

SUNOCO PIPELINE L.P.

Pennsylvania Pipeline Project

Alternatives Analysis

**Joint Permit Application for a
Pennsylvania Water Obstruction & Encroachment Permit and a
U.S. Army Corps of Engineers Section 404 Permit Application**

Revised March 2016



TETRA TECH

Table of Contents

1.0	Introduction.....	3
2.0	Evaluation of Alternatives	3
2.1	No-Action Alternative.....	3
2.2	Route Selection	5
2.2.1	Minor Route Variations	5
2.2.2	Major Route Alternatives.....	16
2.3	Construction Design.....	18
3.0	Exceptional Value Wetlands Alternative Analysis.....	19
4.0	References.....	30

ALTERNATIVES ANALYSIS

1.0 INTRODUCTION

This Alternatives Analysis is being prepared as a part of Sunoco Pipeline's, L.P. (SPLP) Joint Permit Application for a Pennsylvania Water Obstruction and Encroachment Permit Application and USACE Section 404 Permit Application for the Pennsylvania Pipeline Project (Project). SPLP has been diligent in siting the Project to avoid, minimize, and mitigate adverse effects to environmental resources located along the approximately 300-mile route.

2.0 EVALUATION OF ALTERNATIVES

During the development and siting of the proposed Project, SPLP considered a number of different alternatives including the No-Action as well as alternate routes and construction design methods. While it is impractical to document all the actions taken by SPLP to avoid/minimize impacts on a project of this size, the intent of this report is to provide a summary of the major actions SPLP has taken to accomplish this goal. Specifically, the following sections describe the No-Action alternative analysis, highlight some of the minor/major route variations, and construction methods incorporated into the Project.

2.1 NO-ACTION ALTERNATIVE

The No-Action Alternative considers the potential benefits and adverse impacts if the Project were not constructed. If the Project were not constructed, one potential benefit would be the absence of environmental impacts associated with construction and operation of the Project; however, the local communities/markets in need of the natural gas liquids (NGLs) that would no longer be provided would be adversely impacted. Specifically, the purpose/need of the Project to transport low cost Marcellus Shale production to markets locally and domestically in the U.S. and to international markets would not be met. Consequently, the No-Action Alternative would likely require the use of other energy sources to satisfy the growing energy demand that would not be met by the Project. Accordingly, customers in those markets would have fewer available and likely more expensive options for obtaining natural gas supplies in the near future.

According to the Energy Information Administration's (EIA) Annual Energy Outlook 2015 (AEO 2015), energy consumption is projected to grow through 2040 even with increases in energy conservation and energy efficiency (EIA 2015). This is evident in the natural gas industry, where domestic consumption increased 2.8 percent from 2013 to 2014, to 73.6 billion cubic feet per day (Bcf/d). Within Pennsylvania alone, natural gas consumption increased from 706.2 Bcf/d in 1997 to 1,090 Bcf/d in 2013, with dramatic usage coming from the electric generation sector. Due to the increasing demands for energy and abundant supply of natural gas, natural gas consumption is forecast to continue to increase, adding to the rapid growth and expansion of natural gas drilling and production currently in occurrence. NGLs are related to natural gas as they are produced with natural gas in Marcellus shale (and other formation) and extracted via the same wells. Unfortunately, despite the vast increases in natural gas production, the lack of distribution infrastructure has constrained the natural gas and NGLs markets. These constraints have caused

many portions of eastern Pennsylvania and New England to be affected by volatile natural gas and NGLs prices, particularly during cold snaps in the winter heating season. The spikes in price mostly result from insufficient pipeline capacity to transport natural gas and NGLs supplies to those markets where it is most needed. The Pennsylvania Public Utilities Commission (PA PUC) has indicated that additional pipelines could help remove these constraints and stabilize regional markets, and would help move the vastly increased Marcellus Shale gas production to consumers (PA PUC 2015).

Currently, natural gas liquids are being hauled by truck and rail to the Sunoco Marcus Hook facility for processing, storage, and distribution. Under the No Action Alternative, large quantities of NGLs would continue to be shipped long distances from Marcellus production areas to Sunoco's Marcus Hook facility by truck and rail. By contrast, pipelines are considered to be a safer, more efficient mode of transport for many types of substances, including natural gas and NGLs. Alternatively, other pipeline projects may be proposed and constructed, and the associated environmental impacts would be necessary because existing infrastructure is currently not sufficient to provide firm transportation service for the large volumes required to alleviate supply shortages in eastern Pennsylvania and nearby markets in New England, as well as other areas. Nonetheless, assuming business-as-usual trends continue (i.e. current growth rates, world oil prices, and resource assumptions), the AEO2015 forecasts in its Reference Case scenario that liquid fuels, including NGLs, will continue to be imported (EIA 2015).¹ For the reasons discussed above, the No-Action Alternative would not fulfill the purpose or objectives of the Project and was not selected.

¹ Due to the uncertainties inherent in energy market projections, the AEO 2015 indicates that the Reference case result should not be viewed in isolation; however for purposes of this Alternatives Analysis, the NGL import forecast is based on the Reference Case (business-as-usual) scenario as the No Action Alternative represents baseline levels against which the Project can be compared.

2.2 ROUTE SELECTION

SPLP has co-located the Project with an existing right-of-way (ROW) for the majority of the route. This is a major means for avoiding new impacts to sensitive resources (i.e., forested wetlands) and for minimizing environmental impacts for the entire Project. In addition to this major routing decision, SPLP has implemented a number of other route variations, both minor and major, to further reduce the environmental impacts associated with the Project. The following sections provide an overview of just a few of these variations across the different counties traversed by the Project.

2.2.1 Minor Route Variations

SPLP evaluated numerous minor route variations along the original proposed route in response to engineering and environmental constraints identified during the initial/early planning and design process, during field surveys, and coordination regarding other issues of concern (i.e. land use impacts, permanent easement acquisitions, and overall Project costs). A large number of these variations were specifically developed to reduce impacts in environmentally sensitive areas such as wetlands and streams, cultural/historical significant resources, and threatened/endangered species habitats or those habitats for species of concern.

Existing publicly available data, including aerial photography, topographic maps, National Wetland Inventory (“NWI”) maps, USGS quadrangle maps, and parcel maps/attributes were incorporated into a project specific geographic information system (GIS) geo-database used for initial analysis of each route variation. Where feasible, landowners were contacted to survey properties and discuss potential easements. In addition, field surveys were conducted to evaluate further routing opportunities. The intent was to identify an environmentally sound, technically feasible, and cost-effective pipeline route for the transportation of NGLs.

In order to provide a few examples of the minor route variations evaluated and incorporated into the Project, one route variation for each County is described below (Table 1). Note, Allegheny and Juniata counties did not involve any route variations. Through the incorporation of the minor route variations presented below, potential impacts to aquatic resources including wetlands and streams, threatened/endangered or species of concern, and cultural resources were reduced.

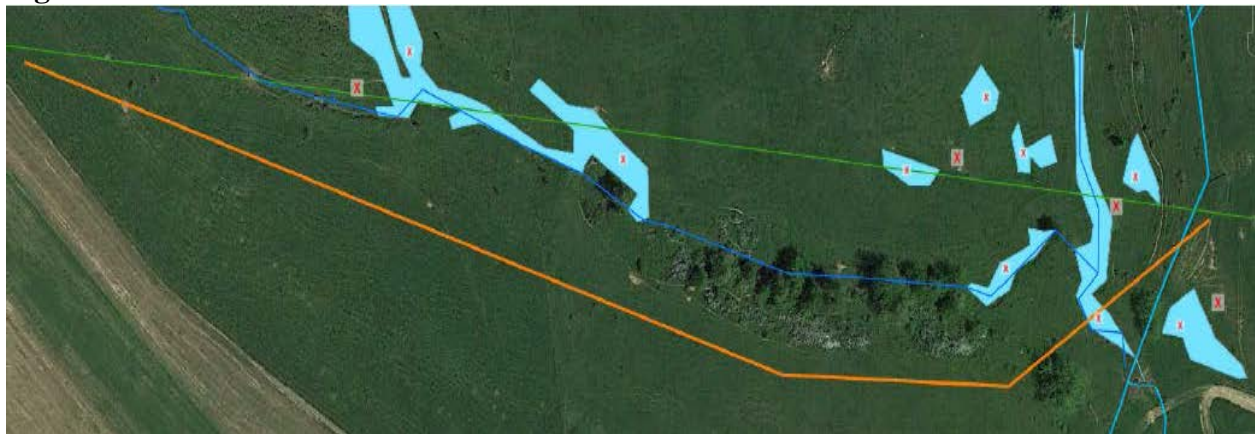
Table 1 Minor Route Variations Evaluated

Variation Number	County	Figure Reference	Variation Description	Status
1	Washington	Figure 1	The original proposed ROW paralleled a stream bed; this variation proposes to move the ROW outside of the stream.	Incorporated
2	Westmoreland	Figure 2	The proposed ROW was moved slightly to the south to avoid forested wetlands.	Incorporated
3	Indiana	Figure 3	This change in ROW proposes to cross existing pipelines at a 90-degree angle, south of existing previously disturbed ROW, and to move away from a cemetery.	Incorporated
4	Cambria	Figure 4	This change in ROW is proposed to move away from mining lands and operations and to reduce the chance for encroachment into TE Products lines and station.	Incorporated
5	Blair	Figure 5	This variation is proposed to move the ROW 25 feet from timber rattlesnake dens that have been confirmed.	Incorporated
6	Huntingdon	Figure 6	This variation is proposed at the request of the landowner and to avoid paralleling down the middle of a stream.	Incorporated
7	Perry	Figure 7	This variation is proposed to move the ROW from timber rattlesnake dens that have been confirmed.	Incorporated
8	Cumberland	Figure 8	This variation moves the ROW away from identified wetlands and power lines in the area.	Incorporated
9	York	Figure 9	This variation moves the proposed ROW to the north to avoid and reduce impacts to forested wetlands.	Incorporated
10	Dauphin	Figure 10	This variation allows a more direct HDD across Highway 283 and avoids impacts to identified wetlands and streams.	Incorporated
11	Lebanon	Figure 11	This variation moves the ROW away from identified wetland areas.	Incorporated
12	Berks	Figure 12	This variation reroutes the ROW north to avoid potential impacts to wetland areas and a pond.	Incorporated
13	Chester	Figure 13	This route variation allows for an improved pipeline ROW drill profile, allowing for an easier HDD through an environmentally sensitive area.	Incorporated

Variation Number	County	Figure Reference	Variation Description	Status
14	Delaware	Figure 14	This ROW avoids a space-constrained area between the waste treatment plant and river bed, as well as wetland areas.	Incorporated
15	Lancaster	Figure 15	This ROW variation avoids a heavily congested route that includes various structures/uses such as a parking lot, a cemetery, gas pumps, existing pipelines, a pond, and home.	Incorporated
16	Westmoreland	Figure 16	This ROW variation avoids a series of wetland complexes, a pond, and an identified hazardous waste site.	Incorporated

Route Variation 1: Located in Washington County, this approximately 0.28-mile route variation moves the pipeline centerline in a south/southeasterly direction to avoid and minimize potential impacts to streams and wetlands before heading northeast to connect to the original proposed pipeline route.

