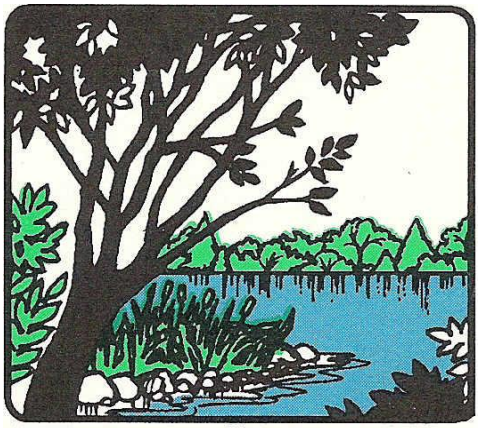

Ecotune

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Wetland Delineation and Watercourse Identification Report
ET-Braddock Well Pad Project Area
North Braddock & East Pittsburgh Boroughs / North Versailles Township, Allegheny County, PA

Prepared For:
Merrion Oil & Gas Corporation
610 Reilly Avenue
Farmington, NM

September 2017
Revised April 2018

1.0 PROJECT LOCATION AND DESCRIPTION

Ecotune Environmental Consultants was retained by Marion Oil & Gas Corporation to conduct a wetland and watercourse investigation of a portion of the Edgar Thomson Works (the Site), located along the south side of Braddock Avenue in North Braddock and East Pittsburgh Boroughs and North Versailles Township, Allegheny County, PA. The Site consists of the eastern end of the overall Edgar Thomson Works plant. And is the potential future site of a gas well development area.

The vast majority of the Site consists of developed land inclusive of warehouse space, access ways, railroad tracks, stockpile areas and a very small extent of old field habitat.

According to the Braddock, PA USGS Map, no "blue-line" streams are located on the Site. However, it is likely that a stream enclosure is located through the central portion of the Site (flowing from north to south).

The Site is depicted in Figure 1 (Location Map, Braddock, PA, USGS Map), Figure 2 (2016 Google Aerial Image), Figures 3 & 3A (Proposed Conditions Plans), Figures 4 and 4A (USDA Soils Map and Legend), and Figure 5 (National Wetland Inventory Map).

This Report identifies and delineates all jurisdictional watercourses and wetlands within the limits of the Site.

2.0 WETLAND DELINEATION METHODOLOGY

The methodology used to determine the existence and extent of jurisdictional wetlands is set forth in the 1987 Corps of Engineers Wetland Delineation Manual. This manual has been supplemented by a number of regional supplements to more accurately delineate wetland in the United States. Because of its location, the Site was delineated using the *U. S. Army Corps of Engineers. 2012 Regional Supplement to the Corps of Engineers Wetland delineation Manual: Eastern Mountain and Piedmont Region.*

No recent development or earthmoving has occurred within the Site. Therefore, the Routine Onsite Determination Method was invoked due to the undisturbed nature of the Site (the soils, hydrology and/or vegetation have not been recently or significantly disturbed).

Identified wetlands were classified using the Cowardin Classification system and were delineated using the three parameter approach, inclusive of vegetation, hydrology and soil evaluation. According to the three parameter approach, all three criteria must be evaluated and must meet specific standards in order for an area to be considered a wetland. These three criteria are as follows:

1. Hydrophytic Vegetation Indicators: Hydrophytic vegetation in the Region is now identified by using one of four indicators. The indicators are as follows:

- **Indicator 1 – Rapid Test for Hydrophytic Vegetation** – all dominant species across all strata are rated OBL or FACW, or a combination of these two categories based on a visual estimation,
- **Indicator 2 – Dominance Test** – More than 50% of the dominant plant species (using the 50/20 rule) across all strata are rated OBL, FACW, or FAC,
- **Indicator 3 – Prevalence Test** – the Prevalence Index is 3.0 or less, or
- **Indicator 4 – Morphological Adaptations** – the plant community passes either the Dominance Test or the Prevalence Test after reconsideration of the indicator status of certain plant species that exhibit morphological adaptations for life in wetlands.

If the plant community passes any one of the four hydrophytic vegetation indicator tests, the vegetation is considered to be hydrophytic.

