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1.0 Introduction

Foundation Mining, LLC (herein referred to as FMLLC), a subsidiary of Alpha Natural Resources, intends to develop an underground bituminous coal mine in the west-central part of Greene County, PA and is in the process of obtaining the necessary permits for the development of the proposed Foundation Mine Complex (herein referred to as Project).

The Project is located in Center and Jackson Townships, near Holbrook, Greene County, Pennsylvania, approximately 9.5 miles southwest of Waynesburg, PA at the intersection of State Highway 0018 (Golden Oaks Road) and Hoge Run Road (Figure 1). It will be situated within the forested stream valleys and ridges of portions of McCourtney Run (40628), Garner Run (40643), House Run (40635), Hoge Run (40632), Grinage Run (40647), and minor portions of the Hargus Creek (40627) and the South Fork Tenmile Creek (40293) watersheds.

The project will allow FMLLC to extract bituminous coal from existing FMLLC reserves in the Pittsburgh Coal Seam using longwall mining techniques and will require construction of various surface facilities to support mine development and operation throughout the anticipated 20-year life of mining. The proposed surface facilities will include:

- Coal Refuse Disposal Area R3
- Coal Refuse Disposal Area CR-1B
- Surface Facility / Prep Plant (includes Pittsburgh slope and shaft pad)
- Water impoundment and access road
- Freshwater Intake line routing and intake / pump house site
- Batch Weigh and Railroad Sidings

The Project area associated with mine development will encompass approximately 1,900 acres, as illustrated on Figure 1. Based on the proposed site designs, approximately 950 acres of the Project area will be disturbed during site preparation and operation of the new mine facilities.

Given the rolling terrain, the development of the various surface facilities will require site preparation, clearing, grubbing, excavation, and placement of soil and rock to establish the facility pad sites; refuse areas, and other operational areas necessary to accommodate facility construction, vehicular access, parking, stockpile areas, conveyor systems and railroad siding expansion. As a result, the construction and operation of the facilities will result in temporary and permanent impacts to Waters of the United States (WOUS) in the form of dredging (excavation) and the placement of rock and soil fill within streams and wetlands that exist within the Project area.

The Conceptual Compensatory Mitigation Plan has been prepared to offset permanent impacts to WOUS that are anticipated to result from project developments and is provided as Appendix F of the 404 Permit application package.

The mitigation plan contains the following primary sections with supporting figures, plan drawings, correspondence and associated data:

- Baseline Streams, Wetland and Mitigation Site Information
- Mitigation Goals and Objectives
- Mitigation Site Selection and Work Plans
- Performance Standards
- Project Success Criteria and Site Protection
- Contingency Planning and Adaptive Management Strategies
- Financial Responsibility
- Anticipated Permits, Approvals and Unresolved Issues
- References, Figures and Attachments

Guidance from the *Compensatory Mitigation for Losses of Aquatic Resource, Final Rule* (33 CFR Parts 325 and 332, and 40 CFR Part 230 [USEPA and USACE, 2008]) and Regulatory Guidance Letter No. 02-2 (USACE, 2002) was used to create this mitigation plan. The mitigation proposed for this project is referred to as "Permittee-Responsible" mitigation, the most common type of resource compensation used for projects of this nature in Pennsylvania. This type of mitigation is conducted by the permittee, who retains responsibility to complete and monitor the mitigation site per special conditions set forth in the permit. Typically, the mitigation activity is in-kind and located as close as possible to the impact site. For this proposed project, mitigation sites have been selected that are located within the same subwatersheds upstream of the proposed activity, and in nearby adjacent tributary subwatersheds as illustrated on Figure 2.

2.0 Baseline Aquatic Resources Information

This section of the Conceptual Mitigation Plan provides baseline information for the existing streams and wetlands within the Project area as well as the proposed mitigation areas.

The proposed Project will be constructed within the predominantly forested stream valleys and valley slopes of the Garner Run, Grinage Run, Hargus Creek, Hoge Run, House Run, McCourtney Run and South Fork Tenmile Creek watersheds within eastern Center and western Jackson Townships, Greene County, PA (Figure 1). The project area consists of approximately 1,900 acres and the majority of the project is roughly marked by a high ridge line to the north, the Norfolk Southern Railroad line to the east, high

ridges to the west, and narrow ridgelines of Garner Run to the south. Ground elevations within the project area range from approximately 980 feet above mean sea level (amsl) at the valley bottom of South Fork Tenmile Creek near the confluence of Hargus Creek and South Fork Tenmile Creek at the intersection of Golden Oaks Road (S.H. 18) and S.R. 21, to just over 1,530 feet amsl at the ridge tops along the northern, western and southern project boundaries. Several overhead electric lines and gas transmission pipelines currently cross over and through portions of the project area.

Forested habitat is the predominant land use, and is generally located along the ridge tops and steep valley slopes higher in the watersheds. Forested riparian habitat is present in areas that are not being used for residential or agricultural purposes. Typical tree species include; American beech (*Fagus grandifolia*), American sycamore (*Platanus occidentalis*), basswood (*Tillia americana*.), black walnut (*Juglans nigra*), black willow (*Salix nigra*), osage orange (*Maclura pomifera*), shagbark hickory (*Carya ovata*), spicebush (*Lindera benzoin*), tulip poplar (*Liriodendron tulipifera*), red and sugar maple (*Acer rubrum and Acer saccharum*), red and white oak (*Quercus rubra and Quercus alba*) and witch hazel (*Hamamelis spp*.).

Old field habitat is typically agricultural land that has been abandoned and allowed to revert to early successional species. Typical old field species include multi-flora rose (*Rosa multiflora*), Allegheny blackberry (*Rubus allegheniensis*), black locust (*Robinia psuedoacacia*), black raspberry (*Rubus occidentalis*), common teasel (*Dipsacus sylvestris*), dogbane (*Apocynum cannabinum*), orchard grass (*Dactylis glomerata*), Canada thistle (*Cirsium arvense*), goldenrods (*Solidago spp.*) and various upland grasses.

Current and recent agricultural practices, including hay cultivation; as well as horse, cattle and sheep production are common within the project area watersheds. Locations of these activities can range from expansive pasture and hayfields along the floodplain areas to rugged pasture at the highest point in the watershed. Livestock production requires access to a water source. As a result many of the farms within the project area allow livestock unlimited access to stream channels. This has caused sediment and nutrient loading, diminished bank stability, and altered the natural stream channels (Figure 2).

In many areas the residential encroachments on stream resources have eliminated riparian buffering and caused bank instability. Placing homes within the floodplain puts the structure at risk of flood damage, and often results in stream channelization practices such as bank armoring, channel alterations, realignments (reducing sinuosity), stream crossings, culverts, foot bridges, and other anthropogenic obstructions and encroachments (Figure 2). These conditions are particularly prevalent along Garner Run and McCourtney Run. Detailed Project area stream, watershed, stream location, sampling

data and mapping is provided in the associated Section 404 Permit Application Section 6.0 and Appendix A.

Streams

Within the Project area, a total of 111,649 LF of stream length was identified representing 43,101 LF of ephemeral, 13,528 LF of intermittent and 55,020 LF of perennial stream length (Table 1).

Of the 111,649 LF of stream length identified within the project area, 53,754 LF will be avoided and 57,895 LF are proposed to be impacted. The total impacted length represents 22,628 LF of ephemeral, 5,260 LF of intermittent and 30,007 LF of perennial stream length (Table 1).

Table 2-1. Existing and proposed impacted ephemeral, intermittent and perennial stream lengths (LF), Foundation Mine Complex, Greene County, Pennsylvania.

Watershed	Ephemeral		Intermittent		Perennial		Total	
	Exist	Impact	Exist	Impact	Exist	Impact	Exist	Impact
Garner Run	13,220	6,043	6,236	2,008	12,924	5,166	32,380	13,217
Grinage Run	1,264	94	713	-	1,439	85	3,416	179
Hargus Creek	-	-	-	-	70	15	70	15
Hoge Run	16,605	11,966	4,074	2,417	26,033	16,814	46,712	31,197
House Run	5,025	3,167	1,109	705	9,815	7,180	15,949	11,052
McCourtney Run	6,972	1,358	1,335	130	4,319	701	12,626	2,189
South Fork Tenmile Creek	15	-	61	-	420	46	496	46
TOTALS	43,101	22,628	13,528	5,260	55,020	30,007	**111,649**	**57,895**

Wetlands

As illustrated on Figure 3, a total of 45 wetlands, comprising 2.676 acres were identified within the Project area (Table 2-2). The majority of the Project area wetlands are depressional in nature and are located along, or within, the relatively narrow valley bottom of existing headwater perennial and intermittent streams. Several are associated with the broader riparian areas of larger order project area perennial streams. Several are located on isolated forested or pastured hillside settings associated with minor groundwater discharges (seeps). The wetlands are all generally small (the largest being 0.38 acres, and 36 of the 45 are less than 0.1 acres) and average approximately 0.059 acres in size. All but 1 of the wetlands is predominantly, or entirely, Palustrine Emergent Wetland systems with 30 of 45 being 100% PEM. Nearly half (20 of 45) of the wetland systems are considered isolated based on USACE JD determination field view and are not directly connected or associated with other surface waters.

In total, the identified wetland systems do not individually, or collectively, possess sufficient areal extent, or the capacity to provide watershed-scale functions and values within the overall forested watersheds. Given the small size, and topographically low elevation of many of the resources within the project area, the wetlands do provide, to a limited degree, the functions of flood water storage and floodflow attenuation in the associated streams during high flow events. Several of the wetlands were also determined to provide stream bank stabilization and sediment/toxicant retention functions. However, these functions are limited to a degree due to the size of the project area wetlands. In addition, the wetlands provide marginal wildlife habitat opportunities due to their dense herbaceous vegetative cover and widely scattered positioning within the predominantly undeveloped, forested stream valley. As a result of the proposed Project, these wetlands will be filled and the limited functions that they provide along with the associated streams will be lost in their entirety.

None of the existing wetlands present within the project area provide unique or high-value habitats, recreational opportunities, or environmental study opportunities. The lack of these types of habitats and opportunities can be attributed to the overall absence of diverse biological conditions or vegetative community assemblages; as well as existing private property use, lack of public access, trail systems or recreational facilities and relatively small size and distribution of the resources.

Wetland Impacts

Of the 45 wetlands identified within the project area, 18 wetlands, totaling 1.177 acres will be avoided and 27 wetlands, totaling 1.499 acres are proposed to be partially or completely impacted. Of the 27 impacted wetlands, 25 are proposed to be completely impacted while two will incur partial impacts. As a result, the total wetland impact for the project area will be 1.304 acres. The wetland impacts represent 1.278 acres of PEM wetland, 0.010 acres of PSS wetland, and 0.016 acres of PFO wetland (Table 2-2a). Detailed wetland system information is presented in Section 6.0 and associated wetland data forms and photographs are provided in Appendix A of the 404 Application package

Table 2-2 Total Existing Wetlands Acres Within the Project Area - Foundation Mine Complex, Greene County, Pennsylvania.

(Table 2-2 on page 6 and 7)

Wetland Resources Within Foundation Mine Project Boundary				
Wetland Name	**Cowardin Wetland Classification**	**Acres**	**Preliminary Nexus to Waterway**	**USACE Jurisdictional* or Isolated**
Garner Run				
F-1	85% PEM/15% PSS	0.003	Adjacent 40644	Jurisdictional
F-2	90% PEM/10% PSS	0.042	Abutting 40643	Jurisdictional
F-71	100% PEM	0.012	Headwaters of 40645-X	Jurisdictional
Wetland H	90% POW/10% PFO	0.380	Along 40644	Jurisdictional
Wetland I	10% PEM/5% PFO/85% POW	0.236	Along 40644	Jurisdictional
Wetland J	100% PEM	0.043	Along 40644	Jurisdictional
40649-W1	85% PEM/15% PSS	0.010	Adjacent 40649-R4	Jurisdictional
Subtotal		**0.726**		
Grinage Run				
GRI-1	100% PEM	0.070	None	Isolated
Wetland M	70% PEM/25% PSS/5% PFO	0.124	Abutting 40648-L1	Jurisdictional
Subtotal		**0.194**		
Hoge Run				
F-16	100% PEM	0.009	Abutting 40632-R3	Jurisdictional
F-19	100% PEM	0.025	None	Isolated
F-20	100% PEM	0.067	Abutting 40632-H	Jurisdictional
F-21	100% PEM	0.052	None	Isolated
F-22	100% PEM	0.012	None	Isolated
F-23	100% PEM	0.009	Adjacent 40632-HH	Jurisdictional
F-28	100% PEM	0.009	None	Isolated
F-41	90% PEM/10% PSS	0.055	Abutting 40634	Jurisdictional
F-44	100% PEM	0.004	Adjacent 40632-BB	Jurisdictional
F-45	95% PEM/5% PSS	0.024	None	Isolated
F-52	100% PEM	0.040	Adjacent 40632	Jurisdictional
F-62	95% PEM/5% PSS	0.006	None	Isolated
F-70	100% PEM	0.001	Headwaters 40632-M1a	Jurisdictional
HOG-3	100% PEM	0.168	None	Isolated
HOGE-1	100% PEM	0.128	None	Isolated
HOGE-2	100% PEM	0.256	None	Isolated
R3-1	100% PEM	0.020	Abutting 40632-P	Jurisdictional
R3-2	100% PEM	0.022	Abutting 40632-P	Jurisdictional
R3-3	100% PEM	0.006	Adjacent 40632-P	Jurisdictional
R3-4	90% PEM/10% PFO	0.146	Abutting 40632-P	Jurisdictional
R3-5	100%PEM	0.084	Abutting 40632	Jurisdictional
Wetland A	100% PEM	0.028	None	Isolated
Wetland B	100% PEM	0.001	None	Isolated
Wetland C	95% PEM/5% PSS	0.106	None	Isolated
Subtotal		**1.278**		
House Run				
F-4	100% PEM	0.023	None	Isolated
F-5	100% PEM	0.020	Abutting 40635	Jurisdictional
F-7	100% PEM	0.008	None	Isolated

F-8	95% PEM/5% PSS	0.073	None	Isolated
F-31	100% PEM	0.017	None	Isolated
Wetland E	100% PEM	0.037	Adjacent 40635-L	Jurisdictional
Subtotal		**0.178**		
McCourtney Run				
F-54	100% PEM	0.037	None	Isolated
F-73	80% PEM/20% PSS	0.181	Abutting 40628-X	Jurisdictional
Wetland F	95% PEM/5% PSS	0.023	Headwaters 40628- H4	Jurisdictional
Wetland G	90% PEM/5% PSS/5% PFO	0.012	None	Isolated
Wetland K	100% PEM	0.027	None	Isolated
Subtotal		**0.280**		
South Fork Tenmile Creek				
F-72	100% PEM	0.020	Abutting 40293-UNT1	Jurisdictional
Subtotal		**0.020**		
	TOTAL ACRES	**2.676**		

** All project area wetland resources are jurisdictional under PADEP*

Table 2-2a Proposed Wetland Impacts -Total Existing acres and Proposed Impacts to PEM, PSS, PFO and POW Classifications - Foundation Mine Complex, Greene County, Pennsylvania.

Watershed	Total		PEM		PSS		PFO		POW	
	Exist	Impact	Exist	Impact	Exist	Impact	Exist	Impact	Exist	Impact
Garner Run	0.726	0.013	0.127	0.011	0.006	0.002	0.050	-	0.543	-
Grinage Run	0.194	0.050	0.157	0.050	0.031	-	0.006	-	-	-
Hargus Creek	0.000	0.000	-	-	-	-	-	-	-	-
Hoge Run	1.278	1.140	1.251	1.119	0.012	0.006	0.015	0.015	-	-
House Run	0.178	0.060	0.174	0.060	0.004	-	-	-	-	-
McCourtney Run	0.280	0.041	0.241	0.038	0.038	0.002	0.001	0.001	-	-
South Fork Tenmile Creek	0.020	0.000	0.020	-	-	-	-	-	-	-
	2.676	**1.304**	1.970	1.278	0.091	0.010	0.072	0.016	0.543	0.000

Existing Stream and Wetland Conditions (Foundation Mine Complex):

Garner Run

Garner Run is a 3rdth order perennial stream and flows northeast along SR 18 in Center and Jackson Townships, Greene County, Pennsylvania (Figure 1). Garner Run and unnamed tributaries drain into McCourtney Run, which flows into Hargus Creek, then into South Fork of Tenmile Creek. Elevations range from approximately 1,000 feet along the stream bottom to 1,520 feet at the adjacent hilltop. Garner Run and its UNT's are designated under the Pennsylvania Department of Environmental Protection (PADEP) Chapter 93 Water Quality Standards as High Quality Warm Water Fisheries (HQ-WWF) due to the classification of the South Fork of Tenmile Creek. The predominance of the

watershed consists of residential and old field lowlands, with early-stage succession species observed on the hillsides. Most of Garner Run is free of agricultural practices; however, several tributaries to Garner Run are impacted by sediment and nutrient loading from obvious agricultural practices.

Streams

Within the project area, 13,220 LF of ephemeral, 6,236 LF of intermittent and 12,924 LF of perennial stream length were identified within the Garner Run watershed by PADEP-CDMO and USACE - Pittsburgh District Office before, during, and following the Jurisdictional Determination field view held through May-June 2011 (Table 2-1).

Stream Impacts

Proposed impacts will occur to 6,043 LF of ephemeral, 2,008 LF of intermittent and 5,166 LF of perennial stream length within the Garner Run watershed (Table 2-1) as a result of the Project.

Wetlands

Seven wetlands totaling 0.726 acres were identified within the Garner Run Watershed (Table 2-2). Two wetlands, totaling 0.013 acres are proposed to be impacted by the project (Table 2-2a). The remaining 5 wetlands, totaling 0.713 acres, will be avoided by the proposed project.

Grinage Run

Grinage Run flows north along Grinage Run Road in Center and Jackson Townships, Greene County, Pennsylvania (Figure 1). Elevations range from approximately 1,025 feet along the stream bottom to 1,500 feet at the adjacent hilltop. Grinage Run and unnamed tributaries flow into Garner Run, and are designated under the PADEP Chapter 93 Water Quality Standards as High Quality Warm Water Fisheries (HQ-WWF) due to the classification of the South Fork of Tenmile Creek. The predominance of the watershed consists of residential and forested land use. Relatively few agricultural practices take place within the Grinage Run watershed. Several single family dwellings exist along Grinage Run Road. Recent timbering practices have taken place in the upper portion of the watershed.

Streams

Within the project area, 1,264 LF of ephemeral, 713 LF of intermittent and 1,439 LF of perennial stream length were identified within the Grinage Run watershed by PADEP-CDMO and USACE - Pittsburgh District Office before, during, and following the Jurisdictional Determination field view held through May-June 2011 (Table 2-1).

Stream Impacts
Proposed impacts will occur to 94 LF of ephemeral, 0 LF of intermittent and 85 LF of perennial stream length within the Grinage Run watershed (Table 2-1).

Wetlands
Two wetlands totaling 0.194 acres were identified within the Grinage Run watershed (Table 2-2). One wetland, totaling 0.07 acres is proposed to be impacted by the project (Table 2-2a). The remaining larger wetland (0.124 acres) will be avoided under the current design alternative.

Hargus Creek
Hargus Creek flows northeast along Hargus Creek Road in Center Township, Greene County, Pennsylvania (Figure 1). Elevation ranges from approximately 980 feet along the stream bottom to 1,560 feet at the adjacent hilltop. Hargus Creek flows into South Fork of Tenmile Creek east of Rogersville, PA. Hargus Creek and its unnamed tributaries are designated under the PADEP Chapter 93 Water Quality Standards as HQ-WWF due to the classification of South Fork of Tenmile Creek. The predominance of the watershed consists of a mixture of agricultural, residential and forested land use.

Streams
Within the project area, 0 LF of ephemeral, 0 LF of intermittent and 70 LF of perennial stream length were identified within the Hargus Creek watershed by PADEP-CDMO and USACE - Pittsburgh District Office before, during, and following the Jurisdictional Determination field view held through May-June 2011 (Table 2-1).

Stream Impacts
Proposed impacts will occur to 0 LF of ephemeral, 0 LF of intermittent and 15 LF of perennial stream length within the Hargus Creek watershed (Table 2-1).

Wetlands
No wetland resources were identified within the Hargus Creek Watershed portion of the project area (Table 2-2).

Hoge Run
Hoge Run flows southeast along Hoge Run Road in Center Township, Greene County, Pennsylvania (Figure 1). Elevation ranges from approximately 1,040 feet along the stream bottom to 1,470 feet at the adjacent hilltop. Hoge Run and unnamed tributaries drain into McCourtney Run, which flows into Hargus Creek, then into South Fork of Tenmile Creek. Hoge Run and its UNT's are designated under the PADEP Chapter 93 Water Quality Standards as HQ-WWF due to the classification of the South Fork of

Tenmile Creek. Two tributaries to Hoge Run (40633 and 40634) are designated as Exceptional Value (EV) waterways. The predominance of the watershed consists of agricultural and residential land use.

Streams

Within the project area, 16,605 LF of ephemeral, 4,074 LF of intermittent and 26,033 LF of perennial stream length were identified within the Hoge Creek watershed by PADEP-CDMO and USACE - Pittsburgh District Office before, during, and following the Jurisdictional Determination field view held through May-June 2011 (Table 2-1).

Stream Impacts

Proposed impacts will occur to 11,966 LF of ephemeral, 2,417 LF of intermittent and 16,814 LF of perennial stream length within the Hoge Run watershed (Table 2-1).

Wetlands

Twenty-four wetlands, totaling 1.278 acres were identified within the Hoge Run Watershed (Table 2-2). Of these, 19 wetlands are proposed to be impacted, totaling 1.14 acres (Table 2-2a). The remaining 5 wetlands, totaling 0.138 acres will be avoided.

House Run

House Run flows southeast along Bristoria Road (S.R. 3020) and Macedonia Road in Center and Jackson Townships, Greene County, Pennsylvania, (Figure 1). Elevation ranges from approximately 1,100 feet along the stream bottom to 1,530 feet at the adjacent hilltop. House Run and unnamed tributaries join with Garner Run to form McCourtney Run. McCourtney Run flows into Hargus Creek then into the South Fork of Tenmile Creek. House Run and unnamed tributaries are designated under the PADEP Chapter 93 Water Quality Standards as HQ-WWF due to the classification of the South Fork of Tenmile Creek. Two tributaries to House Run (40637 and 40638) are designated as Exceptional Value (EV) waterways. The predominance of the watershed consists of a mixture of agricultural, residential and forested land use.

Streams

Within the project area, 5,025 LF of ephemeral, 1,109 LF of intermittent and 9,815 LF of perennial stream length were identified within the House Run watershed by PADEP-CDMO and USACE - Pittsburgh District Office before, during, and following the Jurisdictional Determination field view held through May-June 2011 (Table 2-1).

Stream Impacts

Proposed impacts will occur to 3,167 LF of ephemeral, 705 LF of intermittent and 7,180 LF of perennial stream length within the House Run watershed (Table 2-1).

Wetlands

Six wetlands totaling 0.178 acres were identified within the House Run Watershed portion of the project (Table 2-2). Of these, 2 wetlands, totaling 0.06 acres are proposed for impact (Table 2-2a). The remaining 4 wetlands, totaling 0.118 acres, will be avoided.

McCourtney Run

McCourtney Run flows northeast along SR 0018 in Center Township, Greene County, Pennsylvania (Figure 1). Elevation ranges from approximately 980 feet along the stream bottom to 1,515 feet at the adjacent hilltop. McCourtney Run and unnamed tributaries flow into Hargus Creek then on to the South Fork of Tenmile Creek. McCourtney Run and its unnamed tributaries are designated under the PADEP Chapter 93 Water Quality Standards as HQ-WWF due to the classification of South Fork of Tenmile Creek. One tributary to McCourtney Run (40629) is designated as an Exceptional Value (EV) waterway.

Streams

Within the project area, 6,972 LF of ephemeral, 1,335 LF of intermittent and 4,319 LF of perennial stream length were identified within the McCourtney Run watershed by PADEP-CDMO and USACE - Pittsburgh District Office before, during and following the Jurisdictional Determination field view held through May-June 2011 (Table 2-1).

Stream Impacts

Proposed impacts will occur to 1,358 LF of ephemeral, 130 LF of intermittent and 701 LF of perennial stream length within the McCourtney Run watershed (Table 2-1).

Wetlands

Five wetlands totaling 0.280 acres were identified within the McCourtney Run Watershed portion of the project area (Table 2-2). Three of these wetlands are proposed to be impacted by the project totaling 0.041 acres of wetland impact (Table 2-2a). The 2 remaining wetlands, totaling 0.064 acres of existing wetland, will be avoided entirely.

South Fork Tenmile Creek

South Fork Tenmile Creek flows east along SR 18 in Center, Franklin, Morgan and Jefferson Townships, Greene County, Pennsylvania (Figure 1). Within the project area, elevation ranges from approximately 980 feet along the stream bottom to 1,400 feet at the adjacent hilltop. South Fork Tenmile Creek flows into Tenmile Creek which joins with the Monongahela River near Clarksville, PA. South Fork Tenmile Creek and its unnamed tributaries are designated under the PADEP Chapter 93 Water Quality Standards as HQ-WWF.

