



October 28, 2015

Ms. Kira Heinrich
Division of Archaeology and Protection
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0093

Re: ER# 2015-1839-042
Archaeological Sensitivity Model and Testing Strategy
Shell Pipeline Company, LP
Northeast Pipeline Project
Allegheny, Beaver, Washington Counties, Pennsylvania

Dear Ms. Heinrich:

Shell Pipeline Company, LP (Shell) is proposing to construct approximately 152.9 kilometers (95.0 miles) of ethane pipeline linking various supply points in Ohio, West Virginia and Pennsylvania to various delivery points in these same states (the Project) (**Attachment A**). In response to the initial Section 106 consultation letter, it was the opinion of Pennsylvania Historical and Museum Commission (PHMC) on September 22, 2015 that the APE should not be limited to the Army Corps of Engineers (USACE) permit areas for proposed stream and wetland crossings, but should take into account all areas from which the Project may have direct or indirect (visual) effects. This letter represents a revision from the initial Section 106 consultation by providing a sensitivity model to predict archaeological probability and revised testing strategy to the PHMC for the Project, in accordance with PHMC standards and the protocols of the USACE (the lead federal agency for the Project). The archaeological sensitivity model and revised tested strategy are discussed below, along with review of the data collected during the background research based on the most up-to-date pipeline alignment.

Project Description and Area of Potential Effects (APE)

Shell proposes to construct approximately 68.9 kilometers (42.8 miles) of new pipeline to transport ethane through three Pennsylvania counties in southwest Pennsylvania (see Attachment A) within a study corridor of 30.5 meters (100.0 feet). The Project area is primarily composed of mixed deciduous and regenerating forest, agricultural land, existing rights-of-way, reclaimed strip mines and residential development areas. Wherever possible, Shell routed the proposed



route along existing rights-of-way. Access roads have not been identified at this point, however, when possible, existing roads will be utilized to minimize Project impacts.

The following discussion outlines the results of background research conducted to date, as well as a proposed methodology for identification of archaeological and above-ground resources within the Area of Potential Effects (APE). The APE for direct effects will include all areas of project-related ground disturbance. Based on current project design, direct effects will be contained within an archaeological study corridor that is 30.5 meters (100.0 feet) in width. The APE includes locations not only defined as USACE jurisdictional areas (e.g., streams, wetlands, and associated buffers), but, at the request of the PHMC, includes all areas of ground disturbance within the study corridor.

There are areas of no archaeological probability due to extensive disturbance (e.g., reclaimed strip mines), those areas and areas surveyed by cultural resource compliance surveys will consist of pedestrian survey only. In order to facilitate subsurface sampling of the remaining study corridor, archaeological testing will be determined through pedestrian survey of the entire study corridor and by the use of an archaeological sensitivity model as a field guide (Table 1). Areas of low archaeological sensitivity will be comprised of pedestrian survey and judgmental STP testing based on field observations. Areas of moderate to high sensitivity will include a determined interval testing strategy. Areas of greater than 15 percent will be subjected to pedestrian survey only.

Table 1: Project Area Total Acreage in Pennsylvania

Total Acreage in 100-foot Corridor	Acres
Total Area of Corridor (Pennsylvania)	507.91
Previously Surveyed	16.71
Mining (No Probability)	83.38
Sensitivity Model - Steep (Pedestrian Survey Only)	243.34
Sensitivity Model - Low (Pedestrian Survey/ Judgmental STP Testing)	102.29
Sensitivity Model - Moderate Interval STP Testing	103
Sensitivity Model - High Interval STP Testing	59.28

The surrounding viewshed, or indirect APE, includes above-ground resources that may be visually impacted by the construction of the Project. The APE for visual effects includes locations from which elements of the Project may be visible, including potential changes to the landscape. This includes any above-ground resources that may be physically impacted by the construction of the Project in the form of tree cutting and other alterations to the landscape, and may be visually impacted by the construction of above-ground Project facilities. At this time auxiliary elements of the Project (compressor and meter stations, staging areas, contractor yards, access roads, etc) have not been defined.



Background Research

The following document details the results of the cultural resources literature review conducted by AECOM for the Project. The enclosed AECOM Literature Review:

- Defines the documented historic-era and prehistoric cultural contexts archived with the PHMC;
- Identifies all inventoried cultural resources located within the vicinity of the Project; and,
- Develops a context for assessing the Section 106 requirements (if any) for the Project.

