SECTION T: MITIGATION PLAN

LAKE ERIE CONNECTOR

CONCEPTUAL WETLAND COMPENSATORY MITIGATION PLAN

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1.0 INTRODUCTION

This Conceptual Wetland Mitigation Plan (Plan) provides the proposed approach to compensate for unavoidable impacts to Waters of the United States and waters of the Commonwealth (Jurisdictional Waters), resulting from the construction of the Lake Erie Connector Project (LEC Project) in the Townships of Springfield, Girard and Conneaut, Erie County, Pennsylvania (Figure 1). This Plan provides compensation for impacts associated with permanent conversion of 0.99 acres of palustrine forested (PFO) wetlands to palustrine emergent (PEM) wetlands.

The LEC Project is being proposed by ITC Lake Erie Connector, LLC (Applicant). This Plan is being submitted as Section T of the Applicant's Joint Permit Application (JPA) to the Pennsylvania Department of Environmental Protection (PADEP) and the U.S. Army Corps of Engineers (USACE) for the LEC Project. As explained in the Project Narrative and Section S of the JPA, the permanent impact to wetlands (impact sites) is necessary in order to allow access to install and maintain the underground cable within the permanent easement for the LEC Project.

The compensatory mitigation will take place at a single property which the Applicant currently has an option to purchase (Mitigation Site) located in Girard Township, Erie County, Pennsylvania, along Springfield Road (Figure 2). The proposed Mitigation Site is located at 41°57'10.12" North and 80°22'17.65" West, and both the impact sites and the Mitigation Site are located within the Crooked Creek-Frontal Lake Erie Watershed (HUC: 0412010107).

The proposed compensatory wetland mitigation project involves the establishment of approximately 2.13 acres of PFO wetlands, restoration (rehabilitation) of 2.27 acres of PFO wetlands, enhancement of 0.69 acres of PEM wetlands, preservation of 0.23 acres of upland forest buffer, and establishment of a 0.02 acre stormwater treatment wetland. The proposed 5.34 acre wetland Mitigation Site will be protected in perpetuity with a restrictive covenant or a conservation easement to be held by a third party non-profit or government organization.

This Plan was prepared in accordance with the USACE and the U.S. Environmental Protection Agency (USEPA) Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (Department of Defense, Environmental Protection Agency, 2008), and the PADEP Wetland Replacement Criteria (25 Pa. Code §105.20a).

2.0 MITIGATION JUSTIFICATION

The Applicant selected the preferred LEC Project layout based on a thorough review of several alternative routes, both within Lake Erie and along the underground segment of the proposed route. Section S of the JPA provides a comprehensive alternatives analysis for the LEC Project, and additional information is provided in Section 3.4 of the EA (Attachment 3 of the JPA). To the extent practicable, the Applicant avoided existing wetlands and waterbodies, while also consolidating the majority of the LEC Project route within existing road corridors. In addition several potential impacts were avoided by proposing the use of a horizontal directional drill (HDD) construction technique to install the cable underneath many stream and wetland areas. .

The proposed alignment represents that preferred alternative that meets the purposes of the LEC Project and minimizes overall environmental impacts to the greatest extent practicable. The construction procedures, as well as the alignment of the transmission cable at the impact sites have been designed to avoid and minimize impacts to Jurisdictional Waters, while considering adjacent property ownership and land use constraints.

The construction of the wetland mitigation site will be carried out concurrently with the development of the LEC Project construction to the greatest extent practicable.

3.0 MITIGATION GOALS AND OBJECTIVES

3.1 Project Impacts

As described in Section J of the JPA, construction of the LEC Project will result in the permanent conversion of 0.99 acres of Jurisdictional Waters, (PFO wetlands) to PEM wetlands within the Crooked Creek-Frontal Lake Erie Watershed (HUC: 0412010107).

Wetland delineation and a functional assessment using the Highway Methodology Workbook Supplement (U.S. Army Corps of Engineers, 1999) were conducted in 2014 and 2015 at the LEC Project. Those efforts revealed two general types of wetlands potentially impacted by the LEC Project. These include temporary impacts to PEM wetlands, and permanent impacts to PFO wetland habitats (Cowardin, Carter, Golet, & LaRoe, 1979), which are located in the proposed LEC Project ROW. The PFO wetlands impacted by the proposed LEC Project provide the following principal functions that are anticipated to be permanently impacted as a result of tree clearing activities:

- Floodflow Alteration (0.99 acres),
- Nutrient Removal/Retention/Transformation (0.52 acres), and
- Wildlife Habitat (0.92 acres).

The completed wetland functional assessment forms for the impact sites are included in Attachment 2 to the JPA (LEC Project Waterbody Identification and Wetland Delineation Report).

3.2 Mitigation Site

The proposed Mitigation Site is located within the Crooked Creek-Frontal Lake Erie Watershed (HUC: 0412010107) along the proposed LEC project ROW. The goals set forth for the proposed Mitigation Site are as follows:

- Replace the total area (acres) of principal functions and values of the wetlands that will be disturbed by the LEC Project,

- Create wetlands that are similar in form to the adjacent (reference) PFO wetland west of the Mitigation Site[1],
- Develop a self-sustaining wetland and associated upland buffer.

In support of these goals, 2.13 acres of PFO wetlands will be established, 2.27 acres of PFO wetlands will be restored (rehabilitated), 0.69 acres of PEM wetlands will be enhanced, and 0.23 acres of preserved upland buffer will be established at the Mitigation Site. An additional 0.02 acres of PSS stormwater treatment wetland will be established and preserved at a culvert located north of Interstate 90. The acreage of each proposed community is shown in Table 1 and the conceptual mitigation plan is shown in Figure 3.

Table 1 – Proposed Community Types, Wetland Mitigation Site

Mitigation Type	Cover Type	Cowardin Class	Notes	Area (acres)
Creation	Palustrine Forested Wetland	PFO	Upland area converted to PFO wetland	1.61
Creation	Palustrine Forested Wetland - staging	PFO	Upland area initially used for construction staging then converted to PFO wetland	0.43
Creation	Biofilter-Scrub Shrub Wetland	PSS	Upland area converted to PSS wetland	0.09
Restoration	Palustrine Forested Wetland	PFO	PEM wetland restored to PFO wetland	2.23
Restoration	Biofilter-Scrub Shrub Wetland	PSS	PEM wetland restored to PSS wetland	0.04
Enhancement	Palustrine Emergent Wetland	PEM	PEM wetland to be enhanced	0.69
Preservation	Upland Existing Trees	NA	Area to be preserved	0.23
Stormwater	Biofilter-Scrub Shrub Wetland	PSS	Stormwater treatment wetland	0.02

The establishment, restoration, and enhancement of wetlands at the Mitigation Site is anticipated to create the following principal functions:

- Floodflow Alteration (2.13 acres),
- Sediment/Toxicant/Pathogen Retention (2.13 acres),
- Nutrient Removal/Retention/Transformation (2.13 acres), and
- Wildlife Habitat (5.09 acres).

The created, restored, and enhanced wetlands are anticipated to provide principal functions that will exceed the total area of principal functions impacted by the LEC Project, as is illustrated in Figure 4.

[1] Note that a reference wetland adjacent to the Mitigation Site is to be surveyed following submittal of the 30% design, and future design revisions are anticipated to incorporate aspects of the reference wetland morphology.

This Plan was developed to provide mitigation ratios that will exceed the goal of "no net loss" of wetland function and value as described in the National Wetlands Mitigation Action Plan (Department of the Army, U.S. Environmental Protection Agency, U.S. Department of Commerce, Department of Interior, U.S. Department of Agriculture, U.S. Department of Transportation, 2002) and the "net gain" policy set forth in PADEP Wetlands Net Gain Strategy. The actual compensatory wetland mitigation ratio for the LEC Project based on established wetland area is 2.13 acres to 0.99 acres (2.2:1)[2], or 2.2 acres of wetland created for every acre impacted. Table 2 compares the area of principal wetland functions impacted by the LEC Project to the principal functions proposed to be established at the Mitigation Site.

Table 2 - Comparison of Impacted Wetland Functions to Replacement Wetland Functions

Wetland Function	Wetland Impact Area (acres)	Replacement Wetland Area (acres)
Floodflow Alteration	0.99	2.13
Sediment/Toxicant/Pathogen Retention	0.00	2.13
Nutrient Removal/Retention/Transformation	0.52	2.13
Wildlife Habitat	0.92	5.09
Total Area	**2.43**	**11.48**

These ratios exceed the minimum 1:1 wetland replacement ratio of wetland area and function as required by PADEP (25 Pa. Code §105.20a).

4.0 PERFORMANCE STANDARDS

The following criteria[3] will be used to evaluate the success of the wetland Mitigation Site:

- 85% survival of all proposed wetland mitigation plantings,
- 85% areal coverage[4] of hydrophytic plants [those with a regional indicator status of FAC or wetter in Lichvar et al. (2014) or the current approved wetland plant list] at the Mitigation Site, and
- 10% or less total areal coverage[4] of invasive species including common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), reed canarygrass (*Phalaris arundinacea*), Japanese knotweed (*Polygonum cuspidatum*), Tatarian honeysuckle (*Lonicera tatarica*), and Eurasian water-milfoil (*Myriophyllum spicata*).

[2] Calculated by dividing the total area of wetland creation by the total area of wetlands impacted.

[3] Percent survival, percent areal cover hydrophytic species, and percent areal cover invasive species will be calculated following the methodology described in the Monitoring Plan (Report Section 9.0).

[4] Areal coverage is defined as a measure of dominance that defines the degree to which above ground portions of plants cover the ground surface; it is possible for the total areal cover for all strata combined in a community or for single stratum to exceed 100 percent because most plant communities consist of two or more vegetative strata (Biology-Online, 2005).

5.0 MITIGATION SITE SELECTION

Prior to investigating permittee-responsible off-site mitigation concepts, the possibility of satisfying mitigation requirements through a mitigation bank or an in-lieu fee program as well as on-site wetland/watercourse mitigation were considered. However, as described below, these concepts were not considered viable and therefore off-site mitigation within the Crooked Creek-Frontal Lake Erie watershed is the preferred mitigation concept.

Although mitigation banks or in-lieu fee programs are the environmentally preferred form of compensatory mitigation (Department of Defense, Environmental Protection Agency, 2008), the LEC Project is not located in the service area of an active mitigation bank or in-lieu fee program; therefore, permittee-responsible mitigation is the only option.

Permittee-responsible on-site and in-kind mitigation was also considered as an option. However, the LEC Project ROW offers limited wetland and stream mitigation opportunities due to the LEC Project's configuration and the close proximity of proposed LEC Project ROW to the existing wetlands and watercourses. It would not be possible to provide an adequate buffer for restored and/or created wetlands while staying in the proposed LEC Project ROW, and still meet the functions and values of the impacted Jurisdictional Waters.

As on-site mitigation (e.g., mitigation within the narrow LEC Project ROW) was not a viable option, the Applicant reviewed potential off-site locations within the Crooked Creek-Frontal Lake Erie watershed following a watershed approach. The ultimate goal of a watershed approach is to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites (Department of Defense, Environmental Protection Agency, 2008). Potential wetland establishment or restoration sites were sought that would support the sustainability of aquatic resource functions in the watershed. One such site, the Carr property (Mitigation Site), was identified and further investigated for its ability to replace the functions and values provided by the aquatic resources impacted by the LEC Project.

Following the delineation of aquatic resources and completion of the functional assessment, it was determined that the Carr property has potential to provide suitable conditions to mitigate for permanent wetland impacts associated with the LEC Project. This property was selected as the mitigation site based on its availability to provide wetland functions to support the compensatory mitigation requirements. After completion of the site selection, additional site investigation was completed at the Mitigation Site to identify design constraints, and 30% wetland establishment design plans were created.

6.0 BASELINE INFORMATION

6.1 LEC Project Impacts

The permanent wetland impacts associated with the LEC Project involve conversion of 0.99 acres of existing PFO wetlands to PEM wetlands. The impacts are described in Section J of the JPA, and in Section 5.3.2 of the LEC Project Environmental Assessment (EA) report, which appears as Attachment 3 of the JPA.

6.2 Mitigation Site

The Mitigation Site is located along Springfield Road in the Girard Township, Erie County, Pennsylvania (Figure 2), with the center point located at 41°57'10.12" North and 80°22'17.65" West. Although classified as "off-site," the proposed Mitigation Site is in fact located in close proximity to the LEC Project. Baseline information for the Mitigation Site including the Wetland Delineation Datasheets, the USDA NRCS Web Soil Survey Report (WSSR), and site photographs are included in Appendix A to this Conceptual Mitigation Plan.

6.2.1 Wildlife Usage and Threatened/Endangered Species Habitat

The Indiana bat has the potential to occur in Erie County during the summer. However, according to the Pennsylvania Game Commission (2013), no known hibernacula and/or summer live-captures have been recorded in Erie County. There is only one small patch of trees at the Mitigation Site and these will not be removed. Construction noise could potentially affect the behavior of bats foraging or roosting in the area adjacent to the Mitigation Site; however, since these bats occur in proximity to active road ROWs, it is assumed that they are already habituated to noise level fluctuations. Therefore, Indiana bats are not likely to become displaced or abandon any unknown roosting areas.

Based upon the northern long-eared bat's habitat preferences during winter and summer, it can be assumed that this species would occur in similar or the same areas indicated for the Indiana bat. There are no known hibernacula at the Mitigation Site; however, construction noise could potentially affect the behavior of any bats foraging or roosting adjacent to the Mitigation Site. Because these bats occur in proximity to active road ROWs, it is assumed that they are already habituated to noise level fluctuations. Therefore, northern long-eared bats are not likely to become displaced or abandon any unknown roosting areas.

In a letter dated April 6, 2015, the U.S. Fish and Wildlife Service (USFWS) stated that it is not aware of any bald eagle nests in the vicinity of the LEC Project, and no eagle nests have been observed near the proposed Mitigation Site. Although bald eagles might fly over the Mitigation Site when they are traveling, it is unlikely that they would use the habitats within the Mitigation Site except on a transient basis.

Surveys were conducted by Environmental Solutions & Innovations, Inc. in May and July of 2015 to identify any known or anticipated state-listed plants that might occur in the LEC Project area, which included the proposed wetland Mitigation Site. No state-listed species were found on the Mitigation Site. In a letter dated December 4, 2015, Pennsylvania Department of Conservation and Natural Resources (PADCNR) determined that no impact on state-listed plants from the LEC Project is likely, and that no further coordination with PADCNR is needed.

6.2.2 Cultural Resources

In 2014 and 2015, the Applicant conducted cultural resources studies to identify known and reported archaeological and historic resources within the vicinity of the proposed LEC Project. The Applicant retained Hartgen Archeological Associates, Inc. (Hartgen) of Rensselaer, New

York, to conduct a Phase IA Literature Review and Archaeological Sensitivity Assessment (Phase IA Study) of the LEC Project's proposed alignment, including both the underground and Lake Segments of the route. The Phase IA Study included a walkover and visual inspection of the terrestrial section of the proposed transmission cable route and a review of the Pennsylvania Historical and Museum Commission's (PHMC) Pennsylvania Archaeological Site Survey files and Cultural Resources GIS database. The Phase IA Study also included a review of existing environmental, land use, soils, and geology data, as well as a review of historic maps, regional and local histories, previous cultural resources studies, and documentary information regarding reported shipwrecks. To better define landforms with the potential for subsurface archaeological deposits, David J. De Simone, PhD of De Simone Geoscience Investigations conducted a geomorphological assessment of the LEC Project's proposed route and the location of the proposed Erie Converter Station. The geomorphological assessment was included as a component of the Phase IA Study to better characterize the archaeological sensitivity of the transmission cable alignment and Erie Converter Station. The Phase IA Study was conducted in accordance with the PHMC Bureau for Historic Preservation's (BHP) November 2008 Guidelines for Archaeological Investigations in Pennsylvania (PHMC-BHP Guidelines). Consistent with the PHMC-BHP Guidelines, the Phase IA Study encompassed an area approximately 1 mile (1.6 kilometers) on either side of the centerline of the proposed transmission cable route, as well as the proposed location of the Erie Converter Station. As such the Mitigation Site was included in the Phase IA Study.

The results of the Phase IA Study were summarized in Hartgen's June 2015 report entitled *Phase IA Literature Review and Archaeological Sensitivity Assessment: Lake Erie Connector Project* (Phase IA Report). The Phase IA Report included detailed recommendations for additional Phase IB Archaeological Field Investigations (Phase IB Investigations) including subsurface testing. The Phase IA Report was submitted to the PHMC-BHP, the Seneca Nation of Indians and the Tonawanda Band of Seneca Indians for review in June 2015. By letter dated July 27, 2015, the PHMC-BHP noted that the Phase IA Report met the PHMC-BHP Guidelines and concurred with Hartgen's recommendations for additional testing.

In 2015, Hartgen conducted Phase IB Investigations at the locations identified in the Phase IA Report and at additional areas of potential ground disturbance identified during furtherance of engineering and design process, including the Mitigation Site. In total, Hartgen excavated 34 shovel tests measuring 0.5 meter by 0.5 meter within the Mitigation Site. Consistent with the PHMC-BHP Guidelines, the remainder of the Mitigation Site was not tested because of the presence of standing water within existing wetlands.

Two glass fragments, a shotgun shell, metal bolt, and one piece of slag were recovered from a single shovel test at the Mitigation Site located adjacent to Springfield Road. No other cultural material was encountered. Based on the results of the Phase IB Investigation, Hartgen concluded that the proposed wetland mitigation would have no affect on archaeological or historic resources listed in or eligible for inclusion in the National Register of Historic Places.

The results of the Phase IB Investigation were presented in Hartgen's *Phase IB Archaeological Field Investigation: Lake Erie Connector Project* (Phase IB Report). The Phase IB Report was

submitted to the Seneca Nation of Indians and the Tonawanda Band of Seneca Indians for review in January 2016.

6.2.3 Hazardous Materials & Contaminants

No sources of contamination, such as landfills or regulated point source discharges, have been identified at the Mitigation Site.

6.2.4 Existing Wetlands, Functions and Values

An assessment of existing wetlands located on the Mitigation Site was performed in two phases, Desktop Review and Field Survey, as described below.

6.2.4.1 Desktop Review

Prior to conducting the wetland delineation, relevant materials were reviewed including:

- USFWS National Wetlands Inventory (NWI) Map (Figure 2),
- USDA Soil Map (Figure 2), and
- USDA WSSR (Appendix A).

The NWI map shows no wetlands within the Mitigation Site, which is not consistent with the field study results described below.

The USDA soil map and WSSR shows the majority of the Mitigation Site with delineated wetlands to be Mill silt loam, with a small portion of the southwestern corner of the delineated wetlands being Platea silt loam, 2 to 6 percent slopes. Mill silt loam is described as poorly drained, while Platea silt loam is described as somewhat poorly drained. The majority of Wetland 031, described below, is within the Mill silt loam area which is considered hydric. The southwestern portion of Wetland 031, dominated by broadleaf cattail (*Typha latifolia*), is within the Platea silt loam map unit, which is considered hydric. This is partially consistent with the field survey findings described below, as the Platea silt loam map unit continues outside the boundaries of Wetland 031 into uplands. Table 3 includes a summary of the soil characteristics for the soil series mapped on the Mitigation Site.

Table 3 – Characteristics of Existing Soils as Reported by USDA, Wetland Mitigation Site

Map Unit Symbol	Map Unit Name	Acres in Area of Interest (AOI)	Percent of AOI (%)	Parent Material	Typical Soil Profile	Depth to Restrictive Feature (in)	Drainage Class	Depth to Water Table (in)	Frequency of Ponding	Hydrologic Soil Group
Mh	Mill silt loam	4.5	85.2	Fine-loamy till	A - 0 to 11 inches: silt loam Bg - 11 to 19 inches: silt loam Bw - 19 to 45 inches: silt loam C - 45 to 80 inches: silt loam	>80	Poorly drained	0 to 6	Frequent	C/D
PlB	Platea silt loam, 2 to 6 percent slopes	0.6	11.3	Loamy till	Ap - 0 to 11 inches: silt loam Bt - 11 to 21 inches: silt loam Btx - 21 to 50 inches: clay loam C - 50 to 80 inches: channery silt loam	>80	Somewhat poorly drained	6 to 12	None	D
PtB	Pompton silt loam, 3 to 8 percent slopes	0.1	1.5	Loamy over sandy and gravelly glaciofluvial deposits	Ap - 0 to 10 inches: silt loam Bw - 10 to 34 inches: gravelly sandy loam C - 34 to 80 inches: gravelly loamy sand	>80	Moderately well drained	16 to 24	None	A/D
UaC	Udorthents, loamy, 0 to 15 percent slopes	0.1	2.0	Disturbed regolith derived from loamy till	A - 0 to 3 inches: very gravelly silt loam C1 - 3 to 30 inches: very gravelly silt loam C2 - 30 to 65 inches: extremely gravelly silt loam	>80	Well drained	>80	None	C

6.2.4.2 Field Survey

On November 5, 2014, wetlands were delineated at the Mitigation Site following the three-parameter methodology described in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987), and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual, Northcentral and Northeast Region (U.S. Army Corps of Engineers, 2011). The delineation was completed to assess potential laydown areas for the LEC Project construction and a total of 2.96 acres of PEM wetlands were delineated (Figure 2). The wetland delineation datasheets and a photo log from the November 5, 2014 site visit are included in Appendix A. Below is a description of the delineated PEM wetland.

Wetland 031, the only wetland delineated within the Mitigation Site, comprised the majority of the parcel and was classified as a PEM wetland community. A total of two observation points were inspected and data sheets completed: within Wetland 031 (WL-031-OP-1-WET), and one upland point just outside of Wetland 031 (WL-031-OP-3-UPL). The wetland observation point was within the emergent portion of the wetland, near the eastern boundary of the Mitigation Site (Figure 2). This area is dominated by broadleaf cattail (*Typha latifolia*), which has an obligate (OBL) wetland indicator status. Hydrophytic vegetation was dominant at this observation point, meeting both the dominance test and prevalence index for wetland vegetation. Wetland hydrology was indicated by the presence of primary indicators including surface water, high water table and saturation, and secondary indicators of drainage patterns and microtopographic relief. Hydric soils were indicated by the presence of a redox dark surface. Upland areas of the site consisted of old field community, with some existing trees along a hedge row on the northern edge of the property. Photos 1, 2, and 3 in Appendix A show the general community type present on the site.

As the initial site visit completed in November of 2014 was to assess locations for a potential construction laydown area, a follow-up site visit was completed on December 17, 2015, to assess the site potential for meeting the LEC Project compensatory wetland mitigation requirements. During this site visit a visual assessment of site wetlands was completed and a functional assessment of existing wetlands was completed using the Highway Methodology Workbook Supplement (U.S. Army Corps of Engineers, 1999). The completed wetland function-value evaluation forms for the Mitigation Site are included in Appendix B. During the December 2015 site visit it was noted that some areas currently dominated by broadleaf cattails had been excluded from the November 2014 delineation of Wetland 031. One of these areas is along the southern property boundary, near the outfall of a culvert that runs underneath Route I-90 (see photo 4 in Appendix A). Stormwater runoff draining I-90 discharges from this culvert into Wetland 031. Based on these observations a wetland delineation verification will be completed during the growing season of 2016 to confirm the boundaries of the existing wetlands and watercourses at the Mitigation Site. The wetland mitigation design will then be adjusted as necessary to account for changes to the existing wetland or watercourse boundary.

6.2.5 Existing Hydrology

In addition to documenting the hydrologic indicators observed during the initial site assessment (see wetland delineation datasheets, Appendix A), a water budget was developed for the

Mitigation Site. To ensure a predictable water supply and viability of the created, restored, and enhanced wetlands, multiple water sources can and should be utilized or developed as a way of handling the uncertainty associated with the inherent stochastic nature of rainfall frequency and groundwater levels. The hydrologic cycle of a wetland, or the movement of water within the wetland system, can be expressed in the form of a water budget. A water budget is an equation that accounts for water inflows to and outflows from the system and can be expressed as:

$$\Delta S = [P + S_i + G_i] - [ET + S_o + G_o] \quad (1)$$

where:

$\Delta S =$ Change in volume of water storage in a defined area over time
P = Precipitation
S_i = Surface water inflow
G_i = Groundwater inflow[5]
ET = Evapotranspiration
S_o = Surface water outflow
G_o = Groundwater outflow[5]

This equation represents the ideal case; in practice it can be exceedingly difficult to obtain precise measurements of all components of the hydrologic budget. Nevertheless, this formulation provides a useful tool for gauging the timing and amounts of water that can be expected at a particular site which in turn is useful for the planning and design of constructed and restored wetlands.

The methodology used here to create the water budget for the Mitigation Site is based on "Planning Hydrology for Constructed Wetlands" by Gary J. Pierce (Pierce, 1993). The following sections describe the data sources and methods used to quantify the individual components of the water budget equation (Eqn. 1). It is important to note that even with comprehensive data sources and advanced data collection techniques, uncertainties are inherent in all data and methods used to determine water budgets.

The water budget for the Mitigation Site was calculated using daily values of each component[5] in equation (1) because wetlands are defined by the number of days of saturation during the growing season. Daily values of each component for the last 35 years (1980 to 2015) were used to select a representative wet year, dry year, and "average" year (i.e. representative of normal or typical conditions) to account for the variability associated with wet and dry conditions.
Due to the lack of on-site groundwater monitoring data, the groundwater terms (G_i, G_o) in equation (1) were set to zero[5], although in this area of Erie County, groundwater levels are typically fairly close to the surface.

[5] Due to the lack of groundwater monitoring data from the Mitigation Site, the groundwater inflow (Gi) and outflow (Go) parameters were not included in the water budget prepared for the 30% design. Once site conditions allow then groundwater monitoring wells will be installed at the site and the collected data will be used to refine the water budget and wetland design as necessary.

6.2.5.1 Precipitation

Daily precipitation data recorded at Erie Airport, PA were provided by the Northeast Regional Climate Center at Cornell University (NRCC) for the period of record (1926 to 2015). An initial analysis was completed to review precipitation trends in the full period of record, and an upward I trend in annual precipitation was identified (Figure 5). Due to the trend of increasing annual precipitation, the period of 1980 to 2015 was assumed to be representative of near-term climatological conditions at the Mitigation Site, and was used to select the wet/dry/average years for the water budget. The driest year during the period of record was 1991 with a total of 31.71 inches and the wettest year was 2011 with a total precipitation of 57.44 inches.

The average yearly precipitation at Erie Airport was 42.87 inches over the period of record (1980 to 2015), the closest year to this value was 2010 (39.75 inches). However, the average year selected for the water budget was 2003 (41 inches) as this year had the lowest total residual when compared to the January to June average monthly totals for the period of record (1980 to 2015). The precipitation falling during the January to June period is critical as this is the time period when saturation has the greatest impact on wetland establishment. Figure 5 shows the monthly average precipitation for 1926 to 1979, 1980 to 2015, the dry year (1991), the selected average year (2003), and the wet year (2011).

6.2.5.2 Evapotranspiration

Daily Potential Evapotranspiration (ET) is one of the most challenging components of the wetland water budget to compute and obtaining accurate measurements of transpiration is particularly difficult. ET data for this water budget was obtained along with the precipitation data from the NRCC. The ET estimates are from an evapotranspiration model developed by the NRCC that uses hourly data routinely observed at airport weather stations to compute ET estimates.

6.2.5.3 Watershed Delineation

Contributing watersheds for the Mitigation Site were delineated using a GIS approach (ESRI ArcGIS®). Topography for the area was derived from the Pennsylvania Sea Grant Lake Erie Watershed 2012 LiDAR – las 1.2 program. The aerial LiDAR was acquired in the fall of 2012 at a point density average of 1-meter. Watersheds were created in ArcGIS using the Hydrology tool set of the Spatial Analyst extension (Figure 6). The watershed delineation was adjusted as necessary based on field observation of drainage patterns. A total of five subwatersheds that drain to the Mitigation Site were delineated, with a total area of 16.61 acres.

For the purposes of runoff calculation (see below), each of the delineated sub-watersheds was divided into land-cover types according to the USGS National Land Cover Dataset (2011 edition), and into hydrologic soil groups according to the NRCS soil survey classification for Erie County, PA. The land-cover categories and hydrologic soil groups were then cross-referenced with the land-cover types and hydrologic soil groups listed in Table 2-2 of the USDA TR-55 Method (U.S. Department of Agriculture, 1986) and a single area-weighted CN was calculated for each of the sub-watersheds (Figure 6).

6.2.5.4 Runoff

On-site field measurements typically are not used to quantify the amount of non-channelized flow (i.e. Runoff) that enters a wetland system from contributing upland areas. The predicted runoff flowing to the Mitigation Site was calculated using the TR-55, or Runoff Curve Number (CN) method. This method was developed by the USDA Soil Conservation Service and is widely used to estimate the amount of runoff from a rainfall event in small- to medium-sized watersheds. The TR-55 runoff equation is formulated as:

$$Q = \frac{(P-I_a)^2}{(P-I_a)+S} \quad (2)$$

where:

Q = runoff (inches)
P = rainfall (inches)
S = potential maximum retention after runoff begins (inches)
I_a = initial abstraction (inches), the amount of water that will saturate the soil before runoff begins

Potential storage is calculated as:

$$S = \frac{1000}{CN-10} \quad (3)$$

Runoff was then calculated using equation (2) with the empirically derived substitution (U.S. Department of Agriculture, 1986) of:

$$I_a = 0.2S \quad (4)$$

Using the area-weighted CN, the total runoff (inches) was computed by first determining if the precipitation for a given day was greater than or equal the initial abstraction (Eqn. 4), if it was, the runoff was calculated *using* equation (2), if not, a value of zero was assigned for that day.

