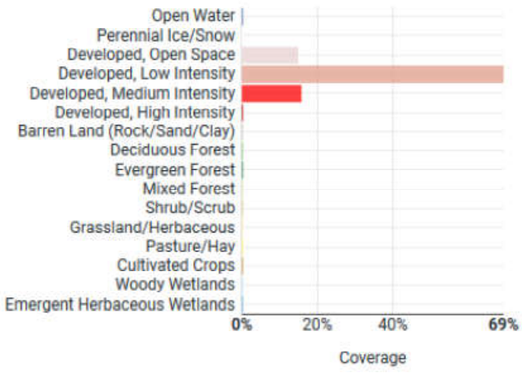
Selected Area 101,595 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	15,251.47	14.9
Developed, Low Intensity	70,874.50	69.3
Developed, Medium Intensity	16,148.62	15.8
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

7:02 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#023_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

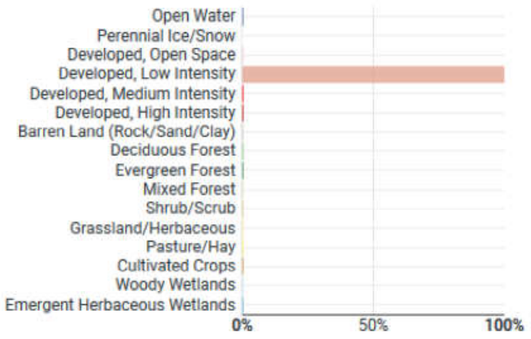
Selected Area 9,108 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	0.00	0.0
Developed, Low Intensity	9,868.61	100.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

7:06 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#024_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

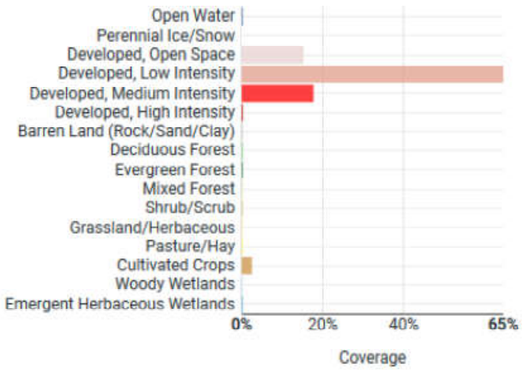
Selected Area 69,489 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	10,765.75	15.2
Developed, Low Intensity	45,754.43	64.6
Developed, Medium Intensity	12,560.04	17.7
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

7:10 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#025_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

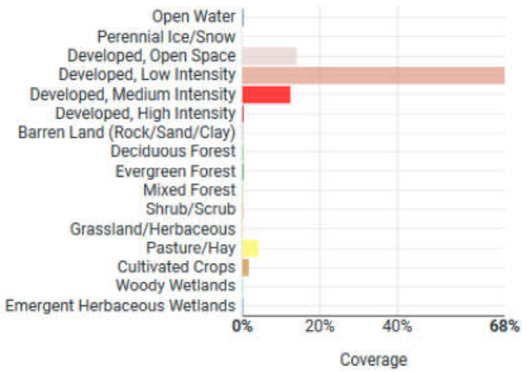
Selected Area 110,024 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	15,251.47	14.0
Developed, Low Intensity	73,565.92	67.8
Developed, Medium Intensity	13,457.18	12.4
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

7:13 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#026_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

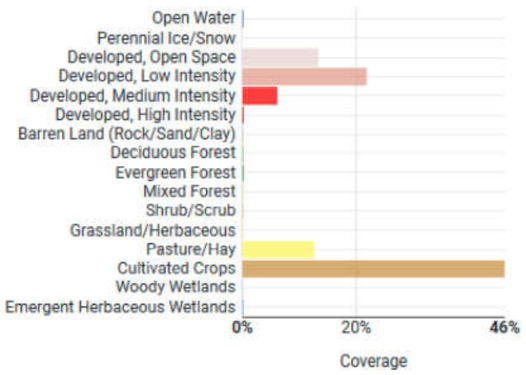
Selected Area 264,358 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	34,988.67	13.3
Developed, Low Intensity	57,417.31	21.8
Developed, Medium Intensity	16,148.62	6.1
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

7:16 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#027_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

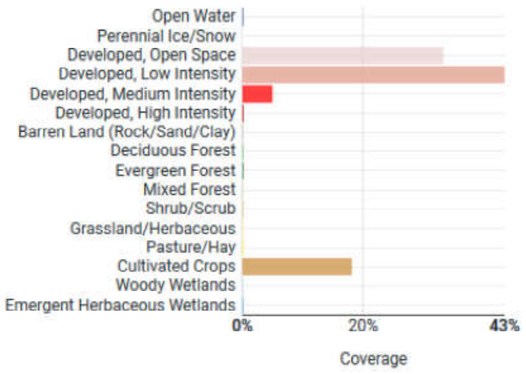
Selected Area 459,955 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	149,823.20	33.3
Developed, Low Intensity	195,577.59	43.4
Developed, Medium Intensity	22,428.62	5.0
Developed, High Intensity	897.14	0.2
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

7:18 AM
6/11/2019

Model My Watershed

About Help Projects MSchallock

Outfall#028_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

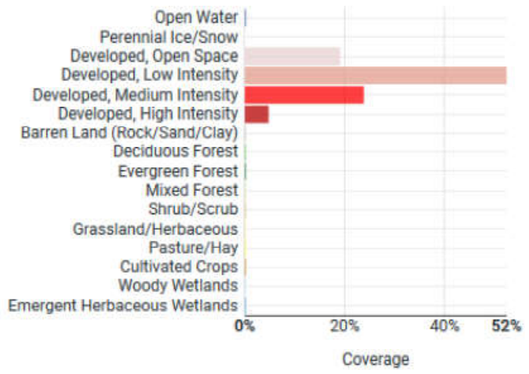
Selected Area 38,720 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	7,177.16	19.0
Developed, Low Intensity	19,737.20	52.4
Developed, Medium Intensity	8,971.45	23.8
Developed, High Intensity	1,794.29	4.8
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:16 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#029_Upper Naz | Details | Analyze | Monitor | Model | Share | New Project

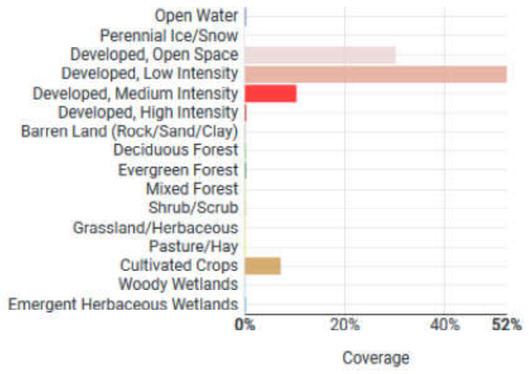
Selected Area 112,176 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	34,091.51	30.2
Developed, Low Intensity	59,211.56	52.4
Developed, Medium Intensity	11,662.88	10.3
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:18 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#030_Upper Naz | Details | Analyze | Monitor | Model | Share | New Project

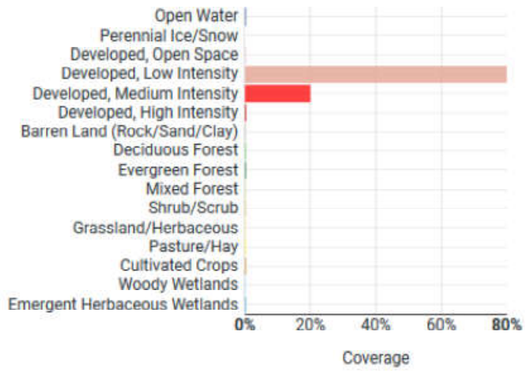
Selected Area 891 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	0.00	0.0
Developed, Low Intensity	3,588.58	80.0
Developed, Medium Intensity	897.15	20.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:20 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#031_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

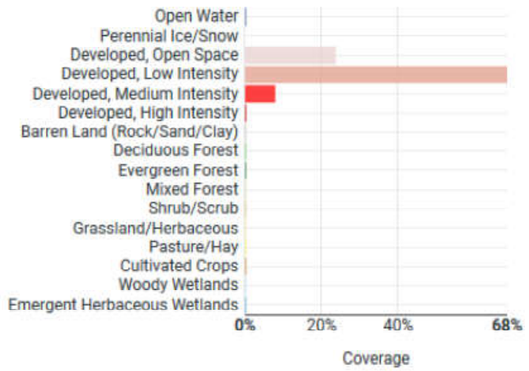
Selected Area 69,175 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	16,148.61	23.7
Developed, Low Intensity	46,651.55	68.4
Developed, Medium Intensity	5,382.87	7.9
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:22 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#032_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

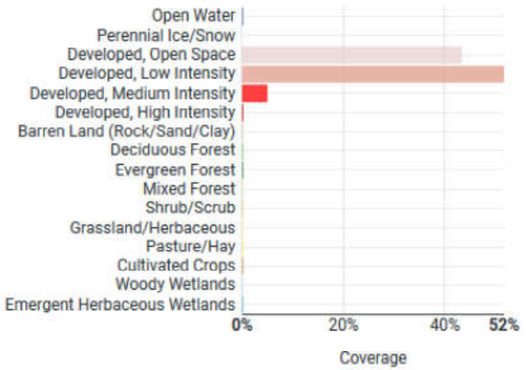
Selected Area 53,806 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	23,325.76	43.3
Developed, Low Intensity	27,811.49	51.7
Developed, Medium Intensity	2,691.43	5.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:24 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#033_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

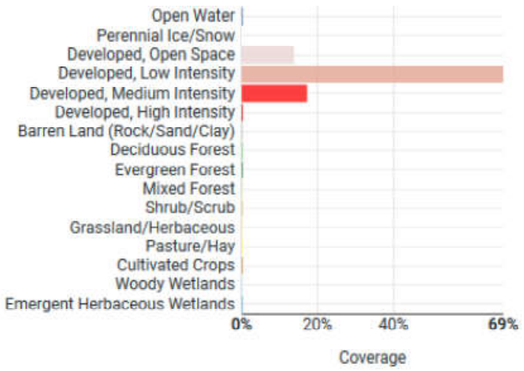
Selected Area 25,961 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	3,588.58	13.8
Developed, Low Intensity	17,942.90	69.0
Developed, Medium Intensity	4,485.72	17.2
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:26 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#034_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

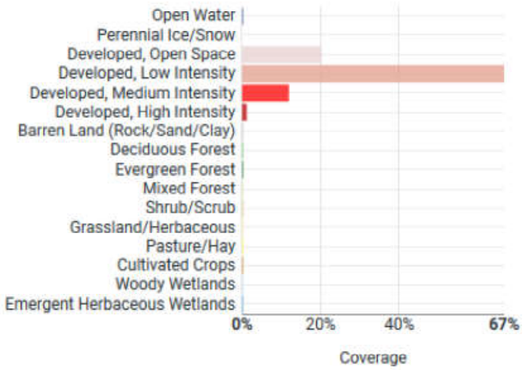
Selected Area 76,432 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	15,251.46	20.2
Developed, Low Intensity	50,240.11	66.7
Developed, Medium Intensity	8,971.45	11.9
Developed, High Intensity	897.14	1.2
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:28 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#036_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

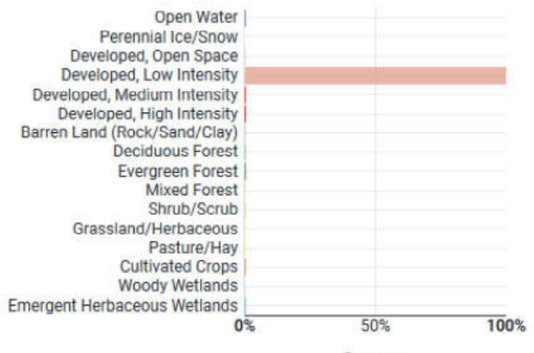
Selected Area 3,863 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	0.00	0.0
Developed, Low Intensity	5,382.87	100.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:29 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#037_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

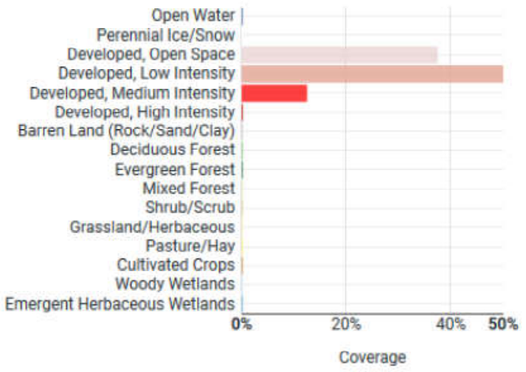
Selected Area 6,546 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.43	37.5
Developed, Low Intensity	3,588.58	50.0
Developed, Medium Intensity	897.14	12.5
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:30 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#038_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

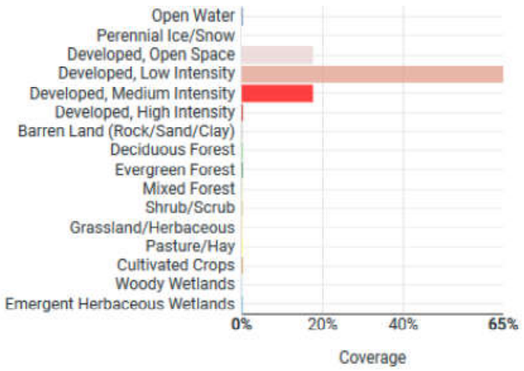
Selected Area 14,508 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.43	17.6
Developed, Low Intensity	9,868.59	64.7
Developed, Medium Intensity	2,691.43	17.6
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:32 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#039_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

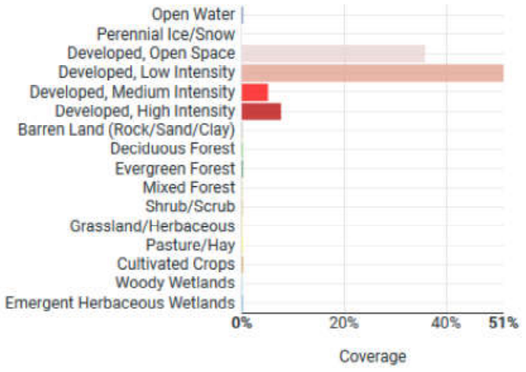
Selected Area 35,864 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	12,560.02	35.9
Developed, Low Intensity	17,942.89	51.3
Developed, Medium Intensity	1,794.29	5.1
Developed, High Intensity	2,691.43	7.7
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:37 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Outfall#040_UpperNaz | Details | Analyze | Monitor | Model | Share | New Project