AECOM consulted the PHMC online mapping system (CRGIS) in August and October 2015, in an effort to locate inventoried cultural resources identified within the one-mile radius Project study buffer. For an archival study of above-ground resources, refer to the literature review and Section 106 Consultation Letter provided to the PHMC on September 15, 2015. The archaeological archival study included a review of the Pennsylvania Archaeological Site Survey (PASS) forms, isolated find forms, and the National Register of Historic Places (NRHP). In conjunction with the resource-inventory research, an examination was undertaken of previous Cultural Resource Management (CRM)-related reports on file at the PHMC, which were completed within the townships containing portions of the Project. The synthesis of these data is intended to provide a clearer picture of cultural resource sensitivity within the limits of the Project, as well as an overview of the previous investigations conducted across the region. The following table (Table 2) quantifies the data collected from the archival research, separated into resources/reports located within the one-mile radius study buffer, and also within 91.4 meters (300.0) feet of the proposed Project centerline. Do note that no NRHP-Listed Properties or Districts are within one-mile study buffer. **Attachment B and C** illustrate the location of the cultural resources identified through the PHMC online mapping system review.

Table 2: Inventoried Cultural Resources and Reports Within One Mile of the Project Centerline

PHMC Data	Count Within One Mile of Project	Count Within 300 Feet of Project
NRHP-Listed Properties/ Districts	0	0
PHMC-Listed Archaeological Sites	141	14
Previous CRM-Related Reports	32	12

Previously Recorded Cultural Resources

Background research identified 141 PASS-inventoried archaeological sites within the one-mile radius of the Project area (Table 3). Nine archaeological sites fall directly on the proposed centerline while 14 site locations fall within 91.4 meters (300.0 feet).

Table 3: PHMC-Listed Archaeological Resources Within One Mile of the Project

Site Number	Type	Temporal Component	Setting	Distance from Centerline (m)
36WH1549	Scatter	Prehistoric	Floodplain	0
36WH1440	Open Habitation	Prehistoric	Upland Flat	0
36WH0157	Open Habitation	Prehistoric - Archaic and Transitional	Stream Bench	0
36BV0375	Open Habitation	Prehistoric	Stream Bench	0
36BV0374	Open Habitation	Protohistoric	Hill Ridge/Toe	0
36BV0192	Open Habitation	Archaic	Terrace	0
36BV0019	Scatter	Prehistoric - Middle Archaic	Terrace	0
36BV0011	Scatter	Archaic-Woodland	Hilltop	0
36BV0010	Scatter	Archaic-Woodland	Terrace	0
36BV0119	Open Habitation	Prehistoric	Terrace	25.5
36BV0250	Open	Prehistoric - Archaic(Late), Transitional, and Woodland	Floodplain	44.5
36BV0110	Open Habitation	Prehistoric	Lower Slopes	63.81
36BV0247	Open Habitation	Archaic	Hill Ridge/Toe	70.7
36BV0232	Open Habitation	Prehistoric	Terrace	71.95
36WH0159	Open Habitation	Prehistoric	Terrace	105.7
36WH0156	Open Habitation	Prehistoric - Archaic	Saddle	122.3
36BV0377	Historic Domestic Site	Historic - (1800-2000)	Lower Slopes	123.1
36WH0800	Open	Prehistoric – Archaic (Middle, Late) and Woodland (Middle)	Stream Bench	126.5
36BV0334	Open Habitation	Prehistoric	Beach	141.2
36BV0379	Open Habitation	Prehistoric	Floodplain	149.3
36WH0241	Historic and Prehistoric	Prehistoric - Archaic / Historic	Middle Slopes	181.4
36BV0161	Open Habitation	Prehistoric	Floodplain	209.8
36BV0100	Open Habitation	Prehistoric	Ridgetop	226.9
36BV0058	Open Habitation	Archaic-Woodland	Floodplain	229
36BV0231	Open Habitation	Prehistoric	Terrace	230.9
36BV0203	Open Habitation	Prehistoric	Terrace	232.6
36BV0098	Open Habitation	Prehistoric	Terrace	236
36BV0179	Open Habitation	Prehistoric - Middle Woodland	Stream Bench	238.9
36WH0608	Village	Prehistoric - Archaic	Terrace	246.2
36BV0050	Open Habitation	Early Archaic-Early Woodland	Floodplain	302
36BV0230	Open Habitation	Archaic and Historic	Floodplain	332.2
36BV0012	Scatter	Archaic-Woodland	Terrace	345



