Elrod Road / Natcher Parkway Interchange Study

Warren County, Kentucky • Item No. 3-130.00
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KENTUCKY TRANSPORTATION CABINET

GRESHAM SMITH AND PARTNERS

Table of Contents

Page

Executive Summary ES1-ES5

1.0 Introduction 1
1.1 Project Location 1
1.2 Purpose and Need 3

2.0 Existing Conditions 4
2.1 Roadway Characteristics 4
2.2 Traffic Volumes and Levels of Service 5
2.3 Other Transportation Projects in the Area 6
2.4 Crash Data 9

3.0 Environmental Setting 11
3.1 Environmental Overview 11
3.2 Resource Agency Coordination 12
3.3 Geotechnical Overview 12

4.0 Alternatives Analysis 17
4.1 Alternatives Overview 17
4.2 Alternatives Refinement 30

5.0 Recommendations 32

List of Figures .....
E.1 Study Area ES1
E.2 Alternative A ES3
E.3 Alternative B ES4
E.4 Alternative C ES4
1.1 Study Area 2
2.1 - 2.2 Level of Service 7-8
2.3 Crash Location Maps 10
3.1 Environmental Overview 13
3.2 Geotechnical Exploration Map 16
4.1 – 4.2 Proposed Typical Sections 19-20
4.3 – 4.6 Proposed Alternatives 22-25
4.7 – 4.9 Alternatives/No-Build Option ADT and Levels of Service 27
4.10 Results of Public Meeting #2 31
5.1 Recommendation Flyer 34

List of Tables .....
2.1 Existing Conditions 5
3.1 Resource Agency Coordination Responses 14-15
4.1 Proposed Interchange Cost Estimates 26
4.2 Traffic Model Exhibits 29
5.1 Alternative Evaluation Factors Quick Glance 32
5.2 Recommended Improvements 33

Appendices

A Level of Service Data and Maps
B Crash Data and Map
C Environmental Overview
D Resource Agency Coordination
E Geotechnical Overview Map
F Typical Sections
G Initial Options
H Final Alternatives
I Final cost Estimate
J Public Meeting Information

Executive Summary

The Elrod Road/Natcher Parkway Interchange Study began in late 2007. The purpose of the study was to determine the viability of adding an interchange to Natcher Parkway near the Elrod Road overpass. A previous study for Three Springs Road (KY 884) included the Elrod Interchange Study as a recommendation. The Three Springs Road study determined that local access to Natcher Parkway was not feasible at Three Springs Road due to the close proximity of I-65 and Three Springs Road, but could be beneficial at another location between Nashville Road (US 31W) and I-65.

This study includes environmental and geotechnical overviews, traffic modeling, crash and traffic analyses, and alternatives development and recommendations. The following sections summarize the study's findings.

Study Area

Smallhouse Road north to Cave Mill Road, Three Springs Road to the east, and Neal Howell Road to the south comprise the area of influence for this study (Figure E.1). The study area is basically centered at the existing Elrod Road overpass at Natcher Parkway. The Elrod Road overpass is located approximately 1.6 miles west of the I-65/Natcher Parkway interchange.

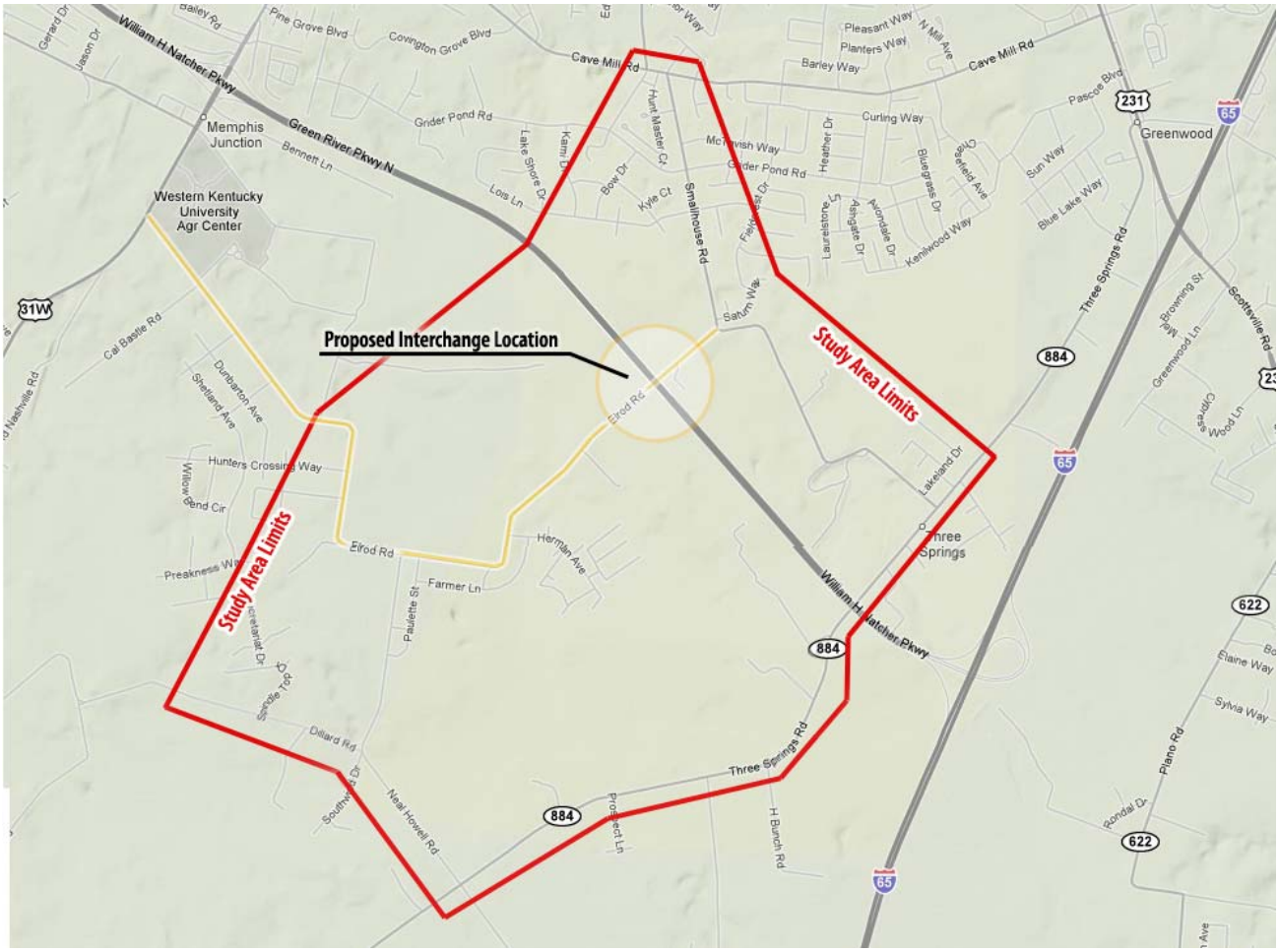


Figure E.1 - Study Area

New residential development along Elrod Road as well as development extending south of Neal Howell Road impacts the study area. Other notable destinations contributing to or expected to contribute to congestion in the area include several churches, the Western Kentucky University Farm, Griffin Park and a proposed elementary school.

Developing the purpose and need statement began with the problem statement on the KYTC Project Identification Form (PIF). After several discussions, the project team, local officials and general public agreed on this final purpose and need statement:

> *Rapid residential and commercial growth is occurring on the southern side of Bowling Green. Motorists have limited options for accessing the Natcher Parkway in southern Bowling Green and Warren County and must rely on the heavily congested routes of US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road) to reach various destinations. Additionally, mobility in the existing study area network is limited for motorists, pedestrians, bicyclists and transit users.*
>
> *The purpose of this interchange study is to improve the safety and efficiency of travel in the Elrod Road/Smallhouse Road area and to provide better connection for travelers along this existing transportation network to the Natcher Parkway.*

Data Analysis

GS&P prepared an environmental overview for the study area. The data research and field reconnaissance found that the environmental concerns within the study area are typical for a previously agricultural area in transition to residential uses. In the areas where an interchange may be constructed for Elrod Road on the Natcher Parkway, environmental concerns relative to air quality, traffic noise, aquatic resources, threatened and endangered species, agricultural activity, community facilities, and UST/hazardous material sites do not appear to be significant.

The geotechnical overview of the study area determined that there are no significant findings that would necessitate choosing one alternative over another. The geotechnical conditions in the study area are typical for the karst plain of south central Kentucky.

The Elrod Road corridor does not meet current KYTC design standards due to the lack of signing and striping in some areas, sharp horizontal curves, narrow lane widths and narrow shoulders. Overall crash rates are low in the study area and crashes typically occurred at horizontal curves. The recommendation of minor improvements or 'spot' improvements addressed necessary countermeasures. These are discussed further in the final recommendations section of the report.

Existing traffic conditions are acceptable in the area with levels of services no worse than a LOS of C. However, 2037 projections show LOS D, E and F in some locations. While there are traffic congestion problems at the terminal points of Elrod Road and Smallhouse Road, the traffic modeling shows that problems compound along this corridor when new access opens up to Natcher Parkway near the existing Elrod Road overpass. Providing an additional interchange along Natcher Parkway could potentially alleviate problems that are currently occurring at Three Springs Road (KY 884) to the east, Cave Mill Road to the north, and Nashville Road (US 31W) to the west. The improved level of service on these roads is negligible when compared to the negative impacts that the project would have on Elrod Road and secondary connecting streets. See Section 2.2 of the report for a more detailed description of the traffic analysis.

Proposed Alternatives

The study considered four types of interchanges: diamond, SPUI (single point urban interchange), folded (or flop) and a barbell design which would incorporate a roundabout on each side at the terminus of the ramps on Elrod Road. The study also included a No-Build alternative. During the public meetings, the preferred interchange type was the diamond interchange . The public found the flop diamond confusing, but the team carried it into the alternatives development since it would minimize impacts to a cemetery on the southeast corner of the overpass.

The study also considered three interchange locations: far west of the existing overpass (Alternative A), just west of the existing overpass (Alternative B), and at the existing overpass (Alternative C). The estimated costs of the alternatives range from $8.8 to $10.6 million. Note that these do not include optional improvements.

Figure E.2 – Alternative A – $9.4 Million

Figure E.3 – Alternative B - $8.8 Million

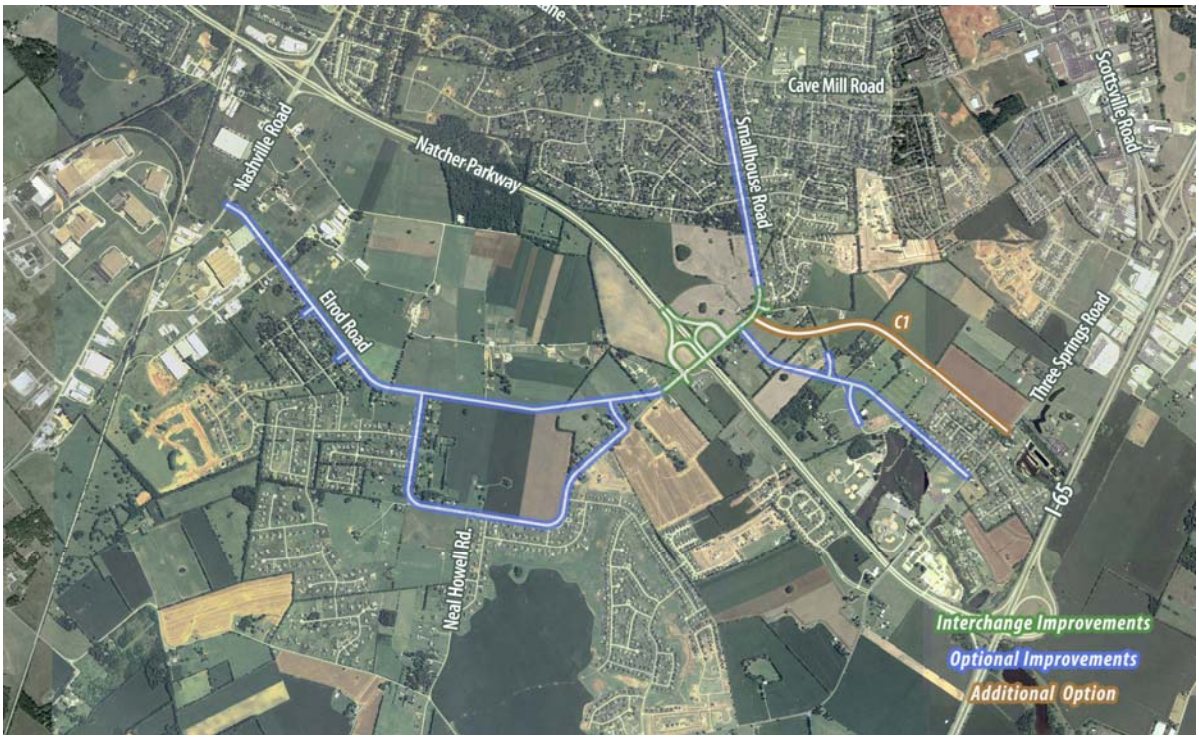


Figure E.4 – Alternative C - $10.6 Million

The final conclusions from the study include the following:

- All of the build alternatives would support economic development (residential growth) in the area.
- None of the alternatives would reduce traffic congestion in the area.
- Public support for the alternatives was not strong. (Parishioners of the proposed Holy Spirit Catholic Church who live outside the area seemed to be the most vocal supporters.)
- All alternatives would result in some level of disruption either to homes, Western Kentucky University property or the churches. Alternatives B and C would be difficult to build while maintaining traffic flow due to removing the existing overpass.
- Development of an interchange would require the City/County to complete the road projects on Smallhouse Road and Elrod Road in the study area prior to construction of the interchange.

The preferred alternatives based on public comments are Alternative A (far west) and the No Build Alternative. Upon analysis of the alternatives and their inability to fulfill the purpose and need, the study recommends:

- *No interchange at this location.*
- *Safety improvements along Smallhouse Road (Spot Improvements) from KY 884 to Cave Mill Road.*
- *An interchange feasibility study for a site on I-65 south of the I-65/Natcher Parkway interchange.*

1.0 Introduction

In late 2007, the Kentucky Transportation Cabinet initiated an interchange study to determine the viability of adding an interchange to the Natcher Parkway near the Elrod Road overpass. This study began as a result of a recommendation from a previous study for Three Springs Road (KY 884). The first study identified a potential need for local access to Natcher Parkway between Nashville Road (US 31W) and Interstate 65. It should be noted that an interchange was not considered as a viable option at Three Springs Road and Natcher Parkway due to its proximity to I-65 (approximately 2,900 feet). Minimum spacing for urban interchanges is typically about one mile, according to the American Association of State Highway and Transportation Officials' *A Policy on Geometric Design of Highways and Streets 2001.* Only 0.5 miles separates KY 884 and I-65 along the Natcher Parkway. Based on the KY 884 study, the local officials indicated that an interchange with Elrod Road may be added to the KYTC's Unscheduled Needs List.

This study includes analysis of data collected from environmental resources, geotechnical findings, and crash data as well as traffic modeling, proposed alternatives and final recommendations.

1.1 Project Location

The study area centers on the existing Elrod Road overpass at Natcher Parkway, which is approximately 1.6 miles west of the I-65/Natcher Parkway interchange. The study area limits encompass Smallhouse Road north to Cave Mill Road, Three Springs Road to the east, and extends south to Neal Howell Road.

The Elrod Road corridor provides a vital link and serves as the primary collector between Three Springs Road (KY 884) to the east, Cave Mill Road to the north, Nashville Road (US 31W) to the west and the growing residential development extending south in the study area.

This study evaluates if adding an additional access point to Natcher Parkway near the existing Elrod Road overpass would help to reduce congestion and travel time along the Elrod Road corridor, on US 231, Three Springs Road (KY 884), and Nashville Road (US 31W) and also meet future traffic demands that further residential growth will bring.

There are a substantial amount of subdivisions and residences within the study area and there is potential for more residential growth in the southern portion of the study area. There are also several destinations along the corridor including, but not limited to, churches, farms, parks and a proposed school.

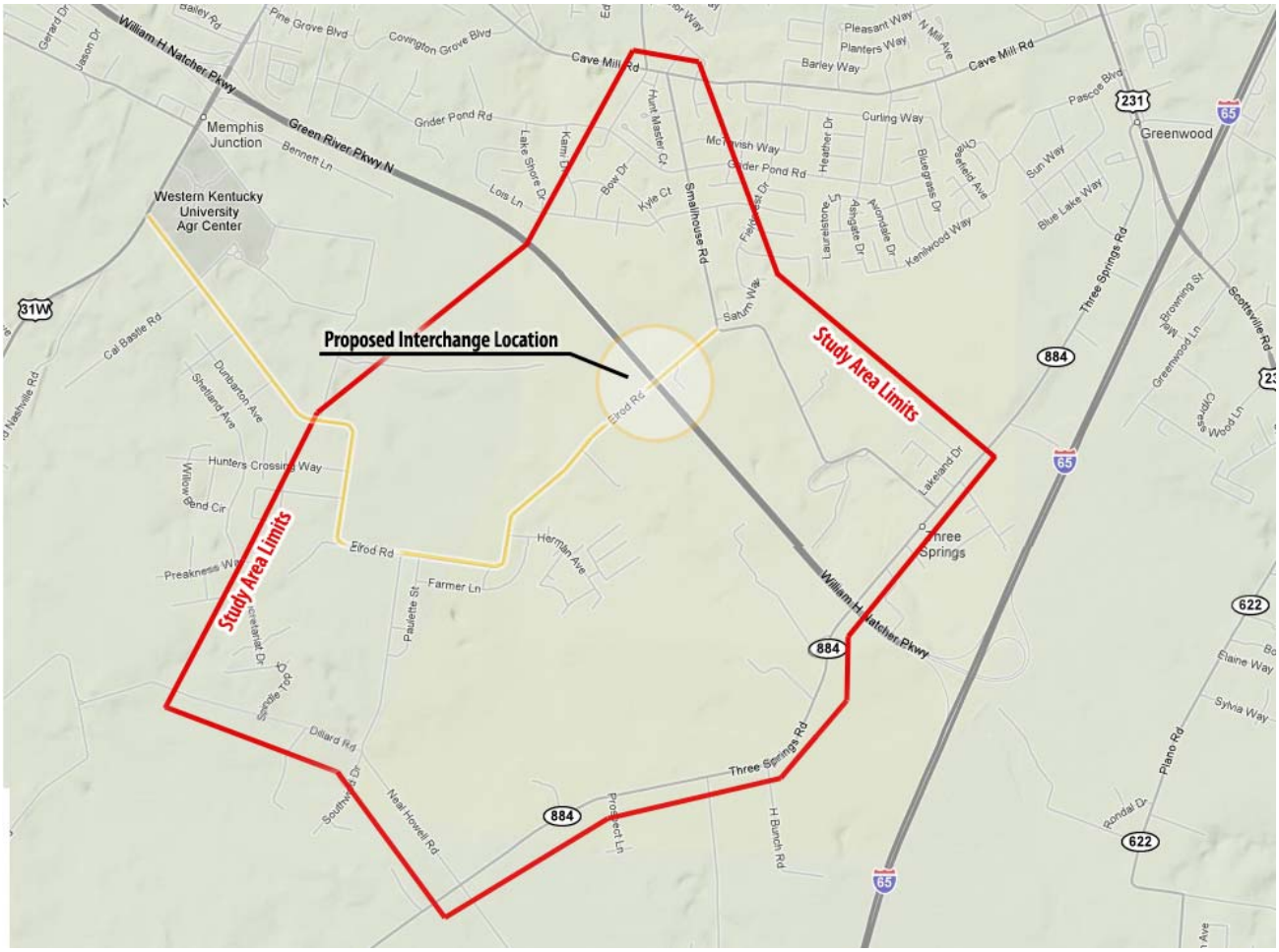


Figure 1.1 - Study Area

1.2 Purpose and Need

The project team decided early that the purpose and need should generally follow the problem statement found on the KYTC Project Identification Form. The project goals should include the following items:

- **Access:** *Providing additional access to Natcher Parkway will hopefully lighten the burden that is currently being experienced along the Elrod Road corridor as well as US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road).*
- **Mobility**: *A bike/pedestrian connection should be closely examined especially with the new school being constructed and the heavy use of the Griffin Park with use of the Greenways Master Plan.*
- **Safety:** *There has been public outcry for reduced speeds and flashing beacon installation south of the project particularly at Matlock and Neal Howell Roads. There are geometrically deficient areas within the study area that need to be examined. Signing and striping in the area is either non-existent in areas, or deficient in others.*
- ***Connection**: Improving secondary connections that are vital to effectively moving traffic between analysis zones is key to the success of the project.*
- **Security**: *The proposed interchange could potentially alleviate some access problems associated with emergency vehicles encountering congestion by providing them with an alternative route.*
- **Economic Development**: *Existing and planned residential development has driven the need for an alternative route and direct access point to Elrod from Natcher due to the congestion and overcrowding of existing routes such as US 231 and KY 884.*

With these items in mind Gresham, Smith and Partners (GS&P) presented the following draft purpose and need statement to local officials on December 10, 2007:

> *In an effort to accommodate the rapid residential and commercial growth on the southern side of Bowling Green, this interchange will greatly improve the safety and efficiency of travel in the area by providing access to the Natcher Parkway and therefore allowing motorists to reach various destinations without using the heavily congested routes of US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road). This interchange and its connections into the existing network will be developed with regard to addressing the mobility and safety of motorists, pedestrians, bicyclists and transit users in the area.*

After several project team and public meetings, GS&P presented the final purpose and need statement at the project team meeting conducted on March 7, 2008.

> *Rapid residential and commercial growth is occurring on the southern side of Bowling Green. Motorists have limited options for accessing the Natcher Parkway in southern Bowling Green and Warren County and must rely on the heavily congested routes of US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road) to reach various destinations. Additionally, mobility in the existing study area network is limited for motorists, pedestrians, bicyclists and transit users.*
>
> *The purpose of this interchange study is to improve the safety and efficiency of travel in the Elrod Road/Smallhouse Road area and to provide better connection for travelers along this existing transportation network to the Natcher Parkway.*

GS&P also presented the purpose and need statement at subsequent Local Officials, Stakeholders and Public Meetings; however, meeting participants did not suggest any changes. Meeting narratives from local officials, stakeholders as well as public meetings are included in the appendix and summarized in Section 4.2.

2.0 Existing Conditions

2.1 Roadway Characteristics

The Natcher Parkway divides the study area. This north-south urban freeway carries over 17,000 vehicles per day. The Natcher Parkway is a divided freeway with two, 12-foot lanes in each direction and a 28-foot median. The closest access point to the Natcher Parkway is at US 31W (Nashville Road), approximately two miles from the Elrod Road overpass.

Smallhouse Road is located north of the Natcher Parkway. This County Road has two, 10-foot lanes with little or no shoulders. Elrod Road connects US 31W to Smallhouse Road. It currently has 10-foot driving lanes with little or no striping or shoulders. There are no pedestrian or bicycle facilities currently on any portion of Elrod Road or Smallhouse Road; however, Basil Griffin Park is used as a staging area for cyclists that use the study area for events. Several 90 degree turns exist along the corridors and at each of these locations, there are little to no advanced warning signs.

There are ten (10) access points on Elrod Road and seven (7) access points on Smallhouse Road that serve subdivisions. This is noteworthy especially on Smallhouse Road where the higher volume of traffic and the lack of left turn lanes for opposing motorists turning into a subdivision cause queues to form.

The intersection of Elrod Road and Smallhouse Road is currently configured as a three-way stop. In the field, the study team observed that motorists traveling through this intersection tend to treat the stop sign as a yield condition. This occurred on each leg of the intersection.

The intersection of Smallhouse Road and Cave Mill Road on the north side of the study area offsets the north/south segment of Smallhouse Road in effect creating two intersections. The study team also observed that motorists turning left onto Cave Mill Road have a difficult time, thus exacerbating queue lengths along Smallhouse Road.

Notable existing and planned traffic destinations in the study area are:

- A new elementary school planned along Elrod Road directly across from Herman Avenue
- Calvary Baptist Church located adjacent to the existing Elrod Road Overpass, including a cemetery
- Holy Spirit Church, which is planning a new facility on the north side of the east leg of Smallhouse Road
- Trinity Free Will Baptist Church on the east leg of Smallhouse Road
- Pennyroyal Horse Farm located off of Elrod Road just southwest of the existing overpass
- Western Kentucky University's agricultural campus located on the north side of the west leg of Elrod Road.
- The Aviation Heritage Park located at the end of the east leg of Smallhouse Road at the intersection of Smallhouse Road and Three Springs Road (KY 884).
- The KOA campground (a state, local and regional attraction), which is nearby and brings tourists in from across the state and country

Table 2.1 Existing Conditions

Item	William H. Natcher Parkway	Smallhouse Road	Elrod Road
Route	WN - 9007	CR - 1235	CR - 1240
Actual Traffic Count	17,100	12,300	N/A
Year of Actual Traffic Count	2006	2003	N/A
Average Right of Way Width	275'	50' *	50' *
Extended Weight System	Parkway	N/A	N/A
Functional Classification	Urban Freeway	County Road	County Road
Lane Width	12'	10' *	10' *
Number of Lanes	4	2	2
Road Type	Divided Highway	Undivided	Undivided
Median	Depressed	N/A	N/A
Width of Median	28'	N/A	N/A
Posted Speed Limit	70 mph	35 mph	35 mph
Outside Shoulder Width	10'	N/A	N/A
Truck Weight Class	AAA	N/A	N/A

* Estimation

There is rapid residential growth in the southern portion of the study area, and the traffic generated here strains not only the Elrod Road corridor but also the intersections of Three Springs Road to the east and Nashville Road to the west.

2.2 Traffic Volumes and Levels of Service

GS&P conducted traffic counts within the study area on Elrod Road, Smallhouse Road and the Natcher Parkway and developed levels of service (LOS) based upon the counts. LOS is an indication of congestion and delay along corridors or at intersections. An LOS of A indicates good, free flow conditions and an LOS of F indicates severe congestion. The 2007 levels are shown in Figure 2.1.

Existing traffic conditions are good in the area with levels of services no worse than a LOS of C. However, 2037 projections show LOS D, E and F in some locations. While there are traffic congestion problems at the terminal points of Elrod Road and Smallhouse Road, the traffic modeling shows that problems compound along this corridor when new access opens up to Natcher Parkway near the existing Elrod Road overpass. GS&P anticipates that providing an additional interchange along Natcher would alleviate problems currently generated at Three Springs Road (KY 884) to the east, Cave Mill Road to the north, and Nashville Road (US 31W) to the west; the increased level of service is negligible when compared to the negative impacts that the project would have on Elrod Road and secondary connecting streets.

GS&P initiated traffic forecasts to determine the 2037 traffic volumes within the study area and performed the following traffic forecasting activities at this stage of the project:

- Refinement of the Bowling Green/Warren County Travel Demand Model (TDM) for the Elrod Road Interchange Study Area
- Development of the No-Build Alternative (Existing-Plus-Committed) Roadway Network.

Figure 2.2 displays the 2037 levels of service that GS&P established for the roadways in the study area. While the level of service analysis (detailed in Appendix A) shows significant congestion on the arterial facilities in the northern part of the study area, only a slight LOS drop is evident along the Elrod Road corridor in the 2037 design year.

GS&P prepared a full traffic forecasting report separately from this report and submitted it to the Kentucky Transportation Cabinet.

2.3 Other Transportation Projects in the Area

The no-build alternative includes the existing configuration of Elrod Road and any projects that were committed or anticipated to be completed according to the Bowling Green/Warren County Metropolitan Planning Organization's adopted Transportation Improvement Program. The list of committed capacity expansion projects follows:

Project	Description
KY 2158 (Cumberland Trace)	Relocation of intersection with Scottsville Road (US 231) at Mel Browning Street to Cherry Farm Lane at Scottsville Road (US 231)
Natcher Parkway Extension	4-lane freeway from I-65 to US 31W at Upton Road (east of Dye Ford Road) with interchange at Plano Road (KY 622)
I-65	Widening to 6 lanes from Cater-Sims Road southward to Tennessee State Line
I-65/US 31W Interchange Reconstruction	Replace existing rural diamond interchange with single-point-urban-diamond interchange
Lovers Lane (KY 880)	Widening to 4 lanes from Cemetery Road (KY 234) to Scottsville Road (US 231)
Three Springs Road (KY 884)	Widening to 4 lanes from Scottsville Road (US 231) to Flea Land
Nashville Road (US 31W)	Widening to 4 lanes from Campbell Lane (US 231) to Dillard Road

NOTE: The forecast year for the Bowling Green/Warren County Travel Demand Model used for the Elrod Study was 2030 based on development activity projected for the year 2030 for the metro area. The travel model cannot project traffic for other years unless you generate new development forecasts for the metro area for those years. The design year of 2037 is utilized as a standard 30 year projection from the year the study commenced.

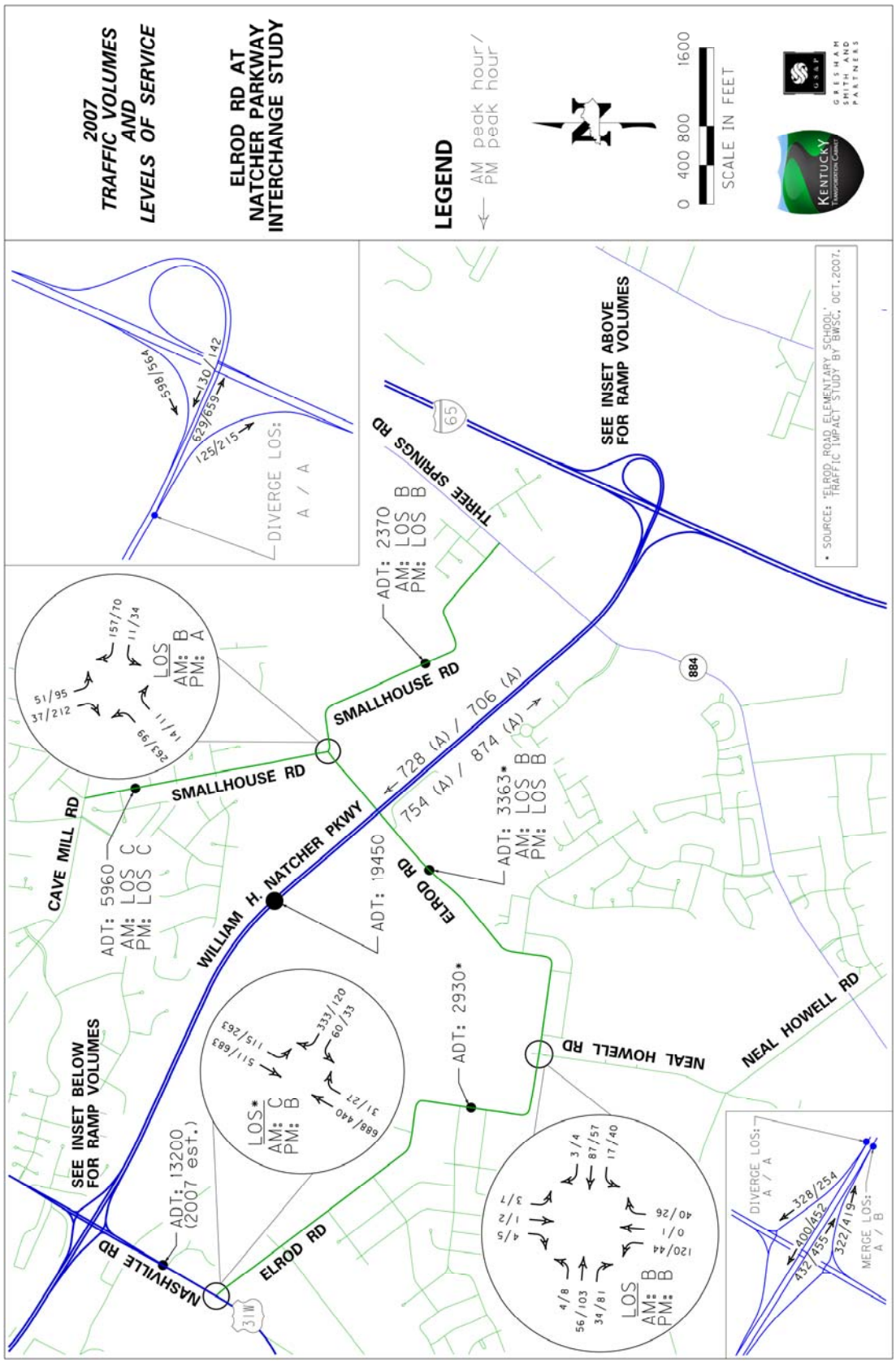


Figure 2.1 – 2007 Traffic Volumes and Levels of Service

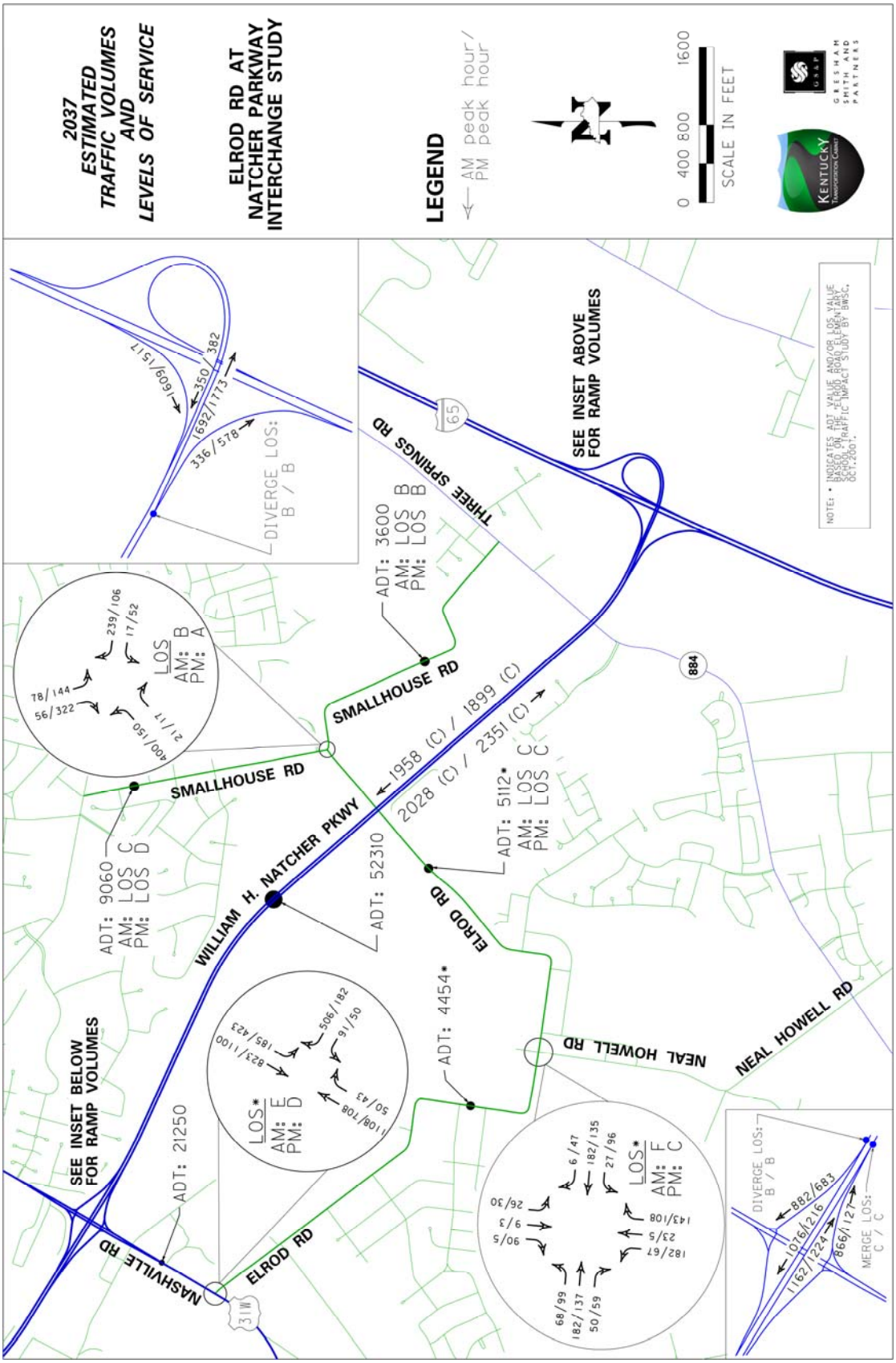


Figure 2.2 – 2037 Traffic Volumes and Levels of Service for the Existing-Plus-Committed Scenario

2.4 Crash Data

GS&P collected crash data from January 2004 through December 2006. The complete list of crashes can be found in Appendix B. Figure 2.3 (next page) illustrates the location and basic information about the crashes.

While the number of crashes in the study area is not significant, reoccurring patterns did emerge from the data collection. The crash data graphic in Figure 2.3 shows that the majority of the crashes occur in one of three locations in the study area:

- Sharp (and poorly signed curves) along Elrod Road and Smallhouse Road
- The three-way stop at Elrod Road and Smallhouse Road
- Rear end collisions attributed to several closely spaced subdivision entrances and left turn movements that do not have a dedicated left turn lane along Smallhouse Road extending north to Cave Mill Road

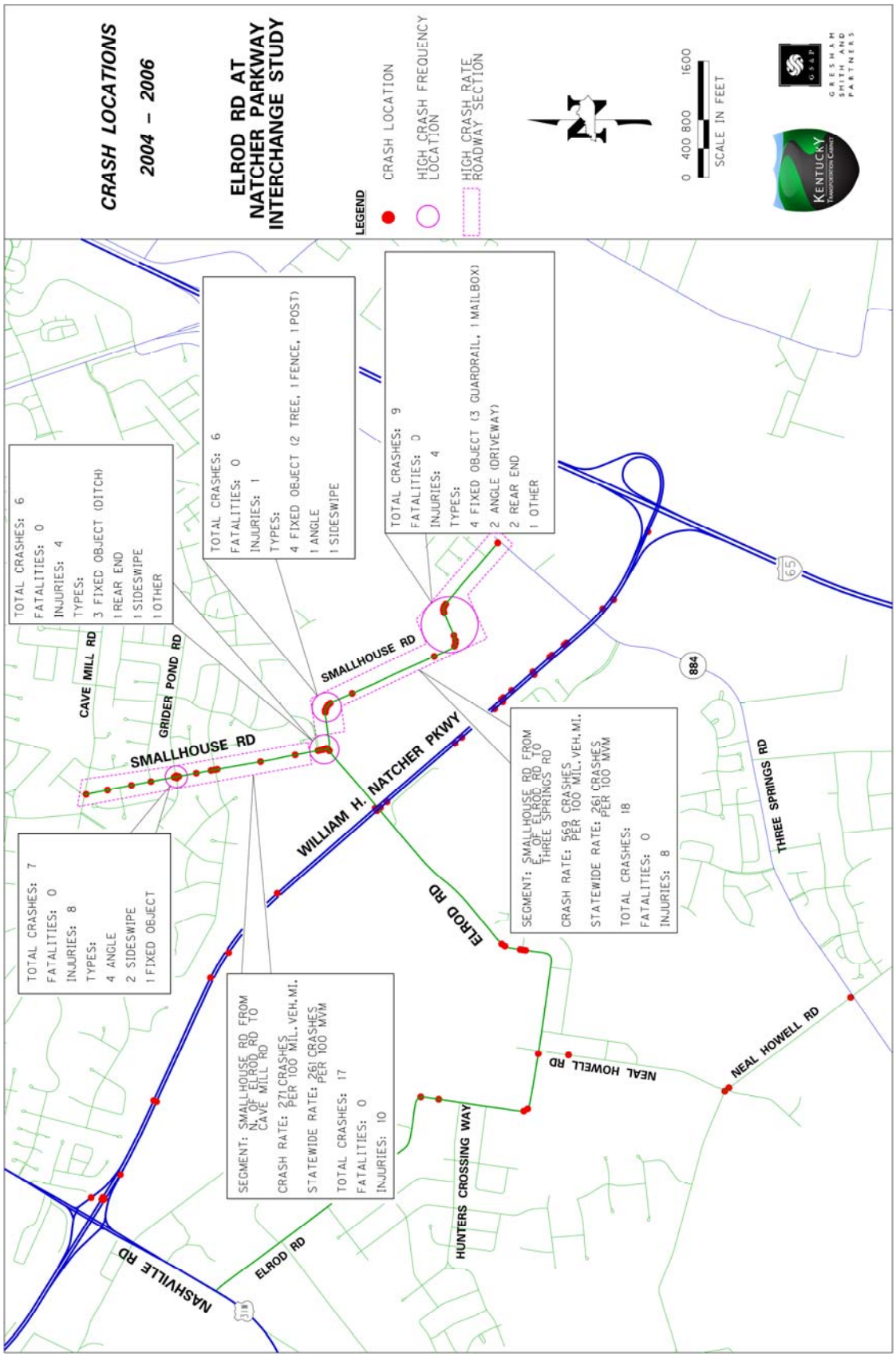


Figure 2.3 – Crash Data

3.0 Environmental Setting

3.1 Environmental Overview

The environmental overview document uncovered several issues that exist in the study area and are shown in Figure 3.1. The list of items discovered included such things as oil/gas wells, sinkholes, Indiana Bat summer maternity habitat, Western Kentucky University (WKU) Farm, wetlands, floodplains, cemetery and churches, aviation Heritage Park, Griffin Park, KOA (Kampgrounds of America) and schools located along the Elrod Road corridor.

According to the environmental overview document, preliminary data research and subsequent field reconnaissance, environmental concerns within the study area are typical for a previously agricultural area in transition to residential use. Environmental concerns relative to air quality, traffic noise, aquatic resources, threatened and endangered species, agricultural activity, communities and community facilities, and UST/hazardous material sites do not appear to be significant in areas where an interchange may be constructed for Elrod Road and the Natcher Parkway.

Specific findings for each of the environmental categories are:

Environmental Justice **–** The team anticipates that proposed alternatives would not negatively affect any of the socio-economics of the area. An environmental justice report found that there were no concentrations of minority or low-income populations in the study area.

Air Quality **–** The team anticipates that proposed alternatives would negatively affect the attainment status in the study area.

Traffic Noise – The three noise sensitive areas identified in the study area are Calvary Baptist Church, Pennroyal Farm Stables, and a group of three homes located north of Natcher Parkway on Elrod Road. The sites should be further examined if proposed changes are made to Elrod Road.

Aquatic Resources – There are 21 potential wetlands in the study area; however, most of these are manmade farm ponds. It is unlikely that impacts will be made to the naturally existing wetlands because of the karst conditions in the study area.

Threatened and Endangered Species – Indiana and gray bats either currently use or could potentially use areas within the study area for habitats. Any proposed alignment changes will require compliance with Section 7 of the Endangered Species Act for the Indiana bat.

Agricultural Activity – There are currently three agricultural businesses or institutions in the study area. These include the Western Kentucky University farm, Holladay Hill Stables and Pennroyal Farm Stables. Pennroyal Farm stables could potentially be impacted by all three proposed improvements.

Community and Community Facilities – There are several communities in the study area and to a lesser degree community facilities. Proposed improvements will more than likely impact residences and the Calvary Baptist Church and adjacent cemetery which is located near the existing Natcher Parkway overpass on Elrod Road. The most significant community resource in the study area is Basil W. Griffin Park which would present Section 4(f) and 6(f) concerns if impacted. Proposed improvements detailed in this report do not anticipate any impacts to said park.

UST / Hazardous Materials – A gas well site and UST was identified on the Western Kentucky University farm as well as a Bowling Green VOR UST tank. These represent the most significant potential hazards in the study area.

3.2 Resource Agency Coordination

The team sent notifications out to the agencies listed in Table 3.1. The notifications asked the agency for the following information:

- Comments on the project goals or purpose and need for the project,
- Significant issues or concerns that may need addressing,
- Any conservation or development plans your agency or organization has ongoing or is aware of in the project area,
- Locations of any known areas, issues, or resources so that impacts can be minimized, mitigated, or avoided early in the process, and
- Any mitigation strategies that should be considered.

Table 3.1 provides a complete list of comments received from the various resource agencies. A full copy of the original mailing list, letter and written responses can be found in Appendix D.

3.3 Geotechnical Overview

The project team conducted a geotechnical review of the study area using documents, maps, interviews with local residences and by field reconnaissance. The findings show that geotechnical conditions in the study area are typical for the karst plain of south central Kentucky.

Karst is the terrain, generally underlain by limestone or dolomite, in which the topography is chiefly formed by the dissolving of rock. Karst regions can be characterized by sinkholes, sinking streams, subterranean drainage and caves. With karst prone areas, regulation of development is crucial to protect the public health, safety and welfare. Regulation of the development and use of environmentally constrained lands can allow for safe and appropriate construction, storm water management and ground water quality.

Construction sites in this area routinely encounter depressions and sinkholes as well as soil collapse during construction or after operations cease. The recommendation of the geotechnical overview is to leave any “open throat” sinkholes undisturbed (by physical fill material or additional drainage run-off).

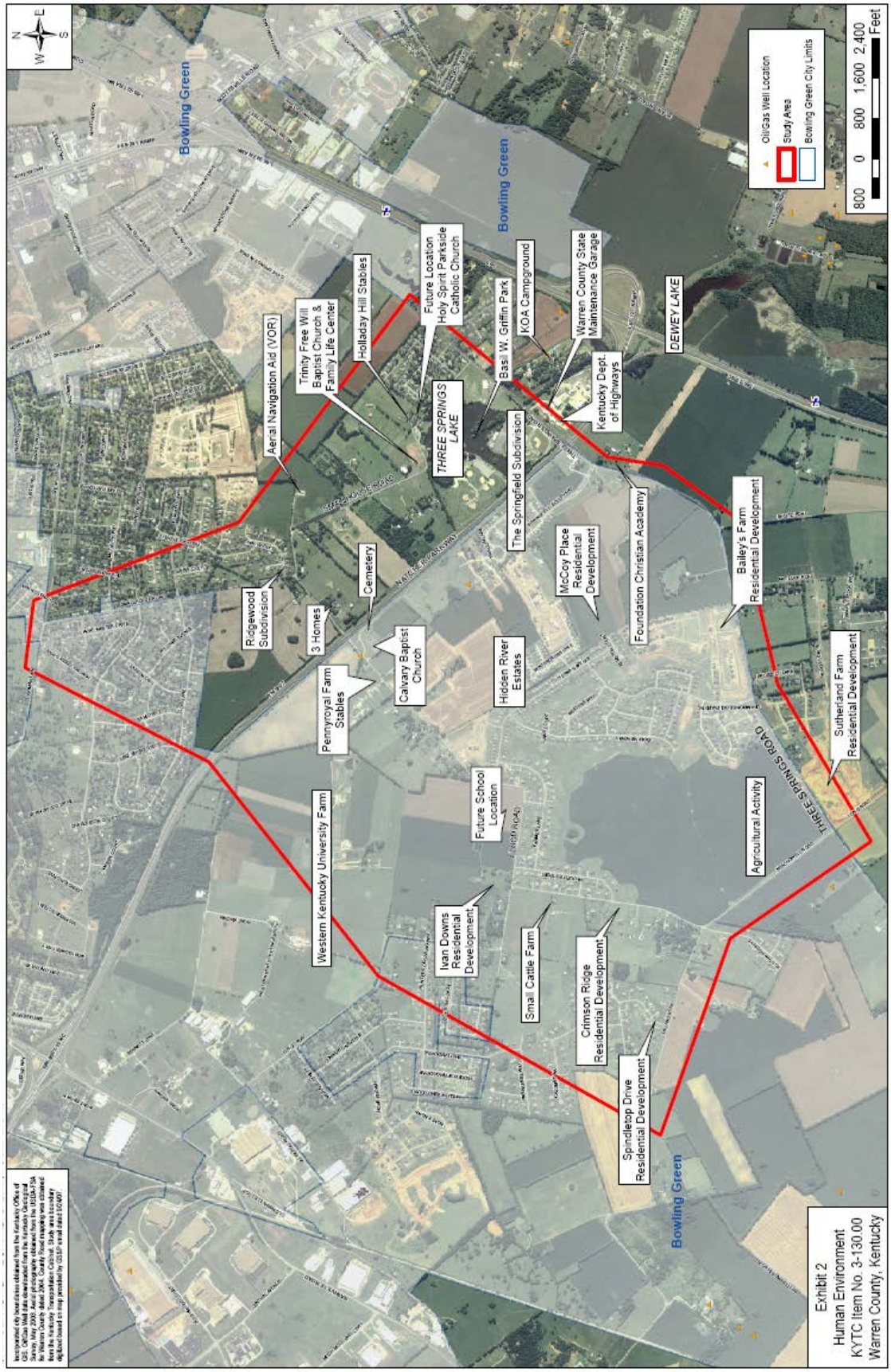


Figure 3.1 – Environmental Issues Exhibit (a full size version is included in Appendix C)

Table 3.1 – Resource Agency Comments

Agency	Comment
KY Division of Air Quality	401 KAR 63:010 and 401 KAR 63:005 would apply during construction of this project.
KY Division of Water	The groundwater branch recommends that a professional hydrologist or geo-hydrologist be utilized to ensure that groundwater in the area will not be adversely affected by this project. Kentucky DOT is exempted from the requirements for a stream construction permit per KY 151.250. Any excess material disposed of outside the DOT right of way and in the regulatory floodplain will require a permit.
Natural Preserves Commission	No comment
Department for Environmental Protection/ Division of Waste Management	No comment
Department of Military Affairs/Boone National Guard Center	The Department of Military Affairs cannot identify any issues or concerns that affect the development of subject project.
KY Heritage Council	There are many architectural resources as well as previously recorded archaeological sites within the study area. The Section 106 review process must be completed prior to the approval of the expenditure of any federal funds.
KY Airport Zoning Commission	Any structure or construction equipment that exceeds 133 feet above ground level would require a permit from the KY Airport Zoning Commission. The proposed study is located app. 14,600 ft from the BG Airport.
KY Commission on Human Rights	No comment
KY Department of Agriculture	No comment
KY Department of Fish & Wildlife Resources	The Kentucky Fish and Wildlife Information System indicate that state/federal threatened and endangered species are known to occur near the project study area.
KY Division of Forestry	No forestry concerns in this area.
KY Division of Waster Management	Link to Superfund report attached to email.
KY State Police	Would be beneficial for the following reasons: Reduce traffic congestion on US 31-W and KY 884; reduce traffic volume on Smallhouse Rd; provide better access to the area for Emergency Responders; better traffic flow should result in fewer crashes.
KY Tourism Council	The addition of the new interchange should not have any detrimental effect on the area tourist attractions, hotels and restaurants…Creating safer roadways and less congestion on Three Springs Rd and Nashville Rd would create a more positive experience for the tourists to those areas.

Agency	Comment
KY Transportation Cabinet/Office of Local Programs	It is the conclusion of this office that the addition of bicycle and pedestrian facilities in the study area would improve safety and efficiency of travel in the Elrod Road area and create a more diverse transportation network. At this point in the study it is too early to recommend whether bike lanes with sidewalks or a multi-use path would be more feasible. This can be determined by the number of access points that will be connecting to the roadway, and the amount of traffic.
U. S. Environmental Protection Agency/ Region 4	The upcoming NEPA document should fully evaluate all environmental impacts, cultural resource impacts, and Environmental Justice impacts, in addition to considering cumulative and secondary impacts of the alternatives. Best management practices (BMPs) that will prevent, reduce, or mitigate environmental impacts should be considered.
U.S Coast Guard	A Coast Guard permit is not required.
U.S. Army Corps of Engineers/Eastern Section	Referred to Louisville District for comment.
U.S. Army Corps of Engineers/Nashville District	Referred to Louisville District for comment.
U.S. Department of Agriculture/ Forest Service	Proposed activities are not likely to impact resources or facilities managed by the Daniel Boone National Forest.
U.S. Department of Transportation/Federal Aviation Administration	Project is not in airspace and should not impact aviation operations unless there is construction 200' above ground level.
U.S. Department of Agriculture/Natural Resources Conservation Service	The NRCS is concerned with potential impacts that the project might have upon prime farmland soils and additional farmlands of statewide importance. If federal dollars are to be used to convert important farmlands from agricultural uses to non-agricultural uses a Form AD-1006 (or Form NRCS-CPA-106 if the project is a corridor type project) must be submitted to the local NRCS office.
Underground Storage Tank Branch	The USTB identified two facilities with a total of six registered underground storage tanks. All six tanks have been removed and all activities are closed. There are no active USTs.
University of Kentucky/KY Geological Survey	Extensive comments attached re: review of maps, online searches and documents available in the files and on the Web site of the KY Geological Survey. No on-site investigation of the planning study area was conducted.
Warren County Schools/Transportation	"These changes are needed as soon as possible; however, I am concerned that the increase in traffic without major road improvements to Smallhouse, Elrod and Cave Mill could make this even more dangerous because of speeding. With the possibility of adding another school on Elrod Rd and our buses being able to enter Natcher via Elrod it would appear to make transport from and to Greenwood and Drakes Creek much easier."

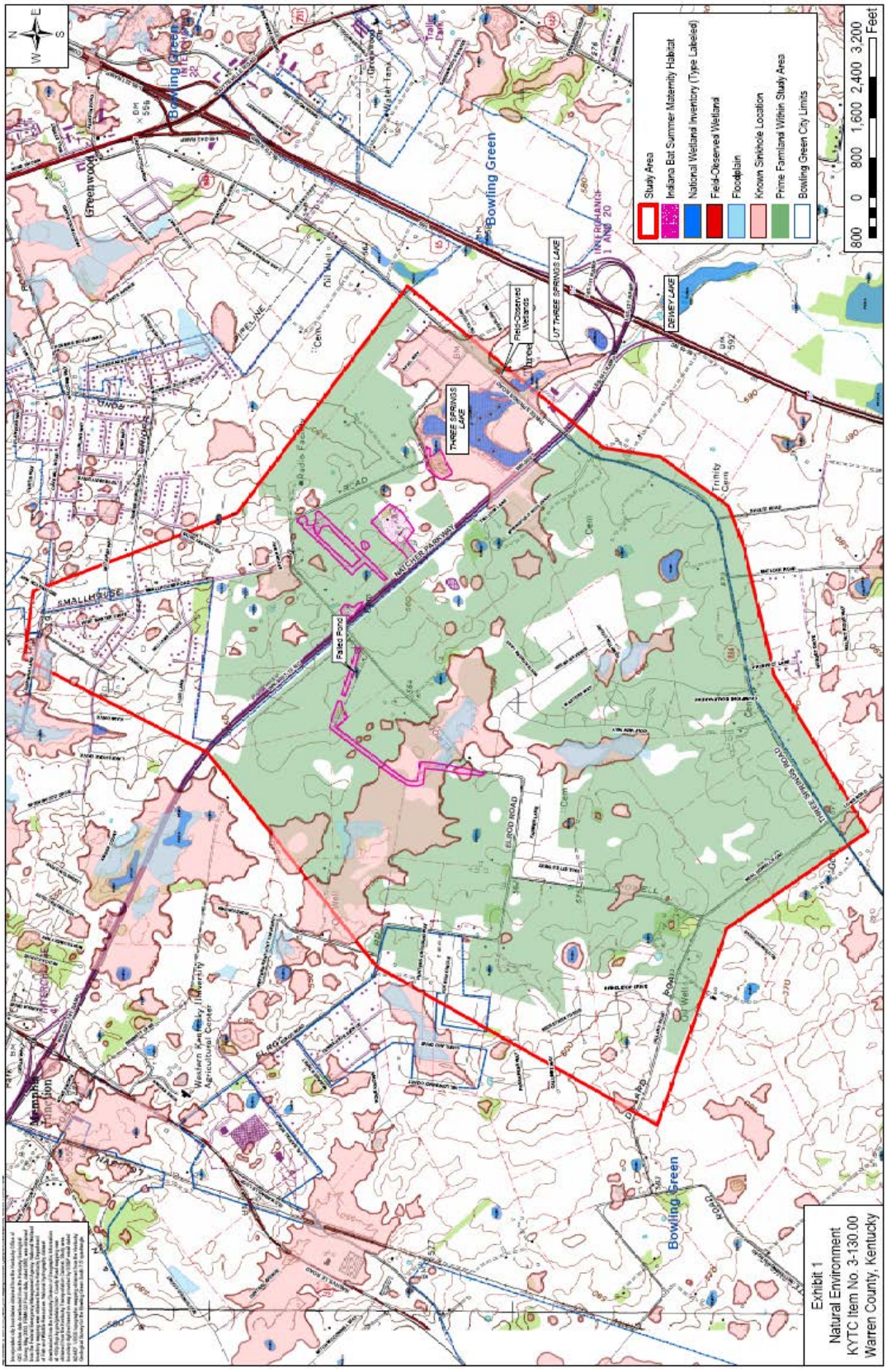


Figure 3.2 – Geotechnical Exploration Map (a full size version is included in Appendix D)

4.0 Alternatives Analysis

4.1 Alternatives Overview

Problems the team observed and quantified in the study area include:

- Congestion
- Narrow Roadways / No Shoulders
- 90 Degree Turns
- Lack of Striping
- Too Many Access Points
- Lack of Multi-Modal Accommodations
- Cave Mill / Smallhouse Offset
- Increased Development
- Underutilization of Natcher Parkway
- Agricultural Vehicles' Needs
- No Access to Multi-Lane Roads

In an effort to establish which options were best suited for further examination early in the study, GS&P checked to ensure that the options agreed with the purpose and need statement for the project at each step of decision-making in the alternative analysis:

> *Rapid residential and commercial growth is occurring on the southern side of Bowling Green. Motorists have limited options for accessing the Natcher Parkway in southern Bowling Green and Warren County and must rely on the heavily congested routes of US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road) to reach various destinations. Additionally, mobility in the existing study area network is limited for motorists, pedestrians, bicyclists and transit users.*
>
> *The purpose of this interchange study is to improve the safety and efficiency of travel in the Elrod Road/Smallhouse Road area and to provide better connection for travelers along this existing transportation network to the Natcher Parkway.*

Interchange Types

The team examined four types of interchanges: diamond, SPUI (single point urban interchange), folded (or flop) and a barbell design which would incorporate a round-about on each side at the terminus of the ramps on Elrod Road. Per discussions at the first team meeting, the team excluded partial interchanges from consideration.

The team eliminated the SPUI type interchange as a viable option because this type of interchange is normally utilized in densely populated urban areas, and it doesn't fit the context of Elrod Road. The team also eliminated the barbell interchange due to the likelihood of farm vehicles utilizing the interchange as well as right-of-way constraints primarily south of the existing overpass.

The two remaining interchange types carried forward were the diamond interchange and the folded (flop) interchange. Both of these fit the context of the study area better and accommodate the projected traffic demands.

Typical Sections

Early typical sections attempted to correct some of the observed deficiencies along the existing project corridor, namely narrow lane widths and the lack of multi-modal facilities. Multi-modal needs had not been determined previously, so the project team relied heavily upon information gathered from the stakeholders and public through the course of the public involvement plan. The design team developed the typical sections displayed in Figure 4.1 to meet the purpose and need statement as well as address the deficiencies observed in the study area.

The typical sections also contain solutions for multi-modal access. The initial expectation was that the entire Elrod Road corridor would be three lanes; one lane in each direction and a center turn lane. Smallhouse Road would remain as two lanes, with improvements.

The initial proposed typical section included curb and gutter as well as pedestrian facilities on parts of Elrod Road and Smallhouse Road extending east to Three Springs Road. Early public involvement made the design team aware of the large number of bicyclists who travelled within the study area. A designated 4-foot bike lane was proposed for the entire length of Elrod Road; it would extend east along Smallhouse Road to provide access to Griffin Park.

Revised Typical Sections

Due to Kentucky Transportation Cabinet's Practical Design approach, anticipated budget constraints and the team revisiting the context of the area, the typical section was modified to a more rural section. The new typical section eliminated the curb and gutter, narrowed the width of the traveled way, and also eliminated pedestrian and designated bicycle lanes. As an alternative, bicyclists can use the proposed paved shoulders on Elrod Road. The team developed the revised typical section shown in Figure 4.2 to agree with Kentucky Transportation Cabinet's Practical Design guidelines.