2. Hydric Soil Indicators: Hydric soil indicators are formed predominantly by the accumulation or loss of iron, manganese, sulfur or carbon compounds in a saturated, anaerobic environment. Hydric soil indicators are presented in three groups:

- **All Soils** - used in any soil regardless of texture,
- **Sandy Soils** - used in soil layers with USDA textures of loamy fine sand or courser, and
- **Loamy or Clayey Soils** - used with soil layers of very fine sand or finer.

If one or more of the hydric soil indicators is present, then the soil is hydric.

3. Wetland Hydrology Indicators

Wetland hydrology indicators are used in conjunction with indicators of hydric soil and hydrophytic vegetation to determine if an area is wetland under the Corps Manual. Hydrology indicators are often the most transitory of the wetland indicators.

Wetland hydrology indicators are presented in four groups:

- **Group A** - based on direct observation of surface water or groundwater during a visit.
- **Group B** - consists of evidence that the site is subject to flooding or ponding, although it may not be inundated currently.
- **Group C** - consists of other evidence that the soil is saturated or was saturated recently.
- **Group D** - consists of landscape, vegetation and soil features that indicate contemporary rather than historical wet conditions.

Within each group, indicators are categorized into one of two groups – primary and secondary indicators, based on their reliability within the region.

3.0 WETLAND DELINEATION RESULTS

Wetland Determination Data Forms were completed for each habitat type located within the Site and can be seen in Appendix A of this report. Data Forms sampling locations are indicated on Figure 3.

At no point within the limits of the Site were all three required wetland parameters met, therefore, no wetlands exist within the limits of the Site.

4.0 WATERCOURSE DETERMINATION

No defined bed or bank areas exist on the Site. Therefore, no open or natural watercourses are located within the Site boundaries.

However, there appears to be a stream enclosure that bisects the site. The stream enclosure appears to originate north of the Site on the north side of Braddock Avenue near the terminus of O'Connell Boulevard. The stream enclosure proceeds south through the Site and terminates at an end wall along Turtle Creek south of the Site (refer to Figure 3A). It appears that both the proposed water and gas lines to be installed to the west of the pad area will cross the stream enclosure.

Relevant photographs of the Site are contained in Appendix B and are keyed to Figure 3.