Site Number	Type	Temporal Component	Setting	Distance from Centerline (m)
36WH0231	Open Habitation	Prehistoric	Ridge Top	362.1
36BV0109	Open Habitation	Prehistoric	Floodplain	372.7
36WH0190	Open	Prehistoric	Upper Slopes	376.8
36BV0249	Open Habitation	Archaic	Terrace	426.5
36WH0158	Open Habitation	Prehistoric - Archaic	Middle Slopes	430.8
36BV0048	Open Habitation	Prehistoric	Hill Ridge/Toe	431.7
36BV0204	Open Habitation	Prehistoric - Early Woodland	Floodplain	439.6
36BV0036	Open Habitation	Prehistoric - Middle Archaic and Woodland	Terrace	441.1
36AL0582	Farmstead	Historic - (1800-1900)	Upland Flat	464
36BV0021	Open Habitation	Prehistoric - Archaic and Woodland (Middle)	Floodplain	470.2
36BV0191	Lithic Reduction	Archaic	Floodplain	483.2
36BV0111	Open Habitation	Prehistoric	Floodplain	488.2
36BV0095	Open Habitation	Prehistoric	Floodplain	506.5
36BV0117	Scatter	Prehistoric - Archaic	Saddle	524.3
36BV0059	Open Habitation	Prehistoric - Middle Woodland	Floodplain	535.7
36BV0180	Open Habitation	Prehistoric - Archaic through Contact	Floodplain	541.1
36BV0193	Open Habitation	Archaic	Floodplain	548.7
36BV0101	Open Habitation	Prehistoric	Floodplain	604.8
36BV0022	Open Habitation	Prehistoric - Archaic and Woodland	Terrace	626
36BV0084	Scatter	Prehistoric	Floodplain	633.2
36WH0191	Open Habitation	Prehistoric	Middle Slopes	653.7
36WH1481	Open Habitation	Prehistoric - Archaic	Terrace	655.9
36BV0125	Open Habitation	Prehistoric	Terrace	655.9
36BV0037	Open Habitation	Prehistoric - Middle Archaic	Hill Ridge/Toe	663.8
36WH0209	Open Habitation	Prehistoric - Archaic and Transitional	Hill Ridge/Toe	678.8
36BV0206	Scatter	Prehistoric	Floodplain	683.6
36BV0046	Scatter	Prehistoric	Floodplain	684.8
36BV0112	Open Habitation	Prehistoric	Upland Flat	705.7
36BV0044	Scatter	Woodland	Floodplain	709.1
36BV0114	Open Habitation	Prehistoric - Middle Woodland	Floodplain	711.6
36BV0124	Open Habitation	Prehistoric	Floodplain	721.2
36WH0155	Open	Prehistoric	Stream Bench	725.2
36WH0035	Isolated Find	Historic - Present	Floodplain	768.5

Site Number	Type	Temporal Component	Setting	Distance from Centerline (m)
36BV0078	Village	Prehistoric - Archaic and Woodland (Late)	Floodplain	775.1
36BV0102	Open Habitation	Prehistoric	Floodplain	779.5
36BV0378	Open	Prehistoric	Floodplain	785.6
36BV0159	Other	Prehistoric - Middle Archaic and Middle Woodland	Terrace	825.8
36BV0099	Open Habitation	Prehistoric	Floodplain	833.1
36BV0045	Open Habitation	Woodland	Floodplain	835.3
36WH1178	Historic Domestic Site	Historic - (1875-1900), (1900-1925)	Upper Slopes	836.7
36BV0280	Open	Prehistoric	Floodplain	845.1
36BV0035	Open Habitation	Prehistoric - Archaic	Floodplain	866.2
36BV0096	Open Habitation	Archaic	Terrace	870
36BV0017	Open Habitation	Prehistoric - Archaic	Upland Flat	871.6
36WH1625	Farmstead	Historic - Present	Middle Slopes	872.9
36BV0221	Open Habitation	Archaic	Upland Flat	873.9
36BV0057	Open Habitation	Archaic-Woodland	Saddle	901.8
36WH0142	Open	Prehistoric	Terrace	907.5
36BV0113	Open Habitation	Prehistoric	Floodplain	918.5
36WH1141	Historical Industrial Site	Historic	Upland Flat	931
36BV0177	Open	Prehistoric - Archaic and Woodland (Middle)	Floodplain	935.3
36AL0382	Historic Domestic Site	Historic - Present	Saddle	945.4
36BV0018	Open Habitation	Prehistoric	Hill Top	963.7
36WH0024	Open Habitation	Prehistoric - Late Archaic	Lower Slopes	966.1
36BV0061	Open Habitation	Prehistoric - Middle Woodland	Hill Top	972.4
36BV0116	Open Habitation	Prehistoric	Terrace	973.3
36BV0372	Open	Prehistoric	Floodplain	974.4
36WH0208	Open Habitation	Prehistoric - Archaic	Middle Slopes	988.5
36BV0217	Rock Shelter/Cave	Prehistoric	Middle Slopes	1013.6
36BV0056	Scatter	Woodland	Hilltop	1022.5
36BV0049	Open Habitation	Prehistoric	Terrace	1034.1
36BV0115	Open Habitation	Prehistoric	Hill Ridge/Toe	1047
36BV0376	Open Habitation	Prehistoric - Early Archaic	Ridge Top	1049.2
36BV0094	Open Habitation	Prehistoric	Floodplain	1049.5
36BV0020	Open Habitation	Prehistoric - Middle Archaic	Floodplain	1049.6
36BV0216	Rock Shelter/Cave	Prehistoric	Middle Slopes	1113.6