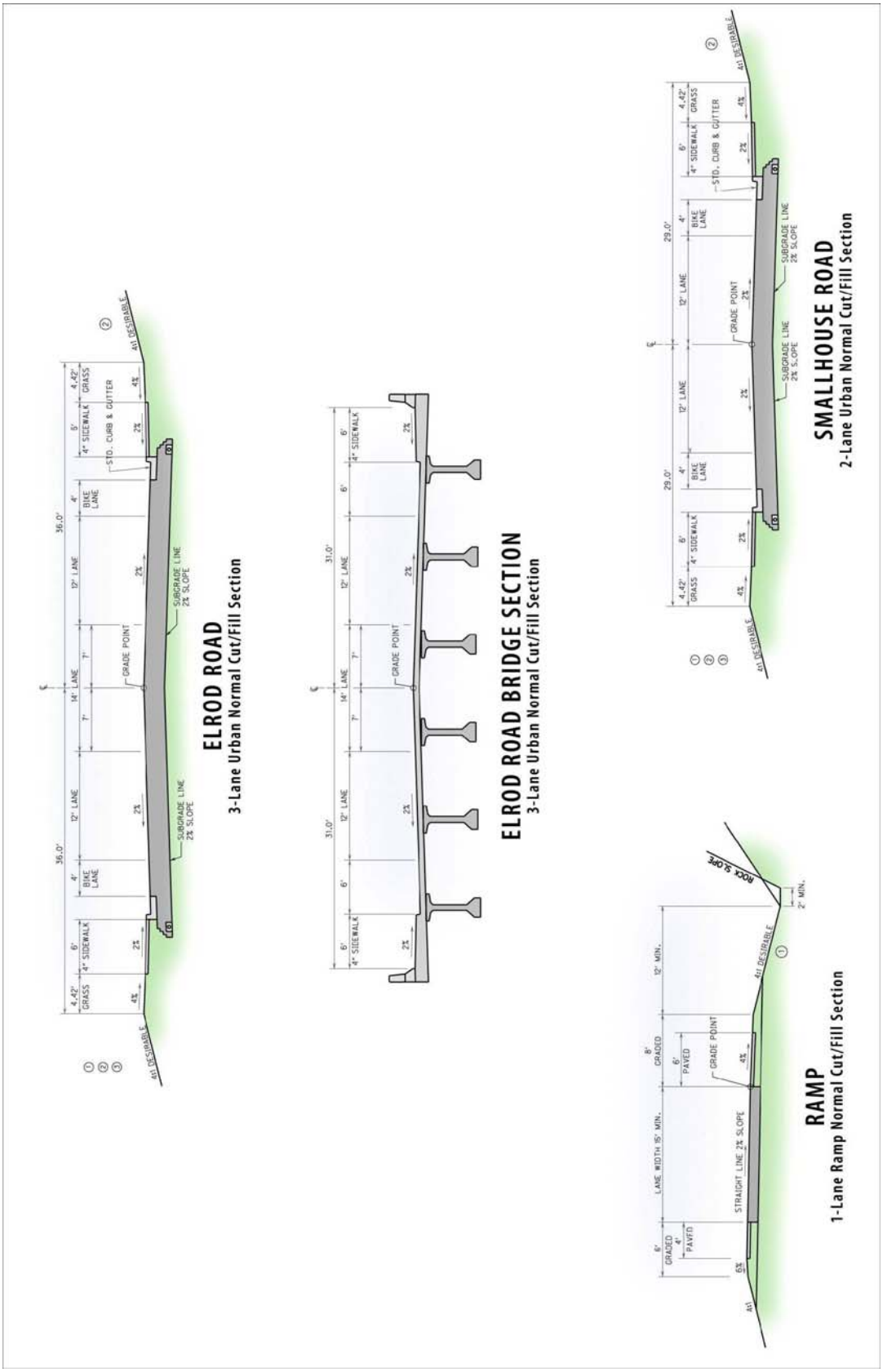


Figure 4.1 – Initial Proposed Typical Sections

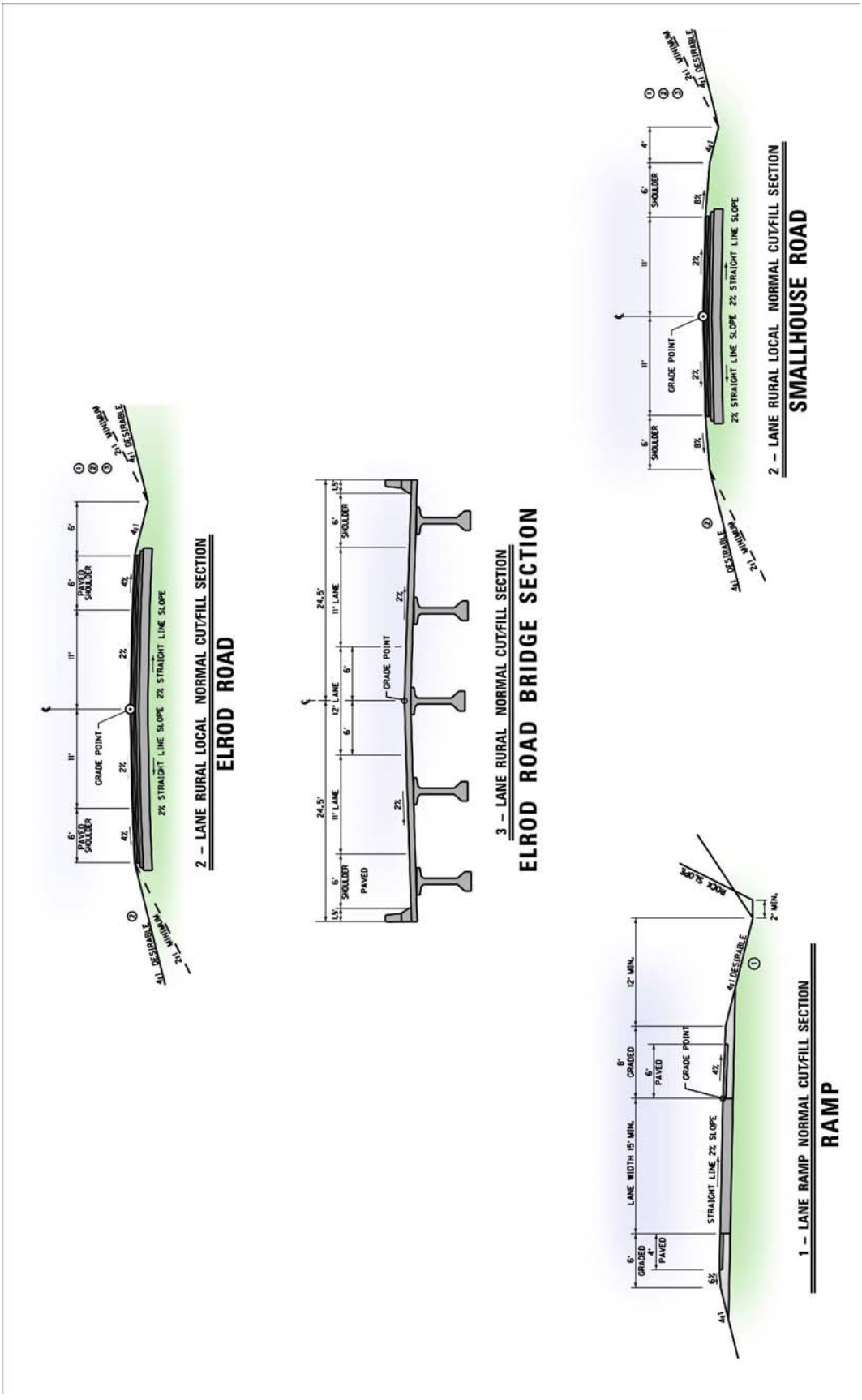


Figure 4.2 – Proposed Typical Sections with Practical Design guidelines applied

With the updated typical section, most of Elrod Road would remain a 2-lane section. The roadway would widen near the proposed overpass to account for required interchange left turn storage lanes. Larger images of all typical sections are in Appendix E.

Horizontal Alignments

Before any alignments were conceptualized, GS&P paid special attention to existing roadway deficiencies. The team collected crash data and analyzed the entire study area. The majority of the crashes on file were due to rear end collisions attributed to turns into subdivisions. The remaining crashes appeared to be concentrated at the sharp curves in the project area or at the three-way stop located at the intersection of Elrod Road and Smallhouse Road. Several of the crashes on the sharp curves along Elrod Road and Smallhouse Road occurred after dark. In the field, GS&P observed that signing for curves along Elrod Road needed improvement, providing drivers with better warning of approaching sharp turns. Crash data for the study area are shown in Figure 2.3.

GS&P developed alignment options to address the geometric deficiencies as well as to accommodate the typical section and provide a new access point to Natcher Parkway near the existing Elrod Road overpass.

The design team gave special consideration to a plan previously developed by the City-County Planning Commission and presented to Western Kentucky University (WKU). The original plan utilized a corridor at the south edge of the WKU property and constructed a new interchange approximately 400 feet northwest of the existing Elrod Road overpass.

The team initially drafted eight options to evaluate. Each option attempted to avoid the potentially problematic areas discovered in the environmental phase (denoted in Figure 4.3 with yellow stars). A detailed graphic of each of the eight initial options is in Appendix F. Figure 4.3 shows all eight options together, providing an overview of the options. There are also several alternatives in each option showing different types of interchanges.

The project team compared each alternative's pros and cons to narrow the focus to three proposed alternatives and a no-build option to present to the public. The criteria used to evaluate each alternative included impact on adjacent facilities, land use impacts, economic impacts, constructability impacts, safety benefits, probable design, construction, ROW and utility impacts, and traffic impacts.

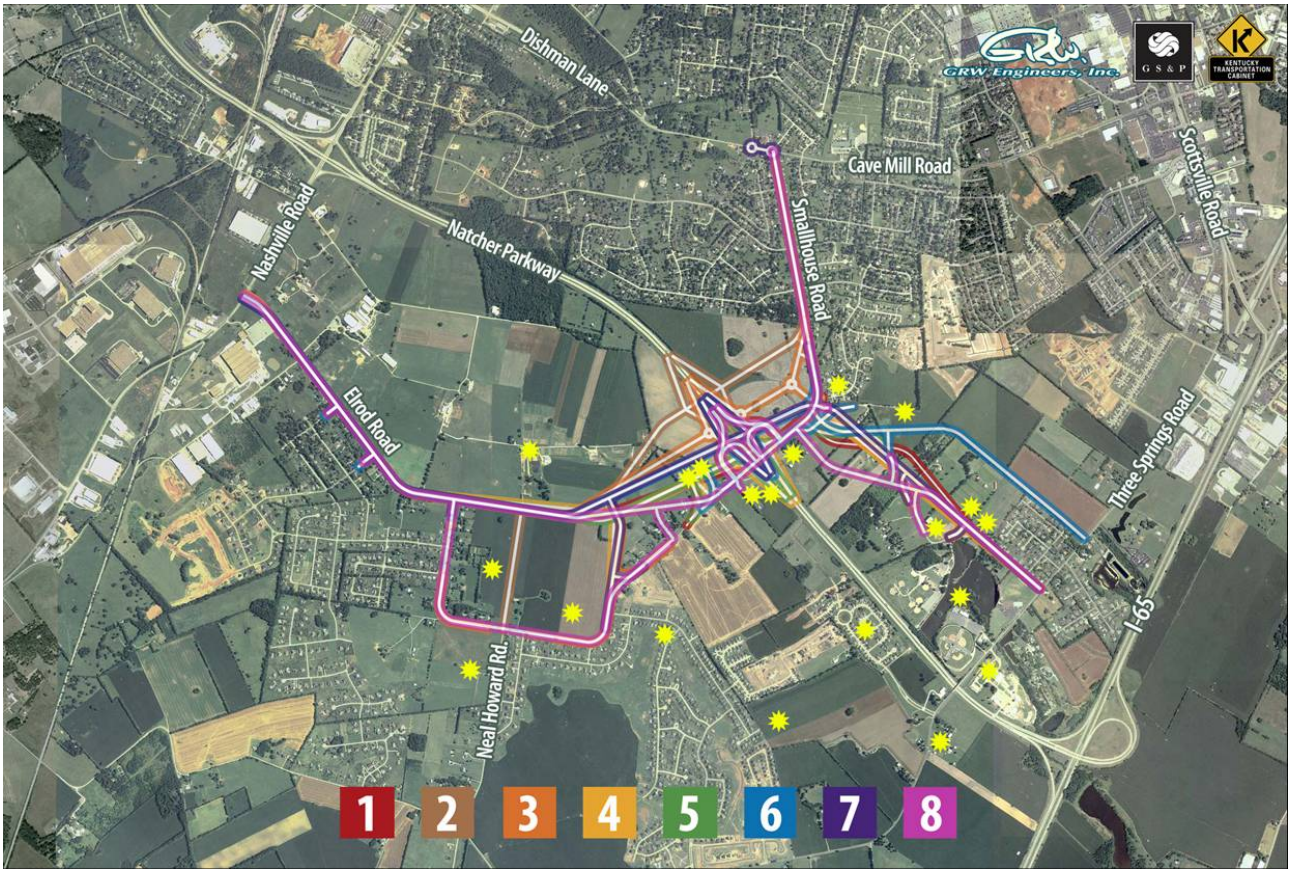


Figure 4.3 – Eight Initial Alignments

Each of the three alternatives was broken down into three different portions to accommodate different City, County and State funding sources. Figures 4.4, 4.5, and 4.6 designate portions of each alternative to the initial interchange improvements (green), second tier optional improvements (blue), and third tier optional improvements (orange). Larger scale versions of each are included in Appendix G.

The following alternatives have several optional and additional improvements shown. These proposed improvements should be considered interchangeable since they can be applied to any of the interchange options. Because of this, all of the possible improvements are not shown in each of the following interchange alternatives.

Optional improvements (shown in blue on Figures 4.4 - 4.6) include:

- Widen the westernmost portion of Elrod Road that extends to Nashville Road to allow through traffic to proceed unencumbered by left turn traffic into the subdivisions.
- Improve the radii on the 90 degree curves on the southernmost portion of Elrod Road and include MUTCD compliant signing to alert motorists of the condition.
- Re-align the east leg of Smallhouse Road that extends to Three Springs Road to eliminate 90 degree curves near the park.
- Widen Smallhouse Road between Elrod Road and Cave Mill Road to help combat the lower level-of-service currently experienced there. This is only a partial solution as the major problem lies with the intersection configuration at Smallhouse Road and Cave Mill Road.

Figure 4.4 – Alternative "A"

Alternative "A" was developed to minimize impacts to properties along Elrod Road. There is a significant advantage during construction because the majority of this alignment is on undeveloped farmland. This alternative, however, also left the largest residual piece of property on the WKU property, meaning there was a significant portion of land that would be cut-off from their main property.

Some *additional options* were examined and presented to the public. These were considered additional to the interchange option and the optional improvements indicated in green and blue in Figure 4.4 above. They are as follows:

- A1 – Small connector to connect the proposed relocated Elrod Road to the existing Elrod Road in case a decision was made that eliminated the direct connection between the western most optional improvements (shown in blue) to the newly relocated interchange.
- A2 – A re-aligned Smallhouse Road to potentially improve safety by eliminating the sharp turns near the park.
- A3 – A newly aligned roadway to potentially improve safety by avoiding the existing sharp turns on Smallhouse Road.
- A4 – A round-about to allow users a legal yield condition at the three-way intersection.

Figure 4.5 – Alternative "B"

Alternative "B" was developed to lessen potential right-of-way impacts compared to Alternative "A"; however, by moving the interchange closer to the existing Elrod Road overpass, there is a potential to impact more property owners even though total right-of-way needs could be less.

Some *additional options* were examined and presented to the public. These were considered additional to the interchange option and the optional improvements indicated in green and blue in Figure 4.5 above. They are as follows:

- B1 – This alignment could eliminate the need for the green connection between the western most optional improvements on Elrod Road (shown in blue) to the proposed interchange.
- B2 – A newly aligned roadway could potentially improve safety by avoiding the existing sharp turns on Smallhouse Road. This could replace the Smallhouse Road alignment shown in blue in Figure 4.5.

Figure 4.6 – Alternative "C"

Alternative "C" was developed to utilize as much of existing Elrod Road right-of-way as possible. A flop interchange type eliminates the residual piece of land on the WKU property.

Some *additional options* were examined and presented to the public. These were considered additional to the interchange option and the optional improvements indicated in green and blue in Figure 4.6 above. They are as follows:

- C1 – A newly aligned roadway could potentially improve safety by avoiding the existing sharp turns on Smallhouse Road. This could replace the Smallhouse Road alignment shown in blue in Figure 4.6.

The following is the list of issues presented to the local officials, at the team meeting and to the public as a synopsis of the pros and cons of each alternative and options:

Interchange Alternative "A"
- Minimizes impacts to properties surrounding the interchange.
- Impacts properties on Smallhouse Road northwest of overpass.
- Requires construction of connector road(s) to existing Elrod Road.

Interchange Alternative "B"
- Minimizes impacts to properties surrounding the interchange.
- Minimizes non-accessible land on WKU Agricultural Farm.
- Impacts properties on Elrod Road north of overpass.
- Requires the existing overpass to be demolished.

Interchange Alternative "C"
- Minimizes the footprint and utilizes as much of existing Elrod Road as possible.
- Minimizes impacts to access to properties along existing Elrod Road in the vicinity of the interchange.
- Creates maintenance of traffic difficulties during construction.

Final cost estimates for the interchange portion of each alternative were generated using preliminary design and right-of-way impacts. The results are as follows:

Table 4.1 - Elrod Road Interchange Project – Cost Estimates*

Item	Alternate A	Alternate B	Alternate C
	($ mil)	($ mil)	($ mil)
Design	0.8	0.8	0.8
Construction	5.6	5.7	7.3
Right-of-Way	2.7	2.0	2.2
Utilities	0.3	0.3	0.3
Total	**9.4**	**8.8**	**10.6**

***Does not include optional improvements to Elrod Road or Smallhouse Road as shown in Figures 4.4, 4.5 or 4.6.**

The corresponding preliminary designs used to estimate each alternative can be found in Appendix H along with the final copy of the estimates.

Additional Intersection Options
The following modifications of the Elrod Road/Smallhouse Road intersection were also considered. Any of the intersection types could be used; however, the traffic model was unable to differentiate any level of service differences between the options.

Continuous Flow from Elrod Road to Smallhouse Road (shown as a roundabout)
- Eliminates the 3-way stop that currently exists.
- Includes a stop sign for one leg of the intersection.
- Favors movements with highest traffic; traffic volumes will determine which leg has to stop.

Four-Way Stop at Elrod Road and Smallhouse Road
- Creates a four-way stop that allows access to the existing south leg of Elrod Road.
- Does not favor any movement.

Continuous Flow from Elrod Road to Smallhouse Road with Smallhouse East Realigned

- Eliminates the 3-way stop that currently exists.
- Includes a stop sign for one leg of the intersection.

Traffic Analysis

GS&P produced a traffic model for the existing system. Once the three alternatives were selected, GS&P also developed a model for each of the three proposed systems that includes the optional tiered improvements. The forecast year for the Bowling Green/Warren County Travel Demand Model used for the Elrod Study was 2030 based on development activity projected for the year 2030 for the metro area. The traffic models included the development of turning movement forecasts, level-of-service analysis and the identification of any additional solutions that would alleviate roadway deficiencies. Because of the close proximity to one another, proposed interchange options A & B would produce no significant impacts to traffic movement when compared to each other. For this reason, only one model was built for options A & B.

GS&P compared the AM design hour, PM design hour and daily turning movement forecasts generated for the two adjacent existing interchanges (at Nashville Road to the west and Interstate 65 to the east) with the projected volumes for the three build alternatives at the Elrod Road Interchange. GS&P also compared traffic impacts for the mainline and adjacent interchanges.

After the model analysis was complete, GS&P presented the results to the project team. In each of the proposed alternatives, a decrease in level-of-service was evident not only on Elrod Road, but also on secondary connector streets in the study area.

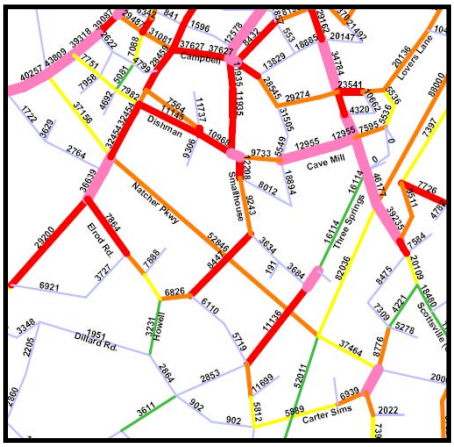


Figure 4.7 - Results of the Existing Model Analysis

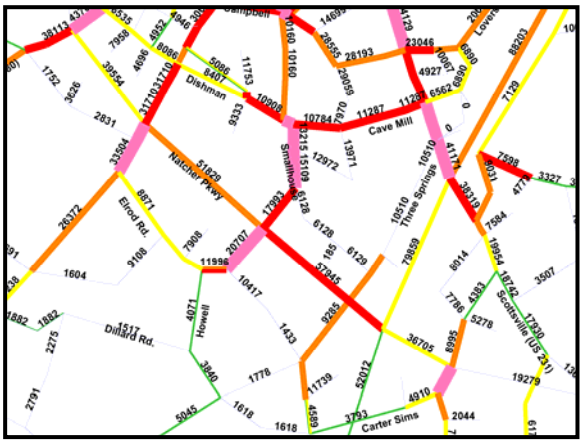
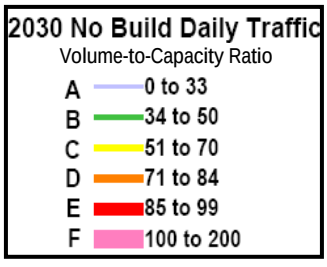


Figure 4.8 - Results of Alternatives A & B



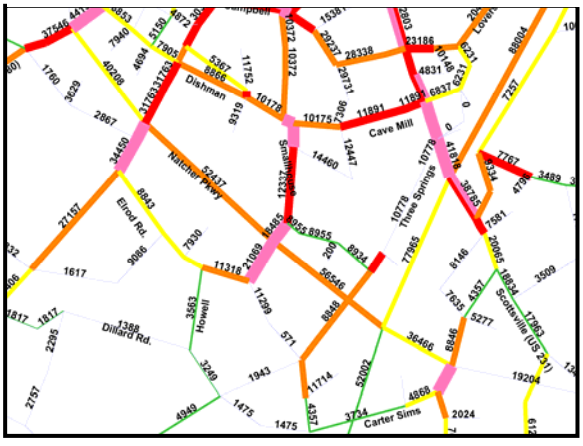


Figure 4.9 - Results of Alternatives C

When comparing the daily traffic assignment for each alternative to the no-build alternative, the following LOS observations are made for the design year of 2030 (more detailed information is included in Table 4.2):

1) The LOS improves on:
    a. Russellville Road (US 68/KY 80) south of the Natcher Parkway.
    b. Three Springs Road (KY 884) between Matlock Road and Smallhouse Road.
    c. Dishman Lane from Nashville Road (US 31W) to Cave Mill Road.
    d. Cave Mill Road from Grinder Pond Road to Scottsville Road (US 231).
    e. Smallhouse Road from Campbell Lane (US 231) to Cave Mill Road.
    f. Elrod Road from Nashville Road (US 31W) to west of Howell Road (due to the proposed improvement of two-lane Elrod Road).
2) The LOS deteriorates on:
    a. Smallhouse Road from Cave Mill Road to Elrod Road (due to increased traffic accessing the new interchange).
    b. Elrod Road from east of Howell Road through the Natcher Parkway Interchange area to Smallhouse Road.

Each of the alternatives increased traffic on Elrod Road by more than 200%. This increase, coupled with the 3-lane section on Elrod Road through the interchange, produced lower LOS at the interchange and along the project corridor. Increases in traffic on Elrod Road also resulted in increases on Smallhouse Road and Cave Mill Road. The intersection of Smallhouse Road and Cave Mill Road is of particular interest because it is currently operating at a low LOS and any increase in traffic resulting from a new interchange at Elrod Road would add to the severity of this problem. The City of Bowling Green is currently studying the intersection.

Results for each of the build alternatives:

- In each of the three alternatives carried forward, severe congestion at the intersection of Smallhouse Road and Cave Mill Road will be exacerbated by an interchange if no other improvements are made at this intersection
- Each of the alternatives will strain the connections for the study area. Namely: Smallhouse Road to Cave Mill Road, Smallhouse Road to Three Springs Road, and Elrod Road west to Nashville Road (US 31W).
- None of the alternatives produced sufficient diversion of traffic on Russellville Road (US 68 / KY 80) or Nashville Road (US 31W) through the Natcher Parkway interchange areas to achieve a minimum acceptable LOS in the year 2030.
- Regardless of the alternatives, the forecasted traffic for the proposed Elrod Road Interchange indicates that the interchange overpass will eventually need to be widened to four through lanes to accommodate 2030 traffic.
- Each of the alternatives provides some relief to Three Springs Road south of Smallhouse Road in the year 2030.
- Alternative “A” resulted in the most effective use of the programmed four-lane improvements to Three Springs Road north of Smallhouse Road.
- Alternative “C” resulted in the least increase in traffic on Smallhouse Road north to Cave Mill Road and it also provided the most relief to the I-65 / US 231 interchange.

Except for the minor comments regarding some slight benefits to surrounding streets contained in the list above, there are no conclusive differences in traffic operation between each of the alternatives. The traffic forecasting report notes this and also suggests that public input be used to further justify the choice of a preferred alternative which would include the three proposed alternatives and the no-build option.

Table 4.2 - Alternatives / No-Build Option ADT and Levels of Service

		Existing	No-Build 2030		Alternative A 2030		Alternative A2 2030		Alternative C 2030	
Route	Termini	Daily Traffic Count (date)	ADT	V/C Ratio	ADT	V/C Ratio	ADT	V/C Ratio	ADT	V/C Ratio
Russellville Road (US 68/KY80)	Memphis Junction Rd. to Natcher Pkwy	22643 ('04)	40257	F	38113	E	37895	E	37546	E
Russellville Road (US 68/KY80)	Natcher Pkwy to Dishman Rd.	23584 ('04)	43809	F	43701	F	42294	F	44192	F
Nashville Road (US 31W)	Memphis Junction Rd. to Natcher Pkwy	11005 ('04)	37860	F	34696	F	34905	F	35661	F
Nashville Road (US 31W)	Natcher Pkwy to Dishman Rd.	18910 ('01)	32454	E	31710	E	31706	E	31763	E
Three Springs Road (KY 884)	Matlock Rd. to Old Smallhouse Road	5193 ('01)	11136	E	9285	D	8862	D	8848	D
Three Springs Road (KY 884)	Old Smallhouse Rd. to New Smallhouse Rd.		12197	F	9084	D	8945	D	10687	E
Three Springs Road (KY 884)	New Smallhouse Rd. to Scottsville Rd. (US 231)	6829 ('01)	16114	B	10510	A	12466	B	10778	A
Dishman Road	Russellville Rd.(US 68) to Nashville Rd. US 31W)	10917 ('03)	8341	C	8187	C	8050	C	8173	C
Dishman Road	Nashville Rd. US 31W) to Cave Mill Rd.	8311 ('04)	11145	E	8407	C	8548	C	8866	D
Cave Mill Road	Dishman Rd. to Smallhouse Rd.	13660 ('02)	10968	E	10908	E	10589	D	10178	D
Cave Mill Road	Smallhouse Rd. to Grinder Pond Rd.	10526 ('03)	9733	D	10784	E	10548	D	10175	D
Cave Mill Road	Grinder Pond Rd. to Scottsville Rd. (US 231)	12569 ('04)	12955	F	11287	E	11708	E	11891	E
Smallhouse Road	Campbell Ln. (US 231) to Cave Mill Rd.	12270 ('03)	11935	E	10160	D	10171	D	10372	D
Smallhouse Road	Cave Mill Rd. to Elrod Road	5951 ('07)	12208	E	15109	F	13835	F	12498	F
Smallhouse Road	Elrod Rd. to Three Springs Rd.	2333 ('07)	3634	A	6129	A	92	A	8955	B
New Smallhouse Road (A2)	Elrod Rd. to Three Springs Rd.						7093	B		
Natcher Parkway	Russellville Rd. (US 68) to Nashville Rd. (US 31W)	16804 ('04)	37156	C	39554	C	39729	C	40208	C
Natcher Parkway	Nashville Rd. (US 31W) to Elrod Road	17341 ('04)	52846	D	51829	D	52082	D	52437	D
Natcher Parkway	Elrod Rd. to I-65	17341 ('04)	52846	D	57945	E	56401	D	56546	D
Natcher Parkway	I-65 to Plano Rd. (KY 662)		37464	C	36705	D	35625	C	36446	C
Natcher Parkway	Plano Rd. (KY 662) to Scottsville Rd. (US 231)		20069	A	19279	A	18575	A	19204	A
Neal Howell Road	Elrod Rd. to Dillard Rd.	2360 ('07)	3231	B	4071	B	4051	B	3563	B
Elrod Road	Nashville Rd. to New Elrod Rd (west of Howell Rd.)	5350 ('07)	7864	E	9226	C	9355	C	9148	C
New Elrod Road	West of Howell Rd. to East of Howell Road		6826	D	11996	D	12045	D	11318	D
New Elrod Road	East of Howell Rd. to Natcher Parkway	3363 ('07)	8447	E	20707	F	21297	F	21069	F
New Elrod Road	Natcher Parkway to Smallhouse Road	3363 ('07)	8447	E	17993	E	17272	E	18485	F
I-65	Natcher Parkway to Scottsville Rd. (US 231)	43800 ('04)	82036	C	79859	C	77320	C	77965	C
Scottsville Road (US 231)	Three Springs Rd. (KY 884) to I-65	37114 ('04)	46177	F	41171	F	42473	F	41818	F
I-65	Scottsville Rd. (US 231) to Cemetery Rd. (KY 234)	45676 ('04)	88000	D	88203	D	88007	D	88004	D
Scottsville Road (US 231)	I-65 to Cumberland Trace (KY 2158)	23938 ('04)	39235	F	38319	E	39411	F	38785	F

4.2 Alternatives Refinement

This section serves as a timeline of events that details the development and refinement of each alternative. Some of the methods employed by the project team to gather public input will be detailed here as well. Complete meeting minutes are included in the Appendices.

LOCAL OFFICIALS MEETING #1 – Held on December 10, 2007

The first local officials meeting was held to introduce the officials to the study area and introduce them to a rough list of milestones for this study. GS&P also presented a draft purpose and need statement.

STAKEHOLDERS MEETING #1 – Held on December 10, 2007

GS&P presented stakeholders with similar information to the information given to local officials. Stakeholders voiced some concerns about existing conditions in the study area. Three teams were formed to help identify problems in the Elrod Road corridor, which were used to develop the purpose for this study. The attendance list, meeting minutes and results from the team activity can be found in Appendix J.

PUBLIC MEETING #1 – Held on February 7, 2008

GS&P further developed the presentation used in the stakeholders meeting to include draft environmental findings, preliminary traffic volumes and crash data. The presentation included environmental considerations, traffic volumes, crash history, draft purpose and need, design considerations, and schedules. Two hundred-and-three people attended and were given the opportunity to participate in an issues exercise. The attendees indicated that their top three concerns were 1) narrow lanes, shoulders, sharp curves, lack of striping and poor visibility (35.3%), 2) too much congestion/increased traffic (33.8%), and 3) lack of access to the Natcher Parkway (17.6%).

LOCAL OFFICIALS MEETING #2 – Held on April 28, 2008

The project team reviewed the inventory of existing conditions at this meeting and the input received from the first public meeting. The top concerns were:

- Too much congestion/increased traffic
- Poor visibility
- Narrow lanes
- Lack of striping
- Narrow shoulders
- Too many driveways
- Sharp curves
- No bike facilities
- Large vehicles (trucks, tractors, RVs)
- No pedestrian facilities
- Lack of access to Natcher Parkway
- Other (see below)
    - Speeding
    - Frequent cracks and potholes
    - Too many traffic lights
    - Traffic lights not in sync
    - Drivers not observing 3-way stop at Smallhouse Road and Elrod Road

Previously, the team decided it would only examine two types of interchanges: diamond interchange and a folded (flop) interchange. They also determined that the alignment should be staged in phases for construction to allow for separate funding sources to apply to different sections.

The practical application of the betterment procedure on the typical sections, often known as "practical solutions", was also formally presented. The project team also informed the local officials of the steps involved in selecting the three alternatives including a no-build alternative. GS&P shared preliminary cost estimates with the public officials as well.

STAKEHOLDERS MEETING #2 – Held on May 8, 2008

GS&P presented the same information to the stakeholders as was presented to the local officials. The team requested that stakeholders provide input on a form that was then used to quickly develop a snapshot of public opinion. GS&P then developed three forms to cover different areas of potential concern. The meeting minutes and attendance list can be found in Appendix J.

PUBLIC MEETING #2 – Held on May 29, 2008

A complete review of the input received from Public Meeting #1, as well as previous Stakeholder meetings, was presented to the public. This was the first opportunity that the public had to see and give input on the alternatives, typical sections and the interchange types. None of the build alternatives were strongly supported by the public as indicated in Figure 4-10. All public input was gathered from attendees and was compiled and presented at the final team meeting held on July 31, 2008. The survey forms that were used as well as the PowerPoint presentations for each of the public meetings can be found in Appendix J.

Elrod Road/Natcher Parkway Interchange Study Exercise Results Public Meeting #2: May 29, 2008				
Step 1: Interchange Alternative	Like the Best	Like Some Aspects	Like the Least	Composite (Percent of Possible Points)
A	19	13	9	30.1%
B	13	17	12	27.8%
C	12	9	36	29.4%
Do Nothing	13	0	0	12.7%
TOTAL RESPONSES	57	39	57	306.0

Figure 4-10 - Results of Public Meeting #2 Exercise

5.0 Recommendations

The *project goals* for the proposed Elrod Road Interchange at Natcher Parkway according to the accepted purpose and need are as follows:

- Meet the needs of rapid residential and commercial growth in southern Bowling Green
- Attempt to alleviate congestion on US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road) by providing additional access to Natcher Parkway
- Improve mobility in the study area network for motorists, pedestrians, bicyclists and transit users
- Improve the safety and efficiency of travel in the Elrod Road / Smallhouse Road area

Utilizing the traffic forecasting analysis and comparing each of the alternatives, GS&P developed a matrix that would give a snapshot of how each alternative compared against all available options, including the no-build option. The method used to compare each alternative was color coded, with GREEN having the most favorable result, YELLOW having moderate results, and RED having poor results. While this system seems very simple, GS&P analyzed the actual assignment of each color very closely by examining information received from the public input efforts or analysis conducted over the course of this preliminary design process.

ELROD ROAD INTERCHANGE PROJECT
EVALUATION FACTORS

Evaluation Factor	No Build	Alt. A	Alt. B	Alt. C	A Intchg.	B Intchg.	C Intchg.
Safety							
Mobility							
Connectivity							
Access							
Disruption to Existing Neighborhoods							
Economic Development							
Property Impacts							
WKU Impacts							
Impacts to Churches							
Impacts to Parks							
Costs							
Impact on New School							
Congestion							
Lane/Shoulder Widths							
Multi-modal							
Public Acceptance							
Constructability							

Table 5.1 – Alternative Evaluation Factors Quick Glance

Ultimately, while the alternatives do meet some of the requirements of the purpose and need, the traffic forecasting report made it clear that a new interchange and associated improvements would adversely impact not only the Elrod Road corridor but also the secondary streets. The benefits that each alternative presented were negated when the effects to the surrounding areas were factored in. The team recommended that a ***no-build*** option be selected due to the data presented above.

The final recommendation for the study includes:

- *No interchange built at this location.*
- *Safety improvements along Smallhouse Road (Spot Improvements) from KY 884 to Cave Mill Road.*
- *An interchange feasibility study for a site on I-65 south of the I-65/Natcher Parkway Interchange.*

The study further advises that the recommendations be implemented in accordance with the schedule below in order to support traffic flow and growth in southern Warren County and increase safety in the study area.

Project & Agency Responsible	Description	Time Frame	Costs
Smallhouse Safety Improvements (Curves) – Warren County	Improve radii at curve near Trinity Freewill Baptist Church and Griffin Park	Immediate (<1 year)	N/A*
Smallhouse/Elrod Intersection Improvement – Warren County	Improve intersection through either a roundabout or by creating a T-intersection with continuous flow from Smallhouse west to Elrod Road. In addition, straighten curve just east of intersection on Smallhouse Road.	Near Term (<5 years)	$100,000 (Design) $400,000 (Right of Way) $100,000 (Utilities) $400,000 (Construction)
I-65 Interchange Feasibility Study – Kentucky Transportation Cabinet	Conduct an interchange feasibility study to improve access to I-65 from Southern Warren County in the general area of the proposed Southwest Parkway.	Near Term (<5 years)	$350,000 (Planning)
Smallhouse Road Widening – City of Bowling Green	Update Smallhouse road to a three-lane section with curb and gutter to allow for left turn lanes.	Mid-Term (5 to 10 years)	$250,000 (Design) $750,000 (Right of Way) $750,000 (Utilities) $2,500,000 (Construction)

*Improvement being done by Holy Spirit Catholic Church as part of the development plans for the new church

Table 5.2 – Recommended Improvements

GS&P anticipated that our third and final public meeting would be held at Griffin Park, but because the no-build option was recommended, the public was informed through the local district Website, local newspaper article and through the flyer in Figure 5.1 that a no-build option was being recommended.

A final stakeholders meeting was held on September 4, 2008 where the recommendation was presented. The project team also tasked the stakeholders with getting this information to their neighbors as another means of information distribution.

Elrod Road/Natcher Parkway Interchange Study

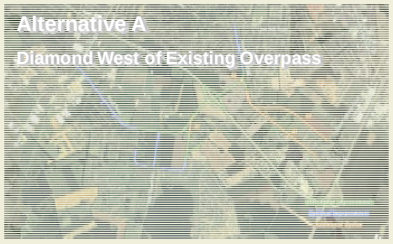
Warren County • Item 3-130.00

Draft Recommendation

Project Purpose

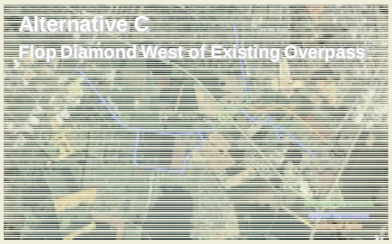
The purpose of this interchange study is to improve the safety and efficiency of travel in the Elrod Road/Smallhouse Road area and to provide better connection for travelers along this existing transportation network to the Natcher Parkway while minimizing disruption to existing neighborhoods .

Comparison of Interchange Options



- Minimizes impacts to properties surrounding the interchange.
- Impacts properties on Smallhouse Road northwest of overpass and WKU.
- Requires connector road(s) to existing Elrod Road.
- Costs $9.2m
- Does not improve congestion
- Preferred by public but only by a small margin.

- Minimizes impacts to properties surrounding the interchange.
- Minimizes non-accessible land on WKU Agricultural Farm.
- Impacts properties on Elrod Road north of overpass.
- Requires the existing overpass to be removed.
- Costs $7.1m
- Does not improve congestion
- Not preferred by public.



- Minimizes the footprint and utilizes as much of the existing Elrod Road as possible.
- Minimizes impacts to access for properties along existing Elrod Road in the vicinity of the interchange.
- Creates maintenance of traffic difficulties during construction.
- Costs $6.8m
- Does not improve congestion.
- Least preferred by public.

PUBLIC MEETING EXERCISE RESULTS
Public Meeting #2: May 29, 2008

Interchange Alternative	Like the Best	Like Some Aspects	Like the Least	Composite (Percent of Possible Points)
A	19	13	9	30.1%
B	13	17	12	27.8%
C	12	9	36	29.4%
Do Nothing	13	0	0	12.7%
Total Responses	57	39	57	306

EVALUATION FACTORS

Evaluation Factor	No Build	Alt. A	Alt. B	Alt. C
1. Purpose and Need	Poor	Fair	Fair	Fair
2. Disruption to Existing Neighborhoods	Good	Fair	Fair	Good
3. Economic Development	Fair	Good	Good	Good
4. Property Impacts	Good	Fair	Poor	Good
5. WKU Impacts	Good	Poor	Fair	Fair
6. Impacts to Churches	Good	Good	Poor	Fair
7. Impacts to Parks	Good	Good	Good	Good
8. Costs	Good	Fair	Fair	Good
9. Impact on New School	Fair	Good	Good	Good
10. Alignment	Fair	Good	Good	Good
11. Lane/Shoulder Widths	Poor	Good	Good	Good
12. Multi-modal	Poor	Fair	Fair	Fair
13. Public Acceptance	Fair	Fair	Fair	Fair
14. Constructability		Good	Fair	Fair

Good Fair Poor

Conclusions

- The alternatives range from $6.8 to $9.2 and would aid in economic development (residential growth) in the area.
- None of the alternatives would reduce traffic congestion in the area.
- Public support for the alternatives was not strong. Parishioners who live outside the area seemed to be the most vocal supporters.
- All alternatives would result in some level of disruption to either homes, WKU or the churches, and Alternatives B and C would be difficult to build while maintaining traffic flow due to removing the existing overpass.
- Development of an interchange would require City/County to complete the road projects on Smallhouse Road and Elrod Road in Study Area first.

Draft Recommendation

- *NO INTERCHANGE BE BUILT AT THIS LOCATION*
- *SAFETY IMPROVEMENTS BE MADE ALONG SMALLHOUSE ROAD*
- *INTERCHANGE FEASIBILITY STUDY BE CONDUCTED FOR SITE SOUTH OF THE I-65/NATCHER PARKWAY*

Figure 5.1 – Recommendation Flyer

Appendix A

FIGURE 10: Alternative A - Year 2030 Daily Traffic

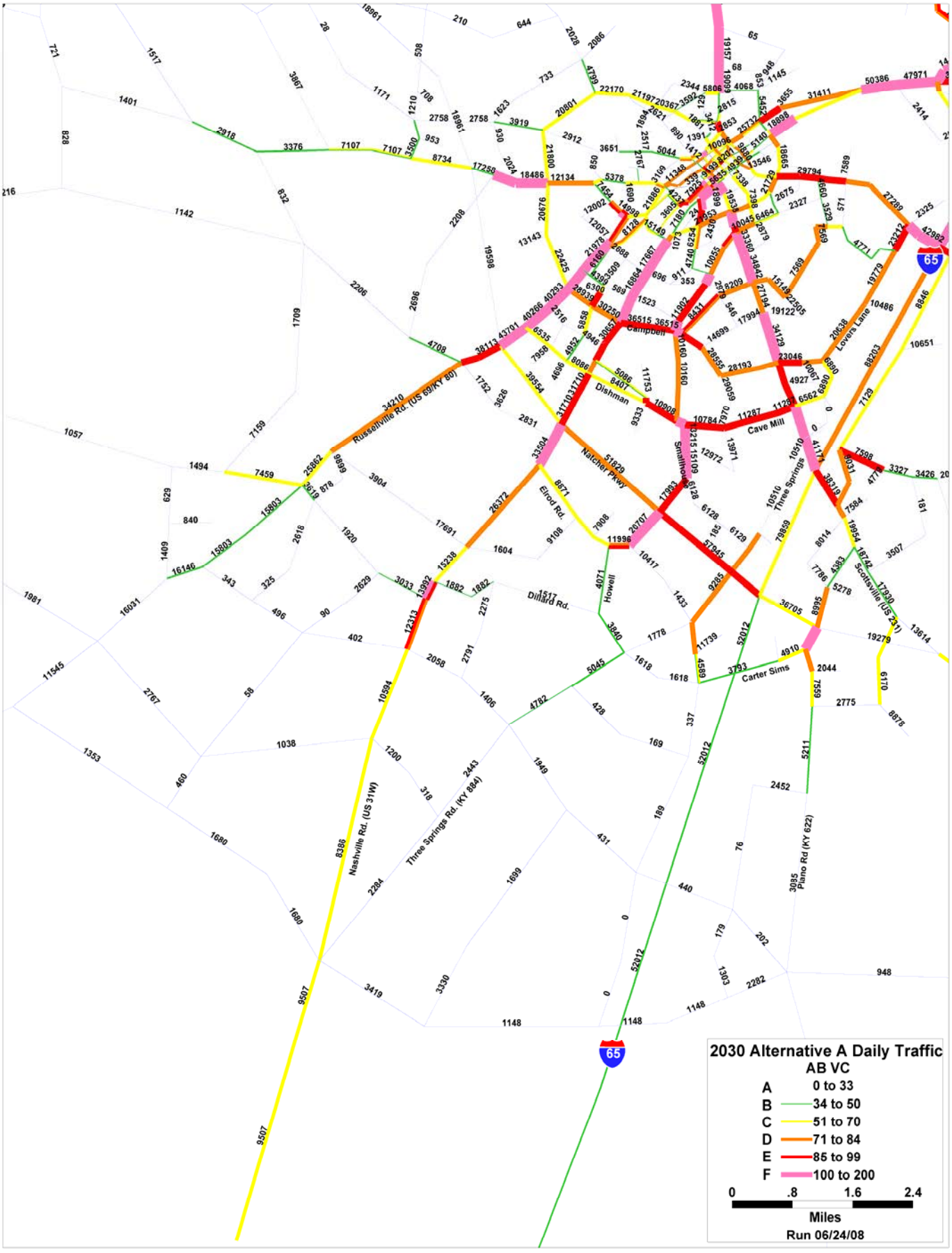


FIGURE 11: Alternative A2 - Year 2030 Daily Traffic

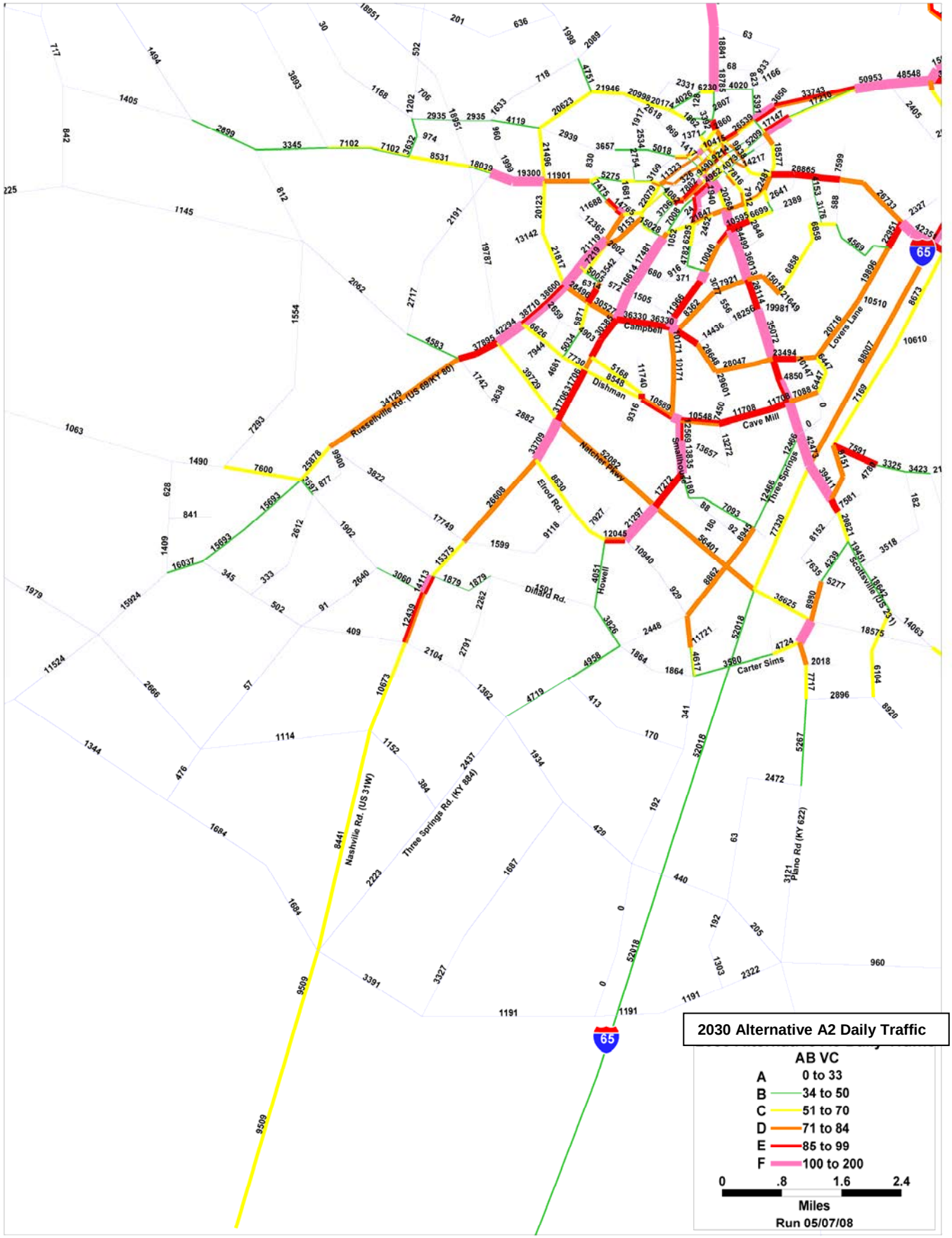
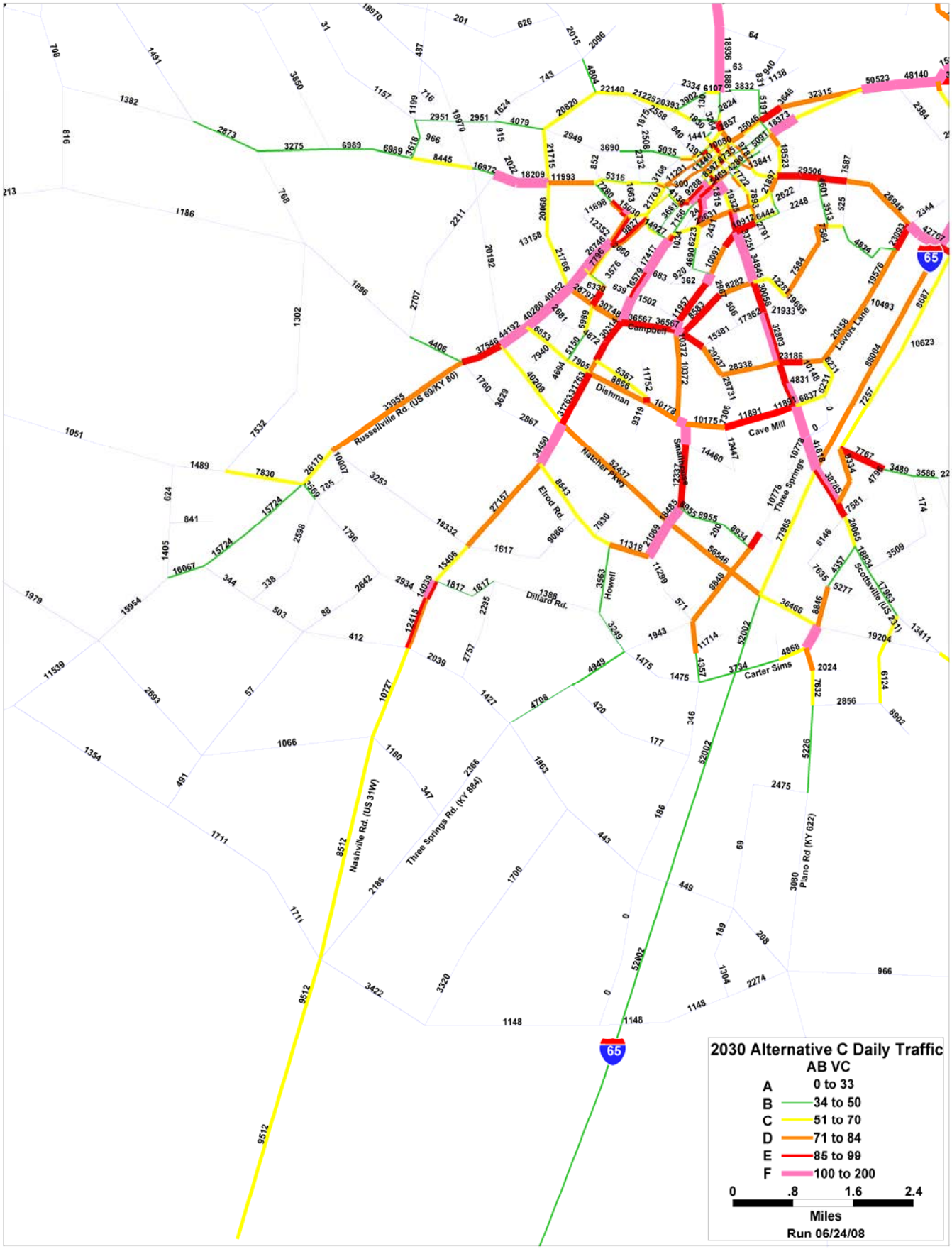


FIGURE 12: Alternative C - Year 2030 Daily Traffic



2007 TRAFFIC VOLUMES AND LEVELS OF SERVICE

ELROD RD AT NATCHER PARKWAY INTERCHANGE STUDY

CAVE MILL RD

NASHVILLE RD

31W

ADT: 13200
(2007 est.)

SEE INSET BELOW
FOR RAMP VOLUMES

ADT: 5951
AM: LOS C
PM: LOS C

LOS
AM: B
PM: A
51/95
37/212
157/70
11/34
263/99
14/11

WILLIAM H. NATCHER PKWY

SMALLHOUSE RD

LOS*
AM: C
PM: B
511/683
115/263
333/120
60/33
688/440
31/27

ADT: 19450

ELROD RD

728 (A) / 706 (A)

754 (A) / 874 (A)

ADT: 2333
AM: LOS B
PM: LOS B

SMALLHOUSE RD

THREE SPRINGS RD

65

ADT: 2930*

ADT: 3363*
AM: LOS B
PM: LOS B

LOS
AM: B
PM: B
4/5
1/2
3/7
4/8
56/103
34/81
3/4
87/57
17/40
120/44
0/1
40/26

NEAL HOWELL RD

884

SEE INSET ABOVE
FOR RAMP VOLUMES

NEAL HOWELL RD

DIVERGE LOS:
A / A
598/564
629/659
130/142
125/215

DIVERGE LOS:
A / A
328/254
400/452
432/455
322/419

MERGE LOS:
A / B

* SOURCE: "ELROD ROAD ELEMENTARY SCHOOL"
TRAFFIC IMPACT STUDY BY BWSC, OCT. 2007.

LEGEND

← AM peak hour/
PM peak hour

N

0 400 800 1600

SCALE IN FEET

KENTUCKY TRANSPORTATION CABINET

GS&P
GRESHAM SMITH AND PARTNERS

2037 ESTIMATED TRAFFIC VOLUMES AND LEVELS OF SERVICE

ELROD RD AT NATCHER PARKWAY INTERCHANGE STUDY

SEE INSET BELOW FOR RAMP VOLUMES

NASHVILLE RD

ADT: 21250 vpd

31W

ELROD RD

*LOS: E / D

823/1100
185/423
506/182
91/50
1108/708
50/43

2028 (LOS C) / 2351 (LOS C)

WILLIAM H. NATCHER PKWY

1958 (LOS C) / 1899 (LOS C)

SMALLHOUSE RD

LOS: B / B

78/144
56/322
239/106
17/52
400/150
21/17

SMALLHOUSE RD

ADT: 5112 vpd*

ELROD RD

ADT: 4454 vpd*

NEAL HOWELL RD

*LOS: F / C

90/5
9/3
26/30
68/99
182/137
50/59
6/47
182/135
27/96
182/67
23/5
143/108

NEAL HOWELL RD

884

THREE SPRINGS RD

65

SEE INSET ABOVE FOR RAMP VOLUMES

MERGE LOS: A / A

1609/1517
350/382
1692/1773
336/578

DIVERGE LOS: B / B

DIVERGE LOS: B / B

882/683
1076/1216
1162/1224
866/1127

MERGE LOS: C / C

*NOTE: ADT VALUES FOR ELROD RD AND LOS VALUES FOR ELROD RD AT US 31 AND ELROD RD AT NEAL HOWELL RD ARE BASED ONTHE "ELROD ROAD ELEMENTARY SCHOOL" TRAFFIC IMPACT STUDY BY BWSC, OCT.2007.

