

Wendell H. Ford Airport Access Road Scoping Study Perry County, Kentucky

prepared for:

Kentucky Transportation Cabinet
District 10 - Jackson
Central Office - Division of Planning

November 2018



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Perry County, KY

Prepared for
Kentucky Transportation Cabinet
Division of Planning
Highway District 10



Prepared by
Palmer Engineering Company



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EXECUTIVE SUMMARY

Wendell H. Ford Airport in Perry County is accessed via Wendell Ford Terminal Road (Terminal Road), a narrow two-lane facility with steep grades exceeding 16% in some locations. The roadway is also characterized by slope failures that have required extensive maintenance and repair. Due to the steepness of the grades and substandard curvature, fuel delivery trucks cannot deliver full loads of fuel to the airport. During winter months, even after treatment, the road conditions often remain so treacherous that the road and the airport are closed. With plans to extend the runway to better serve corporate customers and small cargo aircraft, such occurrences undermine the reliability of the airport to serve existing and future patrons. Furthermore, closing of the road isolates residents of nearly 150 homes that rely upon the road to access KY 15 and the community.

Improving access to the airport is needed to provide a safe travel route for both passenger cars and airport delivery vehicles and to maintain dependable air service at the facility.

Purpose and Need

The purpose of the project is to improve access to the Wendell H. Ford Airport in Hazard, Perry County, Kentucky. The need for this project arises from substandard conditions of the existing access road, including narrow lanes, little to no shoulders, steep grades, and slope failures. These geometric deficiencies limit fuel deliveries to the airport, especially during winter months, when road conditions sometimes become impassable, forcing closure of the road and the airport, and isolating area residents reliant on the road for access to KY 15, the principal arterial road that serves the area.

Project Development

Corridors for improving access to the airport were initially developed with several objectives in mind, including:

- Accommodate fully-loaded fuel trucks (48', five-axle semi-trailer) to transport aviation fuel to the airport at all times throughout the year;
- Avoid impacts to existing housing developments near the airport;
- Avoid impacts to any FAA required navigation equipment supporting airport operation;
- Avoid encroachment of the proposed access road on areas for potential runway or taxiway expansion;
- Meet a design speed of 35-40 mph with a maximum 10% grade (8% preferred) and have 11-foot lanes with 4-foot shoulders (see **Figure ES-1**).

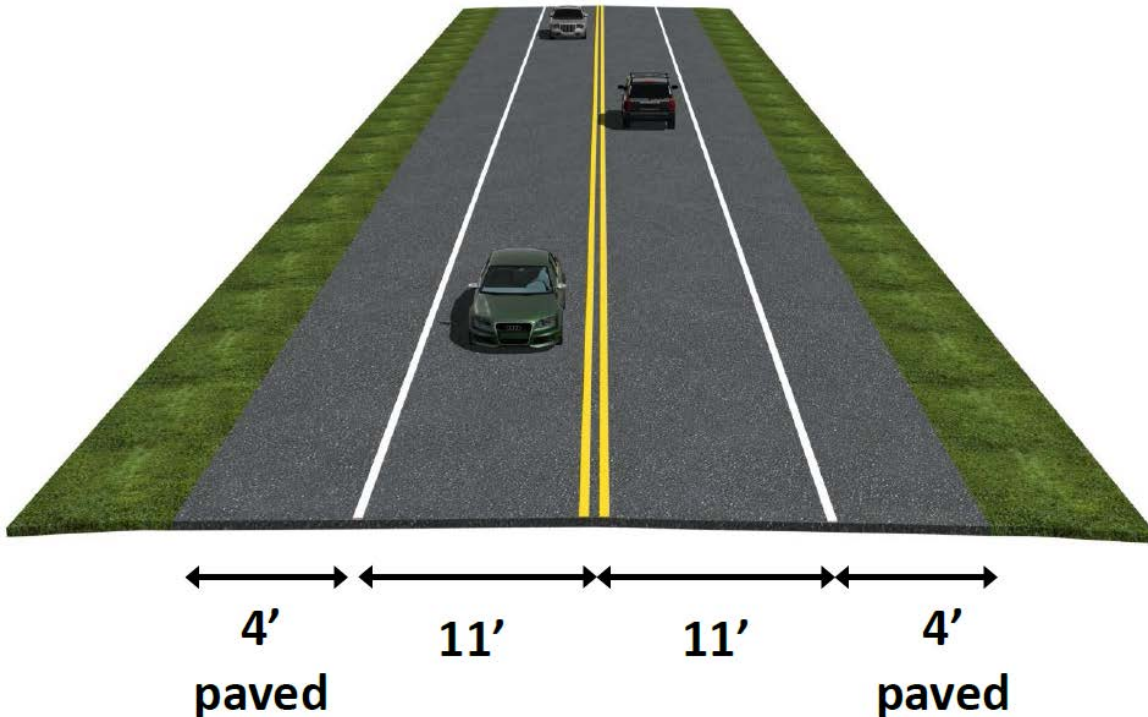


Figure ES-1: Typical Section

The existing intersection of Trus Joist Lane and KY 15, south of the airport, was identified as the location where the new access road, if constructed, would depart from KY 15. Four alternatives were initially developed, using maximum 10% grades and a 35 mph design speed (see **Figure ES-2**).

Alternatives 1, 2, and 3 all terminate at Fly By Hazard Road near a subdivision development along Terminal Road. Alternative 4 intersects with Fly By Hazard Road further to the east and continues northward to tie-in with Terminal Road just west of the airport, avoiding the subdivision. Alternatives 1 and 2 were dismissed due to their similarities with other alternatives. Alternative 5 was later developed with maximum 5% grades and a 40 mph design speed. Its alignment crosses between Alternatives 3 and 4 and is coincidental with Alternative 4 between Fly By Hazard Road and its terminus with Terminal Road near the airport.

Recommendations

Alternative 5 (see **Figure ES-3**) satisfies the Purpose and Need of the project to provide improved access to the airport and meets or exceeds the design objectives established for alternative development. The benefits of reduced grades and higher design speed can be recognized while avoiding routing traffic through the subdivision south of the airport and for less cost than the other alternatives (see **Table ES-1**). Should budget constraints dictate that



turn lanes on KY 15 be considered as a separate project, the table breaks out the impacts and costs of constructing this desirable improvement.

It is recommended that Alternative 5 be advanced to preliminary design for further study.

Table ES-1: Alternatives Comparison Summary

	Alternative 3	Alternative 4	Alternative 5	KY 15 Turn Lanes
Length (miles)	1.22	1.85	1.74	0.37
Maximum Grade (%)	10	10	5	7
Design Speed (mph)	35	35	40	55
Net Earthwork	1,258,000	891,000	-164,000	-50,000
ROW Acquisitions	2	2	2	0
Neighborhood Impacts	Yes	No	No	No
Costs	\$14,344,000	\$18,052,000	\$13,239,000	\$780,000

*Construction costs include a contingency of 35%

**Costs for alternatives include adding left and right turn lanes on KY 15, broken-out in last column

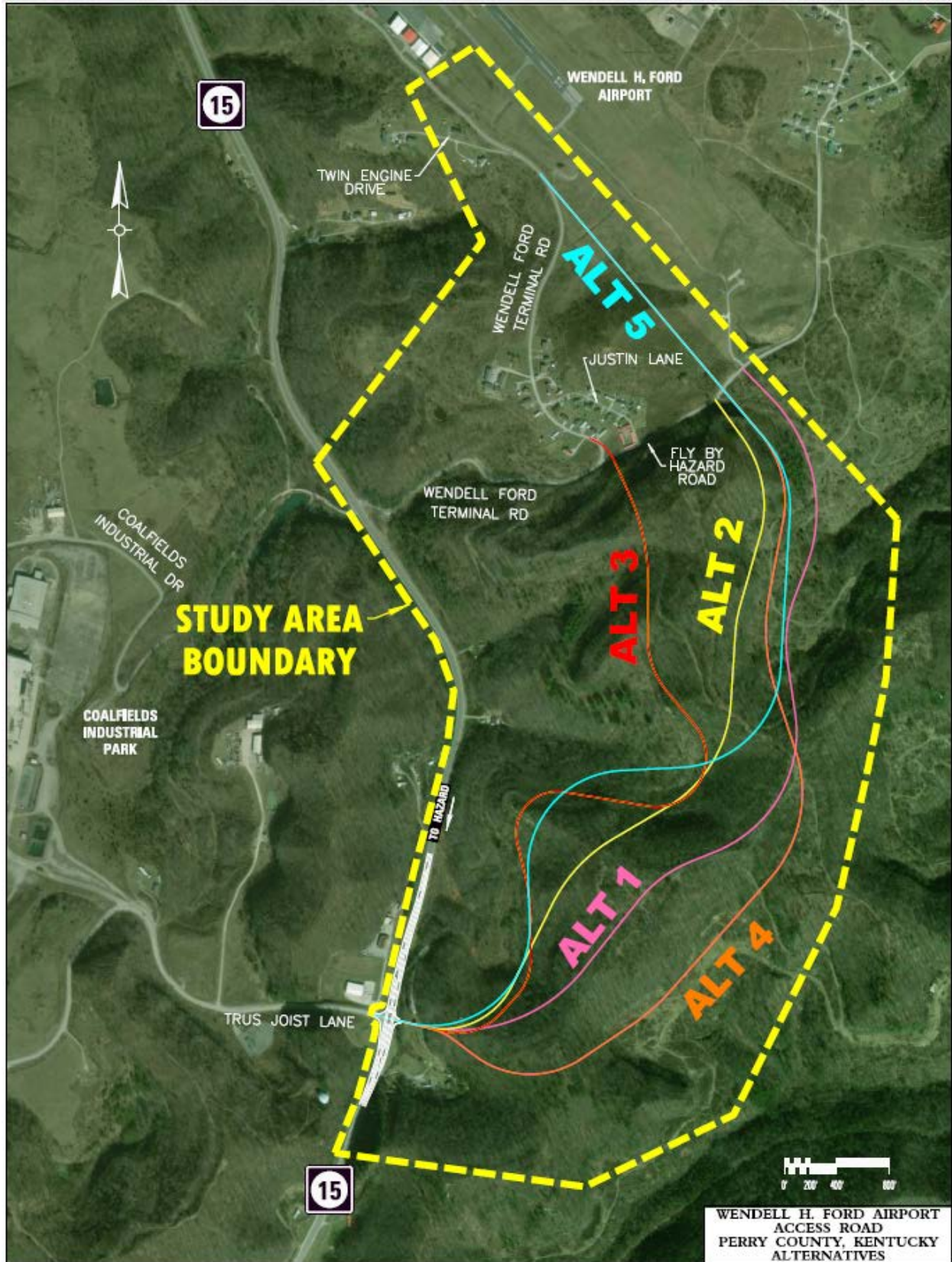


Figure ES-2: Study Area and Alternatives

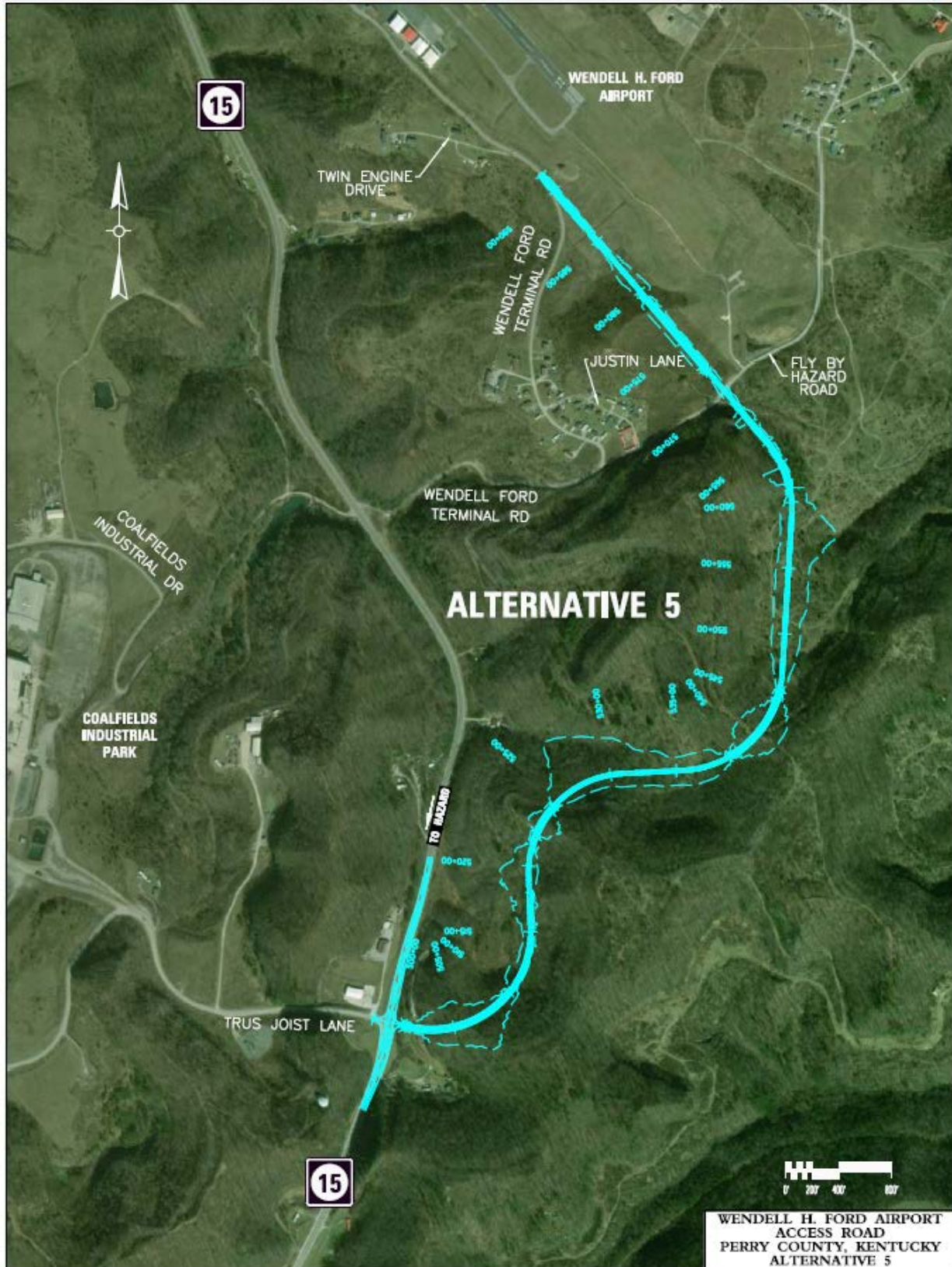


Figure ES-3: Alternative 5 (Preferred)



1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) initiated the Wendell H. Ford Airport Access Improvement Study to evaluate means of improving highway access to the Wendell H. Ford Airport in Perry County. The existing access road is characterized by narrow lane widths, narrow shoulders, and steep grades. During winter months, the highway can become treacherous and is sometimes closed, shutting down airport operations and isolating residents of the nearly 150 homes located in the area. Airport officials have indicated that the grades and roadway geometry are such that fuel trucks cannot deliver full loads of fuel to the airport during the winter. Slope failures and other maintenance concerns also are prevalent along the alignment of the Wendell Ford Terminal Road (Terminal Road). A secondary and older access road can be used to access the airport but its lanes are even narrower and grades are steeper than the primary access road.