Site Number	Type	Temporal Component	Setting	Distance from Centerline (m)
36BV0205	Open	Prehistoric - Archaic and Woodland (Early,Middle)	Floodplain	1114.5
36BV0175	Scatter	Prehistoric - Arcahic and Woodland	Floodplain	1155.7
36BV0174	Scatter	Prehistoric - Middle Woodland	Floodplain	1164.1
36BV0097	Open Habitation	Prehistoric	Hilltop	1174.2
36WH0221	Open Habitation	Prehistoric	Terrace	1186.1
36BV0003	Open Habitation	Middle Archaic-Late Woodland	Floodplain	1192.3
36BV0171	Open	Prehistoric - Late Archaic	Stream Bench	1246.8
36BV0176	Open Habitation	Prehistoric - Middle Woodland	Floodplain	1248.7
36BV0118	Open Habitation	Prehistoric	Floodplain	1254.2
36WH0229	Open Habitation	Prehistoric	Upper Slopes	1265.6
36BV0173	Open Habitation	Prehistoric - Late Woodland	Floodplain	1280.2
36WH0220	Open Habitation	Prehistoric	Floodplain	1284.9
36WH0037	Isolated Find	Prehistoric	Floodplain	1346.3
36WH1376	Unknown	Late Archaic	Terrace	1370.6
36BV0178	Open Habitation	Prehistoric - Middle Archaic	Stream Bench	1396.
36BV0160	Other Specialized Aboriginal Site	Middle Woodland	Floodplain	1407
36BV0015	Open Habitation	Prehistoric - Late Archaic	Ridge Top	1435
36BV0207	Scatter	Prehistoric	Hill Ridge/Toe	1435.7
36BV0030	Scatter	Archaic-Woodland	Floodplain	1448.3
36BV0108	Open Habitation	Archaic	Terrace	1460.5
36BV0372	Open	Prehistoric	Floodplain	1471.6
36WH0228	Unknown	Prehistoric	Upper Slopes	1472.0
36BV0042	Open Habitation	Archaic	Terrace	1489.8
36BV0360	Farmstead	Historic, 1900-2000	Hill Ridge/Toe	1492.1
36BV0052	Isolated Find	Prehistoric - Middle Archaic	Hill Ridge/Toe	1495.8
36WH0219	Open Habitation	Archaic	Terrace	1499.9
36BV0004	Village	Woodland	Terrace	1501.6
36BV0051	Open Habitation	Prehistoric	Floodplain	1516.1
36AL0383	Unknown	Prehistoric - Late Archaic	Hill Ridge/Toe	1517.7
36BV0089	Petroglyph/Pictograph	Prehistoric	Beach	1525.3
36BV0060	Open Habitation	Early Archaic	Island	1530.1
36BV0274	Open Habitation	Prehistoric - Archaic	Hill Top	1583.4
36WH1310	Open	Prehistoric - Archaic	Terrace	1589.0

Site Number	Type	Temporal Component	Setting	Distance from Centerline (m)
36BV0202	Open Habitation	Prehistoric - Archaic and Woodland (Late)	Floodplain	1597.1
36BV0262	Open Habitation	Woodland	Hill Top	1599.8
36BV0169	Open Habitation	Prehistoric - Archaic and Woodland (Late)	Floodplain	1607.2
36WH0230	Unknown	Prehistoric	Middle Slopes	1608.3

Previous Cultural Resources Surveys

Previous archaeological surveys were associated with 32 projects have been conducted within one mile of the study corridor (Table 4). Twelve of these reports detail cultural resource investigations which extend across the Project route, associated with water lines, pipelines, sewer lines and road extensions. The following table lists all 32 of the prior CRM-related field surveys conducted within the one-mile radius of the Project, as reflected in the reports inventory maintained by the PHMC.

