ATTACHMENT 18
Wetland Survey and Determination
Special Waste Landfill Permit
Big Sandy Plant – Ash Pond Closure
Lawrence County, Kentucky

A Wetlands Delineation was performed by URS in 2012. Three separate walkovers were completed over the Project study area in May, June, and October of 2012. The draft report, attached, is currently under review.

BIG SANDY FLY ASH
POND CLOSURE PROJECT

WETLAND DELINEATION AND STREAM ASSESSMENT REPORT

Prepared for:
American Electric Power
1 Riverside Plaza
Columbus, Ohio 43215

525 Vine Street, Suite 1800
Cincinnati, Ohio 45202

May 2013

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

Appendix

LIST OF ACRONYMS and ABBREVIATIONS

AEP	American Electric Power, Incorporated
EPA	Environmental Protection Agency
FAC	Facultative
FACU	Facultative upland
FACW	Facultative wetland
GPS	Global Positioning System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate wetland
OHWM	Ordinary high water mark
ORAM	Ohio Rapid Assessment Method
PEM	Palustrine emergent
PHWH	Primary Headwater Habitat
PSS	Palustrine scrub/shrub
UPL	Upland
U.S.	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 INTRODUCTION

Kentucky Power Company, a unit of American Electric Power (AEP), is proposing to permanently close the Big Sandy Fly Ash Pond located in Lawrence County, Kentucky. AEP owns and operates the 1,097 MW Big Sandy Plant on the west bank of the Big Sandy River near Louisa, Kentucky. Currently, coal combustion fly ash from the plant is disposed in the Big Sandy Fly Ash reservoir, which is impounded by the Horseford Creek Dam located approximately 0.75-mile northwest of the plant. In expectation of future Federal Regulations pertaining to wet ash impoundments, AEP is proposing the design closure of the Plant's 130 acre wet fly ash impoundment; which is referred to as the Big Sandy Fly Ash Pond Closure Project ("Project"). AEP is proposing the completion of the Project since the fly ash pond will no longer be needed for wet sluice disposal beginning in 2016. It is AEP's desire to permanently close the facility by draining and capping the Big Sandy Fly Ash Pond. The lead federal agency for the Project is the United States Army Corps of Engineers, Louisville District (USACE). An overview of the wetland delineation limits for the proposed Project is illustrated on Figure 1.

Land uses within the Project survey area were assigned a general classification based upon the principal land characteristics of the location as observed from within a given area, aerial photograph review, and field surveys. General land use types within the Project survey area include: wooded uplands (young to mature oak-mixed mesophytic forests and young maple-mixed mesophytic forests), wetlands, and fly ash pond. Wooded uplands are the most dominant land use along the Project.

2.0 METHODOLOGY

The purpose of the field survey was to assess whether wetlands and other "waters of the U.S." exist within the approximately 602 acre Project survey area. Prior to conducting field surveys, digital and published county Natural Resources Conservation Service (NRCS) soil surveys, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps, and U.S. Geological Survey (USGS) 7.5-minute topographic maps were reviewed as part of the process to determine the occurrence and location of potential wetland areas.

In May, June, and October 2012, URS biologists walked the Project study area to conduct a wetland delineation and stream assessment. The study area was determined by using the approximate limit of disturbance for the pond closure excavation activities.

During field surveys, the physical boundaries of observed water features were recorded using sub-meter accurate Trimble Global Positioning System (GPS) units. The GPS data was then imported in to ArcMap GIS software where the data was then reviewed and edited for errors.

The field survey results presented herein apply to the existing and reasonably foreseeable site conditions at the time of our assessment. They cannot apply to site changes of which URS is unaware and has not had the opportunity to review. Changes in the condition of a property may occur with time due to natural processes or human impacts at the project site or on adjacent properties. Changes in applicable standards may also occur as a result of legislation or the expansion of knowledge over time. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond the control of URS.

2.1 WETLAND DELINEATION

The Project survey area was evaluated according to the procedures outlined in the U.S. Army Corps of Engineers (USACE) *1987 Wetland Delineation Manual* (*1987 Manual*) (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (*Regional Supplement*) (USACE, 2012). The *Regional Supplement* was released in April 2012 by the USACE to address regional wetland characteristics and improve the accuracy and efficiency of wetland delineation procedures. The *1987 Manual and Regional Supplement* define wetlands as areas that have positive evidence of three environmental parameters: hydric soils, wetland hydrology, and hydrophytic vegetation. Wetland boundaries are placed where one or more of these parameters give way to upland characteristics.

Since quantitative data were not available for any of the identified wetlands, URS utilized the routine delineation method described in the *1987 Manual* and *Regional Supplement* that consisted of a pedestrian site reconnaissance, including identifying the vegetation communities, soils identification, a geomorphologic assessment of hydrology, and notation of disturbance. The methodology used to examine each parameter is described in the following sections. The results of the wetland delineation are presented in Section 3.1 and completed USACE forms recorded for delineated wetlands at the site are provided in Appendix A.

2.1.1 SOILS

Soils were examined using a spade shovel to extract soil samples. The soils were examined for hydric soil characteristics. A *Munsell Soil Color Chart* (Kollmorgen Corporation, 2000) was used to identify the hue, value, and chroma of the matrix and mottles of the soils. Generally, mottled soils with a matrix chroma of two or less, or unmottled soils with a matrix chroma of one or less are considered to exhibit hydric soil characteristics (Environmental Laboratory, 1987). In

sandy soils, mottled soils with a matrix chroma of three or less, or unmottled soils with a matrix chroma of two or less are considered to be hydric soils.

Seven map units from one soil series and three soil series complexes are mapped within the Project survey area (USDA, 2013). Table 1 provides a list of these soil map units along with their basic attributes.

According to the *Web Soil Survey* (USDA, 2013) and the NRCS Hydric Soils List of Kentucky, there are no soil map units within the Project survey boundary listed as containing any hydric component.

2.1.2 HYDROLOGY

The *1987 Manual* requires that an area be inundated or saturated to the surface for an absolute minimum of five percent of the growing season (areas saturated between five percent and 12.5 percent of the growing season may or may not be wetlands, while areas saturated over 12.5 percent of the growing season fulfill the hydrology requirements for wetlands). The *Regional Supplement* states that the growing season dates are determined through onsite observations of the following indicators of biological activity in a given year: (1) above-ground growth and development of vascular plants, and/or (2) soil temperature (12-in. depth) is 41 degree Fahrenheit (^{o}F) or higher as an indicator of soil microbial activity. Therefore, the beginning of the growing season in a given year is indicated by whichever condition occurs earlier, and the end of the growing season by whichever persists later.

The *Regional Supplement* also states that if onsite data gathering is not practical, the growing season can be approximated by the number of days between the average (five years out of ten, or 50 percent probability) date of the last and first 28^{o}F air temperature in the spring and fall, respectively. The National Weather Service WETS data obtained from the NRCS National Water and Climate Center did not identify any growing season records for Lawrence County. The nearest county to the Project area, Boyd County, was identified with data indicating that in an average year, this period lasts from April 18 to October 22, or 187 days. Based on this information it is estimated that in the Project area, five percent of the growing season equates to approximately 9 days.

The soils and ground surface were examined for evidence of wetland hydrology in lieu of detailed hydrological data. This is an acceptable approach according to the *1987 Manual* and the *Regional Supplement.* Evidence indicating wetland hydrology typically includes primary indicators such as surface water, saturation, water marks, drift deposits, water-stained leaves, sediment deposits and oxidized rhizospheres on living roots; and secondary indicators such as,

drainage patterns, geomorphic position, micro-topographic relief, and a positive Facultative (FAC)-neutral test (USACE, 2011).

Review of USGS watershed data indicates that the Project is located within the Big Sandy River watershed (USGS, 2012). Within the Big Sandy River watershed, the Project study area is also within two minor watersheds; Blaine Creek and Big Sandy River.

2.1.3 VEGETATION

Dominant vegetation was visually assessed for each stratum (tree, sapling/shrub, herb and woody vine) and an indicator status of obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and/or upland (UPL) was assigned to each plant species based on the U.S. Army Corps of Engineers *2012 National Wetland Plant List: Eastern Mountains and Piedmont Region,* which encompasses the area of the Project. An area is determined to have hydrophytic vegetation when, under normal circumstances, 50 percent or more of the composition of the dominant species are OBL, FACW and/or FAC species. Vegetation of an area was determined to be non-hydrophytic when more than 50 percent of the composition of the dominant species was FACU and/or UPL species. In addition to the dominance test, the FAC-Neutral test and prevalence tests are used to determine if a wetland has a predominance of hydrophytic vegetation. Recent USACE guidance indicates that to the extent possible, the hydrophytic vegetation decision should be based on the plant community that is normally present during the wet portion of the growing season in a normal rainfall year (USACE, 2012). Table 2 lists the vegetation that was identified in delineated wetlands during field surveys.

2.1.4 WETLAND CLASSIFICATIONS

Wetlands were classified based on the naming convention found in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al*, 1979). All identified wetlands within the survey area were classified as freshwater, Palustrine systems, which include all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens. Three Palustrine wetland classes were identified within the Project survey area. The three classes are as follows:

- ***PEM*** – Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.

- ***PSS*** – Scrub/shrub wetlands are characterized by woody vegetation that is less than 3 inches diameter at breast height (DBH), and greater than 3.28 feet tall. The woody

angiosperms (i.e. small trees or shrubs) in this broad leaved deciduous community have relatively wide, flat leaves that are shed annually during the cold or dry season.

- ***PFO*** – Forested wetlands are characterized by woody vegetation that is 3 inches or more DBH, regardless of height. The woody angiosperms (i.e. trees or shrubs) in this broad leaved deciduous community have relatively wide, flat leaves that are shed annually during the cold or dry season.

2.1.5 OHIO RAPID ASSESSMENT METHOD V. 5.0

Since Kentucky does not have a functional assessment protocol for evaluating wetlands, the USACE Louisville district requested that URS ecologists follow the Ohio Environmental Protection Agency (Ohio EPA) Ohio Rapid Assessment Method for Wetlands v. 5.0 (ORAM). The ORAM method was developed to determine the relative ecological quality and level of disturbance of a particular wetland in order to meet requirements under Section 401 of the Clean Water Act. Wetlands are scored on the basis of hydrology, upland buffer, habitat alteration, special wetland communities, and vegetation communities. Each of these subject areas is further divided into subcategories under ORAM v. 5.0 resulting in a score that describes the wetland using a range from 0 (low quality and high disturbance) to 100 (high quality and low disturbance). Wetlands scored from 0 to 29.9 are grouped into "Category 1", 30 to 59.9 are "Category 2" and 60 to 100 are "Category 3". Transitional zones exist between “Categories 1 and 2” from 30 to 34.9 and between “Categories 2 and 3” from 60 to 64.9. However, according to the Ohio EPA, if the wetland score falls into the transitional range, it must be given the higher Category unless scientific data can prove it should be in a lower Category (Mack, 2001). The ORAM scores for the wetlands that were delineated are discussed in Section 3.1.4 of this report.

Category 1 Wetlands

Category 1 wetlands support minimal wildlife habitat, hydrological and recreational functions, and typically do not provide for or contain critical habitats for threatened or endangered species. In addition, Category 1 wetlands are often hydrologically isolated and have some or all of the following characteristics: low species diversity, no significant habitat or wildlife use, limited potential to achieve wetland functions, and/or a predominance of non-native species. These limited quality wetlands are considered to be a resource that has been severely degraded or has a limited potential for restoration, or is of low ecological functionality.

