Conservation Plan for Identified Species of Special Concern

PNDI No. 22275 (Update 22275)

Pennsylvania Pipeline Project

Allegheny, Berks, Blair, Cambria, Chester, Cumberland, Dauphin, Delaware, Huntingdon, Indiana, Juniata, Lancaster, Lebanon, Perry, Washington, Westmoreland, and York Counties, Pennsylvania

Prepared for:

Sunoco Logistics, L.P.

525 Friztown Road

Sinking Spring, PA 19608

Prepared by:

Tetra Tech, Inc.

661 Anderson Drive

Pittsburgh, Pennsylvania 15220

(412) 921-7090

Fax (412) 921-4040

Submitted to:

PA Department of Conservation of Natural Resources

Bureau of Forestry, Ecological Services Section

ATTN: Mr. Jason Ryndock or Mr. Frederick Sechler

400 Market Street

Harrisburg, Pennsylvania 17105

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TABLE OF CONTENTS

Section **Page**

LIST OF APPENDICES

Appendix

LIST OF FIGURES

Figures

LIST OF TABLES

Tables

LIST OF ACRONYMS and ABBREVIATIONS

ACRONYM	MEANING
COC	Community of Concern
HDD	Horizontal Directional Drill
LOD	Limit of Disturbance
LE	Federal Listed Endangered
ME1	Mariner East Pipeline – Houston to Delmont
N	No Legal Status
NGL	Natural Gas Liquid
PA	Pennsylvania
PA DCNR	Pennsylvania Department of Conservation and Natural Resources
PA DEP	Pennsylvania Department of Environmental Protection
PE	Pennsylvania Endangered
PNDI	Pennsylvania Natural Diversity Index
PNHP	Pennsylvania Natural Heritage Program
Pop.	Population(s)
PPP	Pennsylvania Pipeline Project
PR	Pennsylvania Rare
Project	Pennsylvania Pipeline Project
PT	Pennsylvania Threatened
ROW	Right-of-Way
SOSC	Species of Special Concern
SPLP	Sunoco Pipeline, L.P.
Tetra Tech	Tetra Tech Inc.
TU	Tentatively Undetermined
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

1.0 INTRODUCTION

1.1 PURPOSE OF CONSERVATION PLAN

The purpose of this Conservation Plan is to provide a summary of the proposed project description, pre-construction conservation measures, a summary of the anticipated impacts, and a description of specific conservation measures being implemented to avoid or minimize potential impacts to identified SOSC populations in the vicinity of the Project.

1.2 PROJECT OVERVIEW

Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project (PPP or Project) to expand existing pipeline systems and provide natural gas liquid (NGL) transportation of up to 350,000 barrels per day. The Project involves the phased installation of approximately 561 miles of two parallel pipelines within a 306-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania (PA) to SPLP's Marcus Hook facility in, Delaware County, Pennsylvania with the purpose of interconnecting with existing SPLP Mariner East pipelines. These lines would parallel the previously installed Mariner East 8-inch line for the majority of the Project. Initially, a 20-inch diameter pipeline would be installed within the ROW from Houston, PA to the Marcus Hook facility (306 miles) and a second, up to 20-inch diameter pipeline, is proposed be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, Pennsylvania to the Marcus Hook facility, paralleling the initial line for approximately 255 miles. The proposed pipeline Project location is illustrated on the U.S. Geologic Survey (USGS) Project Location Map provided as Figure 1.

Large project information including a large project form, project description, and preliminary project USGS topographic mapping was initially provided to the Pennsylvania Department of Conservation and Natural Resources (PA DCNR) under the preliminary project name "Mariner East 2 Pipeline - Trans-Pennsylvania". The Mariner East 2 Project originally encompassed all of the project activities within the state of PA, excluding areas covered in the Mariner East Pipeline – Houston to Delmont (ME1) project. Mr. Jason Ryndock and Mr. Frederick Sechler of the PA DCNR utilized the initial large project information to define areas of concern (AOCs) where botanical surveys were required for the specific species of special concern (SOSC) and communities of concern (COC) listed in the Pennsylvania Natural Diversity Index (PNDI) search receipts 22275, dated January 30, 2014 and Update 22275, dated March 13, 2014. All PNDI search receipts are provided in the PPP Botanical Survey Report being submitted concurrently with this Conservation Plan.

After the initial submission to the PA DCNR the Mariner East 2 Project activities and boundaries were broken up into two separate projects; the Pennsylvania Pipeline Project (PPP or Project) and the Ohio Pipeline Project (OPP). A separate botanical report, dated February 2015 was submitted for the OPP portion of Washington County, PA. The Pennsylvania Pipeline Project includes Allegheny, Berks, Blair, Cambria, Chester, Cumberland, Dauphin, Delaware, Huntingdon, Indiana, Juniata, Lancaster, Lebanon, Perry, Westmoreland, and York Counties. The Ohio Pipeline Project included the portions of Washington County west of the existing plant located in Houston, PA. The portion of Washington County to the east of the existing Houston, PA plant, all of Allegheny County, and the portion of Westmoreland County west of Delmont, PA were all previously surveyed during the botanical survey of the ME1 project under PNDI 22132 (Updated 22007). The Botanical Survey Report PNDI No. 22132 (Updated 22007) Mariner East Pipeline – Houston to Delmont is included in the PPP Botanical Survey Report submittal package. PA DCNR clearance letters from the ME1 and OPP botanical surveys have been included in the accompanying PPP Botanical Survey Report.

1.3 SURVEY OVERVIEW

In summary, Tetra Tech on behalf of SPLP conducted field surveys in accordance with DCNR's *Protocols for Conducting Surveys for Plant Species of Special Concern, Part 2 of 4*, Conducting the Botanical Survey (PNHP 2015a). The limits of the study area were based on an approximately 300-foot wide survey corridor that encompassed the pipeline's limit of disturbance (LOD), a 100-foot wide survey corridor encompassing access roads, and the LOD of ancillary facilities (Figures 2-Index-1 to 2-Index-11). AOCs that fell completely outside the survey corridor were not included in the botanical survey. This includes areas initially provided by the PA DCNR that fell outside the survey corridor and areas where the pipeline was rerouted, resulting in the provided AOC existing entirely outside the survey corridor.

Habitat and hydrologic requirements for the SOSC were determined prior to conducting the survey. Field investigations of the AOCs occurred within the survey corridor crossings of AOCs. Botanical surveys were conducted over the 2014 and 2015 growing seasons. The timing of these surveys coincided with the recommended survey periods for the AOC specific SOSC listed on the PNDI response letter and listed in Table 1 of Appendix D in the PPP Botanical Survey Report. The multiple rounds of field surveys ensured that all SOSC listed in the search receipt that were within the defined survey corridor were surveyed for during the recommended survey period. Phenology, habitat preferences, and representative and voucher photographs of the identified SOSC discussed in this conservation plan can also be found within PPP Botanical Survey Report.

Surveys for individual plants were done by two or three individuals walking in a systematic back-and-forth meander through the survey corridor within the assigned AOC. Less accessible areas (e.g. steep slopes or cliffs and extremely dense thicket communities) were surveyed in a random manner, slightly different than the methods mentioned above, but still ensuring coverage of the entire study corridor. Vegetation was reviewed within the entire length and width of the survey corridor, associated access roads, and ancillary facility LODs that lay within each of the assigned AOCs.

In addition to the surveys that were conducted in this report for the PA state listed SOSC listed on PNDI search receipts 22275, coordination with the United States Fish and Wildlife Service (US FWS) yielded an additional required survey for the northeastern bulrush (*Scirpus ancistrochaetus*). Though survey areas for these two surveys overlapped in areas, a separate report will be generated for the northeastern bulrush survey. The bulrush report will be submitted to USFWS and all coordination regarding this federally listed species will be done with USFWS, but any identified populations of *S. ancistrochaetus* will be accounted for in both botanical reports.

All SOSC population information including SOSC identified, numbers of populations and individuals per population, AOCs of occurrences, population coordinate locations, and information regarding whether a voucher specimen was taken and submitted to a PA DCNR recognized herbarium is provided in the PPP Botanical Survey Report and the accompanying Botanical Survey KMZ being submitted concurrently with this conservation plan.

2.0 PRE-CONSTRUCTION CONSERVATION MEASURES

From the onset of the Project, SPLP has instructed project designers to consider environmental impacts in regard to all aspects of the proposed Project and to avoid and minimize wherever possible while allowing safe installation. Pipeline engineers were provided a large list of restrictions, recommendations, and requirements to consider during the design phase. Major considerations, including co-location with existing utility corridors, limiting the construction corridor to the minimum amount practicable, and use of horizontal directional drilling (HDD) technology, have been implemented to avoid and minimize environmental impacts at sensitive habitats.

SPLP has co-located the Project with an existing SPLP ROW for the majority of the route (~80%). With the use of portions of the existing ROW for construction, this is a major means for avoiding new impacts to sensitive resources (i.e., forested wetlands, forest areas, streams) and for minimizing environmental impacts for the entire Project. SPLP has also co-located with foreign utility lines whenever possible when routing pulls away from existing SPLP ROWs. In addition, SPLP has implemented a number route variations through environmental feedback, both minor and major, to further reduce the impacts associated with the Project. Many of these route variations are driven by environmental factors such as avoidance of forested wetlands or areas occupied by sensitive species.

In general, the construction ROW is limited to 75 feet in most areas. This is comprised of a 50-foot-wide permanent easement and 25 feet of temporary workspace required to facilitate construction. In some areas, additional temporary workspace is required to facilitate construction. The industry standard for installation of this size of pipe is 100 feet. Restricting construction to 75 feet significantly reduces impacts to the landscape including a large reduction in impacts to forested areas. Instead of continuing through the wetlands/streams with the 75-foot-wide construction ROW, SPLP has narrowed the construction ROW to 50 feet for all wetland/stream crossings, thus minimizing temporary impacts to wetlands/streams during construction. This narrow construction corridor, along with co-location efforts, has greatly minimized fragmentation of habitat impacts.

Another major construction alternative implemented by SPLP to avoid and minimize environmental impacts is the HDD boring method at areas of unique sensitivity (i.e., bog turtle habitat, rare plant populations, large rivers or reservoirs, forested wetlands, and cultural resource sites). Without HDD, typical construction methods through these areas would involve conventional pipeline trenching (i.e. open cut trenching) construction methods, resulting in significant impacts. Specifically, conventional construction throughout the entire Project length would have required clearing, grading, and the excavation and disturbance of approximately 100 acres of wetlands and approximately 87,000 feet of stream crossings (linear length of stream in construction ROW. In comparison, with the currently proposed locations of HDD construction, impacts have been reduced to approximately 38 acres of wetlands and approximately 52,800 feet of stream crossings. Consequently, the alternative HDD construction method has reduced impacts by approximately 62 acres to wetlands and 34,200 feet to streams. Based on these reduced impacts to wetland/stream resources, the overall Project will result in fewer biological impacts, decreased disturbance to soils, decreased erosion sedimentation and runoff, and less recreational impacts. As such, SPLP has agreed to employ HDD construction methods at certain wetland and stream crossings.

3.0 SUMMARY OF AVOIDANCE, MINIMIZATION, AND IMPACTS

3.1 ANTICIPATED IMPACT OVERVIEW

Proposed Project impacts were evaluated using both the current and proposed PA designations for the assigned state listed SOSC. Whether evaluating by current or proposed PA status, the 2 state and Federally Listed Endangered (LE) northeastern bulrush (*S. ancistrochaetus*) populations identified during the 2014-2015 northeastern bulrush botanical survey will be avoided and will not be impacted by the Project. All identified SOSC populations, population numbers, proposed conservation measures, and anticipated impacts are provided on the Summary of Anticipated Avoidance, Minimization, and SOSC Impacts Table provided as Table 1.

As indicated on the Summary of Anticipated Impacts to SOSC [utilizing Current PA Designations] Table, included as Table 2, forty-seven populations of identified SOSC will not be impacted when evaluating using the current PA designations (PNHP 2015). When using the current PA status two populations of PA Endangered (PE) SOSC, two populations of PA Threatened (PT) SOSC, and no populations of PA Rare (PR) SOSC are anticipated to be impacted (Tables 1 and 2).

As indicated on the Summary of Anticipated Impacts to SOSC [utilizing Proposed PA Designations] Table, included as Table 3, forty-seven populations of identified SOSC will not be impacted when evaluating using the proposed PA designations (PNHP 2015). When using the proposed PA status six populations of PE SOSC, no populations of PT SOSC, and eight populations of PR SOSC are anticipated to be impacted (Tables 1 and 3).

Significant effort was expended to utilize Best Management Practices (BMPs), such as temporary ROW "neck downs" or LOD reductions, HDD borings, and pipeline alignment rerouting, to avoid or minimize anticipated impacts to SOSC populations. Additional conservation measures such as topsoil segregation and replacement, "sod" excavation and replacement, and timber mat crossings will also be implemented to further avoid or minimize unavoidable anticipated impacts to specific SOSC populations. Conservation Measure Detail Maps, included as Figures 2-1 to 2-19, illustrate the additional conservation measures and BMPs employed to reduce or eliminate impacts.

3.2 CONSERVATION MEASURES BY AOC

The identified SOSC occurrences are fully documented in the PPP Botanical Survey Report, illustrated in Figures 2-1 to 2-19, and briefly summarized in Table 1 and in the AOC descriptions below. Occurrences of SOSC are discussed from west to east in order of the AOC in which they were encountered. AOCs were omitted from the conservation measure narratives below if no SOSC were identified within them. No impacts to any SOSC are anticipated in AOCs where no SOSC were identified.

3.2.1 AOC W10

While conducting botanical surveys for the federally LE northeastern bulrush (*S. ancistrochaetus*) at the request of USFWS in AOC W10, one population of PA state listed SOSC bushy bluestem (*Andropogon glomeratus*) was identified. *A. glomeratus* currently has a state status of TU, but a proposed status of PR (PNHP 2015). *A. glomeratus* Population (Pop.) 9 is located directly within the proposed limit of disturbance (LOD). Minimization through the use of soil segregation and replacement will reduce the unavoidable impacts to *A. glomeratus* Population 9 (Figure 2-1). The use of soil segregation and replacement is being considered a minimization measure in this instance due to the immediate adjacency to remaining large undisturbed seedbanks on either side of the LOD coupled with the species specific biology of this SOSC (Table 1).

3.2.2 UNASSIGNED AREA BETWEEN AOC W10 AND AOC ALT W1

While conducting botanical surveys for the LE northeastern bulrush (*S. ancistrochaetus*) four populations of the state listed *A. glomeratus* were identified in the vicinity of the Project between PA DCNR designated AOCs W10 and ALT W1. Additionally, during the same survey, one population of *A. podocarpa* and three populations of Appalachian Blue Violet (*Viola appalachiensis*) were observed, identified, delineated, and photographed (Table 1). *V. appalachiensis* and *A. podocarpa* currently have a state status of PT. *V. appalachiensis* has a proposed status of TU, and *A. podocarpa* has a proposed status of PR (PNHP 2015).

A. glomeratus Pop. 3 is located directly within the proposed permanent ROW for the Project. Unavoidable impacts to *A. glomeratus* Pop. 3 are anticipated as soil segregation and replacement will be implemented to minimize impacts (Figure 2-2). *A. glomeratus* Pop. 1 and Pop. 2 are located within the proposed path of the Project ROW, but a HDD bore will be utilized to travel beneath these two populations (Figure 2-3). A proposed temporary travel lane will still traverse *A. glomeratus* Pop. 1 utilizing timber mats to avoid earth disturbances. A "neck down" of the proposed travel lane LOD will avoid any impacts to *A. glomeratus* Pop. 2 (Table 1). *A. glomeratus* Pop. 4 is located outside the proposed LOD for the project and will not be impacted (Figure 2-3).

No Impacts to *A. podocarpa* Pop. 1 are anticipated because the stream crossing at this location will be "tied-in" and completed within a single crossing and within 24-48 hours (Figure 2-4). The trench will be opened and backfilled within this time frame. As an avoidance measure SPLP will "sod" excavate this plant and its roots and restore the area with the same sod upon restoration all within 24-48 hours. Before the crossing is initiated the population will be avoided by installation of construction fencing. The "tie-in" of this area, from pre-construction activities to restoration, will be monitored by a certified PA DEP botanist. The success of the restoration will be monitored the two days following restoration activities and again at 4 and 8 weeks following the restoration (Table 1).

Implementation of LOD reductions or "neck downs" of the proposed temporary ROW will avoid any impacts to *V. appalachiensis* Pop. 1 (Figure 2-5). Installation of an orange construction fence along the edge of the permanent ROW and implementation of an LOD reduction will minimize impacts to *V. appalachiensis* Pop. 2 (Figure 2-6). Impacts to *V. appalachiensis* Pop 3 will be minimized by inclusion of additional reductions of the temporary LOD near northern end of *V. appalachiensis* Pop. 3 (Figure 2-7). Minimal unavoidable impacts are anticipated to *V. appalachiensis* Pop. 3 where population overlaps wetland W-K27 (Table 1).

3.2.3 AOC ALT W1

While conducting botanical surveys for the federally listed northeastern bulrush (*S. ancistrochaetus*) at the request of USFWS, two populations of state and federally listed northeastern bulrush were identified within AOC ALT W1. Additionally, during the same survey, four populations of *A. glomeratus* were identified. *A. glomeratus* Pop. 6, Pop. 7, and Pop. 8 are located outside the proposed LOD for the project and will not be impacted (Figures 2-8 to 2-9). *S. ancistrochaetus* Pop. 1 and *A. glomeratus* Pop. 5 are located within the proposed Project LOD, but a HDD bore will be utilized to travel beneath these populations avoiding any potential impacts (Figure 2-9). Additionally, *S. ancistrochaetus* Pop. 2 was identified outside the proposed LOD for the project and will not be impacted (Figure 2-10 and Table 1).

3.2.4 AOC W14

Twenty populations of *A. virginica* were identified within AOC W14. *A. virginica* currently has a state status of "no legal status" (N), but has a proposed status of PR (PNHP 2015). *A. virginica* populations 1, 2, 11, 12, 13, 14, 18, 19, and 20 were observed outside of the proposed LOD and will not be impacted (Figures 2-11 to 2-12). *A. virginica* populations 4, 5, 6, 10, and 15 were observed within the proposed LOD, but LOD reductions of "neck downs" of the temporary ROW will avoid impacts to these populations (Figure 2-11). Unavoidable impacts to *A. virginica* populations 3, 8, and 16 are anticipated. Minimization through the use of soil segregation and replacement will reduce the unavoidable impacts to *A. virginica* populations 3, 8, and 16 (Figure 2-11 and Table 1).