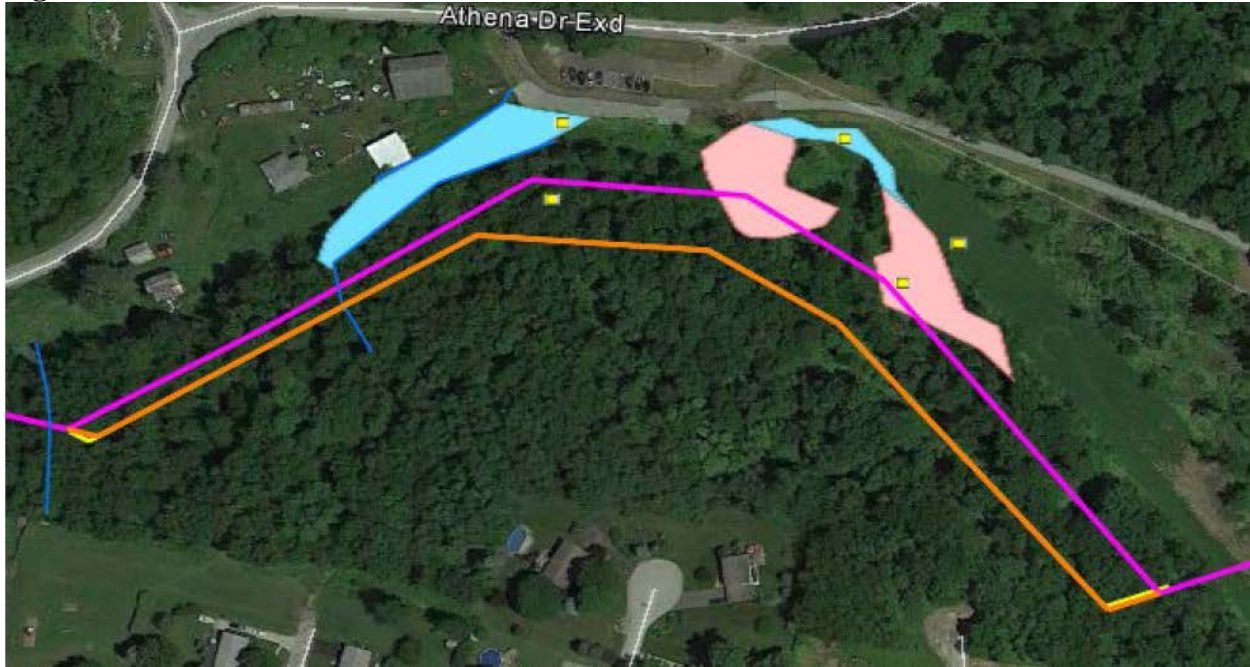
Figure 1: Route Variation 1



Note: green = original route; orange = alternate proposed route; blue = aquatic resources (shaded blue = wetlands; blue line = streams)

Route Variation 2: Located in Westmoreland County, this approximately 0.27-mile route variation moves the centerline of the pipeline approximately 70 feet south around the bend to avoid emergent and forested wetlands until it can connect back to the proposed route. This variation was developed specifically to avoid clearing forested wetlands.

Figure 2: Route Variation 2



Note: purple = original route; orange = proposed alternate route; blue and pink = aquatic resources (shaded blue = emergent wetlands; shaded pink = forested wetlands; blue line = streams)

Route Variation 3: Located in Indiana County, this approximately 0.24-mile route variation moves the centerline of the pipeline south approximately 150 feet from the original proposed route and away from Bethel cemetery in the north.

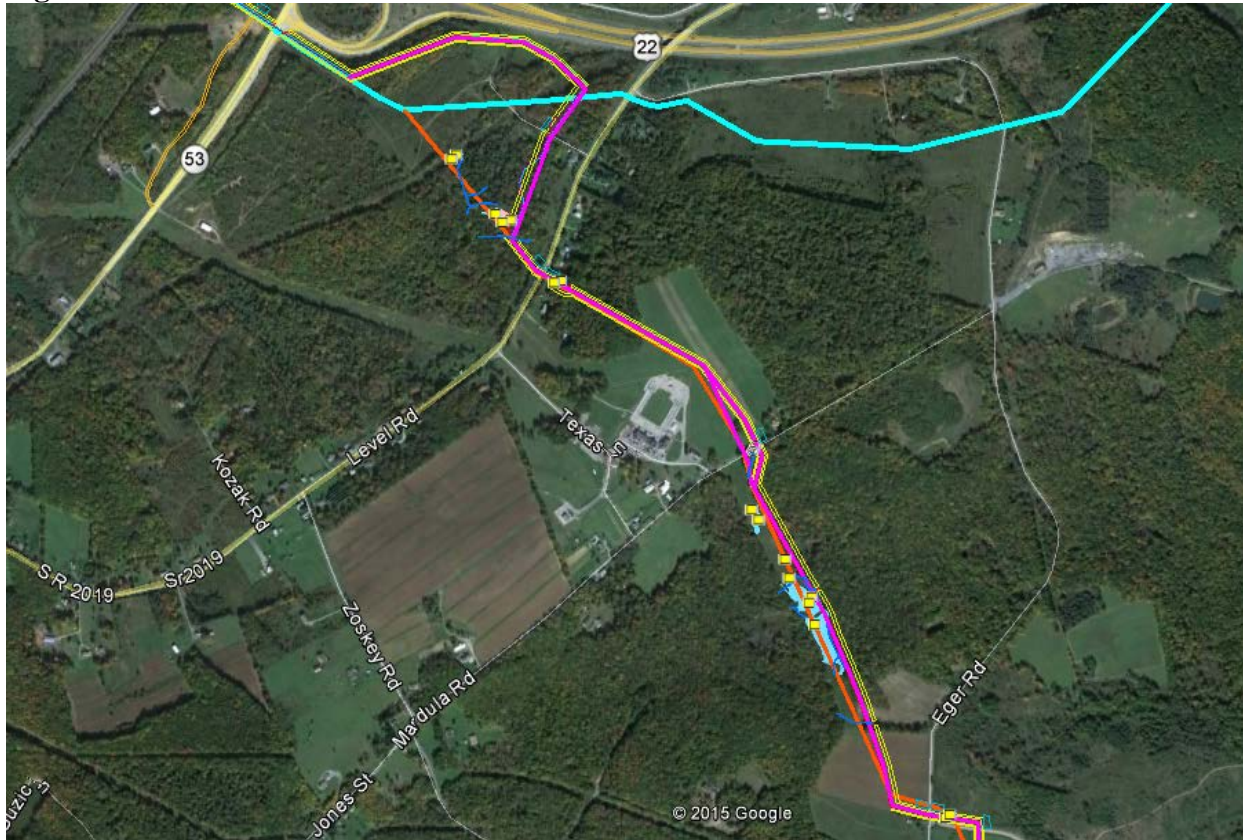
Figure 3: Route Variation 3



Note: green = original route; dark purple = proposed alternate route; yellow = existing pipelines

Route Variation 4: Located in Cambria County, this approximately 1.63-mile route variation moves the centerline of the pipeline from the proposed route by curving northeast to parallel the southern side of Route 22 and dipping southwest to parallel Level Road until it reconnects with the proposed route. This route variation avoids mining operations, existing pipelines/stations, and aquatic resources including wetlands and streams.

Figure 4: Route Variation 4



Note: orange = original route; dark purple = proposed alternate route;

Route Variation 5: Located in Blair County, this approximately 0.18-mile route variation was developed to avoid the presence of confirmed timber rattlesnake (*Crotalus horridus*) dens the area. Timber rattlesnakes are protected by the Pennsylvania Fish and Boat Commission and damages to den areas are prohibited. As such, SPLP determined that moving the centerline of the pipeline ROW 25 feet to the north, would meet the needs of the Project and minimizes impacts to protected species.

Figure 5 – Route Variation 5



Note: purple = original route; orange = proposed alternate route; shaded red = rattlesnake den areas

Route Variation 6: Located in Huntingdon County, this approximately 0.71-mile route variation was developed to avoid impacts to landowners as well as streams and several wetlands in the area. The route variation moves the centerline of the pipeline from the original proposed route approximately 200 feet south until it can reconnect with the proposed route to the northeast, approximately 1,200 feet past Smith Valley Road.

Figure 6: Route Variation 6



Note: purple = original route; orange = proposed alternate route; shaded blue = wetlands;

Route Variation 7: Located in Perry County, this approximately 0.11-mile route variation moves the centerline of the pipelines southeast 25 feet from the original proposed route to avoid a State protected timber rattlesnake den area.

Figure 7 – Route Variation 7



Note: green = original route; orange = proposed alternate route; shaded red = rattlesnake den area

Route Variation 8: Located in Cumberland County, this approximately 0.65-mile route variation moves the centerline of the pipelines from the original proposed route to avoid impacts to wetlands, streams, and power lines that were identified in the area.

Figure 8 – Route Variation 8



Note: green = original route; purple = proposed alternate route; shaded blue = wetlands

Route Variation 9: Located in York County, this approximately 1.83-mile route variation moves the centerline of the pipelines northeast approximately 1,200 feet from the original proposed route to avoid forested wetlands, and thus, reduces impacts on forested wetlands.