Streams
Within the project area, 15 LF of ephemeral, 61 LF of intermittent and 420 LF of perennial stream length were identified within the South Fork Tenmile Creek watershed by PADEP-CDMO and USACE - Pittsburgh District Office before, during, and following the Jurisdictional Determination field view held through May-June 2011 (Table 2-1).

Stream Impacts
Proposed impacts will occur to 0 LF of ephemeral, 0 LF of intermittent and 46 LF of perennial stream length within the South Fork Tenmile Creek watershed (Table 2-1).

Wetlands
One wetland totaling 0.020 acre was identified within the South Fork Tenmile Creek Watershed portion of the project (Table 2-2). No impacts to this wetland are anticipated due to the proposed activities included in this project.

Existing Stream Conditions (Proposed Mitigation Areas):
The proposed project will result in impacts to numerous perennial, intermittent and ephemeral stream segments throughout the project area. In some instances, only portions of streams will be affected while in other areas, tributary subwatersheds will be impacted in their entirety.

Jurisdiction of project area streams (Table 2-3) was assessed based on consultation with representatives from PADEP-CDMO and USACE, Pittsburgh District Office before, during, and following the Jurisdictional Determination field view held through May-June 2011. Because of the nature of the proposed railroad siding project (non-mining project), impacts to streams and wetlands resulting from the rail siding development would be regulated by PADEP, Southwest Region. As a result, stream jurisdiction was determined with the following caveats:

- PADEP-CDMO: would not require mitigation for stream impacts associated with the development of surface facilities excluding refuse areas, water impoundment and the railroad siding. The CDMO indicated that mitigation would not be required for impacts that would result from activities that are not permanent. The majority of the surface facilities are proposed to be returned to Approximate Original Contour (AOC) after completion of mining activities. Additionally, the CDMO indicated that the 100 acre waiver for permitting activities (Chapter 105.12) would be applied to all surface activity streams (with the exception of refuse sites), where applicable.

- PADEP - Southwest Regional Office: would require mitigation for all railroad siding impacts

- USACE - Pittsburgh District Office: would require mitigation for all relatively permanent waterways (RPW), Seasonal RPW watercourses and Non-relatively permanent waterways (NRPW) with a direct connection to RPW watercourses within the entire Project area. USACE would not take jurisdiction of or require mitigation for NRPW's without a direct connection to RPW watercourses.

Table 2-3 Anticipated Mitigation Requirements for Ephemeral, Intermittent and Perennial Stream Length, Foundation Mine Complex, Greene County, Pennsylvania.

Jurisdictional Stream Length - Impacts				
Stream Classification	PADEP-CDMO Jurisdictional Streams [1] (LF)	PADEP-SWRO Jurisdictional Streams [2] (LF)	USACE Jurisdictional Streams [3] (LF)	Total Stream Impacts Entire Project Area [4] (LF)
Impacts				
Perennial*	16,294	464	29,901	30,007
1- Total Perennial with Hoge Run Stream Loss (807 LF)	17,101	n.a.	30,708	30,814
2 - Intermittent	2,581	100	5,218	5,295
3 - Ephemeral	12,923	1,447	18,456	22,593
Total Jurisdictional Stream Length (1+2+3)	33,605	2,011	54,382	58,702

** does not include the Hoge Run Relocation of 5,731 LF, 4,924 LF relocated to new stream channel - 807 LF lost in relocation*

[1] *Impacts associated with the CR1B, R3 Refuse Area, Water Impoundment and Batch Weigh Facility only; all others contained less than 100 acres drainage qualifying for the waiver or were considered temporary by PADEP-CDMO during SMCRA permit preparation and will require restoration to pre-mining grades.*

[2] *Impacts associated with the Railroad Sidings and Batch Weigh only; PADEP-SWRO jurisdiction is limited to these non-coal project areas per coordination and arrangement with PADEP-CDMO.*

[3] *Total of all impacts excluding temporary impacts for waterline installation and NRPW (no significant nexus) streams throughout the project area (ephemerals draining to uplands or seasonal RPW streams (intermittent))*

[4] *Total stream impact length and jurisdictional length requiring mitigation do not coincide due to jurisdictional determination and significant nexus, not all stream impacts fall under state or federal jurisdiction and as such do not require compensatory mitigation.*

In order to meet these requirements, 3 approaches to stream restoration are proposed for this project. The first is the relocation of 5,731 LF of Hoge Run mainstem to a new 4,924 linear foot stream channel located to the north of the existing stream. Per consultation with representatives of USACE and PADEP during the pre-application meeting for the Foundation Mine Surface Facilities, the relocation of an extensive portion of Hoge Run (40632) mainstem will serve as 1:1 perennial stream restoration for impacts to Hoge Run resulting from the Surface Facilities construction. The existing degraded stream channel will be relocated to the north and the relocation will be reconstructed using Natural

Stream Channel Design principles. Compensatory mitigation for stream loss of 807 LF of Hoge Run is addressed within the proposed perennial stream restoration and creation.

The second approach is the restoration of stream riparian buffers, streambank fencing, bank stabilization, and in-stream structures (as necessary) and reconstruction of severely degraded stream channel to enhance approximately 48,200 LF of the mainstem McCourtney Run, Garner Run and House Run that currently flow through active or recently retired pasture, agricultural lands and low density residential areas. As part of the restoration, approximately 400 LF of new stream channel will be created resulting in a grand total of 48,600 LF of perennial stream mitigation.

The third approach is the preservation of existing forested headwater stream areas within adjacent HQ and EV watersheds tributary to McCourtney, Hoge and House Run. Existing fragmented, forested riparian compartments along the degraded streams within the proposed restoration areas will be preserved within an approximately 100-foot wide (50 foot from top of both banks) buffer area. The existing riparian forest within the proposed buffer area totals approximately 24.9 acres. The riparian buffers will be protected in perpetuity with protective perimeter fencing and the establishment of perpetual conservation easements (restrictive covenants).

Hoge Run Relocation – Existing Conditions

Hoge Run Stream Relocation (40632): This low gradient segment of Hoge Run mainstem extends from the confluence of UNT 40634 downstream for approximately 5,000 LF to the culvert beneath Golden Oaks Road (S.H. 0018) at the upper third of restoration area MR-1. The stream generally flows southeast parallel to the Hoge Run Road corridor. According to USDA-NRCS soil survey information, this area is predominately underlain by Newark silt loam (Nw), Huntington silt loam (Hu) and Dormont silt loam, 25-50 percent slopes (DtF) (Figure 4, Soils Map). Due to their composition, depth, and permeability, these soils are conducive for stream restoration activities. Existing ground elevations within this reach vary from 1,000 feet amsl at the stream invert at the northern end of the segment to 1,018 amsl at the stream invert at the southern end of the segment. Based on review of available aerial photography and field views of the reach, the streambed is generally 5 to 18 feet in width while bank heights range from approximately 2 feet to over 4 feet above the water surface. Throughout the reach it is estimated that over 70% of both banks are moderately to severely eroded with vertical banks and exhibit some entrenchment. Full channel relocation with riparian buffer establishment, habitat structures (e.g., rock cross vanes) fencing and planting enhancements would be implemented throughout the reach. This segment is depicted in photo HRR-1-1 to HRR-1-4 located in Attachment H. Photo direction and locations are provided on Figure 2.

Stream Restoration – Existing Conditions

McCourtney Run Watershed:

MR-1 McCourtney Run Main Stem (40628): This low-gradient proposed stream restoration segment of McCourtney Run mainstem is approximately 11,550 feet in length and extends from the confluence of Garner and House Run downstream to the existing railroad bridge over Golden Oaks Road (S.H. 0018). The stream flows roughly parallel along the Golden Oaks Road (S.H. 0018) corridor and exists within active horse pasture, hayfields, croplands, and several residential and commercial properties. A review of available FEMA mapping indicated that this reach is located within a 100 year floodplain area (Zone A), Attachment C. According to USDA-NRCS soil survey information; this area is underlain predominantly by Huntington silt loams (Hu) which are relatively deep floodplain soils. Given these characteristics, the soils are expected to be conducive for wetland establishment and stream restoration activities. Existing ground elevations within this reach vary from approximately 954 amsl at the stream invert at the northern end of the segment to 998 amsl at the stream invert at the southern end of the segment. Based on review of available aerial photography and field views of the reach, the stream bed is generally 12 to over 30 feet in width while bank heights range from approximately 4 feet to over 8 feet above the water surface. Throughout the reach it is estimated that approximately over 70% of both banks are moderately to severely eroded and have vertical banks and exhibit some entrenchment. Riparian buffer establishment, fencing, planting enhancement, stream channel and habitat restoration, and full channel reconstruction and creation would be implemented throughout the reach. This segment is depicted in photos MR-1-1 to MR-1-7 located in Attachment H. Photo direction and locations are illustrated on Figure 2.

MR-2 UNT to McCourtney Run (40630): This low gradient proposed stream restoration segment of UNT 40630 to McCourtney Creek drains from the west through active pasture, hayfield and existing farm facilities to its confluence with McCourtney Run at the approximate midpoint of stream restoration area MR-1. The stream segment is approximately 1,500 feet in length. According to USDA-NRCS soil survey information, this area is underlain by Fluvaquents (Fa) silt loam which is a relatively deep soil. This soil, by virtue of its depth, composition, and permeability is conducive for wetland establishment and stream restoration activities. Existing ground elevations within this reach vary from 1,070 amsl at the stream invert at the eastern end of the segment to 1,144 amsl at the stream invert at the western end of the segment. Based on review of available aerial photography and field views of the reach, the stream bed is generally 2 to 3 feet in width while bank heights range from approximately 1 foot to 4 feet above the stream surface. Throughout the reach, it is estimated that approximately 30% of both banks are

moderately eroded with some entrenchment. Riparian buffer establishment, fencing, planting enhancement, stream channel and habitat restoration would be implemented within the reach. This segment is depicted in photos MR-2-1 and MR-2-2 located in Attachment H. Photo direction and locations are illustrated on Figure 2.

Garner Run Watershed:

G-1 - Garner Run Main Stem (40643): This low gradient, proposed stream restoration segment of Garner Run mainstem extends from the road crossing of Grinage Run Road downstream for approximately 4,800 LF to the confluence with House Run and the upstream terminus of restoration area MR-1. The stream generally flows parallel to the Golden Oaks Road (S.H. 0018) corridor. A review of available FEMA mapping indicated that this reach is located within a 100 year floodplain area (Zone A), Attachment C. According to USDA-NRCS soil survey information, this area is underlain by Newark silt loam (Nw). This soil is conducive for wetland establishment and stream restoration activities. Existing ground elevations within this reach vary from 1,000 feet amsl at the stream invert at the northern end of the segment to 1,018 amsl at the stream invert at the southern end of the segment. Based on review of available aerial photography and field views of the reach, the stream bed is generally 10 to 16 feet in width, while bank heights range from approximately 2 to over 6 feet above the water surface. Throughout the reach it is estimated that over 70% of both banks are moderately to severely eroded with vertical banks and exhibit some entrenchment. Riparian buffer establishment, fencing, planting enhancement, stream channel and habitat restoration, and full channel reconstruction and creation would be implemented throughout the reach. This segment is depicted in photos G-1-1 and G-1-2 located in Attachment H. Photo direction and locations are illustrated on Figure 2.

G-2 Garner Run Main Stem (40643): This low gradient, proposed stream restoration segment of Garner Run main stem extends from the Valley Chapel Road intersection northward for approximately 9,550 LF to a point approximately 1,000 LF upstream of the G-1 stream restoration site. The stream flows roughly parallel to the Golden Oaks Road (S.H. 0018) corridor and exists within existing pasture/hayfield and croplands at the toe of a forested hill slope which is located to the east. A review of available FEMA mapping indicated that this reach is located within a 100 year floodplain area (Zone A), Attachment C. According to USDA-NRCS soil survey information, this area is predominantly underlain by Newark silt loam (Nw). This soil is a relatively deep soil, conducive for wetland establishment and stream restoration activities. Existing ground elevations within this reach vary from 1,034 amsl at the stream invert at the northern end of the segment to 1,066 amsl at the stream invert at the southern end of the segment. Based on review of available aerial photography and field views of the reach, the stream

bed is generally 4 to 10 feet in width while bank heights range from approximately 2 feet to 6 feet above the stream surface. Throughout the reach it is estimated that over 70% of both banks are moderately to severely eroded with vertical banks and exhibit some entrenchment. Riparian buffer establishment, fencing, planting enhancement, stream channel and habitat restoration, and several areas of full channel reconstruction and creation would be implemented in the reach. This segment is depicted in photos G-2-1 to G-2-6 located in Attachment H. Photo direction and locations are illustrated on Figure 2.

G-3 (40650), G-4 (40651) and G-5 (40643-C): These low gradient, proposed stream restoration segments of UNTs to Garner Run drain from relatively small subwatersheds of Garner Run though pasture and farm facilities. The proposed stream restoration segments vary from approximately 850 feet in length to 1,300 feet in length According to USDA-NRCS soil survey information, this area are underlain by Fluvaquents (Fa) and Dormont silt loam, 25-50 percent slopes (DtF). Both of these soils are suitable for stream restoration activities. Existing ground elevations within this reach vary from 968 amsl at the stream invert at the western end of the segment to 992 amsl at the stream invert at the southern end of the segment. Based on review of available aerial photography and field views of the reach, the stream bed is generally 2 to 8 feet in width while bank heights range from approximately 1 foot to 3 feet above the stream surface. Throughout these reaches it is estimated that over 80% of both banks are moderately eroded with areas of severe erosion, vertical banks and some entrenchment. Riparian buffer establishment, fencing, planting enhancement, stream channel and habitat restoration, and full channel reconstruction and creation would be implemented throughout each of these reaches. These segments are depicted in photos G-3-1 to G-5-1 located in Attachment H. Photo direction and locations are illustrated on Figure 2.

House Run Watershed:

HR-1 House Run Main Stem (40635): This low gradient proposed stream restoration segment of House Run drains from the southwest along recently retired pasture and residential properties. The stream segment is approximately 7,100 LF in length. A review of available FEMA mapping indicated that this reach is located within a 100 year floodplain area (Zone A), Attachment C. According to USDA-NRCS soil survey information, this area is underlain by Newark (Nw) silt loam and Dormont silt loam, 25-50 percent slopes (DtF). Both of these soils are conducive for stream restoration. Existing ground elevations within this reach vary from 1,034 amsl at the stream invert at the northern end of the segment to 1,054 amsl at the stream invert at the southern end of the segment. Based on review of available aerial photography and field views of the reach, the stream bed is generally 6 to 8 feet in width while bank heights range from approximately 2 feet to over 4 feet above the stream surface. Throughout the reach it is

estimated that over 70% of both banks are moderately to severely eroded with vertical banks and exhibit some entrenchment. Riparian buffer establishment, fencing, planting enhancement, stream channel and habitat restoration, and full channel reconstruction and creation would be implemented throughout the reach. This segment is depicted in photos HR-1-1 to HR-1-3 located in Attachment H. Photo direction and locations are illustrated on Figure 2.

HR-2 UNT to House Run (40637): This low gradient proposed stream restoration segment of UNT 40637 to House Run drains from the southeast along Hampton and Bristoria Road (S.R. 3020) through reverting pasture land and along several residential properties. The stream segment is approximately 7,950 LF in length. According to USDA-NRCS soil survey information, this area is underlain by Fluvaquents (Fa) silt loam. This soil is a relatively deep soil, conducive for wetland establishment and stream restoration activities. Existing ground elevations within this reach vary from 1,056 above mean sea level (amsl) at the stream invert at the northern end of the segment to 1,134 amsl at the stream invert at the southern end of the segment. Based on review of available aerial photography and field views of the reach, the stream bed is generally 4 to 6 feet in width while bank heights range from approximately 2 feet to 4 feet above the stream surface. Throughout the reach it is estimated that less than 70% of both banks are moderately to severely eroded with vertical banks and exhibit some entrenchment. Riparian buffer establishment, fencing, and planting enhancement would be implemented throughout the reach. This segment is depicted in photos HR-2-1 to HR-2-6 located in Attachment H. Photo direction and locations are illustrated on Figure 2

HR-3 UNT to House Run (40638): This low gradient, proposed stream restoration segment of UNT 40638 to House Run drains from the north to its confluence with UNT 40637 at the lower extent of restoration area HR-2. The stream segment is approximately 3,050 LF and exists within reverting pasturelands in the vicinity of Bristoria Road (S.R. 3020). According to USDA-NRCS soil survey information; this area is underlain by Fluvaquents (Fa) which is a relatively deep soil. Existing ground elevations within this reach vary from 1,066 amsl at the stream invert at the western end of the segment to 1,118 amsl at the stream invert at the eastern end of the segment. Based on review of available aerial photography and field views of the reach, the stream bed is generally 2 to 3 feet in width while bank heights range from approximately 1 foot to 3 feet above the stream surface. Throughout the reach it is estimated that 60% of both banks are stable with little or no entrenchment. Riparian buffer establishment, fencing, and planting enhancement would be implemented throughout the reach. This segment is depicted in photo HR-3-1 located in Attachment H. Photo direction and locations are illustrated on Figure 2.

Each of the watersheds proposed for stream restoration (Garner Run, Hoge Run, House Run and McCourtney Run) has been monitored biannually beginning in the spring of 2008, using the methodology prescribed in Appendix B of PADEP Technical Guidance Document (TGD) #563-2000-655 "*Surface Water Protection – Underground Bituminous Coal Mining Operations*" (Attachment G).

Appendix B Sampling

Benthic Macroinvertebrate Sampling

The methodology prescribed in Appendix B of PADEP Technical Guidance Document (TGD) #563-2000-655 "*Surface Water Protection – Underground Bituminous Coal Mining Operations*" (Attachment G) was used to monitor the baseline conditions of streams within the project area. This methodology is designed to assess several macroinvertebrate metrics to arrive at a "Total Biological Score" for each sample collected. The Total Biological Score is a numerical value based on the following biological metrics:

- Taxonomic Richness
- Trichoptera Taxa Richness
- Percent EPT Taxa
- Intolerant Taxa Richness (Hilsenhoff Index)
- Filterer-Collector + Predator Taxa Richness

A brief description of the Appendix B sampling methodology is presented below.

At each Appendix B sample location, a D-frame dip net equipped with a 500 micron mesh was used to collect ten sub-samples best representing the habitats present within each sampling reach (i.e., 100 meters), including cobble/gravel substrate, snags, coarse particulate organic matter (CPOM), submerged aquatic habitat (SAV), and sand/fine sediment. Each habitat sampled consisted of two 30-inch long sweeps with the D-frame. If the total number of jabs was not divisible by the number of habitats present, the remaining jabs were taken among the most extensive habitat types present within the sampling station.

All rocks and large stones within the D-frame dip net were gently rubbed to dislodge any organisms or pupal cases that may have been clinging to the surface into the net. The sample net was thoroughly emptied into several 2-liter largemouth plastic Nalgene bottles that were labeled accordingly and preserved in 90% Isopropyl alcohol.

In the laboratory, the contents of each sample bottle were decanted of alcohol and gently rinsed with cold water within a 500-micron sieve. All materials from the sample were placed within an 8" X 14" white pan marked with 2" X 2" grids. An illuminated magnifying lens was used to pick all macroinvertebrates out of a minimum of four grids that were randomly chosen. If the four random grids that were chosen did not produce a subsample of 200 (+/-20%), additional grids were randomly chosen until the subsample was obtained. The contents of each subsample were examined under a stereoscopic microscope (45x) for identification and enumeration to the lowest taxonomic level practically achievable by experienced biologists practicing in the field. Identification was assisted by the following references: *Peckarsky (1990), Merrit and Cummins (1996), Stewart and Stark (1993), Pennak (1989), Gelhaus (2002), Johannsen, Thomsen (1970), Wiggins (1977), Voshell, Jr (2005), and Edmunds, Jensen, and Berner (1976).*

Various statistics were calculated including: Taxa Richness, Trichoptera Taxa Richness, Percent EPT Taxa, Intolerant Taxa Richness, and Filter-Collector + Predator Taxa Richness. After determining the observed value of these five metrics, WPI normalized each value based of the 95th percentile value from DEP's statewide, low gradient stream dataset to get the Total Biologic Score for each Appendix B Stream Sampling Station. Average Total Biological Scores for each watershed proposed for mitigation associated with the Project range from 43.0 to 58.6 (Table 2-4). The data presented below represents seven sampling events at 19 stations over the period 2008 through 2011.

Table 2-4 Average PADEP Total Biological Scores, USEPA Habitat Assessment Scores and USEPA Habitat Classifications, Foundation Mine Complex, Greene County, Pennsylvania.

Watershed	Average PADEP Total Biological Score	Average USEPA Habitat Assessment Score	USEPA Habitat Assessment Classification
Garner Run	43.0	64	Sub-optimal
Hoge Run	57.5	61	Sub-optimal
House Run	58.6	60	Sub-optimal
McCourtney Run	47.5	55	Sub-optimal
Averages	**51.7**	**60**	**Sub-optimal**

Physical Habitat

The habitat assessment portion of USEPA's *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish* (Barbour et al. 1999) was utilized to evaluate physical habitat at all Appendix B sample locations.

The data were recorded on the physical characterization/water quality field data sheets. Stream habitat was also scored numerically at each station using habitat assessment field data sheets. The USEPA classifies the relative value of habitat according to numerical scores as follows: (1) optimum (100-76%); (2) sub-optimal (75-51%); (3) marginal (50-26%); and (4) poor (25-0%).

The average USEPA habitat classification for all proposed mitigation streams was Sub-optimal (Table 2-4). Factors limiting the habitat classification of proposed mitigation streams included:

- Epifaunal substrate
- Sediment deposition
- Condition of banks
- Bank vegetative protection
- Grazing/other disruptive pressure
- Riparian vegetation zone width

Each of these metrics will be improved by the proposed stream restoration. Riparian buffer establishment, fencing, planting enhancement, stream channel and habitat restoration, and full channel reconstruction and creation would be implemented throughout each of the restoration reaches.

Water Chemistry

During Appendix B sampling, field physiochemical measurements were recorded for each sampling event. Average pH, water temperature, conductivity and dissolved oxygen for each watershed proposed for mitigation associated with the Project are presented below (Table 2-5). The observed water quality parameters demonstrate that the proposed mitigation reaches are in attainment of their designated life use (i.e., HQ-WWF) according to 25 PA Code , Chapter 93. The data presented below represents seven sampling events at 19 stations over the period of 2008 through 2011.

Table 2-5. Average field physiochemical parameters observed at potential stream restoration areas, Foundation Mine Complex, Greene County, Pennsylvania.

Watershed	pH (Standard Units)	Temperature (^{o}C)	Conductivity (uohms)	Dissolved Oxygen (mg/L)
Garner Run	8.28	10.5	282	13.35
Hoge Run	8.21	8.2	230	16.04
House Run	8.00	9.6	203	12.05
McCourtney Run	8.01	7.5	254	12.29
Averages	**8.13**	**9.0**	**242**	**13.43**

Stream Preservation Areas – Existing Conditions

Mitigation to offset headwater impacts is proposed to be in the form of preservation of existing forested headwater stream areas within adjacent HQ and EV watersheds. Existing fragmented, forested riparian compartments along the degraded streams within the proposed restoration areas will be preserved within an approximately 100-foot wide (50 foot from top of both banks) buffer area. The existing riparian forest within the proposed buffer area totals approximately 24.9 acres. The riparian buffers will be protected in perpetuity with protective perimeter fencing and the establishment of perpetual conservation easements (restrictive covenants). The total area of stream preservation proposed for this project is 445 acres (Table 2-6).

Garner Run Watershed: Stream preservation areas within the Garner Run watershed include G3-A, G4-A and G5-A which are existing forested headwater areas of restoration areas G3, G4 and G5. These 3 preservation areas will protect approximately 103 acres of forested headwater habitat (Table 2-4) in a HQ watershed.

Hoge Run Watershed: Stream preservation areas within the Hoge Run watershed include Hoge-EV-1 and Hoge-EV-2 which are existing forested headwater areas of UNTs to Hoge Run within the proposed Hoge Run Relocation area. These 2 preservation areas will protect approximately 102 acres of forested headwater habitat (Table 2-6) in an EV watershed.

House Run Watershed: Stream preservation areas within the House Run watershed include House-EV-1, House-EV-2 and HR-3A which are existing forested subwatersheds areas of UNTs to House Run that drain to restoration area HR-2 and HR-3 respectively. These 3 preservation areas will protect approximately 240 acres of forested headwater habitat (Table 2-6) in an EV watershed.

Table 2-6 Proposed Preservation Stream Length (LF) and Watershed Area (acres) of High Quality and Exceptional Value Waterways, Foundation Mine Complex, Greene County, Pennsylvania.