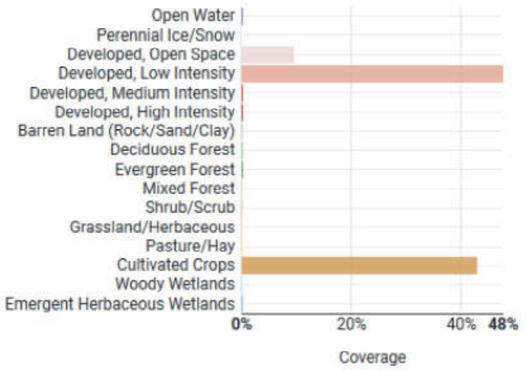
Selected Area 18,576 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	1,794.29	9.5
Developed, Low Intensity	8,971.44	47.6
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:39 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow#001_Upper... Details

Analyze Monitor Model Share New Project

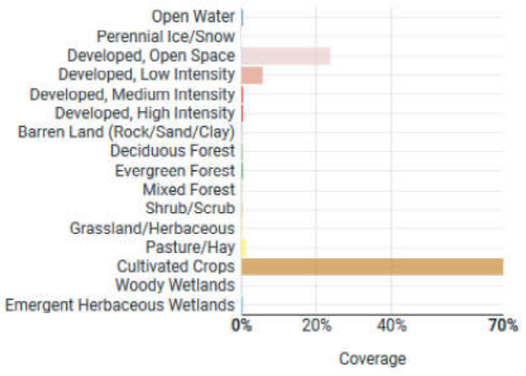
Selected Area 80,054 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	18,840.09	23.6
Developed, Low Intensity	4,485.74	5.6
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:41 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow002_UpperN... Details

Analyze Monitor Model Share New Project

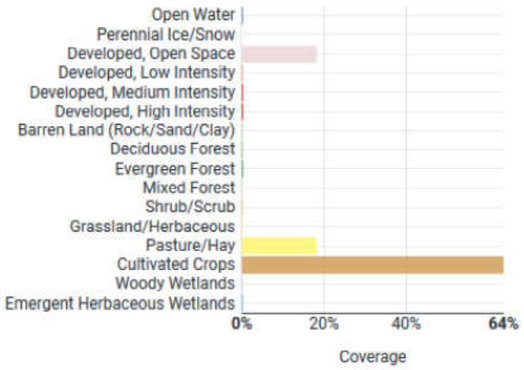
Selected Area 9,605 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	1,794.29	18.2
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:43 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow003_UpperN... Details

Analyze Monitor Model

Share New Project

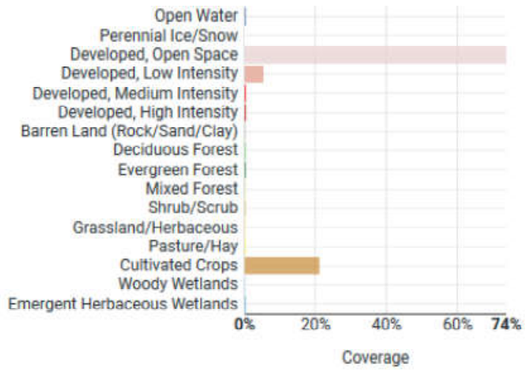
Selected Area 16,168 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	12,560.06	73.7
Developed, Low Intensity	897.15	5.3
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:44 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow004_UpperN... Details

Analyze Monitor Model Share New Project

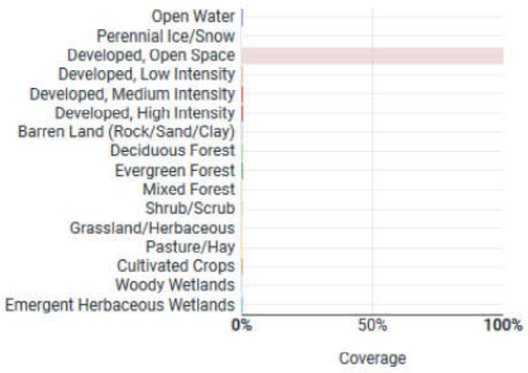
Selected Area 1,788 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	1,794.29	100.0
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:46 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow005_UpperN... Details

Analyze Monitor Model Share New Project

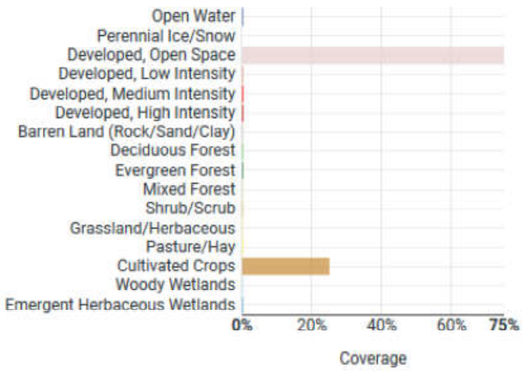
Selected Area 3,765 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.44	75.0
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:47 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow006_UpperN... Details

Analyze Monitor Model Share New Project

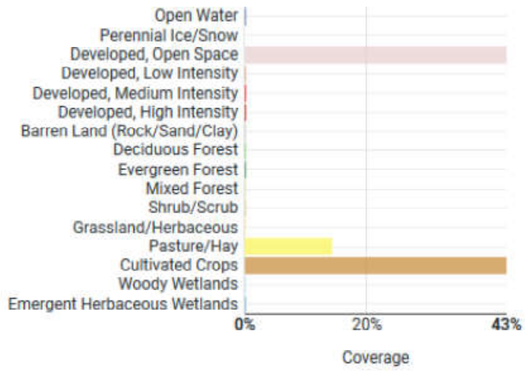
Selected Area 4,184 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.44	42.9
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:49 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow007_UpperN... Details

Analyze Monitor Model Share New Project

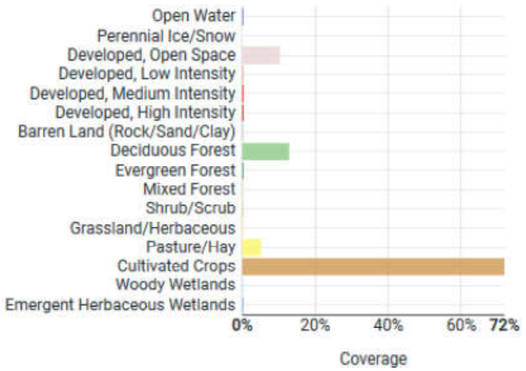
Selected Area 35,893 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	3,588.59	10.3
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	4,485.73	12.8
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:51 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow008_UpperN... Details

Analyze Monitor Model Share New Project

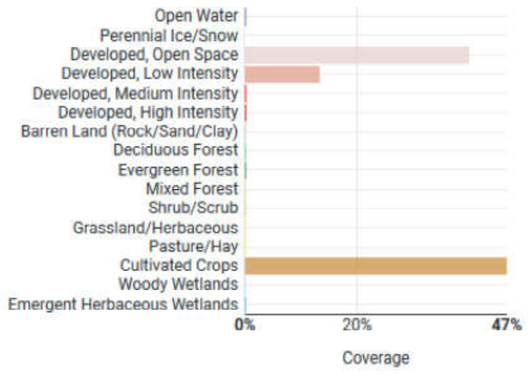
Selected Area 14,381 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	5,382.88	40.0
Developed, Low Intensity	1,794.29	13.3
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:52 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow009_UpperN... Details

Analyze Monitor Model Share New Project

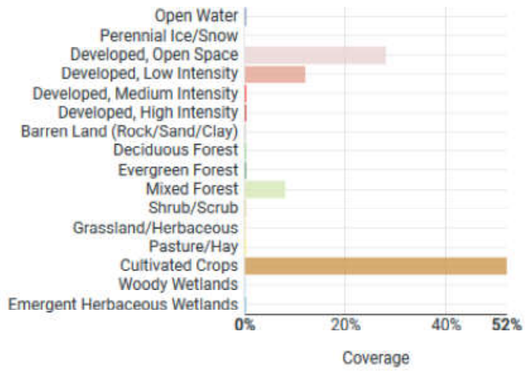
Selected Area 21,661 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	6,280.03	28.0
Developed, Low Intensity	2,691.44	12.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	1,794.29	8.0

Layers

Leaflet | Map data from ESRI

6:54 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow010_UpperN... Details

Analyze Monitor Model Share New Project

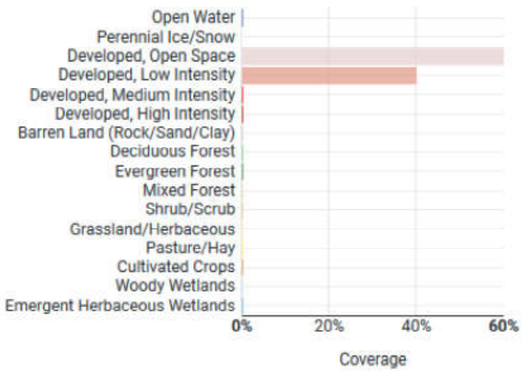
Selected Area 5,529 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.45	60.0
Developed, Low Intensity	1,794.30	40.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:55 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow011_UpperN... Details

Analyze Monitor Model Share New Project

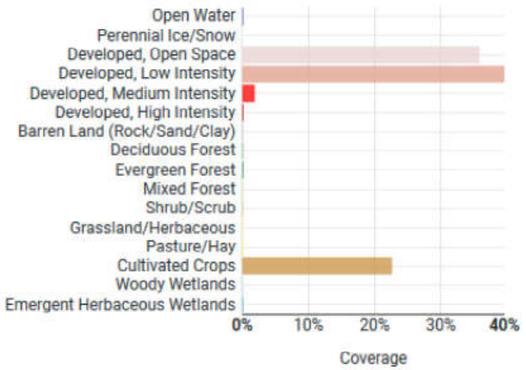
Selected Area 47,145 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	17,045.85	35.8
Developed, Low Intensity	18,840.15	39.6
Developed, Medium Intensity	897.15	1.9
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:57 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow012_Upper N... Details

Analyze Monitor Model Share New Project

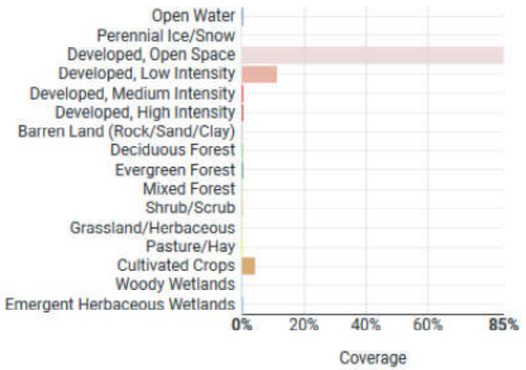
Selected Area 63,734 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	53,828.98	84.5
Developed, Low Intensity	7,177.20	11.3
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

6:59 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow013_UpperN... Details

Analyze Monitor Model Share New Project

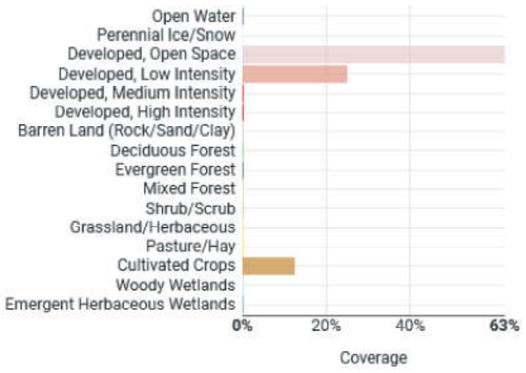
Selected Area 5,868 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	4,485.75	62.5
Developed, Low Intensity	1,794.30	25.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

Leaflet | Map data from ESRI

7:08 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow014_UpperN... Details

Analyze Monitor Model Share New Project

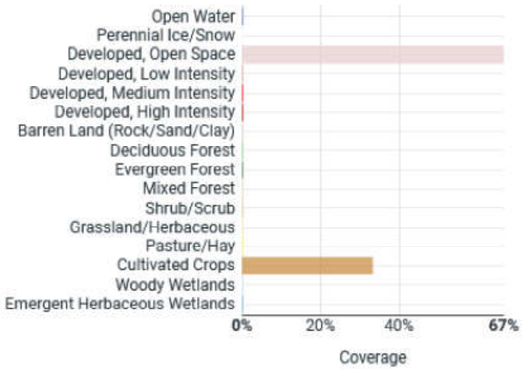
Selected Area 5,574 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	3,588.59	66.7
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

Leaflet | Map data from ESRI

7:15 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow015_UpperN... Details

Analyze Monitor Model Share New Project

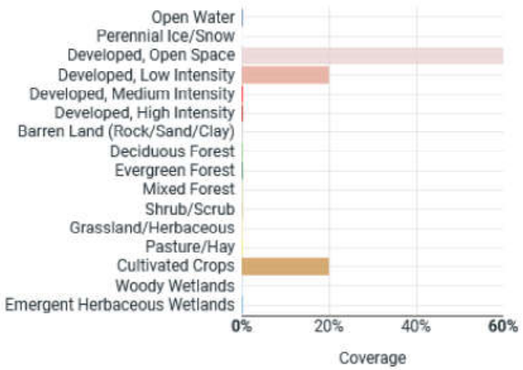
Selected Area 5,130 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.45	60.0
Developed, Low Intensity	897.15	20.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Basemaps

Streets

Satellite

Satellite with Roads

Terrain

Leaflet | Map data from ESRI

7:17 AM
6/12/2019

Model My Watershed

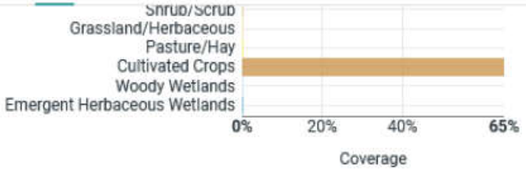
About Help Projects MSchallock

SheetFlow016_UpperN... Details

Analyze Monitor Model Share New Project

Selected Area 165,006 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	36,783.14	22.5
Developed, Low Intensity	17,943.00	11.0
Developed, Medium Intensity	1,794.30	1.1
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0
Shrub/Scrub	0.00	0.0
Grassland/Herbaceous	0.00	0.0
Pasture/Hay	0.00	0.0
Cultivated Crops	106,760.82	65.4
Woody Wetlands	0.00	0.0
Emergent Herbaceous Wetlands	0.00	0.0

Download this data

7:23 AM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow017_UpperN... Details

Analyze Monitor Model Share New Project

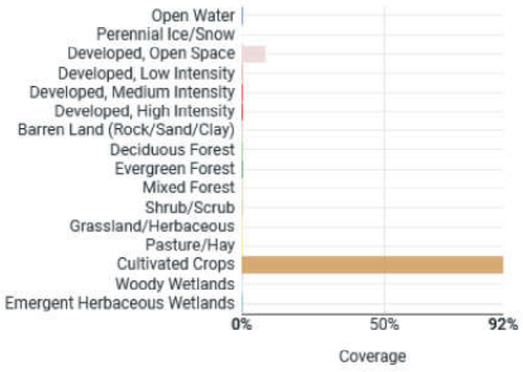
Selected Area 31,042 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.45	8.3
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:38 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow018_UpperN... Details

