

ATTACHMENT 6:
RIPARIAN BUFFER
WAIVER REQUEST
INFORMATION

Attachment 6 - Riparian Buffer Waiver Request

Pennsylvania Pipeline Project - South East Region: Spread 6

November 2016

Prepared for:

Sunoco Logistics, L.P.
525 Fritztown Road
Sinking Spring, PA



Prepared by:

Tetra Tech, Inc. 661
Andersen Drive
Pittsburgh, PA 15220



TABLE OF CONTENTS

Section	Page
LIST OF ATTACHMENTS	2
LIST OF ACRONYMS	2
PENNSYLVANIA PIPELINE PROJECT - RIPARIAN BUFFER WAIVER REQUEST	3
DEMONSTRATION OF WAIVER NECESSITY	3
ALTERNATIVES ANALYSIS	4
Baseline project alternative	4
No impact alternative	4
Route Selection	5
Route Variations	5
DEMONSTRATION OF MINIMIZING IMPACTS.....	8
MEETING REQUIREMENTS OF CHAPTER 102.....	9

LIST OF ATTACHMENTS

- 1 Table 2 – Riparian Buffer Waiver Information
- 2 Table 3- Riparian Buffer Considered Alternatives
- 3 Riparian Buffer Site Plans

LIST OF ACRONYMS

ACRONYM MEANING

BMP	Best Management Practice
E&SC	Erosion and Sediment Control
EV	Exceptional Value
HQ	High Quality
LOD	Limit of Disturbance
PCSM	Post-Construction Stormwater Management
ROW	Right of way
SR	Sight Restoration

PENNSYLVANIA PIPELINE PROJECT - RIPARIAN BUFFER WAIVER REQUEST

The Pennsylvania Pipeline Project qualifies for an exemption of the riparian buffer requirement under Chapter 102.14(d)(1)(ix) for areas within the Chapter 105 permit area where the pipeline corridor crosses perpendicular to the riparian area. The waiver is being requested for all non-perpendicular crossings of the riparian buffers as per the PADEPs guidance. Site plan drawings attached with this narrative are provided to show the 150 foot riparian buffer areas along HQ/EV streams for which this waiver is being prepared. It is assumed that all riparian forest buffers consist predominantly of native trees, shrubs and forbs and provide at least 60% uniform canopy cover. The site plans show the location and limits of the work and earth disturbance. Table 2 is provided as a summary and indication of the locations for which the waiver is being requested. Table 2 also indicates the designated use of the receiving water, if the water is impaired and if the water has a total maximum daily load, TMDL.

In addition to the exception, we are requesting a waiver under 102.14(d)(2)(ii) for areas within 150' of surface waters that are outside of the Chapter 105 permit area.

DEMONSTRATION OF WAIVER NECESSITY

A riparian buffer waiver is necessary to complete the intended scope of the pipeline project. The project involves the installation of two parallel pipelines within a 306-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, PA to SPLP's Marcus Hook facility in Delaware County, PA with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline would be installed within the ROW from Houston to Marcus Hook (306 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, PA to the Marcus Hook facility, paralleling the initial line for approximately 255 miles. Spread 6 (South East Region) of this project are cross through Chester and Delaware Counties, PA. Due to the linear nature of the project and the surrounding topography, riparian buffers could not be avoided altogether.

As defined in Chapter 102 of the Pennsylvania Code, a riparian forest buffer consists of "permanent vegetation that is predominantly native trees, shrubs and forbs along a stream that is maintained in a natural state or sustainably managed to protect and enhance water quality, stabilize stream channels and banks, and separate land use activities from surface waters." In HQ watersheds, the riparian width is identified as 150 feet on both sides of a perennial or intermittent stream.

According to Chapter 102.14(d)(2)(ii), linear pipeline projects are eligible for a waiver from subsections (a) and (b) if the Project demonstrates there are reasonable alternatives for compliance with these subsections, the riparian buffer is undisturbed to the extent practicable, and the Project meets the requirement of this chapter. In addition, the Project must still satisfy the requirements in subsection (c) *(Compliance with Subsection—Mandatory Requirements for all Riparian Buffers)*

The following alternatives analysis presents how the Project complies with these requirements.

ALTERNATIVES ANALYSIS

During the development and siting of the proposed project, SPLP considered a number of different alternatives including the No-Impact 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 section is to provide a summary of the major actions SPLP has taken to accomplish this goal. Impacts to environmental resources, including riparian buffers, were evaluated during the pipeline routing phase of the project. Field teams were deployed to evaluate alternate routes based on environmental and constructability constraints. The final route that was selected minimizes environmental impacts to the maximum extent practicable while still maintaining the project's overall constructability and ensuring a safe working environment while also taking landowner constraints into consideration. Table 3 provides details of the reasons why the route was chosen. Additionally, several variations of horizontal direction drill profiles were evaluated to minimize pullback areas, additional workspaces, and overall disturbance within riparian buffers. Permanent features, such as access roads and block valves, were evaluated to locate the features outside of the riparian buffer, where possible.

BASELINE PROJECT ALTERNATIVE

The Baseline Project Alternative considers that the project is built based on ease of construction and not limiting impacts to resources. The project would significantly impact resources if HDD's were not performed to minimize impacts to resources and were instead open cut installations of the pipeline. Necking down of the ROW at resources and locating temporary workspaces 10 feet from resources is a significant construction constraint that is done to minimize the impacts to streams, wetlands, and riparian buffers.

NO IMPACT ALTERNATIVE

The No-Impact 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, 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 (Bcfd). Within Pennsylvania alone, natural gas consumption increased

from 706.2 Bcfd in 1997 to 1,090 Bcfd 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. Unfortunately, despite the vast increases in natural gas production, the lack of distribution infrastructure has constrained the natural gas market. These constraints have caused many portions of eastern Pennsylvania and New England to be affected by volatile natural gas prices, particularly during cold snaps in the winter heating season. The spikes in price mostly result from insufficient pipeline capacity to transport natural gas supplies to those markets where it is mostly needed. As such, 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).

Under the No Impact Alternative, customers would be required to find alternative means to transport gas produced in the central Marcellus fairway to accessible markets. Consequently, other pipeline construction 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. As such, the No-Impact Alternative would not fulfill the purpose or objectives of the Project and was not selected.

ROUTE SELECTION

SPLP has co-located the project with an existing 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 in the South East region traversed by the project.

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, riparian buffers, 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.

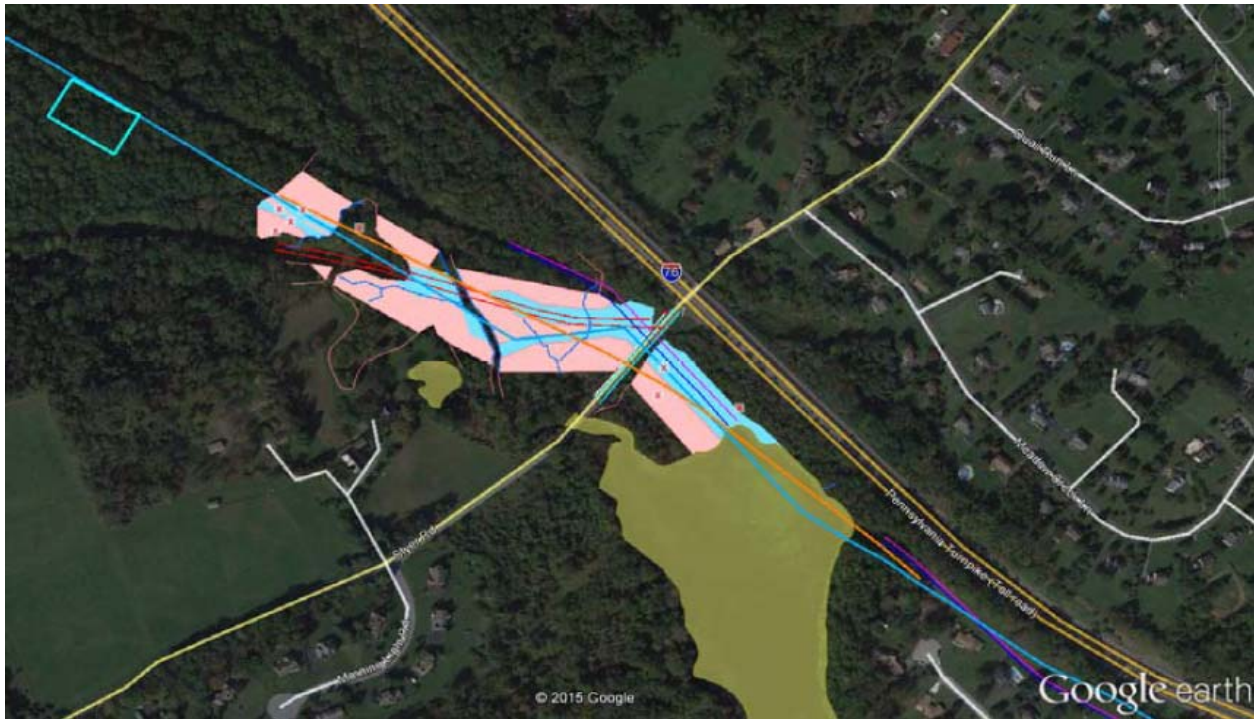
In order to provide a few examples of the minor route variations evaluated and incorporated into the project, one route variation for each County is described below (Table 1). Through the incorporation of the route variations presented below, potential impacts to aquatic resources including wetlands and streams, threatened/endangered or species of concern, riparian buffers and cultural resources were reduced.

Table 1 – Route Variations Evaluated

Variation Number	County	Figure Reference	Variation Description	Status
1	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
2	Delaware	Figure 14	This ROW avoids a space-constrained area between the waste treatment plant and river bed, as well as wetland areas.	Incorporated

Route Variation 1: 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 1



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 2: 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 2



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

DEMONSTRATION OF MINIMIZING IMPACTS

All disturbance activities, including those which impact riparian buffers, have been reduced to the maximum extent practicable. The limit of disturbance (LOD) has been reduced to 50 feet wide at all stream crossings within the riparian buffer area where possible adjacent to the stream area required for crossing and construction. In areas where it is not practicable to reduce the LOD throughout the entire extent of the riparian buffer, the LOD has been reduced to 50 feet wide within 10 feet of the stream banks to limit the proximity of the work areas as per the stream crossing detail from the PADEP manual. The operations within the LOD near stream crossings typically includes a topsoil stockpile, a stockpile for pipe trench excavation material, a pipe trench, a travel lane, a work area for equipment operation and pipeline welding outside the trench, and an area to install the erosion control best management practices (BMPs). In addition, site conditions such as steep slopes, varying depths of topsoil, and other on-site conditions limit the amount of work area. Reducing the LOD to a greater extent could potentially result in unsafe working conditions and would hinder the ability to complete

the stream crossing within the required time frame of 24 hours or less. Workspaces that provide additional space for stream crossing activities have been placed outside of riparian buffers where possible. The PCSM berms and trenches are not located within riparian buffers.