Preservation Area		HQ Designation			EV Designation					Grand Totals
		G3-A	G4-A	G5-A	Hoge-EV-1	Hoge-EV-2	House-EV-1	House-EV-2	HR-3A	
Stream	*Ephemeral*	5,336	-	-	3,430	3,074	7,285	-	1,062	*20,187*
Length by	*Intermittent*	2,828	-	-	892	158	6,412	-	262	*10,552*
Classification	*Perennial*	-	-	-	2,191	1,706	1,706	-	-	*5,603*
(LF)	*Unclassified*	-	2,529	1,118	-	-	-	5,247	-	*8,894*
Total Stream Length (LF)		8,164	2,529	1,118	6,513	4,938	15,403	5,247	1,324	*45,236*
Perimeter Fence Length (LF)		7,072	4,215	3,767	6,525	5,590	13,340	9,153	2,457	*52,119*
Acres of Preservation Area		58	23	22	58	44	136	95	9	*445*
Total Acres of Preservation Area Watershed (Ac.)		77	62	29	91	192	171	116	17	*755*

Existing Stream Conditions (Proposed Reference Areas):

Biological samples from the following watersheds were used as reference samples for stream restoration areas to predict post- restoration biological conditions. The sample points on these reference streams have been sampled since 2007 as part of the pre-mining sampling activities for the proposed Foundation underground mining area. As such, they do not lie within the project area documented in this application, but do lie in close proximity to the proposed activities. These watersheds were chosen based on their close proximity to restoration area streams, similarity of overall watershed land use to expected post restoration conditions and quality of macroinvertebrate populations.

Falling Timber Run- FTR 3 on 32627

Falling Timber Run flows from south to northwest along Falling Timber Run Road in Jackson Township, Greene County, Pennsylvania. The drainage area for FTR 3 encompasses 81% forested and 19% agricultural land use. Elevations within the drainage area of FTR 3 range from 1,160 at the valley floor to 1,440 on the adjacent ridge top. Near the intersection of Delphine road and Falling Timber Run road is the confluence of Falling Timber Run and Job Creek. Falling Timber Run and its unnamed tributaries are designated under the PaDEP chapter 93 water quality standards as TSF.

Garner Run- GAR 8 on UNT 40654

Reference site GAR 8 is located in the headwater reaches of UNT 40654 in Jackson Township, Greene County, Pennsylvania. The drainage area above the point encompasses 99% forested and 1% agricultural land use. Elevations within the drainage area of GAR 8 range from 1,220 on the valley floor to 1,480 on the adjacent ridge top.

Grinage Run- GRR 1

Grinage Run flows north along Grinage Run Road in Center and Jackson Townships, Greene County, Pennsylvania. Elevations within the drainage area of GRR 1 range from

approximately 1,040 feet along the stream bottom to 1,580 feet at the adjacent hilltop. The watershed consists of 8% residential and 92% forested land use. Relatively few agricultural practices take place within the Grinage Run watershed.

House Run- HOU 15 on UNT 40639

House Run UNT 40639 flows southeast along Bristoria Road (S.R. 3020)and Macedonia Road in Jackson Township, Greene County, Pennsylvania. Elevations within the drainage area of HOU 15 range from approximately 1,100 feet along the stream bottom to 1,540 feet at the adjacent ridge top. The drainage area consists of a mixture of 7% agricultural 93% and forested land use.

Webster Run WR-1

Webster Run flows from south to northwest along Bristoria Road (S.R. 3020) in Jackson Township, Greene County, Pennsylvania. The drainage area for WR 1 encompasses 87% forested and 13% agricultural land use. Elevations within the drainage area of WR 1 range from 1,120 at the valley floor to 1,480 on the adjacent ridge top. Near the intersection of Marantha Road and Delphine Road is the confluence of Webster Run and Job Creek which forms Dunkard Fork of Wheeling Creek. Webster Run and its unnamed tributaries are designated under the PaDEP chapter 93 water quality standards as TSF.

Existing Wetland Conditions (Proposed Wetland Mitigation):

A total of forty-five (45) wetland systems, comprising 2.676 acres were identified within the project area. Of the forty-five (45) identified wetlands, twenty-seven (27) wetlands totaling 1.499 acres will be partially or completely impacted as a result of the project. Twenty-five will be completely impacted while 2 will sustain partial impacts. As a result, the total wetland impacts for the Project area will be 1.305 acres. The anticipated wetland impacts include 1.278 acres of PEM wetland, 0.010 acre of PSS wetland, and 0.016 acres of PFO wetland (Table 2-2).

Wetland Functions

The primary functions of the impacted wetlands were determined to be Floodflow Alteration and Nutrient Removal/Attenuation. Secondary functions were determined to be Groundwater Recharge/Discharge, Production Export, Wildlife Habitat, Sediment/Toxicant Retention and Sediment/Shoreline Stabilization. All of these functions were determined to be limited and/or marginal due primarily to the small size of the resources in comparison to their parent watersheds and the wide spatial distribution of the wetlands throughout the project area.

PADEP/USACE Jurisdiction and Wetland Replacement

This section of the Conceptual Mitigation Plan describes the proposed compensatory wetland mitigation areas for the Foundation Mine project. As demonstrated in the previous section, although unavoidable wetland impacts totaling 1.305 acres will occur as a result of the project, the impacted wetland systems do not provide unique or substantial functions and values based on their relatively small size, location, distribution and classification (predominantly PEM wetland systems).

Of the 27 wetlands that will be impacted by the project, 11 were classified as isolated based on the lack of connectivity to (lacking a significant nexus with) other WOUS and did not fall under USACE jurisdiction. However, all 27 wetlands did fall under PADEP jurisdiction. To ensure that sufficient wetland replacement is provided to offset impacts, the more stringent mitigation requirement (e.g., USACE or PADEP) was followed for each wetland impacted. The following section describes the prescribed mitigation ratios based on USACE and PADEP guidelines:

Wetland Area Replacement

The Compensatory Mitigation acreage for wetland impacts was determined through calculating the required acres of wetland mitigation using standard USACE and anticipated PADEP replacement/mitigation ratios for impacts to PEM/POW, PSS and PFO wetland vegetation classifications (e.g., Cowardin classification). Based on current guidance, the USACE mitigation ratios (wetland replacement area) for jurisdictional (does not include isolated wetlands) wetland impacts are:

- PEM and POW Impacts - 1:1 mitigation
- PSS Impacts - 2:1 mitigation
- PFO Wetland - 3:1 mitigation

PADEP guidance stipulates that wetland mitigation for wetland impacts (includes all wetland resources) require a minimum mitigation ratio of 1:1. In this case, given the HQ watershed designation throughout the project area, FMLLC proposes the following increased wetland mitigation ratios:

- PEM and POW Impacts - 1:1 mitigation
- PSS Impacts - 1.5:1 mitigation
- PFO Impacts - 2:1 mitigation

Based on the jurisdictional determination guidance, and because the majority of wetland impact is PEM classification (1:1 mitigation ratio) a minimum of 1.340 acres of wetlands

replacement was determined for the 1.305 acres of anticipated wetland impact that will result from the project. This would represent and overall mitigation ratio of 1.03:1

To help ensure proper establishment of the required wetland area, FMLLC proposes to create a total of 1.415 acre of replacement wetlands on existing Alpha-owned parcels located within the House Run watershed along the mainstem and a tributary. Replacement wetlands will be comprised of 3 wetland cells totaling 1.300 acres of PEM wetland classification, 0.058 acre of PSS wetland classification and 0.057 acre of PFO wetland classification as illustrated in Table 2-7.

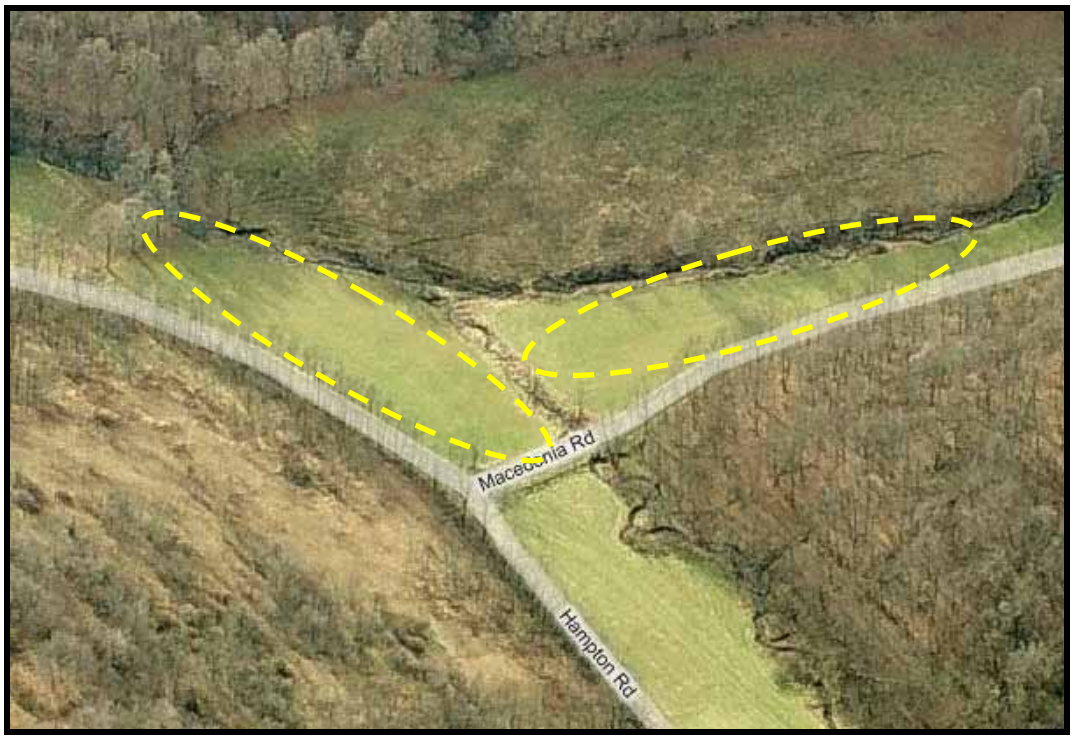
Table 2-7 Wetland Replacement Requirements and Proposal, Foundation Mine Complex, Greene County, Pennsylvania.

FOUNDATION 404 - PROPOSED WETLAND REPLACEMENT					
Wetland Cell	**PEM (AC)**	**PSS (AC)**	**PFO (AC)**	**POW (AC)**	**TOTAL (AC)**
1	0.343	0.039	0.000	0	0.382
2	0.531	0.019	0.038	0	0.588
3	0.427	0.000	0.019	0	0.445
Totals	1.300	0.058	0.057	0	1.415
Required	1.278	0.017	0.045	0	1.340
Difference (surplus)	0.022	0.041	0.012	0	0.075

As a result, this conceptual wetland mitigation plan provides for increased overall wetland replacement mitigation ratio of 1.08:1 (replacement acreage to impact acreage). The surplus wetland area will include additional PEM, PSS and PFO wetland classes. Where possible, pockets of POW wetland area will also be created in the lowest portions of the wetlands to add to the available aquatic habitat and wetland variety. The varied planting zones and elevation ranges within and along the wetland edge will provide a mixture of aquatic influences and habitat types that are anticipated to provide functions and values at least equal to those currently provided by the impacted wetlands.

These potential wetland mitigation locations were preliminarily identified based on the following key characteristics: 1) availability of sufficient acreage (minimum of 1.5 - 2 total acres) to accommodate 1.415 acres of replacement wetlands; 2) favorable low-lying topography to reduce site grading; 3) existing herbaceous vegetative conditions (minimal tree clearing involved to create wetlands); 4) favorable, deep floodplain soils; and 5) proximity to perennial streams and supplemental hydrology sources. In the event that other wetland replacement is necessary, alternate wetland replacement sites with similar topographic settings, vegetation, soils conditions and opportunities for wetland development exist along the upstream and downstream reaches of most of the other

mainstem perennial streams and UNTs in this area. A review of *National Wetlands Inventory* information revealed no previously identified wetland systems within the proposed wetland replacement areas as depicted on Figure 2, although preliminary site selection reconnaissance identified 2 wetland areas in the vicinity of proposed wetland replacement Cell 3 as noted on the design plans and Figure 3.



Location of Proposed Wetland Replacement Cells 1 and 2 – (photo courtesy of Bing)

<u>Wetland Replacement Area Hydrology:</u> The proposed wetland mitigation sites (Cells 1, 2 and 3) are located in existing, reverting cropland and pasturelands in relatively broad stream valley bottoms along the UNT 40639 House Run and UNT 40637 to House Run as illustrated in Figure 2. Forested hillsides rise steeply to the south and west of the broad valley in these areas while reverting pasture/croplands and state and local roadway networks exist to the north and east. Given the very low position of the proposed sites at the toe of adjacent hillsides, and location adjacent to perennial streams with a substantial drainage area (i.e., UNT 40639 and 40637), FMLLC anticipates that sufficient hydrologic input from stream overflow is expected. For purposes of this Conceptual Mitigation Plan, it is also assumed that surface water runoff from adjacent uplands and relatively shallow groundwater hydrology exists and would be intercepted through wetland construction to achieve the hydrologic goals of the wetland mitigation. Further, it has been the experience of Alpha Natural Resources at similar wetland mitigation sites (e.g., Cumberland Mine - Refuse No.2 and the Emerald Batch Weigh facility) that this type of floodplain topography lends itself well to the successful creation of wetlands.

Location of proposed wetland replacement Cell 3 (photo courtesy of Bing)

Upon approval of the conceptual grading plan, up to two groundwater observation wells will be installed in the proposed wetland mitigation areas so that the groundwater surfaces can be reliably determined and modeled. The groundwater elevations in the standpipes will be monitored on a routine basis in order to confirm the design elevations that were used to develop the preliminary grading plans. The preliminary grading plan was developed with the assumption that the groundwater level was essentially level with the streambed elevation of the adjacent streambed at the upstream end of the mitigation site.

Supplemental sources of wetland hydrology will be provided to each cell by creation of an inlet channel along UNT 40639 and UNT 40637 to House Run that will allow out of bank stream overflow to enter the wetland when the stream reaches bankfull elevations. To the extent possible, supplemental hydrology will be collected from surface runoff from surrounding uplands adjacent to the pasture areas. Direct precipitation will also periodically provide hydrology to the site.

Wetland Replacement Area Soils: The USDA-NRCS soil survey indicates that the wetland mitigation areas primarily contain Fluvaquents (Fa) silt loam soil type as depicted on Figure 4. Soils information is also provided in Attachment D. These relatively deep (> 5 feet) floodplain soils are generally located along the floodplains of streams in this region and are frequently flooded for brief periods. These soils are

moderately to poorly drained and have seasonal high water table elevations between 12 18 inches below the existing ground surface. All of these characteristics are favorable for wetlands establishment.

Implementation of the proposed wetland mitigation plan will create depressional areas that provide for periods of extended soil saturation and inundation that exceed the current conditions and will be suitable for the development of hydric soils. Hydric soil development is expected to occur over many years however indicators of the development process will gradually become more apparent and prevalent throughout the cells as time passes. Hydric soil indicators include the development of mineral concretions, oxidized root channels, appearance of soil mottling or even gleying, and mineral depletion, among others.

Wetland Replacement Area Vegetation: The existing vegetation within the proposed wetland replacement areas (Cells 1, 2 and 3) is predominantly comprised of various common early successional pasture species of upland grasses, flowering plants and legumes such as deer-tongue grass (*Panicum clandestinum*), timothy (*Phreum pratense*), clover (*Trifolium repens*), goldenrods (*Solidago ssp*.), ragweed (*Ambrosia ssp*.), and vetch (*Vicia ssp*). These low lying herbaceous vegetated riparian areas are located at the base of deciduous forested slopes and adjacent local roadway embankments.

The proposed wetland planting plan is designed to replicate the impacted wetlands found in this region and will take advantage of the low geographic setting. As such, an obligate/facultative wetland seed mix, consisting of emergent forbs such as blue vervain (*Verbena hastata*), fox sedge (*Carex vulpinoidea*), nodding bur marigold (*Bidens cernua*) and giant bur reed (*Sparganium eurycarpum*) will be planted in the created cells. Riparian buffer shrub species will be planted including buttonbush (*Cephalanthus occidentalis*), silky dogwood (*Cornus amomum*), red osier dogwood (*Cornus sericea*) and American cranberry (*Viburnum trilobum*) to provide the shrub component. These shrub species will be planted along the wetland margins and adjacent stream banks. In addition to the shrub plantings, several tree species have been selected for the forested riparian buffer portion of the wetland mitigation sites. American sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), black gum (*Nyssa sylvatica*) and pin oak (*Quercus palustris*) have all been selected due to their suitability to wetland/riparian areas. Additionally, box elder and black gum, while native to the area, are not as often encountered as American sycamore or pin oak. This increased diversity in surrounding tree species will provide enhanced habitat potential and utilization for the wetland area.

The combination of planted and volunteer herbaceous vegetation will provide additional cover, roosting, resting and nesting areas for many common species of birds, mammals,

reptiles, amphibians and insects that do not currently exist in this area. The wetland mitigation cells would also be incorporated into a protected, vegetated riparian buffer area for the proposed adjacent stream restoration area HR-2. Additionally, the proposed tree canopy and shrub understory will provide substantial input of leaf litter, woody debris and forage materials to the wetland and associated perennial streams which will help to augment the food chain production functions of the wetlands in the local ecosystem and add valuable organic input to the streams.

Proposed Wetland Functions and Values: The wetland mitigation areas have been designed to meet or exceed the marginal wetland functions and values provided by impacted wetlands in the Project area. The low topography, locations along perennial streams and vegetative interspersion will provide a more diverse habitat for flora and fauna than currently exist at the replacement site. The replacement wetlands cells are anticipated to provide equal or greater water quality (nutrient attenuation) and floodwater attenuation functions compared with the wetlands proposed for impacts. As a result of the design and land use in the contributing watersheds, these sites will have the opportunity to store sediments and toxicants to the higher degree simply because of their location adjacent to and downstream of existing pasturelands and agricultural activities and other sediment sources. If adjacent land use changes in the future, the mitigation wetland cells could serve to store sediments and toxicants by virtue of their location within the landscape and dependence on adjacent stream flow for hydrology.

As part of a contiguous, vegetated riparian corridor, the replacement wetlands will provide moderate to high quality wildlife habitat for a diverse number of wildlife species. The replacement wetlands have been preliminarily designed as 3 distinct cells, small portions of which will be inundated and would serve periodically as aquatic habitat (e.g., vernal pools) with hydroperiods ranging from seasonal to semi-permanent. The range of hydroperiods will provide a hydrologic buffer for breeding amphibians and aquatic insect reproduction during extremely wet and dry periods. The target plant species for the mitigation wetlands were also selected for their potential as food sources for wildlife species.

The depressed topography of the created wetlands will help maintain natural drainage characteristics and current flow patterns as well as providing storage and attenuation of floodwaters by accepting and retaining stormwater run-off and overbank flows of UNT 40639 and 40637; thereby providing these functions to a moderate to high degree, in an area where they do not currently exist. Through grading it is anticipated that groundwater will be periodically expressed in the wetlands, at least on a seasonal basis, and that groundwater will periodically discharge through the wetland cells to UNT 40639 and 40637 providing a groundwater discharge that has the potential to augment base flow

of House Run. The wetlands will serve to increase the residence time that runoff and floodwater remains in contact with the soils, microbial community and vegetation, increasing reaction times for physical, chemical, and biological pollution removal mechanisms.

In summary, due to the enhanced location, increased size and capacity, availability of more frequent flooding in the area of the proposed wetland cells in relation to the mainstem of the streams and the existing reverting agricultural land use within the watershed and riparian area, it is anticipated that the proposed wetland cells will function at a higher level than the marginal, lower functioning wetlands that will be impacted by the development of the Project.

Wetland Replacement Protection and Preservation

Wetland replacement is expected to occur at the locations illustrated on Figure 4 within Alpha-owned (PA Land Holdings) parcels. Upon completion, all three wetland mitigation areas (Cells 1, 2 and 3) and the associated stream riparian areas (approximately 100 foot buffers) will be protected in perpetuity through the establishment of permanent Restrictive Covenants (i.e., deed restrictions) and/or Conservation Easements in conformance with USACE and PADEP requirements and technical guidance. Furthermore the wetland systems along with the adjacent stream corridors and riparian buffer areas will be enclosed within a protective 3-wire Conservation Area fence which will be installed to prevent future disturbance to the wetland replacement and stream restoration. As a result, the entire riparian area will serve as an interconnected and densely vegetated wildlife corridor that will provide uninterrupted transitional habitat between adjacent, low, rangeland habitats and valley slope forested compartments.

3.0 MITIGATION GOALS AND OBJECTIVES

The purpose of the goals and objectives section of the mitigation plan is to summarize the proposed methods and establishes the proposed levels of expected improvements or measurable "lift" that the compensatory mitigation plan is designed to provide. Ultimately FMLLC's goal is to provide commensurate compensatory stream and wetland mitigation for the unavoidable impacts to aquatic resources associated with the development of the proposed Foundation Mine Complex project as described in Section 2.0 of the mitigation plan. For the purposes of this project and based on prior consultation with representatives of PADEP and USACE for similar projects, compensatory mitigation will include both wetland creation and a combination of EV and

HQ headwater stream protection, riparian vegetation establishment and enhancement, channel restoration and enhancement, and full stream reconstruction components.

Stream Compensatory Mitigation Goals:

Proposed stream mitigation sites have been identified and preliminarily designed using a watershed approach to provide commensurate USACE compensatory mitigation for jurisdictional ephemeral, intermittent and perennial stream impacts totaling 54,382 linear feet including 18,456 LF of ephemeral, 5,218 LF of intermittent and 30,708 LF of perennial streams that will be impacted by the Project. Based on the agency coordination meeting (April 2011) and Jurisdictional Determination field views (May-June 2011), compensatory mitigation for all of the jurisdictional streams and wetlands impacts is required as discussed in Section 2.0. The mitigation site selection process is further discussed in Section 4.0.

For the Project, FMLLC sought to provide commensurate mitigation within existing mine-owned parcels, to the extent possible, in order to more readily and reasonably accommodate long term protection of the mitigation areas, post-construction. The following 13 goals and objective were developed to demonstrate the anticipated levels of improvement or "lift" that stream mitigation is expected to provide.

Intermittent Stream Mitigation Perpetual Headwater Preservation Objective 1: Compensatory mitigation for 5,218 LF of intermittent stream impacts would be achieved through the protection and fencing of approximately 25,049 LF of existing HQ and EV Intermittent, Perennial and Unclassified streams a nearly 5:1 mitigation ratio. The preservation area stream systems are comprised of relatively undisturbed, headwater tributary watershed areas within Hoge, House and Garner Run watersheds that provide base flow, sediment and biological inputs to the Project area streams. The existing HQ and EV headwater tributary stream systems were preliminarily identified as candidates for stream preservation based on the current, predominantly forested and largely undisturbed land use present in the watersheds, overall existing stream channel integrity, presence of existing dense riparian vegetation along both banks of the stream channel and relatively small watershed size (e.g., all contain less than 200 acres of drainage area with the average watershed size of 94 acres). Through this approach, extensive, contiguous reaches of headwater perennial and intermittent tributary streams would be protected, enhanced and preserved in perpetuity to reduce future potential impacts to water quality from contributing watersheds. This proposal represents intermittent stream mitigation at a 4.80:1 ratio (i.e., length of proposed intermittent/perennial/unclassified preservation stream length to intermittent impacts) Table 3-1. The extent of proposed preservation areas is illustrated on Figures 6a. – 6h.

Ephemeral Stream Mitigation - Perpetual Headwater Preservation – Objective 2: In order to offset impacts to 18,456 linear feet of ephemeral stream FMLLC proposes protection and fencing of 20,187 LF of existing ephemeral streams located in relatively undisturbed HQ and EV designated headwater stream systems. The identified preservation watersheds are comprised of relatively undisturbed headwater tributary stream systems within Hoge, House and Garner Run watersheds that currently provide sediment and biological inputs to the Project area streams. The proposed preservation areas are immediately adjacent to the Project and associated stream systems. This mitigation approach provides a 1.09:1 ratio (i.e., proposed ephemeral stream preservation length to length of ephemeral impacts) for all ephemeral jurisdictional stream impacts associated with the project, Table 3-1. The extent of proposed preservation areas is illustrated on Figures 6a. – 6h.

Perpetual Headwater Protection Conservation Easements- Objective 3: Perpetual conservation easements would be created on existing Alpha owned parcels that would encompass the existing headwater ephemeral, intermittent and unclassified stream channels and established, predominantly forested, adjacent riparian buffer area as described in the previous section. The conservation areas will be protected through the recordation of restrictive covenants (i.e., deed restrictions) that will be conveyed with the land in perpetuity. The model easement/restrictive covenant document FMLLC intends to utilize is provided as Attachment F of this plan

Table 3-1 Intermittent and Ephemeral Stream Mitigation – Headwater Stream Preservation

TOTAL ALL PROPOSED PRESERVATION				
Stream Classification	Total Jurisdictional Stream Impacts (LF)	Proposed Preservation Stream Classification	Proposed Preservation Stream Length (LF)	***Preservation Ratio***
Ephemeral	18,456	Ephemeral	20,187	***1.09 : 1***
Intermittent	5,218	Intermittent	10,552	***See preservation ratio below***
		Perennial	5,603	
		Unclassified streams* (per and int)	8,894	
Intermittent	5,218	Int + Per + Unclass	25,049	***4.80 : 1***
TOTAL LF	23,674	all stream classifications	45,236	***1.91 : 1***
Total Preservation Acres and Protective Fencing				
TOTAL AC	n.a.	all preservation areas	445	***n.a.***
TOTAL FENCE	n.a.	all preservation areas	52,119	***n.a.***

** Unclassified stream length is provided for streams within preservation areas that were not studied in detail. All others were preliminarily identified using PA Code Chapter 89.5 classification methodologies.*

Unclassified length is estimated and based upon available PADEP stream mapping and review of aerial photos and topographic mapping

Intermittent and Ephemeral Stream Mitigation Conservation Area Fencing Objective 4: As an additional measure of buffer protection against any future impacts and to demark the boundary of headwater preservation areas, the preservation areas would be fenced with 3-strand high tensile wire fencing. The fencing, although not impenetrable, will serve to prevent potential impacts to the buffer area from future livestock or human activities on the adjacent uplands and to restrict ingress and egress to and from the preservation areas for potentially destructive activities such as ATV riding, timber harvesting, trail blazing, among others. The extent of proposed preservation areas is illustrated on Figures 6a. – 6h.