Category 2 Wetlands

Category 2 wetlands "...support moderate wildlife habitat, or hydrological or recreational functions," and as wetlands which are "...dominated by native species but generally without the

presence of, or habitat for, rare, threatened or endangered species; and wetlands which are degraded but have a reasonable potential for reestablishing lost wetland functions." Category 2 wetlands constitute the broad middle category of "good" quality wetlands, and can be considered a functioning, diverse, healthy water resource that has ecological integrity and human value. Some Category 2 wetlands are lacking in human disturbance and considered to be naturally of moderate quality; others may have been Category 3 wetlands in the past, but have been degraded to Category 2 status.

Category 3 Wetlands

Wetlands that are assigned to Category 3 have "...superior habitat, or superior hydrological or recreational functions." They are typified by high levels of diversity, a high proportion of native species, and/or high functional values. Category 3 wetlands include wetlands which contain or provide habitat for threatened or endangered species, are high quality mature forested wetlands, vernal pools, bogs, fens, or which are scarce regionally and/or statewide. It is important to stress that a wetland may be a Category 3 wetland because it exhibits one or all of the above characteristics. For example, a forested wetland located in the flood plain of a river may exhibit "superior" hydrologic functions (e.g. flood retention, nutrient removal), but not contain mature trees or high levels of plant species diversity.

2.2 STREAM ASSESSMENTS

Streams were identified by the presence of a defined bed and bank, and evidence of an ordinary high water mark (OHWM). As defined in Title 33 Code of Federal Regulations (CFR) 328.3(e), the term OHWM means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area (33 CFR 328.3e, 1993). Although not exhaustive, USACE Regulatory Guidance Letter No. 05-05 (RGL05-05) identifies 15 characteristics of a OHWM such as natural line impressed on the bank, shelving, changes in the soil character, scour and several other indicators (USACE, 2005). RGL05-05 recommends that two or more characteristics be used to make the OHWM determination unless there is particularly strong evidence for one.

Stream assessments were conducted using the methods described in the USACE's *Operational Draft Regional Guidebook for the Functional Assessment Of High-Gradient Ephemeral And Intermittent Headwater Streams In Western West Virginia And Eastern Kentucky* (USACE, 2010) and the U.S. EPA's *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition* (Barbour et al. 1999).

2.2.1 USACE FUNCTIONAL ASSESSMENT OF HIGH-GRADIENT EPHEMERAL AND INTERMITTENT HEADWATER STREAMS IN WESTERN WEST VIRGINIA AND EASTERN KENTUCKY

Headwater streams are typically considered to be first-order and second-order streams, meaning streams that have no upstream tributaries (or "branches") and those that have only first-order tributaries, respectively. The stream order concept can be problematic when used to define headwater streams because stream-order designations vary depending upon the accuracy and resolution of the stream delineation. Headwater streams are generally not shown on USGS 7.5-minute topographic quadrangles and are sometimes difficult to distinguish on aerial photographs. Nevertheless, headwater streams are now recognized as useful monitoring units due to their abundance, widespread spatial scale and landscape position (Fritz, et al. 2006). Impacts to headwater streams can have a cascading effect on the downstream water quality and habitat value.

The headwater streams located within the Project area were evaluated using the USACE's *Operational Draft Regional Guidebook for the Functional Assessment Of High-Gradient Ephemeral And Intermittent Headwater Streams In Western West Virginia And Eastern Kentucky* (USACE, 2012). This Regional Guidebook indicates the objective of this method is to meet the needs of federal and state agencies for a procedure to assess potential impact and mitigation reaches of streams in eastern Kentucky and western West Virginia.

This assessment method relies on 11 variables to assess the functions of headwater streams within eastern Kentucky and western West Virginia that include channel canopy cover, channel substrate embeddedness, channel substrate size, potential channel bank erosion, large woody debris, riparian/buffer zone tree diameter, riparian/buffer zone snag density, riparian/buffer zone sapling/shrub density, riparian/buffer zone species richness, riparian/buffer zone soil detritus, riparian/buffer zone herbaceous cover, and watershed land-use.

The objective of the stream analysis is to create baseline conditions of the function of the streams within an area and to be able to compare the difference between pre-project and post-project conditions. This functional difference represents the potential loss or gain of functional capacity of the streams as a result of the Project.

Completed USACE high-gradient ephemeral and intermittent headwater stream forms are provided in Appendix C. Results of the high-gradient ephemeral and intermittent headwater stream assessments are discussed in Section 3.2.1 of this report.

2.2.2 U.S. EPA RAPID BIOASSESSMENT PROTOCOLS FOR USE IN STREAMS AND WADEABLE RIVERS

Streams within the Project survey corridor that were identified as perennial, containing substrate dominated by 50 percent or greater bedrock within the stream reach, containing major hydrologic inputs from groundwater, or an estimated gradual slope of four percent or less were not evaluated using the USACE's Functional Assessment of High-Gradient Ephemeral and Intermittent streams since the methodology was not intended for assessment of these types of streams. The stream assessment for these streams was conducted using the methods described in the U.S. EPA's *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition* (Barbour et al. 1999). The protocols include a method for habitat assessment that is calibrated to the stream's biological condition, which is abbreviated as the "HABSCORE". The HABSCORE is an independent, non-invasive, repeatable procedure for statistically defensible biological surveys. It provides a method to assess the quality of instream and riparian habitat. The assessed stream locations within the Project survey area are included on Figures 3A and 3K.

HABSCORE relies on visual observations of 10 parameters including substrate type, embeddedness, sediment deposition, water velocity, flow status, channel alteration, general morphology, bank stability, riparian zone vegetation quantity and width to provide an overall assessment of the sampling site. The 200-point system is broken down into four categories: Optimal (160-200), Sub-Optimal (110-159), Marginal (60-109), and Poor (<60). The form includes nonparametric factors for basic water quality measurements, dominant plant species, land uses, non-point sources of pollution, woody debris, sediment odors, presence of oils and black deposits, among others. The protocols also distinguish between high-gradient and low-gradient streams with different forms for each. Results of the rapid bioassessment are discussed in Section 3.2.2 of this report

3.0 RESULTS

Within the 602 acre Project study area, URS delineated 17 wetlands, 154 streams, and one pond. The delineated wetlands and other water features are discussed in detail in the following sections.

3.1 WETLAND DELINEATION

The locations, approximate extents, and acreages of the wetlands delineated within the Project survey area are shown on Figures 3A and 3K. Completed USACE wetland delineation forms are provided in Appendix A. Color photographs were taken of each delineated wetland during the field survey and are provided in Appendix E1.

3.1.1 Preliminary Soils Evaluation

According to the USDA/NRCS Web Soil Survey of Lawrence County, Kentucky (USDA 2013) and the NRCS Hydric Soils List of Kentucky, one soil series and three soil series complexes are mapped within the Project survey area. No soil series within the Project survey area was identified with any hydric soil map units (NRCS, 2012). Soils in each wetland were observed and documented as part of the delineation methodology. Soil series located within the Project survey area are shown on Figures 2. Table 1 provides a detailed overview of all soil series within the Project survey area.

3.1.2 National Wetland Inventory Map Review

National Wetland Inventory (NWI) wetlands are areas of potential wetland that have been identified from USFWS aerial photograph interpretation which have typically not been field verified. Forested and heavy scrub/shrub wetlands are often not shown on NWI maps as foliage effectively hides the visual signature that indicates the presence of standing water and moist soils from an aerial view. The USFWS website states that the NWI maps are not intended or designed for jurisdictional wetland identification or location. As a result, NWI maps do not show all the wetlands found in a particular area nor do they necessarily provide accurate wetland boundaries. NWI maps are useful for providing indications of potential wetland areas, which are often supported by soil mapping and hydrologic predictions, based upon topographical analysis using USGS topographic maps.

According to the NWI maps of the Fallsburg and Prichard, Kentucky quadrangles, the Project survey area contains three mapped NWI wetlands: one Palustrine Emergent Persistent Semi-permanently Flooded Diked/Impounded wetland (PEM1Fh), one Lacustrine Limnetic Unconsolidated Bottom Permanently Flooded Diked/Impounded (L1UBHh) feature, and one Palustrine Unconsolidated Bottom Permanently Flooded Diked/Impounded (PUBHh) wetland (USFWS, 2012). Summary information on NWI mapped wetlands is presented in Table 3 and shown on Figure 2.

3.1.3 Delineated Wetlands

The delineation identified a total of 17 wetlands, totaling 1.64 acres, within the Project survey area as shown in Table 4. The 17 wetlands are of three different wetland habitat types: 11 PEM wetlands, five PEM/PSS wetlands, and one PFO wetland. See Table 3.1.3 for a summary of the delineated wetlands.

The locations, approximate extents, and acreages of the wetlands identified within the survey areas are shown on Figures 3A and 3K. Completed USACE wetland delineation forms are

provided in Appendix A. Color photographs were taken of each delineated wetland during the field survey and are provided in Appendix E1.

TABLE 3.1.3
SUMMARY OF DELINEATED WETLANDS WITHIN
THE BIG SANDY POND CLOSURE PROJECT SURVEY AREA

Cowardin Wetland Type[a]	ORAM Category 1	ORAM Category 2	ORAM Category 3	Number of Wetlands	Acreage within Survey Corridor
PEM	11	0	0	11	0.65
PEM/PSS	2	3	0	5	0.44
PFO	0	1	0	1	0.55
Total	**13**	**4**	**0**	**17**	**1.64**

Cowardin Wetland Type[a] : PEM = palustrine emergent, PSS = palustrine scrub/shrub, PFO = palustrine forested

3.1.4 Delineated Wetlands ORAM V5.0 Results

Within the Project survey area, 13 of the 17 wetlands are Category 1 wetlands, while the remaining four wetlands are Category 2 wetlands. No Category 3 wetlands were identified within the Project survey area. Wetland 15 had the lowest ORAM score, 21.5, while Wetland 14 had the highest score, 47. Completed ORAM forms for the wetlands are provided in Appendix B.

Category 1 Wetlands

Thirteen Category 1 wetlands, totaling 0.75 acre, were delineated within the Project survey area. The Category 1 wetlands were identified as 11 PEM wetlands (0.65 acre) and two PEM/PSS wetlands (0.12 acre). The highest Category 1 ORAM score was 29 (Wetland 13), and the lowest ORAM score was 21.5 (Wetland 15). These wetlands typically exhibited narrow upland buffers and intensive use of adjacent upland areas (fly ash pond), exhibited limited plant community development with a moderate to high percentage of invasive species, and characteristically had habitat and hydrology in the early stages of recovering from previous manipulation because of farming or other disturbances.

Category 2 Wetlands

Four Category 2 wetlands, totaling 0.87 acre, were delineated within the Project survey area. The four Category 2 wetlands were identified as three PEM/PSS wetlands (0.32 acre) and one

PFO wetland (0.55 acre). The highest scoring Category 2 wetland was 47 (Wetland 14), and the lowest was 32.5 (Wetland 16). The Category 2 wetlands generally exhibited fair to moderate plant communities with few invasive species, low to moderate plant community interspersion, low to high intensity surrounding land use (e.g. young second growth woodlots, shrub-land, etc.), and recovering and/or recovered natural hydrology and habitat.

Category 3 Wetlands

No Category 3 wetlands were delineated within the Project survey area.

3.2 DELINEATED STREAMS

URS identified 154 streams, totaling 42,420 linear feet, within the Project survey area as listed in Table 5. The locations of streams identified within the survey area are shown on Figures 3A through 3K. See Table 3.2 for a summary of the delineated streams.

The 154 streams assessed are composed of 136 ephemeral streams, 15 intermittent streams, and three perennial streams. Eleven streams were assessed using the U.S. EPA's RBA methodology, while the remaining 143 were assessed using the USACE HGM methodology (high gradient ephemeral and intermittent streams).

Review of USGS watershed data indicates that the Project is located within the Big Sandy River watershed (USGS, 2012). Within the Big Sandy River watershed, the Project study area is also within two minor watersheds; Blaine Creek and Big Sandy River.