The airport has plans to extend Runway 14 – 32 and its taxiway by 1,500 feet, increasing the runway length to 7000 feet¹. Extending the runway will allow the airport to better serve corporate jets and small air cargo planes. A 10,000 foot runway extension has been discussed to accommodate larger aircraft, but is considered highly unlikely.

Improving access to the airport is needed to provide a safe and reliable travel route for both passenger cars and delivery vehicles and to maintain dependable air service for the community.

1.1 STUDY AREA

The Study Area is located east of KY 15 in northern Perry County in the eastern Kentucky coal fields (see **Figure 1**). Existing access to the airport is a route from KY 15 then onto Terminal Road, which winds upward through mountainous terrain to the Wendell H. Ford Airport. The airport is situated approximately 350-400 feet in elevation above the valley floor and KY 15. The area surrounding the airport has been extensively mined.

Terminal Road climbs a steep grade- as much as 16%- in its first 2,000 feet after departing from KY 15 and intersecting with Fly By Hazard Road. The road then turns northward, traversing through a small subdivision consisting of 35 homes and then continuing to the airport. The total length of the road is 1.25 miles. From its intersection with Terminal Road, Fly By Hazard Road runs eastward to a subdivision development with 145 homes that lies east of the airport.

¹ Documentation in the project record indicates that the runway extension is approved for 1,000 feet; however, while preparing this report, it was discovered that the Airport Layout Plan approved in 2010 includes a 1,500 foot runway extension.

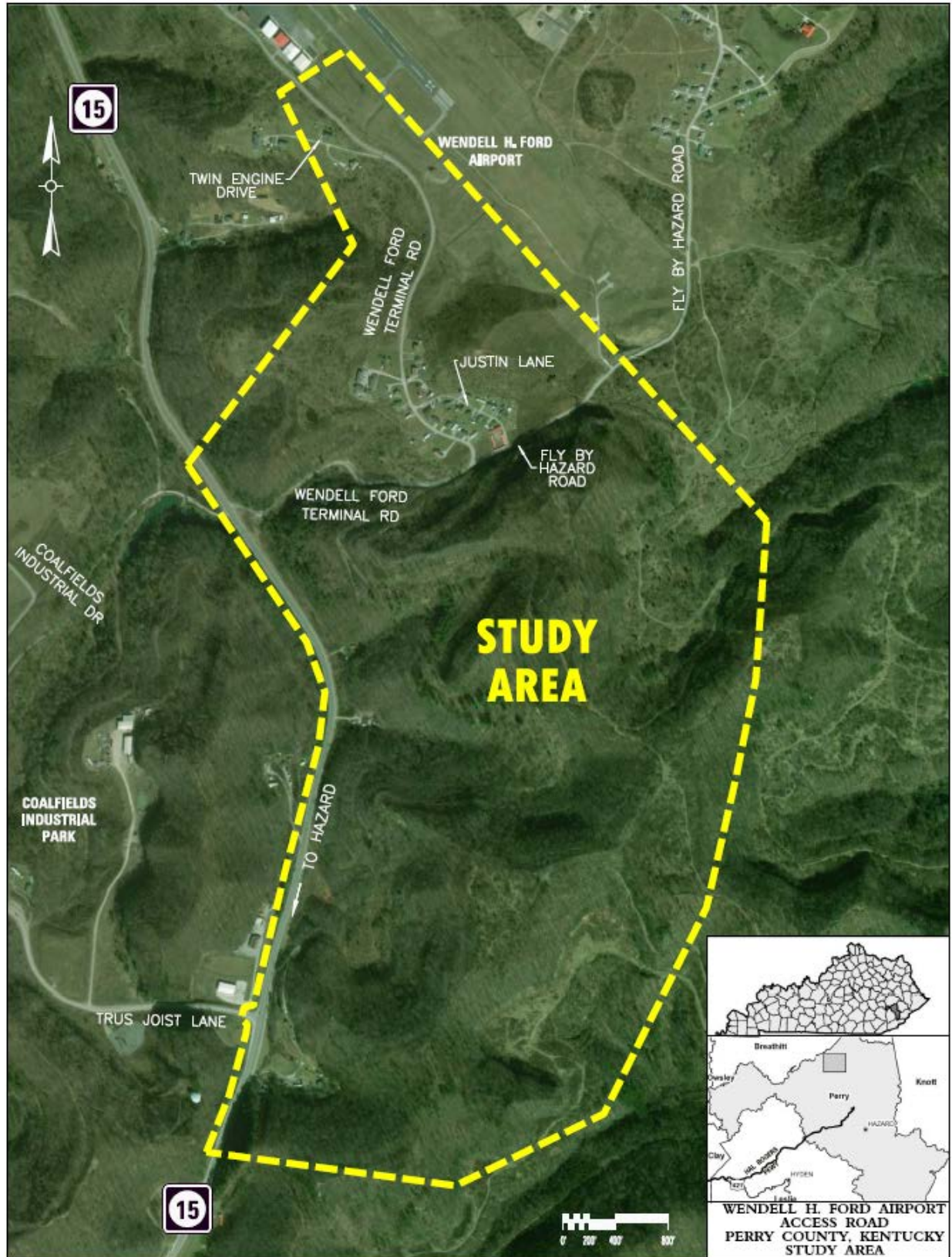


Figure 1: Study Area



The original airport access road, Regional Airport Road, intersects with KY 15 0.9 miles north of the Terminal Road intersection.

Southward near mile point (MP) 22.1, KY 15 intersects with Trus Joist Lane, the access road to the Coal Fields Regional Industrial Park, which is owned and operated by the Perry, Harlan, Leslie, Breathitt, and Knott Regional Industrial Development Authority, Inc. The industrial park currently has two major tenants, a SYKES data call center and a Federal Express regional ground transportation facility. These industries employ approximately 600 people.²

1.2 PURPOSE AND NEED

The purpose of the project is to improve access to the Wendell H. Ford Airport in Hazard, Perry County, Kentucky. The need for this project arises from substandard conditions of the existing access road, including narrow lanes, little to no shoulders, steep grades, and slope failures. These geometric deficiencies limit fuel deliveries to the airport, especially during winter months when road conditions sometimes become impassable, forcing closure of the road and the airport and isolating area residents reliant on the connection to KY 15.

1.3 COMMITTED PROJECTS

The 2018 Highway Plan includes funding to complete reconstruction of a 1.2 mile section of KY 15 (Item Number 10-158), approximately eight miles south of the Study Area. This project, let to construction in January 2018, will improve safety and upgrade geometrics between Morton Boulevard and the KY 15 Bypass. The plan also identifies funding for 12 other projects in Perry County, nine of which address bridge deficiencies. Programmed projects include design of improvements for 0.9 miles of KY 476 in Walkertown, continued funding of a new interchange on the Hal Rogers Parkway near MP 55 (Item Number 10-8903) and funding for a safety project on KY 80 (Item Number 10-8906) between the Leslie County line and KY 451 west of Hazard. That project will widen shoulders, improve sight distance, correct substandard geometry, and replace structures along the route.

KY 15 is also scheduled for improvement in Breathitt County. A 1.15 mile section of KY 15 between the new KY 15/KY 30 intersection and the intersection with KY 1812 in Jackson is scheduled for widening. No other improvements to KY 15 are programmed in the 2018 Highway Plan.

² Phone communication with Chuck Sexton, East Kentucky Concentrated Employment Program

2.0 EXISTING CONDITIONS

Conditions of the study area’s existing transportation network are examined in the following section. The information compiled includes roadway facilities and geometrics, crash history, and traffic volumes within the study area. Data was collected from the KYTC’s Highway Information System (HIS) database, aerial photography, as-built plans, the KY State Police, and field review. A summary of the information contained within the KYTC HIS database for KY 15 is included in **Table 1**. Since Terminal Road is a local road, no data for it is available in the HIS. Reported existing conditions were collected by field observation and measurement, and review of as-built plans.

Table 1: Existing Conditions Summary

Segment	Begin MP	End MP	AADT (2017)	Truck %	Speed Limit	Lanes	Shoulders	Max. Grade (%) - Length
KY 15	21.9	23.0	4,790	12.1	55	2*- 12'	6' Bituminous Paved	6.1-6.6% - 1,210'
Terminal Road	0.00* *	1.2	870	5.7	25	2 – 10'	1-2' Bituminous Paved	14.0 -16.2% - 460'

Source: KYTC Highway Information System

* The typical section through the Study Area includes a truck climbing lane on the SB side

** MP reported as the distance from intersection with KY 15

2.1 ROADWAY SYSTEMS

Functional classification is the grouping of roads, streets, and highways into integrated systems ranked by the level of mobility for through movements and access to adjoining land. This grouping acknowledges that roads serve multiple functions and provides a basis for comparing roads. Functional classifications can be used for, but are not limited to, the following purposes:

- Provide a framework for highways serving mobility and connecting regions and cities within a state.
- Provide a basis for assigning jurisdictional responsibility according to the roadway’s importance.
- Provide a basis for development of minimum design standards according to function.
- Provide a basis for evaluating present and future needs.

- Provide a basis for allocation of limited financial resources.

KY 15 through the Study Area is classified as a Rural Principal Arterial. All other roads within the Study area, including Terminal Road, Fly By Hazard Road, and Trus Joist Lane, are classified as Local Roads.

2.2 ROADWAY GEOMETRIC CHARACTERISTICS

A review of existing geometrics on KY 15 and Terminal Road in the Study Area was conducted. Characteristics of KY 15 were compared with common geometric practices for Rural Arterial Roads listed in Exhibit 700-03 of the 2006 KYTC *Highway Design Manual* (Design Manual) (http://transportation.ky.gov/Highway-Design/Highway_Design_Manual/Geometric_Design_Guidelines.pdf). Conditions on Terminal Road were compared with standards detailed in Exhibit 700-01 for Rural Local Roads in the Design Manual.

KY 15 is a two-lane roadway through the Study Area supplemented with a southbound truck climbing lane. The truck climbing lane begins and ends beyond the Study Area, at approximately MP 23.7 and MP 21.8, respectively. The current configuration of the roadway through this section, consisting of 12-foot lanes with six-foot shoulders, was constructed in 1966. For Average Daily Traffic (ADT) counts of more than 2,000 vehicles per day (vpd), the existing lane widths are consistent with Design Manual standards for a 55 mph design speed on a rural arterial road. Six-foot shoulder widths are slightly less than the graded eight-foot standard.

Within the Study Area, there are no substandard horizontal curves on KY 15. The maximum vertical grade for a 55 mph design speed in mountainous terrain is 6%. As discussed above, a truck climbing lane has been constructed in the southbound direction where grades are as much as 6.6% in the Study Area.

Terminal Road pavement widths are consistently between 23-26 feet, with the exception of a short section just north of the intersection with Twin Engine Road. At this location, the pavement narrows to a width of less than 19 feet where it crosses a culvert. For rural local roads with ADTs of 400-1,500 vpd and a 40 mph design speed, the standard for pavement width is 20 feet.

The striped edge of the driving lane is approximately one foot from the edge of pavement throughout most of the section. Beyond the edge of pavement there is little to no graded shoulder (see **Figure 2**). Hillside cuts,



**Figure 2: Terminal Road;
Edge of Pavement**

tight to the edge of road with little room for ditches, are common. Guardrail near to the edge of the driving lane is also a common characteristic, especially along the steep grades found in the half-mile section nearest the KY 15 intersection. Design Manual guidelines recommend a minimum five-foot graded shoulder width for rural local roads.