Table 4: Summary of Previous Cultural Resource Surveys Within One Mile of the Project

PHMC ID	Title	Reference	Distance to Project (m)
1989-1378-042-C	<i>PhI Arch Survey Prop S.Beltway PA 60 to SR 22 Robinson Twp, Washington Co, Findlay Twp, Allegheny Co,PA</i>	Tidlow 1996	0
1989-1378-042-N	<i>Addendum, Phase I Arch. Survey, Additional Right-of-Way on Tan and Green Alignments, Southern Beltway, PA 60 to US 22, Washington and Allegheny Co,PA</i>	Rue 2000	0
1989-1378-042-UUU	<i>Southern Beltway Transportation Project, S.R. 0022 to Interstate 79, Allegheny and Washington Counties, Pennsylvania, Phase Ib Archaeological Survey</i>	Basalik 2014	0
1995-0511-125-E	<i>Lit Rev & Arch Srvy, Proposed Sewer Pipeline, Robinson, Cecil & Mt Pleasant Twps, Midway & McDonald Boros, WA Co, Pa</i>	Whitman et al. 1999	0
1998-1880-003-C	<i>Phase I Archaeological Survey Report, Potato Garden Water and Sewer Expansion Project, Findlay Township, Allegheny County, Pennsylvania</i>	MacDonald 2006	0



2009-2142-003-B	<i>Negative Survey Form, Route 30 Sanitary Sewer Project, Findaly Township, Allegheny County</i>	Davis 2009	0
2013-2179-003-D	<i>Phase I Archaeological Report, Proposed Construction of Well Pads, Impoundment Areas, Gas Pipeline, and Associated Access Roads, Greater Pittsburgh, International Airport, Findlay and Robinson Townships, Allegheny County.</i>	Jackson 2013	0
2013-2037-007	<i>Phase Ia and Ib Archaeological Investigations for the Proposed Petrochemicals Complex, Potter and Center Townships, Beaver County, Pennsylvania</i>	Dugas 2014	0
2013-2037-007	<i>Phase II Archaeological Investigations for the Proposed Petrochemicals Complex, Potter and Center Townships, Beaver County, Pennsylvania</i>	Dugas 2014	0
2013-2037-007	<i>Addendum Report 1 - Magnotta-Buffinton Site (36BV0386), Phase I and II Archaeological Investigations for the Proposed Petrochemicals Complex, Potter and Center Townships, Beaver County, Pennsylvania</i>	Dugas 2014	0
2013-2037-007	<i>Addendum Report 2 - Lewis-Beils Site (36BV0387), Phase I and II Archaeological Investigations for the Proposed Petrochemicals Complex, Potter and Center Townships, Beaver County, Pennsylvania</i>	Dugas and Rankin 2015	0
2013-2037-007	<i>Addendum Report 3 - Mall Lot 2, Geomorphological Assessment for the Proposed Petrochemicals Complex, Potter and Center Townships, Beaver County, Pennsylvania</i>	Vento, Rankin and Dugas 2015	0
2013-2037-007	<i>Addendum Report 4 - Site 36BV0051, Phase I/II Archaeological Investigations for the Proposed Petrochemicals Complex, Potter and Center Townships, Beaver County, Pennsylvania</i>	Rankin 2015	0
2012-1291-007-A	<i>Negative Survey Form, Mariner West Ethane Line Reroute, 36BV0097 Site Area, Potter Township, Beaver County</i>	Marine 2013	1.2
1991-1517-007-A	<i>Ph I Cult. Res. Inventory, Prop. Wetland Replace. Site, GPIA Midfield Terminal Proj., Independence Twp., BV CO., PA</i>	Waite 1991	24.4
1986-0679-007-B	<i>Ph I Arch. Surv., St. Joe Fly Ash Disposal Site, BV CO., PA</i>	Cosgrove and Michael 1986	41.1