Analyze Monitor Model Share New Project

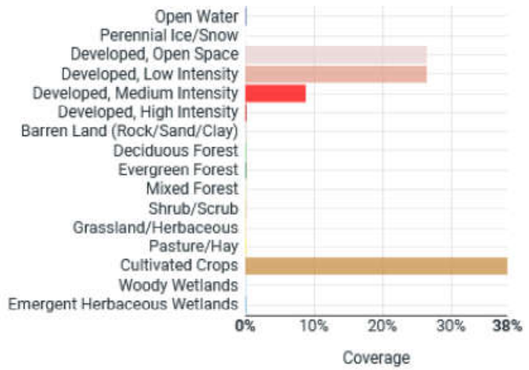
Selected Area 34,005 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	8,074.33	26.5
Developed, Low Intensity	8,074.33	26.5
Developed, Medium Intensity	2,691.44	8.8
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:39 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow019_UpperN... Details

Analyze Monitor Model Share New Project

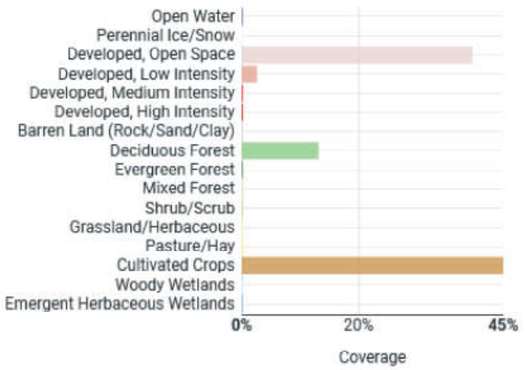
Selected Area 33,605 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	13,457.17	39.5
Developed, Low Intensity	897.14	2.6
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	4,485.72	13.2
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:41 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow020_UpperN... Details

Analyze Monitor Model Share New Project

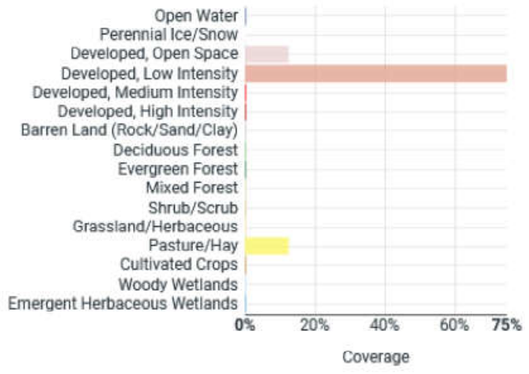
Selected Area 12,863 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	1,794.29	12.5
Developed, Low Intensity	10,765.73	75.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:43 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow021_UpperN... Details

Analyze Monitor Model Share New Project

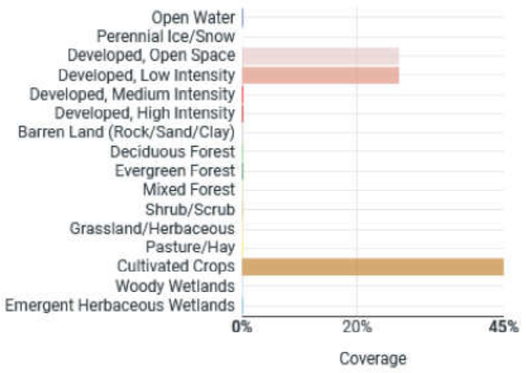
Selected Area 10,992 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	2,691.43	27.3
Developed, Low Intensity	2,691.43	27.3
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:45 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow022_UpperN... Details

Analyze Monitor Model Share New Project

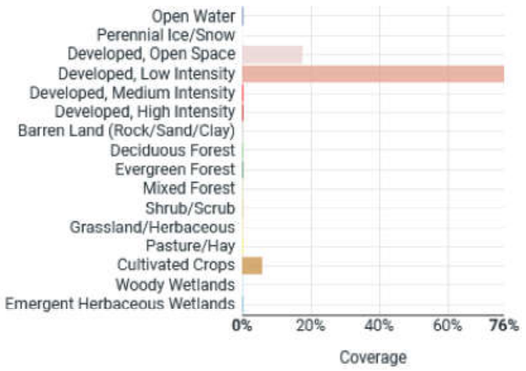
Selected Area 47,880 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	8,074.30	17.6
Developed, Low Intensity	34,988.65	76.5
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:47 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow023_UpperN... Details

Analyze Monitor Model Share New Project

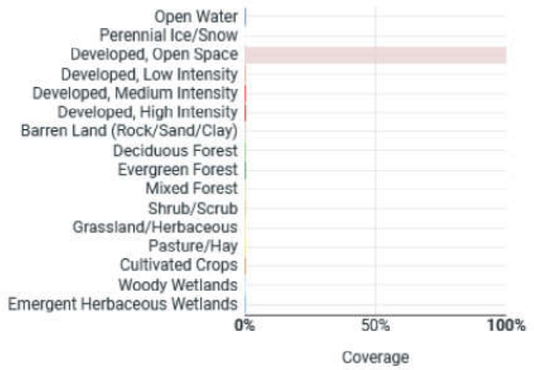
Selected Area 3,633 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	897.15	100.0
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:49 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow024_UpperN... Details

Analyze Monitor Model

Share New Project

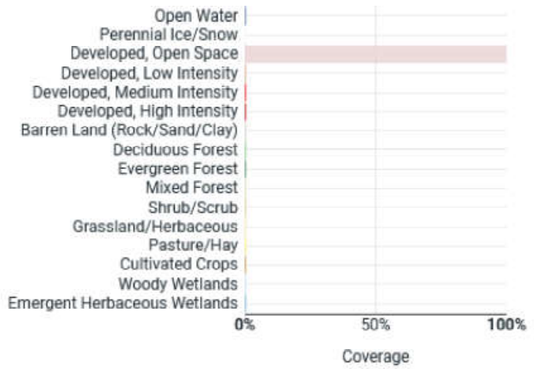
Selected Area 4,258 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	4,485.73	100.0
Developed, Low Intensity	0.00	0.0
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:50 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlow025_UpperN... Details

Analyze Monitor Model Share New Project

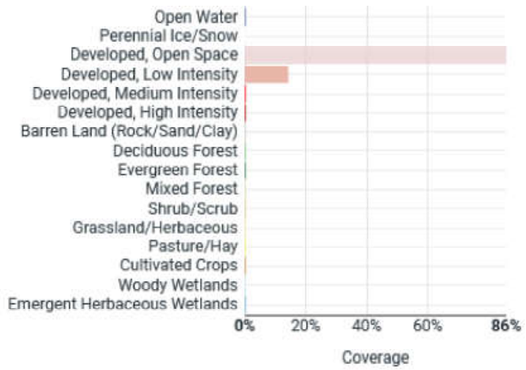
Selected Area 5,379 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	5,382.88	85.7
Developed, Low Intensity	897.15	14.3
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:52 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

SheetFlowOF001_Upper... Details

Analyze Monitor Model

Share New Project

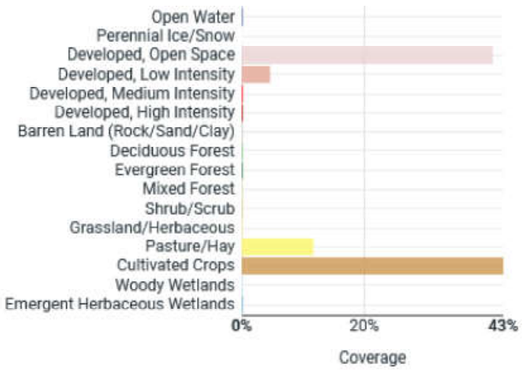
Selected Area 370,655 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	150,721.15	41.0
Developed, Low Intensity	17,045.84	4.6
Developed, Medium Intensity	0.00	0.0
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

Leaflet | Map data from ESRI

2:56 PM
6/12/2019

Model My Watershed

About Help Projects MSchallock

Upper Naz_Checkpoint ... Details

Analyze Monitor Model Share New Project

Selected Area 539,594 m²

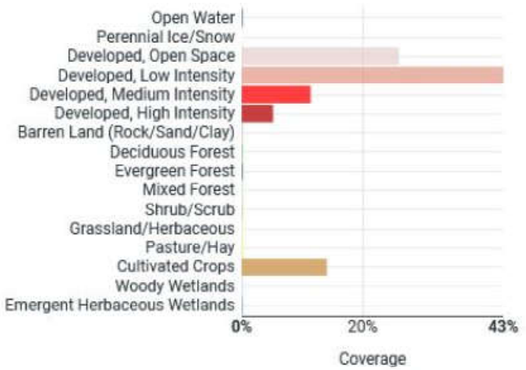
Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)	Active River Area (m²)
Open Water	0.00	0.00	0.00
Perennial Ice/Snow	0.00	0.00	0.00
Developed, Open Space	139,057.71	25.96	2,691.44
Developed, Low Intensity	231,463.80	43.22	3,588.59
Developed, Medium Intensity	61,005.96	11.39	0.00
Developed, High Intensity	27,811.54	5.19	3,588.59

REQUIRED SEDIMENT LOAD REDUCTION CALCULATIONS

UPPER NAZARETH TOWNSHIP - REQUIRED SEDIMENT LOAD CALCULATIONS	
EXISTING SEDIMENT LOAD	**950089.34 LBS/YR**

EXISTING BEST MANAGEMENT PRACTICE (BMP) REDUCTIONS:

Eagles Landing Basin #1	BMP 6.6.2 Dry Ext Basin	
Eagles Landing Basin #2	BMP 6.6.2 Dry Ext Basin	
Eagles Landing Basin #3	BMP 6.6.2 Dry Ext Basin	
Eagles Landing Basin #4	BMP 6.6.2 Dry Ext Basin	
Total		69846.50 LBS/YR

EXISTING SEDIMENT LOAD WITH EXISTING BMP BENEFITS: 880242.84 LBS/YR

(EXISTING SEDIMENT LOAD - EXISTING BEST MANAGEMENT PRACTICE REDUCTIONS)

REQUIRED SEDIMENT LOAD REDUCTION: 88024.28 LBS/YR

(10% OF EXISTING SEDIMENT LOAD WITH EXISTING BMP BENEFITS)

UPPER NAZARETH TOWNSHIP - EXISTING BMP LOADING

WATERSHED TO EXISTING BMP	DEVELOPED, OPEN SPACE (SQ. METERS)	DEVELOPED, OPEN SPACE (ACRES)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACES) (19% OF TOTAL AREA) (A)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACES) (81% OF TOTAL AREA) (B)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACE - SEDIMENT LOADING)(A*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACE - SEDIMENT LOADING) (B*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (SQ. METERS)	DEVELOPED, LOW INTENSITY (ACRES)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACES) (49% OF TOTAL AREA) (C)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACES) (51% OF TOTAL AREA) (D)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (C*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (D*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (SQ. METERS)	DEVELOPED, MEDIUM INTENSITY (ACRES)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACES) (79% OF TOTAL AREA) (E)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACES) (21% OF TOTAL AREA) (F)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (E*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (F*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, HIGH INTENSITY (SQ. METERS)	DEVELOPED, HIGH INTENSITY (ACRES)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACES) (100% OF TOTAL AREA) (G)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (G*1893 LBS/ACRE/YR) (LBS/YR)	UNDEVELOPED LANDS (SQ. METERS)	UNDEVELOPED LANDS (ACRES) (H)	UNDEVELOPED LANDS - SEDIMENT LOADING (H*234.6 LBS/ACRE/YR) (LBS/YR)	TOTAL SEDIMENT LOADING (LBS/YR)	TOTAL STORM SEWERSHED AREA (ACRES)
Eagles Landing Basin #1	18,840.08	4.66	0.88	3.77	1626.67	999.15	28,708.69	7.09	3.48	3.62	6392.51	958.62	7,177.17	1.77	1.40	0.37	2576.57	98.68	0.00	0.00	0.00	0.00	80,743.19	19.95	4680.74	**17332.93**	**33.48**
Eagles Landing Basin #2	41,268.75	10.20	1.94	8.26	3563.17	2188.60	81,640.36	20.17	9.89	10.29	18178.72	2726.06	9,868.62	2.44	1.93	0.51	3542.79	135.69	0.00	0.00	0.00	0.00	186,606.54	46.11	10817.71	**41152.75**	**78.92**
Eagles Landing Basin #3	4,485.74	1.11	0.21	0.90	387.30	237.89	11,662.91	2.88	1.41	1.47	2596.96	389.44	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	8,971.47	2.22	520.08	**4131.67**	**6.21**
Eagles Landing Basin #4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	124,703.45	30.81	7229.15	**7229.15**	**30.81**
		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	**0.00**	**0.00**
		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	**0.00**	**0.00**
		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	**0.00**	**0.00**
		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	**0.00**	**0.00**
		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	**0.00**	**0.00**

TOTAL EXISTING SEDIMENT LOAD TO BMPS 69846.50

PROPOSED BMP REDUCTION CALCULATIONS

UPPER NAZARETH TOWNSHIP - PROPOSED BMP REDUCTION CALCULATIONS						
STORM SEWER SHED NUMBER	EXISTING SEDIMENT LOADING (LBS/YR)	EXISTING BMP REDUCTION (LBS/YR)	EXISTING SEDIMENT LOADING WITH EXISTING BMP REDUCTION CREDIT (LBS/YR)	PROPOSED SEDITMENT REDUCTION BY VEGETATED SWALE WITH INFILTRATION TRENCH (LBS/YR)	TOTAL SEDIMENT LOAD TREATED BY CONVERTED DRY EXTENDED BASIN	PROPOSED SEDIMENT REDUCTION (A*B) (LBS/YR)
001	13977.13	0.00	13977.13	0.00	0.00	0.00
001A	26735.32	0.00	26735.32	0.00	0.00	0.00
002	78440.45	7229.15	71211.30	0.00	0.00	0.00
002A	13737.25	0.00	13737.25	0.00	0.00	0.00
003	13742.54	0.00	13742.54	0.00	0.00	0.00
004	35841.64	0.00	35841.64	0.00	0.00	0.00
005	31027.88	0.00	31027.88	0.00	0.00	0.00
006	2692.70	0.00	2692.70	0.00	0.00	0.00
007	27275.52	0.00	27275.52	0.00	0.00	0.00
008	6184.55	0.00	6184.55	0.00	0.00	0.00
009	15690.39	0.00	15690.39	0.00	0.00	0.00
010	12651.79	0.00	12651.79	0.00	0.00	0.00
011	5029.07	0.00	5029.07	0.00	0.00	0.00
012	9615.33	0.00	9615.33	0.00	0.00	0.00
013	3131.55	0.00	3131.55	0.00	0.00	0.00
014	718.15	0.00	718.15	0.00	0.00	0.00
015	177.05	0.00	177.05	0.00	0.00	0.00
016	48194.87	45284.42	2910.45	0.00	0.00	0.00
017	38480.84	0.00	38480.84	0.00	0.00	0.00
018	18617.89	17332.93	1284.95	0.00	0.00	0.00
019	10962.05	0.00	10962.05	0.00	0.00	0.00
020	334.41	0.00	334.41	0.00	0.00	0.00
021	229.72	0.00	229.72	0.00	0.00	0.00
022	26293.05	0.00	26293.05	0.00	0.00	0.00
023	2526.95	0.00	2526.95	0.00	0.00	0.00
024	18002.02	0.00	18002.02	0.00	0.00	0.00
025	26343.05	0.00	26343.05	0.00	0.00	0.00
026	34543.46	0.00	34543.46	0.00	0.00	0.00
027	84475.40	0.00	84475.40	0.00	0.00	0.00
028	10213.64	0.00	10213.64	0.00	0.00	0.00
029	24728.49	0.00	24728.49	0.00	0.00	0.00
030	1253.30	0.00	1253.30	0.00	0.00	0.00
031	16202.70	0.00	16202.70	0.00	0.00	0.00
032	11375.61	0.00	11375.61	0.00	0.00	0.00
033	6766.63	0.00	6766.63	0.00	0.00	0.00
034	18741.85	0.00	18741.85	0.00	0.00	0.00
036	1378.33	0.00	1378.33	0.00	0.00	0.00
037	1628.41	0.00	1628.41	0.00	0.00	0.00
038	3905.28	0.00	3905.28	0.00	0.00	0.00
039	8236.85	0.00	8236.85	0.00	0.00	0.00
040	3015.37	0.00	3015.37	0.00	0.00	0.00
Sheet Flow 001	7050.95	0.00	7050.95	0.00	0.00	0.00