Between KY 15 and Fly By Hazard Road, the geometry meets a 20 mph design speed. Stopping sight distances are not up to standard at several locations but the more significant issue is

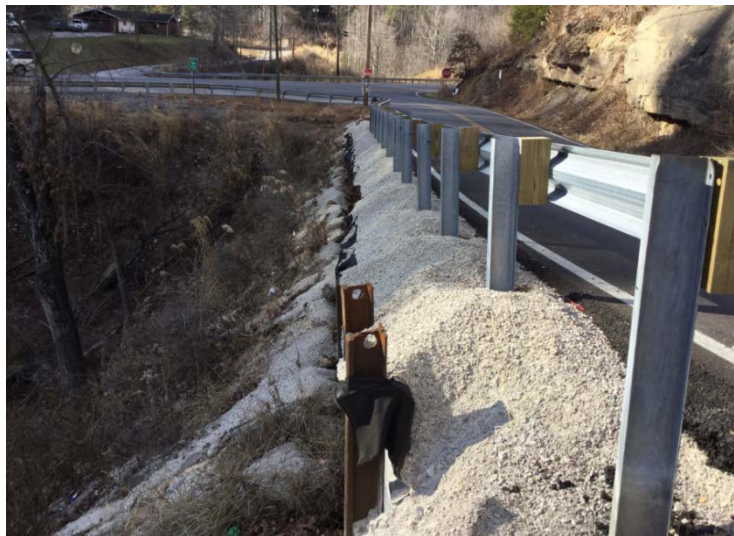


Figure 3: Terminal Road Intersection with KY 15

vertical grade. The maximum grade for a 40 mph design speed in mountainous terrain is 13%. Of the first 2,000 feet of roadway beginning at the KY 15 intersection (see **Figure 3**), 1,600 feet is constructed on grade equaling or exceeding 8% and approximately 540 feet exceeds a grade of 13%. Grades of more than 16% are also located within this section. These grades hinder the delivery of fuel to the airport and, in the winter, create un-drivable conditions that close the road and

airport, stranding area residents. Existing horizontal and vertical geometric data for KY 15 and Terminal Road are depicted in **Figure 4**. Note that the vertical data shown in **Figure 4** represents existing grade deficiencies and does not highlight substandard vertical curves.

There are no bridges on either KY 15 or on Terminal Road within the Study Area. There are also no bicycle or pedestrian facilities in the area.

2.3 EXISTING TRAFFIC VOLUMES

Traffic counts were collected for KY 15 and Terminal Road in 2017 and were used to forecast traffic for the existing condition (2020) as well as the No Build and Build scenarios in the 2040 design year. Traffic volumes (AADT) for the No Build condition are shown on **Figure 5** and summarized in **Table 2**. A copy of the *Traffic Forecast Report and Bike/Ped Accommodation Assessment for Perry County Airport Access Road Planning Study (February 16, 2018)* (Traffic Forecast Report) is provided in **Appendix A**.

Traffic on KY 15 ranges from 5,000 to 6,000 AADT through the Study Area. Trucks comprise 5-6% of the traffic with a slight decline in truck traffic occurring south of the Trus Joist Lane intersection. On Terminal Road, existing traffic consists of 870 vehicles (AADT) with trucks

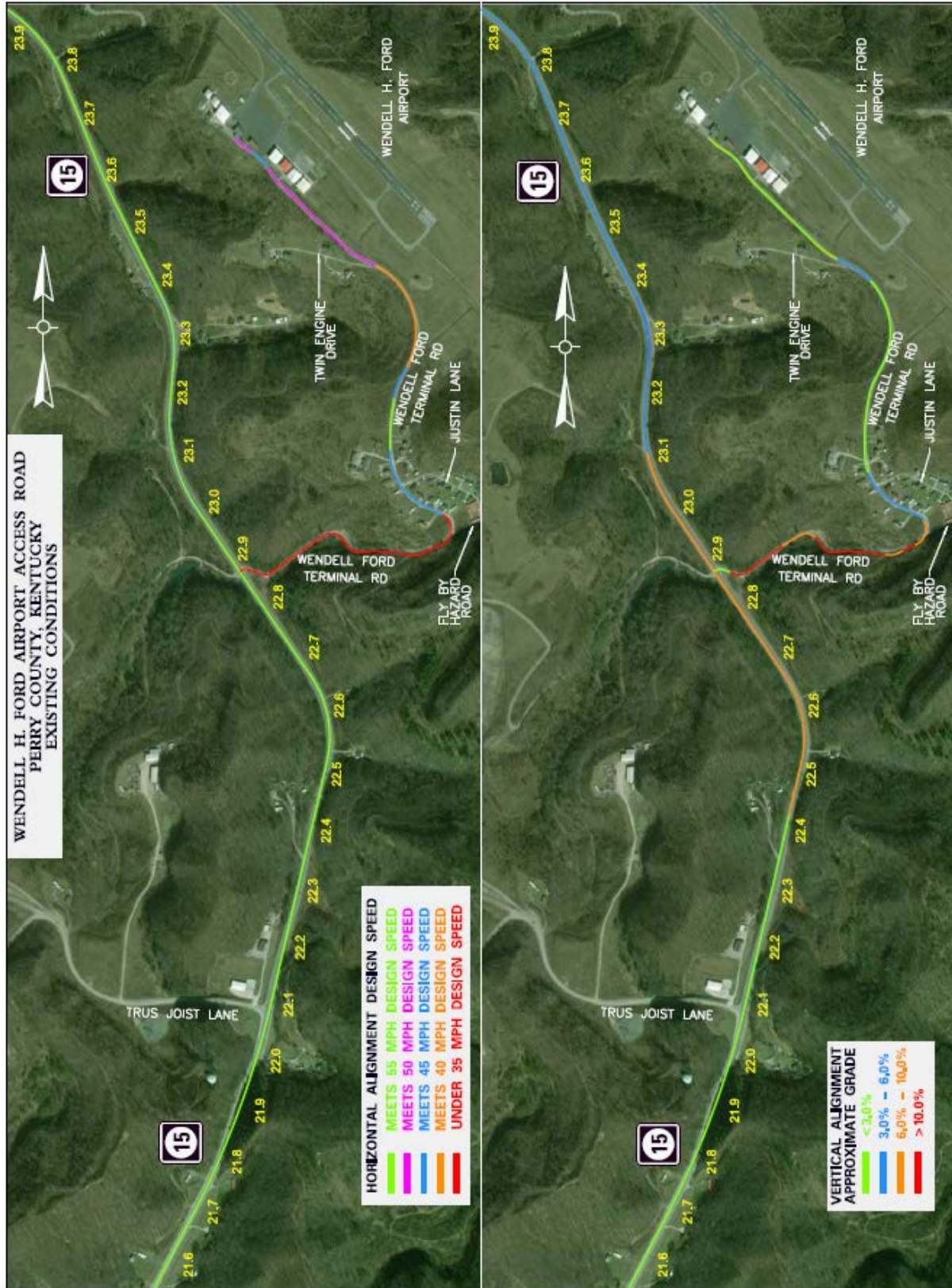


Figure 4: Existing Conditions

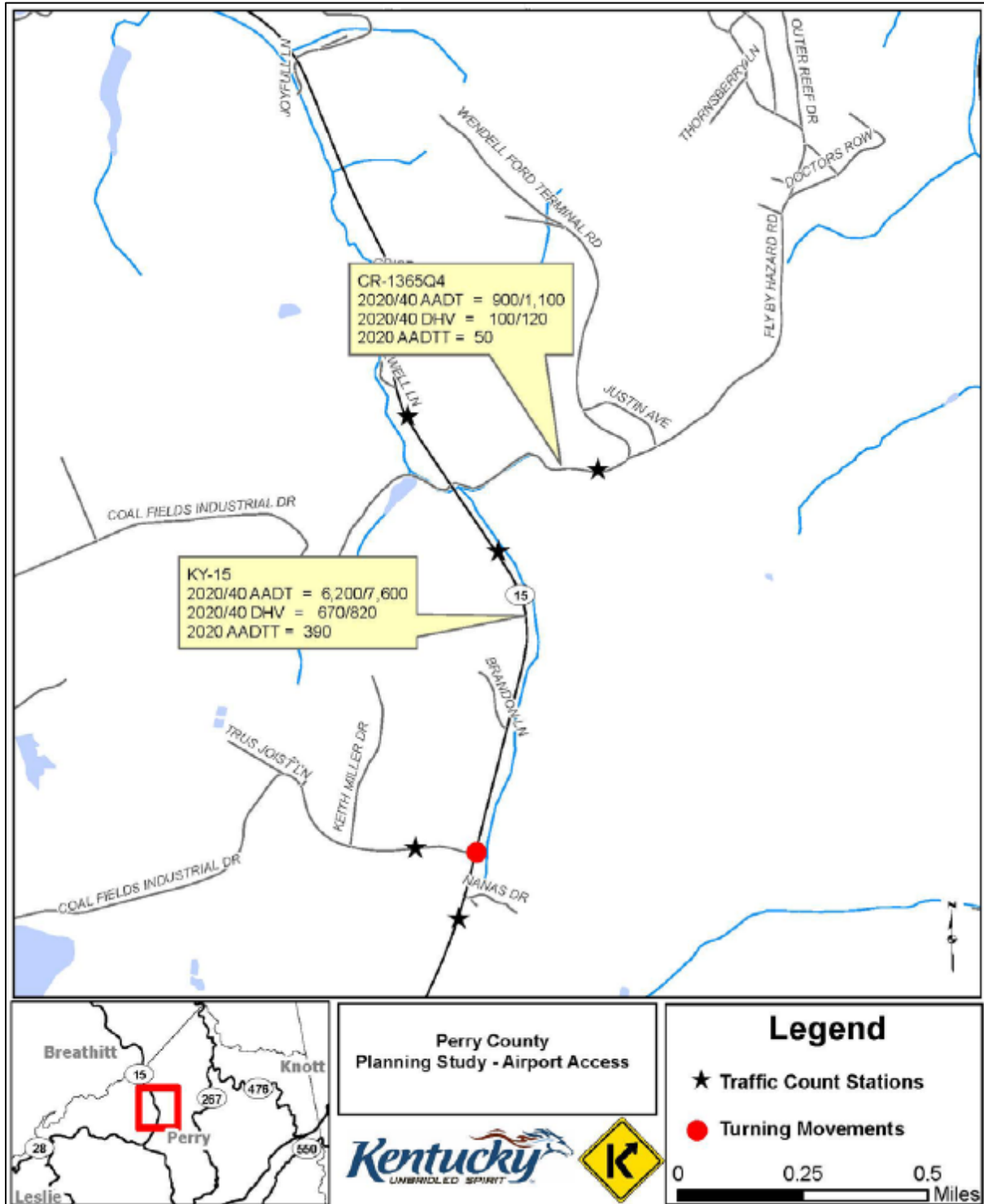


Figure 5: Existing Traffic



comprising slightly less than 6% of the vehicle mix. The traffic forecast for the No Build condition in 2020 indicates modest increases in traffic. The No Build condition was also analyzed for 2040. Though the Kentucky State Data Center projects that population in Perry County will decline over the next 20 years, traffic stations on KY 15 show that traffic is increasing. The forecast assumes a 1% annual traffic growth rate.

Table 2: Traffic Volumes

Segment	Begin MP	End MP	Traffic Count (2017)	% Trucks	Existing (2020)		No Build (2040)	
					AADT	DHV	AADT	DHV
KY 15 - Stidham Lane to Trus Joist Lane	21.5	22.1	5,000	12.1	6,200	670	7,600	820
KY 15 - Trus Joist Lane to Terminal Road	22.1	22.9	6,000					
KY 15 - Terminal Road to Grist Mill Loop	22.9	23.3	5,300					
Terminal Road	0.00*	1.2	870	5.7	900	100	1100	120

Source: KYTC Traffic Forecast Report (February 16, 2018)

* MP reported as the distance from intersection with KY 15

Turning movements for the design year (2040) were evaluated for the intersection of KY 15, the new access road and Trus Joist Lane. The new access road will provide an efficient connection between the airport and the Coalfields Industrial Park, accessible via Trus Joist Lane. More than half of the traffic on the new access road during the a.m. and p.m. peaks originates from or is destined for Trus Joist Lane. Other traffic on the new road is originating from south of the area on KY 15. A turn movement diagram is included in **Appendix A**.

The Traffic Forecast Report also documented little to no bicycle and pedestrian traffic in the area and stated that there are no plans by the local government for construction of facilities to accommodate these alternative transportation modes.