The mitigation goal is to preserve and enhance a total of 45,236 linear feet of headwater streams within the identified stream reaches as compensatory mitigation for the combined total of 23,674 LF of ephemeral and intermittent stream impacts (i.e., 5,218 LF intermittent and 18,456 LF of ephemeral) that would result from the development of the Project. Overall this proposal represents a minimum of 1.91:1 stream preservation to anticipated intermittent and ephemeral stream impact ratio.

Perennial Stream Mitigation Goals:
FMLLC utilized a watershed-wide, multifaceted, perennial stream mitigation approach to develop the compensatory mitigation plan. Based on the anticipated permanent impacts to approximately 30,708 linear feet of jurisdictional perennial stream impacts resulting from the Project, FMLLC proposes overall compensatory stream mitigation at a 1.58:1 length ratio. This proposal would involve the protection/ enhancement/ restoration/ reconstruction/ creation of a combined total of approximately 48,600 linear feet of McCourtney Run main stem and identified tributaries, currently designated as HQ waters, upstream and within the same watershed as the proposed impacts, Table 3-2.

Table 3-2 Jurisdictional Perennial Stream Length and Proposed Restoration and Creation Lengths

Regulatory Agency	Jurisdictional Perennial Stream Impacts (LF)	Hoge Run Relocation Impact (LF)	Hoge Run* Relocation Length (LF)	Hoge Run Stream Loss [1] (LF)	Total Perennial Stream Impacts Requiring Mitigation (LF)	Perennial Stream Restoration Existing Stream Length (LF)	Perennial Stream Restoration Proposed Stream Length (LF)	Additional Created Perennial Stream Length (LF)	Perennial Stream Length Restoration Ratio
PADEP-CDMO	16,294	5,731	4,924	807	17,101	48,200	48,600	400	n.a.
PADEP-SWRO	464	n.a.	n.a.	n.a.	464				n.a.
USACE Pittsburgh District	29,901	5,731	4,924	807	30,708				1.58 to 1

** Per consultation with USACE and PADEP during the pre-application meeting held for the Surface Facilities, it was agreed that the Hoge Run relocation would be credited as 1:1 mitigation [1] Both USACE and PADEP determined that the 807 LF of stream loss resulting from the relocation would require compensatory mitigation*

To accomplish this measure of mitigation, existing degraded perennial streams within the project area and vicinity have been identified that are currently flowing through or along active and recently retired pastureland or has been impacted by recent and long term agricultural, silvicultural and residential activities along and within the riparian corridor of the streams. As a result, the streams are largely devoid of vegetative riparian buffers throughout the majority of the stream reaches. In many pasture areas livestock had or currently have unlimited access to the streams along their entirety. The proposed mitigation streams are identified along segments of mainstem McCourtney Run, Garner Run, House Run on Figure 1.

Hoge Run Relocation- Objective 5: In addition to the restoration of degraded streams, FMLLC, per consultation with representatives of USACE and PADEP during the pre-application meeting for the Foundation Mine Surface Facilities, has developed designs for the relocation of an extensive portion of Hoge Run (40632) mainstem which will serve as 1:1 perennial stream mitigation for impacts to Hoge Run resulting from the Surface Facilities construction as illustrated in Table 3-3

Table 3-3 Hoge Run Relocation Impacts and Channel Relocation

Hoge Run Relocation		
Hoge Run Existing Stream Length (LF)	Hoge Run* Proposed Channel Relocation (LF)	Hoge Run [1] Stream Loss (LF)
5,731	4,924	807

** includes three box culverts (99 LF, 72 LF and 66 LF) depressed into the stream bed a min. of one foot to preserve natural stream bed*

[1] *mitigation of the loss of 807 LF of Hoge Run is included within the proposed perennial stream restoration*

The proposed stream mitigation approach is a multi-faceted restoration/enhancement/ reconstruction / creation strategy that will involve the following key components:

- Stream channel stabilization and habitat enhancements
  - streambank stabilization and bank reconstruction,
  - installation of in-stream flow and habitat structures, such as rootwads, cross-vanes, J-hooks and toe-wood bank stabilization among others;
  - re-establishment of contiguous, extensive forested, scrub shrub and herbaceous riparian buffers
  - stabilization of existing unstable access road crossing areas and replacement with ford crossings at various locations.

- Restoration and enhancement of existing impacted perennial stream channel along McCourtney Run and several tributaries that currently exists within active and historically impacted agricultural areas,

- Reconstruction and creation of new stream channel (perennial) length along the main stem and several tributaries of McCourtney Run through natural channel design to re-establish more natural and stable channel sinuosity, bankfull benches, habitat structures, riparian buffer establishment and plantings and exclusionary fencing.

These stream reaches have been degraded through intensive agricultural practices, piecemeal channel relocations and modifications, road construction/widening, all of which have contributed to stream channelization, bank instability and erosion, entrenchment and subsequent abandonment and loss of connectivity with the floodplain. These past and present actions have resulted in increased bank erosion rates and sediment deposition within subsequent downstream sections of the stream channel. In turn,

increased sedimentation to the stream results in sediment deposition, substrate embeddedness and the loss of benthic habitat for many macroinvertebrates.

Stream Restoration Objectives and Ratios

Several key stream restoration objectives and metrics were evaluated to arrive at the proposed mitigation ratios that will be used to demonstrate functional, physical, and biological and physiochemical lift can be achieved by performing the specified restoration and reconstruction techniques within the stream reaches. The primary metrics include:

- Restoration/Creation Stream Length (LF)
- Restoration/Creation Aquatic Habitat Acreage (Ac)
- Bank Stabilization and Habitat Flow Structures (Quantity)
- Riparian Buffer Establishment and Enhancements (Ac)
- Bank Erosion Rate and Sediment Loading Reduction (FT/YR and T/YR)
- RBP Stream Habitat Assessment Score Improvement (Existing and Anticipated)
- Appendix B – Biological Score Improvements
- Conductivity Level Reduction
- Stream Biological Productivity- Macroinvertebrate Density and EPT Composition Improvements

Perennial Stream Restoration Length/Stream Creation Objective 6: Stream mitigation, historically, has been proposed at a 1:1 ratio on a linear foot basis for in-kind mitigation typically consisting of rehabilitation, enhancement, or preservation (USACE and USEPA 2008) of existing stream systems within the same watershed as the proposed impacts. Total perennial stream impacts proposed for the Project total 30,708 linear feet. This mitigation plan calls for the restoration, enhancement and reconstruction of 48,600 linear feet of perennial stream channel throughout the McCourtney Run watershed. The proposed mitigation includes the creation of approximately 400 linear feet of new perennial stream channel which would be constructed as a result of natural channel design (Rosgen 2001) and the installation and installation of appropriate stream meanders and flow patterns developed for historically modified and straightened stream segments that abut Golden Oaks Road (S.H. 0018), local roadways or existing pasture, croplands and abandoned residential areas. Based on this proposal, the plan provides an overall stream length mitigation ratio of approximately 1.58: 1 (stream restoration length (FT) to perennial stream length (FT)

Increase Aquatic Habitat Acreage in Mitigation Streams Objective 7: While calculating stream mitigation using stream length can be useful, the more important issue surrounds stream habitat. The primary habitat for benthic organisms in streams is the submerged

streambed substrate materials within the active, wetted channel bottom. Many organisms use the interstitial spaces between sediment particles and accumulated organic detritus to complete their life cycles. High-quality substrates have sufficient variation in particle distribution to offer a wide range of habitats to a diverse collection of macroinvertebrates. These macroinvertebrates then play an important role in the food web, being consumed by higher trophic level predators such as fish, amphibians and birds. Excess fine grained sediment load (silt, sand and clay particles) from eroding banks and adjacent, disturbed uplands can accumulate within the channel and fill available interstitial spaces, reducing the habitat necessary to support a healthy benthic community, thereby reducing the biological capacity and productivity of the stream.

In-stream habitat availability for existing mitigation area streams was estimated by direct measurement utilizing CADD and available project area topographic mapping and imagery for the existing stream mitigation reaches. This acreage was then compared to the proposed stream channel design which incorporates Natural Channel Design (Rosgen 2001) principles. Based upon the habitat acreage estimates, the proposed stream mitigation plan will increase the available stream bed aquatic habitat within mitigation streams by 1.9 acres across all mitigation areas. The increase correlates to a 1.11:1 ratio of created aquatic habitat over the available habitat that currently exists within the mitigation streams. It is expected that due to the larger stream size and increased habitat area that will be created within the stream channels and along the adjacent stream banks and floodplains of the mitigation areas, that the restored perennial streams will have a much higher biotic capacity and would also provide the opportunity for the long term establishment of fish populations where these opportunities currently do not exist or are limited within the project area streams that will be impacted.

Bank Stabilization and Habitat Flow Structures (Quantity) Objective 8: As part of the stream restoration, FMLLC proposes to enhance flow regimes and available habitat areas throughout the degraded existing mitigation stream systems. Because of the widespread influences of residential and agricultural land uses along the stream reaches, the streams lack diverse flow regimes and are generally comprised of shallow pools and elongated run segments. To increase diversity of existing stream flow regimes (e.g., comprehensive riffle, run, pool, glide complexes) and overall habitat diversity in the existing degraded streams within the stream restoration areas, approximately 600 individual aquatic habitat, bank stabilization and flow enhancement structures will be installed within the stream and adjacent riparian area as presented in Table 3-4, Attachment G and indicated on the plans. Based on the total length of stream restoration, on average, this represents the installation of 1 structural enhancement per 80 LF of stream mitigation. This objective will include the creation of numerous oxbow retention areas within abandoned stream channel segments which will augment available aquatic habitat along the reaches.

Riparian Buffer Establishment and Enhancements Objective 9: Existing, poorly-vegetated riparian areas along degraded streams within the proposed restoration areas will be enhanced with additional native tree, shrub and herbaceous plantings and preserved within an approximately 100-foot wide (i.e., 50 foot from top of both banks) buffer area, post restoration. In some areas the proposed buffers exceed 120 feet in total width. The total vegetation enhancement area within the proposed riparian buffer and across all restoration areas totals approximately 99.4 acres. In addition, existing fragmented, mature and successional forested riparian compartments along the degraded streams within the proposed restoration areas will remain intact and will be preserved within an approximately 100-foot wide (i.e., 50 foot from top of both banks) buffer area. The existing riparian forest within the proposed buffer area totals approximately 24.9 acres. The riparian buffers will be protected in perpetuity with protective perimeter fencing and the establishment of perpetual conservation easements (restrictive covenants). This represents a 4:1 increase in overall forested riparian buffer area across all mitigation sites.

Reduction of Bank Erosion and Sediment Loading Objective 10: Accelerated erosion of existing banks and deposition within the existing stream channels contributes to substrate embeddedness and reduction in suitable habitat for macroinvertebrates. To estimate sediment loading in the mitigation stream reaches, the NRCS Direct Volume Method of estimation was used. The method is summarized in the following equation:

$$\frac{\text{(erosion area - length (ft) x height (ft)) (lateral recession rate (feet/year)) (soil density (lbs/cu.ft.))}}{\text{2,000 lbs/ton}}$$

Result = Estimated Bank Erosion in Tons per Year

A conservative (high-moderate) bank recession rate of 0.2 feet (2.4 inches) per year was assumed across all the mitigation reaches. This rate is based on reported erosion rate values (Rosgen 2001) and the NRCS technical guidance, and is indicative of the high-moderate range of bank erosion. Based on the soil survey information for this area, the soil types across all areas was considered silt loam which has a dry density of approximately 80 pounds per cu. ft. Details of the method are provided in Section 2.0.

The results indicated that approximately 1,900-2,000 cubic yards of soil material is eroded from the existing stream banks of the proposed restoration reaches. This value is also an expression of the amount of sediment contributed to stream sediment load each year. Although some bank erosion is normal for any stream system, this elevated volume correlates to nearly 2,000 tons of sediment per year being added to the stream from the proposed restoration areas alone. Complete elimination of sediment load is not desirable or practicable. However, it is anticipated that the implementation of riparian habitat improvements, as proposed, can reduce bank erosion (i.e., recession) rates from 0.2 feet

per year (2.4 inches) to 0.045 feet (0.5 inches) per year. 0.5 inches per year is considered low or slight erosion according to NRCS.

Based on the mitigation design and proposed stream stabilization, it is anticipated that post-mitigation erosion rates will be reduced from a moderate-high erosion rate of 2.4 inches per year to a low erosion rate of 0.5 inches per year. Consequently sediment loading is anticipated to be reduced from approximately 2,000 cubic yards per year to approximately 440 cubic yards per year, a 4.44:1 improvement ratio.

Stream Habitat, Biological and Physiochemical Goals:

The proposed stream restoration plan focuses on restoring impaired stream resources within the Garner Run, Hoge Run, House Run and McCourtney Run watersheds. The source of the impairments that are proposed for restoration, stem from historic agricultural and residential land uses along and within the majority of the riparian zones surrounding these existing stream systems. The following stream mitigation goals are consistent with state and federal compensatory mitigation requirements, and are proposed by improving existing stream channels and adjacent riparian zones within the impacted watersheds:

- Improve benthic macroinvertebrate communities to Total Biological Score (TBS) levels consistent with un-impacted, forested, larger order streams within close proximity to the project area.
- Quantitatively (USEPA Habitat Score) improve instream and riparian habitat along 48,600 LF of stream length by implementing the following mitigation tools:
    - Stream bank stabilization
    - Livestock fencing
    - Placement of instream structures
    - Planting and seeding
- Improve base water quality parameters by restoring riparian habitat and forested land use, preventing stream bank erosion and adding instream benthic habitat:
    - pH
    - Temperature
    - Conductivity
    - Dissolved Oxygen

RBP Habitat Score Improvements

Alpha Natural Resources has evaluated the pre-restoration condition of the proposed stream restoration areas within the Garner Run, Hoge Run, House Run and McCourtney

Run watersheds and corresponding conditions at reference sites in the project vicinity. The reference sites were identified to define the ambient benthic macroinvertebrate, stream habitat and field physiochemical conditions at comparable sites in close proximity to, and reflecting similar physical characteristics of, predicted post-restoration conditions.

Table 3-5. Existing Conditions at Proposed Mitigation Sites and Reference Sites.

	Average Proposed Mitigation Reach Values	Average Reference Stream Values (5 sites)
USEPA Habitat Score (%)	61%	66%
PADEP Bio Score	52.8	73.3
pH	8.11	7.86
Temperature (^{o}C)	9.13	8.8
Conductivity (uohms)	243	176
Dissolved Oxygen (mg/L)	13.48	13.92

USEPA- RBP Habitat Scores Improvement- Objective 11: The average USEPA habitat assessment score for the proposed mitigation areas (61%) reflected a middle sub-optimal category (Table 3-5, 3-6). The habitat score for the reference sites (66%) is also in the sub-optimal category (Table 3-6). However with the implementation of the designed stream restoration practices and vegetative buffer establishment, FMLLC proposes to increase the mean habitat assessment score up the optimal category (>75%). Given similar conditions, the proposed stream improvements are anticipated to increase average RBP habitat scores within mitigation streams from the existing Marginal - low Sub-Optimal scores to the high Sub-Optimal/Optimal range within the proposed mitigation reaches which equates to an average habitat improvement ratio of approximately 1.2:1 across all 12 habitat parameters.

Appendix B Biological Score Improvement- Objective 12: The overall average PADEP Biological Score for the Appendix B sample locations in the proposed mitigation areas was 52.8 (Table 3-5). This value represents average scores of seven sampling events conducted over a period of 4 years at 14 distinct sampling sites. The average PADEP Biological Score for the reference sites was 73.3 (Table 3-5). The biological component of the restoration goals is to lift the mean Biological Score of the mitigation areas from the average of approximately 52.8 to an average of 73.3.

Table 3-6. Existing Biological, Habitat and Water Quality Conditions vs. Predicted Post Mitigation Goals.

	Pre-Restoration	Post-Restoration	Improvement Factor
Total Biological Score	52.8	73.3	1.38:1
USEPA Habitat Score	61%	75%	1.22:1
USEPA Habitat Classification	Sub-optimal	Optimal	N/A

Reduction in Conductivity and Physiochemical Improvement – Objective 13: The field physiochemical parameters for the pre-mitigation samples (Table 3-5) fell within 25 PA Code, Chapter 93.7 water quality standards for HQ-WWF. The anticipated result of stream restoration on these physiochemical parameters is as follows:

- Temperature – Increased vegetative cover provided by riparian plantings is anticipated to provide shading to areas of the stream that are currently unprotected. This shade, over the course of the mitigation area, will lower the water temperature (McGurk 1989). The effect of this change is expected to be most notable in the summer months when foliage is at its greatest capacity, and at the downstream terminus of the restoration areas where the water has been protected from direct sunlight for the longest duration.

- Dissolved Oxygen – Reduced water temperature resulting from stream shading and increased riparian plantings is anticipated to increase the water's carrying capacity for dissolved oxygen. The placement of in-stream structures is anticipated to create additional aeration which will also increase the level of dissolved oxygen in the water.

- Conductivity – Increased bank stability, streambank fencing, and the creation of a riparian buffer will decrease the levels of sediment and nutrient loading from agricultural and residential practices and provide filtration of surface water flows from adjacent uplands. Lower levels of sediment and nutrient loading are anticipated to result in a corresponding drop in specific conductivity similar to levels in the reference streams.

- pH – The proposed restoration is expected to have little effect on pH.

Stream Biological Productivity- Macroinvertebrate Density and EPT Composition Improvements Goal:

In order to address evolving agency concerns regarding the anticipated losses of benthic organisms and biological contributions from the watershed as a result of the Project development and the desire to provide measurable improvements in mitigation area

systems, FMLLC will seek to quantify and replace the anticipated losses of benthic productivity and biological input from the impacted streams. FMLLC anticipates that this can be accomplished by increasing the currently diminished capacity and macroinvertebrate productivity within the proposed stream mitigation areas. Through the proposed stream restoration and riparian enhancements, FMLLC anticipates comprehensive improvement in the available stream habitat and substrate composition throughout the mitigation reaches which is expected to result in a corresponding increase in the numbers and composition of the benthic community. The improvements would be reflected in an overall increase in the total numbers of organisms present, as well as increases in the % Ephemeroptera, Plecoptera, Tricoptera (EPT) (taxa composition of the total within the mitigation stream reaches.

While the larger, mainstem streams have been sampled for multiple seasons over a period of several years using the PADEP Appendix B methodology, this method of sampling does not provide data that can be utilized to sufficiently develop benthic densities, total % EPT or other similar metrics. Upon the preliminary acceptance of the conceptual plan by PADEP and USACE, FMLLC will commence collection of the site specific benthic, habitat and water chemistry data for McCourtney Run and the identified UNTs. In order to comprehensively quantify benthic density estimates in existing and mitigation streams and to demonstrate the corresponding "biological lift" or improvement in productivity, benthic density, % EPT, FMLLC proposes to conduct supplemental sampling within impacted streams and proposed mitigation streams.

Specific sampling locations and protocols will be developed in consultation with PADEP and USACE. FMLLC anticipates using the USEPA RBP sampling method or other accepted protocol which provides benthic data from 1 square meter sampling sites. Sampling from these defined areas can be used to quantify benthic numbers on a habitat area basis which can then be used to provide estimated macroinvertebrate density and composition across available stream habitat area within each stream system proposed for impact and mitigation reach. FMLLC anticipates at least two to four rounds of data collection, conducted over a six month period would be sufficient to capture the benthic baseline conditions which will be used to develop the comparisons for pre- and post-stream restoration benthic community densities and quantify existing EPT composition.

FMLLC, in consultation with PADEP and USACE, will establish numerous supplemental benthic data collection points along the currently degraded stream mitigation reaches. Macroinvertebrate samples will be collected from one square meter areas of riffle habitat using a D-frame kicknet for each stream mitigation reach. The samples will be sorted and identified to family and the total numbers of individuals of each will be determined. From these sample areas the existing macroinvertebrate density (i.e., average number of

macros per sq. meter) and the taxa richness (i.e., EPT taxa) will be determined. This density will be used to determine the total number of individuals that exists within the mitigation reaches pre-restoration. Macroinvertebrate densities and % EPT composition will also be determined from comparable forested stream reaches within the same watershed in order to establish benthic community improvement ratio and expected corresponding increases in % EPT taxa post-restoration for stream mitigation areas. The improvements will be expected to result in a net increase in macroinvertebrate numbers equal to or greater than those that will be lost as a result of the Foundation Mine development.

Wetland Compensatory Mitigation Goal:

To provide commensurate compensatory mitigation for the 1.278 acres of combined palustrine emergent, scrub shrub and forested wetland impacts, three replacement wetland cells totaling at least 1.415 acres will be constructed to offset the impacts to 27 PEM wetland systems located throughout the proposed Project area. The replacement wetlands are designed and will be constructed to perform wetlands functions equal to or to a higher level than those currently provided by the proposed impacted wetlands. Given the predominantly PEM nature and the overall limited functions provided by the impacted wetlands, wetland replacement is proposed at a ratio of approximately 1.08 to 1. The following 4 wetland mitigation objectives have been identified to denote the conditions necessary for the completion of the wetland mitigation goal.

Wetland Mitigation Objective 1 – Replacement of Impacted Wetland Area: Wetland mitigation is proposed at a 1.08:1 ratio for the 1.278 acres of combined palustrine emergent, scrub shrub and forested wetland impacts that will result from the project. To provide a suitable depressional setting for wetland development, the replacement wetland cells will be constructed alongside proposed perennial stream restoration areas and will be tied into the bankfull bench elevation. The specific location of the wetland mitigation sites has been determined and three (3) suitable areas have been identified that will readily accommodate the 1.415 acres of combined replacement wetland area as indicated in Section 5.0 and the conceptual wetland design plans in Attachment A.

Wetland Mitigation Objective 2 – Replacement of Impacted Wetland Vegetative Classification: The proposed Project will impact 1.278 acres of combined PEM, PSS, and PFO wetland. The replacement wetland will contain similar vegetative classification composition which will be created within the proposed mitigation site through the application of an obligate/facw wetland seed mix comprised of native species and the planting of native shrub and tree species as indicated within Section 2.0 of the plan and Attachment A detail sheets.

Wetland Mitigation Objective 3 - Replacement of Wetland Functions and Values: Wetland mitigation functional replacement is proposed at a minimum 1:1 ratio. Due to the location, setting, existing topography and relatively small size (e.g., all are <0.39 acres in size and average 0.056 acres is size) of most of the project area wetlands which will be impacted by the refuse area, the majority of the impacted wetlands provide one or more of the following functions to a marginal degree:

- Groundwater Recharge/Discharge
- Nutrient Removal
- Floodflow Attenuation
- Sediment/Toxicant Retention
- Production Export
- Sediment/Shoreline Stabilization
- Wildlife Habitat

Overall, Nutrient Removal and Groundwater Recharge/Discharge functions were determined to be the primary functions performed by Project area wetlands, albeit on a limited scale. Because of the more favorable proposed locations of the replacement wetland cells along UNT 40637 (Cell 2 and 3) and 40639 (Cell 1 and 2) of House Run, the limited functions that the impacted wetlands provide are expected to be enhanced within the replacement wetlands. Given the more suitable depressional setting along the stream floodway and floodplain, the proximity of the replacement wetland areas to the perennial streams, the opportunity for the wetlands to provide all of these functions are expected to increase from low/marginal to moderate. A summary of the anticipated wetland functions and expected improvement in functional capacity of the replacement wetland is provided in the following paragraphs.

Groundwater Recharge/Discharge Function – This function is expected to be enhanced within each of the wetland cells due to the increased size, more suitable location, orientation and topographic setting that will be provided within the replacement wetland. According to the USDA- NRCS soils survey data, Attachment D, Newark (Nw) and Fluvaquents silt-loam soils (Fa) soils underlie the proposed wetland mitigation areas. Both Nw and Fa soils exhibit a seasonally high water table (0-18”) are frequently flooded and moderately drained. These attributes are expected to provide conditions suitable for wetland replacement development. It is anticipated that the excavation required to achieve the proposed depressional nature of the replacement wetland would intercept the water table which should be expressed as groundwater discharge within the wetland and would augment base flow to House Run. The depressional topography will allow for extended retention of surface runoff and stream overflow during precipitation events and periods of high stream flows which will provide more opportunity for the groundwater

recharge function. Actual existing groundwater levels will be determined utilizing piezometers which will be used to establish the wetland cell bottom elevation.