MEETING REQUIREMENTS OF CHAPTER 102

All other requirements of Chapter 102 to minimize impacts to riparian buffers are being met in the project's Erosion and Sediment Control Plan and Site Restoration/Post-Construction Stormwater Management Plans which have been designed in accordance with Chapter 102 and in HQ/EV watersheds to implement ABACT controls where non discharge alternatives do not exist. In accordance with Chapter 102, and E&S plan has been developed to minimize the sediment entering the buffer areas through the use of properly designed E&S bmp's such as, but not limited to, waterbars, compost filter sock, diversion berms, slope pipes and erosion control blanket. A site restoration plan is proposed to revegetate the buffer areas within the right of way. The post construction stormwater management plan has been designed to control runoff rate and volume at permanent above ground facilities through infiltration practices.

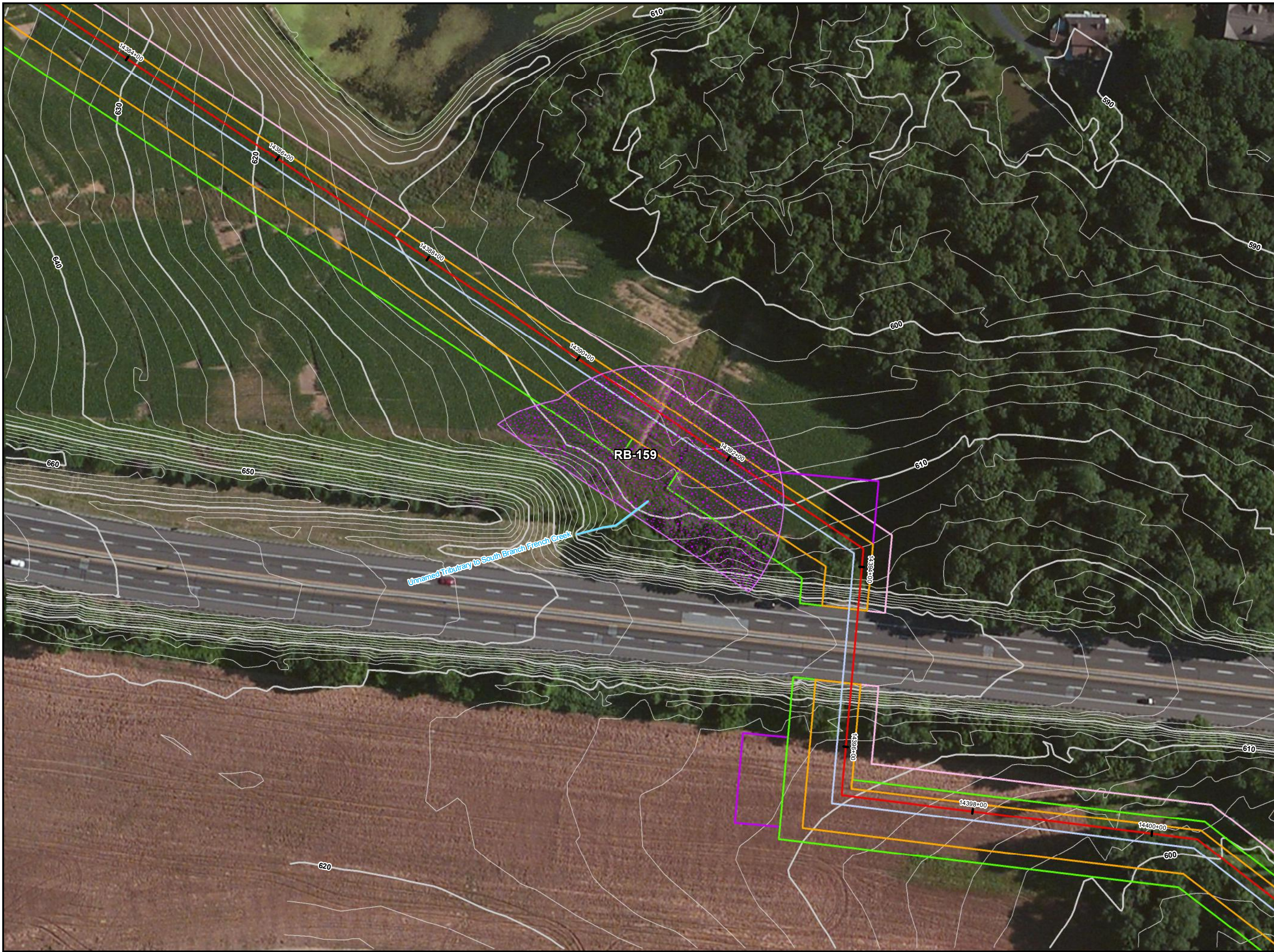
**Table 2:
Riparian Buffer Waiver Information
South East Region**

E&S SHEET NUMBER	STREAM NAME	PERPENDICULAR OR NON-PERPENDICULAR	STATIONING	DESIGNATED USE	SITE PLAN DESIGNATION (RB-)	IMPAIRMENT	TMDL (Yes/No)	LENGTH OF BUFFER	WIDTH OF BUFFER	AREA OF BUFFER	LENGTH OF TIME OF DISTURBANCE
CHESTER											
ES - 6.04	UNT to South Branch French Creek	Non	56+00	EV	159	Source Unknown - Pathogens	No	336.96	189.02	0.98	24 hrs
ES - 6.05	South Branch French Creek	Non	76+00 through 83+00	EV	160	Source Unknown - Pathogens	No	787.66	213.05	2.99	48 hrs
ES - 6.07	UNT to South Branch French Creek	Non	106+00	EV	161	Source Unknown - Pathogens	No	908.47	210.75	3.55	24 hrs
ES - 6.07	UNT to South Branch French Creek	Non	109+ 50	EV	161	Source Unknown - Pathogens	No	908.47	210.75	3.55	24 hrs
ES - 6.07	UNT to South Branch French Creek	Parallel	116+00	EV	162	Source Unknown - Pathogens	No	221.28	66.59	1.53	30 days
ES - 6.09	UNT to Marsh Creek	Non	143+50	HQ-TSF	163	NA	Yes	541.09	301.69	2.29	24 hrs
ES - 6.09	UNT to Marsh Creek	Non	154+00	HQ-TSF	164	NA	Yes	418.45	210.59	1.74	24 hrs
ES - 6.11	UNT to Marsh Creek	Non	187+00	HQ-TSF	165	NA	Yes	352.70	231.29	1.43	24 hrs
ES - 6.19	UNT to Marsh Creek	Non	322+00	HQ-TSF	167	NA	Yes	407.77	225.58	1.88	24 hrs
ES - 6.20	UNT to Marsh Creek	Non	337+50 through 343+00	HQ-TSF	168	NA	Yes	558.46	277.39	2.24	24 hrs
ES - 6.24	Marsh Creek	Non	402+00 through 405+00	HQ-TSF	169	NA	Yes	536.39	365.48	2.29	48 hrs
ES - 6.25	UNT to Marsh Creek	Parallel	415+00 through 418+00	HQ-TSF	170	NA	Yes	419.24	220.48	1.89	30 days
ES - 6.27	UNT to Black Horse Creek	Non	455+00	HQ-TSF	172	NA	Yes	187.81	135.97	0.46	24 hrs
ES - 6.30	UNT to Marsh Creek	Non/Parallel	497+00 through 509+00	HQ-TSF	175	NA	Yes	1299.71	212.17	5.72	24 hrs
ES - 6.30	UNT to Marsh Creek	Parallel	509+00 through 508+00	HQ-TSF	175	NA	Yes	1299.71	212.17	5.72	24 hrs
ES - 6.30	UNT to Marsh Creek	Non	511+50/ 513+00 through 515+50	HQ-TSF	176	NA	Yes	811.89	212.24	2.85	24 hrs
ES - 6.35	UNT to Shamonka Creek	Non	588+00 through 593+00	HQ-TSF	180	NA	Yes	227.92	167.33	0.71	24 hrs
ES - 6.57	UNT to Ridley Creek	Parallel	953+00 through 960+00	HQ-TSF	182	NA	Yes	957.51	320.55	3.83	30 days
DELAWARE											
ES - 6.14	Rocky Run	Parallel	235+00 through 236+50	HQ-CWF	185	Urban Runoff/Storm Sewers - Source Unknown; Urban Runoff/Storm Sewers - Water/Flow Variability; Urban Runoff/Storm Sewers - Siltation; Agriculture - Cause Unknown	No	726.73	210.06	2.60	24 hrs

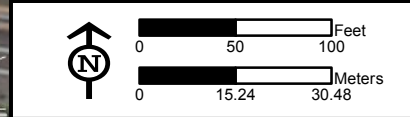
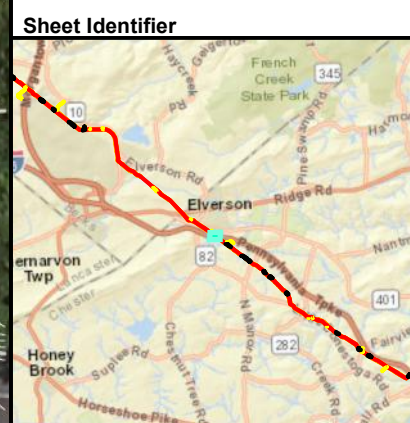
Note: The waiver requests are a direct result of locating the line within and adjacent to the existing right of way.