2.4 CRASH HISTORY

Using information available from Kentucky State Police records, historical crash data from January 1, 2013, to December 31, 2017, was collected for KY 15 and Terminal Road within the Study Area. Crash locations and analysis of crash types can be seen on **Figures 6, 7 and 8**, respectively. During the period, there were eight crashes reported on Terminal Road, all occurring in the section between KY 15 and the intersection with Fly By Hazard Road. This section is characterized by steep grades and substandard horizontal curves. All but one of the crashes occurred when roadway conditions were reported as wet or icy. There is a

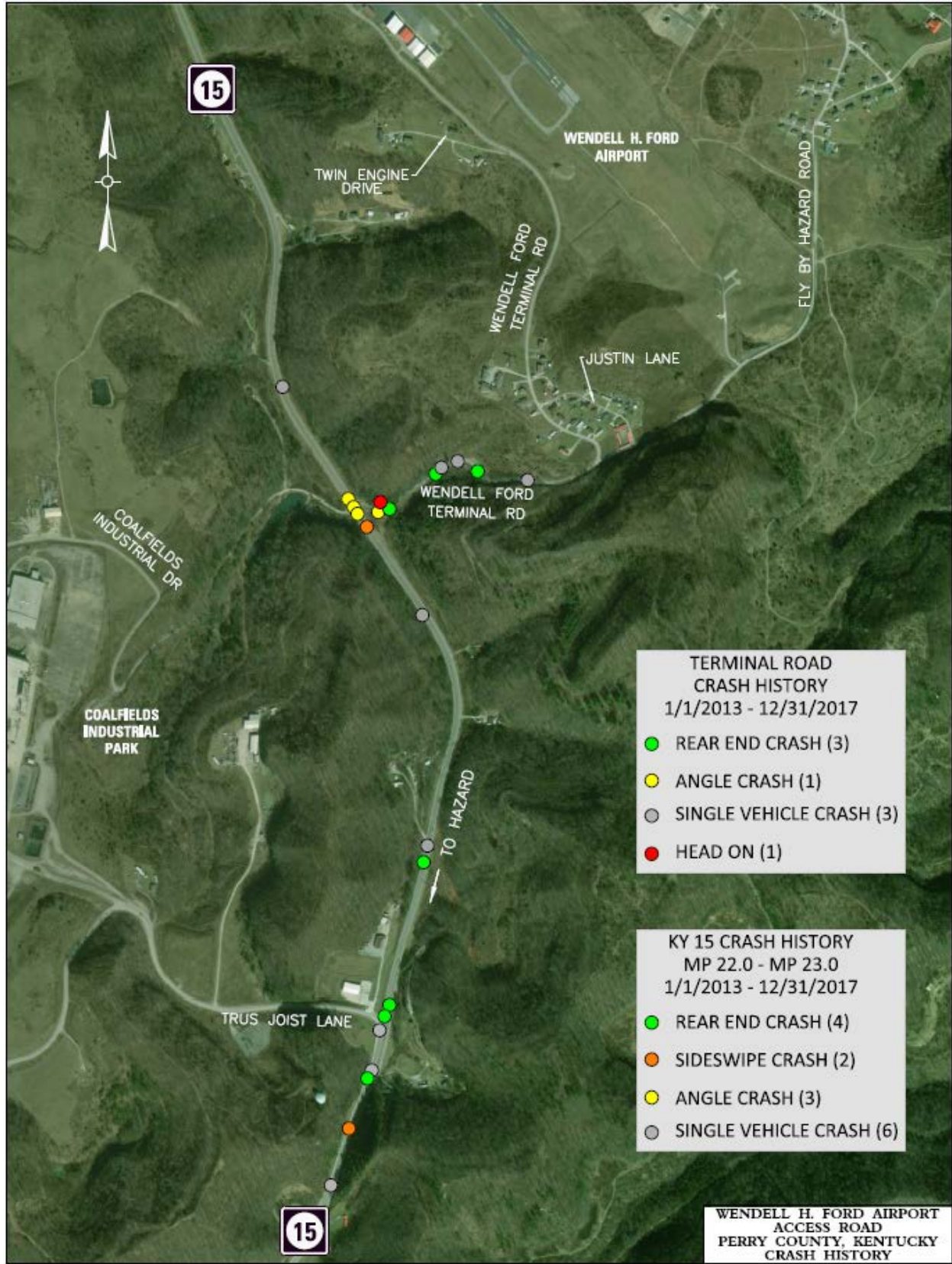


Figure 6: Crash Locations

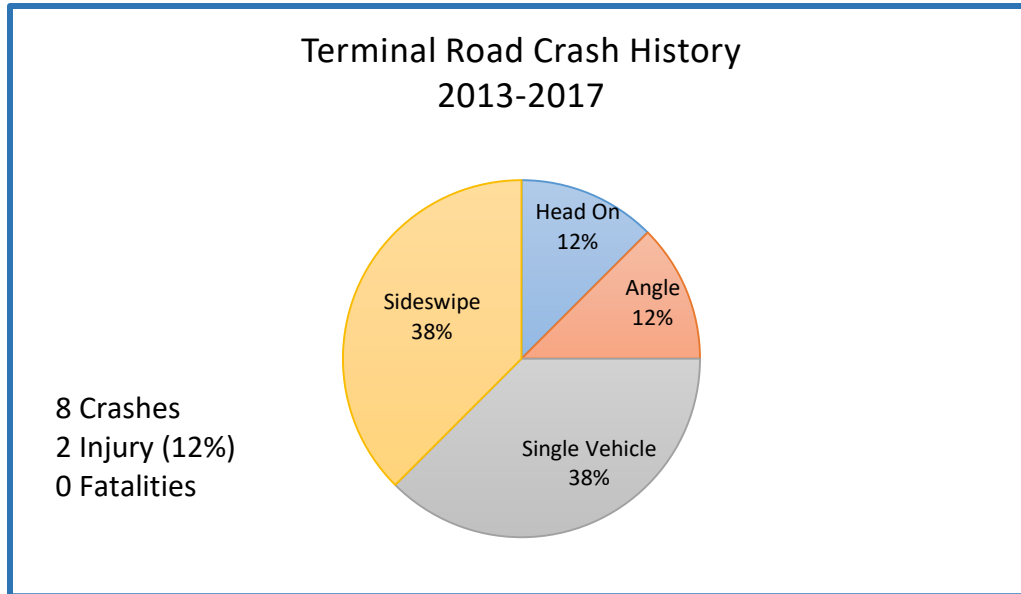


Figure 7: Terminal Road Crash History

concentration of crashes (3) in the tight horizontal curve near KY 15, including a sideswipe, angle and head-on collision. Four of the crashes are in the vicinity of another substandard horizontal curve located approximately 0.2 miles from KY 15. These include two sideswipe and two single vehicle crashes. These incidents and their locations suggest that during inclement weather, geometry of the roadway may contribute to reduced safety. Calculating a crash rate factor (CRF) would compare the crashes on this local road with statewide statistics; however, since these statewide statistics include all classes of roadway, not just local roads, the results would not appropriately represent whether the crash rate is statistically significant and, therefore, the CRF has not been analyzed.

There were 15 crashes reported on KY 15 within the Study Area during the period. There were no fatalities reported; however, nine of the 15 incidents (60%) led to injuries. The most commonly reported crash type involved only a single vehicle (40%) followed by angle crashes (20%) and rear end crashes (20%). Two of these incidents, rear end impacts, occurred at the KY 15/Trus Joist intersection, while three angle crashes were reported at the KY 15/Terminal Drive intersection. Crash history data is included as **Appendix B**. It should be noted that a single vehicle crash occurred on January 4, 2018, just outside the study period, that resulted in a fatality. The incident involved a single vehicle driving in wintery conditions with blowing snow. According to news reports³, the driver lost control of the vehicle and hit the guardrail several times before flipping over the guardrail and hitting a utility pole. The passenger in the vehicle was pronounced dead at the scene. Both the driver and passenger were wearing seatbelts at

³ WYMT TV Posted: Thu 4:21 PM, Jan 04, 2018

the time of the crash. There is no indication that roadway geometrics played a part in the crash, though weather conditions and wet pavement may have contributed.

Crash locations and traffic were considered to determine whether any of the studied section was experiencing above average crash rates. The methodology is defined in the Kentucky Transportation Center research report, *Analysis of Traffic Crash Data in Kentucky* (Kentucky Transportation Center, 2013). As defined in the methodology, segments vary in length and are

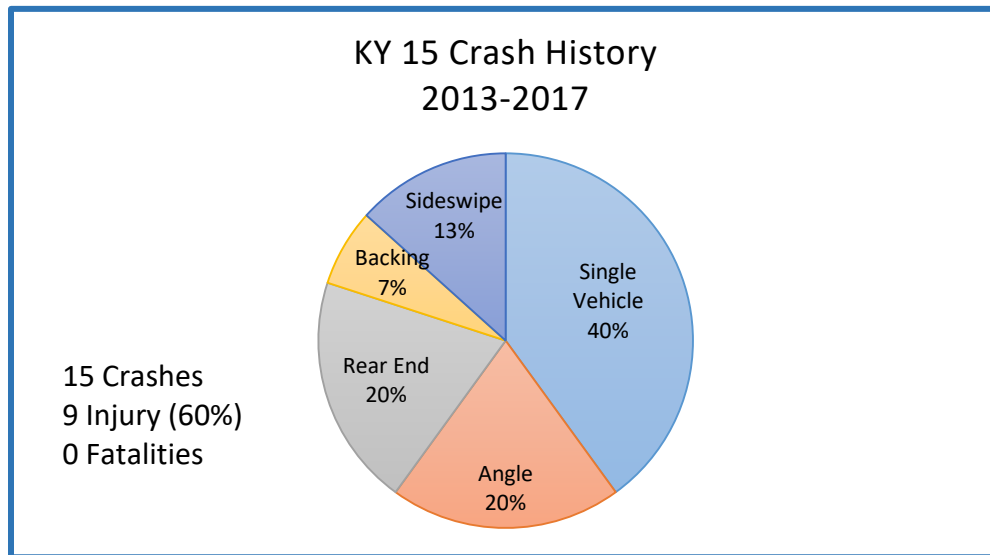


Figure 8: KY 15 Crash History

divided along roadways where geometry or traffic volumes change. For each segment, the number of crashes, traffic volume, rural/urban designation, number of lanes, and segment length were evaluated to determine the critical rate factor (CRF). The CRF is one measure of the safety of a road, expressed as a ratio of the crash rate at the location compared to the average crash rate for roadways of the same functional classification throughout the state. If the CRF is 1.00 or greater, it is an indication that crashes may not be occurring due to random chance. The CRF analysis is summarized in **Table 3**. There are no sections on KY 15 within the Study Area with a CRF greater than 1.0.

Table 3: KY 15 Critical Rate Factor (CRF) Analyses (2013-2017)

Begin	End	Begin MP	End MP	Length (miles)	Critical Crash Rate Factor (CRF)
0.29 mi S. of Trus Joist Ln	Trus Joist Lane	21.80	22.09	0.29	0.34
Trus Joist Lane	Brandon Lane	22.09	22.35	0.26	0.26
Brandon Lane	Terminal Road	22.35	22.89	0.53	0.07
Terminal Road	0.22 mi N. of Terminal Rd	22.89	23.10	0.22	0.30



2.5 FREIGHT STUDY

A study was conducted to assess freight movement in the area, especially as it relates to truck traffic along KY 15 and the existing or potential freight movement through the airport. Identification of truck sizes using the access road was also important to assess the potential for impacts to overhead utilities that cross the road southeast of Twin Engine Drive. A questionnaire was developed and distributed to members of the KY River Area Development District, Board members of the Coalfield Industrial Park, and members of the Airport Board, including the airport manager. The questions gathered information regarding existing conditions such as current use of the airport for freight movement and concerns, if any, with roadway access to the facility. It also sought opinions regarding future use of the airport, should conditions remain unchanged, or if facilities were improved, such as extending the runway length to allow for more use by cargo aircraft. A summary of the results of the study are included as **Appendix C**.

The airport manager indicated that none of the businesses currently in the Coalfields Industrial Park use the airport regularly and that there are no regularly scheduled cargo flights of any kind at the facility. Most airport use is for flight training, corporate or private charters, or personal/recreational flying. Kentucky State Police marijuana eradication efforts result in increased activity during spring and summer months. Overall, an average of 30 take-off/landing operations occur daily.

The access road to the airport significantly hinders its operations, especially in the winter. Fuel deliveries occur weekly and drivers have difficulty negotiating the steep grades and turns on the road. Due to the steepness of the grade (greater than 16%) in some locations, fuel trucks can only safely deliver half of a load of fuel per trip. These steep grades also affect vehicular access to the airport. During inclement weather, even after treatment, the road is impassable and often closed, shutting down airport operations.

Through the data that were gathered, it was determined that the vehicles delivering fuel to the airport are 48-foot, five-axle semi-trailers. Accommodating vehicles of this class without creating conflict with overhead utilities crossing the roadway was an objective in the development of alternatives for the project.

Without more dependable roadway access, expansion and growth of the airport are limited. The reliability of the airport and its limited capacity are also issues that concern businesses considering locating in the area, thus limiting potential economic development opportunities.

2.6 GEOTECHNICAL OVERVIEW

A geotechnical overview (see Geotechnical Overview Report P-003-2018 in **Appendix D**) was conducted to identify potential geotechnical concerns and provide parameters for design in the Study Area. A more thorough geotechnical field investigation should be conducted during the roadway design phase as the project advances in project development. The field review identified numerous indications of subgrade distress. In some areas, the pavement shows signs of cracking and spalling, and potholes are developing. An embankment failure near the KY 15 intersection has been repaired. Slope failures and other maintenance concerns are prevalent along the roadway. In a few instances where no shoulder is present, the roadway is being undermined by drainage within ditches, which are deep and relatively steep. Observed rock cuts (see **Figure 9**) revealed durable sandstone, shale, and coal. These less durable layers are more susceptible to weathering. Both overburden and intermediate benches will be necessary in any sizable rock cuts.



Figure 9: Rock Cut on Trus Joist Lane Near KY 15

Landslides are common in the area and often occur along over-steepened artificial cuts and embankments as well as over-steepened natural slopes. Several of these were noted along KY 15, within and just beyond the boundaries of the Study Area (see **Figures 10 and 11**).



Figure 10: Embankment Failure on Terminal Road



Figure 11: Landslide Data Map

Source: Geotechnical Overview Report P-003-2018; American Engineers (March 2018)



In almost every case where a cause has been determined for these features, movement of groundwater and saturation of the embankment was a driving force. Coal beds can often behave as aquifers and discharge groundwater at a downdip location, which can undermine areas in cut slopes, particularly when encountering nondurable underclays and shales. This needs to be considered during design where proposed roadways may run along a hillside and bury the outcrop of a coal seam beneath an embankment.

The region has been extensively mined for coal. Documented mine adits are scattered throughout the Study Area where mining was conducted for house coal. It is likely that undocumented adits also are present. There is an active coal mining permit southeast of the Study Area where stripping, augering, and drift mining methods have been employed.