1995-3109-007	<i>Ph.I Cult.Res.Survey, Line N Ntl.Gas Pipeline Replac.Proj., Centre,Hopewell,Independence Twps,BV Co,Pennsylvania</i>	Baker 1995	61
2012-1291-007-A	<i>Phase I/II Archaeological Investigation, Site 36BV0094, Mariner West Ethane Transmission Line, Ohio River Crossing, Potter Township, Beaver County</i>	Marine 2012	147.8
2012-1650-042-G	<i>Phase I Archaeological Survey, Proposed First Energy 540 Acre Little Blue Run East Landfill Expansion, Greene Township, Beaver County</i>	Weller 2011	326.1
2015-0534-125-A	<i>Phase I Archaeological Survey Yonkers to Cowden Pipeline</i>	Lackett 2015	379.5
2012-1650-042-G	<i>Addendum 1, Phase I Cultural Resource Investigations for the Proposed Oak Grove to Ft. Beeler and Ft. Beeler to Houston Ethane Pipeline Project, Marshall County, West Virginia and Washington County, Pennsylvania</i>	Green 2013	467.9
1991-4547-007-D	<i>Ph I Arch. Surv. Rpt., Prop. Interconnection Of Pipeline Facilities, Independence Twp., BV CO., PA</i>	Miller 1991	535.2
1999-0080-125-F	<i>Negative Survey Form for Phase I Archeological Survey in Support of the Columbia Line 1758 Project, Washington County</i>	Goodwin 2014	577.9
2008-0424-125-B	<i>Phase I Archaeological Investigation of Proposed Cellular Phone Tower Pads and Access Roadways in Westmoreland and Washington Counties</i>	Nass 2007	771.4
1994-2434-125-B	<i>Ph I Arch. Surv. At The Proposed Waste Coal Fueled Powere Generation Facility, WH CO., PA</i>	Catts 1994	812
2004-0278-003-A	<i>Phase IA Letter Report, Proposed Clinton Road Development Project, Findlay Township, Allegheny County</i>	D.Anderson 2003	861.1
2004-0278-003-C	<i>Phase I Archaeological Survey, PIT Proposed Site 12 Phase II Development, Findlay Township, Allegheny County</i>	Stanilla 2012	863.5
2006-0300-007-A	<i>Archaeological and Geomorphological Invest. for the Proposed Raredon Stream Restoration Project, Independence Twp., Beaver Co., PA</i>	Anderson 2005	1311.6

2005-1240-007-C	<i>Phase I Archaeological Survey, Clinton U.S. Army Reserve local Training Area (LTA)(PA018), Independence Township, Beaver County</i>	Kiebeknecht and Harshbarger 2013	1390.8
2006-0942-042-A	<i>Arch. Reconnaissance of Ohio River Islands National Wildlife Refuge in PA, WV, and KY (and Phase I Arch. Survey of Manchester Isl. No. 2, KY)</i>	Diamanti 2005	1401.2
2004-2421-007-B	<i>Ph. I Arch. Survey, Little Blue Run Disposal Area, Greene Twp, Beaver Co, Pa</i>	Davis 2004	1472.8
1995-1000-007-B	<i>Ph I Arch. Survey, Prop. Towboat Dock, Shippingport Twp., BV CO., PA</i>	Fox and Dwyer 1995	1568.5

Historic Mapping Data

Concurrent with the archival research conducted on the cultural resource inventory data maintained by the PHMC, AECOM also examined available historic-era mapping of the Project areas, in an effort to more appropriately define the historic-era character of this portion of the three counties which contain elements of the Project. The following table (Table 5) lists the mapping resources consulted for the Project.

Table 5: Historic-Era Mapping of the Project

Date	Reference	Title	Comments
1876	J.A. Caldwell	<i>Caldwell's Illustrated, Historical, Centennial Atlas of Washington County, Pennsylvania</i>	Depicts roads, landowners, structures, villages/ towns
1876	J.A. Caldwell	<i>Caldwell's Illustrated, Historical, Centennial Atlas of Beaver County, Pennsylvania</i>	Depicts roads, landowners, structures, villages/ towns
1876	G.M. Hopkins	<i>Atlas of the County of Allegheny, Penna.</i>	Depicts roads, landowners, structures, villages/ towns

An examination of the approximate location of the Project on these maps provides information regarding the historic-era occupation and utility of the landforms within and around the area of the Project. Not surprisingly, the rural agrarian character currently present across the landscape surrounding the Project is mirrored in the late nineteenth century mapping for the townships crossed by the Project within all three counties. It appears likely that the primary locations of sustained late nineteenth through mid-twentieth century occupations in the vicinity of the Project were located adjacent to township and county road alignments, which have largely maintained their alignment from the historic period into the twentieth century. The general continuity of the road network, from the earliest mapping available through to the modern era, suggests that the majority of the Project alignment was likely maintained as cultivated fields and forested lots since the late nineteenth century, which corresponds with the current land-use patterns evident across these landforms in the modern era.