Most assessed streams within the survey area appear to be tributaries that flow into or combine with other streams (waters of the U.S) and connect to Blaine Creek below the fly ash pond. A small area located at the southwest corner of the survey area contains tributaries that flow directly into the Big Sandy River.

TABLE 3.2
SUMMARY OF DELINEATED STREAMS WITHIN
THE BIG SANDY POND CLOSURE PROJECT SURVEY AREA

Flow Type	RBA Assessed Streams	High Gradient Stream Assessed Streams	Number of Streams	Linear Feet within Survey Area
Ephemeral	1	135	136	25,696
Intermittent	7	8	15	12,406
Perennial	3	0	3	4,318
Total	**11**	**143**	**154**	**42,420**

3.2.1 Functional Assessment Of High-Gradient Ephemeral And Intermittent Headwater Streams In Western West Virginia And Eastern Kentucky

Within the Project survey area, 143 streams were evaluated using the Functional Assessment of High-Gradient Ephemeral and Intermittent Headwater Streams in western West Virginia and eastern Kentucky method. The overall landscape and habitat functions of various streams within the Project survey area were observed having comparable resemblance in various areas of the property. Based on the landscape and habitat evaluation conducted by URS during the field survey, it was determined that seven separate stream habitat areas (SHA) exist within the Project survey area. The stream habitat area groupings were developed based on observed differences in habitat including topography, geology, slope, streamflow, and biological characteristics.

Stream Habitat Area 1: There are 20 streams within SHA 1. The canopy of SHA 1 is completely closed to partially open from the mature trees that surround the streams. There is also very little understory growth and very little to no herbaceous growth. Most of the substrate was comprised of sand, silt, some gravel and occasionally large rock particles. Most streams assessed in this location were on gentle slopes near the confluence with the main channel.

Stream Habitat Area 2: There are 10 streams within SHA 2. Most streams assessed in this location were on steep slopes that originate near the top of the ridge and extend downstream to where the hillside has been cut out for the perimeter road around the fly ash pond. The canopy of SHA 2 is completely closed near the top of the hill; however, there is less canopy cover at the downhill extents due to the fly ash pond. There is also little to moderate understory growth and very little herbaceous growth. Most of the substrate was comprised of sand, silt, some gravel and occasionally large rock particles. The streams do not directly connect to the fly ash pond.

Stream Habitat Area 3: There are 12 streams within SHA 3. Most streams assessed in this location were on steep slopes that appear to have been modified through tree removal, cut/fill material and landslides. The canopy of SHA 3 is completely open near the top of the streams, however, there is more canopy cover within the downhill extents due to the lack of clearing. There is moderate to heavy understory growth and moderate to heavy herbaceous growth. Most of the substrate was comprised of sand, silt, and some gravel.

Stream Habitat Area 4: There are 25 streams within SHA 4. The canopy of SHA 4 is completely closed to partially open from the mature trees that surround the streams. There is also very little understory growth and very little to no herbaceous growth. Most of the substrate was comprised of sand, silt, some gravel and occasionally large rock particles. Most streams assessed in this location of the property originate near the ridge tops and extend down to the fly ash pond.

Stream Habitat Area 5: There are 29 streams within SHA 5. The canopy of SHA 5 is completely closed to partially open from the mature trees and understory that surround the streams. There is moderate to thick understory growth from what appears to be previous logging or other disturbances, and little herbaceous growth. Most of the substrate was comprised of sand, silt, some gravel and occasionally large rock particles. Most streams assessed in this location of the property originate near the ridge tops and extend down to intermittent streams, perennial streams, or the fly ash pond.

Stream Habitat Area 6: There are 23 streams within SHA 6. Most streams assessed in this location were on steep slopes that originate near the top of the ridges and extend downstream to where the hillsides have been cut out for the perimeter road around the fly ash pond. The canopy of SHA 6 is completely closed near the top of the hillsides, however, there is less canopy cover at the downhill extents due to the fly ash pond. This part of the property appears to have undergone some selective logging within the past 20-40 years and has created moderate to thick understory growth. Most of the substrate was comprised of sand, silt, some gravel and occasionally large rock particles. Most of the streams do not directly connect to the fly ash pond.

Stream Habitat Area 7: There are 24 streams within SHA 7. Most streams assessed in this location were on steep slopes that originate near the top of benches or ridges and extend downstream to a perennial stream. The canopy of SHA 7 is completely closed due to the mature forest. There is little to no understory growth. Most of the substrate was comprised of sand, silt, some gravel and occasionally large rock particles. Near the confluence with the main channel, most streams had some larger substrate.

A form representing each of the stream habitat areas assessed using the Functional Assessment of High-Gradient Ephemeral and Intermittent Headwater Stream method is provided in Appendix C. Color photographs were taken of a representative sample of the streams during the field survey and are provided in Appendix E2.

3.2.2 Rapid Bioassessment Protocols For Use In Streams And Wadeable Rivers

Eleven streams were assessed using the U.S. EPA's Rapid Bioassessment method within the approximately 602-acre Project survey area. Field surveys within the Project survey area indicated these 11 streams, totaling 13,171 linear feet, were classified as one Optimal stream, four Sub-Optimal streams, and six Marginal streams. The designations for each of these stream types are described below.

A Rapid Bioassessment form for each stream is provided in Appendix D. Color photographs were taken of each stream during the field survey and are provided in Appendix E2.

Poor Streams – No Poor streams were identified within the survey area.

Marginal Streams – Six Marginal streams, totaling 5,580 linear feet, were identified during the field investigations and have scores that range between 62 (Stream 32) and 103 (Stream 4). The Marginal streams located within the Project survey area consisted of one ephemeral stream, four intermittent streams, and one perennial stream. The substrates of these streams were generally dominated by gravel and silt, with lesser amounts of cobble and boulder. The streams showed evidence of moderate epifaunal substrate, low pool variability, channel alteration, and a small riparian vegetative zone.

Sub-Optimal Streams – Four Sub-Optimal streams, totaling 6,210 linear feet, were identified during the field investigations and have scores that range between 112 (Stream 18) and 144 (Stream 15). The Sub-Optimal streams consisted of three intermittent streams and one perennial stream. The substrates of these streams were generally dominated by cobble, gravel, and boulder, with lesser amounts of sand, silt, and clay. The streams showed evidence of good epifaunal substrate, good pool variability, minimal channel alteration, good amount of riffles, and a riparian vegetative zone.

Optimal Streams – One Optimal stream totaling 1,381 linear feet was identified during the field investigations. Stream 68 is a perennial stream that received a score of 167. The substrate of the stream was generally dominated by boulder, cobble, gravel, with lesser amounts of bedrock and sand. The stream showed evidence of good epifaunal substrate, good pool variability, no channel alteration, good amount of riffles, and a riparian vegetative zone.

3.3 DELINEATED PONDS

One pond totaling 0.24 acre was identified within the Project survey area (Table 6). The pond appears to be man-made and used for stormwater control. The location of the pond identified within the Project survey area is shown on Figure 3I. A representative color photograph was taken of the pond during the field survey and is provided in Appendix E3.

4.0 SUMMARY

The delineation of the approximately 602 acre Project survey area identified a total of 17 wetlands, totaling 1.64 acres. The 17 wetlands are of three different wetland habitat types: 11 PEM wetlands, five PEM/PSS wetlands, and one PFO wetland. Of these wetlands, 13 wetlands are Category 1 wetlands and four wetlands are Category 2 wetlands. No Category 3 wetlands were identified within the Project survey boundary.

Field surveys identified 154 streams within the Project survey area totaling approximately 42,420 linear feet. The 154 streams were composed of 136 ephemeral streams, 15 intermittent streams, and three perennial streams. Eleven streams were assessed using the U.S. EPA's RBA methodology, while the remaining 143 were assessed using the USACE's Functional Assessment of High-Gradient Ephemeral and Intermittent Headwater Streams.

One pond totaling 0.24 acre was identified within the Project survey area and appears to be man-made for stormwater control use.

5.0 REFERENCES

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* Office of Biological Services, U.S. Fish and Wildlife Service, Washington, D.C.

Environmental Laboratory. 1987. *U.S. Corps of Engineers Wetlands Delineation Manual.* Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station: Vicksburg, Mississippi.

Fritz, K.M., Johnson, B.R., and Walters, D.M. 2006. *Field Operations Manual for Assessing the Hydrologic Permanence and Ecological Condition of Headwater Streams. EPA/600/ R-06/126*. U.S. Environmental Protection Agency, Office of Research and Development, Washington DC.

Kollmorgen Corporation. 2000. Munsell Soil Color Charts. Baltimore, Maryland.

Mack, John J. 2001. *Ohio Rapid Assessment Method for Wetlands v. 5.0, User's Manual and Scoring Forms. Ohio EPA Technical Report WET/2001-1*. Ohio Environmental Protection Agency, Division of Surface Water, 401/Wetland Ecology Unit, Columbus, Ohio.

U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: : Eastern Mountains and Piedmont Region (Version 2.0)*, ed. J.R. Berkowitz, J. S. Wakeley, R. W. Lichvar, and C. V. Noble, ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Army Corps of Engineers. 2012. National Wetland Plant List – Kentucky, Eastern Mountains and Piedmont Region. http://rsgisias.crrel.usace.army.mil/NWPL/index.html: Accessed 11/5/12

U.S. Army Corps of Engineers, 2010. *Operational Draft Regional Guidebook for the Functional Assessment of High-gradient Ephemeral and Intermittent Headwater Streams in Western West Virginia and Eastern Kentucky*, ed. C. V. Noble, J.R. Berkowitz, and J. Spence, ERDC/EL TR-10-11. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Army Corps of Engineers. 2005. Regulatory Guidance Letter No. 05-05: Guidance on Ordinary High Water Mark Identification.

U.S. Department of Agriculture, Natural Resources Conservation Service, 2012. National Hydric Soils List by State. Available online at ftp://ftp-fc.sc.egov.usda.gov/NSSC/Hydric_Soils/Lists/hydric_soils.xlsx. Accessed 10/04/12.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2012. Web Soil Survey (GIS Shapefile). http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm Accessed 10/4/12

U.S. Fish and Wildlife Service. 2012. National Wetlands Inventory Branch of Resource and Mapping Service. http://137.227.242.85/Data/interpreters/wetlands.aspxU.S. Fish and Wildlife Service. 2012. National Wetlands Inventory Branch of Resource and Mapping Service. http://www.fws.gov/wetlands/FAQs.html Accessed 10/04/12

U.S. Fish and Wildlife Service. 1999. *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition* (Barbour et al. 1999).

U.S. National Archives and Records Administration. 1993. Code of Federal Regulations. Title 33. Navigation and Navigable Waters.

University of Kentucky (UK). 2012. Kentucky 14-digit Sub watersheds (GIS Shapefile). http://www.uky.edu/KGS/gis/hucs.htm. Accessed 11/14/2012.