6.2.5.5 Groundwater

As mentioned previously due to the lack of on-site groundwater monitoring data, the groundwater terms (G_i, G_o) in equation (1) were not considered in the water budget and were assumed to be zero. Once site conditions allow, groundwater monitoring wells will be installed at the Mitigation Site and the collected groundwater data will be used to refine the water budget and wetland design as necessary.

6.2.5.6 Hydrologic Budget

The above computations were done for each water budget year (i.e. dry, average, and wet) and then summed to obtain a monthly value for each budget parameter for the dry year (Figure 7), average year (Figure 8), and wet year (Figure 9).

The predicted depth to groundwater elevation as a function of time during the growing season was also prepared for the dry year (Figure 7), average year (Figure 8), and wet year (Figure 9). The estimate was developed using procedures outlined in Freeze and Cherry (1979) and assumed a starting depth to groundwater based on the information reported in the USDA web soil survey report for the soil map units located on the site. The depth to water for the dominant soil map units (i.e. Mill silt loam and Platea silt loam) is reported by USDA as ranging from 0 to 12 inches.

7.0 MITIGATION WORK PLAN

A set of 30% wetland mitigation construction plans have been developed for the proposed Mitigation Site and these are attached as Appendix C. The mitigation plans include:

- General Notes (G-02),
- Soil Erosion and Sediment Control Notes (G-03),
- Existing Conditions (C-01),
- Soil Erosion and Sediment Control Plan (C-02),
- Grading Plan (C-03),
- Proposed Mitigation Plan (C-04),
- Wetland Mitigation Sections (C-05),
- Soil Erosion and Sediment Control Details (C-06), and
- Planting Details (C-07).

Site preparation, grading, and planting of the Mitigation Site are anticipated to be completed concurrently with the construction at the LEC Project, to the greatest extent practicable.

7.1 Construction Methods

The sequence for the construction of the wetland areas is shown on sheet G-02 of Appendix C. Compost filter sock will be installed as an erosion and sediment control method throughout the Mitigation Site. This will prevent sedimentation along construction staging areas and along the existing wetland areas to the west of the Mitigation Site.

The grading plan **(**Appendix C**,** sheet C-03) shows the proposed grades within the wetland mitigation area, and the typical cross-sections (Appendix C, sheet C-05) show the type of wetland communities and morphology to be established. Wetland pool and mound topography will be established to add diversity to the plant community and onsite hydrology. Once construction activities have been completed, the final site work includes the installation of deer fencing, and the planting of the wetland. The conceptual planting plan and planting summary table is provided in (Appendix C, sheet C-04).

7.2 Planned Hydrology

In order to provide the established and restored wetlands with sufficient water to sustain wetland hydrology, more than one source of hydrology should be used. By utilizing both groundwater and surface water, the conceptual design optimizes the two sources that are potentially abundant

at different times of the year or in different years. Although at this time we do not have on-site groundwater data from monitoring wells, the water budget analysis and data from the USDA WSSR indicates that groundwater could be a viable source of hydrology for the proposed wetland mitigation area. Since a large area of the site is already a wetland it is also known that the basic wetland hydrology does exist on the site. The WSSR indicates mapped soil series with typical depth to water table of 0 to 12 inches, which is consistent with field observations from the November 2014 wetland delineation and December 2015 wetland visual assessment. Under the assumption that the soil series are correctly mapped for the Mitigation Site, then the water budget for the dry, average, and wet years indicates that suitable wetland groundwater hydrology is likely to be supported from surface water inflow and infiltration on the site (see predicted depth to water during the growing season on Figure 7, Figure 8 and Figure 9).

The vitality of wetland plants is affected by the depth of saturation along with the duration of saturation. The critical depth of saturation for maintaining wetland plants is based on the depth of wetland plant roots. Typically, these roots are concentrated in the 1 to 2 foot (30 to 60 cm) range, and thus, the planting depth needs to be within one or two feet of the groundwater for the plants to have access to that source of water. For this reason the conceptual wetland design includes the establishment of hummock (mound) and pool microtopography to establish a range of elevations to support the PFO plant community. The conceptual mound and pool elevations are illustrated relative to a typical ground surface and depth to water for the dry, average, and wet years (see predicted depth to water during the growing season on Figure 7, Figure 8 and Figure 9). The figures illustrate the range of saturation conditions that can be supported by the conceptual design which is intended to promote habitat diversity and plant vitality.

The duration of saturation and its relation to the growing season is the other factor that influences vegetation success. The water budget shows the groundwater level throughout the growing season (April 10 to November 14) for the dry year, average year, and wet year and indicates that in the average and wet years the groundwater will be within 12 inches of the surface 100% of the growing season, and in a dry year about 50% of the growing season. Data on hydrophytic vegetation indicate that reasonable hydrologic thresholds include a depth to water table of less than 12 inches for a continuous period of at least 14 days during the growing season. Based on the preliminary water budget analysis it appears that sufficient wetland groundwater hydrology exists at the Mitigation Site. Excavation elevations one foot above these groundwater elevations would meet wetland criteria, and this information was used to develop the proposed elevations at the Mitigation Site.

In general, a reliable groundwater source is the most predictable and reliable source of hydrology. However, since we do not have on-site data at this time, the long term fluctuation in the local groundwater level is not know and therefore we cannot rely on that as the only source of wetland hydrology. Therefore, the conceptual wetland design has been prepared with the expectation that surface hydrology will supplement the groundwater hydrology. The proposed Mitigation Site contains an existing PEM wetland and two drainage ditches, one that comes from a culvert under Springfield Road and runs along the eastern edge of the site, and a second culvert under I-90 that drains onto the site from south. Based on site observations much of this surface water appears to flow directly to the northwestern edge of the site. In the conceptual wetland

design, subtle grading will allow water from these existing culverts to flow onto and through the site to maintain wetland surface hydrology and supplement the groundwater hydrology.

As mentioned previously, the water budget analysis and conceptual wetland design may be revised following the installation of groundwater monitoring wells and collection of data during the 2016 growing season. Up to five groundwater monitoring wells will be installed as soon as conditions allow in 2016, and data loggers will be installed in the wells to continuously monitor water levels during the 2016 growing season, during the construction period, and throughout the post-construction monitoring period. The proposed location of the monitoring wells is shown on Appendix C, sheet C-02.

7.3 Planned Vegetation

The mitigation plan provides for the seven wetland communities to be created, restored, or enhanced (Table 1). The planned vegetation is based on each habitat type that will be created, where factors such as grading and hydrology have been taken into consideration for the survival of plantings. The proposed plant lists for each community are included on sheet C-04 of Appendix C. The planting densities (i.e., 10 feet for trees, 5 feet for shrubs, and 2 feet for herbaceous) were selected to maximize the potential for site success and reduce potential for long-term maintenance.

7.4 Planned Soils

An attempt will be made to utilize all soils within the Mitigation Site, and re-using soils from any excavation which is necessary to create the proposed wetland habitats. Excavated soil will be stockpiled on-site in staging areas.

7.5 Planned Habitat Features

Microtopographic features to be implemented in the wetland establishment and restoration area include hummocks (mounds) and pools. The mound and pool morphology is typically determined from a survey of a reference wetland near the Mitigation Site. To date a reference wetland survey has not been completed, so the average elevation of the pool is estimated to be 1 foot above average finished grade, and the average elevation for the hummocks is estimated to be 1 foot above average finished grade. Spacing of the hummocks and pools is illustrated in the detail shown in Appendix C, sheet C-07. During the growing season of 2016 a reference wetland survey will be completed for an existing PFO wetland near the Mitigation Site, and the results will be used to revise the mound and pool design as necessary.

8.0 SITE PROTECTION

To provide long-term protection of the Mitigation Site, the Applicant will enter into an agreement with the current owner (or grantor) to transfer a conservation easement to a third-party nonprofit or governmental organization (holder) to manage the terms of the conservation easement in perpetuity (the option agreement between the Applicant and the current Mitigation Site owner explicitly provides for such a conservation easement to be executed). The

established, restored, and enhanced wetlands and upland buffer will be included in the easement area (5.34 acres), which is shown as the "Potential Wetland Mitigation Area" on Figure 3. The conservation easement will follow the standard USACE Pittsburgh District format and a final signed easement will be filed with the Erie County Recorder of Deeds, with copies provided to USACE and PADEP.

Currently the Applicant is in the process of identifying potential holders of the conservation easement; once an agreement with a holder has been established then the terms and conditions of the easement will be finalized. If an agreement with a third party holder cannot be finalized, then it is proposed that the current owner would impose a restrictive covenant to protect the Mitigation Site in perpetuity, with enforcement rights granted to LEC, PADEP, and USACE. The restrictive covenant will follow the standard USACE Pittsburgh district format and a final signed version will be filed with the Erie County Recorder of Deeds, with copies provided to USACE and PADEP.

9.0 MONITORING PLAN

Post-construction monitoring of the replacement wetland areas will involve systematic data collection using standard procedures at regular intervals to provide information on the progress of the developing wetlands. These procedures will allow for an assessment of whether or not the Mitigation Site is addressing the specified goals and meeting performance targets identified in Section 4.0 of this report.

The post-construction monitoring will be performed over a 5-year period to ensure that the established wetlands and buffers are stable and self-sustaining. Annual monitoring reports will be prepared at the end of each monitoring year and will include a description (and photo-documentation) of the geomorphology and hydrologic status of the mitigation wetlands, the condition of planting units and soils, and observations regarding utilization of the wetlands by birds and other wildlife. The monitoring report will also include the results of the vegetation monitoring, vegetation community mapping, wetland delineation, functional assessment, surface water monitoring, and groundwater monitoring described below. These reports will be submitted to USACE and PADEP by December 15th in each of the five monitoring years following completion of the Mitigation Site.

9.1 Responsible Parties

The Applicant is the party responsible for conducting the mitigation project and will conduct the monitoring program for a period of no less than five years following construction. The current land owner will maintain ownership of the Mitigation Site, and a third-party nonprofit or governmental organization will hold the conservation easement for the site. A principal environmental monitor will be selected by the Applicant and will possess the ability to provide the monitoring requirements as described below.

9.2 Monitoring Tasks

The monitoring tasks will include the following:

- Elevation/As-built Survey
- Vegetation Monitoring
    - Percent Cover Hydrophytic Species
    - Percent Cover Invasive Species
    - Percent Survival
    - Dominance Calculation
- Vegetation Community Mapping
- Wetland Delineation and Functional Assessment
- Surface water monitoring
- Groundwater monitoring
- Photographs

Table 4 lists the proposed duration, monitoring interval, and monitoring method for each task.

Table 4 – Recommended Monitoring Plan for Proposed Wetland Mitigation Site

Task	Duration	Frequency	Methods
Elevation/As-built Survey	Following completion of construction	One-time	Licensed Surveyor
Vegetation Monitoring	5 years	Annually (Late Summer/Early Fall)	Minimum of two representative nested plots within each vegetation community; Estimate vegetation dominance, plant condition, areal coverage of hydrophytic plants, and areal coverage of invasive species
Vegetation Community Mapping	5 years	Annually (Late Summer/Early Fall)	GPS mapping of Cowardin classification (Cowardin, Carter, Golet, & LaRoe, 1979)
Wetland Delineation and Functional Assessment	5 years	Annually (Late Summer/Early Fall)	(U.S. Army Corps of Engineers, 2011), (Environmental Laboratory, 1987), (U.S. Army Corps of Engineers, 1999)
Surface Water Monitoring	5 years	Continuous, every 60 minutes (April through November)	Gage with installed level data logger
Groundwater Monitoring	5 years	Continuous, every 30 minutes (April through November)	Monitoring wells with installed data loggers
Photographs	5 years	Annually (Late Summer/Early Fall)	Fixed Photo Stations

9.2.1 Elevation/As-built Survey

The elevation of the created wetlands will be monitored following completion of construction. Elevation data will be gathered by a licensed surveyor and an as-built drawing will be prepared showing the constructed elevations (1-ft interval), locations/elevations of monitoring wells/staff

gage, location of the deer fencing, benchmark locations/elevations, and the easement boundaries. This will facilitate a comparison of final grades to the proposed plan and will help determine if modifications or adjustments are needed.

9.2.2 Vegetation Monitoring

Vegetation will be monitored at the wetland Mitigation Site by sampling a minimum of two representative nested plots within each vegetation community. Within each plot the herbaceous stratum, sapling/shrub stratum, tree stratum, and woody vines will be measured. The classification of the different strata will follow the definitions published in the Regional Supplement to USACE Delineation Manual: Northcentral and Northeast Region (U.S. Army Corps of Engineers, 2011):

- Tree stratum – Consists of woody plants 3 inches (7.6 cm) or more in diameter at breast height (DBH), regardless of height,
- Sapling/shrub stratum – Consists of woody plants less than 3 inches DBH and greater than or equal to 3.28 ft (1 m) tall,
- Herbaceous stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and all woody plants less than 3.28 ft tall,
- Woody vines – Consists of all woody vines greater than 3.28 ft in height.

The herbaceous stratum will be inventoried using ocular estimates of absolute percent cover within a 10 foot diameter circular plot.

Shrubs and saplings will be identified and measured within a 30 foot diameter circle around the center of the herbaceous plot (U.S. Army Corps of Engineers, 2011). The canopy diameters of all shrubs and saplings within the plot will be measured and the absolute percent cover will be calculated.

Trees and woody vines will be identified and measured within a 60 foot diameter circle around the center of the herbaceous plot. (U.S. Army Corps of Engineers, 2011). The canopy diameters of all trees and woody vines within the plot will be measured and the absolute percent cover will be calculated.

Using the data collected at each sampling plot, the permit performance standards (percent cover hydrophytic species, percent cover invasive species, and percent survival) will be calculated for the wetland Mitigation Site and the dominant species will be identified. The calculations will be completed as described in the sections below.

9.2.2.1 Percent Cover Hydrophytic Species

Percent cover of all hydrophytic plants [those with a regional indicator status of FAC or wetter in Lichvar et al. (2014) or the current approved wetland plant list] will be calculated for the wetland Mitigation Site. For each plot, the areal cover of each individual hydrophytic tree, sapling, shrub, and herbaceous species will be calculated as:

$$A_{sp} = \sum_{i=1}^{N} \frac{\pi {d_i}^2}{4}$$

Where:

A_{sp} = Areal cover of Species *sp* (ft^2)
N = The number of individuals of species *sp* observed
i = the i^{th} individual of species *sp*
d = the canopy diameter (ft) of species *i*

The total areal cover of each tree, sapling, shrub, and herbaceous species within a plot will then be converted to percent cover (C) for that species by dividing by the total plot area:

$$C_{sp} = \frac{A_{sp}}{A_q} \, X \, 100\%$$

Where:

C_{sp} = The percent cover of species *sp*
A_q = the area of the sampling plot (ft^2)

The average absolute percent cover hydrophytic species by stratum is then determined by computing the arithmetic average of the percent cover of all plots at the site. The total absolute percent cover hydrophytic species for the site is determined by summing the arithmetic average for all strata.

9.2.2.2 Percent Cover Invasive Species

The total absolute percent cover of invasive species will be calculated similar to the method described above for percent cover hydrophytic species, however instead of selecting only hydrophytic species, all species that are listed as invasive in the performance standard will be selected.

9.2.2.3 Percent Survival

Calculation of percent survival of all mitigation plantings will be performed on the tree and sapling/shrub layer only (i.e. excluding the herbaceous layer). The calculation of Percent Survival (S) will be done on a per plot basis by first calculating the percent mortality (M), given by:

$$M_q = \frac{(\sum N_T + \sum N_S)_{dead}}{\sum N_T + \sum N_S} \, X \, 100\%$$

Where:

M_q = The Percent Mortality of Quadrat q
N_T = The total number of trees counted
N_S = The total number of sapling/shrubs counted

That is, the percent mortality will be calculated by summing the number of dead individuals in the tree and sapling/shrub strata in a given plot and dividing by the total number of individuals counted across the two strata in the plot. The percent survival will be subsequently calculated by subtracting the percent mortality from unity, or:

$$S_q = 1 - M_q$$

The percent survival at the site will then be determined by computing the arithmetic average of the percent survival of all plots at the site, or:

$$S_{site} = \left(\bar{S}_q\right)_{site}$$

9.2.2.4 Dominance Calculation

Dominant species within each sampling plot will be determined using the 50/20 rule as described in the Regional Supplement to the USACE Wetland Delineation Manual: Northcentral and Northeast Region (U.S. Army Corps of Engineers, 2011). According to the 50/20 rule, dominant species are determined by first adding the absolute percent cover for multiple species until they represent more than 50% of the total absolute cover for a stratum. Any other species that represents 20% or more of the total absolute percent cover for the stratum is also considered dominant. Dominance calculation worksheets for each plot will be included in the annual monitoring report submitted to USACE and PADEP.

9.2.3 Vegetation Community Mapping

The boundaries of the vegetative communities within the Mitigation Site will be mapped with a Trimble GeoXH (or similar) GPS unit and classified (Cowardin, Carter, Golet, & LaRoe, 1979). A vegetative cover map will be prepared and the total acreage of each Cowardin class at the site will be calculated.

9.2.4 Wetland Delineation and Functional Assessment

A wetland delineation will be performed at the established wetland area following the procedures outlined in the "1987 Corps of Engineers Manual" (Environmental Laboratory, 1987) and the Regional Supplement to the USACE Wetland Delineation Manual: Northcentral and Northeast Region (U.S. Army Corps of Engineers, 2011). The Mitigation Site will be assessed for the presence of wetland indicators (i.e., hydrophytic vegetation, wetland hydrology, and hydric soils), the boundaries of each wetland will be flagged, and the flag locations mapped with a Trimble GeoXH (or similar) GPS unit. Data forms for routine wetland delineation will be included in the annual monitoring report submitted to USACE and PADEP.

The functions and values will be evaluated annually at the mitigation area using the Highway Methodology (U.S. Army Corps of Engineers, 1999). A Highway Methodology Wetland Function-Value Evaluation Form will be completed for each wetland community at the site and the results of the functional assessment will be included in the annual mitigation monitoring reports submitted to USACE and PADEP.

9.2.5 Surface and Groundwater Monitoring

Surface water level within the wetland Mitigation Site will be monitored with a minimum of one surface water gage installed at a representative location. Surface water level will be recorded continuously (e.g. every 60 minutes) between April and the end of November of each year, with an Onset Hobo (or similar) water-level recording instrument. The elevation of the gage will be recorded by a licensed surveyor and referenced to NAVD88. The elevation of the gage will be checked against a local benchmark on an annual basis to monitor for changes in gage elevation. The recorded water levels will be included in the mitigation monitoring report submitted to USACE and PADEP.

Up to five groundwater monitoring wells will be installed at the site to monitor water levels through the post-construction monitoring period. Groundwater levels will be measured every 30 minutes with an Onset Hobo (or similar) water-level recording instrument from April to the end of November of each year. Figures showing the measured groundwater level at each well relative to the existing ground elevation will be included in the mitigation monitoring report submitted to USACE and PADEP.

9.2.6 Representative Photographs

Permanent ground-level photo stations will also be established in each vegetation community to document changes in plant community composition and structure over time. Photographs will be taken annual during the growing season and included in the mitigation monitoring report to be submitted to USACE and PADEP.

10.0 MAINTENANCE AND ADAPTIVE MANAGEMENT PLAN

The Maintenance and Adaptive Management Plan will focus on invasive species control for species identified during the annual wetland monitoring, and may include chemical and/or mechanical treatments.

10.1 Maintenance Plan and Schedule

A proposed Monitoring Plan is described in Section 9.0. The five-year monitoring program will evaluate the progress of the mitigation areas, identify any problems that require correction, and document the establishment of wetland functions and values in the wetland creation areas. Key aspects of the monitoring program (with annual reports submitted to USACE and PADEP) are success and spread of the plantings, hydrologic functions, and control of invasive plant species. The principal invasive plant species found in the vicinity are reed canarygrass and common reed.

Field crews will monitor and document the presence of these species within the Mitigation Site as part of the monitoring inspections and will be prepared to remove any observed invasive plants. Other options for control, if hand pulling and removal of rootstocks are not effective, are select cutting and wicking (application of a glyphosate herbicide to the cut plant stem), or herbicide spraying by a licensed applicator. USACE and PADEP will be informed of any corrective actions taken to control invasive plant species as part of the annual monitoring report.

10.2 Animal Control Measures

There was evidence of white tailed deer (*Odocoileus virginianus*) on the Mitigation Site, and therefore exclusion fencing will be installed. The use of exclusion fencing to control access by white-tailed deer to the plantings will provide a means of limiting deer damage at the Mitigation Site. Exclusion fencing will be installed immediately following seeding operations and will remain for a minimum of five years. The site contractor will be responsible for maintaining the fencing for the duration of the period.

10.3 Replacement Planting Plan

The replacement planting plan calls for the prompt in-kind replacement of any trees, saplings, or shrubs that die within the monitoring period. The timing of the replacement planting will depend upon grower's recommendations but will generally take place in the early fall or mid-spring of each calendar year, as necessary. The number and species of plants replaced will be documented in the annual monitoring reports submitted to the USACE and PADEP.

10.4 Structure Maintenance and Repair

No water control structures are proposed as part of the wetland mitigation plan. The only structure to be monitored and maintained is the deer exclusion fencing, which will be the responsibility of the site contractor.

10.5 Chemical Control or Amendments

At present there is no plan to use supplemental fertilizer treatments after the initial planting of the mitigation areas. Chemical treatments (by a licensed applicator) may be used on select invasive plant species if other methods (hand pulling and excavation of rhizomes) are not successful.

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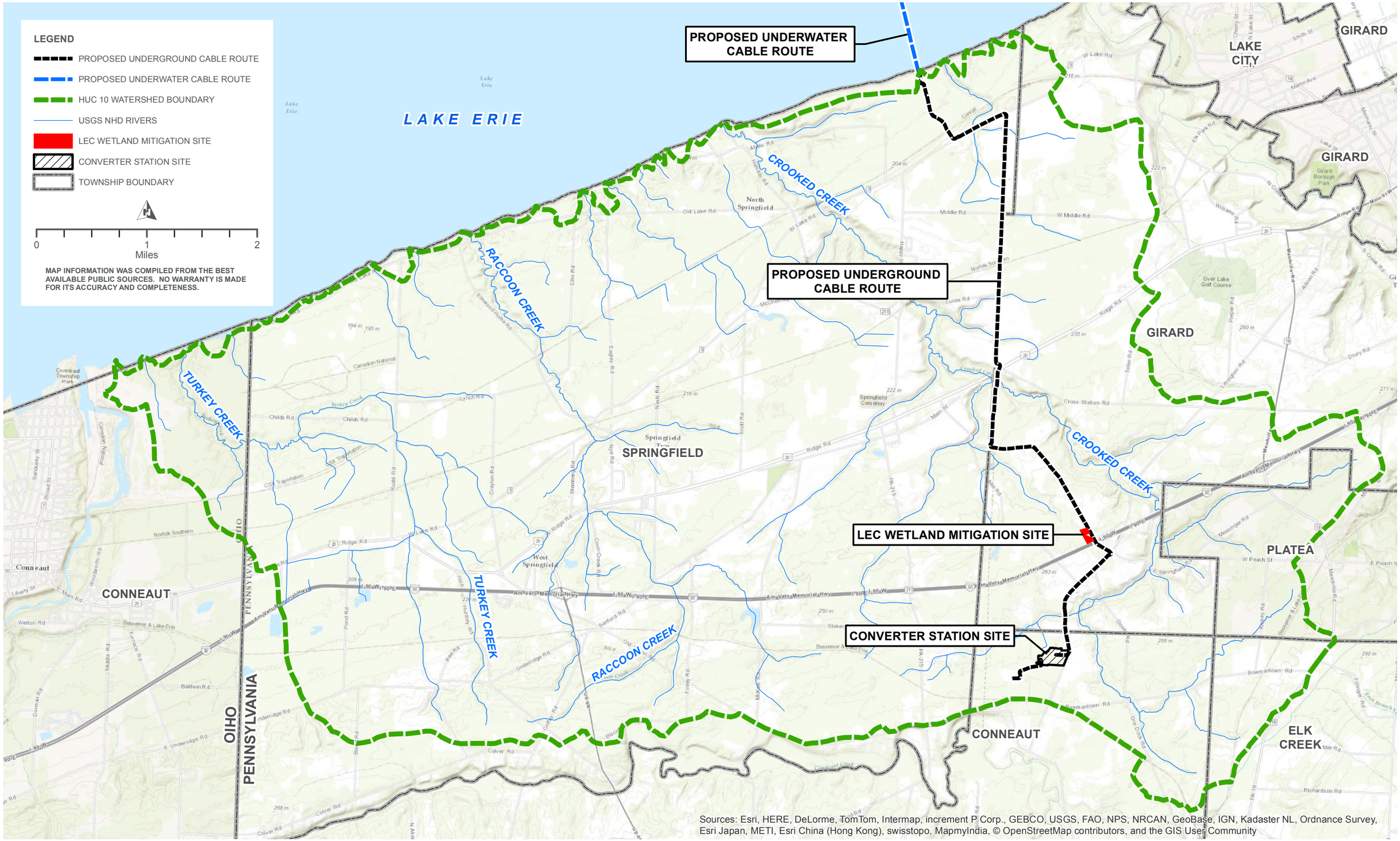


SITE LOCATION MAP, IMPACT SITE AND LEC WETLAND MITIGATION SITE

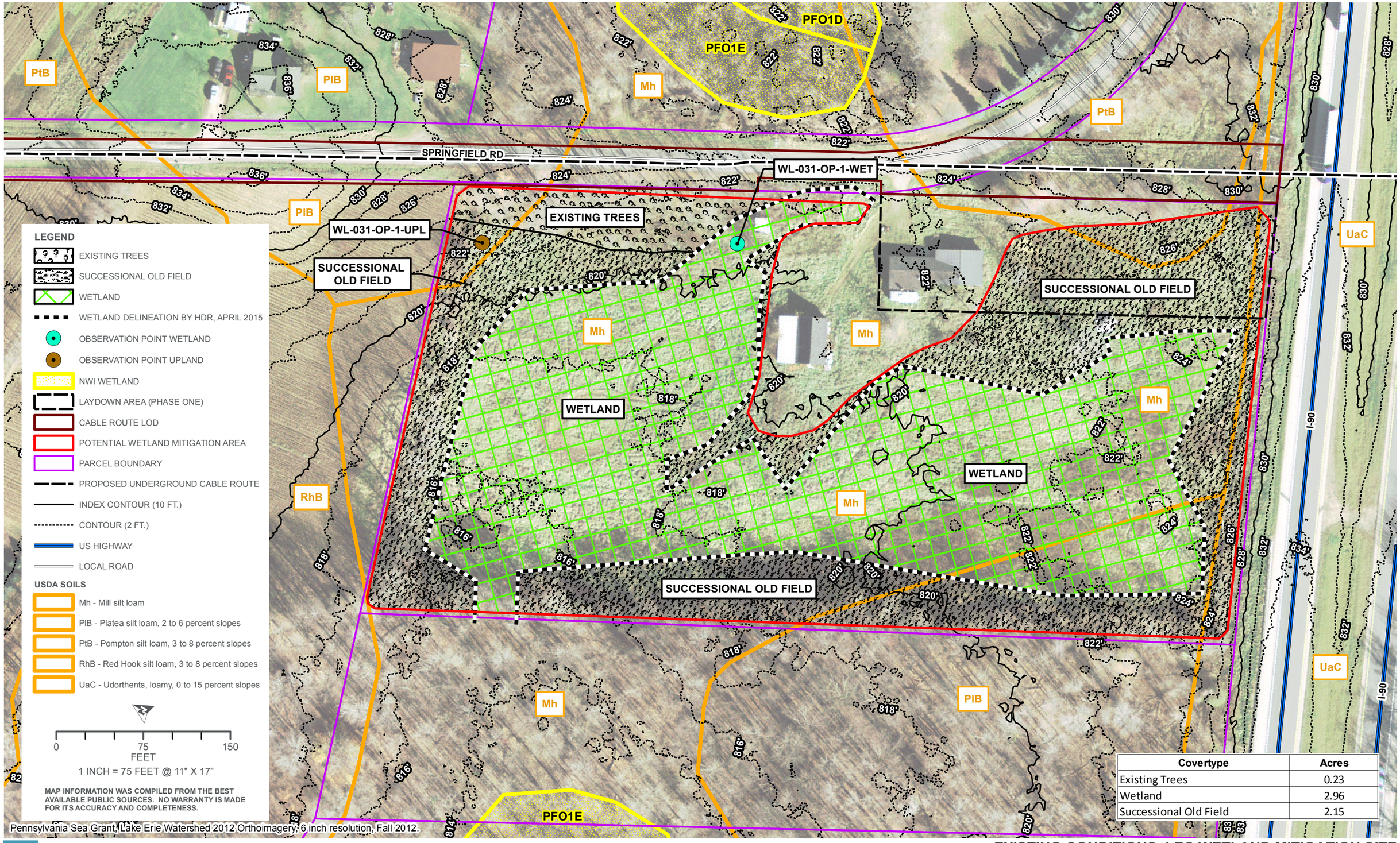
LAKE ERIE CONNECTOR PROJECT

FIGURE 1

JANUARY 2016

LAKE ERIE CONNECTOR, LLC

PATH: N:\GIS2\PROJECTS\LAKE_ERIE_POWER_CORPORATION\211948_SUBSEACABLE_SM_TASK1\MAP_DOCS\FINAL\WETLAND_MITIGATION\REPORT_FIGURES\LEPC_11X17_CARR_SITE_FIGURE_01_SITE_LOCATION_MAP_20160113.MXD - USER: DSOUCIE - DATE: 1/19/2016



