STORMWATER MANAGEMENT FEASIBILITY NARRATIVE

LANDS OF ARDROSSAN FARM

SUBMITTED AS PART OF THE CONDITIONAL USE APPLICATION FOR DENSITY MODIFICATION DEVELOPMENT

BY:

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JULY 31, 2013

STORMWATER MANAGEMENT FEASIBILITY NARRATIVE

The Ardrossan Family Trusts own the land known as the Ardrossan Farm in Radnor Township. The total tract, located at Newtown and Darby-Paoli Roads, contains 352.5 acres and is composed of several individual parcels. Parcel 'A' is the largest parcel containing 311.54 acres and is located on the south east corner of Darby-Paoli and Newtown Roads. Parcel 'A' is the subject of this report. The Trusts propose to develop the site in accordance with Radnor Township's Density Modification provisions of the zoning ordinance which permits cluster development with the provision of open space areas.

The site currently contains several residential and farm buildings. The majority of the site is open meadow with some wooded areas and areas of steep slopes. Darby-Paoli Road forms the forms the western boundary of the site. The Trust owns additional parcels on the west side of Darby-Paoli Road which extend to Darby Creek. Wigwam Run flows through the center of the property and Camp Run flows along the Southern portion of the site. The site will be developed with approximately 55 to 78 new single family dwellings on 64 to 81 new individual residential building lots. The existing manor house will remain as a separate 10 acre lot. The existing cottages and barns will remain on the site and individual lots will be created to accommodate these dwellings.

In order to protect many of the existing natural sensitive and special value features including water bodies, wetlands, woodlands, open meadows and steep slopes, the proposed subdivision provides for several clustered home sites. The proposed design includes Low Impact Development (LID) techniques to reduce the overall impervious coverage and stormwater management demand by seeking approval of far less development than what is permitted by the township zoning ordinance and by requesting waivers of the required roadway widths, cul-de-sac radii, sidewalk requirements, and other design standards. In addition to placing development areas in the least sensitive areas of the site and the reduction of impervious cover as a means of reducing stormwater runoff, several additional non-structural Best Management Practices (BMP), which can be found in the Pennsylvania Stormwater BMP Manual, are also proposed including disconnected impervious by use of roadside swales, cul-de-sac plantings, maintaining areas of undisturbed vegetation and the use of non-traditional lot designs to minimize disturbance.

Stormwater management for the proposed development will be provided by several structural BMPs sized to control the increase in storm water runoff from the developed sub-basin. It is anticipated that underground detention/recharge pipe systems will be installed to control the increase in runoff generated by the proposed public roads and some of the private roads, common driveways and smaller individual lots. Individual on-lot underground pipe systems are proposed to control the increase in runoff generated by the new single family dwellings and associated improvements proposed on the lots not controlled by the common systems. It is also anticipated that ground water recharge seepage beds will be installed on each lot in order to spread the areas of recharge throughout the site. Overflow from the proposed detention facilities will be piped to level spreaders so that runoff can be dissipated over land to grade in an un-concentrated manner.

Soil types were obtained via the Web Soil Survey proved by the United States Department of Agriculture and are depicted on the site plan. The majority of soils on the site are of the Glenelg Series consists of deep, well drained soils of uplands. The soils developed in material weathered mainly from granite, gneiss and mica schist. The Glenelg soils have moderate available moisture capacity and moderate permeability. The majority of the development is proposed within these Glenelg soils.

This site is located in the Radnor Darby-Cobbs Watershed District 'B-2'. The township Stormwater management ordinance requires that several storm water management guidelines must be met by the proposed stormwater facilities. The ordinance requires that where feasible, the increase in storm water runoff for the 2-year storm event shall be infiltrated into the ground via percolation. Water quality treatment must be also provided based on the township's calculation formula and rate control through the 100-year storm must be provided as follows: the 2-year post-development rate to the 1-year pre development rate, the 5-year post to the 2-year pre, the 10-year post to the 5-year post to the 5-year post to the 100-year storm event. The proposed stormwater management facilities are intended to be designed to meet these Township requirements as well as the DEP NPDES General Permit requirements.

In order to determine the feasibility of providing the required ground water recharge, several soil tests were made throughout the site. Soil testing was performed during the week of July 15, 2013 by Evans Mill Environmental LLC at locations where common stormwater management systems are being considered and on several proposed lots throughout the site. Results of the testing are included with this report, and show that in the majority of the cases, good percolation is available and that the stormwater requirements can be attained.

Detailed testing will be performed as part of the design of the individual systems and calculations and associated documentation, including infiltration test results, demonstrating compliance with the Township and DEP codes, will be submitted with the Preliminary Plan application.

WATER QUALITY, THERMAL IMPACT, AND ANTIDEGRADATION NARRATIVE

By infiltrating the increase in stormwater runoff for the 2-year 24-hr storm event, the runoff generated by the proposed development will be treated structurally to remove the appropriate amount of the Total Suspended Solids, phosphorous, and solutes as required by the BMP Manual. Non-structural BMP's such as landscape restoration, the use of vegetated swales, and use of natural drainage ways will also assist in meeting the water quality objectives.

Also by providing subsurface detention and infiltrating the increase in stormwater runoff for the 2-year 24-hr storm event into subsurface stormwater management facilities, thermal impacts will be mitigated through the following processes:

- Convection. Convective heat transfer within the sub-surface structures, and at the surface on swales, is a significant stormwater cooling mechanism. Site design will include subsurface conveyance and the implementation of subsurface stormwater management systems. The stormwater contained and/or moving within these structures will exchange thermal content with the cooler earth and fill material around them. Because the ground temperature surrounding these sub-surface structures is always cooler, it will serve as a "thermal sink" and will absorb heat.
- Evapotranspiration. Revegetating disturbed areas at the site, utilizing native species, and utilization of existing vegetative drainage paths will provide significant thermal mitigation benefits through the process of evapotranspiration. The addition of proposed landscaping will help to provide significant cooling effects at the site, even during storm events, and especially during warmer weather.

The requirements of Pennsylvania's anti-degradation regulations to maintain and protect the water quality of Pennsylvania's creeks and streams, which has been interpreted to include thermal impacts, will be satisfied with the proposed stormwater management design. During storm conditions, the proposed BMP "treatment train" of non-structural and structural BMPs will mitigate potential impacts to the receiving streams from the "first flush" thermal loading generated by the site. Specifically, the BMP treatment train will utilize a variety of thermal mitigation mechanisms — including thermal exchange of runoff volume with "thermal sinks" through infiltration, heat losses in underground structures, and thermal exchange during conveyance—to mitigate thermal loading associated with site stormwater.

The water quality impacts of the proposed development, from both a water quality and thermal standpoint, will satisfy the requirements of Pennsylvania's anti-degradation regulations. Non-discharge stormwater alternatives will be utilized whenever environmentally sound and cost effective. Stormwater recharge facilities will mitigate the increase in stormwater runoff volume from the development for a 2 year 24 hour storm event and, through the use of a sophisticated "treatment train" of proposed non-structural and structural BMPs at the site, the water quality of the receiving streams will be protected and maintained.

APPENDIX 1

USDA SOIL RESOURCE REPORT



United States Department of Agriculture

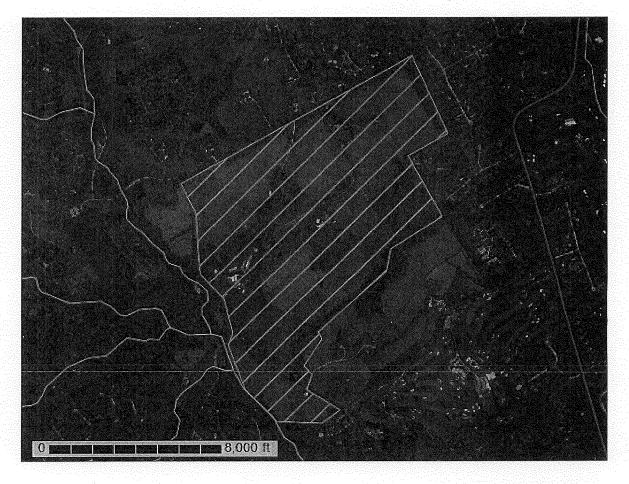


NRCS

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 Delaware County, Pennsylvania

Ardrossan



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://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app? agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

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 Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

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.



MAP LEGEND

Spoil Area Stony Soot	Very Stony Spot	vin Wet Spot	Other Other	Special Line Features	Water Features		Also Rails	Interstate Highways	US Routes	Major Roads	Local Roads	Background	Topographic Map	Aerial Photography					
Area of Interest (AOI) Area of Interest (AOI)	Soil Man Unit Polymons	Soil Map Unit Lines	Soil Map Unit Points		Blowout	Borrow Pit	Clay Spot	Closed Depression	Gravel Pit	Gravelly Spot	Landfill	Lava Flow Bac	Marsh or swamp	Mine or Quarry	Miscellaneous Water	Perennial Water	Rock Outcrop	Saline Spot	Sandy Spot
Area of Int	Soils] \		Special	Э	Ø	×	0	×	**	O	~2	-1	ex	0	0	>	-	•••

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

Source of Map: Natural Resources Conservation Service Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov 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: Delaware County, Pennsylvania Survey Area Data: Version 6, Feb 24, 2009

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

Date(s) aerial images were photographed: Jun 17, 2010—Jul 1, 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.