TABLE 1

SOIL MAP UNITS AND DESCRIPTIONS FOR THE BIG SANDY FLY ASH POND CLOSURE PROJECT SURVEY AREA

Soil Series	Symbol	Map Unit Description	Percent of Survey Area by Series	Topographic Setting	Hydric	Hydric Component (%)
Dumps	Dm	Dumps, mine; tailings; and tipples	26	Flyash pond	Not hydric	N/A
Grigsby	Gf	Grigsby fine sandy loam, frequently flooded	1	Floodplain	Not hydric	N/A
Shelocta	ShF	Shelocta-Hazleton-Fedscreek complex, 30 to 60 percent slopes, stony	7	Hillslopes	Not hydric	N/A
Upshur	UpD	Upshur-Rarden complex, 12 to 25 percent slopes	3	Hillslopes	Not hydric	N/A
	UpF	Upshur-Rarden complex, 25 to 60 percent slopes, rocky	25	Hillslopes	Not hydric	N/A
Vandalia	VaF	Vandalia-Beech complex, 20 to 60 percent slopes, stony	36	Hillslopes	Not hydric	N/A
	VaF2	Vandalia-Beech complex, 20 to 60 percent slopes, stony, eroded	2	Hillslopes	Not hydric	N/A

NOTES:

(1) Data sources include:

USDA, NRCS. 2013 Soil Survey Geographic (SSURGO) Database. Avialable online at: http://soildatamart.nrcs.usda.gov/

USDA, NRCS. April 2012. National Hydric Soils List by State. Available online at: http://soils.usda.gov/use/hydric/lists/state.html

TABLE 2

VEGETATION IDENTIFIED WITHIN THE BIG SANDY FLY ASH POND CLOSURE PROJECT DELINEATED WETLANDS

Common Name	Scientific Name	Stratum[a]	Eastern Mountains and Piedmont Supplement Indicator Status[b]
Allegheny Blackberry	*Rubus allegheniensis*	S	FACU
American Elm	*Ulmus americana*	T	FACW
American Sycamore	*Platanus occidentalis*	S & T	FACW
Beggarticks sp.	*Bidens spp.*	H	FAC
Black Willow	*Salix nigra*	S & T	OBL
Broad-Leaf Cat-Tail	*Typha latifolia*	H	OBL
Canadian Goldenrod	*Solidago canadensis*	H	FACU
Common Boneset	*Eupatorium perfoliatum*	S	FACW
Common Fox Sedge	*Carex vulpinoidea*	H	OBL
Cottongrass Bulrush	*Scirpus cyperinus*	H	FACW
Creeping-Jenny	*Lysimachia nummularia*	H	FACW
Curly Dock	*Rumex crispus*	H	FAC
Dark-Green Bulrush	*Scirpus atrovirens*	H	OBL
Deer-Tongue Rosette Grass	*Dichanthelium clandestinum*	H	FAC
Green Ash	*Fraxinus pennsylvanica*	S & T	FACW
False Nettle	*Boehmeria cylindrica*	H	FACW
Hop Sedge	*Carex lupulina*	H	OBL
Japanese Stilt Grass	*Microstegium vimineum*	S	FAC
Knotty-Leaf Rush	*Juncus acuminatus*	H	OBL
Lamp Rush	*Juncus effusus*	H	FACW
Lesser Poverty Rush	*Juncus tenuis*	H	FAC
Little False Bluestem	*Schizachyrium scoparium*	H	FACU
Narrow-Leaf Cat-Tail	*Typha angustifolia*	H	OBL
Needle Spike-Rush	*Eleocharis acicularis*	H	OBL
Pennsylvania Smartweed	*Polygonum pensylvanicum*	H	FACW
Pointed Broom Sedge	*Carex scoparia*	H	FACW
Poison Ivy	*Toxicodendron radicans*	H	FAC
Purple-Stem American-Aster	*Symphyotrichum puniceum*	H	OBL
Red-Root Flat Sedge	*Cyperus erythrorhizos*	H	FACW
River Birch	*Betula nigra*	T	FACW
Sallow Sedge	*Carex lurida*	H	OBL
Seedbox	*Ludwigia alternifolia*	H	FACW
Sensitive Fern	*Onoclea sensibilis*	H	FACW
Silver Maple	*Acer saccharinum*	T	FACW
Single-Vein Sweetflag	*Acorus calamus*	H	OBL
Small-Spike False Nettle	*Boehmeria cylindrica*	H	FACW
Sphagnum Moss	*Sphagnum spp.*	H	NI
Spotted Touch-Me-Not	*Impatiens capensis*	H	FACW

TABLE 2

VEGETATION IDENTIFIED WITHIN THE BIG SANDY FLY ASH POND CLOSURE PROJECT DELINEATED WETLANDS

Common Name	Scientific Name	Stratum[a]	Eastern Mountains and Piedmont Supplement Indicator Status[b]
Spotted Trumpetweed	*Eutrochium maculatum*	H	FACW
Squarrose Sedge	*Carex squarrosa*	H	FACW
Swamp Rose	*Rosa palustris*	S	OBL
Sweet-Scented Joe-Pye-Weed	*Eutrochium purpureum*	H	FAC
White Grass	*Leersia virginica*	H	FACW
White Turtlehead	*Chelone glabra*	H	OBL
Yellow Bristle Grass	*Setaria pumila*	H	FAC

[a] H = herb, S = shrub or sapling, T = tree, V = vine

[b] Wetland Indicator Status
OBL - Obligate Wetland - Occurs almost always (99% probability) in wetlands
FACW - Facultative Wetlands - Usually occurs in wetlands (67 - 99% probability)
FAC - Facultative - Equally likely to occur in wetlands or non-wetlands (34 - 66% probability)
FACU - Facultative Upland - Usually occurs in non-wetlands (67 - 99% probability)
UPL - Obligate Upland - Occurs almost always in non-wetlands (99% probability)
NI - No Indicator - There is insufficient information on habitat preference

TABLE 3

NWI WETLANDS WITHIN THE BIG SANDY FLY ASH POND CLOSURE PROJECT SURVEY AREA

Wetland Type	NWI Code	NWI Habitat Type [1]	Total Number of Each Habitat Type	NWI Quadrangle
Freshwater Emergent Wetland	PEM1Fh	Palustrine Emergent Persistent Semipermanently Flooded Diked/Impounded	1	Fallsburg
Lake	L1UBHh	Lacustrine Limnetic Unconsolidated Bottom Permanently Flooded Diked/Impounded	1	Fallsburg
Freshwater Pond	PUBHh	Palustrine Unconsolidated Bottom Permanently Flooded Diked/Impounded	1	Fallsburg
Total Number of NWI Wetlands = 3				

Total Number of PEM = 1, PFO = 0, PSS = 0, PUB = 1, R = 0, L = 1

NWI Habitat Type[1] : USFWS National Wetlands Inventory Classification De-coder: http://137.227.242.85/Data/interpreters/wetlands.aspx

TABLE 4

DELINEATED WETLANDS WITHIN THE BIG SANDY FLY ASH POND CLOSURE PROJECT SURVEY AREA

Wetland Name	Latitude	Longitude	Cowardin Wetland Type[a]	ORAM Score	ORAM Category	Acreage within Survey Corridor
Wetland 01	38.185144	-82.65042	PEM/PSS	23	1	0.06
Wetland 02	38.184948	-82.650542	PEM	23	1	0.03
Wetland 03	38.184148	-82.64005	PEM	22	1	0.08
Wetland 04	38.184414	-82.640347	PEM	23	1	0.14
Wetland 05	38.18358	-82.639877	PEM	24	1	0.11
Wetland 06	38.185745	-82.637086	PEM/PSS	40	2	0.03
Wetland 07	38.182916	-82.638806	PEM	28.5	1	0.07
Wetland 08	38.18342	-82.638723	PEM	27.5	1	0.04
Wetland 09	38.185936	-82.635573	PEM/PSS	24	1	0.06
Wetland 10	38.187993	-82.633528	PEM	23	1	0.02
Wetland 11	38.187827	-82.632687	PEM	23	1	0.05
Wetland 12	38.188183	-82.631769	PEM	22	1	0.02
Wetland 13	38.187824	-82.631001	PEM	29	1	0.03
Wetland 14	38.179076	-82.625342	PEM/PSS	47	2	0.21
Wetland 15	38.179389	-82.625917	PEM	21.5	1	0.06
Wetland 16	38.179511	-82.624825	PEM/PSS	32.5	2	0.08
Wetland 17	38.185963	-82.625944	PFO	46	2	0.55
Total: 17	PEM: 11, PEM/PSS: 5, PFO:1					**1.64**

Cowardin Wetland Typea : PEM = palustrine emergent, PSS = palustrine scrub/shrub, PFO = palustrine forested

TABLE 5
DELINEATED STREAMS WITHIN THE BIG SANDY PLANT POND CLOSURE PROJECT SURVEY AREA

Report Name	Latitude	Longitude	Waterbody	Flow Regime	Form Used[a]	Score[b]	Stream Quality or Habitat Area	Linear Feet within Survey Area
Stream 01	38.18278	-82.642085	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	402
Stream 01a	38.18292	-82.642209	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	176
Stream 02	38.182358	-82.641507	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	411
Stream 02a	38.182345	-82.641158	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	157
Stream 03	38.182731	-82.642327	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	313
Stream 04	38.179875	-82.625015	Tributary to Blaine Creek	Intermittent	RBA	103	Marginal	3,343
Stream 05	38.179566	-82.625246	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	70
Stream 06	38.180497	-82.640554	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	170
Stream 07	38.18074	-82.64076	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	278
Stream 08	38.182257	-82.642054	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	101
Stream 09	38.182792	-82.64174	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	479
Stream 09a	38.182594	-82.641687	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	119
Stream 09b	38.182694	-82.64161	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	194
Stream 10	38.183665	-82.644132	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	95
Stream 11	38.184825	-82.643639	Tributary to fly ash pond	Intermittent	HGS	NA	Area 4	491
Stream 11a	38.18441	-82.643544	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	117
Stream 11b	38.184944	-82.643781	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	104
Stream 11c	38.184638	-82.64308	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	381
Stream 11d	38.184545	-82.64252	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	129
Stream 11e	38.184364	-82.644005	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	62
Stream 12	38.184279	-82.644254	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	95
Stream 13	38.185593	-82.648905	Tributary to fly ash pond	Intermittent	RBA	96	Marginal	816
Stream 13a	38.185804	-82.648927	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	56
Stream 13b	38.186405	-82.648953	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	306
Stream 13c	38.186111	-82.649453	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	185
Stream 14	38.177507	-82.639347	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	183
Stream 15	38.17573	-82.642819	Tributary to fly ash pond	Intermittent	RBA	144	Sub-Optimal	895
Stream 15a	38.176481	-82.642261	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	47
Stream 15b	38.176163	-82.642182	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	104

TABLE 5
DELINEATED STREAMS WITHIN THE BIG SANDY PLANT POND CLOSURE PROJECT SURVEY AREA

Report Name	Latitude	Longitude	Waterbody	Flow Regime	Form Used[a]	Score[b]	Stream Quality or Habitat Area	Linear Feet within Survey Area
Stream 15c	38.176046	-82.642318	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	173
Stream 15d	38.175778	-82.642329	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	245
Stream 15e	38.175752	-82.642651	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	61
Stream 15f	38.175687	-82.643729	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	646
Stream 15g	38.175682	-82.643372	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	275
Stream 16	38.17767	-82.642599	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	132
Stream 17	38.179089	-82.645326	Tributary to fly ash pond	Intermittent	HGS	NA	Area 6	797
Stream 17a	38.179664	-82.644962	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	111
Stream 17b	38.179373	-82.645296	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	112
Stream 17c	38.178786	-82.646264	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	233
Stream 18	38.18225	-82.648104	Tributary to fly ash pond	Intermittent	RBA	112	Sub-Optimal	1,120
Stream 18a	38.182426	-82.64647	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	93
Stream 18b	38.182388	-82.646877	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	100
Stream 18c	38.182425	-82.647548	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	113
Stream 18d	38.182362	-82.647975	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	87
Stream 18e	38.182258	-82.648736	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	43
Stream 18f	38.182427	-82.64916	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	114
Stream 18g	38.182275	-82.649426	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	69
Stream 19	38.183625	-82.646425	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	182
Stream 20	38.184248	-82.649346	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	740
Stream 20a	38.184416	-82.648381	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	81
Stream 20b	38.183988	-82.649448	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	138
Stream 20c	38.183736	-82.64961	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	294
Stream 21	38.183258	-82.637508	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	84
Stream 22	38.183653	-82.63824	Tributary to fly ash pond	Intermittent	HGS	NA	Area 3	186
Stream 23	38.183783	-82.638926	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	165
Stream 23a	38.183776	-82.63877	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	77
Stream 24	38.181997	-82.635548	Tributary to fly ash pond	Ephemeral	RBA	67	Marginal	177
Stream 25	38.182203	-82.63839	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	415