**Table 3:
Alternatives Information
South East Region**

SITE PLAN DESIGNATION (RB-)	STREAM NAME	PERPENDICULAR OR NON-PERPENDICULAR	DESIGNATED USE	LENGTH OF BUFFER	WIDTH OF BUFFER	AREA OF BUFFER	Alternatives Considered
Chester							
159	UNT to South Branch French Creek	Non	EV	336.96	189.02	0.98	Located in existing right of way
160	South Branch French Creek	Non	EV	787.66	213.05	2.99	Located in existing right way and to avoid existing residential structures
161	UNT to South Branch French Creek	Non	EV	908.47	210.75	3.55	Located to avoid existing residential structures
161	UNT to South Branch French Creek	Non	EV	908.47	210.75	3.55	Located to avoid existing residential structures
162	UNT to South Branch French Creek	Parallel	EV	221.28	66.59	1.53	Located to avoid existing residential structures
163	UNT to Marsh Creek	Non	HQ-TSF	541.09	301.69	2.29	Located to avoid existing residential structures
164	UNT to Marsh Creek	Non	HQ-TSF	418.45	210.59	1.74	Located to avoid existing residential structures
165	UNT to Marsh Creek	Non	HQ-TSF	352.70	231.29	1.43	Located to avoid existing residential structures
167	UNT to Marsh Creek	Non	HQ-TSF	407.77	225.58	1.88	Located in existing right way and to avoid existing residential structures
168	UNT to Marsh Creek	Non	HQ-TSF	558.46	277.39	2.24	Located in existing right of way
169	Marsh Creek	Non	HQ-TSF	536.39	365.48	2.29	Located to avoid existing residential structures
170	UNT to Marsh Creek	Parallel	HQ-TSF	419.24	220.48	1.89	Located to avoid existing residential structures
172	UNT to Black Horse Creek	Non	HQ-TSF	187.81	135.97	0.46	Located to avoid existing residential structures
175	UNT to Marsh Creek	Non/Parallel	HQ-TSF	1299.71	212.17	5.72	Located in existing right of way
175	UNT to Marsh Creek	Parallel	HQ-TSF	1299.71	212.17	5.72	Located in existing right of way
176	UNT to Marsh Creek	Non	HQ-TSF	811.89	212.24	2.85	Located in existing right of way
180	UNT to Shamona Creek	Non	HQ-TSF	227.92	167.33	0.71	Located in existing right of way
182	UNT to Ridley Creek	Parallel	HQ-TSF	957.51	320.55	3.83	Located to avoid existing residential structures
Delaware							
185	Rocky Run	Parallel	HQ-CWF	726.73	210.06	2.60	Located to avoid existing residential structures



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour



RB-159
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

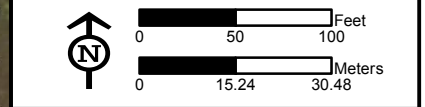
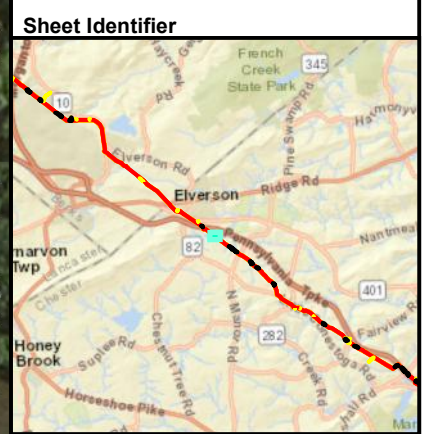


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P\GIS\SUNOCO\MARINER_EAST_2\MXD\PENNSYLVANIA_RIPARIAN\HABITAT_100FT_BSZE.MXD 11/15/16 SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Temporary Access Road
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Index Contour
 - Intermediate Contour

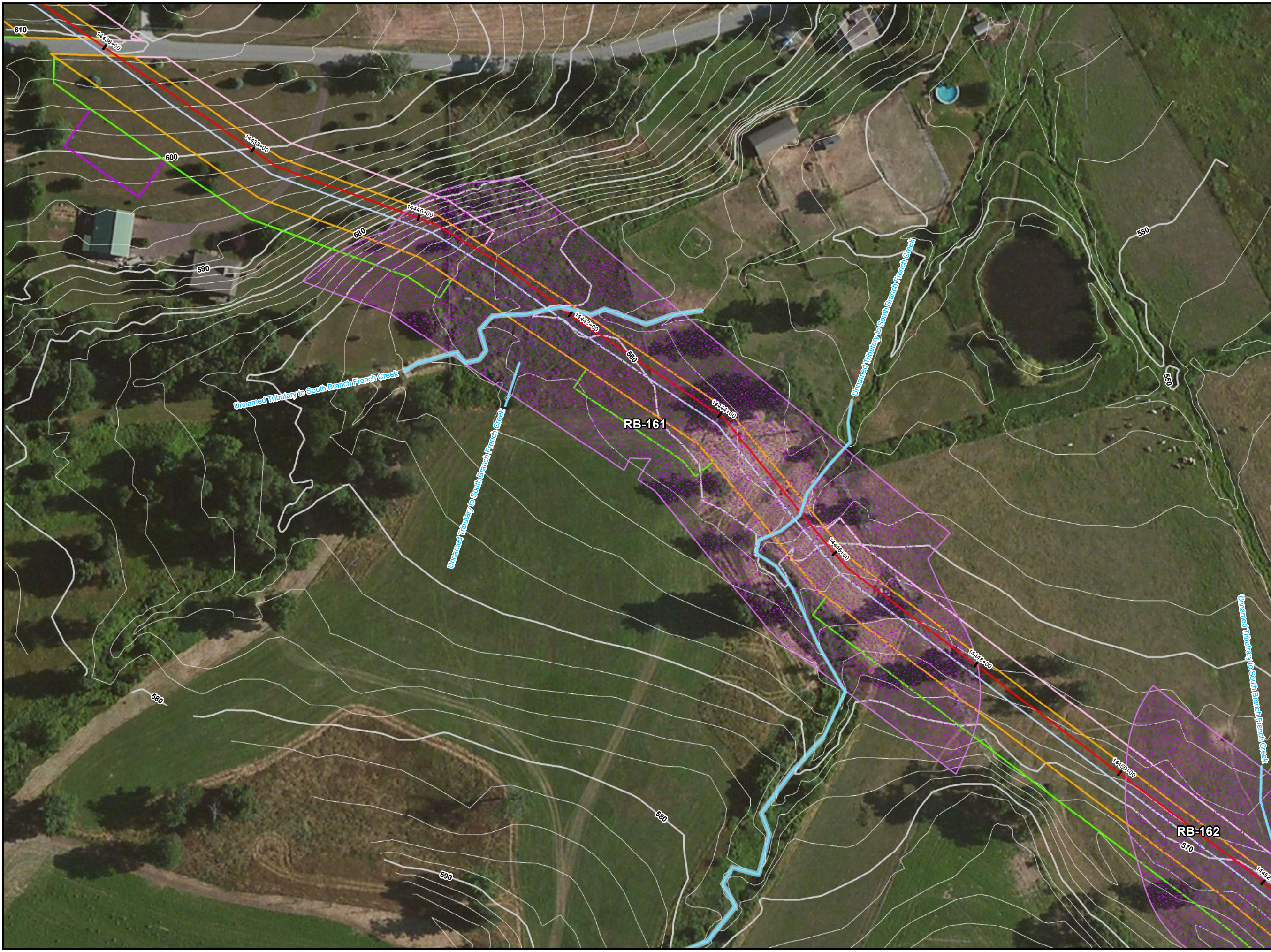


RB-160
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

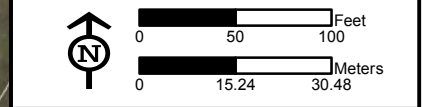
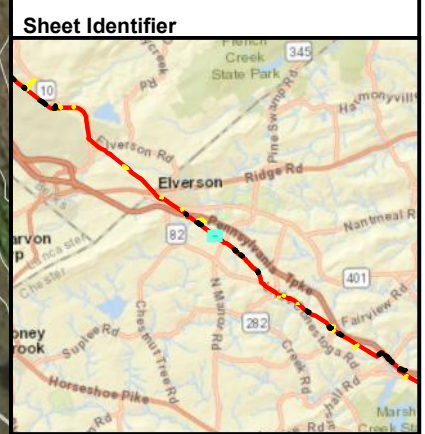


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P:\GIS\SUNOCO\MARINER_EAST_2\MXD\PENPIPELINE_RIPARIAN\HABITAT_100FT_BSIZE.MXD 11/15/16 SP



- ### Legend
- Stationing
 - Stream
 - Top of Bank
 - Riparian Buffer (HQ-EV)
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour

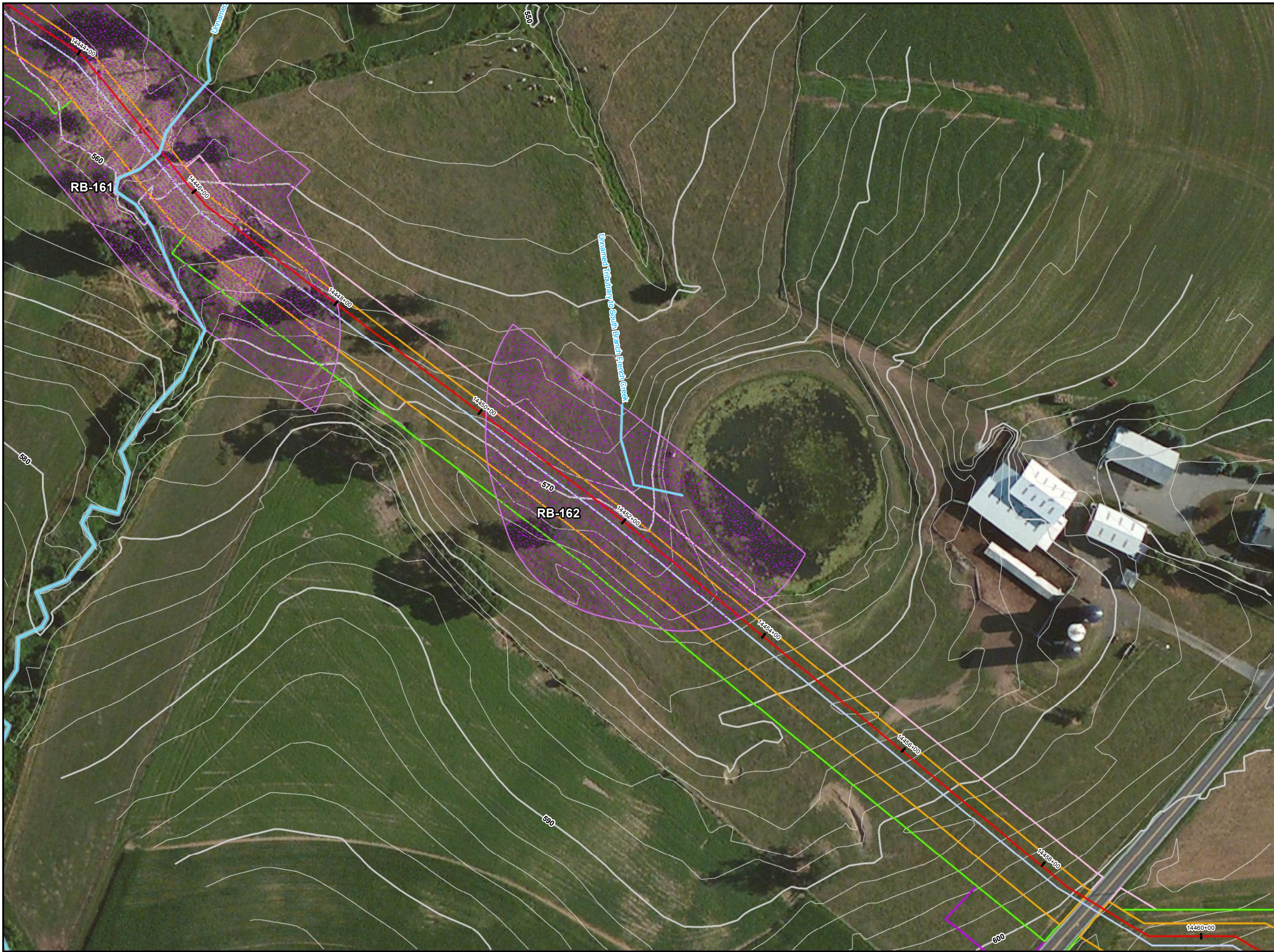


RB-161
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA



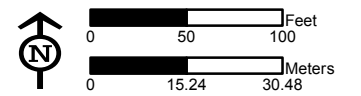
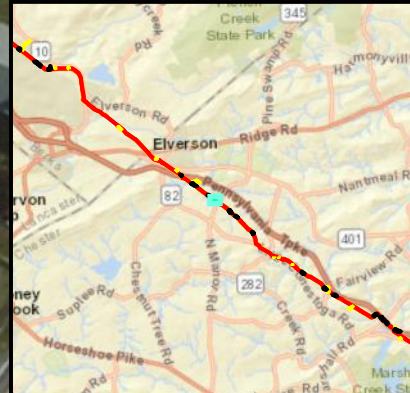
Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P:\GIS\SUNOCO\MARINER_EAST_2\MXD\PENNSYLVANIA_PIPELINE_RIPARIAN\HABITAT_100FT_BSIZE.MXD 11/15/16 SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour

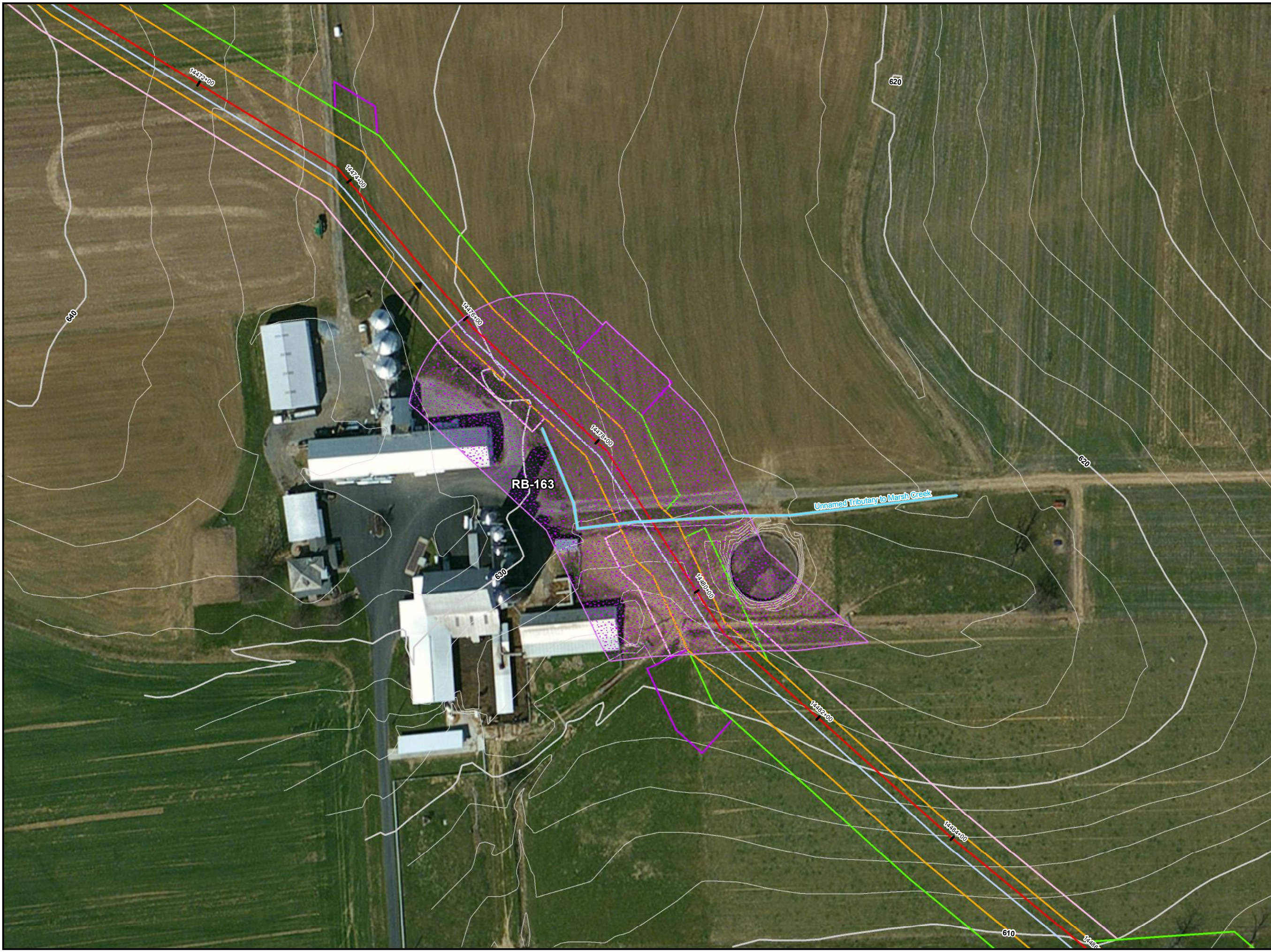
Sheet Identifier



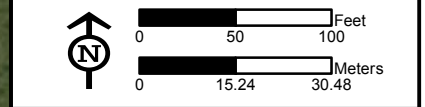
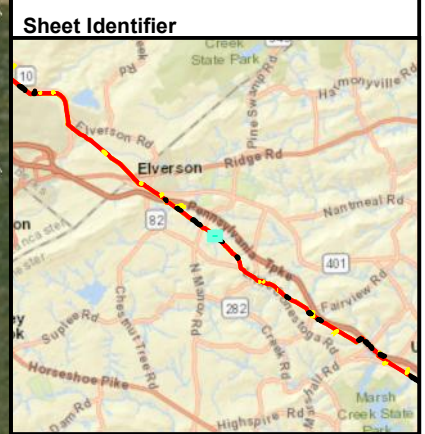
RB-162
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA



Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour

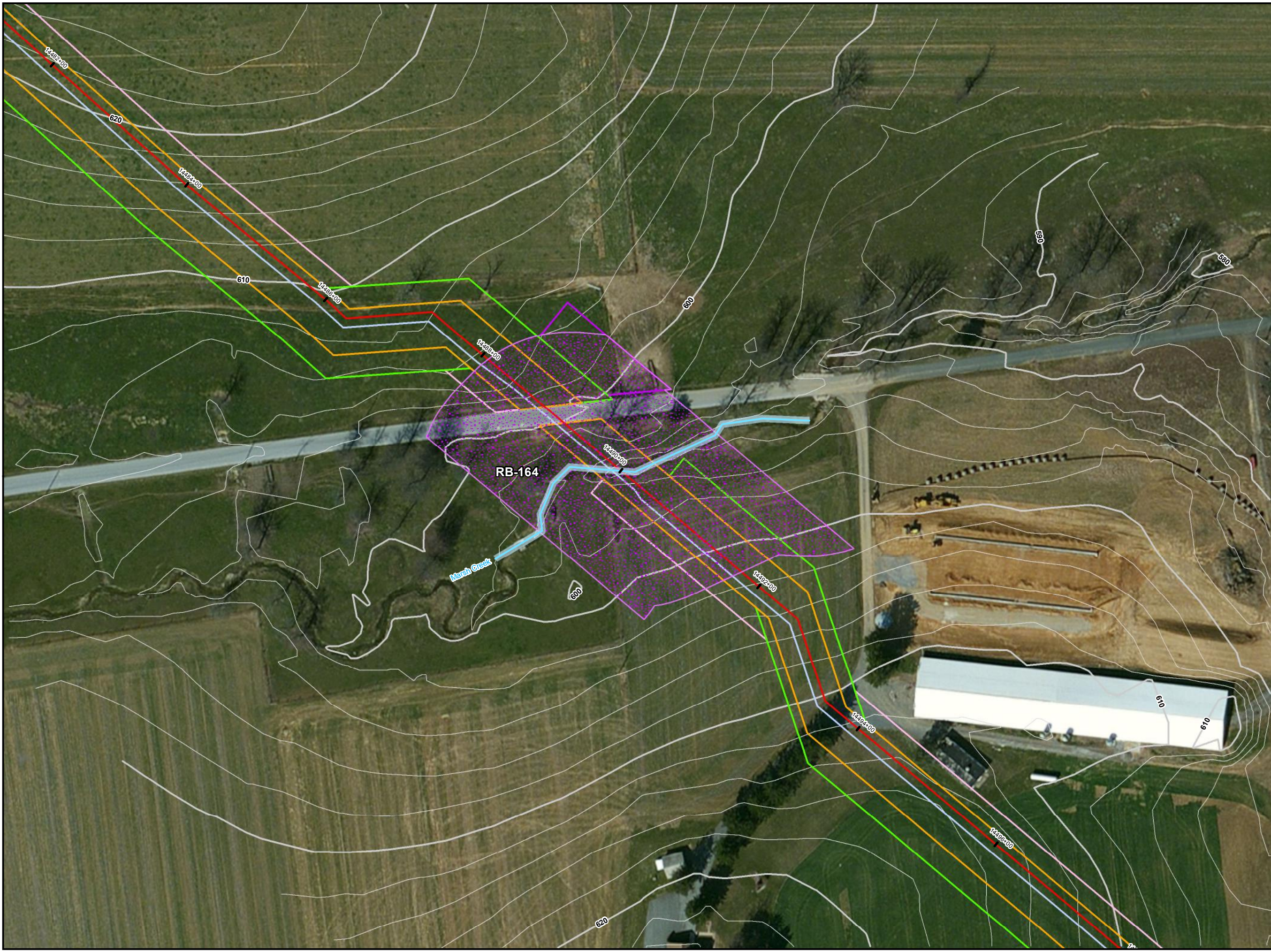


RB-163
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

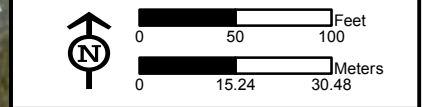
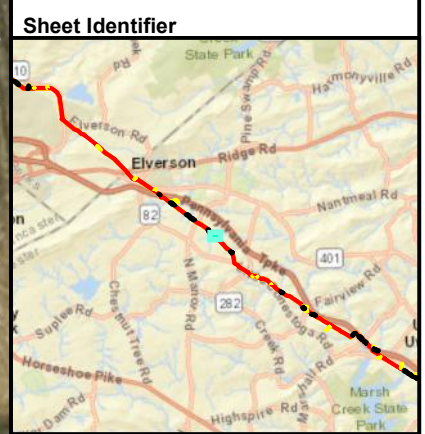


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P\GIS\SUNOCO\MARINER_EAST_2\MXD\PENNSYLVANIA_RIPARIAN\HABITAT_100FT_BSIZ.MXD 11/15/16 SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour



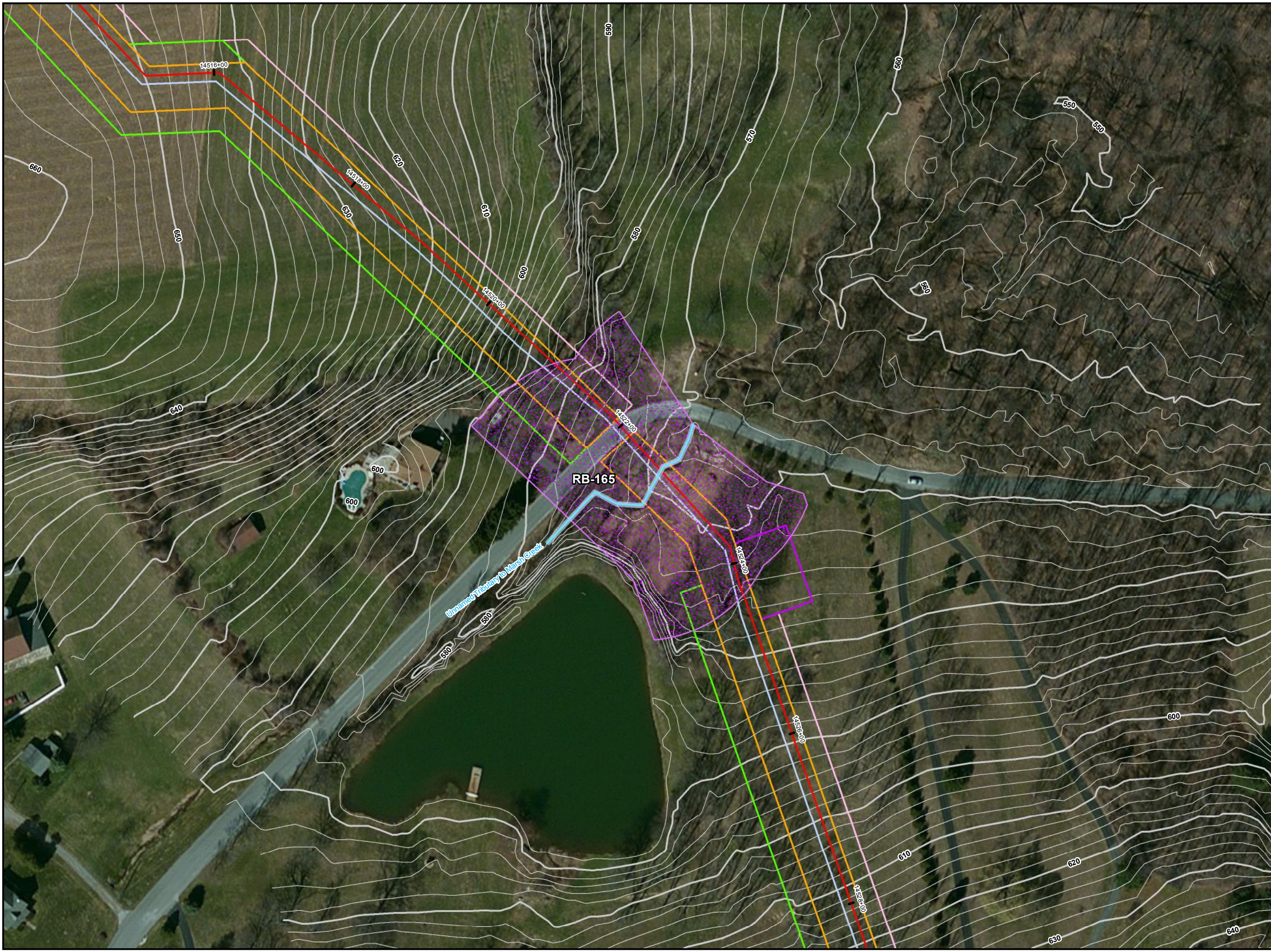
RB-164
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA















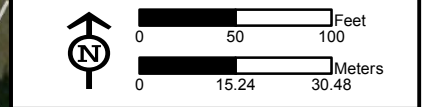
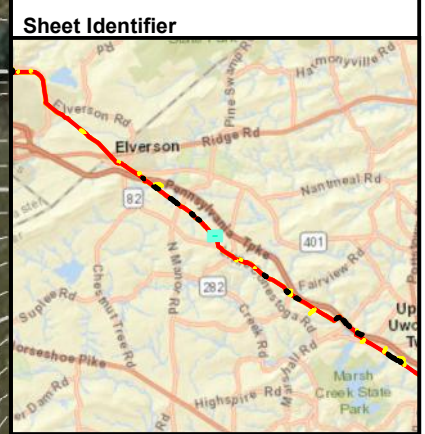
Notes:

- 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
- 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P:\GIS\SUNOCO\MARINER_EAST_2\MXD\PENPIPELINE_RIPARIANHABITAT_100FT_BSIZE.MXD 11/15/16 SP



- ### Legend
-  Stationing
 -  Stream
 -  Top of Bank
 -  Riparian Buffer (HQ-EV)
 -  Proposed 16-inch Pipeline
 -  Proposed 20-inch Pipeline
 -  20-ft Spoil Space
 -  Permanent ROW
 -  Temporary Workspace
 -  Additional Temporary Workspace (ATWS)
 -  Index Contour
 -  Intermediate Contour

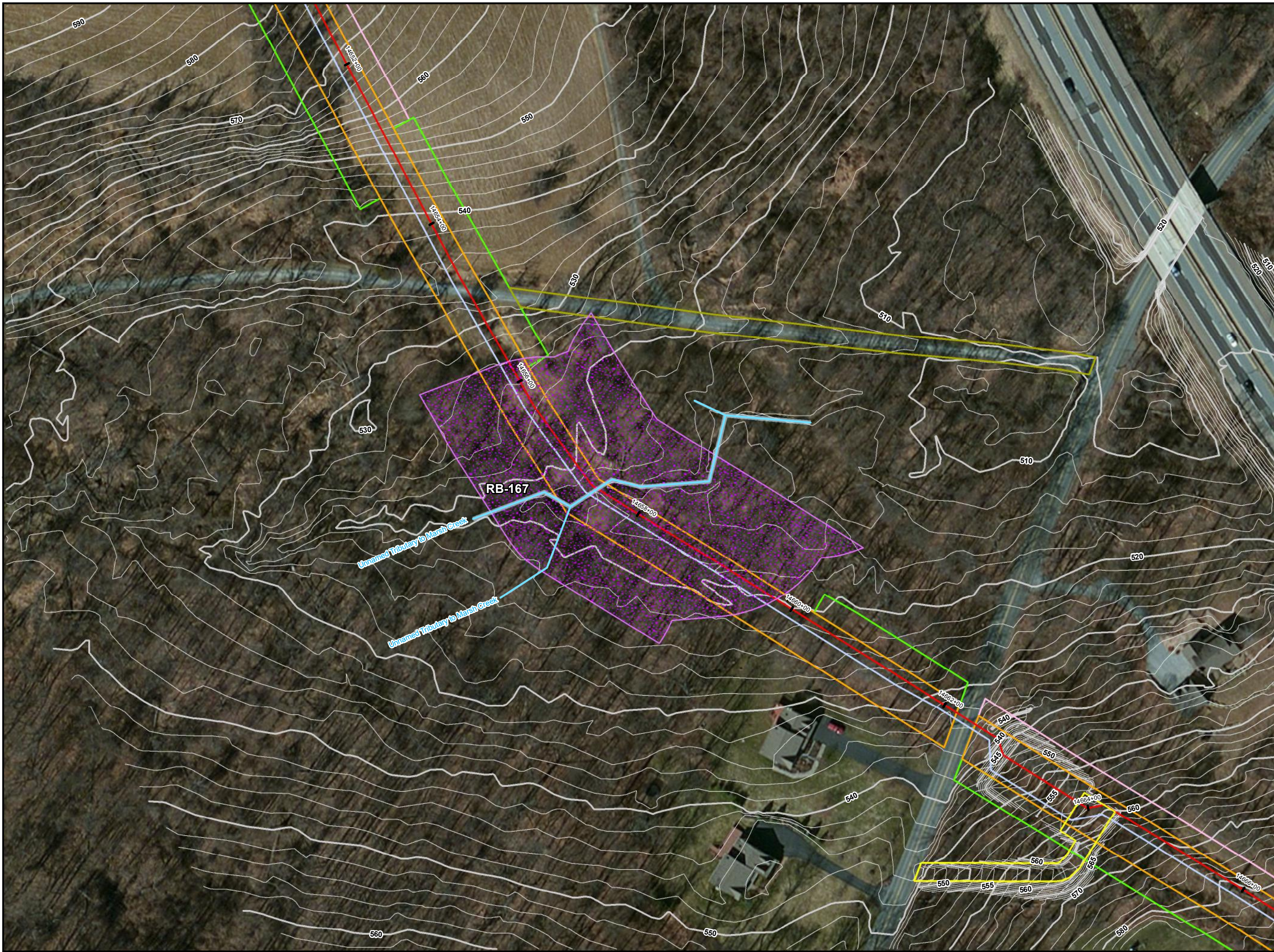


RB-165
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

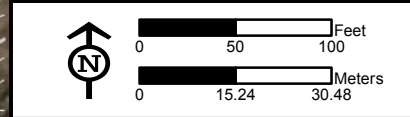
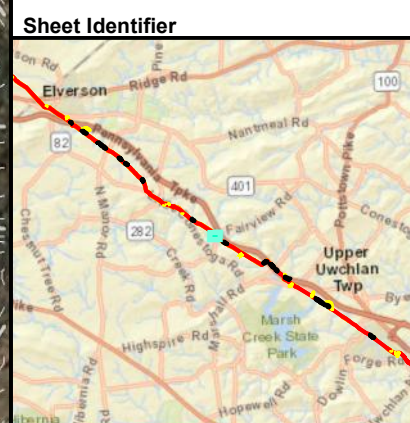


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P:\GIS\SUNOCO\MARINER_EAST_2\MXD\PENNSYLVANIA_PIPELINE_RIPARIAN_BUFFER\TETRA_TECH\B_SHEET_165_11/15/16.SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Permanent Access Road
 - Temporary Access Road
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Index Contour
 - Intermediate Contour