Three underground mines were identified within or very near the boundary of the Study Area and others are proximate but lie to the southeast. Previous mining activity will pose challenges to construction of a new alignment. Alignment locations may be influenced by subsidence of underground mines, underlying spoil materials, or areas not suitably reclaimed after mining operations were discontinued. Where construction overlies previously mined areas, subsidence is common and spoil is prone to sliding when exposed to sidehill cut conditions. New roadway grades should avoid matching the dip angle of the underlying bedrock over long distances and should avoid any areas previously disturbed by mining, to the extent practicable.

Near the intersection of Terminal Road and Fly By Hazard Road, conditions suggest that an abandoned mining adit may be present, though one could not be located during field review. This area should be more thoroughly examined during design. If the project advances to preliminary design, a more extensive review of mining records is recommended along with settlement analyses of reclaimed mining areas. Since the area is prone to landslides, is characterized by significant relief, and has been previously mined, measures to increase factors of safety will likely be required for construction of any significant embankments. These could include constructing flatter than typical slopes, zoning of embankment materials, avoidance of previously mined areas (particularly underground mines and adits), promotion of surface and subsurface drainage, promotion of vegetative growth, and possibly incorporating retaining walls into the design. It was recommended that soil cut and fill slopes not exceed 2:1. These parameters have been incorporated into preliminary alternative development as well as assumed ½:1 cut slopes in rock with 12-foot benches.

3.0 ENVIRONMENTAL REVIEW

An Environmental Overview of the Study Area was conducted in April and May 2018 (see **Appendix E**). The purpose of the Overview was to identify environmental resources and existing conditions within the Study Area that should be considered or may influence the

development of alternatives for the project. There were no Red Flags identified by the review. Information gathered is summarized in the following sections and shown in **Figure 12**.

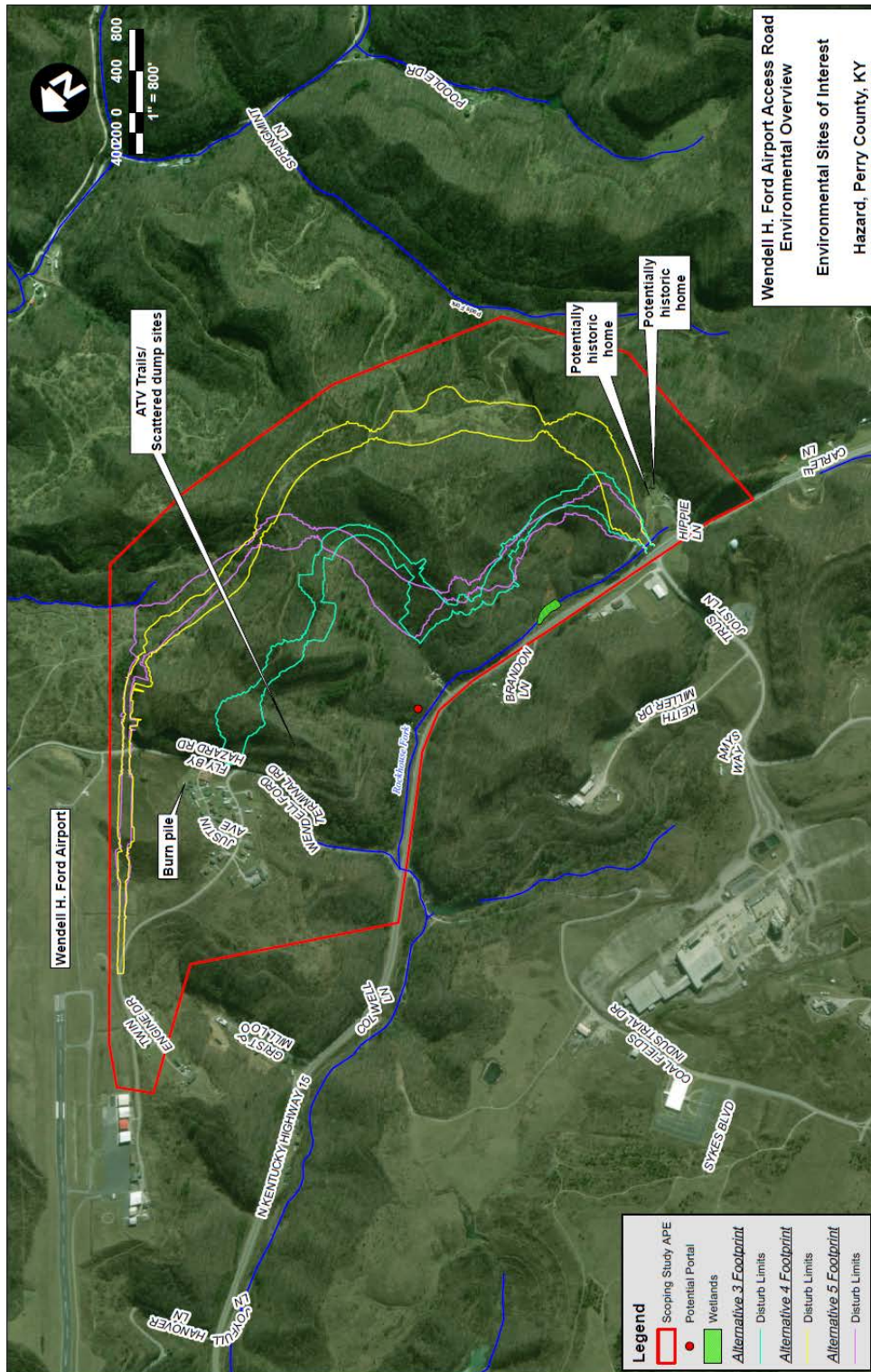


Figure 12: Environmental Sites of Interest

3.1 PHYSICAL SETTING

Perry County is located in southeastern Kentucky in the mountainous Eastern Kentucky Coal Field physiographic region of the state. It is highly dissected with steep valley walls and narrow, sinuous valleys, and most of the rich, mixed forests have been logged and are now in various stages of second and third growth. The area is maturely dissected; ridges and valleys occupy nearly equal portions of the landscape. The meandering valleys of the Middle and North Forks of the Kentucky River cross parts of the county and are outstanding topographic features. The principal flat areas in the county and the lowest elevations are found in the valleys of these two streams.

The project falls within the North Fork Kentucky River watershed USGS Hydrologic Unit Code (HUC8) 05100201, as identified by the Kentucky Division of Water (KDOW). The North Fork Kentucky River subbasin occupies all of Perry County and most of Letcher, Knott, and Breathitt Counties, as well as parts of Wolfe and Lee Counties.



Figure 13: Residences and Commercial Development on Justin Lane

The Study Area encompasses largely undeveloped forested land, much of which has been impacted by mining activities both at the surface and underground. Almost the entire Study Area is indicated to lie within previously mined areas.⁴ A residential community is located northeast of the airport along Fly By Hazard Road. A smaller area of residential development is located south of the airport runway, on Justin Avenue and Terminal Road (see Figure 13). Several additional homes are located near the southern limits of the Study Area, near Trus Joist Lane and Nana Drive and a few

additional homes are scattered along KY 15 and the western boundary. The Study Area encompasses approximately 510 acres owned by a mixture of residential and business owners.

3.2 NATURAL ENVIRONMENT

Air Quality - Perry County is in attainment for all criteria pollutants. The project would need to be listed in the State Transportation Improvement Plan and a qualitative Mobile Source Air Toxics (MSAT) analysis would be required.

⁴ Geotechnical Overview Report P-XXX-2018; American Engineers, Inc.; March 2018

Floodplains – The project crosses two HUC 14 watersheds, Rockhouse Fork (05100201-120-600) and Lost Creek (05100201-120-610) within the larger HUC 11 watershed, Troublesome Creek (05100201-120). There are no floodplains located within the Study Area.



Figure 14: Mining-impacted Streams

Waters and Wetlands – Rockhouse Fork, an intermittent stream, flows along KY 15 and the western boundary of the Study Area. It, as well as its tributaries, appear to have been impacted by mining activity (see **Figure 14**). Wetlands are also present at various locations along the stream. An unnamed intermittent stream originates within the northeast

portion of the Study Area and flows beyond the limits of the study. Ephemeral streams, and possibly some intermittent streams, are likely present within the smaller watersheds but are not identifiable with published mapping. US Army Corps of Engineers jurisdictional determinations will be required for all watercourses impacted by the project.

Threatened and Endangered Species – The US Fish and Wildlife Service identifies four federally protected species that may be impacted by construction in Perry County including: Indiana bat, northern long-eared bat, gray bat and Kentucky arrow darter. Surveys for these bat species will need to be conducted if presence is not assumed. The extent of underground mines and proximity to roadway construction will need to be considered when analyzing project impacts. Underground mine adits in the Study Area may need to be surveyed if openings are determined to provide habitat for these bat species. Mitigation for loss of Indiana bat and northern long-eared bat summer habitat (trees) will be required if surveys are not conclusive that the species are not present. Poor stream conditions as a result of upstream mining activity will likely preclude the need for Kentucky arrow darter surveys and may limit the foraging potential for endangered or threatened bats along the stream corridors.

3.3 HUMAN ENVIRONMENT

Noise – Residential, and a few commercial properties, are present within the Study Area. A noise study will be required to identify the impacts of the project on area residents, especially the cluster development near the intersection of Terminal Road and Fly By Hazard Road. Due to the low density of development and the relatively low traffic volumes forecasted, mitigation for traffic noise is not expected to be a project requirement.

Historic Properties – A windshield survey of the Study Area identified two structures near the Trus Joist Lane intersection that have the potential to be eligible for the National Register of



Figure 15: Potential Historic Properties - Smith (right) and Miller (left) Homes

Historic Places (see **Figure 15**). The Nanny Smith and Joe Miller houses in Smith Hollow will require some additional investigation to determine eligibility. These are not located directly across from Trus Joist Lane and, therefore, alternatives that intersect at this location will not likely have a direct effect on the structures. A single grave is situated near this property adjacent to a non-historic

house on Hippie Lane. This grave represents a Smith family burial circa 1980 and is not considered an historic feature.

An archaeological overview of the Study Area was also conducted. The research consisted of a review of existing documentation; no field work was undertaken for this study. Surveys documented within the general area identified rockshelters, historic farms/residences and historic cemeteries. No surveys have been conducted within the limits of the Study Area. The research did not reveal any archaeological site or condition within the Study Area that would suggest that the project was likely to impact significant archaeological resources. In accordance with federal requirements, an archaeological survey will be conducted as the project further develops.

Section 4(f)/ Section 6(f) – No parks or wildlife refuges were identified within the Study Area. ATV trails that can be seen from Fly By Hazard Road will require some additional investigation to determine Section 4(f) applicability. Unless these are in public ownership or control, they are not likely to be protected under Section 4(f). There is some potential for impacts to historic properties (Smith and Miller homes detailed above), therefore, completing a more detailed historic properties survey and defining historic boundaries should be undertaken at the earliest possible stages of preliminary design so that these properties can be prioritized for avoidance, if appropriate.

Hazardous Materials – Open dump sites and burn piles are visible in the residential area near the Terminal Road/Fly BY Hazard intersection as well as within the undeveloped area along that road near ATV trails. Dump and burn sites were also observed in the residential areas adjacent to KY 15 at Nana’s Way. Approximately 22 transformers were observed in the project area; none appeared to contain PCBs but this will need to be confirmed prior to any impacts to utilities.



Asbestos containing materials (ACMs) may be present in building structures. Prior to demolition of any structures, ACM sampling will need to occur.

Socioeconomic Considerations – A socioeconomic study was prepared by the Kentucky River Area Development District and is included as **Appendix F**. The Study Area includes parts of two census block groups, Census Tract 9703, Block Group 2 (BG2) and Census Tract 9710, Block Group 4 (BG4). BG2 exhibits slightly higher percentages of low-income and non-white populations than Perry County as a whole. Elderly populations in BG4 are 17.6% compared with 14.4% in Perry County. Though certain demographics within block group populations are statistically higher than the Perry County average, the differences may not be considered significant. Consultation with federal agencies should be initiated at the outset of any preliminary design project to determine the potential for the project to negatively affect these populations and the extent of documentation that will demonstrate appropriate consideration of potential impacts to environmental justice communities.

Only one business is potentially impacted by the project, a self-storage facility at the Fly By Hazard and Justin Avenue intersection. Residences are scattered throughout the project area. Avoiding impacts to existing housing was established as a goal for the development of project alternatives (see **Section 4.0 Alternatives Development**).

4.0 ALTERNATIVES DEVELOPMENT

The steepness of grade and winding horizontal alignment of Terminal Road between KY 15 and Fly By Hazard Road create significant travel difficulties for airport patrons and fuel suppliers, as well as for area residents. Between Fly By Hazard Road and the airport, grades and horizontal alignment are much less severe and meet or exceed a 40 mph design speed. Alternatives that would begin at the existing Terminal Road/KY 15 intersection could not reduce these grades and be constructed in a cost-effective manner; thus a new intersection location was determined to be necessary as additional road length is needed in order to reduce the grades. To avoid introduction of an additional intersection along KY 15, alternatives have been studied that would intersect at the Trus Joist/KY 15 intersection, which lies approximately 0.7 miles south of the Terminal Road/KY 15 intersection. The additional length also provides the benefit of shifting the alignment away from areas with known geotechnical slide issues. All alternatives were developed using the same typical section consisting of 11-foot lanes with four-foot shoulders (see **Figure 16**).