LEGEND

LOS: AM peak hour / PM peak hour

AM peak hour / PM peak hour

N

0 400 800 1600

SCALE IN FEET

KENTUCKY TRANSPORTATION CABINET

GS&P

GRESHAM SMITH AND PARTNERS

FIGURE 1: NEW TRAVEL ANALYSIS ZONES

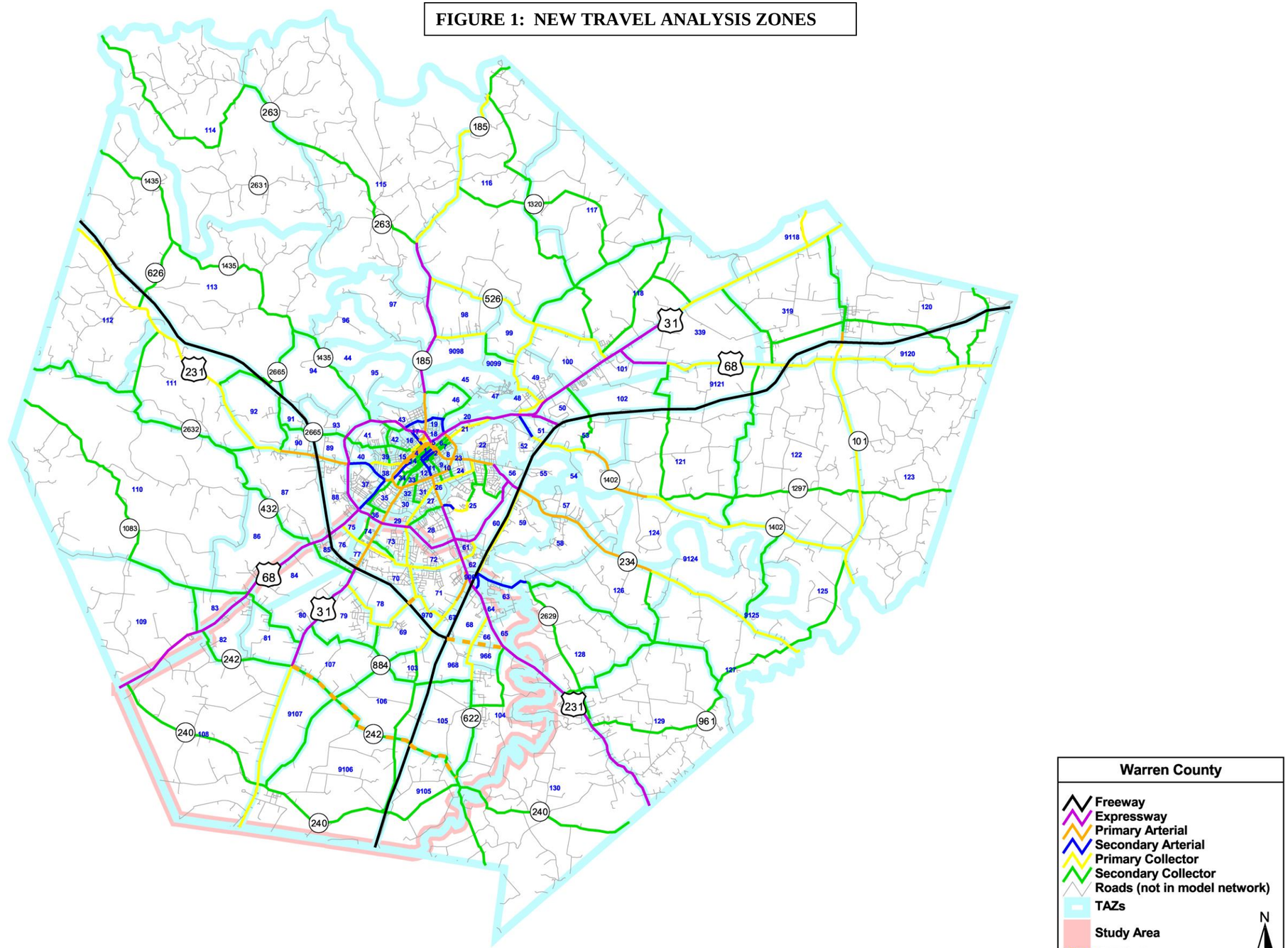


FIGURE 2: 2000-2030 POPULATION CHANGE

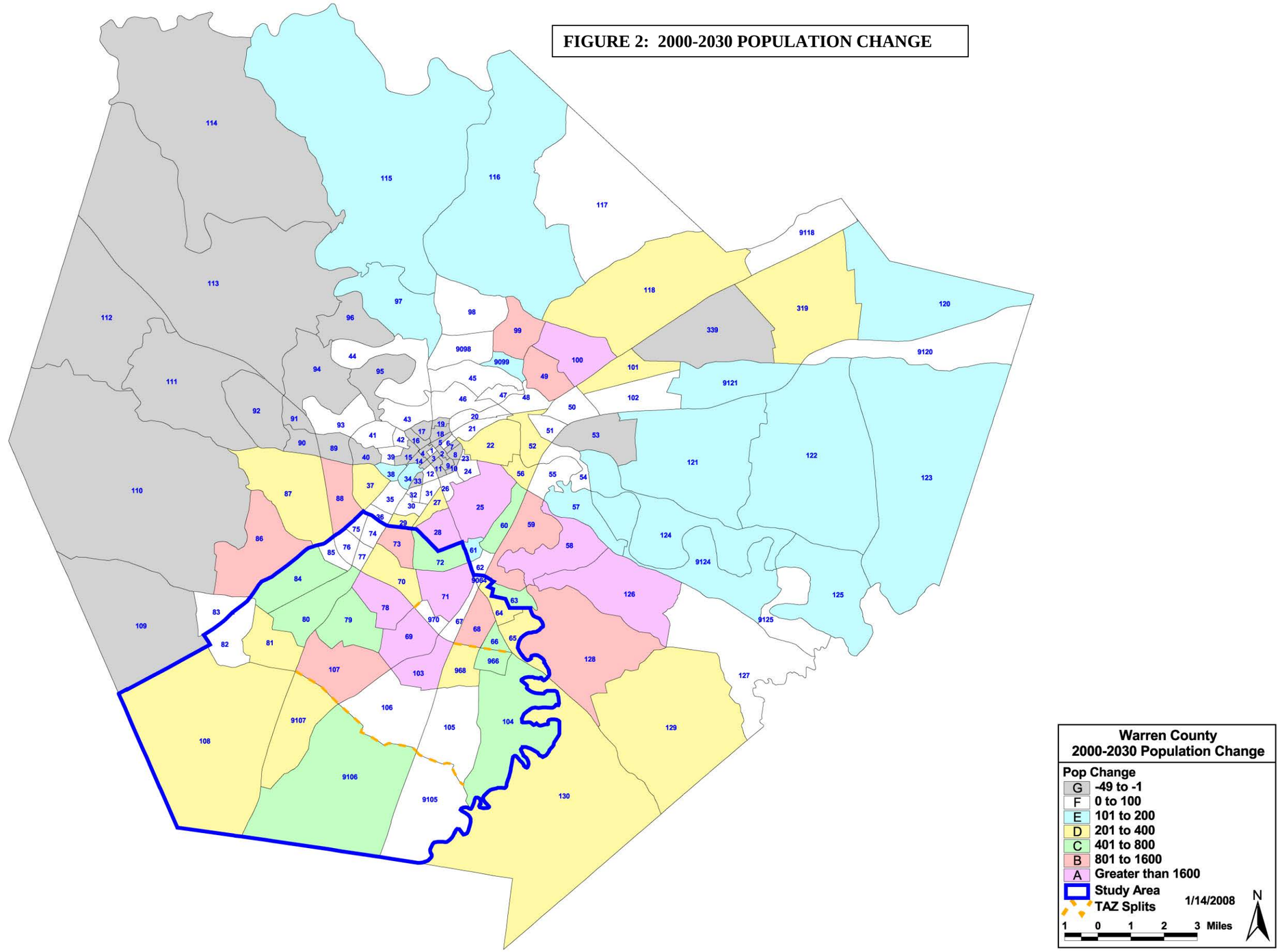
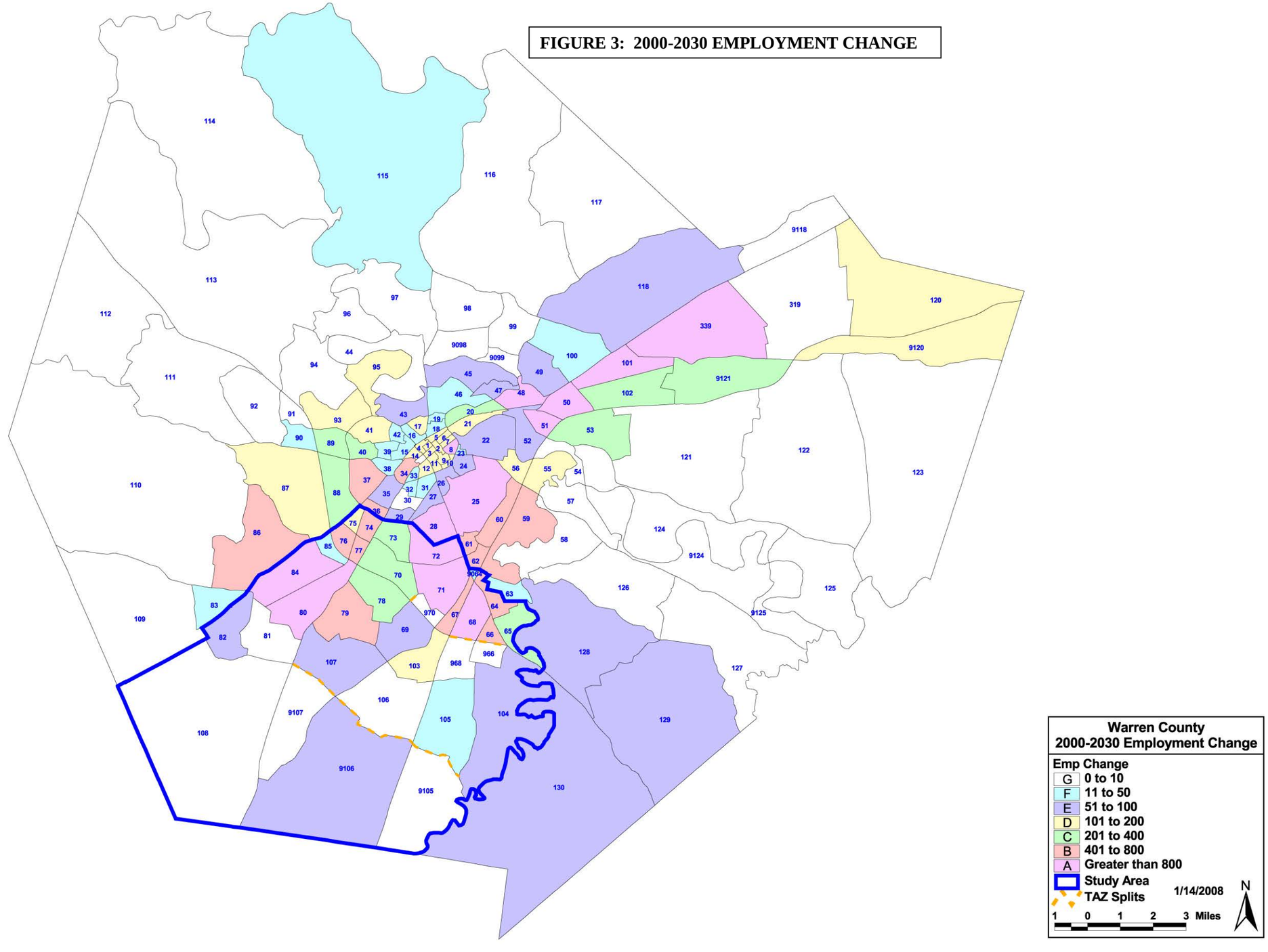


FIGURE 3: 2000-2030 EMPLOYMENT CHANGE



Warren County
Population/Employment Forecast TAZ Data by TAZ -- Year 2000 and Year 2030

TAZ_ID	2000 Population	2000 Group Quarters	2000 Household Population	2000 Households	2000 Housing Units	TAZ_ID	2000 POP	2000 Employment COMM	2000 Employment IND	2000 Employment PUB	2000 Employment TOTAL
1	406	403	3	3	4	1	406	568	17	525	1110
2	364	7	357	121	133	2	364	568	25	79	672
3	68	0	68	37	43	3	68	583	112	406	1101
4	493	12	481	302	350	4	493	142	0	204	346
5	85	6	79	24	26	5	85	322	190	293	805
6	90	0	90	50	67	6	90	340	63	147	550
7	278	0	278	125	139	7	278	639	33	0	672
8	528	249	279	175	182	8	528	2087	28	45	2160
9	221	0	221	103	126	9	221	144	43	2	189
10	80	0	80	46	48	10	80	490	256	2	748
11	620	0	620	326	400	11	620	739	25	14	778
12	915	42	873	462	536	12	915	553	38	19	610
13	490	37	453	239	269	13	490	11	0	0	11
14	976	121	855	397	482	14	976	109	4	47	160
15	1778	0	1778	685	776	15	1778	243	10	22	275
16	584	0	584	193	222	16	584	210	204	0	414
17	844	74	770	259	289	17	844	901	809	0	1710
18	385	0	385	166	170	18	385	120	128	81	329
19	712	0	712	270	284	19	712	276	0	0	276
20	0	0	0	0	0	20	0	181	351	0	532
21	363	12	351	144	170	21	363	152	171	7	330
22	1442	0	1442	604	637	22	1442	279	59	7	345
23	277	0	277	156	167	23	277	327	11	0	338
24	718	0	718	334	353	24	718	676	37	24	737
25	3461	0	3461	1457	1576	25	3461	2206	240	325	2771
26	590	0	590	300	312	26	590	302	45	0	347
27	879	68	811	376	401	27	879	518	35	0	553
28	1317	25	1292	669	758	28	1317	3550	196	150	3896
29	258	33	225	83	85	29	258	110	0	0	110
30	503	0	503	214	224	30	503	10	0	0	10
31	1207	0	1207	585	624	31	1207	403	52	90	545
32	346	0	346	159	167	32	346	73	9	0	82
33	432	59	373	189	208	33	432	99	7	0	106
34	4231	3809	422	208	240	34	4231	166	6	2157	2329
35	1466	0	1466	637	666	35	1466	394	80	17	491
36	173	48	125	46	58	36	173	275	38	5	318
37	3813	6	3807	1730	1949	37	3813	857	522	351	1730
38	1200	3	1197	519	566	38	1200	143	10	45	198
39	1052	0	1052	441	461	39	1052	39	13	0	52
40	300	16	284	105	116	40	300	53	7	70	130
41	853	0	853	359	378	41	853	10	2	0	12
42	722	0	722	238	248	42	722	27	0	0	27
43	821	3	818	320	337	43	821	339	140	128	607
44	100	0	100	36	48	44	100	19	2	0	21
45	37	0	37	12	12	45	37	24	2	0	26
46	85	0	85	34	36	46	85	71	7	2	80
47	15	0	15	3	5	47	15	80	0	0	80
48	227	0	227	89	93	48	227	176	863	97	1136
49	1051	0	1051	406	434	49	1051	57	17	0	74
50	57	0	57	26	27	50	57	157	1264	0	1421
51	0	0	0	0	0	51	0	528	270	0	798
52	613	58	555	211	259	52	613	235	127	0	362
53	391	9	382	144	154	53	391	56	7	0	63
54	4	0	4	3	4	54	4	0	0	0	0
55	99	0	99	35	35	55	99	0	4	0	4
56	157	0	157	65	70	56	157	0	0	0	0
57	472	0	472	177	184	57	472	2	2	0	4
58	707	0	707	244	250	58	707	15	6	0	21
59	1018	0	1018	392	408	59	1018	47	6	92	145
60	181	0	181	96	104	60	181	484	520	0	1004
61	1088	0	1088	504	573	61	1088	1327	324	7	1658
62	958	106	852	458	536	62	958	596	69	0	665
63	470	0	470	142	147	63	470	87	109	0	196
64	322	0	322	121	127	64	322	348	402	0	750
65	111	0	111	44	47	65	111	95	99	0	194
66	286	0	286	110	115	66	286	34	28	0	62
67	199	0	199	75	75	67	199	384	13	25	422
68	648	193	455	185	191	68	648	868	102	257	1227
69	570	0	570	212	230	69	570	2	0	0	2
70	1810	5	1805	714	764	70	1810	220	6	47	273
71	3286	0	3286	1381	1497	71	3286	849	13	45	907
72	2063	53	2010	826	871	72	2063	4313	174	86	4573
73	1850	38	1812	752	774	73	1850	281	10	0	291
74	912	0	912	382	468	74	912	566	950	0	1516
75	22	0	22	12	14	75	22	352	345	0	697
76	14	0	14	8	10	76	14	290	992	0	1282
77	57	0	57	30	63	77	57	57	386	111	554
78	83	0	83	34	34	78	83	7	2	62	71
79	974	0	974	331	338	79	974	201	489	0	690
80	373	0	373	144	159	80	373	429	1702	0	2131
81	449	0	449	163	169	81	449	13	10	0	23
82	593	0	593	231	252	82	593	18	51	78	147
83	130	0	130	50	51	83	130	5	0	0	5
84	452	0	452	172	176	84	452	56	2	0	58
85	763	6	757	289	296	85	763	79	93	0	172
86	552	0	552	216	223	86	552	17	40	0	57
87	818	8	810	301	316	87	818	40	37	2	79
88	1783	0	1783	696	755	88	1783	216	119	97	432
89	114	0	114	49	49	89	114	18	233	0	251
90	265	0	265	101	103	90	265	10	0	0	10
91	207	0	207	74	87	91	207	7	0	0	7
92	366	0	366	140	143	92	366	4	4	0	8
93	140	0	140	51	56	93	140	18	279	0	297
94	240	0	240	92	99	94	240	11	4	0	15
95	37	0	37	18	19	95	37	0	300	0	300
96	17	0	17	8	9	96	17	0	0	0	0
97	467	0	467	169	196	97	467	2	4	0	6
98	664	0	664	246	252	98	664	49	2	0	51
99	157	0	157	61	67	99	157	0	0	0	0
100	464	0	464	179	188	100	464	21	0	98	119
101	1324	0	1324	540	659	101	1324	382	599	0	981
102	33	0	33	12	13	102	33	0	0	0	0
103	167	0	167	55	59	103	167	2	7	0	9
104	1903	0	1903	681	692	104	1903	29	19	0	48
105	560	0	560	209	215	105	560	15	63	0	78
106	107	0	107	44	45	106	107	0	0	0	0
107	364	0	364	133	141	107	364	46	13	73	132
108	962	0	962	364	387	108	962	23	96	0	119
109	643	0	643	233	249	109	643	10	11	0	21
110	1044	0	1044	386	404	110	1044	14	9	0	23
111	747	0	747	269	277	111	747	2	23	0	25
112	397	0	397	153	162	112	397	13	6	0	19
113	708	0	708	260	283	113	708	8	11	0	19
114	599	0	599	216	235	114	599	7	9	0	16
115	1337	0	1337	506	547	115	1337	69	58	70	197
116	1080	0	1080	397	414	116	1080	19	4	0	23
117	866	0	866	312	330	117	866	6	47	0	53
118	1485	0	1485	535	592	118	1485	106	39	268	413
119						119	Split into TAZ 319 and 339				
120	806	0	806	312	340	120	806	275	62	9	346
121	650	0	650	254	267	121	650	60	19	0	79
122	771	0	771	287	307	122	771	22	47	0	69
123	866	0	866	322	346	123	866	11	8	0	19
124	156	0	156	61	67	124	156	10	0	0	10
125	185	0	185	73	75	125	185	0	0	0	0
126	503	0	503	193	201	126	503	18	28	0	46
127	310	0	310	122	126	127	310	4	0	0	4
128	717	0	717	259	273	128	717	9	9	0	18
129	1275	0	1275	463	486	129	1275	16	8	7	31
130	1770	0	1770	656	695	130	1770	52	85	74	211
319	621	2	619	231	248	319	621	99	19	58	176
339	245	0	245	98	104	339	245	0	0	0	0
966	222	0	222	85	89	966	222	0	0	0	0
968	108	0	108	44	45	968	108	0	25	0	25
970	41	0	41	14	15	970	41	0	0	0	0
9064	0	0	0	0	0	9064	0	79	0	7	86
9098	223	0	223	84	85	9098	223	0	0	0	0
9099	152	0	152	51	55	9099	152	4	0	0	4
9105	400	0	400	145	155	9105	400	0	0	0	0
9106	793	48	745	290	312	9106	793	57	125	0	182
9107	131	0	131	54	56	9107	131	0	0	0	0
9118	51	0	51	20	24	9118	51	2	6	125	133
9120	284	0	284	102	114	9120	284	0	7	0	7
9121	247	0	247	104	109	9121	247	4	0	0	4
9124	275	0	275	112	118	9124	275	51	11	0	62
9125	65	0	65	24	25	9125	65	0	0	0	0
TOTALS	92522	5569	86963	35365	38350	TOTALS	92522	35599	15979	7059	58637

TAZ_ID	2030 Population	2030 Group Quarters	2030 Household Population	2030 Households	2030 Housing Units	2030 POP	2030 Employment COMM	2030 Employment IND	2030 Employment PUB	2030 Employment TOTAL	2000-2030 Change POP	Change Employment COMM	Change Employment IND	Change Employment PUB	Change Employment TOTAL	TAZ Area Square Miles	2000 Housing Units per Acre	2030 Housing Units per Acre
1	406	403	3	3	6	406	568	17	673	1258	0	0	0	148	148	0.0495	0.126	0.189
2	362	7	355	128	144	362	568	25	218	811	-2	0	0	139	139	0.0784	2.651	2.870
3	67	0	67	39	49	67	583	112	561	1256	-1	0	0	155	155	0.0701	0.958	1.092
4	452	12	440	294	344	452	152	0	330	482	-41	10	0	126	136	0.0917	5.964	5.862
5	80	6	74	24	29	80	322	190	434	946	-5	0	0	141	141	0.1077	0.377	0.421
6	93	0	93	55	77	93	377	63	238	678	3	37	0	91	128	0.0918	1.140	1.311
7	276	0	276	132	150	276	772	33	50	855	-2	133	0	50	183	0.0831	2.614	2.820
8	514	249	265	177	187	514	3445	28	73	3546	-14	1358	0	28	1386	0.1447	1.965	2.019
9	214	0	214	106	133	214	303	43	3	349	-7	159	0	1	160	0.1185	1.661	1.754
10	77	0	77	47	52	77	637	256	3	896	-3	147	0	1	148	0.0733	1.023	1.108
11	595	0	595	333	412	595	739	25	162	926	-25	0	0	148	148	0.1466	4.263	4.391
12	1011	42	969	546	637	1011	568	38	168	774	96	15	0	149	164	0.1794	4.668	5.548
13	454	37	417	234	267	454	16	0	0	16	-36	5	0	0	5	0.0525	8.006	7.946
14	965	121	844	417	510	965	244	4	76	324	-11	135	0	29	164	0.1185	6.355	6.725
15	1768	0	1768	725	825	1768	256	10	36	302	-10	13	0	14	27	0.2848	4.257	4.526
16	552	0	552	194	226	552	226	204	0	430	-32	16	0	0	16	0.2150	1.613	1.642
17	837	74	763	273	308	837	991	849	50	1890	-7	90	40	50	180	0.2485	1.817	1.937
18	379	0	379	174	181	379	120	128	101	349	-6	0	0	20	20	0.1962	1.354	1.441
19	701	0	701	283	301	701	290	0	0	290	-11	14	0	0	14	0.1220	3.637	3.855
20	0	0	0	0	0	0	312	481	0	793	0	131	130	0	261	0.5987	0.000	0.000
21	440	12	428	187	224	440	291	191	11	493	77	139	20	4	163	0.5086	0.522	0.688
22	1736	0	1736	774	820	1736	341	59	11	411	294	62	0	4	66	1.7690	0.563	0.724
23	317	0	317	190	207	317	338	11	0	349	40	11	0	0	11	0.0604	4.320	5.355
24	735	0	735	364	388	735	759	37	39	835	17	83	0	15	98	0.3505	1.574	1.730
25	8826	0	8826	3954	4280	8826	2709	390	525	3624	5365	503	150	200	853	3.0863	0.798	2.167
26	610	0	610	330	346	610	368	45	25	438	20	66	0	25	91	0.3353	1.454	1.612
27	1118	68	1050	518	556	1118	566	35	25	626	239	48	0	25	73	0.4271	1.467	2.034
28	2927	25	2902	1599	1815	2927	4283	196	242	4721	1610	733	0	92	825	1.0499	1.128	2.701
29	642	33	609	239	248	642	202	0	0	202	384	92	0	0	92	0.3008	0.442	1.288
30	561	0	561	254	269	561	19	0	0	19	58	9	0	0	9	0.3861	0.907	1.089
31	1272	0	1272	656	703	1272	403	52	138	593	65	0	0	48	48	0.3072	3.174	3.576
32	391	0	391	191	204	391	89	9	0	98	45	16	0	0	16	0.1556	1.677	2.049
33	413	59	354	191	213	413	110	7	0	117	-19	11	0	0	11	0.1189	2.733	2.799
34	4377	3750	627	329	383	4377	166	6	2781	2953	146	0	0	624	624	0.3268	1.147	1.831
35	1546	0	1546	715	751	1546	480	80	27	587	80	86	0	10	96	0.5929	1.755	1.979
36	262	48	214	84	109	262	932	38	8	978	89	657	0	3	660	0.2535	0.357	0.672
37	4086	6	4080	1973	2226	4086	1380	522	567	2469	273	523	0	216	739	1.0567	2.882	3.291
38	1331	3	1328	613	672	1331	143	10	79	232	131	0	0	34	34	0.3159	2.800	3.324
39	1087	0	1087	485	510	1087	68	13	0	81	35	29	0	0	29	0.2841	2.535	2.805
40	283	16	267	105	119	283	306	7	113	426	-17	253	0	43	296	0.5081	0.357	0.366
41	882	0	882	395	419	882	183	2	0	185	29	173	0	0	173	0.8193	0.721	0.799
42	747	0	747	262	276	747	54	0	0	54	25	27	0	0	27	0.2199	1.762	1.961
43	913	3	910	379	402	913	339	140	187	666	92	0	0	59	59	1.0479	0.502	0.599
44	159	0	159	61	85	159	19	2	0	21	59	0	0	0	0	3.0063	0.025	0.044
45	119	0	119	41	44	119	99	2	0	101	82	75	0	0	75	1.7671	0.011	0.039
46	108	0	108	46	52	108	84	7	3	94	23	13	0	1	14	1.2404	0.045	0.066
47	61	0	61	13	25	61	158	0	0	158	46	78	0	0	78	0.4344	0.018	0.090
48	254	0	254	106	114	254	679	1123	157	1959	27	503	260	60	823	0.7985	0.182	0.223
49	2102	0	2102	864	927	2102	117	17	0	134	1051	60	0	0	60	1.4928	0.454	0.970
50	74	0	74	36	41	74	319	2064	0	2383	17	162	800	0	962	1.0734	0.039	0.060
51	0	0	0	0	0	0	1347	330	0	1677	0	819	60	0	879	0.5456	0.000	0.000
52	849	58	791	320	396	849	319	137	0	456	236	84	10	0	94	1.0597	0.382	0.584
53	368	9	359	144	157	368	321	7	0	328	-23	265	0	0	265	2.4903	0.097	0.099
54	29	0	29	23	34	29	0	0	0	0	25	0	0	0	0	0.7823	0.008	0.068
55	114	0	114	43	46	114	188	4	0	192	15	188	0	0	188	1.1688	0.047	0.061
56	456	0	456	201	220	456	150	0	0	150	299	150	0	0	150	0.5397	0.203	0.637
57	621	0	621	248	261	621	6	2	0	8	149	4	0	0	4	1.8875	0.152	0.216
58	2538	0	2538	932	958	2538	17	6	0	23	1831	2	0	0	2	3.0993	0.126	0.483
59	2047	0	2047	839	877	2047	651	6	149	806	1029	604	0	57	661	2.7385	0.233	0.500
60	941	0	941	531	579	941	964	570	0	1534	760	480	50	0	530	1.0064	0.161	0.899
61	1248	0	1248	609	691	1248	1760	324	11	2095	160	433	0	4	437	0.3053	2.933	3.536
62	1041	106	935	535	629	1041	1115	69	0	1184	83	519	0	0	519	0.3350	2.500	2.934
63	1173	0	1173	377	394	1173	121	109	0	230	703	34	0	0	34	0.6160	0.373	0.999
64	603	0	603	241	256	603	669	442	50	1161	281	321	40	50	411	0.6618	0.300	0.604
65	422	0	422	178	193	422	344	99	0	443	311	249	0	0	249	1.1466	0.064	0.263
66	812	0	812	332	349	812	467	28	0	495	526	433	0	0	433	0.4035	0.445	1.350
67	212	0	212	85	88	212	931	13	40	984	13	547	0	15	562	0.5541	0.211	0.248
68	1709	193	1516	656	679	1709	1222	283	257	1742	1061	354	161	0	515	1.2316	0.242	0.861
69	3696	0	3696	1463	1591	3696	93	0	0	93	3126	91	0	0	91	1.8870	0.190	1.317
70	1947	5	1942	815	875	1947	450	6	71	527	137	230	0	24	254	1.5530	0.769	0.881
71	6059	0	6059	2710	2941	6059	1743	13	68	1824	2773	894	0	23	917	1.9805	1.181	2.320
72	2767	53	2714	1187	1255	2767	5230	174	127	5531	704	917	0	41	958	1.2858	1.058	1.525
73	2814	38	2776	1226	1265	2814	551	10	0	561	964	270	0	0	270	0.9324	1.297	2.120
74	947	0	947	422	520	947	1165	1045	0	2210	35	599	95	0	694	0.4695	1.558	1.731
75	24	0	24	14	20	24	494	375	0	869	2	142	30	0	172	0.2767	0.079	0.113
76	18	0	18	11	17	18	715	1022	0	1737	4	425	30	0	455	0.5229	0.030	0.051
77	77	0	77	43	94	77	351	426	111	888	20	294	40	0	334	0.3038	0.324	0.483
78	2003	0	2003	873	876	2003	223	2	122	347	1920	216	0	60	276	1.6992	0.031	0.806
79	1698	0	1698	614	630	1698	540	669	0	1209	724	339	180	0	519	2.3114	0.228	0.426
80	1163	0	1163	478	531	1163	933	3102	0	4035	790	504	1400	0	1904	2.4789	0.100	0.335
81	815	0	815	315	330	815	18	10	0	28	366	5	0	0	5	2.0939	0.126	0.246
82	649	0	649	269	297	649	22	51	126	199	56	4	0	48	52	1.8141	0.217	0.256
83	213	0	213	87	92	213	20	0	0	20	83	15	0	0	15	1.2227	0.065	0.118
84	1217	0	1217	493	508	1217	1028	352	0	1380	765	972	350	0	1322	2.5663	0.107	0.309
85	806	6	800	325	336	806	125	93	0	218	43	46	0	0	46	0.4277	1.081	1.227
86	1988	0	1988	828	858	1988	471	44	0	515	1436	454	4	0	458	4.6988	0.074	0.285
87	1186	8	1178	466	493	1186	178	41	3	222	368	138	4	1	143	5.3038	0.093	0.145
88	3156	0	3156	1311	1425	3156	417	129	157	703	1373	201	10	60	271	1.7109	0.690	1.301
89	107	0	107	49	52	107	296	233	0	529	-7	278	0	0	278	0.7940	0.096	0.102
90	249	0	249	101	106	249	22	0	0	22	-16	12	0	0	12	0.6721	0.239	0.246
91	195	0	195	74	90	195	7	0	0	7	-12	0	0	0	0	0.5728	0.237	0.246
92	344	0	344	140	146	344	9	4	0	13	-22	5	0	0	5	3.1092	0.072	0.073
93	144	0	144	56	65	144	113	319	0	432	4	95	40	0	135	1.6503	0.053	0.062
94	226	0	226	92	102	226	11	4	0	15	-14	0	0	0	0	3.6292	0.043	0.044
95	35	0	35	18	22	35	120	330	0	450	-2	120	30	0	150	1.7923	0.017	0.019
96	16	0	16	8	12	16	0	0	0	0	-1	0	0	0	0	2.2131	0.006	0.008
97	613	0	613	236	277	613	7	4	0	11	146	5	0	0	5	4.1419	0.074	0.104
98	713	0	713	281	291	713	49	2	0	51	49	0	0	0	0	2.8076	0.140	0.162
99	1253	0	1253	518	572	1253	2	0	0	2	1096	2	0	0	2	1.7411	0.060	0.513
100	2129	0	2129	874	921	2129	21	0	141	162	1665	0	0	43	43	2.5789	0.114	0.558
101	1670	0	1670	725	888	1670	2200	899	238	3337	346	1818	300	238	2356	1.7935	0.574	0.774
102	67	0	67	26	31	67	268	0	0	268	34	268	0	0	268	2.3496	0.009	0.021
103	3167	0	3167	1083	1165	3167	152	7	0	159	3000	150	0	0	150	1.5392	0.060	1.183
104	2686	0	2686	1023	1043	2686	99	19	0	118	783	70	0	0	70	6.7700	0.160	0.241
105	706	0	706	277	292	706	40	63	0	103	146	25	0	0	25	3.8200	0.088	0.119
106	972	0	972	406	436	972	0	0	0	0	865	0	0	0	0	4.0463	0.017	0.168
107	1311	0	1311	527	558	1311	68	13	73	154	947	22	0	0	22	3.3915	0.065	0.257
108	1227	0	1227	494	529	1227	25	96	0	121	265	2	0	0	2	18.8155	0.032	0.044
109	604	0	604	233	252	604	10	11	0	21	-39	0	0	0	0	10.6866	0.036	0.037
110	1006	0	1006	396	418	1006	14	9	0	23	-38	0	0	0	0	31.7864	0.020	0.021
111	702	0	702	269	280	702	2	23	0	25	-45	0	0	0	0	8.7746	0.049	0.050
112	373	0	373	153	165	373	15	6	0	21	-24	2	0	0	2	10.9600	0.023	0.024
113	665	0	665	260	286	665	8	11	0	19	-43	0	0	0	0	29.6963	0.015	0.015
114	563	0	563	216	238	563	7	9	0	16	-36	0	0	0	0	26.6913	0.014	0.014
115	1492	0	1492	601	653	1492	69	58	95	222	155	0	0	25	25	33.1386	0.026	0.031
116	1196	0	1196	468	491	1196	21	4	0	25	116	2	0	0	2	20.7523	0.031	0.037
117	876	0	876	336	359	876	6	47	0	53	10	0	0	0	0	12.5321	0.041	0.045
118	1794	0	1794	688	765	1794	106	39	343	488	309	0	0	75	75	11.8394	0.078	0.101
119						Split into TAZ 319 and 339				0	Split into TAZ 319 and 339							
120	915	0	915	377	414	915	428	62	15	505	109	153	0	6	159	9.5541	0.056	0.068
121	796	0	796	331	351	796	60	19	0	79	146	0	0	0	0	11.7468	0.036	0.047
122	901	0	901	357	385	901	31	47	0	78	130	9	0	0	9	17.6298	0.027	0.034
123	1016	0	1016	402	435	1016	11	8	0	19	150	0	0	0	0	22.6630	0.024	0.030
124	308	0	308	128	144	308	10	0	0	10	152	0	0	0	0	7.0023	0.015	0.032
125	331	0	331	139	146	331	0	0	0	0	146	0	0	0	0	6.0215	0.019	0.038
126	2319	0	2319	947	990	2319	18	28	0	46	1816	0	0	0	0	5.6713	0.055	0.273
127	325	0	325	136	144	325	4	0	0	4	15	0	0	0	0	7.9947	0.025	0.028
128	1941	0	1941	746	790	1941	89	9	0	98	1224	80	0	0	80	8.6017	0.050	0.144
129	1555	0	1555	601	634	1555	84	8	11	103	280	68	0	4	72	14.4822	0.052	0.068
130	2104	0	2104	830	883	2104	81	85	120	286	334	29	0	46	75	23.2801	0.047	0.059
319	999	2	997	396	428	999	99	19	58	176	378	0	0	0	0	8.8941	0.044	0.075
339	216	0	216	94	99	216	4255	6000	500	10755	-29	4255	6000	500	10755	6.4016	0.025	0.024
966	630	0	630	257	270	630	0	0	0	0	408	0	0	0	0	0.6447	0.216	0.656
968	360	0	360	156	161	360	175	104	0	279	252	175	79	0	254	1.2704	0.055	0.198
970	183	0	183	77	82	183	0	0	0	0	142	0	0	0	0	0.4231	0.055	0.305
9064	0	0	0	0	0	0	100	0	11	111	0	21	0	4	25	0.0651	0.000	0.000
9098	237	0	237	95	99	237	0	0	0	0	14	0	0	0	0	1.6433	0.081	0.094
9099	344	0	344	123	136	344	4	0	0	4	192	0	0	0	0	0.5591	0.154	0.380
9105	400	0	400	157	165	400	0	0	0	0	0	0	0	0	0	5.5563	0.044	0.046
9106	859	48	811	338	364	859	116	135	0	251	66	59	10	0	69	13.7163	0.036	0.041
9107	472	0	472	190	201	472	0	0	271	271	341	0	0	271	271	3.6872	0.024	0.085
9118	67	0	67	28	37	67	2	6	125	133	16	0	0	0	0	2.9196	0.013	0.020
9120	317	0	317	121	139	317	60	67	0	127	33	60	60	0	120	5.8329	0.031	0.037
9121	373	0	373	167	178	373	212	42	0	254	126	208	42	0	250	3.9335	0.043	0.071
9124	429	0	429	186	199	429	51	11	0	62	154	0	0	0	0	6.1695	0.030	0.050
9125	79	0	79	31	36	79	0	0	0	0	14	0	0	0	0	2.5675	0.015	0.022
TOTALS	142184	5500	136684	58420	63442	142185	62509	26404	11407	100320	49663	26910	10425	4348	41683	547.2924	0.109	0.181

ELROD ROAD INTERCHANGE AREA

TAZ_ID	2000 Population	2000 Group Quarters	2000 Household Population	2000 Households	2000 Housing Units	TAZ_ID	2000 POP	2000 Employment COMM	2000 Employment IND	2000 Employment PUB	2000 Employment TOTAL
64	322	0	322	121	127	64	322	348	402	0	750
65	111	0	111	44	47	65	111	95	99	0	194
66	286	0	286	110	115	66	286	34	28	0	62
67	199	0	199	75	75	67	199	384	13	25	422
68	648	193	455	185	191	68	648	868	102	257	1227
69	570	0	570	212	230	69	570	2	0	0	2
70	1810	5	1805	714	764	70	1810	220	6	47	273
71	3286	0	3286	1381	1497	71	3286	849	13	45	907
72	2063	53	2010	826	871	72	2063	4313	174	86	4573
73	1850	38	1812	752	774	73	1850	281	10	0	291
74	912	0	912	382	468	74	912	566	950	0	1516
75	22	0	22	12	14	75	22	352	345	0	697
76	14	0	14	8	10	76	14	290	992	0	1282
77	57	0	57	30	63	77	57	57	386	111	554
78	83	0	83	34	34	78	83	7	2	62	71
79	974	0	974	331	338	79	974	201	489	0	690
80	373	0	373	144	159	80	373	429	1702	0	2131
81	449	0	449	163	169	81	449	13	10	0	23
82	593	0	593	231	252	82	593	18	51	78	147
84	452	0	452	172	176	84	452	56	2	0	58
85	763	6	757	289	296	85	763	79	93	0	172
103	167	0	167	55	59	103	167	2	7	0	9
104	1903	0	1903	681	692	104	1903	29	19	0	48
105	560	0	560	209	215	105	560	15	63	0	78
106	107	0	107	44	45	106	107	0	0	0	0
107	364	0	364	133	141	107	364	46	13	73	132
108	962	0	962	364	387	108	962	23	96	0	119
966	222	0	222	85	89	966	222	0	0	0	0
968	108	0	108	44	45	968	108	0	25	0	25
970	41	0	41	14	15	970	41	0	0	0	0
9064	0	0	0	0	0	9064	0	79	0	7	86
9105	400	0	400	145	155	9105	400	0	0	0	0
9106	793	48	745	290	312	9106	793	57	125	0	182
9107	131	0	131	54	56	9107	131	0	0	0	0
TOTALS	21595	343	21252	8334	8881	TOTALS	21595	9713	6217	791	16721

TAZ_ID	2030 Population	2030 Group Quarters	2030 Household Population	2030 Households	2030 Housing Units	2030 POP	2030 Employment COMM	2030 Employment IND	2030 Employment PUB	2030 Employment TOTAL	2000-2030 Change POP	Change Employment COMM	Change Employment IND	Change Employment PUB	Change Employment TOTAL	Population Change Category	Employment Change Category	TAZ Area Square Miles	2000 Housing Units per Acre	2030 Housing Units per Acre	Vacant Industrial Acreage	
64	603	0	603	241	256	603	669	442	50	1161	281	321	40	50	411	D	B	0.6618	0.300	0.604	13	Bowling Green Corporate Park
65	422	0	422	178	193	422	344	99	0	443	311	249	0	0	249	D	C	1.1466	0.064	0.263		
66	812	0	812	332	349	812	467	28	0	495	526	433	0	0	433	C	B	0.4035	0.445	1.350		
67	212	0	212	85	88	212	931	13	40	984	13	547	0	15	562	F	B	0.5541	0.211	0.248		
68	1709	193	1516	656	679	1709	1222	283	257	1742	1061	354	161	0	515	B	B	1.2316	0.242	0.861	268	Drakes Creek M.S., Greenwood H.S.
69	3696	0	3696	1463	1591	3696	93	0	0	93	3126	91	0	0	91	A	E	1.8870	0.190	1.317		
70	1947	5	1942	815	875	1947	450	6	71	527	137	230	0	24	254	E	C	1.5530	0.769	0.881		
71	6059	0	6059	2710	2941	6059	1743	13	68	1824	2773	894	0	23	917	A	A	1.9805	1.181	2.320		Greenwood Square
72	2767	53	2714	1187	1255	2767	5230	174	127	5531	704	917	0	41	958	C	A	1.2858	1.058	1.525		Greenwood Mall, Natcher E.S.
73	2814	38	2776	1226	1265	2814	551	10	0	561	964	270	0	0	270	B	C	0.9324	1.297	2.120		
74	947	0	947	422	520	947	1165	1045	0	2210	35	599	95	0	694	F	B	0.4695	1.558	1.731		Bowling Green Mall
75	24	0	24	14	20	24	494	375	0	869	2	142	30	0	172	F	D	0.2767	0.079	0.113		
76	18	0	18	11	17	18	715	1022	0	1737	4	425	30	0	455	F	B	0.5229	0.030	0.051	16	South Industrial Park
77	77	0	77	43	94	77	351	426	111	888	20	294	40	0	334	F	C	0.3038	0.324	0.483		
78	2003	0	2003	873	876	2003	223	2	122	347	1920	216	0	60	276	A	C	1.6992	0.031	0.806		
79	1698	0	1698	614	630	1698	540	669	0	1209	724	339	180	0	519	C	B	2.3114	0.228	0.426	88	Murphy Industrial Park (now only 34 acres)
80	1163	0	1163	478	531	1163	933	3102	0	4035	790	504	1400	0	1904	C	A	2.4789	0.100	0.335	167	South Central kentucky Industrial Park and Berry Industrial Property
81	815	0	815	315	330	815	18	10	0	28	366	5	0	0	5	D	G	2.0939	0.126	0.246		
82	649	0	649	269	297	649	22	51	126	199	56	4	0	48	52	F	E	1.8141	0.217	0.256		
84	1217	0	1217	493	508	1217	1028	352	0	1380	765	972	350	0	1322	C	A	2.5663	0.107	0.309	193	South Central kentucky Industrial Park previously 177 acres
85	806	6	800	325	336	806	125	93	0	218	43	46	0	0	46	F	F	0.4277	1.081	1.227		
103	3167	0	3167	1083	1165	3167	152	7	0	159	3000	150	0	0	150	A	D	1.5392	0.060	1.183		
104	2686	0	2686	1023	1043	2686	99	19	0	118	783	70	0	0	70	C	E	6.7700	0.160	0.241		
105	706	0	706	277	292	706	40	63	0	103	146	25	0	0	25	E	F	3.8200	0.088	0.119		
106	972	0	972	406	436	972	0	0	0	0	865	0	0	0	0	B	G	4.0463	0.017	0.168		
107	1311	0	1311	527	558	1311	68	13	73	154	947	22	0	0	22	B	F	3.3915	0.065	0.257		Rich Pond E.S.
108	1227	0	1227	494	529	1227	25	96	0	121	265	2	0	0	2	D	G	18.8155	0.032	0.044		
966	630	0	630	257	270	630	0	0	0	0	408	0	0	0	0	C	G	0.6447	0.216	0.656		
968	360	0	360	156	161	360	175	104	0	279	252	175	79	0	254	D	C	1.2704	0.055	0.198		
970	183	0	183	77	82	183	0	0	0	0	142	0	0	0	0	E	G	0.4231	0.055	0.305		
9064	0	0	0	0	0	0	100	0	11	111	0	21	0	4	25	F	F	0.0651	0.000	0.000		
9105	400	0	400	157	165	400	0	0	0	0	0	0	0	0	0	F	G	5.5563	0.044	0.046		
9106	859	48	811	338	364	859	116	135	0	251	66	59	10	0	69	F	E	13.7163	0.036	0.041		
9107	472	0	472	190	201	472	0	0	271	271	341	0	0	271	271	D	C	3.8872	0.024	0.085		
TOTALS	43430	343	43087	17735	18917	43431	18089	8632	1327	28048	21836	8376	2415	536	11327			90.3453	0.154	0.327		

rating	Population	Employment
A	> 1600	> 800
B	801 to 1600	401 to 800
C	401 to 800	201 to 400
D	201 to 400	101 to 200
E	101 to 200	51 to 100
F	0 to 100	11 to 50
G	-49 to -1	0 to 10

TABLE 1: Population and Employment Forecasts for Years 2000 and 2030

FIGURE 4: Year 2000 Daily Traffic on 2008 Network

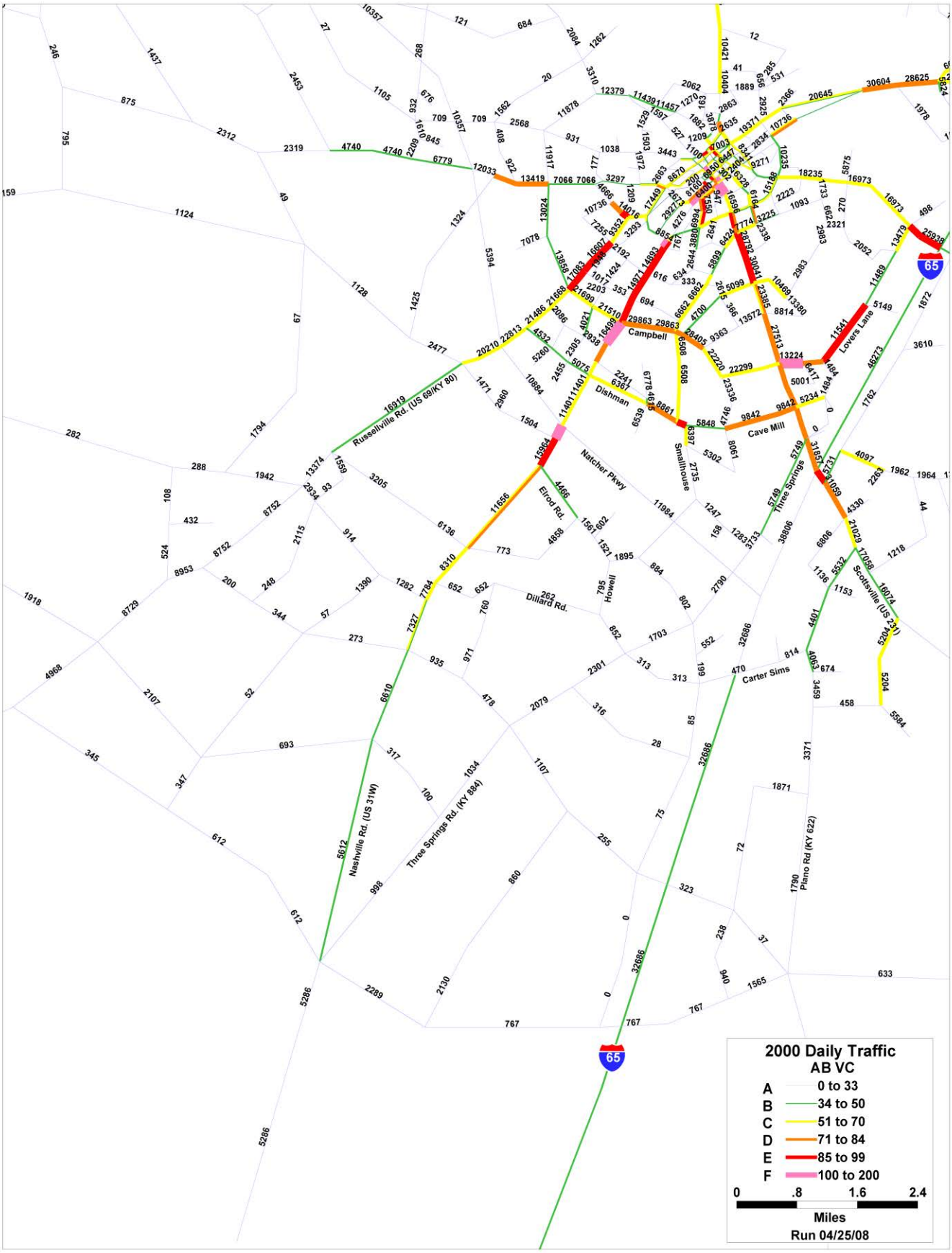


FIGURE 5: Year 2030 Daily Traffic on 2008 Network

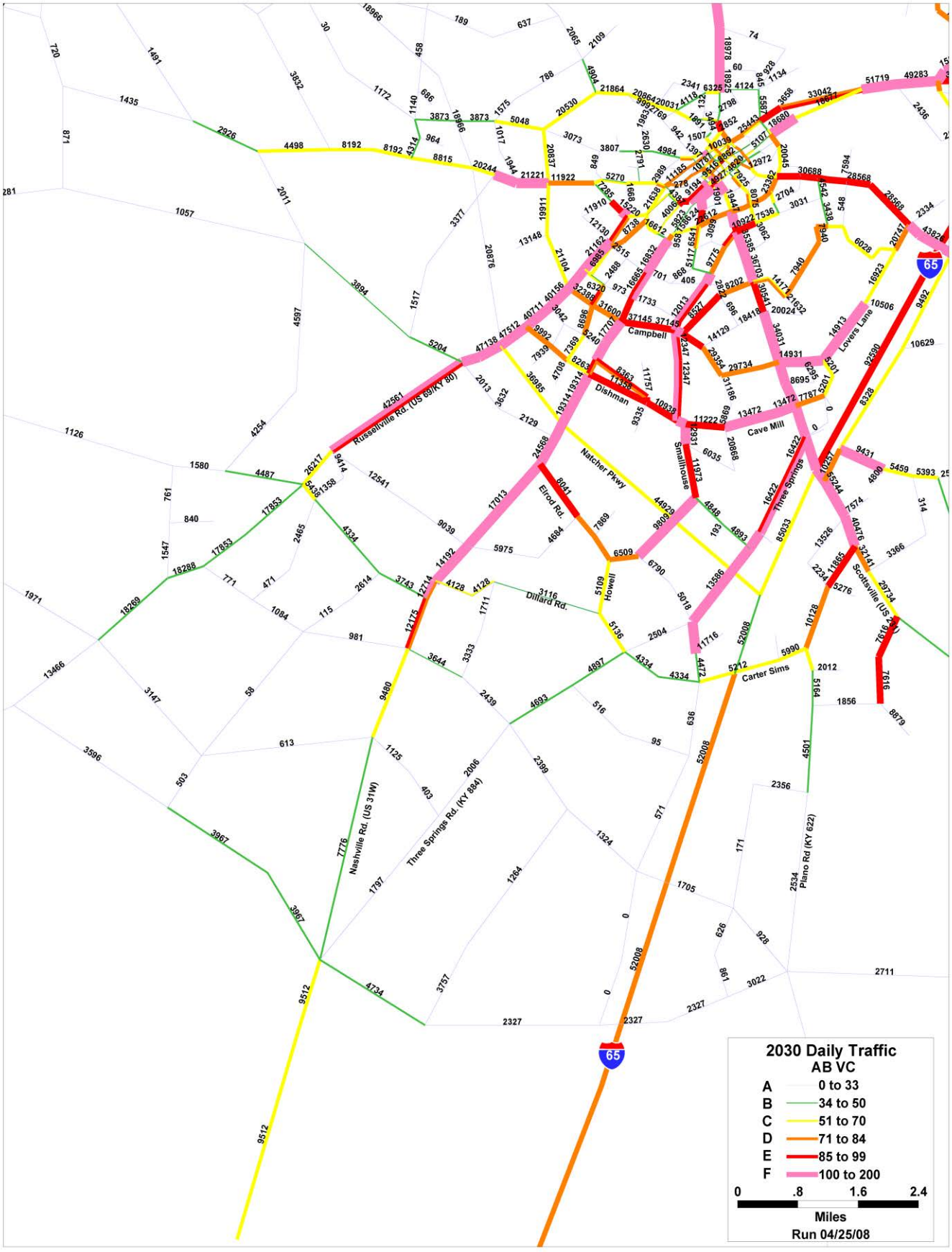
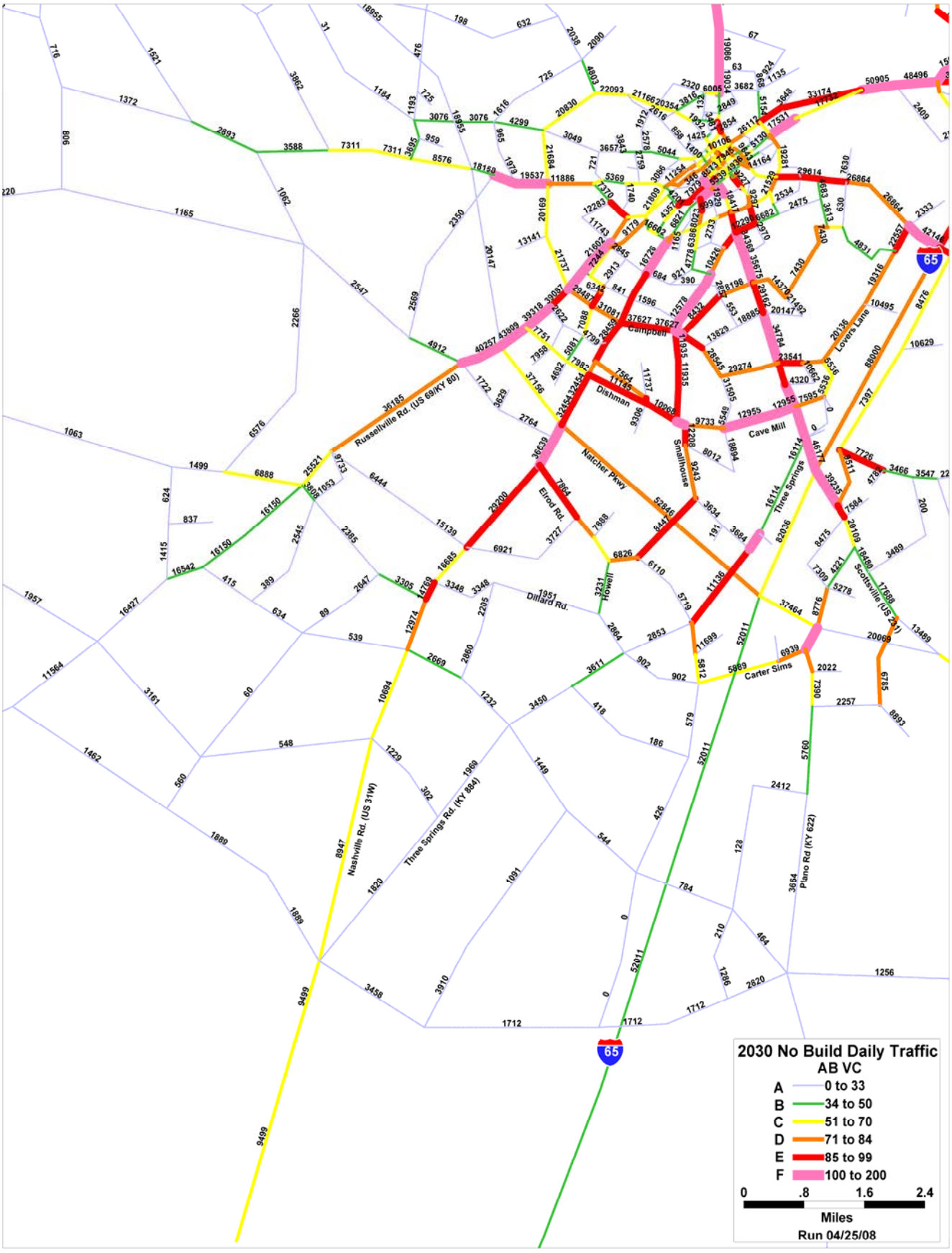


FIGURE 6: Year 2030 Daily Traffic on No Build Network



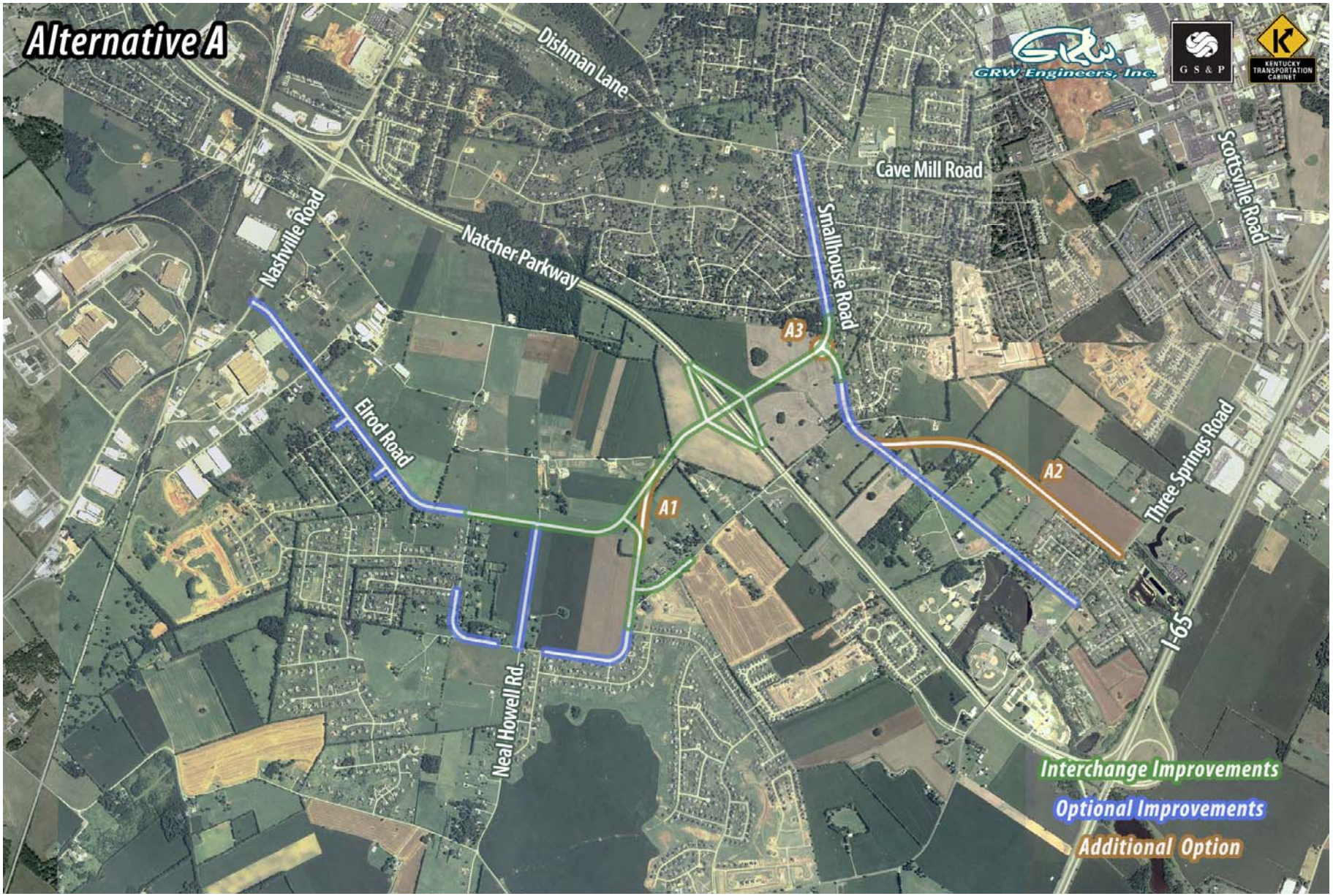


FIGURE 7: ALTERNATIVE A

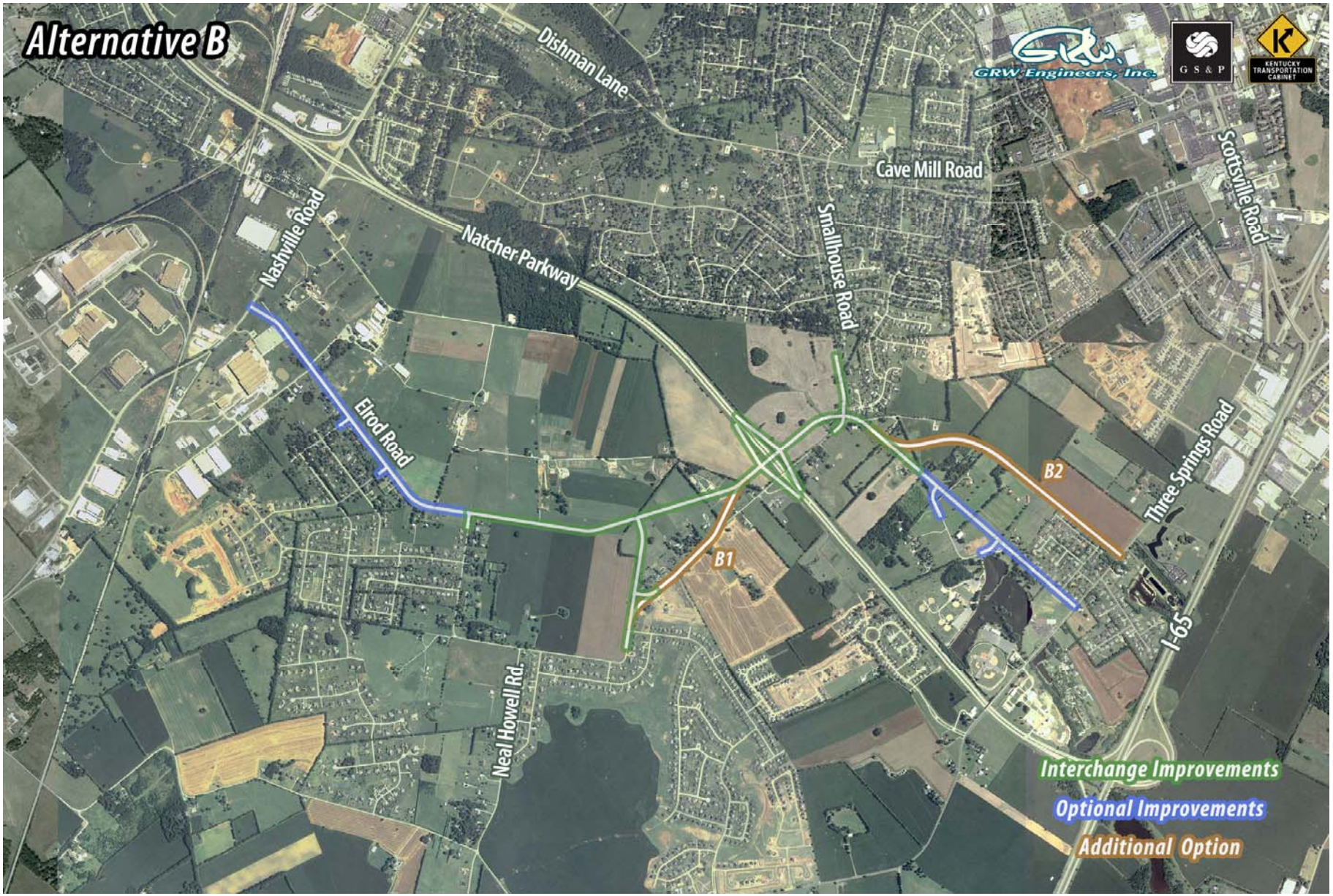


FIGURE 8: ALTERNATIVE B

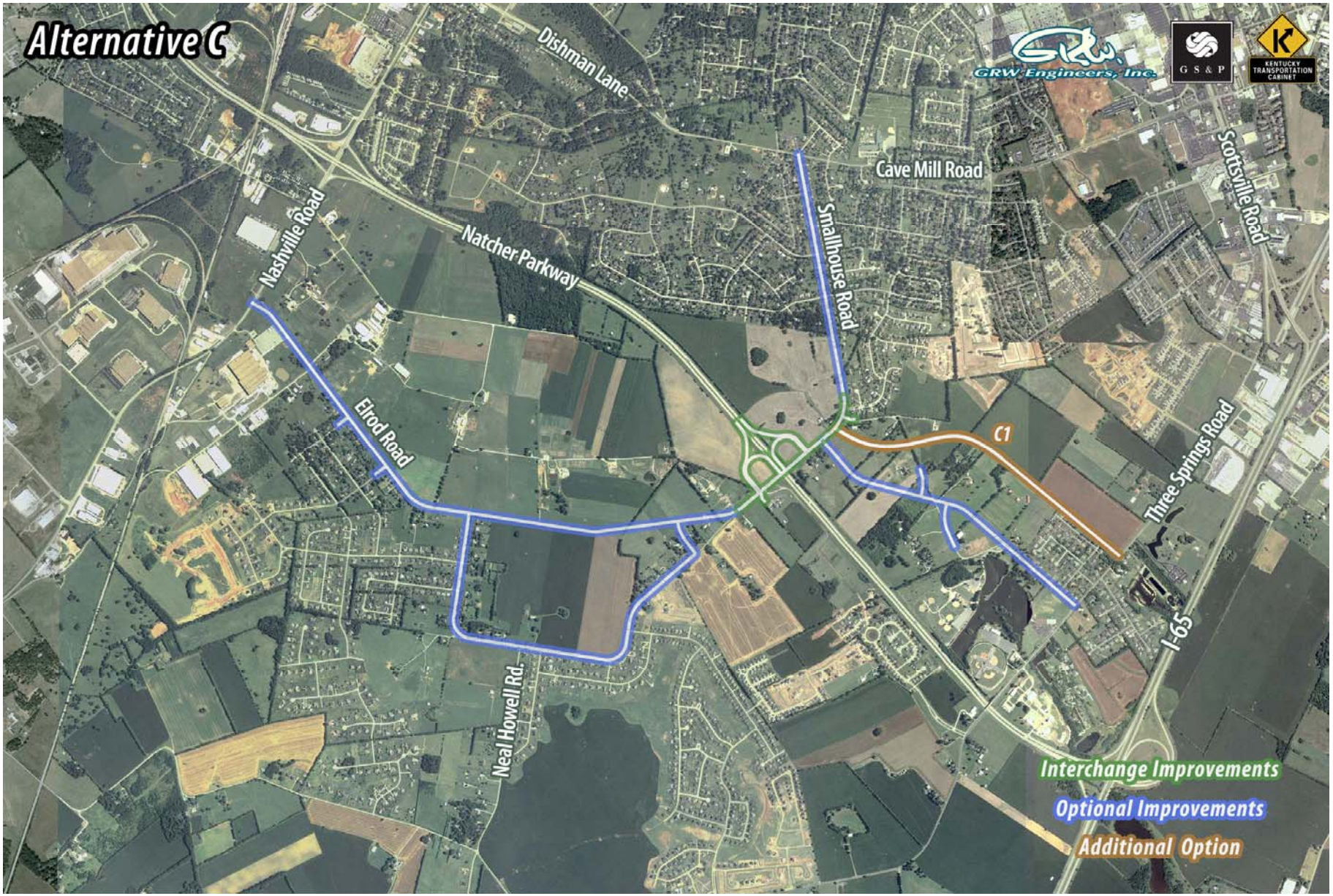


FIGURE 9: ALTERNATIVE C

Appendix B

MONTH/YEAR SUMMARY

MONTH	2004	2005	2006		
JAN	5	4	4	**13**	5.5%
FEB	6	2	6	**14**	5.9%
MAR	14	6	3	**23**	9.7%
APR	10	8	11	**29**	12.2%
MAY	10	13	3	**26**	10.9%
JUN	8	10	10	**28**	11.8%
JUL	6	5	7	**18**	7.6%
AUG	7	6	1	**14**	5.9%
SEP	5	15	5	**25**	10.5%
OCT	7	4	6	**17**	7.1%
NOV	5	4	3	**12**	5.0%
DEC	7	4	8	**19**	8.0%
	90	**81**	**67**	238	

DAY OF WEEK

DAY	2004	2005	2006		
SUN	11	15	7	**33**	13.9%
MON	16	16	7	**39**	16.4%
TUE	14	10	13	**37**	15.5%
WED	17	4	9	**30**	12.6%
THU	16	14	11	**41**	17.2%
FRI	10	9	15	**34**	14.3%
SAT	6	13	5	**24**	10.1%
	90	81	67	238	

PROPERTY DAMAGE

Y/N	2004	2005	2006		
Y	14	14	16	**44**	18.5%
N	76	67	51	**194**	81.5%
	90	81	67	238	

LIGHT

DESCRIPTION	2004	2005	2006		
DAYLIGHT	65	66	50	**181**	76.1%
DARK-HWY NOT LIGHTED	11	4	9	**24**	10.1%
DARK-HWY LIGHTED/ON	10	8	4	**22**	9.2%
DUSK	3	2	2	**7**	2.9%
DAWN	1	0	1	**2**	0.8%
DARK-HWY LIGHTED/OFF	0	1	1	**2**	0.8%
	90	81	67	238	

ROAD CONDITION

DESCRIPTION	2004	2005	2006		
DRY	42	51	39	**132**	55.5%
WET	44	28	26	**98**	41.2%
ICE	2	2	0	**4**	1.7%
SNOW/SLUSH	2	0	2	**4**	1.7%
	90	81	67	238	

ROAD

ROADWAY	2004	2005	2006		
SMALLHOUSE RD	58	50	39	**147**	61.8%
NATCHER PKWY	19	24	20	**63**	26.5%
ELROD RD	12	5	8	**25**	10.5%
NEAL HOWELL RD	1	2	0	**3**	1.3%
	90	81	67	238	

BY TYPE

TYPE	2004	2005	2006		
COLLISION WITH FIXED OBJECT*	27	20	23	**70**	29.4%
REAR END*	33	22	15	**70**	29.4%
OTHER ROADWAY OR MID-BLOCK COLLISION	3	5	6	**14**	5.9%
SIDESWIPE*	4	7	3	**14**	5.9%
ANGLE COLLISION - BOTH VEHICLES GOING STRAIGHT	1	6	4	**11**	4.6%
RAN OFF ROADWAY (1 VEHICLE WITH/EARTH EMBANKMENT/DITCH)	3	4	4	**11**	4.6%
1 VEHICLE ENTERING/LEAVING ENTRANCE	4	3	4	**11**	4.6%
ANGLE COLLISION - ONE VEHICLE TURNING LEFT	2	3	2	**7**	2.9%
VEHICLE BACKING	0	2	2	**4**	1.7%
ANGLE COLLISION - ONE VEHICLE TURNING RIGHT	0	3	0	**3**	1.3%
COLLISION WITH ANIMAL	2	1	0	**3**	1.3%
COLLISION WITH NON-FIXED OBJECT	1	1	1	**3**	1.3%
OTHER COLLISIONS ON SHOULDER	2	1	0	**3**	1.3%
RAMP - VEHICLE RAN OFF ROADWAY	0	2	1	**3**	1.3%
OPPOSITE DIRECTION - BOTH VEHICLES GOING STRAIGHT AHEAD	1	0	1	**2**	0.8%
1 VEHICLE PARKED*	1	0	0	**1**	0.4%
ANGLE COLLISION - OTHER	1	0	0	**1**	0.4%
HEAD-ON COLLISION	1	0	0	**1**	0.4%
MULTIPLE VEHICLE COLLISION ON RAMP	0	0	1	**1**	0.4%
OPPOSING LEFT TURN	1	0	0	**1**	0.4%
OTHER INTERSECTION COLLISIONS	1	0	0	**1**	0.4%
OTHER RAMP RELATED COLLISIONS NOT LISTED ABOVE	1	0	0	**1**	0.4%
OVERTURNED IN ROADWAY	0	1	0	**1**	0.4%
OVERTURNED ON RAMP	1	0	0	**1**	0.4%
	90	81	67	238	

CRASH LOCATIONS

2004 – 2006

ELROD RD AT NATCHER PARKWAY INTERCHANGE STUDY

TOTAL CRASHES: 7
FATALITIES: 0
INJURIES: 8
TYPES:
4 ANGLE
2 SIDESWIPE
1 FIXED OBJECT

TOTAL CRASHES: 6
FATALITIES: 0
INJURIES: 4
TYPES:
3 FIXED OBJECT (DITCH)
1 REAR END
1 SIDESWIPE
1 OTHER

TOTAL CRASHES: 6
FATALITIES: 0
INJURIES: 1
TYPES:
4 FIXED OBJECT (2 TREE, 1 FENCE, 1 POST)
1 ANGLE
1 SIDESWIPE

TOTAL CRASHES: 9
FATALITIES: 0
INJURIES: 4
TYPES:
4 FIXED OBJECT (3 GUARDRAIL, 1 MAILBOX)
2 ANGLE (DRIVEWAY)
2 REAR END
1 OTHER

SEGMENT: ELROD RD FROM US 31 TO HUNTERS CROSSING
CRASH RATE: 266 CRASHES/100 MVM
STATEWIDE RATE: 261 CRASHES/100 MVM
TOTAL CRASHES: 11
FATALITIES: 0
INJURIES: 8
TYPES:
2 FIXED OBJECT (1 CULVERT, 1 MAILBOX)
2 RAN OF ROAD
3 REAR END
1 ANGLE (DRIVEWAY)
1 SIDESWIPE (OPPOSITE DIR.)
2 BACKING

NASHVILLE RD
CAVE MILL RD
GRIDER POND RD
SMALLHOUSE RD
WILLIAM H. NATCHER PKWY
ELROD RD
HUNTERS CROSSING WAY
NEAL HOWELL RD
THREE SPRINGS RD
31W
65
884

LEGEND

- CRASH LOCATION (APPROX.)
- HIGH CRASH FREQUENCY LOCATION
- HIGH CRASH RATE ROADWAY SECTION

N

0 400 800 1600
SCALE IN FEET

KENTUCKY TRANSPORTATION CABINET

GS&P
GRESHAM SMITH AND PARTNERS

Appendix C

Elrod Interchange Study
Resource Agency Comments

Agency	Comment
KY Division of Air Quality	401 KAR 63:010 and 401 KAR 63:005 would apply during construction of this
KY Division of Water	The groundwater branch recomends that a professional hydrologist or geohydrologist be utilized to ensure that groundwater in the area will not be adversely affected by this project. Kentucky DOT is exempted from the requirements for a stream construction permit per KY 151.250. Any excess material disposed of outside the DOT right of way and in the regulatory floodplain will require a permit.
Natural Preserves Commission	No comment
Department for Environmental Protection/ Division of Waste Management	No comment
Department of Military Affairs/Boone National Guard Center	The Department of Military Affairs cannot identify any issues or concerns that affect the development of subject project.
Kentucky Heritage Council	There are many architecural resources as well as previously recorded archaeological sites within the study area. The Section 106 review process must be completed prior to the approaval of the experenditure of any federal funds.
KY Airport Zoning Commission	Any structure or construction equipment that exceeds 133 feet above ground level would require a permit from the KY Airport Zoning Commission. The proposed study is located app. 14,600 ft from the BG Airport.
KY Commission on Human Rights	No comment
KY Department of Agriculture	No comment
KY Department of Fish & Wildlife Resources	The Kentucky Fish and Wildlife Information System indicate that state/federal threatened and endangered species are known to occur near the project study area.
KY Division of Forestry	No forestry concerns in this area.
KY Division of Waster Management	Link to Superfund report attached to email.
KY State Police	Would be beneficial for the following reasons: Reduce traffic congestion on US 31-W and KY 884; reduce traffic volune on Smallhouse Rd; provide better access to the area for Emergency Responders; better traffic flow should result in fewer crashes.
KY Tourism Council	The addition of the new interchange should not have any detrimental effect on the area tourist attractions, hotels and restaurants…Creating safer roadways and less congestion on Three Springs Rd and Nashville Rd would create a more positive experience for the tourists to those areas.
KY Transportation Cabinet/Office of Local Programs	It is the conclusion of this office that the addition of bicycle and pedestrian facilities in the study area would improve safety and efficiency of travel in the Elrod Road area and create a more diverse transportation network. At this point in the study it is too early to recommend whether bike lanes with sidewalks or a multi-use path would be more feasible. This can be determined by the number of access points that will be connecting to the roadway, and the amount of traffic.
U. S. Environmental Protection Agency/ Region 4	The upcoming NEPA document should fully evaluate all environmental impacts, cultural resource impacts, and Environmental Justice impacts, in addition to considering cumulative and secondary impacts of the alternatives. Best management practices (BMPs) that will prevent, reduce, or mitigate
U.S Coast Guard	A Coast Guard permit is not required.
U.S. Army Corps of Engineers/Eastern Section	Referred to Louisville District for comment.
U.S. Army Corps of Engineers/Nashville District	Referred to Louisville District for comment.
U.S. Department of Agriculture/ Forest Service	Proposed activities are not likely to impact resources or facilities managed by the Daniel Boone National Forest.
U.S. Department of Agriculture/Natural Resources Conservation Service	The NRCS is concerned with potential impacts that the project might have have upon prime farmland soils and additional farmlands of statewide importance. If federal dollars are to be used to convert important farmlands from agricultural uses to non-agricultrual uses a Form AD-1006 (or Form NRCS-CPA-106 if the the project is a corridor type project) must be submitted to the local NRCS office.
Underground Storage Tank Branch	The USTB identified two facilities with a total of six registered underground storage tanks. All six tanks have been removed and all activities are closed.
University of Kentucky/Ky Geological Survey	Extensive comments attached re: review of maps, online searches and documents available in the files and on the Web site of the KY Geological Survey. No on-site investigation of the planning study area was conducted.
Warren County Schools/Transportation	"These changes are needed as soon as possible, however, I am concerned that the increase in traffic without major road improvements to Smallhouse, Elrod and Cave Mill could make this even more dangerous because of speeding. With the possibility of adding another school on Elrod Rd and our buses being able to enter Natcher via Elrod it would appear to make transport from and to Greenwood and Drakes Creek much easier."