TABLE 5
DELINEATED STREAMS WITHIN THE BIG SANDY PLANT POND CLOSURE PROJECT SURVEY AREA

Report Name	Latitude	Longitude	Waterbody	Flow Regime	Form Used[a]	Score[b]	Stream Quality or Habitat Area	Linear Feet within Survey Area
Stream 26	38.179403	-82.624443	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	178
Stream 27	38.179562	-82.624478	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	154
Stream 28	38.18034	-82.624501	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	185
Stream 29	38.180985	-82.624289	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	138
Stream 30	38.188125	-82.633499	Tributary to Blaine Creek	Perennial	RBA	89	Marginal	558
Stream 31	38.188061	-82.630791	Tributary to Blaine Creek	Intermittent	RBA	62	Marginal	371
Stream 32	38.188102	-82.631772	Tributary to Blaine Creek	Intermittent	RBA	80	Marginal	315
Stream 33	38.183828	-82.6441	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	64
Stream 34	38.184202	-82.643787	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	141
Stream 34a	38.184134	-82.643645	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	100
Stream 35	38.185591	-82.646285	Tributary to fly ash pond	Intermittent	HGS	NA	Area 4	561
Stream 35a	38.185921	-82.645834	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	211
Stream 35b	38.185204	-82.6465	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 4	78
Stream 36	38.177545	-82.638531	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	280
Stream 37	38.176969	-82.642526	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	171
Stream 38	38.17922	-82.644498	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	279
Stream 39	38.181365	-82.645372	Tributary to fly ash pond	Intermittent	HGS	NA	Area 6	169
Stream 40	38.1813	-82.645778	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	157
Stream 41	38.181378	-82.645992	Tributary to fly ash pond	Intermittent	HGS	NA	Area 6	652
Stream 41a	38.18117	-82.646067	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	56
Stream 42	38.182146	-82.648394	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	114
Stream 43	38.184011	-82.647594	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	368
Stream 44	38.1842	-82.649991	Tributary to fly ash pond	Perennial	RBA	142	Sub-Optimal	2,379
Stream 44a	38.18488	-82.650217	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	554
Stream 44b	38.182484	-82.653843	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	633
Stream 44c	38.181227	-82.653997	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	232
Stream 45	38.183078	-82.637348	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	93
Stream 46	38.18363	-82.638883	Tributary to fly ash pond	Intermittent	HGS	NA	Area 3	432
Stream 47	38.182258	-82.635048	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	48

TABLE 5
DELINEATED STREAMS WITHIN THE BIG SANDY PLANT POND CLOSURE PROJECT SURVEY AREA

Report Name	Latitude	Longitude	Waterbody	Flow Regime	Form Used[a]	Score[b]	Stream Quality or Habitat Area	Linear Feet within Survey Area
Stream 48	38.183095	-82.638419	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	73
Stream 49	38.181963	-82.637701	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	109
Stream 50	38.185788	-82.635826	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	116
Stream 51	38.185756	-82.635877	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 3	75
Stream 52	38.181211	-82.628042	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	47
Stream 53	38.182467	-82.627866	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	64
Stream 54	38.182315	-82.627723	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	39
Stream 55	38.184567	-82.629622	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	88
Stream 56	38.178126	-82.633154	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	36
Stream 57	38.178022	-82.630229	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	43
Stream 58	38.174032	-82.647949	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	604
Stream 59	38.174786	-82.646863	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	881
Stream 59a	38.174412	-82.646894	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	304
Stream 60	38.176137	-82.646625	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	692
Stream 60a	38.175762	-82.647063	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	149
Stream 61	38.180213	-82.627552	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	31
Stream 62	38.182122	-82.627641	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	70
Stream 63	38.182254	-82.627658	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	77
Stream 64	38.184825	-82.629898	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	77
Stream 65	38.185999	-82.630599	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	19
Stream 66	38.186103	-82.630655	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 2	30
Stream 67	38.178037	-82.63036	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 6	51
Stream 68	38.175615	-82.647681	Tributary to Fuller's Branch	Perennial	RBA	167	Optimal	1,381
Stream 68a	38.174678	-82.648721	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	92
Stream 68b	38.17473	-82.648255	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	62
Stream 68c	38.17447	-82.648223	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	224
Stream 68d	38.175023	-82.647836	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	158
Stream 68e	38.174797	-82.648466	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	69
Stream 68f	38.175329	-82.647784	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	68

TABLE 5
DELINEATED STREAMS WITHIN THE BIG SANDY PLANT POND CLOSURE PROJECT SURVEY AREA

Report Name	Latitude	Longitude	Waterbody	Flow Regime	Form Used[a]	Score[b]	Stream Quality or Habitat Area	Linear Feet within Survey Area
Stream 68g	38.174959	-82.648427	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	130
Stream 68h	38.17541	-82.647479	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	200
Stream 68i	38.17517	-82.648242	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	104
Stream 68j	38.175685	-82.647456	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	102
Stream 68k	38.175554	-82.647476	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	139
Stream 68l	38.177244	-82.647641	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	65
Stream 68m	38.177145	-82.647626	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	85
Stream 68n	38.177322	-82.647374	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	204
Stream 68o	38.176957	-82.647088	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	256
Stream 68p	38.1764	-82.647351	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	58
Stream 68q	38.176428	-82.646887	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	251
Stream 68r	38.176653	-82.647099	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	266
Stream 69	38.176948	-82.648002	Tributary to Fuller's Branch	Ephemeral	HGS	NA	Area 7	412
Stream 70	38.183888	-82.650984	Tributary to fly ash pond	Intermittent	HGS	NA	Area 5	442
Stream 70a	38.183487	-82.651216	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	75
Stream 70b	38.183499	-82.650664	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	310
Stream 71	38.185572	-82.653279	Tributary to fly ash pond	Intermittent	RBA	118	Sub-Optimal	1,816
Stream 71a	38.185856	-82.652998	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	262
Stream 71b	38.18583	-82.653492	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	131
Stream 71c	38.186375	-82.654015	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	548
Stream 71d	38.1858	-82.654716	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	440
Stream 71e	38.185899	-82.655866	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	81
Stream 71f	38.185596	-82.655933	Tributary to fly ash pond	Ephemeral	HGS	NA	Area 5	222
Stream 72	38.181433	-82.624959	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	175
Stream 73	38.182305	-82.625104	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	210
Stream 74	38.184755	-82.626268	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	336
Stream 75	38.185768	-82.626399	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	108
Stream 76	38.186226	-82.626544	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	385
Stream 77	38.185364	-82.625733	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	36

TABLE 5
DELINEATED STREAMS WITHIN THE BIG SANDY PLANT POND CLOSURE PROJECT SURVEY AREA

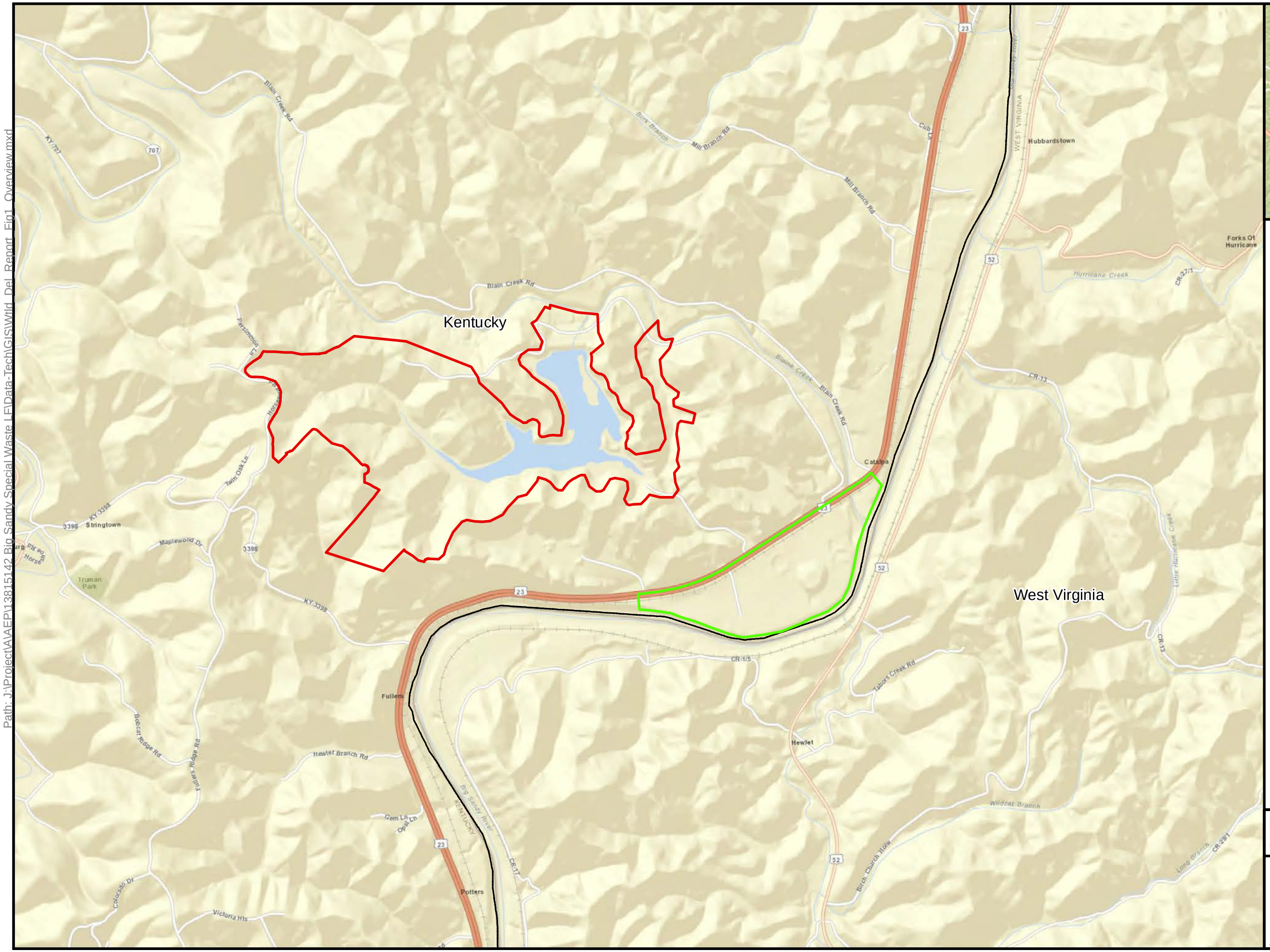
Report Name	Latitude	Longitude	Waterbody	Flow Regime	Form Used[a]	Score[b]	Stream Quality or Habitat Area	Linear Feet within Survey Area
Stream 78	38.183861	-82.624616	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	354
Stream 78a	38.183771	-82.624265	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	120
Stream 78b	38.183921	-82.62445	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	61
Stream 78c	38.184067	-82.624865	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	96
Stream 79	38.182304	-82.623863	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	542
Stream 79a	38.182473	-82.623487	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	391
Stream 79aa	38.182373	-82.622941	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	53
Stream 80	38.186308	-82.626727	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	132
Stream 80a	38.18624	-82.62678	Tributary to Blaine Creek	Ephemeral	HGS	NA	Area 1	80
Total: 154								**42,420**

Form Used[a] : RBA = Rapid Bioassessment Protocol, HGS = High Gradient Stream
Score[b] : NA = Not Applicable