The use of soil segregation and replacement is being considered a minimization measure in this instance due to the immediate adjacency to remaining large undisturbed seedbanks or clonal populations on either side of the LOD. This measure, coupled with the species specific biology of this SOSC, enhances the likelihood that the population will return to reproduce and recolonize. Minimization measures, in the form of a long temporary LOD reduction, will be utilized at *A. virginica* population 17 (Figure 2-11). Minimal unavoidable impacts are anticipated to at *A. virginica* population 17. Minimization measures, in the form of "neck downs" of the temporary ROW, will be utilized at *A. virginica* populations 7 and 9. Minimal unavoidable impacts are anticipated to at *A. virginica* populations 7 and 9 (Figure 2-11 and Table 1).

3.2.5 AOC E1

Five populations of *C. shortiana* were identified within AOC E1. *C. shortiana* currently has a state status of "no legal status" (N), but has a proposed status of PR (PNHP 2015). *C. shortiana* Pop. 1, Pop. 2, and Pop. 3 are located outside the proposed LOD for the project and will not be impacted (Figure 2-13). *C. shortiana* Pop. 4 and Pop. 5 are located within the proposed ROW, but a HDD bore will be utilized to travel beneath these populations avoiding any potential impacts (Figure 2-13). No impacts to any of the identified populations of *C. shortiana* are anticipated (Table 1).

3.2.6 AOC E2

A survey for racemed milkwort (*Polygala polygama*) within AOC E2, located in Perry County, Pennsylvania was conducted based on the PA DCNR defined AOC polygon that included a known documented population of the listed SOSC. As noted in the search receipt comments from the PA DCNR, a documented occurrence of *P. polygama* lies on a pipeline ROW in the Tuscarora State Forest lands within the assigned AOC. AOC E2 within a documented botanical plant sanctuary for the *P. polygama*. Six populations [5 polygons – two polygons were merged into one in July of 2015] of *P. polygama* were identified within AOC E2 (Table 1). *P. polygama* currently has a state status of TU, but has a proposed status of PE (PNHP 2015).

P. polygama Pop. 1, Pop. 2, Pop. 3, and Pop. 5 are located within the proposed temporary ROW for the Project. *P. polygama* Pop. 5 and Pop. 6 are located outside of the proposed LOD for the Project and will not be impacted (Figure 2-14). Minimal impacts to *P. polygama* populations 1, 2, 3, and 5 are anticipated but were minimized with a recent pipeline alignment and LOD shift [Post-PA DCNR visit; June 2015] (Figure 2-14). The routing through this State Forest has already been agreed upon by the PA DCNR and Tuscarora State Forest District Forester and was routed to the south of the known populations to avoid the majority of impacts to these SOSC. Any additional conservation measures and recommendations for this AOC (AOC E2) will be subject to comment by the PA DCNR and Tuscarora State Forest District Forester due to the presence of a Botanical Sanctuary present within this AOC.

3.2.7 AOC E3

Six populations of *R. missouriensis* were identified within AOC E3. *R. missouriensis* has a current and proposed state status of PE (PNHP 2015). *R. missouriensis* populations 1, 2, and 3 were observed outside of the proposed LOD and, therefore, will not be impacted (Figure 2-15). *R. missouriensis* Pop. 5 is located in the proposed temporary ROW but will be avoided with the implementation of a LOD reduction or "neck down" of the temporary ROW. Minimal impacts to *R. missouriensis* populations 4 and 6 are anticipated with narrow "neck downs" of the temporary ROW and relocation of proposed additional work spaces serving as minimization measures (Figure 2-15).

3.2.8 AOC E4

One population of *R. missouriensis* was identified within AOC E4. *R. missouriensis* Pop. 7 is located outside the proposed LOD for the project and will not be impacted. *R. missouriensis* has a current and proposed state status of PE (PNHP 2015). No other SOSC were identified within AOC E4 during the 2014 field investigations (Figure 2-16).

3.2.9 AOC E6

Four populations of *O. humifusa* were identified within AOC E6. *O. humifusa* has a current and proposed state status of PR (PNHP 2015). *O. humifusa* populations 1, 2, 3, and 4 were observed outside of the proposed LOD, and, therefore, will not be impacted. No other SOSC were identified within AOC E6 during the field investigation (Figure 2-17).

3.2.10 AOC E14

A survey for water sedge (*Carex aquatilis*) within AOC E14, located in Berks County, Pennsylvania was assigned due to a documented population of the SOSC and potential habitat suitability within the PA DCNR defined AOC polygon. No *C. aquatilis* was identified within AOC E14 during the 2015 field investigation, but a similarly looking species, tussock sedge (*Carex stricta*), was found in numerous clumps within habitat D. *C. stricta* could have easily been mistaken in the past with *C. aquatilis*. A voucher sample of the *C. stricta* was submitted to the CMNH herbarium for identification confirmation. The sedge was confirmed to be *C. stricta*. No SOSC populations were identified within AOC E14; therefore, there are no impacts to any SOSC within this AOC.

3.2.11 AOC E17

Two populations of *D. nuttallii* were identified within AOC E17. *D. nuttallii* currently has a state status of "no legal status" (N), but has a proposed status of PT (PNHP 2015). *D. nuttallii* populations 1 and 2 were observed outside of the proposed LOD and will therefore not be impacted. No other SOSC were identified within AOC E17 during the 2014 field investigations (Figure 2-18).

3.2.12 AOC E19

Three populations of *P. anonyma* and two populations of *P. teretifolius* were identified within AOC E19. *P. anonyma* and *P. teretifolius* both have a current and proposed state status of PT (PNHP 2015). A Serpentine Grassland COC, currently listed as "critically imperiled" [proposed "critically imperiled"], was identified within the southern portion of AOC E19. All SOSC populations and the one COC [Serpentine Grassland] present within AOC 19 are located outside of the proposed LOD and will not be impacted (Figure 2-19).

4.0 CONCLUSION

This Conservation Plan provides SPLP's commitment to avoidance, minimization, and mitigation measures to prevent impacts to the listed SOSCs within the Project area. SPLP has conducted extensive background research and field surveys to identify SOSC occurrence within and adjacent to all Project work areas. Field surveys were conducted during the 2014 and 2015 growing seasons within each of the assigned AOCs that the proposed pipeline Project traverses. Surveys were conducted during the appropriate time of year for the AOC specific target SOSC listed in the PA DCNR response letter. These surveys provided the foundation for the development of this plan.

Sixty-three separate occurrences of PA state listed SOSCs were identified while completing surveys on the Project. Eight of the 63 occurrences were identified outside of the 23 investigated AOCs. Of the 63 populations of state listed target species identified during the botanical survey of the Project, two populations of the LE northeastern bulrush were observed. The northeastern bulrush populations were located within AOC ALT W1 during the USFWS requested northeastern bulrush survey. One population was within the Project area, and one was well outside. The LE occurrence within the Project limits is located within a wetland that is anticipated to be HDD bored. Coordination with USFWS regarding northeastern bulrush are ongoing. One Community of Concern (COC) was identified during the botanical survey within AOC E19. The serpentine grassland vegetative community with multiple SOSCs identified within it was observed outside of the anticipated LOD.

As indicated on the Summary of Anticipated Impacts to SOSC [utilizing Current PA Designations] Table, included as Table 2, forty-seven populations of identified SOSC will not be impacted when evaluating using the current PA designations (PNHP 2015). When using the current PA status two populations of PA Endangered (PE) SOSC, two populations of PA Threatened (PT) SOSC, and no populations of PA Rare (PR) SOSC are anticipated to be impacted (Tables 1and 2).

As indicated on the Summary of Anticipated Impacts to SOSC [utilizing Proposed PA Designations] Table, included as Table 3, forty-seven populations of identified SOSC will not be impacted when evaluating using the proposed PA designations (PNHP 2015). When using the proposed PA status six populations of PE SOSC, no populations of PT SOSC, and eight populations of PR SOSC are anticipated to be impacted (Tables 1 and 3).

Significant effort was expended to utilize Best Management Practices (BMPs), such as temporary ROW "neck downs" or LOD reductions, HDD borings, and pipeline alignment rerouting, to avoid or minimize anticipated impacts to SOSC populations. Voluntary BMPs were utilized as often as practical to completely avoid or drastically reduce anticipated impacts to identified SOSC populations. Additional conservation measures such as topsoil segregation and replacement, "sod" excavation and replacement, and timber mat crossings will also be implemented to further avoid or minimize unavoidable anticipated impacts to specific SOSC populations. SPLP has utilized as many conservation measures as was practical to minimize total project impacts. Based on these avoidance, minimization, and mitigation measures, we do not anticipate significant impacts to any state-listed SOSC.

5.0 REFERENCES

Pennsylvania Natural Heritage Program. 2015. Species of Special Concern List. Available at: http://www.naturalheritage.state.pa.us/Species.aspx

Pennsylvania Natural Heritage Program. 2015a. Protocols for Conducting Surveys for Plant Species of Special Concern. http://www.gis.dcnr.state.pa.us/hgis-er/PNDI_DCNR.aspx

FIGURES

Legend

- Access Road
- Alignment Centerline
- PA State Boundary

Sheet Identifier

Miles
0 10 20

Kilometers
0 16.095 32.19

FIGURE 1
USGS PROJECT LOCATION MAP
BOTANICAL CONSERVATION PLAN
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
COUNTY,

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

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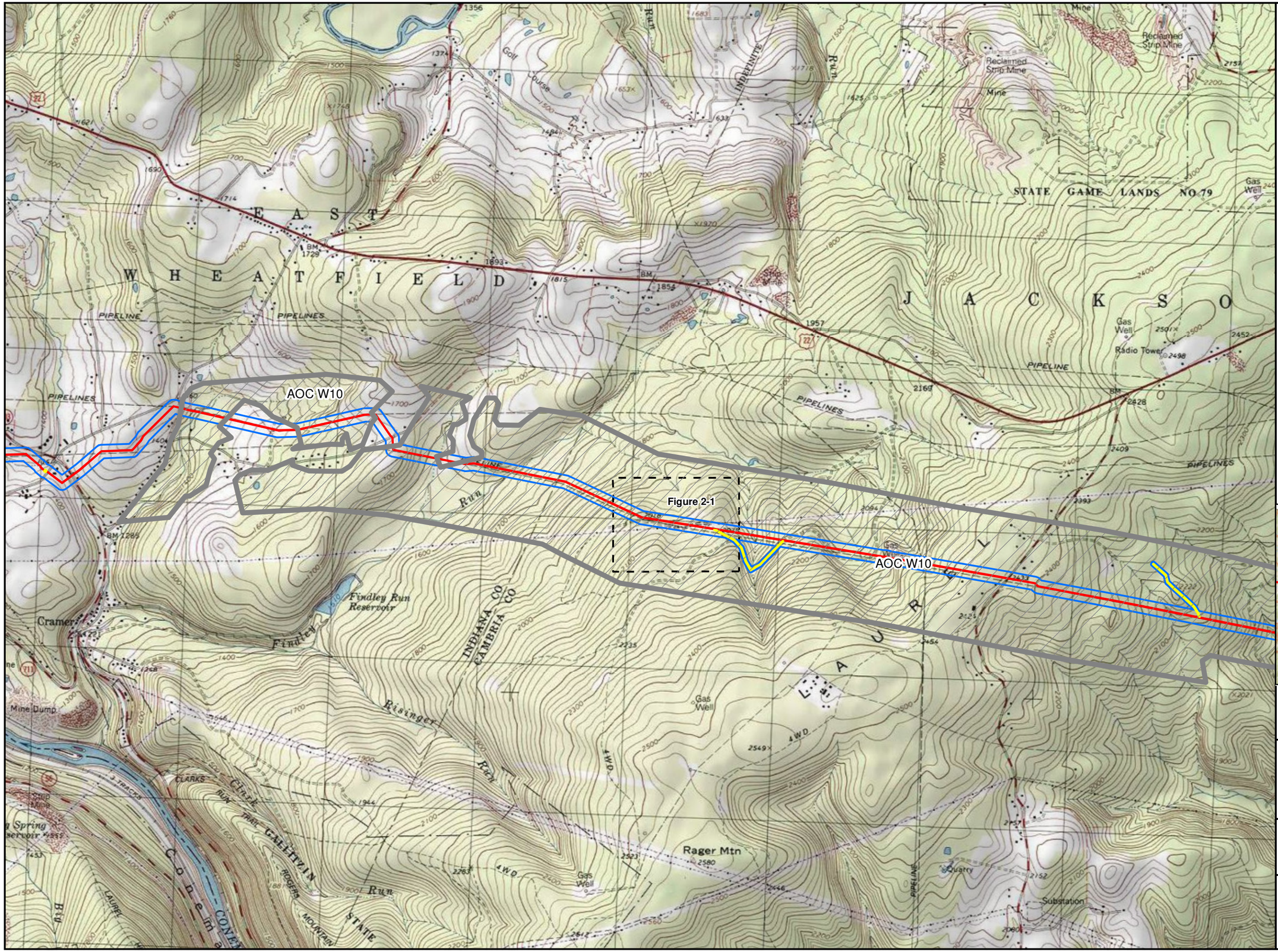


Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier

N

Feet
0 1,000 2,000
Meters
0 304.8 609.6

FIGURE 2-INDEX-1
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

2) Quadrangles being displayed:
Vintondale

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_BOTANICAL_CONSERVATION_INDEX.MXD 11/02/15 JN

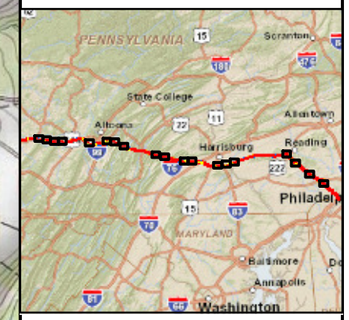
Figure 2-3

Figure 2-2

Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier



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Meters
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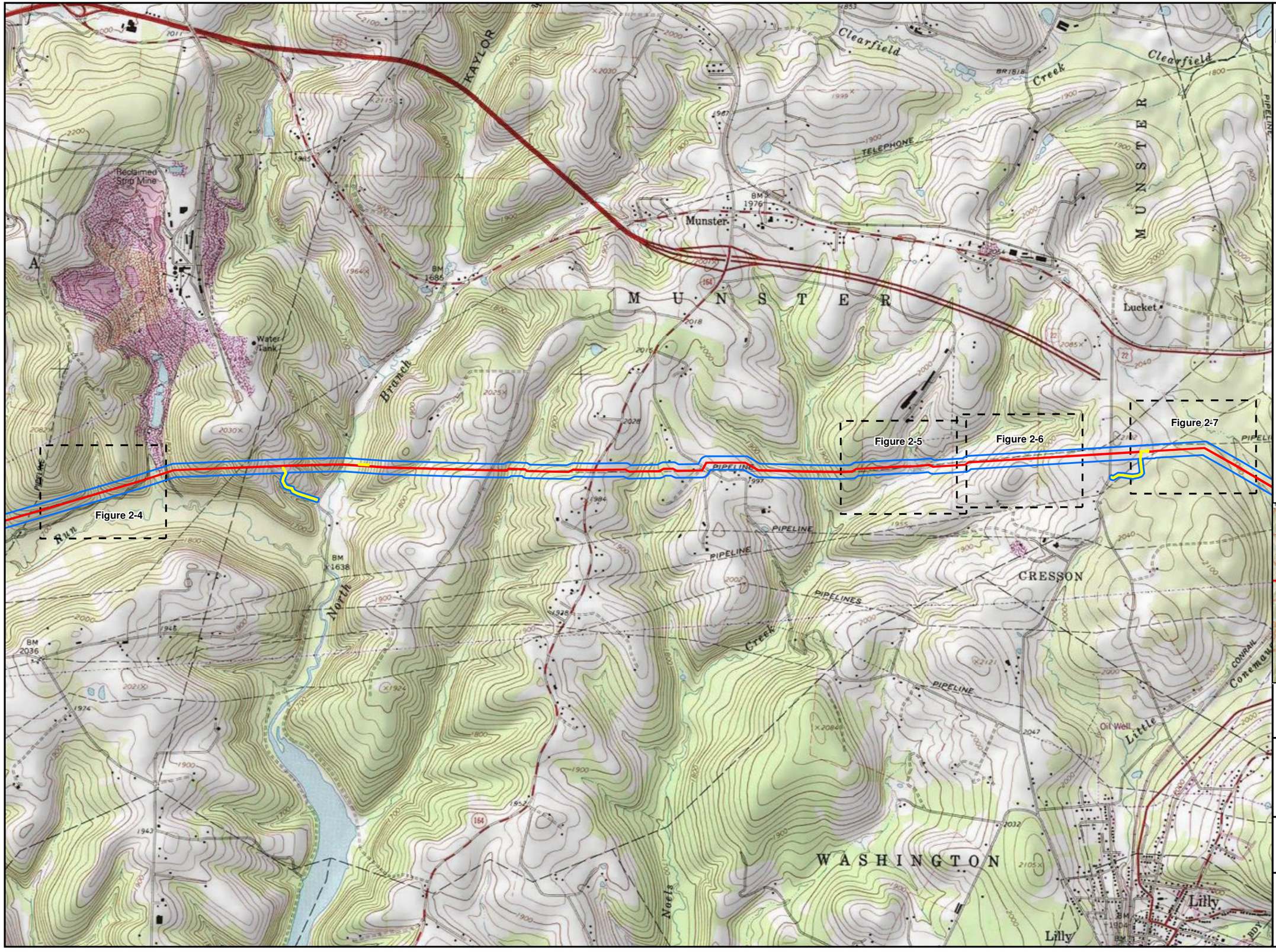
FIGURE 2-INDEX-2
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

2) Quadrangles being displayed:
Nanty Glo and Ebensburg

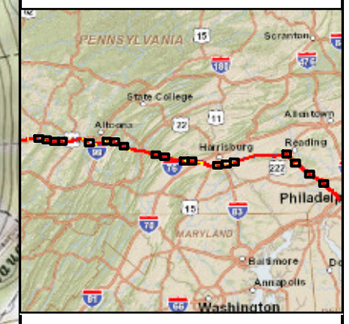
PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_BOTANICAL_CONSERVATION_INDEX.MXD 11/02/15 JN



Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier



N

0 1,000 2,000 Feet

0 304.8 609.6 Meters

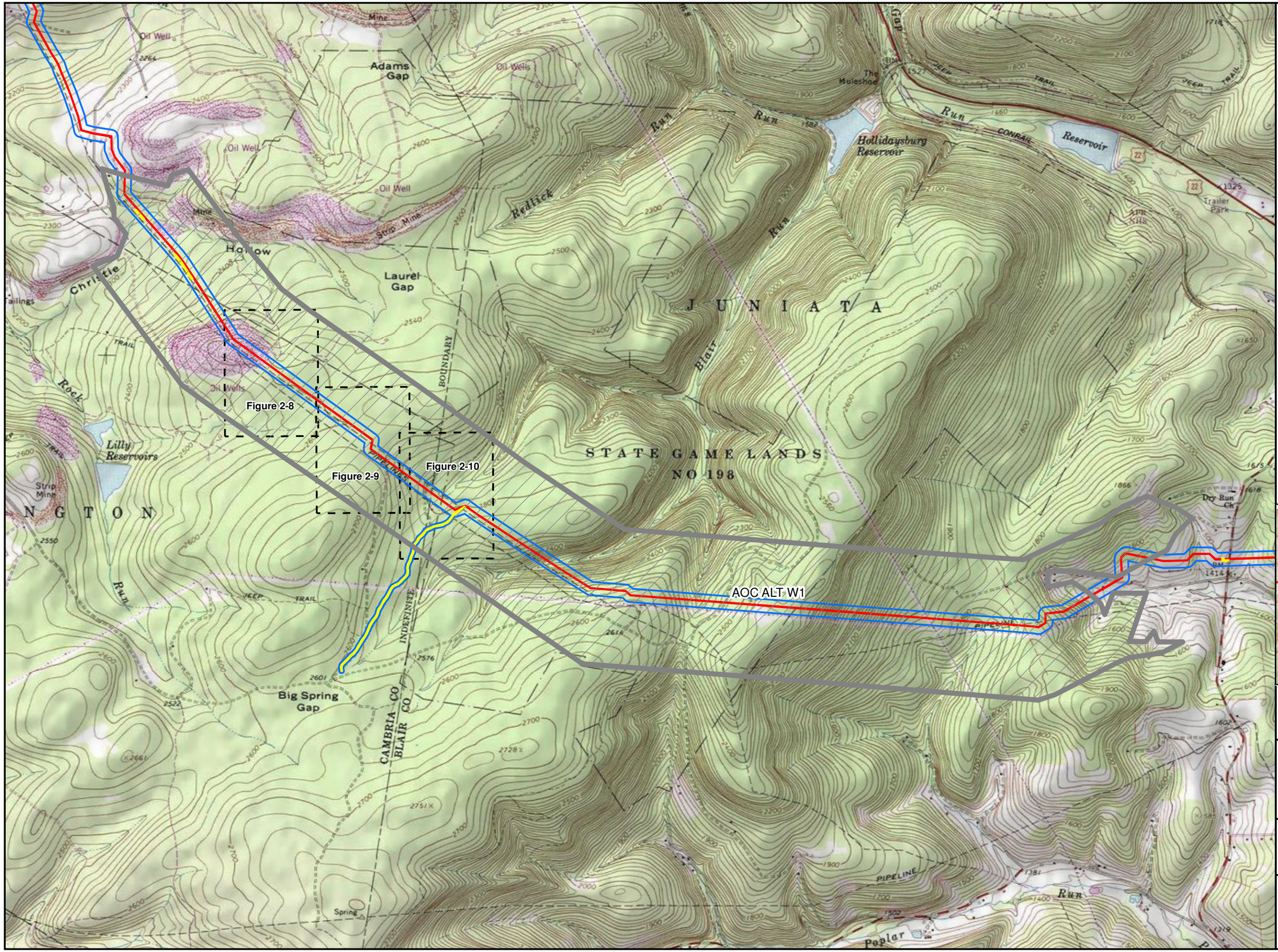
FIGURE 2-INDEX-3
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

2) Quadrangles being displayed:
Ebensburg and Cresson

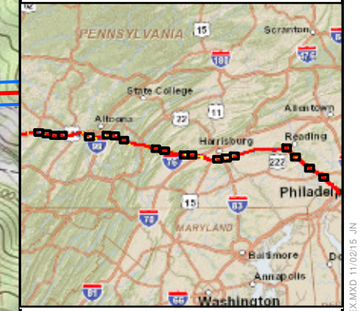
PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_BOTANICAL_CONSERVATION_INDEX.MXD 11/02/15 JN



Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier



N

Feet
0 1,000 2,000

Meters
0 304.8 609.6

FIGURE 2-INDEX-4
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
BLAIR COUNTY, PA

TETRA TECH

Notes:
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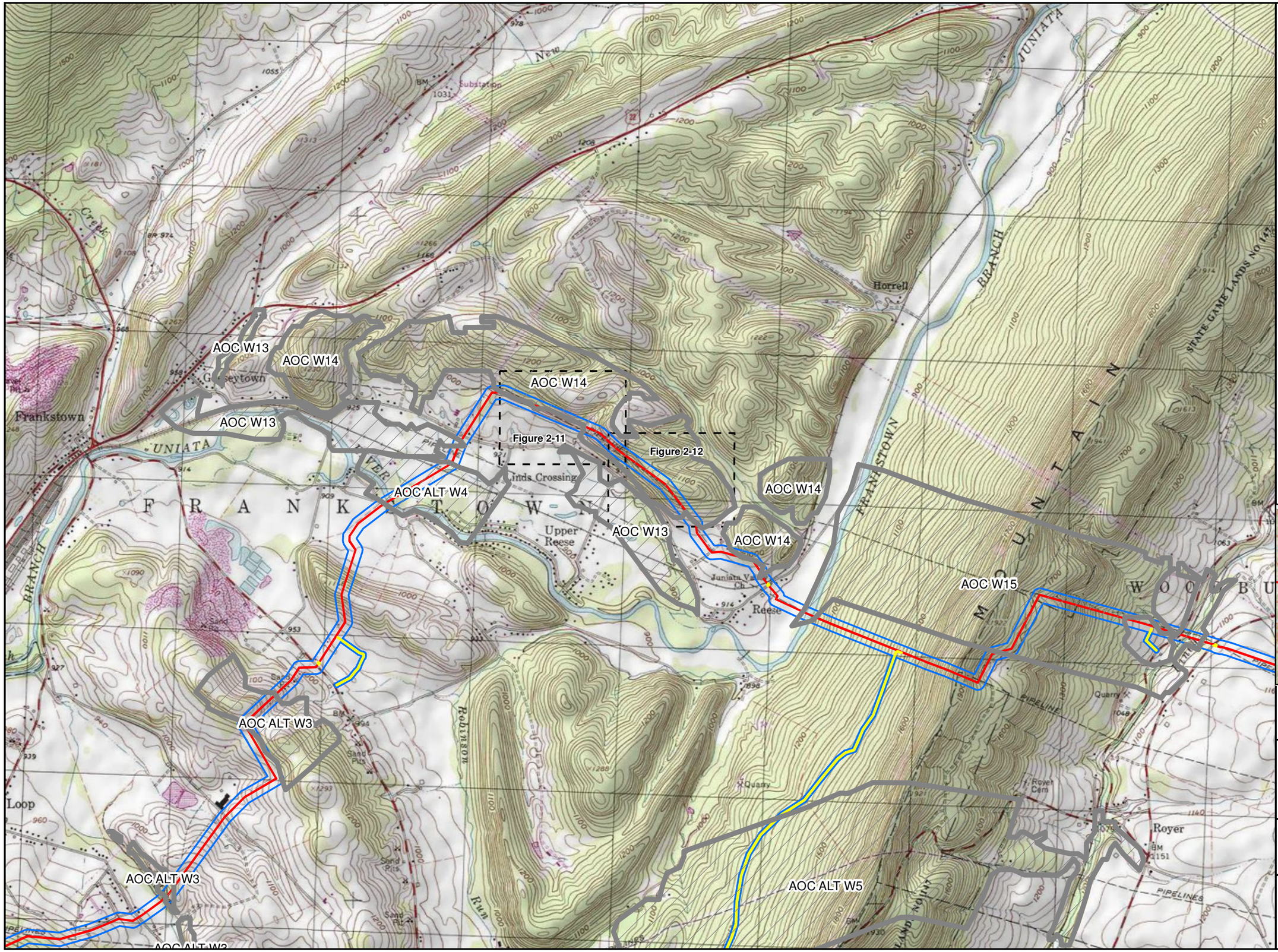
2) Quadrangles being displayed:
Cresson and Hollidaysburg

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_BOTANICAL_CONSERVATION_INDEX.MXD 11/02/15 JN



Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 304.8 609.6

FIGURE 2-INDEX-5
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
BLAIR COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

2) Quadrangles being displayed:
Frankstown

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_BOTANICAL_CONSERVATION_INDEX.MXD 11/02/15 JN

Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier

N

0 1,000 2,000 Feet

0 304.8 609.6 Meters

FIGURE 2-INDEX-6
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
JUNIATA COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

2) Quadrangles being displayed:
Blairs Mills

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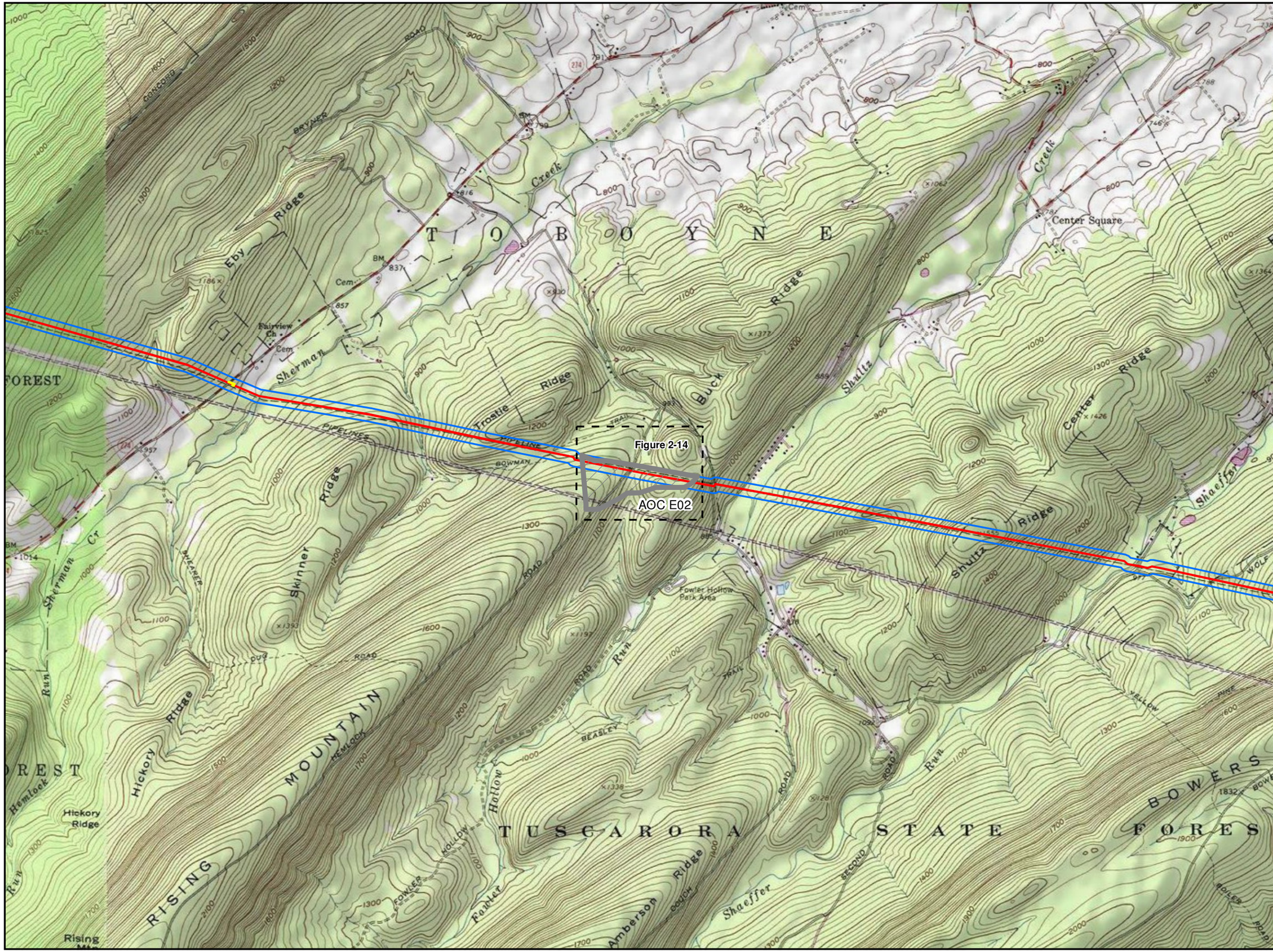
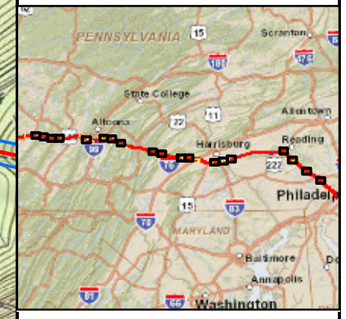


Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier



Feet
0 1,000 2,000
Meters
0 304.8 609.6

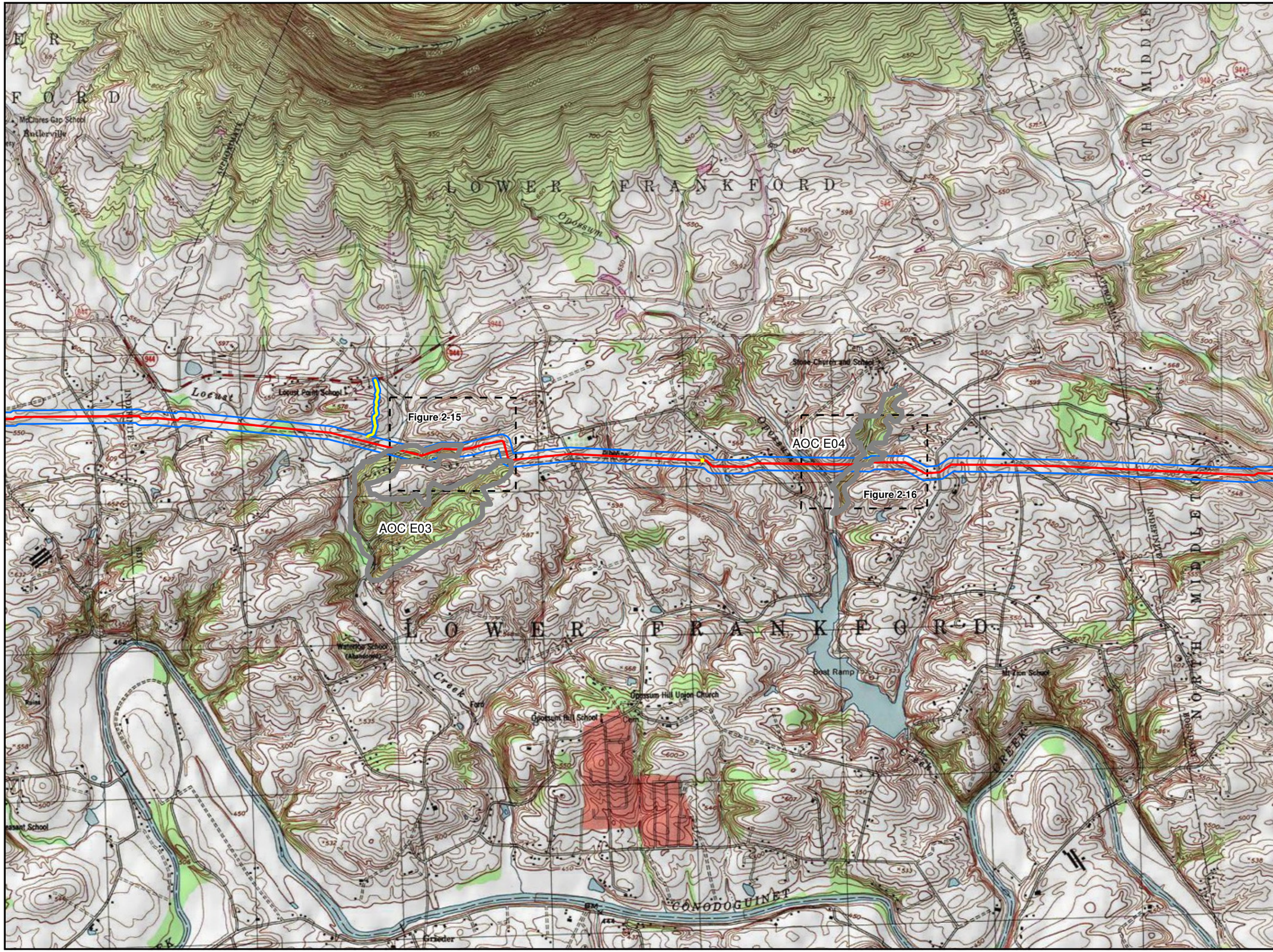
FIGURE 2-INDEX-7
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

2) Quadrangles being displayed:
Blairs Mills and Blain

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_BOTANICAL_CONSERVATION_INDEX.MXD 11/02/15 JN



Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 304.8 609.6

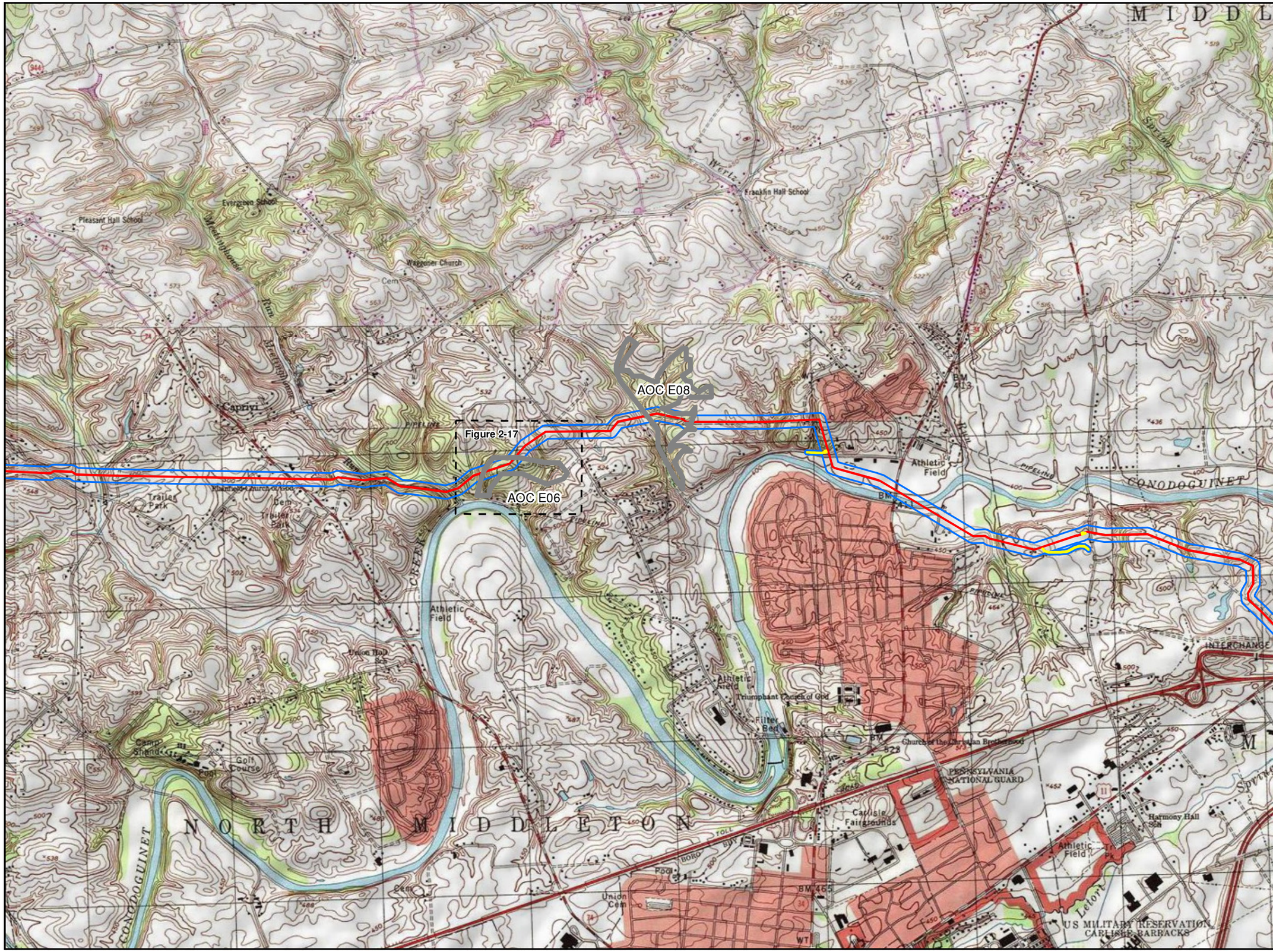
FIGURE 2-INDEX-8
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CUMBERLAND COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