Environmental Overview

Elrod Road/Natcher Parkway Interchange
Warren County, Kentucky
KYTC Item No. 3-130.00

Prepared for
Gresham Smith & Partners
December 20, 2007

Prepared by
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THIRD ROCK CONSULTANTS

Environmental Overview

Elrod Road/Natcher Parkway Interchange
Warren County, KY
Item No. 3-130.00

for

Gresham Smith & Partners
101 South Fifth Street, Suite 1400
Louisville, KY 40202

December 20, 2007

Prepared/Compiled by:

Rebecca Colvin

Reviewed by:

Virginia Goodman

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Environmental Analysis & Restoration

Table of Contents

Page

I. PROJECT DESCRIPTION....1

II. ENVIRONMENTAL SETTING....1

III. EXISTING CONDITIONS....4
- A. Air Quality....4
- B. Traffic Noise....5
- C. Aquatic Resources....6
- D. Threatened and Endangered Species....7
- E. Socioeconomic....10
  - 1. Existing Transportation Facilities....10
  - 2. Land Use....11
  - 3. Population and Growth....11
  - 4. Household Data....13
  - 5. Income and Poverty....13
  - 6. Local Economy....14
  - 7. Agricultural Activity....15
  - 8. Communities and Community Facilities....17
- F. UST/Hazardous Materials....18

IV. SUMMARY....20
- A. Air Quality....20
- B. Traffic Noise....20
- C. Aquatic Resources....20
- D. Threatened and Endangered Species....21
- E. Agricultural Activity....21
- F. Communities and Community Facilities....21
- G. UST/Hazardous Materials....21

REFERENCES....22

TABLES

TABLE 1 – NWI Wetlands....6
TABLE 2 – Racial Composition of Population....12
TABLE 3 – Household Characteristics....13
TABLE 4 – Household Units and Costs....14
TABLE 5 – Income and Population Below Poverty Level....14
TABLE 6 – Unemployment Rates....15
TABLE 7 – Major Business and Industry....16

EXHIBITS

EXHIBIT 1 – Natural Environment.....2
EXHIBIT 2 – Human Environment.....3

APPENDICES

APPENDIX A – Natural Resources Agency Correspondence
APPENDIX B – EDR Report Summary

I. PROJECT DESCRIPTION

The project is a scoping study to analyze the possibilities for a new interchange at or near the Natcher Parkway and Elrod Road (CR 1240) south of Bowling Green, Warren County, Kentucky. The study area extends from north of Smallhouse Road (CR 1235) to just south of Neal Howell Road (CR 1241) & Dillard Road (CR 1266) (Exhibit 1 and Exhibit 2, pages 2 and 3). To the east and west, the study area extends from Three Springs Road (KY 884) (eastern border) to approximately 3,000 to 4,000 feet west of and parallel to Elrod Road and Neal Howell Road (western border). Elrod Road generally bisects the middle of the study area.

Elrod Road Bridge Over Natcher Pkwy - View from Calvary Baptist Church

The purposes of the project are many. A new interchange would reduce traffic volumes on Scottsville Road (US 231) to the east and Nashville Road (US 31W) to the west. An Elrod Road interchange, which would be located between these two roads, would also support the recently developed and developing residential subdivisions within the study area. The specific purposes of the project as outlined by the project team include access, mobility, safety, intermodal connections, and security.

Third Rock Consultants, LLC (Third Rock) was retained by Gresham Smith & Partners (GS&P) to conduct an overview of sensitive air quality and traffic noise receptors, aquatic and terrestrial resources, socioeconomic issues (excluding environmental justice), and underground storage tank (UST)/hazardous materials concerns in the study area. Third Rock researched available data prior to performing field reconnaissance and used the field reconnaissance to verify and supplement the findings. This report summarizes the existing environmental conditions present in the study area.

II. ENVIRONMENTAL SETTING

The study area is located within the Western Pennyroyal Physiographic Region of the Mississippian Plateau (USDA 1981). Upper Mississippian limestone of the Ste. Genevieve Formation is prevalent throughout the study area (USGS 1963). Karst topography is characterisitic with numerous sinkholes present throughout the study area (Exhibit 1, page 2). These sinkholes vary from a few feet in diameter to greater than half an acre in size. Water collecting in these sinkholes often represents the only source of surface water within the area. Sinkholes are formed by the dissolution and removal of limestone by percolating water, and the subsequent collapse of the overlying material. Soils of the area are of the Pembroke-Crider association. These soils are well drained with loamy and clayey subsoil (USDA 1981). These soils are well suited for hay, pasture and cultivated crops.

Sinkhole

EXHIBIT 1 – NATURAL ENVIRONMENT

EXHIBIT 2 – HUMAN ENVIRONMENT

Row Crops with Sinkhole

Isolated Wood Lot

III. EXISTING CONDITIONS

A. Air Quality

The study area is located in the South Central Kentucky Intrastate Air Quality Control Region (LRC 2007). The study area is currently being developed into residential subdivisions. Sensitive receptors for air pollutants in the study area could include outdoor areas associated with residents, churches, and a local park.

Based on Kentucky carbon monoxide (CO) screening criteria, this project would not meet the criteria requiring a CO level analysis and would not produce a project violation of CO standards (35 ppm 1-hr; 9ppm 8-hr). All of the study area is currently designated in attainment for lead, nitrogen dioxide, and sulfur dioxide. Warren County is in attainment for ozone and $PM_{2.5}$. Warren County is also in attainment for PM_{10}, therefore conformity procedures of 23CFR770 do not apply to this project (Koos 2007). Subsequently, no quantitative analysis of CO, $PM_{2.5}$, PM_{10}, lead, nitrogen dioxide, or sulfur dioxide would be required for a proposed interchange project in the study area.

McCoy Place Residential Development

The Environmental Protection Agency (EPA) conducted the Motor Vehicle Air Toxics Study (MVATS) in 1993 to determine the emissions from vehicles, which lead to the Mobile Source Air Toxics (MSATs) Rule in March 2001. The Rule designated 21 compounds emitted by vehicles. Six MSATs were identified as priorities for regulation including acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde, and diesel particulate matter/diesel exhaust organic gases. FHWA developed an interim guidance to MSATs with a three-tiered approach. An Elrod Road interchange project could potentially fall into either the no analysis required category (projects with no potential for meaningful MSAT effects) or the qualitative analysis category (projects with low potential for MSAT effects). Also, regardless of roadway modifications within this study area, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020.

No formal air quality analysis has been performed for the potential project or its associated study area. The study area is in attainment for all transportation related air pollutants. It is not anticipated that any alternative developed by the planning study will negatively affect the attainment status of the study area. However, once project alternatives are developed and environmental documentation progresses, a determination should be made whether MSATs will be exempt from analysis or require a qualitative analysis.

B. Traffic Noise

Vehicle tires, engines, and mufflers propagate noise at levels dependent upon the volume, speed, percentage of trucks, and slope of the roadway. These traffic noises are measured in decibels in the A-scale (dBA). The A-scale is designed to best approximate the way noise is heard by the human ear. Due to the logarithmic nature of noise measurements, a 3 dBA increase in the noise level represents a doubling in the noise level, but this increase is barely detectible by the human ear. A 10 dBA increase is perceived as a doubling of the noise level.

Noise analysis was not conducted for this study, but traffic noise concerns in the study area were identified through an examination of topographic and aerial mapping as well as field reconnaissance to locate noise sensitive areas. The study area consists of a developing urban area with numerous residential subdivisions, churches, and a park. According to the Federal Highway Administration Policy, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, traffic noise impacts occur when the predicted traffic noise levels approach or exceed the noise abatement criteria (NAC) or when the predicted traffic noise levels substantially exceed the existing noise level. KYTC Noise Abatement Policy further defines approach as “within 1 dBA” and substantially exceed as “10 dBA” (KYTC DEA 2000). The NAC is defined as 67 dBA for residential areas and 72 dBA for commercial areas.

Noise impacts are most likely to occur in close proximity to the proposed interchange. Three noise sensitive areas were identified within the study area and include Calvary Baptist Church, Pennyroyal Farm Stables, and a group of three homes located north of Natcher Parkway on Elrod Road (Exhibit 2, page 3). These noise sensitive sites would need to be re-evaluated after scoping study alternatives are developed and environmental documentation progresses.

Calvary Baptist Church

One of the most cost-effective means of reducing overall noise impacts is the selection of horizontal and vertical alignments. Other noise mitigation methods include purchasing noise buffer zones, traffic management, and/or noise barriers. Although noise barriers are frequently considered as a noise abatement option, they are usually only reasonable in high-density residential areas in close proximity to the alignment.

A noise analysis is recommended for future interchange alternatives that may be developed as a result of this scoping study. A noise analysis would determine traffic noise impacts at the identified noise sensitive receptors and verify the feasibility and reasonableness of mitigation measures.

C. Aquatic Resources

Correspondence with the Water Quality Branch of the Natural Resources and Environmental Protection Cabinet (NREPC) indicated there are no Outstanding Resource Waters or Wild Rivers within the study area (Appendix A). The study area is located in the Barren River sub-basin (HUC# 05110002) in the Green River watershed. The only surface stream within the study area is an unnamed stream that drains Dewey Lake into Three Springs Lake, located in the southeastern section of the study area. During a site reconnaissance, the stream was reviewed. The stream was a mixture of riffle/run areas with no pools. Riparian zones were very narrow on both sides of the stream. The remainder of the study area has sub-surface drainage within the Lost River Karst Groundwater Basin. Several small ponds and sinkholes that may temporarily hold water are located throughout the study area. The largest water body present within the study area is the 37-acre Three Springs Lake located within Basil W. Griffin Park. This lake receives recreational use including fishing and boating. Since the lake is spring fed, the Kentucky Department of Fish and Wildlife Resources (KDFWR) stock rainbow trout (*Oncorhyynchus mykiss*) on a "put and take" basis.

National Wetland Inventory (NWI) mapping for the Bowling Green South 7.5 minute topographic quadrangle indicated the presence of 21 potential wetlands in the study area (Table 1) (Exhibit 1, page 2).

Three Springs Lake

TABLE 1 – NWI WETLANDS

Wetland Type	Number of Occurrences
PUBHx	9
PUBH	4
PUSCx	4
PFO1A	1
PSS1Cx	1
PEM1C	1
L1UBHh	1
Total	21

The majority of these potential wetlands were categorized as Palustrine Unconsolidated Bottom Permanently Flooded Excavated (PUBHx), and unexcavated (PUBH). These wetlands are generally manmade ponds, or poorly drained sinkholes. Palustrine Unconsolidated Shore Seasonally Flooded Excavated (PUSCx) was the next most common type of wetland indicated on NWI mapping for the study area. All other wetlands were infrequent and included palustrine emergent (PEM1C), scrub-shrub (PSS1Cx), and forested (PFO1A). Three Springs Lake is also indicated on NWI mapping as Lacustrine Limnetic Unconsolidated Bottom Permanently Flooded excavated. Two wetlands not indicated on NWI mapping were observed during a previous field survey of the area. Both wetlands are located adjacent to Three Springs Road at the entrance to a KOA Campground near to the Natcher Parkway. The wetland located north of the campground entrance is a shallow pond approximately 0.1 acre in size. The other wetland is located on the south side of the campground entrance and runs parallel to Three Springs Road for approximately 400 feet and is about 10 feet wide. This wetland contained broad-leaved cattails (*Typha latifolia*) and hydric soils. A potential wetland located northwest of the Elrod Road and Natcher Parkway (PUBHx) crossing was inspected in the field and was observed to be a failed pond that no longer retained water. No jurisdictional determinations were made for any wetlands occurring in the study area.

Failed Pond

Due to the karst nature of the study area, impacts to surface waters are not likely as a result of any interchange construction. However, if any new stream crossings or improvements to existing crossings occur, a United States Army Corps of Engineers (USACE) Section 404, and Kentucky Division of Water (KDOW) Section 401 permit could be required. Since drainage is mostly sub-surface for the study area, adherence to the Kentucky Transportation Cabinets' policy paper for best management practices (BMPs) for karst areas should be followed. The policy paper, Design Memorandum No. 12-05, dated July 27, 2005, suggests BMPs designed to reduce impacts to water quality such as use of grass swales and detention/containment basins to receive runoff from the swales before it is discharged.

D. Threatened and Endangered Species

The United States Fish and Wildlife Service (USFWS 2005) lists 13 federally threatened or endangered species for Warren County. The list includes two mammals, Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*); eight mussel species; one plant species, Price's potato-bean (*Apios priceana*); and one crustacean, Kentucky cave shrimp (*Palaemonias ganteri*). The nine listed mussel species include purple catspaw pearlymussel (*Epioblasma o. obliquata*), clubshell (*Pleurobema clava*), fanshell (*Cyprogenia stegaria*), northern riffleshell (*Epioblasma torulosa rangiana*), orangefoot pimpleback (*Plethobasus cooperianus*), pink mucket (*Lampsilis abrupta*), ring pink (*Obovaria retusa*), and rough pigtoe (*Pleurobema plenum*). All mussels are listed as endangered. A review of the KDFWR website (2007) indicated the potential for both bat species, all the mussel species except for orangefoot pimpleback, and listed piping plover (*Charadrius melodus*), a bird species not listed by the USFWS. A review of the Kentucky State Nature Preserves Commission (KSNPC) website (2007) concurred with the USFWS listings for Indiana bat, gray bat, all of the mussels species, Price's potato bean, and Kentucky cave shrimp. The KSNPC list did not include piping plover. Species lists generated from agency websites and correspondence are included in Appendix A.

The Indiana bat formally attained endangered species status on March 11, 1967 (USFWS 1999). A recovery plan was approved March 1, 1999. The historic range for this species consisted of the central and southeastern United States. Within Kentucky, two caves, Bat Cave in Carter County and Coach Cave in Edmonson County, have been designated as critical habitat for the species (USFWS 1976).

Indiana bats hibernate during the winter months in large, cool caves, sinks, and/or mines (hibernacula) where they form tight clusters containing hundreds of individuals. Mines include coal, limestone, as well as other mineral recovery operations. Each spring, the females emerge from these hibernacula and migrate to summer (maternity) habitat consisting of hardwood forests. Maternity colonies are formed in these areas under the exfoliating bark of dead trees or loose bark of living trees. The migration of males is variable. Some males do not migrate, others migrate only a short distance to smaller, warmer caves, and others migrate to the same habitat as females.

Summer roosting habitat for Indiana bat is minimal within the study area and is fragmented and isolated. This type of habitat is present in fencerows, wooded sinkholes, and small isolated woodlots located within the study area. Living trees that contain exfoiliating bark which are utilized by Indiana bats for summer roosting (*i.e*. shagbark hickory (*Carya ovata*)) were not observed in these areas during the cursory field visit. However, dead trees and dead limbs of living trees that did contain exfoiliating bark were observed during the field visit. Winter hibernating habitat for Indiana bat is potentially present within the study area due to the presence of karst features. Two caves are known to exist adjacent to the study area, with one of the caves being utilized by bats (Third Rock 2007).

Once a location for the proposed interchange has been selected, future environmental surveys should inspect all karst features as potential Indiana bat winter hibernating habitat. Three Springs Lake, the unnamed tributary that flows into the lake, and small ponds within the study area represent Indiana bat foraging habitat. Indiana bats prefer foraging over streams with dense canopy cover; therefore these open water bodies would represent minimal foraging habitat.

The gray bat formally attained endangered species status on April 28, 1976. A recovery plan was approved July 8, 1982 (USFWS 1982). It is the largest species of *Myotis* found in the eastern United States. Its historical North American range includes the cave regions of the central and south central United States. Within Kentucky, the species is most common in the cave region of the south central portion of the state. Gray bats occupy caves or cave-like habitats throughout the year and tend to use the same caves each year. Beginning in March, females migrate from cold (42 to 52 degrees Fahrenheit) hibernacula and enter warm caves (57 to 77 degrees Fahrenheit) that have deep vertical passages with large rooms and associated stream systems. Such habitats are typically in close proximity to rivers or reservoirs where the bats forage for aquatic insects. Summer maternity colonies contain a few hundred to many thousands of pregnant females. Adult males and non-reproductive females use other caves during the summer that are in close proximity to maternity caves. Mating begins in September as females migrate back to winter hibernacula, followed by males and juveniles. Most gray bats have begun to hibernate by November (Slone and Wethington 2001; USFWS, TESS 2004).

The potential for gray bat roosting habitat exists within the study area due to the presence of karst features. Once a location for the proposed interchange has been selected, future environmental surveys should inspect all karst features as potential gray bat roosting habitat. A single gray bat has been observed roosting in a cave located just to the east of the study area (Third Rock 2007). Mist netting conducted in 2006 as part of a biological assessment for the Natcher Parkway Extension (KYTC Item # 3-53) resulted in the capture of 27 gray bat individuals from the unnamed tributary between Dewey Lake and Three Springs Lake. Therefore, this tributary, Dewey Lake, and Three Springs Lake are likely being utilized by gray bats for foraging.

The only stream present within the study area, unnamed tributary of Three Springs Lake, is not suitable habitat for any of the listed mussel species. The tributary is too small in size, lacks suitable flow, and is isolated from other surface waters. All listed mussel species prefer medium to large rivers and/or large perennial streams. The stream is also too far from any feasible interchange location to be impacted by the potential project.

The small isolated woodlots within the study area could be considered marginal habitat for Price's potato bean. The species attained threatened

species status on January 5, 1990. The range for the plant is from the southern Gulf states to Kentucky. Price's potato bean is a twining perennial vine that occurs in moderately moist forests, often next to streams, and is usually associated with openings in the forest canopy. The plant grows in forest openings in mixed hardwood stands where ravine slopes grade into creek or stream bottoms. Plants often found with this species include giant cane (*Arundinaria gigantea*), chinkapin oak (*Quercus muehlenbergii*), basswood (*Tilia Americana*), and slippery elm (*Ulmus rubra*). Small remnant populations in Kentucky persist on roadsides and powerlines, where light levels are high. Kentucky counties with known populations include Livingston, Lyon, and Trigg counties. Population decline is primarily due to habitat destruction, but other impacts such as disease, predation, and historical tuber collection have also contributed. Although vines can benefit from some canopy disturbance, intensive land conversion will eliminate plants. Several populations have been protected by management of mowing and herbicide spraying along roadsides (Slone and Wethington 2001; USFWS 2004; Alabama Forestry Commission 2005).

The Kentucky cave shrimp formally attained endangered species status on October 12, 1983, and a recovery plan was finalized in October of 1988. The species is endemic to groundwater basins in Kentucky's Mammoth Cave National Park region in Barren, Edmonson, and Hart counties. The shrimp is known to occur in basins on both the north and south sides of the Green River (Leitheuser 1988). At present, cave shrimp are known to occupy nine groundwater basins (*i.e.,* Suds Spring, Mile 205.7 Spring, Pike Spring, Echo River Spring, Turnhole Spring, Ganter Cave, Lee Cave, McCoy Blue Spring, and Double Sink). The Kentucky Division of Water has designated these basins as Outstanding State Resource Waters and Coldwater Aquatic Habitats (KDOW 2005). Also, approximately one (1.0) mile of the Roaring River Passage in Mammoth Cave National Park is designated as critical habitat for the cave shrimp. While the habitat actually occupied by the shrimp is entirely within the boundaries of the Mammoth Cave National Park, the groundwater basins in which they exist extend well beyond the park.

Cave shrimp are small (1.25 inches long), blind, translucent crustaceans. The species is restricted to underground stream systems within one mile of the Green River. Within this basin they are typically associated with large, base level cave streams characterized by slow flow, abundant organic material, coarse to fine grain sand, and coarse silt sediments. Cave shrimp feed by grazing on protozoa, algal cells, fungi, and other organic matter from cave sediments.

Kentucky cave shrimp is not known to occur in Lost River groundwater basin, which drains the study area.

Piping plover was formally listed as endangered and threatened on January 10, 1986. Piping plover breeds in three geographic regions within the United States: Atlantic Coast, Great Lakes, and Northern Great Plains. The Atlantic Coast population breeds on sandy beaches along the east coast of North America; the Great Lakes Population nests on a few sites on the Upper Great Lakes; and the Northern Great Plains population nests on major river systems, and alkali lakes and wetlands of the region. The Great Lakes population is endangered while the other two populations are threatened. Piping plovers migrate south during winter months. Their winter range extends along the Atlantic and Gulf Coasts from North Carolina to Mexico and into the Bahamas and West Indies (USFWS 1996).

No breeding habitat exists for piping plover in Kentucky. Previous records for piping plover in Kentucky were likely migrating individuals.

Roosting and foraging habitat for Indiana and gray bat is either present or has the potential to be present within the study area. To comply with Section 7 of the Endangered Species Act for Indiana bat, potential impacts to Indiana bat or its habitat may be addressed in one of three ways: (i) a biological assessment may be conducted, (ii) tree cutting may be restricted to the period between October 15 and March 31, or (iii) KYTC may pay for the acquisition of summer maternity habitat (roost trees) under its Programmatic Biological Opinion Agreement with USFWS. Karst features within the study area represent potential gray bat roosting habitat and winter hibernating habitat for Indiana bat. Upon development of alternatives, closer examination of the area should be conducted to determine if any caves or sinkholes present within the study area meet the requirements for roosting and/or hibernating for either species.

To comply with Section 7 of the Endangered Species Act, a survey for Price's potato bean may need to be performed. If wooded areas are to be impacted by the project, proposed alternative locations will need to be surveyed for Price's potato bean.

Due to the lack of suitable habitat for freshwater mussels, Kentucky cave shrimp, and piping plover within the study area, future surveys for these species will not be necessary.

E. Socioeconomic

1. Existing Transportation Facilities

Two main roadways provide access to areas within the study area: Elrod Road and Three Springs Road (Exhibit 2, page 3). Secondarily, Smallhouse Road and Neal Howell Road serve as connections between both Elrod Road and Three Springs Road. Numerous residential neighborhood streets that tie into these four roadways also support the study area. The Natcher Parkway traverses the study area in a southeast direction yet provides no access directly within the study area.

Three Springs Road parallels the easternmost boundary of the study area and is a two-lane facility with 9-foot lanes and 3-foot shoulders. Posted speed limit is 55 miles per hour (mph) (KYTC Division of Planning 2007). This roadway itself serves as a connector to one of Bowling Green's busiest routes, Scottsville Road, in the commercial heart of the city. Elrod Road and Smallhouse Road are both two-lane facilities with no shoulders. The speed limit on these two roadways is an estimated 25 to 35 miles per hour. The Natcher Parkway is a four-lane, divided highway with depressed median and 12-foot lanes and 10-foot shoulders (GS&P 2007). The Parkway ends approximately 1,500 feet east of the study area at an interchange with I-65. Currently, the Natcher Parkway is planned for extension to Scottsville Road to the east.

No official Bowling Green Bikeways are located in the study area. However, the study area is an active bicycling location. Basil W. Griffin Park is located along Three Springs Road north of Natcher Parkway and along Smallhouse Road. The park serves as a starting point for several bicycling routes of the Bowling Green League of Bicyclists. The League's web site lists approximately 17 routes, most of which begin at Griffin Park (BGLOB 2007). The League rides from Griffin Park every Monday through Thursday during daylight savings time; typical evening rides are 25 to 35 miles. Many of the routes cross roads in the study area including Smallhouse Road, Elrod Road, and Neal Howell Road. Weekend rides are not regularly scheduled but are also begun from Griffin Park. According to Ann Ellis, Vice President (Education) for the League, the League has 75 to 85 members with 5 to 30 cyclists participating in the weekday, summer rides. Weekend rides often draw larger membership participation.

In addition to roadways, an important aircraft facility is located in the study area. A VOR, which is short for VHF Omni-directional Radio Range, is located approximately 0.5 mile northeast of the Elrod Road bridge over Natcher Parkway. A VOR is a type of radio navigation system for aircraft.

Bowling Green Public Transit, known as GO BG, provides four, fixed bus routes within the Bowling Green city limits (City of Bowling Green 2007). None of these routes traverse the study area.

2. Land Use

The study area is predominately residential or in transition to residential use. Historically, the study area was agricultural in use, which is still reflected in current zoning districts as indicated on the 2007 Zoning Map for Warren County (City-County Planning Commission of Warren County, KY 2007). A review of the map indicates the study area is dominated by Agriculture District, various types of Single-Family Residential Districts, and Planned Unit Development (PUD) Districts. In addition to these districts, only three other small locations otherwise zoned exist in the study area. Those three locations include two areas adjoining the Natcher Parkway to the south; both are zoned Townhouse/Multi-family Residential Districts. The third location is zoned Highway Business District and is the KOA Campground located along Three Springs Road. Agriculture District includes permitted uses not inherently obvious in the district name. Agriculture District can include such uses as single-family residential, which is evidenced throughout the study area. Planned Unit Development Districts are a mechanism for providing developments, redevelopment, etc. A sizable portion of the study area to the north of the intersection of Neal Howell Road and Three Springs Road is designated PUD with much of the area at present being agricultural use or residential subdivisions.

A field review of the study area confirmed the district designations of the zoning map. Along Smallhouse Road, residential use dominates including two subdivisions and somewhat older, rural residences (Exhibit 2, page 3). Smallhouse Road also includes entrances to an existing church, a planned church location, a stable, and an entrance to Basil W. Griffin Park. Elrod Road through the study area supports residential entrances including new subdivisions and older, rural residences. A church and cemetery and a stable are also along Elrod Road, and a future school may also be located along Elrod Road. Neal Howell Road supports new subdivisions and rural residences. Land use along Three Springs Road is residential but also includes a Christian academy and entrances to Basil W. Griffin Park and the KOA Campground.

Failed Pond

3. Population and Growth

Census data from 2000 was consulted for general demographic data. The portion of the study area located south of Natcher Parkway and west of Three Springs Road is within the City of Bowling Green limits. Additionally, the study area is primarily located within three census tract block groups: Census Tract 107 Block Group 3 (CT 107 BG 3), Census Tract 108 Block Group 2 (CT 108 BG 2) and Census Tract 108 Block Group 3 (CT 108 BG 3).

Although a very small portion of the study area south of Dillard and Neal Howell Roads is located in Census Tract 119, homes and land use are similar to CT 108 BG 3 immediately to the north. Therefore, it was assumed that demographic data for this area would be similar to CT 108 BG 3 and subsequently demographic data for Census Tract 119 is not included in discussions below. It should also be noted that CT 108 BG 3 covers a very large percentage of the study area. The two Block Groups to the north of CT 108 BG 3 contain portions of older, established neighborhoods in Bowling Green. Areas included in the study area and immediately adjacent to CT 108 BG 3 are similar in land use and residential development. Therefore, CT 108 BG 3 data presented below likely best represents data for persons living in the study area as a whole. Census and demographic data is presented in relation to the state, county, city, and census tract block groups, as available.

According to US Census data, Warren County had a population of 92,552 in 2000, which is a 20.7 percent increase since 1990. In July 2006, the county had an estimated population of 101,266.

The median age for individuals in Kentucky is 35.9, which is higher than the median age in Warren County (32.3), Bowling Green (28.6), CT 107 BG 3 (29.1), and CT 108 BG 3 (35.1), and lower than CT 108 BG 2 (37.2).

Warren County, Bowling Green, and CT 107 BG 3 have higher percentages of minority populations than the state average of 9.9 percent, as shown in Table 2 below. CT 108 BG 2's minority population of 9.0 is only slightly lower than the state average, but CT 108 BG 3's minority population of 2.9 percent is substantially lower.

TABLE 2 – RACIAL COMPOSITION OF POPULATION

	Kentucky	Warren County	Bowling Green	CT 107 BG 3	CT 108 BG 2	CT 108 BG 3
Total:	4,041,769	92,522	49,296	2,767	2,121	1,835
One Race (%)	98.9	98.6	98.0	98.6	99.0	99.5
White (%)	90.1	87.0	80.8	84.5	91.0	97.1
Black or African American (%)	7.3	8.6	12.7	11.0	5.6	1.1
American Indian and Alaskan Native (%)	0.2	0.2	0.2	0.0	0.0	0.0
Asian (%)	0.7	1.4	1.9	2.0	2.1	1.2
Native Hawaiian and Other Pacific Islander (%)	0.0	0.1	0.1	0.3	0.0	0.0
Some Other Race (%)	0.6	1.3	2.2	0.8	0.3	0.1
Two or More Races (%)	1.1	1.4	2.0	1.4	1.0	0.5
Hispanic or Latino (%)*	1.5	2.7	4.1	2.7	0.8	0.3
Total Minorities (%)**	9.9	13.0	19.2	15.5	9.0	2.9

*Hispanic Origin is not considered a separate race. The number shown is counted twice, once as Hispanic Origin and once as on of the other racial groups listed above.
**Hispanic Origin not included to avoid duplication.
Source: 2000 US Census, American FactFinder

4. Household Data

Household data within the study area varies widely when compared to the state average (Table 3). Warren County and Bowling Green both have a lower percentage of family households (66.2 percent and 55.5 percent, respectively) than Kentucky (69.4 percent), while CT 107 BG 3 and particularly CT 108 BG 3 have a much higher percentage of family households (79.1 percent and 95.8 percent, respectively). The percentage of family households in CT 108 BG 2 (70.0 percent) is only slightly higher than the state average. Study area households have fewer households with individuals under 18, as well as fewer households with individuals 65 and older.

CT 108 BG 3 has a much lower percentage of renters (4.5 percent) compared to CT 108 BG 2 (27.6 percent), CT 107 BG 3 (61.0 percent), Bowling Green (53.0 percent), Warren County (36.0 percent), and Kentucky (29.2 percent). Homes in CT 108 BG 3 also have a higher median value than homes in the other areas studied. Overall, homes in the study area have a higher median value than the state average ($86,700), as all Block Groups have homes with a median value of $100,400 or above. Median gross rent as a percentage of household income is roughly equivalent to the state average (24 percent) in Warren County (24.4 percent) and Bowling Green (25.1), but much lower in CT 107 BG 3 (19.7) and higher in CT 108 BG 2 (26.6) and CT 108 BG 3 (29.4). Homes in the three, Block Groups are also relatively new compared to the city and county. Additional housing data is including in Table 4, page 14.

5. Income and Poverty

With the exception of Bowling Green, the areas studied have a higher median household income and per capita income than the state average (Table 5, page 14). CT 108 BG 3 has a significantly higher median household income than any other location. Warren County, CT 107 BG 3, CT 108 BG 2, and CT 108 BG 3 also have a lower percentage of residents living below the poverty level: 15.4 percent, 10.5 percent, 6.3 percent, and 4.0 percent, respectively, as compared to the state average of 15.8 percent. Bowling Green, however, has a much higher percentage of individuals living below the poverty level (21.8 percent) than not only Kentucky but the rest of the study area as well.

TABLE 3 – HOUSEHOLD CHARACTERISTICS

	Kentucky	Warren County	Bowling Green	CT 107 BG 3	CT 108 BG 2	CT 108 BG 3
Total Households	1,590,647	35,365	19,277	2,777	849	1,760
Family (%)	69.4	66.2	55.5	79.1	70.0	95.8
Non-Family (%)	30.6	33.8	44.5	21.0	30.0	4.2
Average Household Size	2.47	2.46	2.27	2.30	2.53	2.84
Households with Individuals < 18 (%)	35.5	34.3	28.9	33.8	33.8	33.8
Households with Individuals ≥ 65 (%)	22.8	19.4	21.3	11.4	16.6	10.5
Living In Group Quarters	2.8	6.0	11.1	0.0	0.3	0.0

Source: 2000 US Census, American FactFinder

TABLE 4 – HOUSEHOLD UNITS AND COSTS

	Kentucky	Warren County	Bowling Green	CT 107 BG 3	CT 108 BG 2	CT 108 BG 3
Total Housing Units	1,750,927	38,350	21,290	1,333	881	676
Owner-Occupied Units (%)	70.8	64.0	47.0	39.0	72.4	95.5
Median Value	$86,700	$100,400	$104,200	$125,800	$143,800	$163,300
Renter-Occupied Units (%)	29.2	36.0	53.0	61.0	27.6	4.5
Median Gross Rent as % Household Income	24	24.4	25.1	19.7	26.6	29.4
Vacant Units (%)	9.2	7.8	9.5	8.7	5.8	4.4
Median Year Structure Built	1973	1977	1974	1991	1987	1995

Source: 2000 US Census, American FactFinder

TABLE 5 – INCOME AND POPULATION BELOW POVERTY LEVEL (1999)

	Kentucky	Warren County	Bowling Green	CT 107 BG 3	CT 108 BG 2	CT 108 BG 3
Median Household Income	$33,672	$36,151	$29,047	$41,399	$47,768	$76,068
Per Capita Income	$18,093	$18,847	$17,621	$24,352	$26,322	$26,874
Population Living Below Poverty Level (%)	15.8	15.4	21.8	10.5	6.3	4.0

Source: 2000 US Census, American FactFinder

6. Local Economy

Bowling Green is a part of the Barren River Area Development District, along with Simpson, Logan, Butler, Edmonson, Hart, Metcalfe, Barren, Monroe, and Allen counties. In September 2007, Warren County had an available civilian labor force of 59,050 individuals. In general, unemployment rates in Warren County have been lower than the state and national rates since 2002. In 2006, Warren County's unemployment rate was slightly higher than the national average, but still lower than the state average. Unemployment data for 2002 through 2006 is contained in Table 6, on page 15.

In 2000, 88.9 percent of Warren County residents were working inside the county, likely due to the strong economy in the Bowling Green metropolitan area. In October 2007, the Bowling Green Chamber of Commerce released data indicating that the Bowling Green metropolitan area's economy had grown faster than that of the state and nation. Bowling Green's gross domestic product (GDP) increased 9.5 percent between 2004 and 2005. Over the same period, Kentucky's GDP increased 5.1 percent, and the national GDP increased 6.4 percent.

Not surprisingly, due to the large percentage of the population working within the county, Warren County and Bowling Green residents have a shorter daily commute than the average Kentucky citizen. Warren County residents have a mean travel time to work of 19.6 minutes, and Bowling Green residents have a mean travel time to work of 16.3 minutes, while the state average is 23.5 minutes.

The largest industry employing Warren County workers is the service industry; 36.3 percent of

employees work in this industry. Other major industries employing Warren County workers are trade, transportation, and utilities (employing 21.0 percent of the population) and manufacturing (employing 17.8 percent of the population).

Since 2004, 40 manufacturers and support/service providers have located or expanded their existing facilities in Warren County, representing an investment of approximately $63 million in the area. Table 7 contains detained information regarding major businesses and industry located in Warren County. None of these facilities is located within the study area.

7. Agricultural Activity

As noted in Land Use, although much of the study area is zoned Agricultural District, agricultural activity is very limited in the study area with an impending continued decrease in such activity. The largest amount of agricultural activity in the study area occurs north of the intersection of Neal Howell Road and Three Springs Road (Exhibit 2, page 3). At the time of the field visit, the property was clear of any crop, but evidence of row cropping in the previous growing season was present. This area is however zoned a Planned Unit Development District and is therefore likely to transition to residential and/or associated uses. The fringes of this large area have already been transitioned to such.

Other sizeable, agricultural/institutional activity exists in the northwestern portion of the study area. The Western Kentucky University (WKU) Farm, although not directly an agricultural activity in the traditional sense, borders Elrod Road (Exhibit 2, page 3). The WKU Farm is approximately 780 acres and has an agricultural exposition center, sales and show arenas, and barns and stables.

Two other, private agricultural businesses exist in the study area, both of which are stables (Exhibit 2, page 3). Holladay Hill Stables is located on Smallhouse Road, while Pennyroyal Farm Stables is located just southwest of the Elrod Road bridge over the Natcher Parkway.

Prime farmland soils exist throughout the study area (Exhibit 1, page 3). By soil type, slightly more than 2,000 acres of the study area would be characterized prime farmland soils. However, under the Farmland Protection Act, 7 CSR 658.2(a), property within city limits are exempt from consideration as farmland.

TABLE 6 – UNEMPLOYMENT RATES

Year	United States (%)	Kentucky (%)	Warren County (%)
2002	5.8	5.7	5.1
2003	6.0	6.3	5.5
2004	5.5	5.5	4.6
2005	5.1	6.0	5.0
2006	4.6	5.7	4.8

Source: Kentucky Cabinet for Economic Development

TABLE 7 – MAJOR BUSINESS AND INDUSTRY

Firm	Product/Service	No. Of Employees	Year Established
AFNI	Business solution/call center	384	2000
Bowling Green Metalforming, LLC	Automotive parts	730	2004
Country Oven Bakery	Frozen dough and cakes	410	1981
DESA, LLC	Portable gas heaters and generators, corporate office, lighting, controls, electric power tools, door chimes	600	1964
Eagle Industries, LLC	Oak furniture	500	1992
Fruit of the Loom	Headquarters and distribution center	1,005	1988
General Motors Corp.	Automotive assembly – Chevrolet Corvette and Cadillac XLR	1,200	1980
Georgia Pacific Corporation	Paper plates	170	1993
Hill's Pet Nutrition, Inc.	Pet foods	188	1986
Holley Performance Products	Automotive and marine parts and accessories	340	1951
Huish Detergents, Inc.	Detergent	808	1994
NHK of American Suspension Components, Inc.	Automotive coil suspension springs, trunk lid torsion bars, stabilizer links	231	1987
Pan-Oston	Design, delivery, and service of custom metal and wood store fixtures and cash registers.	340	1988
Perot Systems Heathcare/ARS	Office consulting services and accounts receivable management for the healthcare industry	175	2003
Renaissance Mark, Inc.	Printed labels	200	1993
Scotty's Contracting and Stone, LLC	Asphalt and paving materials	300	1972
S-R of Kentucky, Inc.	Chroming plastic interior and exterior trims and moldings	292	1996
Trace Die Cast, Inc.	Aluminum die castings and secondary specialty machining	477	1988
Weyerhaeuser Co.	Corrugated shipping containers and point of purchase displays	250	1970

Source: Kentucky Cabinet for Economic Development

The Kentucky Environmental and Public Protection Cabinet, Division of Natural Resources, Department of Conservation (KDOC) oversees what are termed Agricultural Districts. These Agricultural Districts are not the same as Agricultural Districts noted previously as a zoning designation of the City-County Planning Commission. Kentucky's Agricultural District Program became law in Kentucky Revised Statute (KRS) 262 on July 15, 1982, after passage of House Bill 744, the Agricultural District and Conservation Act. No agricultural districts exist in or near the study area (KDOC 2007).

Agricultural Activity Along Neal Howell Road

8. Communities and Community Facilities

A review of aerial mapping definitively shows several communities or subdivisions located throughout the study area and beyond (Exhibit 2, page 3). These subdivisions consist of smaller, older developments such as the one located near the intersection of Smallhouse Road and Three Springs Road to larger, newer developments of several hundred homes. A newer, larger development, for example, exists between Elrod Road and Three Springs Road near the center and southern portions of the study area. Some developments are recent enough as to not appear on aerial mapping (Exhibit 2, page 3). Other "communities" exist in the form of older, typical rural residences lining the main roadways. Such communities may be found along all the main roadways traversing the study area, *i.e.*, Smallhouse Road, Elrod Road, Dillard Road, Neal Howell Road, and Three Springs Road. One community of this type exists very near the Elrod Road bridge over the Natcher Parkway. This "community" consists of three residences immediately northeast of the Parkway at Elrod Road.

Ridgewood Subdivision

Several community facilities either exist in the study area or are planned for construction in the study area. These facilities include two existing churches, one planned church, a cemetery, a park, a future school location, and an existing elementary school (Exhibit 2, page 3). Trinity Free Will Baptist Church and its associated Family Life Center are located along Smallhouse Road. Nearby and along Smallhouse Road is the future site of the Holy Spirit Parkside Catholic Church. Calvary Baptist Church and cemetery are located in the southeast quadrant formed by the crossing of Elrod Road over Natcher Parkway. Basis W. Griffin Park is located in the northwest quadrant of the Three Springs Road crossing of Natcher Parkway. The Park is owned by Warren County and operated by the Parks and Recreation Department of Warren County. This property covers approximately 115 acres and requires consideration under Section 4(f) of the Department of Transportation Act of 1966, which deals with the loss of park/recreational lands. The Park also requires consideration under Section 6(f) of the Land and Water

Conservation Fund Act as the Park received funds resulting from the Acto on three occasions since the 1970's (NPS 2007). A future school location is proposed approximately mid-way through the study area along Elrod Road. Foundation Christian Academy (FCA) is located along Three Springs Road just south of the Natcher Parkway. FCA accommodates students in preschool through sixth grades; this particular facility was opened in October 2007 although the school itself has existed since 1996 (FCA 2007).

Trinity Free Will Baptist Church

Holy Spirit Parkside Church - Future Location

Foundation Christian Academy

Calvary Baptist Church Cemetery - Natcher Parkway in Background

F. UST/Hazardous Materials

A site reconnaissance was conducted December 3, 2007 to identify UST locations and hazardous material concerns within the study area. The purpose of the site reconnaissance was to confirm the location of facilities identified in the environmental database research (EDR) report and document any other sites of concern observed within the study area. Sites of concern and the EDR report findings are described below, and shown on Exhibit 2, page 3.

An environmental regulatory agency database search was conducted for the study area. This database search evaluated databases from 37 federal databases and 10 State of Kentucky databases. An executive summary of the EDR report is located in Appendix B. Additionally, the Kentucky Geological Survey (KGS) maintains records on oil and gas wells within the state of Kentucky. The locations of oil and gas wells within the study area are shown on Exhibit 2 page 3.

Five sites were determined to be located inside the study area based on the EDR report. Of the five, one is a state hazardous waste site (SHWS), another is a Resource and Recovery Act (RCRA) small-quantity generator (SQG) and Facility Index System (FINDS) and the remaining three are UST locations.

The SHWS site identified is the McCoy Farm located at 2636 Three Springs Road. According to the EDR report, the status of this site is closed and is described as an exempt UST used for the storage of gasoline for farm equipment. The RCRA SQG/FINDS site identified is the Kentucky Department of Highways facility located at 2096 Three Springs Road. No violations have been reported for this site. However, both facilities are located on Three Springs Road along the eastern boundary of the study area and would not likely be impacted by the proposed interchange.

The three remaining UST locations are described below.

1. The Western Kentucky University (WKU) Farm located at 406 Elrod Road contains one exempt tank and one tank identified as "verified removal." The facility ID number for this site is U003991414. The exact location of the UST on the approximate 780-acre farm is unknown. Documentation of the verified removal should be reviewed for details of the tank location and removal process.

2. The Bowling Green VORTAC BWG (VOR) is located on Smallhouse Road. It has one UST with a tank status of "verified removal." There is also an above ground storage tank (AST) located at this facility, but it is not referenced in the EDR report. The facility ID for this site is U000722957. Since the UST is no longer present, it will not impact the proposed project. However, documentation of the verified removal should be reviewed for details of the tank removal process.

3. The Warren County State Maintenance Garage located at 2160 Three Springs Road had five tanks, all classified as "verfied removal." The facility ID for this site is U004109010. Since the tanks are no longer present and this facility is located on the eastern boundary of the study area, it would not be impacted by a proposed interchange. However, documentation of the verified removal should be reviewed for details of the tank removal process should any alternative be developed in this area.

Western Kentucky University Farm

Aerial Navigation Aid

Two oil and gas well sites are also located within the study area. One, not identified by the KGS database, is located on the Western Kentucky University Farm in the southwest quadrant of Elrod Road and the Natcher Parkway. Another oil and gas well, operated by Beamtec, is located approximately 800 feet southwest of the Natcher Parkway and adjacent to the Springfield Subdivision. Alternatives considered should avoid these locations due to the potential for significant cleanup cost and liability.

Gas Well Near Natcher and Elrod

The identified oil and gas well site and UST on the WKU Farm and the Bowling Green VOR UST tank represent the most significant potential hazards in the study area relative to likely interchange locations. Sites containing USTs can represent a significant cleanup cost liability. Additionally, closure documentation for all sites with removed USTs should be reviewed to determine a clean closure of the site or any problems associated with the UST removal process. Future alternatives should consider the potential for these significant cleanup costs associated with taking right-of-way associated with UST facilities and oil and gas well sites.

IV. SUMMARY

Based upon the preliminary data research and subsequent field reconnaissance, environmental concerns within the study area are typical for a previously agricultural dominated area in transition to residential uses. Particularly in areas where an interchange may be constructed for Elrod Road and the Natcher Parkway, environmental concerns relative to air quality, traffic noise, aquatic resources, threatened and endangered species, agricultural activity, communities and community facilities, and UST/hazardous materials sites does not appear to be significant.

A. Air Quality

The study area is in attainment for all transportation related air pollutants. It is not anticipated that any alternative developed by the planning study would negatively affect the attainment status of the study area. However, once project alternatives are developed and environmental documentation progresses, a determination should be made whether MSATs will be exempt from analysis or require a qualitative analysis.

B. Traffic Noise

Three noise sensitive areas were identified within the study area and include Calvary Baptist Church, Pennyroyal Farm Stables, and a group of three homes located north of Natcher Parkway on Elrod Road. These noise sensitive sites would need to be re-evaluated after scoping study alternatives are developed and environmental documentation progresses.

C. Aquatic Resources

National Wetland Inventory (NWI) mapping for the Bowling Green South 7.5 minute topographic quadrangle indicated the presence of 21 potential wetlands in the study area. Most of these wetlands are manmade farm ponds. Once scoping study alternatives are developed and environmental documentation progresses, the jurisdictional status of any of these wetlands within the boundaries of an alternative should be determined.

Due to the karst nature of the study area, impacts to surface waters are not likely as a result of any interchange construction. Since drainage is mostly sub-surface for the study area, adherence to the Kentucky Transportation Cabinet's policy paper for BMPs for karst areas, Design Memorandum No. 12-05, dated July 27, 2005, should be followed for any alternative constructed.

D. Threatened and Endangered Species

Roosting and foraging habitat for Indiana and gray bat is either present or has the potential to be present within the study area. To comply with Section 7 of the Endangered Species act for Indiana bat, potential impacts to Indiana bat or its habitat may be addressed in one of three ways: (i) a biological assessment may be conducted, (ii) tree cutting may be restricted to the period between October 15 and March 31, or (iii) KYTC may pay for the acquisition of summer maternity habitat (roost trees) under its Programmatic Biological Opinion Agreement with USFWS. Karst features within the study area represent potential gray bat roosting habitat and winter hibernating habitat for Indiana bat. Upon development of alternatives, closer examination of the area should be conducted to determine if any caves or sinkholes present within the study area meet the requirements for roosting and/or hibernating for either species.

To comply with Section 7 of the Endangered Species Act, a survey for Price's potato bean may need to be performed. If wooded areas are to be impacted by the project, once alternatives have been developed, these areas will need to be surveyed for Price's potato bean.

E. Agricultural Activity

Due to the changing land use in the study area, agricultural activity impacts are expected to be minimal. Prime farmland does exist throughout the study area, but the land's value as such has already and continues to be significantly compromises. Three agricultural businesses/ institutions do exist in the study area. They include the WKU Farm and two stables: Holladay Hill Stables and Pennyroyal Farm Stables. The latter agricultural business is located close to the existing Elrod Road bridge over the Natcher Parkway and could be impacted by alternatives developed as a result of this planning study.

F. Communities and Community Facilities

Communities exist throughout the study area and to a lesser degree community facilities. The most likely impact to a community or typical rural residential homes exists for those residences nearest the Elrod Road bridge over Natcher Parkway. Likewise, Calvary Baptist Church and cemetery are located very close to this bridge and represent the most likely impacted community facilities. The most significant resource in the study area is Basil W. Griffin Park; the Park presents a Section 4(f) concern as well as a Section 6(f) concern. Yet, this facility is far enough from probable interchange locations that no direct impacts are expected.

G. UST/Hazardous Materials

The identified oil and gas well site and UST on the WKU Farm and the Bowling Green VOR UST tank represent the most significant potential hazards in the study area relative to likely interchange locations. Sites containing USTs can represent a significant cleanup cost liability. Additionally, closure documentation for all sites with removed USTs should be reviewed to determine a clean closure of the site or any problems associated with the UST removal process. Future alternatives should consider the potential for these significant cleanup costs associated with taking right-of-way associated with UST facilities and oil and gas well sites. All others sites identified within the study area are located along Three Springs Road and are not likely to be locations of the proposed interchange.

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APPENDICES

APPENDIX A – NATURAL RESOURCES AGENCY CORRESPONDENCE

APPENDIX B – EDR REPORT SUMMARY

The EDR Radius Map
with GeoCheck®

Proposed Elrod Interchange
Elrod Roat at Natcher Pkwy
Bowling Green, KY 42104

Inquiry Number: 2086708.1s

November 27, 2007

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	6
Orphan Summary	24
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting Source Map	A-7
Physical Setting Source Map Findings	A-8
Physical Setting Source Records Searched	A-13

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

ELROD ROAT AT NATCHER PKWY
BOWLING GREEN, KY 42104

COORDINATES

Latitude (North):	36.920000 - 36° 55' 12.0''
Longitude (West):	86.459000 - 86° 27' 32.4''
Universal Tranverse Mercator:	Zone 16
UTM X (Meters):	548187.8
UTM Y (Meters):	4085931.5
Elevation:	536 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	36086-H4 BOWLING GREEN SOUTH, KY
Most Recent Revision:	1993

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

FEDERAL RECORDS

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
Delisted NPL ---------- National Priority List Deletions
NPL LIENS ---------- Federal Superfund Liens
CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned
CORRACTS ---------- Corrective Action Report
RCRA-TSDF ---------- Resource Conservation and Recovery Act Information
RCRA-LQG ---------- Resource Conservation and Recovery Act Information
ERNS ---------- Emergency Response Notification System

EXECUTIVE SUMMARY

HMIRS Hazardous Materials Information Reporting System
US ENG CONTROLS Engineering Controls Sites List
US INST CONTROL Sites with Institutional Controls
DOD Department of Defense Sites
FUDS Formerly Used Defense Sites
US BROWNFIELDS A Listing of Brownfields Sites
CONSENT Superfund (CERCLA) Consent Decrees
ROD Records Of Decision
UMTRA Uranium Mill Tailings Sites
ODI Open Dump Inventory
TRIS Toxic Chemical Release Inventory System
TSCA Toxic Substances Control Act
FTTS FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
SSTS Section 7 Tracking Systems
LUCIS Land Use Control Information System
DOT OPS Incident and Accident Data
ICIS Integrated Compliance Information System
DEBRIS REGION 9 Torres Martinez Reservation Illegal Dump Site Locations
HIST FTTS FIFRA/TSCA Tracking System Administrative Case Listing
US CDL Clandestine Drug Labs
RADINFO Radiation Information Database
LIENS 2 CERCLA Lien Information
PADS PCB Activity Database System
MLTS Material Licensing Tracking System
MINES Mines Master Index File
FINDS Facility Index System/Facility Registry System
RAATS RCRA Administrative Action Tracking System

STATE AND LOCAL RECORDS

HIST LF Historical Landfills
SB193 SB193 Branch Site Inventory List
INST CONTROL State Superfund Database
VCP Voluntary Cleanup Program Sites
DRYCLEANERS Drycleaner Listing
BROWNFIELDS Kentucky Brownfield Inventory
NPDES Permitted Facility Listing
AIRS Permitted Airs Facility Listing
LEAD Environmental Lead Program Report Tracking Database
PSTEAF Facility Ranking List

TRIBAL RECORDS

INDIAN RESERV Indian Reservations
INDIAN LUST Leaking Underground Storage Tanks on Indian Land
INDIAN UST Underground Storage Tanks on Indian Land

EDR PROPRIETARY RECORDS

Manufactured Gas Plants EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

EXECUTIVE SUMMARY

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL RECORDS

RCRAInfo: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System(RCRIS). The database includes selective information on sites which generate, transport, store , treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month Large quantity generators generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRA-SQG list, as provided by EDR, and dated 06/13/2006 has revealed that there are 2 RCRA-SQG sites within approximately 2 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
KENTUCKY DEPARTMENT OF HIGHWAY	***2096 THREE SPRINGS ROAD***	***1 - 2***	***ESE***	***A4***	***12***
USDA-ARS ANIMAL WASTE MGMT RES	230 BENNETT LANE	1 - 2	NW	10	20

STATE AND LOCAL RECORDS

SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Environmental Protection's Uncontrolled Site Branch List.

A review of the SHWS list, as provided by EDR, and dated 09/24/2007 has revealed that there are 3 SHWS sites within approximately 2 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
MCCOY FARM Facility Status: Closed	2636 THREE SPINGS RD	1 - 2	SE	5	13
WEYERHAEUSER CO SOUTH Facility Status: Managed	***5150 NASHVILLE RD***	***1 - 2***	***WNW***	***9***	***19***
BOWLING GREEN LANDFILL Facility Status: Active	NONE	1 - 2	NW	B13	22

EXECUTIVE SUMMARY

SWF/LF: The Solid Waste Facilities/Landfill Sites records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. The data come from the Department of Environmental Protection's List of All Active Contained & Residential Landfills/List of All Transfer Stations.

A review of the SWF/LF list, as provided by EDR, and dated 09/14/2007 has revealed that there is 1 SWF/LF site within approximately 2 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
BOWLING GREEN RESIDENTIAL LAND	W OF OLD LOUISVILLE RD	1 - 2	NW	B12	22

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Environmental Protection's Owner/Facility Report of All Tanks Regardless of Status list.

A review of the UST list, as provided by EDR, and dated 10/15/2007 has revealed that there are 8 UST sites within approximately 2 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir		Map ID	Page
WESTERN KY UNIVERSITY HOG FARM	406 ELROD RD	1/2 - 1	NE	1	6
BOWLING GREEN VORTAC BWG	SMALL HOUSE RD	1 - 2	NE	2	7
WARREN CO STATE MAINTENANCE GA	2160 THREE SPRINGS RD	1 - 2	ESE	A3	8
FORMER MINIT MART 87	1291 THREE SPRINGS RD	1 - 2	E	6	13
HAYS MARKET	RICHARDSVILLE RD	1 - 2	W	7	16
O N ELKINS	RICHARDSVILLE RD	1 - 2	W	8	17
FMC CORPORATION	US 31W S	1 - 2	WNW	11	20
WESTERN KY TRACTOR	NASHVILLE RD	1 - 2	NW	B14	22

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
KY 185 DRUMS	SHWS
COLTEC INDUSTRIAL HOLLEY RPD PLANT 7	SHWS
WESTERN KY UNIVERSITY	SHWS, SWF/LF, UST, AIRS
BOWLING GREEN GASLIGHT CO	SHWS
DESA US LLC	SHWS, AIRS
CITY OF BOWLING GREEN - SPRING ALLEY	SHWS
SPRINGHILL QUARRY	SHWS
BELLSOUTH	SHWS
WALLACE FORD MOTORS	SHWS
EATON CORP	SHWS
MCADOO PROPERTY	SHWS
NORRIS ROAD DRUM	SHWS
WARREN COUNTY RESIDENT ENGINEERS OFFICE	SHWS
KY 622 DRUMS	SHWS
KEITH FARM PONDS	CERCLIS, FINDS
SPRINGHILL ROCK QUARRY	CERCLIS, FINDS
WKU SCI. & TECHNOLOGY HALL	SB193
CONTRACTORS WASTE SERVICES FACILITY NO 4	SWF/LF
SUNNYSIDE GOTT NO 1	SWF/LF
SOUTHERN LEISURE INC RESIDENTIAL LANDFIL	SWF/LF
WHITE STONE OF WARREN INC	SWF/LF
BRISTOW LANDFILL	SWF/LF
KY NATIONAL GUARD ARMORY	SWF/LF
KENWAY CONTRACTING CD&D	SWF/LF
PETTYS CONTRACTING	SWF/LF
BOWLING GREEN STREET DEPT DUMP - MONARCH	SWF/LF
CONTRACTORS WASTE SERVICES FACILITY NO 3	SWF/LF
HABITAT FOR HUMANITY INTERNATIONAL	SWF/LF
ABONDONED DRUM	RCRA-SQG, FINDS
WESTERN KY UNIVERSITY OGDEN COLLEGE	RCRA-SQG, FINDS
HIDDEN RIVER SUBD	NPDES

THIRD ROCK CONSULTANTS

2514 Regency Road, Suite 104
Lexington, Kentucky 40503

Ph: 859-977-2000
Fax: 859-977-2001

www.thirdrockconsultants.com

Map Document: (P:\2007\3-130_Warren_EO07\Mapping\GIS\Exhibit2_aerial(24x36).mxd) 1/25/2008 -- 9:24:55 AM las

Incorporated city boundaries obtained from the Kentucky Office of GIS. Oil\Gas Well data downloaded from the Kentucky Geological Survey, May 2003. Aerial photography obtained from the USDA-FSA for Warren County dated 2004. County Road mapping was obtained from the Kentucky Transportation Cabinet. Study area boundary digitized based on map provided by GS&P email dated 9/24/07.