Covertype	Acres
Existing Trees	0.23
Wetland	2.96
Successional Old Field	2.15

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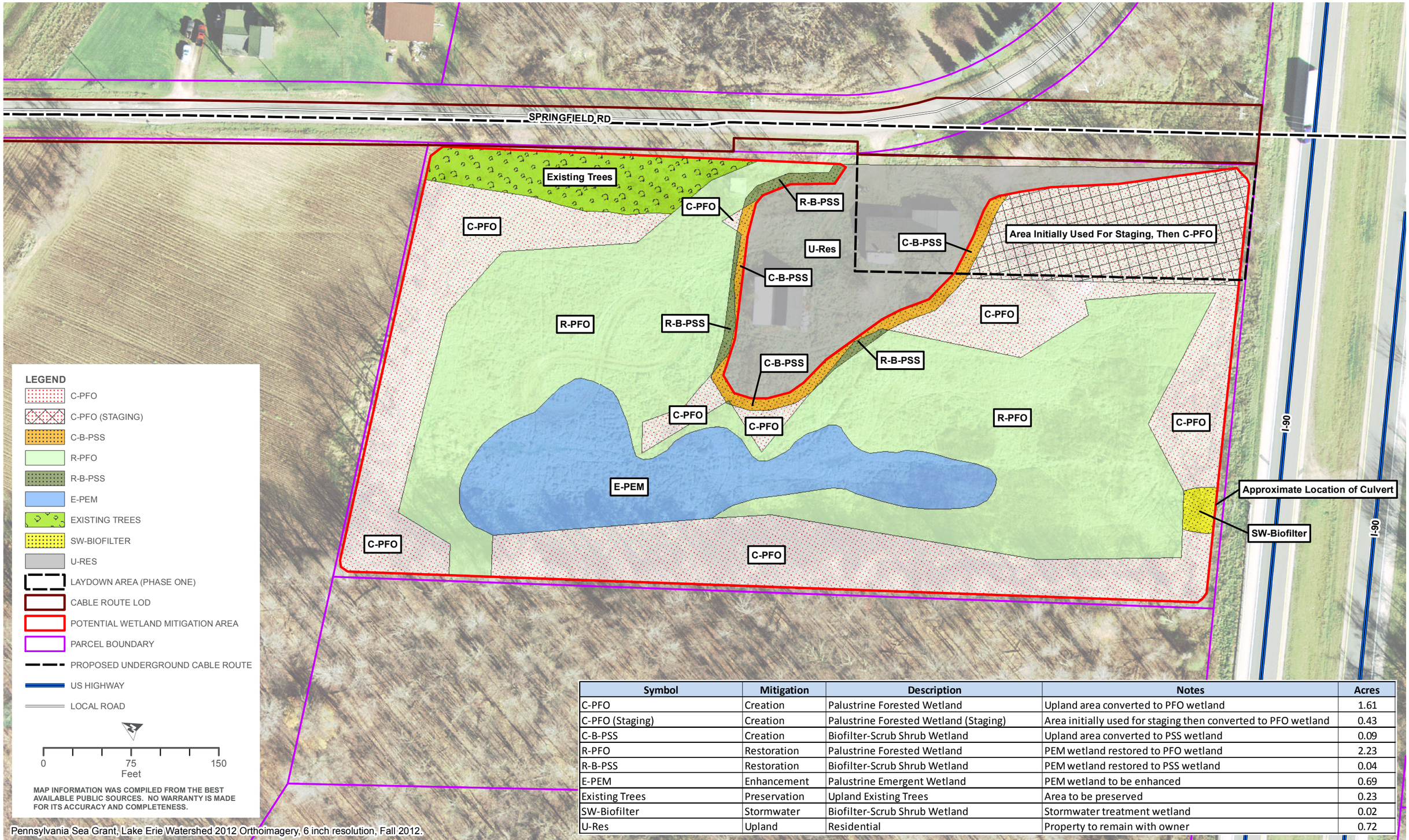
EXISTING CONDITIONS, LEC WETLAND MITIGATION SITE

LAKE ERIE CONNECTOR PROJECT

FIGURE 2

JANUARY 2016



Symbol	Mitigation	Description	Notes	Acres
C-PFO	Creation	Palustrine Forested Wetland	Upland area converted to PFO wetland	1.61
C-PFO (Staging)	Creation	Palustrine Forested Wetland (Staging)	Area initially used for staging then converted to PFO wetland	0.43
C-B-PSS	Creation	Biofilter-Scrub Shrub Wetland	Upland area converted to PSS wetland	0.09
R-PFO	Restoration	Palustrine Forested Wetland	PEM wetland restored to PFO wetland	2.23
R-B-PSS	Restoration	Biofilter-Scrub Shrub Wetland	PEM wetland restored to PSS wetland	0.04
E-PEM	Enhancement	Palustrine Emergent Wetland	PEM wetland to be enhanced	0.69
Existing Trees	Preservation	Upland Existing Trees	Area to be preserved	0.23
SW-Biofilter	Stormwater	Biofilter-Scrub Shrub Wetland	Stormwater treatment wetland	0.02
U-Res	Upland	Residential	Property to remain with owner	0.72

LAKE ERIE CONNECTOR, LLC

CONCEPTUAL WETLAND MITIGATION PLAN, LEC WETLAND MITIGATION SITE

LAKE ERIE CONNECTOR PROJECT

FIGURE 3

JANUARY 2016

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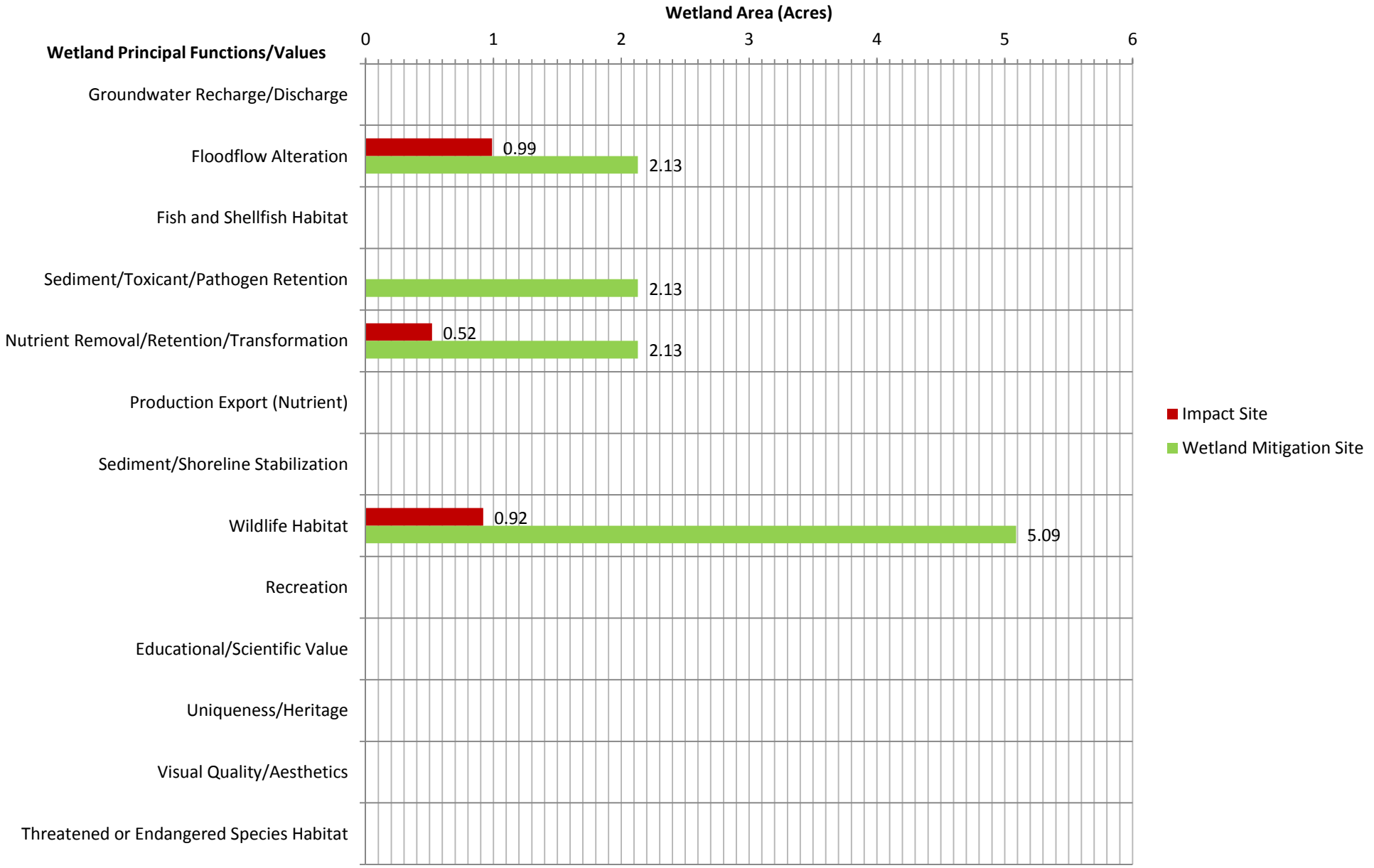
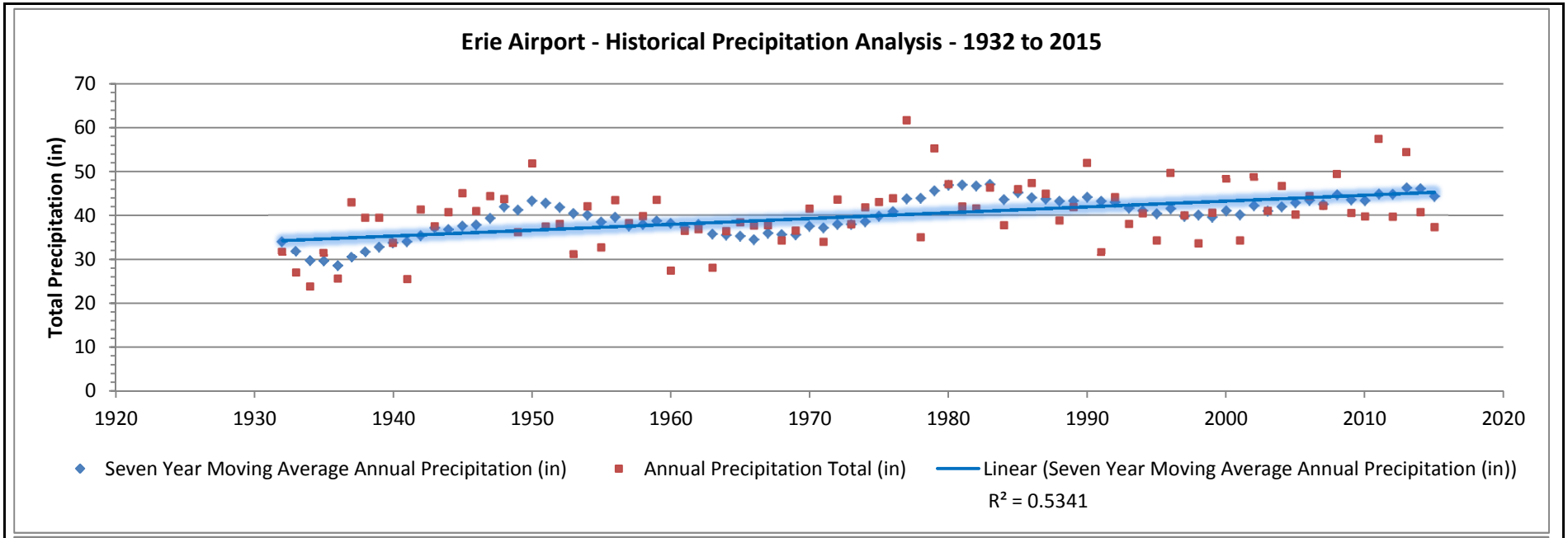
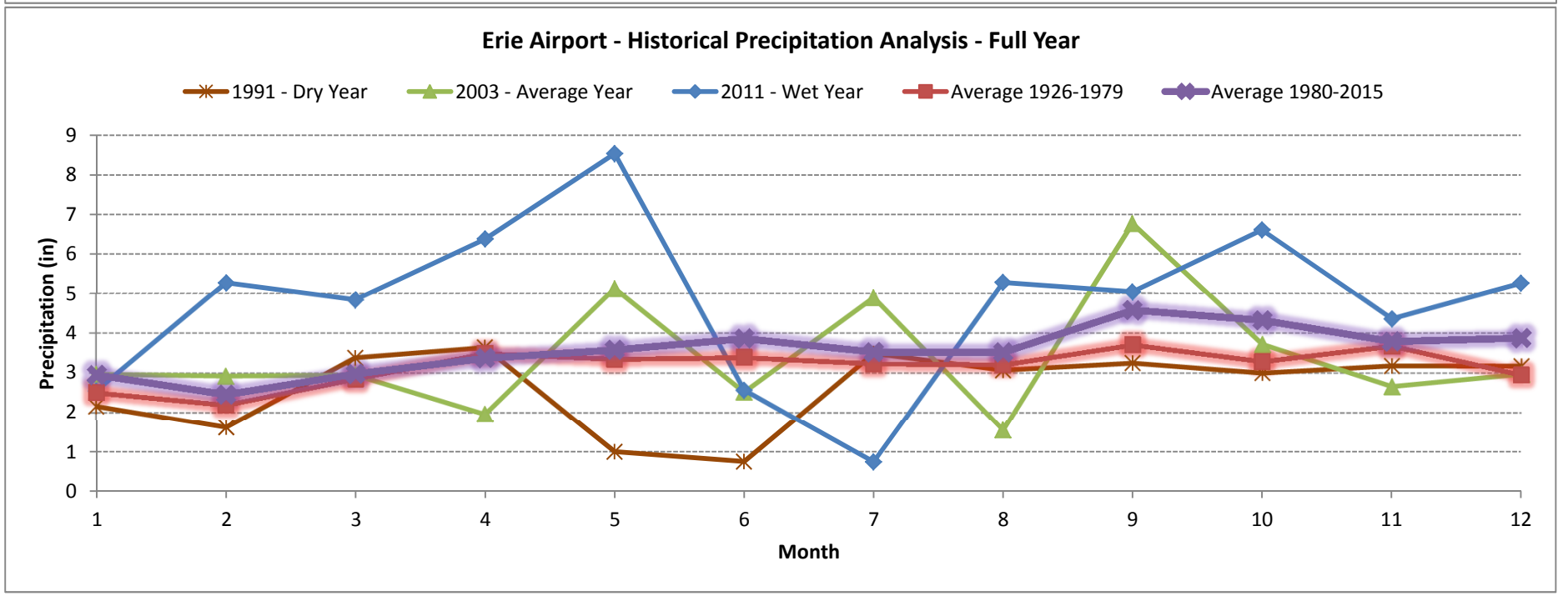


HDR	*LEC Wetland Mitigation*	Area of wetland functions and values impacted at the LEC project site and established at the project wetland mitigation site.	DATE:	1/20/2016	**FIGURE**
			CREATED BY:	KV	**4**
			REVIEWED BY:	JR	
			JOB NO:	243732	





HDR	*LEC Wetland Mitigation*	Historical precipitation analysis for determination of wet, average, and dry years, 1926 to 2015, Erie Airport.	DATE:	1/20/2016	**FIGURE**
			CREATED BY:	KV	**5**
			REVIEWED BY:	JV	
			JOB NO:	243732	

c:\pwworking\pitt\d1609702\3518FD60

LEGEND

- APPROXIMATE LOCATION OF CULVERT
- SUBWATERSHED BOUNDARY
- LAYDOWN AREA (PHASE ONE)
- CABLE ROUTE LOD
- POTENTIAL WETLAND MITIGATION AREA
- PROPOSED UNDERGROUND CABLE ROUTE
- INDEX CONTOUR (10 FT.)
- CONTOUR (2 FT.)
- RIVER | STREAM
- US HIGHWAY
- LOCAL ROAD

N

0 200 400
FEET

1 INCH = 200 FEET @ 11" X 17"

MAP INFORMATION WAS COMPILED FROM THE BEST AVAILABLE PUBLIC SOURCES. NO WARRANTY IS MADE FOR ITS ACCURACY AND COMPLETENESS.

CN: 76
3.78 ACRES

CN: 86
3.36 ACRES

CN: 86
4.27 ACRES

CN: 68
2.15 ACRES

CN: 79
3.05 ACRES

POTENTIAL WETLAND MITIGATION AREA

APPROXIMATE LOCATION OF CULVERT

SPRINGFIELD RD

NEIGER RD

Pennsylvania Sea Grant, Lake Erie Watershed 2012 Orthoimagery, 6 inch resolution, Fall 2012.

LEXINGT

LAKE ERIE CONNECTOR, LLC

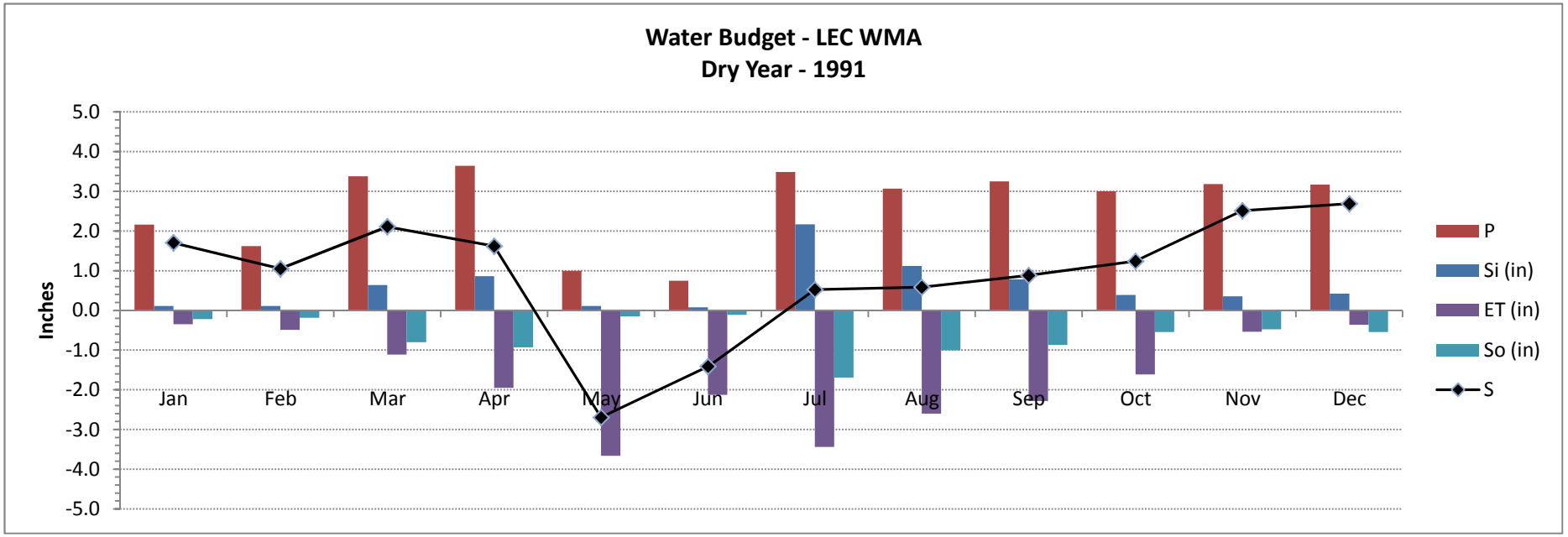
SUBWATERSHED RUNOFF CURVE NUMBERS, LEC WETLAND MITIGATION SITE

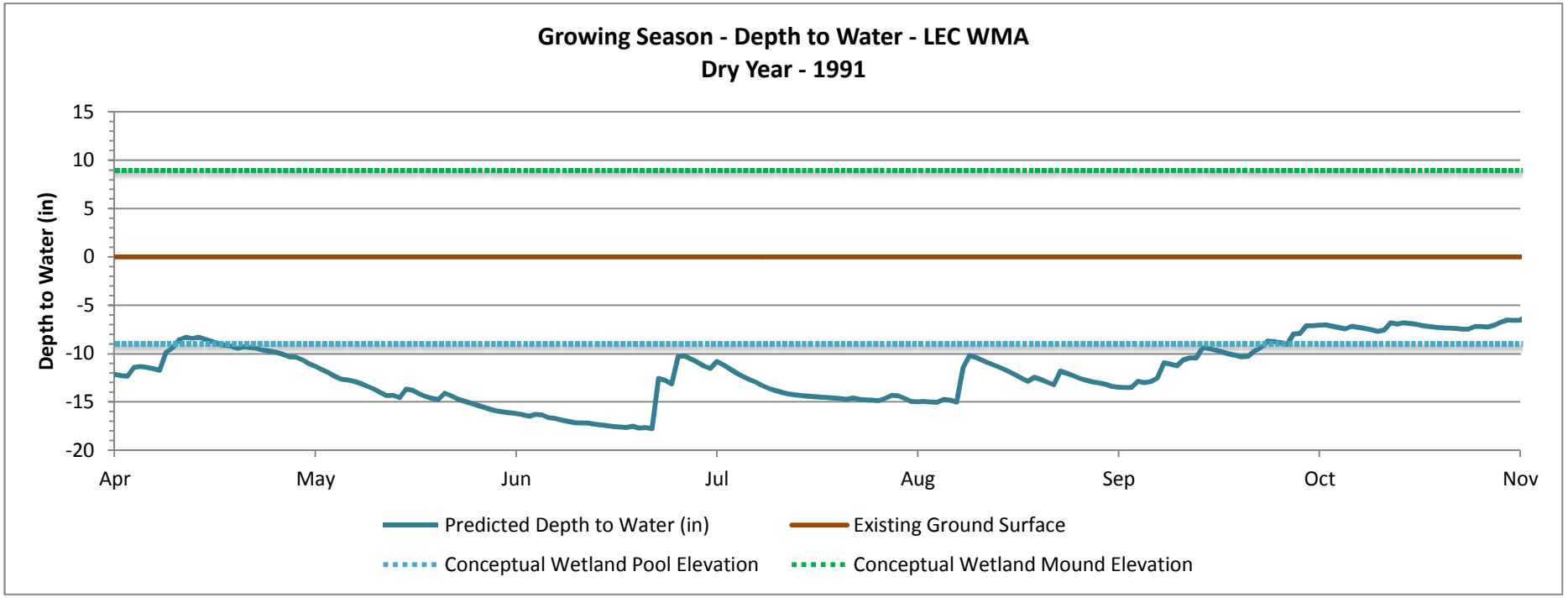
LAKE ERIE CONNECTOR PROJECT

FIGURE 6

JANUARY 2016

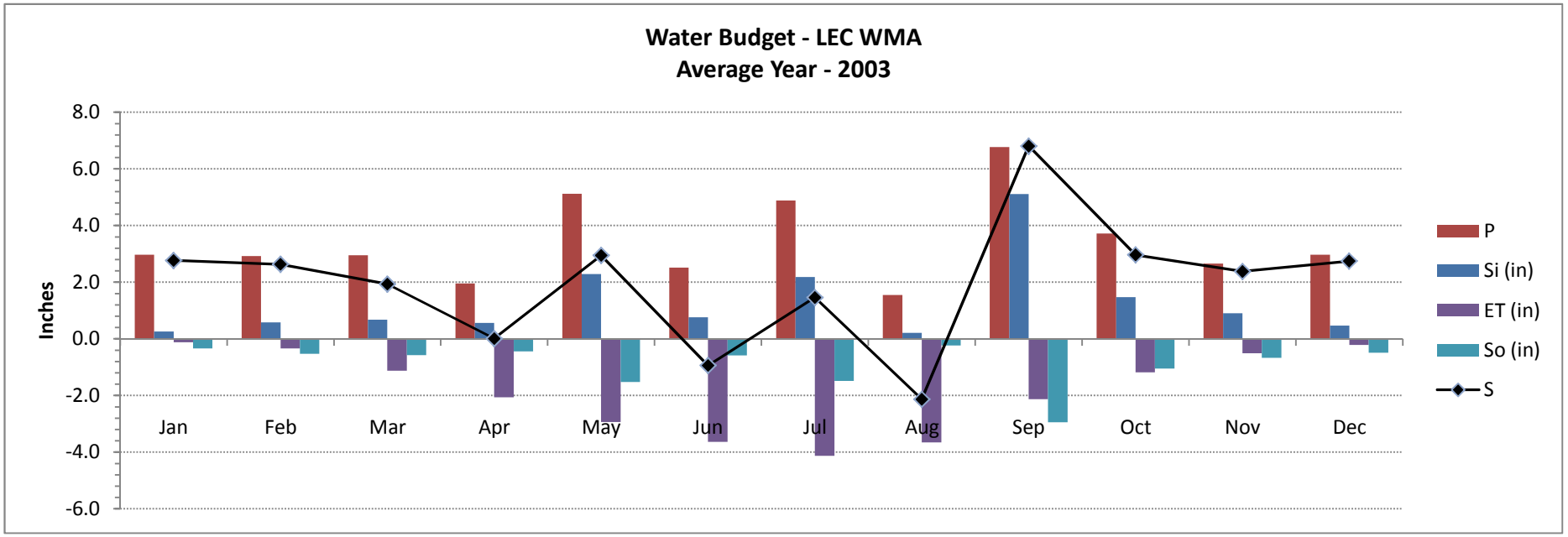
PATH: N:\GIS2\PROJECTS\LAKE_ERIE_POWER_CORPORATION\211948_SUBSEACABLE_SM_TASK1\MAP_DOCS\FINAL\WETLAND_MITIGATION\REPORT_FIGURES\LEPC_11X17_CARR_SITE_FIGURE_06_SUBWATERSHEDS_20160122.MXD - USER: DSOUCIE - DATE: 1/22/2016

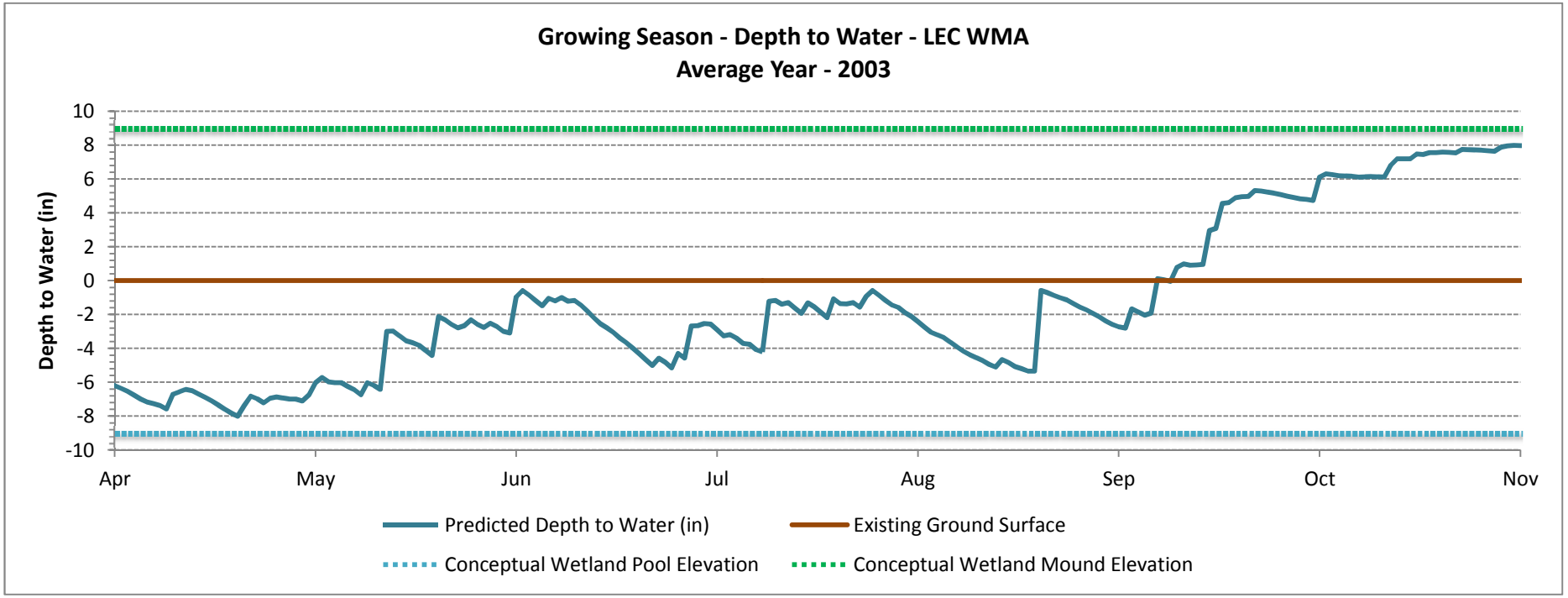




HDR	*LEC Wetland Mitigation*	Annual water budget and predicted depth to water during the growing season for typical dry year (1991) for LEC Wetland Mitigation Site. Wetland groundwater inflow and outflow not included in water budget.	DATE:	1/20/2016	**FIGURE**
			CREATED BY:	KV	**7**
			REVIEWED BY:	JV	
			JOB NO:	243732	