Severely Eroded Spot

Slide or Slip Sodic Spot

0 4

Sinkhole

Map Unit Legend

	Delaware County, Penn	sylvania (PA045)	
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GeB2	Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded	133.7	38.2%
GeC	Glenelg channery silt loam, 8 to 15 percent slopes	13.1	3.7%
GeC2	Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded	83.8	23.9%
GeC3	Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded	0.0	0.0%
GeD2	Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded	9.9	2.8%
GeD3	Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded	10.6	3.0%
GeE	Glenelg channery silt loam, 25 to 35 percent slopes	1.5	0.4%
GeE3	Glenelg channery silt loam, 25 to 35 percent slopes, severely eroded	0.1	0.0%
GnB	Glenville silt loam, 3 to 8 percent slopes	8.2	2.4%
GnB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded	55.2	15.8%
Me	Made land, schist and gneiss materials	0.5	0.1%
MkF	Manor soils, 35 to 60 percent slopes	3.4	1.0%
We	Wehadkee silt loam	15.4	4.4%
WoA	Worsham silt loam, 0 to 3 percent slopes	8.8	2.5%
WoB	Worsham silt loam, 3 to 8 percent slopes	5.8	1.7%
Totals for Area of Interest		350.1	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.

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.

Delaware County, Pennsylvania

GeB2—Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded

Map Unit Setting

Elevation: 300 to 2,000 feet

Mean annual precipitation: 40 to 55 inches Mean annual air temperature: 45 to 61 degrees F

Frost-free period: 110 to 235 days

Map Unit Composition

Glenelg and similar soils: 85 percent

Description of Glenelg

Setting

Landform: Hillslopes

Landform position (two-dimensional): Backslope, shoulder Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Convex, linear Across-slope shape: Convex, linear

Parent material: Fine-loamy residuum weathered from mica schist

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

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 capacity: High (about 9.4 inches)

Interpretive groups

Farmland classification: All areas are prime farmland

Land capability (nonirrigated): 2e

Hydrologic Soil Group: B

Typical profile

0 to 8 inches: Channery silt loam 8 to 26 inches: Channery silt loam 26 to 60 inches: Channery loam

GeC—Glenelg channery silt loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 300 to 2,000 feet

Mean annual precipitation: 40 to 55 inches Mean annual air temperature: 45 to 61 degrees F

Frost-free period: 110 to 235 days

Map Unit Composition

Glenelg and similar soils: 85 percent

Description of Glenelg

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Linear, convex Across-slope shape: Linear, convex

Parent material: Residuum weathered from mica schist

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 40 to 60 inches to paralithic bedrock

Drainage class: Well drained

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 capacity: Moderate (about 8.0 inches)

Interpretive groups

Farmland classification: Farmland of statewide importance

Land capability (nonirrigated): 3e Hydrologic Soil Group: B

Typical profile

0 to 8 inches: Channery silt loam 8 to 29 inches: Channery silt loam 29 to 50 inches: Very channery loam

GeC2—Glenelg channery silt loam, 8 to 15 percent slopes, moderately eroded

Map Unit Setting

Elevation: 300 to 2,000 feet

Mean annual precipitation: 40 to 55 inches Mean annual air temperature: 45 to 61 degrees F

Frost-free period: 110 to 235 days

Map Unit Composition

Glenelg and similar soils: 85 percent

Description of Glenelg

Setting

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

Parent material: Fine-loamy residuum weathered from mica schist

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

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 capacity: High (about 9.4 inches)

Interpretive groups

Farmland classification: Farmland of statewide importance

Land capability (nonirrigated): 3e Hydrologic Soil Group: B

Typical profile

0 to 8 inches: Channery silt loam 8 to 26 inches: Channery silt loam 26 to 60 inches: Channery loam

GeC3—Glenelg channery silt loam, 8 to 15 percent slopes, severely eroded

Map Unit Setting

Elevation: 300 to 2,000 feet

Mean annual precipitation: 40 to 55 inches Mean annual air temperature: 45 to 61 degrees F

Frost-free period: 110 to 235 days

Map Unit Composition

Glenelg and similar soils: 85 percent

Description of Glenelg

Setting

Landform: Hillslopes

Landform position (two-dimensional): Backslope, shoulder Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Convex, linear Across-slope shape: Linear, convex

Parent material: Residuum weathered from mica schist

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 60 to 120 inches to paralithic bedrock

Drainage class: Well drained

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 capacity: High (about 9.4 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4e Hydrologic Soil Group: B

Typical profile

0 to 8 inches: Channery silt loam 8 to 26 inches: Channery silt loam 26 to 60 inches: Channery loam

GeD2—Glenelg channery silt loam, 15 to 25 percent slopes, moderately eroded

Map Unit Setting

Elevation: 300 to 2,000 feet

Mean annual precipitation: 40 to 55 inches Mean annual air temperature: 45 to 61 degrees F

Frost-free period: 110 to 235 days

Map Unit Composition

Glenelg and similar soils: 85 percent

Description of Glenelg

Setting

Landform: Hillslopes

Landform position (two-dimensional): Backslope, shoulder Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Linear, convex Across-slope shape: Linear, convex

Parent material: Fine-loamy residuum weathered from mica schist

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

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 capacity: High (about 9.4 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4e Hydrologic Soil Group: B

Typical profile

0 to 8 inches: Channery silt loam 8 to 26 inches: Channery silt loam 26 to 60 inches: Channery loam

GeD3—Glenelg channery silt loam, 15 to 25 percent slopes, severely eroded

Map Unit Setting

Elevation: 300 to 2,000 feet

Mean annual precipitation: 40 to 55 inches

Mean annual air temperature: 45 to 61 degrees F

Frost-free period: 110 to 235 days

Map Unit Composition

Glenelg and similar soils: 85 percent

Description of Glenelg

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Linear, convex Across-slope shape: Linear, convex

Parent material: Residuum weathered from mica schist

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 60 to 120 inches to paralithic bedrock

Drainage class: Well drained

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 capacity: High (about 9.4 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 6e

Hydrologic Soil Group: B

Typical profile

0 to 8 inches: Channery silt loam 8 to 26 inches: Channery silt loam 26 to 60 inches: Channery loam

GeE—Glenelg channery silt loam, 25 to 35 percent slopes

Map Unit Setting

Elevation: 300 to 2,000 feet

Mean annual precipitation: 40 to 55 inches Mean annual air temperature: 45 to 61 degrees F

Frost-free period: 110 to 235 days

Map Unit Composition

Glenelg and similar soils: 85 percent

Description of Glenelg

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Side slope, nose slope

Down-slope shape: Convex, linear Across-slope shape: Linear, convex

Parent material: Residuum weathered from mica schist

Properties and qualities

Slope: 25 to 35 percent

Depth to restrictive feature: 60 to 120 inches to paralithic bedrock

Drainage class: Well drained

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 capacity: High (about 9.4 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 6e

Hydrologic Soil Group: B

Typical profile

0 to 8 inches: Channery silt loam 8 to 26 inches: Channery silt loam 26 to 60 inches: Channery loam

GeE3—Glenelg channery silt loam, 25 to 35 percent slopes, severely eroded

Map Unit Setting

Elevation: 300 to 2,000 feet

Mean annual precipitation: 40 to 55 inches Mean annual air temperature: 45 to 61 degrees F

Frost-free period: 110 to 235 days

Map Unit Composition

Glenelg and similar soils: 85 percent

Description of Glenelg

Setting

Landform: Hillslopes

Landform position (two-dimensional): Backslope, shoulder Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Convex, linear Across-slope shape: Linear, convex

Parent material: Residuum weathered from mica schist

Properties and qualities

Slope: 25 to 35 percent

Depth to restrictive feature: 60 to 120 inches to paralithic bedrock

Drainage class: Well drained

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 capacity: High (about 9.4 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 7e Hydrologic Soil Group: B

Typical profile

0 to 8 inches: Channery silt loam 8 to 26 inches: Channery silt loam 26 to 60 inches: Channery loam

GnB—Glenville silt loam, 3 to 8 percent slopes

Map Unit Setting

Elevation: 200 to 2,000 feet

Mean annual precipitation: 35 to 50 inches Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 120 to 220 days

Map Unit Composition

Glenville and similar soils: 90 percent

Minor components: 5 percent

Description of Glenville

Setting

Landform: Hillslopes

Landform position (two-dimensional): Footslope, backslope Landform position (three-dimensional): Head slope, side slope

Down-slope shape: Linear, concave Across-slope shape: Linear, concave

Parent material: Colluvium and/or residuum weathered from mica schist

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 15 to 30 inches to fragipan; 60 to 99 inches to paralithic

bedrock

Drainage class: Moderately well drained

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 6 to 36 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Low (about 3.0 inches)

Interpretive groups

Farmland classification: All areas are prime farmland Land capability (nonirrigated): 2e

Hydrologic Soil Group: C

Typical profile

0 to 9 inches: Silt loam 9 to 19 inches: Silt loam 19 to 39 inches: Silt loam 39 to 82 inches: Channery loam

Minor Components

Baile

Percent of map unit: 5 percent

Landform: Depressions

Landform position (two-dimensional): Footslope Landform position (three-dimensional): Base slope

Down-slope shape: Concave, linear Across-slope shape: Concave, linear

GnB2—Glenville silt loam, 3 to 8 percent slopes, moderately eroded

Map Unit Setting

Elevation: 200 to 2,000 feet

Mean annual precipitation: 35 to 50 inches Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 120 to 220 days

Map Unit Composition

Glenville and similar soils: 85 percent Minor components: 7 percent

Description of Glenville

Setting

Landform: Hillslopes

Landform position (two-dimensional): Footslope, backslope Landform position (three-dimensional): Head slope, side slope

Down-slope shape: Linear, concave Across-slope shape: Concave, linear

Parent material: Loamy colluvium and/or residuum weathered from mica schist

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 60 to 99 inches to Drainage class: Somewhat poorly drained

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 6 to 36 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Moderate (about 6.9 inches)