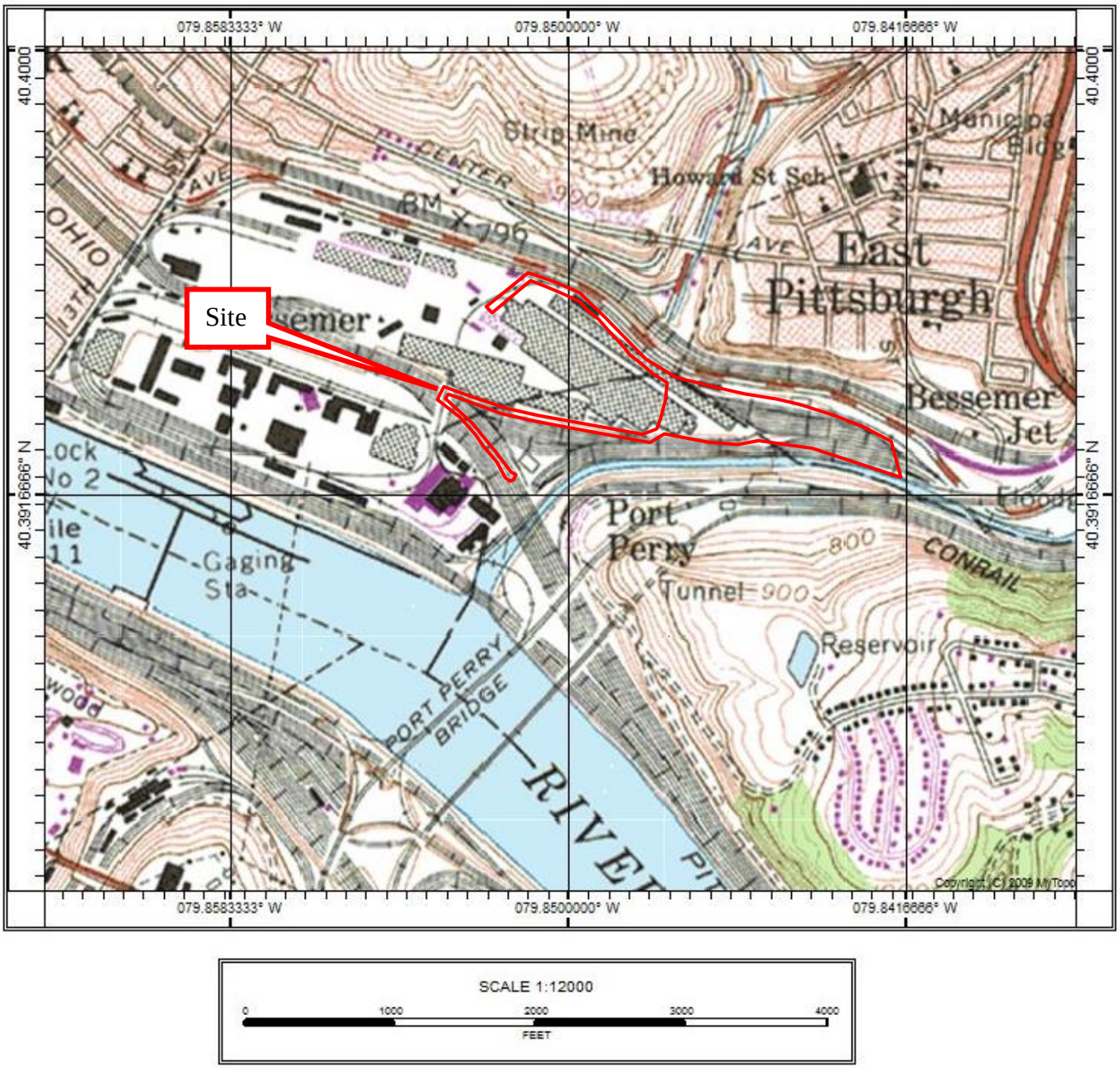

Figure 1 – Location Map (Braddock, PA USGS Map)

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Figure 2 – Location Map (2016 Google Earth)

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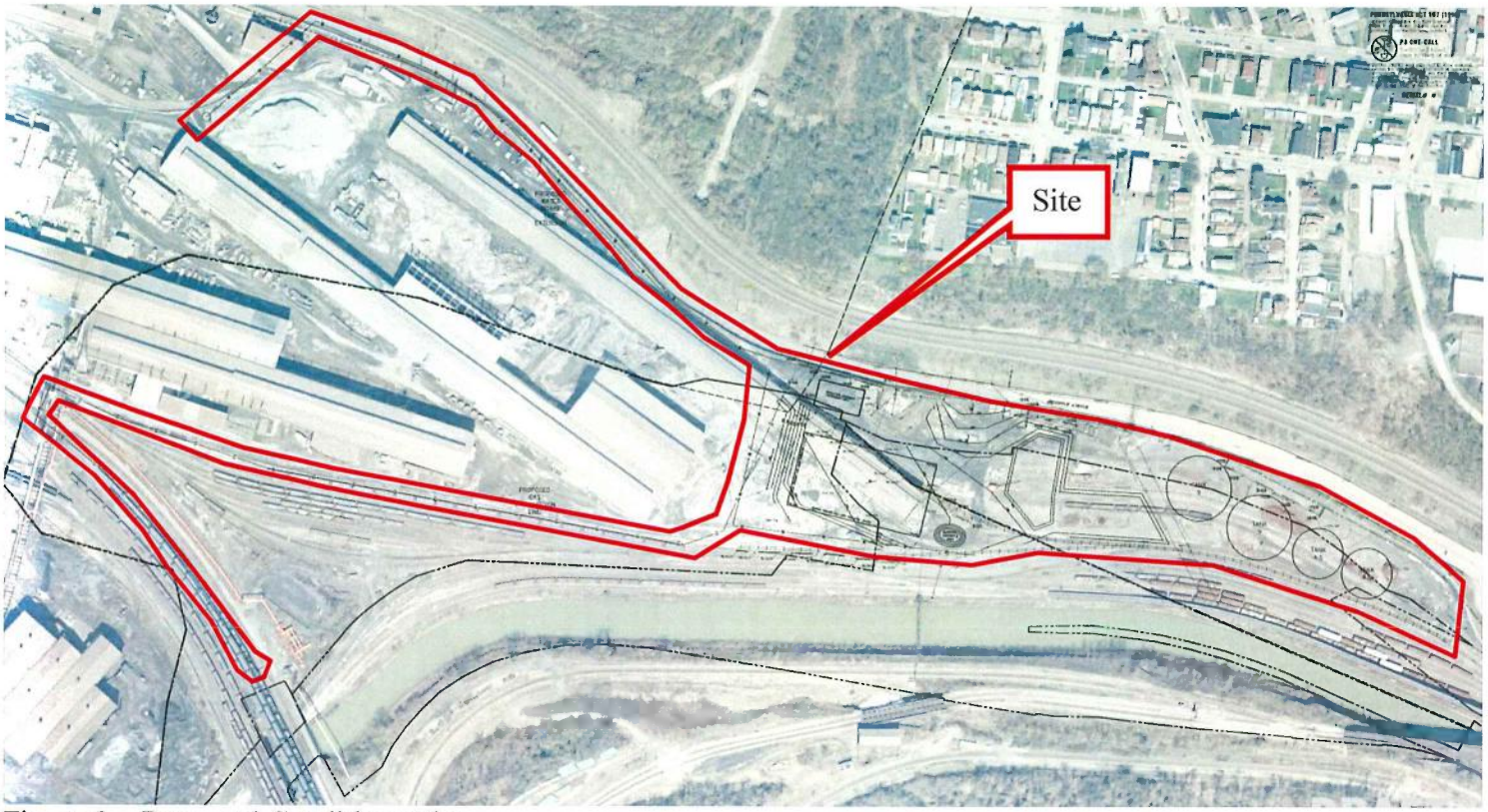