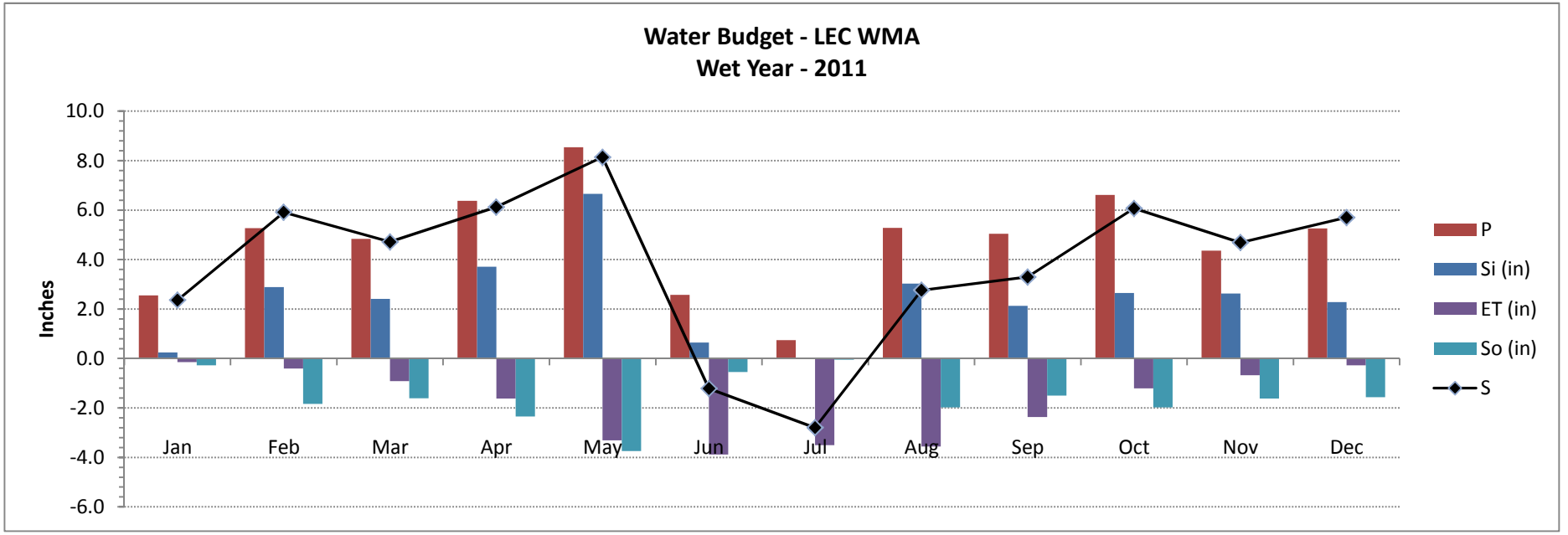
c:\pwworking\pitt\d1609702\3518FD60

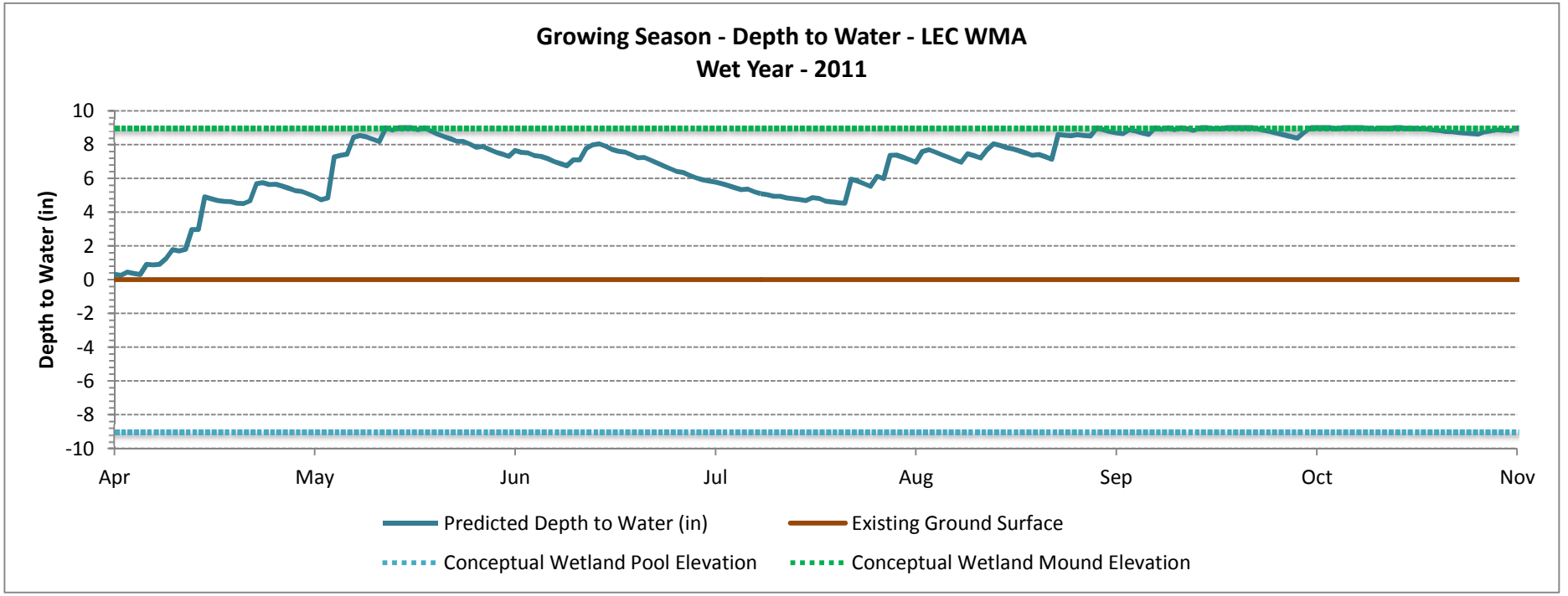




HDR	*LEC Wetland Mitigation*	Annual water budget and predicted depth to water during the growing season for average year (2003) for LEC Wetland Mitigation Site. Wetland groundwater inflow and outflow not included in water budget.	DATE:	1/20/2016	**FIGURE**
			CREATED BY:	KV	**8**
			REVIEWED BY:	JV	
			JOB NO:	243732	

c:\pwworking\pitt\d1609702\3518FD60





HDR	*LEC Wetland Mitigation*	Annual water budget and predicted depth to water during the growing season for typical wet year (2011) for LEC Wetland Mitigation Site. Wetland groundwater inflow and outflow not included in water budget.	DATE:	1/20/2016	**FIGURE**
			CREATED BY:	KV	**9**
			REVIEWED BY:	JV	
			JOB NO:	243732	

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Appendix A - Mitigation Site Wetland Delineation Datasheets, Web Soil Survey Report, and Photographs

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Lake Erie Connector | City/County: Cranesville | Sampling Date: 11/5/2014

Applicant/Owner: Carr | State: PA | Sampling Point: WL-031-OP-1-WE

Investigator(s): Schwalder KO | Section, Township, Range S T R

Landform (hillslope, terrace, etc.): Depression | Local Relief (concave, convex, none): Concave | Slope(%) 0

Subregion (LRR or MLRA): LRR R | Lat: 41.95351 | Long: -80.370725 | Datum: NAD83

Soil Map Unit Name: Mh, PIB, PtB | NWI Classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If No, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	X	No		
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?**	**Yes X No**
Wetland Hydrology Present?	Yes	X	No	If yes, optional Wetland Site ID	WL-031

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- [x] Surface Water (A1)
- [x] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [x] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imag.(C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [x] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	X	No		Depth (inches):	0
Water Table Present?	Yes	X	No		Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	0

Wetland Hydrology Present? Yes X No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION– Use scientific names of plants.

Sampling Point: WL-031-OP-1-WET

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Typha latifolia	85	Y	OBL
	85	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	85	x 1 =	85
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		85 (B)

Prevalence Index = B/A= 1.00

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test > 50%
- X Prevalence Index ≤ 3.0
- ___ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3in.(7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
0 to 12	10YR 3 / 1	90	2.5YR 4/8	10	C	PL	LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B))
- ☐ Loamy Mucky Mineral (F1) (LRR K,L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12) (LRR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☐ **Restrictive Layer (if observed):**

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Lake Erie Connector City/County: Cranesville Sampling Date: 11/5/2014

Applicant/Owner: Carr State: PA Sampling Point: WL-031-OP-1-UPL

Investigator(s): Schwalder KO Section, Township, Range S T R

Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): Convex Slope(%) 1

Subregion (LRR or MLRA): LRR R Lat: 41.953928 Long: -80.371861 Datum:

Soil Map Unit Name: R NWI Classification: Upland

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If No, explain in Remarks)

Are Vegetation ____, Soil ____, or Hydrology ____, significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydrology ____, naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach a site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?**	**Yes**	**No X**
Hydric Soil Present?	Yes	No X			
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID		

Remarks:

No hydrology indicators present. Hydrophytic vegetation not dominant. No hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imag.(C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):		
Water Table Present?	Yes	No X	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):		

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present.

VEGETATION– Use scientific names of plants.

Sampling Point: WL-031-OP-1-UPL

	Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum			
Shrub Stratum			
Herb Stratum (Plot size: 6 Ft)			
Plantago lanceolata	20	Y	FACU
Plantago major	20	Y	FACU
Trifolium pratense	15	N	FACU
UID	15	N	NI
Aster spp.	10	N	NI
	80	=Total Cover	
Vine Stratum			

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	55 (A)		220 (B)

Prevalence Index = B/A= 4.00

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test > 50%

___ Prevalence Index ≤ 3.0

___ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3in.(7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** **X**

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation not dominant.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of Indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type [1]	Loc [2]	Texture	Remarks
0 to 12	10YR 3 / 2	100					LOAM	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Martix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B))
- ☐ Loamy Mucky Mineral (F1) (LRR K,L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils: [3]

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (LRR P, S, T)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12) (LRR T, U)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

☑ **Restrictive Layer (if observed):**

Type: Rock

Depth (inches): 12

Hydric Soil Present? **Yes** ☐ **No** ☒ **X**

Remarks:

No hydric soil indicators.

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 Erie County, Pennsylvania

January 20, 2016

Preface

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

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

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

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

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

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

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Contents

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.

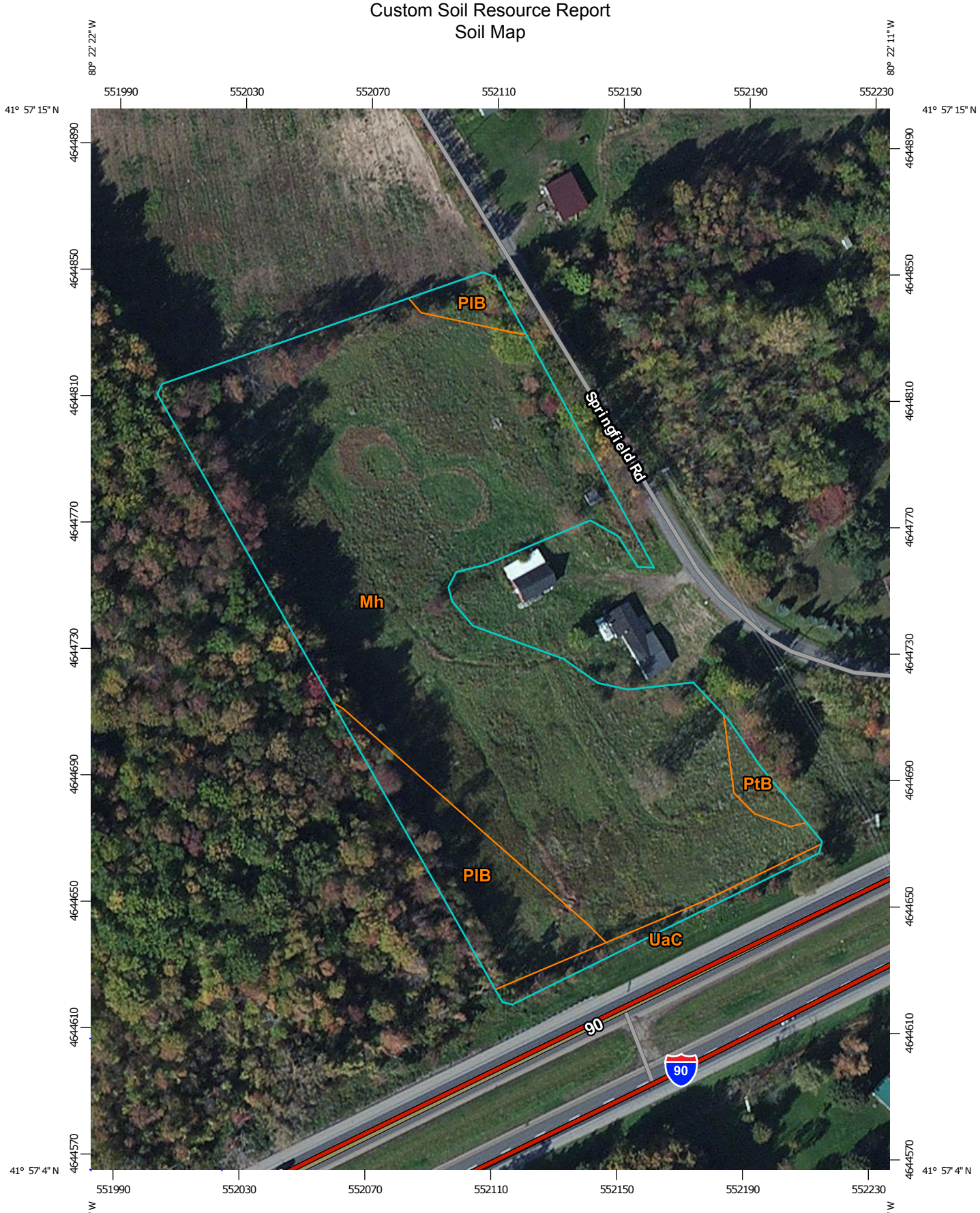
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree 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.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,640 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Erie County, Pennsylvania
Survey Area Data: Version 12, Nov 16, 2015

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

Date(s) aerial images were photographed: Oct 7, 2011—Oct 8, 2011

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

Map Unit Legend

Erie County, Pennsylvania (PA049)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Mh	Mill silt loam	4.5	85.2%
PlB	Platea silt loam, 2 to 6 percent slopes	0.6	11.3%
PtB	Pompton silt loam, 3 to 8 percent slopes	0.1	1.5%
UaC	Udorthents, loamy, 0 to 15 percent slopes	0.1	2.0%
Totals for Area of Interest		**5.3**	**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.

Erie County, Pennsylvania

Mh—Mill silt loam

Map Unit Setting

National map unit symbol: 2rg6l
Elevation: 770 to 1,350 feet
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 130 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Mill and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mill

Setting

Landform: Ground moraines, end moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Dip, flat
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Fine-loamy till

Typical profile

A - 0 to 11 inches: silt loam
Bg - 11 to 19 inches: silt loam
Bw - 19 to 45 inches: silt loam
C - 45 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D

Minor Components

Platea

Percent of map unit: 13 percent
Landform: End moraines, ground moraines

Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve, crest, rise
Down-slope shape: Linear
Across-slope shape: Linear

Alden

Percent of map unit: 5 percent
Landform: Depressions on ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

PlB—Platea silt loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2rg6j
Elevation: 750 to 1,350 feet
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Platea and similar soils: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Platea

Setting

Landform: End moraines, ground moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve, crest, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

Ap - 0 to 11 inches: silt loam
Bt - 11 to 21 inches: silt loam
Btx - 21 to 50 inches: clay loam
C - 50 to 80 inches: channery silt loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: About 6 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

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

Minor Components

Pierpont

Percent of map unit: 8 percent
Landform: Ground moraines, end moraines
Landform position (two-dimensional): Footslope, backslope, shoulder
Landform position (three-dimensional): Base slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex

Mill

Percent of map unit: 5 percent
Landform: Ground moraines, end moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Dip, flat
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave

PtB—Pompton silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2rg72
Elevation: 600 to 1,800 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 105 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Pompton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pompton

Setting

Landform: Valley trains, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave

Across-slope shape: Convex
Parent material: Loamy over sandy and gravelly glaciofluvial deposits

Typical profile

Ap - 0 to 10 inches: silt loam
Bw - 10 to 34 inches: gravelly sandy loam
C - 34 to 80 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 16 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D

Minor Components

Chenango

Percent of map unit: 17 percent
Landform: Kame terraces, outwash terraces
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Fredon

Percent of map unit: 3 percent
Landform: Depressions on outwash terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

UaC—Udorthents, loamy, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2rg7y
Elevation: 770 to 1,500 feet
Mean annual precipitation: 37 to 50 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 100 to 185 days

Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Udorthents, Loamy

Setting

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Disturbed regolith derived from loamy till.

Typical profile

A - 0 to 3 inches: very gravelly silt loam
C1 - 3 to 30 inches: very gravelly silt loam
C2 - 30 to 65 inches: extremely gravelly silt loam

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 1.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C

Minor Components

Urban land

Percent of map unit: 10 percent
Down-slope shape: Linear
Across-slope shape: Linear

Mill

Percent of map unit: 5 percent
Landform: Ground moraines, end moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Dip, flat
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Land Classifications

Land Classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit (Carr)

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Custom Soil Resource Report
Map—Hydric Rating by Map Unit (Carr)

Map Scale: 1:1,640 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

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

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Erie County, Pennsylvania
Survey Area Data: Version 12, Nov 16, 2015

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

Date(s) aerial images were photographed: Oct 7, 2011—Oct 8, 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.

Table—Hydric Rating by Map Unit (Carr)

Hydric Rating by Map Unit— Summary by Map Unit — Erie County, Pennsylvania (PA049)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Mh	Mill silt loam	87	4.5	85.2%
PlB	Platea silt loam, 2 to 6 percent slopes	5	0.6	11.3%
PtB	Pompton silt loam, 3 to 8 percent slopes	3	0.1	1.5%
UaC	Udorthents, loamy, 0 to 15 percent slopes	5	0.1	2.0%
Totals for Area of Interest			**5.3**	**100.0%**

Rating Options—Hydric Rating by Map Unit (Carr)

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Saturated Hydraulic Conductivity (Ksat) (Carr)

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Map—Saturated Hydraulic Conductivity (Ksat) (Carr)

Map Scale: 1:1,640 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

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

Soils

Soil Rating Polygons
- <= 2.8200
- > 2.8200 and <= 5.7431
- > 5.7431 and <= 7.4425
- > 7.4425 and <= 23.0000
- Not rated or not available

Soil Rating Lines
- <= 2.8200
- > 2.8200 and <= 5.7431
- > 5.7431 and <= 7.4425
- > 7.4425 and <= 23.0000
- Not rated or not available

Soil Rating Points
- <= 2.8200
- > 2.8200 and <= 5.7431
- > 5.7431 and <= 7.4425
- > 7.4425 and <= 23.0000
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Erie County, Pennsylvania
Survey Area Data: Version 12, Nov 16, 2015

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

Date(s) aerial images were photographed: Oct 7, 2011—Oct 8, 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.

Table—Saturated Hydraulic Conductivity (Ksat) (Carr)

Saturated Hydraulic Conductivity (Ksat)— Summary by Map Unit — Erie County, Pennsylvania (PA049)				
Map unit symbol	**Map unit name**	**Rating (micrometers per second)**	**Acres in AOI**	**Percent of AOI**
Mh	Mill silt loam	5.7431	4.5	85.2%
PlB	Platea silt loam, 2 to 6 percent slopes	7.4425	0.6	11.3%
PtB	Pompton silt loam, 3 to 8 percent slopes	23.0000	0.1	1.5%
UaC	Udorthents, loamy, 0 to 15 percent slopes	2.8200	0.1	2.0%
Totals for Area of Interest			**5.3**	**100.0%**

Rating Options—Saturated Hydraulic Conductivity (Ksat) (Carr)

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Component" returns the attribute value associated with the component with the highest percent composition in the map unit. If more than one component shares the highest percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher attribute value should be returned in the case of a percent composition tie. The result returned by this aggregation method may or may not represent the dominant condition throughout the map unit.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Fastest

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Interpret Nulls as Zero: No

This option indicates if a null value for a component should be converted to zero before aggregation occurs. This will be done only if a map unit has at least one component where this value is not null.

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

For an attribute of a soil horizon, a depth qualification must be specified. In most cases it is probably most appropriate to specify a fixed depth range, either in centimeters or inches. The Bottom Depth must be greater than the Top Depth, and the Top Depth can be greater than zero. The choice of "inches" or "centimeters" only applies to the depth of soil to be evaluated. It has no influence on the units of measure the data are presented in.

When "Surface Layer" is specified as the depth qualifier, only the surface layer or horizon is considered when deriving a value for a component, but keep in mind that the thickness of the surface layer varies from component to component.

When "All Layers" is specified as the depth qualifier, all layers recorded for a component are considered when deriving the value for that component.

Whenever more than one layer or horizon is considered when deriving a value for a component, and the attribute being aggregated is a numeric attribute, a weighted average value is returned, where the weighting factor is the layer or horizon thickness.

Top Depth: 0

Bottom Depth: 24

Units of Measure: Inches

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (Carr)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group (Carr)

Map Scale: 1:1,640 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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)

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Soil Survey Area: Erie County, Pennsylvania
Survey Area Data: Version 12, Nov 16, 2015

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

Date(s) aerial images were photographed: Oct 7, 2011—Oct 8, 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.

Table—Hydrologic Soil Group (Carr)

Hydrologic Soil Group— Summary by Map Unit — Erie County, Pennsylvania (PA049)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Mh	Mill silt loam	C/D	4.5	85.2%
PlB	Platea silt loam, 2 to 6 percent slopes	D	0.6	11.3%
PtB	Pompton silt loam, 3 to 8 percent slopes	A/D	0.1	1.5%
UaC	Udorthents, loamy, 0 to 15 percent slopes	C	0.1	2.0%
Totals for Area of Interest			**5.3**	**100.0%**

Rating Options—Hydrologic Soil Group (Carr)

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be

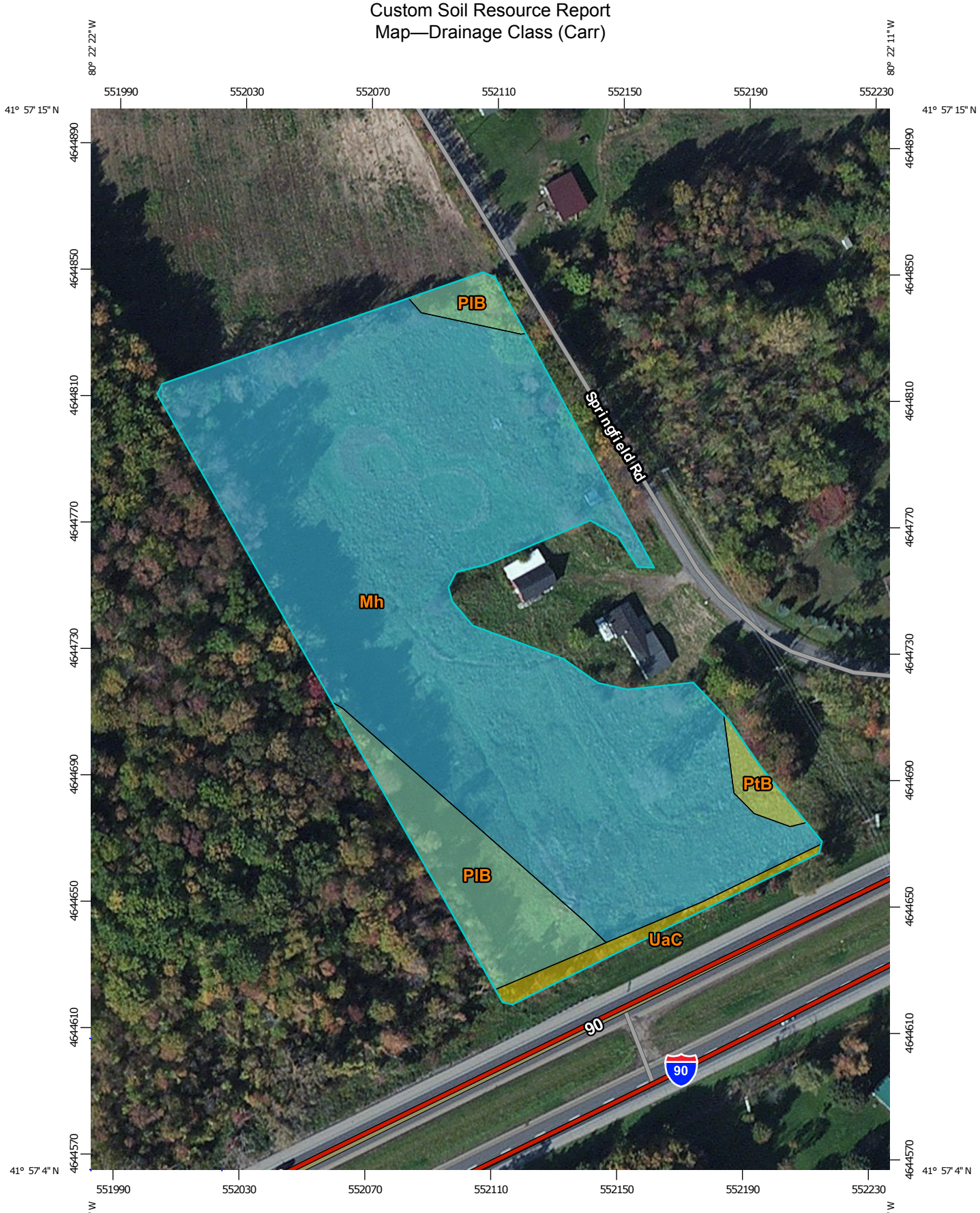
considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Drainage Class (Carr)

"Drainage class (natural)" refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized-excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."



Map Scale: 1:1,640 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Excessively drained
- Somewhat excessively drained
- Well drained
- Moderately well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Subaqueous
- Not rated or not available

Soil Rating Lines

- Excessively drained
- Somewhat excessively drained
- Well drained
- Moderately well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Subaqueous
- Not rated or not available

Soil Rating Points

- Excessively drained
- Somewhat excessively drained
- Well drained
- Moderately well drained
- Somewhat poorly drained
- Poorly drained
- Very poorly drained
- Subaqueous
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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)

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Soil Survey Area: Erie County, Pennsylvania
Survey Area Data: Version 12, Nov 16, 2015

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

Date(s) aerial images were photographed: Oct 7, 2011—Oct 8, 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.