Interpretive groups

Farmland classification: All areas are prime farmland

Land capability (nonirrigated): 2e

Hydrologic Soil Group: C

Typical profile

0 to 10 inches: Silt loam 10 to 16 inches: Silt loam 16 to 50 inches: Silt loam 50 to 70 inches: Channery loam

Minor Components

Worsham

Percent of map unit: 7 percent Landform: Depressions

Me-Made land, schist and gneiss materials

Map Unit Setting

Elevation: 200 to 900 feet

Mean annual precipitation: 36 to 48 inches Mean annual air temperature: 50 to 57 degrees F

Frost-free period: 140 to 200 days

Map Unit Composition

Udorthents, schist and gneiss, and similar soils: 95 percent

Minor components: 1 percent

Description of Udorthents, Schist And Gneiss

Setting

Landform: Ridges

Landform position (two-dimensional): Backslope, shoulder, summit Landform position (three-dimensional): Nose slope, side slope, interfluve

Down-slope shape: Linear, convex Across-slope shape: Linear, convex

Parent material: Graded areas of schist and/or gneiss

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 40 to 72 inches to paralithic bedrock

Drainage class: Well drained

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 capacity: High (about 10.1 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 7s Hydrologic Soil Group: B

Typical profile

0 to 3 inches: Silt loam

3 to 40 inches: Gravelly silt loam 40 to 60 inches: Gravelly silt loam

Minor Components

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

MkF-Manor soils, 35 to 60 percent slopes

Map Unit Setting

Elevation: 250 to 1,000 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 48 to 57 degrees F

Frost-free period: 150 to 220 days

Map Unit Composition

Manor and similar soils: 100 percent

Description of Manor

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, backslope Landform position (three-dimensional): Nose slope, side slope

Down-slope shape: Linear, convex Across-slope shape: Convex, linear

Parent material: Residuum weathered from mica schist

Properties and qualities

Slope: 35 to 60 percent

Depth to restrictive feature: 72 to 99 inches to paralithic bedrock

Drainage class: Well drained

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 capacity: High (about 9.4 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 7e Hydrologic Soil Group: B

Typical profile

0 to 3 inches: Channery loam 3 to 22 inches: Channery loam 22 to 60 inches: Venu fine conduction

22 to 60 inches: Very fine sandy loam

We-Wehadkee silt loam

Map Unit Setting

Elevation: 200 to 600 feet

Mean annual precipitation: 36 to 46 inches Mean annual air temperature: 54 to 57 degrees F

Frost-free period: 140 to 200 days

Map Unit Composition

Wehadkee and similar soils: 90 percent

Description of Wehadkee

Setting

Landform: Flood plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Concave Across-slope shape: Concave

Parent material: Loamy alluvium derived from igneous and metamorphic rock

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

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: About 0 to 6 inches

Frequency of flooding: None Frequency of ponding: None

Available water capacity: Moderate (about 8.9 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 4w

Hydrologic Soil Group: D

Typical profile

0 to 9 inches: Silt loam 9 to 28 inches: Silt loam

28 to 60 inches: Silty clay loam 60 to 64 inches: Stratified clay

WoA-Worsham silt loam, 0 to 3 percent slopes

Map Unit Setting

Elevation: 330 to 2,000 feet

Mean annual precipitation: 35 to 50 inches Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 120 to 220 days

Map Unit Composition

Worsham and similar soils: 85 percent

Description of Worsham

Setting

Landform: Draws, drainageways

Landform position (two-dimensional): Footslope, toeslope Landform position (three-dimensional): Head slope, base slope

Down-slope shape: Linear, concave Across-slope shape: Linear, concave

Parent material: Local alluvium derived from granite and gneiss

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

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 capacity: High (about 10.8 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 5w

Hydrologic Soil Group: D

Typical profile

0 to 9 inches: Silt loam 9 to 40 inches: Clay loam 40 to 60 inches: Loam

WoB-Worsham silt loam, 3 to 8 percent slopes

Map Unit Setting

Elevation: 330 to 2,000 feet

Mean annual precipitation: 35 to 50 inches Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 120 to 220 days

Map Unit Composition

Worsham and similar soils: 85 percent

Description of Worsham

Setting

Landform: Drainageways, draws

Landform position (two-dimensional): Footslope, toeslope Landform position (three-dimensional): Base slope, head slope

Down-slope shape: Linear, concave Across-slope shape: Linear, concave

Parent material: Local alluvium derived from granite and gneiss

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

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 capacity: High (about 10.8 inches)

Interpretive groups

Farmland classification: Not prime farmland

Land capability (nonirrigated): 6w

Hydrologic Soil Group: D

Typical profile
0 to 9 inches: Silt loam
9 to 40 inches: Clay loam
40 to 60 inches: Loam

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APPENDIX 2

EVANS MILL ENVIRONMENTAL

SOIL TEST PIT AND INFILTRATION TESTING LOGS

SOIL SUMMARY REPORT FOR STORMWATER INFILTRATION

ARDROSSAN	PROJECT NUMBER	2143-00-530	SUBDIVISION	ARDROSSAN
NEWTOWN ROAD	MUNICIPALITY	RADNOR	COUNTY	DELAWARE
7/17/2013	CONDUCTED BY	WLW	SITE	1
SUNNY		PRECIPITATION		
MID 90'S		SOIL CONDITIONS	WET	X DRY
CONTRACTOR AND	NEWTOWN ROAD 7/17/2013 SUNNY	NEWTOWN ROAD MUNICIPALITY 7/17/2013 CONDUCTED BY SUNNY	ARDROSSAN NUMBER 2143-00-530 NEWTOWN ROAD MUNICIPALITY RADNOR 7/17/2013 CONDUCTED BY PRECIPITATION	ARDROSSAN NUMBER 2143-00-530 SUBDIVISION NEWTOWN ROAD MUNICIPALITY RADNOR COUNTY 7/17/2013 CONDUCTED BY WJM PRECIPITATION SUBDIVISION SUBDIVISION PRECIPITATION

SOIL PROFILE Test Pit #7-19-1 HORIZON BOUNDARY COLOR TEXTURE % CF STRUCTURE CONSISTENCE ROOTS UPPER LOWER % clay, macro pores, etc. Ap 0 9 AS 10 YR 3/3 LOAM <5 2 GRAN FRIABLE MANY AS 10 YR 4/6 LOAM <5 В 9 17 2 SBK FRIABLE FINE SANDY LOAM 1 SBK 17 AS 10 YR 4/6 <5 FRIABLE BC 26 . С 84 VARIGATED SANDY LOAM 26 10 0 S.G. LOOSE NOTES: THE AREA BETWEEN THE CHANNERS WAS FILLED WITH FINES. GLENELG SOIL DEPTH CLASS SOIL DRAINAGE CLASS CARBONATE DERIVED NO DEEP WELL DRAINED SLOPE: 3 - 8% LIMITING CONDITION MODERATELLY DEEP MODERATELY WELL DRAINED TYPE: BOP SHALLOW SOMEWHAT POORLY DRAINED COVER: PASTURE DEPTH: POORLY DRAINED

REDOX - Redoxymorphic features (Drainage Mottling) A/S/O - Abundance/Size/Contrast f -few, c -common, m -many; f -fine, m -medium, c -coarse; f -faint, d -distinct, p -prominent

INFILTRATION TEST DATA

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*t)] x I (h,/h;)
1	60"	3"	6"	10:12	6.00"	4.50"	30 min	5.00"	4.00"	4.00"	4.25"	4.25"				8.50	2.11
2	60"	3"	6"	10:12	6.00"	5.00"	30 min	4.00"	3.75"	3.50"	3.50"	3.50"	3.50"	5 v. 6 s v. celo v. 9 c con v. 19 s v. celo co.	AND STREET, STREET, STREET,	7.00	1.50
3											***************************************				partie Combination and processing		
4	-								primers and the latest and a	AND THE SHAPE SEED OF THE SEED	Chapter of Association (Associated	and the other means are con-	Merchanist de la company	Similarin'i International Confession (Confession)	one with the second	NATION AND ADDRESS OF THE PARTY	en saties de manuelle schaffe schoole
5		more for cook		A STATE OF BRIDE VOLUME	A				and any open for the contract of the party	A CALL CONTRACTOR OF STREET AND ADDRESS.	The contract second contract of the contract o	0.00,000,000,000,000,000,000	CONTRA RECORDING THE CONTRACTOR			AND DESCRIPTION OF THE PARTY OF	
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												GE	OMETRI	C MEAN	(IN/HR):	7.71	1.78

DIAGRAM/COMMENTS	St. The state of t



SOIL SUMMARY REPORT FOR STORMWATER INFILTRATION

MUNICIPALITY		
WORGFALL	RADNOR	COUNTY DELAWARE
CONDUCTED BY	WJM	SITE
	PRECIPITATION	
	SOIL CONDITIONS WET	DRY
		PRECIPITATION

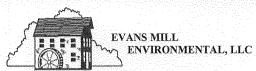
HORIZON DEPTH		PTH	BOUNDARY	GOLOR	TEXTURE	% CF	REDOX				NOTES
HURIZUN	UPPER	LOWER	BUONDART	COLOR	TEATURE	7.05	A S C	STRUCTURE	CONSISTENCE	ROOTS	% clay, macro pores, etc.
Ар	0	8	AS	10 YR 3/3	SILT LOAM	<5		2 GRAN	FRIABLE	MANY	
Apb	8	33	AS	10 YR 4/6	SILT LOAM	<5	MMD	2 SBJ	FRIABLE	-	Mn stains
В	33	45	AS	10 YR 4/4	SILT LOAM	<5	MMD	1 SBK	FRIABLE		Mn stains
вс	45	55	c s	10 YR 7/1; 5/YR 4/4	SILT LOAM	<5	MMP	2 SBK	FRIABLE		Mn stains
С	55	84		10 YR 7/1; 5/YR 4/4	SILT LOAM	<5	MMP	0 MASS	FRIABLE	-	Mn stains