TABLE 6
DELINEATED PONDS WITHIN THE BIG SANDY
FLY ASH POND CLOSURE PROJECT SURVEY AREA

Report Name	Latitude	Longitude	Acreage within Survey Corridor
Pond 1	38.177116	-82.641885	0.24
Total: 1			**0.24**

Path: J:\Project\AIAEP\13815142 Big Sandy Special Waste L\Data-Tech\GIS\Wild_Del_Report_Fig1_Overview.mxd



N

LEGEND

- Property Survey Boundary
- Big Sandy Plant Boundary
- State

0 2,000 4,000

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online
World Street Map

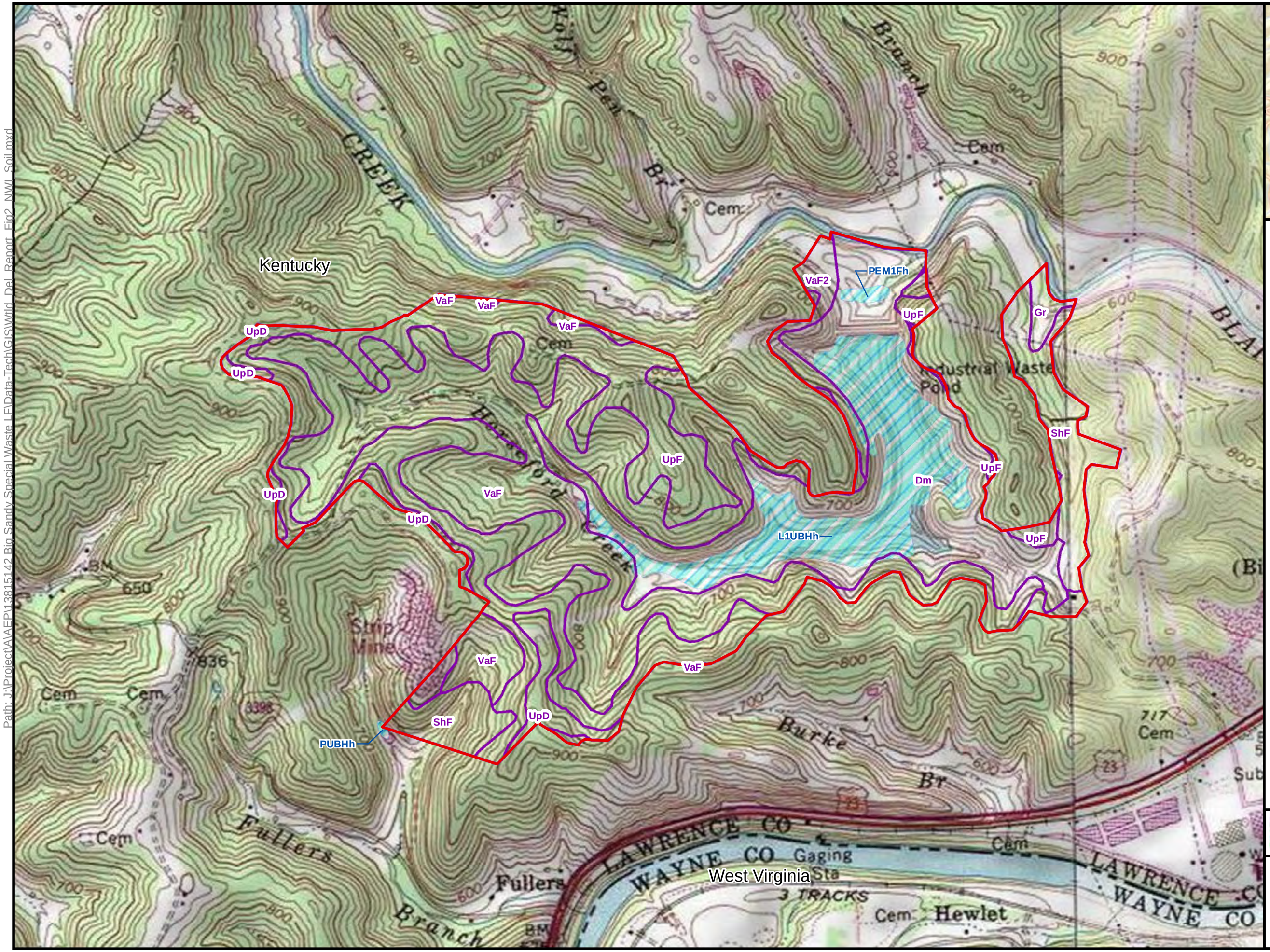
Big Sandy Fly Ash Pond Closure

FIGURE 1
OVERVIEW MAP

JOB NO. 13815142

URS

Path: J:\Project\AEP\13815142 Big Sandy Special Waste L\Data-Tech\GIS\Wtld_Del_Report_Fig2_NWI_Soil.mxd



N

LEGEND

- Property Survey Boundary
- Soil Map Unit
- NWI Wetland

0 1,000 2,000

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online
USA Topo Maps
Fallsburg, KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

Big Sandy Fly Ash Pond Closure

FIGURE 2
NATIONAL WETLAND INVENTORY AND SOIL MAP UNITS MAP

JOB NO. 13815142

URS

J:\Project\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd

N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 750 1,500

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

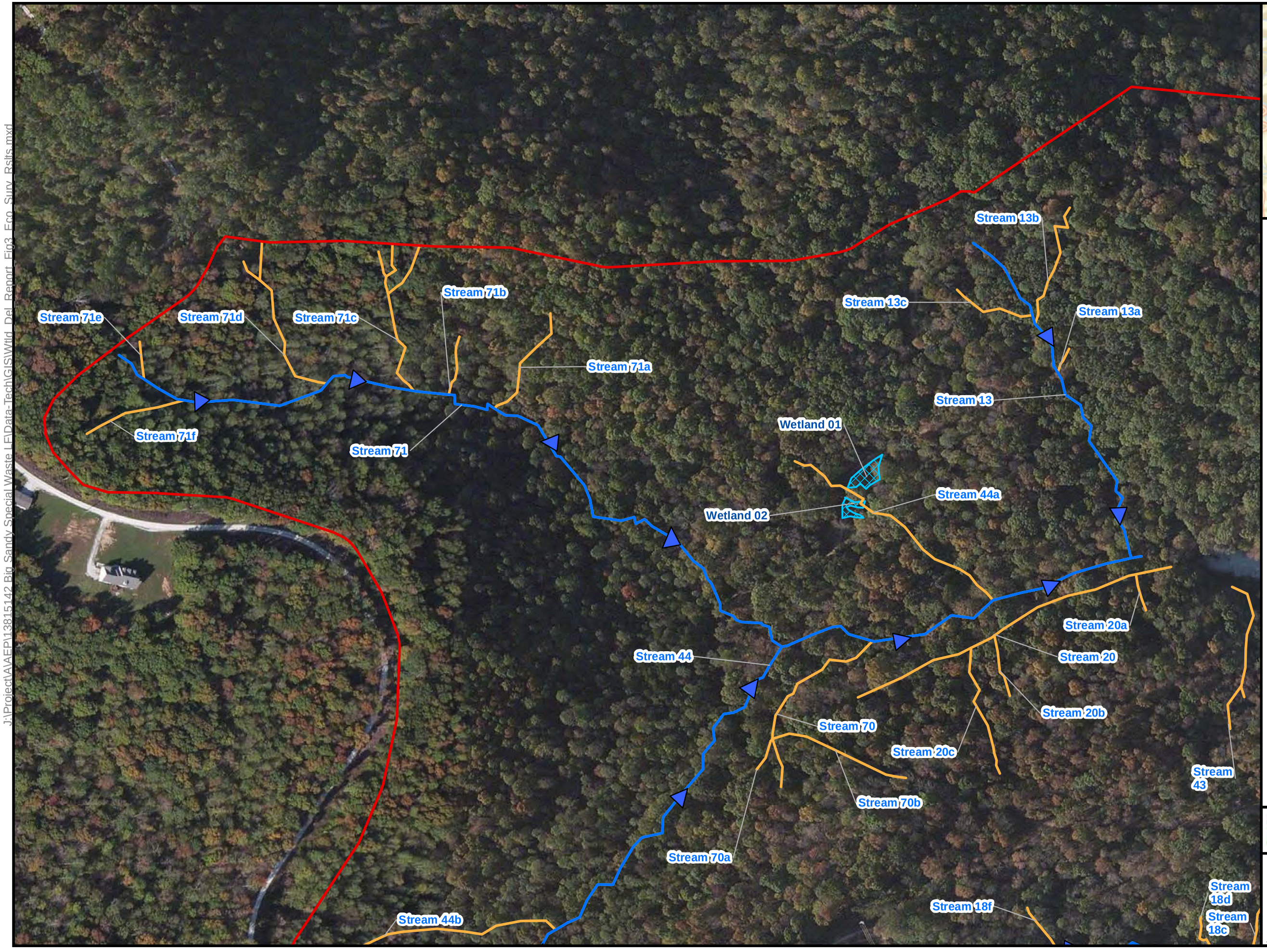
Big Sandy Fly Ash Pond Closure

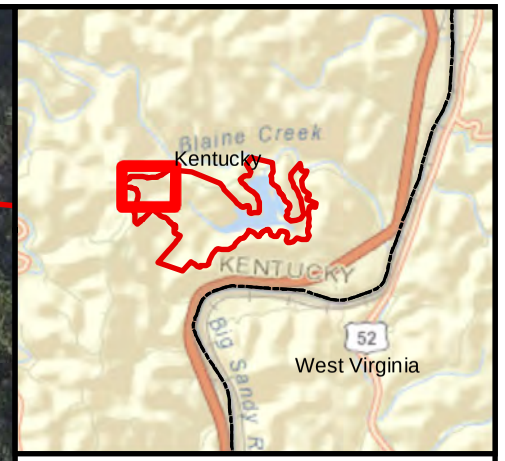
FIGURE 3
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

URS

J:\Project\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd





N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg, KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