Table—Drainage Class (Carr)

Drainage Class— Summary by Map Unit — Erie County, Pennsylvania (PA049)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Mh	Mill silt loam	Poorly drained	4.5	85.2%
PlB	Platea silt loam, 2 to 6 percent slopes	Somewhat poorly drained	0.6	11.3%
PtB	Pompton silt loam, 3 to 8 percent slopes	Moderately well drained	0.1	1.5%
UaC	Udorthents, loamy, 0 to 15 percent slopes	Well drained	0.1	2.0%
Totals for Area of Interest			**5.3**	**100.0%**

Rating Options—Drainage Class (Carr)

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be

considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Water Features

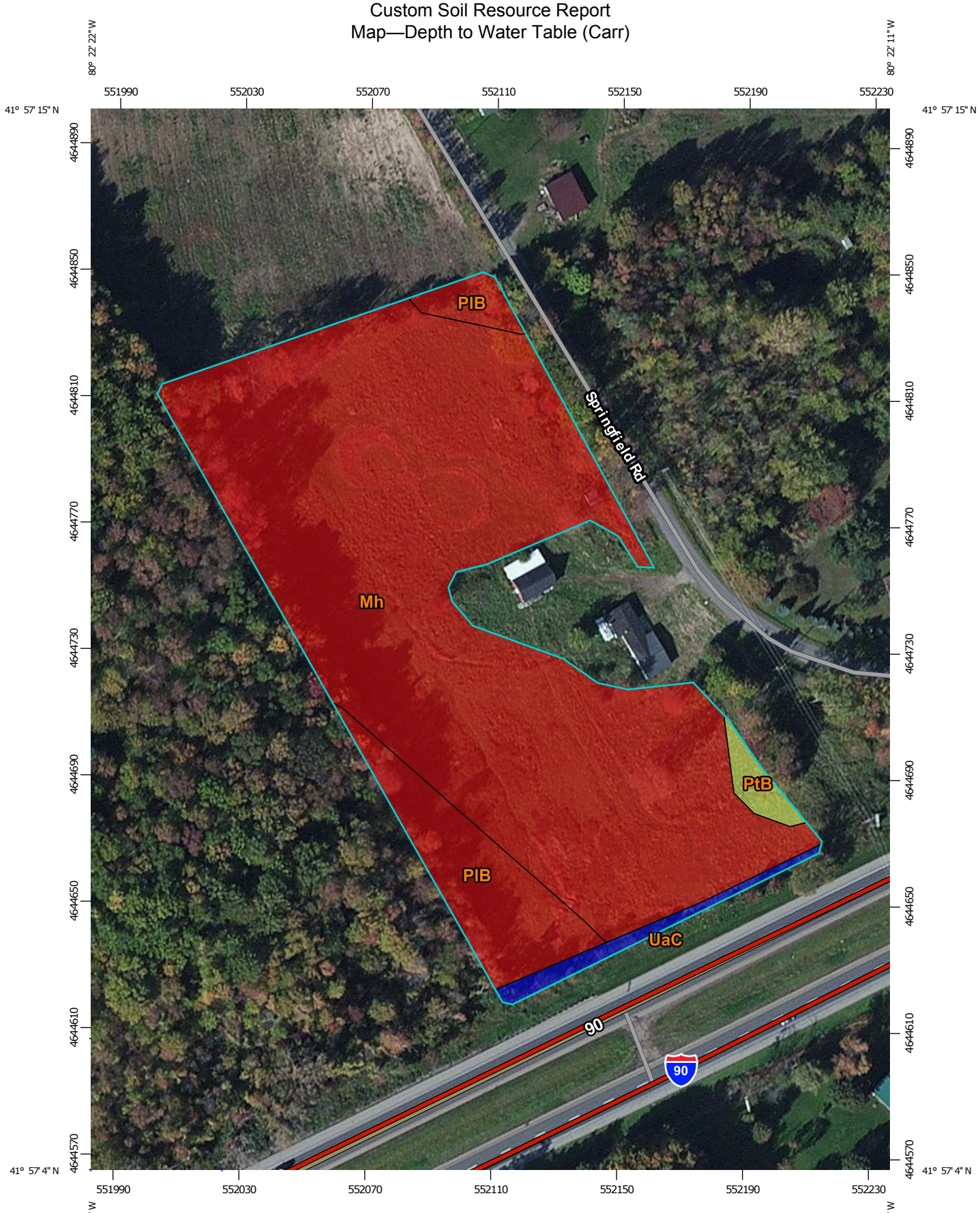
Water Features include ponding frequency, flooding frequency, and depth to water table.

Depth to Water Table (Carr)

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Custom Soil Resource Report
Map—Depth to Water Table (Carr)



Map Scale: 1:1,640 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

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

Soils

Soil Rating Polygons
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Lines
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Soil Rating Points
- 0 - 25
- 25 - 50
- 50 - 100
- 100 - 150
- 150 - 200
- > 200
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

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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)

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Soil Survey Area: Erie County, Pennsylvania
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Date(s) aerial images were photographed: Oct 7, 2011—Oct 8, 2011

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Table—Depth to Water Table (Carr)

Depth to Water Table— Summary by Map Unit — Erie County, Pennsylvania (PA049)				
Map unit symbol	**Map unit name**	**Rating (centimeters)**	**Acres in AOI**	**Percent of AOI**
Mh	Mill silt loam	0	4.5	85.2%
PlB	Platea silt loam, 2 to 6 percent slopes	15	0.6	11.3%
PtB	Pompton silt loam, 3 to 8 percent slopes	56	0.1	1.5%
UaC	Udorthents, loamy, 0 to 15 percent slopes	>200	0.1	2.0%
Totals for Area of Interest			**5.3**	**100.0%**

Rating Options—Depth to Water Table (Carr)

Units of Measure: centimeters

Aggregation Method: Dominant Component

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Component" returns the attribute value associated with the component with the highest percent composition in the map unit. If more than one component shares the highest percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher attribute value should be returned in the case of a percent composition tie. The result returned by this aggregation method may or may not represent the dominant condition throughout the map unit.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Lower

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Interpret Nulls as Zero: No

This option indicates if a null value for a component should be converted to zero before aggregation occurs. This will be done only if a map unit has at least one component where this value is not null.

Beginning Month: January

Ending Month: December

Flooding Frequency Class (Carr)

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent.

"None" means that flooding is not probable. The chance of flooding is nearly 0 percent in any year. Flooding occurs less than once in 500 years.

"Very rare" means that flooding is very unlikely but possible under extremely unusual weather conditions. The chance of flooding is less than 1 percent in any year.

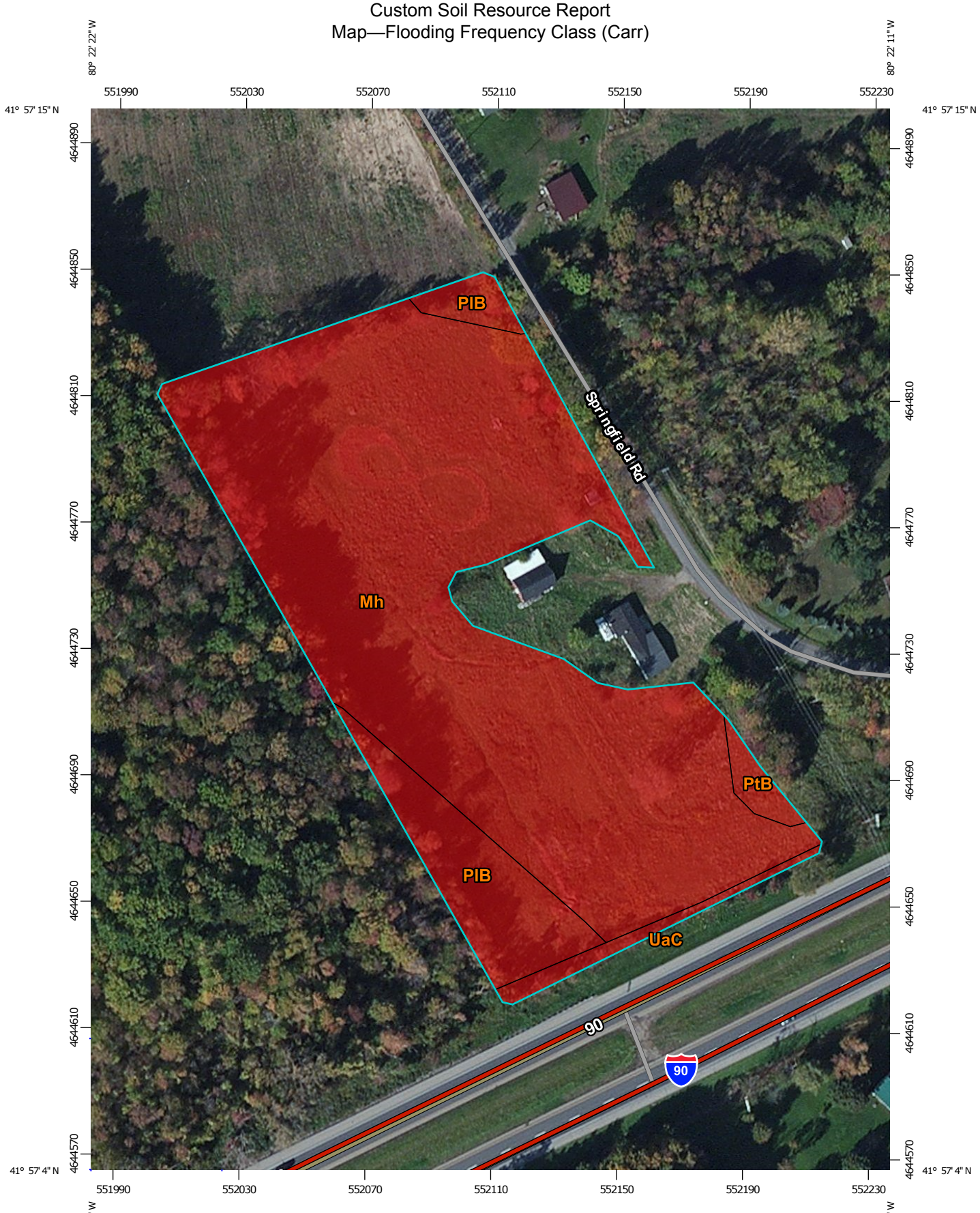
"Rare" means that flooding is unlikely but possible under unusual weather conditions. The chance of flooding is 1 to 5 percent in any year.

"Occasional" means that flooding occurs infrequently under normal weather conditions. The chance of flooding is 5 to 50 percent in any year.

"Frequent" means that flooding is likely to occur often under normal weather conditions. The chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year.

"Very frequent" means that flooding is likely to occur very often under normal weather conditions. The chance of flooding is more than 50 percent in all months of any year.

Custom Soil Resource Report
Map—Flooding Frequency Class (Carr)



Map Scale: 1:1,640 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

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

Soils

Soil Rating Polygons
- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent
- Not rated or not available

Soil Rating Lines
- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent
- Not rated or not available

Soil Rating Points
- None
- Very Rare
- Rare
- Occasional
- Frequent
- Very Frequent
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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Coordinate System: Web Mercator (EPSG:3857)

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Soil Survey Area: Erie County, Pennsylvania
Survey Area Data: Version 12, Nov 16, 2015

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

Date(s) aerial images were photographed: Oct 7, 2011—Oct 8, 2011

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Table—Flooding Frequency Class (Carr)

Flooding Frequency Class— Summary by Map Unit — Erie County, Pennsylvania (PA049)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Mh	Mill silt loam	None	4.5	85.2%
PlB	Platea silt loam, 2 to 6 percent slopes	None	0.6	11.3%
PtB	Pompton silt loam, 3 to 8 percent slopes	None	0.1	1.5%
UaC	Udorthents, loamy, 0 to 15 percent slopes	None	0.1	2.0%
Totals for Area of Interest			**5.3**	**100.0%**

Rating Options—Flooding Frequency Class (Carr)

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be

considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: More Frequent

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Beginning Month: January

Ending Month: December

Ponding Frequency Class (Carr)

Ponding is standing water in a closed depression. The water is removed only by deep percolation, transpiration, or evaporation or by a combination of these processes. Ponding frequency classes are based on the number of times that ponding occurs over a given period. Frequency is expressed as none, rare, occasional, and frequent.

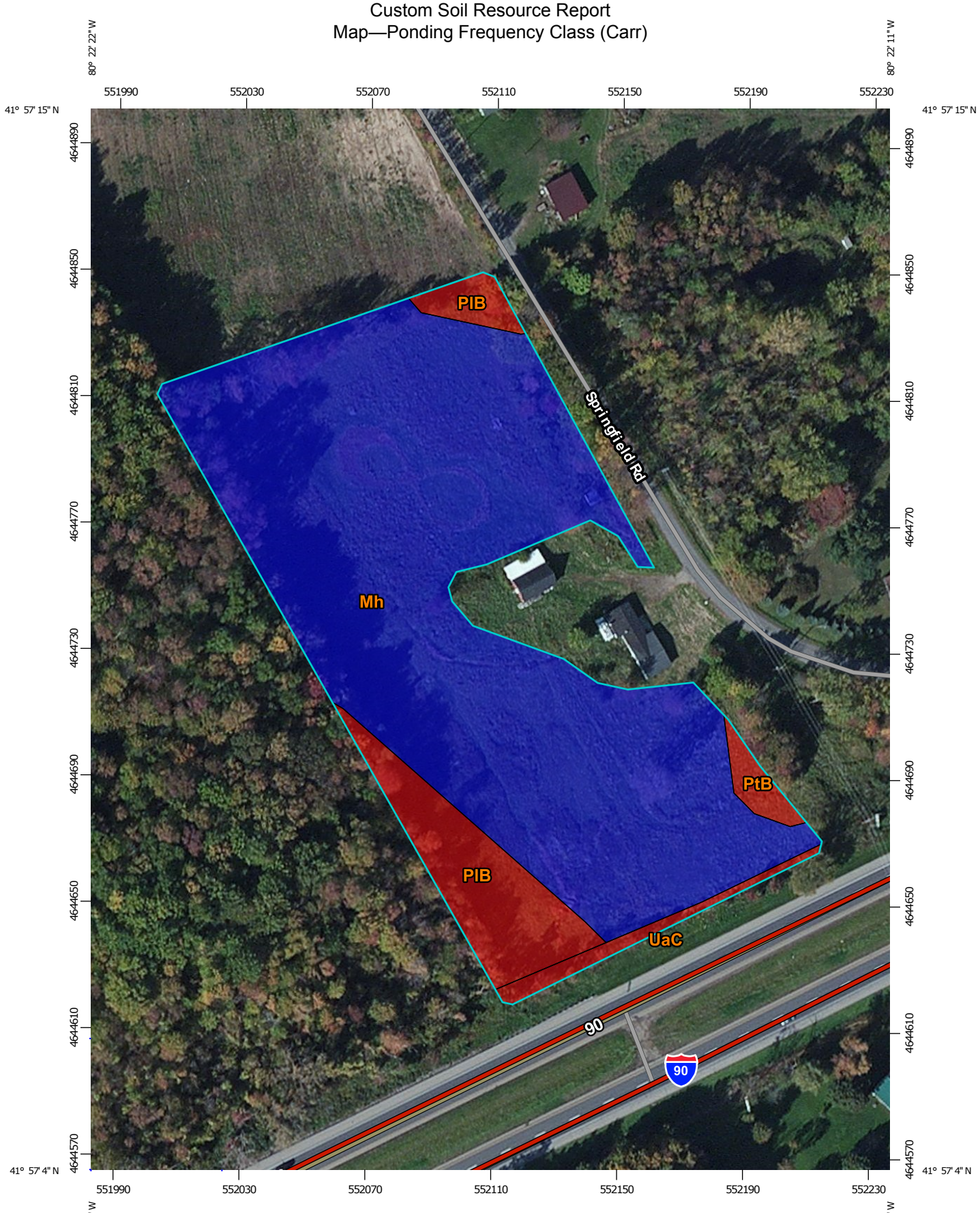
"None" means that ponding is not probable. The chance of ponding is nearly 0 percent in any year.

"Rare" means that ponding is unlikely but possible under unusual weather conditions. The chance of ponding is nearly 0 percent to 5 percent in any year.

"Occasional" means that ponding occurs, on the average, once or less in 2 years. The chance of ponding is 5 to 50 percent in any year.

"Frequent" means that ponding occurs, on the average, more than once in 2 years. The chance of ponding is more than 50 percent in any year.

Custom Soil Resource Report
Map—Ponding Frequency Class (Carr)



Map Scale: 1:1,640 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

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

Soils

Soil Rating Polygons
- None
- Rare
- Occasional
- Frequent
- Not rated or not available

Soil Rating Lines
- None
- Rare
- Occasional
- Frequent
- Not rated or not available

Soil Rating Points
- None
- Rare
- Occasional
- Frequent
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Erie County, Pennsylvania
Survey Area Data: Version 12, Nov 16, 2015

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

Date(s) aerial images were photographed: Oct 7, 2011—Oct 8, 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.

Table—Ponding Frequency Class (Carr)

Ponding Frequency Class— Summary by Map Unit — Erie County, Pennsylvania (PA049)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
Mh	Mill silt loam	Frequent	4.5	85.2%
PlB	Platea silt loam, 2 to 6 percent slopes	None	0.6	11.3%
PtB	Pompton silt loam, 3 to 8 percent slopes	None	0.1	1.5%
UaC	Udorthents, loamy, 0 to 15 percent slopes	None	0.1	2.0%
Totals for Area of Interest			**5.3**	**100.0%**

Rating Options—Ponding Frequency Class (Carr)

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be

considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: More Frequent

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Beginning Month: January

Ending Month: December

References

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Client Name: ITC Lake Erie Connector LLC	**Site Location:** 41°57'10.12"N, 80°22'17.65"W	**Project No.** 243732

Photo No.	**Date:**
1	12/17/15

Direction Photo Taken:

Looking north from Springfield Road

Description:
Watercourse A, facing downstream (north) in center.

Client Name: ITC Lake Erie Connector LLC	**Site Location:** 41°57'10.12"N, 80°22'17.65"W	**Project No.** 243732

Photo No.	**Date:**
2	12/17/15

Direction Photo Taken:

Looking north

Description: WL-031, from southwest corner of property.

Client Name: ITC Lake Erie Connector LLC	**Site Location:** 41°57'10.12"N, 80°22'17.65"W	**Project No.** 243732

Photo No.	**Date:**
3	12/17/15

Direction Photo Taken:

Looking southeast

Description:

WL-031, from northwest corner of property.

Client Name: ITC Lake Erie Connector LLC	**Site Location:** 41°57'10.12"N, 80°22'17.65"W	**Project No.** 243732

Photo No.	**Date:**
4	12/17/15

Direction Photo Taken:

Looking south

Description: Culvert outfall by Route I-90 at southern end of property. Note standing water.

Appendix B - Wetland Function-Value Evaluation Form for Existing and Proposed Wetlands at the Wetland Mitigation Site

Wetland Function-Value Evaluation Form

Total area of wetland 0.00 acres Human made? NA Is wetland part of a wildlife corridor? NA or a "habitat island"? NA

Adjacent land use Agricultural, residential Distance to nearest roadway or other development Approximately 20-feet

Dominant wetland systems present None, this is existing upland Contiguous undeveloped buffer zones present No

Is the wetland a separate hydraulic system? NA If not, where does the wetland lie in the drainage basin? NA

How many tributaries contribute to the wetland? NA Wildlife & vegetation diversity/abundance Lower than normal diversity.

Wetland **I.D**. LEC Mitigation Site – Creation - PFO

Latitude: 41°57'10.12"N Longitude: 80°22'17.65"W

Prepared by**:** KV Date: 12/29/15

Wetland Impact**:**
Type: Area: 2.13 acres

Evaluation based on: Field and desktop analysis

Office: X Field: X

Corps manual wetland delineation completed? 1987 and 2012 Regional Supplement

Function/Value		Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Groundwater Recharge/Discharge		*			
	Floodflow Alteration	C		**2, 3, 5, 6, 8, 9, 10, 13, 14, 16, 17, 18**	C	Function to be added as principal through installation of native tree plantings and grading to establish PFO community.
	Fish and Shellfish Habitat		*			
	Sediment/Toxicant Retention	C		**1, 3, 4, 5, 9, 10, 11, 12, 13, 14**	C	Function to be added as principal through installation of native tree plantings and grading to establish PFO community.
	Nutrient Removal	C		**3, 4, 5, 7, 8, 10, 11, 12, 13, 14**	C	Function to be added as principal through installation of native tree plantings and grading to establish PFO community.
	Production Export	C		**2, 7, 8, 10, 12**		Function to be added through installation of native tree plantings and grading to establish PFO community.
	Sediment/Shoreline Stabilization		*			
	Wildlife Habitat	C		**3, 5, 6, 7, 8, 9, 11, 13, 14, 15, 19, 20**	C	Function to be added as principal through installation of native tree plantings and grading to establish PFO community.
	Recreation		*			Private property owner.
	Educational Scientific Value		*			Private property owner.
	Uniqueness/Heritage		*			
	Visual Quality/Aesthetics		*			
	Endangered Species Habitat		*			
Other						

Notes: Functions to be added through wetland creation are noted with "C", and the expected rationale to be added are noted in bold.

Wetland Function-Value Evaluation Form

Total area of wetland 2.27 acres Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural, residential Distance to nearest roadway or other development Approximately 20-feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zones present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 2 culverts Wildlife & vegetation diversity/abundance Lower than normal diversity.

Wetland **I.D**. LEC Mitigation Site – Restoration - PFO

Latitude: 41°57'10.12"N Longitude: 80°22'17.65"W

Prepared by**:** KV Date: 12/29/15

Wetland Impact**:**
Type: Area: 2.27 acres

Evaluation based on: Field and desktop analysis

Office: X Field: X

Corps manual wetland delineation completed? 1987 and 2012 Regional Supplement

Function/Value		Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Groundwater Recharge/Discharge		*			
	Floodflow Alteration	*		2, 3, 5, 6, 8, 9, 10, 13, 14, 16, 17, 18		
	Fish and Shellfish Habitat		*			
	Sediment/Toxicant Retention	*		1, 3, 4, 5, 9, 10, 11, 12, 13, 14	*	
	Nutrient Removal	*		3, 4, 5, 7, 8, 10, 11, 12, 13, 14	*	
	Production Export	R		**2**, **7**, **8**, **10**, **12**		Function to be added through installation of native tree plantings and grading to establish PFO community.
	Sediment/Shoreline Stabilization		*			
	Wildlife Habitat	*		3, 5, 6, 7, **8**, **9**, **11**, 13, **14**, **15**, 19, **20**	R	Function to be added as principal through installation of native tree plantings and grading to establish PFO community.
	Recreation		*			Private property owner.
	Educational Scientific Value		*			Private property owner.
	Uniqueness/Heritage		*			
	Visual Quality/Aesthetics		*			
	Endangered Species Habitat		*			
Other						

Notes: Functions to be added through wetland restoration are noted with "R", and the expected rationale to be added are noted in bold.

Wetland Function-Value Evaluation Form

Total area of wetland 0.69 acres Human made? _____ Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Agricultural, residential Distance to nearest roadway or other development Approximately 50-feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zones present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 2 culverts Wildlife & vegetation diversity/abundance Lower than normal diversity.

Wetland **I.D**. LEC Mitigation Site – Enhancement - PEM

Latitude: 41°57'10.12"N Longitude: 80°22'17.65"W

Prepared by: KV Date: 12/29/15

Wetland Impact:
Type: Area: 0.69 acre

Evaluation based on: Field and desktop analysis

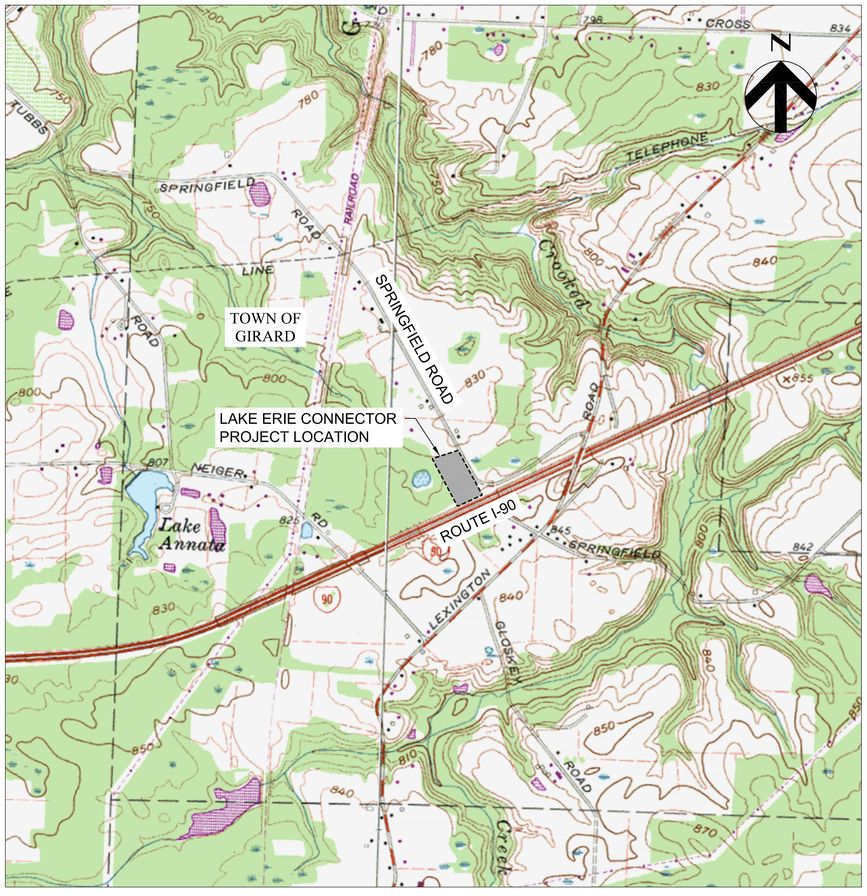
Office: X Field: X

Corps manual wetland delineation completed? 1987 and 2012 Regional Supplement

Function/Value		Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Groundwater Recharge/Discharge	*		5, 7, 9, 13, 15		
	Floodflow Alteration	*		2, 3, 5, 6, 8, 9, 10, 13, 14, 16, 17, 18		
	Fish and Shellfish Habitat		*			
	Sediment/Toxicant Retention	*		1, 3, 4, 5, 9, 10, 11, 12, 13, 14	*	
	Nutrient Removal	*		3, 4, 5, 7, 8, 10, 11, 12, 13, 14	*	
	Production Export	E		**2**, **7**, **8**, **10**, **12**		Function to be added through removal of invasive species and installation of native plantings to add site diversity and enhance existing PEM wetland.
	Sediment/Shoreline Stabilization		*			
	Wildlife Habitat	*		3, 5, 6, 7, **8**, **9**, **11**, 13, **14**, **15**, 19, **20**	E	Function to be added as principal through removal of invasive species and installation of native plantings to add site diversity and enhance existing PEM wetland.
	Recreation		*			Privately owned parcel.
	Educational Scientific Value		*			Privately owned parcel.
	Uniqueness/Heritage		*			
	Visual Quality/Aesthetics		*			
	Endangered Species Habitat		*			
Other						

Notes: Functions to be added through wetland enhancement are noted with "E", and the expected rationale to be added are noted in bold.

Appendix C - 30% Design Drawings for Wetland Mitigation Site



Contract Drawings For

Lake Erie Connector
Concept Mitigation Plan
Town of Girard, PA.

Henningson, Durham & Richardson
Architecture and Engineering, P.C.
in association with HDR Engineering, Inc.

Civil Plans - 30% Design - For Permit Purposes Only
Project No. 243732
January 2016
Mahwah, New Jersey

GENERAL NOTES:

1. ALL WORK SHALL CONFORM TO NATIONAL, STATE AND LOCAL BUILDING CODES.
2. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND BECOME THOROUGHLY FAMILIAR WITH THE PROJECT SITE PRIOR TO COMMENCING WORK. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.
3. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL INFORMATION ON THE DRAWINGS AND IN THE SPECIFICATIONS AND FOR THE CONSEQUENCES OF ANY UNAUTHORIZED SUBSTITUTIONS, OMISSIONS, DELETIONS AND ANY NON-COMPLIANCE WITH THE CONTRACT DOCUMENTS.
4. ALL WORK SHALL CONFORM TO APPLICABLE RULES AND REGULATIONS UNDER ALL AUTHORITIES HAVING JURISDICTION.
5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM ANY AND ALL AGENCIES HAVING JURISDICTION PRIOR TO COMMENCING WORK.
6. DO NOT SCALE THE DRAWINGS. WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL HAVE PRECEDENCE OVER SCALED DIMENSIONS.
7. SHOULD UNFORESEEN CONDITIONS OR OTHER CAUSES NECESSITATE CONSTRUCTION DETAILS NOT IN ACCORDANCE WITH THESE PLANS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND SUBMIT HIS DETAILS SHOWING THE PROPOSED METHOD TO ACCOMPLISH THE REQUIRED RESULTS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PATCHING, REPAIRING AND FINISHING OF ALL DISTURBED AREAS. PATCHING OF SURROUNDING AREAS SHALL BE WITH MATERIALS TO MATCH EXISTING OR APPROVED OTHER.
9. THE CONTRACTOR SHALL CLEAN UP AND REMOVE DEBRIS FROM THE WORK SITE DAILY DURING THE CONSTRUCTION PERIOD.
10. SEE SOIL EROSION AND SEDIMENT CONTROL PLAN (C-02) FOR LOCATION OF SEDIMENT AND EROSION CONTROL FEATURES, SOIL EROSION AND SEDIMENT CONTROL DETAILS (C-07) FOR DETAILS, AND SOIL EROSION AND SEDIMENT CONTROL NOTES (G-03) FOR NOTES.
11. ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE INSTALLED PRIOR TO ANY MAJOR SOIL DISTURBANCES, OR IN THEIR PROPER SEQUENCE AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
12. ANY DISTURBED AREAS THAT WILL BE LEFT EXPOSED MORE THAN 30 DAYS AND NOT SUBJECT TO CONSTRUCTION TRAFFIC, WILL IMMEDIATELY RECEIVE A TEMPORARY SEEDING. IF THE SEASON PREVENTS THE ESTABLISHMENT OF A TEMPORARY COVER, THE DISTURBED AREAS WILL BE MULCHED WITH STRAW, OR EQUIVALENT MATERIAL, AT A RATE OF TWO (2) TONS PER ACRE, ACCORDING TO PENNSYLVANIA STATE STANDARDS,
13. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE STATE STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN PENNSYLVANIA.
14. ADDITIONAL SILT FENCING (OR FIBER SOCK) WILL BE USED AS NECESSARY (I.E. FOR SOIL STOCKPILE AREA).