Figure 3 – Proposed Conditions Plan

[redacted]

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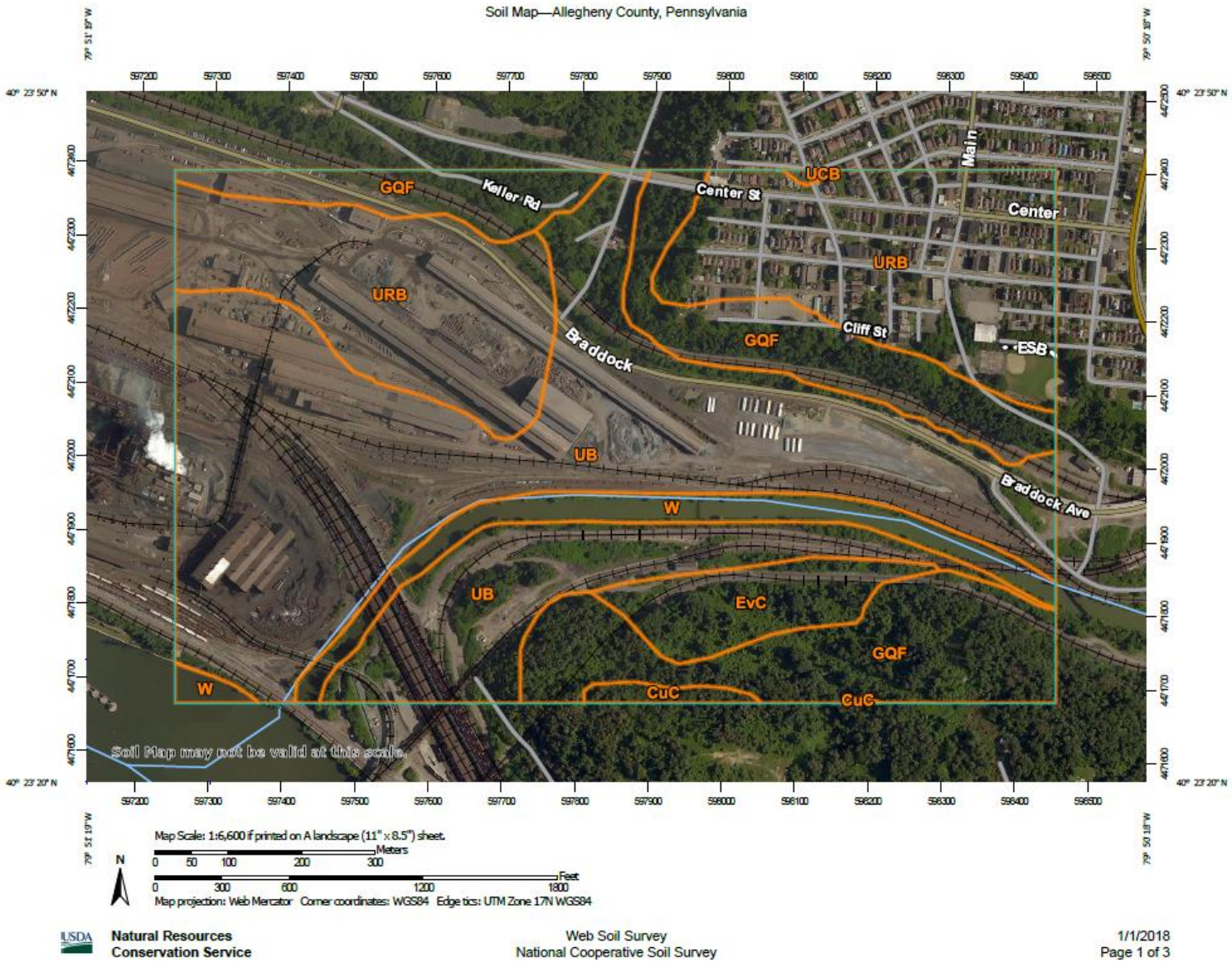