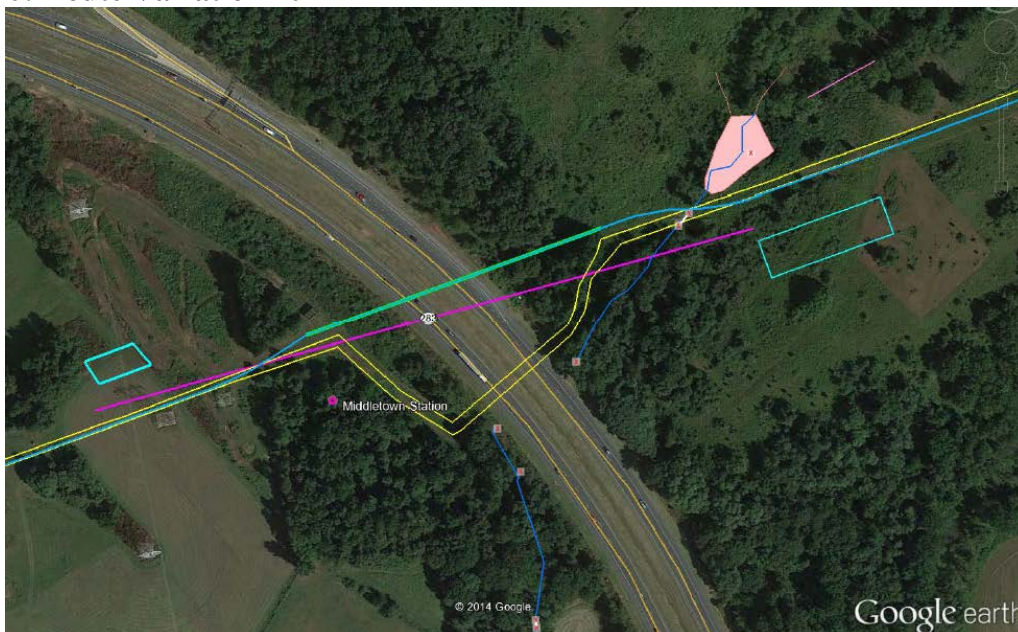
Figure 9: Route Variation 9



Note: orange = original route; purple = proposed alternate route; shaded pink = forested wetland

Route Variation 10: Located in Dauphin County, this approximately 0.21-mile route variation moves the centerline of the pipelines slightly south from the original proposed route to avoid a forested wetland and stream (on the east side of the Highway 283) and to allow for a more direct straight line HDD across Highway 283.

Figure 10: Route Variation 10



Note: light blue/green = original route; purple = proposed alternate route; shaded pink = forested wetlands

Route Variation 11: Located in Lebanon County, this approximately 2.67-mile route variation moves the centerline of the pipelines from the original proposed route (in light blue) approximately 3,500 feet southeast to avoid several streams and wetlands, as well as a cemetery.

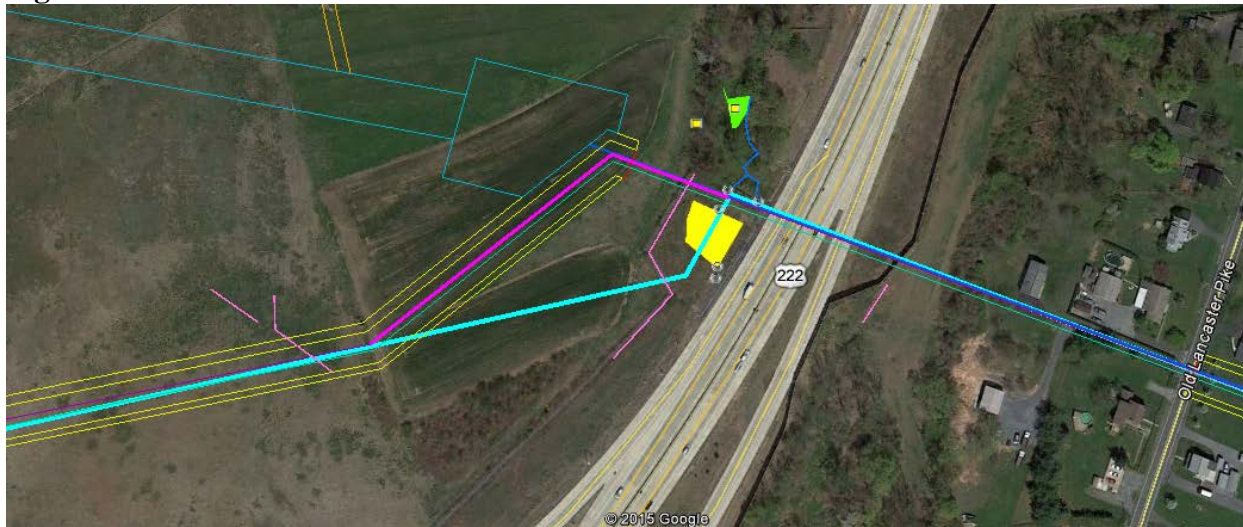
Figure 11: Route Variation 11



Note: light blue = original route; pink = proposed alternate route; shaded blue/pink = wetlands

Route Variation 12: Located in Berks County, this approximately 0.13-mile route variation moves the centerline of the pipelines northeast from the original proposed route before it crosses Highway 222 avoiding impacts to a wetland/pond and stream.

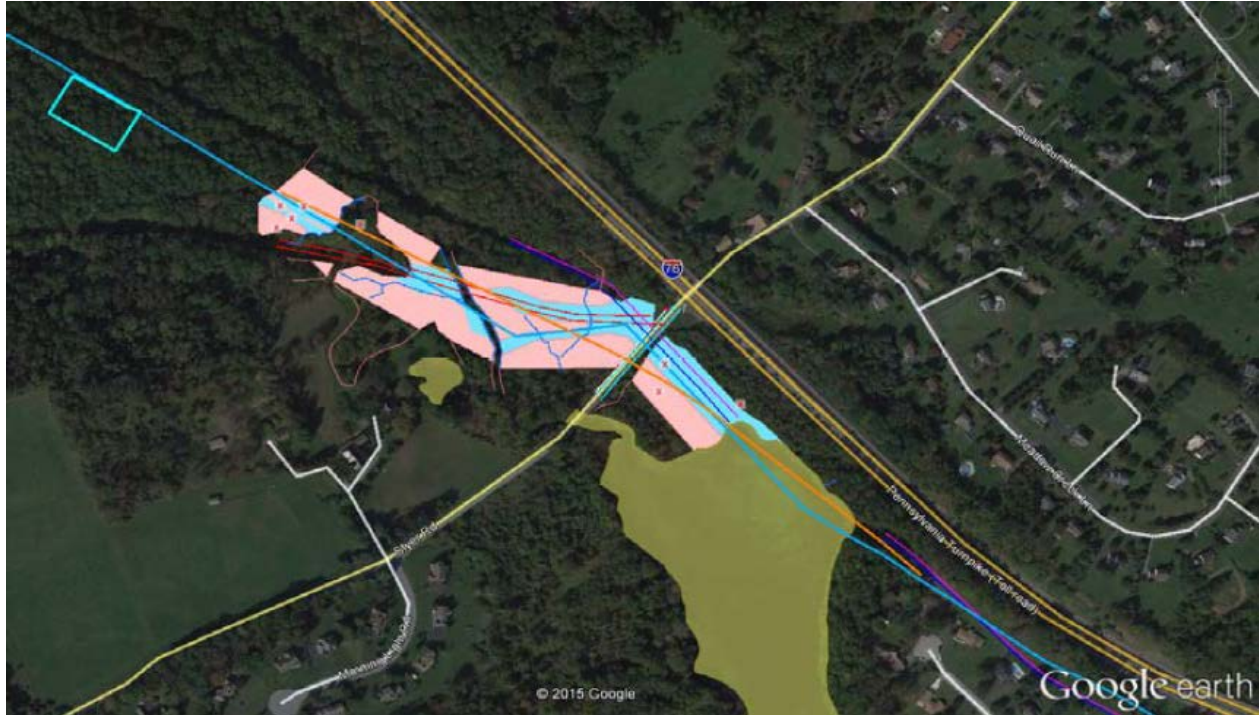
Figure 12: Route Variation 12



Note: light blue = original route; purple = proposed alternate route

Route Variation 13: Located in Chester County, this approximately 0.46-mile route variation moves the centerline of the pipelines south from the original proposed route to reduce impacts to forested wetlands, streams, and the Marsh Creek Reservoir. In addition, this variation allows SPLP to maintain a direct drill profile.

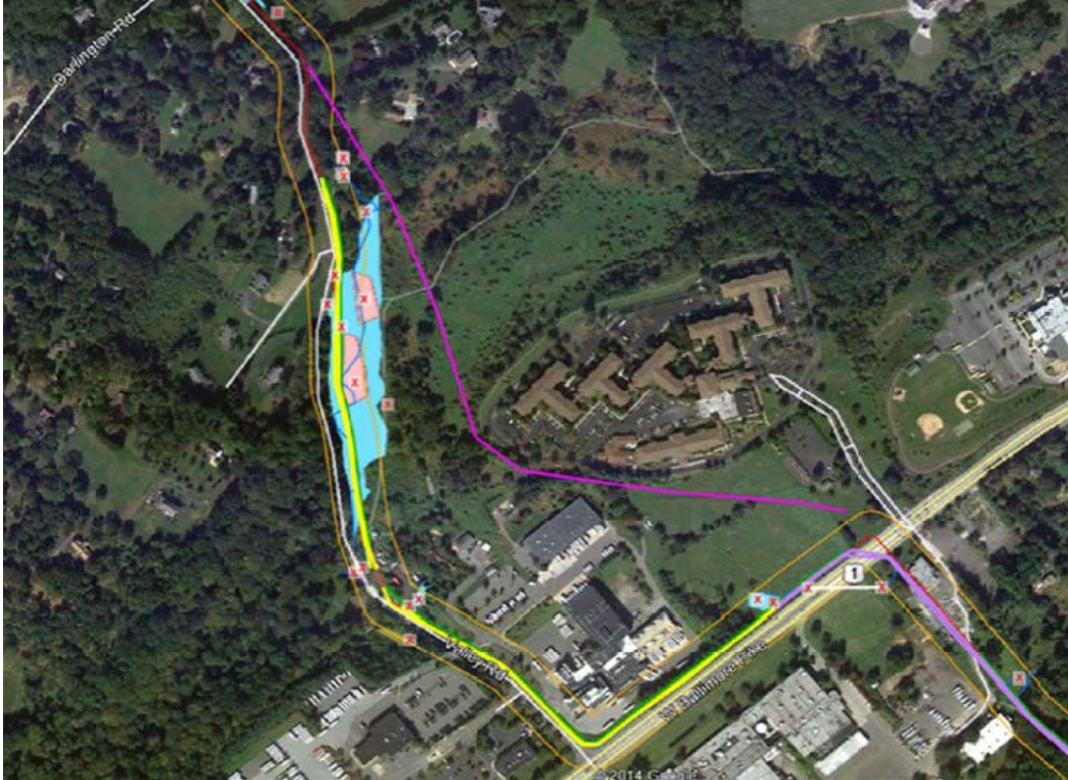
Figure 13: Route Variation 13



Note: dark blue = Buckeye Pipeline; purple = Enterprise Pipeline; red = Texas Eastern Pipeline; light blue = original route; orange = proposed alternate route; shaded blue/pink = wetlands

Route Variation 14: Located in Delaware County, this approximately 0.58-mile route variation moves the centerline of the pipelines southeast from the original proposed route to avoid limited space between the waste treatment plant and the river bed, and also to avoid wetland areas.