Nutrient Removal Function - The nutrient removal function is expected to be enhanced due to the opportunity, increased size, more suitable location, dense herbaceous vegetation and low topographic setting that will be provided within the replacement wetlands. The wetland cells will be situated adjacent to the created bankfull bench of House Run UNTS and will have the capacity to retain runoff from adjacent uplands and flood flows through extended water retention times. In addition, the wetland will be planted with a dense, native herbaceous obligate/facw wetland seed mix interspersed with native shrub and tree plantings. When fully established, the varied vegetative zones will provide increased water filtration capability and the opportunity for increased nutrient utilization and uptake than currently available due to the overall lack of vegetation along much of the existing stream margin and the incised/entrenched nature of the streams. In addition, the watershed contributing to the stream and wetland contains numerous sources of surplus nutrients including agriculture and livestock operations, pastures, residential lawns, gardens and areas of croplands that could be, at least in part, utilized within the wetland.

Floodflow Attenuation Function- This function is expected to be enhanced due to the increased size, more suitable location, and topographic setting that will be provided within the replacement wetland cells. The wetlands will be situated along the created bankfull bench of House Run and through the excavation of an inflow channel, will receive frequent flood flows during precipitation events. Due to the overall designed depressional nature, the wetland will have the capacity to retain floodwaters for an extended period and provide additional floodwater storage function for both House Run tributaries in areas where none or limited flood storage currently exists or is somewhat lacking.

Sediment/Toxicant Retention Function - This function is expected to be enhanced due to the more suitable location, depressional nature, dense vegetation and topographic setting that will be provided within the replacement wetlands. The wetland cells will be situated on the created bankfull bench of House Run Tributaries and will have the capacity to retain sediments/toxicants from out of bank stream flows and adjacent uplands through extended floodwater retention times and the opportunity for filtration and settling to occur. In addition to the low topographic setting, the wetland cells will be planted with a dense herbaceous obligate/facw seed mix intersperse with and partially surrounded with shrub and tree plantings which, when fully established, will provide water filtration function and the opportunity for enhanced sediment trapping and toxicant retention. The watershed contributing to the stream and proposed wetlands contains numerous potential

sources of sediments including local roadways, agricultural livestock operations, pastures, lawns, gardens and areas of croplands.

Production Export Function - This function is expected to be enhanced due to the increased size, more suitable location and topographic setting and the diverse herbaceous, shrub and tree species that will be provided within the replacement wetland cells. The wetland cells are expected to provide plant materials (e.g., flowers, seed, fruits, stalks and leaves) that would attract and be consumed by lower level mammal, reptile, amphibian, avian, and insect species. These species will in turn serve as base level food sources for higher level consumers (e.g., raptors, rodents and other predators) further up the food chain in areas where wetland habitat and biotic production is currently limited as a result of existing agricultural, residential and adjacent forested land use and lack of diverse riparian vegetation.

Sediment/Shoreline Stabilization Function - This function is expected to be enhanced due to the increased size, more suitable location, dense herbaceous vegetation and topographic setting that will be provided within the replacement wetland. The creation of the bankfull bench areas, elimination of vertical banks and establishment of dense herbaceous, shrub and tree species along and within the created wetland cells and adjacent restored stream margins and riparian buffer will serve to minimize bare soil to flowing water contact, dissipate shear stress on the adjacent stream banks and reduce flow velocities within the stream channel during high flow events.

Wildlife Habitat Function- This function is expected to be enhanced due to the increased size, dense vegetation, location and topographic setting that will be provided within the replacement wetland cells. The establishment of dense herbaceous and scrub shrub and forest vegetation along and within the wetland and stream margins and restored riparian corridor will add to the diversity of the available habitat in the project area and create a more extensively vegetated and contiguous corridor for wildlife utilization than currently exists in this area. Likewise, the herbaceous plantings contain plant species the will provide forage opportunities for a variety of common animal, bird and insect species that will contribute to the local food web. The diverse planting types will also add vegetative diversity to the surrounding proposed scrub shrub and forested riparian buffer area in areas that have been, until recently, active agricultural land.

Wetland Mitigation Objective 4 – Protection and Preservation of Replacement Wetlands: Wetland replacement areas associated with the Project will be constructed according to the design plans and monitored to ensure successful wetland development and achievement of the functional replacement as presented. In order to protect and preserve the wetland from future anthropogenic induced damages to the wetland systems, all three

wetland mitigation cells and the associated riparian stream corridors will be surrounded with conservation area fencing. Furthermore, all of the associated conservation area within the fencing will be placed under perpetual conservation easements/deed restrictions.

4.0 Mitigation Site Investigation and Selection

This section of the conceptual mitigation plan briefly discusses the proposed stream and wetland mitigation site selection processes and rationale that led to the identification of the proposed stream and wetland mitigation and preservation sites for the Foundation Mine Project.

Introduction: In the Commonwealth of Pennsylvania, when an applicant begins assessing mitigation requirements for impacts to streams and wetlands, it is understood that both PADEP and USACE typically require on-site, in-kind compensatory mitigation. In-kind stream mitigation typically includes restoration of existing degraded streams through traditional stream restoration techniques at a minimum 1:1 length ratio (USACE, 2002) including; bank stabilization, stream fencing, riparian vegetation, in-stream flow and habitat enhancements. Preservation of existing intact stream systems that have not been degraded by recent disturbances and exist within stable landscapes is also permitted although preservation is usually required at a much higher length ratio of 5 or 10:1.

In terms of location, applicants are generally expected to provide commensurate mitigation within the same subwatershed as the project impacts and in close proximity to the impact locations, where possible (Multiagency pre-application meeting - Attachment B, Appendix F). Typically, the further removed from the proposed impacts the mitigation site(s) is/are the less desirable the mitigation alternative (USACE, 2002). In circumstances where on-site mitigation is impracticable, or opportunities within the immediate watershed do not exist or will not exist after the project has been implemented, off-site mitigation within the larger watershed area may be considered as an alternative. In order to meet the mitigation criteria for the Project, FMLLC utilized the following multi-step evaluation process to identify mitigation opportunities for the Project.

Preliminary Stream and Wetland Mitigation Opportunity Inventory: Over the past several years, Alpha Natural Resources and its consultants, in a proactive effort to address stream and wetland mitigation needs in advance of project development, have preliminarily identified approximately 250,000 LF of existing impaired and degraded perennial streams within the South Fork Tenmile Creek watershed that could benefit from

traditional stream restoration and riparian buffer enhancements. Preliminary identification of potential mitigation sites for the inventory was based primarily on the following:

- Locations within the South Fork Tenmile Creek Watershed within which Alpha's existing coal reserves and present and projected mining activities are located
- Alpha's (and its consultant's) familiarity with the local stream systems and adjacent land uses
- Preliminary field observations and review of available aerial photography, topographic mapping, soils and land use data and;
- Professional judgment of field investigators

In addition to traditional stream restoration opportunities Alpha also recognized other impacts and impairments to regional stream systems and sought to expand available mitigation options and potential opportunities by identifying and proposing a combination of non-traditional, out-of-kind mitigation projects that also occurred within the SFTC and adjacent watersheds including:

- AMD treatment of legacy mine discharges from prior surface and room and pillar mining (Tenmile Creek and Monongahela River)
- Reclamation of legacy mine gob pile/spoils left from historic surface and room and pillar mining operations (Tenmile Creek and Monongahela River)
- Restoration of degraded trout -stocked fisheries (Canonsburg Lake/Little Chartiers Creek)

Initial Perennial Stream Mitigation Proposals: FMLLC conducted a pro-active multi-agency mitigation consultation meeting in April 2011 in order to achieve the following: present conceptual stream and wetland mitigation proposals to the regulatory agencies; obtain additional mitigation guidance and; solicit agency input in advance of permit submission. FMLLC presented the mitigation strategies to an assemblage of various state and federal resource agency representatives including members of PFBC, PADEP, USACE, USFWS and USEPA. At the time, the quantification of stream and wetland impacts, jurisdictional determinations and anticipated mitigation totals had not been finalized. A summary of the meeting attendees and discussions is provided as Attachment B in Appendix F.

Because future longwall mining was projected for areas immediately surrounding the proposed Foundation Mine Project area, FMLLC initially presented a combination of traditional stream restoration/reconstruction within degraded streams to the northwest and southeast of the Project area along with multiple out-of-kind mitigation options and

opportunities as indicated in the previous section. Several potential wetland mitigation areas were also presented along McCourtney Run mainstem. Through the discussions, the agencies reached several key determinations:

- The out-of-kind mitigation options, as presented, were not considered viable without intensive, long term study of the sites to quantify their effects to stream systems. It was further stated that inclusion of any of these non-traditional mitigation proposals within the Foundation Mine permit application would likely complicate the permit review process.
- Reconfirmed their support for traditional stream restoration and wetland replacement projects where anthropogenic influences have degraded streams and lift could be demonstrated to water quality, habitat, benthics and other traditional aquatic habitat and biological metrics.
- Required FMLLC, due to the HQ watershed designation, to provide stream mitigation (traditional restoration) at a greater than 1.5:1 ratio compared to stream impact length.
- Informed FMLLC that it could pursue traditional stream mitigation on degraded stream reaches that exist within their own parcels, over projected longwall mining panels and that may be subsided by future mining activities, provided that the plan addressed potential subsidence related effects to the mitigation site(s).
- Both USACE and PADEP agreed that the proposed Hoge Run stream relocation, which will be constructed using Natural Stream Channel Design methods, would provide 1:1 mitigation for the 4,924 LF while FMLLC would be obligated to provide additional perennial stream mitigation for the 807 LF of associated stream loss. This issue was discussed during early consultation with PADEP and USACE in the initial phases of project development.
- Stressed that wetland mitigation opportunities should be provided along perennial streams in lower order (smaller) tributary stream systems and should be designed so that they provide similar functions to those proposed for impacts.

Stream and Wetland Mitigation Refinement: Following the mitigation meeting, FMLLC reassessed potential stream and wetland mitigation opportunities for the proposed Project with a focus on the immediate Project area and adjacent tributary streams within the McCourtney Run (40628) watershed where the Project and impacts are located. The analysis encompassed the following named streams: Hoge Run (40632) and tributaries, House Run (40635) and tributaries, Garner Run (40634) and tributaries and Grinage Run (40647) and tributaries.

On-Site Mitigation Assessment: While assessing the McCourtney Run watershed and tributaries, FMLLC considered several key criteria for the refined assessment of potential stream and wetland mitigation sites including:

- Locations within the project boundary or in immediately adjacent subwatersheds
- Locations outside the footprint or immediate vicinity of proposed Project impacts
- Stream reaches that were visibly impaired by agriculture or residential land uses within or adjacent to the proposed impacts.
- Locations within existing Alpha-owned parcels within and surrounding the Project area
- Impaired stream areas readily accessible from existing roads or Alpha parcels
- Impaired stream areas possessing minimal existing forested riparian and requiring limited clearing activities

For wetland mitigation FMLLC sought to identify:

- Existing low lying, topographically flat or depressional areas along stream systems within FMLLC parcels
- Areas comprised of predominantly herbaceous vegetation or poorly vegetated riparian zones
- Areas that would readily accommodate wetland construction

Initially FMLLC evaluated mainstem stream corridors draining through the Project area as well as the tributary stream networks in the immediate vicinity. Due to the nature and extent of anticipated earthwork required to prepare the site, and the forested condition of the tributary stream valleys, FMLLC determined that most streams with the Project area boundary and proximity of the surface facility footprints would either be filled entirely, surrounded with surface facility cut and fill embankments or were heavily forested and were therefore not suitable for stream restoration. The only on-site mitigation opportunity identified was the Hoge Run Stream Relocation which was previously developed as 1:1 stream mitigation as previously discussed.

Off-Site, Adjacent Stream Mitigation Assessment: Other than the Hoge Run Relocation, no practicable mitigation opportunities for tributary streams inside the Project area boundary were identified. Utilizing the same evaluation parameters, FMLLC identified several stream segments along immediately adjacent streams outside the Project boundary including one segment of McCourtney Run mainstem (restoration area MR-1) totaling approximately 11,600 LF, two mainstem Garner Run segments (restoration area G-1 and G-2) totaling approximately 13,300 LF and one mainstem House Run segment

(restoration area HR-1) totaling approximately 7,100 LF (Figure 2). These stream segments provided 32,000 LF of stream mitigation length.

Degraded Stream Characteristics: The majority of the McCourtney Run (40628) and the associated mainstem streams identified in this phase of evaluation existed within active or recently retired agricultural land (predominantly pasture and cropland) that was until recently, heavily impacted by livestock, hay and crop production and other intensive agricultural uses. Direct impacts to the streams from agriculture included: uncontrolled livestock access to the stream, accelerated bank erosion and increased sediment deposition, anthropogenic channel modifications and entrenchment, absence or limited presence of developed riparian vegetation or in some instances bare soils, and increased sediment and nutrient loading from pastureland, croplands, and hayfields located immediately adjacent to the existing streams. These land uses dominated the valley floor along the mainstem of the larger order perennial streams and as a result much of the riparian zone (within approximately 200' of the stream channel) vegetation was removed to the top of banks, often leaving only herbaceous ground cover or bare earth.

Due to past channel modifications, realignments and subsequent entrenchment, the streams also generally possessed a moderate to low sinuosity. Many were somewhat entrenched with moderately to severely eroded stream banks and marginal stream habitat diversity throughout the majority of the riparian corridor. As a result of the channel entrenchment, the streams became "cut off" from their original floodplains and increased bank erosion and subsequent channel instability developed. In an effort to establish new floodplain area streams laterally migrated. The subsequently eroded stream banks typically ranged from approximately one foot in height (in the upper reaches of UNT 40637 to House Run) to over 8 feet in height (in the lower reaches of McCourtney Run mainstem) above existing water surface elevations throughout the majority of the identified stream restoration reaches.

Although these areas provided sufficient stream length necessary to fulfill typical 1:1 stream mitigation (impact length [feet] to stream restoration length [feet]), FMLLC continued to identify additional degraded perennial stream length. This effort was conducted in order to accommodate the agency's (PADEP, USACE/USEPA) requirement for FMLLC to provide stream mitigation length in excess of 1.5:1 (stream restoration length to impact length) as stipulated during the April 2011 coordination meeting (Attachment B, Appendix F). To meet this requirement, FMLLC assessed degraded tributary perennial streams within the subwatersheds outside the immediate Project area and vicinity.

Off-Site Stream Mitigation Assessment: FMLLC expanded the evaluation area to McCourtney Run tributaries upstream and downstream of the proposed project including House Run and Garner Run UNTs. Garner Run and its tributaries generally flow from the south and originate within predominantly forested, rolling terrain. The mainstem of Garner Run flows within a relatively broad (> 250 feet in average width) valley situated between the toe of the Golden Oaks Road (S.H. 0018) embankment and the opposing toe of slope of the Norfolk Southern Railroad embankment. Within the Garner Run drainage, three additional degraded tributary stream segments (restoration areas G-3, G-4 and G-5) totaling 3,100 LF were identified along with 3 tributaries (restoration areas HR-1, HR-2 and HR-3) to House Run, totaling 11,000 LF. In addition, one McCourtney Run tributary stream segment (restoration area MR-2) totaling 1,500 LF was identified. The supplemental off-site stream mitigation assessment identified an additional 15,600 LF of stream mitigation length.

Overall Stream Mitigation Identification: FMLLC preliminarily identified nine primary stream mitigation areas encompassing approximately 48,600 LF of stream restoration length through the on-site and off-site stream assessment. The proposed mitigation areas existed within the McCourtney Run and tributary watersheds of Garner Run and House Run. In addition, FMLLC also identified several secondary stream mitigation sites in other adjacent and nearby watersheds that could be utilized in the event that any of the primary sites failed or additional stream mitigation was required. The general location and extents of secondary stream mitigation sites are depicted on Figure 7.

In order to provide the required protection and long term management and maintenance of stream and wetland mitigation areas, FMLLC would prefer to provide mitigation on properties currently owned by them or their affiliates. Over the past 5-10 years, FMLLC has gained ownership of a large number of parcels within the McCourtney Run watershed in and around the Project area including areas within Garner, House and Hoge Run watersheds. As a result the majority of the proposed stream mitigation areas, as identified, will occur on Alpha owned parcels.

<u>Practicability of Stream and Wetland Mitigation Site Construction:</u>
To further demonstrate the suitability of proposed restoration sites, the following section briefly describes the practicability of mitigation site establishment in consideration of anticipated cost, and any technological or logistical constraints or issues that may exist due to existing site conditions, presence of incompatible land uses, proximity to existing buildings roadways, underground or overhead utilities, and other considerations.

Costs – Although a detailed construction cost estimate has not been developed for the mitigation sites, at this time FMLLC does not anticipate any unusual costs associated

with the development of the stream mitigation sites at the identified locations. As part of this evaluation, the following conditions were considered:

- FMLLC currently owns the majority of the property associated with the proposed stream and wetland mitigation sites. No property acquisition is anticipated to be required in order to develop the mitigation sites.
- Due to the favorable topographic setting, limited excavation (generally < 5 feet) will be required to achieve the proper grades for most proposed wetland and stream mitigation.
- Sufficient adjacent upland areas on Alpha owned parcels currently exist nearby to accommodate disposal of excess excavated soil from mitigation site grading and excavation. If offsite soil disposal is necessary, FMLLC will provide necessary stockpiles on upland areas in the vicinity of the mitigation sites that are of sufficient size to accommodate surplus soil and rock materials.
- Other than existing overhead electric powerlines and several existing gaslines, no other utilities are known to exist in the proposed mitigation areas. FMLLC does not anticipate that the proposed mitigation will require any significant utility relocations or related impacts.
- Because of the rural, residential nature of the project area, there are no known hazardous wastes, dumps, landfills or other contaminated areas or structures within the project area that would require significant cleanup or remediation prior to construction. Many of the previously inhabited residential structures have been razed and disposed of properly in local landfills.
- The majority of the proposed mitigation sites are only marginally vegetated, especially along the left descending banks of most streams. FMLLC expects that only limited tree clearing will be required to create the replacement wetlands and stream mitigation areas.
- Available woody materials (trees, brush, root wads, limbs, and chippings) that currently exist on site, or will be created as a result of clearing and grubbing operations associated with the stream and wetland mitigation site preparation and development will be utilized on the site or have been incorporated into the mitigation design further reducing material and construction costs.

Logistics – The proposed mitigation sites are generally readily accessible from existing state and local roadways and private access/service roads within the area. Only minor, temporary access improvements would be required in order to transport construction equipment, plant materials, and supplies throughout the identified sites. It is expected that sufficient upland areas exist alongside the existing stream channel to temporarily accommodate equipment and material staging; therefore, no long term road closures or detours are anticipated. Brief, temporary lane closures or detours on the state and local

road systems may be required during mobilization and throughout construction to accommodate construction equipment staging and periodic material delivery. Prior to any detour or road closure, PennDOT and Center and Jackson Township officials will be consulted to determine any permitting requirements and to develop appropriate temporary road closure and/or detour plans as necessary. If required, flagmen will be provided to conduct traffic control as necessary. In addition to the cost considerations, the proposed mitigation sites exhibit the following conditions that make them favorable for mitigation site development for the Project:

- The sites have sufficient area to accommodate the proposed stream and wetland mitigation.
- Proposed mitigation sites are predominantly located within Alpha owned parcels allowing for the establishment of a wider (approximately 100 feet wide) riparian buffer area throughout the stream corridor than if the parcels were not owned by Alpha.
- The sites are readily accessible through Alpha owned parcels from existing state and local roadways, gravel service roads and gravel driveways that exist along the corridor reducing or eliminating the need for construction of supplemental haul roads.
- Proposed mitigation sites are located in close proximity to the proposed impacts and the proposed FMLLC office complex and surface facilities. The proximity to the operational area provides a measure of security that would not exist if the mitigation area was located a greater distance away.
- Sites are located along the immediate receiving stream (McCourtney Run) and adjacent named and unnamed tributaries adjacent to, or immediately upstream of the proposed impacts.
- Portions of the streams have been historically modified, straightened and exposed to intensive agricultural activities along the stream banks, creating stream bank erosion, reduced diversity of flow regimes and loss of aquatic habitat.
- The streams are largely cut off from their floodplain in these areas. An appropriate bank full bench, as well as a more natural and stable stream meander pattern and stream profile can be restored throughout the identified stream reaches.
- Due to the channel conditions and recent agricultural activities the stream has aggraded, coarser gravel and cobble substrates have become somewhat embedded in fine grained sediments, reducing the quality and availability of benthic habitat to many organisms.
- Much of the existing stream length generally lacks two of the four diverse flow regimes (riffle, run, pool, and glide). The streams are predominantly

comprised of shallow pools and runs with limited or deep pool or glide development.

- Eroded stream banks exist throughout much of the proposed mitigation area and can be stabilized to help reduce sediment loading and improve downstream habitat and flow conditions.
- The area contains few existing aquatic resources (wetlands) other than the degraded stream channel. Those that are present will be readily identified prior to construction and avoided, incorporated into the site or further enhanced during site construction.
- Minimal tree clearing would be required along the majority of the proposed stream restoration sites as riparian vegetation is sparse or virtually non-existent throughout much of the area. Revegetation in the riparian area would provide numerous water quality benefits such as water temperature modulation (stream shading), surface water and stream flow filtration, reduction in turbidity, nutrient attenuation, among others and would incorporate a variety of higher value, native tree, shrub and herbaceous species.
- Mitigation in these areas would improve McCourtney Run and the named tributary streams and UNTs upstream of the proposed impacts.

Existing Technology – For the reasons stated above, FMLLC anticipates that the mitigation site development will be reasonably accomplished using conventional excavating equipment such as excavators, bulldozers, highlifts, and Bobcats in addition to manpower/laborers and equipment operators, to conduct bulk surface grading and to install erosion and sediment pollution controls, in-stream habitat and flow structures, fencing, and tree sapling, shrub and herbaceous plantings. The plan includes common, readily available soil stabilization methods and native plant materials will be utilized. FMLLC expects that all materials will be readily obtained from local plant suppliers within the same eco-region. No special or unique equipment, construction materials, methods, or installation techniques are anticipated to be required to construct any of the proposed mitigation sites.

The mitigation site construction is estimated to take approximately 12-18 months to complete, depending on weather conditions, availability of materials, and permitting requirements.

5.0 Mitigation Work Plan

The mitigation work plan details the overall construction approach that FMLLC proposes to employ during the implementation of the Compensatory Mitigation Plan components and establishes estimated time frames for the proposed activities.

FMLLC proposes to commence the wetland and stream mitigation activities for the Project concurrent with the permitted stream and wetland impacts, which would occur over an extended period as surface facility sites are prepared. By design, the majority of stream restoration activities are proposed on parcels currently owned by Alpha Natural Resources through its subsidiary PA Land Holdings, Inc., however, portions of the Garner Run and McCourtney Run (G-1 and MR-1) stream restoration areas are proposed on several privately owned parcels.

Upon acceptance of the Conceptual Mitigation Plan design by PADEP and USACE, FMLLC will commence contacting and entering into negotiations with affected private landowners to gain site access, secure conservation easements, and/or establish deed restrictions for proposed mitigation areas that contained within parcels not owned by FMLLC. Timeframes for completing these activities are contingent upon the receipt of permit approvals from the PADEP and the USACE. However, once these activities are completed, and the final mitigation design has been approved, the following general, construction work plan and Life-of-Permit (anticipated to last approximately 20 years) monitoring schedule is proposed for the project. It is anticipated that monitoring will occur twice per year for the first 2 years and then once per year throughout the remainder of the Life-of-Permit activities for a total of approximately 22 monitoring inspections:

- Initial 18 Months: Install erosion controls and perform mass grading of stream restoration sites, construct stream protection/stream restoration, and habitat enhancements/channel reconstruction, and the 3 PEM, PSS and PFO wetland replacement cells according to the final design plans. Install seed/mulch, plant woody vegetation; install tree/shrub protection and exclusionary fencing, fords, and all other elements of the final plans. Surround 8 proposed stream preservation areas with 3-wire conservation area fencing. Conduct post-construction as-built survey of completed mitigation sites.

- 24 Months: Evaluate hydrologic and vegetative conditions of the wetland mitigation sites, as well as the structural integrity and vegetative condition of the stream preservation/restoration/reconstruction and associated riparian buffer areas, as required. Establish and conduct semi-annual benthic macroinvertebrate samples, and analyze according to methods prescribed in the U.S. Environmental

Protection Agency's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour et. al. 1999). Collect water chemistry data along each of the stream mitigation (restoration) areas. Water chemistry parameters include; dissolved oxygen, conductivity, temperature, pH, alkalinity, hot acidity, iron, aluminum, manganese, sulfate, and suspended solids. The first monitoring inspection will be conducted during the first half of Year 2 and the second monitoring inspection during the second half of Year 2. Monitoring transects will be developed to evaluate baseline densities of vegetation. Comparisons between plants observed, and those planted within the wetland and riparian buffer, will be noted along with the conditions of structural elements of the mitigation sites. Prepare and submit first monitoring inspection report. Conduct second monitoring inspection during the late summer/early fall, and prepare and submit second monitoring report to the agencies. Upon achieving an 85 percent vegetative density, remove temporary E&S controls.

- 36 Months: Conduct third and fourth monitoring inspections at the first half and second half of the year. Identify any deficiencies in the stream or wetland mitigation sites and preservation areas. Develop appropriate corrective measures, if necessary. All modifications will be submitted to the USACE and PADEP prior to implementation. Conduct semi-annual benthic macroinvertebrate samples, and analyze according to methods prescribed in the U.S. Environmental Protection Agency's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour et. al. 1999). Collect water chemistry data along each of the stream mitigation (restoration) areas. Water chemistry parameters include; dissolved oxygen, conductivity, temperature, pH, alkalinity, hot acidity, iron, aluminum, manganese, sulfate, and suspended solids.