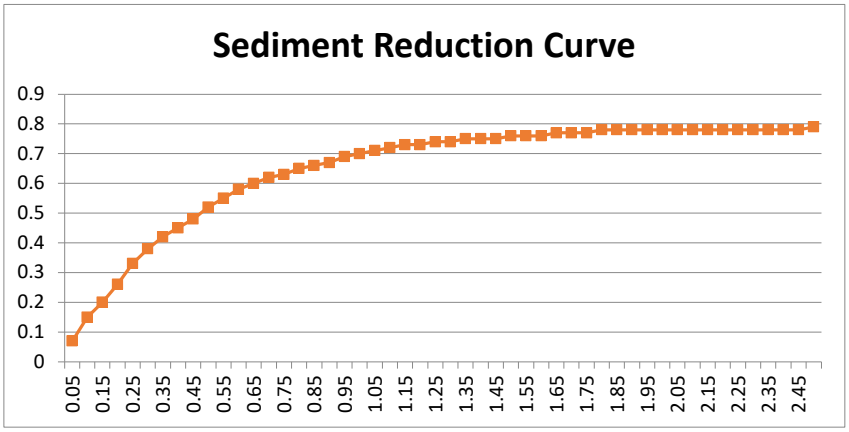
Sheet Flow 002	718.15	0.00	718.15	0.00	0.00	0.00
Sheet Flow 003	2200.84	0.00	2200.84	0.00	0.00	0.00
Sheet Flow 004	250.08	0.00	250.08	0.00	0.00	0.00
Sheet Flow 005	427.12	0.00	427.12	0.00	0.00	0.00
Sheet Flow 006	583.15	0.00	583.15	0.00	0.00	0.00
Sheet Flow 007	2320.44	0.00	2320.44	0.00	0.00	0.00
Sheet Flow 008	1573.73	0.00	1573.73	0.00	0.00	0.00
Sheet Flow 009	2344.56	0.00	2344.56	0.00	0.00	0.00
Sheet Flow 010	834.56	0.00	834.56	0.00	0.00	0.00
Sheet Flow 011	8158.45	0.00	8158.45	0.00	0.00	0.00
Sheet Flow 012	9496.16	0.00	9496.16	0.00	0.00	0.00
Sheet Flow 013	1136.65	0.00	1136.65	0.00	0.00	0.00
Sheet Flow 014	604.17	0.00	604.17	0.00	0.00	0.00
Sheet Flow 015	656.85	0.00	656.85	0.00	0.00	0.00
Sheet Flow 016	16578.89	0.00	16578.89	0.00	0.00	0.00
Sheet Flow 017	2091.39	0.00	2091.39	0.00	0.00	0.00
Sheet Flow 018	4872.19	0.00	4872.19	0.00	0.00	0.00
Sheet Flow 019	3249.47	0.00	3249.47	0.00	0.00	0.00
Sheet Flow 020	3110.76	0.00	3110.76	0.00	0.00	0.00
Sheet Flow 021	1324.32	0.00	1324.32	0.00	0.00	0.00
Sheet Flow 022	10240.54	0.00	10240.54	0.00	0.00	0.00
Sheet Flow 023	125.04	0.00	125.04	0.00	0.00	0.00
Sheet Flow 024	625.19	0.00	625.19	0.00	0.00	0.00
Sheet Flow 025	979.96	0.00	979.96	0.00	0.00	0.00
Sheet Flow Outfall #001	36969.18	0.00	36969.18	0.00	0.00	0.00
Check Point #001	118448.08	0.00	118448.08	0.00	0.00	0.00
BMP #1 Tewsbury, Dry Extended Basin	38631.07		38631.07		25110.20	25110.20
BMP #2 Fieldview, Dry Extended Basin	31231.18		31231.18		20612.58	20612.58
BMP #3 Farmview, Dry Extended Basin	53530.96		53530.96		37471.67	37471.67
BMP #4 Sycamore Park Vegetated Swale	11644.96		11644.96	4890.88		4890.88
TOTALS	**950,089.34**	**69,846.50**	**880,242.84**	**TOTAL PROPOSED SEDIMENT REDUCTION**		**88,085.33**
	REQUIRED SEDIMENT REDUCTION		**88,024.28**			

UPPER NAZARETH TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S																									
BMP	DEVELOPED, OPEN SPACE (SQ. METERS)	DEVELOPED, OPEN SPACE (ACRES)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACES) (19% OF TOTAL AREA) (A)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACES) (81% OF TOTAL AREA) (B)	DEVELOPED, OPEN SPACE (IMPERVIOUS SURFACE - SEDIMENT LOADING)(A*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, OPEN SPACE (PERVIOUS SURFACE - SEDIMENT LOADING) (B*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (SQ. METERS)	DEVELOPED, LOW INTENSITY (ACRES)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACES) (49% OF TOTAL AREA) (C)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACES) (51% OF TOTAL AREA) (D)	DEVELOPED, LOW INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (C*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, LOW INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (D*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (SQ. METERS)	DEVELOPED, MEDIUM INTENSITY (ACRES)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACES) (79% OF TOTAL AREA) (E)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACES) (21% OF TOTAL AREA) (F)	DEVELOPED, MEDIUM INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (E*1893 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, MEDIUM INTENSITY (PERVIOUS SURFACE - SEDIMENT LOADING) (F*264.96 LBS/ACRE/YR) (LBS/YR)	DEVELOPED, HIGH INTENSITY (SQ. METERS)	DEVELOPED, HIGH INTENSITY (ACRES)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACES) (100% OF TOTAL AREA) (G)	DEVELOPED, HIGH INTENSITY (IMPERVIOUS SURFACE - SEDIMENT LOADING) (G*1893 LBS/ACRE/YR) (LBS/YR)	UNDEVELOPED LANDS (SQ. METERS)	UNDEVELOPED LANDS (ACRES) (H)	UNDEVELOPED LANDS - SEDIMENT LOADING (H*234.6 LBS/ACRE/YR) (LBS/YR)	TOTAL SEDIMENT LOADING (LBS/YR)	TOTAL TRIBUTARY AREA (ACRES)
BMP #1 Tewsbury Basin Dry Extended Baisn Conversion	23325.81	5.76	1.10	4.67	2013.97	1237.04	81640.32	20.17	9.89	10.29	18178.71	2726.06	34988.71	8.65	6.83	1.82	12560.80	481.07	897.15	0.22	0.22	407.69	897.15	0.22	52.01	**37,657.34**	**35.03**
BMP #2 Fieldview Basin Dry Extended Baisn Conversion	43062.94	10.64	2.02	8.62	3718.09	2283.75	85228.74	21.06	10.32	10.74	18977.73	2845.88	5382.87	1.33	1.05	0.28	1932.43	74.01	0.00	0.00	0.00	0.00	11662.88	2.88	676.11	**30,508.00**	**35.91**
BMP #3 Farmview Basin Dry Extended Baisn Conversion	69977.42	17.29	3.29	14.01	6041.90	3711.11	126497.65	31.26	15.32	15.94	28167.01	4223.90	16148.64	3.99	3.15	0.84	5797.29	222.03	8074.32	2.00	2.00	3669.17	7177.17	1.77	416.07	**52,248.48**	**56.31**
BMP #4 Sycamore Park, Vegetated Swale	23325.76	5.76	1.10	4.67	2013.96	1237.03	27811.49	6.87	3.37	3.50	6192.74	928.66	2691.43	0.67	0.53	0.14	966.21	37.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**11,375.61**	**13.30**
		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	**-**	**0.00**

UPPER NAZARETH TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: BMP #1 converstion to BMP 6.6.3 Dry Ext

Tewsbury Basin



TOTAL DRAINAGE AREA (Acres):	**35.03**
TOTAL IMPERVIOUS AREA (Acres):	**18.03**

BMP SEDIMENT LOAD (lbs/yr):	**38,631.07**

EXISTING SEDIMENT REMOVAL REDUCTIONS

PROPOSED SEDIMENT REMOVAL REDUCTIONS	
Volume Treated (ac-ft.)	**1.205**
Inches of Impervious Area Treated:	**0.80**
Percent Reduction:	**65%**
Removed Sediment:	**25,110.20**

Type	Area (m2)	ACRES	IMP. AREA	PER. AREA
Open Water	0	0.00		
Perennial Ice/Snow	0	0.00		
Developed, Open Space	23325.81	5.76	1.10	4.67
Developed, Low Intensity	81640.32	20.17	9.89	10.29
Developed, Medium Intensity	34988.71	8.65	6.83	1.82
Developed, High Intensity	897.15	0.22	0.22	0.00
Barren Land (Rock/Sand/Clay)	0	0.22		0.22
Deciduous Forest	0			
Evergreen Forest	0			
Mixed Forest	0			
Shrub/Scrub	0			
Grassland/Herbaceous	0			
Pasture/Hay	0			
Cultivated Crops	0			
Woody Wetlands	897.15			
Emergent Herbaceous Wetlands	0			

			CF
			52500.00
BMP Area	10500	ft2	
Treated Depth (in.)	60	inches	

Model My Watershed

About Help Projects MSchallock

Upper Naz-BMP #1 Details

Analyze Monitor Model Share New Project

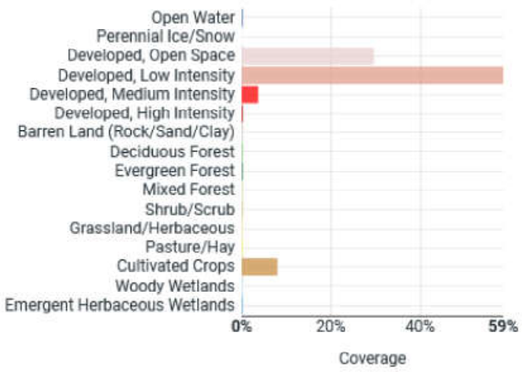
Selected Area 149,847 m²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)
Open Water	0.00	0.0
Perennial Ice/Snow	0.00	0.0
Developed, Open Space	43,062.94	29.6
Developed, Low Intensity	85,228.74	58.6
Developed, Medium Intensity	5,382.87	3.7
Developed, High Intensity	0.00	0.0
Barren Land (Rock/Sand/Clay)	0.00	0.0
Deciduous Forest	0.00	0.0
Evergreen Forest	0.00	0.0
Mixed Forest	0.00	0.0

Layers

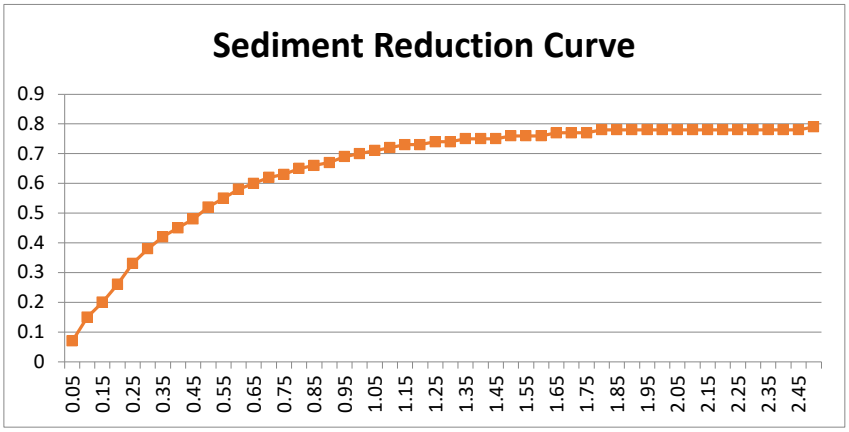
Leaflet | Map data from ESRI

6:39 AM
6/27/2019

UPPER NAZARETH TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: BMP #2 converstion to BMP 6.6.3 Dry Ext