2) Quadrangles being displayed:
Plainfield and Carlisle

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_BOTANICAL_CONSERVATION_INDEX.MXD 11/02/15 JN



Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 304.8 609.6

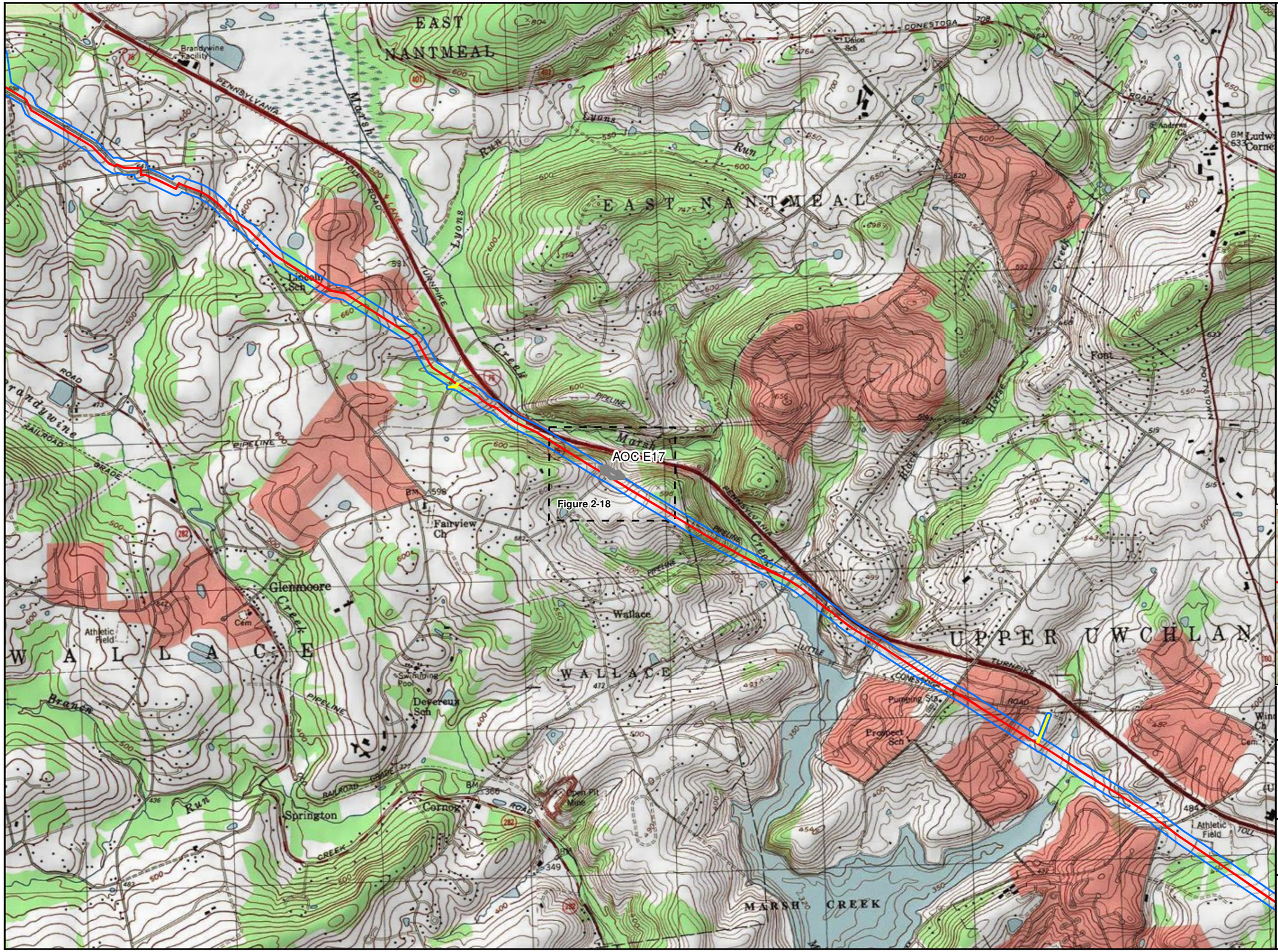
FIGURE 2-INDEX-9
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CUMBERLAND COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

2) Quadrangles being displayed:
Plainfield and Carlisle

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_BOTANICAL_CONSERVATION_INDEX.MXD 11/02/15 JN



Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 304.8 609.6

FIGURE 2-INDEX-10
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).

2) Quadrangles being displayed:
Wagontown and Downingtown

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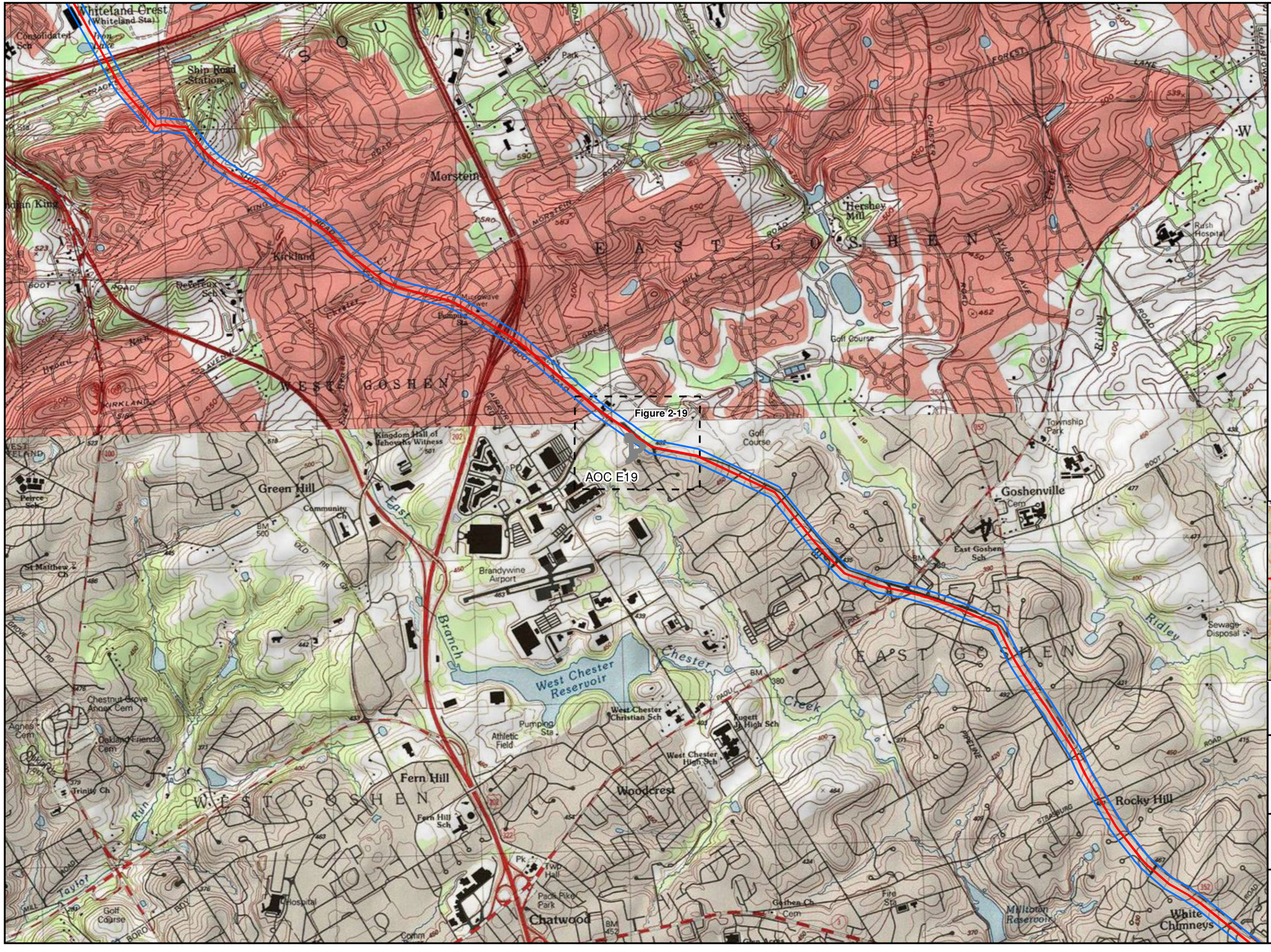
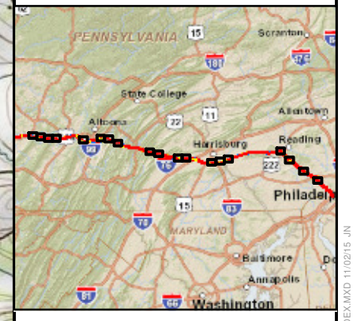


Legend

- Area of Concern
- Alignment Centerline
- Access Road
- ATWS/Limit of Disturbance
- Block Valve Site Layout
- Botanical Survey Corridor

Sheet Identifier



N

Feet
0 1,000 2,000

Meters
0 304.8 609.6

FIGURE 2-INDEX-11
BOTANICAL CONSERVATION PLAN
INDEX MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PA

TETRA TECH

Notes:
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2) Quadrangles being displayed:
Malvern and West Chester

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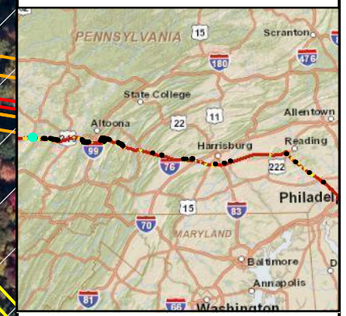
Andropogon glomeratus Pop 7
(Unavoidable Impact)

Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Access Road
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier



N

Feet
0 100 200

Meters
0 30.48 60.96

AOC W10
FIGURE 2-1
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

Notes:
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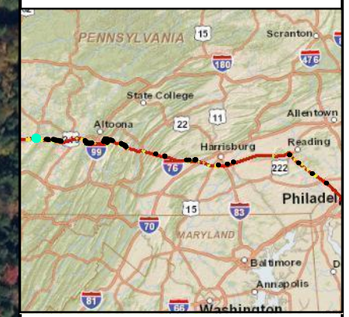
Andropogon glomeratus Pop 3
(Unavoidable Impact)

Legend

- Identified Species of Special Concern (SOSC)
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier



N

Feet
0 100 200

Meters
0 30.48 60.96

UNASSIGNED AREA BETWEEN AOC W10 AND AOC ALT W1
FIGURE 2-2
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.

TETRA TECH

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Andropogon glomeratus Pop 4
(No Impact)

Andropogon glomeratus Pop 1
(No Impact)

1 " = 50 '

Andropogon glomeratus Pop 2
(No Impact)

Legend

- Avoidance Measures
- Identified Species of Special Concern (SOSC)
- Access Road
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

N

Feet
0 100 200

Meters
0 30.48 60.96

UNASSIGNED AREA BETWEEN AOC W10 AND AOC ALT W1
FIGURE 2-3
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.

TETRA TECH

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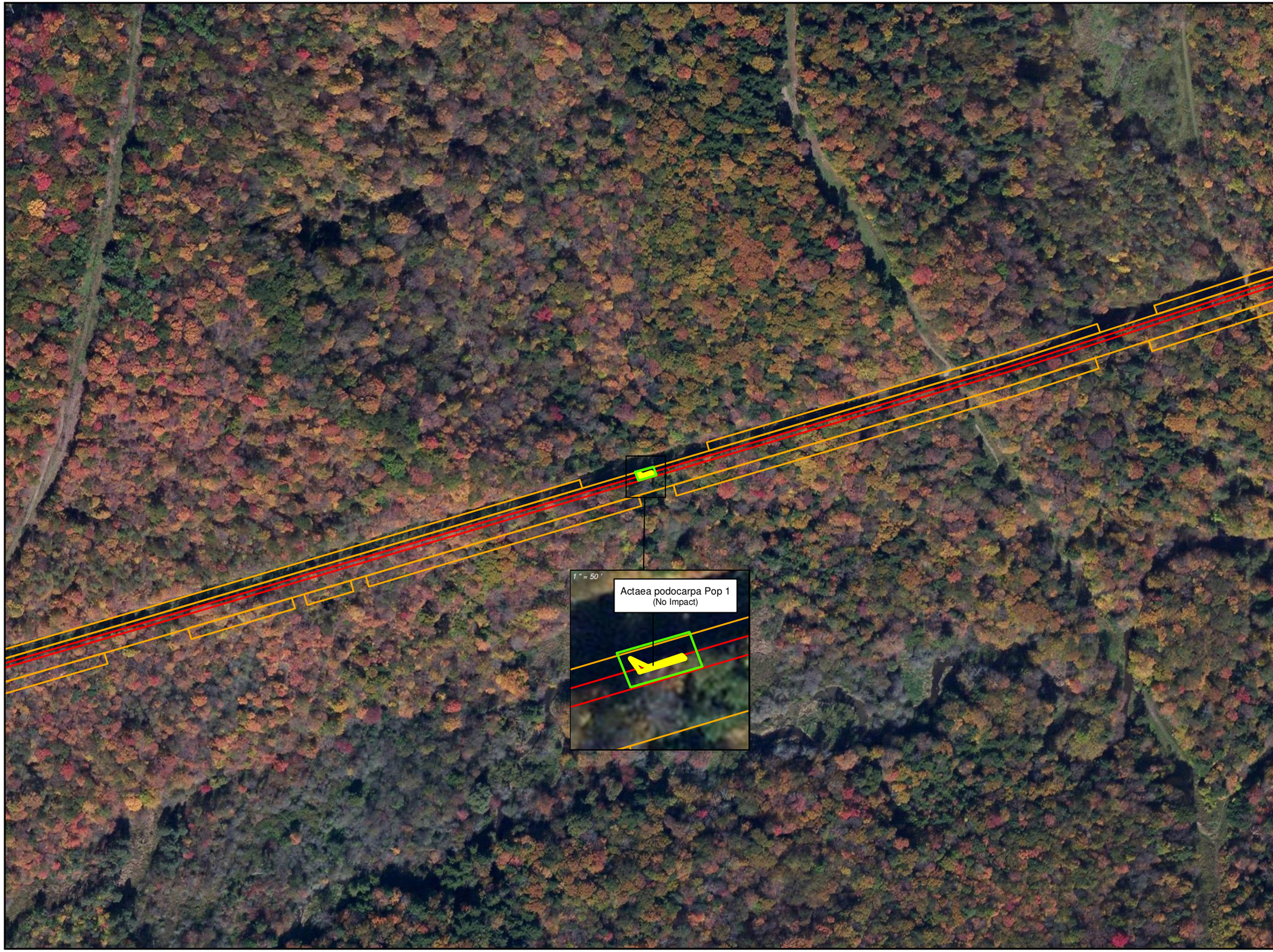

Legend

- Identified Species of Special Concern (SOSC)
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

Feet
0 100 200
Meters
0 30.48 60.96

UNASSIGNED AREA BETWEEN AOC W10 AND AOC ALT W1
FIGURE 2-4
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.

TETRA TECH

Notes:
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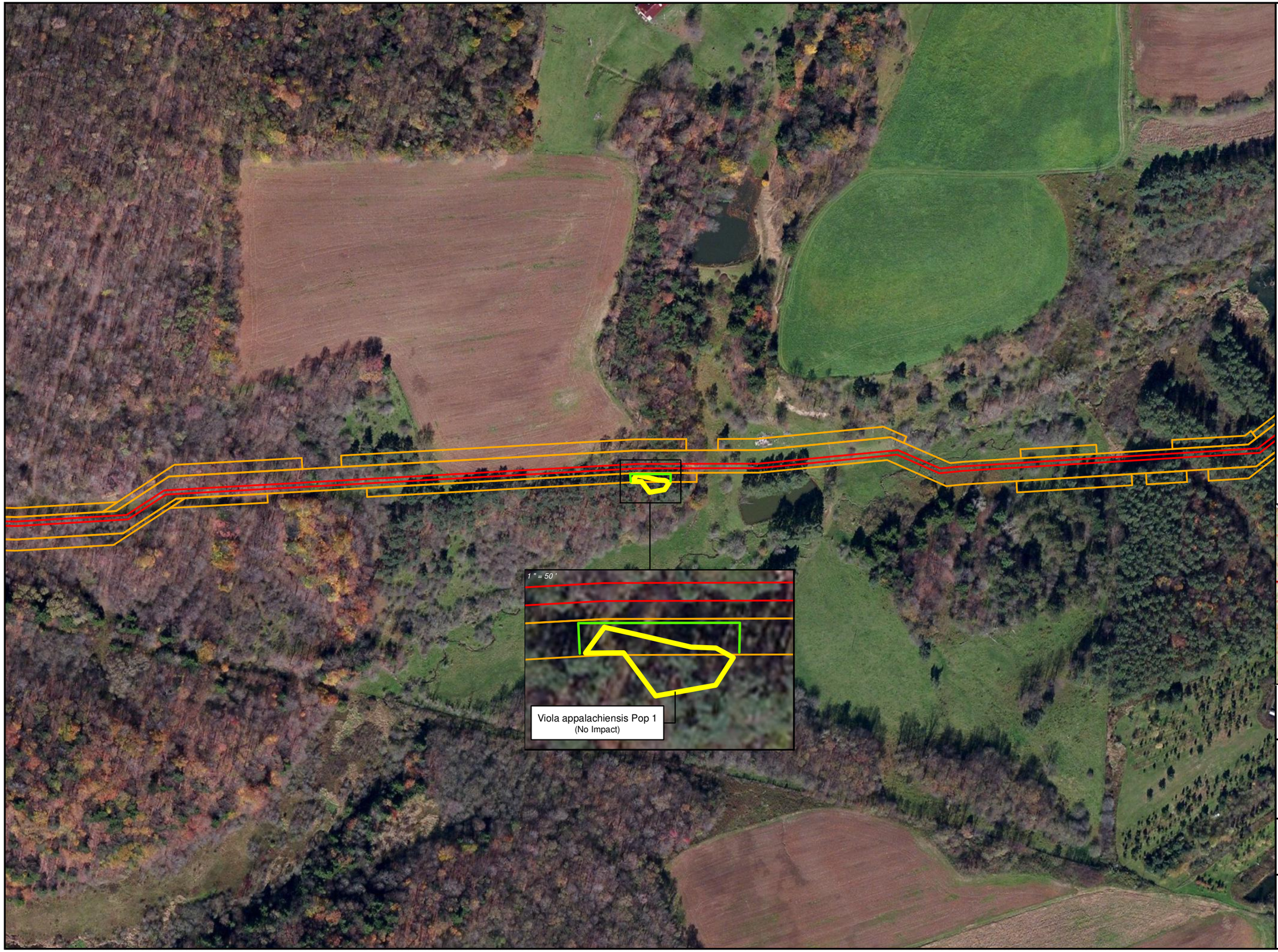

Legend

- Avoidance Measures
- Identified Species of Special Concern (SOSC)
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

Feet
0 100 200
Meters
0 30.48 60.96

UNASSIGNED AREA BETWEEN AOC W10 AND AOC ALT W1
FIGURE 2-5
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.