- 48 Months: Conduct fifth monitoring inspection during the growing season, preferably May-September. Conduct semi-annual benthic macroinvertebrate samples, and analyze according to methods prescribed in the U.S. Environmental Protection Agency's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour et. al. 1999). Collect water chemistry data along each of the stream mitigation (restoration) areas. Water chemistry parameters include; dissolved oxygen, conductivity, temperature, pH, alkalinity, hot acidity, iron, aluminum, manganese, sulfate, and suspended solids. Evaluate success criteria and make adjustments to grading, plantings or other factors as necessary. All proposed modifications will be submitted to the USACE and PADEP prior to implementation.

- 60 Months: Conduct sixth monitoring inspection during the growing season, preferably May-September. Conduct semi-annual benthic macroinvertebrate samples, and analyze according to methods prescribed in the U.S. Environmental Protection Agency's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour et. al. 1999). Collect water chemistry data along each of the stream mitigation (restoration) areas. Water chemistry parameters include; dissolved oxygen, conductivity, temperature, pH, alkalinity, hot acidity, iron, aluminum, manganese, sulfate, and suspended solids. Assuming the wetland replacement areas have met the specified goals and objectives, request concurrence on the success of the mitigation site(s), and release liability for future wetland monitoring activities. Evaluate success criteria and make adjustments to grading, plantings, or other factors; as field conditions dictate. All proposed modifications will be submitted to the USACE and PADEP prior to implementation.

- 72 Months through Life-of-Permit: Conduct annual monitoring inspections during the growing season, preferably May-September. Conduct semi-annual benthic macroinvertebrate samples, and analyze according to methods prescribed in the U.S. Environmental Protection Agency's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour et. al. 1999). Collect water chemistry data along each of the stream mitigation (restoration) areas. Water chemistry parameters include; dissolved oxygen, conductivity, temperature, pH, alkalinity, hot acidity, iron, aluminum, manganese, sulfate, and suspended solids. Re-grade and stabilize any accumulated sediments and remaining bare soil. Remove remaining E&S controls and conduct final remaining site work. Prepare final post-monitoring as-built survey of successful mitigation site(s). Prepare detailed final mitigation site assessment report documenting established plant stem density, stream habitats, water chemistry, species composition, and habitat usage. Submit final monitoring report.

Should the mitigation construction activity exceed 18 months, as a result of poor weather conditions, catastrophic event(s), extended drought, or similar adverse conditions that would potentially be detrimental to plantings or vegetation establishment; the site monitoring program will not commence until the entire mitigation site has been fully constructed and will continue as described through the Life-of-Permit.

Anticipated Construction Methods:

Wetland Replacement: Upon approval of the conceptual grading plans, up to 2 piezometers will be installed in each of the 3 proposed wetland mitigation cells so that

the groundwater surfaces can be more accurately assessed, and the elevations determined and sufficiently modeled. The groundwater elevations in the standpipes will be monitored on a routine basis in order to confirm the design elevations used to develop the preliminary grading plans. The preliminary grading plans were developed on the knowledge that groundwater recharge elevations are expected to be consistent with the streambed elevations of UNT 40639 to House Run, and/or UNT 40637, and at the upstream end of the proposed mitigation sites.

Wetland hydrology will be provided to each cell by creation of an inlet channel along UNT 40639 and UNT 40637 to House Run that will allow periodic stream overflow to enter the wetland when the stream reaches bankfull elevations. Supplemental hydrology will be collected from overland flow from surrounding uplands adjacent to the existing pasture areas. Direct precipitation, presence of depressional topography, and expected long water retention times will also augment hydrology to the site during precipitation events.

During mass excavation of the site, the topsoil will be stripped and stockpiled on adjacent uplands, then placed back in the wetland mitigation areas to establish final grade. Replacing approximately 1 foot of topsoil is intended to create suitable loose soil substrate for rapid and successful establishment of wetland vegetation. To aid in hydrological inputs to the wetland cell, an inlet channel and depressional topography will be created by excavating an inlet channel from the adjacent stream bank to the deepest cell elevation within each proposed wetland cell. Excess soil material will be graded outside of the wetland area and local floodplain/floodway. To provide more natural wetland development, final grading will be constructed with “rough” micro-topography throughout the wetland cell to more closely mimic the natural hummocky conditions present in many wetlands and to avoid an unnatural, overly “manicured” look. Soil supplements may be added to the soil pending the results of soils testing.

Herbaceous Vegetation: An obligate/facultative wetland seed mix consisting of emergent grasses, sedges, rushes, and forbs, such as blue vervain (*Verbena hastata*), fox sedge (*Carex vulpinoidea*), nodding bur marigold (*Bidens cernua*), and giant bur reed (*Sparganium eurycarpum*) will be planted in cells that have been designed to maintain seasonal to permanent saturation. The wetland seed mix is provided on detail sheets within the Conceptual Wetland Mitigation Plans provided as Attachment A.

Shrub Vegetation: Wetland shrub species will include a mixture of buttonbush (*Cephalanthus occidentalis*), silky dogwood (*Cornus amomum*), red-osier dogwood (*Cornus stolonifera*), common elderberry (*Sambucus canadensis*), black willow (*Salix nigra*) and American cranberry (*Viburnum trilobum*) as indicated on the wetland plans. These species will be planted along the wetland cell margins, adjacent to streams. These

species, in combination with the herbaceous vegetation within the floodplain areas, will provide stable root mass, dense cover, and food sources for a variety of birds and mammals.

Sapling Tree Vegetation: In addition to the shrub plantings and herbaceous vegetation, several tree species have been selected for the wetland mitigation sites. American sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), black gum (*Nyssa sylvatica*), red maple (*Acer rubrum*) and pin oak (*Quercus palustris*) will be incorporated for their wildlife habitat function and morphological adaptations to riparian areas. Additionally, box elder and black gum, while native to the area, are not encountered as often as American sycamore or pin oak. This increased diversity in surrounding tree species will provide enhanced habitat potential and utilization for the wetland area. Tree plantings will be a minimum 2" diameter at breast height (DBH), balled, and burlapped saplings.

Stream Restoration/Reconstruction/Creation and Hoge Run Relocation Areas: Stream reaches within the larger UNTs and main stem of McCourtney Run will be restored and enhanced, or fully reconstructed, depending on the final mitigation design and results of negotiations with the existing private land owners to obtain perpetual conservation easements. In addition, forested and scrub-shrub riparian buffer areas will be established along the restored and reconstructed stream reaches. A minimum 50-foot riparian buffer area (approximately 100 foot in total width) will be established along both banks of the existing streams within Alpha-owned parcels. A minimum 25-foot riparian buffer (approximately 50 foot in total width) will be established along both banks of the existing streams within privately owned parcels, unless the land owner is agreeable to the 50-foot buffer width (100-foot total width). The plan as presented provides a 50-foot buffer.

Stream restoration areas will adhere to the existing stream channel pattern and will require bulk excavation of the eroded banks to establish new floodplain areas within bankfull benches. Bankfull benches will average a minimum of 10 feet in width, distributed as site conditions dictate over both banks, depending on the meander pattern, bank heights, and any existing constraints (e.g., trees, buildings, utilities, culverts, other structures, etc.) as determined during final design. During mass excavation of the site, the topsoil will be stripped and stockpiled, then re-placed within the stream restoration areas (i.e., bankfull bench) to establish final grade. Sand/gravel/cobble stream substrates within relocated channel segments will be excavated and temporarily stockpiled on site (adjacent uplands) for later use in augmenting restored stream substrates. Subsoil and any weathered bedrock materials will be utilized to fill abandoned stream channel sections where full excavation of new channel meanders is proposed. Excess topsoil and subsoil material from the floodplain excavations will be re-graded on adjacent uplands, or

hauled off site to an approved soil disposal area. As with the wetland cell development, final grading along bank restoration areas will be constructed with a rough, hummocky final surface to more closely mimic natural conditions in riparian areas and to avoid an unnatural "manicured" look. Soil amendments (lime and fertilizers) will be added as necessary to the soil pending the results of soils testing to ensure optimal soil conditions for riparian plantings and seed mixes.

1. Topsoil Preparation

   a. Topsoil shall consist of reused, stockpiled topsoil from grading operations. Acceptable topsoil material shall consist of friable loam which is free of subsoil, roots, grass, weeds, stone, and other foreign matter with a minimum of 4 percent and a maximum of 25 percent organic matter. The acceptable pH shall be between 5.5 to 7.5. In the event that suitable topsoil does not exist within the project area, supplemental soil sources will be identified.

   b. Topsoil removed during grading shall be prepared using York rakes, drag lines, or other necessary mechanical methods and hand labor to eliminate all stones and debris over 1 inch in diameter.

   c. Organic amendments shall be uniformly added to the top 6 inches of topsoil and shall be composed of leaf or pine bark compost, sewage sludge, or other organic materials as approved by the Engineer/Biologist. Unless otherwise directed by the Engineer/Biologist, organic soil amendments shall be combined with equal parts of topsoil.

   d. The installation of all vegetation shall be proceeded by the application of a slow-release, commercial fertilizer, designed to release nutrients under saturated soil conditions to assure good initial plant growth. All materials shall be approved by the Engineer/Biologist prior to application and shall conform to the requirements of the Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L. 258, No. 86, as amended.

   e. The following fertilizer specifications shall be followed in all wetland areas, as necessary:

      - For summer planting: 19-6-12, three- to four-month release.
      - For spring planting: 18-6-12, eight- to nine-month release.
      - For winter/fall planting: 18-5-11, twelve- to fourteen-month release.

      The derivation of the fertilizer elements shall be as follows:

      Nitrogen - ammonium sulfate, ammonium nitrate, ammonium phosphate, or urea;

Phosphorus	-	phosphoric acid, calcium phosphate or ammonium phosphate;
Potassium	-	muriate of potash or sulfate of potash

f. Recommended quantities and application of commercial fertilizer shall follow the manufacturer's recommendations as specified.

g. The backfilling of all trees and scrub shrubs shall utilize the topsoil/compost mixture described above. Compost materials shall be combined with equal parts of topsoil together with a quantity of fertilizer as specified by the manufacturer's recommendations.

h. The quantity of compost/soil/fertilizer mixture shall be estimated utilizing the following equation:

- (number of plants) (container size in gallons) (0.005 cubic yards/gallon) = cubic yards of backfill compost

2. Permanent Seeding

a. The Contractor shall furnish and place seed, soil supplement, mulching and erosion control materials on all disturbed areas and as directed by the Engineer/Biologist.

b. All materials shall be obtained from a dealer or manufacturer whose products are shown by analysis to fulfill the guarantee claimed by the producer.

c. All seed shall conform to the Pennsylvania Seed Act of 1965 and regulations of the Pennsylvania Department of Agriculture, Bureau of Plant Industry.

d. The percentage of pure seed present shall represent the freedom of such agricultural seeds from inert matter and from other seeds distinguished by their appearance. The percentage of germination for each species shall conform to analysis by the Commonwealth of Pennsylvania, Department of Agriculture, Bureau of Plant Industry. Seed shall be from the most recent available crop.

e. Disturbed areas which are at finished grade will not be redisturbed within 1 year must be stabilized in accordance with permanent seeding specifications.

f. During non-germinating periods, mulch must be applied at the recommended rates.

g. The herbaceous seed mixture in all wetland replacement areas shall be composed of the FACW Wetland Meadow Mix outlined in Table 1.

h. The seed mixture in all upland areas shall be composed of 50 percent perennial ryegrass (*Lolium perenne*) and 50 percent annual ryegrass (*Lolium multiflorum*) and shall be applied at a rate of 50 pounds per acre in order to establish a vegetation density of 20 plants per square foot.

i. Disturbed areas which are not at finished grade and which will be re-disturbed within 1 year must be stabilized in accordance with temporary seeding specifications.

j. Before seeding, the area to be seeded shall be decompacted through disking, rototilling, or ripping of the soils to a depth of no less than 4 inches.

k. Straw mulch must be applied at rates of at least 3.0 tons per acre.

l. All areas outside the grading limits where the vegetative growth has been disturbed or destroyed by operation of the contractor shall be restored and seeded with seed formulas typical for the project, in accordance with these specifications, by the Contractor at his own expense.

m. Soil areas of 3:1 gradients and flatter shall be thoroughly loosened to a depth of at least 2 inches by plowing, disking, harrowing, scarifying or by other approved methods until the tillage is acceptable. Any irregularities resulting from the contractor's operations, or from soil erosion, shall be satisfactorily corrected before seeding operations. Any unsuitable materials larger than 1 inch in any dimension shall be removed and disposed of during this operation.

n. On slopes steeper than 3:1, the tillage operations shall be confined to horizontal scarification and elimination of irregularities resulting from soil erosion.

o. Areas shall be scarified sufficiently to break up the surface crust immediately before seeding, except when the ground is loose and friable.

p. All stones and debris over 6 inches in any dimension, which are loose and subject to rolling or sliding, and all objects which would be detrimental to maintenance, shall be removed and disposed of as directed. In these areas seed shall be mixed with 3 times its volume of sand and the seed/sand mixture and rolled.

q. The contractor shall employ a satisfactory method of sowing; using approved hydraulic seeders, or hand seeders. Broadcast seeding, either by hand, or by approved sowing equipment, also may be used to uniformly distribute seed over the designated areas. Where practicable, 1/2 of the seed shall be sown

when the sower is moving in one direction, and the remainder shall be sown moving at right angles to the first sowing.

r. The contractor shall be responsible for the proper maintenance of the seeded areas until either a satisfactory turf has developed or the entire project has been completed and accepted. Maintenance of grass areas shall commence as soon as any seeding is completed.

s. When a seeded surface has become damaged or gullied, the affected areas shall be regraded and retreated as specified.

t. All mulching material shall be free from mature seed-bearing stalks or roots of prohibited or noxious weeds as defined in the Pennsylvania Seed Act of 1965. In addition, the mulch shall not contain the stems of tobacco, soybeans, or other coarse or woody materials.

u. Mulch shall be placed on the given areas within 48 hours after seeding. Hay mulching materials shall be well-seasoned before baling and shall contain less than 20 percent moisture by weight; and shall consist of timothy hay, or mixed clover and timothy hay, or other approved native or agricultural grasses. Salt hay or other saline grasses are ***not*** acceptable.

v. Straw mulch shall be placed uniformly in a continuous blanket at the rate of 3 tons per acre.

w. A mechanical blower may be used to apply mulch material, provided the machine has been specifically designed and approved for this purpose. Machines which cut mulch into short pieces will not be permitted.

x. If the Seeding and Mulching work on a slope has been satisfactorily completed and a slide or slip of magnitude occurs, which requires excavation and the establishment of a new slope; the Seeding and Mulching operations shall be performed again

3. Temporary Seeding

a. Any disturbed area on which activity has ceased and which will remain exposed for more than 20 days must be stabilized immediately.

b. During non-germinating periods, mulch must be applied at the recommended rates.

c. The temporary seed mixture in all areas shall be composed of 50 percent perennial ryegrass (*Lolium perenne*) and 50 percent annual ryegrass (*Lolium multiflorum*) and shall be applied at a rate of 50 pounds per acre in order to establish a vegetation density of 20 plants per square foot.

d. Disturbed areas which are not at finished grade and which will be redisturbed within 1 year must be stabilized in accordance with temporary seeding specifications.

e. Disturbed areas which are either at finished grade or will not be redisturbed within 1 year must be stabilized in accordance with permanent seeding specifications.

f. Before seeding, the area to be seeded shall be decompacted through disking, rototilling, or ripping of the sediments to a depth of no less than 4 inches.

g. Straw mulch must be applied at rates of at least 3.0 tons per acre.

h. Additional guidelines for temporary seeding shall follow the guidelines outlined under permanent seeding.

Floodplain and Riparian Buffer Vegetation: Riparian buffers will be vegetated with a combination of native herbaceous, scrub shrub, and sapling tree species suited to the moist soil conditions that exist within the riparian zone and associated floodplain areas.

Herbaceous Vegetation: Riparian herbaceous vegetation establishment will include application of a floodplain wildlife seed mix, which will be overseeded within all disturbed areas of the floodplain, bankfull bench, and adjacent bank slopes associated with the stream restoration. The floodplain wildlife mix will include native riparian obligate, FACW and FAC herbaceous species including but not limited to fox sedge (*Carex vulpinoidea*), sensitive fern (*Onoclea sinsibillis*), rice cutgrass (*Leersia oryzoides*), lurid sedge (*Carex lurida*), flat-topped white aster (*Aster umbellatus*) among others. Upland disturbances will be vegetated with an upland seed mix comprised of annual (*Lolium multiflorum*) and perennial (*Lolium perenne*) ryegrass. All disturbed areas will be temporarily stabilized with straw mulch until herbaceous ground cover becomes established.

Shrub Vegetation: Riparian buffer shrub species will include a mixture of buttonbush (*Cephalanthus occidentalis*), silky dogwood (*Cornus amomum*), red osier dogwood (*Cornus stolonifiera*), common elderberry (*Sambucus canadensis*), black willow (*Salix nigra*) and American cranberry (*Viburnum trilobum*) as indicated on the restoration/relocation plans. These species (or equivalent, native substitutes) will be planted along the floodplain margins. These species, in combination with the herbaceous vegetation within the floodplain areas, will provide stable root mass, dense cover, and food sources for a wide variety of birds and mammals. In addition, the leaf and woody stem materials from these shrubs will provide additional organic input and woody

material into the streams for use by lower trophic level macroinvertebrates that form the basis for the local food chain production within the stream system.

Sapling Tree Vegetation: In addition to the shrub plantings, several tree species have been selected for the forested riparian buffer portion of the stream mitigation sites, including: American sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), black gum (*Nyssa sylvatica*), red maple (*Acer rubrum*) and pin oak (*Quercus palustris*). Additionally, box elder and black gum, while native to the area, are not encountered as often as American sycamore or pin oak. This increased diversity in surrounding tree species will provide enhanced habitat potential and utilization for the wetland area. Tree plantings will be a minimum 2" DBH, balled, and burlapped saplings.

HQ and EV Headwater Stream Preservation and Buffer Enhancement Areas: To preserve the existing herbaceous, scrub shrub and mature forest vegetation that currently exists within the preservation areas no grading or earth disturbance is proposed or will occur in these areas. Three-wire, high tensile wire fencing, will be installed around the entire perimeter of the preservation buffer area to denote the boundary and to prevent future livestock or human impacts and infiltration. A perpetual conservation easement/restrictive covenant (deed restriction) for the entire preservation buffer area will be established by FMLLC on existing parcels owned by Alpha (or its subsidiaries and affiliates) to preserve the integrity of the headwater stream conditions.

General Replacement Wetland and Stream Restoration Construction Sequence: Erosion and sediment pollution controls will be installed prior to any bulk earth disturbance. Existing aquatic resources (i.e., streams and wetlands) will be identified and delineated with protective fencing to avoid impacts to the resources during mitigation construction. Necessary permits and site access agreements would be acquired from affected private property owners, PennDOT District 12-0, and Center and Jackson Township officials, to provide access to the site from state and local roadways. Coordination with PENNDOT District 12-0 will be conducted in a timely manner to secure a Highway Occupancy Permit(s) (HOP) for the access from adjacent state roads such as Golden Oaks Road (S.H. 0018) and Bristoria Road (S.R. 3020), if necessary.

Stream restoration/construction activities will proceed from the upstream limit of the project toward the downstream limit within the specific stream restoration/mitigation reach. Clearing and grubbing of existing vegetation would be minimized and accomplished at the outset to provide clear access to the mitigation area. Available woody materials, branches, and debris from the surface facility or mitigation area clearing operations would be temporarily stockpiled for reuse in the bank stabilization and habitat structure installation (e.g., toe wood, root wads, log vanes, etc.).

Prior to stream excavations, or in-stream channel work, existing stream flow will be contained and pumped around active construction zones via the installation of cofferdams and pump systems while bank grading and stabilization is installed. A detail of the proposed typical cofferdam installation is included on Sheet 9 of 97 of the Conceptual Mitigation Plan, Attachment A. Bank excavation will be limited to manageable increments that can be accomplished within 1 day, depending on the required cut and enhancements (generally 2-300 LF per day). It is expected that where necessary, channel work would occur on both banks concurrently, and stabilization of stream banks would follow immediately after grading operations on the completed segment. Surplus soils from bank excavations will be wasted in abandoned stream channel areas, as indicated on the plans, or stockpiled and graded out on adjacent uplands. Soil disposal areas will be located at least 50 feet away from the stream channel and outside of existing FEMA 100-year floodplain areas where present. Installation of in-stream structures will occur as each section of stream channel is completed, but prior to final seeding and planting. Soil matting materials, seeding, shrub and tree plantings, and mulch will be installed on disturbed stream banks and within the proposed riparian buffers as designed. Upon final stabilization, high tensile, 3-wire conservation area fencing will be installed around the restoration area to encompass the proposed approximately 50-foot riparian buffer area.

Where applicable, the replacement wetland areas will be excavated last, and seeded and planted according to the final design plans. Upon completion of the earth work, the stockpile embankments and associated disturbance will be leveled and shaped to mimic adjacent topography and seeded and mulched according to the plans. The cofferdams and pump will be removed and the stream flow returned to the restored channel. Temporary rock construction entranceways, and haul roads will be removed; and the affected areas regraded, seeded, and mulched.

Perimeter erosion and sediment pollution controls will remain in place until vegetation is established. Upon reaching the vegetative establishment criteria set forth at the beginning of this section, the remaining erosion and sediment pollution controls will be removed, accumulated sediments will be incorporated into the adjacent upland slopes, and any residual bare soils will be seeded and mulched. Upon completion, an as-built survey of the constructed stream and wetland mitigation site will be performed to document the final grades and location of various components of the site.

E&S Control Provisions: Appropriate erosion and sediment pollution controls will be implemented from the onset of construction in advance of earth disturbance as determined through final design and in the manner and schedule detailed within the plan narrative. For this project the implementation of following erosion and sediment pollution controls and best management practices are anticipated:

- Rock Construction Entrances
- Stream Flow Cofferdam, Rock Filter Dam, and Pump Around
- Silt Fence / Filter Sock
- Soil Matting
- Sodding
- Upland Temporary and Permanent Seeding and Mulch (uplands only)
- Floodplain Seeding and Mulch (floodplains only)
- OBL/FACW Seeding and Mulch (wetlands only)
- Topsoil Stockpiles
- General Construction Staging and Sequencing
- Protective 3-Wire Conservation Area Fencing

Typical design details and specifications for the erosion and sediment pollution controls are included in the General Details Sheets (Plan Sheets 5 - 9 of 97) of the Conceptual Mitigation Plan, Attachment A. The temporary measures will remain in place and will be properly maintained until the contributory drainage areas have become vegetated to the appropriate coverage density (85% minimum vegetative coverage across all areas of disturbance).

Invasive Vegetation Control: Based on cursory field investigations conducted by WPI biologists; several invasive, herbaceous, shrub and tree species were noted within the identified stream restoration and mitigation areas. These plants included, but may not be limited to:

- Tree-of-Heaven (*Ailanthus altissima)*
- Reed Canary Grass *(Phalaris arundinacea)*
- Wild Garlic Mustard *(Alliaria petiolata)*
- Multiflora Rose *(Rosa multiflora)*
- Japanese Knotweed (*Polyganum cuspidatum*)

No other invasive vegetation was observed in the project area, although it is possible that other invasive species were present. In order to prevent the spread of invasive species to other locations, or within the mitigation site, the following strategies will be implemented during construction:

- All surplus woody plant materials from clearing and grubbing activities will be incorporated into the bank stabilization (e.g., toe wood), or will remain on site and be burned, if possible. All herbaceous plant materials will remain on the site to prevent the spread of seed, live roots, or plant stalks that may promote regrowth.

- All excavating equipment and trucks will be washed and allowed drying time prior to leaving the site to remove any plant and soil materials from tracks, tires, and undercarriages, with the intention of preventing accidental spread of invasive organisms to other locations.
- All excess soil from the channel and replacement wetland excavation and bank grading will be wasted on site or hauled from the site and disposed of at an approved soil waste location.
- Disturbed soils will be immediately revegetated with native plant materials and seed mixes as prescribed in the final planting plans to minimize the opportunity for establishment of invasive plant colonies within the mitigation site on recently disturbed soils.
- Spot treatment of live invasive plants using the application of appropriate herbicide(s) such as Glyphosate (RoundUp™, etc.) will be conducted on an as-needed basis during the construction and Life-of-Permit monitoring phase of the project. No herbicides will be applied in proximity to the restored stream or replacement wetland cells unless by an authorized applicator.
- If necessary, mechanical removal, spot treatment with herbicide and/or burning of invasive plant materials will be conducted on an ongoing, as-needed basis through the Life-of-Permit monitoring period or the colonies are eradicated.