Figure 4 – Site Soils Map
USDA Soil Survey

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Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CuC	Culleoka channery silt loam, 8 to 15 percent slopes	1.4	0.6%
EvC	Ernest-Vandergrift silt loams, 8 to 15 percent slopes	8.9	4.1%
GQF	Gilpin-Upshur complex, very steep	42.9	19.9%
UB	Urban land	95.8	44.4%
UCB	Urban land-Culleoka complex, gently sloping	0.2	0.1%
URB	Urban land-Rainsboro complex, gently sloping	55.4	25.7%
W	Water	11.0	5.1%
Totals for Area of Interest		**215.6**	**100.0%**

Figure 4A – Site Soils Legend
USDA Soil Survey

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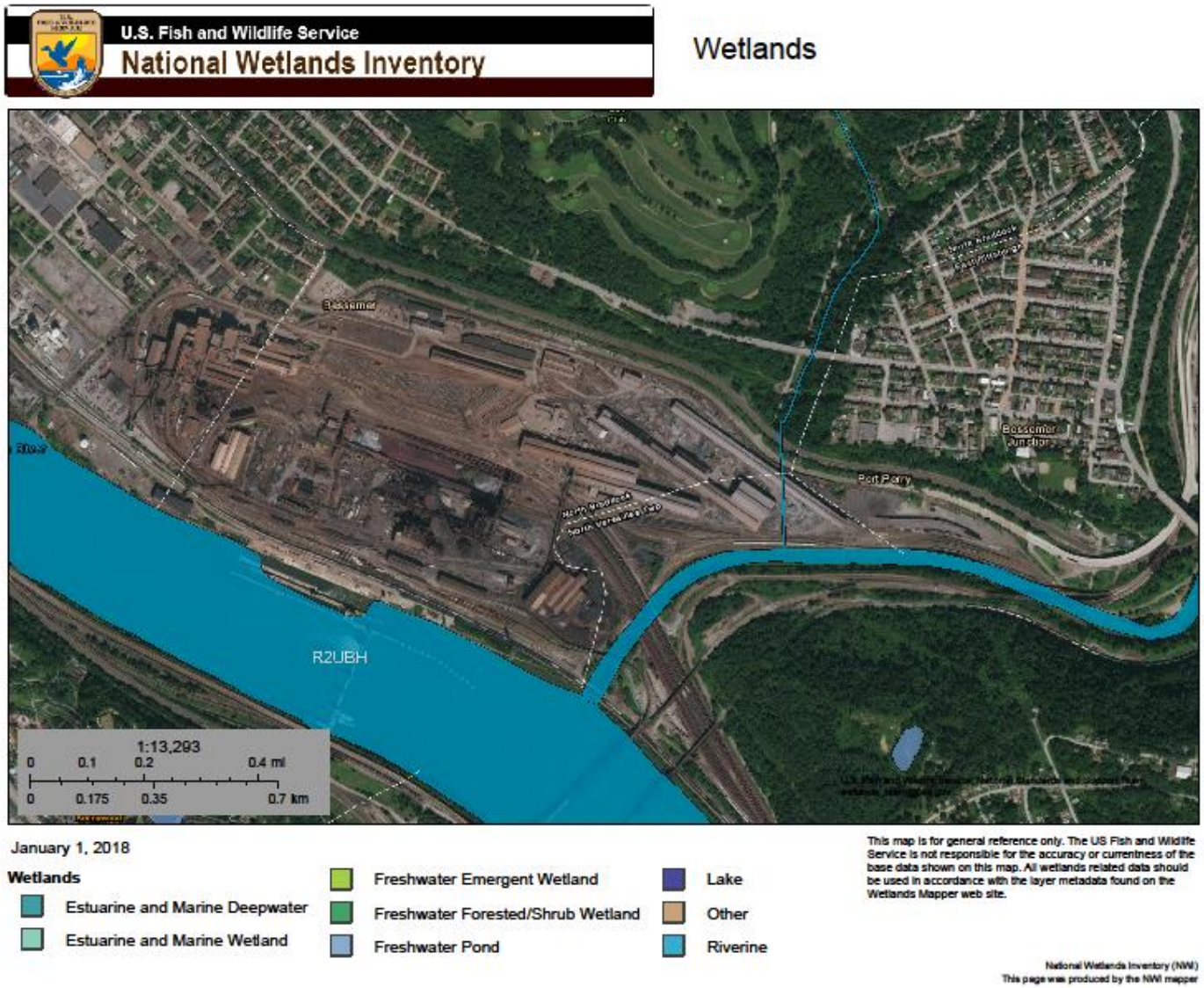

