Armstrong Coal Company
Ohio County, Kentucky
Warden Waste Site

ALTERNATIVES ANALYSIS

I. INTRODUCTION

The purpose of the proposed Warden Waste Storage Area is to allow for disposal of mixed coal refuse generated from the Armstrong Dock Prep Plant 1.25 miles to the west (see Exhibit 1). The proposed action is needed to allow the continued operation of the Dock Plant, which processes coal from the Armstrong Coal Company (ACC) Kronos Underground and Equality Surface mines. The project is needed to meet the energy demands of the United States, as well as to stimulate the local economy. ACC met its purposes in a manner that returns a reasonable profit on investments in land, site development, infrastructure, and equipment while being environmentally responsible and complying with regulatory requirements. Clean Water Act Section 404(b)(1) requires that all reasonable alternatives be considered for projects that impact Jurisdictional Waters of the United States. As discussed in federal guidelines established for this regulation (45 FR 85344), an alternative is considered practicable if it may be implemented considering environmental impact, cost, existing technology, and logistics as they relate to the project's purpose. An alternative is considered reasonable if it is practicable and feasible from a common sense technical or economic standpoint. The applicant first considered all alternatives, then eliminated those deemed non-practicable. Reasonable alternatives were then selected from the remaining practicable alternatives; the Preferred Alternate was then chosen from the practicable alternatives once baseline data for potential jurisdictional waters had been collected and reviewed. With current technology, there are essentially no other practical options for coal waste disposal. This report will further show the selected site and configuration is the only practicable choice.

II. PRACTICABLE ALTERNATIVES CONSIDERED

No-Action Alternative

The no-action alternative for the project was found to be unacceptable as it would not allow Armstrong Coal Company to continue operations at the Dock Prep Plant, continue coal recovery at the Kronos Underground and Equality Surface mine facilities, or deliver the resource to the marketplace. These three facilities had an initial capital investment of approximately $130 million; not being allowed to continue operation of existing facilities and mines would place an

unreasonable financial burden on the company. The local economy also would be adversely impacted by the loss of coal production and employment. The project would extend employment for 450 positions at the previously-mentioned facilities, representing 3.5% of the Ohio County Workforce. Thus, ceasing operations at these facilities potentially could raise the unemployment rate of 6.8% by over 50%. The average wage of the mine ($65,000 per year) more than doubles the median personal income in the county, and is 48% higher than the median household income. Not installing the waste facility would result in the significant losses of tax monies, approximately $52 million from coal not extracted at the dependent mine sites. A final consideration is the existence of contracts with several energy partners. LG&E, Alcoa, East Kentucky Power Cooperative, Owensboro Municipal Utilities, Duke, AEP, and the Tennessee Valley Authority are expecting deliveries of coal from ACC. In addition to loss of revenue to the company, electric power customers potentially face an increase in rates if these providers must find alternate sources of coal.

Impacts: None
Criteria for Exclusion: Does not meet project plan and purpose

General Storage Rationale

Given the estimated recovery ratios and minable coal volume at the Kronos Underground and Equality Surface mines and prep plant processing efficiency, an estimated volume of coal waste is known for the lifespan of the mines. Areas that can accommodate that volume were then identified in areas immediately adjacent to the prep plant to minimize trucking distance and utilize existing, permitted haul roads. Four alternate areas were identified in the project area (refer to Exhibit 1). However, due to the relatively low relief of Ohio County, only a single site identified could be used by itself, with the rest being combined for a nearly equivalent storage area. Thus, action alternates considered are the combination of 3 sites in low-relief areas and a single site in a relatively high-relief area.

Multiple Alternate Storage Sites

Three storage sites totaling 823 acres would be required to accommodate the predicted mixed coal refuse volume. They are located west of the selected site in three different watersheds, and would have significant environmental impact. The multiple waste sites would directly impact

25 stream segments, totaling approximately 30,354 linear feet. This impact would be spread among three separate watersheds, and would encroach upon the floodplain of the Green River. Disposal in these areas also would directly impact five wetland areas for a total of approximately 11.2 acres. Please refer to Tables 1 and 2 for a detailed impact breakdown and Exhibit 2 for a graphical representation of these impacts.