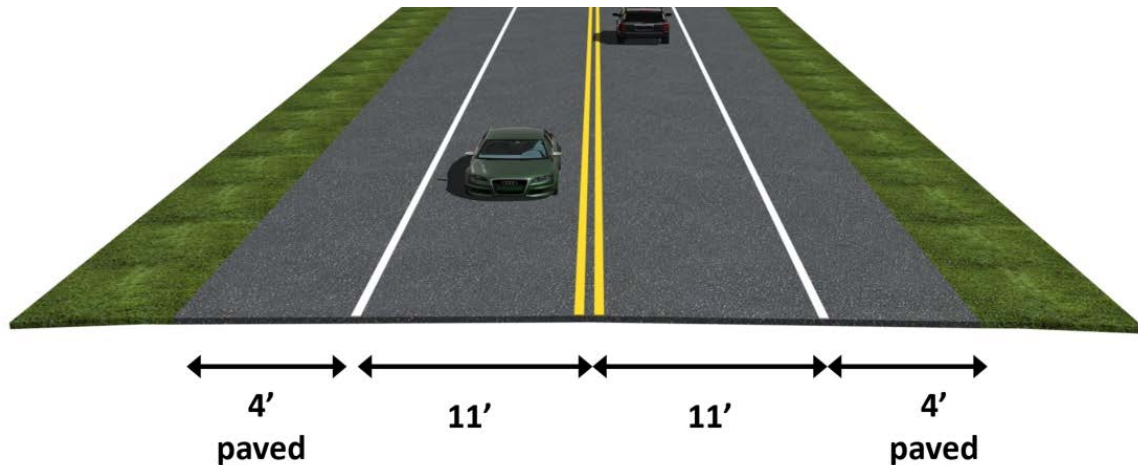


Figure 16: Typical Section

Existing and future airport operations were also important considerations when developing the alternatives. The airport has plans to extend runway 14-32 by 1,000 feet to a total length of 6,500 feet. The runway extension will allow the airport to better serve corporate jets and small air cargo planes. A much larger project that would extend the runway to 10,000 feet has also been discussed but is considered unlikely at this time.

Several objectives were established for development of alternatives, including:

- Accommodate fully-loaded fuel trucks (48', five-axle semi-trailer) to transport aviation fuel to the airport at all times throughout the year;
- Avoid impacts to existing housing developments near the airport;
- Avoid impacts to any FAA required navigation equipment supporting airport operation;
- Avoid encroachment of the proposed access road on areas for potential runway or taxiway expansion;
- Meet a design speed of 35-40 mph with a maximum 10% grade (8% preferred).

It is intended that Terminal Road and Regional Airport Road will remain after construction of the project and provide an alternate means of accessing the airport and area residences.

Though the number of vehicles turning onto the new alternatives from KY 15 may not warrant turn lanes, due to safety concerns with the high speed of traffic on KY 15, a northbound right turn lane and southbound left turn lane are included for each of the alternatives.

4.1 TRAFFIC FORECASTS

Traffic forecasts were developed by the KYTC Division of Planning for the year 2040 (see **Figure 17**). A complete copy of the *Traffic Forecast Report* is included as **Appendix A**. The forecast

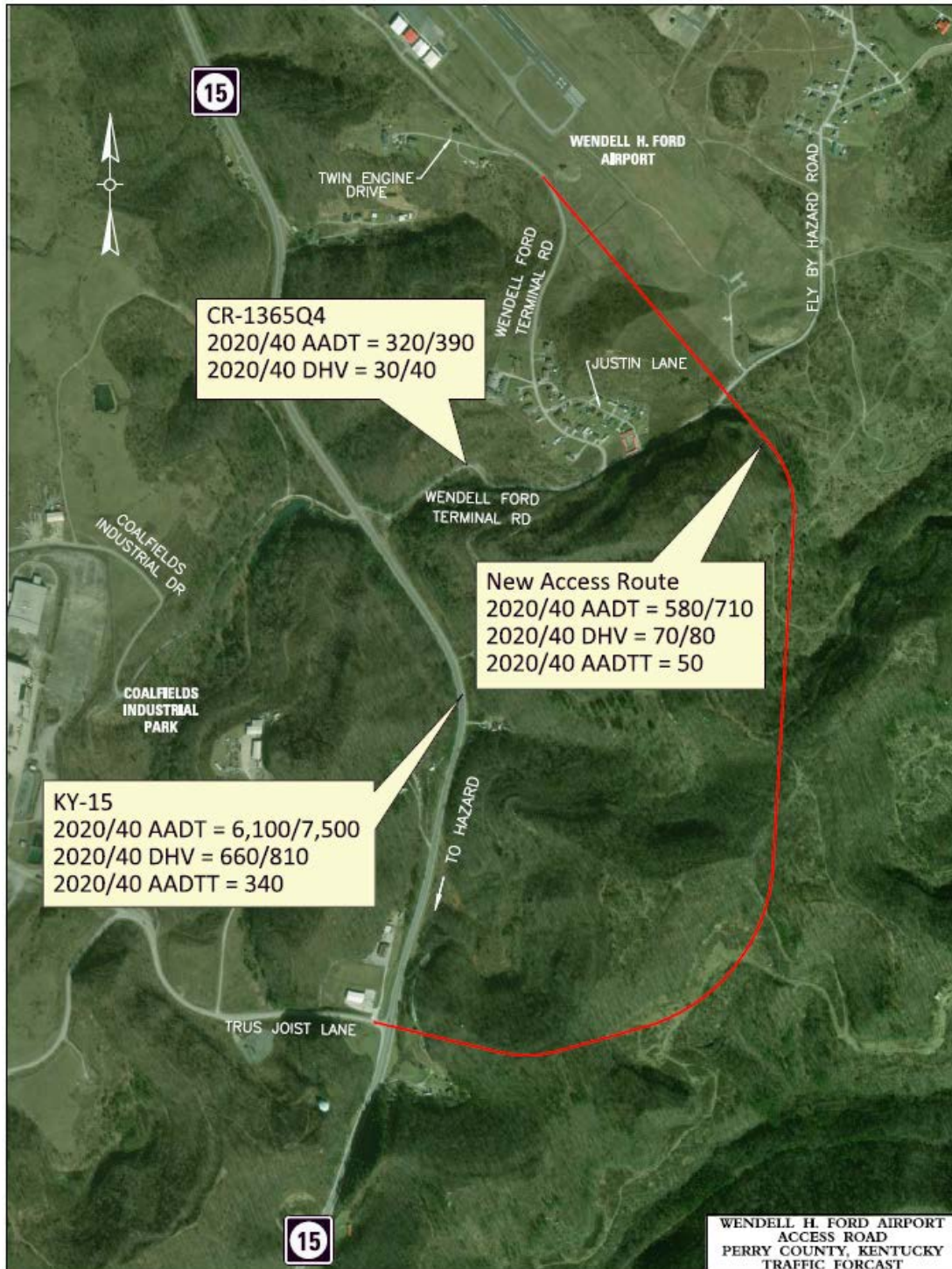


Figure 17: Traffic Forecast



also documented that there is very little pedestrian or bicycle use in the area. For improvements made along KY 15, the report recommended a six-foot shoulder with ten-foot gaps in rumble strips (if installed), to accommodate bicycle and pedestrian traffic. There were no specific recommendations for accommodating bicycle and pedestrian traffic on the proposed roadway. There is no indication that bicycle or pedestrian traffic is expected to increase. With the inclusion of a four-foot shoulder to the proposed typical section, the improved roadway is expected to adequately provide for the low volume of expected bicycle and pedestrian traffic in the foreseeable future.

4.2 ALTERNATIVES CONSIDERED

The No Build alternative must always be considered. Selecting the No Build alternative would leave the existing Terminal Road, with its 20 mph design speed, as the primary access for the airport. The narrow lanes, steep grade, and substandard horizontal curves would continue to present an obstacle to fuel delivery trucks destined for the airport. Closure of the road and the airport during inclement winter weather would also be expected to continue, rendering the airport unreliable for airport patrons and receipt/delivery of cargo, and isolating area residents. There are no construction costs associated with the No Build alternative; however, high maintenance costs would continue to be incurred due to the instability of cuts and embankments along the road. Additionally, the No Build alternative does not satisfy the purpose and need of the project.

Alternatives 1 and 2 were preliminarily developed to assess the scale of the project. Both alternatives originated at the KY 15/Trus Joist Lane intersection (see **Figure 18** at the end of this section). The alternatives followed slightly different corridors to the airport, with both terminating at Fly By Hazard Road, northeast of its intersection with Terminal Road. These alternatives essentially would have created an offset intersection for those travelling from KY 15 to the airport. In an effort to minimize grades, earthwork and costs, these alternatives were refined to create Alternatives 3 and 4. Alternative 3 ties into Terminal Road near the Fly By Hazard Road intersection. This location lies to the north of the section of Terminal Road with the steep substandard grades and sharp horizontal curves. Traffic would continue to be funneled through the residential development near the intersection. Alternative 4 intersects with Fly By Hazard Road north of the residential development on Terminal Road and Justin Lane, and continues northwest until it ties into Terminal Road just east of Twin Engine Drive and southeast of the airport taxiway. All of the alternatives would require the acquisition and relocation of two residences near the KY 15 intersection. Due to their similarity with Alternatives 3 and 4, Alternatives 1 and 2 were formally dismissed from further evaluation at the Project Team meeting held on March 15, 2018.



While a marked improvement to the 16% grades that exist on Terminal Road, Alternatives 3 and 4 include significant lengths with 10% grades. It was desired to explore opportunities for a cost-effective alignment that met the objectives set forth for the other alignments and reduced grades to a maximum of 5%, which resulted in the development of Alternative 5.

All of the alternatives are proposed to tie into KY 15 across from Trus Joist Road, creating a four-way intersection. Design Year (2040) turning movements provided in the *Traffic Forecast Report (Appendix A)* were used to evaluate the performance of the intersection with the addition of a build alternative. The highest volumes of traffic through the intersection occur during the a.m. peak hour. The analysis concluded that the KY 15 approaches will operate at Level of Service (LOS) A and Trus Joist Lane and the new alternative will operate at LOS C. Volume to capacity (v/c) ratios were also calculated for each lane approaching the intersection. The v/c ratios for the new airport access road and Trus Joist Lane were 0.19 and 0.22, respectively. For the KY 15 turn lanes, v/c ratios were less than 0.04.

The performance of the new roadway was also evaluated. All of the proposed alternatives were determined to function at LOS B. The existing roadway was also analyzed and determined to be LOS E. The steep grade and low speed limit contribute to the LOS being below the desirable level.

Previous mining activity is also a consideration for each of the alternatives. To an extent, previous mining activities will have a degree of influence on all of the alternatives. Alternatives 4 and 5 both cross an area of previous mining northeast of their intersection with Fly By Hazard Road before tying into Terminal Road near the airport. Alternative 4 also crosses an area further to the south that has been cleared and is suspected of previous surface mining activity. The alignment of Alternative 3 stays to the west of surface mining activity but, like all of the alternatives, may be affected by underground mining. The influence of mining activities on alignments that are further considered will be better defined during future phases of project development.

Alternative 3 is 1.22 miles long and was developed using a 35 mph design speed. It has maximum grades of 10% for 820 feet of the alignment (see **Figure 19** at the end of this section). It would require more than 1.5 million cubic yards of excavation and generate more than 1.2 million cubic yards of excess material. An excess excavation site would be required for the excess material, which would almost certainly result in additional environmental impacts to streams beyond those required for construction of the roadway. By terminating at the Terminal Road/Fly By Hazard Road intersection, traffic would continue to pass through the residential development south of the airport. Though no relocations in the neighborhood are required, the continued routing of traffic through this area does not meet the objective of



“avoiding impacts to existing housing developments” as suitably as other alternatives. The total estimated cost for Alternative 3 is \$14,344,000.

Alternative 4 is 1.85 miles long and was also developed using a 35 mph design speed. It has a series of 10% grades stretching across the first mile of the alignment nearest KY 15 (see **Figure 20** at the end of this section). The alignment lies to the north of the residential development near the Fly By Hazard intersection, and ties-in with Terminal Road just south of the airport taxiway and east of Twin Engine Road. Construction would require more than 1.8 million cubic yards of excavation and generate nearly 900,000 cubic yards of excess material. Excess material sites would almost certainly result in additional stream impacts and mitigation costs. The total estimated cost for Alternative 4 is \$18,052,000.

Alternative 5 is 1.74 miles long and was developed using a design speed of 40 mph with a maximum grade of 5% (see **Figure 21** at the end of this section). Like Alternative 4, the alignment lies to the north of the residential development near the Fly By Hazard intersection, and ties-in with Terminal Road just south of the airport taxiway and east of Twin Engine Road. Earthwork is much more balanced than the other alternatives. Construction would require approximately 949,000 cubic yards of excavation and 1.1 million cubic yards of fill for a net of 164,000 cubic yards of embankment. Borrow material sites would potentially be much smaller than excess material sites for other alternatives and would likely result in fewer additional stream impacts and less additional mitigation cost. The total estimated cost for Alternative 5 is \$13,239,000.

The impacts of the various alternatives are summarized in **Table 4**. Should budget constraints dictate that turn lanes on KY 15 be considered as a separate project, the table breaks out the impacts and costs of constructing this improvement.