N
W E
S

MODERN WAY
LUCINDA DRIVE
SARAH DRIVE
RAINTREE DRIVE
LYNNWOOD WAY
CAVE MILL ROAD
ELIJAH COURT
CHEYENNE DRIVE
CEDARWOOD WAY
GARRETT DRIVE
MARTIN WAY
CARRIAGE HILL DRIVE
CROSS WINDS AVENUE
CROSSRIDGE STREET
RIDGESIDE AVENUE
NONE KNOWN
BAILY COURT
PINE GROVE BOULEVARD
SEQUOIA WAY
CEDAR WAY
FLEENOR WAY
PLEASANT WAY
CHENOWETH CIRCLE
PLANTERS WAY
NORTH MILL AVENUE
BEDDINGTON WAY
SMALLHOUSE ROAD
DISHMAN LANE
BARLEY WAY
CURTIS WAY
CAVE MILL ROAD
HALCOMB WAY
CROSSING BOULEVARD
RED OAK DRIVE
MONTGOMERY WAY
VICKSBURG COURT
LEXINGTON DRIVE
SPRINGWOOD DRIVE
HUNTING CREEK DRIVE
LANDON WAY
CURLING WAY
MEMPHIS JUNCTION ROAD
WN-9007-111 RAMP
CHARLESTON COURT
AMBER COURT
HUNT MASTER DRIVE
SMALLHOUSE ROAD
MCTAVISH WAY
TIPPERARY DRIVE
HEATHER WAY
ERIN WAY
BLUEGRASS DRIVE
PONTE AVENUE
GRIDER POND ROAD
KAMI DRIVE
LAKE SHORE DRIVE
BEAR WAY
BOW DRIVE
WILLIAMS AVENUE
CALVIN COURT
ELMHURST WAY
HELLOCREST DRIVE
MORNING GLORY DRIVE
ANDOVER STREET
NASHVILLE ROAD
NONE KNOWN
BENNETT LANE
LOIS LANE
NEPTUNE WAY
AQUARIUS WAY
KENILWOOD WAY
SATURN WAY
NONE KNOWN
WESTERN KENTUCKY UNIVERSITY
CAL BASTAL ROAD
ELROD ROAD
MORAGE STREET
DUNBARTON AVENUE
NONE KNOWN
Ridgewood Subdivision
Aerial Navigation Aid (VOR)
WN-9007-10 NC
3 Homes
SMALLHOUSE ROAD
Western Kentucky University Farm
Pennyroyal Farm Stables
Bowling Green
Calvary Baptist Church
Cemetery
NATCHER PARKWAY
Trinity Free Will Baptist Church & Family Life Center
Holladay Hill Stables
Future Location Holy Spirit Parkside Catholic Church
THREE SPRINGS ROAD
THREE SPRINGS LAKE
Basil W. Griffin Park
ONYX COURT
STERLING WAY
KOA CAMPGROUND ROAD
NONE KNOWN
WILLOW BEND COURT
HIDDEN SPRINGS DRIVE
SHETLAND DRIVE
HUNTERS CROSSING WAY
FOX RUN CIRCLE
Ivan Downs Residential Development
Future School Location
Hidden River Estates
TRILLIUM LANE
SPRINGFIELD BOULEVARD
The Springfield Subdivision
WN-9007
KOA Campground
Warren County State Maintenance Garage
I-65-10 NC
65
PREAKNESS WAY
ELROD ROAD
FARMER LANE
LINKS COURT
HERMAN AVENUE
WINTERGRESS LANE
Small Cattle Farm
CALUMET WAY
SECRETARIAT DRIVE
PAULETTE STREET
MASTERS WAY
Kentucky Dept. of Highways
McCoy Place Residential Development
Crimson Ridge Residential Development
SWEEPSTAKES COURT
KEMPTON COURT
Foundation Christian Academy
I-65-141 RAMP
I-65-131 RAMP
Spindletop Drive Residential Development
DILLARD ROAD
GOLFVIEW WAY
CHAMPIONS BOULEVARD
I-65
DEWEY LAKE
Bailey's Farm Residential Development
SOUTHWIND DRIVE
NEAL HOWELL ROAD
Agricultural Activity
CHAMPIONS BOULEVARD NC
PROSPECT LANE
SHULTZ ROAD
THREE SPRINGS ROAD
NUGGET DRIVE
Sutherland Farm Residential Development
WALNUT RIDGE WAY
LONG ROAD
CARTER-SIMS ROAD
BALDOCK ROAD
FRED LIVELY ROAD
MATLOCK ROAD

Oil/Gas Well Location
Study Area
Bowling Green City Limits

750 0 750 1,500 2,250 Feet

Exhibit 2
Human Environment
KYTC Item No. 3-130.00
Warren County, Kentucky

Steven L. Beshear
Governor

Robert D. Vance
Secretary
Environmental and Public
Protection Cabinet

Donald S. Dott, Jr.
Director

Commonwealth of Kentucky
Kentucky State Nature Preserves Commission
801 Schenkel Lane
Frankfort, Kentucky 40601-1403
502-573-2886 Voice
502-573-2355 Fax

December 21, 2007

Laura Butler
Third Rock Consultants
2514 Regency Road, Suite 104
Lexington, KY 40503

Data Request **08-091**

Dear Ms. Butler:

This letter is in response to your data request of December 6, 2007 for the Natcher Parkway and Elrod Road Possible Interchange project. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Kentucky State Nature Preserves Commission occur near the project area on the Bowling Green South USGS Quadrangle, as shown on the map provided. Please see the attached reports for more information, which reflect analysis of the project area with three buffers applied:

1-mile for all records – 21 records
5-mile for aquatic records – 50 records
5-mile for federally listed species – 13 records
10-mile for mammals and birds – 20 records

Myotis grisescens (Gray myotis, federally listed endangered, KSNPC threatened) is known to occur within five miles of the proposed project. A thorough survey for this species should be conducted by a qualified biologist if suitable habitat will be disturbed. The survey should include a search for potential roost and winter sites, and a mistnetting census at numerous points within the proposed corridor, particularly in preferred summer habitat. Summer foraging habitats include upland forests, bottomland forests and riparian corridors. Suitable roost and winter sites include sandstone and limestone caves, rockhouses, clifflines, auger holes, and abandoned mines. In order to avoid impacts to bats, bottomland forests and riparian corridors, particularly near caves, should not be disturbed.

The site is located within a karst landscape characterized by numerous sinkholes, underground conduits, or caves. Construction disturbance or release of pollutants within the specified area could

easily cause contamination of groundwater. Two subterranean species known to have occurred historically in the area are *Orconectes pellucidus* (Mammoth Cave crayfish, USFWS Species of Management Concern, KSNPC Special Concern), which is only known to occur in Kentucky and Tennessee; and *Typhlichthys subterraneus* (Southern Cavefish, federal species of management concern, KSNPC special concern). Caves are often associated with sensitive ecosystems and may provide habitat for a number of rare or endangered species. Cave organisms are heavily dependent on water quality, and steps should be taken to avoid introducing contaminants into the water system.

Many of the species reported are known only from historic records, but some are still known to persist in the Barren River, Drakes Creek, and Trammel Fork, including: *Barbicambarus cornutus* (Bottlebrush Crayfish, KSNPC Special Concern), *Etheostoma maculatum* (Spotted darter, KSNPC threatened, federal species of management concern), *Percina macrocephala* (Longhead darter, KSNPC threatened, federal species of management concern), *Phenacobius uranops* (Stargazing minnow, KSNPC Special Concern).

Aquatic species and habitats in the area are sensitive to increased turbidity, sediment, and other adverse influences on water quality. A written erosion control plan should be developed that includes stringent erosion control methods (i.e., straw bales, silt fences and erosion mats, immediate seeding and mulching of disturbed areas), which are placed in a staggered manner to provide several stages of control. All erosion control measures should be monitored periodically to ensure that they are functioning as planned. Our data are not sufficient to guarantee absence of endangered, threatened or sensitive species from the sites of proposed construction disturbance. We recommend that impacted streams be thoroughly surveyed by a qualified biologist prior to any in-stream disturbance.

Cistothorus platensis (Sedge Wren, KSNPC special concern) can be found in hayfields, meadows, and weedy fields.

Thyromanes bewickii (Bewick's Wren, KSNPC special concern, federal species of management concern) can be found in brushy areas, thickets, scrub in open country, open and riparian woodlands, and in country towns and farms.

Tyto alba (Barn Owl, KSNPC special concern) can be found in hollow trees, old buildings, barns, silos and other abandoned structures. Before demolition of existing structures, it should be determined that these birds are not present.

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request. The license agreement states "Data and data products received from the Kentucky State Nature Preserves Commission, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Kentucky State Nature Preserves Commission." The exact location of plants, animals, and natural communities, if released by the Kentucky State Nature Preserves Commission, may not be released in any document or correspondence. These products are provided on a temporary basis for the express project (described above) of the requester, and may not be redistributed, resold or copied without the written permission of the Kentucky State Nature Preserves

Commission's Data Manager (801 Schenkel Lane, Frankfort, KY, 40601. Phone: (502) 573-2886).

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed, and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

If you have any questions or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Sara Hines
Data Manager

SLD/SGH

Enclosures: Data Report and Interpretation Key

Data Key for Element and Occurrence Reports (v. 9.05)

Kentucky State Nature Preserves Commission
Natural Heritage Program Data Services

Many of the data fields on the enclosed report are easily understood. Other fields, however, use abbreviations and formats that are not always self-explanatory. A key to these fields follows. Your report may contain some or all of the following data fields.

BEARING:	Bearing in degrees from a center point to an occurrence's latitude and longitude. This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U, and Q precision occurrence records.
BESTSOURCE:	Best available reference to the occurrence: literature citation, collector, collection number, museum or herbarium code, etc.
COMMENTS:	Additional information about the occurrence including identification, taxonomy, or date of occurrence.
DIRECTIONS:	Directions to an occurrence. This field is masked for sensitive occurrences; contact KSNPC in these cases.
DISTANCE:	Distance from a center point to an occurrence's latitude and longitude. Units coded as M (miles), K (kilometers), and F (feet). This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U, and Q precision occurrence records.
ELCODE:	Element (species) code.
EOCODE:	Element (species) code, occurrence number (last three digits), and state.
EODATA:	Occurrence population data: date of observation, number of individuals, health, size of colony, flowering data, etc.
EORANK:	Judgement of occurrence quality: A = excellent, B = good, C = marginal, D = poor, E = verified extant but quality not judged, O = obscure (not found at reported site but more searching needed), H = historically known from site but no known observation or collection since 1975, X = extirpated from site.
FIRSTOBS:	Year of first known observation or collection.
GENDESC:	Description of an occurrence's habitat.
GRANK:	Estimate of element abundance on a global scale: G1 = extremely rare, G2 = rare, G3 = uncommon, G4 = common, G5 = very common, GH = historically known and expected to be rediscovered, GU = uncertain, GX = extinct. Subspecies and variety abundances are coded with a 'T' suffix; the 'G' portion of the rank then refers to the entire species.
HABITAT:	General description of the element's habitat across its range.
IDENT:	Whether the identification has been checked by a reliable individual and is believed to be correctly identified: Y = identification confirmed and believed correct, N = No, identification determined to be wrong despite reports to the contrary, ? = Whether identification is correct or not is confusing or disputed, blank or U = unknown whether identification correct or not, assumed correct.
KSNPC:	Kentucky State Nature Preserves Commission status: N or blank = none, E = endangered, T = threatened, S = special concern, H = historic, X = extirpated.
LASTOBS:	Year(-month-date) of most recent known observation or collection.
LAT:	Latitude. This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U and Q precision occurrences.
LONG:	Longitude. This field is masked for sensitive occurrences; contact KSNPC in these cases. Omitted for G, U and Q precision occurrences.
PREC:	See PRECISION.
PRECISION:	Precision of the latitude, longitude, directions, and plotted location: S = location accurate to within three seconds of latitude-longitude, M = location accurate to within one minute of latitude-longitude, G = precision within about 8 km or 5 miles, or to place name precision only, Q = element known from the quadrangle but site-specific locations are not recorded by KSNPC because the species may be relatively frequent on the

	quadrangle or is known to frequently move, U or blank = accuracy of location unknown or not specified. The accuracy of an occurrence's location is designated by the precision code assigned to the record. Only 'S' precision occurrence records are reliably mapped at or near their precise locations. While an attempt is made to map 'M' precision occurrences as accurately as possible, the plotted locations, lat, long, directions, bearing, and distance data fields may or may not be correct. 'G' and 'Q' precision occurrence locations are very unreliable and only should be used to indicate the possibility that the species is in the area.
SPROT:	See KSNPC.
SRANK:	Estimate of element abundance in Kentucky: S1 = extremely rare, S2 = rare, S3 = uncommon, S4 = many occurrences, S5 = very common, SA = accidental in state, SE = exotic, SH = historically known in state, SN = migratory or nonbreeding, SR = reported but without persuasive documentation, SRF = reported falsely in literature, SU = uncertain, SX = extirpated.
USESA:	U.S. Fish and Wildlife Service status: N or blank = none, LT = listed as threatened, LE = listed as endangered, C=Candidate.
OTHER STATUS:	SOMC = Designated by the U.S. Fish and Wildlife Service as a Species of Management Concern.
WATERBODY:	Name of the 11-digit Hydrologic Unit Code EPA Waterbody in which the occurrence is plotted.
WATERSHED:	See WATERBODY.

Standard Occurrence Report

KSNPC Federally Listed Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Vascular Plants																		
PDFAB0D020*009	*Apios priceana*	Price's Potato-bean	G2	S1	E	LT			1920-07-31	G	H	Warren	Bowling Green South Bowling Green North Polkville Rockfield Bristow	365847N	0862558W	05110002220 - West Fork of Drakes Creek 05110002190 - Barren River Lake	Near Bowling Green.	Rocky limestone open wooded slopes and floodplain edges among mixed hardwoods.
Freshwater Mussels																		
IMBIV10020*006	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1927-08-27	M	H	Warren	Bowling Green South Polkville	365841N	0862236W	05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 1 MI E OF MT. VICTOR.	Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989).
IMBIV10020*007	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1927-08-27	M	H	Warren	Polkville Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN R, 4 MI E OF BOWLING GREEN.	
IMBIV10020*076	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1989-01-16-pre	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake	Barren River at Bowling Green.	
IMBIV16184*003	*Epioblasma torulosa rangiana*	Northern Riffleshell	G2T2	S1	E	LE		Y	1927-08-27	M	H	Warren	Bowling Green South Polkville	365814N	0862258W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 1 MI SE MT VICTOR.	Riffles or shoals with current and substrate of sand and/or gravel in small to moderate-size rivers (Clarke 1981, Watters 1987).
IMBIV16184*008	*Epioblasma torulosa rangiana*	Northern Riffleshell	G2T2	S1	E	LE		Y	1978-pre	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER, BOWLING GREEN.	

Standard Occurrence Report
KSNPC Federally Listed Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV34030*076	*Plethobasus cyphyus*	Sheepnose	G3	S1	E	C		Y	1989-pre	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER, BOWLING GREEN.	Usually found in large rivers in current on mud, sand, or gravel bottoms at depth of 1-2 meters or more (Baker 1928, Parmalee 1967, Gordon and Layzer 1989).
IMBIV35060*003	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1927-08-27	G	H	Warren	Polkville Bristow Bowling Green North Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN R, 4 MI E OF BOWLING GREEN.	This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).
IMBIV35060*040	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1908-12-02	M	X	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER AT BOWLING GREEN.	
IMBIV35060*051	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1927-08-27	M	H	Warren	Bowling Green South Polkville	365814N	0862258W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 1 MI SE MT VICTOR.	
IMBIV35060*074	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	19--	S	H	Warren	Bowling Green South	365658N	0862416W	05110002220 - West Fork of Drakes Creek	DRAKES CREEK AT MIDDLE BRIDGE RD.	
IMBIV35240*031	*Pleurobema plenum*	Rough Pigtoe	G1	S1	E	LE		Y	1988-04-15	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER AT BOWLING GREEN.	Medium to large rivers in sand, gravel, and cobble substrates (Ahlstedt 1984, Bogan and Parmalee 1983, Clarke 1981, Neel and Allen 1964).

Mammals

Standard Occurrence Report

KSNPC Federally Listed Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
AMACC01040*124	*Myotis grisescens*	Gray Myotis	G3	S2	T	LE		Y	2005-07-21	S	E	Warren	Bowling Green South Bowling Green North	365959N	0862907W	05110002190 - Barren River Lake	Jennings Creek, ca 0.5 air mi E of Glen Lily Road.	

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

Extant in Kentucky

Freshwater Mussels

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV02040*022	*Alasmidonta marginata*	Elktoe	G4	S2	T	SOMC		Y	1927-09-26	S	H	Warren	Drake	365018N	0862527W	05110002220 - West Fork of Drakes Creek	WEST FORK DRAKES CREEK, MASSEY MILL.	Occurs in large to medium size streams but more typical of smaller streams (Buchanan 1980, Goodrich and Van Der Schalie 1944, Oesch 1984, Parmalee 1967, Wilson and Clark 1914). Sometimes found in lakes connected to rivers. Parmalee (1967) reported the preferred habitat to be small streams with good current sand or gravel bottoms, and depth of several inches to two feet. Buchanan (1980) found this species to be common in gravel and cobble substrate in 2 to 18 inches of water, Neel and Allen (1964) found this species to be more abundant in the mainstream Cumberland River than in small streams.
IMBIV02040*023	*Alasmidonta marginata*	Elktoe	G4	S2	T	SOMC		Y	1927-08-26	G	H	Warren	Bowling Green South Polkville Drake Allen Springs	365343N	0862253W	05110002340 - Trammel Creek 05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek 05110002200 - Bays Fork	DRAKES CREEK, 7.0 MI S OF BOWLING GREEN.	
IMBIV02040*041	*Alasmidonta marginata*	Elktoe	G4	S2	T	SOMC		Y	1908-12-02	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER AT BOWLING GREEN.	

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV02040*058	*Alasmidonta marginata*	Elktoe	G4	S2	T	SOMC		Y	1988-12-20-pre	M	H	Warren	Bowling Green South Polkville	365606N	0862332W	05110002220 - West Fork of Drakes Creek	DRAKES CREEK 5 MI SE OF BOWLING GREEN.	Occurs in large to medium size streams but more typical of smaller streams (Buchanan 1980, Goodrich and Van Der Schalie 1944, Oesch 1984, Parmalee 1967, Wilson and Clark 1914). Sometimes found in lakes connected to rivers. Parmalee (1967) reported the preferred habitat to be small streams with good current sand or gravel bottoms, and depth of several inches to two feet. Buchanan (1980) found this species to be common in gravel and cobble substrate in 2 to 18 inches of water, Neel and Allen (1964) found this species to be more abundant in the mainstream Cumberland River than in small streams.
IMBIV02040*069	*Alasmidonta marginata*	Elktoe	G4	S2	T	SOMC		Y	19--	S	H	Warren	Bowling Green South	365658N	0862416W	05110002220 - West Fork of Drakes Creek	DRAKES CREEK AT MIDDLE BRIDGE RD.	
IMBIV10020*006	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1927-08-27	M	H	Warren	Bowling Green South Polkville	365841N	0862236W	05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 1 MI E OF MT. VICTOR.	Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989).

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV10020*007	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1927-08-27	M	H	Warren	Polkville Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN R, 4 MI E OF BOWLING GREEN.	Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989).
IMBIV10020*076	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1989-01-16-pre	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake	Barren River at Bowling Green.	
IMBIV16184*003	*Epioblasma torulosa rangiana*	Northern Riffleshell	G2T2	S1	E	LE		Y	1927-08-27	M	H	Warren	Bowling Green South Polkville	365814N	0862258W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 1 MI SE MT VICTOR.	Riffles or shoals with current and substrate of sand and/or gravel in small to moderate-size rivers (Clarke 1981, Watters 1987).
IMBIV16184*008	*Epioblasma torulosa rangiana*	Northern Riffleshell	G2T2	S1	E	LE		Y	1978-pre	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER, BOWLING GREEN.	
IMBIV16190*007	*Epioblasma triquetra*	Snuffbox	G3	S1	E	SOMC		Y	1927-08-26	S	H	Warren	Drake	365018N	0862527W	05110002220 - West Fork of Drakes Creek	WEST FORK DRAKES CREEK, MASSEY MILL.	Occurs in medium-sized streams to large rivers generally on mud, rocky, gravel, or sand substrates in flowing water (Baker 1928, Buchanan 1980, Johnson 1978, Murrary and Leonard 1962, Parmalee 1967). Often deeply buried in substrate and overlooked by collectors.
IMBIV16190*078	*Epioblasma triquetra*	Snuffbox	G3	S1	E	SOMC		Y	1964-07-17	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER AT RT 31W BRIDGE AT BOWLING GREEN.	

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV16190*097	*Epioblasma triquetra*	Snuffbox	G3	S1	E	SOMC		Y	1927-08-24	G	H	Warren	Bowling Green South Allen Springs Bowling Green North Drake Polkville Bristow	365606N	0862332W	05110002190 - Barren River Lake 05110002340 - Trammel Creek 05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 5 MI SE OF BOWLING GREEN.	Occurs in medium-sized streams to large rivers generally on mud, rocky, gravel, or sand substrates in flowing water (Baker 1928, Buchanan 1980, Johnson 1978, Murrary and Leonard 1962, Parmalee 1967). Often deeply buried in substrate and overlooked by collectors.
IMBIV17120*018	*Fusconaia subrotunda*	Longsolid	G3	S3	S			Y	1927-	G	H	Warren	Polkville Bristow Bowling Green North Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER, 4 MI E OF BOWLING GREEN.	Gravel bars and deep pools in large rivers and large to medium-sized streams (Ahlstedt 1984, Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967).
IMBIV17120*068	*Fusconaia subrotunda*	Longsolid	G3	S3	S			Y	1908-11-30	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER AT BOWLING GREEN.	
IMBIV21130*002	*Lampsilis ovata*	Pocketbook	G5	S1	E			Y	1927-08-27	M	H	Warren	Bowling Green South Polkville	365841N	0862236W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 1.0 MI E OF MOUNT VICTOR.	Considered a large river species (Clench and Van Der Schalie 1944, Parmalee 1967, Stansbery 1976), but occurs in medium-sized streams in gravel, sand, or even mud (Parmalee 1967, Johnson 1970, Gordon and Layzer 1989). In the Lower Wabash and Ohio Rivers specimens were taken in deep water (6-10 feet or more) in current from sand or gravel.

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV21130*032	*Lampsilis ovata*	Pocketbook	G5	S1	E			Y	1908-11-30	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER AT BOWLING GREEN.	Considered a large river species (Clench and Van Der Schalie 1944, Parmalee 1967, Stansbery 1976), but occurs in medium-sized streams in gravel, sand, or even mud (Parmalee 1967, Johnson 1970, Gordon and Layzer 1989). In the Lower Wabash and Ohio Rivers specimens were taken in deep water (6-10 feet or more) in current from sand or gravel.
IMBIV34030*076	*Plethobasus cyphyus*	Sheepnose	G3	S1	E	C		Y	1989-pre	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER, BOWLING GREEN.	Usually found in large rivers in current on mud, sand, or gravel bottoms at depth of 1-2 meters or more (Baker 1928, Parmalee 1967, Gordon and Layzer 1989).
IMBIV35060*003	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1927-08-27	G	H	Warren	Polkville Bristow Bowling Green North Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN R, 4 MI E OF BOWLING GREEN.	This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).
IMBIV35060*040	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1908-12-02	M	X	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER AT BOWLING GREEN.	
IMBIV35060*051	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1927-08-27	M	H	Warren	Bowling Green South Polkville	365814N	0862258W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 1 MI SE MT VICTOR.	

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV35060*074	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	19--	S	H	Warren	Bowling Green South	365658N	0862416W	05110002220 - West Fork of Drakes Creek	DRAKES CREEK AT MIDDLE BRIDGE RD.	This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).
IMBIV35240*031	*Pleurobema plenum*	Rough Pigtoe	G1	S1	E	LE		Y	1988-04-15	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER AT BOWLING GREEN.	Medium to large rivers in sand, gravel, and cobble substrates (Ahlstedt 1984, Bogan and Parmalee 1983, Clarke 1981, Neel and Allen 1964).
IMBIV39041*007	*Quadrula cylindrica cylindrica*	Rabbitsfoot	G3T3	S2	T	SOMC		Y	1927-08-27	G	H	Warren	Polkville Bristow Bowling Green North Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER 4 MI E OF BOWLING GREEN.	Small to large rivers with sand, gravel, and cobble and moderate to swift current, sometimes in deep water (Parmalee 1967, Bogan and Parmalee 1983).
IMBIV39041*010	*Quadrula cylindrica cylindrica*	Rabbitsfoot	G3T3	S2	T	SOMC		Y	1927-08-26	S	H	Warren	Drake	365018N	0862527W	05110002220 - West Fork of Drakes Creek	WEST FORK DRAKES CREEK, MASSEY MILL.	
IMBIV43030*002	*Toxolasma lividus*	Purple Lilliput	G2	S1	E	SOMC		Y	1927-08-25	G	H	Warren	Bowling Green South Polkville Drake Allen Springs	365343N	0862253W	05110002340 - Trammel Creek 05110002220 - West Fork of Drakes Creek 05110002200 - Bays Fork 05110002190 - Barren River Lake	DRAKES CREEK, 7 MI S BOWLING GREEN.	Small to medium-sized streams (Goodrich and Van Der Schalie 1944, Parmalee 1967, Stansbery 1976, Lauritsen 1987). Parmalee (1967) reported its occurrence on mud but related that sand or fine gravel beds in shallow running water was the preferred habitat.

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV43030*015	*Toxolasma lividus*	Purple Lilliput	G2	S1	E	SOMC		Y	1927-08-27	S	H	Warren	Drake	365018N	0862527W	05110002220 - West Fork of Drakes Creek	WEST FORK DRAKES CREEK, MASSEY MILL.	Small to medium-sized streams (Goodrich and Van Der Schalie 1944, Parmalee 1967, Stansbery 1976, Lauritsen 1987). Parmalee (1967) reported its occurrence on mud but related that sand or fine gravel beds in shallow running water was the preferred habitat.
IMBIV47070*006	*Villosa lienosa*	Little Spectaclecase	G5	S3S4	S			Y	1927-08-26	S	H	Warren	Drake	365018N	0862527W	05110002220 - West Fork of Drakes Creek	WEST FORK DRAKES CREEK AT MASSEY MILL.	Inhabits small to medium-sized rivers, usually in shallow water on a sand/mud/detritus bottom (Parmalee 1967, Gordon and Layzer 1989).
IMBIV47070*007	*Villosa lienosa*	Little Spectaclecase	G5	S3S4	S			Y	1927-08-27	M	H	Warren	Bowling Green South Polkville	365841N	0862236W	05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 1 MI E OF MT VICTOR.	
IMBIV47070*008	*Villosa lienosa*	Little Spectaclecase	G5	S3S4	S			Y	1927-08-25	M	H	Warren	Bowling Green South Polkville	365343N	0862253W	05110002220 - West Fork of Drakes Creek	DRAKES CREEK 7 MI S OF BOWLING GREEN.	
IMBIV47070*009	*Villosa lienosa*	Little Spectaclecase	G5	S3S4	S			Y	1927-08-27	M	H	Warren	Polkville Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER 4 MI E OF BOWLING GREEN.	
IMBIV47070*055	*Villosa lienosa*	Little Spectaclecase	G5	S3S4	S			Y	1964-07-17	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake	BARREN RIVER AT BOWLING GREEN.	

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV47100*002	*Villosa ortmanni*	Kentucky Creekshell	G2	S2	T	SOMC		Y	1927-08-27	M	X	Warren	Bowling Green South Polkville	365841N	0862236W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	Drakes Creek, 1 mi E of Mt. Victor.	Free-flowing, upland rivers that range in size from small (1st order) spring fed streams to the Green River (Cicerello 1994). Many flow permanently, but others sometimes have no flow. Substrates range from cobble and boulder with mixed gravel and sand over bedrock to clayey-mud. Depths range from less than 6 inches to more than 2 meters.
IMBIV47100*003	*Villosa ortmanni*	Kentucky Creekshell	G2	S2	T	SOMC		Y	1927-08-25	G	H	Warren	Bowling Green South Polkville Drake Allen Springs	365343N	0862253W	05110002220 - West Fork of Drakes Creek 05110002200 - Bays Fork 05110002190 - Barren River Lake 05110002340 - Trammel Creek	Drakes Creek, 7 mi S of Bowling Green.	
IMBIV47100*004	*Villosa ortmanni*	Kentucky Creekshell	G2	S2	T	SOMC		Y	1927-08-27	G	X	Warren	Polkville Bristow Bowling Green North Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	Barren River, 4 mi E of Bowling Green.	
IMBIV47100*010	*Villosa ortmanni*	Kentucky Creekshell	G2	S2	T	SOMC		Y	2000-08-09	S	F	Warren	Drake	365018N	0862527W	05110002220 - West Fork of Drakes Creek	West Fork Drakes Creek, Massey Mill.	
IMBIV47100*032	*Villosa ortmanni*	Kentucky Creekshell	G2	S2	T	SOMC		Y	1964-08-17	M	H	Warren	Bowling Green North Bowling Green South	370002N	0862544W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	Barren River at RT 31W bridge at Bowling Green.	
Crustaceans																		
ICMAL49010*032	*Barbicambarus cornutus*	Bottlebrush Crayfish	G3G4	S2	S			Y	2000-08-09	S	D	Warren	Drake	365018N	0862527W	05110002220 - West Fork of Drakes Creek	West Fork Drakes Creek at KY 622.	Lives under or near large, flat cobbles or boulders in streams.

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
ICMAL49010*037	*Barbicambarus cornutus*	Bottlebrush Crayfish	G3G4	S2	S			Y	2004-10-04	S	BC	Warren	Bowling Green North Bowling Green South	370005N	0862550W	05110002190 - Barren River Lake	Barren River at rock dam upstream from KY 68/80 in NE Bowling Green.	
Fishes																		
AFCQC02420*049	*Etheostoma maculatum*	Spotted Darter	G2	S2	T	SOMC		Y	2001-07-24	S	D	Warren	Drake	365018N	0862527W	05110002220 - West Fork of Drakes Creek	WEST FORK DRAKES CREEK AT KY 622.	Inhabits medium to large streams where it occurs among coarse gravel, cobble and boulders in swift riffles and shoals (Kuehne and Barbour 1983, Page 1983, Zorach and Raney 1967, Stiles 1972, Burr and Warren 1986, Kessler 1992).
AFCJB15010*004	*Hybopsis amnis*	Pallid Shiner	G4	S1	E	SOMC		Y	1955-07-21	G	H	Warren	Bowling Green North Bowling Green South Hadley Rockfield	370034N	0862818W	05110002190 - Barren River Lake 05110002350 - Gasper River 05110002220 - West Fork of Drakes Creek	LARGE SPRING IN JENNINGS CREEK.	Sandy and silty pools of medium to large rivers (Page and Burr 1991).
AFCQC04120*011	*Percina macrocephala*	Longhead Darter	G3	S1	E	SOMC		Y	1890-	G	H	Warren	Bowling Green North Bowling Green South Bristow Hadley Polkville Rockfield	370044N	0862509W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BIG BARREN RIVER, 0.75 MI. NE. OF BOWLING GREEN.	Clear, upland streams and rivers with moderate current, over clean substrates, often above and below riffles (Kuehne and Barbour 1983, Page 1983, Burr and Warren 1986).
AFCQC04120*022	*Percina macrocephala*	Longhead Darter	G3	S1	E	SOMC		Y	1890-08-02	G	H	Warren	Bowling Green South Polkville Bristow Drake Allen Springs Bowling Green North	365606N	0862332W	05110002340 - Trammel Creek 05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	DRAKE CREEK, 8 MI SE OF BOWLING GREEN, JUST BELOW THE SHAKER MILL, AND ABOUT 5 MI FROM MOUTH AT BIG BARREN RIVER.	

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
AFCQC04120*030	*Percina macrocephala*	Longhead Darter	G3	S1	E	SOMC		Y	1993-10-25	S	B	Warren	Allen Springs	365224N	0862223W	05110002340 - Trammel Creek	TRAMMEL FORK AT FORD APPROX 0.2 KM UPSTREAM FROM DRAKES CREEK CONFLUENCE, APPROX 1.7 KM W OF KY 231-KY 872 JCT AT ALVATON.	Clear, upland streams and rivers with moderate current, over clean substrates, often above and below riffles (Kuehne and Barbour 1983, Page 1983, Burr and Warren 1986).
AFCJB30050*011	*Phenacobius uranops*	Stargazing Minnow	G4	S2S3	S			?	1890-08-02	G	H	Warren	Bowling Green South Polkville Bristow Drake Allen Springs Bowling Green North	365606N	0862332W	05110002190 - Barren River Lake 05110002340 - Trammel Creek 05110002220 - West Fork of Drakes Creek	DRAKE CREEK 8 MI SE OF BOWLING GREEN, JUST BELOW THE SHAKER MILL, AND ABOUT 5 MI FROM THE POINT WHERE THIS CREEK FLOWS INTO BIG BARREN RIVER.	Inhabits medium-size streams to small rivers with high gradient, permanent flow, clear water, and pebble and gravel substrates (Burr and Warren 1986).
AFCJB30050*018	*Phenacobius uranops*	Stargazing Minnow	G4	S2S3	S			Y	1890-08-01	G	H	Warren	Bowling Green North Bowling Green South Bristow Hadley Polkville Rockfield	370044N	0862509W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BIG BARREN RIVER 0.75 MI NE OF BOWLING GREEN.	
AFCJB30050*021	*Phenacobius uranops*	Stargazing Minnow	G4	S2S3	S			Y	1970-06-09	G	E	Warren Allen	Polkville Meador Bristow Bowling Green South Allen Springs	365635N	0861832W	05110002200 - Bays Fork 05110002190 - Barren River Lake 05110002030 - Barren River\Bowling Green 05110002220 - West Fork of Drakes Creek	(BARREN RIVER) 4 MI W CLAYPOOL (PLOTTED 4 MI NW CLAYPOOL).	

Standard Occurrence Report

KSNPC Monitored Aquatic Elements within a 5-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
AFCLA04010*009	*Typhlichthys subterraneus*	Southern Cavefish	G4	S2S3	S	SOMC		Y	1957-pre	G	H	Warren Simpson	Woodburn Rockfield Drake Bowling Green South	365209N	0863051W	05110002220 - West Fork of Drakes Creek 05110002240 - Lick Creek\Hickory Flat 05110002350 - Gasper River 05110002190 - Barren River Lake	RICH POND.	Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, Pflieger 1975, Starnes and Etnier 1980, Burr and Warren 1986).

SENSITIVE ELEMENTS: Locational information for sensitive plants, animals, and natural communities, if released by the Kentucky State Nature Preserves Commission, may not be released in any document or correspondence. Please refer to the Data License Agreement for a full description of rights and restrictions.

Extant in Kentucky

Crustaceans

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
ICMAL11070*025	*Orconectes pellucidus*	Mammoth Cave Crayfish	G5	S3	S	SOMC		Y	1964-08-07	S	H	Warren	Bowling Green South	CONTACT KSNPC	CONTACT KSNPC	05110002190 - Barren River Lake	SENSITIVE ELEMENT-CONTACT KSNPC	Subterranean waters (Hobbs 1976).

Fishes

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
AFCLA04010*002	*Typhlichthys subterraneus*	Southern Cavefish	G4	S2S3	S	SOMC		Y	1969-10-24	S	H	Warren	Bowling Green South	CONTACT KSNPC	CONTACT KSNPC	05110002190 - Barren River Lake	SENSITIVE ELEMENT-CONTACT KSNPC	Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, Pflieger 1975, Starnes and Etnier 1980, Burr and Warren 1986).

Standard Occurrence Report

KSNPC Monitored Birds and Mammals within a 10-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Breeding Birds																		
ABNJB10150*002	*Anas clypeata*	Northern Shoveler	G5	S1	E			Y	1989-07-17	S	D	Warren	Woodburn	365207N	0863013W	05110002190 - Barren River Lake	McElroy Lake.	Nests occasionally in temporary karst lakes in open agricultural land.
ABNJB10130*002	*Anas discors*	Blue-winged Teal	G5	S1S2B	T			Y	1998-07-17	S	C	Warren	Woodburn	365206N	0863014W	05110002190 - Barren River Lake	McElroy Lake or 'Rich Pond'; southern part of county, just E of KY 884, 1.5 mi SW of Rich Pond.	Marshes, ponds, sloughs, lakes and sluggish streams. In migration and when not breeding, in both freshwater and brackish situations (B83COM01NA).
ABNJB10130*003	*Anas discors*	Blue-winged Teal	G5	S1S2B	T			Y	1997-07-14	S	C	Warren	Woodburn	365223N	0863222W	05110002190 - Barren River Lake	Chaney Lake, W of US 31W, 2 mi N of Woodburn.	
ABNJB10130*005	*Anas discors*	Blue-winged Teal	G5	S1S2B	T			Y	1989-06-06	S	D	Simpson	Woodburn	364849N	0863616W	05110002350 - Gasper River	Ca 3.35 mi NW of Salmons, on E side of Adams Road, ca 0.35 mi S of jct KY 621.	
ABPBX96010*050	*Chondestes grammacus*	Lark Sparrow	G5	S2S3B	T			Y	1968-06-09	M	H	Warren	Polkville	365308N	0861945W	05110002190 - Barren River Lake	Vicinity of Alvaton, along Goshen Road, nr jct w/ H.E. Johnson Road ca 2.0 air mi ENE of town (Iron Bridge BBS Route, Stop 41) (050A) and along Bays Fork Road, ca 1.5 mi NE of town (Iron Bridge BBS Route, Stop 42) (050B).	Open situations with scattered bushes and trees, prairie, forest edge, cultivated areas, orchards, fields with bushy borders, and savanna (B83COM01NA).
ABPBX96010*052	*Chondestes grammacus*	Lark Sparrow	G5	S2S3B	T			Y	1998-07-23	M	E	Warren	Rockfield	365239N	0863415W	05110002350 - Gasper River	West side Old Downing (Vance) Road, 0.7 rd mi N jct KY 240.	

Standard Occurrence Report

KSNPC Monitored Birds and Mammals within a 10-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
ABPBG10010*009	*Cistothorus platensis*	Sedge Wren	G5	S3B	S			Y	1989-summer	S	E	Warren	Woodburn	365153N	0863053W	05110002190 - Barren River Lake	McElroy Farm.	Grasslands and savanna, especially where wet or boggy, sedge marshes, locally in dry cultivated grainfields. In migration and winter also in brushy grasslands. (B83COM01NA)
ABNME14020*001	*Fulica americana*	American Coot	G5	S1B	E			Y	1939	M	H	Warren	Woodburn Drake Rockfield	365206N	0863014W	05110002190 - Barren River Lake	McElroy or Rich Pond Lake, just E of SR-884, approx 1.5 mi SE of Rich Pond.	Freshwater lakes, ponds, marshes, and larger rivers, wintering also on brackish estuaries and bays. Also on land bordering these habitats.
ABNME14020*002	*Fulica americana*	American Coot	G5	S1B	E			Y	1950-summer	M	H	Warren	Woodburn Rockfield	365223N	0863222W	05110002190 - Barren River Lake	Chaney Lake, just W of US-31W, 2 mi N of Woodburn.	
ABNME13010*001	*Gallinula chloropus*	Common Moorhen	G5	S1S2B	T			Y	1935-08-06	M	H	Warren	Woodburn Drake Rockfield	365206N	0863014W	05110002190 - Barren River Lake	McElroy Lake, approx. 1 mi S of Rich Pond.	Freshwater marshes, canals, quiet rivers, lakes, ponds, mangroves, primarily in areas of emergent vegetation and grassy borders; taro patches in HI.
ABNJB20010*007	*Lophodytes cucullatus*	Hooded Merganser	G5	S1S2B, S3S4N	T			Y	1997-06-05	S	C	Warren	Woodburn	365223N	0863222W	05110002190 - Barren River Lake	Chaney Lake, W of US 31W, ca 10.0 mi S of Bowling Green.	Streams, lakes, swamps, marshes, and estuaries; winters mostly in freshwater but also regularly in estuaries and sheltered bays (B83COM01NA).
ABNGA13010*002	*Nyctanassa violacea*	Yellow-crowned Night-heron	G5	S2B	T			Y	1949-04-13	G	H	Warren	Bowling Green South	365602N	0862703W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	Lowland Woods about 4 mi S of Bowling Green.	Marshes, swamps, lakes, lagoons, and mangroves.

Standard Occurrence Report

KSNPC Monitored Birds and Mammals within a 10-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
ABNCA02010*006	*Podilymbus podiceps*	Pied-billed Grebe	G5	S1B,S4N	E			Y	1989-07-04	S	D	Warren	Woodburn	365206N	0863014W	05110002190 - Barren River Lake	Ravine [low area/ditch] of McElroy Lake.	Lakes, ponds, sluggish streams, and marshes; also in brackish bays and estuaries in migration and when not breeding.
ABNCA02010*008	*Podilymbus podiceps*	Pied-billed Grebe	G5	S1B,S4N	E			Y	1998-08-08	S	C	Warren	Rockfield Woodburn	365230N	0863225W	05110002190 - Barren River Lake	Chaney Lake.	
ABPBG07010*016	*Thryomanes bewickii*	Bewick's Wren	G5	S3B	S	SOMC		Y	1987-	M	E	Warren	Bowling Green South	365845N	0862422W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	Northeast Block of quadrangle.	Brushy areas, thickets and scrub in open country, open and riparian woodland, and chaparral, more commonly in arid regions but locally also in humid areas (subtropical and temperate zones) (B83COM01NA). Found in country towns and farms.
ABPBG07010*020	*Thryomanes bewickii*	Bewick's Wren	G5	S3B	S	SOMC		Y	1991-06-10	S	E	Simpson	Drake	364839N	0862915W	05110002220 - West Fork of Drakes Creek	Circa 1.25 air mi NNW of Hiseville.	
ABNSA01010*039	*Tyto alba*	Barn Owl	G5	S3	S			Y	2004-06-09	S	E	Warren	Bowling Green South	365249N	0862508W	05110002190 - Barren River Lake	Vicinity of Plano.	
Mammals																		
AMACC01040*124	*Myotis grisescens*	Gray Myotis	G3	S2	T	LE		Y	2005-07-21	S	E	Warren	Bowling Green South Bowling Green North	365959N	0862907W	05110002190 - Barren River Lake	Jennings Creek, ca 0.5 air mi E of Glen Lily Road.	

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Extant in Kentucky

Mammals

Standard Occurrence Report

KSNPC Monitored Birds and Mammals within a 10-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
AMACC01040*043	*Myotis grisescens*	Gray Myotis	G3	S2	T	LE		Y	2006-06	S	A	Simpson	Woodburn	CONTACT KSNPC	CONTACT KSNPC	05110002220 - West Fork of Drakes Creek	SENSITIVE ELEMENT-CONTACT KSNPC	Gray bats use primarily caves throughout the year, although they move from one cave to another seasonally. Males and young of the year use different caves in summer than females.
AMACC01040*087	*Myotis grisescens*	Gray Myotis	G3	S2	T	LE		Y	2000-06-14	S	D	Warren	Allen Springs	CONTACT KSNPC	CONTACT KSNPC	05110002340 - Trammel Creek	SENSITIVE ELEMENT-CONTACT KSNPC	

Standard Occurrence Report

KSNPC Monitored Elements within a 1-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Vascular Plants																		
PDFAB0D020*009	*Apios priceana*	Price's Potato-bean	G2	S1	E	LT			1920-07-31	G	H	Warren	Bowling Green South Bowling Green North Polkville Rockfield Bristow	365847N	0862558W	05110002220 - West Fork of Drakes Creek 05110002190 - Barren River Lake	Near Bowling Green.	Rocky limestone open wooded slopes and floodplain edges among mixed hardwoods.
PMPON03030*001	*Heteranthera limosa*	Blue Mud-plantain	G5	S2S3	S			Y	1968-10-18	G	H	Warren	Rockfield Woodburn Drake Bowling Green South	365424N	0863051W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek 05110002350 - Gasper River	ON FARM ALONG US 31W, CA 5.0 MI S OF BOWLING GREEN.	Sloughs, pond margins and mud flats.
PDBRA1L060*007	*Leavenworthia torulosa*	Necklace Gladecress	G4	S2	T				1970-04-13	G	H	Warren Simpson Logan	Woodburn Drake Auburn Rockfield Bowling Green South	365132N	0863208W	05110002240 - Lick Creek\Hickory Flat 05110002220 - West Fork of Drakes Creek 05110002350 - Gasper River 05110002190 - Barren River Lake	ABOUT 15 KM SW OF BOWLING GREEN ON US-31W.	Limestone glades and other thin-soil areas where limestone bedrock is at or near surface, holding water in spring.
PDFAB40210*014	*Trifolium reflexum*	Buffalo Clover	G3G4	S1S2	E			Y	1910-	G	H	Warren	Rockfield Bowling Green South Polkville Bristow Bowling Green North Hadley	365904N	0862624W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek 05110002350 - Gasper River	BOWLING GREEN.	Prairies and disturbed openings either associated with forests or opportunistically in fields or well-drained sites.
Freshwater Mussels																		

Standard Occurrence Report
KSNPC Monitored Elements within a 1-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV02040*023	*Alasmidonta marginata*	Elktoe	G4	S2	T	SOMC		Y	1927-08-26	G	H	Warren	Bowling Green South Polkville Drake Allen Springs	365343N	0862253W	05110002340 - Trammel Creek 05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek 05110002200 - Bays Fork	DRAKES CREEK, 7.0 MI S OF BOWLING GREEN.	Occurs in large to medium size streams but more typical of smaller streams (Buchanan 1980, Goodrich and Van Der Schalie 1944, Oesch 1984, Parmalee 1967, Wilson and Clark 1914). Sometimes found in lakes connected to rivers. Parmalee (1967) reported the preferred habitat to be small streams with good current sand or gravel bottoms, and depth of several inches to two feet. Buchanan (1980) found this species to be common in gravel and cobble substrate in 2 to 18 inches of water, Neel and Allen (1964) found this species to be more abundant in the mainstream Cumberland River than in small streams.
IMBIV02040*058	*Alasmidonta marginata*	Elktoe	G4	S2	T	SOMC		Y	1988-12-20-pre	M	H	Warren	Bowling Green South Polkville	365606N	0862332W	05110002220 - West Fork of Drakes Creek	DRAKES CREEK 5 MI SE OF BOWLING GREEN.	
IMBIV16190*097	*Epioblasma triquetra*	Snuffbox	G3	S1	E	SOMC		Y	1927-08-24	G	H	Warren	Bowling Green South Allen Springs Bowling Green North Drake Polkville Bristow	365606N	0862332W	05110002190 - Barren River Lake 05110002340 - Trammel Creek 05110002220 - West Fork of Drakes Creek	DRAKES CREEK, 5 MI SE OF BOWLING GREEN.	Occurs in medium-sized streams to large rivers generally on mud, rocky, gravel, or sand substrates in flowing water (Baker 1928, Buchanan 1980, Johnson 1978, Murrary and Leonard 1962, Parmalee 1967). Often deeply buried in substrate and overlooked by collectors.

Standard Occurrence Report

KSNPC Monitored Elements within a 1-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV17120*018	*Fusconaia subrotunda*	Longsolid	G3	S3	S			Y	1927-	G	H	Warren	Polkville Bristow Bowling Green North Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER, 4 MI E OF BOWLING GREEN.	Gravel bars and deep pools in large rivers and large to medium-sized streams (Ahlstedt 1984, Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967).
IMBIV35060*003	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1927-08-27	G	H	Warren	Polkville Bristow Bowling Green North Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN R, 4 MI E OF BOWLING GREEN.	This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).
IMBIV39041*007	*Quadrula cylindrica cylindrica*	Rabbitsfoot	G3T3	S2	T	SOMC		Y	1927-08-27	G	H	Warren	Polkville Bristow Bowling Green North Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BARREN RIVER 4 MI E OF BOWLING GREEN.	Small to large rivers with sand, gravel, and cobble and moderate to swift current, sometimes in deep water (Parmalee 1967, Bogan and Parmalee 1983).
IMBIV43030*002	*Toxolasma lividus*	Purple Lilliput	G2	S1	E	SOMC		Y	1927-08-25	G	H	Warren	Bowling Green South Polkville Drake Allen Springs	365343N	0862253W	05110002340 - Trammel Creek 05110002220 - West Fork of Drakes Creek 05110002200 - Bays Fork 05110002190 - Barren River Lake	DRAKES CREEK, 7 MI S BOWLING GREEN.	Small to medium-sized streams (Goodrich and Van Der Schalie 1944, Parmalee 1967, Stansbery 1976, Lauritsen 1987). Parmalee (1967) reported its occurrence on mud but related that sand or fine gravel beds in shallow running water was the preferred habitat.

Standard Occurrence Report
KSNPC Monitored Elements within a 1-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV47100*003	*Villosa ortmanni*	Kentucky Creekshell	G2	S2	T	SOMC		Y	1927-08-25	G	H	Warren	Bowling Green South Polkville Drake Allen Springs	365343N	0862253W	05110002220 - West Fork of Drakes Creek 05110002200 - Bays Fork 05110002190 - Barren River Lake 05110002340 - Trammel Creek	Drakes Creek, 7 mi S of Bowling Green.	Free-flowing, upland rivers that range in size from small (1st order) spring fed streams to the Green River (Cicerello 1994). Many flow permanently, but others sometimes have no flow. Substrates range from cobble and boulder with mixed gravel and sand over bedrock to clayey-mud. Depths range from less than 6 inches to more than 2 meters.
IMBIV47100*004	*Villosa ortmanni*	Kentucky Creekshell	G2	S2	T	SOMC		Y	1927-08-27	G	X	Warren	Polkville Bristow Bowling Green North Bowling Green South	365856N	0862204W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	Barren River, 4 mi E of Bowling Green.	
Fishes																		
AFCJB15010*004	*Hybopsis amnis*	Pallid Shiner	G4	S1	E	SOMC		Y	1955-07-21	G	H	Warren	Bowling Green North Bowling Green South Hadley Rockfield	370034N	0862818W	05110002190 - Barren River Lake 05110002350 - Gasper River 05110002220 - West Fork of Drakes Creek	LARGE SPRING IN JENNINGS CREEK.	Sandy and silty pools of medium to large rivers (Page and Burr 1991).
AFCQC04120*011	*Percina macrocephala*	Longhead Darter	G3	S1	E	SOMC		Y	1890-	G	H	Warren	Bowling Green North Bowling Green South Bristow Hadley Polkville Rockfield	370044N	0862509W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BIG BARREN RIVER, 0.75 MI. NE. OF BOWLING GREEN.	Clear, upland streams and rivers with moderate current, over clean substrates, often above and below riffles (Kuehne and Barbour 1983, Page 1983, Burr and Warren 1986).

Standard Occurrence Report

KSNPC Monitored Elements within a 1-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
AFCQC04120*022	*Percina macrocephala*	Longhead Darter	G3	S1	E	SOMC		Y	1890-08-02	G	H	Warren	Bowling Green South Polkville Bristow Drake Allen Springs Bowling Green North	365606N	0862332W	05110002340 - Trammel Creek 05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	DRAKE CREEK, 8 MI SE OF BOWLING GREEN, JUST BELOW THE SHAKER MILL, AND ABOUT 5 MI FROM MOUTH AT BIG BARREN RIVER.	Clear, upland streams and rivers with moderate current, over clean substrates, often above and below riffles (Kuehne and Barbour 1983, Page 1983, Burr and Warren 1986).
AFCJB30050*011	*Phenacobius uranops*	Stargazing Minnow	G4	S2S3	S			?	1890-08-02	G	H	Warren	Bowling Green South Polkville Bristow Drake Allen Springs Bowling Green North	365606N	0862332W	05110002190 - Barren River Lake 05110002340 - Trammel Creek 05110002220 - West Fork of Drakes Creek	DRAKE CREEK 8 MI SE OF BOWLING GREEN, JUST BELOW THE SHAKER MILL, AND ABOUT 5 MI FROM THE POINT WHERE THIS CREEK FLOWS INTO BIG BARREN RIVER.	Inhabits medium-size streams to small rivers with high gradient, permanent flow, clear water, and pebble and gravel substrates (Burr and Warren 1986).
AFCJB30050*018	*Phenacobius uranops*	Stargazing Minnow	G4	S2S3	S			Y	1890-08-01	G	H	Warren	Bowling Green North Bowling Green South Bristow Hadley Polkville Rockfield	370044N	0862509W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	BIG BARREN RIVER 0.75 MI NE OF BOWLING GREEN.	
AFCLA04010*009	*Typhlichthys subterraneus*	Southern Cavefish	G4	S2S3	S	SOMC		Y	1957-pre	G	H	Warren Simpson	Woodburn Rockfield Drake Bowling Green South	365209N	0863051W	05110002220 - West Fork of Drakes Creek 05110002240 - Lick Creek\Hickory Flat 05110002350 - Gasper River 05110002190 - Barren River Lake	RICH POND.	Subterranean waters where limestone bedrocks are honeycombed by subsurface drainages. Occurs in cave streams, most frequently over mixed gravel, sand, and mud, or rubble substrates and may occur at springs and wells (Cooper 1980, Cooper and Beiter 1972, Pflieger 1975, Starnes and Etnier 1980, Burr and Warren 1986).

Standard Occurrence Report
KSNPC Monitored Elements within a 1-mile radius of the Proposed Natcher Parkway and Elrod Road Interchange Project (Warren County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Breeding Birds																		
ABNGA13010*002	*Nyctanassa violacea*	Yellow-crowned Night-heron	G5	S2B	T			Y	1949-04-13	G	H	Warren	Bowling Green South	365602N	0862703W	05110002190 - Barren River Lake 05110002220 - West Fork of Drakes Creek	Lowland Woods about 4 mi S of Bowling Green.	Marshes, swamps, lakes, lagoons, and mangroves.

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Extant in Kentucky

Insects

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IICOL4EBQ0*001	*Pseudanophthalmus transfluvialis*	A Cave Obligate Beetle	G1G2	S1S2	S			Y	1985-pre	M	U	Warren	Bowling Green South	CONTACT KSNPC	CONTACT KSNPC	05110002190 - Barren River Lake	SENSITIVE ELEMENT-CONTACT KSNPC	A cave obligate species.