Archaeological Sensitivity Model

Archaeological sensitivity will be determined through pedestrian survey of the entire study corridor in addition to a predictive model. The model is presented below and serves as a guide for field teams. Given the high degree of variability for archaeological site location and environmental variation, this model will assist in targeting field work by correctly identifying the location of a large percent of known sites. Clearly, no single model can account for the full range of Native American habitation location decisions; therefore this model is simply a guide for the field effort. The true assessment of sensitivity will take place in the field, based on on-the-ground observations to modify the model's recommendations and set the testing interval accordingly.

The archaeological sensitivity model created for the Project is a weighted combination of 25 environmental variables including such features as topographic slope and the distance to wetlands, streams, and water bodies, while taking into account areas of extensive disturbance, such as reclaimed strip mines and residential development areas (see **Attachment B and C**). This model is based on a baseline model for the sensitivity of prehistoric site-presence throughout the Pennsylvania Commonwealth using Archaeological Predictive Modeling (see Harris et al. 2015¹). The objective of this model is to identify areas that are within proximity to valuable hydrologic resources and on soils suitable for habitation. By weighing each factor individually, the model is able to not only identify the suitability of single attributes but also the combination of attributes. The theoretical underpinning of this model is simply that suitable ground and access to water are the most basic factors for habitation choices. This approach mirrors how archaeologists have been locating sites for decades, but uses the availability of digital data to apply it over a large area. Clearly, there are many potential habitation locations that such a model will not identify, but this model is intended primarily as a guide to the field effort and does not replace in-field decisions for locating judgmental test locations, which are equally, if not more, important.

The assignment of weights to the classification of environmental variables allows the archaeologist to rank the importance of certain measures. There are various ways to weight a model factor, which include arbitrary assessment, inductive assessment based on known site locations, deductive assessments based on an *a priori* theory, or a combination of these. This model uses the theory that lower slopes and water resources have a large influence on the location of most Native American archaeological sites. As such, each of the variables is weighted so that the more level or closer to a water resource or toolstone quarry-related geology an area is, the greater the sensitivity for Native American archaeological sites. To create the weights, layers were created in a GIS to represent the topographic slope (percent), distance to toolstone-related bedrock geology formations, streams from the National Hydrologic Dataset (high resolution), and the wetlands and water bodies of the National Wetland Database and assigned weights from 10 to 1 based on a preference for lower slopes and proximity to water. To create the thresholds of high, moderate, and low sensitivity, the weights were divided based on

¹ Harris, Matthew D., Robert Kingsley, and Andrew R. Sewell
2015

Pennsylvania Department of Transportation Archaeological Predictive Model Set, Task 7: Project Synopsis. Report submitted to the Pennsylvania Department of Transportation (Contract #355101), Harrisburg, Pennsylvania. Report on file with AECOM, Pittsburgh, Pennsylvania.



the percent of known sites located within each weight class and the amount of area that class occupied in the study area. The intention of this is to balance an acceptably high correct classification rate for known sites while at the same time not diluting the survey efficiency.

Proposed Methodology for Field Survey

Archaeological Resources

Methods for the identification of archaeological sites will be consistent with the PHMC's guidelines: *Cultural Resource Management in Pennsylvania: Guidelines for Archaeological Investigations* (2008). The 30.5-meter (100.0-foot) study corridor will be visually inspected to identify rockshelters, foundations, or other surface indications of archaeological sites regardless of field conditions (i.e. in areas of excessive slope, standing water).

Subsurface testing in USACE jurisdictional areas and non-USACE jurisdictional areas of moderate and high probability areas will be accomplished by shovel test pits (STPs) excavated at 15.0-meter (49.2-foot) intervals (high probability) and 25-meter (82.0-foot) intervals (moderate probability) on landforms where archaeological sites can be demonstrated to occur within one meter of the surface. In areas where archaeological sites may be present below one meter, test units (TUs) measuring one-meter-square or larger will be excavated at 25-meter (82.0-foot) intervals. STPs in low sensitivity areas will be excavated on a judgmental basis (e.g., near locally prominent landforms or lithic sources).

In portions of the study corridor where soil visibility is greater than 70 percent (except in areas of no-till agriculture), systematic inspection of the surface for artifacts will be conducted along transects spaced at 3.0-meter (9.8-foot) intervals in high probability areas. Surface survey transects in areas of medium and low probability will be spaced at 6.0-meter (19.7-foot) intervals. In general, subsurface testing will not be conducted on excessive slopes (≥ 15 percent slope) or in areas of standing water. As noted above, these settings will be visually inspected for the presence of rockshelters, lithic sources, and structural remnants. If evidence of these features is identified in areas of excessive slope or standing water, subsurface testing will be conducted on a judgmental basis.