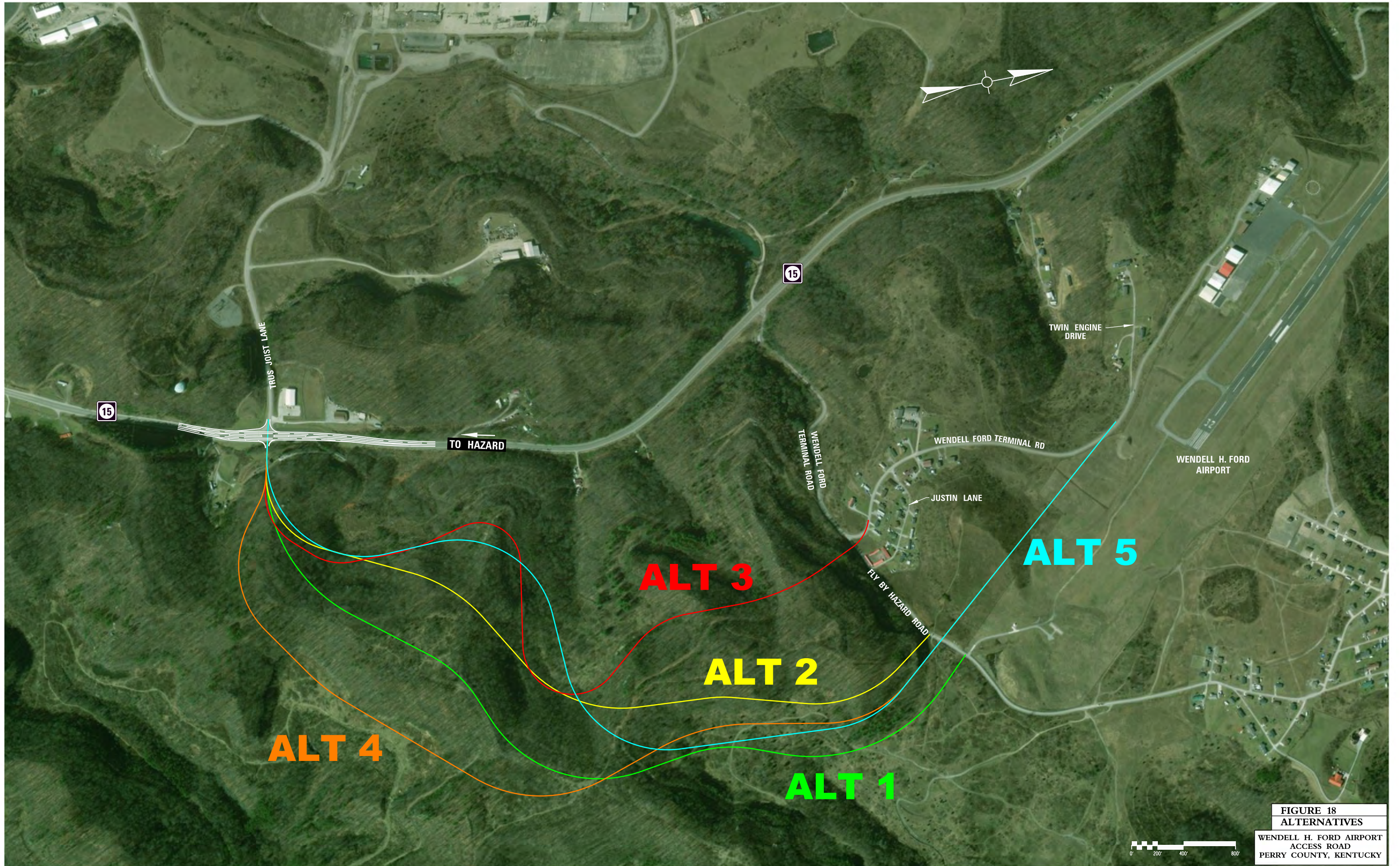


FIGURE 18
ALTERNATIVES
WENDELL H. FORD AIRPORT
ACCESS ROAD
PERRY COUNTY, KENTUCKY

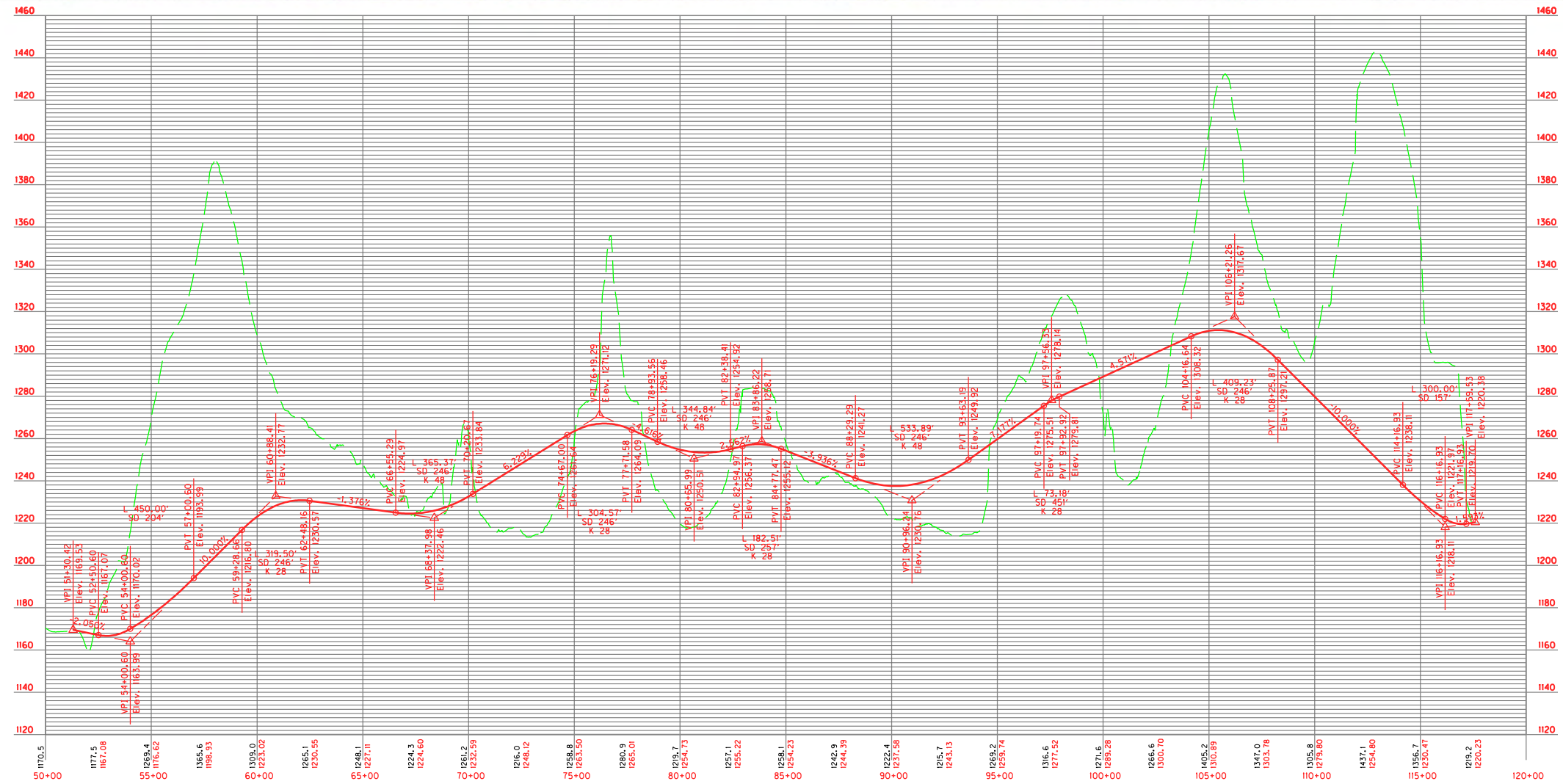
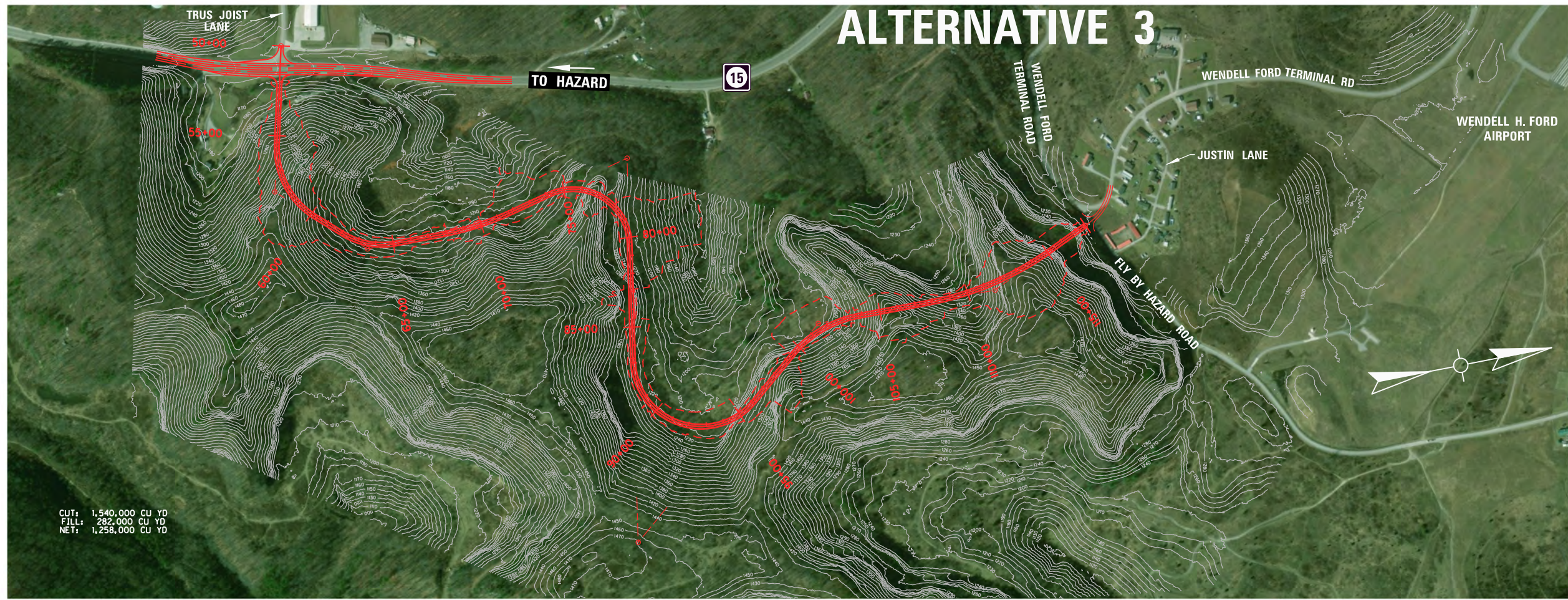
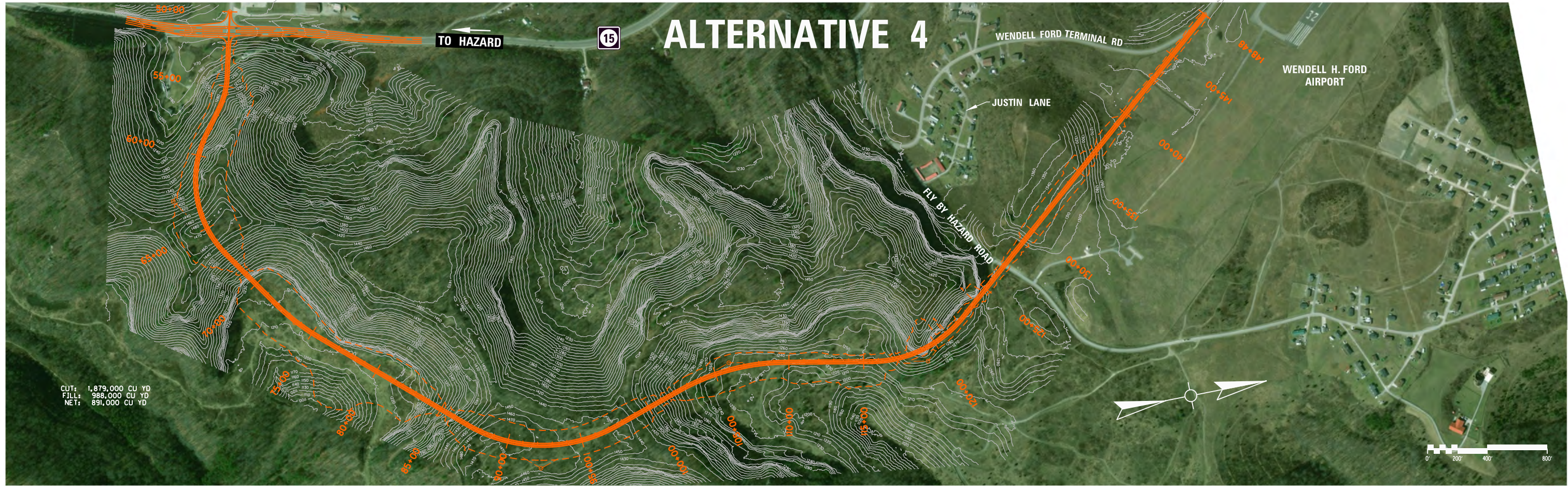