Fieldview Basin



TOTAL DRAINAGE AREA (Acres):	**35.91**
TOTAL IMPERVIOUS AREA (Acres):	**13.39**

BMP SEDIMENT LOAD (lbs/yr):	**31,231.18**

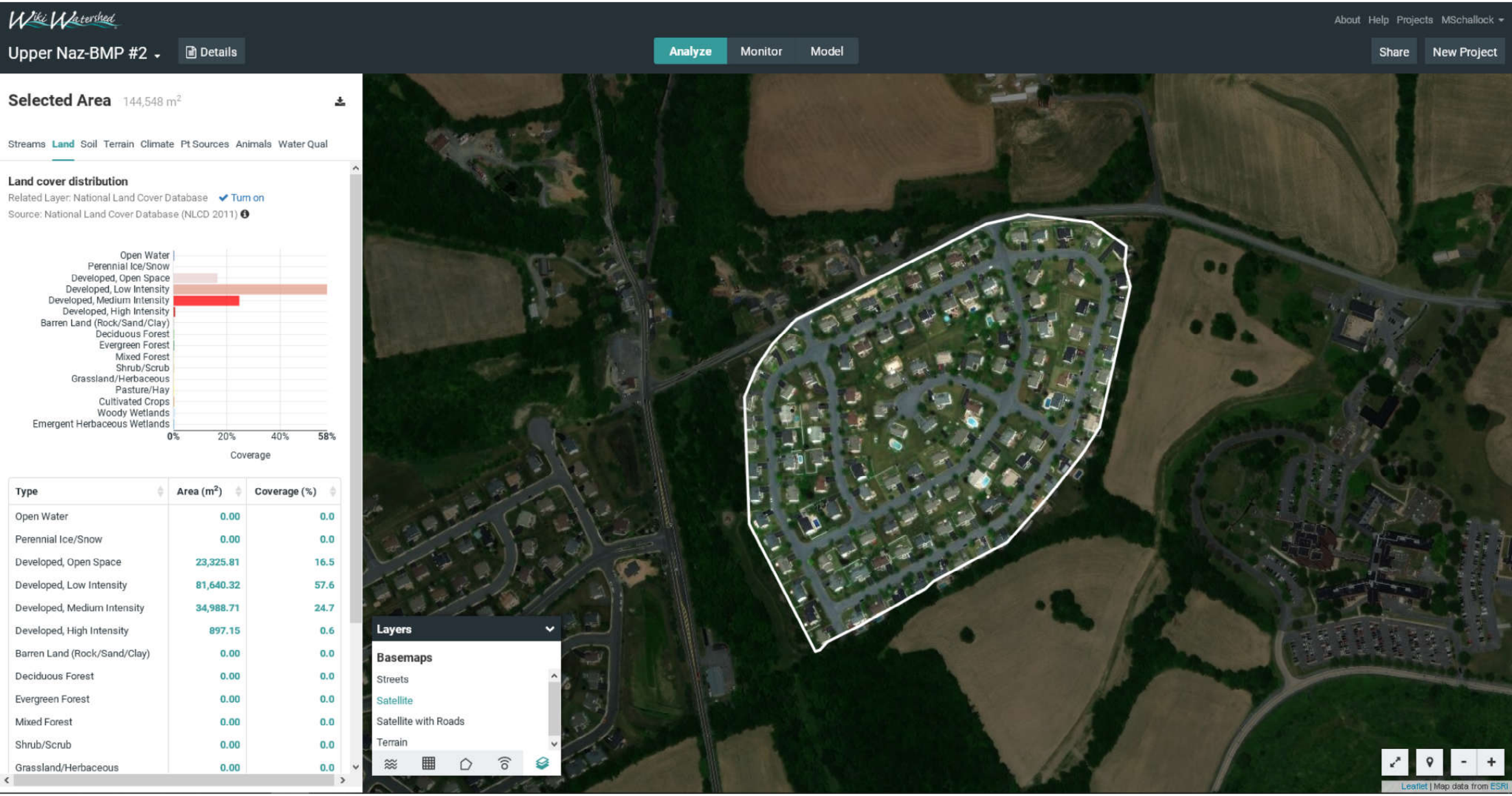
EXISTING SEDIMENT REMOVAL REDUCTIONS

PROPOSED SEDIMENT REMOVAL REDUCTIONS	
Volume Treated (ac-ft.)	**0.964**
Inches of Impervious Area Treated:	**0.86**
Percent Reduction:	**66%**
Removed Sediment:	**20,612.58**

Type	Area (m2)	ACRES	IMP. AREA	PER. AREA
Open Water	0	0.00		
Perennial Ice/Snow	0	0.00		
Developed, Open Space	43062.94	10.64	2.02	8.62
Developed, Low Intensity	85228.74	21.06	10.32	10.74
Developed, Medium Intensity	5382.87	1.33	1.05	0.28
Developed, High Intensity	0	0.00	0.00	0.00
Barren Land (Rock/Sand/Clay)	0	2.88		2.88
Deciduous Forest	0			
Evergreen Forest	0			
Mixed Forest	0			
Shrub/Scrub	0			
Grassland/Herbaceous	0			
Pasture/Hay	0			
Cultivated Crops	11662.88			
Woody Wetlands	0			
Emergent Herbaceous Wetlands	0			

CF
42000.00

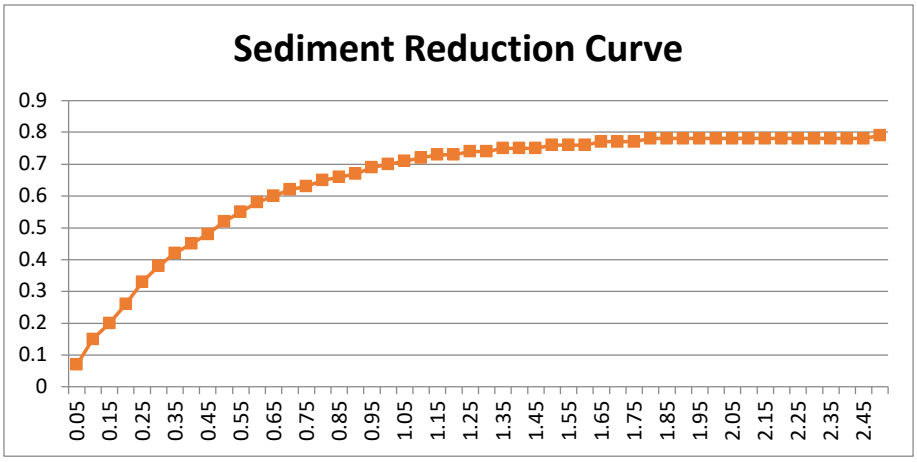
BMP Area	10500	ft2
Treated Depth (in.)	48	inches


Wiki Watershed
About Help Projects MSchallock
Upper Naz-BMP #2
Details
Analyze Monitor Model
Share New Project
Selected Area 144,548 m²
Streams Land Soil Terrain Climate Pt Sources Animals Water Qual
Land cover distribution
Related Layer: National Land Cover Database
Turn on
Source: National Land Cover Database (NLCD 2011)
Open Water
Perennial Ice/Snow
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Barren Land (Rock/Sand/Clay)
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrub/Scrub
Grassland/Herbaceous
Pasture/Hay
Cultivated Crops
Woody Wetlands
Emergent Herbaceous Wetlands
0% 20% 40% 58%
Coverage
Type
Area (m²)
Coverage (%)
Open Water 0.00 0.0
Perennial Ice/Snow 0.00 0.0
Developed, Open Space 23,325.81 16.5
Developed, Low Intensity 81,640.32 57.6
Developed, Medium Intensity 34,988.71 24.7
Developed, High Intensity 897.15 0.6
Barren Land (Rock/Sand/Clay) 0.00 0.0
Deciduous Forest 0.00 0.0
Evergreen Forest 0.00 0.0
Mixed Forest 0.00 0.0
Shrub/Scrub 0.00 0.0
Grassland/Herbaceous 0.00 0.0
Layers
Basemaps
Streets
Satellite
Satellite with Roads
Terrain
Leaflet | Map data from ESRI

UPPER NAZARETH TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: BMP #3 converstion to BMP 6.6.3 Dry Ext

Farmview Basin



TOTAL DRAINAGE AREA (Acres):	**56.31**
TOTAL IMPERVIOUS AREA (Acres):	**23.75**

BMP SEDIMENT LOAD (lbs/yr):	**53,530.96**

EXISTING SEDIMENT REMOVAL REDUCTIONS

PROPOSED SEDIMENT REMOVAL REDUCTIONS

Volume Treated (ac-ft.)	**1.990**
Inches of Impervious Area Treated:	**1.01**
Percent Reduction:	**70%**
Removed Sediment:	**37,471.67**

Type	Area (m2)	ACRES	IMP. AREA	PER. AREA
Open Water	0	0.00		
Perennial Ice/Snow	0	0.00		
Developed, Open Space	69977.42	17.29	3.29	14.01
Developed, Low Intensity	126497.65	31.26	15.32	15.94
Developed, Medium Intensity	16148.64	3.99	3.15	0.84
Developed, High Intensity	8074.32	2.00	2.00	0.00
Barren Land (Rock/Sand/Clay)	0	1.77		1.77
Deciduous Forest	0			
Evergreen Forest	0			
Mixed Forest	0			
Shrub/Scrub	0			
Grassland/Herbaceous	0			
Pasture/Hay	0			
Cultivated Crops	7177.17			
Woody Wetlands	0			
Emergent Herbaceous Wetlands	0			

			CF
			86666.67
BMP Area	32500	ft2	
Treated Depth (in.)	32	inches	

Model My Watershed

About Help Projects MSchallock

Upper Naz_BMP Basin#... Details

Analyze Monitor Model Share New Project

Selected Area 227,829 m²

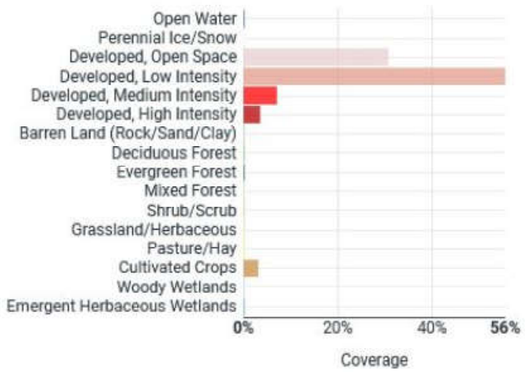
Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Land cover distribution

Related Layer: National Land Cover Database ✔ Turn on

Source: National Land Cover Database (NLCD 2011)

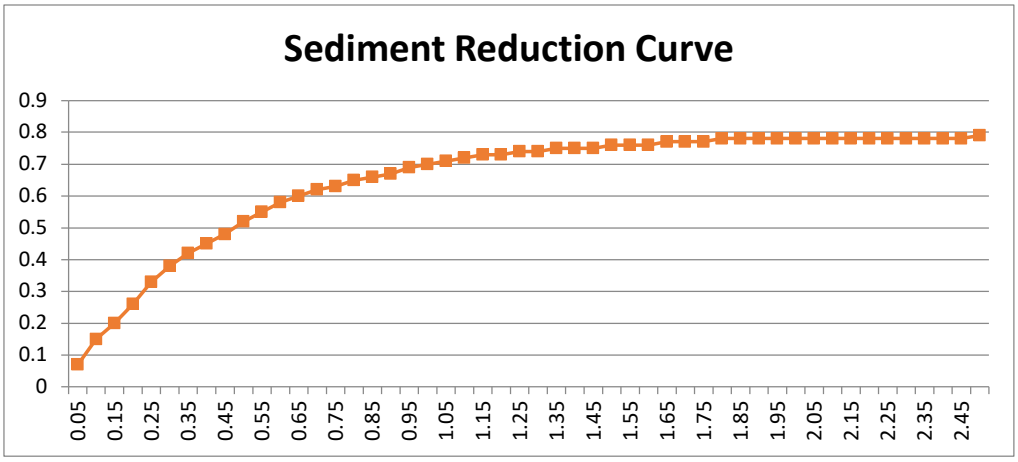


Type	Area (m²)	Coverage (%)	Active River Area (m²)
Open Water	0.00	0.00	0.00
Perennial Ice/Snow	0.00	0.00	0.00
Developed, Open Space	69,977.42	30.71	2,691.44
Developed, Low Intensity	126,497.65	55.51	1,794.29
Developed, Medium Intensity	16,148.64	7.09	0.00
Developed, High Intensity	8,074.32	3.54	3,588.59

UPPER NAZARETH TOWNSHIP - SEDIMENT LOADING TO PROPOSED BMP'S

BMP NAME: BMP 6.4.8: Vegetated Swale with Infiltration Trench

Sycamore Park



TOTAL DRAINAGE AREA (Acres):	**13.30**
TOTAL IMPERVIOUS AREA (Acres):	**4.99**
BMP SEDIMENT LOAD (lbs/yr):	**11,644.96**

EXISTING SEDIMENT REMOVAL REDUCTIONS

PROPOSED SEDIMENT REMOVAL REDUCTIONS

Volume Treated (ac-ft.)	**0.149**
Inches of Impervious Area Treated:	**0.36**
Percent Reduction:	**42%**
Removed Sediment:	**4,890.88**

Type	Area (m2)	ACRES	IMP. AREA	PER. AREA
Open Water	0	0.00		
Perennial Ice/Snow	0	0.00		
Developed, Open Space	23325.76	5.76	1.10	4.67
Developed, Low Intensity	27811.49	6.87	3.37	3.50
Developed, Medium Intensity	2691.43	0.67	0.53	0.14
Developed, High Intensity	0	0.00	0.00	0.00
Barren Land (Rock/Sand/Clay)	0	0.00		0.00
Deciduous Forest	0			
Evergreen Forest	0			
Mixed Forest	0			
Shrub/Scrub	0			
Grassland/Herbaceous	0			
Pasture/Hay	0			
Cultivated Crops	0			
Woody Wetlands	0			
Emergent Herbaceous Wetlands	0			

				CF 6500.00
			Width	length
BMP Area	3250	ft2	10.00	325.00
Treated Depth (in.)	24	inches		

Model My Watershed

About Help Projects MSchallock

Upper Naz-BMP#4 Details

Analyze Monitor Model Share New Project

Selected Area 53,806 m²

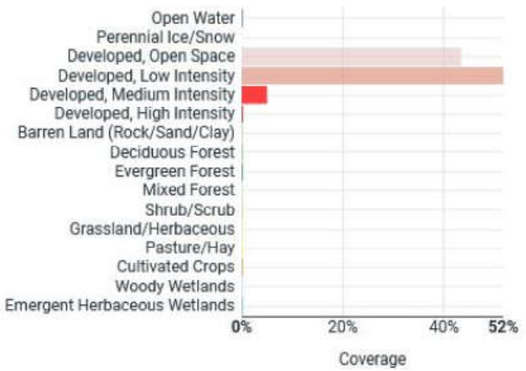
Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Land cover distribution

Land cover distribution

Related Layer: National Land Cover Database Turn on

Source: National Land Cover Database (NLCD 2011)



Type	Area (m²)	Coverage (%)	Active River Area (m²)
Open Water	0.00	0.00	0.00
Perennial Ice/Snow	0.00	0.00	0.00
Developed, Open Space	23,325.76	43.33	2,691.43
Developed, Low Intensity	27,811.49	51.67	2,691.43
Developed, Medium Intensity	2,691.43	5.00	0.00
Developed, High Intensity	0.00	0.00	0.00

Layers

Streams

Continental US Medium Resolution Stream Network

Delaware River Basin High Resolution Stream Network

Leaflet | Map data from ESRI

MS4 OUTFALL AND STORM SEWER MAP

KEYSTONE CONSULTING ENGINEERS,Inc.
2870 EMRICK BOULEVARD, BETHLEHEM, PA 18020 - 610-865-4555
5012 MEDICAL CENTER CIRCLE, SUITE 1 ALLENTOWN, PA 18106 - 610-395-0971
865 INTERCHANGE ROAD, KRESGEVILLE, PA 18333 - 610-681-5233
www.KCEinc.com

KEYSTONE CONSULTING ENGINEERS

OUTFALL AND STORM SEWER STRUCTURE LOCATIONS

UPPER NAZARETH TOWHSHIP STORM SEWER LOCATION MAP

UPPER NAZARETH TOWNSHIP, NORTHHAMPTON COUNTY PENNSYLVANIA

This is an I:\GEOGRAPHIC INFORMATION SYSTEM\Drawing Path= F:\ACE Accounts\Upper Nazareth\GIS_DATA\MT_Address Map_Sheet 1of 2.mxd

REVISIONS	DRAWN	DATE
	MPS	7/15/2019
	MPS	10/26/2020

JOB NUMBER:	UNT-17-011
DESIGNED:	MPS
DRAWN:	MPS
CHECKED BY:	ARK
DATE:	8/01/2018
SCALE:	1" = 1000'
SHEET:	1 OF 2

PUBLIC NOTICE ADVERTISEMENT

The Home News

The Home News | PO BOX A, Walnutport, PA 18088 | Since 1942 | 610-923-0382

Proof of Publication Notice in *The Home News*

Under Newspaper Advertising Act No. 587, Approved May 16, 1929

PUBLIC NOTICE

Upper Nazareth Township invites the public to review and provide comments on the Township Pollutant Reduction Plan beginning on November 23, 2020 and extending through January 7, 2021. The Pollutant Reduction Plan, as required by the PAG-13 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) permit, outlines the Townships 5-year plan, beginning in 2021 to reduce sediment loading to impaired local surface waters. A copy of the Pollutant Reduction Plan is available for public review at the Upper Nazareth Township Office located at 100 Newport Avenue, Nazareth, PA 18064; Monday through Friday between the hours of 7:30 AM and 3:30 PM. The Township will also accept comments from the public at its regularly scheduled Board Meeting on December 16, 2020 at 7:00 PM at which meeting a public hearing on the plan will be held.