TETRA TECH

Notes:
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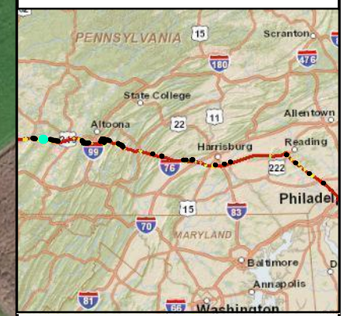
Viola appalachiensis Pop 2
(Minimal Unavoidable Impact)

Legend

- Minimization Measures
- Identified Species of Special Concern (SOSC)
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier



N

0 100 200 Feet

0 30.48 60.96 Meters

UNASSIGNED AREA BETWEEN AOC W10 AND AOC ALT W1
FIGURE 2-6
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.

TETRA TECH

Notes:
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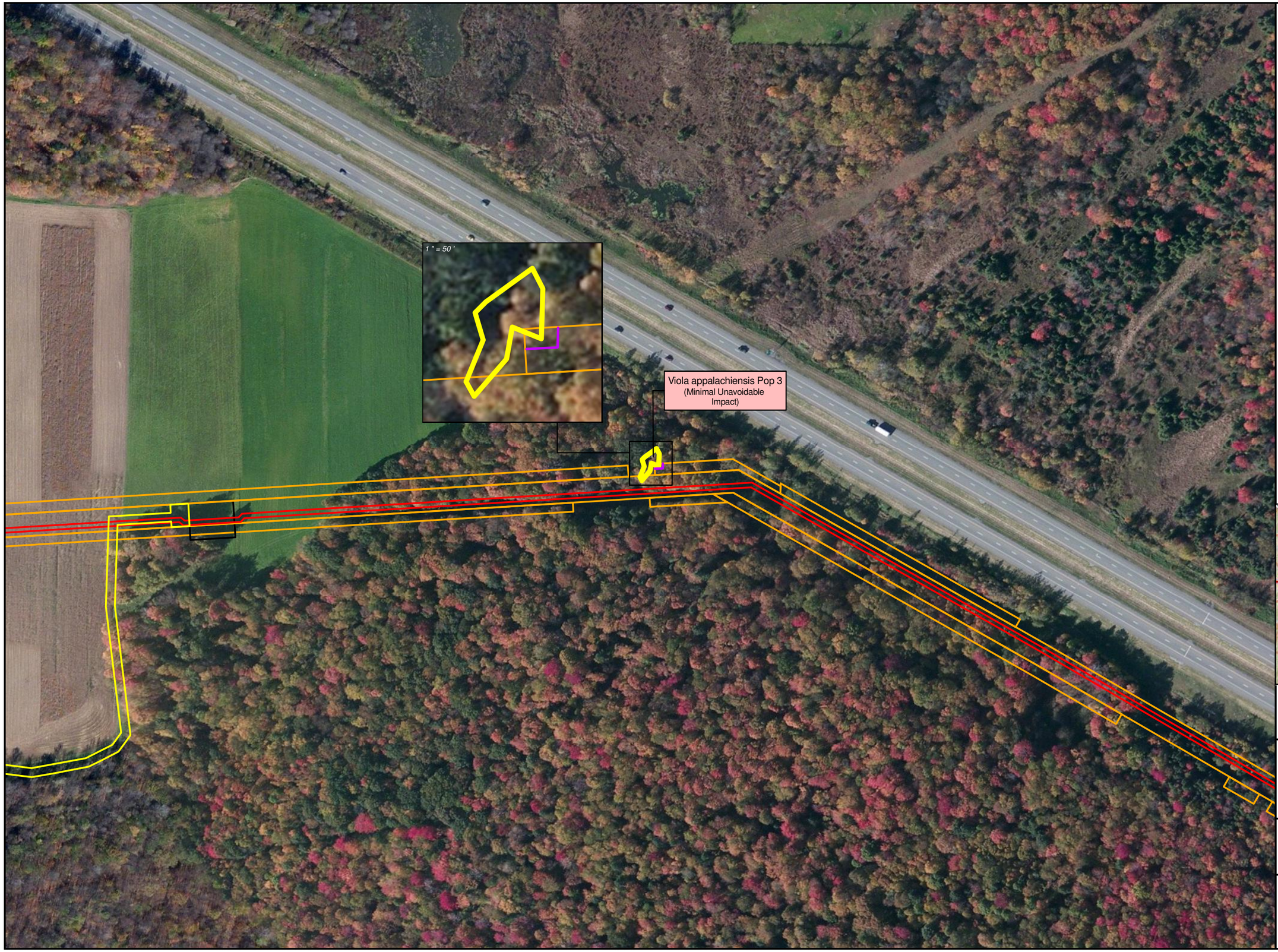
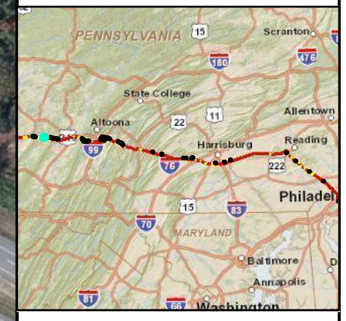


Legend

- Minimization Measures
- Identified Species of Special Concern (SOSC)
- Access Road
- Alignment Centerline
- ATWS/Limit of Disturbance
- Block Valve Site Layout

Sheet Identifier



Feet
0 100 200
Meters
0 30.48 60.96

UNASSIGNED AREA BETWEEN AOC W10 AND AOC ALT W1
FIGURE 2-7
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.

TETRA TECH

Notes:
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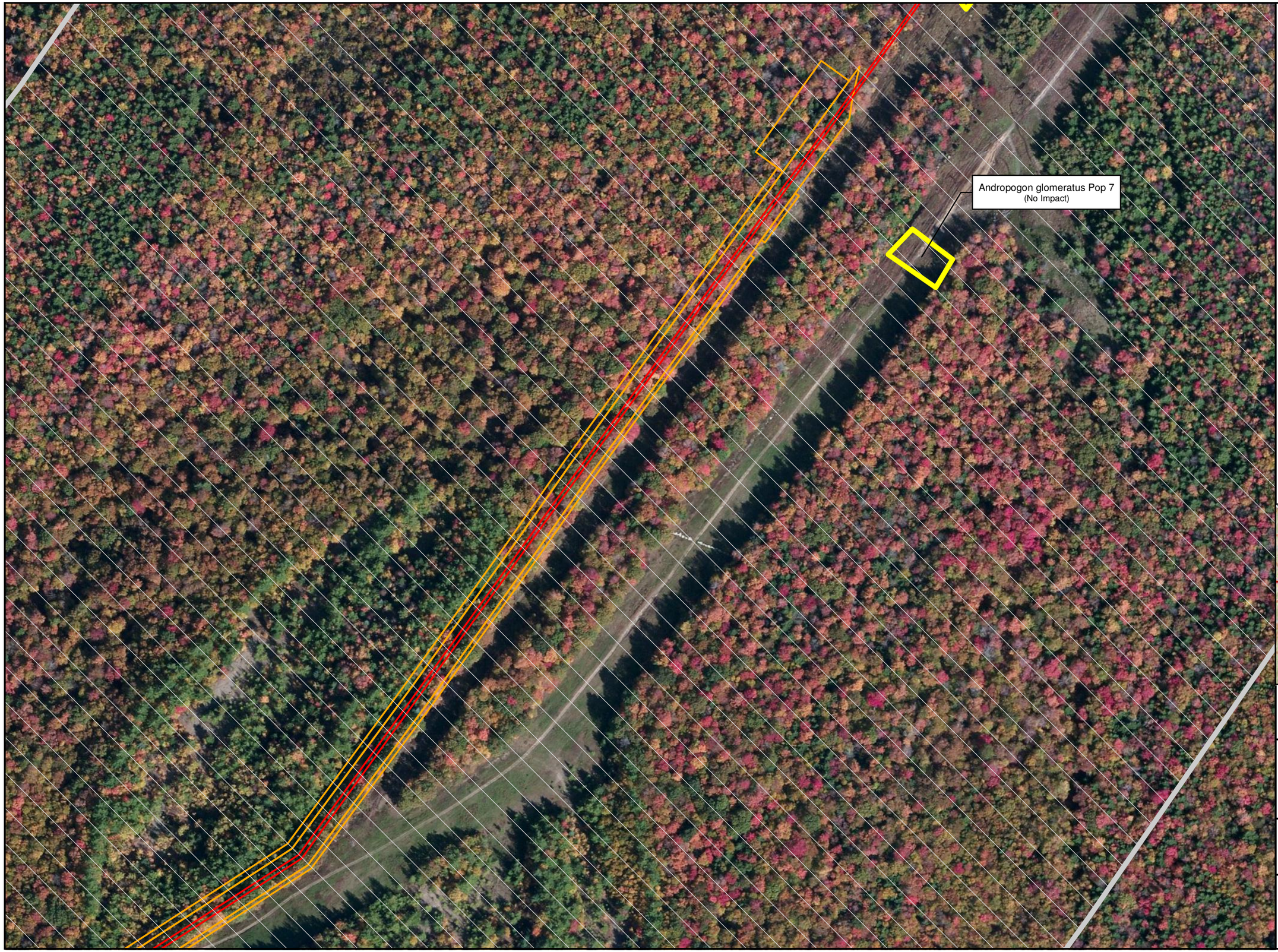

Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

Feet
0 100 200

Meters
0 30.48 60.96

AOC ALT W1
FIGURE 2-8
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

Notes:
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Andropogon glomeratus Pop 6
(No Impact)

Scirpus ancistrochaetus Pop 1
(No Impact)

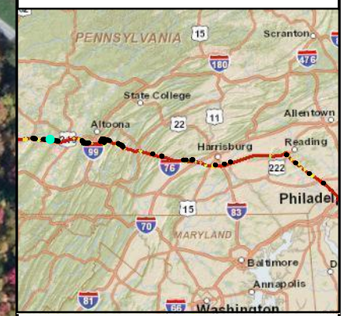
Andropogon glomeratus Pop 5
(No Impact)

Andropogon glomeratus Pop 8
(No Impact)

Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier



Feet
0 100 200

Meters
0 30.48 60.96

AOC ALT W1
FIGURE 2-9
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

Notes:
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Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Access Road
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

Feet
0 100 200
Meters
0 30.48 60.96

AOC ALT W1
FIGURE 2-10
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

Notes:
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Antennaria virginica Pop 1
(No Impact)

Antennaria virginica Pop 2
(No Impact)

Antennaria virginica Pop 3
(Unavoidable Impact)

1 " = 50 '

Antennaria virginica Pop 4, 5, 6
(No Impact)

1 " = 50 '

Antennaria virginica Pop 9
(Minimal Unavoidable Impact)

1 " = 50 '

Antennaria virginica Pop 10
(No Impact)

1 " = 50

Antennaria virginica Pop 15
(No Impact)

Antennaria virginica Pop 7
(Minimized Impact)

Antennaria virginica Pop 8
(Unavoidable Impact)

Antennaria virginica Pop 11
(No Impact)

Antennaria virginica Pop 12
(No Impact)

Antennaria virginica Pop 13
(No Impact)

Antennaria virginica Pop 14
(No Impact)

Antennaria virginica Pop 16
(Unavoidable Impact)

Antennaria virginica Pop 17
(Minimized Unavoidable Impact)

Legend

- Avoidance Measures
- Minimization Measures
- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

Feet
0 100 200
Meters
0 30.48 60.96

AOC W14
FIGURE 2-11
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
BLAIR COUNTY, PA

TETRA TECH

Notes:
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Antennaria virginica Pop 18
(No Impact)

Antennaria virginica Pop 19
(No Impact)

Antennaria virginica Pop 20
(No Impact)

Legend

- Minimization Measures
- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

Feet
0 100 200
Meters
0 30.48 60.96

AOC W14
FIGURE 2-12
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
BLAIR COUNTY, PA

TETRA TECH

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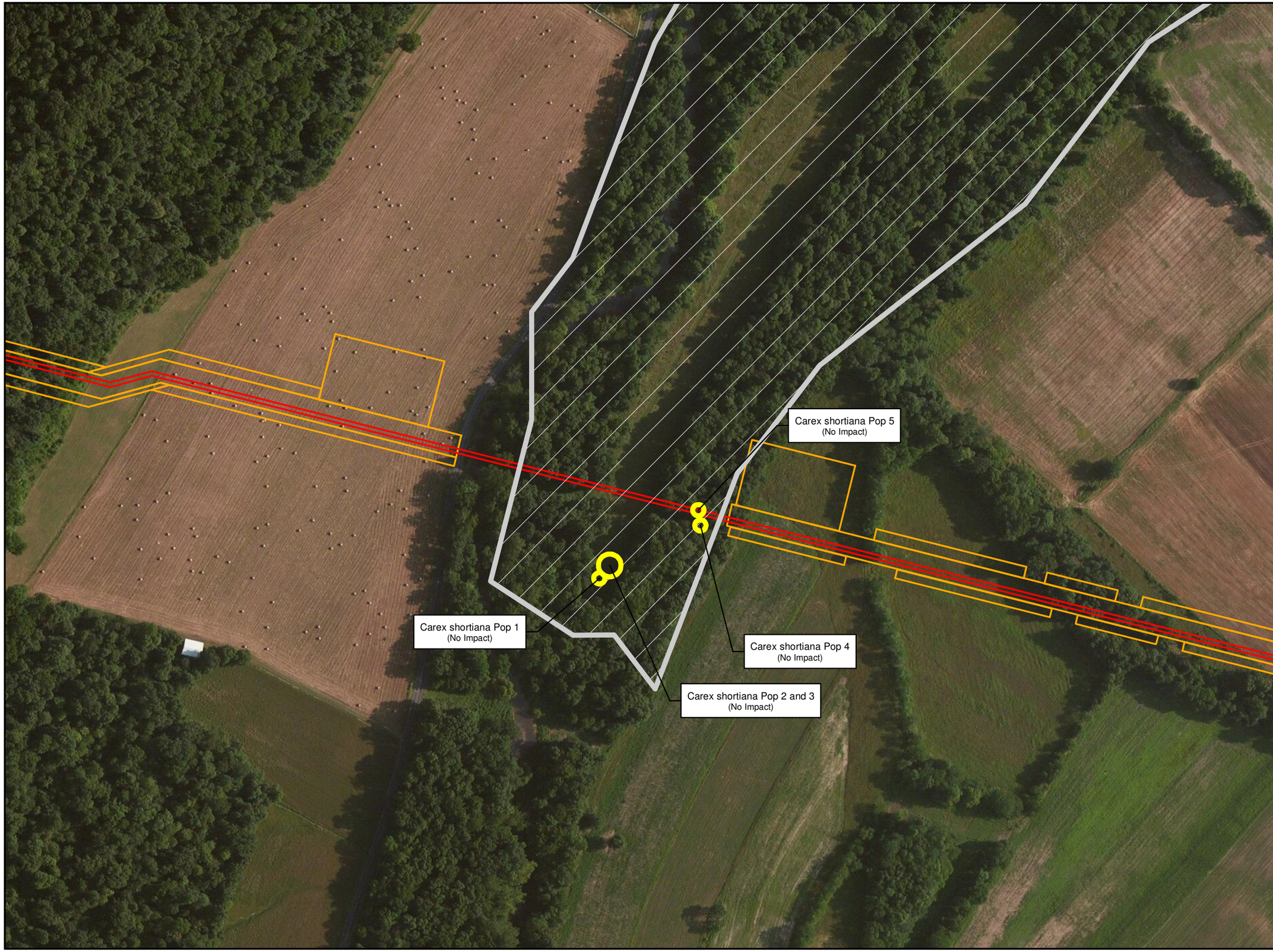
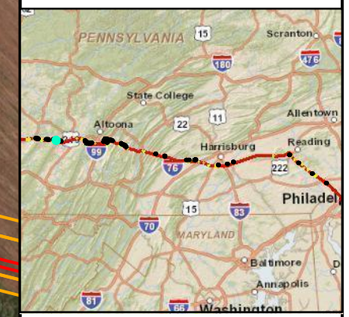
PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_BOTANICAL_CONSERVATION.MXD 11/02/15 SP



Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier



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Meters
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AOC E1
FIGURE 2-13
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
JUNIATA COUNTY, PA