Figure 5 – NWI Map

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APPENDIX A
WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: ET-braddock Well Pad City/County: Allegheny Sampling Date: 12-04-2017

Applicant/Owner: Marion Oil & Gas State: PA Sampling Point: DF-1

Investigator(s): ECOTUNE- PG Section, Township, Range: Braddock Boro

Landform (hillslope, terrace, etc.) Flat Local relief (concave, convex, none): None

Slope (%): 3 Lat: 40.3936° Long: -79.8460 ° Datum:

Soil Map Unit Name: UB NWI Classification: Not Mapped

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

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

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

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

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?**	Yes ____	No X
Hydric Soil Present?	Yes ____	No X			
Wetland Hydrology Present?	Yes ____	No X			

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes ____ No X

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

Remarks:

VEGETATION (Four Strata) - Use scientific names of plants.

Sampling Point DF-1 _____

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50/20=		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
50/20= 12.5/5	25	= Total Cover	

Herb Stratum (Plot size: 5')			
1. Verbesina alternifolia	5	X	FAC
2. Dipsacus fullonum	5	X	FACU
3. Solidago altissima	3	X	FACU
4. Alliaria petiolata	2		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
50/20 = 7.5 / 3	15	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
50/20 = 22.5/9		= Total Cover	

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is > 50%

___ 3 - Prevalence Test is ≤ 3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Vegetation Strata:

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

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

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

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

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

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

SOIL

Sampling Point: DF-1 _____

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	NA							Coal Spoil
3-16	10YR5/5	100					Mineral	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (s4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: ET-braddock Well Pad City/County: Allegheny Sampling Date: 12-04-2017

Applicant/Owner: Marion Oil & Gas State: PA Sampling Point: DF-2

Investigator(s): ECOTUNE- PG Section, Township, Range: Braddock Boro

Landform (hillslope, terrace, etc.) Flat Local relief (concave, convex, none): None

Slope (%): 3 Lat: 40.3937° Long: -79.8461 ° Datum:

Soil Map Unit Name: UB NWI Classification: Not Mapped

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

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

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

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

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?**	Yes ____	No X
Hydric Soil Present?	Yes ____	No X			
Wetland Hydrology Present?	Yes ____	No X			

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

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

Wetland Hydrology Present? Yes ____ No X

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

Remarks:

VEGETATION (Four Strata) - Use scientific names of plants.