Stream Flow and Habitat Structure Installation: In-stream flow and habitat enhancement structures will be installed within the restored and new stream channel as indicated on the final design plans. A tabulation of the proposed structures, by plan sheet and stream reach is located in Attachment G. These structures are intended to increase channel stability, create more diverse flow regimes and channel bedforms, improve the substrate composition and sediment transport (i.e., particularly the transport of fine sediment) capabilities of the stream, and enhance the in-stream habitat for benthic macroinvertebrates. For this project, the following 15 in-stream habitat, stream flow and bank stabilization structures and enhancements will be incorporated throughout the stream restoration/reconstruction areas:

1. Alternating Log Vane Structures – A stream flow structure comprised of a series of several alternating logs installed partially across the stream channel to create variable stream flow regimes and to direct stream flows, in an alternating fashion, toward the mid-channel area.
2. Bank Stabilization (Bioengineering/live staking) – Installation of live, woody stem stakes of various shrub species along with natural fiber matting materials within reconstructed stream bank areas to augment vegetative growth and provide a dense woody bank armoring. Typically used in concert with

herbaceous seed mix on the outside of stream meanders where erosive forces are greatest.

3. Converging Rock Structures – A clustering of larger cobble size rocks within the stream bed that are specifically arranged to concentrate erosive stream flows toward the mid-channel and away from the banks. Also provides variable substrate sizes and habitat area.
4. Buried Rock Armor – Traditional rock rip rap placement at the toe of reconstructed stream banks typically installed on the outside of stream meanders where erosive forces tend to be greatest.
5. Hammerhead Structures – A stream flow device that provides variable flow regimes within tightly curved stream meanders and creates back-eddy areas off of the main stream channel.
6. Rock Cross Vanes – A stream flow device comprised of boulders placed in a curved "V" configuration (with the curve pointing upstream) that extends across the stream channel and directs erosive stream flow away from the banks to the mid-channel area. Often results in mid-stream scour pool development between the ends of the vane arms.
7. Rock J-Hooks – A stream flow device comprised of a series of boulders placed in a "J" configuration (with the curve pointing upstream) that extends partially across the stream channel and directs erosive stream flows away from the banks toward the mid-channel area. Often results in mid-stream scour pool development downstream of the inside curvature of the structure.
8. Root Wad/Log Vane/J-Hook Combination Structure – A larger bank stabilization, stream flow and aquatic habitat structure that is comprised of an interlocking combination of the three structures. Provides structural bank stabilization, stream flow modification and aquatic habitat enhancement within a lengthy section of stream.
9. Rock Roll Log Structures - A combination of several interwoven logs that are placed partially across the stream channel and are alternately propped up on top of the other, in sequence. Typically function to create variable flow regimes, alternating flow paths and habitats within the stream channel.
10. Oxbow Retention Areas – Residual stream meanders resulting from stream reconstruction/relocation that accept out of bank flow and groundwater and serve as "back water" retention areas off the newly constructed stream channel alignment.
11. Stream Fords – Submerged rock-lined stream crossings that extend across the entire stream channel and up both banks. Provide a stable base for occasional livestock, equipment and vehicular crossings of restored stream channel

12. Scour Pools – A stream flow and habitat enhancement whereby the mid-channel portion of the stream bed is excavated to a deeper elevation at strategic locations to enhance flow depth regimes where none currently exists.
13. Step Pool Structures – A stream flow and stabilization structure constructed of boulders placed across the entire stream channel that stabilizes head-cuts and allows greater elevation changes within a short distance in the stream channel.
14. Root Wads/Log Vanes – A bank stabilization, stream flow and habitat structure comprised of an interlocking rootwad and log that are installed to direct erosive stream flow away from the banks while augmenting bank stability and submerged habitat.
15. Toe Wood Bank Stabilization – A bank stabilization measure comprised of an interlocking woody debris assemblage that is typically placed at the toe of reconstructed stream banks along the outside of meanders where erosive forces tend to be greatest.

Details and specifications for each of the structures are included on the General Details Sheets (Plan Sheets 6 - 12 of 97) in Attachment A of the Conceptual Stream Mitigation Plan. Where practicable, existing boulders, cobble, tree trunks, rootwads, branches, and woody debris will be salvaged and reused to construct the in-stream flow and habitat enhancement structures. If necessary, additional rock and native woody materials will be obtained from Project area sources resulting from clearing and grubbing in order to construct the structural enhancements, root wads, and toe wood bank stabilization.

Stream Channel Substrate Enhancement: Within stream restoration channel realignment areas, and where possible, existing cobble, gravel and sand substrates from the existing stream bed will be excavated and stockpiled for reuse in reconstructed stream channel areas to augment bedforms and channel features. Temporary stockpiles of substrate materials will be placed at least 50 feet from the active channel on upland areas. Surplus sediments not reused in the channel restoration areas will be incorporated into the surplus soil piles and graded into upland areas outside of existing floodplains, wetlands, or streams.

Site Management and Maintenance:

Short Term: Throughout the Life-of-Permit monitoring period, the site will be regularly visited as part of the required monitoring plan for the project as described in previous sections. Monitoring will occur twice per year for the first 2 years and then once per year for the remaining approximately 18 years, for a total of 22 total monitoring inspections. If during a regular inspection, deficiencies are discovered, they will be documented within the monitoring report and depending on the severity, an Action Plan may be developed, in consultation with PADEP and USACE, to address the problem. If the

deficiency is determined to be minimal or not severe, no Action Plan may be required and the area will be re-evaluated during the next regularly scheduled inspection. In addition, at any time during the Life-of-Permit monitoring, additional monitoring inspections may be warranted due to unforeseen, catastrophic climatic or precipitation events that could potentially jeopardize the success of the mitigation area. A catastrophic event may include a particularly intense rain storm of several inches per hour over a period of time or a severe drought lasting weeks or possibly months. In such cases, following high intensity precipitation events, a cursory field view will be immediately conducted to assess mitigation site conditions and determine whether maintenance, repairs, or further investigation is required.

Long Term: All of the proposed stream restoration, stream preservation and wetland replacement mitigation areas will be placed into perpetual conservation easements and/or preserved under permanent restrictive covenants/deed restriction. The existing Alpha ownership of the parcels occupied by the mitigation sites is anticipated to remain unchanged for the foreseeable future, estimated at 20 years. After the required Life-of-Permit monitoring period and final approval and acceptance of the mitigation site by USACE and PADEP; FMLLC and Alpha would no longer be responsible to conduct regular inspections on the site or to provide additional maintenance or site management services. Although the site will be preserved as conservation areas through easements and/or deed restrictions in perpetuity, there are no plans or necessity for additional long term monitoring or maintenance beyond the Life-of-Permit monitoring period once the mitigation goals and objectives have been achieved.

6.0 PERFORMANCE STANDARDS

In order to determine whether the wetland (replacement) and stream (restoration and preservation) mitigation sites are achieving planned goals, the following readily observable, measureable performance standards have been developed for the proposed mitigation goals identified in Section 3.0. Because of the lack of long-term, detailed benthic macroinvertebrate, water chemistry and habitat assessment information for some of the proposed mitigation streams, several performance based criteria have been preliminarily identified to qualitatively assess the overall performance and success of the mitigation components using a combination of visual observation and professional judgment. In addition, FMLLC utilized reference reach data from similar, predominantly forested watersheds in the project vicinity to provide anticipated levels of Conductivity improvements (reduction) and Appendix B biological and RBP habitat score improvements. The assessment parameters will be further evaluated and more precisely determined and supported through comprehensive field measurement, water quality

analysis, standard RBP habitat evaluation and benthic sampling following the conditional acceptance of the proposed sites by resource agencies and the preparation of final design mitigation plans.

Wetland Mitigation Success Criteria:

Wetland Replacement Cells 1, 2 and 3: The wetland mitigation areas (Cells 1, 2 and 3) will be deemed successful when the following parameters have been evaluated and are determined to have been achieved during the initial five year monitoring and maintenance period or if necessary through the Life-of-Permit monitoring period:

- The proposed wetland mitigation sites provide a minimum total of 1.415 acres of wetland replacement, which will include PEM, PSS and PFO vegetative class and habitat as indicated on the plans. The establishment status will be based on the completion of a Routine Onsite Determination Method delineation and as-built survey that demonstrates that all three wetland criteria including the development of hydric soils indicators, presence of 50% or greater density of hydrophytic vegetation communities, and establishment of suitable hydrologic conditions are achieved within the replacement wetland areas.
- The wetland performs all of the identified principle functions to an observable level as determined through on-site field assessment and the completion of the USACE Rapid Wetland Functional Assessment protocol.
- The wetland mitigation area are planted with appropriate, native plant species such that>50% of the dominant plant species in the wetland mitigation areas are classified as obligate (OBL), facultative wetland (FACW) or facultative (FAC), according to Reed (1988) and comprise 85% or more areal vegetative coverage.
- The wetland is comprised of an assemblage of herbaceous, shrub and forest vegetative classification to the levels designed. The criteria will be considered met even if higher functioning palustrine scrub shrub (PSS) or the palustrine forested (PFO) component becomes increasingly established in portions of the replacement wetland as PSS and PFO wetland is generally considered higher value wetlands.
- The wetland vegetation becomes established and no one plant species becomes dominant (>50% total coverage) over the majority of the mitigation area (e.g. cattail, sweetflag etc.).
- No plant species listed as PA Invasive (phragmites [*Phragmites australis*], Japanese knotweed [*Polyganum cuspidatum*], multiflora rose [*Rosa Multiflora*], Japanese stiltgrass [*Microstegium vimineum*], among others) becomes established to a dominance of >10% of the total vegetative cover throughout any of the wetland cells.

An estimate of the " percent achieved" for each wetland creation success criteria will be provide within each monitoring inspection report to gauge the relative success of the wetland mitigation sites over time and to help determine whether a problem exists and corrective action is required.

Stream Mitigation Success Criteria: The stream mitigation areas will be deemed successful when the following parameters have been evaluated and are determined to have been achieved during the Life-of-Permit monitoring and maintenance period:

Ephemeral and Intermittent Stream Mitigation:
Perennial HQ and EV Headwater Stream Preservation and Enhancement: The criteria will be met upon the establishment of perpetual conservation easements for all proposed riparian buffer areas within the identified existing EV and HQ headwater streams and; the successful and complete installation of protective fencing around the entire perimeter of all preservation areas as indicated on Preservation Area figures. Preservation areas are contained wholly within Alpha-owned parcels.

Perennial Stream Mitigation:
Perennial Stream Restoration and Creation: The success of the perennial stream mitigation will be gauged by the observance of the following physical characteristics and evaluation methods:

Perennial Stream Reconstruction/Restoration/Creation: The reconstructed/restored perennial stream channel will be considered successful when a total of approximately 48,600 linear feet of existing, degraded stream channel is fully reconstructed, containing approximately 400 additional feet of new stream length and 48,200 linear feet of degraded stream. Complete channel restoration will be achieved when the installation of bankfull bench areas, in-stream habitat and flow structures, riparian plantings and stabilization measures are fully established and remain intact completed and the entire riparian buffer area (conservation area) is enclosed within protective fencing.

Perennial Stream Aquatic Habitat Increase: This aspect of the project will be attained when the existing, degraded stream channel has been fully restored, enhanced and reconstructed with the appropriate channel dimensions, bankfull benches and habitat structures and more diverse flow regimes have become established throughout the mitigation reaches per the design plans. As a result of these activities, the available aquatic habitat area provided within the active stream bed is expected to increase from approximately 13.4 acres to 14.9 acres across all stream restoration areas.

Bank Stabilization and Sediment Loading: While some overall bank erosion is expected within any natural stream system, the stream bank stabilization areas will be considered successful when existing moderate-severe bank erosion present throughout the majority of the combined 48,600 feet of stream restoration is reduced from existing moderate-high erosion rates (0.20 feet per year) to post-restoration establishment low rates (0.045 feet per year according to Rosgen). Bank erosion monitoring stations will be identified at regular intervals and at potential problem areas (e.g., meander bends, stream crossings, and utility line crossings) along the stream reaches. Linear, physical measurement of the moderate to severely eroded bank surfaces and recession depths pre and post restoration will be calculated. Preliminary estimates indicate that bank recession and subsequent sediment loading to the streams is currently occurring at a rate of nearly 2,000 tons per year across all proposed restoration areas. The stabilization will be considered successful when this rate is reduced to approximately 440 tons per year across the proposed restoration areas. Following more detailed bank erosion assessment (measured length of all channel erosion and severity levels) a more precise recession/sediment loading rate will be determined. This information will be used to assess and quantify the reduction of erosion and the ultimate attainment of the goal.

Preservation of Existing Riparian Forest Areas: Although clearing and grading within the stream banks, channel bed and riparian zones is required for stream restoration activities, existing fragmented forested riparian compartments are expected to be preserved during construction, in their current state. Restoration designs will be adapted where necessary and to the extent possible to protect these areas throughout the restoration process. The measure will be deemed successful when the estimated 24.9 acres of existing forested riparian is fully enclosed in protective conservation area fencing and is further preserved with conservation easements/deed restrictions.

Establishment of Riparian Zone Vegetation: Establishment of vegetated riparian buffer planting area averages 50 feet in width from the top of both banks and vegetative cover has reached 85% coverage density across the site and at least an 80% survival rate of all riparian plantings has been achieved.

Installation of Riparian Buffer Area Protective Fencing: Upon completion of the structural stream restoration work and revegetation of the riparian buffer area, the installation of 3-wire high tensile strength protective wire fencing will be installed around the perimeter of the entire conservation area(s).

In-stream Flow Structures and Improvements in Benthics, Habitats and Substrates: The goal will be attained when the proposed 607 stream habitat and flow structures (e.g., toe wood, cross vanes, j-hooks, rootwads, substrate augmentation, etc.) tabulated in

Attachment G are fully installed and remain stable per the approved final mitigation plans; and the corresponding habitat and benthic metrics have been successfully determined and achieved as indicated below:

- Projected increases in total number and densities of macroinvertebrates that compensate for the loss of organisms from the development of Surface Facilities (TBD) has been achieved based on quantitative benthic sampling
- % EPT taxa colonization has increased to projected levels (TBD)
- Appendix B – Biological Scores – Average biological score increases from 52% to a minimum of 75% across all restoration stream reaches using the Appendix B methodology.
- Appendix B Sampling – Average USEPA RBP Habitat metrics are increased from existing marginal-low suboptimal range (50-60%) to at least high suboptimal/low optimal range (RBP score of 70-75%);
- The stream substrates are dominated by coarse grained (gravel size) particles instead of fine grained (silt and sand sized) particles
- Diversity and occurrence of stream channel flow depth regimes (riffle, pool, glide, run) is increased throughout the restoration reaches (TBD)

Average Conductivity Level Improvement (Reduction): The parameter will be met when existing average Conductivity levels within mitigation area streams are reduced from an average of 240 (µS· cm-1) to sub- 200 (µS· cm-1) levels post restoration establishment. This parameter is subject to land use changes and water quality influences outside the Alpha controlled parcels and immediate restoration area. The parameter may require future modification if upstream conditions change or existing non-mining land uses, such as pasture use, continue post-construction.

To closely track the site progress, post-construction, estimates of the "percent achieved" for each stream restoration criteria indicated will be provided within each monitoring inspection report according to the proposed mitigation monitoring schedule and procedures contained in Section 9.0. The estimate of "percent achieved" will be used to track and gauge the relative success of the mitigation site over time and to help determine whether any problems exist and/or corrective actions or modifications to the plan are required. No corrective actions or modifications will occur without prior consultation with and approval from PADEP and USACE.

7.0 PROJECT SUCCESS AND SITE PROTECTION PLANS

Project Success: FMLLC and its parent company Alpha Natural Resources are identified as the entity which will be responsible for the ultimate success of the mitigation site. Contact Information for FMLLC is provided below:

Foundation Mining, LLC
P.O. Box 1020
158 Portal Road
Waynesburg, PA 15370
Mr. Chester Huff, P.E. – Sr. Project Engineer
724-852-5818

The designated point of contact for FMLLC who is responsible for project success is Mrs. Michelle Anderson. Mrs. Anderson will oversee mitigation construction and monitoring as well as coordination and consultation with representatives of the USACE and PADEP, as necessary. Mrs. Anderson's contact information is provided below.

Mrs. Michelle Anderson
Environmental Specialist
PA Land Holdings Company, LLC
PO Box 1020 158 Portal Road
Waynesburg, PA 15370
724-852-5889

Site Protection: The majority of the proposed stream restoration and preservation areas, and all three of the wetland replacement sites (Cell 1, 2 and 3) are located within Alpha-owned parcels; however, portions of the stream restoration sites in the Garner Run and McCourtney Run stream segments specifically the upper portion of G-2 and the middle and lower portion of MR-1, would potentially require access from private properties that are not currently owned by Pennsylvania Land Holdings, an affiliate to FMLLC and a subsidiary of its parent company Alpha Natural Resources, or any of Alpha's subsidiaries or affiliates. Alpha Natural Resources and its subsidiary FMLLC anticipate entering into negotiations with the private landowners to secure restrictive covenants/conservation easements for the portion of the properties where stream restoration sites would be located on parcels not owned by Alpha. The restrictive covenants/conservation easements will serve to protect and preserve the stream and mitigation sites in perpetuity. If possible, and if circumstances warrant, FMLLC would consider outright fee-simple purchase of non-Alpha owned property(ies) on a case by case basis. A sample of the

USACE model conservation easement document and FMLLCs proposed conservation easement/restrictive covenant document is provided as Attachment F of the plan.

The majority of the proposed mitigation sites are located on Alpha owned parcels along, or in close proximity to, unoccupied residences, active and recently retired agricultural operations and local and state roadways including Golden Oaks Road (S.H. 0018), Hoge Run Road, Macedonia Road, Bristoria Road (S.R. 3020) and Hampton Road. The Garner and McCourtney Run restoration areas are also bounded to the east by the existing Norfolk Southern Railroad track and rail bed embankment. Although not heavily traveled, the identified mitigation sites for the most part are readily observed from the local and state roadways and the Norfolk Southern Railroad located within the project vicinity which is expected to provide a measure of security from common vandalism, theft and other types of man-induced damage that could potentially occur during and post construction. Within the mitigation sites themselves, the proposed protective, high-tensile 3-wire conservation area fencing will also provide additional security from inadvertent livestock and human activities that could potentially result in damages such as trail blazing, mountain biking, motorcycling, horseback riding, ATV riding, other trail development and other forms of off-road vehicle activities that tend to be destructive to sensitive riparian environments.

In addition, the proposed mitigation sites are all located within 5 miles of the proposed Foundation Mine Complex which will operate 24 hours per day, seven days per week. The proximity to the proposed mitigation sites would allow rapid response by FMLLC personnel to address any mitigation site issues that would arise. Likewise, numerous consultants currently working for Alpha regularly perform biological sampling, surveying and field investigations within the project area and vicinity. It is anticipated that throughout the construction and monitoring phase of the project, FMLLC personnel and consultants will routinely conduct cursory field views of the mitigation sites throughout each year to regularly assess if any aspect of the site has been compromised or if additional protective or security measures are warranted to maintain mitigation site integrity and protection. The cursory field views would be conducted in addition to the planned monitoring inspections which will extend through the Life-of-Permit anticipated being 20 years or more.

8.0 CONTINGENCY PLAN and ADAPTIVE MANAGEMENT

Adaptive management and contingency planning identifies potential circumstances (e.g., flooding, drought, invasive species colonization, site degradation, influences from adjacent land uses, future mine subsidence) and conditions that pose a risk to project

success and provides guidance for how these issues will be addressed in the future, post construction. By design, the proposed mitigation sites are located predominantly on properties owned or controlled by Foundation Mining LLC (FMLLC), its parent company Alpha Natural Resources, or affiliates which alleviate access concerns when addressing adverse site conditions. Contact information for FMLLC is provided below:

Foundation Mining, LLC
P.O. Box 1020
158 Portal Road
Waynesburg, PA 15370
Mr. Chester Huff, P.E. – Sr. Project Engineer
724-852-5818

Alpha Natural Resources and FMLLC have identified Mrs. Michelle Anderson as the project representative and point of contact for the development, implementation, monitoring and maintenance of the compensatory wetland and stream mitigation portion of the project. Mrs. Anderson's contact information is provided below.

Mrs. Michelle Anderson
Environmental Specialist
PA Land Holdings Company, LLC
PO Box 1020 158 Portal Road
Waynesburg, PA 15370
724-852-5889

The following measures will be implemented in the event that portions of the mitigation site do not fully develop as expected, or as the result of unforeseen events (e.g., natural, anthropogenic, catastrophic), which may affect the ultimate success of the mitigation site(s). FMLLC will provide the necessary funding to ensure that alternative designs, methods, and efforts are capable of being implemented throughout the required Life-of-Permit monitoring and management period.

Headwater Stream Preservation/Enhancement Contingency: In the event that portions of the headwater stream preservation areas are affected by tree damaging fungus, wood boring, or leaf eating pests that result in large scale tree mortality within the headwater preservation areas, FMLLC would provide supplemental tree and shrub plantings along and within a minimum 50-foot riparian zone to replace the lost vegetative stream canopy. FMLLC proposes to encircle the stream preservation areas with protective wire fencing to provide a physical barrier and long term protection for the mitigation sites. Should fencing become damaged or weakened during the monitoring period, the defective

sections will be repaired or removed and replaced with new fencing to maintain the uninterrupted protective barrier.

Stream Restoration Mitigation Contingency: In the event that portions of the bank stabilization measures, reconstructed channels, or in-stream habitat and flow control structures fail, or become damaged or deficient; the areas would be re-evaluated and if necessary, a substitute bank stabilization method, channel design, or alternate structure will be developed. Alternative bank stabilization methods may include the use of bioengineering techniques such as brush mattresses, fascines, or incorporation of fibrous matting materials, among others. Alternative flow and habitat structures may include log vanes or the use of larger materials (e.g., foot rock and rootwads). Substitute materials and design(s) would be submitted to USACE and PADEP for review and approval prior to installation to ensure that the overarching goals and objectives of the plan would still be met. Upon approval and subsequent final design, the stream restoration contingency measures would be quickly implemented to correct the deficient area(s) in a timely manner. The area would then be monitored according to the regular inspection schedule to ensure that the substitute stabilization measure/structure succeeds as designed.

Riparian Buffer Planting Contingency: Should riparian buffer plantings, floodplain seedings, sodding, or matting materials fail to establish, or become dislodged or damaged, damaged materials will be removed, affected areas regraded, and the vegetative materials replaced with additional native plant stock of a similar vegetation class and species composition. As a contingency for seeded areas, FMLLC will revegetate deficient areas utilizing rooted plantings, peapots, rhizomes, or other forms of established plant material to augment seedings, reduce plant mortality, and shorten vegetative establishment timeframes. To provide additional structural stability after planting, additional staking, fibrous matting, or netting materials would be employed as needed. In case of drought conditions, post-planting, that may compromise the survival of new vegetation, local periodic irrigation using water buffaloes, stream flows, or pumped water from nearby reservoirs or other available water sources would be considered. The revegetated area(s) will then be monitored according to the regular inspection schedule to ensure that the stabilization measure/plantings succeed as prescribed.

Stream Mitigation Aquatic Habitat Restoration Contingencies: In the event that any elements of the bank stabilization, fencing, or in-stream structures fail or become damaged or deficient, the areas shall be re-evaluated and the area reconstructed per the plans, or a substitute measure will be developed. The substitute restoration measure(s) will be developed in consultation with USACE and PADEP and submitted for review and approval prior to final design and installation to ensure that the overarching goals and objectives of the plan will still be met.

Channel Reconstruction and Creation Contingency: In the event that any portions of the created or fully reconstructed stream channel fail or become damaged or deficient, the areas and associated channel design will be re-evaluated. As needed, FMLLC will incorporate additional bio-engineering techniques such as brush mattressing, coconut fiber matting with live staking, fascines, and other structural stabilization practices into the channel design and the area will be reconstructed per the plans. No excelsior or other fine mulch netting materials will be utilized on mainstem stream bank areas, bankfull benches, or floodplain areas as tend to ensnare/trap larger fish species during higher stream flow events resulting in fish mortality. The structural stabilization practices and channel redesign will be developed in consultation with USACE and PADEP and submitted for their review and approval prior to final design and installation to ensure that the overarching goals and objectives of the plan will still be met.

Upon approval, and subsequent final design, the contingency measures will be rapidly implemented, weather permitting, to correct the deficient area(s) at the appropriate time of the year and suitable low stream flow conditions. The area(s) will then be monitored according to the regular inspection schedule to ensure that the modifications/alternate measures succeed.

Floodplain and Riparian Buffer Plantings and Seeding Contingency: Should riparian buffer plantings or floodplain seeding materials fail to establish as intended or become damaged, the deficient materials will be removed, affected areas re-graded and the materials replaced with appropriate quantities of native plant stock of a similar vegetation class, stage of development, and species composition. Prior to replanting, representative soils testing will be conducted to determine if soil pH, available nutrient levels, or other soil fertility issues exist. If low pH, or low levels of available nutrients are present, appropriate quantities of soil amendments in the form of agricultural lime and fertilizers will be incorporated to the soil as recommended prior to replanting. Consultation with the Greene County - Penn State Cooperative Extension office will be initiated for soil testing and amendment application recommendations.

As a contingency for the seeded areas, FMLLC will utilize more mature plantings, pea pots, rhizomes or other forms of established plant material to augment seedings and to promote establishment rates and success. To provide additional structural stability after planting, additional staking, matting or fibrous netting materials (e.g., jute/coconut fiber matting) will be implemented in addition to straw mulching. In the event of failure due to drought conditions that may compromise the overall survival rate of plantings, local periodic watering using water buffaloes, stream flows or pumped water from nearby reservoirs will be implemented as needed to ensure survival. The area will then be

monitored according to the regular inspection schedule to ensure that the stabilization measure/plantings succeed.