TETRA TECH

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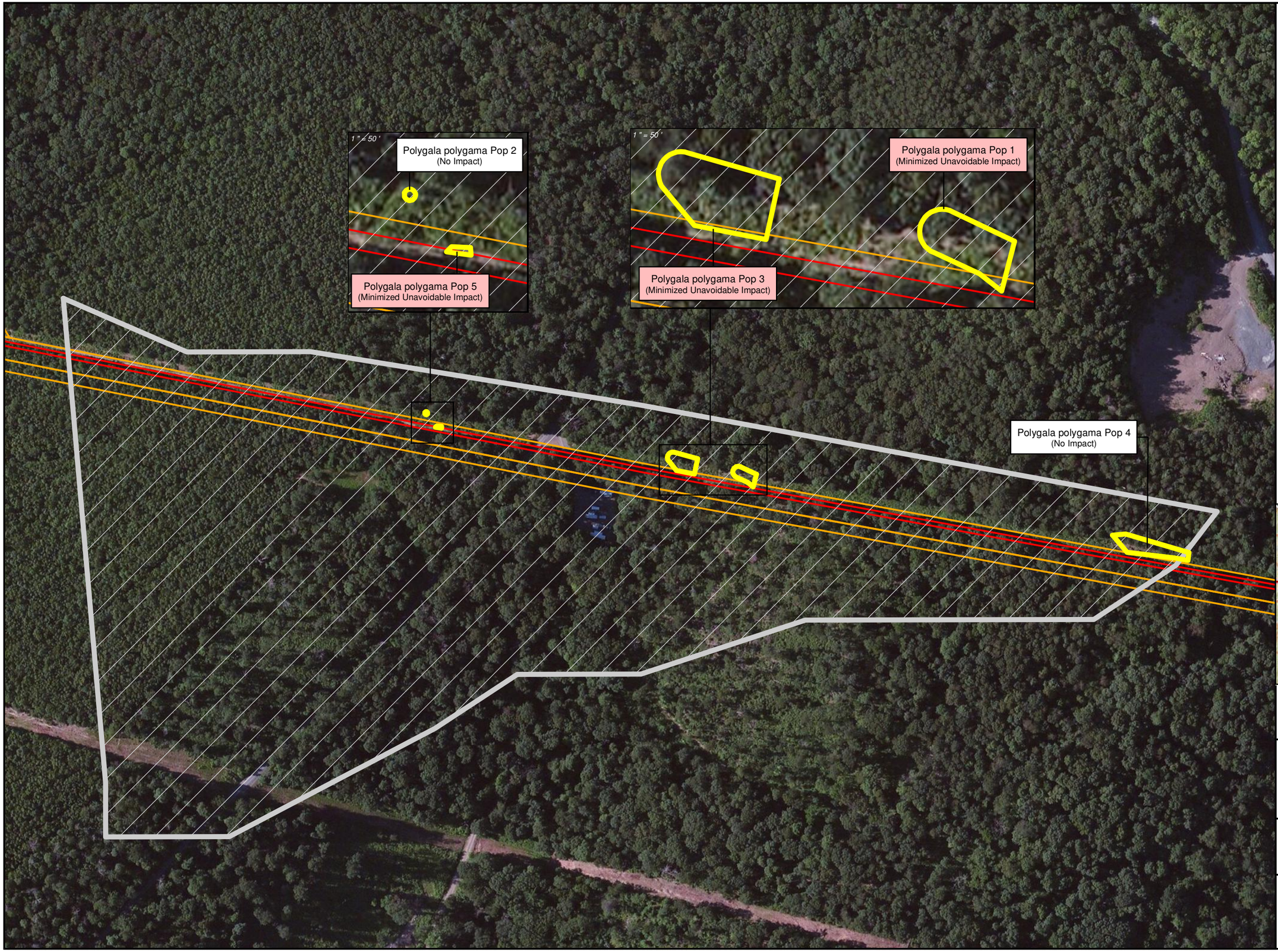

Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

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AOC E2
FIGURE 2-14
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PA

TETRA TECH

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Ribes missouriense Pop 6
(Minimal Unavoidable Impact)

Ribes missouriense Pop 4
(Minimal Unavoidable Impact)

Ribes missouriense Pop 3
(No Impact)

Ribes missouriense Pop 5
(No Impact)

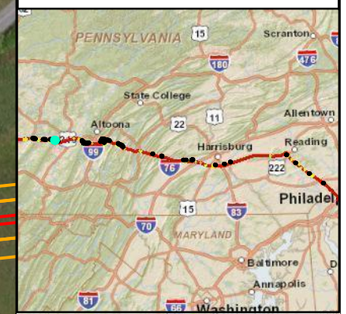
Ribes missouriense Pop 2
(No Impact)

Ribes missouriense Pop 1
(No Impact)

Legend

- Avoidance Measures
- Minimization Measures
- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier



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Meters
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AOC E3
FIGURE 2-15
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CUMBERLAND COUNTY, PA

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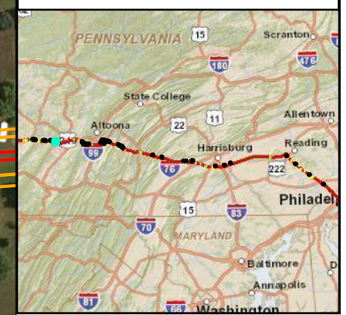
Ribes missouriense Pop 7
(No Impact)

Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier



Feet
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Meters
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AOC E4
FIGURE 2-16
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CUMBERLAND COUNTY, PA

TETRA TECH

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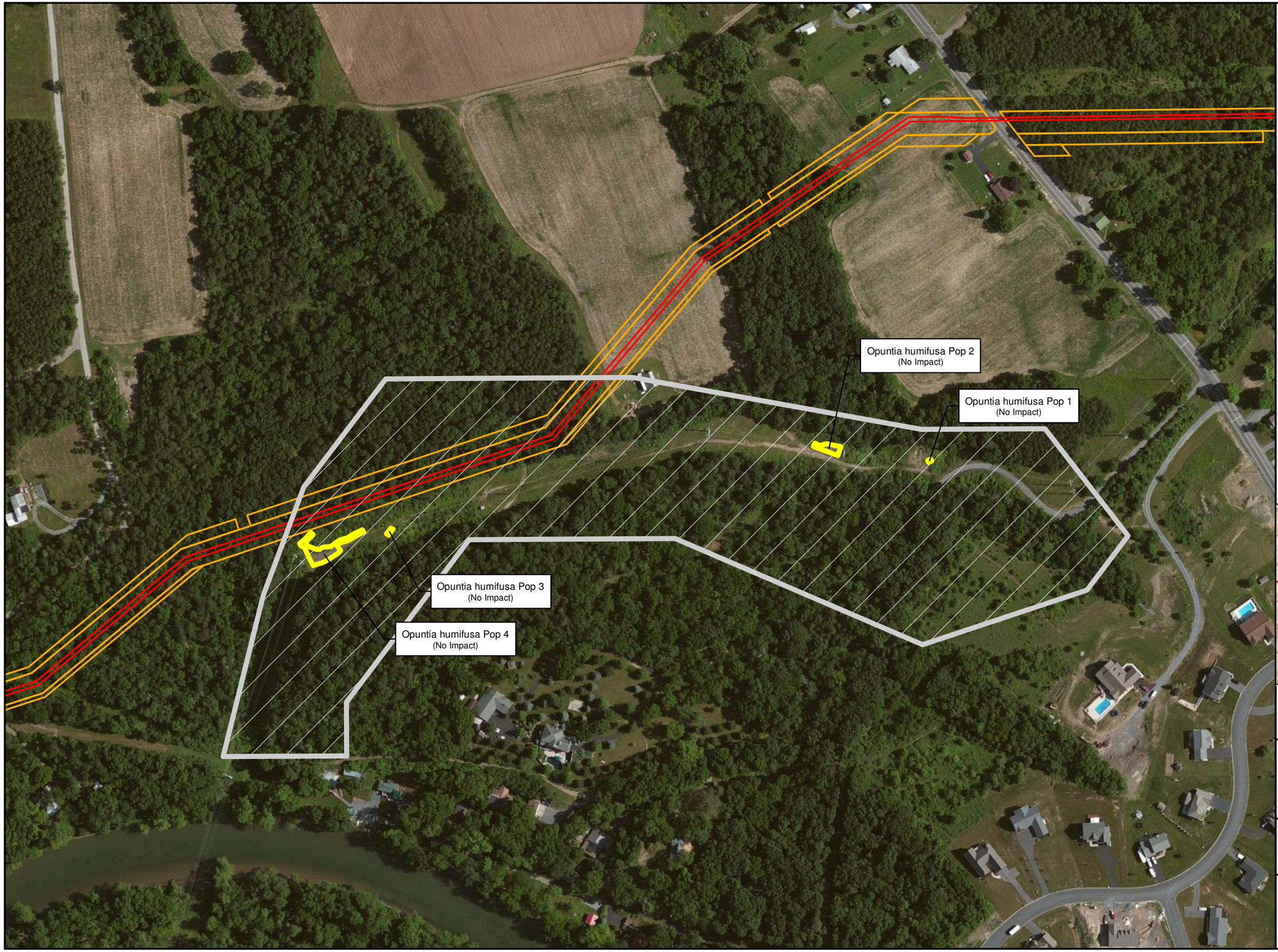

Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

N

0 100 200 Feet

0 30.48 60.96 Meters

AOC E6
FIGURE 2-17
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CUMBERLAND COUNTY, PA

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Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Access Road
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier

Feet
0 100 200
Meters
0 30.48 60.96

AOC E17
FIGURE 2-18
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PA

TETRA TECH

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Serpentine Grassland Community
(No Impact)

Packera anonyma Pop 1
(No Impact)

Phemeranthus teretifolius Pop 1
(No Impact)

Packera anonyma Pop 3
(No Impact)

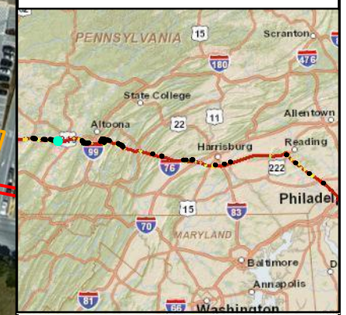
Phemeranthus teretifolius Pop 2
(No Impact)

Packera anonyma Pop 2
(No Impact)

Legend

- Identified Species of Special Concern (SOSC)
- Area of Concern
- Alignment Centerline
- ATWS/Limit of Disturbance

Sheet Identifier



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Feet
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Meters
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AOC E19
FIGURE 2-19
CONSERVATION MEASURES DETAIL MAP
PENNSYLVANIA PIPELINE PROJECT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PA

TETRA TECH

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TABLES

Table 1 - Summary of Anticipated Avoidance, Minimization, and SOSC Impacts

Identified SOSC Population West to East	Common Name	Number Identified	Current Designation	Proposed Designation	Impact Anciticpated	Conservation Measures and Comments
Andropogon glomeratus **Pop 9**	**Bushy Bluestem**	**10,000+**	**Undetermined**	**Rare**	**Yes, Minimization in the form of soil segregation**	**Unavoidable impact anticipated - Minimization Measure of soil segregation planned for *A. glomeratus* Pop 9.**
Andropogon glomeratus **Pop 3**	**Bushy Bluestem**	**5**	**Undetermined**	**Rare**	**Yes, Minimization in the form of soil segregation**	**Unavoidable impact anticipated - Minimization Measure of soil segregation planned for *A. glomeratus* Pop 3.**
Andropogon glomeratus **Pop 2**	**Bushy Bluestem**	**200-500**	**Undetermined**	**Rare**	**No; Avoidance Measure utilized to avoid Pop.**	**No Impacts to *A. glomeratus* Pop 2 are anticipated. Avoidance Measure - HDD boring underneath population and wetland will negate direct impacts. A reduction in the LOD along the travel lane will avoid indirect impacts to *A. glomeratus* Pop 2.**
Andropogon glomeratus **Pop 1**	**Bushy Bluestem**	**200-500**	**Undetermined**	**Rare**	**No; Avoidance Measure utilized to avoid Pop.**	**No Impacts to *A. glomeratus* Pop 1 are anticipated. Avoidance Measure - HDD boring underneath population and wetland will negate direct impacts. The utilization of a timber mat crossing across *A. glomeratus* Pop 1 within the travel lane LLOD will avoid indirect impacts to *A. glomeratus* Pop 1.**
Andropogon glomeratus **Pop 4**	**Bushy Bluestem**	**50**	**Undetermined**	**Rare**	**No; Outside of current LOD**	**No Impact to *A. glomeratus* Pop 4.**
Actaea podocarpa **Pop 1**	**Mountain Bugbane**	**12**	**Threatened**	**Rare**	**No; Avoidance Measure utilized to avoid direct impacts to Pop.**	**No Impacts to *A. podocarpa* Pop 1. are anticipated. Because of the stream crossing at this location will be "tied-in" and completed within a single crossing and within 24-48 hours. The trench will be opened and backfilled within this time frame. As an avoidance measure SPLP will "sod" excavate this plant and its roots and restore the area with the same sod upon restoration all within 24-48 hours. Before the crossing is initiated the population will be avoided by installation of construction fencing. The "tie-in" of this area, from pre-construction activities to restoration will be monitored by a certified PADEP botanist. The success of the restoration will be monitored two days following restoration and at 4 and 8 weeks following restoration.**
Viola appalachiensis **Pop 1**	**Appalachian Blue Violet**	**1000+**	**Threatened**	**Undetermined**	**No; Avoidance Measure utilized to avoid Pop.**	**No Impact to *V. appalachiensis* Pop 1. Avoidance Measure - Avoidance of *V. appalachiensis* Pop 1 by implementation of LOD reduction.**
Viola appalachiensis **Pop 2**	**Appalachian Blue Violet**	**1000+**	**Threatened**	**Undetermined**	**Yes; Minimal Impacts anticipated, with TWS overlapping about half of this population area and permanent ROW a long sliver of Pop.**	**Unavoidable impact anticipated - Minimization of impacts to *V. appalachiensis* Pop 2 by installation of an orange construction fence along the edge of the Premanent ROW and implementation of a LOD reduction. This will reduce the impact to SOSC individuals immediately adjacent to the Permanent ROW.**
Viola appalachiensis **Pop 3**	**Appalachian Blue Violet**	**50+**	**Threatened**	**Undetermined**	**Yes; Minimal Impacts anticipated, with a small potion of the Pop within the permanent ROW and W-K27.**	**Unavoidable impact anticipated - Minimization of impacts to *V. appalachiensis* Pop 3 by further reduction of the temporary LOD near northern end of *V. appalachiensis* Pop 3. Minimal unavoidable impacts are anticipated to *V. appalachiensis* Pop 3 where population overlaps wetland W-K27.**
Andropogon glomeratus **Pop 7**	**Bushy Bluestem**	**700+**	**Undetermined**	**Rare**	**No; outside of LOD**	**No Impact to *A. glomeratus* Pop 7. Outside LOD**
Andropogon glomeratus **Pop 5**	**Bushy Bluestem**	**500+**	**Undetermined**	**Rare**	**No; HDD bore under Population**	**No Impact to *A. glomeratus* Pop 5. HDD Boring under wetland and large *A. glomeratus* Pop 5.**
Andropogon glomeratus **Pop 8**	**Bushy Bluestem**	**500+**	**Undetermined**	**Rare**	**No; outside of LOD**	**No Impact to *A. glomeratus* Pop 8. Outside LOD**
Andropogon glomeratus **Pop 6**	**Bushy Bluestem**	**100+**	**Undetermined**	**Rare**	**No; outside of LOD**	**No Impact to *A. glomeratus* Pop 6. Outside LOD**
Scirpus ancistrochaetus **Pop 1**	**Northeastern Bulrush**	**55**	**Federal Endangered**	**Federal Endangered**	**No; HDD bore under Population**	**No Impact to Federally Listed *S. ancistrochaetus* Pop 1 due to the HDD Boring under the wetland and identified plant population.**
Scirpus ancistrochaetus **Pop 2**	**Northeastern Bulrush**	**30**	**Federal Endangered**	**Federal Endangered**	**No; outside of LOD**	**No Impact to Federally Listed *S. ancistrochaetus* Pop 2. Outside LOD.**

Identified SOSC Population West to East	Common Name	Number Identified	Current Designation	Proposed Designation	Impact Anciticpated	Conservation Measures and Comments
Antennaria virginica **Pop 1**	**Shale Barren Pussytoes**	**65**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *A. virginica* Pop 1. Outside LOD.**
Antennaria virginica **Pop 2**	**Shale Barren Pussytoes**	**50**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *A. virginica* Pop 2. Outside LOD.**
Antennaria virginica **Pop 3**	**Shale Barren Pussytoes**	**13**	**No Legal Status**	**Rare**	**Yes, Minimization in the form of soil segregation**	**Unavoidable impact anticipated - Minimization Measure of soil segregation planned for *A. virginica* Pop 3.**
Antennaria virginica **Pop 4**	**Shale Barren Pussytoes**	**8**	**No Legal Status**	**Rare**	**No; Avoidance Measure utilized to avoid Pop.**	**No Impact to *A. virginica* Pop 4. Avoidance Measure - Avoidance of *A. virginica* Pop 4 by implementation of LOD reduction.**
Antennaria virginica **Pop 5**	**Shale Barren Pussytoes**	**6**	**No Legal Status**	**Rare**	**No; Avoidance Measure utilized to avoid Pop.**	**No Impact to *A. virginica* Pop 5. Avoidance Measure - Avoidance of *A. virginica* Pop 5 by implementation of LOD reduction.**
Antennaria virginica **Pop 6**	**Shale Barren Pussytoes**	**16**	**No Legal Status**	**Rare**	**No; Avoidance Measure utilized to avoid Pop.**	**No Impact to *A. virginica* Pop 6. Avoidance Measure - Avoidance of *A. virginica* Pop 6 by implementation of LOD reduction.**
Antennaria virginica **Pop 7**	**Shale Barren Pussytoes**	**76**	**No Legal Status**	**Rare**	**Yes; Minimization of anticipated impacts to Pop.**	**Minimization Measure - Implementation of an LOD reduction on the northern side of the LOD will avoid most of A. virginica Pop 7.**
Antennaria virginica **Pop 8**	**Shale Barren Pussytoes**	**20**	**No Legal Status**	**Rare**	**Yes, Minimization in the form of soil segregation**	**Unavoidable impact anticipated - Minimization Measure of soil segregation planned for A. virginica Pop 8.**
Antennaria virginica **Pop 9**	**Shale Barren Pussytoes**	**4**	**No Legal Status**	**Rare**	**Yes; Minimization of anticipated impacts to Pop.**	**Minimization Measure - Implementation of an LOD reduction on the northern side of the LOD will avoid most of *A. virginica* Pop 9.**
Antennaria virginica **Pop 10**	**Shale Barren Pussytoes**	**5**	**No Legal Status**	**Rare**	**No; Avoidance Measure utilized to avoid Pop.**	**No Impact to *A. virginica* Pop 10. Avoidance Measure - Avoidance of *A. virginica* Pop 10 by implementation of LOD reduction.**
Antennaria virginica **Pop 11**	**Shale Barren Pussytoes**	**12**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *A. virginica* Pop 11. Outside LOD.**
Antennaria virginica **Pop 12**	**Shale Barren Pussytoes**	**8**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *A. virginica* Pop 12. Outside LOD.**
Antennaria virginica **Pop 13**	**Shale Barren Pussytoes**	**3**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *A. virginica* Pop 13. Outside LOD.**
Antennaria virginica **Pop 14**	**Shale Barren Pussytoes**	**3**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *A. virginica* Pop 14. Outside LOD.**
Antennaria virginica **Pop 15**	**Shale Barren Pussytoes**	**4**	**No Legal Status**	**Rare**	**No; Avoidance Measure utilized to avoid Pop.**	**No Impact to *A. virginica* Pop 15. Avoidance Measure - Avoidance of *A. virginica* Pop 15 by implementation of LOD reduction.**
Antennaria virginica **Pop 16**	**Shale Barren Pussytoes**	**13**	**No Legal Status**	**Rare**	**Yes, Minimization in the form of soil segregation**	**Unavoidable impact anticipated - Minimization Measure of soil segregation planned for A. virginica Pop 16.**