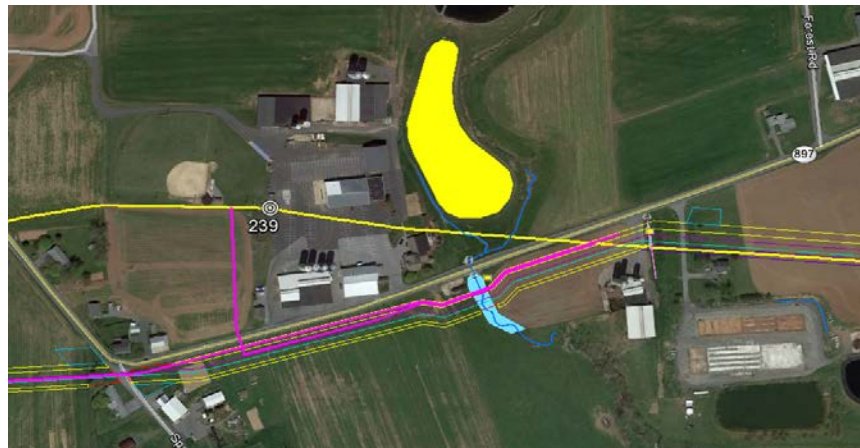
Figure 14: Route Variation 14



Note: yellow = original route; purple = proposed alternate route; blue- and pink-shaded areas = emergent and forested wetlands

Route Variation 15: Located in Lancaster County, this approximately 0.08-mile route variation moves the centerline of the pipelines south in a 90 degree angle along the edge of a farm field to avoid a cemetery, gas pumps, existing lines, pond, and residence.

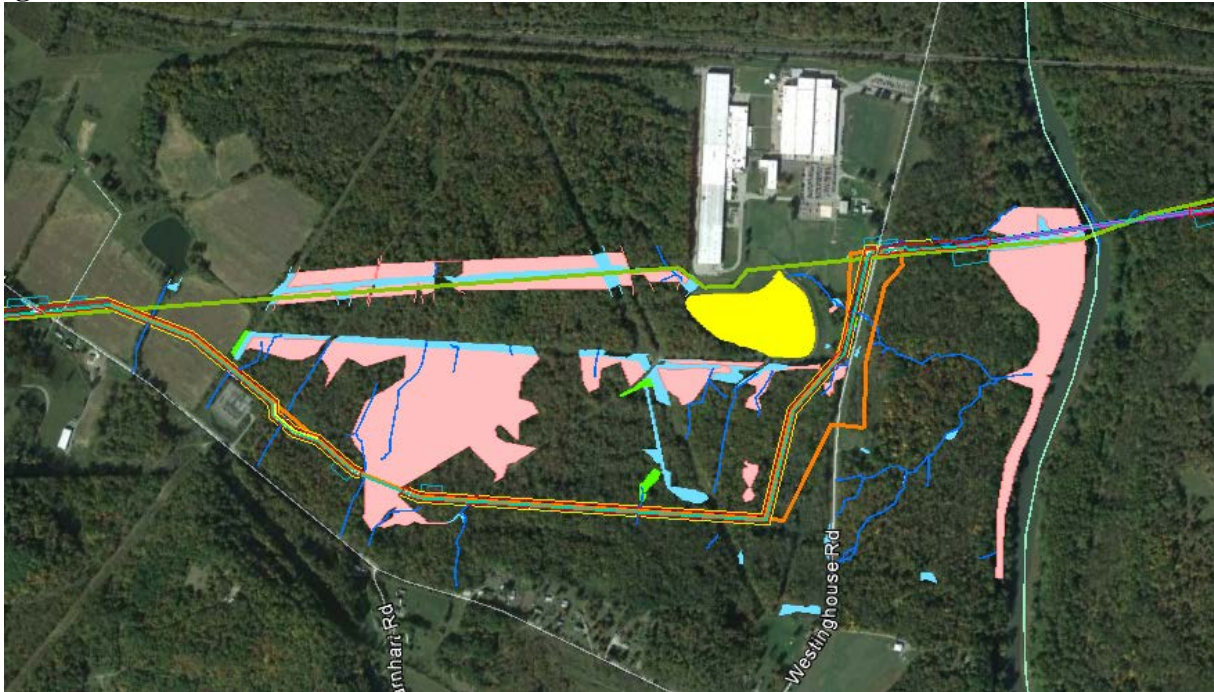
Figure 15: Route Variation 15



Note: yellow = original route; pink = proposed alternate route

Route Variation 16: Located in Westmoreland County, this approximately 1.3-mile reroute variation moves the centerline of the pipelines south paralleling Livermore Road before reconnecting back to the pipeline off Westinghouse Road. This reroute avoids several large wetland complexes, a pond, and avoids an identified hazardous waste site.

Figure 16: Route Variation 16



Note: green = original route, orange = proposed alternate reroute

2.2.2 Major Route Alternatives

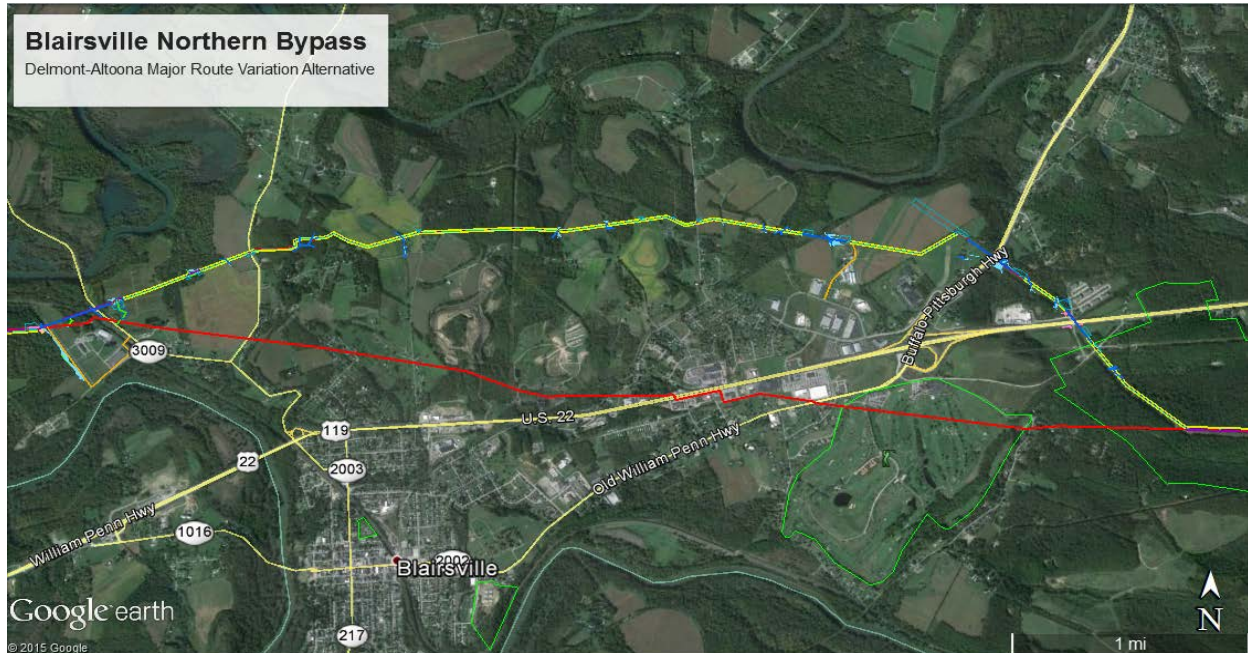
Similar to the minor route variations, SPLP also identified, evaluated, and incorporated a number of Major Route Alternatives in order to avoid or reduce impacts on environmentally sensitive resources, such as large population centers, scenic areas, wildlife management areas, or cultural/historically significant resources crossed by the proposed Project. The Major Route Alternatives do not change the origin and delivery point of the Project, but did involve a concerted effort to identify alternative routes that would satisfy the Project objectives and minimize environmental impacts and/or improve public health and safety. When compared to minor route variations, these major reroutes were lengthier in distance and varied relatively significantly from the original proposed route. Following the initial evaluation, the proposed major route alternative was further evaluated in terms of potential engineering and landowner considerations.

Two of the major route alternatives evaluated and ultimately incorporated were reroutes around the Borough of Blairsville, in Indiana County and around the heavily developed and populated area of Altoona—specifically between the Borough of Cresson, Cambria County and the Township of Frankstown Township in Blair County. These two major route alternatives were sited to primarily parallel an existing ROW to avoid/reduce impacts to the extent possible. However, after further evaluation, it was determined that a reroute was necessary.

Blairsville Northern Bypass

The Blairsville Northern Bypass shifts the Project alignment north of the Borough of Blairsville (Figure 17). This alternative is approximately 5.5 miles long, and would result in a 0.5 mile increase in pipeline length. This route alternative would avoid a highly developed area including residential, commercial, and recreational uses (i.e. Chestnut Ridge Golf Course, etc.). As such, potential land use and recreational impacts were avoided.