Mailing Title	Letter Title	First Name	Last Name		Suffix	Title	Organization	Address1	Address2	City	State	Zip	Send
Mr.	Mr.	Phillip	Braden			District Office Manager	Memphis Airports District Office, Federal Aviation Administration	2862 Business Park Drive Building G		Memphis	TN	38118-1555	Y
	Sir and/or Madam						American Association of Truckers		P.O. Box 487	Benton	KY	42025	Y
	Sir and/or Madam						Delta Regional Authority	236 Sharkey Avenue, Suite 400		Clarksdale	MS	38614	Y/N
Mr.	Mr.	Edward W.	Tonini	x		Brigadier General	Department of Military Affairs	Boone Nat'l Guard Ctr., 100 Minuteman Pky.		Frankfort	KY	40601	Y
Mr.	Mr.	Jamie	Link			Acting Commissioner	Department of Parks	10th Floor, Capital Plaza Tower	500 Mero Street	Frankfort	KY	40601	Y
Mr.	Mr.	George	Crothers	x		Director, Office of State Archaeology	Dept. of Anthropology, University of Kentucky	211 Lafferty Hall		Lexington	KY	40506-0024	Y
Mr.	Mr.	William	Straw	x	, Ph.D.	Regional Environmental Officer	Federal Emergency Management Agency, Region IV	3003 Chamblee-Tucker Road		Atlanta	GA	30341-4130	Y
Mr.	Mr.	Jack	Fish	x		President	Kentuckians for Better Transportation	10332 Bluegrass Parkway		Louisville	KY	40299	Y
	Sir and/or Madam						Kentuckians for The Commonwealth	105 Reams Street	P.O. Box 1450	London	KY	40743	Y
Ms.	Ms.	Janie	Miller	x		Secretary	Cabinet for Health and Family Services	275 East Main		Frankfort	KY	40601	Y
Mr.	Mr.	Randall	Royer	x		Interim Chairman	Kentucky Airport Zoning Commission	Capital City Airport	90 Airport Road, Building 400	Frankfort	KY	40601	Y
Mr.	Mr.	Bob	Arnold	x		Executive Director	Kentucky Association of Counties	380 King's Daughters Drive		Frankfort	KY	40601	Y
Mr.	Mr.	Dave	Adkisson	x		President	Kentucky Chamber of Commerce Executives, Inc.	464 Chenault Road		Frankfort	KY	40601	Y
Mr.	Mr.	Richie	Farmer	x		Commissioner	Kentucky Department of Agriculture	32 Fountain Place		Frankfort	KY	40601	Y
Mr.	Mr.	Bruce	Scott			Commissioner	Kentucky Department for Environmental Protection	300 Fair Oaks Lane		Frankfort	KY	40601	Y
Dr.	Dr.	Jonathan	Gassett	x		Commissioner	Kentucky Department of Fish and Wildlife Resources	1 Sportsman's Lane		Frankfort	KY	40601	Y
Ms.	Ms.	Susan	Bush	x		Commissioner	Kentucky Department of Nat'l. Resources	#2 Hudson Hollow		Frankfort	KY	40601	Y
Mr.	Mr.	Stephen A.	Coleman	x		Director	Kentucky Department of Nat'l. Resources, Division of Conservation	#2 Hudson Hollow		Frankfort	KY	40601	Y
Mr.	Mr.	Rodney	Brewer	x		Commissioner	Kentucky Department of State Police	919 Versailles Road		Frankfort	KY	40601	Y
Mr.	Mr.	Paul	Rothman	x		Director	Division of Mine Reclamation and Enforcement	# 2 Hudson Hollow		Frankfort	KY	40601	Y
Mr.	Mr.	Chase	Foster			President	Kentucky Disabilities Coalition		P.O. Box 1589	Frankfort	KY	40602-1589	Y
Mr.	Mr.	John	Lyons	x		Director	Kentucky Division of Air Quality	803 Schenkel Lane		Frankfort	KY	40601	Y
Ms.	Ms.	Leah W.	MacSwords	x		Director	Kentucky Division of Forestry	627 Comanche Trail		Frankfort	KY	40601	Y
Mr.	Mr.	Greg	Howard	x		Commissioner	Kentucky Department of Vehicle Enforcement	125 Holmes Street, 3rd Floor		Frankfort	KY	40622	Y
Mr.	Mr.	Tony	Hatton	x		Acting Director	Kentucky Division of Waste Management	14 Reilly Road		Frankfort	KY	40601	Y
Ms.	Ms.	Sandy	Gruzesky	x		Acting Director	Kentucky Division of Water	14 Reilly Road		Frankfort	KY	40601	Y
Mr.	Mr.	John	Hindman	x		Secretary	Kentucky Cabinet for Economic Development	Old Capitol Annex	300 West Broadway	Frankfort	KY	40601	Y
Mr.	Mr.	Jim	Cobb	x		State Geologist & Director	Kentucky Geological Survey, University of Kentucky	228 Mining and Mineral Resources Bldg.		Lexington	KY	40506	Y
Ms.	Ms.	Donna M.	Neary	x		Executive Director & State Historic Preservation Officer	Kentucky Heritage Council	300 Washington Street		Frankfort	KY	40601	Y
Mr.	Mr.	Kent	Whitworth	x		Executive Director	Kentucky Historical Society	100 W. Broadway		Frankfort	KY	40601	Y
Mr.	Mr.	Mike	Mangeot			Preseident/CEO	Kentucky Association of Economic Development	2225 Lawrenceburg Road, Bldg. B., Suite 4		Frankfort	KY	40601-8489	Y
Ms.	Ms.	Sylvia L.	Lovely	x		Executive Director	Kentucky League of Cities, Inc.	101 East Vine Street, Ste. 600		Lexington	KY	40507	Y
Mr.	Mr.	Jamie	Fipke			President/CEO	Kentucky Motor Transport Association	617 Shelby Street		Frankfort	KY	40601	Y
Mr.	Mr.	Robert D.	Vance	x		Secretary	Kentucky Environmental and Public Protection Cabinet	Capital Plaza Tower, 5th Floor		Frankfort	KY	40601	Y
Mr.	Mr.	Donald S.	Dott	x	, Jr.	Executive Director	Kentucky Nature Preserves	801 Schenkel Lane		Frankfort	KY	40601	Y
Ms.	Ms.	Vickie	Bourne	x		Executive Director	Kentucky Office of Transportation Delivery	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622	Y
Mr.	Mr.	Beecher	Hudson	x		Executive Director	Kentucky Public Transit Association	c/o Louisville Red Cross	P.O. Box 1675	Louisville	KY	40201	Y
	Sir and/or Madam						Kentucky Tourism Council	612B Shelby Street		Frankfort	KY	40601	Y
Ms.	Ms.	Marcheta	Sparrow	x		Secretary	Kentucky Commerce Cabinet	Capital Plaza Tower, 24th Floor	500 Mero Street	Frankfort	KY	40601	Y
Mr.	Mr.	Allan	Frank	x		Director	KYTC, Division of Structural Design	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622	Y
Ms.	Ms.	Greta	Smith	x		Director	KYTC, Division of Construction	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622	Y
Mr.	Mr.	David	Waldner	x		Director	KYTC, Division of Environmental Analysis	Transportation Office Building, 5th Floor	200 Mero Street	Frankfort	KY	40622	Y
Mr.	Mr.	Bill	Broyles	x		Branch Manager	KYTC, Geotechnical Branch	1236 Wilkinson Boulevard		Frankfort	KY	40601-1200	Y
Mr.	Mr.	Duane	Thomas	x		Director	KYTC, Division of Traffic Operations	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622	Y
Mr.	Mr.	Tom	Napier	x		Branch Manager	KYTC, Permits Branch	Transportation Office Building, 3rd Floor	200 Mero Street	Frankfort	KY	40622	Y
Ms.	Ms.	Tiffani	Jackson				KYTC, Office of Special Programs	Transportation Office Building, 6th Floor	200 Mero Street	Frankfort	KY	40622	Y
Ms.	Ms.	Helen	Mountjoy	x		Secretary	Education Cabinet	Capital Plaza Tower, 2nd Floor		Frankfort	KY	40601	Y
Mr.	Mr.	James	Aldridge	x		Director	Nature Conservancy - Kentucky Chapter	642 West Main Street		Lexington	KY	40508	Y
Ms.	Mr.	Keith P.	Eiken	x		Executive Director	Scenic Kentucky		P. O. Box 2646	Louisville	KY	40201	Y
Mr.	Mr.	William	Arguto			NEPA Team Leader	Environmental Programs Branch	U.S. EPA Region 3	1650 Arch Street	Philadelphia	PA	19103	
	Sir and/or Madam			x			Sierra Club	259 West Short Street		Lexington	KY	40507	Y
Mr.	Mr.	Kenneth A.	Westlake			Chief	National Envronmental Policy Act Implementation Section	Office of Enforcement and Compliance Assistance, U.S. EPA Region 5	77 W. Jackson Boulevard	Chicago	IL	60604	
Mr.	Mr.	Heinz	Mueller			Attorney	U. S. Environmental Protection Agency, Region 4 Office	Sam Nunn Atlanta Federal Center	61 Forsyth St. SW	Atlanta	GA	30303	Y
Mr.	Mr.	Michael D.	Hubbs	x		State Conservationist	U.S. Dept. of Agriculture, Natural Resources Conservation Service	711 Corporate Drive, Suite 110		Lexington	KY	40503	Y
Mr.	Mr.	Kenneth W.	Holt				U.S. Dept. of Health & Human Serv., Center for Disease Control, Emergency And Environmental Health Services Division	Mail Stop F-16	4770 Buford Highway, N.E.	Atlanta	GA	30341-3724	Y
Mr.	Mr.	Lee	Andrews			Field Supervisor	U.S. Dept. of the Interior, Fish and Wildlife Service	330 W. Broadway, Suite 264		Frankfort	KY	40601	Y
Mr.	Mr.	Roger	Wiebusch			Bridge Administrator	United States Coast Guard, Bridge Branch	1222 Spruce Street		St. Louis	MO	63103	Y
The Honorable	Senator	Jim	Bunning	x		United States Senator	United States Senate	316 Hart Senate Office Building		Washington	DC	20510	Y
The Honorable	Senator	Mitch	McConnell	x		United States Senator	United States Senate	361-A Russell Senate Office Building		Washington	DC	20510	Y
Mr.	Mr.	Thomas M.	Hunter	x		Executive Director	Appalachian Regional Commission	1666 Connecticut Ave., NW		Washington	DC	20235	Y/N
Colonel	Colonel	William	Howard			Executive Director	Kentucky Association of Riverports, Henderson County Riverport	6200 Riverport Rd.		Henderson	KY	42420	Y/N
Colonel	Colonel	Dana R.	Hurst			Commander	U. S. Army Corps of Engineers, Huntington District	502 Eighth Street		Huntington	WV	25701-2070	Y/N
Colonel	Colonel	Raymond E.	Midkiff	x		District Engineer	U. S. Army Corps of Engineers, Louisville District		P.O. Box 59	Louisville	KY	40201	Y/N
Colonel	Colonel	Charles O.	Smithers	x	III	District Engineer	U. S. Army Corps of Engineers, Memphis District	167 N. Main Street		Memphis	TN	38103-1894	Y/N
Lt. Colonel	Lt. Colonel	Steven	Roemhildt	x		District Engineer	U. S. Army Corps of Engineers, Nashville District		P.O. Box 1070	Nashville	TN	37202-1070	Y/N
The Honorable	Congressman	John	Yarmouth	x		United States Representative - District 3	U. S. House of Representatives	1004 Longworth House Office Building		Washington	DC	20515	Y/N
The Honorable	Congressman	Ben	Chandler	x		United States Representative - District 6	U. S. House of Representatives	1117 Longworth House Office Building		Washington	DC	20515	Y/N
The Honorable	Congressman	Ken	Lucas	x		United States Representative - District 4	U. S. House of Representatives	1237 Longworth House Office Building		Washington	DC	20515	Y/N
The Honorable	Congressman	Ed	Whitfield	x		United States Representative - District 1	U. S. House of Representatives	236 Cannon House Office Building		Washington	DC	20515	Y/N
The Honorable	Congressman	Harold	Rogers	x		United States Representative - District 5	U. S. House of Representatives	2406 Rayburn House Office Building		Washington	DC	20515	Y/N
The Honorable	Congressman	Ron	Lewis	x		United States Representative - District 2	U. S. House of Representatives	2418 Rayburn House Office Building		Washington	DC	20515	Y/N
Ms.	Ms.	Krista	Mills	x		Field Office Director	U.S. Department of Housing & Urban Development, Ky. Louisville Field Office	601 West Broadway		Louisville	KY	40202	Y/N
Ms.	Ms.	Pamela	Rice			Kentucky Division Administrator	Federal Motor Carrier Safety Administration	300 West Broadway, Suite 264		Frankfort	KY	40601	
Mr.	Mr.	Bill	Lally	x		Executive Director	Kentucky Household Goods Carrier Association Inc.	P.O. Box 22204		Louisville	KY	40252-0204	

Mr.	Mr.	Tony	Reck	x		President & CEO, P& L Railway, Inc.	Kentucky State Rail Association	1500 Kentucky Avenue		Paducah	KY	42003		
Ms.	Ms.	Linda Strite	Murnane	x		Executive Director	Kentucky Commission on Human Rights	332 West Broadway, Suite 700		Louisville	KY	40202		
Mr.	Mr.	Steve	Suder			Planning Team Leader	FHWA - Eastern Federal Lands Highway Division	21400 Ridgetop Circle		Sterling	VA	20166		
	Sir and/or Madam			x		Planning Staff Officer	U.S. Dept. of Agriculture, Forest Service, Daniel Boone Nat'l Forest	1700 Bypass Rd.		Winchester	KY	40391	Y/N	
Ms.	Ms.	Vicki	Fitch			Executive Director	Bowling Green Area Convention & Visitors Bureau	352 Three Springs Road		Bowling Green	KY	42104		
Mr.	Mr.	Jim	Goff			Principal	Lost River Elementary School	450 Modern Way		Bowling Green	KY	42101		
Mr.	Mr.	Shawn	Holland			Principal	Rich Pond Elementary School	530 Rich Pond Road		Bowling Green	KY	42104		
Ms.	Ms.	Stephanie	Martin			Principal	Natcher Elementary School	1434 Cave Mill Road		Bowling Green	KY	42104		
Ms.	Ms.	Melissa	Stephanski			Principal	Plano Elementary School	2650 Plano Road		Bowling Green	KY	42104		
General	General	Dan	Cherry			Aviation Heritage Park Director	Aviation Heritage Park	P.O. Box 1526		Bowling Green	KY	42102		
Mr.	Mr.	Gerry	Brown			Bowling Green Fire Chief	Bowling Green Fire Department	1636 Media Drive		Bowling Green	KY	42101		
Mr.	Mr.	Bill	Waltrip			Bowling Green Police Chief		1019 Highland Way		Bowling Green	KY	42104		
Mr.	Mr.	John	Osborne			Campus Services & Facilities	Western Kentucky University	1906 College Heights Blvd. # 11019		Bowling Green	KY	42101		
Mr.	Mr.	Bob	Jaynes			Department of Agriculture	Western Kentucky University	1906 College Heights Blvd. # 11096		Bowling Green	KY	42101		
Dr.	Dr.	Jack	Rudolph			Department of Agriculture	Western Kentucky University	1906 College Heights Blvd. # 11096		Bowling Green	KY	42101		
Mr.	Mr.	Jeff	Moore		AICP.	Division of Planning	Kentucky Transportation Cabinet	900 Morgantown Rd	P.O. Box 599	Bowling Green	KY	42102-0599.		
Mr.	Mr.	Jim	Askins			Field Representative		423 Frederica Street		Owensboro	KY	42301		
Ms.	Ms.	Phyllis	Causey			Field Representative		1001 Center Street, Suite 300		Bowling Green	KY	42101		
Ms.	Ms.	Leann	Crosby			Field Representative		241 E. Main Street, Rm. 102		Bowling Green	KY	42101		
Ms.	Ms.	Anna Caryl	Guffy			Field Representative		1100 S. Main Street, Suite 12		Hopkinsville	KY	42240		
Ms.	Ms.	Sandy	Simpson			Field Representative		Monroe County Courthouse, 2nd Floor		Tompkinsville	KY	42167		
Mr.	Mr.	Josh	Moore			Greenways Coordinator	City - County Planning Commissio	1141 State Street		Bowling Greer	KY	42101		
Mr.	Mr.	Mike	Buchanon			Judge Executive		429 East Tenth Street		Bowling Green	KY	42101		
	Sir and/or Madam					LD Brown Agriculture Exposition Center	Western Kentucky University	406 Elrod Road		Bowling Green	KY	42104		
Ms.	Ms.	Elaine	Walker			Mayor	City of Bowling Green	P.O. Box 430		Bowling Green	KY	42102		
Ms.	Ms.	Jennifer	Tougas			Parking & Transportation Services	Western Kentucky University	1906 College Heights Blvd. # 11096		Bowling Green	KY	42101		
Ms.	Ms.	Jody	Richards			Representative		817 Culpeper Street		Bowling Green	KY	42103		
Mr.	Mr.	Johnny	Bell			Representative		108 North Green Street		Glasgow	KY	42141		
Mr.	Mr.	Rob	Wilkey			Representative		220 N. Homestead Court		Scottsville	KY	42164		
Mr.	Mr.	Brett	Guthrie			Senator		1005 Wrenwood Drive		Bowling Green	KY	42103		
Mr.	Mr.	Dale	Brown			Superintendent		303 Lover's Lane	P.O. Box 51810	Bowling Green	KY	42102		
Mr.	Mr.	Ron	Lewis			The Honorable		1001 Center Street, Suite 300		Bowling Green	KY	42101		
Mr.	Mr.	Eddie	Beck			Warren County Magistrate		2307 Grandview Court		Bowling Green	KY	42101		
Mr.	Mr.	Robert	Donoho			Warren County Magistrate		495 Hayes Road		Bowling Green	KY	42103		
Mr.	Mr.	Tom	Hunt			Warren County Magistrate		518 Smith Grove-Klnd. Road		Smiths Grove	KY	42171		
Mr.	Mr.	James	Kaelin			Warren County Magistrate		712 Newberry Street		Bowling Green	KY	42103		
Mr.	Mr.	Richard	Morgan			Warren County Magistrate		117 E 11 Avenue		Bowling Green	KY	42101		
Mr.	Mr.	Terry	Young			Warren County Magistrate		3424 Montgomery Way		Bowling Green	KY	42104		
Mr.	Mr.	Jerry	Gaines			Warren County Sheriff		429 East Tenth Street		Bowling Green	KY	42101		
The Honorable	Congressman	Jim	Bunning				United States Senate	1100 S. Main Street, Suite 12		Hopkinsville	KY	42240		
Mr.	Mr.	Joe	Denning				Bowling Green City Commission	1001 College Street		Bowling Green	KY	42101		
The Honorable	Congressman	Mitch	McConnell					241 E. Main Street, Rm. 102		Bowling Green	KY	42101		
Mr.	Mr.	Phil	Moore				Warren County Parks and Recreation	2055 Three Springs Road		Bowling Green	KY	42104		
Mr.	Mr.	Brian	Nash				Bowling Green City Commission	1001 College Street		Bowling Green	KY	42101		
Mr.	Mr.	John	Odom				Warren County Transportation Dept.	800 Brookwood Drive		Bowling Green	KY	42101		
Mr.	Mr.	Jerry	Riney				Holy Spirit Catholic Church	2232 Smallhouse Road		Bowling Green	KY	42104		
Mr.	Mr.	Brian	Strow				Bowling Green City Commission	638 E Main Street		Bowling Green	KY	42101		
The Honorable	Congressman	Ed	Whitfield					1403 S. Main Street		Hopkinsville	KY	42240		
Mr.	Mr.	Bruce	Wilkerson				Bowling Green City Commission	1001 College Street		Bowling Green	KY	42101		
	Sir and/or Madam						Alvaton Volunteer Fire Department	122 Jfs Circle		Bowling Green	KY	42104		
	Sir and/or Madam						Trinity Free Will Baptist Church	4550 Smallhouse Road		Bowling Green	KY	42104		
	Sir and/or Madam						Calvary Baptist Church	3011 Elrod Road		Bowling Green	KY	42104		
	Sir and/or Madam						Bowling Green KOA	1960 Three Springs Road		Bowling Green	KY	42104		

NOTES:

Use ADD lists from Local Officials & Local Agencies Mtgs. For the last column in this spread sheet 'send' the Y is always sent. Y/N a decision has to be made of who to send it to.

Also Send:
- State Senator(s)
- State Representative(s)
- County Judge(s)
- Mayor(s)
- Other Local Officials
- Local Agencies

Send CCs:
- Jose Sepulveda
- John Ballantyne
- Chief District Engineer(s)
- C.O. Project Management Coordinator
- District Planning Branch Manager
- District Design Branch Manager
- ADD(s)
- Consultant

Appendix D

Mr. Phillip Braden,
Memphis Airports District Office, Federal Aviation Administration
2862 Business Park Drive Building G
Memphis TN 38118-1555

American Association of Truckers
P.O. Box 487
Benton KY 42025

Delta Regional Authority
236 Sharkey Avenue, Suite 400
Clarksdale MS 38614

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Department of Military Affairs
Boone Nat'l Guard Ctr., 100 Minuteman Pky.
Frankfort KY 40601

Mr. Jamie Link,
Department of Parks
10th Floor, Capital Plaza Tower
500 Mero Street
Frankfort KY 40601

Mr. George Crothers,
Dept. of Anthropology, University of Kentucky
211 Lafferty Hall
Lexington KY 40506-0024

Mr. William Straw, Ph.D.,
Federal Emergency Management Agency, Region IV
3003 Chamblee-Tucker Road
Atlanta GA 30341-4130

Mr. Jack Fish,
Kentuckians for Better Transportation
10332 Bluegrass Parkway
Louisville KY 40299

Kentuckians for The Commonwealth
105 Reams Street
P.O. Box 1450
London KY 40743

Ms. Janie Miller,
Cabinet for Health and Family Services
275 East Main
Frankfort KY 40601

Mr. Randall Royer,
Kentucky Airport Zoning Commission
Capital City Airport
90 Airport Road, Building 400
Frankfort KY 40601

Mr. Bob Arnold,
Kentucky Association of Counties
380 King's Daughters Drive
Frankfort KY 40601

Mr. Dave Adkisson,
Kentucky Chamber of Commerce Executives, Inc.
464 Chenault Road
Frankfort KY 40601

Mr. Richie Farmer,
Kentucky Department of Agriculture
32 Fountain Place
Frankfort KY 40601

Mr. Bruce Scott,
Kentucky Department for Environmental Protection
300 Fair Oaks Lane
Frankfort KY 40601

Dr. Jonathan Gassett,
Kentucky Department of Fish and Wildlife Resources
1 Sportsman's Lane
Frankfort KY 40601

Ms. Susan Bush,
Kentucky Department of Nat'l. Resources
#2 Hudson Hollow
Frankfort KY 40601

Mr. Stephen A. Coleman,
Kentucky Department of Nat'l. Resources, Division of Conservation
#2 Hudson Hollow
Frankfort KY 40601

Mr. Rodney Brewer,
Kentucky Department of State Police
919 Versailles Road
Frankfort KY 40601

Mr. Paul Rothman,
Division of Mine Reclamation and Enforcement
2 Hudson Hollow
Frankfort KY 40601

Mr. Chase Foster,
Kentucky Disabilities Coalition
P.O. Box 1589
Frankfort KY 40602-1589

Mr. John Lyons,
Kentucky Division of Air Quality
803 Schenkel Lane
Frankfort KY 40601

Ms. Leah W. MacSwords,
Kentucky Division of Forestry
627 Comanche Trail
Frankfort KY 40601

Mr. Greg Howard,
Kentucky Department of Vehicle Enforcement
125 Holmes Street, 3rd Floor
Frankfort KY 40622

Mr. Tony Hatton,
Kentucky Division of Waste Management
14 Reilly Road
Frankfort KY 40601

Ms. Sandy Gruzesky,
Kentucky Division of Water
14 Reilly Road
Frankfort KY 40601

Mr. John Hindman,
Kentucky Cabinet for Economic Development
Old Capitol Annex
300 West Broadway
Frankfort KY 40601

Mr. Jim Cobb,
Kentucky Geological Survey, University of Kentucky
228 Mining and Mineral Resources Bldg.
Lexington KY 40506

Ms. Donna M. Neary,
Kentucky Heritage Council
300 Washington Street
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Mr. Kent Whitworth,
Kentucky Historical Society
100 W. Broadway
Frankfort KY 40601

Mr. Mike Mangeot,
Kentucky Association of Economic Development
2225 Lawrenceburg Road, Bldg. B., Suite 4
Frankfort KY 40601-8489

Ms. Sylvia L. Lovely,
Kentucky League of Cities, Inc.
101 East Vine Street, Ste. 600
Lexington KY 40507

Mr. Jamie Fipke,
Kentucky Motor Transport Association
617 Shelby Street
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Mr. Robert D. Vance,
Kentucky Environmental and Public Protection Cabinet
Capital Plaza Tower, 5th Floor
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Mr. Donald S. Dott, Jr.,
Kentucky Nature Preserves
801 Schenkel Lane
Frankfort KY 40601

Ms. Vickie Bourne,
Kentucky Office of Transportation Delivery
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Mr. Beecher Hudson,
Kentucky Public Transit Association
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P.O. Box 1675
Louisville KY 40201

Kentucky Tourism Council
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Ms. Marcheta Sparrow,
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Mr. Allan Frank,
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Mr. Bill Broyles,
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Mr. Duane Thomas,
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Mr. Tom Napier,
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Ms. Tiffani Jackson,
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Transportation Office Building, 6th Floor
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Ms. Helen Mountjoy,
Education Cabinet
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National Envronmental Policy Act Implementation Section
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U. S. Environmental Protection Agency, Region 4 Office
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The Honorable Mitch McConnell,
United States Senate
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Appalachian Regional Commission
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Colonel William Howard,
Kentucky Association of Riverports, Henderson County Riverport
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Lt. Colonel Steven Roemhildt,
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1004 Longworth House Office Building
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1117 Longworth House Office Building
Washington DC 20515

The Honorable Ken Lucas,
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1237 Longworth House Office Building
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The Honorable Ed Whitfield,
U. S. House of Representatives
236 Cannon House Office Building
Washington DC 20515

The Honorable Harold Rogers,
U. S. House of Representatives
2406 Rayburn House Office Building
Washington DC 20515

The Honorable Ron Lewis,
U. S. House of Representatives
2418 Rayburn House Office Building
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518 Smith Grove-Klnd. Road
Smiths Grove KY 42171

Mr. James Kaelin,
712 Newberry Street
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Mr. Richard Morgan,
117 E 11 Avenue
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Mr. Terry Young,
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Bowling Green KY 42104

Mr. Jerry Gaines,
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Bowling Green KY 42101

The Honorable Jim Bunning,
United States Senate
1100 S. Main Street, Suite 12
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Bowling Green City Commission
1001 College Street
Bowling Green KY 42101

The Honorable Mitch McConnell,
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2055 Three Springs Road
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Bowling Green City Commission
638 E Main Street
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The Honorable Ed Whitfield,
1403 S. Main Street
Hopkinsville KY 42240

Mr. Bruce Wilkerson,
Bowling Green City Commission
1001 College Street
Bowling Green KY 42101

Alvaton Volunteer Fire Department
122 Jfs Circle
Bowling Green KY 42104

Trinity Free Will Baptist Church
4550 Smallhouse Road
Bowling Green KY 42104

Calvary Baptist Church
3011 Elrod Road
Bowling Green KY 42104

Bowling Green KOA
1960 Three Springs Road
Bowling Green KY 42104

«Mailing_Title» «First_Name» «Last_Name»«Suffix», «Title»
«Organization»
«Address1»
«Address2»
«City» «State» «Zip»

June 10, 2008

Dear «Letter_Title» «Last_Name»:

Subject: Planning Study, Warren County
Elrod Road/Natcher Parkway Interchange Study
Item No. 3-130.00

We are requesting your agency's input and comments on a planning study to determine the need and potential impacts for a proposed highway project. The Kentucky Transportation Cabinet has assembled a study team to evaluate improvements, including the addition of an interchange to Elrod road and the Natcher parkway. The primary goals of this project would be to improve safety and efficiency of travel in the Elrod Road/Smallhouse Road area and provide a better connection for travelers along the existing transportation network to the Natcher Parkway. The study is currently in the initial data-gathering stage with several improvement alternatives developed for the Elrod Road/Smallhouse Road area.

We ask that you identify specific issues or concerns of your agency that could affect the development of the project. This planning study will include a scoping process for the early identification of potential alternatives, environmental issues, and impacts related to the proposed project. We believe that early identification of issues or concerns can potentially minimize negative impacts on alternatives as we move forward. In particular, we are asking that you provide the following information:

- Comments on the project goals or purpose and need for the project,
- Significant issues or concerns in the project area that may need to be addressed so that the project can be adequately scoped,
- Any conservation or development plans your agency or organization has ongoing or is aware of in the project area,
- Locations of any known areas, issues, or resources within the project area that should be considered when developing alternatives so that impacts can be minimized, mitigated, or avoided early in the process, and
- Any mitigation strategies that should be considered in the development of the project.

We respectfully ask that you provide us with your comments by June 30, 2008, to ensure timely progress in this planning effort.

During the development of this planning study, comments will be solicited from federal, state, and local agencies, as well as other interested persons and the general public, in accordance with principles set forth in the National Environmental Policy Act (NEPA) of 1969. The Federal Highway Administration is partnering with us in these efforts.

Other Transportation Cabinet offices or consultants working on behalf of the Transportation Cabinet may also contact you seeking more detailed data or information to assist them in completing their environmental studies for this phase of the project.

We have enclosed the following project information for your review and comment:

- Study Area Map
- Existing Conditions
- Draft Environmental Overview – Natural Environmental
- Draft Environmental Overview
- Preliminary 2007 Traffic Volumes and Levels of Service
- Preliminary Crash Locations and Rates
- Draft Purpose and Need

We appreciate any input you can provide concerning this project. Please direct any comments, questions, or requests for additional information to Jeff Moore of the Division of Planning at (270) 746-7898 or at Jeff.Moore@ky.gov. Please address all written correspondence to Jeff Moore, AICP., Division of Planning, District 3, Kentucky Transportation Cabinet, 900 Morgantown Rd, P.O. Box 599, Bowling Green, KY 42102-0599.

Sincerely,

Jeff Moore, AICP.
Division of Planning

DJG/JCW/NH

Enclosures
c:
Jose Sepulveda, FHWA (w/a)
Mary Murray, FHWA (w/a)
Gene Becker, MPO
Greg Meredith
Steve James
Scott Pedigo
Renee Slaughter
Jim Simpson
Mark Harmon
David Martin
Barry House

FILE
CST 3-130.00
Corresp RLC

KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES
COMMERCE CABINET

Steven L. Beshear
Governor

#1 Sportsman's Lane
Frankfort, Kentucky 40601
Phone (502) 564-3400
1-800-858-1549
Fax (502) 564-0506
fw.ky.gov

Marcheta Sparrow
Secretary

Dr. Jonathan W. Gassett
Commissioner

January 16, 2008

Rebecca Colvin
Third Rock Consultants
2514 Regency Road, Suite 104
Lexington, KY 40503

RE: Scoping Study for Possible New Interchange at Natcher Parkway and Elrod Road
Warren County, Kentucky
KYTC Item No. 3-130.00

Dear Ms. Colvin:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) have received your request for the above-referenced information. The Kentucky Fish and Wildlife Information System (KFWIS) indicate that state/federal threatened and endangered species are known to occur near the project study area (see attached list). Please be aware that our database system is a dynamic one that only represents our current knowledge of the various species distributions. Accordingly we off the following comments:

- The Indiana bat utilizes a wide array of habitats, including riparian forests, upland forest, and fencerows for both summer foraging and roosting habitat. Indiana bats typically roost under exfoliating bark, in cavities of dead and live trees, and in snags (i.e., dead trees or dead portions of live trees). Trees in excess of 16 inches diameter at breast height (DBH) are considered optimal for maternity colony roosts, but trees in excess of 9 inches DBH appear to provide suitable maternity roosting habitat. Removal of suitable Indiana bat roost trees due to construction of the proposed project should be completed between October 15 and March 31 in order to avoid impacting summer roosting Indiana bats. However, if any Indiana bat hibernacula are identified on the project area or are known to occur within 10 miles of the project area, we recommend the applicant only remove trees between November 15 and March 31 in order to avoid impacting Indiana bat "swarming" behavior.
- In areas where bats are known to occur, cave entrances, mine portals, and/or rock shelters that exist within the project area should be surveyed for potential use by such species as gray bats and Indiana bats. KDFWR recommends avoiding those areas that provide adequate habitat for bats.
- To minimize impacts to the aquatic and subterranean resources strict erosion control measures should be developed and implemented prior to construction to minimize siltation into streams and karst systems located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed.

For more information on how to precede with the threatened/endangered species surveys please contact the US Fish and Wildlife Service Kentucky Field Office at (502) 695-0468.

It appears that the proposed project has the potential to impact wetland habitats. KDFWR recommends that you look at the appropriate US Department of Interior National Wetland Inventory Map (NWI) and the appropriate county soil surveys to determine where the proposed project may impact wetlands. Additionally, field verification may be needed to determine the extent and quality of wetland habitats within the project area. Any planning should include measures designed to eliminate and/or reduce impacts to wetland habitats. If impacts cannot be avoided, mitigation should be properly designed and proposed to offset the losses. KDFWR will recommend, at a minimum, a 2:1 mitigation ratio for any permanent loss or degradation of wetland habitats.

KDFWR recommends that you contact the appropriate US Army Corps of Engineers office and the Kentucky Division of Water prior to any work within the waterways or wetland habitats of Kentucky. Additionally, KDFWR recommends the following for the portions of the project that impact streams:

- Channel changes located within the project area should incorporate natural stream channel design.
- If culverts are used, the culvert should be designed to allow the passage of aquatic organisms.
- Culverts should be designed so that degradation upstream and downstream of the culvert does not occur.
- Development/excavation during low flow period to minimize disturbances.
- Proper placement of erosion control structures below highly disturbed areas to minimize entry of silt into area streams.
- Replanting of disturbed areas after construction, including stream banks, with native vegetation for soil stabilization and enhancement of fish and wildlife populations. We recommend a 100 foot forested buffer along each stream bank.
- Return all disturbed instream habitat to a stable condition upon completion of construction in the area.
- Preservation of any tree canopy overhanging any streams within the project area.

I hope this information proves helpful to you. If you have any questions or require additional information, please call me at (800) 852-0942 Extension 366.

Sincerely,

Doug Dawson

Doug Dawson
Wildlife Biologist III

Attachments

Cc: Environmental Section File

Federal/State listed species for the Study Area.

Scientific Name	Common Name	Federal Status	KSNPC Status
Cyprogenia stegaria	Fanshell	LE	E
Epioblasma obliquata obliquata	Catspaw	LE	E
Epioblasma torulosa rangiana	Northern Riffleshell	LE	E
Lampsilis abrupta	Pink Mucket	LE	E
Myotis grisescens	Gray Myotis	LE	T
Myotis sodalis	Indiana Bat	LE	E
Pegias fabula	Littlewing Pearlymussel	LE	E
Pleurobema clava	Clubshell	LE	E
Pleurobema plenum	Rough Pigtoe	LE	E

US Fish & Wildlife Service Status:

N = None
C = Candidate
LT = Listed as Threatened
LE = Listed as Endangered

KY State Nature Preserves Commission Status

N = None
E = Endangered
T = Threatened
S = Special Concern
H = Historic
X = Extirpated

STEVEN L. BESHEAR
GOVERNOR

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
14 REILLY ROAD
FRANKFORT, KENTUCKY 40601
www.kentucky.gov

ROBERT D. VANCE
SECRETARY

Client GS+P
Project # 3-130 0007
Folder corresp
PA Initials RAC

20 December 2007

Ms. Rebecca Colvin
Third Rock Consultants
2514 Regency Road, Suite 104
Lexington, KY 40503

Subject: Proposed Interchange at Natcher Parkway and Elrod Road, Warren County, KY

Dear Ms.Colvin,

The proposed interchange project in Warren County, KY will not impact any Wild Rivers, Outstanding State Resource Waters or known Exceptional Waters. The National Wetland Inventory maps designate fifteen palustrine wetlands, in the form of ponds and sinkholes, and one lacustrine wetland, a lake. After review of our database, I did not find biological or physicochemical data for the project area. If there are any questions please feel free to call (502-564-3410) or email (john.brumley@ky.gov) me.

Sincerely,

John F. Brumley
Ecological Support Section
Water Quality Branch
Division of Water
14 Reilly Rd.
Frankfort, KY 40601
(502) 564-3410

U.S. Department
of Transportation
**Federal Aviation
Administration**

Memphis Airports District Office
2862 Business Park Dr, Bldg G
Memphis, TN 38118-1555

Phone: 901-322-8180

December 24, 2008

Mr. Jeff Moore, AICP
Division of Planning, District 3
Kentucky Transportation Cabinet
900 Morgantown Rd.
P.O. Box 599
Bowling Green, KY 42102-0599

Re: Planning Study, Warren County
Elrod Road/ Natcher Parkway Interchange Study
Item No. 3-130.00

Dear Mr. Moore:

We have reviewed the information you provided concerning a planning study to evaluate the need and potential impacts for a proposed highway project and an interchange to Elrod road and the Natcher parkway in Warren County, Bowling Green, Kentucky.

Based on the review of information provided by you and maps in our office, we have concluded that this project is not located within Airport Clear Zones. However, any construction or alteration of more than 200 feet in height above ground level at this site, or any construction or alteration of greater height than an imaginary surface extending outward and upward at 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of an airport with a runway of more than 3200 feet in length should file a "Notice of Proposed Construction or Alteration", FAA Form 7460-1. The closest public use airport according to our records is Bowling Green-Warren County Regional Airport. Please notify our office if any changes should occur from the original project.

Thank you for considering our opinion in your study and if you have any question feel free to call our office at (901) 322-8180.

Sincerely,

James H. Williams
Program Manager

FILE
CST 3-130.00
Corresp RLC

KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES
COMMERCE CABINET

Steven L. Beshear
Governor

#1 Sportsman's Lane
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Marcheta Sparrow
Secretary

Dr. Jonathan W. Gassett
Commissioner

January 16, 2008

Rebecca Colvin
Third Rock Consultants
2514 Regency Road, Suite 104
Lexington, KY 40503

RE: Scoping Study for Possible New Interchange at Natcher Parkway and Elrod Road
Warren County, Kentucky
KYTC Item No. 3-130.00

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- The Indiana bat utilizes a wide array of habitats, including riparian forests, upland forest, and fencerows for both summer foraging and roosting habitat. Indiana bats typically roost under exfoliating bark, in cavities of dead and live trees, and in snags (i.e., dead trees or dead portions of live trees). Trees in excess of 16 inches diameter at breast height (DBH) are considered optimal for maternity colony roosts, but trees in excess of 9 inches DBH appear to provide suitable maternity roosting habitat. Removal of suitable Indiana bat roost trees due to construction of the proposed project should be completed between October 15 and March 31 in order to avoid impacting summer roosting Indiana bats. However, if any Indiana bat hibernacula are identified on the project area or are known to occur within 10 miles of the project area, we recommend the applicant only remove trees between November 15 and March 31 in order to avoid impacting Indiana bat "swarming" behavior.
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It appears that the proposed project has the potential to impact wetland habitats. KDFWR recommends that you look at the appropriate US Department of Interior National Wetland Inventory Map (NWI) and the appropriate county soil surveys to determine where the proposed project may impact wetlands. Additionally, field verification may be needed to determine the extent and quality of wetland habitats within the project area. Any planning should include measures designed to eliminate and/or reduce impacts to wetland habitats. If impacts cannot be avoided, mitigation should be properly designed and proposed to offset the losses. KDFWR will recommend, at a minimum, a 2:1 mitigation ratio for any permanent loss or degradation of wetland habitats.

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Sincerely,

Doug Dawson

Doug Dawson
Wildlife Biologist III

Attachments

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KY State Nature Preserves Commission Status

N = None
E = Endangered
T = Threatened
S = Special Concern
H = Historic
X = Extirpated

Elrod Interchange Study
Resource Agency Comments

Agency	Comment
KY Division of Air Quality	401 KAR 63:010 and 401 KAR 63:005 would apply during construction of this
KY Division of Water	The groundwater branch recomends that a professional hydrologist or geohydrologist be utilized to ensure that groundwater in the area will not be adversely affected by this project. Kentucky DOT is exempted from the requirements for a stream construction permit per KY 151.250. Any excess material disposed of outside the DOT right of way and in the regulatory floodplain will require a permit.
Natural Preserves Commission	No comment
Department for Environmental Protection/ Division of Waste Management	No comment
Department of Military Affairs/Boone National Guard Center	The Department of Military Affairs cannot identify any issues or concerns that affect the development of subject project.
Kentucky Heritage Council	There are many architecural resources as well as previously recorded archaeological sites within the study area. The Section 106 review process must be completed prior to the approaval of the experenditure of any federal funds.
KY Airport Zoning Commission	Any structure or construction equipment that exceeds 133 feet above ground level would require a permit from the KY Airport Zoning Commission. The proposed study is located app. 14,600 ft from the BG Airport.
KY Commission on Human Rights	No comment
KY Department of Agriculture	No comment
KY Department of Fish & Wildlife Resources	The Kentucky Fish and Wildlife Information System indicate that state/federal threatened and endangered species are known to occur near the project study area.
KY Division of Forestry	No forestry concerns in this area.
KY Division of Waster Management	Link to Superfund report attached to email.
KY State Police	Would be beneficial for the following reasons: Reduce traffic congestion on US 31-W and KY 884; reduce traffic volune on Smallhouse Rd; provide better access to the area for Emergency Responders; better traffic flow should result in fewer crashes.
KY Tourism Council	The addition of the new interchange should not have any detrimental effect on the area tourist attractions, hotels and restaurants…Creating safer roadways and less congestion on Three Springs Rd and Nashville Rd would create a more positive experience for the tourists to those areas.
KY Transportation Cabinet/Office of Local Programs	It is the conclusion of this office that the addition of bicycle and pedestrian facilities in the study area would improve safety and efficiency of travel in the Elrod Road area and create a more diverse transportation network. At this point in the study it is too early to recommend whether bike lanes with sidewalks or a multi-use path would be more feasible. This can be determined by the number of access points that will be connecting to the roadway, and the amount of traffic.
U. S. Environmental Protection Agency/ Region 4	The upcoming NEPA document should fully evaluate all environmental impacts, cultural resource impacts, and Environmental Justice impacts, in addition to considering cumulative and secondary impacts of the alternatives. Best management practices (BMPs) that will prevent, reduce,
U.S Coast Guard	A Coast Guard permit is not required.
U.S. Army Corps of Engineers/Eastern Section	Referred to Louisville District for comment.
U.S. Army Corps of Engineers/Nashville District	Referred to Louisville District for comment.
U.S. Department of Agriculture/ Forest Service	Proposed activities are not likely to impact resources or facilities managed by the Daniel Boone National Forest.
U.S. Department of Agriculture/Natural Resources Conservation Service	The NRCS is concerned with potential impacts that the project might have have upon prime farmland soils and additional farmlands of statewide importance. If federal dollars are to be used to convert important farmlands from agricultural uses to non-agricultrual uses a Form AD-1006 (or Form NRCS-CPA-106 if the the project is a corridor type project) must be submitted to the local NRCS office.
Underground Storage Tank Branch	The USTB identified two facilities with a total of six registered underground storage tanks. All six tanks have been removed and all activities are closed. There are no
University of Kentucky/Ky Geological Survey	Extensive comments attached re: review of maps, online searches and documents available in the files and on the Web site of the KY Geological Survey. No on-site investigation of the planning study area was conducted.
Warren County Schools/Transportation	"These changes are needed as soon as possible, however, I am concerned that the increase in traffic without major road improvements to Smallhouse, Elrod and Cave Mill could make this even more dangerous because of speeding. With the possibility of adding another school on Elrod Rd and our buses being able to enter Natcher via Elrod it would appear to make transport from and to Greenwood and Drakes Creek much easier."

Appendix E

Geotechnical Overview
Proposed I-65 and Elrod Road Interchange
Warren County, Kentucky

Summary and Conclusions

Review of numerous published and unpublished documents and maps, interviews with individuals knowledgeable of the Proposed Study Area and Interchange Site and on-site reconnaissance of the subject area and interchange site indicate that conditions are features are typical for the karst plain of south central Kentucky. Construction sites in and around the Bowling Green area routinely encounter depressions and sinkholes with "open throats", and operations encounter soil collapse during construction and after operations cease.

Potential contamination of the Proposed Study Area by construction operations at the Elrod Road Bridge requires the convergence of numerous independent events. Groundwater, the most likely vector for contamination, flows from the proposed construction site northward toward Lost River Cave. Portions of the Lost River Cave basin up gradient (south and west) would likely be undisturbed by construction activities. At present, the entire Lost River Cave Basin is undergoing subdivision development with increased runoff directed into the subsurface drainage system.

When possible, all "open throats" and other karst features which accept runoff water, that are encountered during construction operations, should be maintained in as "undisturbed condition: as possible. Minimizing disturbance of these features allows the developed drainage system to function properly and reduces the likelihood of new drainage avenues opening up.

Drainage courses leading away from the proposed interchange should incorporate a combination of distance, filtration and retention to help mitigate a potential hazardous material spill or accidental release. The combination creates time for treatment options to be performed before the spill material can reach the groundwater aquifer.

Preliminary Geotechnical Recommendations

Based on the information gathered during this study, and our knowledge of subsurface conditions within the region, we anticipate steel H piles and/or drilled shafts will be the preferred choice for bridge foundations.

To develop the appropriate construction plans for this project, a detailed Geotechnical Investigation shall be implemented for the proposed roadway alignment and structures. A successful project will include remedial solutions and methods developed during the planning stages of the project to promote stable slopes and sufficient structure foundations.

Incorporated city boundaries obtained from the Kentucky Office of GIS. Sinkholes data downloaded from the Kentucky Geological Survey, May 2003. FEMA Q3 Flood data, dated 9/98, was obtained from the Federal Emergency Management Agency. National Wetland Inventory mapping was obtained from the Kentucky Department of Fish and Wildlife Resources. National hydrography dataset downloaded from the Kentucky Division of Geographic Information at <http://ogi.ky.gov/gisdata.htm>. County Road mapping was obtained from the Kentucky Transportation Cabinet. Study area boundary digitized based on map provided by GS&P email dated 9/24/07. USGS topographic mapping obtained from the Kentucky Geological Survey for the Bowling Green South 7.5' quadrangle.

N W E S

Failed Pond

Field-Observed Wetlands

THREE SPRINGS LAKE

UT THREE SPRINGS LAKE

DEWEY LAKE

Bowling Green

Memphis Junction

Western Kentucky University Agricultural Center

Three Springs

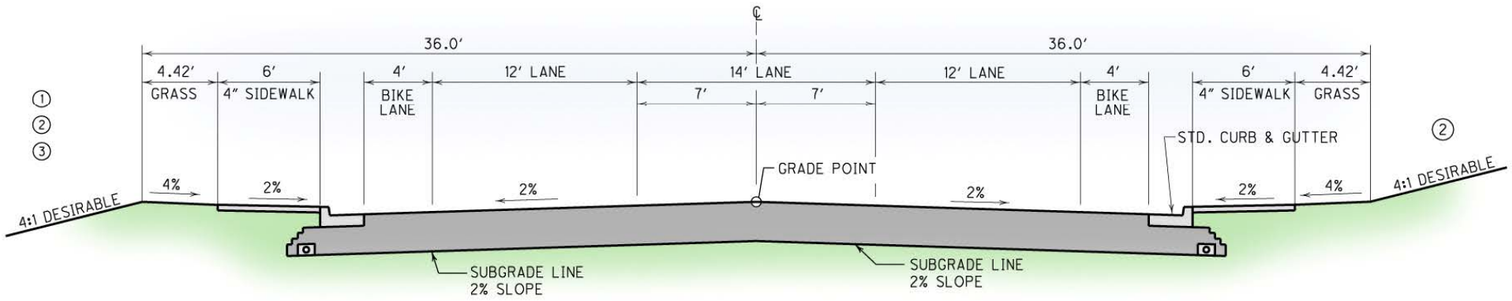
Trinity Cem

Study Area
Indiana Bat Summer Maternity Habitat
National Wetland Inventory (Type Labeled)
Field-Observed Wetland
Floodplain
Known Sinkhole Location
Prime Farmland Within Study Area
Bowling Green City Limits

750 0 750 1,500 2,250 3,000 Feet

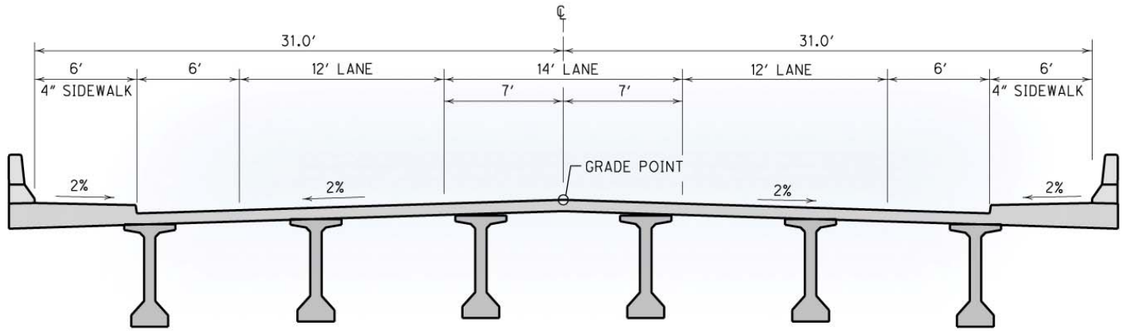
Exhibit 1
Natural Environment
KYTC Item No. 3-130.00
Warren County, Kentucky

Appendix F



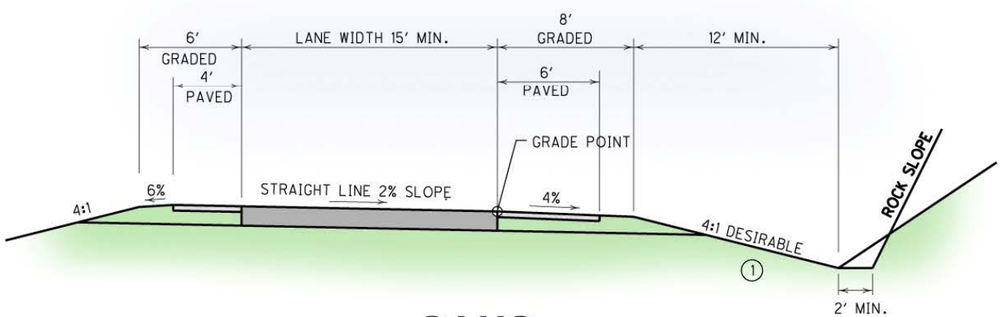
ELROD ROAD

3-Lane Urban Normal Cut/Fill Section



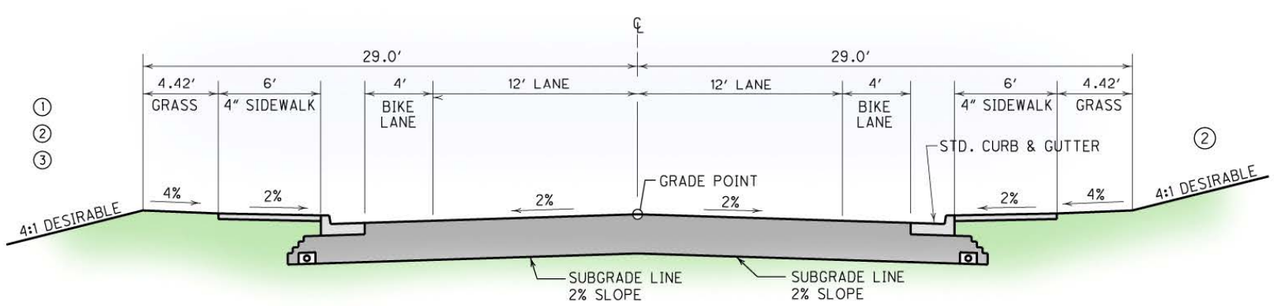
ELROD ROAD BRIDGE SECTION

3-Lane Urban Normal Cut/Fill Section



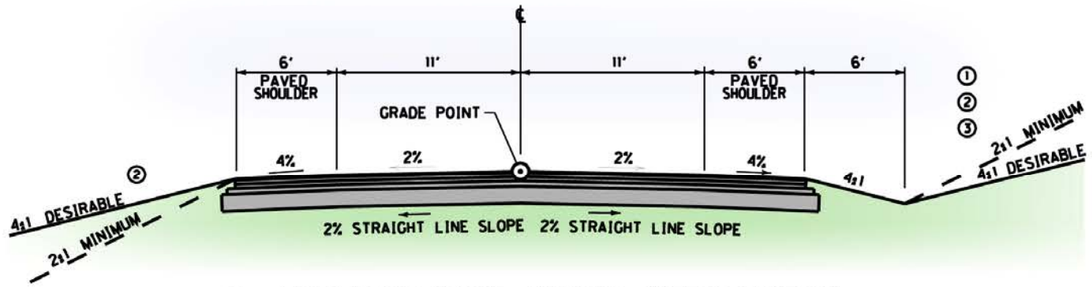
RAMP

1-Lane Ramp Normal Cut/Fill Section



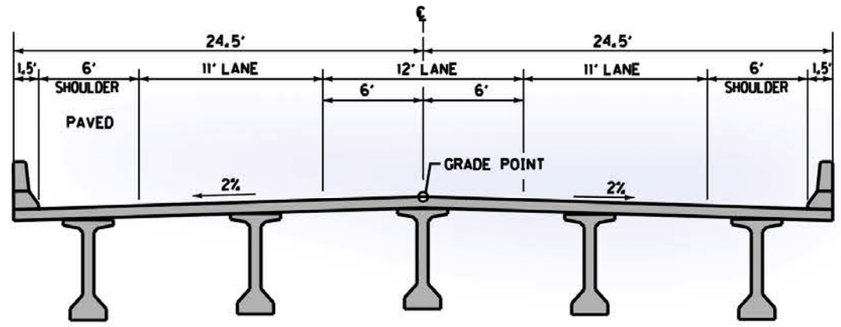
SMALLHOUSE ROAD

2-Lane Urban Normal Cut/Fill Section



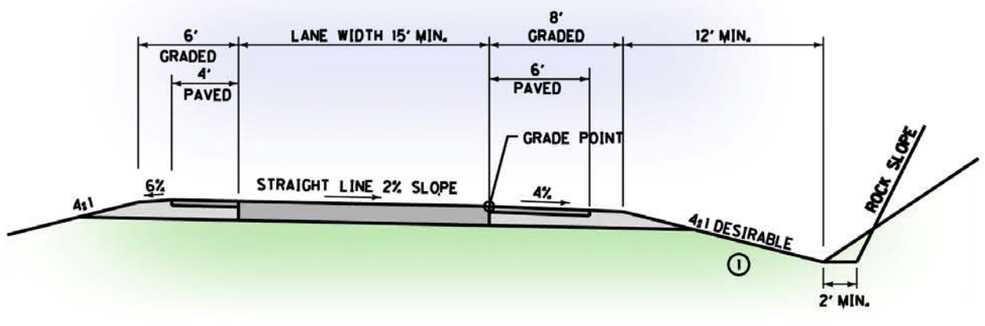
2 – LANE RURAL LOCAL NORMAL CUT/FILL SECTION

ELROD ROAD



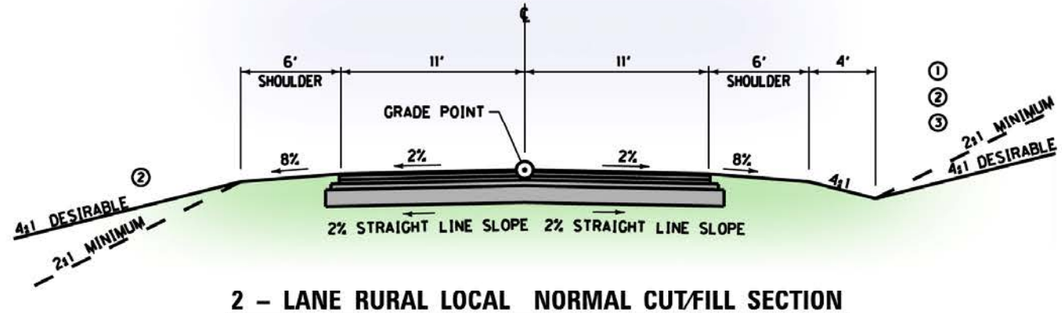
3 – LANE RURAL NORMAL CUT/FILL SECTION

ELROD ROAD BRIDGE SECTION



1 – LANE RAMP NORMAL CUT/FILL SECTION

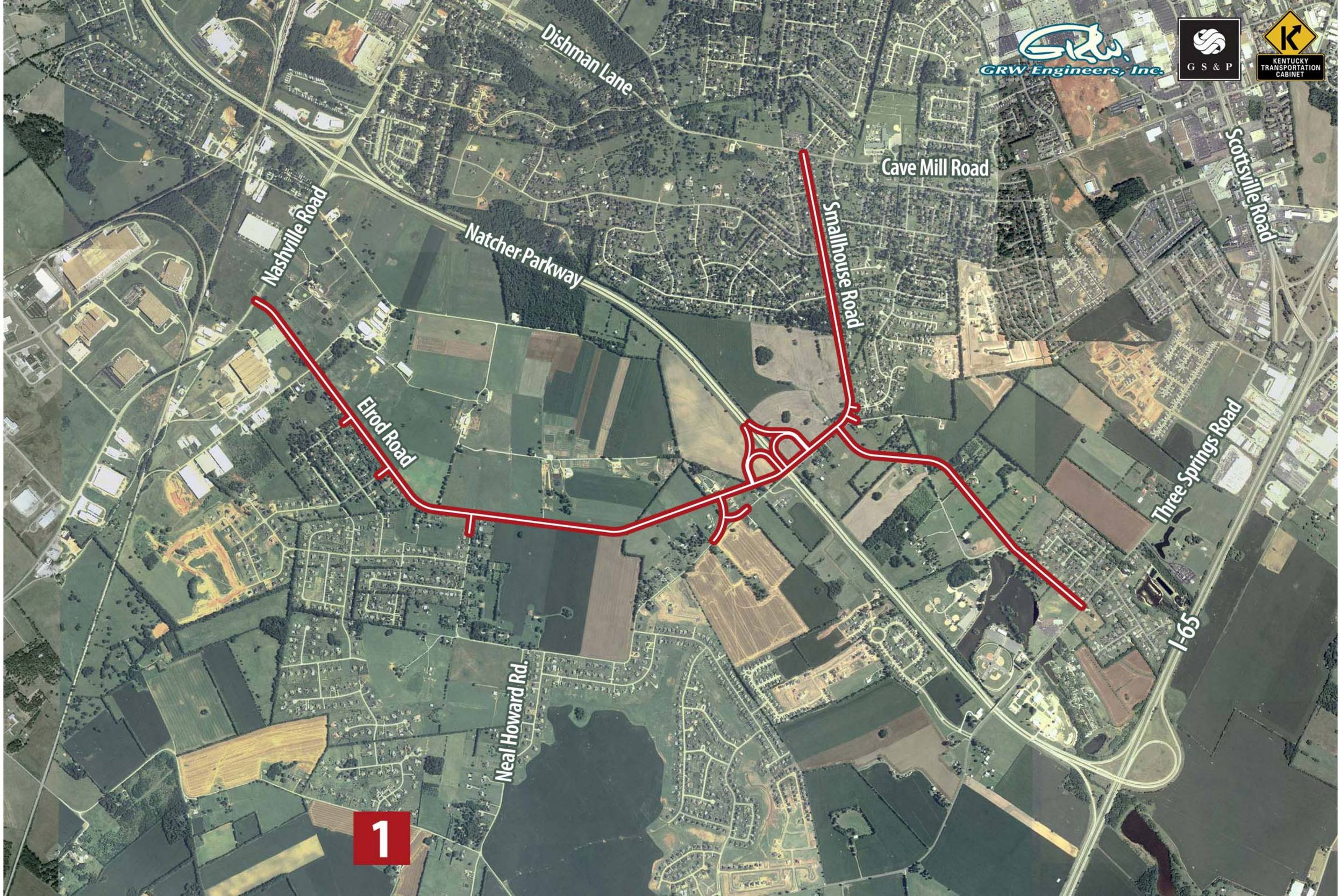
RAMP



2 – LANE RURAL LOCAL NORMAL CUT/FILL SECTION

SMALLHOUSE ROAD

Appendix G


Dishman Lane
Nashville Road
Natcher Parkway
Cave Mill Road
Smallhouse Road
Scottsville Road
Elrod Road
Neal Howard Rd.
Three Springs Road
I-65
1
GRW Engineers, Inc.
G S & P
KENTUCKY TRANSPORTATION CABINET