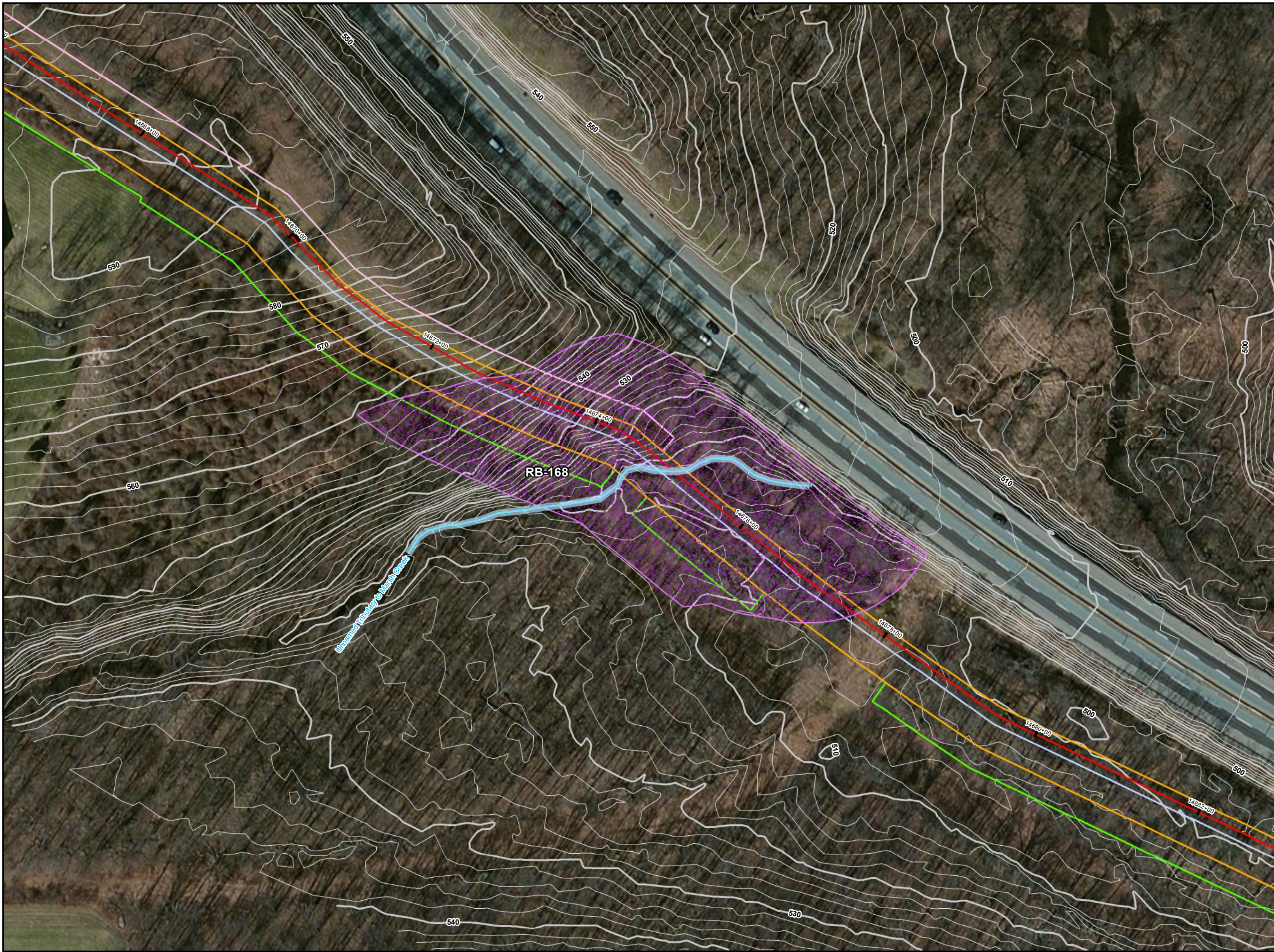


RB-167
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

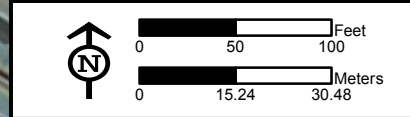
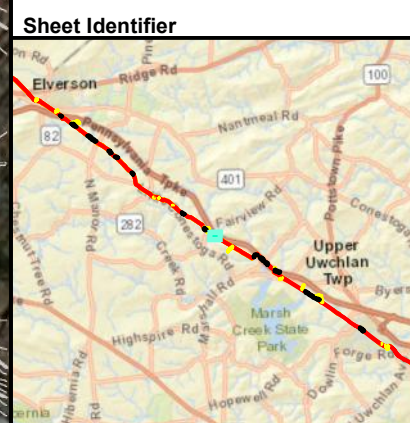


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

P:\GIS\SUNOCO\MARINER EAST 2\MDX\PENNSYLVANIA\RIPIARIAN\HABITAT_100FT_BSZE.MXD 11/15/16 SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Index Contour
 - Intermediate Contour

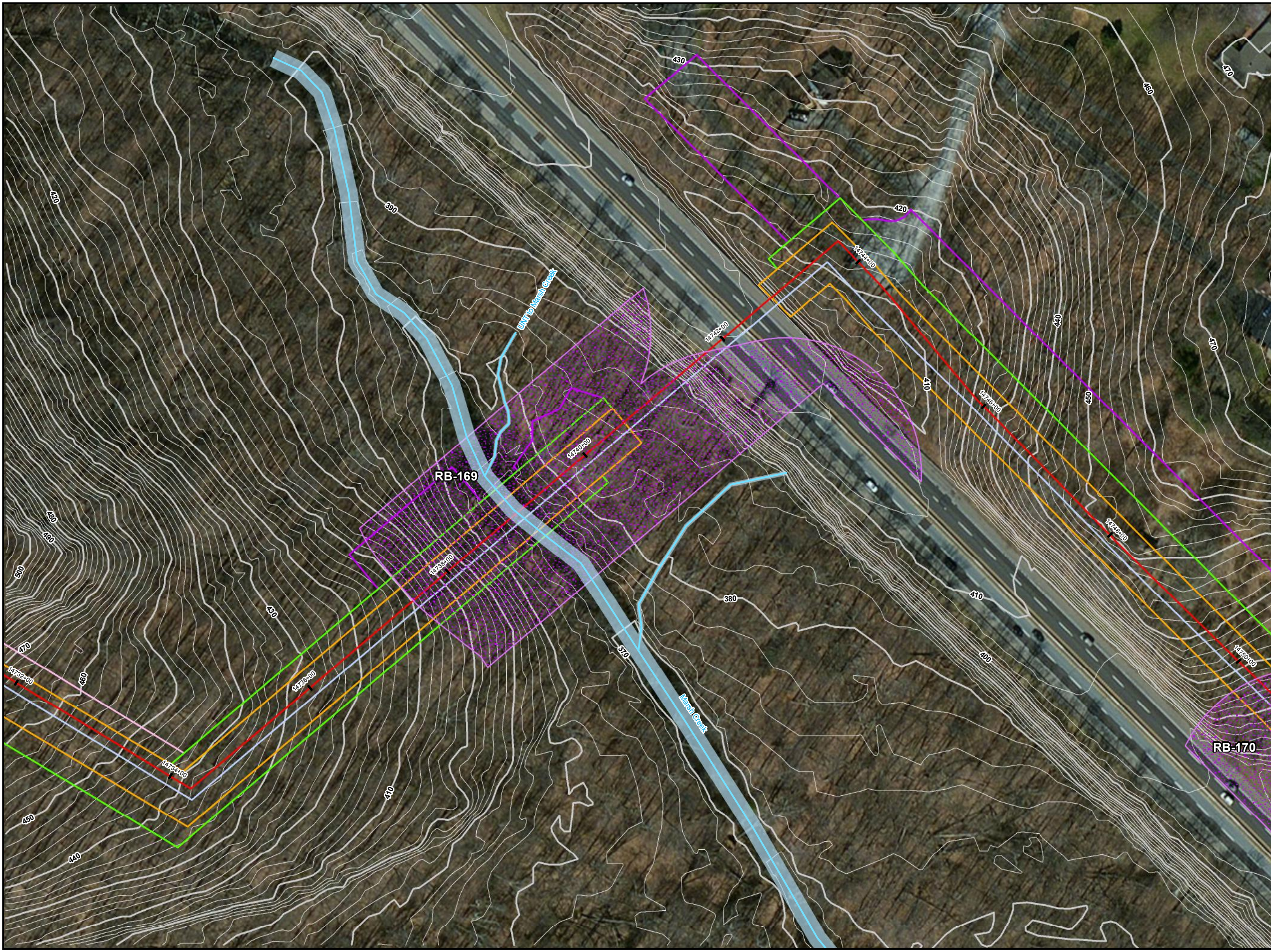


RB-168
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

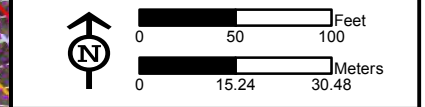
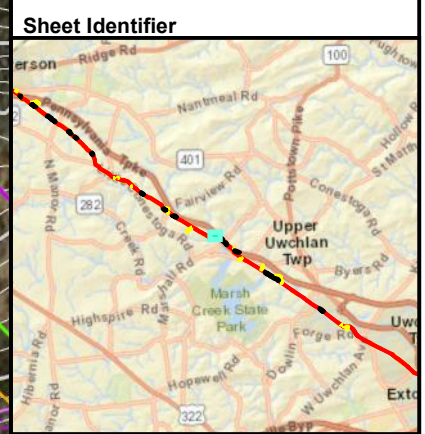


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P:\GIS\SUNOCO\MARINER_EAST_2\MXD\PENNSYLVANIA_PIPELINE_RIPARIAN\HABITAT_100FT_BSIZ.MXD 11/15/16 SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour

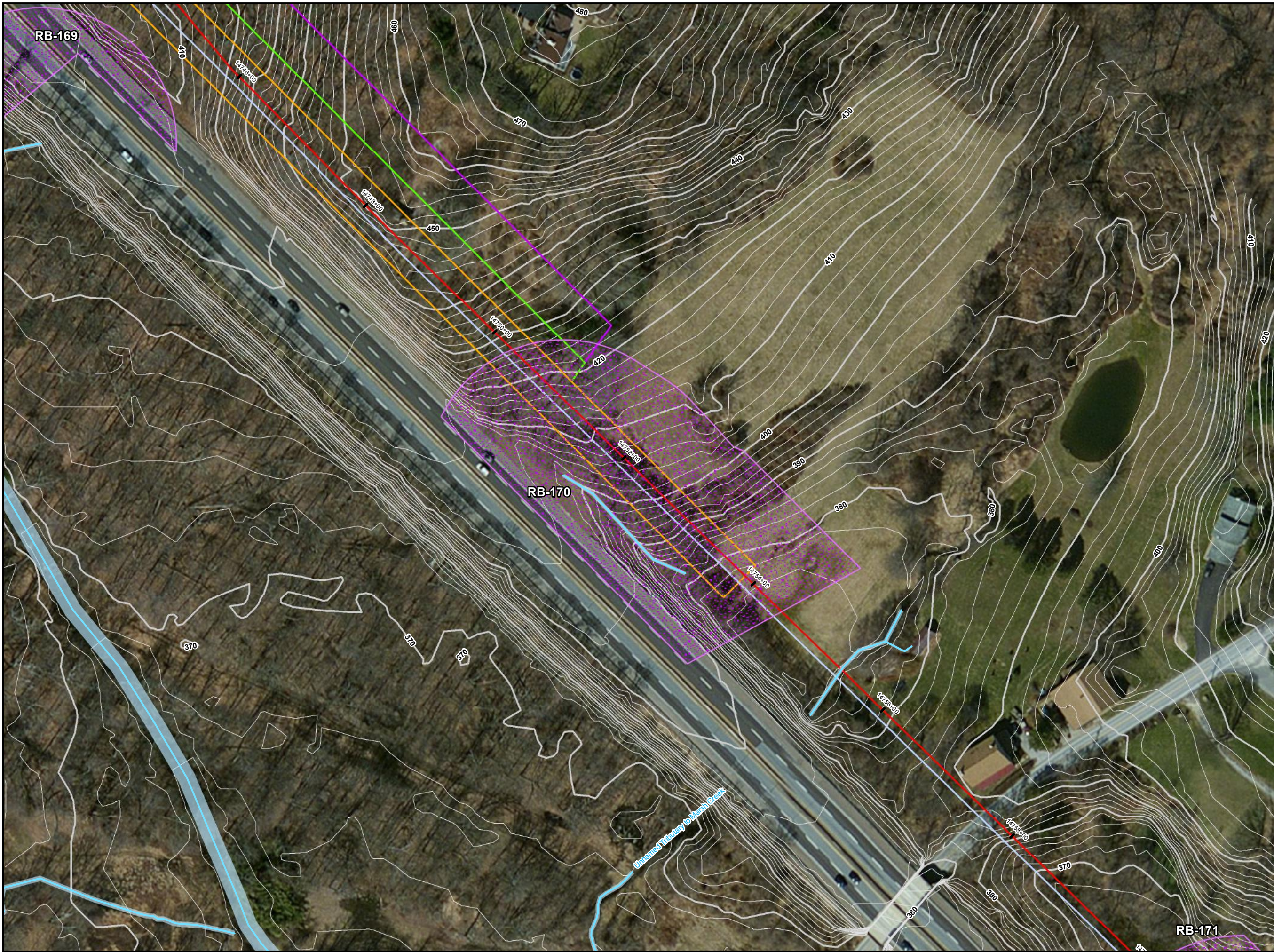


RB-169
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

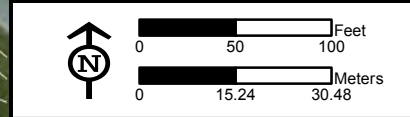
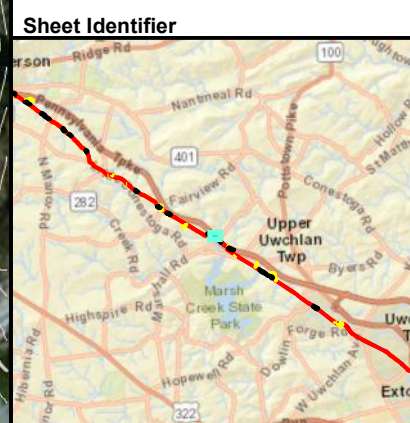


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P:\GIS\SUNOCO\MARINER_EAST_2\MXD\PENNSYLVANIA_PIPELINE_RIPARIAN\HABITAT_100FT_BSIZE.MXD 11/15/16 SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour



RB-170
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

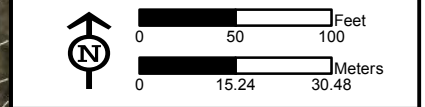
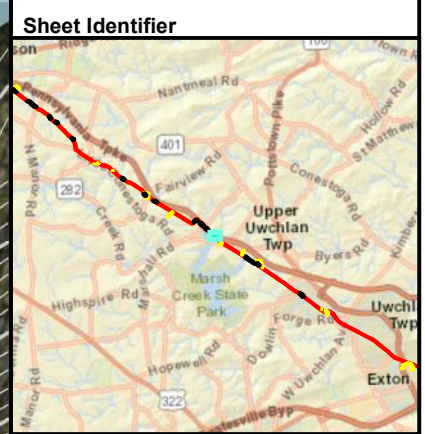


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P\GIS\SUNOCO\MARINER_EAST_2\MXD\PENNSYLVANIA_PIPELINE_RIPARIAN\HABITAT_100FT_BSIZE.MXD 11/15/16 SP



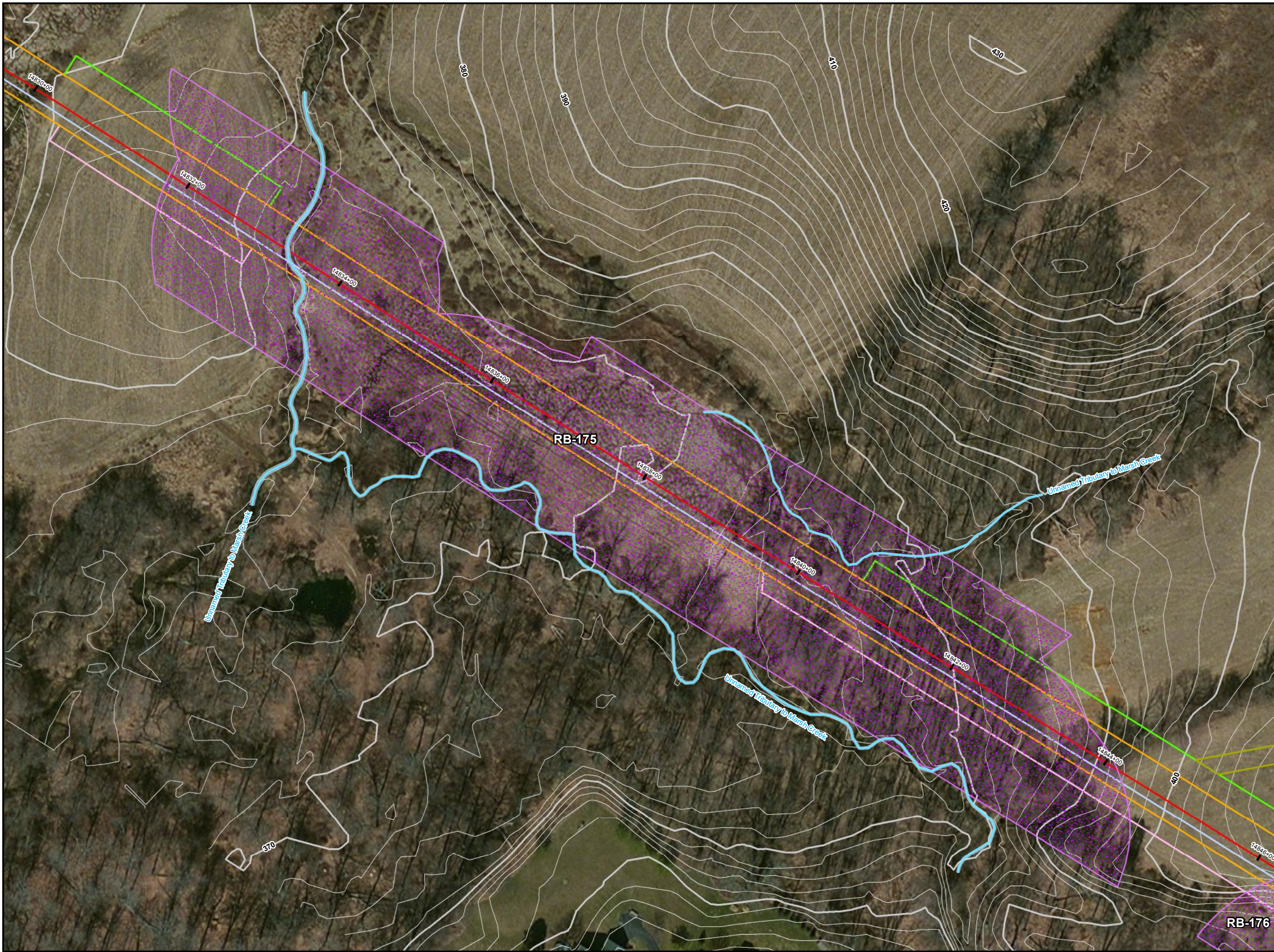
- Legend**
- Stationing
 - Stream
 - Top of Bank
 - Riparian Buffer (HQ-EV)
 - Temporary Access Road
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour



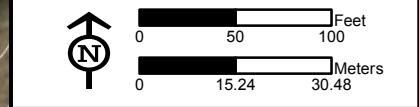
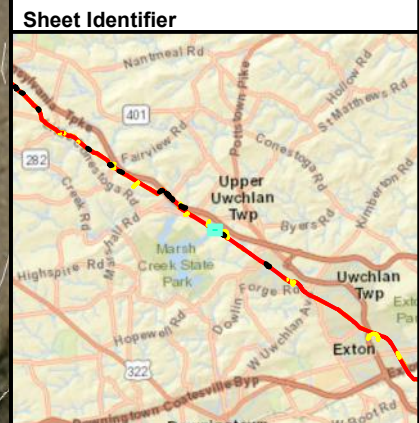
RB-172
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA



Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Temporary Access Road
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Index Contour
 - Intermediate Contour