PLANTING NOTES:

1. SEE PLANTING SCHEDULE ON C-04 PROPOSED MITIGATION PLAN.

MAINTENANCE NOTES:

1. DEER EXCLUSION FENCE TO REMAIN FOR A PERIOD OF ONE YEAR FOLLOWING DATE OF FINAL CONTRACT ACCEPTANCE.
2. AT THE END OF THE ONE YEAR MAINTENANCE PERIOD, THE CONTRACTOR IS TO LEAVE IN PLACE, OR AS DIRECTED BY THE ENGINEER OF RECORD, THE DEER EXCLUSION FENCE AT NO ADDITIONAL COST TO THE PANYNJ.
3. MAINTENANCE OF DEER FENCE AFTER ONE YEAR BY THE CONTRACTOR, WILL BE MAINTAINED FOR THE REMAINDER OF THE MONITORING PERIOD BY A PARTY TO BE DESIGNATED LATER.

CONSTRUCTION SEQUENCE:

1. PRIPRIOR TO CONTRACTOR MOBILIZATION INSTALL "PROTECTIVE AREA" SIGNAGE, FLAG BOUNDARIES OF EXISTING WETLANDS, AND ACCESS ROADS, AND TAG TREES TO BE REMOVED AND PROTECTED UNDER THIS CONTRACT.
2. TREAT INVASIVE SPECIES ON SITE AS INSTRUCTED IN THE SPECIFICATIONS.
3. INSTALL CONSTRUCTION ENTRANCE (10' X 50' X 6").
4. INSTALL COMPOST FILTER SOCK (1,200 LINEAR FEET).
5. INSTALL WOOD FIBER ACCESS ROAD.
6. INSTALL DEER EXCLUSION FENCE (2,450 LINEAR FEET).
7. LOCATE STOCKPILE AREAS AND SOIL STORAGE AREAS (SEE SOIL EROSION AND SEDIMENT CONTROL NOTES).
8. ROUGH GRADE AND STOCKPILE SOIL IN STOCKADE AREA.
9. INSTALL WETLAND HUMMOCK AND POOL AS PER SPECIFICATION.
10. SPREAD WETLAND TOPSOIL AND PREFORM FINAL GRADING; CONTRACT SHALL OVER-EXCAVATE 6" TO ALLOW ROOM FOR TOPSOIL REUSE.
11. INSTALL TEMPORARY SEEDING FOR THE ENTIRE SITE.
12. PLANT ENTIRE AS PER WETLAND MITIGATION PLAN AND PLANT SCHEDULE.
13. INSTALL PERSONNEL ACCESS GATES.
14. ONCE LAY-DOWN AREA IS NO LONGER USED FOR THE CABLE CROSSING CONSTRUCTION; PLANT THE REMAINDER OF THE SITE.
15. ONCE SITE VEGETATION HAS REACHED 75% COVER; REMOVE AND DISPOSE OF ALL WASTE AND SOIL EROSION AND SEDIMENT CONTROL MEASURES OFF-SITE AND IN A LEGAL MANNER.
16. ACCESS ROAD AND DEER EXCLUSION FENCING TO REMAIN IN PLACE UNTIL MONITORING PERIOD IS OVER.

DRAWING LIST:

LEGEND

- 820 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPERTY BOUNDARY
- SOILS BOUNDARY
- EXISTING TREES
- EXISTING WETLAND
- 820 — PROPOSED GRADING
- PALUSTRINE FORESTED WETLAND (RESTORATION) (2.23 ACRES)
- PALUSTRINE EMERGENT WETLAND (ENHANCEMENT) (0.69 ACRES)
- PALUSTRINE FORESTED WETLAND (CREATION) (1.61 ACRES)
- PALUSTRINE FORESTED WETLAND (CREATION-STAGING) (0.43 ACRES)
- RESIDENTAL (UPLAND) (0.72 ACRES)
- BIOFILTER SCRUB SHRUB WETLAND (STORMWATER) (0.02 ACRES)
- BIOFILTER SCRUB SHRUB WETLAND (RESTORATION) (0.04 ACRES)
- BIOFILTER SCRUB SHRUB WETLAND (CREATION) (0.09 ACRES)
- GROUNDWATER MONITORING WELL
- DEER EXCLUSION FENCE
- COMPOST FILTER SOCK
- TREE PROTECTION FENCE
- SOIL STOCKPILE
- CONSTRUCTION ENTRANCE

ISSUE	DATE	DESCRIPTION
01	2016-01-21	PRELIMINARY 30% DESIGN

PROJECT MANAGER	P. BROWNE
DESIGNED BY	J. ROEBIG
DRAWN BY	J. WYNOHRADNYK
PROJECT NUMBER	390-243732-011

LAKE ERIE CONNECTOR
TOWN OF GIRARD , PA.

GENERAL NOTES AND LEGEND

0 1" 2"

FILENAME G-02.dwg
SCALE NOT TO SCALE

SHEET G-02

BMPS TO BE USED:

THE FOLLOWING BEST MANAGEMENT PRACTICES (BMPS) ARE PROPOSED FOR EROSION AND SEDIMENTATION CONTROL BEFORE, DURING, AND AFTER EARTH DISTURBANCE ACTIVITIES. IN THE FOLLOWING DESCRIPTIONS, DISTURBED AREAS ARE CONSIDERED TO BE STABILIZED WHEN A UNIFORM 70 PERCENT PERENNIAL VEGETATIVE COVER HAS BEEN ACHIEVED, OR THE SURFACE HAS BEEN OTHERWISE COVERED WITH A DURABLE, MUD FREE DRIVING SURFACE.

MINIMIZE LENGTH OF OPEN EXCAVATION. ON MANY HVDC UNDERGROUND CABLE PROJECTS, CABLES ARE DIRECT BURIED IN OPEN TRENCHES, AND SINCE THE CABLES CAN BE UP TO 2,500 FEET LONG, UP TO 2,500 FEET OF OPEN TRENCH MUST BE KEPT OPEN UNTIL THE CABLE CAN BE LAID. FOR THIS PROJECT, CABLES WILL BE INSTALLED IN CONCRETE ENCASED DUCT BANKS. THE LENGTH OF OPEN TRENCH NECESSARY FOR THE INSTALLATION OF THE DUCT BANK WILL TYPICALLY BE LESS THAN 60 FEET, AND NO MORE THAN 150 FEET. FOR EACH CONSTRUCTION DAY, THE LENGTH OF CONSTRUCTION WILL BE LIMITED TO THAT WHICH CAN BE BACKFILLED IN THAT DAY. THE LENGTH OF TIME FOR AN EXCAVATION TO REMAIN OPEN IS THEREFORE MINIMIZED. AS SUCH, THE EROSION, SEDIMENT TRANSPORT, AND DEWATERING ASSOCIATED WITH OPEN TRENCHES WILL ALSO BE MINIMIZED. THIS DOES NOT PRECLUDE THE INSTALLATION OF CERTAIN SHORT LENGTHS OF CABLE BY DIRECT BURIAL. THIS ALSO DOES NOT PRECLUDE LEAVING THE ENDS OF THE DUCT BANK EXPOSED OVERNIGHT, PROVIDED PROPER SAFETY MEASURES ARE USED TO PROTECT THE OPEN EXCAVATION.

HORIZONTAL DIRECTIONAL DRILLING. AT CERTAIN STREAMS, HDD WILL BE USED TO CONSTRUCT THE CABLE CONDUITS ACROSS THE STREAMS, MAINTAINING A MINIMUM 3 FOOT COVER BETWEEN THE CONDUIT AND THE STREAM BOTTOM. AN INADVERTENT FLUID RELEASE PREVENTION, MONITORING, AND CONTINGENCY PLAN HAS BEEN DEVELOPED TO ADDRESS THE INADVERTENT RELEASE OF DRILLING FLUIDS TO THE SURFACE OR DUE TO WEAK SPOTS IN THE SOIL.

AVOID CONSTRUCTION DURING STREAM FLOW. AT CERTAIN EPHEMERAL OR INTERMITTENT STREAMS, CONSTRUCTION ACROSS THE STREAM WILL BE LIMITED TO OCCUR ONLY WHEN THERE IS NO STREAM FLOW.

CULVERT BYPASS. AT CERTAIN STREAMS WHERE AN EXISTING ROADWAY CROSSES THE STREAM OVER AN EXISTING CULVERT, THE CABLE DUCT BANK WILL BE PLACED A MINIMUM OF 3 FEET UNDERNEATH THE CULVERT. THE CULVERT WILL REMAIN IN PLACE DURING CONSTRUCTION TO CONVEY THE STREAM ACROSS THE DUCT BANK EXCAVATION.

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK. A ROCK CONSTRUCTION ENTRANCE WITH WASH RACK WILL BE CONSTRUCTED WHERE CONSTRUCTION VEHICLES ACCESS CERTAIN AREAS OF THE PROJECT, PARTICULARLY CONSTRUCTION LAYDOWN AREAS. THE PURPOSE OF A ROCK CONSTRUCTION ENTRANCE WITH WASH RACK IS TO PREVENT SOIL LOSS FROM TRAFFIC LEAVING THE CONSTRUCTION SITE. WASH RACKS IN CONSTRUCTION ENTRANCES ARE FOR WASHING OF TIRES ONLY – WHERE IT IS NECESSARY TO WASH AN ENTIRE VEHICLE PRIOR TO LEAVING THE SITE, THIS SHOULD BE DONE AT A SITE DESIGNED TO PREVENT UNTREATED NUTRIENT-ENRICHED WASTEWATER OR HAZARDOUS WASTES FROM BEING DISCHARGED TO SURFACE OR GROUND WATERS. THE LOCATION AND DETAILS FOR THE ROCK CONSTRUCTION ENTRANCE WITH WASH RACK ARE SHOWN ON THE E&SC PLAN DRAWINGS. THE ROCK CONSTRUCTION ENTRANCE WITH WASH RACK WILL BE INSTALLED BEFORE SIGNIFICANT EARTH DISTURBANCE IS TO OCCUR AT THE SITE, AND WILL REMAIN IN PLACE UNTIL THE SITE IS STABILIZED SUCH THAT NO SIGNIFICANT SOIL LOSS ONTO ADJACENT ROADWAYS IS EXPECTED.

COMPOST FILTER SOCK. COMPOST FILTER SOCK WILL BE PLACED DOWNGRADIENT OF CERTAIN DISTURBED AREAS TO PREVENT THE TRANSPORT OF SEDIMENT OFFSITE. DETAILS OF THE COMPOST FILTER SOCK AS WELL AS LOCATIONS FOR PLACEMENT ARE SHOWN ON THE E&SC PLAN DRAWINGS. SEDIMENT WILL BE REMOVED FROM THE FILTER SOCK WHEN ACCUMULATIONS REACH ONE HALF THE HEIGHT OF THE SOCK. COMPOST FILTER SOCKS WILL BE INSTALLED BEFORE SIGNIFICANT EARTH DISTURBANCE OCCURS UPGRADIENT OF THE COMPOST FILTER SOCK, AND WILL REMAIN IN PLACE UNTIL UPGRADIENT DISTURBED AREAS HAVE BEEN STABILIZED.

ROCK FILTER. ROCK FILTERS WILL BE USED IN EXISTING CHANNELS AND ROADSIDE DITCHES DOWNGRADIENT OF DISTURBED AREAS. DETAILS OF ROCK FILTERS AS WELL AS LOCATIONS FOR PLACEMENT ARE SHOWN ON THE E&SC PLAN DRAWINGS. ROCK FILTERS WILL INCLUDE A 6 INCH LAYER OF COMPOST ON THE UPGRADIENT SIDE. ROCK FILTERS WILL BE INSTALLED BEFORE SIGNIFICANT EARTH DISTURBANCE OCCURS UPGRADIENT OF THE ROCK FILTER, AND WILL REMAIN IN PLACE UNTIL UPGRADIENT DISTURBED AREAS HAVE BEEN STABILIZED, INCLUDING THE CHANNEL LINING ITSELF, IF NECESSARY.

EROSION CONTROL MULCH BLANKET. EROSION CONTROL MULCH BLANKETS WILL BE INSTALLED ON DISTURBED SLOPES 3H:1V AND STEEPER. SPECIFICATIONS FOR EROSION CONTROL MULCH BLANKETS ARE PRESENTED ON THE E&SC PLAN DRAWINGS. EROSION CONTROL MULCH BLANKETS WILL BE INSTALLED AS SOON AS PRACTICAL AFTER FINAL GRADE HAS BEEN ACHIEVED, AND WILL REMAIN IN PLACE AS THE PERMANENT VEGETATIVE COVER IS ESTABLISHED.

PUMPED WATER FILTER BAGS. PUMPED WATER FILTER BAGS WILL BE CONNECTED TO THE DISCHARGE END OF ALL DEWATERING PUMPS. PUMPED WATER FILTER BAGS WILL BE SURROUNDED BY A COMPOST FILTER SOCK RING FOR ALL DEWATERING OPERATIONS WITHIN THE CROOKED CREEK WATERSHED. BAGS SHALL BE LOCATED IN A WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.

VEGETATIVE STABILIZATION. VEGETATIVE STABILIZATION CONSISTS OF FINAL GRADING, TOPSOIL PLACEMENT, SEEDING, AND MULCHING. IF WEATHER CONDITIONS ARE FAVORABLE, PERMANENT SEEDING WILL TAKE PLACE WITHIN 7 DAYS OF THE COMPLETION OF THE EARTH DISTURBANCE ACTIVITIES. OTHERWISE, TEMPORARY SEEDING AND MULCHING WILL BE IMPLEMENTED UNTIL CONDITIONS BECOME FAVORABLE FOR THE ESTABLISHMENT OF PERMANENT VEGETATIVE COVER. TEMPORARY SEEDING AND MULCHING WILL BE APPLIED TO EARTH-EXPOSED AREAS WHERE EARTHWORK IS DELAYED OR STOPPED FOR A PERIOD OF 4 OR MORE DAYS. TEMPORARY VEGETATIVE STABILIZATION WILL BE MAINTAINED UNTIL EARTHMOVING RECOMMENCES, OR UNTIL THE TEMPORARY VEGETATIVE STABILIZATION IS REPLACED BY PERMANENT VEGETATIVE STABILIZATION. SPECIFICATIONS FOR VEGETATIVE STABILIZATION ARE INCLUDED ON THE E&SC PLAN DRAWINGS.

INLET FILTER BAGS. STORM SEWER INLETS ARE PRESENT ONLY IN THE VICINITY OF ROUTE 20 AND TOWNLINE ROAD. INLET FILTER BAGS WILL BE PLACED IN THOSE INLETS DOWNGRADIENT OF CONSTRUCTION ACTIVITIES. THE FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SIEVE. TYPICAL INSTALLATION DETAILS ARE SHOWN ON THE E&SC PLAN DRAWINGS. INLET FILTER BAGS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

MAINTENANCE PROVISIONS

A MAINTENANCE PROGRAM FOR EROSION AND SEDIMENTATION CONTROL FACILITIES WILL BE IMPLEMENTED, CONSISTING OF INSPECTIONS BY THE CONTRACTOR TO OCCUR WEEKLY, AS WELL AS AFTER ANY STORMWATER EVENT, OR MORE FREQUENTLY WHERE INDICATED BELOW. EACH INSPECTION MUST BE DOCUMENTED IN WRITING AS TO THE DATE OF THE INSPECTION, THE PERSON PERFORMING THE INSPECTION, AND ANY BMP REPAIRS, REPLACEMENT OR MAINTENANCE ACTIVITIES THAT OCCUR. RECORDS OF THESE INSPECTIONS WILL BE KEPT ON SITE BY THE CONTRACTOR, AND WILL BE MADE AVAILABLE UPON REQUEST TO INSPECTORS FROM PADEP OR THE ERIE COUNTY CONSERVATION DISTRICT. INSPECTIONS WILL COVER ALL ASPECTS OF THE BMPS, PARTICULARLY WITH REGARD TO THE FOLLOWING:

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK. THE ROCK CONSTRUCTION SIZE AND THICKNESS WILL BE MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ADDITIONAL ROCK AS NECESSARY. A STOCKPILE WILL BE MAINTAINED ON SITE FOR THIS PURPOSE. THE DRAIN SPACE UNDER THE WASH RACK WILL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK WILL BE REPAIRED PRIOR TO FURTHER USE OF THE WASH RACK. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED FROM THE SITE ONTO ADJACENT ROADWAYS WILL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE. WASHING THE ROADWAY OR SWEEPING DEPOSITS INTO ROADSIDE DITCHES, STORM SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

COMPOST FILTER SOCK. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK. COMPOST FILTER SOCKS WILL BE RESET AS NECESSARY, AND REPAIRED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS. BIODEGRADABLE FILTER SOCKS WILL BE REPLACED AFTER SIX MONTHS; PHOTODEGRADABLE SOCKS AFTER ONE YEAR. POLYPROPYLENE SOCKS WILL BE REPLACED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. UPON REMOVAL, THE COMPOST FILTER SOCKS MAY BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

ROCK FILTER. COMPOST AND FILTER STONE THAT BECOMES CLOGGED WITH SEDIMENT WILL BE REPLACED. DAMAGED ROCK FILTERS WILL BE REPAIRED IMMEDIATELY AFTER INSPECTION.

EROSION CONTROL MULCH BLANKET. AREAS COVERED BY EROSION CONTROL MULCH BLANKETS WILL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70 PERCENT COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS WILL BE RESTORED OR REPLACED WITHIN 4 CALENDAR DAYS.

PUMPED WATER FILTER BAGS. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME 1/2 FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS SHALL BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED.

VEGETATIVE STABILIZATION. SEEDED AREAS WILL BE MAINTAINED IN ACCORDANCE WITH THE SPECIFICATIONS UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70 PERCENT COVERAGE.

INLET FILTER BAGS. INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. NEEDED REPAIRS SHOULD BE INITIATED IMMEDIATELY AFTER THE INSPECTION. FILTER BAGS SHOULD BE CLEANED AND/OR REPLACED WHEN THE BAG IS HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. ACCUMULATED SEDIMENT SHOULD BE DISPOSED IN THE APPROVED MANNER. BAGS THAT WILL BE REUSED SHOULD BE RINSED AT A LOCATION WHERE THE RINSE WATER WILL ENTER A SEDIMENT TRAP OR SEDIMENT BASIN. DAMAGED FILTER BAGS SHOULD BE REPLACED.

SOIL LIMITATIONS

SOIL NAME	CUTBANKS CAVE	CORROSIVE TO CONCRETE/STEEL	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE/ SEASONAL HIGH WATER TABLE	HYDRIC/HYDRIC INCLUSIONS	LOW STRENGTH/ LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK-SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
BARRIEN	X	s		X		X	X		X	X		X			X	
BIRDSALL	X	c/s				X	X	X	X	X	X	X	X		X	X
CANADICE	X	s		X		X	X	X	X		X	X	X		X	X
CONOTTON	X	c/s	X	X		X	X	X	X	X	X	X				
FREDON	X	c/s	X	X		X	X	X	X		X	X				X
HALSEY	X	c/s		X	X	X	X	X	X	X	X	X				X
OTTAWA	X	c	X						X			X				
PLATEA	X	c/s		X		X	X	X	X	X		X				X
RIMER	X	c/s	X	X		X	X		X	X	X	X	X			X
WALLINGTON	X	c/s		X		X	X	X	X	X	X	X				X
WAUSEON	X	c/s				X	X	X	X	X	X	X			X	X
WAYLAND	X	s		X	X	X	X	X	X	X	X	X			X	X

PROPOSED MEASURES TO ADDRESS SOIL LIMITATIONS

1. CUTBANKS CAVE. THERE WILL BE NO EXPOSED CUTBANKS UPON COMPLETION OF THE PROJECT. THE CONTRACTOR SHALL ADHERE TO ALL OSHA REGULATIONS REGARDING EXCAVATION AND SHORING/BRACING OR SLOPING TRENCH WALLS.
2. CORROSIVE TO CONCRETE/STEEL. CONCRETE AND STEEL STRUCTURES SHALL BE DESIGNED BY THE SUPPLIER FOR DIRECT BURIAL.
3. DROUGHTY. VEGETATION MANAGEMENT AREAS HAVE BEEN ESTABLISHED TO PROTECT THE CABLES FROM DRYOUT.
4. EASILY ERODIBLE. ALL DISTURBED SURFACES WILL BE STABILIZED EITHER WITH VEGETATION TO PREVENT EROSION. SLOPES OF 3H:1V AND STEEPER WILL BE STABILIZED USING AN EROSION CONTROL MULCH BLANKET UNTIL A UNIFORM 70% VEGETATIVE COVER HAS BEEN ESTABLISHED.
5. FLOODING. FLOODING IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.
6. DEPTH TO SATURATED ZONE/SEASONAL HIGH WATER TABLE. SOIL BORINGS HAVE BEEN INVESTIGATED AND THE SEASONAL HIGH WATER TABLE IS NOT EXPECTED TO CAUSE PROBLEMS FOR THIS PROJECT. APPROPRIATE DEWATERING BMPS ARE PROVIDED FOR DURING CONSTRUCTION.
7. HYDRIC/HYDRIC INCLUSIONS. WETLANDS HAVE BEEN DELINEATED WITHIN THE PROJECT AREA. THE THE AREA PROPOSED FOR DEVELOPMENT ON THE SITE HAS BEEN LOCATED TO PROTECT THE DELINEATED WETLANDS.
8. LOW STRENGTH/LANDSLIDE PRONE. THE PROPOSED GRADES AND CONSTRUCTION ACTIVITIES LOCATED IN THESE AREAS ARE NOT SUBJECT TO LANDSLIDES.
9. SLOW PERCOLATION. SLOW PERCOLATION IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.
10. PIPING. PIPING IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.
11. POOR SOURCE OF TOPSOIL. THE PROJECT IS NOT DEPENDENT UPON A SIGNIFICANT DEPTH OF TOPSOIL. WHAT TOPSOIL IS AVAILABLE ON SITE WILL BE STOCKPILED AND REDISTRIBUTED ON AREAS THAT ARE TO BE SEEDED. ANY ADDITIONAL TOPSOIL THAT IS REQUIRED BEYOND WHAT IS AVAILABLE ON SITE WILL BE IMPORTED FROM A SUPPLIER.
12. FROST ACTION. THIS LIMITATION WILL NOT HAVE AN ADVERSE EFFECT ON THE PROPOSED ACTIVITY.
13. SHRINK/SWELL. THIS LIMITATION WILL NOT HAVE AN ADVERSE EFFECT ON THE PROPOSED ACTIVITY.
14. PONDING. PONDING IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.
15. WETNESS. WETNESS IS NOT EXPECTED TO HAVE AN ADVERSE IMPACT ON THIS PROJECT.

STAGING OF CONSTRUCTION ACTIVITIES FOR SOIL EROSION AND SEDIMENT CONTROL

BMP INSTALLATION AND REMOVAL IN RELATION TO EARTH DISTURBANCE ACTIVITIES ARE PROJECTED TO PROCEED IN ACCORDANCE WITH THE FOLLOWING RELATIVE SEQUENCE. THIS SEQUENCE MAY BE REPEATED FOR DIFFERENT WORK AREAS AS THE PROJECT PROGRESSES.

1. SITE PREPARATION.
   a. INSTALL ROCK CONSTRUCTION ENTRANCE WITH WASH RACK AT REQUIRED ENTRANCES TO CONSTRUCTION LAYDOWN AREAS AND THE SITE.
   b. IN THE VICINITY OF THE WORK AREA, INSTALL COMPOST FILTER SOCK AS NOTED ON THE PLANS.
   c. IN DITCHES OR CHANNELS DOWNGRADIENT OF WORK AREAS, AS NOTED ON THE PLANS, INSTALL ROCK FILTERS.
   d. IMPLEMENT TRAFFIC CONTROL WHERE NECESSARY.
2. TEMPORARY SURFACE RESTORATION.
   a. FOR ROADWAYS, IMPROVED SHOULDERS, AND DRIVEWAYS, SURFACE WILL BE RESTORED TEMPORARILY WITH A MINIMUM OF 18 INCHES OF COMPACTED PENNDOT 2A COARSE AGGREGATE. FINAL RESTORATION OF ROADWAYS AND SHOULDERS MAY OCCUR LATER IN ACCORDANCE WITH TOWNSHIP SPECIFICATIONS.
   b. FOR NON-ROADWAY AREAS, SURFACE WILL BE ROUGH GRADED TO BE SLIGHTLY HIGHER THAN ADJACENT GRADE.
3. DEMOBILIZE THE SITE AND CONSTRUCTION LAYDOWN AREAS.
4. REMOVE ROCK CONSTRUCTION ENTRANCES AND WASH RACKS.
5. APPLY PERMANENT VEGETATIVE STABILIZATION TO ALL REMAINING DISTURBED AREAS; APPLY EROSION CONTROL MULCH BLANKET TO ALL PERMANENT SLOPES OF 3:1 OR GREATER.
6. AFTER ALL UPGRADIENT DISTURBED AREAS HAVE BEEN STABILIZED WITH PERMANENT VEGETATION, REMOVE COMPOST FILTER SOCKS AND ROCK FILTERS.

RECYCLING MATERIAL AND WASTE/BORROW AREAS

EXCESS EXCAVATED MATERIAL AND SEDIMENTS REMOVED FROM BMPS MAY BE USED AS FILL IN A NON-WETLAND UPLAND AREA. ALL BUILDING MATERIALS AND WASTES (DEMOLITION DEBRIS, CONCRETE WASHOUT, EXCESS BUILDING MATERIALS, ETC.) MUST BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH PADEP AND OTHER APPLICABLE REGULATIONS. NO BUILDING MATERIALS OR WASTES WILL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE. ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS MUST BE FOLLOWED IN THE USE, HANDLING, AND DISPOSAL OF POTENTIALLY HAZARDOUS MATERIALS.

FOR CONCRETE OPERATIONS, A SUITABLE WASHOUT FACILITY MUST BE PROVIDED FOR THE CLEANING OF CHUTES, MIXERS, AND HOPPERS OF THE DELIVERY VEHICLES UNLESS SUCH A FACILITY WILL BE USED AT THE SOURCE OF THE CONCRETE. WASH WATER FROM THESE VEHICLES WILL NOT BE ALLOWED TO ENTER ANY SURFACE WATERS. PROPER SIGNAGE WILL BE PROVIDED TO DRIVERS SO THAT THEY ARE AWARE OF THE PRESENCE OF WASHOUT FACILITIES. WASHOUT FACILITIES SHOULD NOT BE PLACED WITHIN 50 FEET OF STORM DRAINS, OPEN DITCHES OR SURFACE WATERS. THEY SHOULD BE IN A CONVENIENT LOCATION FOR THE TRUCKS, PREFERABLY NEAR THE PLACE WHERE THE CONCRETE IS BEING POURED, BUT FAR ENOUGH FROM OTHER VEHICULAR TRAFFIC TO MINIMIZE THE POTENTIAL FOR ACCIDENTAL DAMAGE OR SPILLS. WHEREVER POSSIBLE, THEY SHOULD BE LOCATED ON SLOPES NOT EXCEEDING A 2 PERCENT GRADE. SELF-INSTALLED, EARTHEN WASHOUTS SHOULD BE EXCAVATED BELOW GRADE TO PREVENT RUNOFF OF THE WASH WATER AND MINIMIZE THE POTENTIAL FOR BREACHING. THEY SHOULD BE SIZED TO HANDLE SOLIDS, WASH WATER, AND RAINFALL. A BELOW-GRADE WASHOUT SHOULD BE A MINIMUM OF 10 FEET WIDE AND PROVIDE AT LEAST 12 INCHES OF FREEBOARD ABOVE THE LIQUID AND SOLID WASTE ANTICIPATED BETWEEN CLEANOUT INTERVALS. THE PIT SHOULD BE LINED WITH PLASTIC SHEETING OF AT LEAST 10-MIL THICKNESS (WITH NO HOLES OR TEARS) TO PREVENT LEACHING OF LIQUIDS INTO THE GROUND. SEDIMENT BASINS AND SEDIMENT TRAPS MAY NOT BE USED AS CONCRETE WASHOUT DEVICES, SINCE THEY DISCHARGE DIRECTLY TO SURFACE WATERS. ALL CONCRETE WASHOUT FACILITIES SHOULD BE INSPECTED DAILY. DAMAGED OR LEAKING WASHOUTS SHOULD BE DEACTIVATED AND REPAIRED OR REPLACED IMMEDIATELY. ACCUMULATED MATERIALS SHOULD BE REMOVED WHEN THEY REACH 75 PERCENT CAPACITY. PLASTIC LINERS SHOULD BE REPLACED WITH EACH CLEANING OF THE WASHOUT FACILITY.

INVASIVE SPECIES CONTROL

PER THE RECOMMENDATIONS OF PA. DCNR, THE FOLLOWING STEPS SHOULD BE TAKEN TO HELP PREVENT THE SPREAD OF INVASIVE SPECIES:
1. THE AREA OF DISTURBANCE SHOULD BE MINIMIZED TO THE FULLEST EXTENT THAT WOULD ALLOW FOR CONSTRUCTION. THIS WILL HELP TO LESSEN THE AREA OF SOIL AND VEGETATION DISTURBANCE ASSOCIATED WITH THIS PROJECT.
2. IF POSSIBLE, CLEAN ALL CONSTRUCTION EQUIPMENT AND VEHICLES THOROUGHLY (ESPECIALLY THE UNDERCARRIAGE AND WHEELS) BEFORE THEY ARE BROUGHT ON SITE. THIS WILL REMOVE INVASIVE PLANT SEEDS FROM THE EQUIPMENT AND UNDERCARRIAGES OF THE VEHICLES THAT MAY HAVE BEEN PICKED UP AT OTHER SITES.
3. AVOID USING SEED MIXES THAT INCLUDE INVASIVE PLANT SPECIES (E.G. CROWN VETCH) TO RE-VEGETATE THE AREA. USE WEED-FREE STRAW OR HAY MIXES WHEN POSSIBLE.