(11/26)

State of Pennsylvania,
County of Northampton,

Paul Prass, Publisher of *The Home News*, being duly sworn, deposes and says that *The Home News* is a weekly periodical, of general circulation, headquartered in the Borough of Walnutport, PA, which periodical was established December 11, 1942, since which date said periodical has been regularly issued weekly; that a copy of the printed notice or publication is attached hereto exactly as the same was printed and published in the regular editions and issues of the said periodical on the following dates, viz November 26 2020 that the affiant is the associate publisher of *The Home News* and declares that he is not interested in the subject matter of the aforesaid advertisement, and that all allegations of the time, place and character of the publication are true.

Signed: Paul Prass

Sworn to and subscribed before me this 2nd day of December, A.D. 2020.

Commonwealth of Pennsylvania - Notary Seal
DONNA JO BACHMAN - Notary Public
Northampton County
My Commission Expires October 20, 2024
Commission Number 1005025

Signed: Donna Jo Bachman

Donna Jo Bachman, Notary Public

Statement of Advertising Costs

Billed to Upper Nazareth Township
100 Newport Ave
Nazareth PA 18064

To *The Home News*, Dr.

For publishing the notice or advertisement attached hereto on the above dates	$ 66.00
Probating same	$ 5.00
TOTAL	$ 71.00

Publisher's Receipt for Advertising Costs

The Home News, a weekly general circulation newspaper, hereby acknowledges receipt of the aforesaid advertising and publication costs and certifies that the same have been fully paid.

By Paul Prass

PUBLIC COMMENTS AND RESPONSES

Upper Nazareth Township

POLLUTANT REDUCTION PLAN

RESPONSE TO COMMENTS

No public comments received.

MCM 3:
Illiit Discharge Detection and Elimination

Upper Nazareth Township MS4 Stormwater Program Manual

Prepared by:
KEYSTONE CONSULTING ENGINEERS
www.KeystoneConsultingEngineers.com

June 2018

MCM 3: Illicit Discharge Detection and Elimination

Importance of Illicit Discharge, Detection and Elimination (IDD&E)

Discharges into surface waters such as rivers, streams, lakes, and ponds from Municipal Separate Storm Sewer Systems (MS4s) often include wastes and wastewater from non-stormwater sources. A study conducted in 1987 in Sacramento, California, found that almost one-half of the water discharged from a local MS4 was not directly attributable to precipitation runoff. A significant portion of the dry weather flows were from illicit and/or inappropriate discharges and connections to the system. Pollutant levels from these illicit discharges have been shown in EPA studies to be high enough to significantly degrade receiving water quality and threaten aquatic, wildlife, and human health.

The objective of the illicit discharge detection and elimination minimum control measure is for the Township to gain a thorough awareness of its storm sewer system. This awareness will allow the Township to determine the types and sources of illicit discharges entering its system and establish the legal, technical, and educational means needed to eliminate these discharges.

Definition of "Illicit Discharge"

Federal regulations define an illicit discharge as "... any discharge to an MS4 that is not composed entirely of stormwater ...". Illicit discharges include the following non-stormwater wastes:

- Sanitary wastewater;
- Effluent from septic tanks;
- Carwash wastewater;
- Improper disposal of automobile and household toxins;
- Improper disposal of oil;
- Laundry wastewater; and
- Spills from roadway accidents.

The following non-stormwater wastes are <u>not</u> considered illicit discharges:

- Discharges from fire-fighting activities;
- Runoff from irrigation practices;
- Diverted stream flows;
- Uncontaminated ground water infiltration;
- Uncontaminated pumped ground water;
- Discharges from potable water sources;
- Foundation drains;
- Air conditioning condensate;
- Springs;
- Water from crawl space pumps; and
- Discharges from NPDES-permitted industrial sources.

Illicit discharges enter the system through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g., infiltration into the storm sewer system from cracked sanitary sewer systems, spills or toxins collected by or dumped directly into storm sewer inlets). The result is untreated discharges that contribute high levels of pollutants, including heavy metals, toxins, oil and grease, solvents, nutrients, viruses, and bacteria to receiving waterbodies.

Program Development Requirements

In order to reduce to the maximum extent practicable the adverse impacts of illicit discharges on surface water quality, the IDD&E Program must address the following minimum requirements.

- Establish written practices and procedures to identify and eliminate illicit discharges to surface waters and screen storm sewer outfalls;
- Prepare a storm sewer system map showing the location of all outfalls and the names and locations of all waters of the United States that receive discharges from those outfalls;
- Prohibit, through ordinance or other regulatory mechanism to the extent allowable under State or local law, non-stormwater discharges into the MS4 and enact appropriate enforcement procedures and penalties;
- Devise a plan to detect and address non-stormwater discharges, including illegal dumping, into the MS4; and
- Educate Township employees, businesses, and the general public about the hazards associated with illegal discharges and improper disposal of waste.

<u>BMP 3-1: Develop, Implement, and Maintain a Written Program for the Detection, Elimination, and Prevention of Illicit Discharges (Including Illegal Dumping)</u>

A. Implementation

1. Detection and Reporting of Illicit Discharges

a. Public

i. The Township should educate the public about the hazards of illicit discharges (including illegal dumping), how to identify a suspected illicit discharge, and what to do if one identifies a suspected illicit discharge using best practices contained in BMP 1-4 and BMP 3-6 herein.

ii. The Township should implement the following procedures to facilitate the public reporting of suspected illicit discharges.

- Include as a part of the forthcoming Township MS4 website prominently displayed information regarding illicit discharges including a telephone number and an email address for public reporting purposes.

- Designate one or more Township employees (e.g. Township secretary, Township Zoning Officer, etc.) to receive, document, process, and manage public reports of suspected illicit discharges (the Manager).
- Provide initial and ongoing education and training as needed to ensure that the Manager is familiar with established policies and procedures and is able to properly perform tasks related to the receipt and management of public reports of suspected illicit discharges.
- The Manager should complete Section 1 of the Suspected Illicit Discharge – Report Form contained in Appendix A1 of this Manual for each report received.
- The Manager should make a copy of the partially completed Report Form, maintain the original in a designated location, and forward the copy to the Investigator described below.
- Following the investigation, the Manager should obtain the completed Report Form from the Investigator along with any photographs, test results, or other documentation related to the investigation of the suspected illicit discharge.
- The Manager should contact the complainant by telephone and provide the complainant with a summary of the investigation into the suspected illicit discharge, actions taken, if any, to resolve the issue, and planned future action, if any, on the part of the Township (unless pending or possible future litigation involving the source of the suspected illicit discharge prevents such follow-up with complainant).
- The Manager should complete the 'Follow-Up with Complainant' section of the Report Form.
- The Manager should file the completed Report Form along with any photographs, test results, or other documentation related to the investigation of the suspected illicit discharge in the designated location.
- At the end of each permit year (September 30), the Manager should make copies of all completed Report Forms and furnish same to the Township Engineer for inclusion in the MS4 Annual Report.

b. Township Employees

   i. The Township should educate its employees about the hazards of illicit discharges (including illegal dumping), how to identify a suspected illicit discharge, and what to do if one identifies a suspected illicit discharge.

   ii. The Township should reinforce in its employees their responsibility to look out for suspected illicit discharges while performing their primary job responsibilities.

iii. The Township should implement the following procedures for the reporting of suspected illicit discharges by its employees.

- Employees should verbally report suspected illicit discharges to their department head who will then convey the information to the Manager described above or advise the employee to convey the information to the Manger directly.
- The Manager will process the suspected illicit discharge according to the procedure outlined above.

c. Outfall Screening

i. The Township should regularly screen identified outfalls in Urbanized Areas.

ii. Refer to BMP 3-4 herein for guidance related to outfall screening practices.

2. Investigation and Elimination of Illicit Discharges

a. Designate one or more qualified person or persons (e.g. Township Engineer, Sewage Enforcement Officer, Zoning Officer, etc.) to investigate reports of suspected illicit discharges (the Investigator).

b. Provide initial and ongoing education and training as needed to ensure that the Investigator is familiar with established policies and procedures and is able to properly perform tasks related to the investigation of suspected illicit discharges.

c. The Investigator should assess the reported suspected illicit discharge in accordance with the procedures described in "Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessment" (the IDD&E Guidance Manual) which is included as an attachment to this Manual.

d. If deemed illicit, the Investigator should attempt to identify the source of the discharge in accordance with the procedures described in the IDD&E Guidance Manual.

e. If the source is able to be identified, the Township should take any and all reasonable and legal actions it deems appropriate to correct or eliminate the illicit discharge.

f. The Investigator should document the findings of the investigation, actions taken, if any, to resolve the issue, and planned future action, if any, on the part of the Township in Sections 2 and 3 of the Suspected Illicit Discharge – Report Form contained in Appendix A1 of this Manual.

g. Following the investigation, the Investigator should return the completed Report Form to the Manager along with any photographs or other documentation related to the investigation of the suspected illicit discharge.

3. Gaining Access to Private Property

a. The Investigator should not enter private property to investigate a suspected illicit discharge without prior authorization from the department head.

b. The Investigator should conduct any authorized investigations or other activities on private property in a respectful and un-intrusive manner to the extent practicable.

c. The Township, with assistance from the Township Solicitor and Township Engineer, should review the suitability of existing Township ordinances to permit access by the Township to private property for the purposes of investigating and correcting illicit discharges and enact new or amended ordinances as necessary.

d. Upon adoption of any new or amended ordinances to permit access to private property as described above, the Township should amend this section of the Program to include any specific policies or protocol from the ordinance.

B. Measurable Goals

1. Develop the IDD&E Program during the first year of permit coverage.

2. Establish a dedicated telephone number and email address to accept public reports of suspected illicit discharges (To be completed).

3. Maintain records of all reports of suspected illicit discharges including the report form, any photographs or other documentation, the findings of the investigation, actions taken, if any, to resolve the issue, and planned future action, if any, on the part of the Township.

4. Review the suitability of existing Township ordinances to permit access by the Township to private property for the purposes of investigating and correcting illicit discharges and enact new or amended ordinances as necessary.

5. Document any new or amended ordinances related to the IDD&E Program adopted during each reporting period.

6. Review and update the IDD&E Program annually and implement improvements as appropriate.

<u>BMP 3-2: Develop and Maintain a Map of the Regulated MS4 Watershed Area</u>

A. Implementation

1. The Township Engineer should locate by field survey using a hand-held GPS device or other appropriate equipment and document any new or altered outfalls within Urbanized Areas of the Township. (Completed during storm sewer inspection and survey during 2018)

2. Location information should include both horizontal and vertical positioning data reflecting the North American Datum of 1983 (NAD83) State Plane Coordinate System, Pennsylvania South Zone and North American Vertical Datum of 1988 (NAVD88), respectively.

B. Measurable Goals

1. Review the MS4 Watershed Map annually and update as necessary.

BMP 3-3: Develop and Maintain a Map of the Storm Sewer Collection System within the Regulated MS4 Watershed Area

A. Implementation

1. The Township Engineer should locate by field survey using a hand-held GPS device or other appropriate equipment all Township-owned storm sewer system components, including inlets and catch basins, oil-debris separators, piping, culverts, open channels, basins, infiltration practices, and outfalls within Urbanized Areas of the Township. (Completed in June of 2018)
2. Location information should include both horizontal and vertical positioning data reflecting the North American Datum of 1983 (NAD83) State Plane Coordinate System, Pennsylvania South Zone and North American Vertical Datum of 1988 (NAVD88), respectively.
3. The Township should consider documenting additional parameters for storm sewer system components including the following:
    a. Inlet size, type, and grate elevation; (Completed in June of 2018)
    b. Endwall size and type; (Completed in June of 2018)
    c. Pipe size, type, and invert elevations; (Completed in June of 2018)
    d. Approximate volume, geometry, and type of basins and infiltration practices; and
    e. Approximate geometry and longitudinal slopes for open channels.
4. The Township should consider authorizing the Township Engineer or other qualified professional to compile location information and additional parameters for storm sewer system components using ESRI ArcMap Graphical Information System (GIS) software which can serve as a valuable reference tool to assist the Township in the operation and maintenance of its storm sewer system.

B. Measurable Goals

1. Review the MS4 Watershed Map annually and update as necessary.

BMP 3-4: Conduct Outfall Field Screenings

A. Intent: Develop and implement a program to systematically screen identified outfalls within Urbanized Areas of the Township for the purposes of detecting and eliminating illicit discharges.

B. Implementation

1. Perform outfall field screenings according to the following general schedule.

   a. Screen each identified outfall during dry weather conditions at least once during each five-year permit coverage term;

   b. Screen outfalls annually in areas where past problems have been detected or known sources of dry weather flows occur on a regular basis; and

   c. Screen outfalls in high impact areas such as those with high ratios of impervious cover or high levels of industrial activity more frequently and during varying seasonal and meteorological conditions.

2. The Investigator defined in BMP 3-1 above or other designated, qualified person should screen outfalls to ensure accuracy and consistency.

3. Document the findings of each outfall field screening using the Outfall Inventory and Screening Field Sheet contained in Appendix A1 of this Manual.

4. Maintain copies of records of all outfall field screenings including the completed field sheet, photographs, other documentation, and test results, as applicable, in a designated location.

5. Furnish original records of all outfall field screenings to the Manager defined in BMP 3-1 herein.

6. At the end of each permit year (September 30), the Manager should make copies of records of all outfall field screenings performed during the past permit year and furnish same to the Township Engineer for inclusion in the MS4 Annual Report.

7. Investigate suspected illicit discharges detected during field screenings in accordance with the procedures described in "Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessment" (the IDD&E Guidance Manual) which is included as an attachment to this Manual.

8. Refer to the IDD&E Program in BMP 3-1 herein for guidance related to the investigation of suspected illicit discharges.