Figure 17: Blairsville Northern Bypass

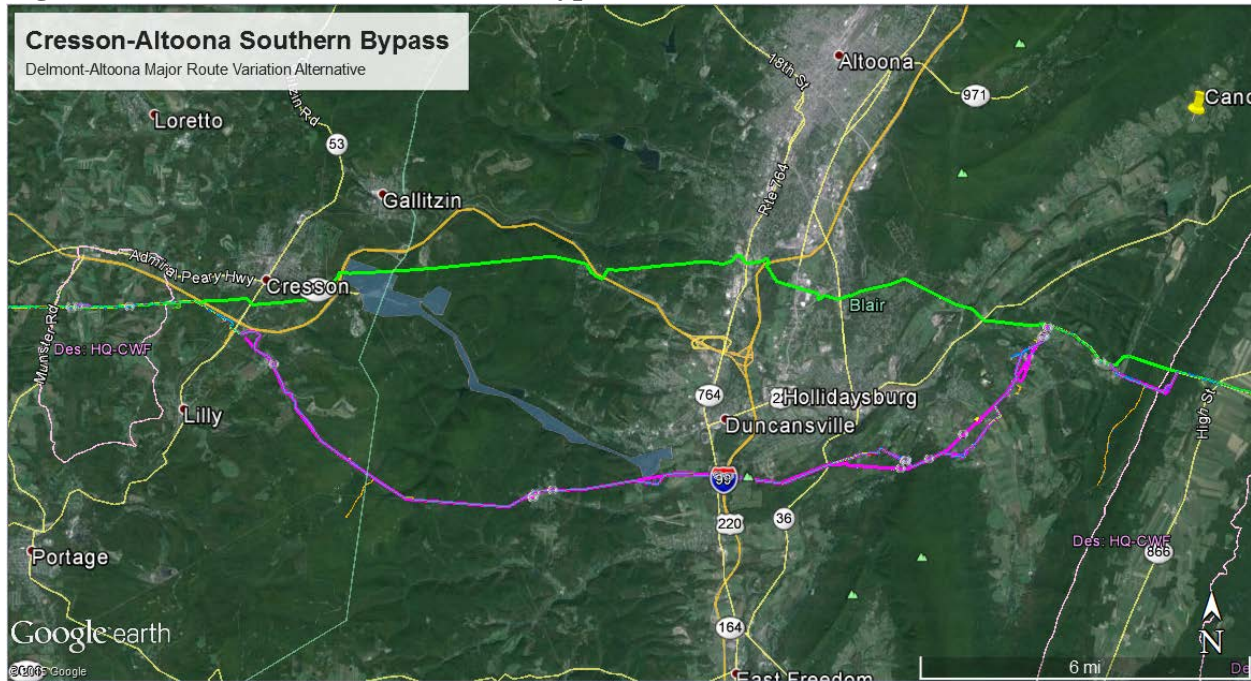


Note: red = original proposed route; yellow = proposed alternate route

Cresson-Altoona Southern Bypass

The Cresson-Altoona Southern Bypass (approximately 20 miles), traverses south of the Borough of Cresson, continues southeast through State Game Lands 198, and then heads east/northeast to connect to the original proposed route near Frankstown Township (Figure 18). This major route alternative avoids the heavily developed City of Altoona and the Allegheny Portage Railroad National Historic Site, a site marked historical by the Pennsylvania Historical and Museum Commission (PHMC) on April 1, 1947, and a designated National Historic Landmark (NHL) listed in the U.S. National Register of Historic Places on December 29, 1962. Incorporation of this major route alternative avoided potentially significant environmental impacts to the City of Altoona, and specifically to cultural/historic resources in the area.

Figure 18: Cresson-Altoona Southern Bypass



Note: green = original proposed route; pink/purple = proposed alternate route; blue gray shaded area = Allegheny Portage Railroad Historic Site/Property

2.3 CONSTRUCTION DESIGN

During preliminary Project planning and design, SPLP evaluated alternative pipeline construction methods in sensitive areas including water resources (i.e. wetlands and streams), threatened/endangered species habitat, and cultural resources. One of the primary construction design alternatives implemented to avoid and reduce environmental (wetland/stream) impacts is the reduction of the construction ROW through these sensitive 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.

Another major construction alternative implemented by SPLP to avoid and minimize environmental impacts, is the horizontal directional drill (HDD) 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 more direct 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 39 acres of wetlands and approximately 55,000 feet of stream crossings. Consequently, the alternative HDD construction method has reduced impacts by approximately 61 acres to wetlands and 32,000 feet to streams

(Table 2). 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 water quality, and less recreational impacts. As such, SPLP has agreed to employ HDD construction methods at certain wetland and stream crossings, where feasible and necessary.

Table 2 – Wetland and Stream Impacts

County	Open Cut Trenching Alternative		Proposed Project (Reduced ROW and HDD Method)	
	Wetland Impacts (Total Acreage)	Stream Impacts (Total Lengths)	Wetland Impacts (Total Acreage)	Stream Impacts (Total Lengths)
Washington	0.39	4,127	0.53	2,471
Allegheny	0.58	2,587	0.36	1,533
Westmoreland	13.08	12,887	3.45	7,503
Indiana	2.41	5,147	1.49	4,742
Cambria	10.65	9,416	4.90	6,181
Blair	2.34	1,227	3.33	2,883
Huntingdon	7.49	9,465	3.52	7,558
Juniata	0.41	3,070	0.25	2,222
Perry	4.76	2,723	1.29	2,132
Cumberland	12.59	8,565	7.22	5,566
York	0.96	1,107	0.40	1,231
Dauphin	6.98	4,986	1.84	2,079
Lebanon	4.27	3,565	1.19	2,161
Lancaster	10.65	2,753	1.89	863
Berks	8.08	5,812	2.38	2,694
Chester	11.79	6,061	3.75	2,001
Delaware	2.59	3,443	1.32	1,391

County	Open Cut Trenching Alternative		Proposed Project (Reduced ROW and HDD Method)	
	Wetland Impacts (Total Acreage)	Stream Impacts (Total Lengths)	Wetland Impacts (Total Acreage)	Stream Impacts (Total Lengths)
Totals	100.02	86,941	39.12	55,211

3.0 EXCEPTIONAL VALUE WETLANDS ALTERNATIVE ANALYSIS

Recognizing that wetlands are valuable resources that require consideration and protection, this section of the Alternative Analysis has been specifically prepared in accordance with Title 25 of the Pennsylvania Code 105.18a(a), to demonstrate that the Project will not have an adverse impact on Exceptional Value (EV) wetlands. Specifically, this section is intended to affirmatively demonstrate the following: 1) the Project is water-dependent, and 2) there is no practicable alternative to the Project that would fulfill the purpose of the Project and would not involve a wetland (or that would have less effect on the wetland), and would not have other significant adverse effects on the environment.

According to the United States Fish and Wildlife Service’s National Wetland Inventory, there are more than 400,000 acres of wetlands across the Commonwealth of Pennsylvania (PADCNR 2015). With the Marcellus shale formation largely underlying the Commonwealth, it is apparent that transmission pipelines will need to be developed to transport natural gas and natural gas liquids products to markets locally and throughout the region. Accordingly, policymakers have recognized that proactive planning and implementation of tools and guidelines for siting and construction/restoration best management practices that have been used and have become standard in the industry throughout the United States (e.g., FERC Wetland and Waterbody Construction and Mitigation Procedures, 2013; FERC Upland Erosion Control, Revegetation, and Maintenance Plan, 2013, and FERC regulations on siting natural gas pipelines). These siting standards include co-locating new proposed pipelines with existing roads, power lines, and other pipelines to effectively minimize natural resource impacts associated with these projects.

SPLP has sited the proposed Project parallel to and overlapping existing ROWs to the maximum extent practicable. Further, SPLP has employed avoidance and minimization measures (refer to Attachment 19 – Mitigation Plan) to reduce potential Project impacts to wetlands, including, but not limited to, the following:

- Reducing the width of temporary construction workspace through wetlands from 75 feet to 50 feet;
- Locating additional temporary work spaces a minimum of 10 feet away from wetlands, where possible;
- Using alternative construction methods, including the use of horizontal directional drill (HDD) technology under wetlands, where feasible; and,

- Identifying and considering (through map and field review and discussions with utility line operators and private/public property owners) other ROWs that could be utilized to minimize Project impacts while still fulfilling the Project's purpose.

In many cases, SPLP was able to avoid wetlands (including EV wetlands) through route adjustment or proposing HDD construction techniques. However, despite SPLP's best efforts, due to the linear nature and length of the Project and the abundance of wetlands in Pennsylvania, some impacts to wetlands, including some EV wetlands, will be unavoidable. Minor, temporary impacts to wetlands (including some EV wetlands) will be necessary to fulfill the basic purposes of the Project.

This Project is considered to be water-dependent because there is no other practicable alternative to the proposed pipeline that does not involve crossing streams and wetlands. In some cases, routing around a wetland (or EV wetland) would be considered possible but not practicable, because the alternative route would either affect other aquatic resources or would involve other environmental and public impact considerations. Other environmental and public impact considerations include the creation of new ROW where an existing ROW does not currently exist and/or addition of mileage to the overall length, resulting in new tree clearing in a wider ROW (if the beneficial opportunity to overlap with existing corridors was not available), newly fragmenting habitats, new disturbance in previously undisturbed areas (cultural/archaeological resources), possible additional species/habitats of concern, and involving new/additional landowners and properties with new easements that encumber future land uses.

Many other alternatives to the proposed route were considered in attempts to reduce impacts to aquatic resources. For those areas of wetlands (including EV wetlands) that were not able to be avoided, alternative construction techniques, workspace reductions, and special wetland construction procedures were considered and implemented where feasible. In some cases, certain avoidance measures were not feasible because they were determined to be as environmentally sound, cost-effective, or logistically feasible. However, through substantial project planning (including route selection, design of workspaces, and selection of construction and restoration methods), SPLP has avoided and minimized temporary impacts to EV wetlands to the maximum extent practicable. In addition, SPLP has completely avoided the need to place permanent fill in EV wetlands (for the pipeline and aboveground facilities), and has avoided or limited to *de minimus* the impacts of permanent vegetation conversion in EV wetlands.