GENERAL NOTES:

IN THE FOLLOWING NOTES, "DEPARTMENT" REFERS TO THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, NORTHWEST REGIONAL OFFICE, 230 CHESTNUT STREET, MEADVILLE PA 16335, AND "LOCAL CONSERVATION DISTRICT" REFERS TO THE ERIE COUNTY CONSERVATION DISTRICT, 1927 WAGER ROAD, ERIE PA 16509.

1. ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.
2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON-SITE PRECONSTRUCTION MEETING.
3. AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1-800-242-1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES. THE SERIAL NUMBERS FOR THIS PROJECT ARE 20152940877, 20152941001, 20152941002, 20152941042, 20152941043, 20152941104, 20152941105, 20152941193, 20152941245, 20152941277, 20152941278, 20152941342, 20152941567, 20152941568, 20152941661, 20152941788, AND 20152941789.
4. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.
5. AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.
6. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.
7. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.
8. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAPS(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER.
9. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.
10. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE.
11. ALL OFF-SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.
12. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.
13. ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS.
14. VEHICLES AND EQUIPMENT MAY NEITHER ENTER DIRECTLY NOR EXIT DIRECTLY FROM CONSTRUCTION LAYDOWN AREAS ONTO ADJACENT ROADWAYS EXCEPT AT DESIGNATED ROCK CONSTRUCTION ENTRANCES.
15. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPS SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.
16. A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.
17. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.
18. ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS.
19. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES — 6 TO 12 INCHES ON COMPACTED SOILS — PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.
20. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
21. ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
22. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
23. FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.
24. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
25. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
26. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED. SEEDED AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.
27. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON-GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
28. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR OTHER MOVEMENTS.
29. E&S BMPS SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.
30. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPS.
31. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPS SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.
32. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.
33. FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE PENNSYLVANIA CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.

FILL MATERIAL

IF THE SITE WILL NEED TO HAVE FILL IMPORTED FROM AN OFFSITE LOCATION, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND THE DETERMINATION OF CLEAN FILL WILL RESIDE WITH THE CONTRACTOR. IF THE SITE WILL HAVE EXCESS FILL THAT WILL NEED TO BE EXPORTED TO AN OFFSITE LOCATION, THE RESPONSIBILITY OF CLEAN FILL DETERMINATION AND ENVIRONMENTAL DUE DILIGENCE RESTS ON THE OWNER. THIS INFORMATION SHALL BE COMPLETED PRIOR TO CONDUCTING THE WORK. IF ALL CUT AND FILL MATERIALS WILL BE USED ON THE SITE, A CLEAN FILL DETERMINATION IS NOT REQUIRED BY THE CONTRACTOR UNLESS THERE IS A BELIEF THAT A SPILL OR RELEASE OF A REGULATED SUBSTANCE OCCURRED ON SITE.

ALL OFF-SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR DEP FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.

FILL MATERIAL SHALL NOT BE PLACED WITHIN 50' OF THE TOP OF STREAM BANKS.

OWNER AND/OR CONTRACTOR MUST USE ENVIRONMENTAL DUE DILIGENCE TO ENSURE THAT THE FILL MATERIAL ASSOCIATED WITH THIS PROJECT QUALIFIES AS CLEAN FILL. DEFINITIONS OF CLEAN FILL AND ENVIRONMENTAL DUE DILIGENCE ARE PROVIDED BELOW.

CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON-WATER SOLUBLE, NON-DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE-USE.)

ENVIRONMENTAL DUE DILIGENCE: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS.

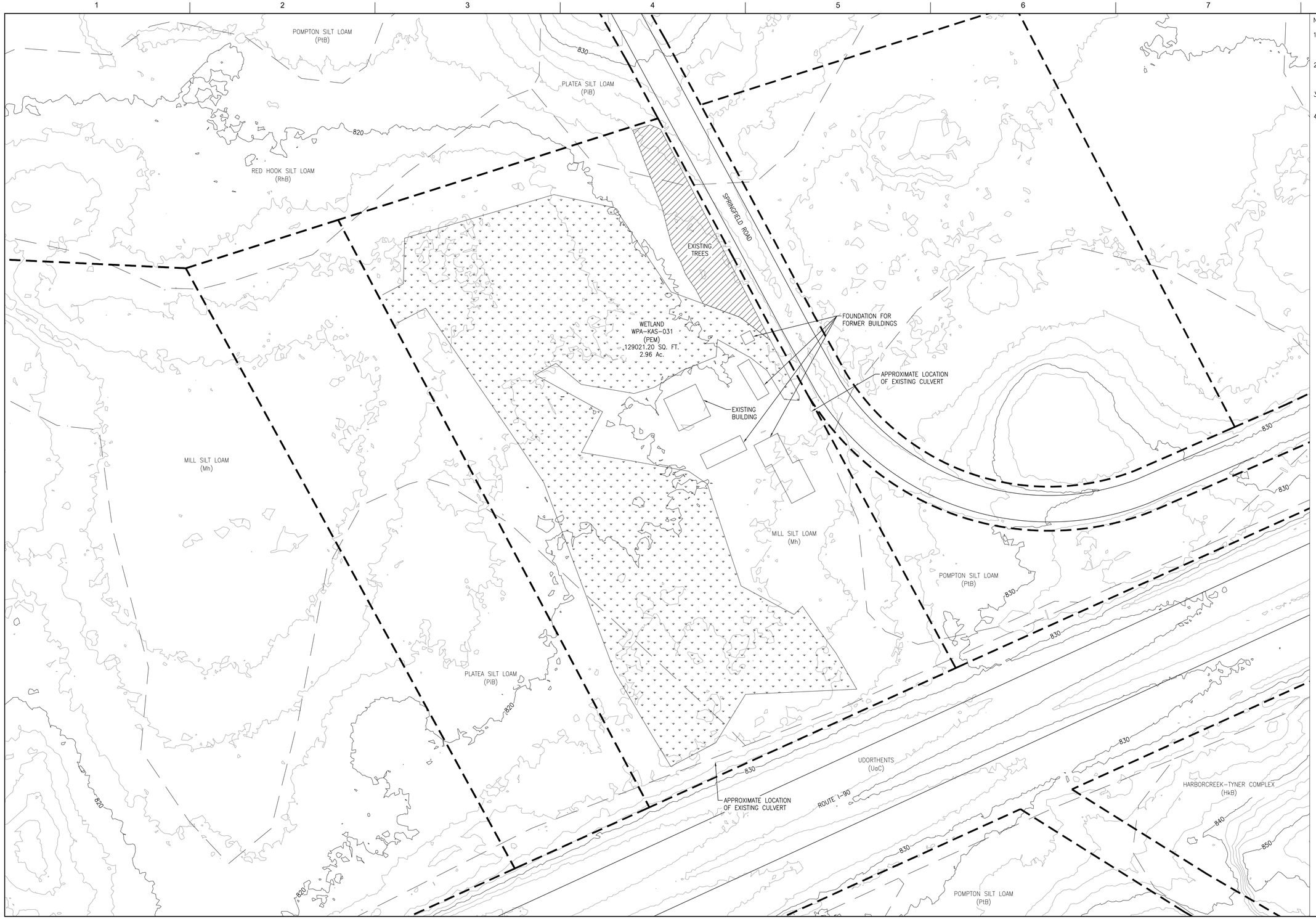
ISSUE	DATE	DESCRIPTION
01	2016-01-21	PRELIMINARY 30% DESIGN

PROJECT MANAGER: P. BROWNE
DESIGNED BY: J. ROEBIG
DRAWN BY: J. WYNOHRADNYK
PROJECT NUMBER: 390-243732-011

LAKE ERIE CONNECTOR
TOWN OF GIRARD , PA.

SOIL EROSION AND SEDIMENT CONTROL NOTES

FILENAME: G-03.dwg
SCALE: NOT TO SCALE
SHEET: G-03



NOTES:

1. EXISTING 2 FOOT LIDAR TOPOGRAPHY INFORMATION SHOWN HEREIN OBTAINED FROM FROM THE PENNSYLVANIA SPATIAL DATA ACCESS (PASDA).
2. COORDINATE SYSTEM REFERS TO STATE PLANE PENNSYLVANIA NORTH ZONE, NAD 83, UNITS US SURVEY FEET.
3. EXISTING WETLAND DELINEATION FOR BASE MAPPING BY HDR ENGINEERING, INC.
4. PROPERTY LINES ARE BASED ON COUNTY TAX MAPS AND ARE APPROXIMATE.

N

0 50 100
SCALE IN FEET

ISSUE	DATE	DESCRIPTION
01	2016-01-21	PRELIMINARY 30% DESIGN

PROJECT MANAGER	P. BROWNE
DESIGNED BY	J. ROEBIG
DRAWN BY	J. WYNOHRADNYK
PROJECT NUMBER	390-243732-011

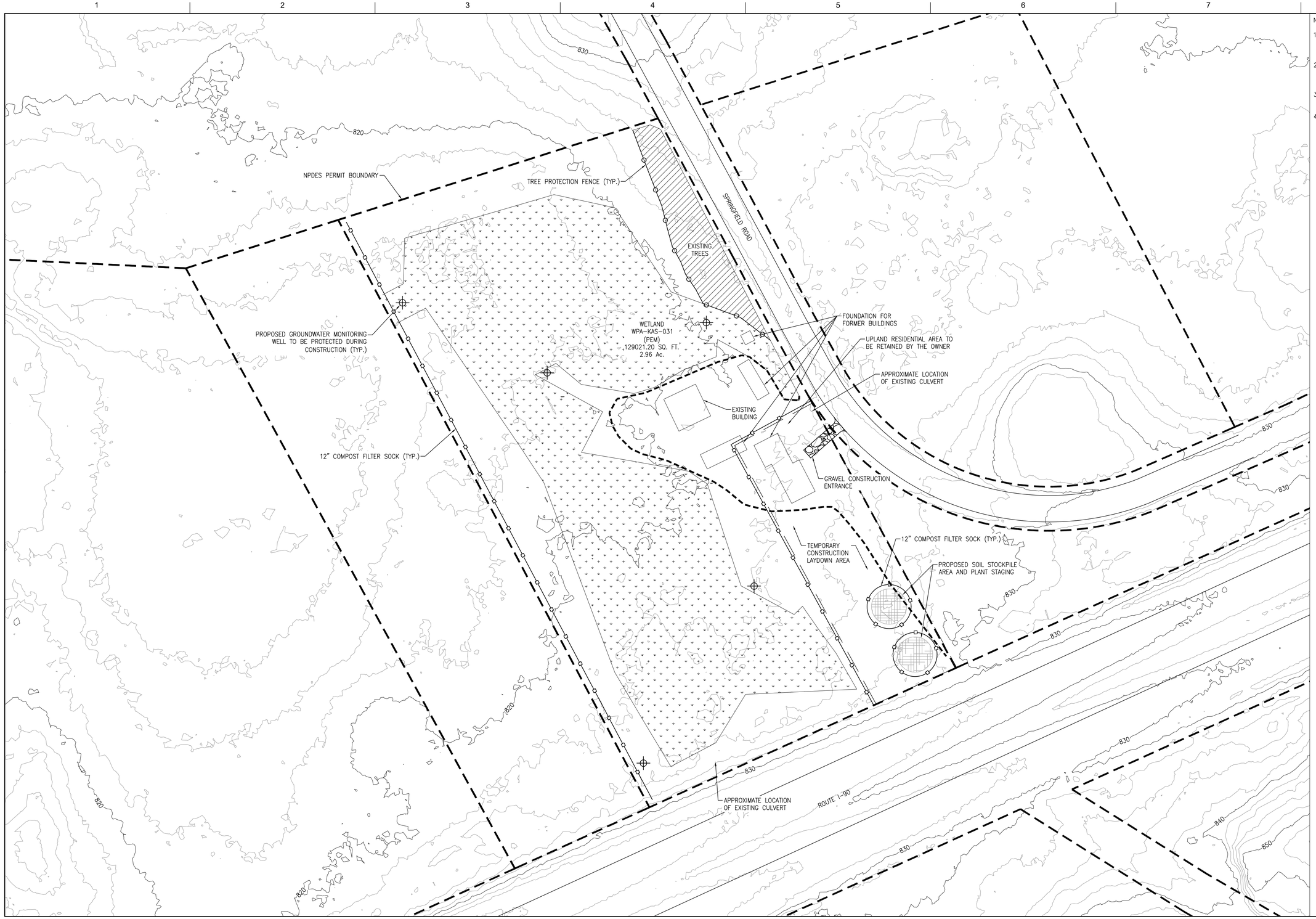
LAKE ERIE CONNECTOR
TOWN OF GIRARD , PA.

EXISTING CONDITIONS PLAN

0 1" 2"

FILENAME C-01.dwg
SCALE AS SHOWN

SHEET
C-01



NOTES:

1. EXISTING 1 FOOT LIDAR TOPOGRAPHY INFORMATION SHOWN HEREIN OBTAINED FROM FROM THE PENNSYLVANIA SPATIAL DATA ACCESS (PASDA).
2. COORDINATE SYSTEM REFERS TO STATE PLANE PENNSYLVANIA NORTH ZONE, NAD 83, UNITS US SURVEY FEET.
3. EXISTING WETLAND DELINEATION FOR BASE MAPPING BY HDR ENGINEERING, INC.
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ISSUE	DATE	DESCRIPTION
01	2016-01-21	PRELIMINARY 30% DESIGN

PROJECT MANAGER	P. BROWNE
DESIGNED BY	J. ROEBIG
DRAWN BY	J. WYNOHRADNYK
PROJECT NUMBER	390-243732-011

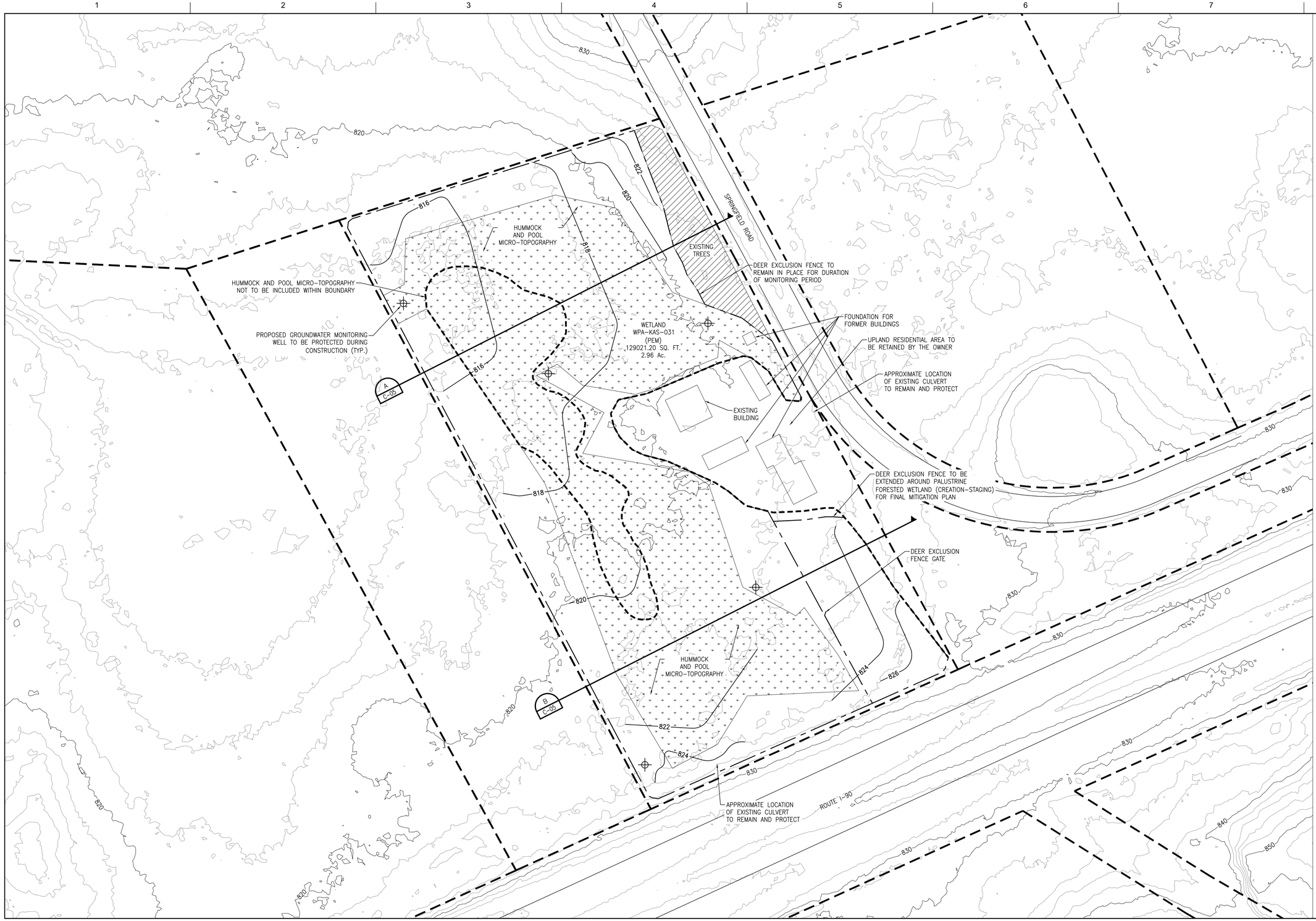
LAKE ERIE CONNECTOR
TOWN OF GIRARD , PA.

SOIL EROSION AND SEDIMENT CONTROL PLAN

0 1" 2"

FILENAME C-02.dwg
SCALE AS SHOWN

SHEET C-02



NOTES:

1. EXISTING 2 FOOT LIDAR TOPOGRAPHY INFORMATION SHOWN HEREIN OBTAINED FROM FROM THE PENNSYLVANIA SPATIAL DATA ACCESS (PASDA).
2. COORDINATE SYSTEM REFERS TO STATE PLANE PENNSYLVANIA NORTH ZONE, NAD 83, UNITS US SURVEY FEET.
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ISSUE	DATE	DESCRIPTION
01	2016-01-21	PRELIMINARY 30% DESIGN

PROJECT MANAGER	P. BROWNE
DESIGNED BY	J. ROEBIG
DRAWN BY	J. WYNOHRADNYK
PROJECT NUMBER	390-243732-011

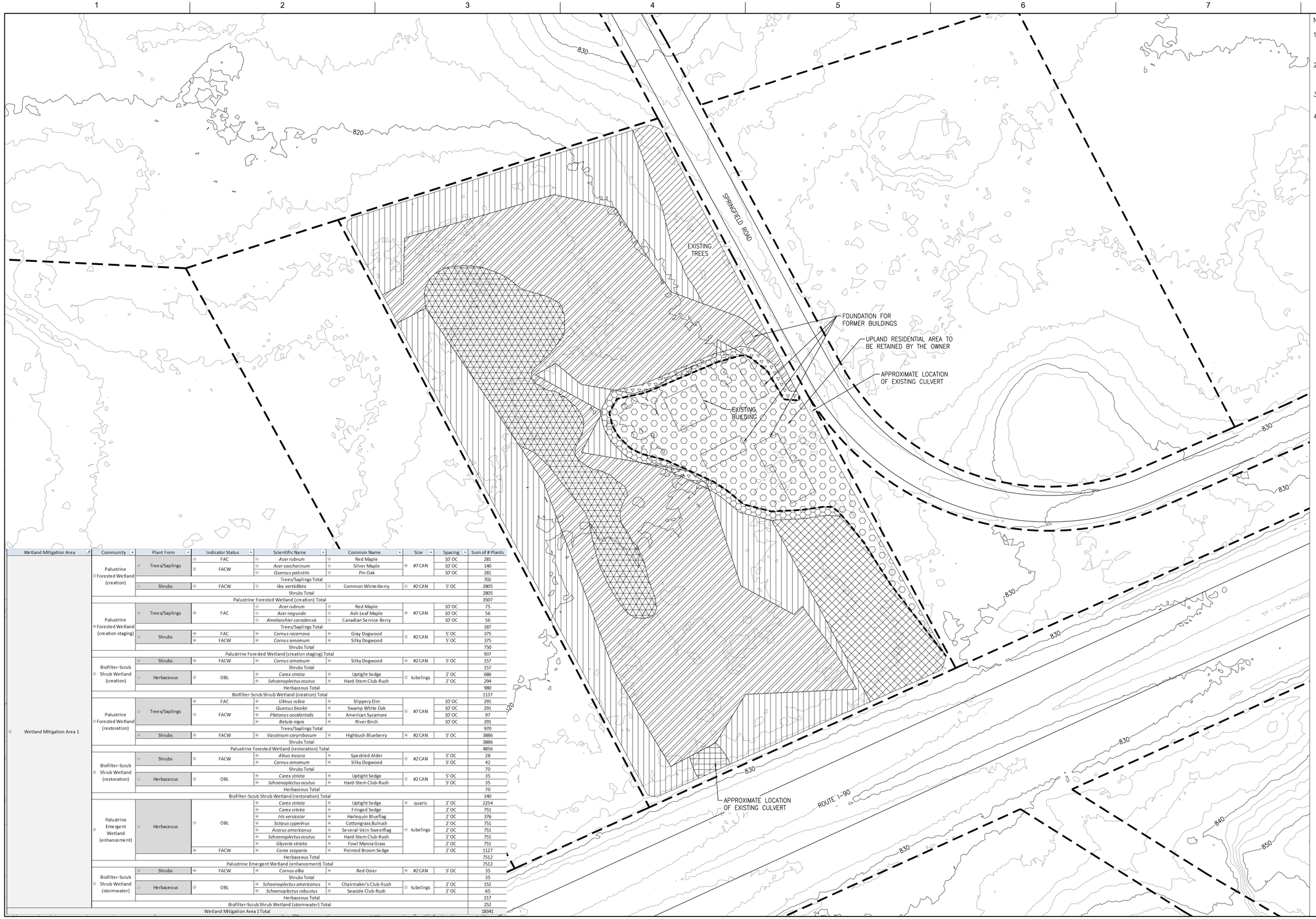
LAKE ERIE CONNECTOR
TOWN OF GIRARD , PA.

GRADING PLAN

0 1" 2"

FILENAME C-03.dwg
SCALE AS SHOWN

SHEET C-03



Wetland Mitigation Area	Community	Plant Form	Indicator Status	Scientific Name	Common Name	Size	Spacing	Sum of # Plants
Wetland Mitigation Area 1	Palustrine Forested Wetland (creation)	Trees/Saplings	FAC	*Acer rubrum*	Red Maple		10' OC	281
			FACW	*Acer saccharinum*	Silver Maple	#7 CAN	10' OC	140
				Quercus palustris	Pin Oak		10' OC	281
				Trees/Saplings Total				702
		Shrubs	FACW	*Ilex verticillata*	Common Winterberry	#2 CAN	5' OC	2805
				Shrubs Total				2805
				Palustrine Forested Wetland (creation) Total				3507
	Palustrine Forested Wetland (creation staging)	Trees/Saplings	FAC	*Acer rubrum*	Red Maple		10' OC	75
				Acer negundo	Ash-Leaf Maple	#7 CAN	10' OC	56
				Amelanchier canadensis	Canadian Service-Berry		10' OC	56
				Trees/Saplings Total				187
		Shrubs	FAC	*Cornus racemosa*	Gray Dogwood	#2 CAN	5' OC	375
			FACW	*Cornus amomum*	Silky Dogwood		5' OC	375
				Shrubs Total				750
				Palustrine Forested Wetland (creation staging) Total				937
	Biofilter-Scrub Shrub Wetland (creation)	Shrubs	FACW	*Cornus amomum*	Silky Dogwood	#2 CAN	5' OC	157
				Shrubs Total				157
		Herbaceous	OBL	*Carex stricta*	Uptight Sedge	tubelings	2' OC	686
				Schoenoplectus acutus	Hard-Stem Club-Rush		2' OC	294
				Herbaceous Total				980
				Biofilter-Scrub Shrub Wetland (creation) Total				1137
	Palustrine Forested Wetland (restoration)	Trees/Saplings	FAC	*Ulmus rubra*	Slippery Elm		10' OC	291
			FACW	*Quercus bicolor*	Swamp White Oak	#7 CAN	10' OC	291
				Platanus occidentalis	American Sycamore		10' OC	97
				Betula nigra	River Birch		10' OC	291
				Trees/Saplings Total				970
		Shrubs	FACW	*Vaccinium corymbosum*	Highbush Blueberry	#2 CAN	5' OC	3886
				Shrubs Total				3886
				Palustrine Forested Wetland (restoration) Total				4856
	Biofilter-Scrub Shrub Wetland (restoration)	Shrubs	FACW	*Alnus incana*	Speckled Alder	#2 CAN	5' OC	28
				Cornus amomum	Silky Dogwood		5' OC	42
				Shrubs Total				70
		Herbaceous	OBL	*Carex stricta*	Uptight Sedge	#2 CAN	5' OC	35
				Schoenoplectus acutus	Hard-Stem Club-Rush		5' OC	35
				Herbaceous Total				70
				Biofilter-Scrub Shrub Wetland (restoration) Total				140
	Palustrine Emergent Wetland (enhancement)	Herbaceous	OBL	*Carex stricta*	Uptight Sedge	quarts	2' OC	2254
				Carex crinita	Fringed Sedge		2' OC	751
				Iris versicolor	Harlequin Blueflag		2' OC	376
				Scirpus cyperinus	Cottongrass Bulrush		2' OC	751
				Acorus americanus	Several-Vein Sweetflag	tubelings	2' OC	751
				Schoenoplectus acutus	Hard-Stem Club-Rush		2' OC	751
				Glyceria striata	Fowl Manna Grass		2' OC	751
			FACW	*Carex scoparia*	Pointed Broom Sedge		2' OC	1127
				Herbaceous Total				7512
				Palustrine Emergent Wetland (enhancement) Total				7512
	Biofilter-Scrub Shrub Wetland (stormwater)	Shrubs	FACW	*Cornus alba*	Red Osier	#2 CAN	5' OC	35
				Shrubs Total				35
		Herbaceous	OBL	*Schoenoplectus americanus*	Chairmaker's Club-Rush	tubelings	2' OC	152
				Schoenoplectus robustus	Seaside Club-Rush		2' OC	65
				Herbaceous Total				217
				Biofilter-Scrub Shrub Wetland (stormwater) Total				252
				Wetland Mitigation Area 1 Total				18341

NOTES:

1. EXISTING 2 FOOT LIDAR TOPOGRAPHY INFORMATION SHOWN HEREIN OBTAINED FROM FROM THE PENNSYLVANIA SPATIAL DATA ACCESS (PASDA).
2. COORDINATE SYSTEM REFERS TO STATE PLANE PENNSYLVANIA NORTH ZONE, NAD 83, UNITS US SURVEY FEET.
3. EXISTING WETLAND DELINEATION FOR BASE MAPPING BY HDR ENGINEERING, INC.
4. PROPERTY LINES ARE BASED ON COUNTY TAX MAPS AND ARE APPROXIMATE.

ISSUE	DATE	DESCRIPTION
02	2016-01-26	PRELIMINARY 30% DESIGN
01	2016-01-21	PRELIMINARY 30% DESIGN

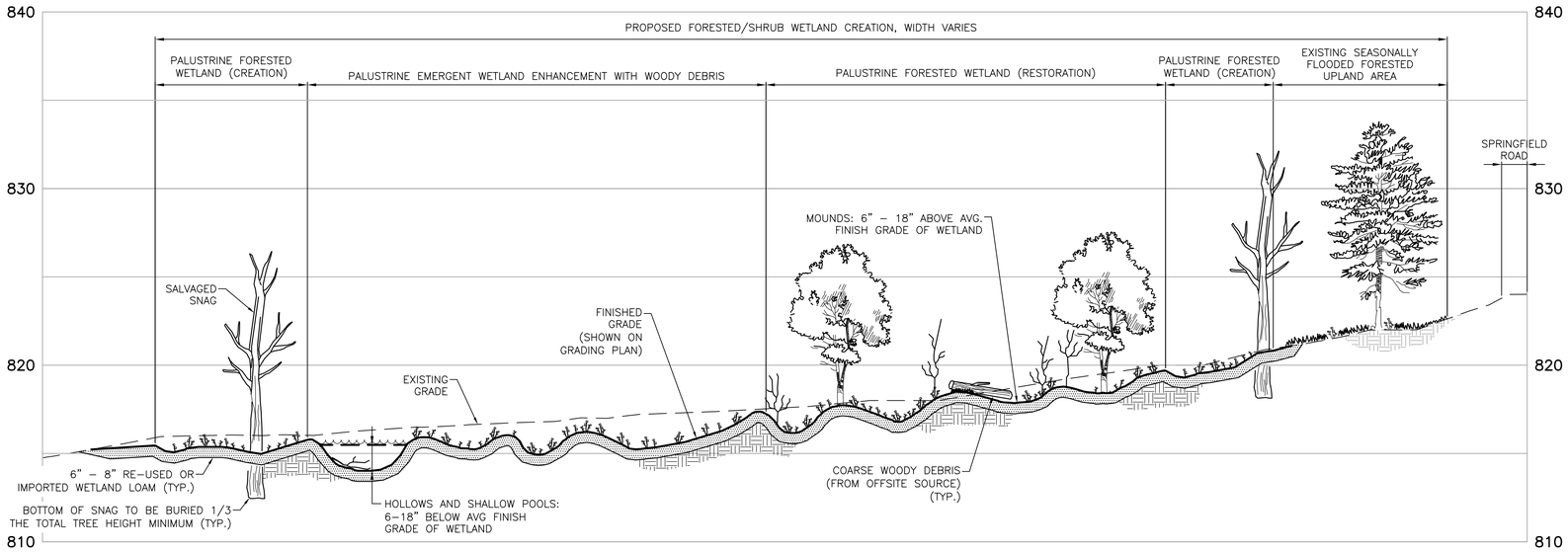
PROJECT MANAGER	P. BROWNE
DESIGNED BY	J. ROEBIG
DRAWN BY	J. WYNOHRADNYK
PROJECT NUMBER	390-243732-011

LAKE ERIE CONNECTOR
TOWN OF GIRARD , PA.