All soils from STPs and TUs will be excavated by natural horizons. Soils from each horizon will be screened separately through one-quarter-inch wire mesh. Data from STPs and TUs will be recorded on standardized forms. Soil profiles will be recorded using the Munsell color system and standard texture classifications. Excavations will be completely backfilled, compacted, and the sod replaced. The location of survey transect beginning and end points, STPs, TUs, surface artifacts, and features will be mapped with a hand-held Global Positioning System (GPS) unit with sub-meter accuracy. Digital photography will be used to record surface conditions, select excavation profiles, cultural features, and identified archaeological sites.

Above-ground Resources

Current design of the Project has not defined auxiliary elements of the Project such as compressor and meter stations, staging areas, contractor yards, access roads. In addition, no tree cutting and other alterations to the landscape have been currently identified. As project design



progresses, there is potential for the Project to cross through parcels containing above-ground resources, including agricultural buildings and landscape features that are fifty years of age or older. If parcels with historic above-ground resources are to be physically impacted by the construction of the Project in the form of tree cutting and other alterations to the landscape, and may be visually impacted by the construction of above-ground Project facilities (including compressor stations), the following methodology will be initiated. For an archival study of above-ground resources, please refer to the literature review and Section 106 Consultation Letter provided to the PHMC on September 15, 2015.

The area of potential effects (APE) for above-ground historic resources will be limited to the boundaries of parcels that are crossed by the proposed project survey corridor. Where new above-ground facilities such as compressor stations are proposed, a one-quarter-mile visual APE is recommended. It is anticipated that the project area will include three compressor stations and that their locations will be known during the reconnaissance survey.

Secretary of the Interior-qualified architectural historians will conduct an architectural history field reconnaissance of parcels along the Preferred Alignment containing above-ground resources 50 years of age or older in the APE. This survey will include documentation of both previously recorded and newly identified historic resources that are in the APE for historic above-ground resources. All resources included in the survey will be documented with high resolution digital photography and will be plotted on maps.

AECOM will submit PHMC short forms for parcels in the APE containing resources aged fifty years of age or older that are clearly not eligible for the National Register as recommended in PHMC's Survey Guidelines for Pipeline Projects using data from the reconnaissance survey. This includes properties that are intersected by the proposed study corridor as well as properties in the visual APE of proposed compressor stations. AECOM will follow the PHMC guidelines for historic resource survey short forms.

For resources that are 50 years or older and outside the category of "clearly not eligible", a modified tabular Identification Documentation Submission will be submitted to PHMC. For agricultural properties, AECOM will follow the Survey Guidelines for Pipeline Projects published by your PHMC Bureau for Historic Preservation in June 2013. This table will also include any non-agricultural historic above-ground resources that we document in the APE along with our research recommendations. All resources included in the survey will be documented with high resolution digital photography and will be plotted on maps. AECOM will submit to PHMC the Identification Documentation Submission. PHMC may require intensive level survey of a limited number of resources that are submitted for their review. AECOM will complete full historic resource survey forms for such resources.

Summary

As stated earlier, this letter details a field strategy for the identification and evaluation of cultural resources within the APE. The letter also includes a review of the data collected during the background research based on the most up-to-date pipeline alignment.



Archaeological field methods will follow the current PHMC *Guidelines*, and will involve the Phase I survey of both USACE jurisdictional areas and all areas of ground disturbance within the study corridor. USACE jurisdictional areas and moderate to high probability locales within non-USACE jurisdictional areas will be subjected to two main strategies (pedestrian survey and shovel testing), while the remaining areas of ground disturbance will be subjected to visual surface inspection and the judgmental placement of STPs. These methods are considered sufficient given the overall scope of the Project. The results of the Phase I archaeological survey and the geomorphic assessment will be incorporated into one report and submitted to the PHMC for review.

Shell and AECOM would appreciate your consideration of the enclosed material and look forward to receiving your response to the proposed investigations as described herein. In the meantime should you have any questions please feel free to contact me at (609) 694-1933 or at jennifer.rankin@aecom.com.

Sincerely,

AECOM

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Enclosures (14)

Attachment A–Overview Map

Attachment B–Archaeological Sensitivity Index Map

Attachment C–Archaeological Sensitivity

cc: Christopher G. Heitman, Shell Chemical Appalachia, LLC

Kyle L. Webster, Shell Pipeline Company, LP