Linear, buried pipeline projects throughout the U.S. are generally recognized as not having significant adverse impacts on the Nation's aquatic resources. The USACE and the majority of states allow such projects to proceed under the Nationwide Permit Program (i.e., Nationwide Permit 12 – Utility Lines). The Nationwide Permit Program is designed to streamline the review (if needed) and authorization of projects and activities that, due to the category/nature of the activity and the required implementation of required construction/restoration measures, already have been determined to have no to minimal adverse impacts on aquatic resources. The Nationwide Permits are reviewed every five (5) years and potential impacts, including spatial, temporal, and cumulative, are considered during the reissuance process (i.e., National Environmental Policy Act). In Pennsylvania, the USACE reviews utility projects not under the


Nationwide Permit Program, but does review utility projects in a similar fashion through the Pennsylvania State Programmatic General Permit – 4 (PASPGP-4). In addition, several states, including Pennsylvania, have a general permit program (i.e. GP-5) that also allows linear utility projects to proceed due to the recognition that these types of activities, in general, do not result in significant adverse impacts on aquatic resources. When certain thresholds are exceeded, more stringent agency review may result, but typically the same or increased best management practices are followed to ensure no adverse impact.


As presented in Section 2.0 (above) and the remainder of this section, SPLP has evaluated numerous alternatives and has minimized impacts to EV wetlands to the extent practicable. Table 3 below shows a list of the EV wetlands identified within the Project area in Berks County. As shown, the Project crosses a total of 16 EV wetlands in Berks County for a total linear distance of approximately 0.19 mile (refer to Table 2 in Attachment 11); therefore, the total potential impact to EV wetlands (assuming a 50' construction ROW) would be approximately 1.14 acres. The Wetland Function-Value Evaluation Form is filled out for each of these wetlands and is located in Attachment A. In addition, SPLP will utilize boring construction methods at three (3) of these wetland crossings, thus reducing the total temporary impacts through EV wetlands to approximately 0.86 acre, which would be temporary in nature and restored to preconstruction conditions/cover. As such, no adverse impacts to these wetlands and/or adjacent wild trout streams and bog turtle habitat would occur. Alternatives to these EV wetland crossings, where practicable, are discussed further below.

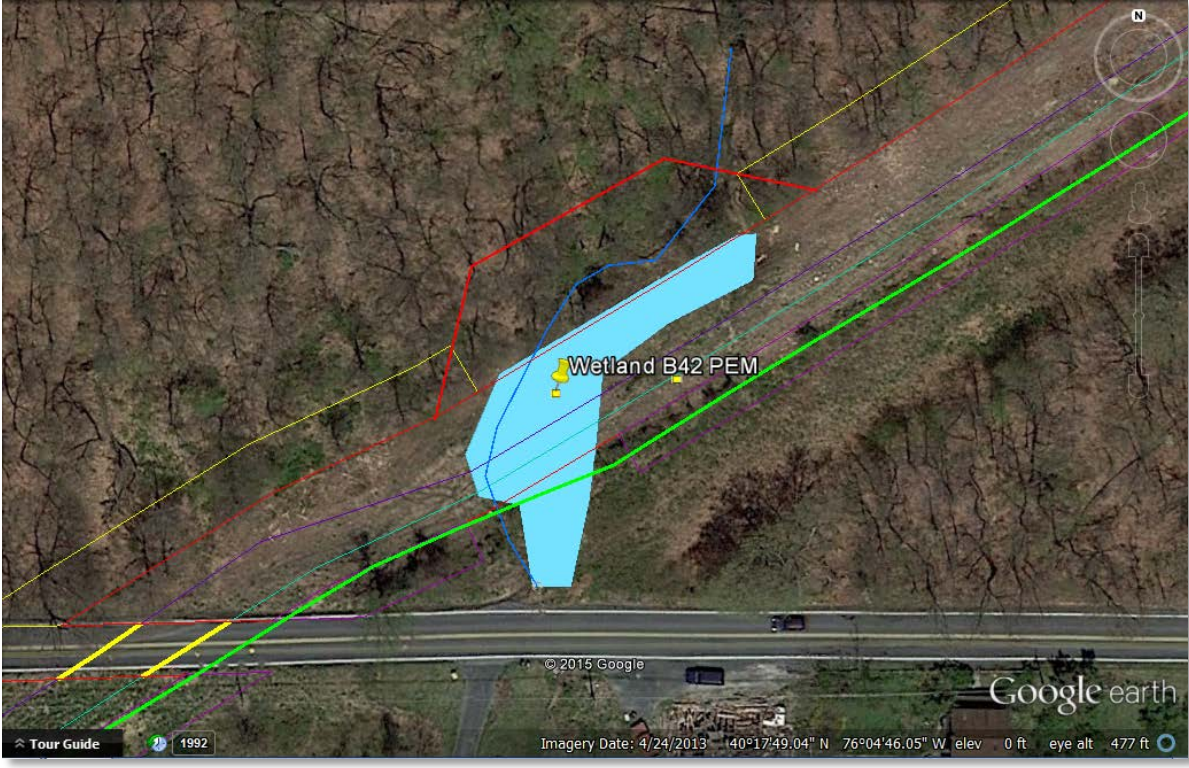
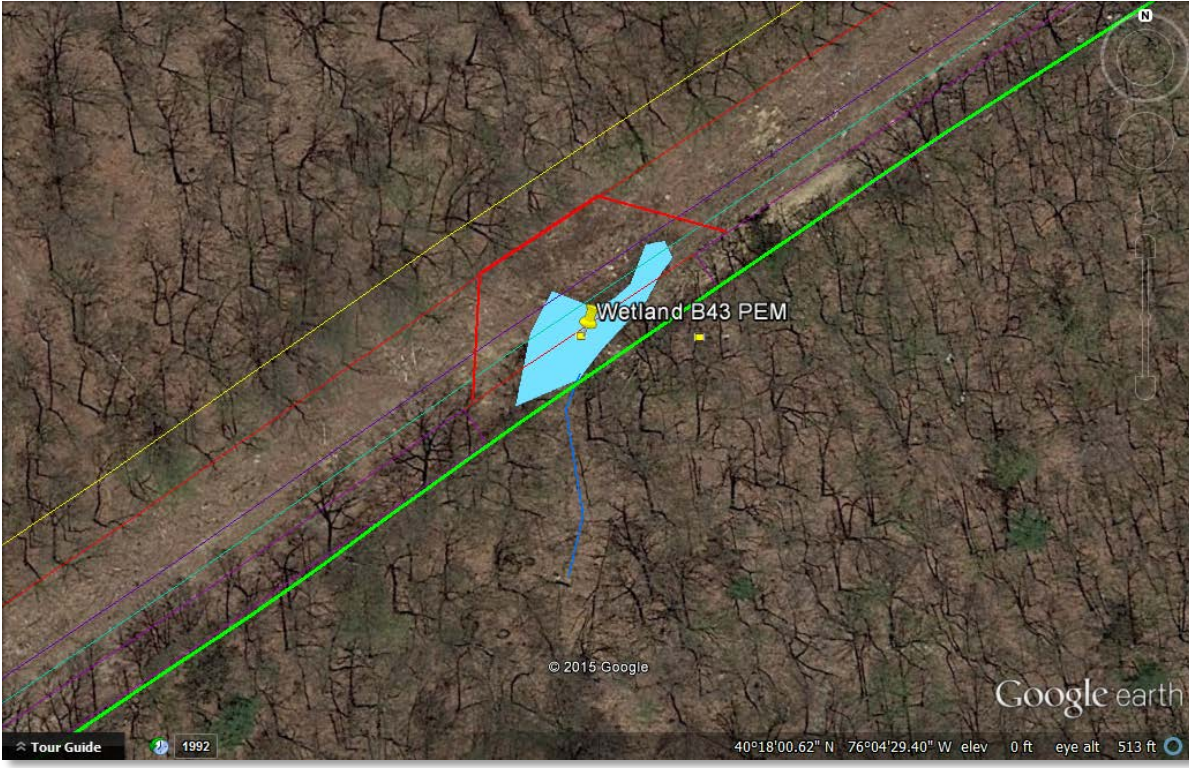
SPLP believes that the Project, as designed and proposed/presented in this section and other sections of the entire application:

- 1) Is water-dependent;
- 2) Has no available practicable alternative that would fulfill the purpose of the Project that would not involve a wetland or that would have less effect on EV wetlands, and which would not have other significant adverse effects on the environment;
- 3) Cumulatively will not contribute to the impairment of the Commonwealth's EV wetland resources;
- 4) Will not have a significant adverse impact on EV wetlands, either through areal extent or impacts on wetlands' values and functions; and
- 5) Has been designed and planned to avoid or reduce to the maximum extent practicable the adverse environmental impacts on EV wetlands.


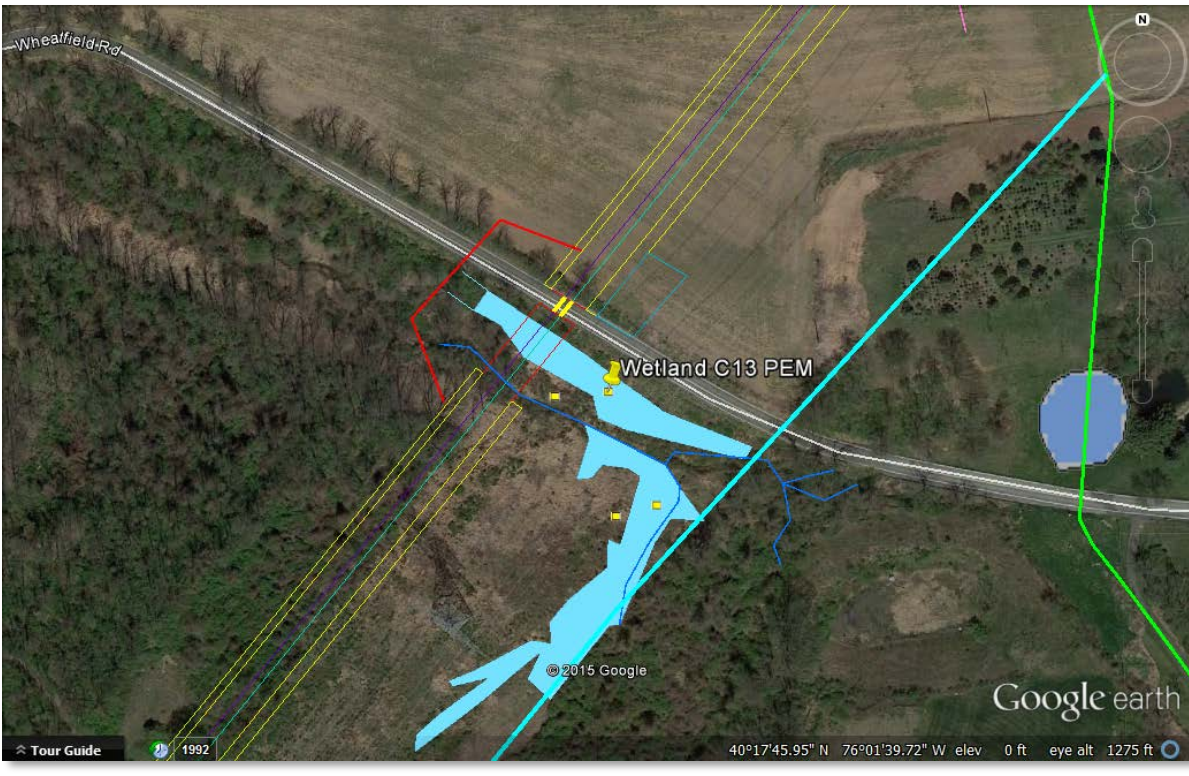
Table 3 –Exceptional Value Wetland Crossing Alternatives within Berks County