OIL TYPE: GLENVILLE	SOIL DEPTH CLASS	SOIL DRAINAGE CLASS	
ARBONATE DERIVED N	X DEEP	WELL DRAINED	SLOPE:
IMITING CONDITION	MODERATELLY DEEP	MODERATELY WELL DRAINED	
YPE: REDOX	SHALLOW	X SOMEWHAT POORLY DRAINED	
EPTH: 8		POORLY DRAINED	COVER: GRASS

INFILTRATION TEST DATA

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A((F'D')] x in (h,/h _s)
1 1			South personal and secure and	NOTES AND ADMINISTRATION OF THE PARTY.						***************************************	A CONTRACTOR OF THE CONTRACTOR	Average statistically	byte working contraction to a		Now the second state of the second		
2			and the second														
3								To be a second of the second		A SECTION AND ADDRESS OF THE PARTY OF THE PA		24 11 21 21 11 11 11 11 11 11 11 11 11 11					
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5			discount of the street of the		physical action reduction (see	Control of the Contro	CONTRACTOR			Se an en an en en en antiere an		Stromment interested		Control Section on pressure of the Control		and a property of	
6	and a large service of	Blygoret etgolisticos		entrantic Atlahinintal et alaman	periore de laborie e ben intrombiel	Control of the Control of Control of Control		Management (Secretary of Secre		Control of the Contro				and the second second second second			
	ONE CONTRACTOR IN	**********										GE	OMETRI	C MEAN	(IN/HR):		

DIAGR	AM/CO	VIMENTS:



PF	OJECT		ARDROSSAN		PROJECT NUMBER	2143-00-53	0		SUBDIVIS	SION ARE	DROSSAN
SITE	LOCATI	ON	NEWTOWN RO	AD	MUNICIPALITY	RADNOR			COUN	ry DEL	AWARE
TES	ST DATE	Ξ	7/17/2013	****	CONDUCTED BY	WJM			SITE		
WEATHER	R CONE	ITIONS	SUNNY				PRECIPITATION				
TEMF	ERATU	RE	MID 90'S				SOIL CONDITIONS	WET			X DRY
SOIL PR	OFILE		Test Pit #	7-19-3							
HORIZON	C	PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ар	0	10	A S	10 YR 3/3	LOAM	<5		2 GRAN	FRIABLE	MANY	
Bt	10	31	AS	10 YR 5/6	SILTY CLAY LOAM	10		2 SBK	FRIABLE		
BC	31	41	СS	VARIGATED	SANDY LOAM	10		1 SBK	FRIABLE		
С	41	84		VARIGATED	MICAEOUS SANDY LOAM	10	0 MASSIVE	O MASS	VERY FRIABLE		
NOTES:							I				
SOIL TYPI	E:		GLENELG	is is	OIL DEPTH CLASS		SOIL DRAINAG	E CLASS		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	1
CARBONA	TE DE	RIVED	N		X DEEP		×	WELL DRA	INED		SLOPE:
LIMITING		ION BOP			MODERA' SHALLOV	TELLY DEEF V			ELY WELL DRAI T POORLY DRA		

INFILTRATION TEST DATA

REDOX - Redoxymorphic features (Drainage Mottling) A/S/C - Abundance/Size/Contrast f -few, c -common, m -many; f -fine, m -medium, c -coarse; f -faint, d -distinct, p -prominent

DEPTH:

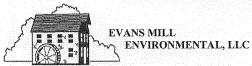
HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*t)] x in (h,/h,)
	60"	3"	6"	10:10	6.00"	4.50"	30 min	5.50"	5.50"	5.50"	5.50"					11.00	4.26
2	60"	3"	6"	10:10	6.00"	3.00"	30 min	3.50"	3.50"	3.50"	3.50"	printed and the second series	Statement of the State of Control			7.00	1.50
3				hig compressed the state of the part of the co	ph pur demonstration (per la research) y												
4		2018101020201010	all and a second and a second	NII 1800 TUO NII 1800 TUO				5005470707070									
5	ESSINGLES SOCIEDADES	roem extehentis	Manches agencies in the season	paparan separah dan sahara	Transference y da la como est	hand the second			CONTRACTOR SECURITION	No-chille Congression (AN)				years and the second			
6	- Comment	digention records		paragilia y nemidikan papah (pp. 1900)				***************************************		Children care in all or to pre-mone							
Employee works and												GI	OMETRI	IC MEAN	(IN/HR):	8.77	2.53

POORLY DRAINED

COVER:

GRASS

DIAGRAM/COMMENTS:



PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-530	SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR	COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	WJM	SITE	4
WEATHER CONDITION	S SUNNY		PRECIPITATION		
TEMPERATURE	MID 90'S		SOIL CONDITIONS WE	T	X DRY

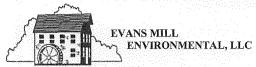
OIL PR	OFILE	http://www.com/awakes	Test Pit #7-	19-4							
HORIZON	A salaca a macologico de	PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	REDOX A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ap	0	9	AS	10 YR 3/3	LOAM	10		2 GRAN	FRIABLE	MANY	
Bt	9	17	СS	10 YR 4/6	SILT LOAM	10		2 SBK	FRIABLE		
вс	17	33	СS	10 YR 5/6	SANDY LOAM	10		0 MASS	FRIABLE	-	
С	33	84		VARIGATED	SANDY LOAM	10		0 MASS	VERY FRIABLE		
OTES: OIL TYPE			GLENELG		SOIL DEPTH CLASS		SOIL DRAINAG	E OLAGO			
	TE DER		N N		X DEEP		X X	WELL DRA	INED		SLOPE:
AITING O	************		- 14			ELLY DEEP		-	ELY WELL DRAI	INED	SLOF L.
PE:	-	30P			SHALLOW			SOMEWHA	T POORLY DRA		
PTH:		34						POORLY D	RAINED		COVER: GRASS

INFILTRATION TEST DATA

REDOX - Redoxymorphic features (Drainage Mottling) A/S/C - Abundance/Size/Contrast f -few, c -common, m -many; f -fine, m -medium, c -coarse; f -faint, d -distinct, p -prominent

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*t)] × Ir (h,/h ₂)
1	60"	3"	6"	14:30	6.00"	6.00"	10 min	4.00"	4.00"	4.00"	4.00"					24.00	5.65
2	60"	3"	6"	14:30	6.00"	6.00"	10 min	2.00"	2.00"	2.25"	2.25"					13.50	2.42
3	-3.0 (4-1040000)	principles of Employment		and the second second													
4				2010-1-10-20 11-10-1-1-10-1-1													
5	A Designation of the Land	iniska susidekiata	Age (Market Green Street Green)	habitage on period of the control of the	contravillation con	hikko kolemia avenira irri	entering of contract of a transfer	(Agriculture and Aragon (Arabida)	Angelija nijerjas spilgar savag sale	Late National and August August August	peper 10 4/0 000 year	Ang Sangarang Ang Sarana Sanasana	per con any the private by her pa	E (s) care pour y objective place per	Nigor (Nigor)	ATTOMORPH CONTRACTOR	and the control of the control of the control of
6	o de la companya de l	esperie ver enere		sates ligram replanada a sati data	Anna in the state of the state		Continues designed (total Content										
												GI	OMETRI	C MEAN	(IN/HR):	18,00	3.69

DIAGRAM/COMMENTS:				Lorent	
DIAGRAMICOMMENTS.					
."					



PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-530	SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR	COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	MJM	SITE	5
WEATHER CONDITION	SUNNY		PRECIPITATION	E (1)	
TEMPERATURE	MID 90'S		SOIL CONDITIONS	WET	X DRY

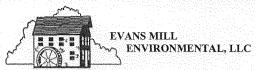
SOIL	PRA	FILE	. 1	Toet	Dif	# 7.	19.5

HORIZON	The William Control	PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ар	0	10	A S	10 YR 3/3	LOAM	20	-	2 GRAN	FRIABLE	MANY	
B1	10	20	AS	7.5 YR 3/4	SILT LOAM	10		2 SBK	FRIABLE		
B2	20	48	AS	7,5 YR 3/6	SILTY CLAY LOAM	10		2 SBK	FRIABLE		
вс	48	62	AS	10 YR 4/6	SILT LOAM	10	-	1 SBK	FRIABLE	•	
С	62	84		VARIGATED	SANDY LOAM	20	-	O MASS	FRIABLE		

OIL TYPE: GLENELG	SOIL DEPTH CLASS	SOIL DRAINAGE CLASS	
ARBONATE DERIVED N	X DEEP	X WELL DRAINED	SLOPE:
IMITING CONDITION	MODERATELLY DEEP	MODERATELY WELL DRAINED	
YPE: BOP	SHALLOW	SOMEWHAT POORLY DRAINED	
EPTH: 84+		POORLY DRAINED	COVER: GRASS

HOLE#		DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*t)] x in (h,/h,)
1		60"	3"	6"	14:35	0.50"	0.25"	30 min	0.50"	0.25"	0.25"	0.25"					0.50	0.07
2	30.7	60"	3"	6"	14:35	4.00"	0.25"	30 min	0.00"	0.25"	0.25"	0.25"		ANALYS OF STREET, STREET,	Anner a leve mi misse aura)	CONTRACTOR STATE	0.50	0.07
3			and an area of the col															
4			and the second second		ing and a state of the state of	V15-01-01-01-01-01-01			Portera es Estados (Bestas)		produce of the first of the second	Sixurinana material			palanteed manifestor	Danielan eliker eraneran		ALEXANDER OF THE PROPERTY.
5	at an injustral		odentie o ingesti.	20-020-020-02-02-02-02-02-02-02-02-02-02	network fallet Administration of		CONTRACTOR OF GRANDS	3,4135,414,414,414	Aprilla Harrison (1994)	And an addition of the community	proesio introdutivo iza	green and statement		prepared lifetime (unit contre	de udalisée descessor de serves	der oraner odderend	CONTRACTOR CONTRACTOR	
6			entrant of constant		To party on a result of the small to send over	arrianes motorones	process and analysis of the con-		Collect Charles and particular and a little of					Company of the Compan				
	400.00												GI	OMETRI	C MEAN	(IN/HR):	0.50	0,07