PROPOSED MITIGATION PLAN

0 1" 2"

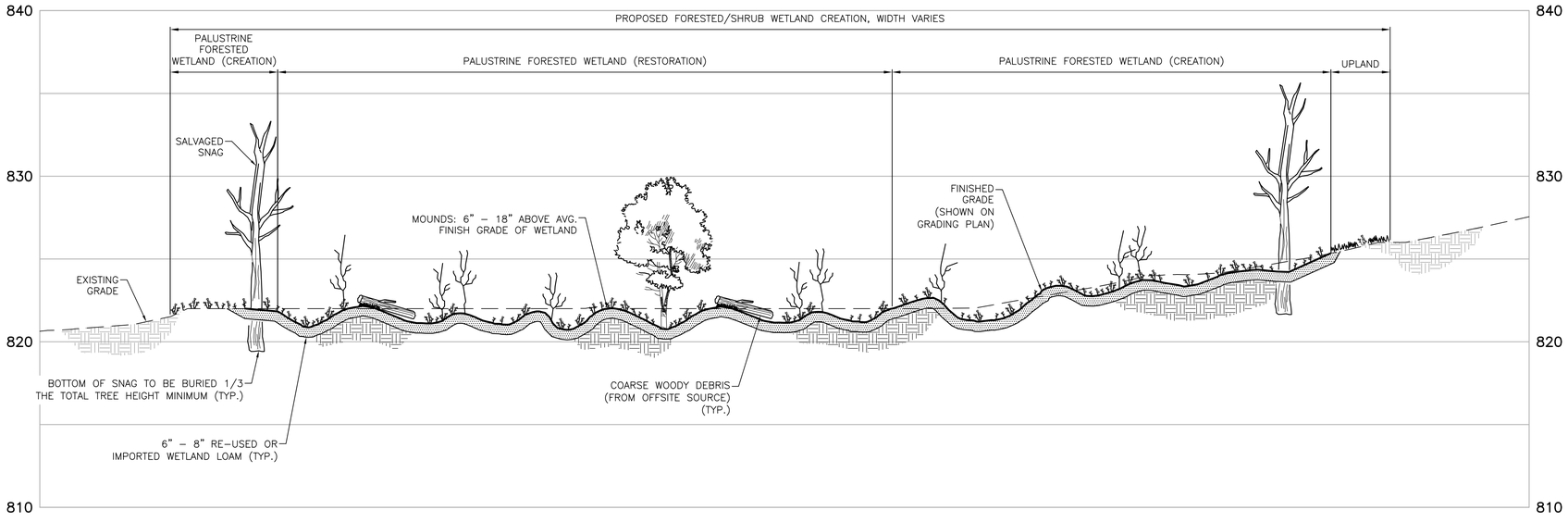
FILENAME	C-04.dwg
SCALE	AS SHOWN
SHEET	**C-04**



TYPICAL WETLAND SECTION
WETLAND CREATION/ENHANCEMENT/UPLAND BUFFER

A
C-03

HORIZONTAL SCALE: 1"=20', VERTICAL SCALE: 1"=5'



TYPICAL WETLAND SECTION
WETLAND CREATION/ENHANCEMENT/UPLAND BUFFER

B
C-03

HORIZONTAL SCALE: 1"=20', VERTICAL SCALE: 1"=5'

NOTES:

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2. COORDINATE SYSTEM REFERS TO STATE PLANE PENNSYLVANIA NORTH ZONE, NAD 83, UNITS US SURVEY FEET.
3. EXISTING WETLAND DELINEATION FOR BASE MAPPING BY HDR ENGINEERING, INC.
4. PROPERTY LINES ARE BASED ON COUNTY TAX MAPS AND ARE APPROXIMATE.

PROPOSED TREATMENTS:

1. EXCAVATION:
   A. FORESTED/SHRUB WETLAND CREATION/ENHANCEMENT: EXCAVATE/FILL TO NATIVE SOIL OR UP TO 8" BELOW FINISH GRADE. FORM SHALLOW POOLS AND PLANTING GROUPS.
   B. UPLAND BUFFER: EXCAVATE/FILL 4" TO 6" BELOW FINISH GRADE.
2. SOILS:
   A. FORESTED/SHRUB WETLAND CREATION/ENHANCEMENT: AS NECESSARY PLACE UP TO 8" OF IMPORTED WETLAND LOAM MIX OVER SUBGRADE MAINTAINING MICROTOPOGRAPHY FEATURES.
   B. WETLAND BUFFER: PLACE 4" TO 6" OF IMPORTED WEED–FREE MINERAL TOPSOIL.
3. PLANTINGS:
   A. FORESTED/SHRUB WETLAND CREATION/ENHANCEMENT: PLANTING GROUPS/SEEDED AREA – PLANT TREES AND SHRUBS. PLACE WETLAND SEED MIX IN REMAINING AREAS.
   B. UPLAND BUFFER: SEED UPLAND BUFFER WITH TMI UPLAND MEADOW MIX.

PROPOSED TREATMENTS:

1. EXCAVATION:
   A. FORESTED/SHRUB WETLAND CREATION/ENHANCEMENT: EXCAVATE/FILL TO NATIVE SOIL OR UP TO 8" BELOW FINISH GRADE. FORM SHALLOW POOLS AND PLANTING GROUPS.
   B. UPLAND BUFFER: EXCAVATE/FILL 4" TO 6" BELOW FINISH GRADE.
2. SOILS:
   A. FORESTED/SHRUB WETLAND CREATION/ENHANCEMENT: AS NECESSARY PLACE UP TO 8" OF IMPORTED WETLAND LOAM MIX OVER SUBGRADE MAINTAINING MICROTOPOGRAPHY FEATURES.
   B. WETLAND BUFFER: PLACE 4" TO 6" OF IMPORTED WEED–FREE MINERAL TOPSOIL.
3. PLANTINGS:
   A. FORESTED/SHRUB WETLAND CREATION/ENHANCEMENT: PLANTING GROUPS/SEEDED AREA – PLANT TREES AND SHRUBS. PLACE WETLAND SEED MIX IN REMAINING AREAS.
   B. UPLAND BUFFER: SEED UPLAND BUFFER WITH TMI UPLAND MEADOW MIX.

5 0 5 10
VERTICAL SCALE: 1"=5'

20 0 20 40
HORIZONTAL SCALE: 1"=20'

ISSUE	DATE	DESCRIPTION
01	2016-01-21	PRELIMINARY 30% DESIGN

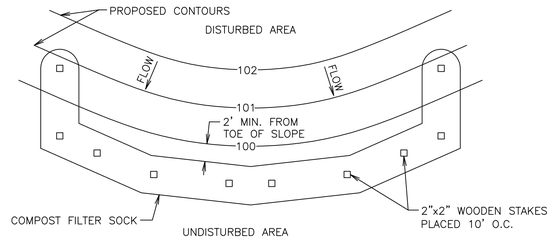
PROJECT MANAGER	P. BROWNE
DESIGNED BY	J. ROEBIG
DRAWN BY	J. WYNOHRADNYK
PROJECT NUMBER	390-243732-011

LAKE ERIE CONNECTOR
TOWN OF GIRARD , PA.

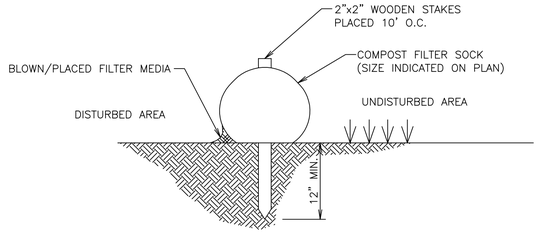
WETLAND MITIGATION SECTIONS

0 1" 2"

FILENAME	C-05.dwg
SCALE	AS SHOWN
SHEET	C-05



PLAN VIEW



SECTION VIEW

NOTES:

1. COMPOST SHALL MEET THE FOLLOWING STANDARDS:

ORGANIC MATTER CONTENT	25%–100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5–8.5
MOISTURE CONTENT	30%–60%
PARTICLE SIZE	30%–50% PASS THROUGH 3/8" SIEVE
SOLUBLE SALT CONCENTRATION	5.0 dS MAXIMUM

2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT.

3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.

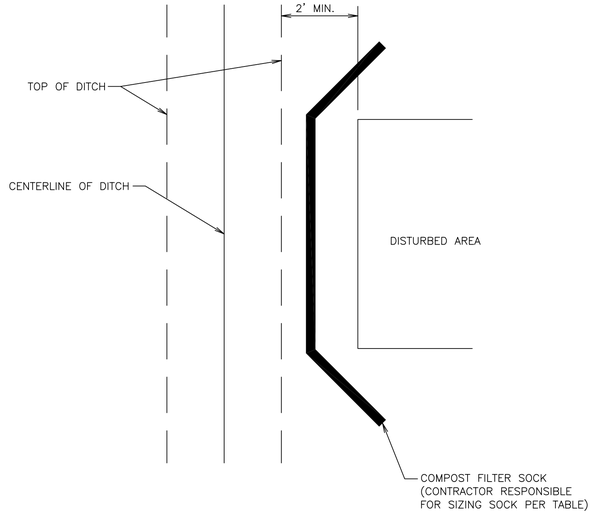
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES ½ THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE THE PLAN.

5. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCK SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

6. BIODEGRADABLE FILTER SOCK SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

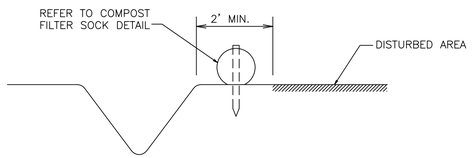
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

D | 1 / C–06 COMPOST FILTER SOCK
N.T.S.

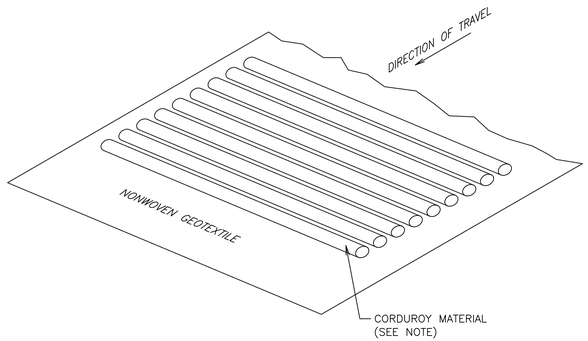


SLOPE %	MAXIMUM SLOPE LENGTH (FEET)				
	8 IN. (200 MM)	12 IN. (300 MM)	18 IN. (450 MM)	24 IN. (600 MM)	32 IN. (800 MM)
2(OR LESS)	400	520	690	1,000	1,300
5	200	250	340	500	650
10	100	150	250	300	400
15	50	100	190	250	350
20	30	70	140	200	250
25	20	60	100	150	180
30	20	40	80	100	130
35	20	40	70	90	100
40	15	35	55	75	90
45	10	30	45	60	80
50	10	30	35	45	60

TABLE CREATED FROM DATA IN FIGURE 4.2 OF THE MARCH 2012, "PA. DEP EROSION AND SEDIMENTATION POLLUTION CONTROL MANUAL."



D | 2 / C–06 DISTURBANCE ADJACENT TO DITCHES (TYP.)
N.T.S.



NOTES:

1. COVER CROSSING AREA WITH NONWOVEN GEOTEXTILE.
2. LAY PIECES OF ROUNDWOOD, MILL SLABWOOD, BRUSH, OR SLASH ONTO THE GEOTEXTILE, PERPENDICULAR TO THE DIRECTION OF TRAVEL. EACH PIECE OF CORDUROY SHOULD BE AS LONG AS ANY WEAK AREAS (OR AT LEAST AS LONG AS THE EQUIPMENT USING THE CROSSING) TO PROVIDE MAXIMUM FLOATATION. LAYER THE MATERIAL FOR ADDITIONAL STRENGTH IF NEEDED.
3. SIZE INDIVIDUAL PIECES OF CORDUROY TO MEET ANTICIPATED LOADS, SOIL STRENGTH, AND INSTALLATION EQUIPMENT. USE LONGER CORDUROY ON VERY WEAK SOILS THAT HAVE A LOW BEARING STRENGTH (E.G. MUCK OR PEAT), TO SPREAD THE WEIGHT OVER A LARGER AREA.
4. ADD MORE CORDUROY TO REPAIR DAMAGED SECTIONS OR IF MATERIAL DOESN'T ADEQUATELY SUPPORT TRAFFIC.

D | 3 / C–06 TYPICAL CORDUROY TEMPORARY WETLAND CROSSING
N.T.S.

SEEDING SPECIFICATIONS

SPECIES:	TEMPORARY: PENNDOT FORMULA E MIX (ANNUAL RYEGRASS/PERENNIAL RYEGRASS/CREEPING RED OR CHEWINGS FESCUE/KENTUCKY BLUEGRASS)	GENERAL SITE (INCLUDING INFILTRATION BASINS): PENNDOT FORMULA B MIX
% PURITY	95	97/97/97
% GERMINATION	90	90/85/80
APPL. RATE (LB/ACRE)	48	203 TOTAL (41/60/102)

SOW SEEDS UNIFORMLY ON THE PREPARED AREAS BY HYDRAULIC PLACEMENT, BROADCASTING, DRILLING, OR HAND SEEDING METHODS. INSPECT SEEDING EQUIPMENT AND ADJUST THE EQUIPMENT, IF REQUIRED, TO ENSURE THE SPECIFIED APPLICATION RATES. PERIODICALLY PERFORM A CHECK ON THE RATE AND UNIFORMITY OF APPLICATION, AS DIRECTED. SEEDING MAY BE APPLIED MARCH 15 TO OCTOBER 15 FOR TEMPORARY; MARCH 15 – JUNE 1, AUGUST 1 – OCTOBER 15 FOR PERMANENT.

1. COMMERCIAL FERTILIZER SHALL BE 10–20–20 APPLIED AT 678 LB/ACRE AND BLENDED INTO THE TOPSOIL
2. LIMING RATE SHALL BE 1.9 TON/ACRE
3. A SLOW RELEASE NITROGEN FERTILIZER SHALL BE APPLIED TO THE SURFACE AND SHALL BE 38–0–0 UREAFORM FERTILIZER APPLIED AT 242 LB/ACRE OR 32–0–0 TO 38–0–0 SULFER COATED UREA FERTILIZER APPLIED AT 286 LB/ACRE TO 242 LB/ ACRE OR 31–0–0 IBDU FERTILIZER APPLIED AT 295 LB/ACRE

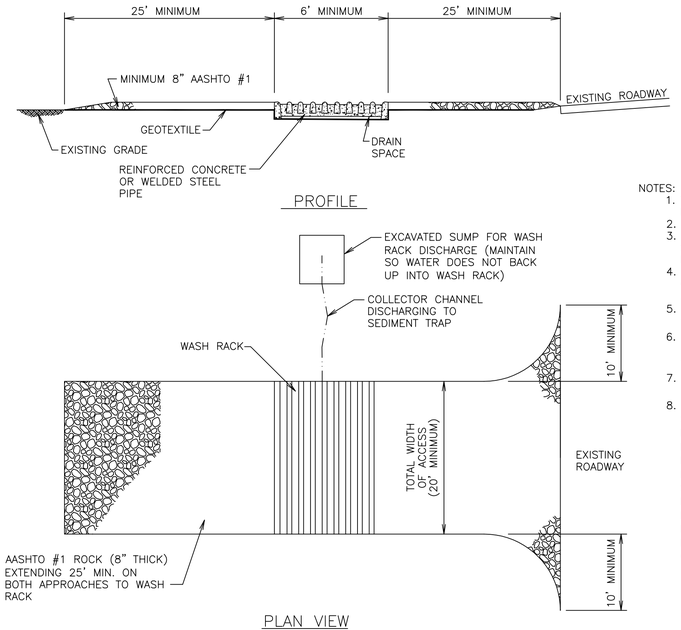
MULCH SHALL BE FREE FROM NOXIOUS WEEDS, MOLD, AND OTHER DELETERIOUS MATERIALS.

1. STRAW – EITHER WHEAT OR OAT STRAW, REASONABLY FREE OF VIABLE SEED, WELL CURED TO LESS THAN 20% MOISTURE CONTENT, BY WEIGHT AND OF PROPER CONSISTENCY FOR PLACING WITH COMMERCIAL MULCH BLOWING EQUIPMENT.

2. HAY – TIMOTHY HAY, MIXED CLOVER AND TIMOTHY HAY, OR OTHER ACCEPTABLE NATIVE OR FORAGE GRASSES, WELL–CURED TO LESS THAN 20% MOISTURE CONTENT, BY WEIGHT AND OF PROPER CONSISTENCY FOR PLACING WITH COMMERCIAL MULCH BLOWING EQUIPMENT.

APPLICATION: HAY OR STRAW MULCH SHALL BE SPREAD UNIFORMLY AT THE RATE OF 3.0 TONS PER ACRE TO PRODUCE A LAYER 1.0 TO 1.5 INCHES DEEP. MULCH SHALL BE SPREAD BY HAND, BLOWER–TYPE MULCH SPREADER, OR OTHER APPROVED METHOD. MULCHING SHALL BE STARTED ON THE WINDWARD SIDE OF RELATIVELY FLAT AREAS OR ON THE UPPER PART OF STEEP SLOPES, AND CONTINUED UNIFORMLY UNTIL THE AREA IS COVERED. THE MULCH SHALL NOT BE BUNCHED OR CLUMPED. SUNLIGHT SHALL NOT BE COMPLETELY EXCLUDED FROM PENETRATING TO THE GROUND SURFACE. ALL AREAS INSTALLED WITH SEED SHALL BE MULCHED ON THE SAME DAY AS THE SEEDING. MULCH SHALL BE ANCHORED IMMEDIATELY FOLLOWING SPREADING.

PROPERLY MAINTAIN MULCHED AREAS UNTIL THE ENTIRE PROJECT HAS BEEN COMPLETED. PROMPTLY REAPPLY MULCH MATERIALS WHICH BECOME DISLODGED OR LOST DUE TO WIND, RAIN, OR OTHER CAUSES, AT INITIAL OR MODIFIED RATES, AS DIRECTED. AFTER MULCHING WORK ON A SLOPE HAS BEEN SATISFACTORILY COMPLETED, IF A SLOPE FAILURE OCCURS THAT REQUIRES REDRESSING, EXCAVATION, OR THE ESTABLISHMENT OF A NEW SLOPE, REPLACE THE SEED AND MULCH, AS DIRECTED.



NOTES:

1. TOPSOIL SHOULD BE REMOVED PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE.
2. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.
3. RUNOFF SHALL BE DIVERTED FROM ROADWAY TO A SUITABLE SEDIMENT REMOVAL BMP PRIOR TO ENTERING ROCK CONSTRUCTION ENTRANCE.
4. MOUNTABLE BERM SHOULD BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED. PIPE TO BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.
5. WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS.
6. WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.
7. A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.
8. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWER, CULVERTS, OR OTHER DRAINAGEWAYS IS NOT ACCEPTABLE.

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK
N.T.S.

D | 4 / C–06 TYPICAL CORDUROY TEMPORARY WETLAND CROSSING
N.T.S.

ISSUE	DATE	DESCRIPTION
01	2016-01-21	PRELIMINARY 30% DESIGN

PROJECT MANAGER	P. BROWNE
DESIGNED BY	J. ROEBIG
DRAWN BY	J. WYNOHRADNYK
PROJECT NUMBER	390-243732-011

LAKE ERIE CONNECTOR
TOWN OF GIRARD , PA.

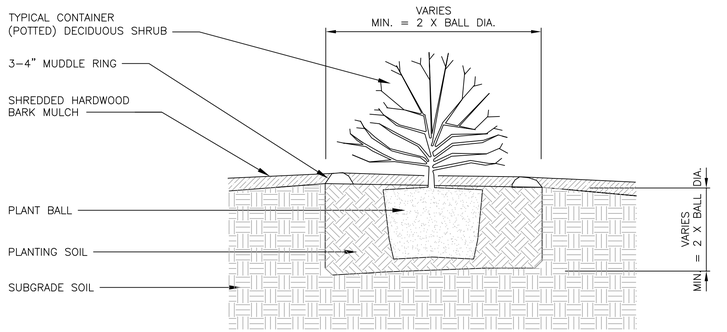
SOIL EROSION AND SEDIMENT CONTROL DETAILS

0 1" 2"

FILENAME C-06-07.dwg
SCALE NOT TO SCALE
SHEET C-06

NOTES:

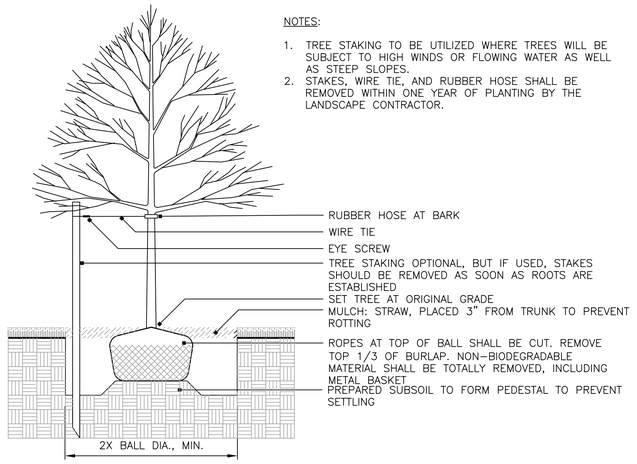
1. MULCH SHOULD BE PLACED 3" FROM TRUNK BASE TO PREVENT ROTTING.
2. PRUNE SHRUB AS RECOMMENDED BY GROWER ONLY AFTER THE PLANT HAS BEEN WATERED IN TO THE PLANTING SOIL



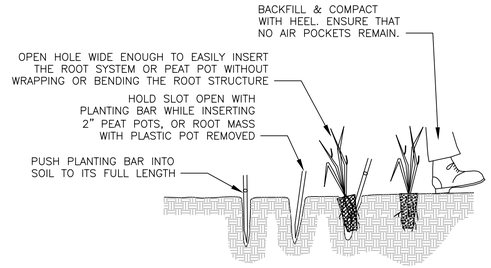
D/1 C-07 SHRUB PLANTING DETAIL
N.T.S.

NOTES:

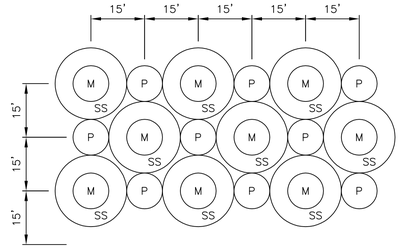
1. TREE STAKING TO BE UTILIZED WHERE TREES WILL BE SUBJECT TO HIGH WINDS OR FLOWING WATER AS WELL AS STEEP SLOPES.
2. STAKES, WIRE TIE, AND RUBBER HOSE SHALL BE REMOVED WITHIN ONE YEAR OF PLANTING BY THE LANDSCAPE CONTRACTOR.



D/2 C-07 DECIDUOUS TREE PLANTING DETAIL
N.T.S.



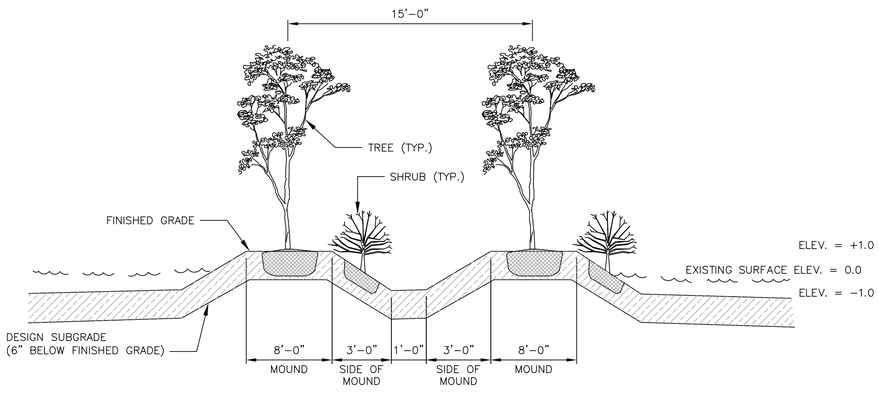
D/3 C-07 EMERGENT PLANT DETAIL
N.T.S.



NOTES:

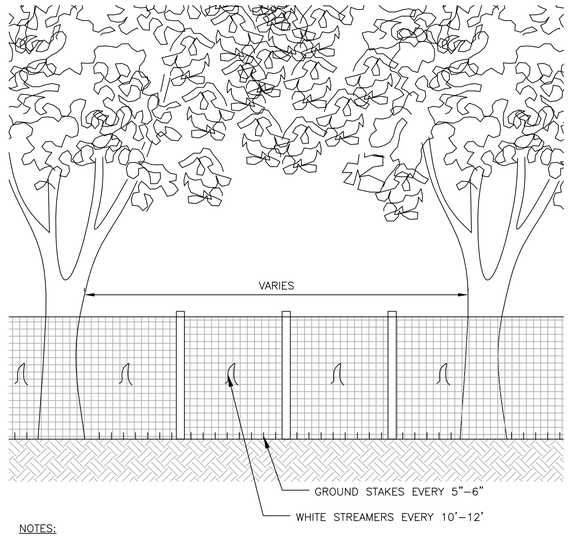
1. M = MOUND.
   P = POOL
   SS = SIDE SLOPE
2. HUMMOCK SPACING PLAN ILLUSTRATES THE GENERAL CHARACTER, DENSITY AND SPACING OF THE MOUNDS (OR HUMMOCKS).
3. AVERAGE SPACING OF THE MOUNDS IS TO BE APPROXIMATELY 20 FEET O.C.
4. AVERAGE DENSITY OF THE MOUNDS SHALL BE 10 MOUNDS PER 5,000 SQUARE FEET.
5. FINAL MOUND ALIGNMENT SHOULD NOT BE IN STRAIGHT LINES BUT SHOULD APPEAR NATURALISTIC AT THE COMPLETION OF THE WORK.

D/4 C-07 HUMMOCK SPACING PLAN
N.T.S.



NOTES:
1. AVERAGE EXISTING SURFACE ELEVATION = 0.0
2. AVERAGE HUMMOCK ELEVATION = +1.0

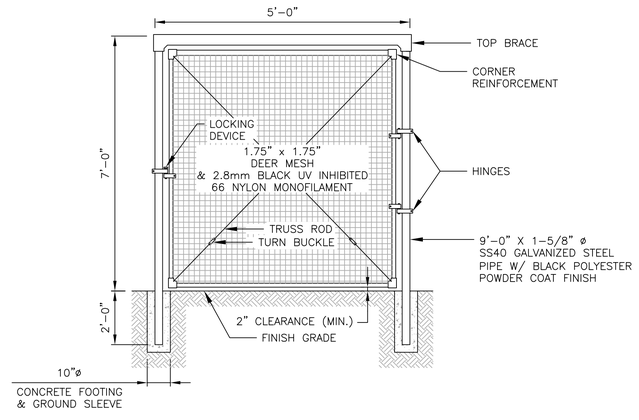
D/5 C-07 TREE HUMMOCK DETAIL
N.T.S.



NOTES:

1. 7.5' OPEN MESH POLY PROPYLENE DEER FENCING SYSTEM (E.G. BENNER'S GARDEN HEAVY PERIMETER FENCE, OR APPROVED EQUAL) TO BE INSTALLED AROUND THE PERIMETER OF THE PLANTING AS SHOWN ON THIS DRAWING.
2. TREES MAY BE USED TO SUPPORT DEER FENCE.
3. ALL DEER FENCING SHALL BE MAINTAINED FOR THE DURATION OF THE CONTRACT.

D/6 C-07 DEER FENCE DETAIL
N.T.S.



D/7 C-07 DEER FENCE ACCESS GATE DETAIL
N.T.S.

ISSUE	DATE	DESCRIPTION
01	2016-01-21	PRELIMINARY 30% DESIGN

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DRAWN BY	J. WYNOHRADNYK
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PLANTING DETAILS

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SHEET C-07