Sampling Point DF-2 _____

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
50/20=		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
50/20=		= Total Cover	

Herb Stratum (Plot size: 5')			
1. Polygonatum biflorum	2		FACU
2. Polystichum acrostichoides	3	X	FACU
3. Datylis glomerata	5	X	FACU
4. Solidago altissima	5	X	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
50/20 = 7.5 / 3	15	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
50/20 =5/2		= Total Cover	

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is > 50%

___ 3 - Prevalence Test is ≤ 3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Vegetation Strata:

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

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

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

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

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

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

SOIL

Sampling Point: DF-2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2								Coal Spoil
2-16	10YR5/6	98	10YR4/4	2			Mineral	

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

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (s4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

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

Remarks:

APPENDIX B
SITE PHOTOGRAPHS

All Photographs Taken On December 4, 2017

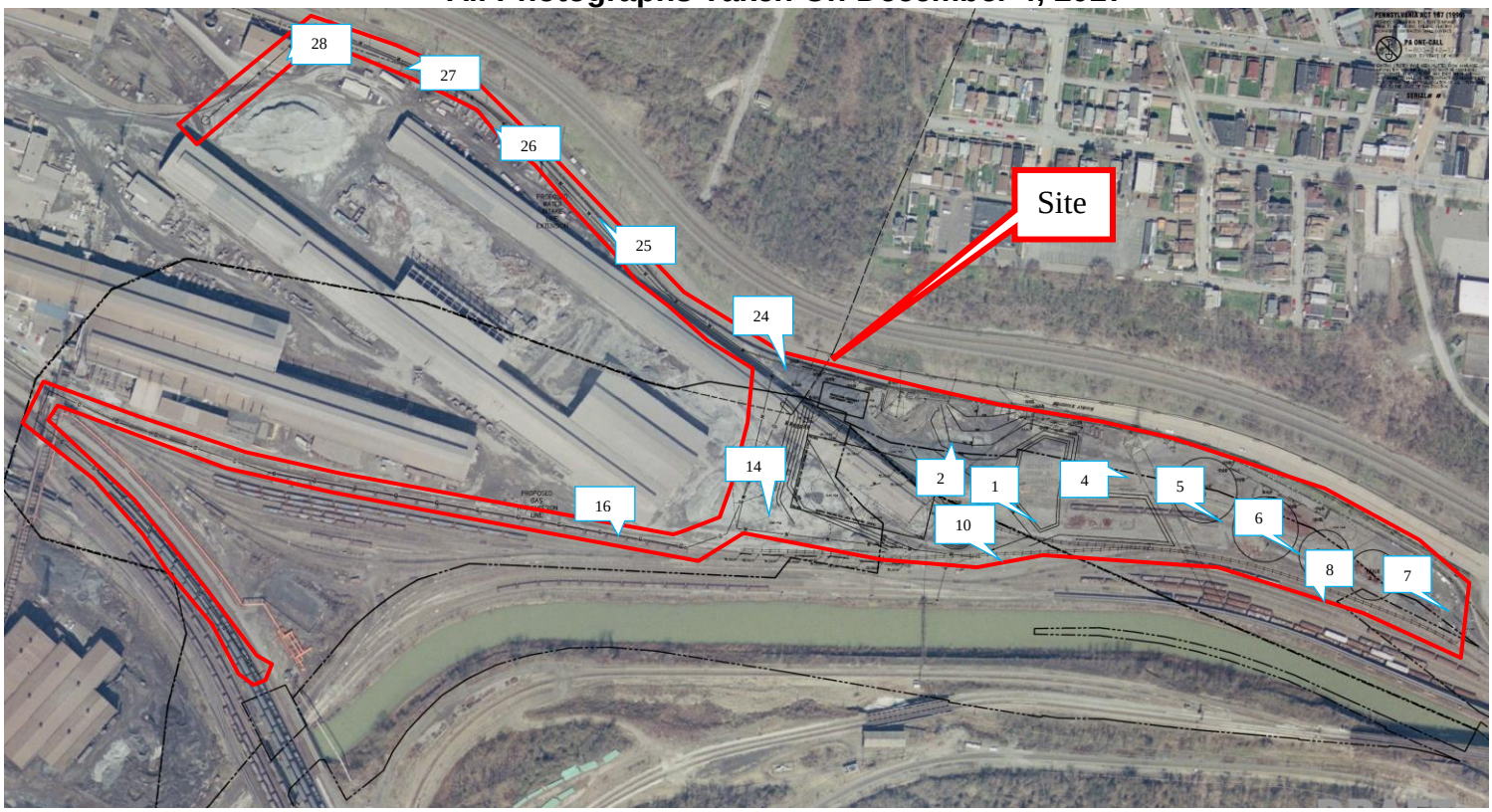
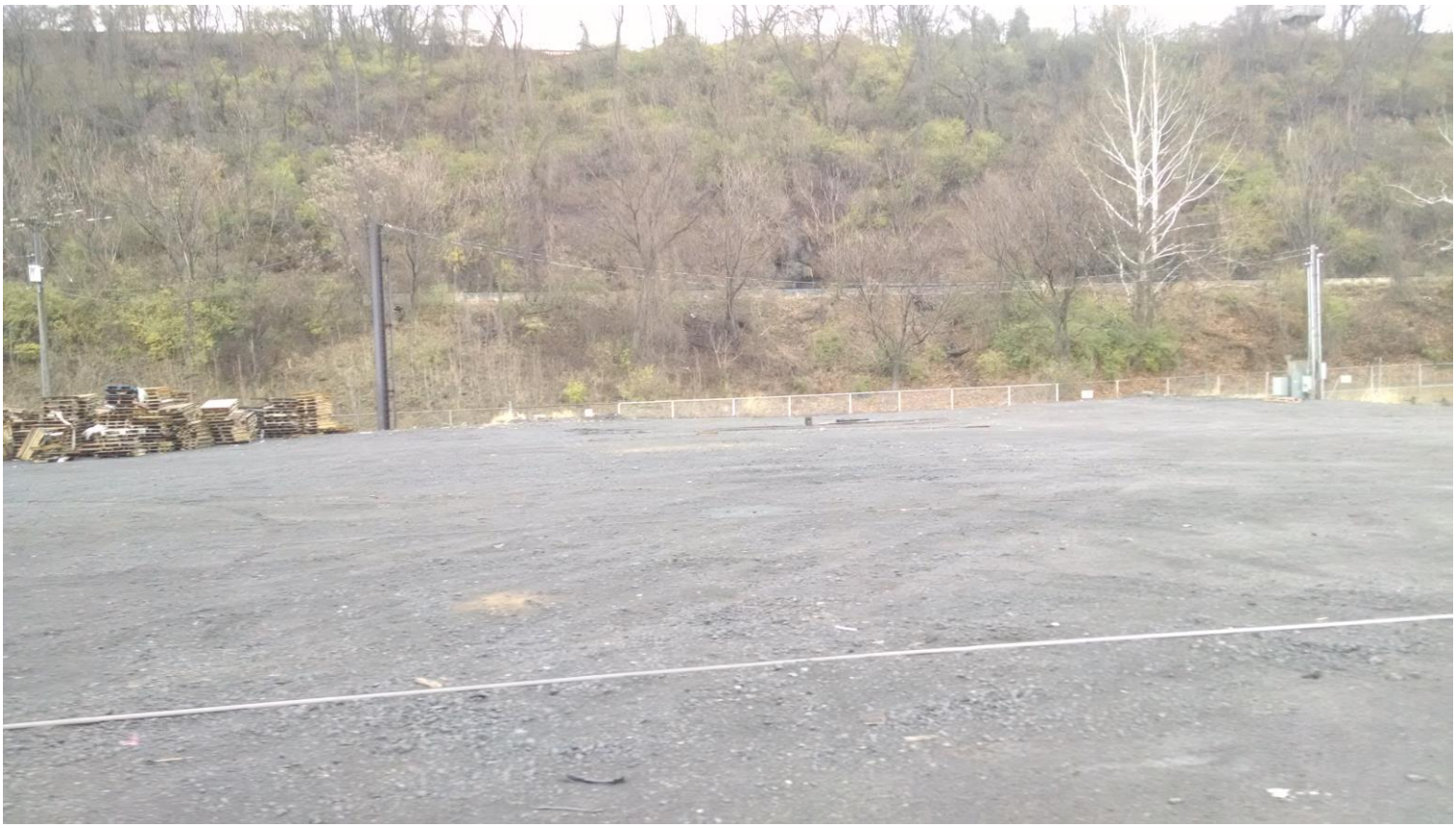


Figure 3 – Photograph Location Plan

P1



P2

P4

P5

P6

P7

P8

P10

P14


P16