DIA	GR	AM	/CO	MI	ME	NT	S:



PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-530	SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR	COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	MCM	SITE	6
WEATHER CONDITIONS	SUNNY		PRECIPITATION		
TEMPERATURE	MID 90'S		SOIL CONDITIONS WET		X DRY

SOIL PROFILE Test Pit #7-19-6

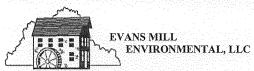
HORIZON	TWO BOATENANO	PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	REDOX A s c	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ар	0	9	A S	10 YR 3/3	LOAM	•	-	2 GRAN	FRIABLE	MANY	
C1	9	34	AS	10 YR 5/4	VERY CHANNERY LOAM	60	-	O MASS	FRIABLE	-	
C2	34	84		VARIGATED	MICAEOUS LOAM			0 MASS	VERY FRIABLE		
NOTES:											
SOIL TYPE			GLENELG	SC	OIL DEPTH CLASS		SOIL DRAINAG	E CLASS			
CARBONA	TE DEF	RIVED	N		X DEEP		X	WELL DRA	INED		SLOPE:
LIMITING (CONDIT	ION			MODERATI	ELLY DEEP		MODERATI	ELY WELL DRAI	INED	
TYPE:	YPE: BOP			SHALLOW			SOMEWHA	T POORLY DRA	INED		

REDOX - Redoxymorphic features (Drainage Mottling) A/S/C - Abundance/Size/Contrast f -few, c -common, m -many; f -fine, m -medium, c -coarse; f -faint, d -distinct, p -prominent

INFILTRATION TEST DATA

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*1)] x In (h,/h,)
1	60"	3"	6"	15:15	6.00"	4.25"	30 min	4.00"	3.50"	3.50"	3.50"	3.50"				7.00	1.50
2	60"	3"	6"	15:15	6.00"	1.50"	30 min	1.50"	1.50"	1.50"	1.50"		herber yezhoù ez e eustra e zoak e	Committee on Microsophisms	processor and the second date.	3.00	0.49
3											ATTREMORPHUM ST. SC. 1984						
4				C. Dangkariano Transminan			School State of State	nis vyvostkina nav	p it sage a the Color control of the Color of the	anagem i i nestejnica ana e lagil	research extrinsis promited	(DANGER FOR A KELDEN SELEN	ALCOHOLOGY CONTROL CONTROL	DOMESTICAL PROPERTY OF STREET, SANS	Comments of the Committee of the Committ	ecolo estratora di cons	
5					Contract of Contract (NC	totoko litelejaikuwankelish	California de Caracteria de Ca	ti i programa digena com asta d	a secreta contrata de companyo	of content of the content of the co	Distriction of the St. P. J. His Post Ser.	Accepted as Andrews and Security of		latining day on concern about	kuraja ja karasi irinia	atanama atanama	
6		100000000000000000000000000000000000000			Process replaced and the second	Communication of the Communica	and the second second		parameter in the section of the section of	Statistical at material particular and a statistic							
												GE	OMETRI	C MEAN	(IN/HR):	4.58	0,86

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Environmental Engineers & Consultants

PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-5	30	SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR		COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	WJM		SITE	7
WEATHER CONDITION	s sunny			PRECIPITATION	######################################	
TEMPERATURE				SOIL CONDITIONS WET		DRY

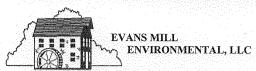
 		 14.00	10.00	40 7

HORIZON	CONTRACTOR CONTRACTOR	PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ap	0	8	A S	10 YR 3/3	LOAM	-		2 GRAN	FRIABLE	MANY	
Bt	8	21	AS	10 YR 4/6	SILTY CLAY LOAM			2 SBK	FRIABLE	MANY	
вс	21	34	AS	10 YR 4/6	LOAM			1 SBK	FRIABLE	MANY	
С	34	34+	-	VARIGATE	SANDY LOAM	20		0 mass	FRIABLE	MANY	
IOTES:											
OIL TYPE		28401688333016	GLENELG		SOIL DEPTH CLASS		SOIL DRAINAG	GE CLASS			
ARBONA	TE DEF	RIVED	N		X DEEP		Х	WELL DRA	INED		SLOPE:
	ITING CONDITION			MODERAT	P MODERATELY WELL DRAINED						
IMITING (CONDIT	ION			MODERA	,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			(量) (control of the control of the
IMITING (ION BOP			SHALLOW			-	T POORLY DRA	NINED	

REDOX - Redoxymorphic features (Drainage Mottling) A/S/C - Abundance/Size/Contrast f -few, c -common, m -many; f -fine, m -medium, c -coarse; f -faint, d -distinct, p -prominent

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*t)] x to (h,/h ₀)
1	60"	3"	6"	14:20	2.50"	2.00"	30 min	2.50"	2.50"	2.50"	2.50"					5.00	0.92
2	60"	3"	6"	14:20	3.00"	3.00"	30 min	2.00"	2.00"	2.00"	2.00"		\$10 per \$10 per \$10 per \$20 per \$10 pe	PROPERTY AND ADDRESS OF THE ADDRESS	-	4.00	0.69
3															Territorio Sentrado		
4		Set (herologists		And a series of the series against the series	SANCTON WAS IN MIT THE SECTION OF	AND RESTORES AND RESTORES	Anymic and Copera-Continues	ration of the composition of the party of	biological sylvenia propositive	Million Scotton St. Societation Ch.	And a series in the control of the c	OPEN TRANSPORTER LINES OF THE PARTY OF THE P	entrining that every en	and deposits and property of	Security of the section was	energia de contra	Process (and a color trade on primary or an
5	Promision of	tint (n) (n, van) è	ed Austria gentrus lõg Aussyut	in the bird of the state of the state of	ande meniming et et	prominental strengthension	CONTROL SERVICE SERVIC	color reality to see earlier	en jaco-pari o en erano e e	(Sabjanistro Hilphingto Sai			Bout talled come harmony characters	operproductive expensive and an	die uterten verenweren	OCCUPATION CONTROL	and the second second
6		e Control de la control		ing transport to the contract of	\$100 miles (100 miles	Server Arrest volume recom		2000 C 100 C	All the beginning the second				ela dia mandana di seperata a section				
I CANADA MARKANIA		PORTUNEZUESKI										GE	OMETRI	C MEAN	(IN/HR):	4.47	0.80

			TS:	



PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-530	SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR	COUNTY	DELAWARE
TEST DATE	TEST DATE 7/17/2013		MJM	SITE	8
WEATHER CONDITION	S SUNNY		PRECIPITATION		NONE
TEMPERATURE	MID 90'S		SOIL CONDITIONS	WET	X DRY

SOIL PROFILE Test Pit #7-19-8

HORIZON		PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ap	0	13	A S	10 YR 3/3	LOAM			2 GRAN	FRIABLE		
Bt	13	33	AS	10 YR 5/6	SILTY CLAY LOAM			2 SBK	FRIABLE		
вс	33	47	AS	10 YR 4/6	LOAM	20		1 SBK	FRIABLE		
	47	84		VARIGATED	SANDY LOAM			0 MASS	FRIABLE		
NOTES:											
SOIL TYPI	E:		GLENELG	so	IL DEPTH CLASS		SOIL DRAINAG	GE CLASS			1
CARBONA	TE DEF	RIVED	N		X DEEP		X	WELL DRA	INED		SLOPE:
LIMITING					MODERATELLY DEEP		MODERATELY WELL DRAINED				<u> </u>
TVDE	144	ROP			SHALLOW			SOMEWHA	T POOR! Y DRA	IMED	

POORLY DRAINED

GRASS

COVER:

REDOX - Redoxymorphic features (Drainage Mottling) A/S/C - Abundance/Size/Contrast f -few, c -common, m -many; f -fine, m -medium, c -coarse; f -faint, d -distinct, p -prominent

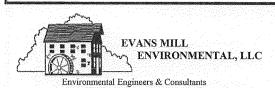
INFILTRATION TEST DATA

84+

DEPTH:

HOLE#	DEPTH OF TEST	CASING DIA, (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F'D'1)] x h (h./h ₂)
1	60"	3"	6"	14:25	0.25"	0.25"	30 min	0.25"	0.25"	0.25"	0.25"					0.50	0.07
2	60"	3"	6"	14:25	0.50"	0.25"	30 min	0.50"	0.50"	0.50"	0.50"	Anna Contraction	Burnette mount () - come	South Annual Confession of	***	1.00	0.15
3										CONTRACTOR CONTRACTOR			Commence of the section of the secti				
4	- Proposition	No. 2011 of the Contraction	A SANTON ALL DATA STORES	manaran da sancarana		A DESCRIPTION OF STREET	filestate (Conferme System and	Moseko (ulterebijous zreou)	Principal des November (1999)	Albaniana et ett anders	de como mornomico e viveni	or to average distriction reporting	ROULESTEAD CONTINUES ON THE	Construence Section 1400		-statistics into the six	(AND DESCRIPTION OF STREET
5		Naghty (program)	A CHARLES A CHARLES AND A	emana na dan mada 4 da	Lander of the incharges	tripost valuetament i	APPERATOR CONTRACTOR	statement strategic (Colo	Province descriptions are the	territario establishmente esta	British Printer (10 p. 10 p. 1	architecturi de la companya de la co	parametriani incressi	Transcription of the second	\$200 HEROTO 11 STATE HEROTO	#859000000000000000000000000000000000000	
6	-	in passage and a large		a promocon planter of the total		er melet vers til sæget star skræder.	Arrama (arrama arrama)	- Agrico como de destretado e		hade a commence of		are deligrated to develop the deposits of	Antonio de promoto con qualo	Continuent (selection of the selection of		december to the second	
KINAHARIS DIGE												GI	OMETRI	IC MEAN	(IN/HR):	0.71	0.10