C. Measurable Goals

1. Develop and implement an outfall field screening program during the first year of permit coverage.

2. Develop a written outfall screening schedule.

3. Review the screening program annually and update as necessary.
4. Maintain records of all outfall field screenings including the completed field sheet, photographs, other documentation, and test results, as applicable.

BMP 3-5: Enact a Stormwater Management Ordinance (SWMO) that Includes a Prohibition of Non-Stormwater Discharges

A. Implementation

1. The Township, with assistance from the Township Solicitor and Township Engineer, should review the suitability of its current SWMO to prohibit non-stormwater discharges into its storm sewer system and take enforcement action (including imposing sanctions and penalties) against property owners in the event that a non-stormwater discharge is discovered.
2. Enact amendments to the SWMO as necessary.
3. Advertise any proposed amendments to the SWMO in accordance with Pennsylvania Municipalities Planning Code minimum requirements.
4. Provide opportunities for and actively solicit public involvement in the process of developing amendments to the SWMO.
5. Refer to BMP 2-2 herein for guidance related to advertising proposed amendments to the SWMO and soliciting public involvement in the process of developing those amendments.

B. Measurable Goals

1. Review the SWMO annually and update as necessary.
2. Properly advertise any proposed amendments to the SWMO using at least one alternate advertising channel in addition to the local newspaper.
3. Document any amendments to the SWMO adopted during each reporting period.

BMP 3-6: Provide Educational Outreach related to the IDD&E Program

A. Implementation

1. The Township should engage in educational outreach efforts to generate public awareness of and interest in its IDD&E Program and inform the public of the following:
    a. What is an illicit discharge;
    b. The hazards of illicit discharges, including illegal dumping;
    c. How to identify a suspected illicit discharge;
    d. What to do and how to report a suspected illicit discharge; and

e. How to participate in programs and activities designed to identify and eliminate illicit discharges.

Refer to BMP 1-4 herein for suggested communication channels and best practices for devising effective public education and outreach initiatives.

2. The Township should organize or sponsor the following programs or other similar activities to involve the public in the implementation of its IDD&E Program.

   a. Label outfalls and other storm drainage features to facilitate identification and public reporting of illicit discharges;

   b. Volunteer efforts for locating, labeling, and visually inspecting outfalls and storm drains;

   c. Recycling programs for commonly dumped wastes such as motor oil, antifreeze, paint, and pesticides; and

   d. Specific initiatives to reach high-impact segments of the target audience such as commercial, industrial, and institutional entities that are likely to have a significant impact on stormwater (e.g. carpet cleaning businesses, gas stations, etc.).

   Refer to BMP 2-3 herein for suggested methods to promote public involvement and participation.

3. Upon request by the Township, the Township Engineer will furnish educational materials and guidance resources and provide consulting services to assist with the administration of the IDD&E Program.

B. Measurable Goals

1. Upon establishing protocol for public reporting of suspected illicit discharges, publish promotional and educational information related to the IDD&E Program on the forthcoming Township MS4 website and in the Township newsletter.

2. Conduct at least one of the above or similar public outreach initiatives, activities, or programs related to the IDD&E Program annually.

MCM 6:
Pollution Prevention/Good Housekeeping for Municipal Operations

MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations

Importance of Pollution Prevention and Good Housekeeping for Municipal Operations

The Pollution Prevention/Good Housekeeping Program for municipal operations is a key element of the Small MS4 Stormwater Program (the Program). Due to the broad scope and extensive scale of its operational and maintenance responsibilities, the Township and its employees possess significant potential to impact stormwater runoff quality. For example, the Township routinely conducts activities such as lawn and landscaping maintenance, building and facilities maintenance, regular and winter road maintenance and repair work, and automobile and equipment fleet maintenance that can pose a threat to water quality. Additionally, the Township performs work intended to reduce the amount of pollutants that reach the storm sewer system such as parking lot and street sweeping and storm drain system cleaning. Finally, the Township is responsible to contain spills, manage trash and yard waste, and regulate non-stormwater discharges. Through thoughtful evaluation of these and other similar activities and the development and implementation of sound practices and procedures the Township can ensure it limits the amount of pollutants introduced into its storm sewer systems thereby improving stormwater runoff quality to the maximum extent practicable.

Program Development Considerations

The Township should consider the following general guidelines as it continues to implement and further develop its Pollution Prevention / Good Housekeeping Program for municipal operations:

- Practices and procedures to ensure the proper regular and long-term inspection and maintenance of structural and non-structural stormwater best management practices (BMPs) to reduce floatables and other pollutants that are discharged from storm sewer systems;
- Practices and procedures that will reduce or eliminate the discharge of pollutants from areas such as public roads and parking lots, Township maintenance and storage yards (including salt storage and snow disposal areas), and other Township facilities;
- Practices and procedures for the proper disposal of waste such as dredge spoil, accumulated sediments, floatables, and other debris removed from storm sewer systems and areas listed above; and
- Policies and regulations to require the evaluation of existing flood management projects for possible incorporation of additional water quality protection devices and to ensure that new flood management projects are assessed relative to their potential to impact water quality.

BMP 6-1: Identify and Document all Facilities and Activities Owned and/or Operated by the Township that have the Potential to Generate or Impact Stormwater Runoff

A. The Township identified the following Township facilities and activities with the potential to generate or impact stormwater runoff:

1. Maintenance of storm sewer system components such as inlets and catch basins, oil-debris separators, piping, culverts, open channels, basins, and outfalls including inspection and cleaning of storm drains and piping, controlling illicit discharges and connections, and controlling illegal dumping;
2. Maintenance of roads, parking areas, and loading areas including sweeping and cleaning, repair and maintenance, striping, application of salt or other deicing agents, and bridge and structure maintenance;
3. Maintenance and repair of buildings including Administrative offices, public works buildings, police and fire departments, garages and storage buildings, and others;
4. Maintenance of grounds and landscaping including mowing, trimming, planting, application of fertilizers or pesticide, erosion control, and managing landscape wastes;
5. Maintenance, repair, fueling, and washing of vehicles and equipment;
6. Handling and disposal of waste including debris removed from stormwater management BMPs, solid waste collection, waste reduction and recycling, household hazardous waste collection; landscaping wastes from municipal operations, and controlling litter and illegal dumping;
7. Material handling and storage including liquid containers and raw (e.g. salt, soil, etc.), and hazardous materials; and
8. Spill prevention and response.

B. Measurable Goals

1. Develop an inventory of Township facilities and activities with the potential to generate or impact stormwater runoff (completed June of 2018).
2. Review and update the inventory of Township facilities and activities on an annual basis.

<u>BMP 6-2: Develop, Implement, and Maintain a Written Operation and Maintenance (O&M) Program for all Facilities and Activities Owned and/or Operated by the Township that have the Potential to Generate or Impact Stormwater Runoff</u>

A. The Township should follow the practices and procedures outlined below when performing each of the following operation and maintenance activities.

1. Storm Sewer System Components

a. Inspect system components including inlets and catch basins, oil-debris separators, piping, culverts, open channels, basins, and outfalls at least once per year. For the sake of efficiency, this could be done in conjunction with the annual street sweeping program.

b. Remove and collect debris.

c. Flush pipes to remove clogs or accumulated sediment and debris as necessary.

d. Repair or replace damaged structures as necessary.

e. Repair and re-stabilize eroded and bare areas in vegetated channels.

f. Follow all Federal and state regulations related to the proper storage and disposal of waste removed from the storm sewer system.

g. Prior to disposal store waste in a contained covered location outside of 100-year flood plains.

2. Road and Parking Area Maintenance

   a. Resurfacing
      - Perform paving operations involving concrete asphalt or other sealers only during dry weather conditions.
      - Employ proper staging techniques such as covering storm drain inlets and manholes during paving operations, using erosion and sediment controls to decrease runoff from repair sites, and using drip pans, absorbent materials and other pollution prevention materials to limit leaks of paving materials and fluids from paving machines.

   b. Salt Application and Storage
      - Store salt or alternative deicing materials in a contained covered location outside of 100-year flood plains.
      - Avoid over-application of deicing materials.
      - Calibrate equipment to apply deicing materials at a rate and spread width as appropriate based on site specific characteristics (e.g. road width, traffic volume, proximity to surface waters, etc.).
      - Use gravel rather than chemical deicers in environmentally sensitive areas when practicable.

   c. Roadside Vegetation
      - Apply chemical fertilizers and pesticides sparingly.
      - Use natural fertilizers and pesticides as opposed to chemical equivalents whenever practicable.
      - Apply chemical fertilizers and pesticides during ideal weather conditions (e.g. low wind, no rain in near forecast).
      - When establishing roadside vegetation, select a type of grass that is both salt and drought-tolerant.

   d. Cleaning
      - Sweep and vacuum Township streets and parking areas at Township facilities to remove pollutants such as trash, sediment buildup, and debris from curb gutters and storm sewer inlets.

- Maintain accurate logs of the number of curb-miles swept and the amount of waste collected.
- Evaluate the above logs and devise a sweeping schedule that will maximize pollutant removal.
- Follow all Federal and state regulations related to the proper storage, disposal, and reuse of sweepings.
- Prior to disposal or reuse, store sweepings in a contained covered location outside of 100-year flood plains.

3. Grounds Maintenance

   a. Plant locally or regionally native species whenever practicable.

   b. Plant non-turf grass areas wherever practicable. Alternative ground cover such as meadow grass, wild flowers, and shrubs require less water and maintenance than turf grass.

   c. Where turf is used, select a type of grass that can withstand drought and become dormant during prolonged hot, dry weather.

   d. Water plants and lawns sparingly. Use low-volume water application approaches such as drip or sprinkler irrigation systems wherever practicable.

   e. Cut grass to a minimum height of three to four inches.

   f. Leave mulched clipping on the lawn as a natural fertilizer.

   g. Apply mulch to planting beds to prevent weeds and retain soil moisture.

   h. Apply chemical fertilizers and pesticides sparingly.

   i. Use natural fertilizers and pesticides as opposed to chemical equivalents whenever practicable.

   j. Apply chemical fertilizers and pesticides during ideal weather conditions (e.g. low wind, no rain in near forecast).

   k. Follow application and safety instructions on the label when using chemical pesticides. Wear the appropriate protective equipment when working with organophosphate insecticides or concentrated sprays or dusts. Read and follow all safety precautions listed on pesticide labels and wash hands and face before smoking or eating.

   l. Rinse tools or equipment that were used to apply or incorporate pesticides in a bucket and apply the rinse water as if it were full-strength pesticide.

   m. Safely store for later use or dispose of any unused pesticides at a hazardous waste collection location.

4. Vehicle and Equipment Maintenance

a. Waste Reduction
   - Minimize the number of solvents used. This makes recycling easier and it reduces hazardous waste management cost.
   - Perform all liquid cleaning at a centralized station to ensure that solvents and residues stay in one area.
   - Locate drip pans and draining boards to direct solvents back into a solvent sink or holding tank for reuse.

b. Use of Safer Alternative Chemical Products
   - Use non-hazardous cleaners whenever practicable.
   - Replace chlorinated organic solvents with non-chlorinated ones such as kerosene or mineral spirits.
   - Purchase recycled products, such as engines, oil, transmission fluid, antifreeze, and hydraulic fluid, to help support the recycled products market.

c. Spill Containment and Cleanup
   - Perform all maintenance activities inside or under cover to contain spills and prevent work surface runoff from entering storm drains.
   - Clean up spills immediately without water whenever possible and properly dispose of clean up materials. Where necessary, use water sparingly.
   - Seal floor drains.
   - Consider hiring a service to collect spent solvents and other hazardous substances.
   - Implement a spill prevention plan and maintain necessary spill kits nearby maintenance areas.

d. Good Housekeeping
   - Update facility schematics to accurately reflect all plumbing connections.
   - Closely monitor parked vehicles for leaks and place pans under any leaks to collect the fluids for proper disposal or recycling.
   - Promptly transfer used fluids to recycling drums or hazardous waste containers.
   - Dispose of liquid waste properly.
   - In the event of a spill, cover drains with drain mats.
   - Store cracked batteries in leak-proof secondary containers.

e. Parts Cleaning
   - Use detergent-based or water-based cleaning systems instead of organic solvent degreasers.
   - Steam clean or pressure wash parts instead of using solvents. Water discharged into the sanitary sewer may require treatment prior to release. Wastewater

generated from steam cleaning can be discharged to an on-site oil/water separator.

5. Vehicle and Equipment Fueling

   a. Ensure vehicle fueling areas are properly paved with cement, concrete, or an equivalent impervious surface, with a two to four percent slope to prevent ponding, and separated from the rest of the site by a grade break or berm to prevent run-on of stormwater.

   b. Ensure vehicle fueling areas are properly covered. The cover should have minimum dimensions equal to or greater than the area within the grade break and should not drain onto the fuel dispensing area. Install a perimeter drain or slope the pavement inward so that runoff drains to a blind sump. It might be necessary to install and maintain an oil control device in catch basins that might receive runoff from the fueling area.

   c. Implement a spill prevention plan and maintain necessary spill kits nearby fueling areas.

   d. Inspect vehicle fueling areas and equipment regularly.
      - Check for external corrosion and structural failure in aboveground tanks.
      - Check for evidence of spills and overfills due to operator error.
      - Check for failure of any piping systems.
      - Inspect tank foundations, connections, coatings, tank walls, and piping systems.
      - Test above-ground tanks periodically for integrity using a qualified professional.

   e. Maintain vehicle fueling areas and equipment in good working condition.

6. Vehicle and Equipment Washing

   a. Use a commercial car wash whenever practicable.

   b. Avoid the use of detergents whenever possible. If detergents are necessary, use a phosphate-free, non-toxic, biodegradable soap. Using a commercial car wash.

   c. Wash vehicles and equipment in an area designed to collect and hold the wash water effluent generated. Recycle the wash water effluent or pump effluent onto grass or landscaped areas to provide filtration.

   d. If installation of a containment area is not feasible, wash vehicles and equipment on gravel, grass, or other permeable surfaces.

   e. Select location for wash area that does not drain to storm inlets to avoid discharges to the storm sewer system.

f. Avoid on-site pressure cleaning and steam cleaning whenever possible. If done on-site, do not pressure or steam clean in an area designated as a wellhead protection area of a public water supply.

g. Immediately contain and clean up spills.

7. Materials Handling and Storage

a. General

- Maintain an accurate inventory of materials to reduce the occurrence of overstocking hazardous materials.
- Identify all hazardous and nonhazardous substances present at a facility.
- Obtain a Material Safety Data Sheet (MSDS) for each material.

b. Hazardous Materials Storage

- Note on the inventory of materials described above any special handling, storage, and/or disposal requirements for hazardous chemicals.
- Label all containers with the name of the chemical, unit number, expiration date, handling instructions, and health or environmental hazards. Ensuring sufficient aisle space to provide access for inspections and to improve the ease of material transport.
- Store materials in a contained covered location outside of 100-year flood plains.
- Store materials away from high-traffic areas to reduce the likelihood of accidents that might cause spills or damage to drums, bags, or containers.
- Stack containers in accordance with the manufacturers' directions to avoid damaging the container or the product itself.
- Store containers on pallets or equivalent structures to facilitate inspection for leaks and prevent the containers from coming into contact with wet floors, which can cause corrosion. This consideration also reduces the incidence of damage by pests (insects, rodents, etc.).
- Delegate the responsibility for management of hazardous materials to personnel trained and experienced in hazardous substance management.
- Implement a spill prevention plan and maintain necessary spill kits nearby materials storage areas.