FIGURE 19
ALTERNATIVE 3
WENDELL H. FORD AIRPORT
ACCESS ROAD
PERRY COUNTY, KENTUCKY



CUT: 1,879,000 CU YD
 FILL: 988,000 CU YD
 NET: 891,000 CU YD

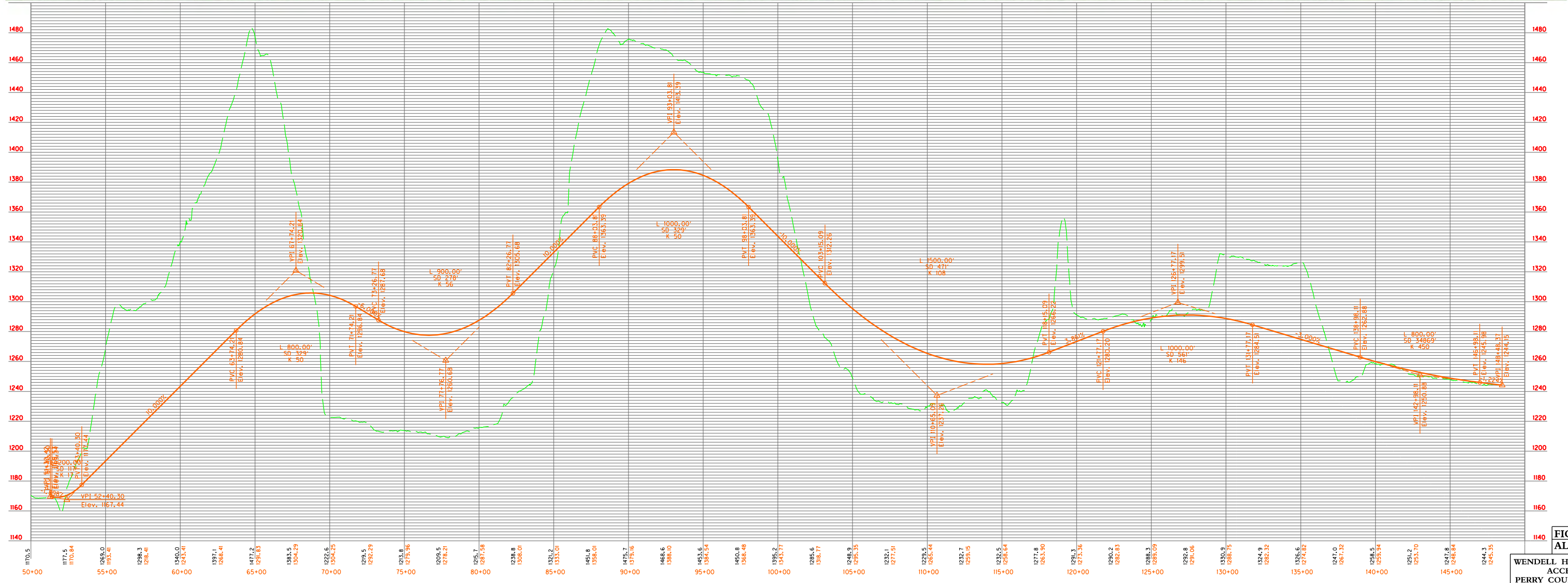
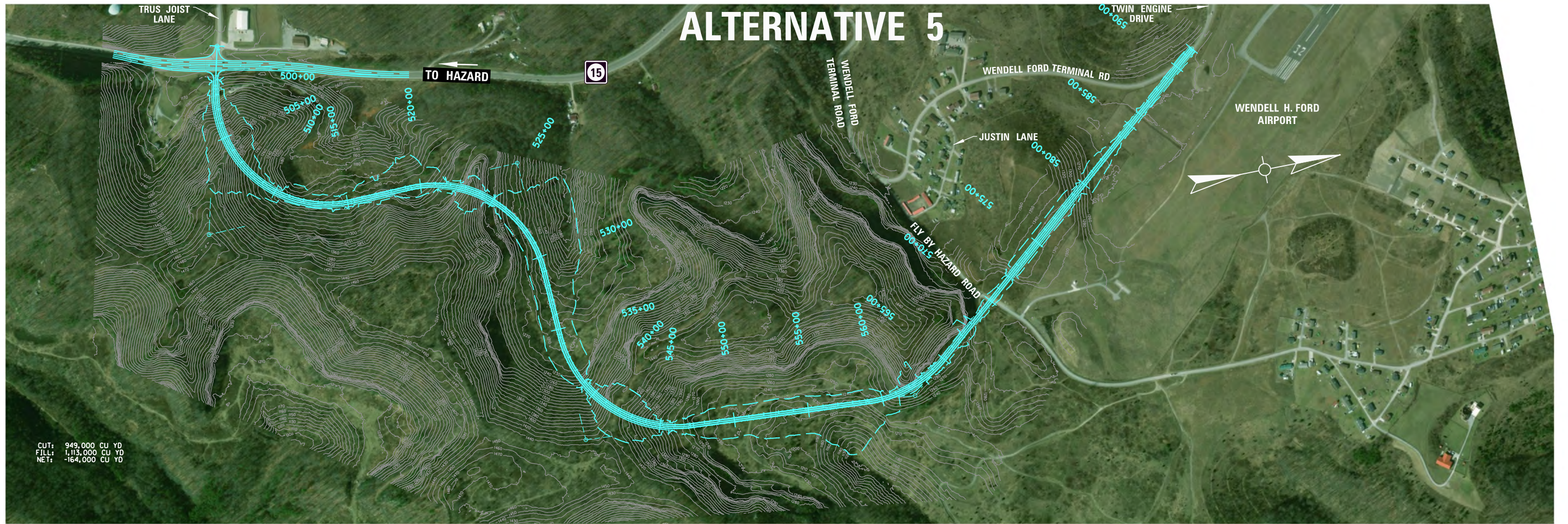


FIGURE 20
ALTERNATIVE 4
 WENDELL H. FORD AIRPORT
 PERRY COUNTY, KENTUCKY



CUT: 949,000 CU YD
 FILL: 1,113,000 CU YD
 NET: -164,000 CU YD

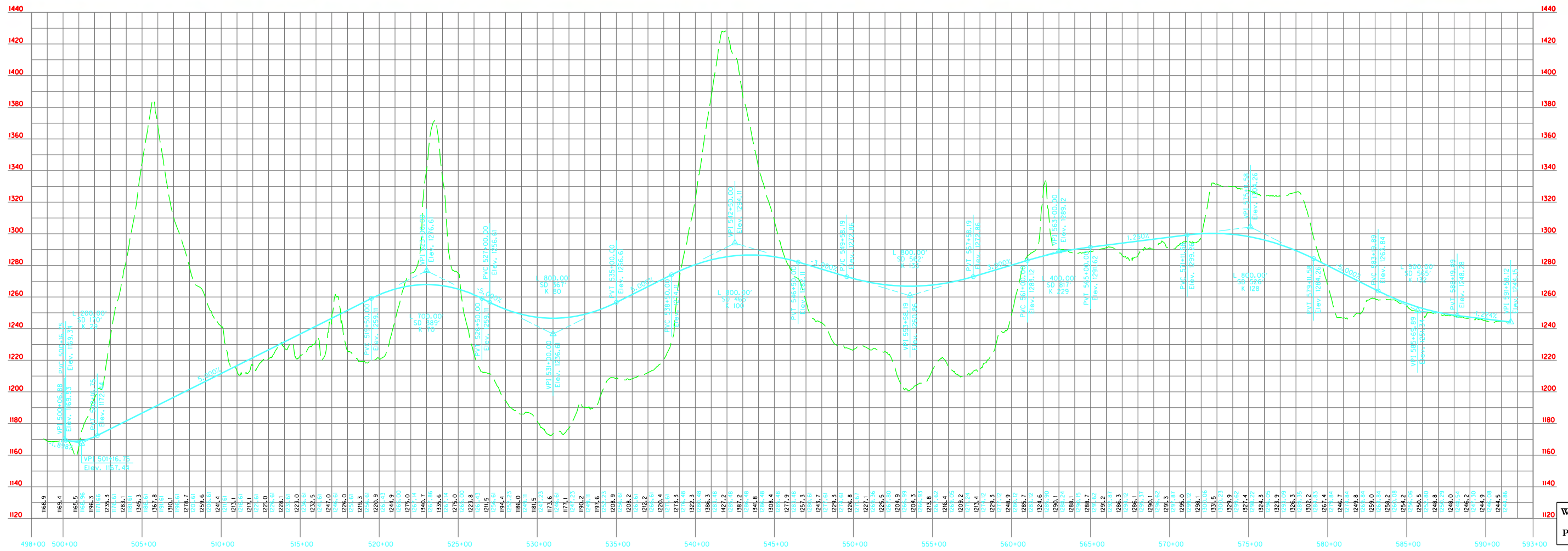


FIGURE 21
ALTERNATIVE 5

WENDELL H. FORD AIRPORT
 ACCESS ROAD
 PERRY COUNTY, KENTUCKY

Table 4: Alternative Comparison Matrix

	Existing/No Build	Alternative 3	Alternative 4	Alternative 5	Turn Lanes Only
Length (miles)	1.23	1.22	1.85	1.74	0.37
Maximum Grade (%)	16	10	10	5	7
Design Speed (mph)	20	35	35	40	55
Total Curves (#)	13	7	6	4	4
Earthwork					
Cut (cu yd)		1,540,000	1,879,000	949,000	0
Fill (cu yd)		282,000	988,000	1,113,000	50,000
Net (cu yd)		1,258,000	891,000	-164,000	-50,000
Disturb Limits (Acres)		29	43	37	5
Stream Impacts (ft)		791	1291	2643	87
Right of Way					
Number of Parcels		5	10	9	0
Acquisition (acres)		52	70	62	0
Residential Takings		2	2	2	0
Neighborhood Impact		Yes	No	No	No
Maintenance of Traffic Impacts		Low	Low	Low	Med
Utility Impacts		Low	Low	Low	Low
Oil and Gas Wells		No	No	No	No
Mine impacts		Yes	Yes	Yes	No
Costs*					
Design		\$1,010,000	\$1,010,000	\$1,010,000	\$62,000
Right of Way		\$1,080,000	\$1,330,000	\$1,220,000	\$50,000
Utilities		\$200,000	\$200,000	\$200,000	\$25,000
Stream Mitigation		\$314,000	\$512,000	\$699,000	\$23,000
Construction		\$11,740,000	\$15,000,000	\$10,110,000	\$620,000
Total**		\$14,344,000	\$18,052,000	\$13,239,000	\$780,000

*Construction costs include a contingency of 35%

**Costs for alternatives include adding left and right turn lanes on KY 15, broken-out in last column



5.0 STAKEHOLDER COORDINATION

Stakeholders and Local Officials were convened on April 26, 2018, to share information and solicit input that might guide project decisions. The group consisted of city officials, county officials, a State Representative, as well as representatives of the Wendell Ford Airport Board, Coal Fields Industrial Park Board, Hazard-Perry County Economic Development Alliance, Kentucky River Area Development District, Pine Branch Mining, and Kentucky River Properties, LLC. The purpose of the project, existing conditions, and corridors being considered was presented to the group. A comparison of the impacts of construction within each corridor, the preliminary results of a Freight Study conducted for the project, and funding challenges were also discussed. A copy of the presentation, list of attendees, and meeting minutes are provided in **Appendix G**.

The presentation was followed by a question and answer period. Project Team members clarified that none of the roadway alternatives would interfere with future expansion of the airport or lengthening of the runway. While a runway improvement and roadway construction could potentially be coordinated and simultaneously undertaken, the roadway alternatives have not been optimized under this assumption.

Stakeholders questioned whether 12-foot lanes should be considered. Team members explained that use of 11-foot lanes is consistent with similar facilities statewide. Lane widths and other design criteria being used will be sufficient, even if traffic volumes were to be tripled. The design will also adequately accommodate any road-legal trucks. Though not specifically discussed at the meeting, the proposed 4-foot full-depth paved shoulders would effectively yield 15-foot paved lanes that are striped as 11-foot lanes for driving. This common strategy helps keep speeds lower, provides more safety area on the shoulder, improves pavement life by reducing edge breaks, and can eliminate the need for curve widening.

Funding was also a topic of discussion. The project is not included in the current State Highway Plan. Stakeholders were advised that they should communicate their support for the project with legislators and possibly explore other additional funding sources such as General Aviation Airport State Funds, Federal Aviation Administration funding or federal earmarks.

6.0 RECOMMENDATIONS AND FUTURE STEPS

The No Build alternative would leave a severely substandard roadway in place, one that is relied upon to provide a critical link between Wendell H. Ford Airport and KY 15, the primary arterial route through the area. During winter months, should the No Build alternative be selected, occasional closing of the airport and temporary isolation of area residents from their community can be expected to continue. In addition, fuel trucks will continue to be unable to

make full deliveries due to the road grades and will be prevented from deliveries at all during many winter days. The existing road will continue to require a high degree of maintenance to address failing slopes. For these reasons, the No Build alternative does not meet the purpose and need of the project and is not the best long-term solution for this transportation challenge.

Alternative 5 represents the best choice for improving access to the airport (see **Table 4**). It was developed using a higher design speed (40 mph) than the other alternatives and has a maximum 5% grade, whereas other alternatives have 10% grades. It also has the fewest number of horizontal curves when compared with the other build alternatives. The cut/fill of the alignment is much more balanced than the other alternatives, which will reduce the non-roadway costs of excess material sites and avoid the acquisition, permitting, and mitigation costs that typically are associated with them. Though it is approximately one-half mile longer than Alternative 3, nearly as long as Alternative 4, and developed using a higher design speed than Alternatives 3 and 4, Alternative 5 is the least costly of the three build alternatives. For these reasons, further consideration of Alternative 5 is recommended for improving access to Wendell H. Ford Airport during subsequent stages of project development. Critical cross sections for Alternative 5 are provided in **Appendix H**.

To advance the project, funding will need to be secured to initiate design. The project should be identified for consideration through the planning processes of KYTC during development of future Highway Plans. Alternative funding methods, such as through Kentucky's General Aviation program, Federal Aviation Administration, or legislative earmarks, may also be explored.

7.0 CONTACTS/ ADDITIONAL INFORMATION

Additional information regarding this study can be obtained by contacting the Project Manager, Jason Blackburn, at the KYTC District 10 office by calling (606) 666-8841 (email Jason.blackburn@ky.gov).



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