DI	AGR	AM	/CO	MME	NTS:



PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-530	SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR	COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	MLW	SITE	9
WEATHER CONDITIONS	SUNNY		PRECIPITATION	ESDIVARIAN MATERIAL DE SANTAN	NONE
TEMPERATURE	MID 90'S		SOIL CONDITIONS	WET	X DRY

SOIL PE	OFILE	Toet	Dit #	7-19-9

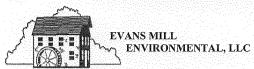
HORIZON	or evolutions were one	PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	REDOX A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ap	0	10	AS	10 YR 3/3	LOAM			2 GRAN	FRIABLE	MANY	
B1	10	20	AS	7.5 YR 5/4	SILT LOAM	-	MMF	1 SBK	FRIM		
B2	20	42	AS	7.5 YR 5/6	SILT LOAM		MMD	2 PRIS	VERY FIRM		
С	42	84		7.5 YR 5/6	SILT LOAM		MMD	0 MASS	FIRM		

NOTES: REDOX WAS N 6/

SOIL TYPE: WORSHAM	SOIL DEPTH CLASS	SOIL DRAINAGE CLASS	
CARBONATE DERIVED N	X DEEP	WELL DRAINED	SLOPE:
LIMITING CONDITION	MODERATELLY DEEP	MODERATELY WELL DRAINED	
TYPE: REDOX	SHALLOW	X SOMEWHAT POORLY DRAINED	
DEPTH: 10		POORLY DRAINED	COVER: GRASS

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HYORSLEV SOLUTION K,=[A/(F*D*i)] x in (h,/h,)
1 1	la anno ano	liang connected plans	A resident extremental income		And the control of the control of		MARKET AND ARTHUR AND A										
2																	
3				Talan Baannen (b. 14 th Taland)			NO	TEST	St. (constitution of the state of the state of								
4		Congression union		alian garangan da		a como suo are menti entrata	Section and section (1995)	AUDIO DOSTORIO SOUNA		ACT OF AN ART ARE LISTED AND	40-1110-00-01-05-10-00-05		PRESENTATION OF STREET	St. Complete St. Complete St. Complete	oor oo began all on the colors	The Management of State Con-	ATTENDED TO STATE OF THE STATE
5	de Carriotes (1964)	mercent contra	Spherical manual sections of	inerformiss (n.E.) Arms (E.O.)	pp in a construction of the same	haran ya ya kesheri (Mari Masaria)	(teltik i sijas apendepuseles	esteini estechtariene	CATTLE STATE AND ADDRESS OF	(Mallin Hardway) (1941) 116		Analis is an increase on a called	orana makalin 1944 s	e de l'encettre du Fertale (e)	katagrapia siyatan di kawa	CONTRACTOR CONTRACTOR	CONTRACTOR CONTRACTOR
6	1	handi ereliyi bereke		eren anga paganatat kan angapa		And probably completed to					A14, A14, C14, B1, B1, B1, B1, B1, B1, B1, B1, B1, B1	2011/2012/04/10/2020/04/04		hi je na za mozanego zmenance	de Maria (100 Alba Maria Estado (17)		
										STANCE VALUE COURSE		GE	OMETRI	C MEAN	(IN/HR):		

DIA	GRA	M/C	OMME	ENTS:	



PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-53	0		SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR	INOR		COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	MUM			SITE	10
WEATHER CONDITION	s sunny			PRECIPITATION			NONE
TEMPERATURE	MID 90'S			SOIL CONDITIONS	WET		X DRY

COII	DDAC	11 =	Tool	Di+ # 7	140-4A

HORIZON	SAN MERCANISA	PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.		
Ap	0	10	A S	10 YR 3/3	LOAM	•	ļ .	2 GRAN	VERY FRIABLE	MANY			
В	10	24	c s	10 YR 4/6	SILT LOAM		-	1 SBK	VERY FRIABLE	•			
С	24	84		VARIGATED	COARSE SANDY LAOM	40		O MASS	VERY FRIABLE				
NOTES:	<u>.</u>		GLENELG	S	DIL DEPTH CLASS		SOIL DRAINAG	GE CLASS			T		
	ARBONATE DERIVED N		N		X DEEP		Х	WELL DRA		SLOPE:			
JARBONA	NG CONDITION MODERATELLY DEEP				ELLY DEEP		MODERATI	INED					
-							ACTION ACTION ACTIONS		SOMEWHAT POORLY DRAINED				
-		ION BOP B4+	-		SHALLOW			SOMEWHA	T POORLY DRA	NNED			

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATIO RATE UTILIZING TH HVORSLEV SOLUTION K,=[A/(F*D*()]) (h,/h_)
1	60"	3"	6"	11:00	4.00"	3.00"	30 min	3.00"	3.00"	3.00"	3.00"					6.00	1.19
2	60"	3"	6"	11:00	3.00"	2.50"	30 min	2.50"	2.50"	2.50"	2.50"	St. Colon Copins II Mary (1000)	ign of the earth of the transmission	don/trespectative cast terrespec		5.00	0.92
3			Salaring ministrate spining of										Contraction of the sector				
4		distances	appropriate contract contract.	Donas en gen rantengg i Annya		A SECTION OF SERVICES PROPERTY.	leviation of this is	venoversierkonkreaming			promission or contrastent	D SEASON CHARLES CONTRACTOR	State of the state			*************	
5	Sees to Minister (1996)	Gersekouleren		The second of the Property of the Second	Contract of the Contract of Managery	realitiments realizabilities con	enamenta energy arrivalu		kamilika u kasasara Amilya		Research of the early Digman Con-	president får 1546 den met Sverser	en trout remarket we work	finite arrive en instance	AR STORESTER LANGE	etrocopy and an execution	ALL DESCRIPTION OF THE PROPERTY OF THE PROPERT
6	AV I S C. HAND LING CO.	nstarregaterraeg	Spell and property services		ryeenstelle agenery my land	policies de la companya de la companya de		See Children Construction Co.	more Cilinas and Selection and	A CONTRACTOR OF THE PARTY OF				Andreas Services			
												GI	EOMETRI	C MEAN	(IN/HR):	5,48	1.05

DIA	G	R	Δ١	VI.	C	Oñ	Λľ	ME	N	TS	•



PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-530	SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR	COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	MLW	SITE	11
WEATHER CONDITION	is sunny		PRECIPITATION		NONE
TEMPERATURE	MID 90'S		SOIL CONDITIONS	WET	X DRY

SOILE	PROFIL	=	Toet	Dif # "	7-19-11

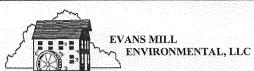
HORIZON		PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	REDOX A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ар	0	15	A S	10 YR 3/3	LOAM	<5		2 GRAN	FRIABLE	MANY	
В	15	34	AS	10 YR 4/6	SILTY CLAY LOAM	<5	-	2 SBK	FRIABLE	•	
BC	34	60	AS	VARIGATED	SILT LOAM	<5		1 SBK	FRIABLE	-	
С	60	84		VARIGATED	SANDY LOAM	15		0 MASS	VERY FRIABLE		
NUMBER OF STREET	SIND MATERIAL PROPERTY.	THE REAL PROPERTY.	CONTRACTOR STATES OF THE STATE		(Capped Capped C		angele and a second and a second	administration of the contract of		NAMES AND POST OFFICE ADDRESS AND PARTY.	
			OLENEI O	lco.	NI DEDTUCI ACC		Teou spania	SE CLASS			
NOTES: SOIL TYPI CARBONA			GLENELG N	so	OL DEPTH CLASS X DEEP		SOIL DRAINAC	GE CLASS WELL DRA	NED		SLOPE:

INFILTRATION TEST DATA

REDOX - Redoxymorphic features (Drainage Mottling) A/S/C - Abundance/Size/Contrast f -few, c -common, m -many; f -fine, m -medium, c -coarse; f -faint, d -distinct, p -prominent

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*1)] × In (h,/h,)
1	60"	3"	6"	11:10	0.00"	0.50"	30 min	0.50"	0.50"	0.50"	0.50"					1.00	0.15
2	60"	3"	6"	11:10	3,00"	3.00"	30 min	2.00"	2.00"	2.00"	2.00"		er skelas komisi osomenassi	e de l'estre le décent de l'entre	0.0000000000000000000000000000000000000	4.00	0.69
3	Compressor of	v je vysjaništer živecy že p	Contraction in the Contract States	or confirme year (contract) committee													
4	ATTACHEMENT TO THE		Spirit sandressi en yderskendel	eros anteriores or redeological	other of the BIR Own Alberta	e no excessional de marion	P 40000 TOO TOO TOO TOO TOO TOO	- District Control of Control	Reprovious las les cessis d'ins	e (come of the minutes of the	September of the september	Company) district carefulation		Vojenskom protestalnik um	Opinio Curto atria Contrago (CO	104.	
5	himiton-ness	handrampung/en	deligi deligi (Associa de estra del Associa	especielos per escaperos establicas		en reconstitution and reconstitution		99KI 1110 - 1940 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1967 - 1		processing several control to the	presentati presentati	must take the expression of the control	Accompanient of the least tree times	Contract description of the contract of the co	De colometroscoporous polo		and the second second second
6	haman	Henry Republic	the Commission of the Control of the			Personal Company of Co		anni a spirana più anci pi		harmo maria managan ana		Constitution of the Consti					
												GI	OMETRI	IC MEAN	(IN/HR):	2,00	0.32