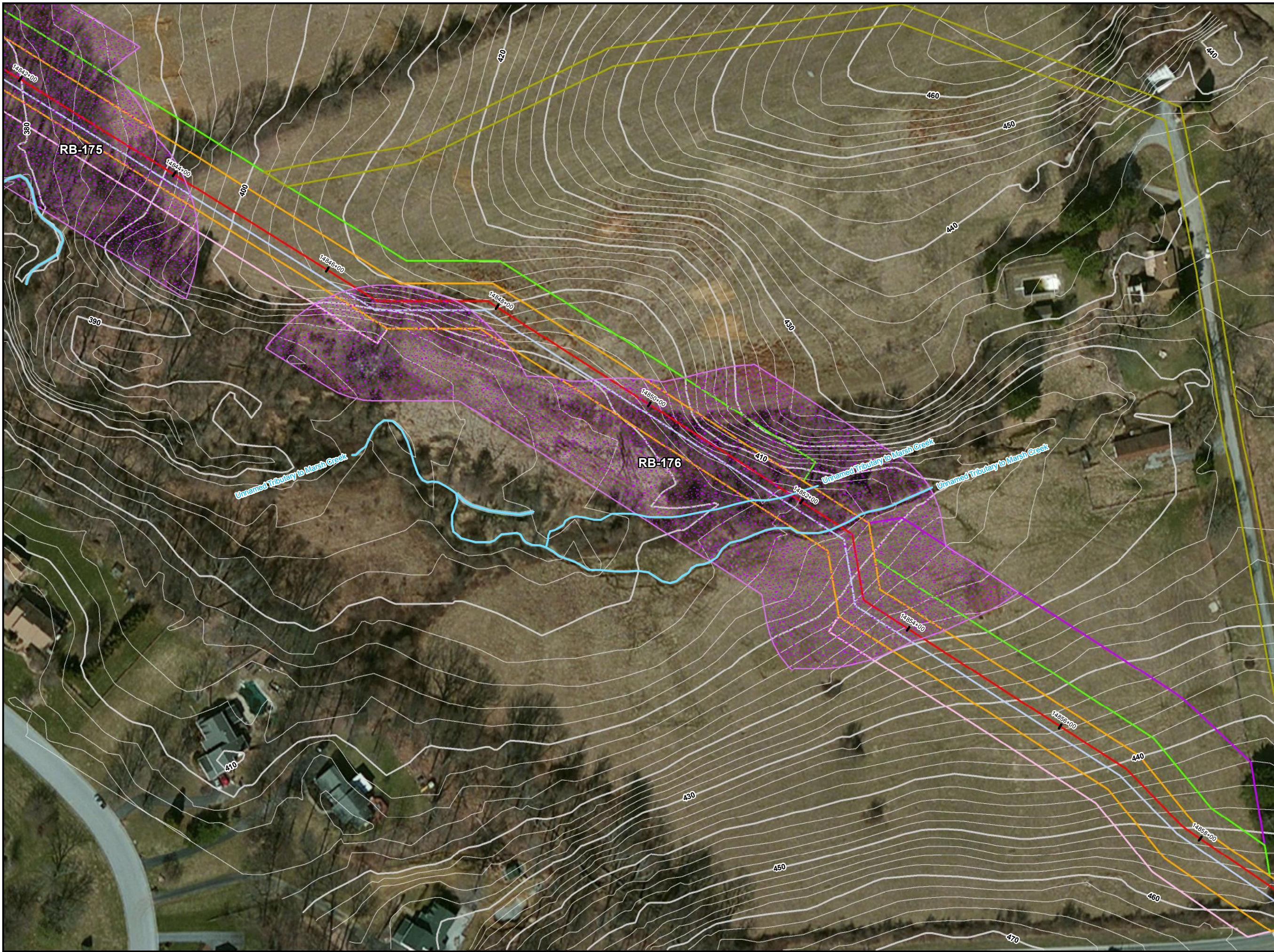


RB-175
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

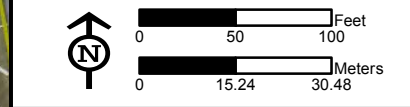
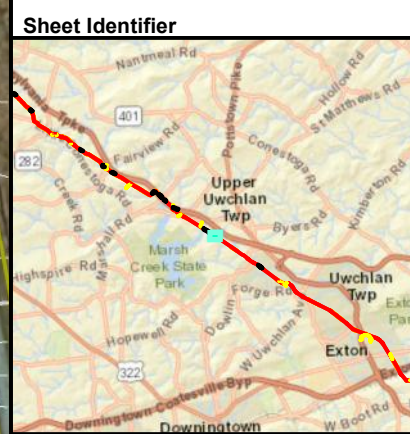


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P:\GIS\SUNOCO\MARINER_EAST_2\MXD\PENNSYLVANIA_PIPELINE_RIPARIAN\HABITAT_100FT_BSIZE.MXD 11/15/16 SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Temporary Access Road
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - 20-ft Spoil Space
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour



RB-176
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

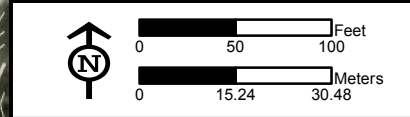
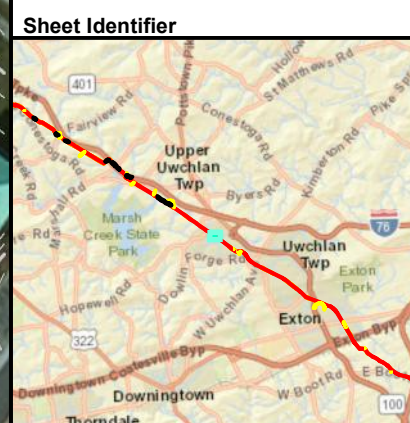


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P:\GIS\SUNOCO\MARINER_EAST_2\MXD\PENNSYLVANIA_PIPELINE_RIPARIAN_BUFFER_100FT_BUFFER_11/15/16.SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - Permanent ROW
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour














RB-180
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

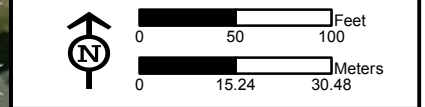
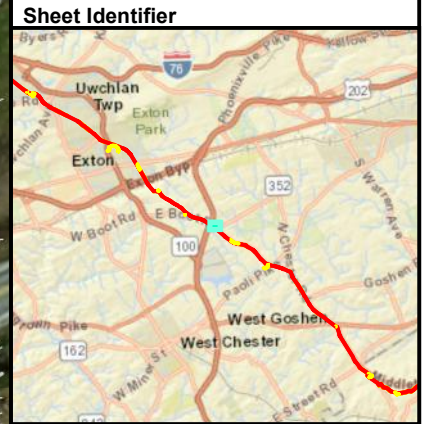


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

P:\GIS\SUNOCO\MARINER_EAST_2\MDX\PENNSYLVANIA\HABITAT_100FT_BUFFER\MXD\11/15/16.SP



- Legend**
-  Stationing
 -  Stream
 -  Top of Bank
 -  Riparian Buffer (HQ-EV)
 -  Permanent Access Road
 -  Proposed 16-inch Pipeline
 -  Proposed 20-inch Pipeline
 -  Permanent ROW
 -  Additional Temporary Workspace (ATWS)
 -  Index Contour
 -  Intermediate Contour

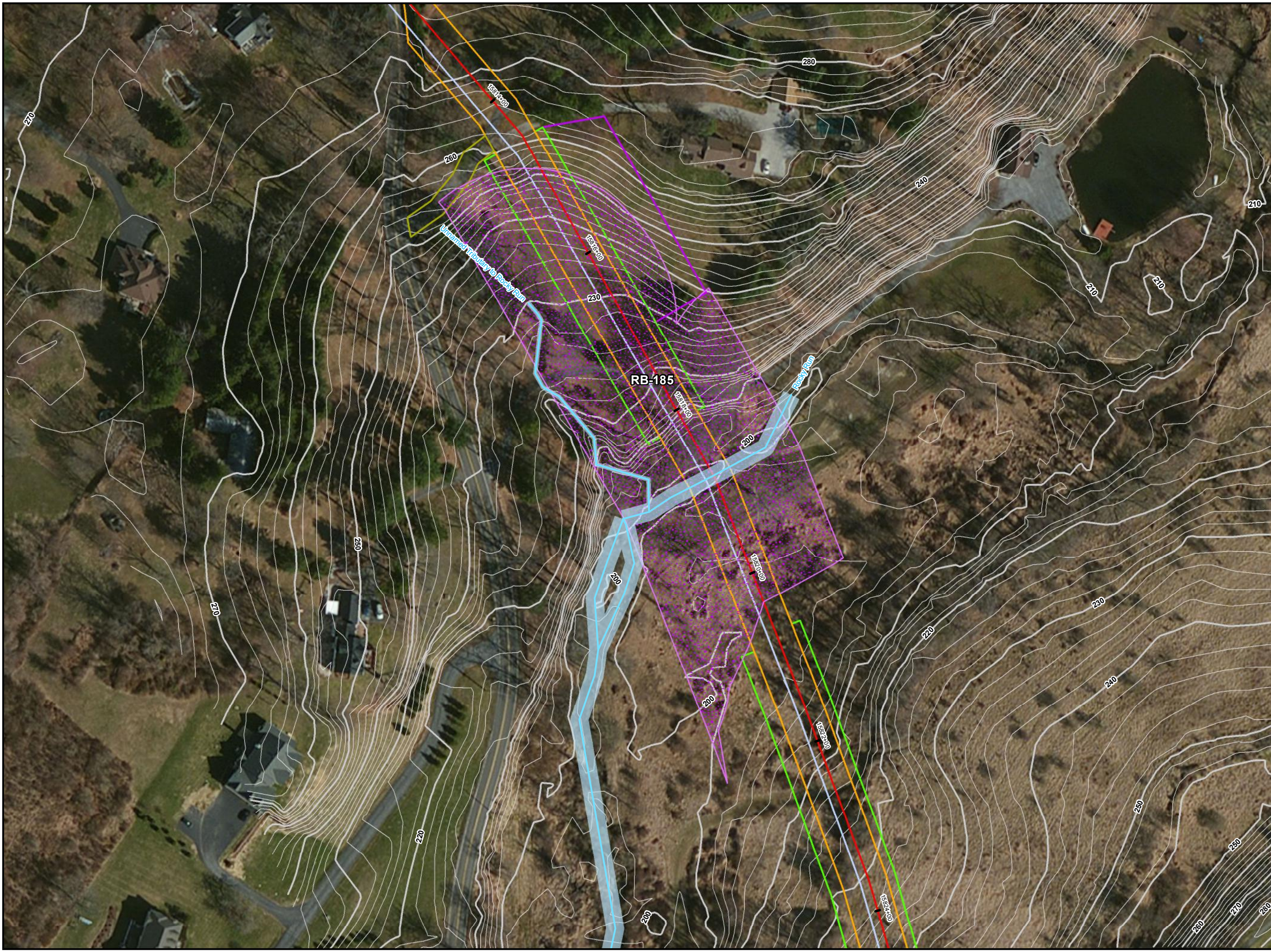


RB-182
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CHESTER COUNTY, PENNSYLVANIA

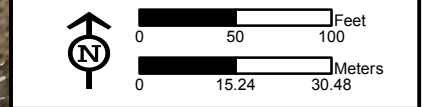
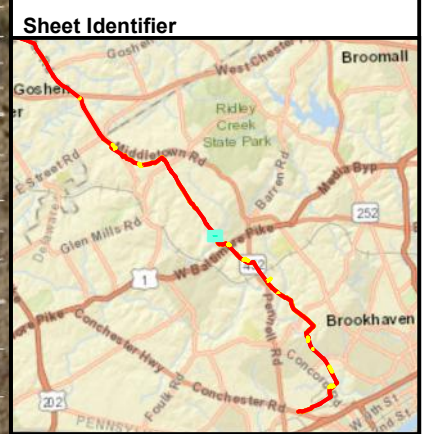


Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.

PGH_P\GIS\SUNOCO\MARINER_EAST_2\MXD\PEN\PIPELINE_RIPARIAN\HABITAT_100FT_BSIZE.MXD 11/15/16 SP



- Legend**
- Stationing
 - Stream
 - Top of Bank
 - ▨ Riparian Buffer (HQ-EV)
 - Temporary Access Road
 - Proposed 16-inch Pipeline
 - Proposed 20-inch Pipeline
 - Permanent ROW
 - Temporary Workspace
 - Additional Temporary Workspace (ATWS)
 - Index Contour
 - Intermediate Contour



RB-185
HQ-EV RIPARIAN BUFFER
PENNSYLVANIA PIPELINE PROJECT
NOVEMBER 12, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PENNSYLVANIA



Notes:
 1) Aerial photograph provided by ESRI ArcGIS Online World Imagery map service (© 2015 ESRI and its data suppliers).
 2) Coordinate system is NAD 83 State Plane Pennsylvania South.