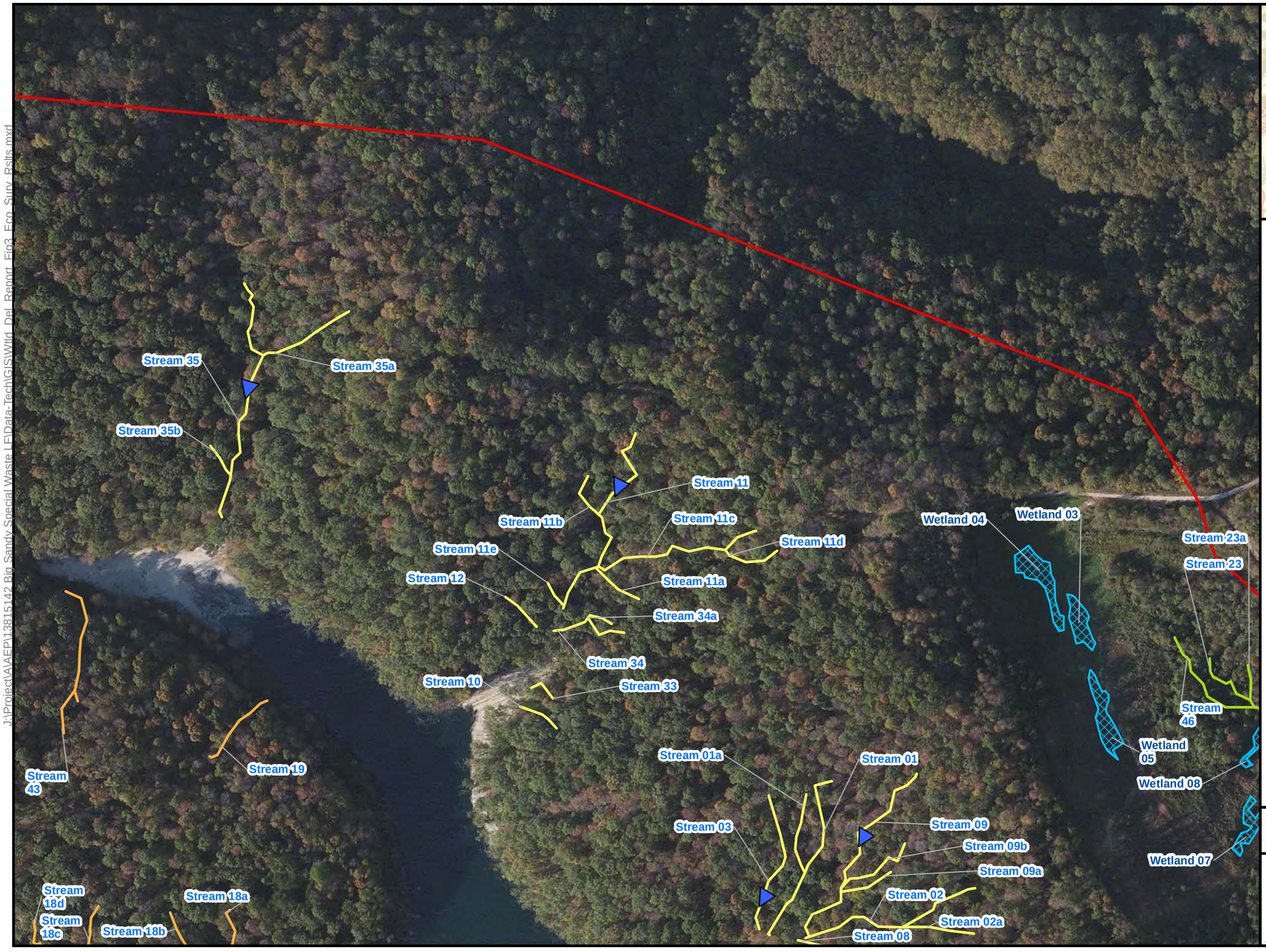
Big Sandy Fly Ash Pond Closure

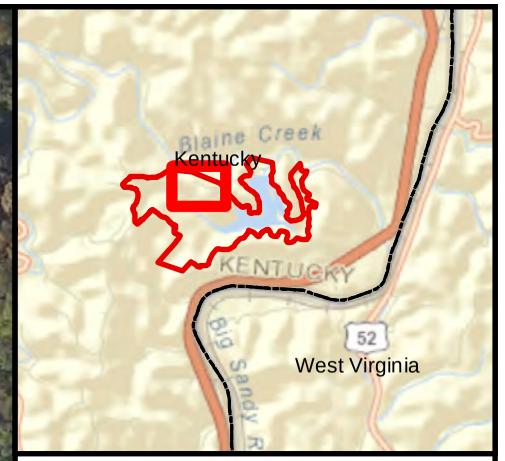
FIGURE 3A
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

URS

J:\Project\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd





N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg, KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

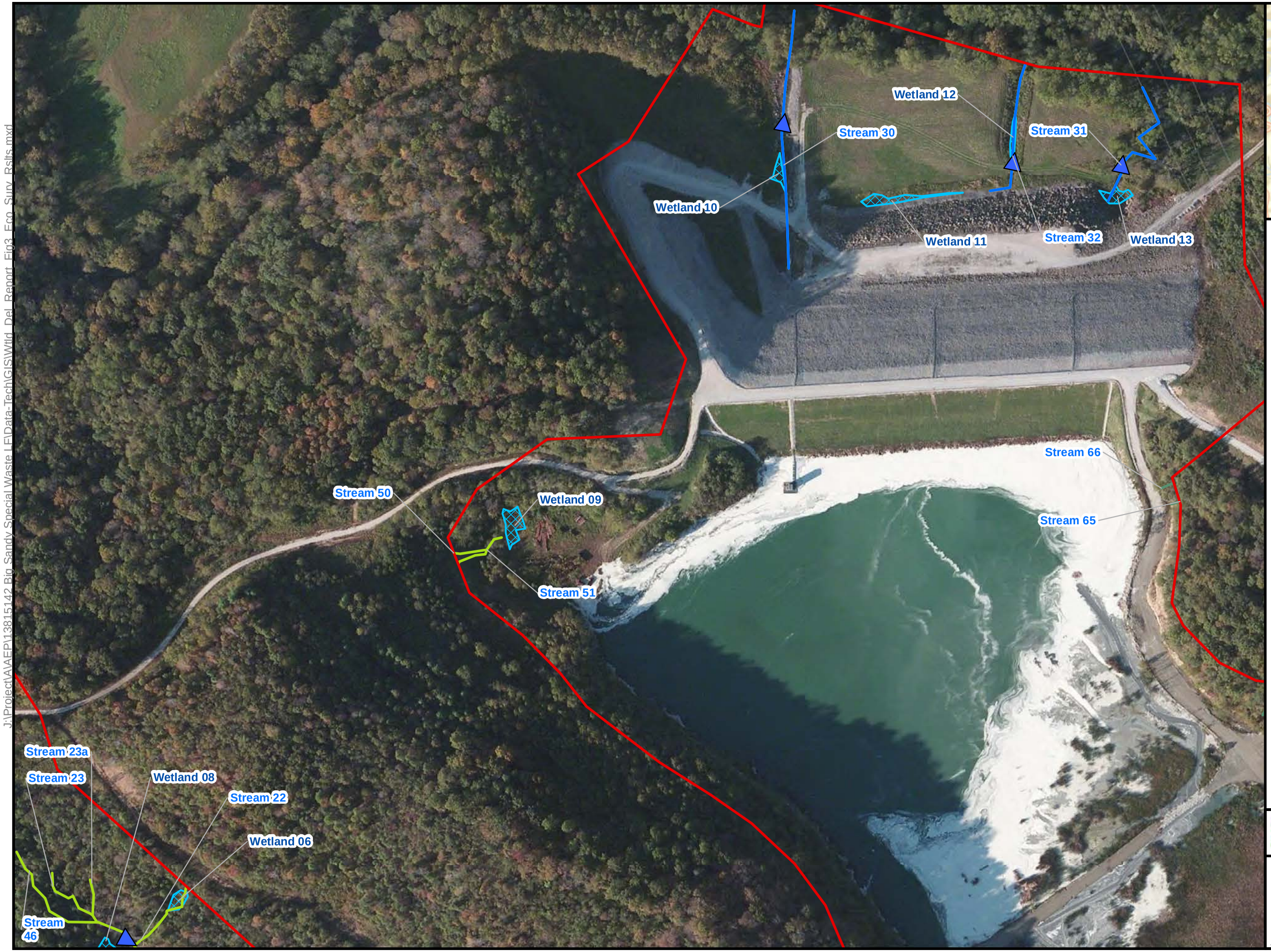
Big Sandy Fly Ash Pond Closure

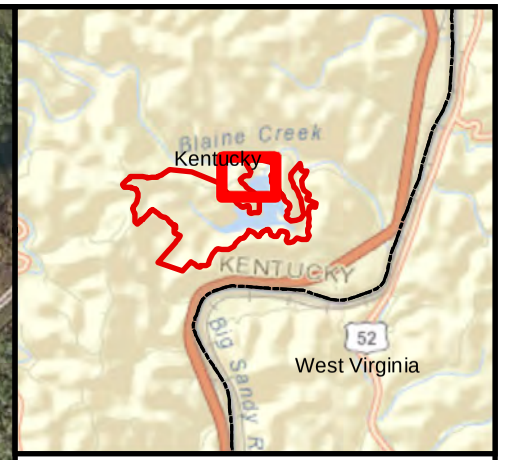
FIGURE 3B
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

URS

J:\Project\AI\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd





N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

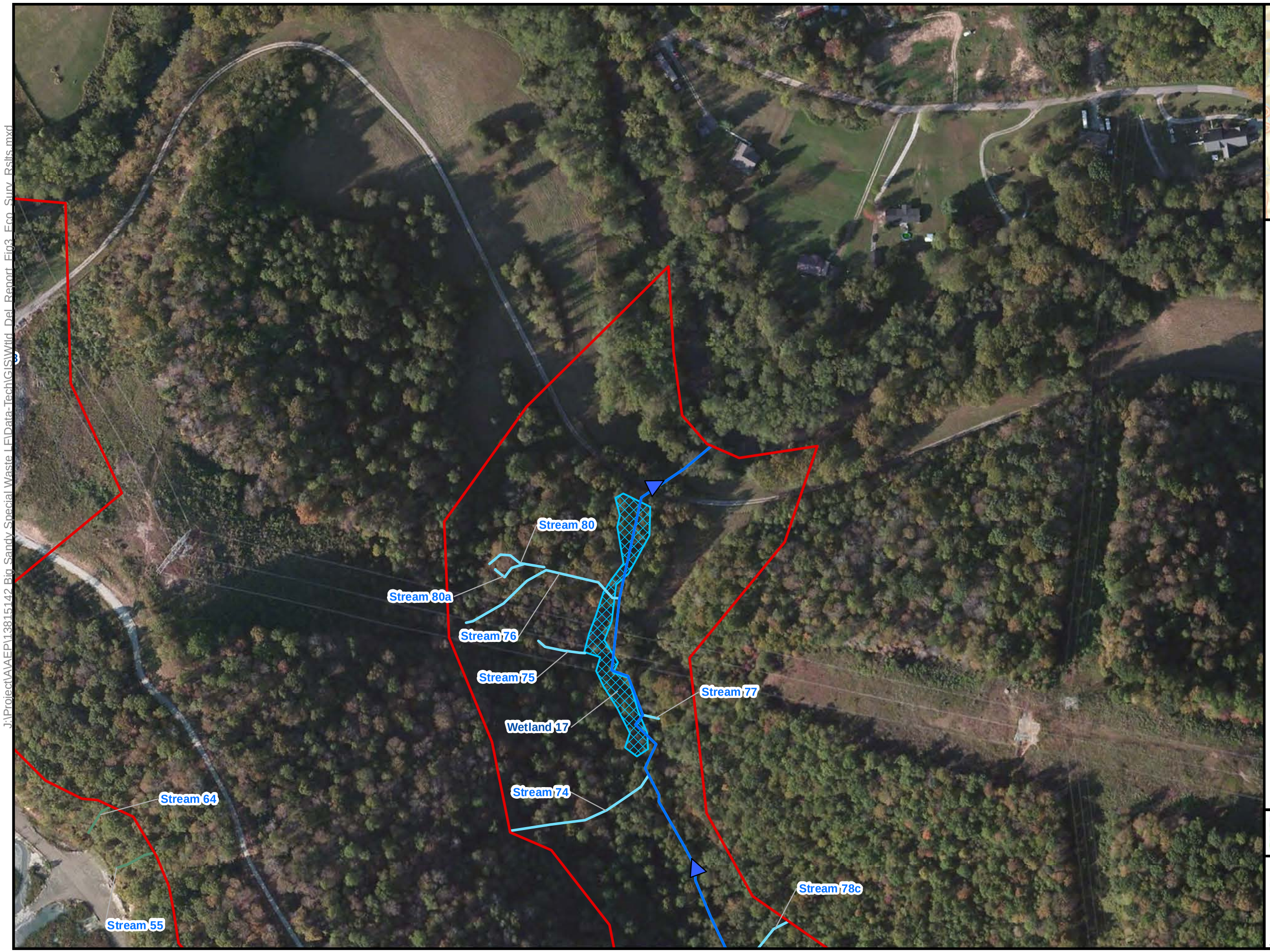
Big Sandy Fly Ash Pond Closure

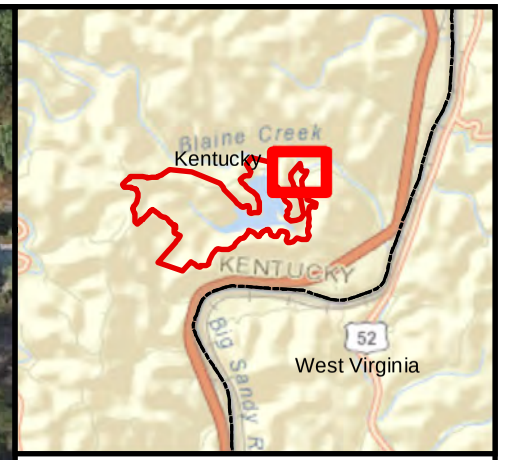
FIGURE 3C
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