Table 1. Impacts to Streams from Multiple Waste Sites

Stream Type	Number Affected	Length Affected (feet)
Ephemeral	20	16,418
Intermittent	2	6,523
Perennial	3	7,413
	Total:	30,354

*Note ephemeral stream extent in Alternate Areas 2 and 3 estimated by GIS analysis and likely are low

Table 2. Impacts to Wetlands from Multiple Waste Sites

Wetland Type	Number Affected	Acreage Affected
Forested	2	10.5
Fringe	3	0.7
	Total:	11.2

Benefits: Meets project plan and purpose, facilitating extraction and processing of 52 million tons of coal, which will produce approximately 118 billion kWh of energy for the regional power grid. Operation of facility will maintain 450 high-paying jobs, approximately 3.5% of Ohio County workforce.

Criteria for Exclusion: Significant disturbance of land surface and impacts to aquatic resources in multiple watersheds within the floodplain of the Green River.

Single Storage Site

A single site capable of accommodating the required volume of coal waste was located between the East Fork Kronos and Warden surface operations. This alternate would impact 310 acres of land surface while handling more spoil than the other three sites combined. Impacts to water resources would be comparable; total stream impact is five intermittent reaches totaling 9,543 feet and 36 ephemeral reaches totaling 18,518 feet. Direct wetland impacts are limited to three areas totaling 4.036 acres. It should be noted that these totals come from detailed onsite survey of the Warden Waste Site, and that only Alternate Area 1 has detailed information

available. Alternate Sites 2 and 3 were estimated from topographic, orthographic, hydrologic, and soils data, and likely are underestimates of existing stream and wetland features.

Table 3. Impacts to Streams from Single Waste Site

Stream Type	Number Affected	Length Affected (feet)
Ephemeral	36	18,518
Intermittent	5	9,543
Perennial	0	0
	Total:	28,061

Table 4. Impacts to Wetlands from Single Waste Site

Wetland Type	Number Affected	Acreage Affected
Forested	2	4.028
Emergent	1	0.008
	Total:	4.036

Benefits: Increased Economic benefits over multiple waste areas, impacts fewer aquatic resources and significantly less land area in a single watershed. Meets project plan and purpose, facilitating extraction and processing of coal; allows for generation of 118 billion kWh of energy.

Criteria for Exclusion: Disturbance of streams and wetlands.

III. PREFERRED ALTERNATIVE AND CONCLUSION

The Warden Waste Area was selected as the preferred alternative based largely on environmental criteria. It minimizes impacts to jurisdictional Waters of the US while restricting those impacts to a single watershed. Its location allows for use of existing, permitted haul roads, which precludes environmental effects associated with construction of new roads. An additional benefit is keeping heavy truck traffic off the public road system, which reduces roadway wear and tear and increases public safety. The preferred alternative is the only site within reasonable proximity of the source that meets project goals with minimum environmental impacts.

Mixed coal refuse material generated from Armstrong Dock Coal Preparation Plant would be placed at the site. Prior to placing this material, top soil and subsoil will be removed and stockpiled for use as cover material. Upon completion of disposal operations, the refuse

material will be final graded and covered with a minimum 4' of material consisting of non-toxic, non-combustible material (soil and rock) and a minimum of 0.5' of topsoil. The site will be re-vegetated in accordance with SMCRA reclamation guidelines. Streams and wetlands will be impacted by excavation and fill during the sites development.