8. Spill Prevention and Response

a. Identify the individual(s) responsible for implementing the Spill Prevention and Response Plan.

b. Define safety measures associated with each potential type of waste (e.g. gasoline, fuel oil or other petroleum products; residential or industrial waste; etc.).

c. Define the protocol for notification of appropriate authorities, such as police and fire departments, hospitals, or publicly-owned treatment works for assistance.

d. Define procedures for containing, diverting, isolating, and cleaning up spills.

e. Describe spill response equipment to be used, including safety and cleanup equipment.

B. Measurable Goals

1. Develop, implement, and maintain a written Operation and Maintenance (O&M) Program for all facilities and activities owned and/or operated by the Township that have the potential to generate or impact stormwater runoff (June of 2018).

2. Review and update the O&M Program on an annual basis.

BMP #6-3: Develop and Implement an Employee Training Program Designed to Further the Goal of Reducing or Preventing the Discharge of Pollutants from Municipal Operations

A. Applicability

1. All municipal employees, regardless of job description, should receive training designed to educate staff about potential sources of stormwater contamination and methods to minimize the impact of municipal operations on stormwater runoff quality.

2. Municipal employees who are directly involved in activities that have the potential to cause or prevent pollution should receive training tailored to their specific activities in addition to general training.

B. Approved Topics

1. General stormwater awareness

2. Detection, reporting, and elimination of illicit discharges

3. Operation and maintenance of stormwater management BMPs

4. Pollution prevention through good housekeeping procedures

5. Spill prevention and response

C. Instructional Methods and Resources

1. In-house classroom format

2. In-house “tailgate” meetings

3. On-the-job reinforcement

4. Workshops and conferences

5. Display or distribution of educational materials

D. Cost Savings Considerations

1. Incorporate initiatives into existing employee training programs.
2. Utilize free educational materials and training tools available through various online resources.
3. Select free or low-cost workshops or conferences presented by government agencies, outside organizations, and companies.

E. Implementation

1. The Township should provide at least four formal training sessions annually (one per quarter) to each employee.
2. At the beginning of each permit year, the Township superintendent should select general and job-specific training topics, select appropriate training methods, and set training schedules for the year.
3. The Township should cover a variety of topics from year to year from the categories outlined above.
4. Department heads should strive to provide additional in-field training whenever possible to reinforce lessons taught during formal training sessions.
5. Department heads should post informational resources such as placards, posters, and stickers at appropriate locations around the work place to raise awareness of stormwater pollution prevention and remind employees of proper procedures.
6. Department heads should maintain records of training sessions using the Municipal Employee Training – Annual Report Form contained in Appendix A2 of this Manual.
7. At the end of each permit year (September 30), department heads should make copies of all completed Report Forms and furnish same to the Township Engineer for inclusion in the MS4 Annual Report.
8. Upon request by the Township, the Township Engineer will furnish educational materials and guidance resources and provide consulting services to assist with the administration of the municipal employee training program.

F. Measurable Goals

1. Develop a municipal employee training program during the first year of permit coverage (completed June of 2018).
2. Provide at least four formal training sessions annually (one per quarter) to each employee.
3. Maintain records of training sessions using the form contained in Appendix A2 of this Manual.
4. Implement and review the training program annually and update as necessary.

Inventory of Facilities/Activities

for the Upper Nazareth Township

Contact Shawn shupe

Facility/Activity	Storm Sewer System Impact	Discharge To	O&M Responsibilities (all included "signage")	Attachment
Public works(west)	Inlet and piping	East branch Monocacy Creek	Oil management,inlets,washwater	1
Public works(east)	Swale	Schoeneck Creek	Oil management,inlets,washwater	2
Municibal Building	None			
Parking Lots	Inlets, swales	Schoeneck Creek,Monocacy Creek	Clean and repair as needed	3
Parks and sports fields	Inlet and piping,swales	East branch Monocacy Creek	Clean inlets and swales	4
Streets	Inlet and piping	Schoeneck Creek,Monocacy Creek	Clean and repair catch basins,street sweeping	5

Contact Shawn Shupe

Public Works Yard(west)

O&M Actions (Detailed)			
Responsibility	**When and How Often?**	**Actions**	**Additional Considerations**
Oil and fluids management	Daily	Repairs comleted inside garage, including leaks and maintnace Oil absorbent and pads are use as needed. Used oil is collected and stored in leak proof container until recycled.	
Wash water	As needed	Wash in designated areas	
Inlets	As needed	Cleaned,repaired and pumped	Tops are checked before every storm

Contact Shawn Shupe

Public WorksYard (east)

O&M Actions (Detailed)

Responsibility	When and How Often?	Actions	Additional Considerations
Oil and fluids management	Daily	Repairs comleted inside garage, including leaks and maintnace Oil absorbent and pads are use as needed. Used oil is collected and stored in leak proof container until recycled.	
Salt shed	Winter	Practice good house keeping	
Wash water	As needed	Wash in designated areas	
Yard waste	open spring to fall	Compost drop off, hauled to recycler in container Brush stored on property and recycled anually Practice good house keeping	

Contact Shawn Shupe

Township owned Parking Lots

O&M Actions (Detailed)

Responsibility	When and How Often?	Actions	Additional Considerations
Municipal/Police Building	Weekly	Inspecting inlets and swales,asphalt swept annually	
Public works (east)	Weekly	Inspecting inlets and swales,asphalt swept annually	
Public works (west)	Weekly	Inspecting inlets and swales,asphalt swept annually	
Tuskes park	Weekly	Inspecting inlets and swales,asphalt swept annually	
Silvercrest park	Weekly	Keep clean of garbage	stone lot

Contact Shawn Shupe

Parks and Sports Fields

O&M Actions (Detailed)

Responsibility	When and How Often?	Actions	Additional Considerations
Tuskes park	Weekly	Mowing fields Checking inlets and swales clean any garbage or debris Basketball and volleyball court,pavilian, playgrounds and parking lots are cleaned as needed	Garbage and Recycling removed weekly by Private hauler
Silvercrest park	Weekly	Mowing fields	Garbage and Recycling removed weekly by Public works
Creekside park	Weekly	Mowing fields Playground cleaned as needed	Garbage and Recycling removed weekly by Public works
Sycamore park	Weekly	Mowing fields Playground and Basketball court cleaned as needed	Garbage and Recycling removed weekly by Public works
Hillside park	Weekly	Mowing fields Playground cleaned as needed	Garbage and Recycling removed weekly by Public works
Newport park	Weekly	Mowing fields Playground cleaned as needed	Garbage and Recycling removed weekly by Public Public works

Contact Shawn Shupe

Township Streets

O&M Actions (Detailed)

Responsibility	When and How Often?	Actions	Additional Considerations
Streets	As Needed	Streets are Swept and repaired as needed	Sweepings area taken to Landfill
Inlets	As Needed	Inlets are checked and cleaned before any Major Storm Inlets are checked and cleaned after every Storm	Debris are taken to Landfill Debris are taken to Landfill
Storm Piping	Quarterly	Checked for any blockages and cleaned as needed	Debris are taken to Landfill

Appendix A1

Section 1: Background Data

Watershed Name:		Outfall ID:	
Date:		Time (Military):	
Investigator Name:		Rainfall (In.) in Last 24 Hrs.:	
Air Temperature:		Rainfall (In.) in Last 48 Hrs.:	
Latitude:	Longitude:	GPS Unit:	GPS LMK:
Camera:		Photo #s:	

Land Use(s) in Drainage Area

☐ Industrial	☐ Open Space	Known Businesses/Industries:
☐ Urban Residential	☐ Institutional	_____
☐ Suburban Residential	☐ Other: _____	_____
☐ Commercial	☐ Other: _____	_____

Notes: (e.g. Origin of outfall, if known)

Section 2: Outfall Description

Type	Material	Geometry		Dimensions	Submerged
☐ Pipe	☐ RCP ☐ HDPE ☐ PVC ☐ CMP ☐ Steel ☐ Other: _____	☐ Circular ☐ Eliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Dia./Dims. _____	Water: ☐ Yes ☐ No ☐ Part Sedmnt.: ☐ Yes ☐ No ☐ Part
☐ Channel	☐ Concrete ☐ Earthen ☐ Rip-rap ☐ Other: _____	☐ Trapazoidal ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bot. Width: _____	

☐ In Stream	(Applicable when collecting samples)		
Flow Present	☐ Yes	☐ No	(If no, skip to Section 5)
Flow Description	☐ Trickle	☐ Moderate	☐ Substantial

Section 3: Quantitative Characterization

Field Data for Flowing Outfalls				
Parameter		**Result**	**Unit**	**Equipment**
☐ Flow #1	Volume		Liter	Bottle
	Time to Fill		Second	Stop Watch
☐ Flow #2	Flow Depth		Inches	Tape Measure
	Flow Width	_____' -_____"	Ft.-In.	Tape Measure
	Traveled Length	_____' -_____"	Ft.-In.	Tape Measure
	Travel Time		Seconds	Stop Watch
Water Temperature			F°	Thermometer
pH			pH	Test Strip/Probe
Ammonia			Miligrams/Liter	Test Strip

Section 4: Physical Indicators for Flowing Outfalls Only

Are any physical indicators present in the flow? □ Yes □ No (If no, skip to Section 5)

Type	Description	Relative Severity Index		
□ Odor	□ Sewage □ Petrol./Gas □ Sulfide □ Other: _____ □ Rancid/Sour	□ 1 Faint	□ 2 Easily Detectible	□ 3 Noticeable from Distance
□ Color	□ Clear □ Grey □ Green □ Red □ Brown □ Yellow □ Orange □ Other: _____	□ 1 Faint color in bottle	□ 2 Clearly visible in bottle	□ 3 Clearly visible in flow
□ Turbidity	See Severity	□ 1 Slight Cloudy	□ 2 Cloudy	□ 3 Opaque
□ Floatables (Excludes Trash)	□ Sewage (Toilet paper, etc.) □ Petrolium (Oil sheen) □ Sewage □ Other: _____	□ 1 Few/Slight Origin not Obvious	□ 2 Some Indications of Origin	□ 3 Some Origin Obvious

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are any physical indicators present that are not related to flow? □ Yes □ No (If no, skip to Section 6)

Indicator	Description	Comments
□ Outfall Damage	□ Peeling Paint □ Spalling or Cracking □ Corrosion	
□ Deposits/ Stains	□ Oily □ Flow Line □ Paint □ Other: _____	
□ Abnormal Vegetation	□ Excessive □ Inhibited	
□ Poor Pool Quality	□ Odors □ Suds □ Colors □ Excess Algae □ Floatables □ Other: _____ □ Oil Sheen	
□ Pipe Benthic Growth	□ Brown □ Green □ Orange □ Other: _____	

Section 6: Overall Outfall Characterization

□ Unlikely	□ Potential (presence of 2 or more indicators)	□ Suspect (1 or more indicators severity >3)	□ Obvious

Section 7: Data Collection

Sample for Lab Analysis	□ Yes □ No	
If Yes, Collected from	□ Flow □ Pool	
Intermittent Flow Trap Set	□ Yes □ No	If yes, type? □ OBM □ Caulk Dam

Section 8: Any Non-Illicit Discharge Concerns (trash or needed infrastructure repairs)

Description:

Responder Information	
Call Received by:	Call Date:
Precipitation Depth (In.) in Past 24-48 Hrs.:	Call Time (Military):
Reporter Information	
Name:	Incident Date:
Address:	Incident Time (Military):
Telephone Number:	Email Adress:

Section 2: Incident Location

Latitude/Longitude:	Outfall Number:

Location of Discharge (nearest street intersection, address, nearby landmarks, etc.): _____

_____

_____

Description	
	□ Stream Corridor (In or Adjacent to Stream)
	□ Outfall □ In-Stream □ Along Banks
	□ Upland Area (Land not Adjacent to Stream)
	□ Near Inlet □ Near Other Water Source (Detention Basin, Wetland, etc.)

Section 3: Upland Problem Indicator Description

□ Dumping □ Soap Suds □ Oil, Solvents, Chemicals □ Other: _____

Section 4: Stream Corridor Problem Indicator Description

Flow Present	□ Yes	□ No			
Flow Description	□ Trickle	□ Moderate	□ Substantial	□ Intermittant	
Photo Provided	□ Yes	□ No	(If yes, attach to form)		
Odor	□ None	□ Musty	□ Sewage	□ Rotten Eggs	□ Sour Milk
	□ Petrolium	□ Other: _____			
Color	□ None	□ Red	□ Yellow	□ Brown	□ Green
	□ Grey	□ Other: _____			
Clarity	□ Clear	□ Cloudy	□ Opaque		
Floatables	□ None	□ Garbage	□ Algae	□ Dead Fish	□ Oily Sheen
	□ Sewage (Toilet Paper, etc.)		□ Other: _____		

Additional Information: _____

_____

_____

Suspected Violator or Source (Name, Address, Personal or Vehicle Description, License Plate Number, etc.:

_____

_____

Investigator Name:	Date:
	Time (Military):
Date of Last Rainfall:	Approx. Rainfall Depth (In.):
□ No Investigation Made	Reason:
□ Referred to Oustide Agency	Agency Name:
□ Investigated: No Action Necessary	Reason:
□ Investigated: Required Action	Reason:
Description of Action(s) Taken: _____	
Hours between Call and Investigation:	Date Inclident Closed:
Additional Information: _____	

Appendix A2

Municipal Employee Training - Annual Report Form

Session 1: January - March

Proctor Name:	Employee Attendee Names:
Date:	
Topic:	
Duration:	
Training Session / Resource Type:	
☐ Video ☐ General Discussion	
☐ On-Job Reinforcement ☐ Conference	
☐ Vendor Presentation ☐ Other: _____	

Session 2: April - June

Proctor Name:	Employee Attendee Names:
Date:	
Topic:	
Duration:	
Training Session / Resource Type:	
☐ Video ☐ General Discussion	
☐ On-Job Reinforcement ☐ Conference	
☐ Vendor Presentation ☐ Other: _____	

Session 3: July - September

Proctor Name:	Employee Attendee Names:
Date:	
Topic:	
Duration:	
Training Session / Resource Type:	
☐ Video ☐ General Discussion	
☐ On-Job Reinforcement ☐ Conference	
☐ Vendor Presentation ☐ Other: _____	

Session 4: October - December

Proctor Name:	Employee Attendee Names:
Date:	
Topic:	
Duration:	
Training Session / Resource Type:	
☐ Video ☐ General Discussion	
☐ On-Job Reinforcement ☐ Conference	
☐ Vendor Presentation ☐ Other: _____	