URS

J:\Project\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd





N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

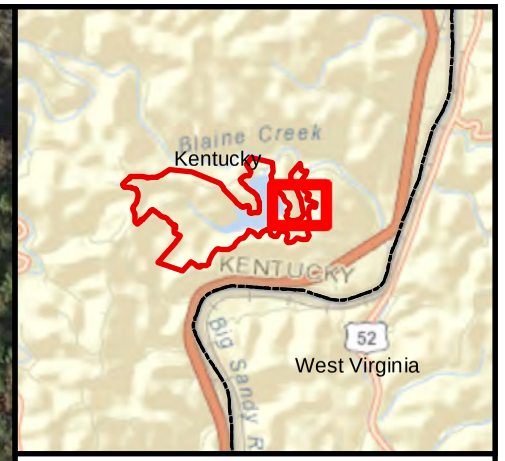
Big Sandy Fly Ash Pond Closure

FIGURE 3D
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

J:\Project\AI\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd

Stream 64
Stream 55
Stream 74
Stream 78c
Stream 78b
Stream 78a
Stream 78
Stream 79a
Stream 79aa
Stream 79
Stream 53
Stream 54
Stream 63
Stream 62
Stream 73
Stream 72
Stream 52
Stream 29
Stream 61
Stream 28
Wetland 16
Stream 04
Stream 27
Stream 05
Stream 26



N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

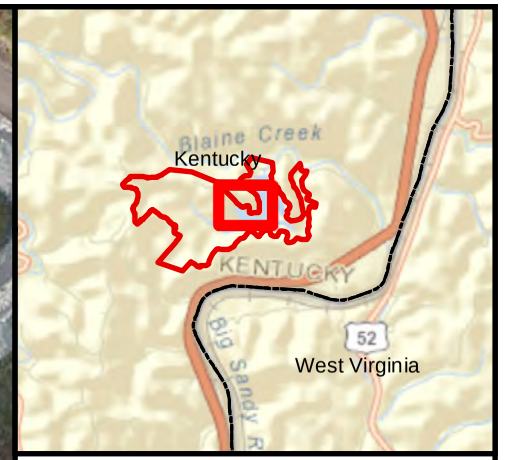
Big Sandy Fly Ash Pond Closure

FIGURE 3E
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

URS

J:\Project\AI\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd



N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

Big Sandy Fly Ash Pond Closure

FIGURE 3F
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

URS

N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

Big Sandy Fly Ash Pond Closure

FIGURE 3G
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

J:\Project\AIAEP\13815142 Big Sandy Special Waste Fl\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd

J:\Project\AI\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Ecg_Surv_Rslts.mxd

Stream 44b
Stream 44
Stream 44c
Stream 18f
Stream 18g
Stream 18e
Stream 42
Stream 18
Stream 18d
Stream 18c
Stream 18b
Stream 18a
Stream 41
Stream 17
Stream 17c
Stream 68m
Stream 68l
Stream 68n
Stream 68o

N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

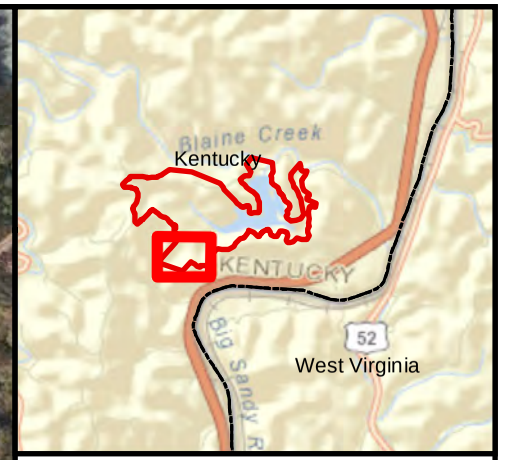
Big Sandy Fly Ash Pond Closure

FIGURE 3H
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

J:\Project\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd

Stream 68m
Stream 68l
Stream 68n
Stream 68o
Stream 68p
Stream 69
Stream 68r
Stream 68q
Stream 60
Stream 68
Stream 60a
Stream 68i
Stream 68j
Stream 68k
Stream 68h
Stream 68f
Stream 68g
Stream 68d
Stream 59
Stream 68e
Stream 68a
Stream 68b
Stream 59a
Stream 68c
Stream 58
Stream 16
Stream 37
Pond 1
Stream 15a
Stream 15b
Stream 15c
Stream 15f
Stream 15g
Stream 15d
Stream 15e
Stream 15



N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

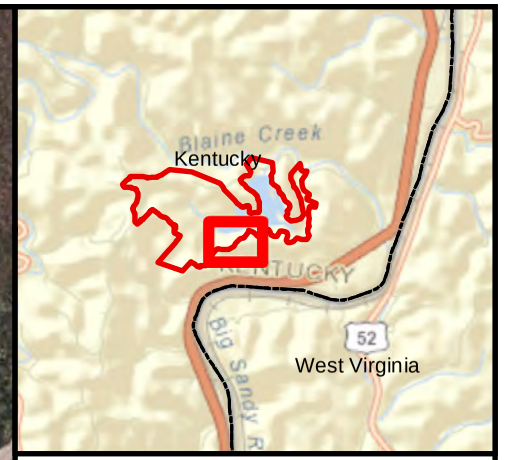
Big Sandy Fly Ash Pond Closure

FIGURE 3I
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

URS

J:\Project\AI\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd



N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

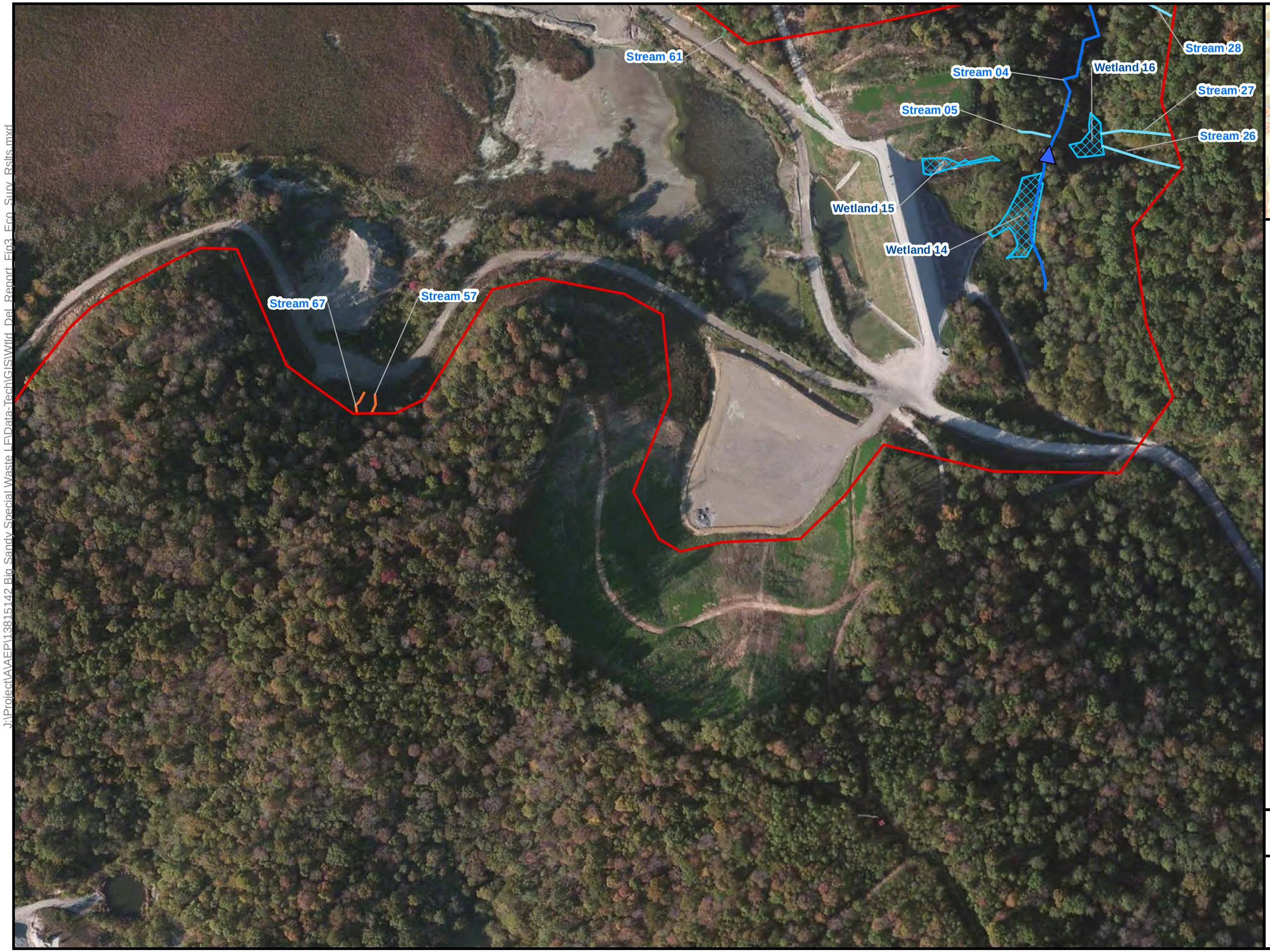
AEP

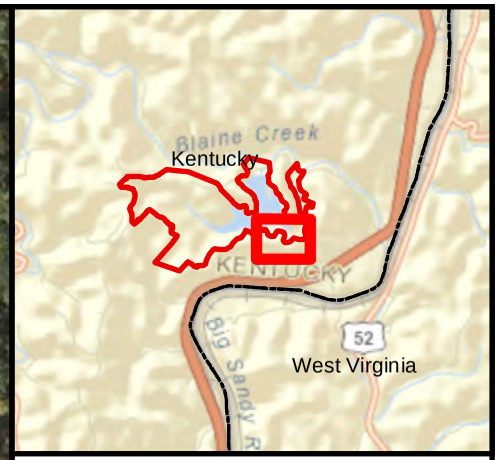
Big Sandy Fly Ash Pond Closure

FIGURE 3J
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

URS





N

LEGEND

- Project Survey Boundary
- Delineated Wetland
- Delineated Pond
- RBA Delineated Stream
- Stream Flow Direction

High Gradient Stream Habitat Areas

- Area 1 Delineated Stream
- Area 2 Delineated Stream
- Area 3 Delineated Stream
- Area 4 Delineated Stream
- Area 5 Delineated Stream
- Area 6 Delineated Stream
- Area 7 Delineated Stream

0 200 400

Scale in Feet

BASE MAP SOURCE:
ArcGIS Online World Imagery
Fallsburg. KY; Prichard, KY
7.5' USGS Topograpgic Quadrangles

Big Sandy Fly Ash Pond Closure

FIGURE 3K
WETLAND DELINEATION AND STREAM ASSESSMENT MAP

JOB NO. 13815142

J:\Project\AI\AEP\13815142 Big Sandy Special Waste LF\Data-Tech\GIS\Wtld_Del_Report_Fig3_Eco_Surv_Rslts.mxd