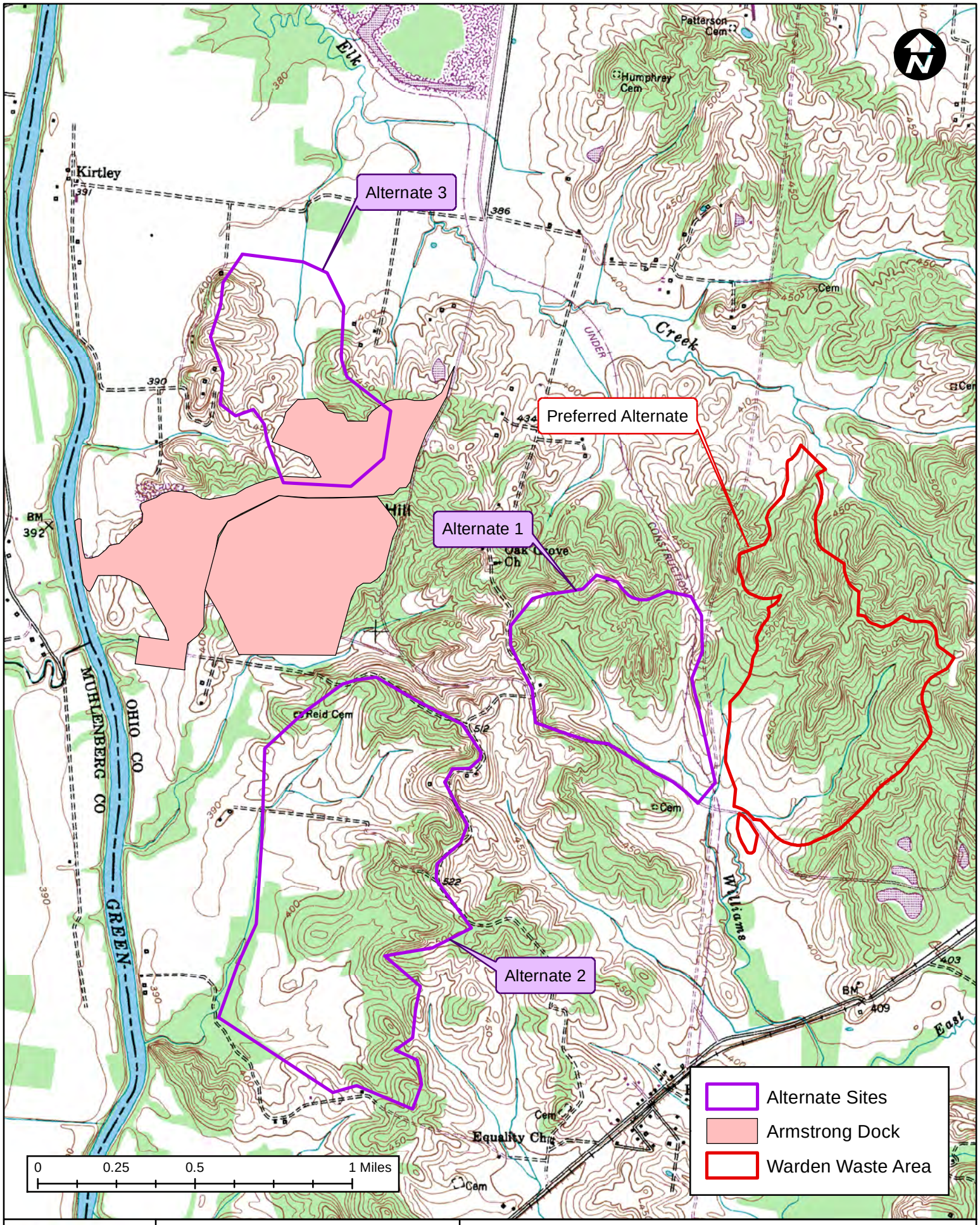
Mitigation for stream and wetland impacts associated with this project will be conducted on adjacent property owned by the applicant. Stream mitigation will consist of a combination of perennial, intermittent and ephemeral stream enhancement and preservation. In-stream structures will be installed to provide more diverse aquatic habitat than what currently exists and stream banks will be stabilized in sections where excessive erosion is present. Native vegetation including trees, shrubs and herbaceous species will be established in areas disturbed by structure placement and bank stabilization measures. Tree and shrub plantings will be of higher quality than what currently exists. Wetland mitigation will consist of creating forested wetlands along a perennial stream, enhancing and preserving existing wetlands located on the property. Wetland hydrology will be established by inducing backwater flooding and creating an active floodplain that will restore natural hydrological connections and raise the local water table.

Installation of the Warden Waste disposal area has significant economic benefits, primarily through the continued operation of the Armstrong Dock prep plant, Kronos Underground mine, and Equality surface mine. The local economy would maintain high-quality employment for 450 persons throughout the life of the surface mine; these positions have an average salary of $66,000, more than double the county per capita average. The state and county stand to gain $52 million in coal severance taxes over the lifetime of the project, as well as associated property and payroll taxes. Also, the applicant has existing contracts with LG&E, Alcoa, East Kentucky Power, Owensboro Municipal Utilities, Duke, AEP, and TVA. Electric power customers potentially face an increase in rates if these providers must find alternate sources of coal.