Identified SOSC Population West to East	Common Name	Number Identified	Current Designation	Proposed Designation	Impact Anciticpated	Conservation Measures and Comments
Antennaria virginica **Pop 17**	**Shale Barren Pussytoes**	**178+**	**No Legal Status**	**Rare**	**Yes; Minimization of anticipated impacts to Pop.**	**Minimization Measure - Implementation of an LOD reduction on the northern side of the LOD will avoid most of A. virginica Pop 17.**
Antennaria virginica **Pop 18**	**Shale Barren Pussytoes**	**7**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *A. virginica* Pop 18. Outside LOD.**
Antennaria virginica **Pop 19**	**Shale Barren Pussytoes**	**30**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *A. virginica* Pop 19. Outside LOD.**
Antennaria virginica **Pop 20**	**Shale Barren Pussytoes**	**20**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *A. virginica* Pop 20. Outside LOD**
Carex shortiana **Pop 1**	**Short's Sedge**	**1**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *C. shortiana* Pop 1. Outside LOD.**
Carex shortiana **Pop 2 & 3**	**Short's Sedge**	**2**	**No Legal Status**	**Rare**	**No; outside of LOD**	**No Impact to *C. shortiana* Pops 2 & 3. Outside LOD**
Carex shortiana **Pop 4**	**Short's Sedge**	**1**	**No Legal Status**	**Rare**	**No; HDD bore under Population**	**No Impact - Avoidance measure includes an HDD Boring underneath *C. shortiana* Pop 4. No impacts are anticipated.**
Carex shortiana **Pop 5**	**Short's Sedge**	**1**	**No Legal Status**	**Rare**	**No; HDD bore under Population**	**No Impact - Avoidance measure includes an HDD Boring underneath *C. shortiana* Pop 5. No impacts are anticipated.**
Polygala polygama **Pop 5**	**Racemed Milkwort**	**15**	**Undetermined**	**Endangered**	**Yes; Impact minimized by shift of LOD to the south.**	**Minimization Measure - Minimized with a ROW/LOD shift post-PA DCNR visit [June]. The routing through this State Forest has already been discussed with the DCNR and was routed to the south to avoid the majority of impacts to these populations. All additional Measures and Recommendations for this AOC (AOC E2) are subject to comment by the PA DCNR due to the presence of a Botanical Sanctuary present within this AOC.**
Polygala polygama **Pop 3**	**Racemed Milkwort**	**3**	**Undetermined**	**Endangered**	**Yes; Impact minimized by shift of LOD to the south.**	**Minimization Measure - Minimized with a ROW/LOD shift post-PA DCNR visit [June]. The routing through this State Forest has already been discussed with the DCNR and was routed to the south to avoid the majority of impacts to these populations. All additional Measures and Recommendations for this AOC (AOC E2) are subject to comment by the PA DCNR due to the presence of a Botanical Sanctuary present within this AOC.**
Polygala polygama **Pop 1**	**Racemed Milkwort**	**38**	**Undetermined**	**Endangered**	**Yes; Impact minimized by shift of LOD to the south.**	**Minimization Measure - Minimized with a ROW/LOD shift post-PA DCNR visit [June]. The routing through this State Forest has already been discussed with the DCNR and was routed to the south to avoid the majority of impacts to these populations. All additional Measures and Recommendations for this AOC (AOC E2) are subject to comment by the PA DCNR due to the presence of a Botanical Sanctuary present within this AOC.**
Polygala polygama Pop 2	**Racemed Milkwort**	**1**	**Undetermined**	**Endangered**	**Yes; Impact minimized by shift of LOD to the south.**	**Minimization Measure - Minimized with a ROW/LOD shift post-PA DCNR visit [June]. The routing through this State Forest has already been discussed with the DCNR and was routed to the south to avoid the majority of impacts to these populations. All additional Measures and Recommendations for this AOC (AOC E2) are subject to comment by the PA DCNR due to the presence of a Botanical Sanctuary present within this AOC.**
Polygala polygama **Pop 4**	**Racemed Milkwort**	**10**	**Undetermined**	**Endangered**	**No; outside of LOD**	**No Impact to *P. polygama* Pop 4. Outside the LOD. The routing through this State Forest has already been discussed with the DCNR and was routed to the south to avoid the majority of impacts to these populations.**
Polygala polygama **Pop 6**	**Racemed Milkwort**	**1**	**Undetermined**	**Endangered**	**No; outside of LOD**	**No Impact to *P. polygama* Pop 6. Outside the LOD. The routing through this State Forest has already been discussed with the DCNR and was routed to the south to avoid the majority of impacts to these populations.**
Ribes missouriense **Pop 5**	**Missouri Gooseberry**	**5**	**Endangered**	**Endangered**	**No; Avoidance Measure utilized to avoid Pop.**	**No Impact to *R. missouriense* Pop 5. Avoidance Measure - Avoidance of *R. missouriense* Pop 5. by implementation of LOD reduction.**
Ribes missouriense **Pop 6**	**Missouri Gooseberry**	**8**	**Endangered**	**Endangered**	**Yes; Minimization of anticipated impacts to Pop.**	**Minimization Measure - Minimal impacts anticipated to *R. missouriense* Pop 6. by implementation of soil segregation and replacement with large adjaent populations for recolonization.**

Identified SOSC Population West to East	Common Name	Number Identified	Current Designation	Proposed Designation	Impact Anciticpated	Conservation Measures and Comments
Ribes missouriense **Pop 4**	Missouri Gooseberry	40+	Endangered	Endangered	Yes; Minimization of anticipated impacts to Pop.	Minimization Measure - Minimal impacts anticipated to *R. missouriense* Pop 4. by implementation of LOD reduction and relocation of additional work spaces areas .
Ribes missouriense **Pop 3**	Missouri Gooseberry	22	Endangered	Endangered	No; outside of LOD	No Impact to *R. missouriense* Pop 3. Outside the LOD.
Ribes missouriense **Pop 2**	Missouri Gooseberry	12	Endangered	Endangered	No; outside of LOD	No Impact to *R. missouriense* Pop 2. Outside LOD.
Ribes missouriense **Pop 1**	Missouri Gooseberry	13	Endangered	Endangered	No; outside of LOD	No Impact to *R. missouriense* Pop 1. Outside LOD.
Ribes missouriense **Pop 7**	Missouri Gooseberry	1	Endangered	Endangered	No; outside of LOD	No Impact to *R. missouriense* Pop 7. Outside LOD.
Opuntia humifusa **Pop 4**	Prickly-pear Cactus	50+	Rare	Rare	No; outside of LOD	No Impact to *O. humifusa* Pop 4. Outside LOD
Opuntia humifusa **Pop 3**	Prickly-pear Cactus	3	Rare	Rare	No; outside of LOD	No Impact to *O. humifusa* Pop 3. Outside LOD
Opuntia humifusa **Pop 2**	Prickly-pear Cactus	20-30	Rare	Rare	No; outside of LOD	No Impact to *O. humifusa* Pop 2. Outside LOD
Opuntia humifusa **Pop 1**	Prickly-pear Cactus	5	Rare	Rare	No; outside of LOD	No Impact to *O. humifusa* Pop 1. Outside LOD
Desmodium nuttallii **Pop 2**	Nuttall's Tick Trefoil	1	No Legal Status	Threatened	No; outside of LOD	No Impact to *D. nuttallii* Pop 2. Outside LOD
Desmodium nuttallii **Pop 1**	Nuttall's Tick Trefoil	2	No Legal Status	Threatened	No; outside of LOD	No Impact to *D. nuttallii* Pop 1. Outside LOD
Packera anonyma **Pop 1**	Plain Ragwort	1	Threatened	Threatened	No; outside of LOD	No Impact to *P. anonyma* Pop 1. Outside proposed LOD
Packera anonyma **Pop 2**	Plain Ragwort	1	Threatened	Threatened	No; outside of LOD	No Impact to *P. anonyma* Pop 2. Outside proposed LOD
Packera anonyma **Pop 3**	Plain Ragwort	1	Threatened	Threatened	No; outside of LOD	No Impact to *P. anonyma* Pop 3. Outside proposed LOD
Phemeranthus teretifolius **Pop 1**	Round-leaved Fame Flower	14	Threatened	Threatened	No; outside of LOD	No Impact to *P. teretifolius* Pop 1. Outside proposed LOD
Phemeranthus teretifolius **Pop 2**	Round-leaved Fame Flower	5	Threatened	Threatened	No; outside of LOD	No Impact to *P. teretifolius* Pop 2. Outside proposed LOD

Identified SOSC Population West to East	Common Name	Number Identified	Current Designation	Proposed Designation	Impact Anciticpated	Conservation Measures and Comments
Serpentine Grassland Community	Serpentine Grassland	N/A	Critically Imperiled	Critically Imperiled	No; outside of LOD	No Impact to Serpentine Grassland Community within AOC E19. Located entirely outside of proposed LOD

Table 2 - Summary of Anticipated Impacts to SOSC [utilizing Current PA Designations]

Current Status	**Moderately** Impacted Populations - Current Alignment [with recommendations]	**Minimally** Impacted Populations - Current Alignment [with recommendations]	**Unimpacted** Populations - Current Alignment [with recommendations]
Endangered	1	1	5
Federal Endangered	0	0	2
Rare	0	0	4
Threatened	0	2	7

Table 3 - Summary of Anticipated Impacts to SOSC [utilizing Proposed PA Designations]

Proposed Status	Moderately Impacted Populations - Current Alignment [with recommendations]	Minimally Impacted Populations - Current Alignment [with recommendations]	Unimpacted Populations - Current Alignment [with recommendations]
Endangered	1	5	7
Federal Endangered	0	0	2
Rare	6	2	30
Threatened	0	0	7

APPENDIX A
HDD Inadvertent Return Plan

Sunoco Pipeline, L.P. HDD Inadvertent Return Contingency Plan with Special Bog Turtle Area Procedures -Pennsylvania Pipeline Project-

Revision - August 11, 2015

Introduction

This document has been prepared to minimize potential for impacts to sensitive environmental resources from inadvertent releases associated with the horizontal directional drill (HDD) method. This plan will be followed during construction of Sunoco Pipeline, L.P.'s (SPLP's) Pennsylvania Pipeline Project where the HDD construction method is planned under streams, rivers, wetlands, special areas, and transportation features. This plan also contains a specific section outlining the procedures to be implemented to avoid potential impacts to the bog turtle (*Glyptemys muhlenbergii*), a federally threatened species, at some of the HDD locations. A listing of HDD sites is provided in Attachment A with the special bog turtle HDDs highlighted. Construction personnel will be provided detailed constructions plans for each HDD, and will be required to implement all erosion and sedimentation control and this contingency plan.

Horizontal directional drilling is used to install pipeline crossings on construction projects, depending on site-specific conditions. HDD is a widely used trenchless construction method which accomplishes the installation of pipelines and buried utilities with minimal disturbance to the ground surface, including streams and wetlands. The primary potential environmental impact associated with HDD revolves around the use of drilling fluids. An inadvertent return of drilling lubricant is a potential concern when the HDD method is used. The purpose of this document is to present SPLP's plan for minimizing the risk for inadvertent returns and potential environmental impacts associated with drilling fluids that do inadvertently escape to the ground surface.

The purpose of this contingency plan is to:

- Provide an overview of the HDD process;
- Minimize the potential for inadvertent returns associated with horizontal drilling activities;
- Provide for the timely detection of inadvertent returns;
- Protect areas that are considered environmentally sensitive (streams, wetlands, other biological resources, cultural resources);
- Ensure an organized and timely response in the unlikely event an inadvertent release of drilling mud would occur; and,
- Ensure that all appropriate notifications are made to SPLP's Environmental Compliance Coordinator, the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), Pennsylvania Department of Environmental Protection (PADEP), and other applicable regulatory agencies in a timely manner, and that all required documentation is completed as identified in this document.

Background

An awareness of the function and composition of HDD drilling fluids (also referred to as drilling mud) is imperative in producing a permittable and constructable HDD crossing design. The principal functions of drilling fluid in HDD pipeline installation are listed below.

- **Transportation of Spoil.** Drilled spoil, consisting of excavated soil or rock cuttings, is suspended in the fluid and carried to the surface by the fluid stream flowing in the annulus between the bore hole and the pipe.

- **Cooling and Cleaning of Cutters.** Build-up of drilled spoils on bit or reamer cutters is removed by high velocity fluid streams directed at the cutters. Cutters are also cooled by the fluid.

- **Reduction of Friction.** Friction between the pipe and the hole wall is reduced by the lubricating properties of the drilling fluid.

- **Hole Stabilization.** Stabilization of the drilled hole is accomplished by the drilling fluid building up a "wall cake" which seals pores and holds soil particles in place. This is critical in HDD pipeline installation as holes are often in soft soil formations and are uncased.

- **Transmission of Hydraulic Power.** Power required to turn a bit and mechanically drill a hole is transmitted to a downhole motor by the drilling fluid.

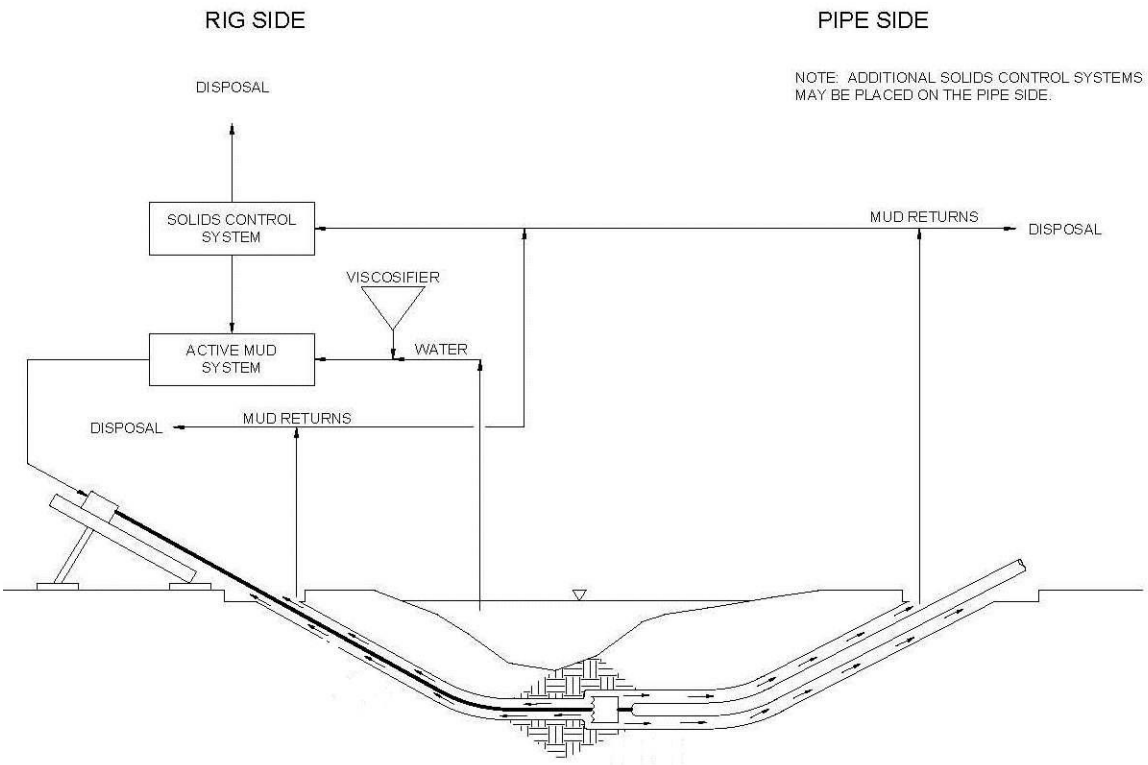
- **Hydraulic Excavation.** Soil is excavated by erosion from high velocity fluid streams directed from jet nozzles on bits or reaming tools.

- **Soil Modification.** Mixing of the drilling fluid with the soil along the drilled path facilitates installation of a pipeline by reducing the shear strength of the soil to a near fluid condition. The resulting soil mixture can then be displaced as a pipeline is pulled into this formation.

The major component of drilling fluid used in HDD pipeline installation is fresh water, typically obtained at the crossing location. To increase the hydraulic properties of the water, it is generally necessary to modify it by adding a viscosifier. The viscosifier used almost exclusively in HDD drilling fluids is naturally occurring bentonite clay, which is principally sodium montmorillonite. It is not a listed hazardous material/substance as defined by the U.S. Environmental Protection Agency's (USEPA) Emergency Planning and Community Right-to-know Act (EPCRA) or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulatory criteria. If the product becomes a waste, it does not meet the criteria of a hazardous waste, as defined by the USEPA. Bentonite is non-toxic and commonly used in farming practices, but has the potential to impact plants, fish and their eggs if discharged to waterways in significant quantities.

All stages of HDD involve circulating drilling fluid from equipment on the surface, through a drill pipe, and back to the surface through a drilled annulus. Drilling fluid returns collected at the entry and exit points are stored in a steel tank and processed through a solids control system which removes spoil from the drilling fluid, allowing the fluid to be recycled. The cleaned fluid is trucked back to the entrance point for reuse. The basic method used by the solids control system is mechanical separation using shakers, desanders, and desilters. The excess spoil and drilling fluid

are transported to, and disposed of, at an approved and permitted solid waste landfill. A typical HDD drilling fluid flow circuit is illustrated schematically below.



Drilling fluid expended downhole will flow in the path of least resistance. In the drilled annulus, the path of least resistance may be an existing fracture or fissure in the soil or rock substrate. When this happens, circulation can be lost or reduced. This is a common occurrence in the HDD process, but does not prevent completion. However, the environment may be impacted if the fluid inadvertently returns to the surface at a location on a waterway's banks or within a waterway or wetland.

Inadvertent Return Minimization Practices

The risk of an inadvertent return can be mitigated through profile design and implementation of specific measures throughout the installation process.

The HDD profile is designed to minimize the potential for the release of drilling fluid in sensitive areas. Cohesive soils, such as clays, dense sands, and competent rock are considered ideal materials for containment of drilling fluids. Case by case analysis of the overburden will be conducted to determine the depth of the bore necessary to provide a margin of safety against returns in a sensitive area. In non-cohesive soils, such as gravel, a greater depth of cover will be used. If substrate test bores are required during the design phase, they should be a minimum of 20 feet from the HDD centerline where practical. The bore holes should be properly sealed by filling with concrete prior to the HDD process.