Wetland ID/ Classification	EV Wetland Designation	Wetland Acreage (On Site)	Latitude	Longitude	Project Construction Impacts (Acreage)	Wetland	Alternatives Evaluated
Wetland W48 PEM	Adjacency to a Wild Trout stream	0.0190	40.2609	-75.9959	0.001-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve the open cut/trench construction method through approximately 0.001-acre of palustrine emergent wetland. To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once construction is complete, the wetland would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation associated with a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to wetland W48 and the associated wild trout stream would occur.</p> <p>Reroutes to the west/east were not considered feasible as it would result in the clearing and disturbance of previously undisturbed habitat, including potential wetlands, and an additional 0.05 mile of pipeline, which was not considered environmentally or economically feasible.</p>

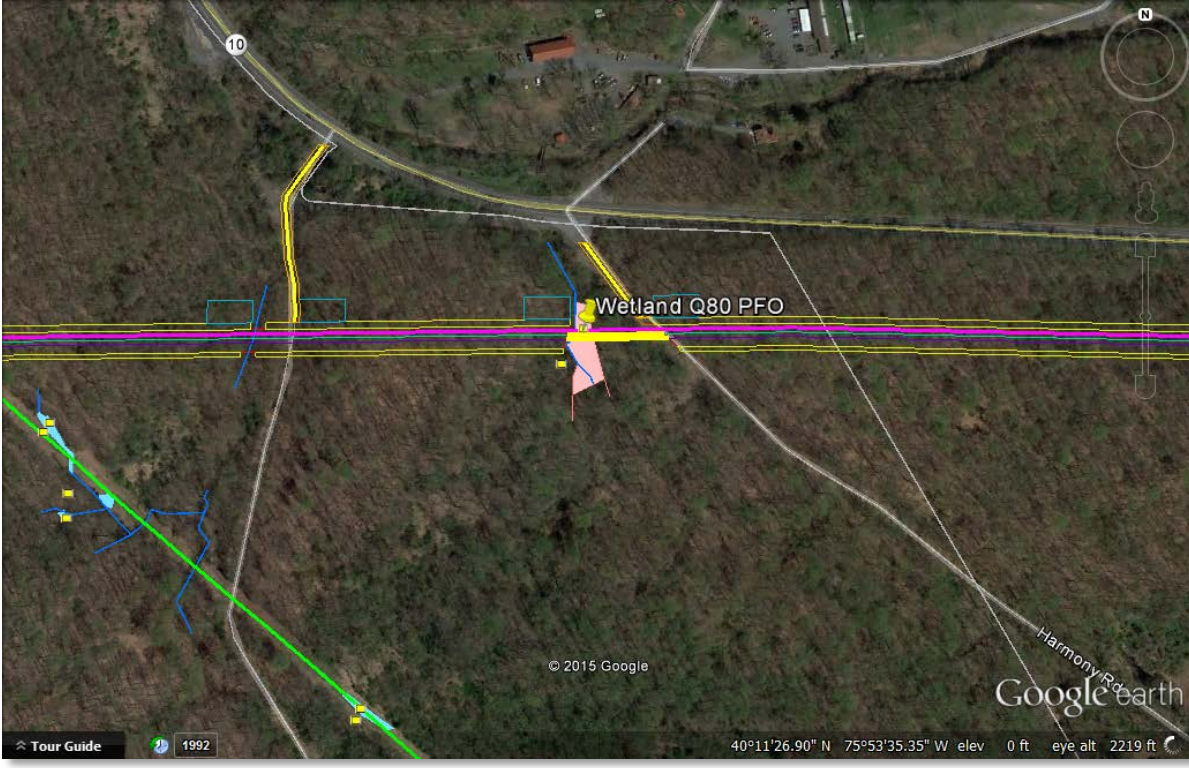
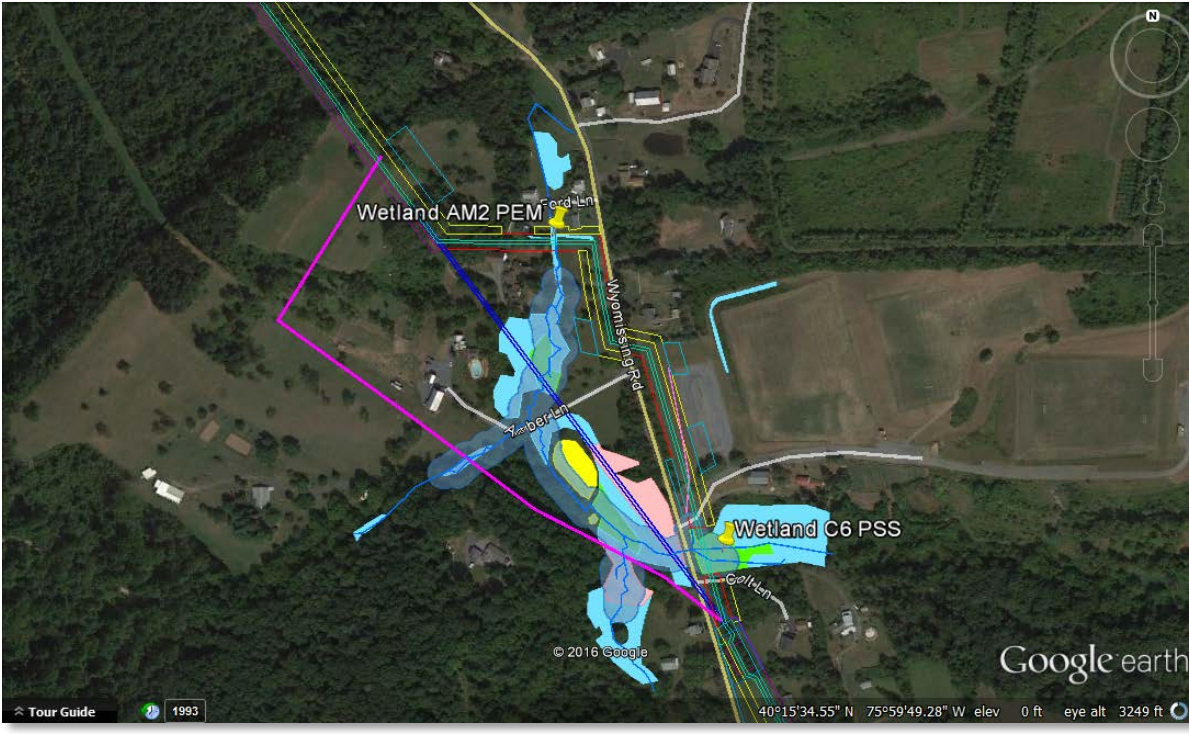
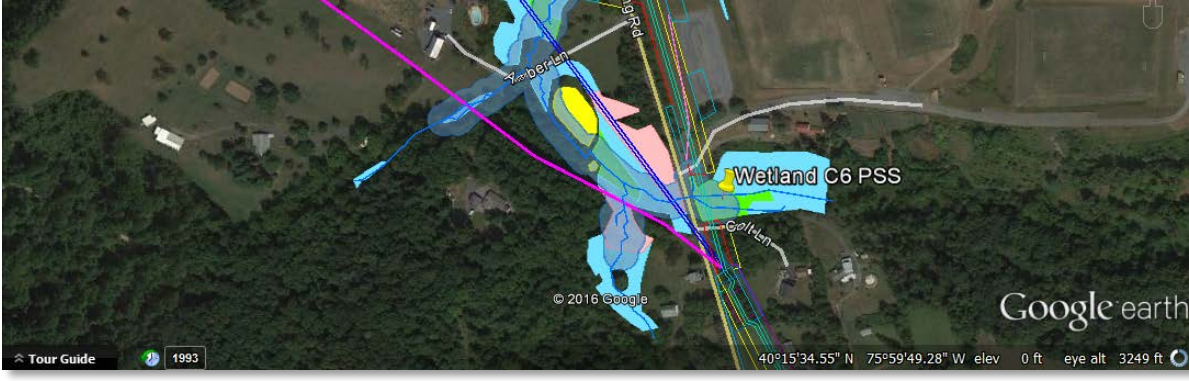
Wetland ID/ Classification	EV Wetland Designation	Wetland Acreage (On Site)	Latitude	Longitude	Project Construction Impacts (Acreage)	Wetland	Alternatives Evaluated
Wetland B21 PEM	Adjacency to a Wild Trout stream	0.0619	40.2928	-76.0879	0.109-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve the open cut/trench construction method through approximately 0.109-acre and 0.290-acre of emergent wetlands (wetlands B21 and B22). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once construction is complete, the entire wetland complex would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation associated with a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to this wetland complex and associated wild trout stream would occur.</p> <p>A reroute to the north of the proposed Project ROW was not considered feasible as it would result in the clearance/disturbance of previously undisturbed forested habitat (including potentially other streams and wetlands), and an additional 0.03 mile of pipeline, which was not considered environmentally or economically feasible. A reroute to the south was not considered feasible for similar reasons.</p>
Wetland B22 PEM	Adjacency to a Wild Trout stream	0.5313	40.2933	-76.0871	0.290-acre temp		
Wetland B24 PEM	Adjacency to a Wild Trout stream	0.0896	40.2952	-76.0829	0.057-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve the open cut/trench construction method through approximately 0.057-acre of palustrine emergent wetland (wetland B24). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once construction is complete, the wetland would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation associated with a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to wetland B24 and adjacent wild trout streams would occur.</p> <p>A reroute to the north was not considered a feasible alternative as it would result in the clearing and disturbance of previously undisturbed forested habitat, proximity to residences, and an additional 0.01 mile of pipeline which was not considered environmentally or economically feasible. A reroute to the south was not considered feasible for similar reasons and due to the potential for increased impacts to other wetlands including forested wetlands.</p>