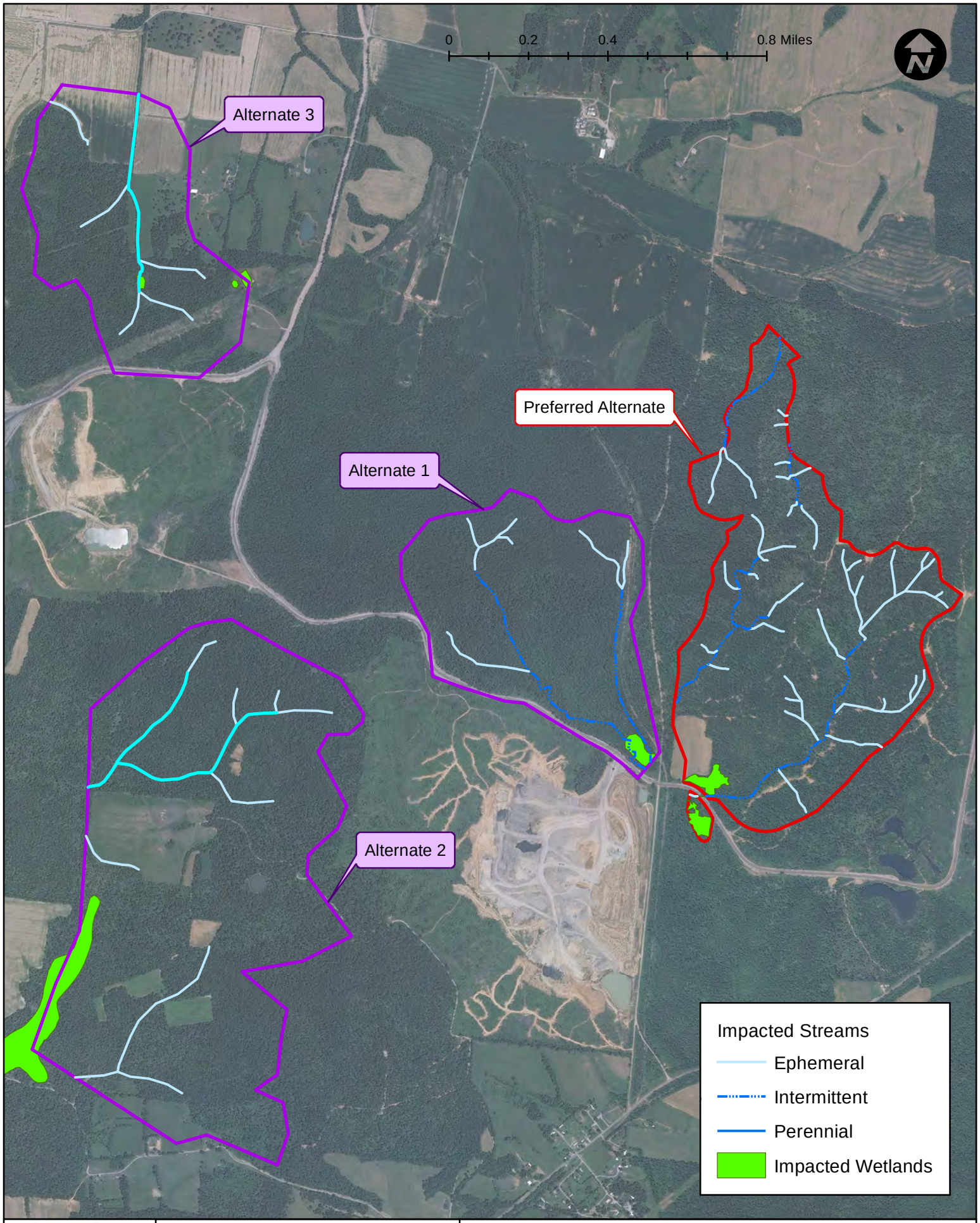
Nationally, coal represents 21% of the energy supply and is used to produce 50% of our electricity. Approximately 93% of the Kentucky's electricity comes from coal fired plants, and over 50% of the coal comes from western Kentucky. Given a yield of 2,260 kWh per ton for, the coal from which the spoil disposed of at the Warden Waste site will produce approximately 118 billion kWh of electric power over its lifespan. Kentucky's demand of coal for electricity

generation is approximately 42 million tons per year; therefore, the facility will help the dependent mines and prep plant satisfy approximately 12% of the annual demand.

Overall, the proposed location and configuration is the only alternative within reasonable proximity of the source that meets project goals and minimizes environmental impacts while maintaining a viable project. The facility will accomplish this while maximizing public safety and minimizing its environmental footprint.



T. H. E. J-E Engineers, Inc.	PROJECT: Warden Waste Area	Alternates Considered and Dependent Prep Plant	
	COUNTY: Ohio	STATE: Kentucky	NEAR: Equality	EXHIBIT 1



T. H. E. Engineers, Inc.	PROJECT: Warden Waste Area	Water Resources Potentially Impacted by Alternates	
	COUNTY: Ohio	STATE: Kentucky	NEAR: Equality	EXHIBIT 2