Dishman Lane
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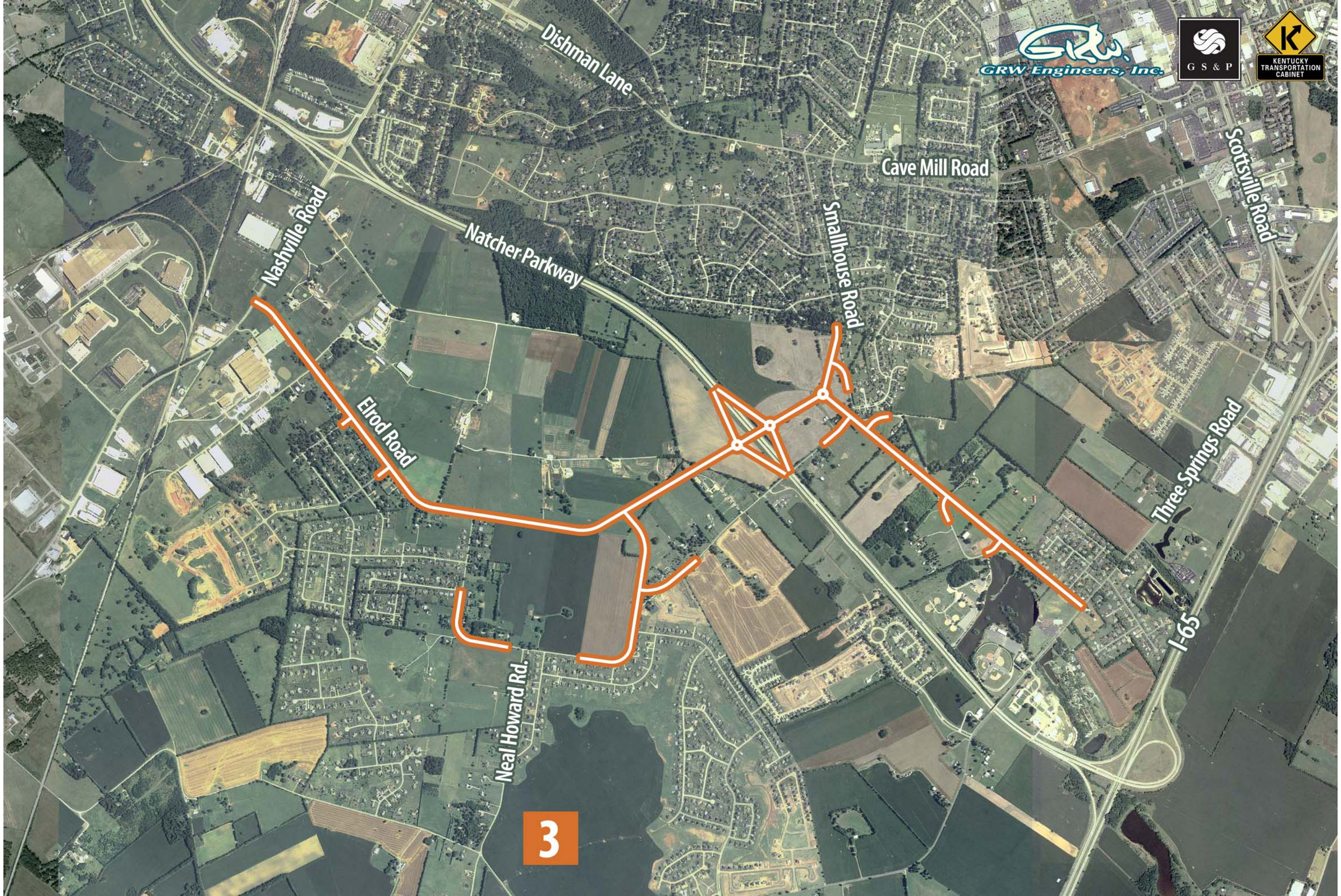
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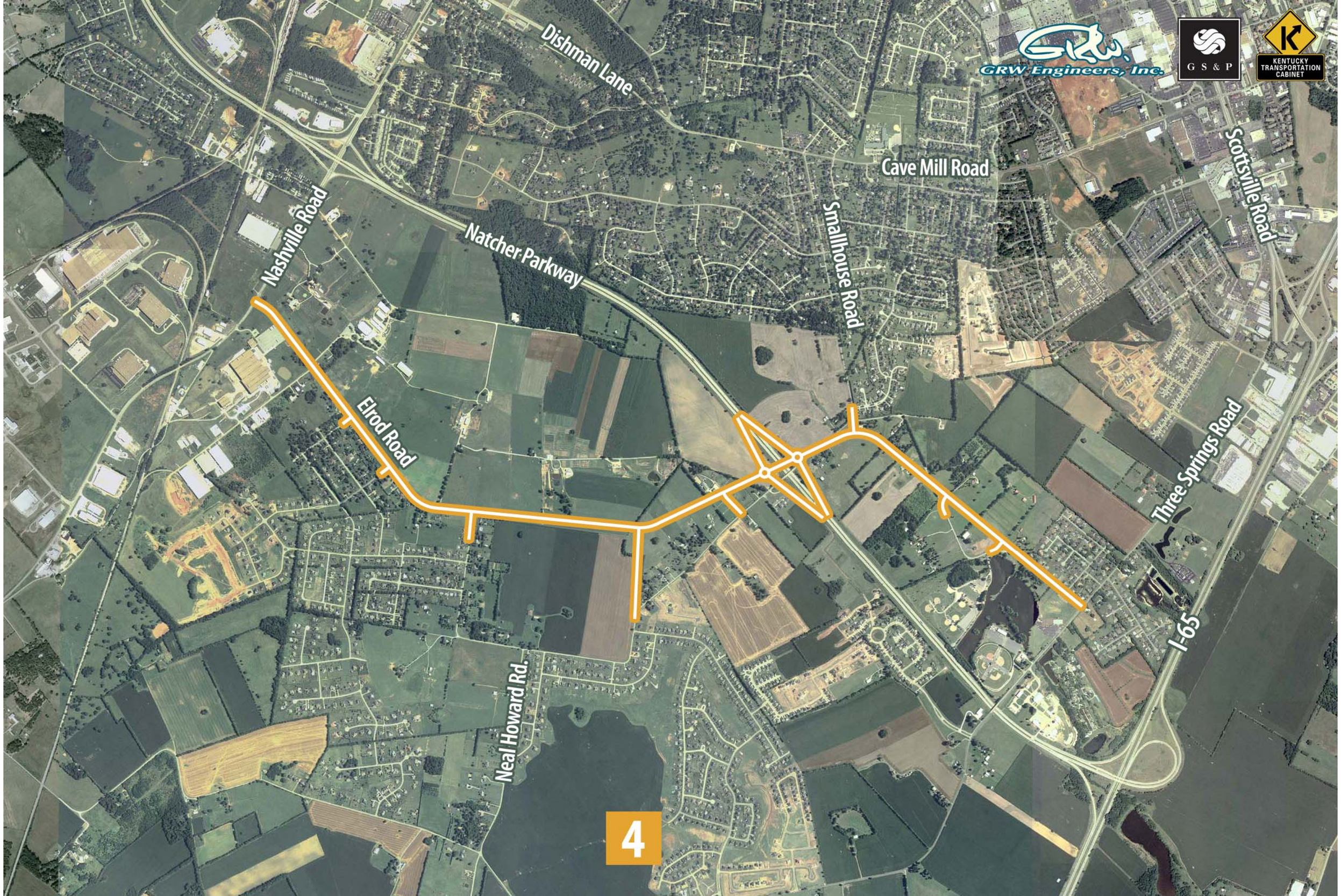
G S & P
KENTUCKY TRANSPORTATION CABINET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Nashville Road
Natcher Parkway
Cave Mill Road
Smallhouse Road
Scottsville Road
Elrod Road
Three Springs Road
Neal Howard Rd.
I-65
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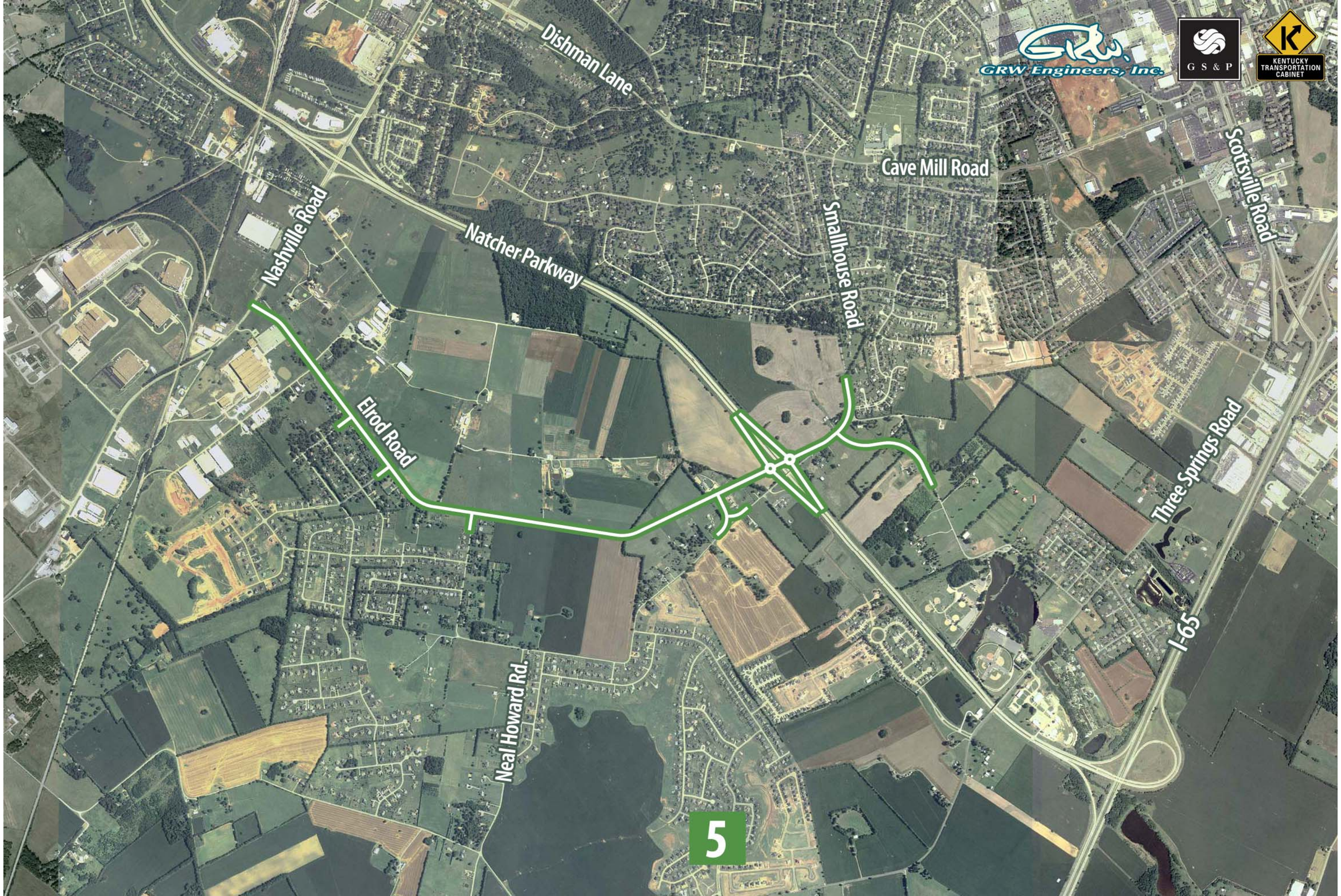
GRW Engineers, Inc.
G S & P
KENTUCKY TRANSPORTATION CABINET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G S & P
KENTUCKY TRANSPORTATION CABINET
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Smallhouse Road
Scottsville Road
Elrod Road
Three Springs Road
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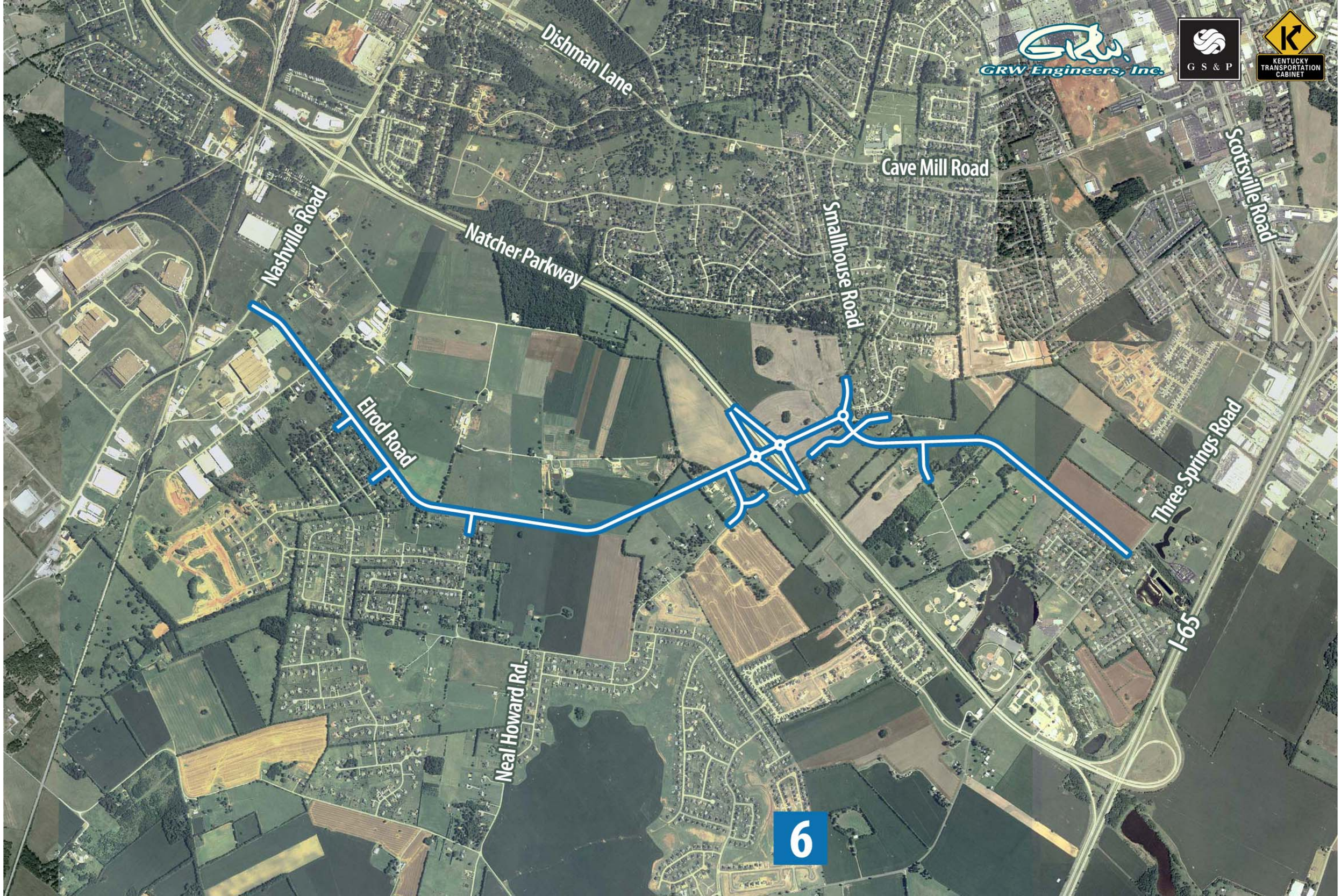
Neal Howard Rd.
5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Smallhouse Road
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Elrod Road
Three Springs Road
Neal Howard Rd.
I-65
6
GRW Engineers, Inc.
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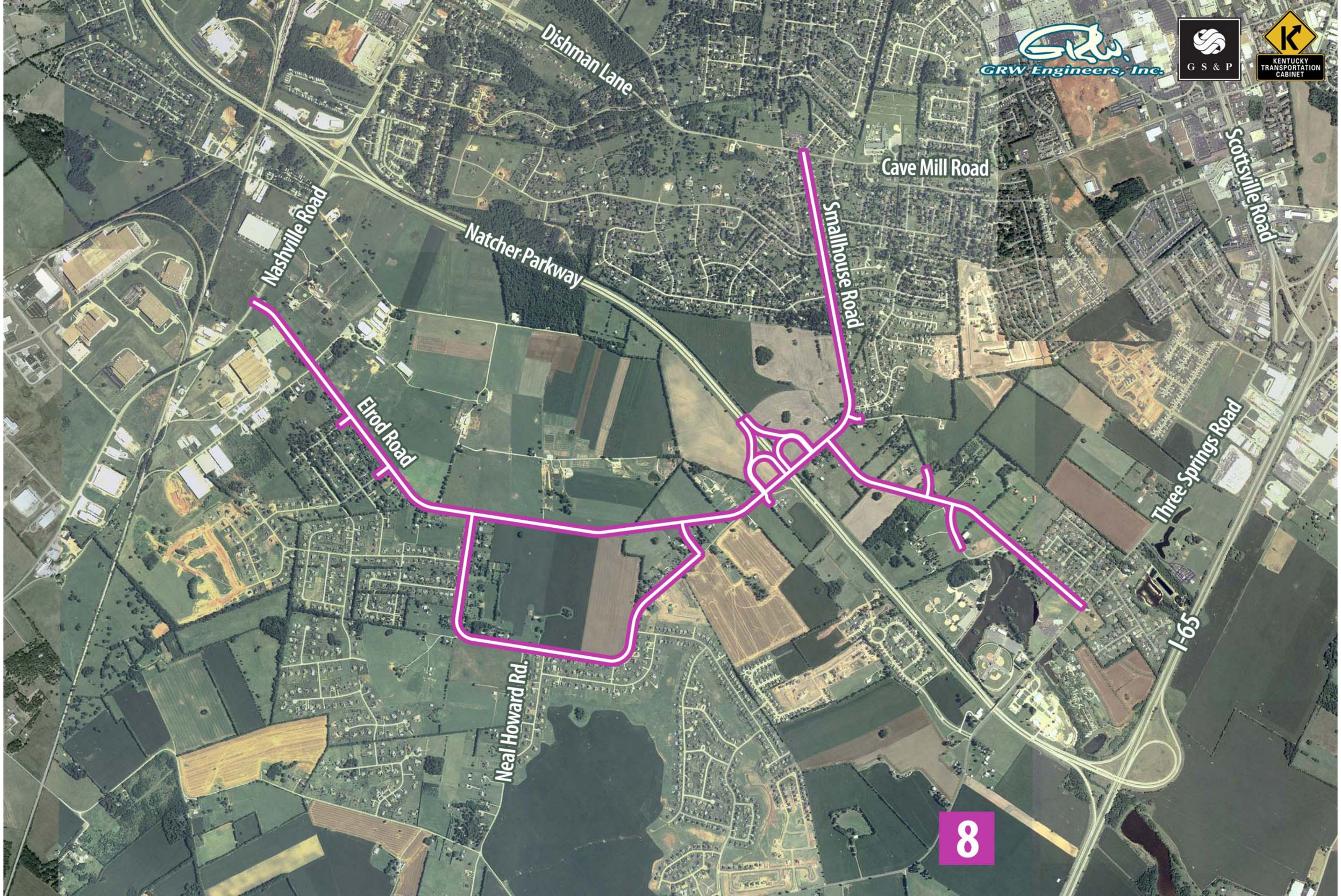
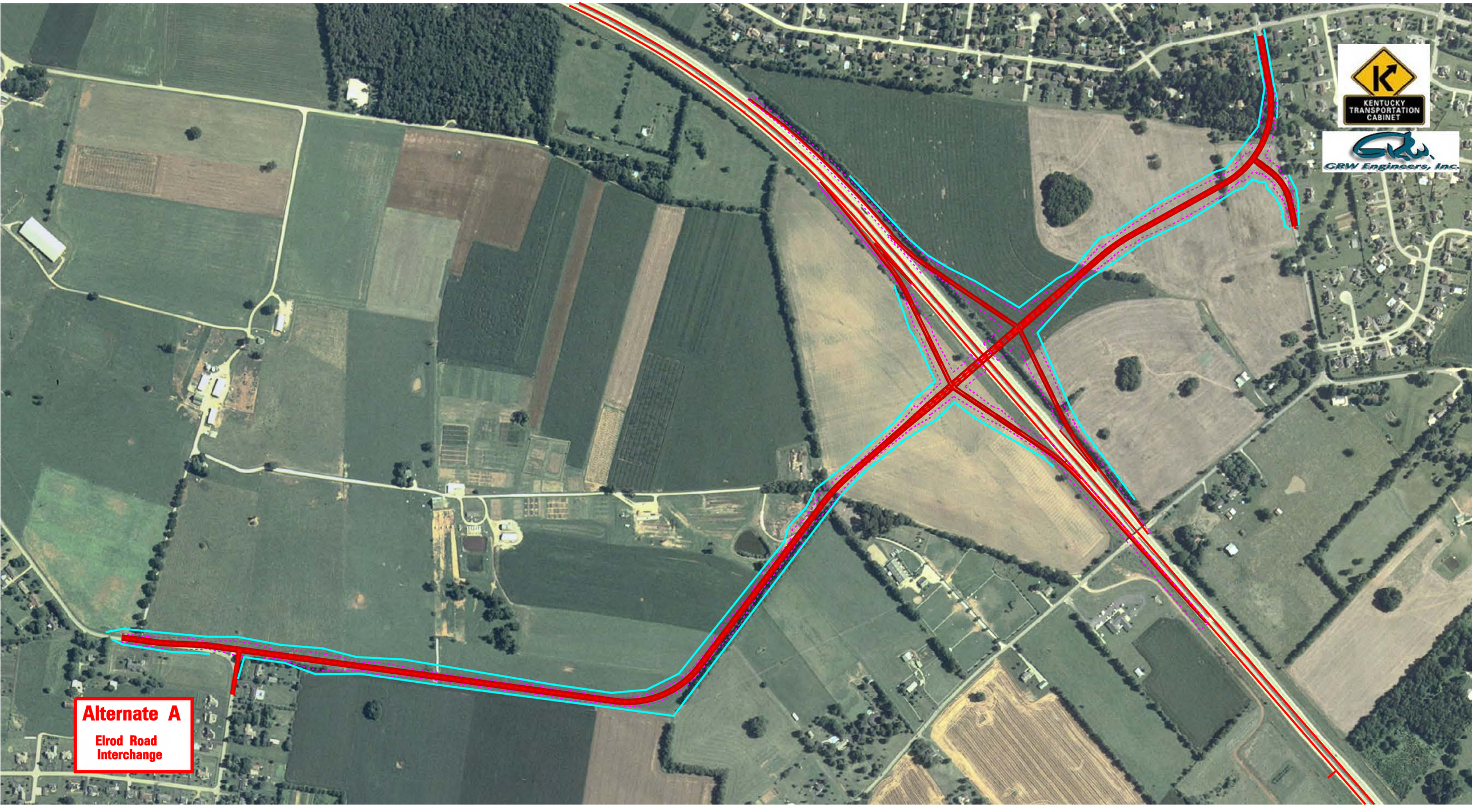
KENTUCKY TRANSPORTATION CABINET


Dishman Lane
Nashville Road
Natcher Parkway
Cave Mill Road
Smallhouse Road
Scottsville Road
Elrod Road
Three Springs Road
Neal Howard Rd.
I-65
7
GRW Engineers, Inc.
G S & P
KENTUCKY TRANSPORTATION CABINET


Dishman Lane
Nashville Road
Natcher Parkway
Cave Mill Road
Smallhouse Road
Scottsville Road
Elrod Road
Neal Howard Rd.
Three Springs Road
I-65
GRW Engineers, Inc.
G S & P
KENTUCKY TRANSPORTATION CABINET
8

Appendix H


KENTUCKY
TRANSPORTATION
CABINET
GRW Engineers, Inc.
Alternate A
Elrod Road
Interchange

KENTUCKY TRANSPORTATION CABINET

GRW Engineers, Inc.

Alternate B

Elrod Road Interchange

KENTUCKY TRANSPORTATION CABINET

GRW Engineers, Inc.

Alternate C

Elrod Road Interchange

Appendix I

Elrod Road Interchange Project
Cost Estimate
3-130.00

	Alternate A	Alternate B	Alternate C
Item	($ mil)	($ mil)	($ mil)
Design	0.8	0.8	0.8
Construction	5.6	5.7	7.3
Right-of-Way	2.7	2.0	2.2
Utilities	0.3	0.3	0.3
Total	9.4	8.8	10.6

Alternate A

Interchange

Elrod

length	9650.00	ft
Width	34.00	ft
Area	328100.00	sq ft
	36455.56	sq yd

Bridge

Length	300.00	ft
Width	49.00	ft
Area	14700.00	sq ft
	1633.33	sq yd
Barrier Walls	600.00	ft

Ramps

Length	4000.00	ft
Width	25.00	ft
area	100000.00	sq ft
	11111.11	sq yds

Optional Improvements

Elrod Rd

Length	13275.00	ft
Width	34.00	ft
Area	451350.00	sq ft
	50150.00	sq yd

Neil Howard Rd.

Length	2375.00	ft
Width	34.00	ft
Area	80750.00	sq ft
	8972.22	sq yd

Smallhouse Rd.

Length	3122.00	ft
Width	34.00	ft
Area	106148.00	sq ft
	11794.22	sq yd

Alternate B

Interchange

Elrod

length	5675.00	ft
Width	34.00	ft
Area	192950.00	sq ft
	21438.89	sq yd

Bridge

Length	300.00	ft
Width	49.00	ft
Area	14700.00	sq ft
		sq yd

Barrier Walls 600.00 ft

Ramps

Length	3800.00	ft
Width	25.00	ft
area	95000.00	sq ft
	10555.56	sq yds

Optional Improvements

Elrod Rd

Length	15050.00	ft
Width	34.00	ft
Area	511700.00	sq ft
	56855.56	sq yd

Smallhouse Rd

Length	3800.00	ft
Width	22.00	ft
Area	83600.00	sq ft
	9288.89	sq yd

Alternate C

Interchange

Elrod		
length	3400.00	
Width	34.00	
Area	115600.00	sq ft
	12844.44	sq yd

Bridge

Length	300.00	
Width	49.00	
Area	14700.00	sq ft
		sq yd
Barrier Walls	600.00	ft

Ramps

Length	6000.00	
Width	25.00	
area	150000.00	sq ft
	16666.67	sq yds

Optional Improvements

Elrod Rd

Length	19300.00	
Width	34.00	
Area	656200.00	sq ft
	72911.11	sq yd

Smallhouse Rd

Length	4650.00	
Width	22.00	
Area	102300.00	sq ft
	11366.67	sq yd

Appendix J

What are your most important issues or concerns?

Please place the appropriate stickers next to your top three issues below.

Too much congestion/ increased traffic

Narrow lanes, shoulders, sharp curves, lack of striping and poor visibility

Sharing the road with large vehicles – tractors, semis, RVs

Lack of access to the Natcher Parkway

Too many driveways/ driveways spaced too closely

No pedestrian or bicycle facilities (sidewalks, paths, bike lanes)

Most important concern Second most important concern Third most important concern

Elrod Road/Natcher Parkway Interchange Study

Warren County • Item 3-130.00

KENTUCKY TRANSPORTATION CABINET

G S & P

MINUTES
Public Involvement Meeting

Elrod Road/Natcher Parkway Interchange Study
KYTC Item No. 3-130.00

Western Kentucky University
L.D. Brown Ag Expo Center
Bowling Green, Kentucky
February 7, 2008
4:00 PM – 7:00 PM (Open House)

A public involvement open house meeting was held on Thursday, February 7, 2008, from 4:00 p.m. to 7:00 p.m. at Western Kentucky University L.D. Brown Ag Expo Center in Bowling Green, Kentucky. The purpose of the meeting was to discuss the issues and concerns with a new interchange connecting Elrod Road to the Natcher Parkway. The following Kentucky Transportation Cabinet (KYTC), Area Development District (ADD), and consultant staff were in attendance:

Gene Becker	BRADD
Deneatra Hack	KYTC, District 3 Planning
Barry House	KYTC, Central Office Planning
Jim Hudson	KYTC, District 3 Design
Keirsten Jaggers	KYTC, District 3
Steve James	KYTC, District 3 Preconstruction
Greg Meredith	KYTC, District 3
Jeff Moore	KYTC, District 3 Planning
Andy Stewart	KYTC, District 3 Design
Cathy Stone	KYTC, District 3
Jon Whitaker	KYTC, District 3 Planning
Richard Guidi	GRW Engineers
Karen Mohammadi	Gresham, Smith and Partners
Mike Sewell	Gresham, Smith and Partners
Bill Seymour	Gresham, Smith and Partners
Dave Stills	Gresham, Smith and Partners

- Sign-In and Survey

  Upon arrival, attendees were greeted at the door and asked to sign the attendance list. At this station, attendees were given a survey questionnaire.

- Welcome and Overview

  At approximately 4:00 PM, Jeff Moore welcomed attendees and gave a brief overview of study history, meeting format and purpose of the meeting. Karen Mohammadi then led the attendees through a Power Point Presentation. The PowerPoint presentation included:

  - Environmental considerations
  -Traffic volumes

-Crash history
-Purpose and need
-Design considerations
-Schedules

- Attendees were given instructions for participating in the Issues Exercise, which included placing color dots on the Issues Exercise display board to correspond with the level of importance each issue had to them.

- Maps of the existing roads and proposed alternatives were provided on tables throughout the room, and attendees were encouraged to study the maps and provide comments. Display boards were also provided showing issues and attendees were asked to review them and talk with KYTC and consultant personnel about their concerns and questions.

- Meeting attendees were asked to complete the questionnaires provided as they signed in, and contact information was posted for any future comments or questions. They were asked to return the forms before leaving the meeting, or if not possible to request a postage-paid envelope at the sign-in table and return the questionnaire by mail no later than March 1, 2008.

A total of 203 persons registered attendance at the three-hour public session. Additional comments are anticipated from the questionnaires. Once all of the questionnaires are received by KYTC, these comments will also be included in the official meeting record.

The meeting closed at 7:00 PM.

MINUTES
Public Involvement Meeting

Elrod Road/Natcher Parkway Interchange Study
KYTC Item No. 3-130.00

Western Kentucky University
L.D. Brown Ag Expo Center
Bowling Green, Kentucky
May 29, 2008
4:00 PM – 7:00 PM (Open House)

A public involvement open house meeting was held on Thursday, May 29, 2008, from 4:00 p.m. to 7:00 p.m. at Western Kentucky University L.D. Brown Ag Expo Center in Bowling Green, Kentucky. The purpose of the meeting was to provide the public with an update on the findings, including proposed alternatives, for the a new interchange connecting Elrod Road to the Natcher Parkway. The following Kentucky Transportation Cabinet (KYTC), Area Development District (ADD), and consultant staff were in attendance:

Deneatra Henderson	KYTC, District 3 Planning
Barry House	KYTC, Central Office Planning
Keirsten Jaggers	KYTC, District 3
Steve James	KYTC, District 3 Preconstruction
Greg Meredith	KYTC, District 3
Jeff Moore	KYTC, District 3 Planning
Jonathan Ross	KYTC, District 3 Planning
Andy Stewart	KYTC, District 3 Design
Cathy Stone	KYTC, District 3
Misti Wilson	KYTC, District 3 Planning
Warren Iulg	GRW Engineers
Karen Mohammadi	Gresham, Smith and Partners
Mike Sewell	Gresham, Smith and Partners
Bill Seymour	Gresham, Smith and Partners
Dave Stills	Gresham, Smith and Partners

- Sign-In and Survey

  Upon arrival, attendees were greeted at the door and asked to sign the attendance list. At this station, attendees were given a survey questionnaire.

- Welcome and Overview

  At approximately 4:00 PM, Jeff Moore welcomed attendees, gave a brief overview of study history and explained the purpose of the meeting. Jeff also addressed many concerns about whether the public would have any true input into a decision to construct an interchange at Elrod. Jeff emphasized the importance of public input in making such decisions and encouraged all participants to provide their comments after the PowerPoint Presentation. Karen Mohammadi led the PowerPoint video presentation which included:

- Purpose and need
- Inventory of existing conditions
- Results of the questionnaire from the first public meeting
- Alternatives considered:
    - Full interchange options
        - Diamond interchange just west of Elrod overpass
        - Diamond interchange far west of Elrod overpass
        - Folded interchange at Elrod overpass
    - Bridge and roadway section
    - Local road connections
    - Comparison of interchange and local road connections options

-Instructions on completing exercise
- Schedule and next steps

- Attendees were given instructions for participating in the Issues Exercise, which included placing color dots on the Issues Exercise display board to correspond with the level of importance each issue had to them. They were also encouraged to study the displays presented on easels throughout the room, and to discuss and questions, concerns or comments with the staff.

- Meeting attendees were asked to complete the questionnaires provided as they signed in, and contact information was posted for any future comments or questions. They were asked to return the forms before leaving the meeting, or if not possible, to request a postage-paid envelope at the sign-in table and return the questionnaire by mail no later than June 13, 2008.

A total of 85 persons registered attendance at the three-hour public session. Additional comments are anticipated from the questionnaires. Once all of the questionnaires are received by KYTC, these comments will also be included in the official meeting record.

The meeting closed at 7:00 PM.

_____

Elrod Road/Natcher Parkway Interchange Study
Public Information Meeting #2
WKU L.D. Brown Ag Expo Center
406 Elrod Road
Warren County • 3-130.00

Survey Questionnaire – You can help us better understand transportation problems, issues, and potential impacts for the proposed interchange at Elrod Road and Natcher Parkway and the possible improvements to roadways in the Elrod/Smallhouse Road area. The Kentucky Transportation Cabinet will use your input to evaluate the three interchange alternatives and several improvement possibilities for Elrod and Smallhouse Roads. Please return this form before leaving the meeting, or request a postage-paid envelope today and return the questionnaire by mail no later than June 13, 2008.

Project Purpose and Need: Rapid residential and commercial growth is occurring on the southern side of Bowling Green. Motorists have limited options for accessing the Natcher Parkway in Southern Bowling Green and Warren County and must rely on the heavily congested routes of US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road) to reach various destinations. Additionally, mobility in the existing study area network is limited for motorists, pedestrians, bicyclists and transit users.

The purpose of this interchange study is to improve the safety and efficiency of travel in the Elrod Road/Smallhouse Road area and to provide better connection for travelers along this existing transportation network to the Natcher Parkway.

Your Name	
Address:	
Phone (optional):	
Email Address (optional):	

1. Please provide your thoughts on each of the Alternatives for the Elrod Road Interchange. (See attachment.) Please be specific with your comments, likes or dislikes, etc.

Interchange Alternatives	*Comments:*
"No-Build" Option	
Alternative "A" Diamond Interchange	
Alternative "B" Small foot-print Diamond Interchange	
Alternative "C" Folded Intersection	

_____

2. Please provide your thoughts on each of the Alternatives for the Smallhouse Road and Elrod Road beyond the interchange. Please be specific with your comments, likes or dislikes, etc.

	Comments:
"No-Build" Option	
Utilize as much of the existing roadway as possible.	
A shift of Smallhouse Road to the North. *(Shown as A2, B2, and C1 on attached exhibit)*	
Connectors to existing Elrod Rd. *(Shown as A1 and B1 on attached exhibit)*	
Roundabout at Smallhouse - Elrod Rd intersection (*Shown as A3 on attached exhibit)*	

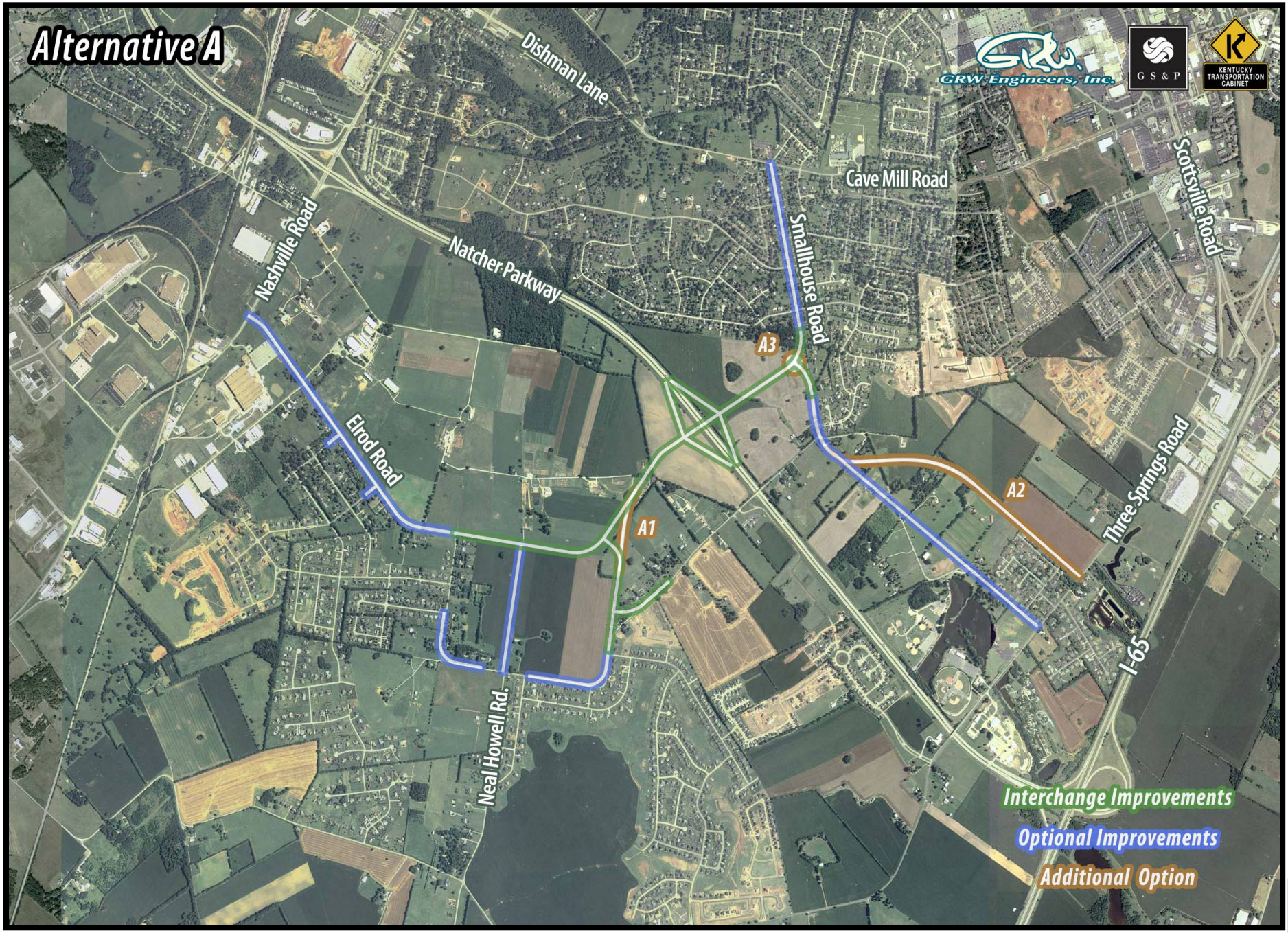
3. For all possible roadway improvements, please help us determine your needs by rating the following:

Item	1 (***not*** *important)* ..... 10 (***very*** *important)*									
Access to Natcher Parkway from Elrod Road	1	2	3	4	5	6	7	8	9	10
Improvements along Elrod Road	1	2	3	4	5	6	7	8	9	10
Improvements along Smallhouse Road	1	2	3	4	5	6	7	8	9	10
Bicycle facilities *(utilizing the paved shoulder shown on the typical sections)*	1	2	3	4	5	6	7	8	9	10

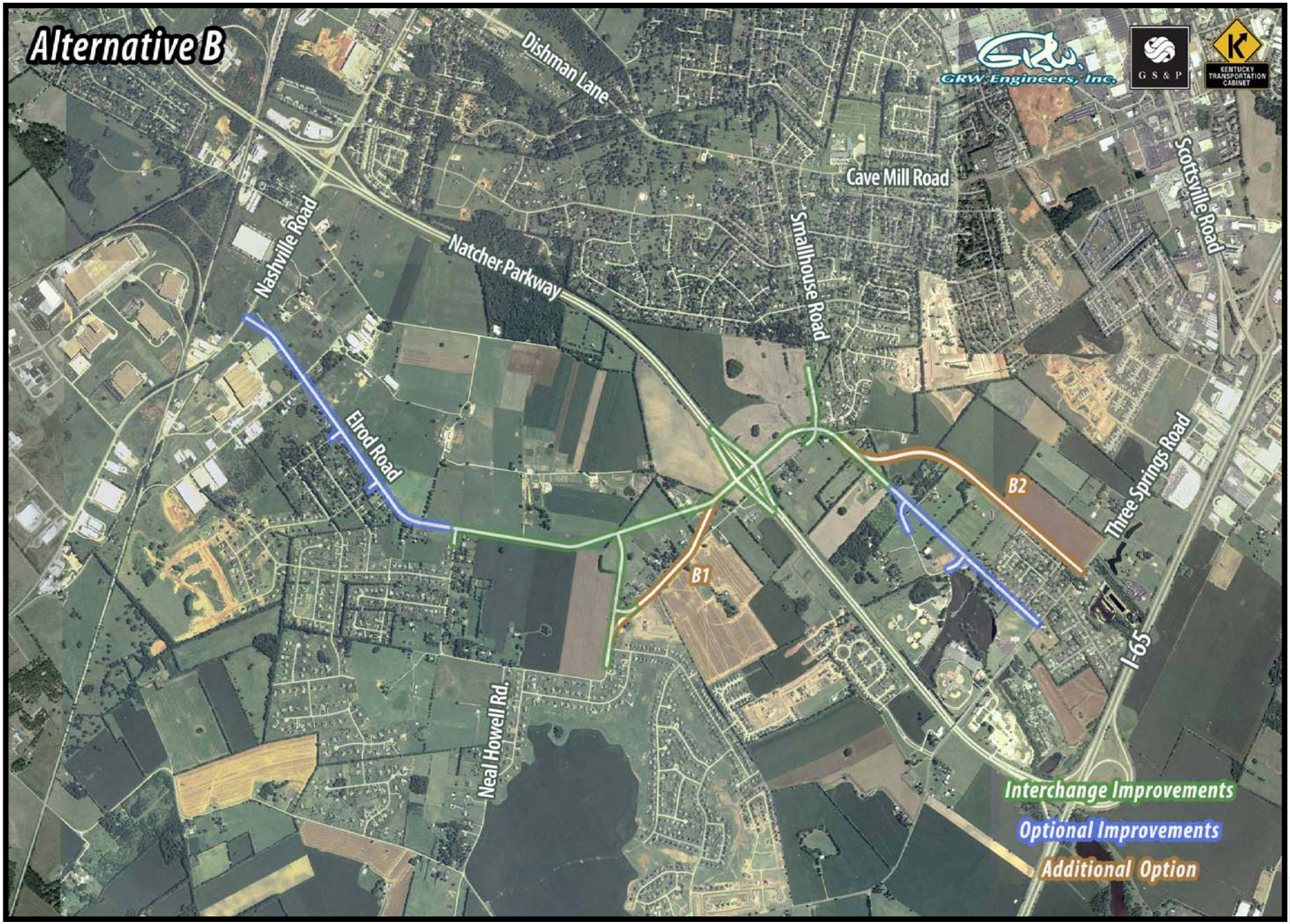
General Comments - Please use the space below to inform us of any additional issues or concerns.

We value your comments. Thank you for taking the time to complete this form. If you did not receive a postage-paid envelope, please send this survey questionnaire as well as any future comments and questions to:

KYTC Project Manager:
Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 40210-1599
Jeff.Moore@ky.gov
Phone Line: 781-7020 Email: Elrod@gspnet.com


Alternative A
Dishman Lane
Nashville Road
Natcher Parkway
Cave Mill Road
Smallhouse Road
Scottsville Road
A3
Elrod Road
A1
A2
Three Springs Road
I-65
Neal Howell Rd.
GRW Engineers, Inc.
G S & P
KENTUCKY TRANSPORTATION CABINET
Interchange Improvements
Optional Improvements
Additional Option

#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GRW Engineers, Inc.
G S & P
KENTUCKY TRANSPORTATION CABINET
Dishman Lane
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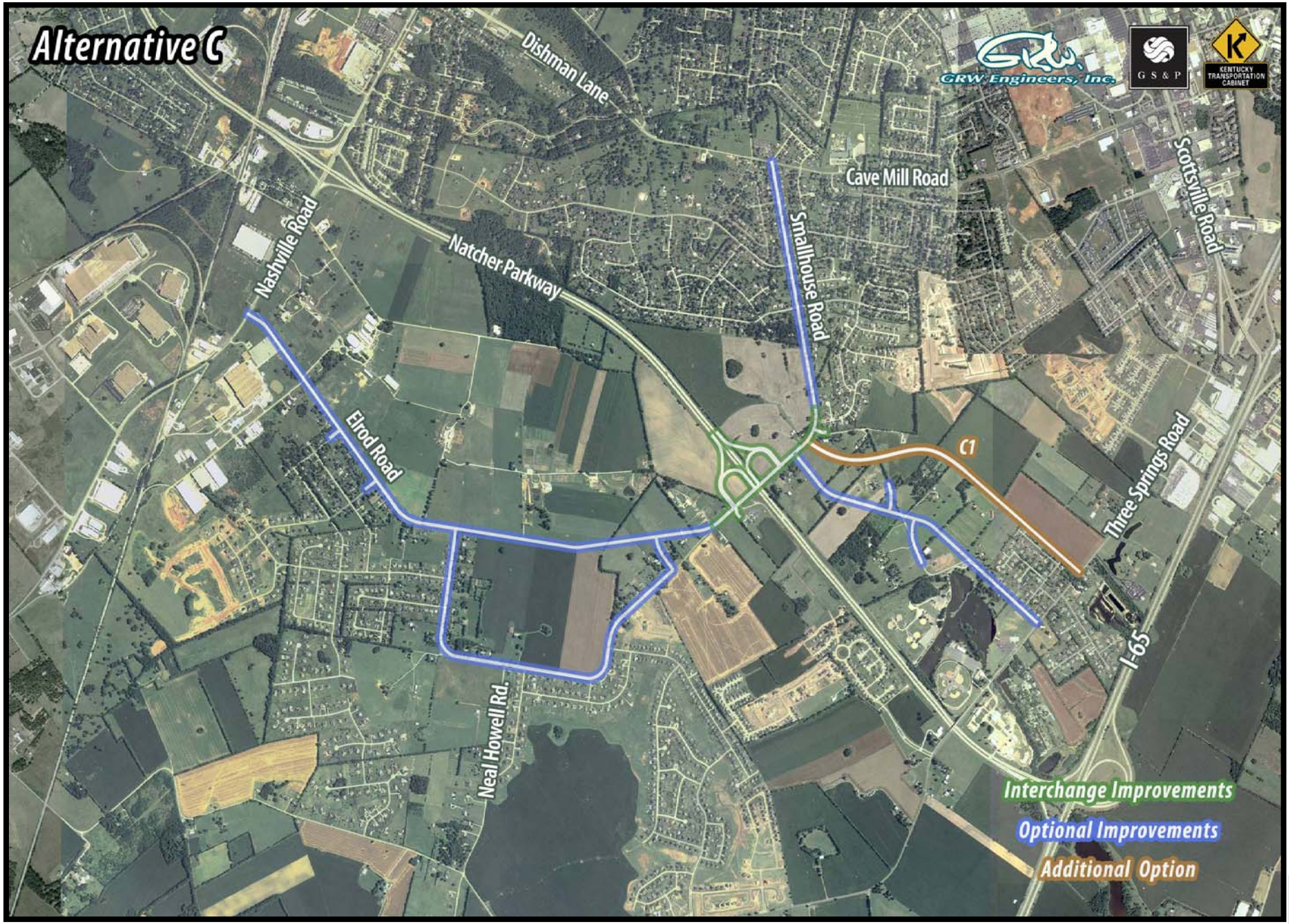
Natcher Parkway
Cave Mill Road
Smallhouse Road
Scottsville Road
Elrod Road
B1
B2
Three Springs Road
I-65
Neal Howell Rd.
Interchange Improvements
Optional Improvements
Additional Option

#


Alternative C
GRW Engineers, Inc.
G S & P
KENTUCKY TRANSPORTATION CABINET
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Nashville Road
Natcher Parkway
Cave Mill Road
Smallhouse Road
Scottsville Road
Elrod Road
C1
Three Springs Road
I-65
Neal Howell Rd.
Interchange Improvements
Optional Improvements
Additional Option

#

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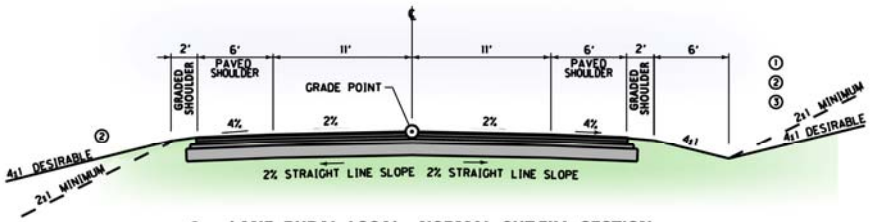
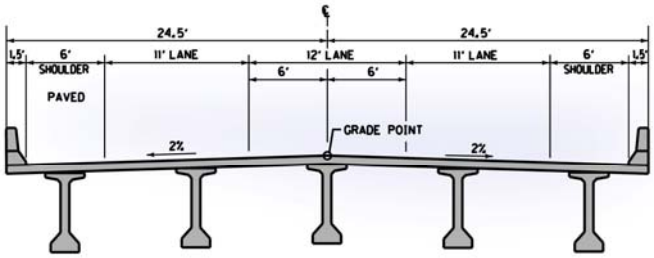


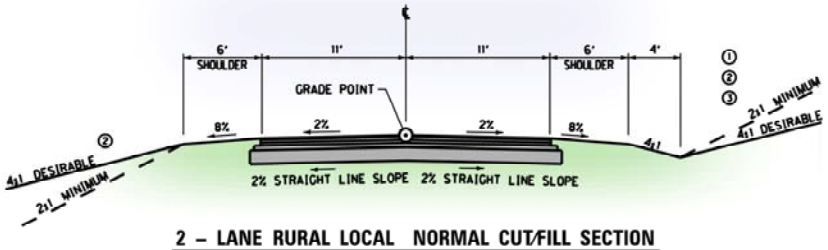
2 – LANE RURAL LOCAL NORMAL CUT/FILL SECTION

ELROD ROAD



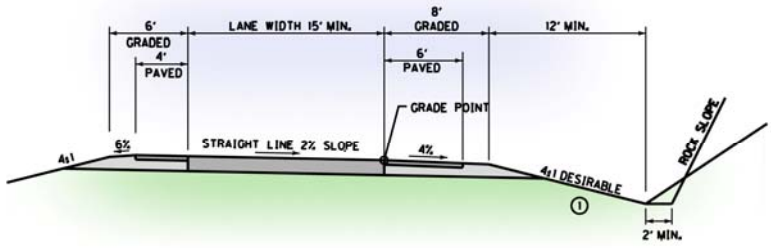
3 – LANE RURAL NORMAL CUT/FILL SECTION

ELROD ROAD BRIDGE SECTION



2 – LANE RURAL LOCAL NORMAL CUT/FILL SECTION

SMALLHOUSE ROAD



1 – LANE RAMP NORMAL CUT/FILL SECTION

RAMP

Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: JACK L. Rudolph Jr.

Address: Department of Agriculture

Email Address: Jack.Rudolph@WKU.Edu

Please answer the following:

What travel problems exist in this area of Warren County?	bottle necks - but mostly in the morning - this is only getting worse due to housing development.
What do you see as the purpose and need of the project?	purpose - Make ELRoy Road more safe. User friendly move traffic around city better
What would be good project goals?	To TAKE the least Amount of Farm land from the WKU Farm and to provided an entrance off the ELRod Road directly to the WKU Mulch Site - (BG Leaf Pick.
Do you know of any environmental issues in the area?	Concern for the way the Road curves across the WKU Farm.
General Comments	How does this Project Tie INTO the City/County ELROD Project?

We value your comments. Thank you for taking the time to complete this form.
Please send this comment form or any future comments and questions to:

KYTC Project Manager:
Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 402101-599
or
Jeff.Moore@ky.gov

GS&P Project Manager:
Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
101 South Fifth Street
Suite 1400
Louisville, KY 40202
or
Karen_Mohammadi@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: John Odom

Address: 437 Golfview Way

Email Address: John.Odom@warren.kyschools.us

Please answer the following:

What travel problems exist in this area of Warren County?

Narrow RDS
Traffic
Curves.

What do you see as the purpose and need of the project?

Safety Needs
Better Traffic Flow
Widden RDS for buses.

What would be good project goals?

Open up NW Traffic
Better ~~&~~ student TRANSPORT
Cut down on Curves

Do you know of any environmental issues in the area?

None that has not been discussed.

General Comments

We value your comments. Thank you for taking the time to complete this form.
Please send this comment form or any future comments and questions to:

KYTC Project Manager:
Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 402101-599
or
Jeff.Moore@ky.gov

GS&P Project Manager:
Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
101 South Fifth Street
Suite 1400
Louisville, KY 40202
or
Karen_Mohammadi@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: Jerry Riney

Address: 2232 Smallhouse Rd

Email Address: wjriney@holyspiritcatholic.org

Please answer the following:

What travel problems exist in this area of Warren County?

Smallhouse Rd — 90° ∠ Turns ?
Access to Natcher Pkwy ?
Congestion — Bowling Green Pkwy
Access to Three Springs Park

What do you see as the ~~purpose~~ and need of the project?

To create better access
To ease congestion
Safety
To move traffic throughout city.

What would be good project goals?

Do you know of any environmental issues in the area?

Thank you for your help. N

General Comments

What is date for general meeting ?

We will have 950 families/households wanting to motor to + from our new Church complex @ 4754 Smallhouse Rd
We have concerns about egress + ingress.
Currently
We support the interchange at Elrod + Natcher as well as the Natcher extention.
Where Elrod meets Three Springs is a concern for us...?

4754 Smallhouse Rd

We value your comments. Thank you for taking the time to complete this form.
Please send this comment form or any future comments and questions to:

KYTC Project Manager:
Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 402101-599
or
Jeff.Moore@ky.gov

GS&P Project Manager:
Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
101 South Fifth Street
Suite 1400
Louisville, KY 40202
or
Karen_Mohammadi@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)
Your Name: Stephanie Martin – Natcher Elem.
Address: 715 Hunters Crossing Way / 1434 Cave Mill Rd.
Email Address: Stephanie.martin@warren.kyschools.us

Please answer the following:

What travel problems exist in this area of Warren County?

- Congestion on Cave Mill Road
- Smallhouse & Cave Mill
- Smallhouse & Elrod Rd.

What do you see as the purpose and need of the project?

- ease congestion especially due to ~~lack~~ new growth/population on that side of town

What would be good project goals?

to think ahead to projected congestion that will be created due to new interchange

Do you know of any environmental issues in the area?

/

General Comments

Date for general meeting?

We value your comments. Thank you for taking the time to complete this form.
Please send this comment form or any future comments and questions to:

KYTC Project Manager:
Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 402101-599
or
Jeff.Moore@ky.gov

GS&P Project Manager:
Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
101 South Fifth Street
Suite 1400
Louisville, KY 40202
or
Karen_Mohammadi@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: J.M. Towell

Address:

Email Address: mac.towell@bglky.org

Please answer the following:

What travel problems exist in this area of Warren County?	Access to through routes
What do you see as the purpose and need of the project?	Connectivity
What would be good project goals?	Connect KY 884 and US 31-W
Do you know of any environmental issues in the area?	Karst, park, cemetery
General Comments	The only problem is money.

We value your comments. Thank you for taking the time to complete this form.
Please send this comment form or any future comments and questions to:

KYTC Project Manager:
Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 402101-599
or
Jeff.Moore@ky.gov

GS&P Project Manager:
Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
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Suite 1400
Louisville, KY 40202
or
Karen_Mohammadi@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: John Knepler

Address: PO Box 177 Alvaton, KY 42122

Email Address: jknepler@bellsouth.net

Please answer the following:

What travel problems exist in this area of Warren County?	Scottsville road into town Three springs road into town Poor signal coordination on Scottsville Rd
What do you see as the purpose and need of the project?	Improve traffic flow into town - Smallhouse site Reduce congestion at Three Springs ~~Scottsville~~ Enhance development so. of Natcher Pkwy
What would be good project goals?	Improve traffic flow across Natcher Improve traffic flow parallel to Natcher within BG
Do you know of any environmental issues in the area?	
General Comments	Hurry up!

We value your comments. Thank you for taking the time to complete this form.
Please send this comment form or any future comments and questions to:

KYTC Project Manager:
Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 402101-599
or
Jeff.Moore@ky.gov

GS&P Project Manager:
Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
101 South Fifth Street
Suite 1400
Louisville, KY 40202
or
Karen_Mohammadi@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: David Gifford

Address: 138 Phelps Way

Email Address: davidgif@gmail.com

Please answer the following:

What travel problems exist in this area of Warren County?	Crowded intersections, increased residential traffic. High rate of speed in dense population areas.
What do you see as the purpose and need of the project?	Accessability to major roads for community growth.
What would be good project goals?	Develope access to interchange that will not excalate the problem
Do you know of any environmental issues in the area?	No.
General Comments	Interchange would be a personal advantage for myself, however without access roads such as small house, 3 Springs, Elrod, & Neal Howell improved the potential for a larger problem exists.

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Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: Lynn Davenport

Address:

Email Address: LynnDavenport@Remax.net

Please answer the following:

What travel problems exist in this area of Warren County?

Congestion - Poor Access Points
Travel Time

What do you see as the purpose and need of the project?

To Release Congestion and offer
Better Access to Area
& Lessen traffic on curvy Roads

What would be good project goals?

Ease Congestion on Three Springs Rd
Offer more convient Access from
South of The Natcher Pky

Do you know of any environmental issues in the area?

Hidden River Cave System
Basil Griffin Park
Wetlands on Three Springs Rd

General Comments

This project is currently needed and
will become even more important
as New Home construction expands in
the Area

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Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: Robert Jaynes

Address: 406 Elrod Rd

Email Address: Bob.Jaynes@WKU.EDU

Please answer the following:

What travel problems exist in this area of Warren County?	Elrod to narrow + other side roads in that area
What do you see as the purpose and need of the project?	Move traffic more safely through area
What would be good project goals?	Have traffic Funneled to Parkway same time interchanges is done
Do you know of any environmental issues in the area?	No
General Comments	

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Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: JENNIFER TONGAS

Address:

Email Address: jennifer.tongas@wku.edu

Please answer the following:

What travel problems exist in this area of Warren County?

CONGESTION / NARROW RDS, DANGEROUS CURVES, LACK OF STRIPING
ACCESS POINTS ALONG CORRIDOR
PED / BIKE ACCOMODATIONS
LACK OF SHOULDERS

What do you see as the purpose and need of the project?

BIKE/PED

IMPROVE CONNECTIVITY TO TRANSPORTATION GRID
MINIMIZE IMPACT TO EXISTING CONDITIONS
AVOID INCREASED NEIGHBORHOOD CUT THROUGH
ALLEVIATE CONGESTION (CURRENT & FUTURE)
IMPROVE MOBILITY, SAFETY, CONNECTIVITY

What would be good project goals?

BIKE/PED

IMPROVE CONNECTIVITY TO TRANSPORTATION GRID
IMPROVE CAPACITY OF TRANSPORTATION SYSTEM TO ACCOMMODATE ANTICIPATED GROWTH
IMPROVE SAFETY OF TRANSPORTATION SYSTEM
IMPROVE DIVERSITY OF TRANSPORTATION MODES
MINIMIZE IMPACTS TO EXISTING COMMUNITY AND ENVIRONMENT

Do you know of any environmental issues in the area?

NO

General Comments

CONCERN IS INCREASED TRAFFIC ON SMALL HOUSE TRAVELING NORTH IF INTERCHANGE IS CREATED
SMALLHOUSE IS ALREADY CROWDED, PARTICULARLY AT PEAKS AM/PM.
CAPACITY/DESIGN OF RURAL RDS IN AREA - NOT BUILT FOR MORE TRAFFIC
POTENTIAL CUT THROUGH NEIGHBORHOODS TO REACH INTERCHANGE

We value your comments. Thank you for taking the time to complete this form.
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Elrod Road/Natcher Parkway Interchange Study
Stakeholders Meeting #1 – Comment Form
Warren County • 3-130.00

(optional)

Your Name: MARK HIGDON (ALSO - HOLY SPIRIT CATHOLIC CHURCH)

Address: 2329 ELROD ROAD, BOWLING GREEN, KY 42104

Email Address: MarkHigdon@INSIGHTBB.com

Please answer the following:

What travel problems exist in this area of Warren County?	ROADS ARE NOT DESIGNED FOR TYPE OF TRAFFIC NOR AMOUNT OF TRAFFIC IE - SHOULDERS/WIDTH
What do you see as the purpose and need of the project?	SAFETY & FLOW OF TRAFFIC
What would be good project goals?	TAKE CARE OF IMMEDIATE DEFICIENCIES THEN PLAN FOR GROWTH
Do you know of any environmental issues in the area?	SINK HOLES/THREE SPRINGS PARK/ ~~HOD~~ /HIDDEN OR LOST RIVER
General Comments	

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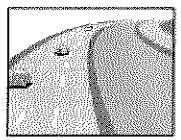
Preliminary 2007 Traffic Volumes and Levels of Service

Levels of Service Key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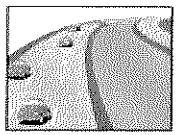
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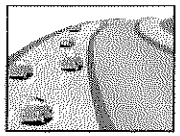
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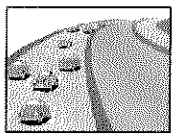
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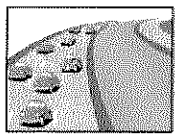
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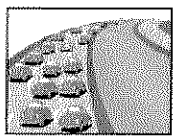
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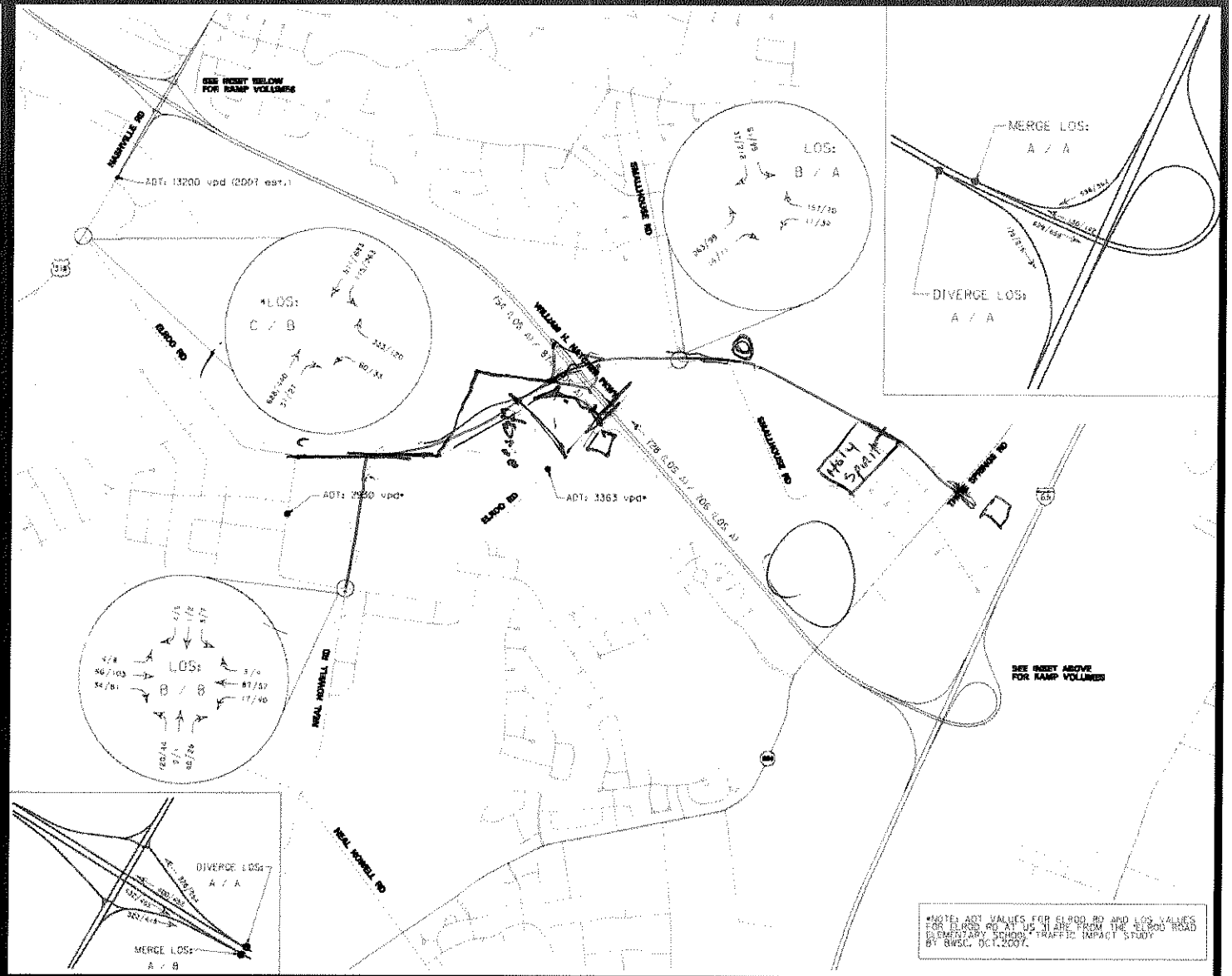


GS&P

KENTUCKY TRANSPORTATION CABINET

Elrod Road/Natcher Parkway Interchange Study

Warren County • Item 3-130.00

STEP 1

Interchange Alternative

Please use your colored stickers to select your preferred alternative.
Feel free to write any comments you may have in the space to the right.

Like this best

Like some aspects

Like the least

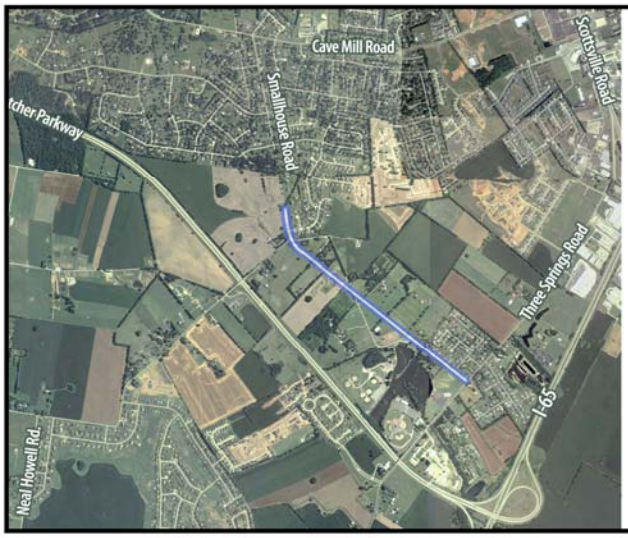
STEP 2

Connecting Improvements

Please use your colored stickers to select your preferred alternative.
Feel free to write any comments you may have in the space to the right.

Most Important | Important | Least Important

Improvements to existing Elrod Road, South of Natcher Parkway.



Improvements to Smallhouse Road extending East towards Three Springs Road.

Improvements to Smallhouse Road extending North towards Cave Mill Road.

STEP 3

Smallhouse Road Options

Please use your colored stickers to select your preferred options.
Feel free to write any comments you may have in the space to the right.

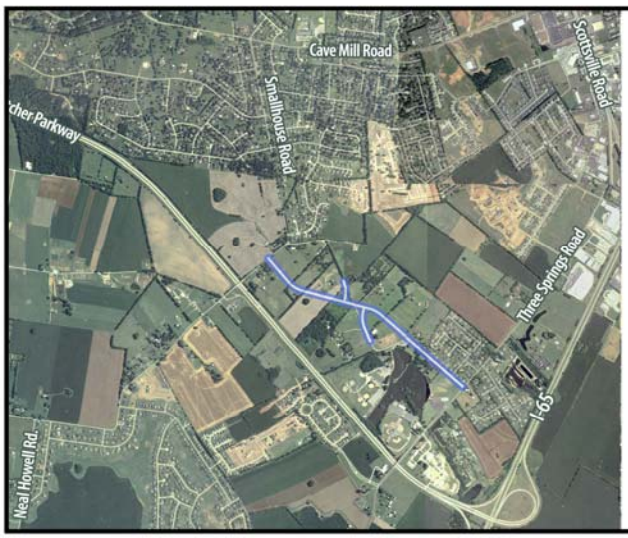
Like this best

Like some aspects

Like the least

Correct the existing sharp curves by straightening the alignment

Create a new alignment shifted North of the existing roadway



Correct the sharp curves near the park and shift the west tie-in South

`Elrod Road/Natcher Parkway Interchange Study
Public Information Meeting #2
WKU L.D. Brown Ag Expo Center
406 Elrod Road
Warren County • 3-130.00

Survey Questionnaire – You can help us better understand transportation problems, issues, and potential impacts for the proposed interchange at Elrod Road and Natcher Parkway and the possible improvements to roadways in the Elrod/Smallhouse Road area. The Kentucky Transportation Cabinet will use your input to evaluate the three interchange alternatives and several improvement possibilities for Elrod and Smallhouse Roads. Please return this form before leaving the meeting, or request a postage-paid envelope today and return the questionnaire by mail no later than June 13, 2008.

Project Purpose and Need: Rapid residential and commercial growth is occurring on the southern side of Bowling Green. Motorists have limited options for accessing the Natcher Parkway in Southern Bowling Green and Warren County and must rely on the heavily congested routes of US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road) to reach various destinations. Additionally, mobility in the existing study area network is limited for motorists, pedestrians, bicyclists and transit users.

The purpose of this interchange study is to improve the safety and efficiency of travel in the Elrod Road/Smallhouse Road area and to provide better connection for travelers along this existing transportation network to the Natcher Parkway.

1. Please provide your thoughts on each of the Alternatives for the Elrod Road Interchange. (See attachment.) Please be specific with your comments, likes or dislikes, etc.

Interchange Alternatives	*Comments:*
"No-Build" Option	

#1: Red dot
#2: Green dot
#3: The interchange will be much more of an exit than an entrance – it will simply suck a lot more traffic from the north and west toward the great outlet of 3 Springs Road and Scottsville Road. (Green dot)
#4: I would like to be able to access I-65 via Natcher Pkwy without going to Scottsville

on insanity. The only expectation that I have is worse traffic issues if this happens.
#28: Only if you reconfigure and improve the I-65/Scottsville Road interchange
#29: Congestion is bad – plan needed
#31: My choice – the interchange will create more problems than it will solve. We would be better suited to have a interchange to I-65 on the south side of town like on Matlock Road. An interchange on Elrod will create more traffic through the Hidden River neighborhood addition & create even more speed problems on Champions, Golfview & Herman. With a school being added to Elrod Road the crosswalk to Hidden River will be a blind intersection with speeding vehicles from the parkway creating a dangerous intersection. Please do not do this interchange.
#42: No – If you could do it at 3 Springs, but not Elrod
#44: The best for now because when you dump Elrod Rd & Parkway on 3 Springs you make a bad problem worse.
#49: Must do something. Anything would be better.
#54: As a homeowner I don't want to see an increase in traffic and noise as a result of this interchange. The fact that location is so close to current Scottsville Rd I don't see the value.
#55: This is the best option. These areas are primarily residential, therefore roads are adequate.
#56: We can't wait any longer.
#57: Not a good plan. Doesn't address traffic needs & growth.
#58: My favorite option. There is a finite amount of oil in the earth. People will be carpooling more, driving less, biking more. More encouragement of biking, why no sidewalks?
#59: This is the best option with gas getting more expensive. My guess is traffic will reduce not increase over next 30 years.
#60: Do not feel the interchange is necessary since we have two off the parkway @ Nashville Road and Russellville Road.
#67: This is our first & only option.
#69: Definitely not the best option
#70: Not a good option. Having a road between the WKU Farm and all of our neighbors is a good thing.
#75: Provides for no future growth.
#77: At this time I think 10 yrs down road would put build out of date. Takes up too much farm.
#81: Best – Just improve what we have, shoulders, etc.