Wetland ID/ Classification	EV Wetland Designation	Wetland Acreage (On Site)	Latitude	Longitude	Project Construction Impacts (Acreage)	Wetland	Alternatives Evaluated
Wetland B42 PEM	Adjacency to a Wild Trout stream	0.1512	40.2969	-76.0795	0.112-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve open cutting through approximately 0.112-acre of palustrine emergent wetlands (wetland B42). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once construction is complete, the wetland would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation associated with a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to wetland B42 and adjacent wild trout streams are anticipated to occur.</p> <p>A reroute to the north was not considered a feasible alternative as it would result in the clearing and disturbance of previously undisturbed forested habitat and the additional of 0.01 mile of pipeline, which was not considered environmentally or economically feasible. A reroute to the south was not considered feasible due to potential for increased roadway access/traffic impacts to E. Galen Hall Road and the private driveway that intersects it to the south.</p>
Wetland B43 PEM	Adjacency to a Wild Trout stream	0.0490	40.2997	-76.0738	0.023-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve the open cut/trench construction method through approximately 0.023-acre of palustrine emergent wetlands (wetland B43). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once construction is complete, the wetland would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation associated with a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to wetland B43 are anticipated.</p> <p>Reroutes to the northeast/ southwest were not considered feasible as it would result in the clearing and disturbance of previously undisturbed forested habitat (including other streams and wetlands) and would result in an additional 0.01 mile of pipeline which was not considered environmentally or economically feasible.</p>

Wetland ID/ Classification	EV Wetland Designation	Wetland Acreage (On Site)	Latitude	Longitude	Project Construction Impacts (Acreage)	Wetland	Alternatives Evaluated
Wetland B44 PEM	Adjacency to a Wild Trout stream	0.0316	40.3048	-76.0640	0.008-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve open cutting through approximately 0.008-acre of palustrine emergent wetlands (wetland B44). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once construction is complete, the wetland would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation and adjacency to a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, adverse impacts to wetland B44 and the associated wild trout stream would not occur.</p> <p>Reroutes to the north/south were not considered feasible as it would result in disturbance of previously undisturbed habitat (including potentially other streams and wetlands), as well as an additional 0.01 mile of pipeline.</p>
Wetland B49 PSS	Adjacency to a Wild Trout stream	0.1686	40.3161	-76.0422	0.018-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve the open cut/trench construction method through approximately 0.018-acre of palustrine scrub-shrub wetlands (wetland B49). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once complete, the wetland would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation and adjacency to a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, adverse impacts to wetland B49 and the adjacent wild trout streams would not occur.</p> <p>Reroutes to the north/south of the proposed Project ROW were not considered feasible as it would result in the clearing/disturbance of previously undisturbed forested wetland habitat and streams, respectively, which was not considered environmentally or economically feasible.</p>

Wetland ID/ Classification	EV Wetland Designation	Wetland Acreage (On Site)	Latitude	Longitude	Project Construction Impacts (Acreage)	Wetland	Alternatives Evaluated
Wetland C12 PEM	Adjacency to a Wild Trout stream	0.8486	40.2985	-76.0237	0.136-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve the open cut/trench construction method through approximately 0.136-acre of palustrine emergent wetlands (wetland C12). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once complete, the wetland would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation associated with a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to wetland C12 and associated wild trout stream are anticipated.</p> <p>Reroutes to the west or east of the proposed Project ROW were not considered feasible as it would result in the clearance/disturbance of previously undisturbed habitat (including potentially other wetland habitat) and an additional 0.04 mile of pipeline.</p>
Wetland C13 PEM	Adjacency to a Wild Trout stream	0.3115	40.2948	-76.0251	0.048-acre temp		<p>The Project ROW through this wetland originally paralleled SPLP's existing ROW (in green). However, it was rerouted to the west to avoid potential roadway access/traffic impacts to Highway 222 and a heavily developed residential community to the east, resulting in an open cut across approximately 0.048-acre of palustrine emergent wetland (wetland C13). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once complete, the wetland would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation associated with a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to wetland C13 and the associated wild trout stream are anticipated.</p> <p>Reroutes further to the west were not considered feasible as it would result in the clearance/disturbance of previously undisturbed habitat (and potentially other wetland habitat) and an additional 0.05 mile of pipeline, which was not considered environmentally or economically feasible.</p>

Wetland ID/ Classification	EV Wetland Designation	Wetland Acreage (On Site)	Latitude	Longitude	Project Construction Impacts (Acreage)	Wetland	Alternatives Evaluated
Wetland H21 PEM	Adjacency to a Wild Trout stream	0.0507	40.1966	-75.9058	0.032-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve the open cut/trench construction method through approximately 0.032-acre of palustrine emergent wetlands (wetland H21). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once complete, the wetland would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation associated with a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to wetland H21 and associated wild trout stream are anticipated.</p> <p>Reroutes to the west/east of the Project ROW were not considered feasible as it would result in the clearing and disturbance of previously undisturbed forested habitat and an additional 0.01-mile of pipeline, which was not considered environmentally or economically feasible.</p>
Wetland H25 PEM	Adjacency to a Wild Trout stream	0.0064	40.2089	-75.9257	0.006-acre temp		<p>The Project ROW through this wetland parallels SPLP's existing ROW and would involve the open cut/trench construction method through approximately 0.023-acre of palustrine emergent wetlands (wetlands H25 and H26). To minimize impacts, the temporary workspace has been reduced to the permanent 50-foot-wide ROW. Once complete, the wetlands would be restored to preconstruction conditions/cover. Furthermore, due to its EV designation associated with a wild trout stream, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to wetlands H25, H26, and the associated wild trout stream are anticipated.</p> <p>Reroutes to the west were not considered feasible as it would result in the clearing and disturbance of previously undisturbed forested habitat and an additional 0.02 mile of pipeline, which was not considered an environmentally or economically feasible alternative. A reroute to the east was not considered feasible for similar reasons.</p>
Wetland H26 PEM	Adjacency to a Wild Trout stream	0.0377	40.2090	-75.9259	0.017-acre temp		

Wetland ID/ Classification	EV Wetland Designation	Wetland Acreage (On Site)	Latitude	Longitude	Project Construction Impacts (Acreage)	Wetland	Alternatives Evaluated
Wetland Q80 PFO	Adjacency to a Wild Trout stream	0.2065	40.1886	-75.8884	None – Bore		<p>This Project ROW originally paralleled SPLP’s existing ROW (in green) but was rerouted (in pink) to go around the perimeter of New Morgan Properties, LP, requiring crossing a forested wetland (Q80). Reroutes to the north were not considered feasible as it would potentially increase roadway access/traffic impacts to State Route 10 - Morgantown Road, Harmony Road and the clearing/disturbance of additional undisturbed habitat. Reroutes to the south were not considered for similar reasons, as well as the potential to result in forested wetland impacts.</p> <p>Ultimately, it was determined that the most feasible alternative would be to bore underneath wetland Q80, avoiding potential impacts to forested wetlands and adjacent stream, surface water quality concerns, and erosion/sedimentation impacts including to adjacent wild trout streams. Furthermore, SPLP will adhere to any timing or construction restrictions stipulated by the PAFBC/PADEP within their project authorizations to provide additional protection to these waters. As such, no adverse impacts to wetland Q80 and adjacent wild trout streams are anticipated.</p>
Wetland AM2 PEM	Adjacency to Bog Turtle Habitat	0.0867	40.2575	-75.9911	0.046-acre		<p>This Project ROW originally paralleled SPLP’s existing ROW (in green) and originally proposed the use of horizontal directional drill (HDD) construction methods to minimize/eliminate potential impacts to an identified bog turtle wetland complex (that includes Wetland AM2 and Wetland C6, a palustrine emergent and scrub-shrub wetland, respectively). Due to landowner constraints, and USFWS concerns, this Project ROW was rerouted twice to the proposed route. Reroute 1 (in pink) would have paralleled another existing SPLP ROW and would have resulted in a dry crossing bore. However this reroute was eliminated from consideration due to landowner constraints, resulting in the second reroute to the east (as proposed). This reroute would result in approximately 0.046-acre of temporary impacts to Wetland AM2 but presented the most feasible environmental and economic reroute options available, including the use of a dry bore through Wetland C6. Once construction is complete, the wetland would be restored to preconstruction conditions/cover. As such, Project impacts to Wetland AM2 would be temporary and no permanent impacts to the wetland would occur.</p>
Wetland C6 PSS	Wild Trout Stream	0.4120	40.2549	-75.9893	None - Bore		

4.0 REFERENCES

- EIA 2014. Energy Information Administration, EIA Natural Gas Consumption by End Use, December 2014; Available online at: <http://www.eia.gov>
- EIA 2015. U.S. Energy Information Administration, Annual Energy Outlook 2015 with projections to 2040; DOE/EIA 0383 (2015); April 2015. Available online at: [http://www.eia.gov/forecasts/aeo/pdf/0383\(2015\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2015).pdf)
- PADCNR 2015. Pennsylvania Department of Conservation and Natural Resources, Appendix G – Wetlands Update; Pennsylvania Waterways and Wetlands Update Pennsylvania Outdoor Recreation Plan 2014-2019, April 2015; Available online at: http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_20030876.pdf
- PA PUC 2015. Pennsylvania Public Utility Commission. Pennsylvania 2014 Gas Outlook Report. June 2015. Available online at: http://www.puc.state.pa.us/NaturalGas/pdf/Gas_Outlook_Report-2014.pdf
- Tiner, Ralph W., Wetlands of the Northeast, Results of the National Wetlands Inventory, U.S. Fish and Wildlife Service, Northeast Region, Hadley, MA, 2010; Available online at: http://www.fws.gov/northeast/ecologicalservices/pdf/Northeast_Wetlands_Final_Report.pdf