)	IA	GF	A	M	C	Of	ΝN	E	NT	S	



PF	ROJECT	***********	ARDROSSAN		PROJECT NUMBER	2143-00-53	0		SUBDIVIS	SION AR	RDROSSAN		
SITE	LOCATIO	ON	NEWTOWN RO	AD.	MUNICIPALITY	RADNOR			COUNT	ry DE	LAWARE		
TES	ST DATE		7/17/2013		GONDUCTED BY	MLW			SITE		12		
WEATHER	R COND	ITIONS	SUNNY				PRECIPITATION				NONE		
TEMP	PERATUI	RE .	MID 90'S				SOIL CONDITIONS	WET			X DRY		
SOIL PR	OFILE		Test Pit #1-	7-1 (FROM THE	2008 INVESTIGAT	ION) (4/2)						
HORIZON		PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	REDOX A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.		
Ар	0	17	Α	10 YR 4/3	LOAM	<5	-	2 GRAN	FRIABLE	FEW			
Bt	17	36	С	10 YR 4/6	SANDY CLAY LOAM	<5		2 SBK	FRIABLE				
C1	36	50	С	VARIGATED	SANDY CLAY LOAM	<5		0 MASS	FRIABLE	-			
C2	50	84	•	VARIGATED	CHANNERY SILT LOAM	25		0 MASS	LOOSE				
NOTES:		**********	L.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			1							
SOIL TYP	TYPE: GLENELG SOIL DEPTH CLAS						SOIL DRAINAG	E CLASS			I		
CARBONA	ATE DEF	RIVED					X DEEP X WELL DRA				LL DRAINED SLOPE:		
LIMITING	LIMITING CONDITION MODERATEL						P		ELY WELL DRAI				
TYPE: BOP SHALLOW					٧			T POORLY DRA	INED	COVER: GRASS			
DEPTH:	0.00	84+						POORLY D	MAINED		COVER: GRASS		

INFILTRATION TEST DATA

84+

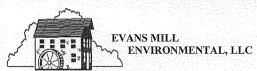
REDOX - Redoxymorphic features (Drainage Mottling) A/S/C - Abundance/Size/Contrast f -few, c -common, m -many; f-fine, m -medium, c -coarse; f-faint, d -distinct, p-prominent

DEPTH:

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*!)] x ln (h,lh;)
1	60"	3"	6"	14:40	4.00"	1.00"	30 min	1.00"	1.00"	1.00"	1.00"					2,00	0.31
2	60"	3"	6"	14:40	2.00"	1.50"	30 min	1.50"	1,50"	1.50"	1.50"	Sample of Contract of the	II-1 segi sayantinaye, mur		AV HINGS IN STREET	3.00	0.49
3			Lollander (1927) (1944) (American American Ameri														
4		277777112474															
5									i i								
6		or consensus to the															
												GI	OMETRI	C MEAN	(IN/HR):	2,45	0.39

COVER:

Ν	(c)	KA.	WI!		JIV	IIVI	Ŀ١	٧I	Э.	
P MANAGES	COSTA III	REGISTO	BUHM	alesta	DESIGNA	STORES .	NAME OF	Maries .	CENTED	46



PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-53	30		SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR			COUNTY	DELAWARE
TEST DATE	rEST DATE 7/17/2013 CONDUCTED BY WJ					SITE	1
WEATHER CONDITION	IS SUNNY			PRECIPITATION			
TEMPERATURE	MID 90'S			SOIL CONDITIONS	WET		X DRY

HORIZON		PTH	BOUNDARY	COLOR	TEXTURE	% CF	REDOX	STRUCTURE	CONSISTENCE	ROOTS	NOTES
HURIZON	UPPER	LOWER	BOUNDARY	COLOR	TEATURE	A CF	A S C	SIRUCIURE	CONSISTENCE	ROOIS	% clay, macro pores, etc.
Аp	0	14	A S	10 YR 3/2	LOAM	<5	•	2 GRAN	FRIABLE	MANY	
B1	14	26	C S	10 YR 5/6	SILTY CLAY LOAM	<5		2 SBK	FRIABLE		
B2	26	44	СS	7.5 YR 5/6	SILTY CLAY LOAM	<5	MMD	2 SBK	FRIABLE	-	
С	44	60+		7.5 YR 4/6	SILT LOAM	<5	MPD	0 MASS	FRIABLE		
NOTES: R	EDOX (COLOR	IS 10 YR 6/2								
SOIL TYPE	=:		GLENVILE	sc	OIL DEPTH CLASS		SOIL DRAINA	GE CLASS			
CARBONA	TE DEF	RIVED	N		X DEEP			WELL DRA	INED		SLOPE:
HAITTINIO (~ ~ A I C I T	1001	Name: 1500 August 2000 (190)(190)(1900 (1900 (1900 (1900 (1900 (1900 (1900 (1900 (19	***************************************	MODERATE	TIVETE	1	HODEOAT	ELVINELL DOV	Acres	

SOMEWHAT POORLY DRAINED

GRASS

COVER:

POORLY DRAINED

SHALLOW

REDOX - Redoxymorphic features (Drainage Mottling) A/S/C - Abundance/Size/Contrast f -few, c -common, m -many; f -fine, m -medium, c -coarse; f -faint, d -distinct, p -prominent

INFILTRATION TEST DATA

TYPE:

DEPTH:

REDOX

26"

HOLE#	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (In/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*1)] × In (h,/h,)
1		********	And the Child Section of	latin di seconi dendi della la	id literative and the control	and well be a section of		AND CONTRACTOR OF THE		eritorio recesso di occidento.	A CANADA CONTRACTOR	a contraction of the contraction with	ntalin lannan kan	palakera kan kalinga bahasa	and a state of the		
2		ada (Sapanian Samera					NO	TEST							A SERVICE CONTRACTOR		
4	(\$-02.0 \) (\$41\) (404.0	orașen ra-septili	44,000,000,000,000	National Sections	en en en gregorioù e en trette de Cire		homes and the	LO Description of the control of the	NTTACON NICHINGTON	Carried on State of Table Charles	are active expension over the	timiteriida oo oo oo oo oo oo oo oo	Service Court of the Court of t	majar velicima eesa	englaeer/oversitasjisjistelj		
5	Poliston Aster	nowey mentangen e	CONTRACTOR CONTRACTOR	end morphism in supplied	228-200-200-201			- presidente de la companya de la co			Selfa svojeno prazavanom	tero datro vo espela do enlace	None the control of the control	CONTRACTOR MARKETON PRO	anarangakan menebika	Property and a second second	100000000000000000000000000000000000000
6		ACTOR AT A SAME AND															
												GE	OMETRI	C MEAN	(IN/HR):		

DIAGRAM/COMMENTS:	



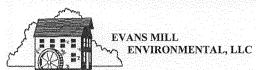
PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-530	SUBDIVISIO	N ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR	COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	MCW	SITE	14
WEATHER CONDITION	NS SUNNY		PRECIPITATION		NONE
TEMPERATURE	MID 90'S		SOIL CONDITIONS	WET	X DRY

SOIL	DRAFI	1 C	Toot	D# #	7 40 44	

HORIZON	The second second	PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	REDOX A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
			AS	10 YR 3/3	LOAM	<5	A S C	2 GRAN	FRIABLE	MANY	% ctay, macro pores, etc.
Ap	0	12	A S	10 11 3/3	LOAM			2 GRAIN	FRIABLE	MANT	
В	15	22	AS	10 YR 4/6	SILT LOAM	<5		2 SBK	FRIABLE		
С	22	84		VARIGATED	SANDY LOAM	<5		0 MASS	FRIABLE		
******************	 		7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7								
		44					A CONTRACTOR OF STATE OF				
NOTES:											
NOTES: SOIL TYPE			GLENELG	[5	SOIL DEPTH CLASS		SOIL DRAINAG	BE CLASS			
			GLENELG N	S	SOIL DEPTH CLASS X DEEP		SOIL DRAINAG	BE CLASS WELL DRAF	NED		SLOPE:
SOIL TYPE	TE DEF	RIVED		E	X DEEP	ELLY DEEP		WELL DRAI	NED ELY WELL DRAI	NED	SLOPE:
SOIL TYPE CARBONA	TE DEF	RIVED		[S	X DEEP			WELL DRAI			SLOPE:

HOLE #	DEPTH OF TEST	CASÍNG DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (In/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*1)] × (h./h;)
1	60"	3"	6"	9:20	6.00"	5.00"	30 min	5.88"	5.88"	5.88"	5.75"					11.50	5.45
2	60"	3"	6"	9:20	4.00"	4.00"	30 min	5.50"	5.75"	5.50"	5.50"	heart (Market State Control of Aurora of St		a filos programas companyones o	\$ 000 miles (0.000	11.00	4.26
3		Activities of the Control						. Commentered State (1997)	Samo and the Specific of State Co.					All mouths demonstrated faces			
4			rigito cilii tirs area vecesi at	,	G01-84/11/11/11/	COURTON	Caralle and Aller and Alle										
5	many disersol	de se de la marce de la legrana	Agricus established institute	Policiane en el cetario Gené	And and a thirty control of the season		environment announced a	Control of the State Control	a mate la trans a l'ambre ben'ny p	Late the second section of the late		errensjesje i lide odeser de			Sep potro velas considera	CONTRACTOR CONTRACTOR	
6		endistin angle	ing a maranana karang malayan paga	Composition on the composition of the composition o	portion and an interest of			lander of the land						1			
		CASC CONTROL STATE	CONTROL CONTROL CONTROL									GI	OMETRI	C MEAN	(IN/HR):	11.25	4.82