Key preventive measures implemented during installation are geared toward keeping the drill fluid contained in the borehole and preventing its escape to the surface. This is accomplished through monitoring and management of drill fluid pressures and drill fluid volumes. The most effective ways of containing and controlling an inadvertent return are early detection and quick response by the HDD crew.

Minimization of Environmental Impact

The major key to minimize environmental impacts associated with HDD drilling fluids is to maintain fluid circulation to the extent practical. Maintenance of fluid circulation is the responsibility of the HDD contractor. Monitoring of drilling mud volumes, pressures, and pump rates/returns will be monitored to assist in determining if significant drill mud loss occurs signaling a possible inadvertent return.

It should be recognized that restoration of circulation may not be practical or possible, and that environmental impact will be minimized by completing construction as soon as possible.

Drilling fluid is easily contained by standard erosion and sedimentation control measures. Drilling fluid is controlled within the boundaries of the worksite through the use of pits at the crossing entry and exit points and typical fluid handling equipment such as vac trucks.

The environmental impacts of a release of drilling fluid into a water body include a temporary increase in local turbidity until drilling fluid dissipates with the current and/or settles to the bottom. In the immediate vicinity of a release, benthic organisms may be impacted if sufficient quantities of bentonite settle upon them.

SPLP will ensure that the HDD contractor will closely monitor fluid circulation to detect potential inadvertent returns at the earliest possible time.

SPLP does not expect that HDD will alter, disturb, or otherwise impact subsurface hydrology of associated streams and wetlands, including subsurface pressurized waters. As such, the surfacing of groundwater is not expected. The HDD engineer is able to monitor pressure releases which would signify a potential return or the surfacing of ground water. Such pressure releases would result in the inspection of the HDD alignment and adjacent areas for releases. If a groundwater discharge is identified, it will be photographed, characterized (i.e., location, size, limits, flow rate, flow direction, clarity, etc.) and reported to the chain of command which will follow the proper agency notification procedures. The inspection and early detection of any discharge will allow the HDD engineer to stop or adjust the HDD to reduce the potential for secondary impacts.

Response to Inadvertent Returns

The HDD contractor shall immediately notify the lead Construction Inspector (CI) and Environmental Inspector (EI) of any sudden losses in returns or any inadvertent return to the surface. If a return is observed, the HDD contractor will take reasonable measures to eliminate, reduce, or control the release. The actions to be taken will depend on the location and time of release, site specific geologic conditions, and the volume of the release. The EI or CI will notify the SPLP's Environmental Compliance Coordinator (ECC) with the initial details of the return upon discovery.

Inadvertent Returns in Uplands

If a release is identified within or nearby the HDD alignment, but outside of wetland areas and within the adjacent uplands, notification, containment, and clean-up will be carried out as necessary. The EI will be required to be present as these activities may need to be conducted outside of pre-approved limits of disturbance. The CI and EI will work closely to determine the best course of action for inadvertent returns occurring within upland areas. The EI will be responsible for notification of the return to SPLP's ECC. The PADEP/USACE/USFWS will not be notified in these cases. The HDD contractor will take appropriate reasonable actions to reduce, eliminate, or control the release. The actions may include:

- Constructing a small pit or sandbag coffer around the release point, installing a section of silt fence and/or straw bales to trap as much drilling fluids as possible, and placing a pump hose in the pit to pump the drilling fluid back to the bore site or temporary holding area or vessels (i.e.: vac truck);
- Reducing drilling fluid pressures;
- Thickening drilling fluid mixture; and/or
- Adding pre-approved loss circulation materials to the fluid mixture, such as wood fibers or shredded paper.

Drilling fluid may be recovered, recycled, and reused to the extent practical. All waste drilling fluid will be properly managed.

Inadvertent Returns in Wetlands/Streams

If the release is identified within wetlands and/or streams, drilling operations will be temporarily suspended to allow the EI to appropriately quantify the release, document its location, photograph the release, assess the potential to impact to the resource(s), and report the incident to SPLP's ECC. Information about the return will be recorded and updated as necessary as a running report on the data form provided in Attachment B. SPLP's ECC is responsible for completion of the data form with the assistance of the EI and environmental compliance contractor. Each form will be updated as new information is learned about the return and as activities to restore the area occur. The general reporting will be "Initial", "Interim", and then "Final". The initial, interim, and final reports will comprehensively document the return from initial discovery/notification through final restoration. **ALL inadvertent returns in wetlands and streams, regardless of size, are to be reported to the appropriate agencies in accordance with the notification section below.**

Containment, clean-up, and restoration activities that would require the installation of construction matting or the entry of construction vehicles and equipment are not allowed without PADEP/USACE approval. If upon reporting the incident, and under further consultation with the agencies, the return is determined to be significant enough to warrant containment, clean-up, and restoration via mechanical methods, then the following procedures will be followed:

- Draft containment and restoration plan, outlining the limits, types, and duration of disturbances, will be submitted to the PADEP/USACE for review and approval.
- Appropriate aquatic resource encroachment permits will be applied for depending on levels and types of disturbances required to clean up the material.
- Approved activities would only be implemented under the close, full-time supervision of the assigned EI.

- Drilling operations will resume when the return is contained and successfully remediated. The return area will continue to be monitored during the daily inspection.

One exception to ceasing drilling operations would be a release of drilling fluids during the pipe pullback process. Ceasing operations would pose significant risk of causing the pulled pipe to be stuck and not able to resume.

Containment & Clean-up Material and Equipment

The HDD contractor will be required to have the necessary containment and clean-up equipment on-site and/or readily available for use. At a minimum, a combination of some or all of the following material and equipment should be on site and in ample supply depending on the extent of sensitive areas:

- Spill sorbent pads and booms
- Compost filter socks
- Straw bales (certified weed-free)
- Wood stakes
- Sand bags
- Silt fence
- Plastic sheeting
- Corrugated plastic pipe
- Shovels
- Push brooms
- Centrifugal, trash and sump pumps
- Vacuum truck
- Rubber tired or wide track back hoe
- Bobcat (if needed)
- Storage tanks (if needed)
- Floating turbidity curtain (may be considered for use on large streams)Timber (enough to cross 50% of the wetland length need to be readily available)

If necessary, a 24-hour outside emergency response company may be called in for assistance (such as Enviroserve – 1-800-642-1311).

Notifications

No agency notifications are required for returns occurring in and contained in upland areas. SPLP's ECC will be responsible for notifying the PADEP/USACE of all returns occurring in or flowing into aquatic resources. SPLP's ECCs are identified as Chris Embry (610-670-3237) and Matt Gordon (610-670-3284). The notifications will initially be via phone to the PADEP Emergency Response numbers listed below and then to the appropriate agency personnel via submittal of an initial inadvertent return data form located in Attachment B.

The Pennsylvania Clean Streams Law regulations require that when any pollutant is discharged into surface or groundwater, including sewers, drains and ditches, the person spilling the substance or the person owning the premises from which the substance is spilled must notify PADEP

immediately. Therefore all returns in aquatic resources SPLP will notify the appropriate PADEP regional emergency number within 24 hours of return discovery:

- PADEP Southcentral Regional Office: 717-705-4802
- PADEP Southeast Regional Office Waters and Wetlands: 484-250-5160

In addition, SPLP will notify the appropriate USACE regulatory office numbers within 24 hours of return discovery:

- U.S. Army Corps of Engineers
  Baltimore District: 410-962-3670
  Philadelphia District: 215-656-6728

Following notification to the appropriate emergency/regulatory numbers, SPLP's ECC will notify the following individuals via e-mail submittal of the inadvertent return form located in Attachment B. This will consist of the initial reporting of the return and open consultation and further reporting to the PADEP/USACE in regards the return. The further consultations will be regards to remediation approval, restoration approval, and the need for appropriate approval/permits. The inadvertent return data form will be used to document the consultation and approvals and report final remediation/restoration.

- PADEP Southcentral Regional Permit Reviewer (TBD)
- USACE Baltimore District Permit Reviewer (TBD)
- USACE Philadelphia District Permit Reviewer (TBD)

SPECIAL BOG TURTLE AREA PROCEDURES

All crossings occurring within known or potential bog turtle habitats, as identified and approved by the U.S Fish and Wildlife Service (USFWS) and listed in Attachment A (highlighted in yellow), will be HDD, rather than open trenched, to minimize impact to this species and their habitat. In addition, the drilling activities will only occur at known or potential sites between the dates of April 1 and October 31 to further minimize the potential impact. This plan includes pre-construction and during construction procedures to ensure no bog turtles are negatively impacted at the HDD sites listed in Attachment A (and highlighted in yellow), and outlines a contingency plan for inadvertent releases at these special concern areas.

As discussed, the primary potential environmental impact associated with HDD revolves around the use of drilling fluids. Inadvertent return of drilling lubricant is a potential environmental concern in general and is of particular concern to the USFWS and SPLP in regards to potential impacts to bog turtles where they occur or have the potential to occur. In addition, the increased construction activity in the area of known or potential habitats has the potential for unintentional disturbance to individuals and their habitats. Although implementation of the HDD crossing method represents one of the highest levels of avoidance of impacts (by minimizing/avoiding open trench excavation and the operation of construction equipment in the wetland), the purpose of this document is to present SPLP's plan to further minimize potential impacts to bog turtles associated with all phases of the HDD process and in particular in the event of an inadvertent release.

The objectives of this section of this contingency plan are:

- Avoid impacts to the bog turtle.
- List known or potential bog turtle habitats.
- Ensure project work areas and wetlands are clearly defined on engineer approved project plans.
- Ensure all construction contractors are appropriately trained on the identification of this species and its biology, the notification procedures, and implementation of this contingency plan.
- Ensure bog turtle wetlands/areas are marked prior to construction and that all work areas are appropriately defined (e.g., staked) according to project plans.
- Ensure bog turtle wetlands/areas are sealed off/protected from construction activities.
- Provide daily inspection of contractor activities to ensure compliance with project work plans.
- Provide daily inspection of the HDD alignment and adjacent areas for timely detection of inadvertent returns.
- Ensure all appropriate notifications are made to the USFWS, United States Army Corps of Engineers (USACE) and PADEP, and all other applicable regulatory agencies in a timely manner and that all required documentation is completed as identified in this document.

Pre-construction Activities

All construction, including professional survey personnel will be trained on implementation of this plan, the identification of this species and its biology, and the location of the areas of particular concern. All construction personnel, Environmental Inspector (EI), and on-site bog turtle Specialist (BT Specialist) will be provided with the necessary project plans, mapping, permits, authorized impacts, clearance letters, and this contingency plan prior to the start of construction activities.

To reduce the risk of unintentional damage to bog turtles and their habitats, a BT Specialist will inspect the surveyed (e.g. staked) entrance and exit locations and access roadways associated with the HDD prior to disturbance to ensure that they are not sited in bog turtle habitat and in accordance with project plans (A BT Specialist is defined as an individual holding a Pennsylvania Fish and Boat Commission a Scientific Collector's Permit, and a Special Permit to survey for and handle bog turtles species pursuant to 58 PA Code 75.4). In addition, the boundary of the bog turtle habitat nearest the work areas will be temporarily marked to ensure no activities are unintentionally conducted within bog turtle wetlands and work is restricted to approved work-spaces. Under the direction of the BT Specialist, silt fence will be installed between wetlands and work areas to also prevent bog turtles from entering construction work spaces. Under the direction of the BT Specialist, some areas of herbaceous vegetation may require clearing so that inspection of the area for bog turtles can be made easier.

Construction Activities

No HDDs identified as bog turtle HDDs in Attachment A will occur between November 1 and March 30 to protect hibernating turtles from potential returns. Some pre-construction activities that do not include ground disturbance within the wetland areas, such as drill rig set-up and equipment staging may occur before April 1.

All procedures implemented by the drilling contractor discussed previously in this contingency plan to reduce the potential for, identification, and notification of inadvertent returns will be implemented at all HDDs. At the bog turtle HDDs listed in Attachment A, inspection of the work areas and compliance with the project plans will be carried out daily by the BT Specialist. In addition, when drilling commences the BT Specialist will inspect all disturbed upland areas and silt fencing multiple times for bog turtles and inadvertent returns. In addition, each wetland will be inspected once-daily for the occurrence of inadvertent returns, including the surfacing of ground water by the BT Specialist. Multiple, daily inspections for inadvertent returns within the wetlands areas were determined unnecessary and a one-time daily inspection would reduce the direct disturbance of normal behaviors if turtles are present. These inspections will continue until drilling is completed and the inadvertent return risk in the wetlands has been removed. Only if the drilling contractor suspects an inadvertent return as determined from the drilling progress and monitoring of the drilling fluids would more than one daily inspection of the wetlands for returns be performed.

Bog Turtle Observations and Handling

Construction personnel will be trained to report all turtle observations to the EI immediately upon siting. All bog turtle observations that are not in harm's way will be documented within project logs and reported to the USFWS/USACE/PADEP within the final report. Documentation will

include dates, times, photographs, and behavior. Additional, protection measures should be considered depending on where bog turtles are observed in relation to project areas.

Bog turtles observed in harm's way shall be handled by the bog turtle Specialist assigned to the area and only if handling is determined necessary to remove the risk of injury or death. Other project personnel are allowed to move turtles small distances but only in cases of immediate danger. Otherwise steps to passively remove the threat and allow the turtles to continue normal behavior may be determined to be the best course of action. Bog turtles will only be moved to an area within the same wetland, only to a distance necessary to remove the threat. Additional silt fence installation may be required in the area to prevent turtles from returning to areas that presented the threat. Removal or relocation of the construction activity in that particular area will also be considered if practicable to completing the drill. Any bog turtles found within harm's way will be reported to the USFWS immediately as an incident and how it was handled.

Response to Inadvertent Returns

The HDD contractor shall immediately notify the lead Construction Inspector (CI) and Environmental Inspector (EI) of any sudden losses in returns or any inadvertent return to the surface. If a return is observed, the HDD contractor will take reasonable measures to eliminate, reduce, or control the release. The actions to be taken will depend on the location and time of release, site specific geologic conditions, and the volume of the release. The EI or CI will notify the SPLP's Environmental Compliance Coordinator (ECC) with the initial details of the return upon discovery.

Inadvertent Returns in Bog Turtle Wetlands/Streams

If the release is identified within bog turtle wetlands and/or streams, drilling operations will be temporarily suspended to allow the EI and BT Specialist to appropriately quantify the release, document its location, photograph the release, assess the potential to impact to the resource(s), and report the incident to SPLP's ECC. Information about the return will be recorded and updated as necessary as a running report on the data form provided in Attachment B. SPLP's ECC is responsible for completion of the data form with the assistance of the EI, BT Specialist, and environmental compliance contractor. Each form will be updated as new information is learned about the return and as activities to restore the area occur. The general reporting will be "Initial", "Interim", and then "Final". The initial, interim, and final reports will comprehensively document the return from initial discovery/notification through final restoration.

ALL inadvertent returns in bog turtle wetlands and streams, regardless of size, are to be reported to the appropriate agencies in accordance with the notification section below.

Containment, clean-up, and restoration activities that would require the installation of construction matting or the entry of construction vehicles and equipment are not allowed without PADEP/USACE/USFWS approval. If upon reporting the incident, and under further consultation with the agencies, the return is determined to be significant enough to warrant containment, clean-up, and restoration via mechanical methods, then the following procedures will be followed:

- Draft containment and restoration plan, outlining the limits, types, and duration of disturbances, will be submitted to the PADEP/USACE/USFWS for review and approval.

- Appropriate aquatic resource encroachment permits will be applied for depending on levels and types of disturbances required to clean up the material.
- Approved activities would only be implemented under the close, full-time supervision of the assigned EI.
- Drilling operations will resume when the return is contained and successfully remediated. The return area will continue to be monitored during the daily inspection.

One exception to ceasing drilling operations would be a release of drilling fluids during the pipe pullback process. Ceasing operations would pose significant risk of causing the pulled pipe to be stuck and not able to resume.

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The HDD contractor will be required to have the necessary containment and clean-up equipment on-site and/or readily available for use. At a minimum, a combination of some or all of the following material and equipment should be on site and in ample supply depending on the extent of sensitive areas:

- Spill sorbent pads and booms
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- Straw bales (certified weed-free)
- Wood stakes
- Sand bags
- Silt fence
- Plastic sheeting
- Corrugated plastic pipe
- Shovels
- Push brooms
- Centrifugal, trash and sump pumps
- Vacuum truck
- Rubber tired or wide track back hoe
- Bobcat (if needed)
- Storage tanks (if needed)
- Floating turbidity curtain (may be considered for use on large streams)Timber (enough to cross 50% of the wetland length need to be readily available)

If necessary, a 24-hour outside emergency response company may be called in for assistance (such as Enviroserve – 1-800-642-1311).

Notifications

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- PADEP Southeast Regional Office Waters and Wetlands: 484-250-5160

In addition, SPLP will notify the appropriate USACE regulatory office numbers within 24 hours of return discovery:

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- PADEP Southcentral Regional Permit Reviewer (TBD)
- USACE Baltimore District Permit Reviewer (TBD)
- USACE Philadelphia District Permit Reviewer (TBD

HDDs under bog turtle wetlands will also require additional notification to the USFWS/USACE/ PADEP personnel. The contact information for the identified points of contacts for bog turtles for these agencies is provide below (note: these may overlapped with other notifications points of contact):

<table>
<tr><td colspan="2">Kayla Easler
U.S. Fish and Wildlife Service
Pennsylvania Field Office
315 South Allen Street, Suite 322
State College, Pennsylvania 16801
814- 234-4090 Ext. 234
kayla_easler@fws.gov</td></tr>
<tr><td>Cumberland County
Debby Nizer
U. S. Army Corps of Engineers
Baltimore Dist., Regulatory Branch, PA Section
P. O. Box 1715
Baltimore, MD 21203-1715
Phone: 410-962-6085
DEBBY.NIZER@usace.army.mi</td><td>Berks (Baltimore District), York Counties
Mike Danko
U. S. Army Corps of Engineers
Carlisle Regulatory Field Office
401 Louther Street, Suite 205
Carlisle, PA 17013
Phone: 717-249-8730</td></tr>
</table>

Berks (Philadelphia District), Chester (Philadelphia District), Delaware, Counties Bill Jenkins, Chief, Applications Section U. S. Army Corps of Engineers Wanamaker Building 100 Penn Square East Philadelphia, PA 19107-3390 Phone: 215-656-6726	**Chester (Baltimore District), Lancaster, Lebanon Counties** Pat Strong U. S. Army Corps of Engineers Baltimore Dist., Regulatory Branch, PA Section P. O. Box 1715 Baltimore, MD 21203-1715 Phone: 410-962-1847

Summary Report

A summary report will be prepared at the end of the project to document the implementation of the drilling method and this special section of the contingency plan. Number of drills, duration of drills, number of returns, return characteristics, inspection results and observations, lessons learned, and recommendations will all be discussed within this report.

ATTACHMENT A

HDD Table

ATTACHMENT B

Inadvertent Return Data Form