Wetland Mitigation Contingency: In the event that portions of the proposed PEM/PSS/PFO wetland systems become damaged, become deficient, or fail to develop or fully establish to the identified wetland mitigation criteria, the area will be re-evaluated.

Vegetation Establishment: Areas where wetland vegetation establishment is lacking will be reseeded or replanted depending on the vegetation class that is deficient. As a contingency for seeded areas, the applicant will utilize established rooted plantings, pea pots, rhizomes, or other forms of more mature wetland plant material to augment the seedings.

Hydrology: If hydrologic input to the wetland is deficient, the applicant will reassess the designed grades, and re-grade the inlet channel to the adjacent streams, or the UNT, to provide a more persistent flow of water from the stream or the excavation of the wetland bottom to a depth that better intercepts the local water table. In case of drought conditions, post-planting that may compromise the survival of plantings, local periodic watering using water buffaloes, the freshwater impoundment, or stream flows, will be augmented and/or implemented. The area will then be monitored along with the restoration area according to the regular inspection schedule to ensure that the wetland succeeds.

Hydric Soils Development: The development of hydric soils can take years to develop. Factors involved in the development of an anaerobic environment include: hydrologic input, frequency of inundation, seasonal or permanent saturation, and seasonal fluctuation of the groundwater table. Indicators of hydric soil development include, but are not limited to, soil gleying and reduction, presence of oxidation in root channels and pore linings, and development of soil mottling within the soil profile. Development of hydric soils is expected to occur over an extended period of time as a function of hydrology and is the natural result of hydrologic input to the wetland system. Based on current scientific evidence (Environmental Laboratory, 1987) hydric soils are not expected to develop within the specified monitoring period.

In the event there is a complete failure of the wetland mitigation site, another site will be identified and a design will be prepared to satisfy the mitigation requirements. FMLLC has preliminarily identified several other potential wetland replacement areas along the proposed stream mitigation reaches that could readily accommodate supplemental wetland mitigation area.

Alternative Mitigation Site(s): If repeated attempts to correct identified deficiencies within stream mitigation reach(es) fail, FMLLC will examine the use of "hard armoring" techniques (e.g., rip rap or gabion channel lining) or other traditional band stabilization methods to stabilize the stream reach and then identify alternative mitigation areas within the watershed to provide appropriate replacement area. FMLLC has preliminarily identified over 200,000 linear feet of stream channel within the South Fork Tenmile Creek watershed that could benefit from forms of stream restoration. Optional mitigation sites located on Alpha-owned parcels and within close proximity to the Project area are identified on Figure 7, Appendix F. These potential mitigation sites are preliminary, and have not involved detailed site evaluations or contact with existing adjacent private landowners. However, this effort has been conducted to provide a "catalogue" of potential sites that can be rapidly studied, in detail, in the event the measures outlined in this proposed mitigation plan do not meet the stated goals. The identification, evaluation, selection, and design of alternative stream and wetland mitigation sites will be conducted in consultation with USACE and PADEP, and any alternate site would be submitted to both agencies for review and approval prior to implementation. Alternate site(s) would then be monitored along with the original stream and wetland mitigation areas according to the regular inspection schedule to ensure that the alternative site succeeds.

Invasive Species Colonization Contingency: In the event that invasive species become established within the stream restoration or wetland replacement areas, FMLLC will immediately implement a multiphase eradication process including:

- Selective Application of Herbicides – Spot treatment of small colonies or individual plants within a discreet geographic area. Treatment would continue until no further development or regrowth is observed for at least one full year. Denuded areas will be revegetated per the original mitigation plans.

- Broad-Based Application of Herbicides - Treatment of expansive colonies within a broader geographic area. Treatment would continue until no further development or regrowth is observed for at least one full year. Denuded areas will be revegetated per the restoration plans. Broad application of herbicides in proximity to streams and wetlands would be conducted in a manner to preclude damages to existing resources.

- Mechanical Removal with Herbicide Application – Depending on the invasive species identified, physical removal and on site incineration of plant material would be implemented to prevent offsite transportation and colonization of invasive plant species. Herbicide treatment of these areas will occur as necessary as new shoots emerge.

Future Longwall Mine Subsidence Contingency: The proposed stream mitigation and wetland replacement sites and surrounding areas are located above existing Alpha (Foundation Mining, LLC) coal reserves that are proposed for longwall mining. These streams and floodplains will in all likelihood be undermined by future longwall mining activities. The location of projected mining panels within the proposed mitigation areas is illustrated on Figure 8. Longwall mining often produces broad mining induced subsidence as the mining operation advances that may result in loss of stream flow (e.g., stream dewatering) and/or stream pooling within existing surface waters as panel areas subside and interstitial gate areas remain at existing elevations. These issues, if encountered after restoration and mitigation site construction are complete, are regulated by PADEP-CDMO through the Surface Mining Control and Reclamation Act (SMCRA) of 1977 as part of the mining permits that are required for mining operations. Project area streams will be monitored on an ongoing basis in accordance with SMCRA requirements leading up to, during and following mining activities. Corrective measures in accordance with SMCRA requirements will be employed to restore flow or alleviate pooling as necessary and as detailed in the following paragraphs:

Stream Dewatering and Minor Stream Restoration: In the event that underground mining results in stream dewatering and/or flow loss, restoration measures will be proposed as necessary. Minor stream restorations involve 25 PA Code Chapter 105 in-stream activities, including stream channel bedload-alluvium removal to correct flow obstruction by sediment deposition and uncover potential specific streambed dewatering fractures or zones to facilitate additional minor stream restoration measures including surface sealing/grouting and subsurface grouting. Removal of stream channel bedload-alluvium may be necessary at locations to increase or maintain grouting effectiveness, which can be reduced due to sediment coverage of fractures that contribute to flow loss.

Removal of unconsolidated bedload-alluvium suspected to be overlying flow loss features: Removal of stream channel bedload-alluvium will be limited to the removal of material to the original relative profile and cross section of the stream prior to sediment deposition. These materials will be temporarily stockpiled at a designated location for off-site disposal. Any materials removed from the stream bed will be transported off-site (i.e., 50 feet or greater from the stream channel) to ensure there are no on-site erosion and sedimentation issues. Stream channel bedload-alluvium removal will be conducted in a manner that creates the least amount of disturbance to surface property and stream bank stability. With PADEP field approval, stream bedload-alluvium material can be removed manually to enhance the effectiveness of the grouting program. This work may also be accomplished utilizing light equipment from the stream bank, if possible, and within the stream bed when necessary in order to minimize disturbance. Removal of stream bedload-alluvium by mechanized means will require a 25 Pa Code Chapter 105 permit application.

Stream deformation repair or removal of heaved/fractured material associated with flow loss: Removal of heaved bedrock and stream deformation restoration, associated with flow loss, will be limited to the removal of material to establish the original dimension, pattern, and profile prior to subsidence. With PADEP approval, stream deformation repair will be conducted in the most efficient manner that creates the least amount of disturbance to surface property and stream bank stability. This work will be accomplished utilizing light equipment from the stream bank, if possible, and within the stream bed, when necessary, to minimize disturbance.

Surface flow loss feature sealing: Flow loss features, such as surface fractures and bedding plane separations, will be sealed by two primary methods.

The first method will be to redirect surface flow to enable for the direct sealing of surface fractures and cracks with bentonite, grout, or mechanical compaction of impermeable stream bed materials that are in place or a combination of these procedures. These procedures are performed in an effort to reduce near-surface permeability, at known, or suspected flow loss zones (e.g., low fracture density locations). Bentonite sealing will only be conducted by placement of material in exposed fractures and will not be broadcast in a stream channel. Bentonite placement will be conducted in a manner to minimize downstream migration and to prevent pollution.

The second method will involve shallow consolidation grouting, or the drilling of shallow vertical and/or incline boreholes to introduce balanced-stable bentonite amended cement or synthetic grout under pressure. The streambed consolidation grouting program, where employed, will be performed by injecting grout into the shallow subsurface via 3/8 to 2-inch diameter boreholes that terminate at depths of 3 to 6 feet below ground surface. Targeted reaches will be grouted using both patterned and selected point specific approaches, based upon stream flow measurements and possibly geophysical data. Areas immediately upstream, downstream, and within the channel section exhibiting flow loss will be included. A regular geometric pattern will be used to site the boreholes, with the option of some percentage of the boreholes being drilled at an angle under the adjacent stream bank. Borehole spacing will be selected based on the condition of fracturing, but is expected to range from 3 to 10 feet on center. A tighter initial spacing may be considered for grouting of discrete fracture zones. The type of grout typically used is either bentonite-amended cement or a polyurethane mixture.

Grouting will be performed in stages, working bottom to top, targeting specific subsurface horizons. Packer assemblies, or other similar approaches, may be used to achieve this objective. Grout injection pressures will be determined in the field by the grouting contractor. Injection pressures will be sufficient to place grout as far as possible into the formation without the creation of secondary fractures or induce heaving in near surface strata. Injection boreholes that receive an excessive volume of grout will have secondary boreholes installed surrounding the primary injection borehole. This

secondary set of boreholes will be drilled in a geometric pattern on centers that are half the distance of the original borehole spacing.

Streambed grouting will be performed in phases, working from upstream to downstream. Each phase of work will treat a limited reach of streambed, covering approximately 100 to 300 feet of stream. After a given reach of streambed is grouted, the effectiveness of the grouting program will be evaluated by measuring stream flow in the treated reach. If stream flows are low or absent when the grouting program is conducted, flow augmentation will be used to induce flow into the reach to be monitored. Stream flow will be measured along the treated reach at stations established at appropriate intervals to determine if losses are present.

Stream Pooling Related Issues: Per SMCRA regulations (Pennsylvania Department of Environmental Protection (PADEP) Technical Guidance Document (TGD) 563-2000-655), stream restoration is required in areas where pooling in excess of 1 foot (over and above existing stream depth) is caused by subsidence effects of longwall mining. The pooling predicted or observed in these locations is caused by lack of a "gate" subsiding, and the adjacent subsidence of upstream areas within the panel area of the longwall mine. Gates are approximately 200-feet wide and are utilized underground for access to the coal seam by workers and equipment. Because residual portions of the coal seam are left in place, these areas remain un-subsided after mining has progressed through the area. Conversely, the panels are fully undermined and allowed to subside which causes a depression on the surface. When post-mining streams flow in such a fashion that the downstream gate becomes higher in elevation than the upstream areas located overtop subsided panels, a backwater effect results, causing excess pooling.

Gate cutting: A procedure where a new longitudinal stream profile and grade are established through the elevated gate area at the surface to promote positive flow of the stream, or at a minimum, reduce or eliminate the pooling. The gate cut starts at the lowest portion of the pool and proceeds downstream at a new slope through the gate, and ends at a point where it once again intersects the existing streambed elevation.

Substrate Restoration: Post gate cutting substrate restoration and the prevention of excess channel erosion includes one or more of the following; removal and stockpile of existing streambed material for re-distribution on the new streambed; replacement of streambed material with equivalently sized material from another source.

If suitable streambed material is encountered during the gate-cutting process, it should be stockpiled and placed to a depth of 3-4 inches in the newly cut channel such that the material brings the final streambed grade to the design elevation. Suitable material is considered sand, rounded river gravel, cobbles and boulders. If insufficient bed material is found on-site, a 50:50 mixture of R-3 sized rounded river gravel and 2A-sized rounded

river gravel shall be deposited in the streambed in the same manner as described above. This material should not consist of quarried stone with angular edges; rather it should come from a dredging operation and consist of rounded, smooth material.

If bedrock is encountered and is removed via excavator or pneumatic hammer, this material should be removed from the site. Fractured bedrock material is not suitable streambed material and should not be placed in the stream. In areas where bedrock is cut, no additional streambed material should be placed on top of the bedrock.

Natural Disasters/Catastrophic Event Contingency: In any case, during the Life-of-Permit monitoring phase (anticipated to be 20 years) should a catastrophic precipitation event (inches per hour) or other such unforeseen natural disaster occur following stream and wetland mitigation area construction that would result in partial or total failure of the mitigation area, FMLLC will provide for the reconstruction of the affected mitigation area. Following such an event, FMLLC will consult with the USACE, and PADEP to determine the appropriate course of action regarding stream and wetland mitigation requirements based on the post- catastrophic event site conditions.

Future Modification to Performance Standards Contingency: If as the result of site monitoring (Life-of-Permit – anticipated to be 20 years), FMLLC should determine that the stream restoration and/or wetland replacement areas have achieved or are achieving stated mitigation goals and objectives (metrics) through unintended or unanticipated ways, modification of the stated performance standards will be permitted. FMLLC will prepare a detailed monitoring report and supporting studies and analysis to justify the modification of the standards and an explanation how the mitigation site(s) meets the developed standards.

9.0 Mitigation Monitoring and Long Term Management

Specific timeframes for the commencement of mitigation site monitoring are dependent on a number of factors including the receipt of necessary permits and agency approvals from the PADEP, and the USACE, and the final design and implementation of the mitigation plan. However, assuming the successful completion of the above activities, the following construction and monitoring schedule is envisioned for the project, once all necessary permit authorizations have been obtained.

Party Responsible for Monitoring and Long-Term Maintenance:

FMLLC will be the responsible party for the Life-of-Permit monitoring of the mitigation site upon completion. Contact information for FMLLC is provided below:

Foundation Mining, LLC
P.O. Box 1020
158 Portal Road
Waynesburg, PA 15370
Mr. Chester Huff, P.E. – Sr. Project Engineer
724-852-5818

Mrs. Michelle Anderson will be the point of contact for FMLLC regarding the mitigation sites for the project. Her contact information is provided below.

Mrs. Michelle Anderson
Environmental Specialist
PA Land Holdings Company, LLC
PO Box 1020 158 Portal Road
Waynesburg, PA 15370
724-852-5889

Mitigation Implementation Schedule: FMLLC anticipates that the construction of the stream and wetland mitigation area will be concurrent with the proposed aquatic resource impacts for the development of the Foundation Mine Complex surface facilities. Upon final construction of the stream restoration and wetland replacement sites, an as-built survey of the entire mitigation areas will be completed to serve as the baseline condition for all future monitoring inspections and the survey will be used as the base mapping for the monitoring report documentation and all future assessments. It is anticipated that the monitoring inspection program would commence within approximately 6 months of the completion of the mitigation site construction. Assuming that the necessary permits are issued by the end of 2013 and mitigation construction is completed by the end of 2015, initial monitoring inspection is expected to occur within the second quarter of 2016. Given this scenario, wetland and stream mitigation site monitoring would continue for the life of the mining operations and mining permits and is anticipated to continue for approximately 20 years, at which time all of the mitigation goals and objectives would have been met. Mitigation monitoring will occur 2 times per year for the first 2 years and then once per year thereafter, for a total of approximately 22 monitoring inspections.

The stream mitigation area will be monitored to determine the success of both early and late season riparian vegetation establishment and to observe the stream following periods of expected high and low flow conditions. All monitoring will be performed by qualified scientist(s). The results of the monitoring inspections will be documented in formal monitoring reports that will be submitted to PADEP and USACE on an annual basis.

Mitigation Monitoring Reports: Each monitoring report will be submitted to the PADEP and USACE within 45 days of the inspection date(s). Prior to initiating the monitoring program, permanent photo stations will be established within the mitigation areas to track the development of the stream and wetland systems over time. These photographs will be incorporated within the report along with other site condition data. Specifically, each monitoring report will include the following information:

1. Photographs taken from the permanently established locations with photo location map.
2. Associated site design mapping, including as-built stream and wetland mitigation mapping.
3. Most recent stream conditions assessment and water chemistry sampling data. Water chemistry parameters include; dissolved oxygen, conductivity, temperature, pH, alkalinity, hot acidity, iron, aluminum, manganese, sulfate, and suspended solids. Habitat assessments will be conducted according to methods prescribed in the U.S. Environmental Protection Agency's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour et. al. 1999) and PADEP Appendix B sampling protocols as specified in the TGD.
4. Wolman Pebble Count data at established representative stream mitigation reaches.
5. Identification of dominant plant taxa and their relative abundance within wetland plant communities, stream floodplain areas, and the established riparian buffer and stream preservation areas.
6. Estimates of the percent aerial coverage by the dominant plant taxa within wetland plant community.
7. Preparation of *Corps of Engineers Wetland Delineation Manual (Technical Report Y-87-1).* (Environmental Laboratory (1987)) data forms for each of the 3 wetland cells.
8. Narrative discussion of wetland functions being provided as defined in; US Army Engineer District, Pittsburgh. The *Highway Methodology Workbook Supplement; Wetland Functions and Values A Descriptive Approach* (Technical Report NEDEP-360-1-30a). (Boston, MA: Author (1995).
9. Narrative discussion of the preserved, restored, and reconstructed stream conditions.
10. Seasonal benthic macroinvertebrate samples and analysis according to methods prescribed in the U.S. Environmental Protection Agency's *Rapid*

Bioassessment Protocols for Use in Wadeable Streams and Rivers (Barbour et. al. 1999) within mitigation streams at established sampling points.

11. Identification of the presence and relative abundance of any invasive or exotic vegetation, including recommendations for any corrective action, if necessary.
12. Identification and discussion of any structural, vegetative, or functional deficiencies within the stream or wetland mitigation areas.
13. If warranted, a detailed remedial action plan will be developed and included in the report, including goals and objectives of the remediation efforts, substitute practices or plantings and species recommendations.
14. Observations of wildlife use of mitigation wetlands and stream mitigation corridor.
15. Estimated percent complete for all mitigation site performance parameters including any additional functions, habitats, or opportunities that the mitigation site provides.

Should the monitoring inspection reveal serious deficiencies within the mitigation area requiring immediate attention, a detailed action plan of specific corrective action or remedial measures to address the deficiency (ies) and ensure that the mitigation area meets the wetland and stream mitigation goals and success criteria will be developed and submitted with the regular monitoring report.

10.0 FINANCIAL ASSURANCE MECHANISMS

FMLLC is committed to provide appropriate financing to ensure that, upon acceptance of the conceptual mitigation plan and completion of final stream and wetland mitigation design, the approved compensatory stream and wetland mitigation plan is fully implemented, the mitigation areas are properly managed and monitored for both the short and long term, and the wetland and stream mitigation areas ultimately meet the stated functional and compensatory goals and objectives.

Securing financial assurances will be the sole responsibility of FMLLC, a subsidiary of Alpha Natural Resources, Inc. based in Waynesburg, Greene County, PA. Contact information for FMLLC is provided below:

Foundation Mining, LLC
P.O. Box 1020
158 Portal Road
Waynesburg, PA 15370
Mr. Chester Huff, P.E. – Sr. Project Engineer
724-852-5818

At this time, the potential/proposed mitigation sites are located predominantly on properties owned or controlled by FMLLC. FMLLC anticipates that once the conceptual mitigation plan has been accepted by USACE and PADEP, the process of final plan preparation, securing temporary construction access, and the development of the required perpetual conservation easements/restrictive covenants will be completed.

FMLLC will provide financial assurance through any one or several available mechanisms such as:

- Letter of Credit
- Performance or Surety Bond
- Cash in Escrow Account
- Casualty Insurance

The specific financial assurance method will be presented in the final mitigation plan following final design and the completion of the final project cost estimate.

FMLLC has identified Mrs. Michelle Anderson as the point of contact for the development, implementation, monitoring and maintenance of the compensatory wetland and stream mitigation project. Mrs. Anderson's contact information is provided below.

Mrs. Michelle Anderson
Environmental Specialist
PA Land Holdings Company, LLC
PO Box 1020 158 Portal Road
Waynesburg, PA 15370
724-852-5889

11.0 ANTICIPATED PERMITS AND APPROVALS FOR COMPENSATORY MITIGATION AND UNRESOLVED ISSUES RELATED TO PROPOSED COMPENSATORY MITIGATION

Anticipated Permits and Approvals: Over the past 4-5 years, FMLLC has been in the process of obtaining the state and federal mining, construction, and environmental permits, necessary to advance the proposed Foundation Mine project. However, the implementation of the proposed stream and wetland mitigation plans will also require additional local, state and federal permitting and approvals for various aspects of construction of the proposed mitigation.

Based on recent coordination with USACE Pittsburgh District, PADEP-CDMO, PADEP Southwest Regional Office, the Center and Jackson Township Administrative Offices, PENNDOT District 12-0, and the anticipated need for temporary construction access and construction easements along state and local roads, FMLLC anticipates the following permits and approvals will be necessary to complete the implementation of the proposed Stream and Wetland Mitigation project for the Foundation Mine Complex project:

Authorization Type	Permit or Approval Needed	Authority/ Agency	Status
Federal	Section 404 Permit (stream restoration)	USACE	In progress
	PASPGP-04	USACE	Pending
State	Section 401 Water Quality Certification	PADEP - CDMO	Pending
	25 PA Code Chapter 105 Permit (stream restoration activities)	PADEP – CDMO/PADEP-SWRO	Pending
	PennDOT Highway Occupancy Permit (S.R. 0018, Golden Oaks Road)	PennDOT, District 12-0	Pending
	PNDI - Threatened and Endangered Species Coordination Clearance and resolution of species conflicts	PFBC	Pending
	PHMC - BHP Cultural Resources Clearances	Bureau for Historic Preservation (BHP), Pennsylvania Historical and Museum Commission (PHMC), State Historic Preservation Office (SHPO).	In progress
	NPDES Construction Discharge Permit	PADEP	Pending
Local	Township Road Use and Bonding Agreements (various local roadways)	Center & Jackson Townships	Pending
	E & S Plan Approval	Greene County Conservation District	Pending

This listing does not include the various underground mining permits and SMCRA surface facility permits that are necessary for the development of the surface facilities and future mining activities and which are in various stages of development and preparation by FMLLC and/or administrative and technical review by PADEP-CDMO. Any additional permits or approvals not specifically listed here will be obtained as necessary through future coordination and consultation with various federal, state and local agencies.

Unresolved Issues Related to Compensatory Mitigation: The Conceptual Compensatory Mitigation Plan was developed to the extent possible however until the final determination of the extents of required mitigation, certain aspects of the proposal may be modified during the permit review phase and thus are difficult to finalize. The following items are currently outstanding and are either pending conditional approval of the mitigation proposal or are in the process of being resolved through coordination and consultation with appropriate agencies.

Hydrologic and Hydraulic Studies: During the mitigation planning phase, PADEP-CDMO indicated that detailed hydrologic and hydraulic studies (HEC-RAS) will be required for stream restoration areas that occur within designated FEMA 100-year floodplain areas to provide assurances that restoration activities will not elevate the existing floodplain elevation more than 1.0 feet above the current elevations post-restoration. Restoration areas MR-1, G-1, G-2 and portions of HR-1 and the Hoge Run Relocation are subject to this requirement as these reaches exist within Zone A (100-year floodplains) as depicted on FEMA-Flood insurance rate mapping (FIRM). HEC-RAS analysis has been completed for the Hoge Run Relocation as part of the detailed design and is provided in Attachment A. FIRM maps of the MR-1, G-1, G-2 and HR-1 sites are provided in Attachment C. Upon conditional approval of the Conceptual Mitigation Plan supplemental HEC-RAS analysis will be conducted, as appropriate, for mitigation area MR-1 (McCourtney Run mainstem), G-1, G-2 (Garner Run mainstem) and HR-1 (House Run mainstem). Because of the nature of the proposed stream restoration (increase in channel cross-sectional area), none of the proposed activities are anticipated to increase existing 100 year flood elevations above the acceptable level.

Restoration Area PNHP Review Conflicts: Several potential conflicts with Special Concern Species have been preliminarily identified within the proposed restoration areas as indicated below:

- PADCNR Conflicts – Special Concern Species – Common Roadside Skipper (*Amblyscirtes vialis*) – A butterfly. PA imperiled species - The conflicts were identified in PNHP environmental review for various restoration locations along

Garner Run, House Run and McCourtney Run. In a response letter dated November 1, 2011, PADCNR determined that no impacts to the potential species were likely to result from the Project and that no further consultation was necessary. The PADCNR response letter is provided in Attachment E.

- PFBC Conflicts – Special Concern Species – Wabash Pigtoe (*Fusconaia flava*) - A fresh water mussel. Proposed PA endangered species - The conflicts were identified in PNHP environmental review for various restoration locations in Hoge Run and McCourtney Run. Coordination with PFBC is currently ongoing and the response letter and any further consultation information will be incorporated into the permit application as required.

FMLLC is in the process of resolving the remaining conflict regarding the Wabash Pigtoe mussel through further consultation with PFBC as required. A letter from PFBC will be provided as an addendum to the application once coordination is complete and the conflicts have been resolved.

PHMC – Section 106 Cultural Resources Investigations (Historical and Archaeological) and Clearances: FMLLC is in the process of completing cultural resources investigations in accordance with Section 106 requirements for the entire Foundation Mine Complex Project area including the proposed stream restoration, wetland mitigation and stream preservation areas. Upon completion of cultural resources investigations, supporting correspondence and clearance documentation from PHMC for the stream restoration and wetland mitigation areas will be provided as an addendum to the application.

12.0 REFERENCES

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