					TS	



PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-530	SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR	COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	MLW	SITE	15
WEATHER CONDITIONS	SUNNY		PRECIPITATION		NONE
TEMPERATURE	MID 90'S		SOIL CONDITIONS WET		X DRY

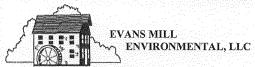
SOIL PR	OFILE		Test Pit #7-	19-15							
HORIZON		PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	REDOX A 5 C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ap	0	9	AS	10 YR 3/3	LOAM	<5		2 GRAN	FRIABLE	MANY	
В	9	28	c s	10 YR 4/6	SILTY CLAY LOAM	10		2 SBK	FRIABLE		
С	24	84+	*	VARIGATED	SANDY LOAM	10		0 MASS	FRIABLE		
NOTES:											
SOIL TYPI	Ξ:		GLENELG	so	IL DEPTH CLASS		SOIL DRAINA	GE CLASS			

SOIL TYPE:	GLENELG	SOIL DEPTH CLASS	SOIL DRAINAGE CLASS	
CARBONATE DERIVED	N	X DEEP	X WELL DRAINED	SLOPE:
LIMITING CONDITION		MODERATELLY DEEP	MODERATELY WELL DRAINED	
TYPE: BOP		SHALLOW	SOMEWHAT POORLY DRAINED	
DEPTH: 84+			POORLY DRAINED	COVER: GRASS
	features (Drainage Mottling) A/S/C			-t

INFILTRATION TEST DATA

HOLE #	DEPTH OF TEST	CASING DIA. (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*()] x (h,/h,)
1	60"	3"	6"	14:30	6.00"	5.00"	30 min	4.00"	4.00"	4.00"	4.00"					8.00	1.88
2	60"	3"	6"	14:30	6.00"	5.88"	30 min	4.50"	4.50"	4.50"	4.50"	er eksplone innskramananne.	(The section as the section of the	Secretary days (secure from	i-ter de peror zo yezhoù de la	9.00	2.38
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DIL PR	MACHINE STREET	PTH	Test Pit	# 7-	19-16	9				REDOX				1			NOTE	
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PROJECT	ARDROSSAN	PROJECT NUMBER	2143-00-530		SUBDIVISION	ARDROSSAN
SITE LOCATION	NEWTOWN ROAD	MUNICIPALITY	RADNOR		COUNTY	DELAWARE
TEST DATE	7/17/2013	CONDUCTED BY	MLW		SITE	17
WEATHER CONDITIONS	SUNNY		PRECIPITATI	ION		NONE
TEMPERATURE	MID 90'S		SOIL CONDITI	ONS WET		X DRY

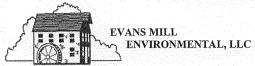
SOIL PR	OFILE		Test Pit #7-	19-17							
HORIZON	100000000000000000000000000000000000000	PTH LOWER	BOUNDARY	COLOR	TEXTURE	% CF	REDOX A S C	STRUCTURE	CONSISTENCE	ROOTS	NOTES % clay, macro pores, etc.
Ар	0	9	AS	10 YR 3/3	LOAM	<5		2 GRAN	FRIABLE	MANY	
В	9	27	СS	10 YR 4/6	CHANNERY LOAM	50		1 SBK	FRIABLE		
С	27	84+	•	VARIGATED	LOAMY SAND	<5		0 S.G.	LOOSE		
OTES:											
OIL TYPE:		GLENELG		SOIL DEPTH CLASS		SOIL DRAINAGE CLASS					
ARBONATE DERIVED		N		X DEEP		X WELL DRAINED				SLOPE:	
IMITING CONDITION				MODERATELLY DEEP			MODERATI	INED			
YPE:		вор			SHALLOW		SOMEWHA	VINED			
FPTH.	EDTH: 84+							POORLY D	RAINED		COVER: GRASS

INFILTRATION TEST DATA

REDOX - Redoxymorphic features (Drainage Mottling) A/S/C - Abundance/Size/Contrast f -few, c -common, m -many, f -fine, m -medium, c -coarse; f -faint, d -distinct, p -prominent

HOLE#	DEPTH OF TEST	CASING DIA, (IN)	INITIAL HEIGHT OF WATER COLUMN (IN)	INITIAL FILL TIME	DROP AFTER 1st PRE- SOAK (IN)	DROP AFTER 2st PRE- SOAK (IN)	TIME: 15 MIN OR 30 MIN	READING #1 DROP (IN)	READING #2 DROP (IN)	READING #3 DROP (IN)	READING #4 DROP (IN)	READING #5 DROP (IN)	READING #6 DROP (IN)	READING #7 DROP (IN)	READING #8 DROP (IN)	FIELD RATE OF DROP (in/hr)	INFILTRATION RATE UTILIZING THE HVORSLEV SOLUTION K,=[A/(F*D*f)] × (h./h.)
1	60"	3"	6"	9:45	3.50"	3.50"	30 min	3.00"	3.00"	3.00"	3.00"			1		6.00	1.19
2	60"	3"	6"	9:45	5.00"	4.50"	30 min	4.00"	4.00"	4.00"	4.00"	Part and a proper care depth for the	h-0-00m/0-70-0-0-0-0-0	de como de un excepto (dondo lo		8.00	1.88
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APPENDIX 3

PENNSYLVANIA NATURAL DIVERSITY INVENTORY

PROJECT ENVIRONMENTAL REVIEW RECEIPT

Project Search ID: 20130724414163

1. PROJECT INFORMATION

Project Name: Ardrossan Residential Development

Date of review: 7/24/2013 3:42:13 PM

Project Category: Development, Residential, Subdivision containing more than 2 lots and/or

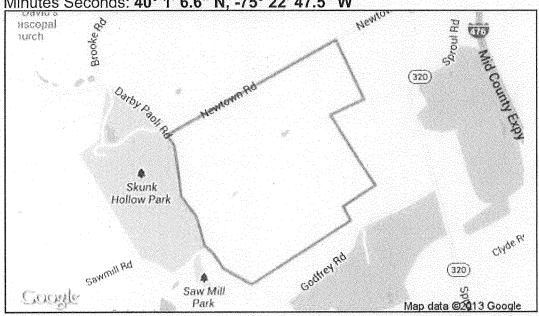
2 single-family units Project Area: 385.2 acres

County: Delaware Township/Municipality: Radnor

Quadrangle Name: NORRISTOWN ~ ZIP Code: 19073,19085,19087

Decimal Degrees: 40.018511 N, -75.379853 W

Degrees Minutes Seconds: 40° 1' 6.6" N, -75° 22' 47.5" W



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	Potential Impact	FURTHER REVIEW IS REQUIRED, See Agency Response
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	No Known Impact	No Further Review Required

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Note that regardless of PNDI search results, projects requiring a Chapter 105 DEP individual permit or GP 5, 6, 7, 8, 9 or 11 in certain counties (Adams, Berks, Bucks, Carbon, Chester, Cumberland, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill and York) must comply with the bog turtle habitat screening requirements of the PASPGP.

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE: Further review of this project is necessary to resolve the potential impacts(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: http://www.gis.dcnr.state.pa.us/hgis-er/PNDI_DCNR.aspx.)

Scientific Name: Aplectrum hyemale

Common Name: Puttyroot

Current Status: Special Concern Species*
Proposed Status: Special Concern Species*

PA Fish and Boat Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE: No impacts to <u>federally</u> listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.* is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

- * Special Concern Species or Resource Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
- ** Sensitive Species Species identified by the jurisdictinal agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, send the following information to the agency(s) seeking this information (see AGENCY CONTACT INFORMATION).

Check-list of Minimum Materials to be submitted:

SIGNED copy of this Project Environmental Review Receipt	
Project narrative with a description of the overall project, the work to be performed, current pl	nysical
characteristics of the site and acreage to be impacted.	
Project location information (name of USGS Quadrangle, Township/Mu?icipality, and County)
USGS 7.5-minute Quadrangle with project boundary clearly indicated, and quad name on the	map
The inclusion of the following information may expedite the review process.	
A basic site plan(particularly showing the relationship of the project to the physical features s	<u>uch as</u>
wetlands, streams, ponds, rock outcrops, etc.)	
Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what dire	ection each
photo was taken and the date of the photos)	
Information about the presence and location of wetlands in the project area, and how this wa	s determined
(e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project	plans showing
the location of all project features, as well as wetlands and streams	

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at http://www.naturalheritage.state.pa.us.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section 400 Market Street, PO Box 8552, Harrisburg, PA. 17105-8552 Fax:(717) 772-0271

PA Fish and Boat Commission

Name:

Division of Environmental Services 450 Robinson Lane, Bellefonte, PA. 16823-7437 NO Faxes Please

U.S. Fish and Wildlife Service

Endangered Species Section 315 South Allen Street, Suite 322, State College, PA. 16801-4851 NO Faxes Please.

PA Game Commission

Bureau of Wildlife Habitat Management Division of Environmental Planning and Habitat Protection 2001 Elmerton Avenue, Harrisburg, PA. 17110-9797 Fax:(717) 787-6957

7. PROJECT CONTACT INFORMATION

Company/Business Name:					
Address:		1.74			
City, State, Zip:					
Phone:()	Fax:()			
Email:					
size/configuration, project typ type, location, size or configu	N t information contained in this e, answers to questions) is tru ration changes, or if the answe to re-do the online environme	ie, accurate and ers to any quest	l complete. Ir	n addition, if the	
applicant/project propers	nt dispature	مامام			
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