Alternative "A"
Diamond Interchange

#1: Green dot
#4: I like this option the most because it would close the existing overpass and leave me on a short Deadend street and because the interchange would be farther from my property.
#8: Best choice
#9: Best alternative; traffic flows would function better during const

#22: No option! The area around Elrod and Smallhouse is still very much beautiful country and green. If any improvements must be done do at other end by Nashville Rd.
#24: Like this the best. Leave existing overpass for "local" traffic. A large section of "new" Elrod could be built without affecting "old" Elrod.
#26: If I had to choose one I suppose this option would be preferred of ABC, but no build is my first choice.
#28: Must be linked to the timely improvements of Smallhouse Road and Elrod Road.
#29: Last choice. This really hurts property values on Smallhouse – not good.
#44: None of these ("A" , "B" or "C") because you can't divert enough traffic to make cost effective
#49: Like this one best. Of the SKU land affected they can make use as test plots. Across the Natcher will probably be convenience stores or houses.
#56: Looks like the best options for the interchange and to open up Elrod, Neal Howell and Smallhouse.
#58: If you absolutely insist on encouraging transportation and increasing CO2 in the atmosphere to fuel global climate change, I would be able to stand this option.
#69: The most beneficial for current and future development. However, this will require a high level or coordination between city, county & sate. Not something that happens often!
#70: This one will take more of the Farm than the others.
#75: Too much change.
#77: If I was for build this would be the one I would be in favor of.

Alternative "B"
Small foot-print
Diamond Interchange

#1: Yellow dot
#4: This alternative is definitely preferable to "C" but not as good for me as "A." The interchange would be quite near my property still.
#8: 2nd choice
#9: No as 1st choice; 2nd choice only; too much disruption to traffic during const.
#10: The smaller footprint is good, but the routing really doesn't funnel traffic away

	#75: Least amount of construction with easy access to homes by-passed by the new Elrod construction. 4-way stop improves flow.
Alternative "C" Folded Intersection	**#1**: I think this would be too much traffic on Elrod Road & Smallhouse Road from all four directions – too much traffic by new proposed school. (Red dot) **#4:** I am strongly opposed to this plan that would put the flop/folded entrance across the street from my house and the reconfigured "Smallhouse East" right beside it. I do not want this alternative to become reality. I also wonder if my property would be taken for either of these plans ("B" or "C"), which is a whole different concern altogether. **#8:** Not a good choice **#9:** No! Too dangerous for access onto Natcher; confusion on entrance/exit to Parkway **#10**: This interchange looks like it would really increase the queues on Elrod during peak periods. **#22:** No option! With nice, big lots of green grass and plenty of trees. Leave this section country! **#24**: 3rd best. Can't rely on county to improve Elrod. **#26**: No way!!!! Not in a million years. **#28**: This is "foreign" to this part of KY. **#29:** Access to "previous" Elrod Rd not convenient **#49:** This is o.k. I am familiar with this in Maceo KY/Rockport IN bridge. You can't have too many signs. **#55:** If we have to do something, this seems to be the least invasive, and thus the best between A, B & C. **#56:** Maybe the 2nd best option but I am not sure about the capacity of the folded design. **#57:** Preferred. **#58**: This destroys my grandmother's property. I don't like it. **#69:** Less land acquisition required. Would utilize old bridge location. Needs to include connection of Ivan Downs Blvd. & Neal Howell! **#70**: This will take the least. **#75**: Possible. **#81:** We do not want A2, B2 C1 – the additional options

2. Please provide your thoughts on each of the Alternatives for the Smallhouse Road and Elrod Road beyond the interchange. Please be specific with your comments, likes or dislikes, etc.

	Comments:
"No-Build" Option	**#2**: Leave Smallhouse alone-it is a scenic road-a good road as it is. (Green dot)

	#3: Leave Smallhouse alone! It doesn't need to be "improved" so people from somewhere else can go through faster than they do already! **#4:** I do not think "no building" is a viable option. Even without a new interchange, improvements must be made to Smallhouse & Elrod. **#8:** We need continuous improvements **#9:** Must be improved if our community is to continue propser! **#10**: Of the 3 options you have presented, the "no build" option is the best one. **#19**: Do not take others' property-how would you like your yard taken. **#22:** #1 Choice. The area of Smallhouse I live on is perfect just the way it is. It's a small bit of country near larger populations of people. Leave it country! We don't want big projects. The subdivisions may but we don't. Please leave our section of Smallhouse country. **#24**: Improvements needed sooner than later **#26**: The road in front of my house should not be expanded, traffic should be routed away from that section of Elrod Rd. **#27:** Ok if the curves of Smallhouse <u>are realigned</u>! **#28**: The improvement of the connectors to the proposed interchange must be done at the same time. **#31:** Not needed **#49:** You must do something **#54**: Again I support no-build. **#56:** Can't afford to wait. Someone will construct something where roads must go. **#58**: See previous comments. This option! **#59:** Leave it alone. Improve it but don't change its path. **#60**: Do not like changes to Smallhouse –would put our church (Trinity FWB) on an island. As a property owner on Smallhouse make improvements but do not change the road. **#67:** We do not want any more vehicle traffic by our property. Vehicle traffic is increasing daily from Three Springs Road. No fatal traffic wrecks have occurred on our section of road in 32 years. Improve Three Springs Road! **#69:** Not a good option considering projected growth. **#70:** Not an option. **#75**: Strongly think this opens community to future gridlock.
Utilize as much of the existing roadway as possible, but re-align the portion near the sharp curves. The focus of these changes is to improve safety. *(shown in blue on exhibit pages)*	**#2**: Red dot **#3**: I have lived in sight of these terrible curves for over 25 years and recall knowing about only 2 accidents, one of which was caused by ice. Curves are good! They slow people down. Do you have any data to prove this particular contention? **#4:** I am not opposed to improving these two roads, but many safety issues could be drastically reduced by strict enforcement of traffic laws (speed limits, stop signs, no passing lines). **#8:** Best idea **#9:** Best alignment

#10: Leave the existing curves alone and provide new roads to accommodate the bulk of the traffic.
#22: 100% completely NO! The road is safe. Check the police accident reports. The only thing that slows people down on road is the curves. People drag race on long straight stretch in front of my parents' house. Have for many, many years.
#26: I think routing Elrod a different way eliminating high traffic over some of the sharp curves is a better idea.
#27: I do not like these options as they conflict w/ church properties & planned development for Holy Spirit.
#28: Improving the 90° curves on Smallhouse will be a must if this option is selected. This isolates the Trinity FWB Church which they have voiced concern over.
#29: Negative – effect on way too much property
#42: Straighten Smallhouse – without additional options – or better yet – just improve what is already there
#44: Traffic is like water it is going to use the quickest provided & easiest way to get to the mall & restaurants
#49: I liked the design on alternative Map A of the maps attached to this survey. Everything flows. If your objective is to move traffic then do it. If it is to build a road to get traffic to a spot then build Alt. C
#54: Straightening out Smallhouse as shown on Alternative "C" in blue is preferred over the other two. Do not want to see a shift as noted below.
#56: That would be a great improvement and should be done immediately – before the interchange. Very important.
#67: We have long straight section of highway in front of our property & cars & motorcycles race on this section of road at least twice a week. Take out curves & you improve the straightway so they can race faster.
#69: This could speed up the process and make it more acceptable by most local res.
#75: Option B seems to meet these needs.
#77: This would be the sensible one and just widening roads would be a big help.

A shift of Smallhouse Road to the North. *(Shown as A2, B2, and C1 on attached exhibit pages.)*

#2: This is the only option that would not damage our property to any great extent. (Yellow dot)
#3: If you must create change (note I did not say "improvements") this option does the least damage to personal property.
#4: None of the brown "additional options" would impact me either way; however the Alt. C Smallhouse East (blue) option would be extremely close to my side property line if it did not, indeed, take my land.
#8: No
#9: No
#10: The Smallhouse Road/Three Springs Road intersection needs to be

moved closer to Scottsville Road.
#22: No! No! No! No! This would basically put the road in my backyard. If I'd wanted to live near a road I would have built my home near a road. I chose to live in peace and quiet. I like my privacy. I chose a natural environment for my home. Not by a street!
#26: Works in my mind.
#27: I am in favor of these options as they would provide another entrance to Holy Spirit & reduce traffic on Smallhouse.
#28: This isolates the Trinity Freewill Baptist Church which they have voiced concern over.
#29: No opinion
#42: No!
#49: I don't know. If you go with Alt A or B will traffic eventually bottleneck? Won't Alt C spread traffic out.
#54: Very much against all 3 of these options.
#56: Smallhouse is and will always be a major entry/exit to B.G. Widen and straighten. Smallhouse at Cave Mill is a nightmare.
#55: Absolutely no to option C1, B2 & A1
#67: We do not want traffic at rear of our property either. We are nature lovers.
#69: Probably a good idea but one that will meet with very strong local opposition.

3. For all possible roadway improvements, please help us determine your needs by rating the following:

Item	1 (***not*** *important)* ..... 10 (***very*** *important)*									
Access to Natcher Parkway from Elrod Road	1	2	3	4	5	6	7	8	9	10
	11	**1**	**1**		**1**	**2**		**4**	**2**	**4**
Improvements along Elrod Road	1	2	3	4	5	6	7	8	9	10
	7	**3**	**1**	**1**	**1**	**1**		**1**	**2**	**9**
Improvements along Smallhouse Road	1	2	3	4	5	6	7	8	9	10
	9	**2**	**2**		**1**		**2**	**1**	**2**	**8**
Bicycle facilities *(utilizing the paved shoulder shown on the typical sections)*	1	2	3	4	5	6	7	8	9	10
	10	**1**	**1**	**1**	**6**	**3**	**2**	**1**		**3**

General Comments - Please use the space below to inform us of any additional issues or concerns.

SEE BELOW

We value your comments. Thank you for taking the time to complete this form. If you did not receive a postage-paid envelope, please send this survey questionnaire as well as any future comments and questions to:

KYTC Project Manager:
Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 40210-1599
Jeff.Moore@ky.gov
Phone Line: 781-7020 Email: Elrod@gspnet.com

General Comments:

#3: Everything that has been done roadwise and residential-wise in the last 30 years has been to suck everything to the Scottsville Road – Greenwood Interchange area. These new proposals just add more access to the same tortured area.

#4: Besides the generally heavy traffic on the Smallhouse Rd (starting at Hwy 231)/Elrod Rd corridor, the backup/bottlenecking at Smallhouse/Campbell Ln and Smallhouse/Cave Mill is horrendous. Could not Campbell & Cave Mill be built to overpass Smallhouse or vice versa? Even if the lanes were adequate there would still be long waits at these intersections, as long as the roads physically intersect. The railroad overpass on Campbell Lane is a wonderful thing!

#22: From the Y at Smallhouse and Elrod to Trinity Baptist there is 13 homes including mine. That's not a subdivision or many homes by any means. We don't need or want any changes on our section of Smallhouse. The people in the subdivisions choose to live close together in highly populated areas. We don't! We like our land and our green space.

#24: Why is the new Elrod not 4 lane? Remember the new high school, middle school and proposed grade school. Better do it now rather than later. How can we speed this process up?

#26: The real problem was created by Planning and Zoning when they approved all the development in the area without consideration of the impact to the existing residents and how to handle the increased traffic associated with the development. If they created the problem make them solve it. Charge the developers to make the road improvements to Elrod and Smallhouse.

#27: Add bicycle facilties to all roadways!! If funding is unavailable for options, then scale down to at least fix the curves on Smallhouse within their right-a-ways. Safety first – congestion second.

#28: Improving Smallhouse by taking a route through the Rove Farm will be a long and costly legal battle. Saying this, it (A2, B2 or C1) would give improved access to the Holy Spirit property. It may also isolate the Trinity Freewill Baptist Church, another possible legal battle. All of the improvements shown in "Blue" isolates the Baptist Church to a higher degree.

#29: Thank you for giving us the opportunity to give our opinions.

#44: It would make more sense to put an interchange at Carter Sims Rd and make Long Rd and Carter Sims a 4 lane feeder that would help both Elrod & 3 Springs dump traffic on I-65 to get to 231-S.

#49: Thanks for looking at this problem. I'm not college educated but it would seem easier if roads were built first complimentary to land & then add houses & businesses.

#56: Our streets and roadways are a mess. A complete lack of planning for the last 100 years to accommodate today's and future traffic needs. Sharp curves and misaligned intersections should be corrected ASAP.
#57: Include bike lanes on Smallhouse to allow bike access to Basil Griffin Park.
#58: We have a responsibility to encourage future generations to use more sustainable forms of transportation. We do not need to encourage more traffic particularly w/option C which destroys my grandmother's property.
#59: Warren County paves from ditch to ditch – which means this bike shoulder is just a bad dream.
#60: Would question the accident statistics on Smallhouse Road curves. I have lived in one of the curves for 30 years. Most accidents are by being not adhering to speed limits. We built Trinity Church 2-3 years ago and have a million dollar structure and church that would adversely be affected by changes to Smallhouse.
#67: We purchased 12 acres of land in 1975 & this is amount of land we want. We do not want our land broken up by additional highways. This would also devalue our property if it is broken up in two pieces.
#69: If we can at least connect the dead-end of Ivan Downs Blvd. it will help greatly with through community traffic.
#70: Thank you for this opportunity to speak. BG has got to do more to make the community not completely dependant on driving – sidewalks, bike paths, etc.
#75: Good presentation. Easily understood. Hope B can be built, but if not perhaps C.
#77: What will this cost taxpayers and would the homeowners have to give up property along Elrod or would it come from college farm?

GRESHAM
SMITH AND
PARTNERS

December 11, 2007

MEETING NOTES

ELROD ROAD / NATCHER PARKWAY INTERCHANGE STUDY
STAKEHOLDERS MEETING
WARREN COUNTY, KENTUCKY
GS&P Project No. 25826.00

MEETING DATE: December 10, 2007 – Monday 2:00 p.m.

PARTICIPANTS: See attached sign-in sheet

DISCUSSION: STAKEHOLDERS MEETING

1. The Holy Spirit Church's pastor commented that the congregation is dispersed all over Warren County and that he wanted it to be known that others would be using this interchange and the surrounding roads.

2. There was a study done on Three Springs Road in late 1999 or early 2000 that gave way to this study. It is currently under design for widening.

3. Several stakeholders voiced concerns over the current Smallhouse Road at Cave Mill Road signal offset problems. They would like this to be considered in the proposed study area. This is to be added before the MPO meeting on December 17th, 2007.

4. The project study area did take into consideration the population growth that has been occurring south of Elrod Road. This is the reason that the study area extends so far south.

5. The 3-way stop is viewed more as a 3-way "be careful" because motorists fail to comply with the stop sign.

6. A question from a stakeholder was raised about the length of time that was considered on the crash map. It was indicated that the display portrayed data from roughly 3 years of crashes.

MEETING NOTES

ELROD ROAD / NATCHER PARKWAY INTERCHANGE STUDY
STAKEHOLDERS MEETING
WARREN COUNTY, KENTUCKY
GS&P Project No. 25826.00
December 11, 2007

7. Nashville Road is currently under consideration for substantial widening along it's corridor to 5 lanes. This will be done in segments and extend south eventually improving to the school.

8. Several stakeholders voiced concerns that the neighborhoods would be used as cut-throughs if enough consideration wasn't given to improving areas beyond the interchange.

9. The Natcher Parkway is currently in the last phases of design. The next step is environmental clearances.

10. Representatives from WVU expressed concerns that a new alignment would bisect their property and cause large portions to be unusable. The design team agreed that every opportunity should be made to avoid this and to use as much of the existing right of way as possible along the existing Elrod Road corridor. They would also like to see the previous alignments that were studied presented at the public meeting.

11. The general consensus of the stakeholders was to bring various typical sections that could potentially be proposed to the public meeting as talking points.

12. The stakeholders were divided up into three teams to independently identify problems and issues in the Elrod Road corridor, attempt to identify the purpose of this project, attempt to identify goals to accomplish with this project, and listed additional environmental concerns outside of what has already been identified. These are listed in the revised slide-kit (attached). Representatives from GS&P collected all of the worksheets (attached).

13. The public meeting has been tentatively scheduled for January 31st , 2008with a fall-back date scheduled for February 7th, 2008. A potential venue could be the Expo.

14. It was vocalized that this study will take approximately 1 year to complete.

15. Planning and Zoning will be an substantial part of the team as an MPO model is currently in place.

MEETING NOTES

ELROD ROAD / NATCHER PARKWAY INTERCHANGE STUDY
STAKEHOLDERS MEETING
WARREN COUNTY, KENTUCKY
GS&P Project No. 25826.00
December 11, 2007

This represents our understanding of the items discussed at this meeting. If you have any questions or comments concerning any of the information contained herein, please contact me.

Prepared by: Mike Sewell, P.E.
Gresham, Smith and Partners
Associate

ms
Attachments: Worksheet Forms scanned
Revised PPT
Attendance sheet scanned

Copy Participants

Elrod Road/Natcher Parkway Interchange Study

Warren County • Item 3-130.00

Stakeholders Meeting #1
December 10, 2007

Agenda

1. Introduction
2. Study Area
3. Environmental Considerations
4. Traffic Volumes
5. Crash History
6. Purpose and Need
7. Design Considerations
8. Schedule
9. Next Steps

Study Area Map

The Study Area is centered on the present Elrod Road overpass at the Natcher Parkway - the limits are from Smallhouse Road to the north, half way to the US 31W interchange with the Natcher Parkway to the west, Dillard Road/Neal Howell Road to the south, and Three Springs Road to the east.

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Existing Conditions

Item	William H. Natcher Parkway	Smallhouse Road	Elrod Road
Route	WN - 9007	CR - 1235	CR - 1240
Actual Traffic Count	17,100	12,300	N/A
Year of Actual Traffic Count	2006	2003	N/A
Average Right of Way Width	275'	50' *	50' *
Extended Weight System	Parkway	N/A	N/A
Functional Classification	Urban Freeway	County Road	County Road
Lane Width	12'	10' *	10' *
Number of Lanes	4	2	2
Road Type	Divided Highway	Undivided	Undivided
Median	Depressed	N/A	N/A
Width of Median	28'	N/A	N/A
Posted Speed Limit	70 mph	35 mph	35 mph
Outside Shoulder Width	10'	N/A	N/A
Truck Weight Class	AAA	N/A	N/A

* Estimation

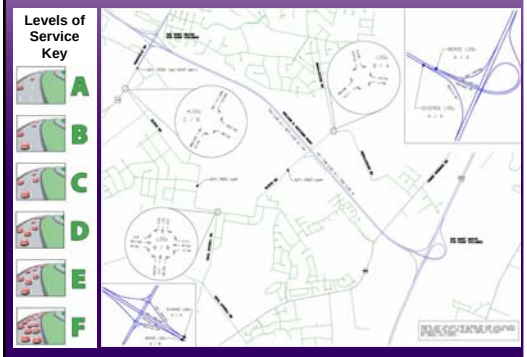
Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Draft Environmental Overview

Known Environmental Issues - Oil/Gas Wells, Sinkholes, Indiana Bat Summer Maternity Habitat, Western KY University Farm, Wetlands, Floodplains, Cemetery and Churches, Aviation Heritage Park, Griffin Park, KOA & Schools

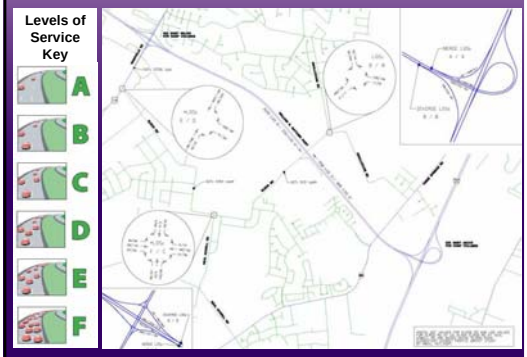
Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Preliminary 2007 Traffic Volumes and Levels of Service



Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Preliminary 2037 Traffic Volumes and Levels of Service



Elrod Road/Natcher Parkway Interchange Study
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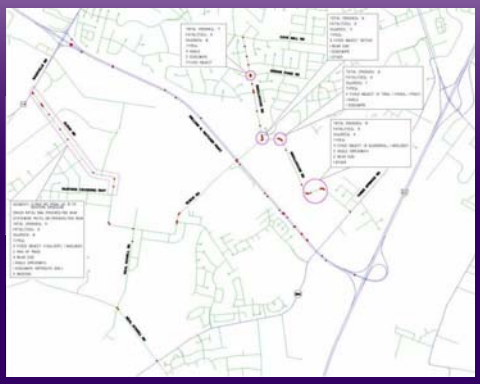
Preliminary Crash Locations and Rates



Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Travel problems exist in this area?

- Congestion
- Narrow Roadways / No Shoulders
- Dangerous Curves / 90 degree turns
- Lack of Striping – width related
- Access points
- Lack of Multi-Modal Accommodations
- Cave Mill / Smallhouse problems offset - congestion
- Increased Development
- Underutilization of Natcher Pkwy
- Too many people, too much traffic
- Agricultural Vehicles using roadway – WKU Compost Facility
- No access to multi-lane roads

Purpose and Need?

- Improve Mobility
- Improve Safety
- Multi-modal connections
- Access to/from/across Natcher
- Overall interconnectivity – move traffic around the city
- Minimize Right of Way impacts
- Alleviate Congestion
- Avoid cut through on residential streets
- Make sure Smallhouse will handle future traffic
- Plan for 15-20 years of growth
- Ease congestion
- Fix secondary roads before the interchange
- Limit Access along Elrod Road

Project Goals?

- See interchange improve connectivity in a safer manner
- Improve the Elrod connector
- Eliminate dangerous curves
- Incorporate Multi-modal traffic needs – tie into logical future
- Improve emergency response time
- Improve safety
- Improve traffic flow
- Reduce drive time
- 45 design speed
- Maintain integrity of the neighborhood streets
- Address agricultural / horse / camper traffic

Other Environmental Issues

- Additional cemetery

Other Issues

- Access to the park
- School plans
- Different peaks for different traffic attractors
- Take into consideration future traffic on roads outside of this study area
- Narrow local roads saturated w/ traffic from subdivisions will give some relief if it has access to major routes
- Service road between 3 Springs to Elrod
- 2 lane vs. 3 lane – determined based on future traffic needs
- Eliminate "no man's land" in ROW

Draft Purpose and Need

In an effort to accommodate the rapid residential and commercial growth on the southern side of Bowling Green, this interchange will greatly improve the safety and efficiency of travel in the area by providing access to the Natcher Parkway and therefore allowing motorists to reach various destinations without using the heavily congested routes of US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road). This interchange and its connections into the existing network will be developed with regard to addressing the mobility and safety of motorists, pedestrians, bicyclists, and transit users in the area.

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

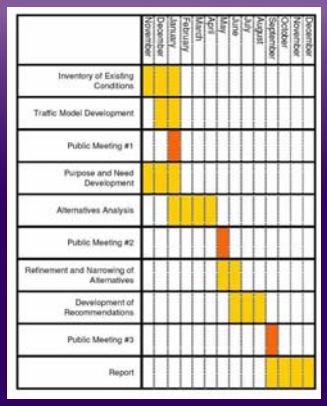
Design Considerations

1. This project is not an interchange justification study.
2. The bridge width and road widths should be governed by volume demands and should include turn lanes.
3. Access management practices should be in line with current city standards and be proposed to the stakeholders for feedback.
4. Four alternatives to be examined include :
   - Full Diamond
   - Single Point Urban (SPUI)
   - Folder (or Flop) Diamond
   - Barbell (Diamond with roundabout terminal ramps)
5. A partial interchange will not be analyzed.
6. Multimodal needs will be determined.
7. The functional classification of the road should be updated as a result of the study.




Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Schedule



Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Comments?

Please send your comment form or any future comments and questions to:

KYTC Project Manager:

Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 402101-599
or
Jeff.Moore@ky.gov

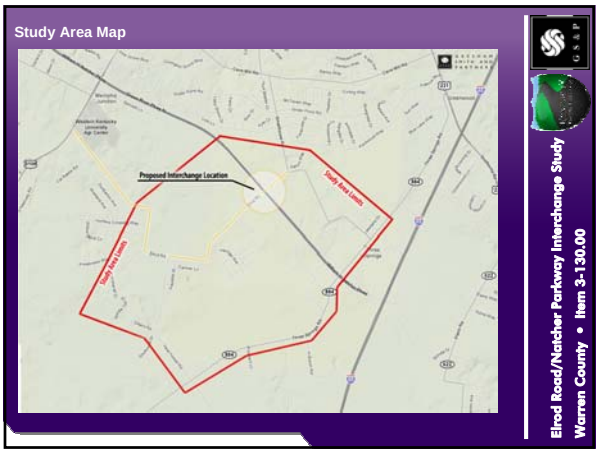
GS&P Project Manager:

Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
101 South Fifth Street
Suite 1400
Louisville, KY 40202
or
Karen_Mohammadi@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Draft Environmental Overview

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00


Study Area Map
Proposed Interchange Location
Study Area Limits
Study Area Limits
Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Elrod Road/Natcher Parkway Interchange Study

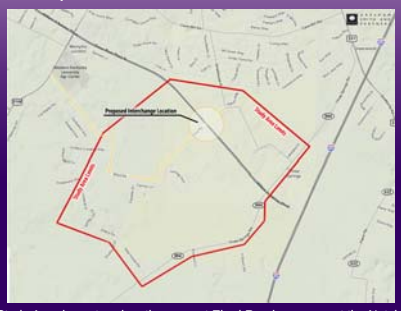
Warren County • Item 3-130.00

Local Officials Presentation #1
December 17, 2007

Agenda

1. Introduction
2. Study Area
3. Environmental Considerations
4. Traffic Volumes
5. Crash History
6. Stakeholder Input
7. Purpose and Need
8. Design Considerations
9. Schedule
10. Next Steps

Study Area Map



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Warren County • Item 3-130.00

Draft Environmental Overview

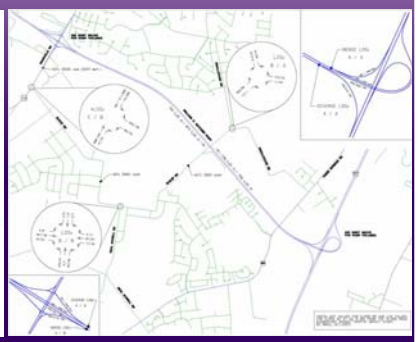
Known Environmental Issues - Oil/Gas Wells, Sinkholes, Indiana Bat Summer Maternity Habitat, Western KY University Farm, Wetlands, Floodplains, Cemetery and Churches, Aviation Heritage Park, Griffin Park, KOA & Schools

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Preliminary 2007 Traffic Volumes and Levels of Service

Levels of Service Key

A
B
C
D
E
F



Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

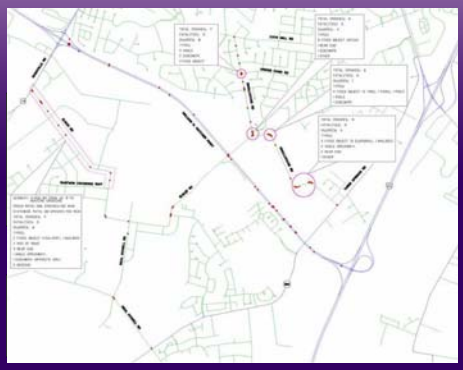
Preliminary 2037 Traffic Volumes and Levels of Service

Levels of Service Key

A
B
C
D
E
F

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Preliminary Crash Locations and Rates



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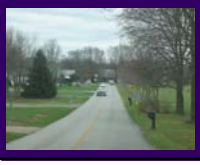
What Travel Problems Exist in this Area?

- Congestion
- Narrow Roadways / No Shoulders
- Dangerous Curves / 90 Degree Turns
- Lack of Striping
- Too Many Access Points
- Lack of Multi-Modal Accommodations
- Cave Mill / Smallhouse Offset
- Increased Development
- Underutilization of Natcher Pkwy
- Agricultural Vehicles Needs
- No Access to Multi-Lane Roads

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

What Should be the Purpose and Need?

- Improve Mobility
- Improve Safety
- Add Multi-Modal Connections
- Provide Access to/from/across Natcher
- Improve Overall Regional Interconnectivity
- Minimize Right of Way Impacts
- Alleviate/Ease Congestion
- Avoid Cut Through Traffic on Residential Streets
- Add Capacity to Smallhouse for Future Traffic
- Plan for 15-20 years of growth
- Fix Secondary Roads First
- Limit Access along Elrod Road



Elrod Road/Natcher Parkway Interchange Study
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What Should be the Project Goals?

- See Interchange Improve Connectivity In A Safer Manner
- Improve the Elrod Connector
- Eliminate Dangerous Curves
- Incorporate Multi-modal Traffic Needs
- Improve Emergency Response Time
- Improve Safety
- Improve Traffic Flow
- Reduce Drive Time
- Use 45 Design Speed
- Maintain Integrity Of the Neighborhood Streets
- Address Agricultural / Horse / Camper Traffic

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Other Issues

- Access To The Park, Churches
- School Plans
- Different Peaks for Different Traffic Attractors
- Take into Consideration Future Traffic on Roads Outside of this Study Area
- Narrow Local Roads Saturated W/ Traffic From Subdivisions
- Need for Service Road between Three Springs and Elrod
- Consider Three Lanes
- Eliminate "No Man's Land" In Right of Way

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Draft Purpose and Need

In an effort to accommodate the rapid residential and commercial growth on the southern side of Bowling Green, this interchange will greatly improve the safety and efficiency of travel in the area by providing access to the Natcher Parkway and therefore allowing motorists to reach various destinations without using the heavily congested routes of US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road). This interchange and its connections into the existing network will be developed with regard to addressing the mobility and safety of motorists, pedestrians, bicyclists, and transit users in the area.

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

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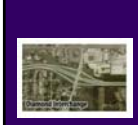
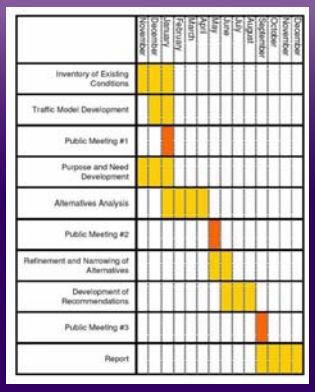


Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Schedule



Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Comments?

Please send your comment form or any future comments and questions to:

KYTC Project Manager:

Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 402101-599
or

Jeff.Moore@ky.gov

GS&P Project Manager:

Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
101 South Fifth Street
Suite 1400
Louisville, KY 40202
or

Karen_Mohammadi@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Elrod Road/Natcher Parkway Interchange Study

Warren County • Item 3-130.00

Public Meeting #1
February 7, 2008
WKU L.D. Brown Ag Expo Center

Phone Line: 781-7020 Email: Elrod@gspnet.com

Tonight's Agenda

1. Sign In
2. Review Video Presentation of:
   - Environmental Considerations
   - Traffic Volumes
   - Crash History
   - Purpose and Need
   - Design Considerations
   - Schedules
3. View Displays/Ask Questions
4. View Aerials/Add Comments to Maps
5. Add Dots to Issues and Concerns Boards to Tell Us What is Most Important to You
6. Fill out Comment Forms and Turn in to Registration Staff

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Phone Line: 781-7020 Email: Elrod@gspnet.com

Introduction

During the development of the Three Springs Road Scoping Study, a need was identified for an interchange on the Natcher Parkway between I-65 and US 31 W (Nashville Road). The Elrod Road overpass represents an approximate mid point between the two existing interchanges.

To address the need for an interchange, the Kentucky Transportation Cabinet in 2007 selected Gresham, Smith and Partners to conduct a study on the possible location and type of interchange needed.

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Phone Line: 781-7020 Email: Elrod@gspnet.com

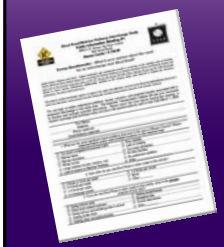
Purposes of this Planning Study

1. Define project purpose and needs
2. Identify the study area of the project
3. Discuss needs with public officials, government agencies, and other groups
4. Identify known environmental concerns
5. Listen to and share information with the public
6. Develop alternatives to address identified needs
7. Recommend a preferred alternative

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Phone Line: 781-7020 Email: Elrod@gspnet.com

Your Input Today Will Help Us …

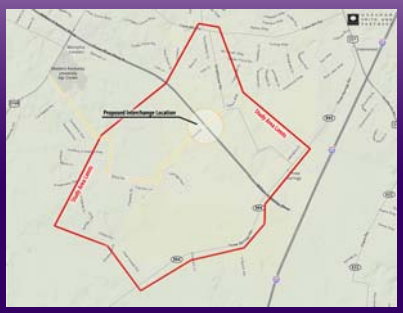


- Avoid and minimize impacts to environmentally sensitive areas
- Identify concerns so they may be considered early in the design process
- Identify how the community feels about the project
- Establish a clear purpose and direction for the project
- Reduce the amount of additional work or rework
- Accelerate project delivery
- Create projects that the community embraces and supports

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Phone Line: 781-7020 Email: Elrod@gspnet.com

Study Area Map



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Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Phone Line: 781-7020 Email: Elrod@gspnet.com

Existing Conditions

The Kentucky Transportation Cabinet and field observations identified the following conditions along the Natcher Parkway, Smallhouse Road and Elrod Road.

Item	William H. Natcher Parkway	Smallhouse Road	Elrod Road
Route	WN - 9007	CR - 1235	CR - 1240
Actual Traffic Count	19,450	5,960	3,363
Year of Actual Traffic Count	2007	2007	2007
Average Right of Way Width	275'	50' *	50' *
Extended Weight System	Parkway	N/A	N/A
Functional Classification	Urban Freeway	County Road	County Road
Lane Width	12'	10' *	10' *
Number of Lanes	4	2	2
Road Type	Divided Highway	Undivided	Undivided
Median	Depressed	N/A	N/A
Width of Median	28'	N/A	N/A
Posted Speed Limit	70 mph	35 mph	35 mph
Outside Shoulder Width	10'	N/A	N/A
Truck Weight Class	AAA	N/A	N/A

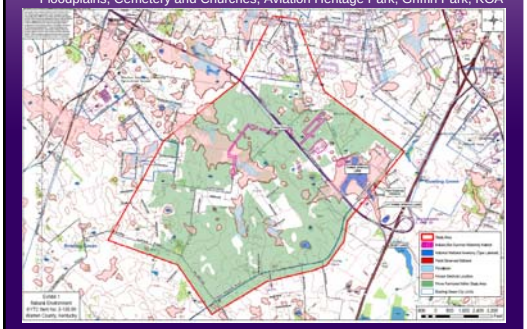
* Estimation

Phone Line: 781-7020 Email: Elrod@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Draft Environmental Overview – Natural Environmental

Known Environmental Issues in the area include Oil/Gas Wells, Sinkholes, Indiana Bat Summer Maternity Habitat, Western KY University Farm, Wetlands, Floodplains, Cemetery and Churches, Aviation Heritage Park, Griffin Park, KOA



Phone Line: 781-7020 Email: Elrod@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

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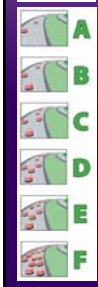
Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Preliminary 2007 Traffic Volumes and Levels of Service

Levels of Service Key

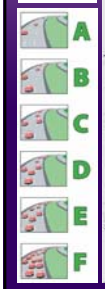


Phone Line: 781-7020 Email: Elrod@gspnet.com

Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Preliminary 2037 Traffic Volumes and Levels of Service

Levels of Service Key



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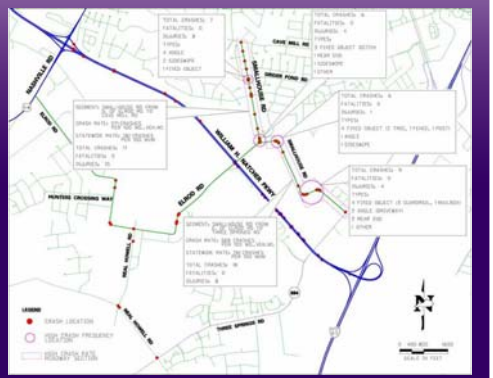
Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Preliminary Crash Locations and Rates



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Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

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Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Design Considerations

1. Access management practices (number of entrances and distances between entrances) will be according to City standards
2. Multimodal needs will be determined.
3. Four alternatives to be examined include :
   - Full Diamond
   - Single Point Urban (SPUI)
   - Folded (or Flop) Diamond
   - Barbell (Diamond with roundabout terminal ramps)

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Elrod Road/Natcher Parkway Interchange Study
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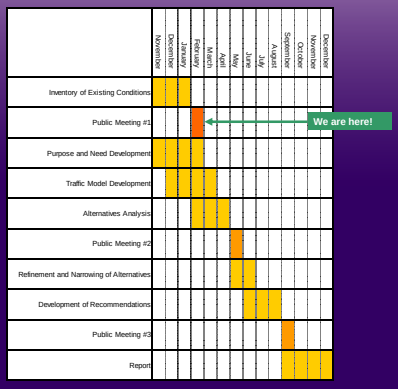
Planning Study Schedule



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Elrod Road/Natcher Parkway Interchange Study
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Typical Design Schedule

1. Funding has not been authorized nor identified for these phases.
2. Operations includes maintaining the roadway and right of way, and repairing problems

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Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Why are You Here?

We want your opinion!!

1. Please look at the displays and talk to us.
2. Add comments on maps on tables and let us know what things you feel we should consider in the alternatives development process.
3. Add your dots to the issues board so we know what is most important to you.
4. Complete a survey questionnaire and return it before leaving the meeting, or take an envelope to send it to us by mail.

Your input will be taken into consideration as these alternatives are evaluated!

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Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Comments?

Please send your comment form or any future comments and questions to:

KYTC Project Manager:

Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 40210-1599
or

Jeff.Moore@ky.gov

GS&P Project Manager:

Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
101 South Fifth Street
Suite 1400
Louisville, KY 40202
or

Karen_Mohammadi@gspnet.com

You may also submit comments to our project phone message service or email address :

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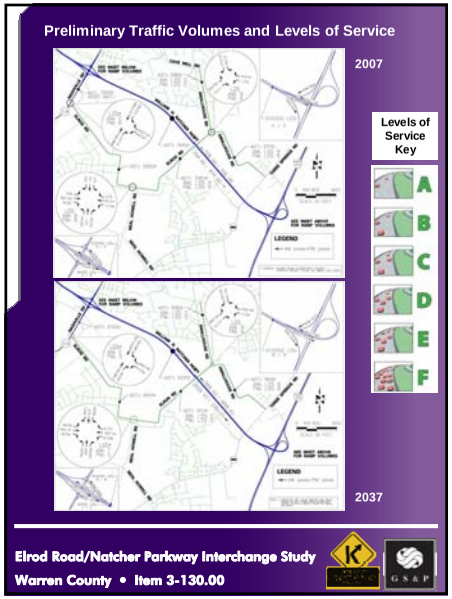
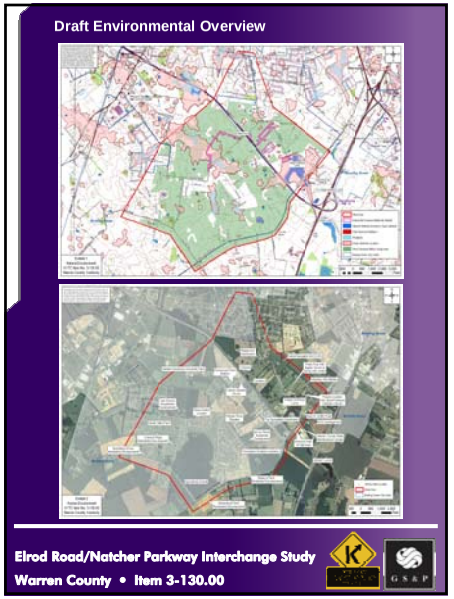
Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00


Preliminary Traffic Volumes and Levels of Service
2007
Levels of Service Key
A
B
C
D
E
F
2037
Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00


Draft Environmental Overview
Elrod Road/Natcher Parkway Interchange Study
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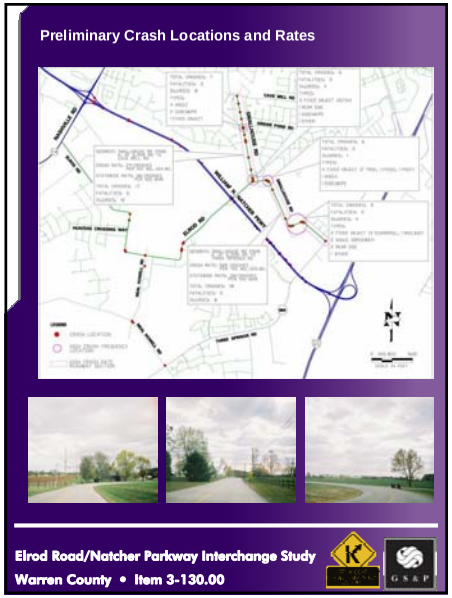
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Elrod Road/Natcher Parkway Interchange Study
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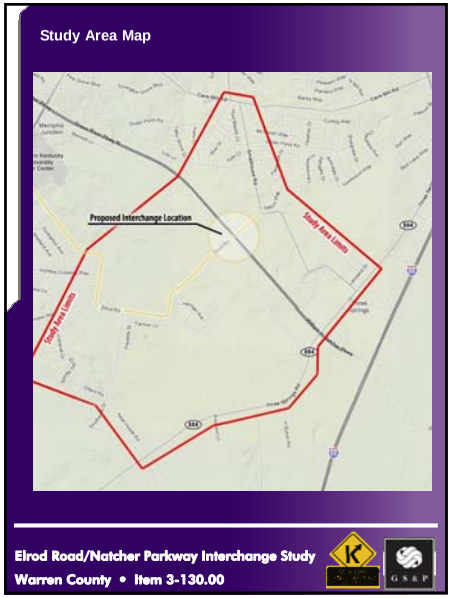
Study Area Map
Proposed Interchange Location
Study Area Limits
Study Area Limits
Elrod Road/Natcher Parkway Interchange Study
Warren County • Item 3-130.00

Elrod Road / Natcher Parkway Interchange Study

Warren County • Item 3-130.00

MPO Meeting Update – April 28, 2008
Preliminary Alternatives Discussion

Agenda

- Introductions
- Inventory of Existing Conditions
- Public Outreach Meetings
- Purpose and Need
- Alternatives Analysis
  - Full Interchanges Options
  - Bridge Options
  - Local Road Connections
  - Multi-modal Considerations
  - Access Control
  - Evaluation factors
- Next Steps
  - Public Outreach
  - Refine Alternatives

Inventory of Existing Conditions

Known Environmental Issues in the area include Oil/Gas Wells, Sinkholes, Indiana Bat Summer Maternity Habitat, Western KY University Farm, Wetlands, Floodplains, Cemetery and Churches, Aviation Heritage Park, Griffin Park, KOA & Schools

Public Meeting Questionnaire Results

- **What are the most significant travel problems that exist in this area of Warren County?**
  - Too much congestion/increased traffic 85
  - Poor visibility 30
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  - Narrow shoulders 82
  - Too many driveways 12
  - Sharp curves 80
  - No bike facilities 31
  - Large vehicles (trucks, tractors, RVs) 20
  - No pedestrian facilities 27
  - Lack of access to Natcher Parkway 53
  - Other (see below) 9
    - Speeding
    - Frequent cracks and potholes, slow speed limits!
    - Speeding(!!!!!!)
    - Too many traffic lights.
    - Traffic lights not in sync.
    - Drivers not observing 3-way stop at Smallhouse & Elrod.

Public Meeting Questionnaire Results

- **How often do you use Elrod Road or other roads in this vicinity?**
  - 5 times or more per week 70
  - 1-2 times per month 7
  - 3-4 times per week 13
  - Never 0
  - 1-2 times per week 6
  - Other (see below) 4
  - 3-4 times per month 3
    - 10 times per day
    - Every time we leave our driveway.

Public Meeting Questionnaire Results

- **If you do use Elrod Rd. or other roads in this vicinity, what is the *primary* purpose of your trips?**
  - Going to/from work 59
  - Visiting family/friends 39
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    - To stay off of Three Springs Road.
    - Medical visits.
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    - Getting to I-65.
    - Baseball games and other games for kids.
    - Taking child to activities at church (Holy Spirit) & going there ourselves.
    - Volunteering – get to and from.
    - By-passing traffic.
    - Restaurant and mall walking.
    - All errands & business taken care of.
    - Cannot go anywhere without using Elrod.
    - Live there – use all of the time.
    - All activity – home & other.
    - To go anywhere as I live in Hunters Crossing.
    - I have to use Elrod to go anywhere & everywhere!

Public Meeting Questionnaire Results

Elrod Road/Natcher Parkway Interchange Study Exercise Results Public Meeting February 7, 2008				
Concern	Most important (3 points)	Second most important (2 points)	Third most important (1 point)	Composite (Percent of Possible Points)
Too much congestion/ increased traffic	58	18	15	33.8%
Narrow lanes, shoulders, sharp curves, lack of striping and poor visibility	41	52	8	35.3%
Sharing the road with large vehicles - tractors, semis, RVs	1	2	13	3.0%
Lack of access to the Natcher Parkway	13	27	24	17.6%
Too many driveways/ driveways spaced too closely	0	1	10	1.8%
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TOTAL RESPONSES	114	109	105	665.0

Public Meeting Flip Chart Notes

- Build new segments for Elrod instead of trying to straighten the old road
- Keep front yard
- Just Widening Elrod Road with shoulders
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Alternatives Analysis - Refinement

- Full Interchanges Options
  - *Diamond Interchange*
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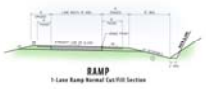
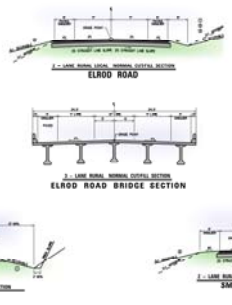
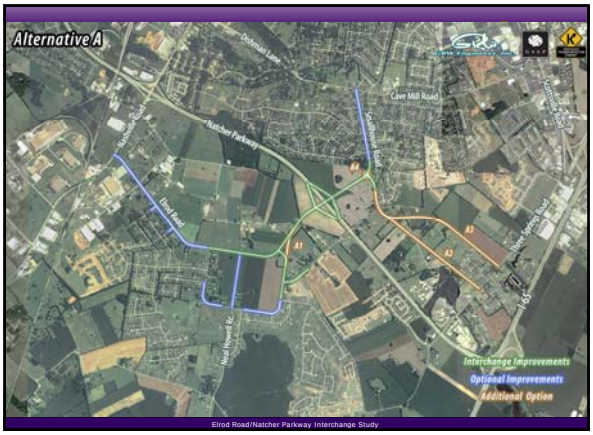
- Bridge Options
- Local Road Connections – *Presented as Options for funding purposes*
- Multi-modal Considerations
- Access Control

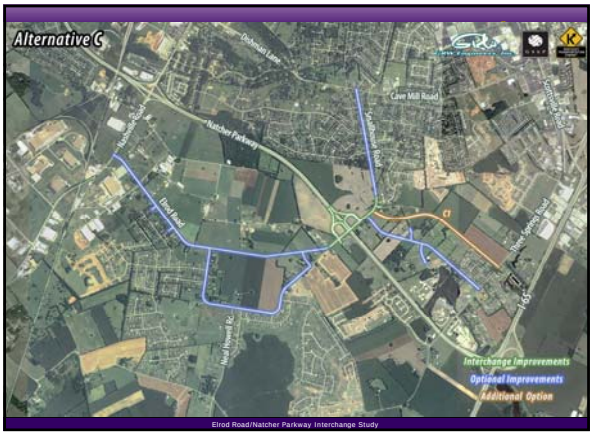
Possible Typical Sections – "Cadillac" Version



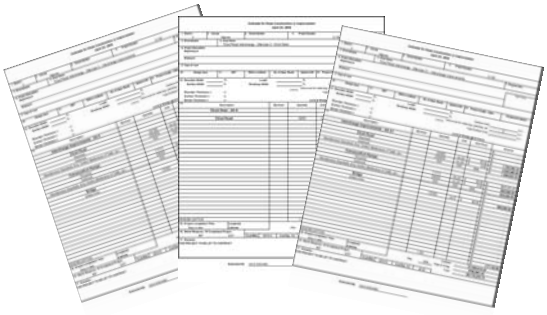
Possible Typical Sections Based on Missouri Model



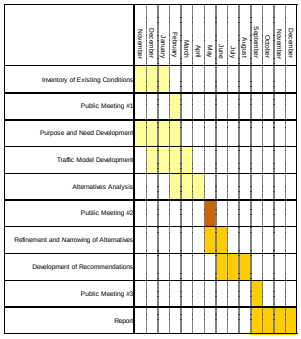




Cost Estimates for each Alternative and for each Option



Study Schedule



Next Steps

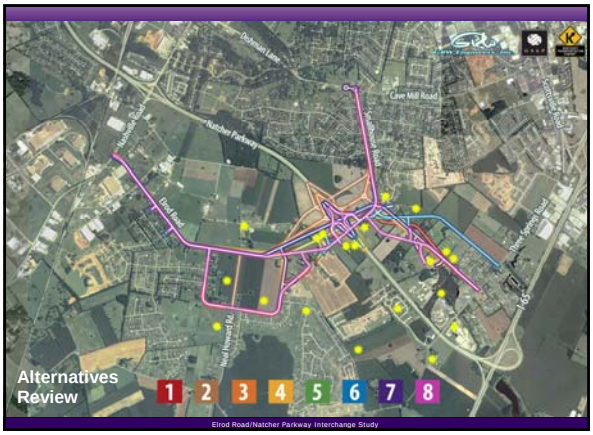
- Stakeholders Meeting #2 May 8th
- Public Meeting #2 May 29th
- Refine Alternatives

Moving Forward

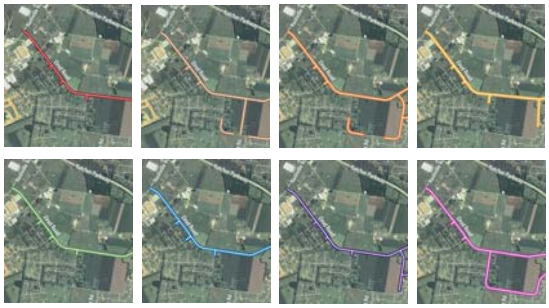
- Currently 8 options

1 2 3 4 5 6 7 8

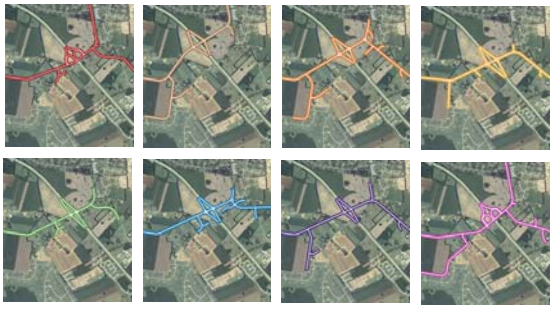
- Pull things from each to create 3 to move forward with



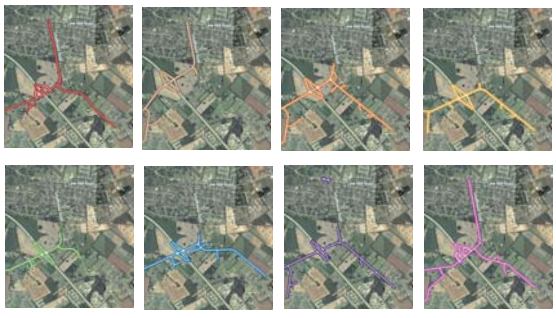
Elrod Road Improvements – West Tie In



Interchange Location and Style



Smallhouse Improvements – East Tie In



Elrod Road / Natcher Parkway Interchange Study

Warren County • Item 3-130.00

Stakeholders 2nd Meeting – May 8, 2008
Preliminary Alternatives Discussion

Agenda

- Introductions
- Inventory of Existing Conditions
- Public Outreach Meetings
- Purpose and Need
- Alternatives Analysis
  - Full Interchanges Options
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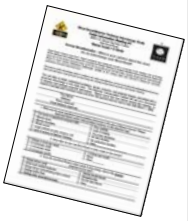

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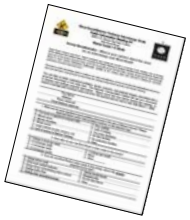

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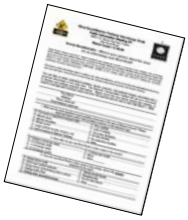

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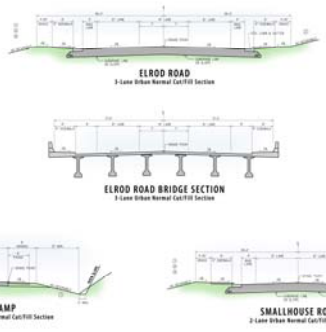

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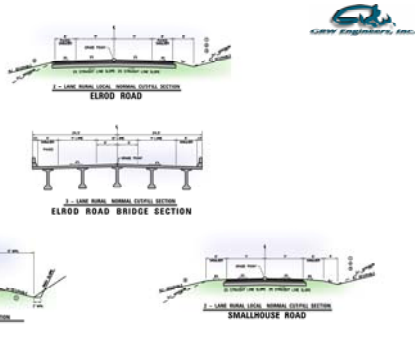

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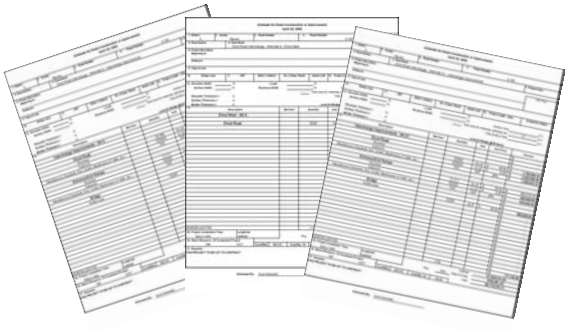
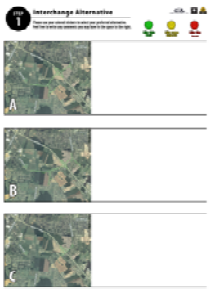
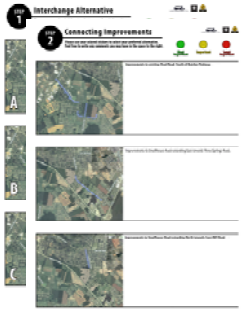


Exercise Part – Step 1 Interchange Alternative



- Use your stickers to rank your most favorite to least favorite interchange option.
  - **GREEN** = Like the Best
  - **YELLOW** = Like some aspects
  - **RED** = Like the Least

Exercise Part – Step 2
Interchange Alternative

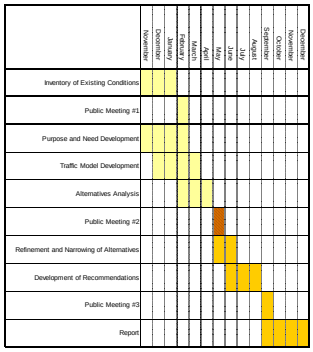


- Use your stickers to rank your what connecting improvements are most important to you
  - **GREEN** = Most Important
  - **YELLOW** = Important
  - **RED** = Least Important

Exercise Part – Step 3
Smallhouse Road Options

- Use your stickers to rank Smallhouse Road options.
  - **GREEN** = Like the Best
  - **YELLOW** = Like some aspects
  - **RED** = Like the Least

Study Schedule



Next Steps

- Stakeholders Meeting #2
  May 8th
- Public Meeting #2
  May 29th
- Refine Alternatives

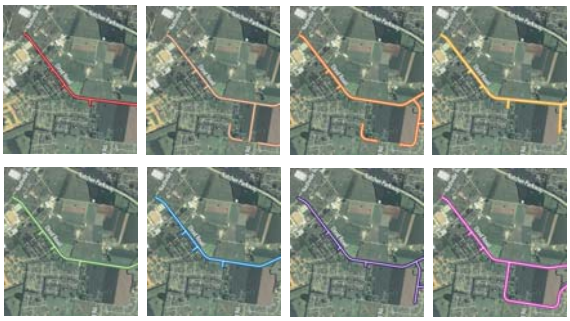
Moving Forward

- Currently 8 options

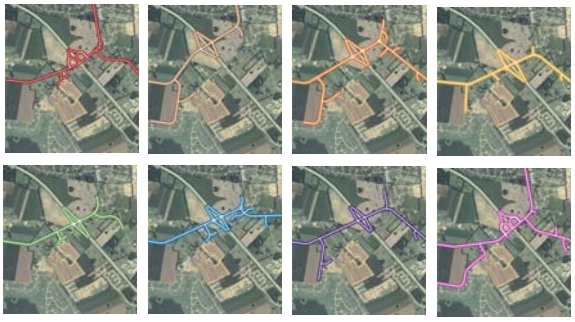
1 2 3 4 5 6 7 8

- Pull things from each to create 3 to move forward with

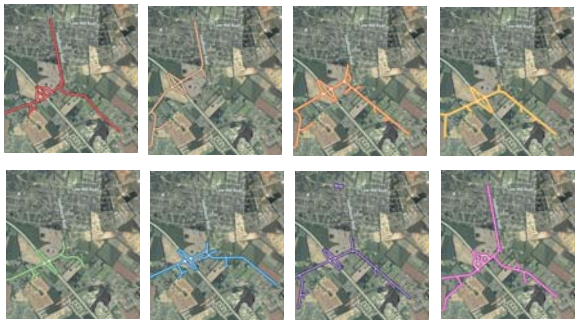
Elrod Road Improvements – West Tie In



Interchange Location and Style



Smallhouse Improvements – East Tie In



GRESHAM SMITH AND PARTNERS

Elrod Road/Natcher Parkway Interchange Study

Warren County • Item 3-130.00

Public Meeting #2 – May 29, 2008
Preliminary Alternatives Discussion

Agenda

- Purpose and Need
- Forecasted Traffic
- Public Meeting #1 Comments
- Alternatives Analysis
  - Full Interchange Options
  - Local Road Connections
  - Multi-modal Considerations
  - Access Control
- Alternatives
- Next Steps
  - Refine/Recommend Preferred Alternative
  - Public Meeting #3

Purpose and Need

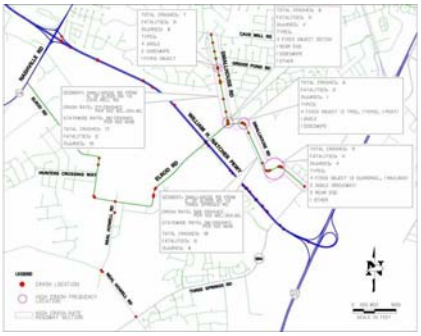
Rapid residential and commercial growth is occurring on the southern side of Bowling Green. Motorists have limited options for accessing the Natcher Parkway in Southern Bowling Green and Warren County and must rely on the heavily congested routes of US 231 (Scottsville Road), KY 884 (Three Springs Road) and US 31W (Nashville Road) to reach various destinations. Additionally, mobility in the existing study area network is limited for motorists, pedestrians, bicyclists and transit users.

The purpose of this interchange study is to improve the safety and efficiency of travel in the Elrod Road/Smallhouse Road area and to provide better connection for travelers along this existing transportation network to the Natcher Parkway.

Forecasted Traffic – 2030 No Build

The high level of congestion in the year 2030 is due to the 54% increase in population and 59% increase in employment in Warren County between year 2000 and year 2030.

Crash Locations and Rates



Public Meeting #1 Questionnaire Results

- **What are the most significant travel problems that exist in this area of Warren County?**
  - Too much congestion/increased traffic 85
  - Narrow lanes 85
  - Narrow shoulders 82
  - Sharp curves 80
  - Lack of access to Natcher Parkway 53

Public Meeting #1 Questionnaire Results

- **If you do use Elrod Rd. or other roads in this vicinity, what is the ***primary*** purpose of your trips?**
  - Going to/from work 59
  - Visiting family/friends 39
  - Shopping trips 48
  - Church attendance 60
  - Visiting Griffin Park 35

Public Meeting #1 Questionnaire Results

Elrod Road/Natcher Parkway Interchange Study Exercise Results
Public Meeting February 7, 2008

Concern	Most important (3 points)	Second most important (2 points)	Third most important (1 point)	Composite (Percent of Possible Points)
Too much congestion/ increased traffic	58	18	15	33.8%
Narrow lanes, shoulders, sharp curves, lack of striping and poor visibility	41	52	8	35.3%
Sharing the road with large vehicles - tractors, semis, RVs	1	2	13	3.0%
Lack of access to the Natcher Parkway	13	27	24	17.6%
Too many driveways/ driveways spaced too closely	0	1	10	1.8%
No pedestrian or bicycle facilities (sidewalks, paths, bike lanes	1	9	35	8.4%
TOTAL RESPONSES	114	109	105	665.0

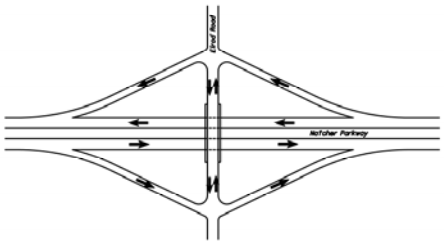
Public Meeting #1 Flip Chart Notes

- Build new segments for Elrod instead of trying to straighten the old road
- Keep front yard
- Just Widening Elrod Road with shoulders
- Straighten curves on Smallhouse and build interchange
- Improve local roads to interchange
- Will project fix city/county roads?
- Crash data for Three Spring Road not on display

Alternatives Analysis - Refinement

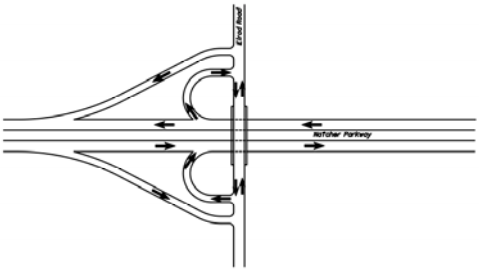
- Full Interchange Options Taken Forward
  - *Diamond Interchange*
  - *Folded Interchange*
- Local Road Connections – ***Presented as Options for non state funding***
- Multi-modal Considerations
  - Bike Lanes – ***Use of shoulder***
  - Sidewalks – ***Not proposed, no connectivity***
- Access Control

Interchange Type - Diamond



The Diamond Interchange

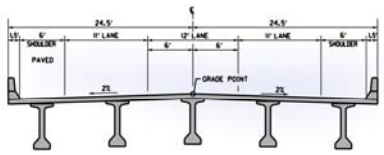
Interchange Type - Folded



The Folded or "Flop" Interchange

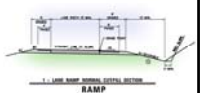
wms1

Possible Typical Sections – Interchange
Practical Design Model

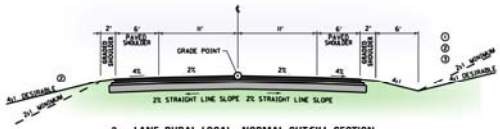


3 – LANE RURAL NORMAL CUT/FILL SECTION

ELROD ROAD BRIDGE SECTION



Possible Typical Sections – Elrod Road
Practical Design Model

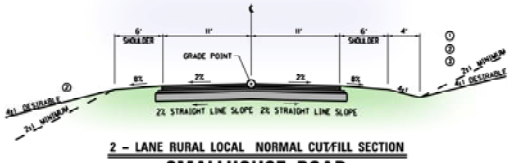


2 – LANE RURAL LOCAL NORMAL CUT/FILL SECTION

ELROD ROAD

wms3

Possible Typical Sections – Smallhouse Road
Practical Design Model



2 – LANE RURAL LOCAL NORMAL CUT/FILL SECTION

SMALLHOUSE ROAD

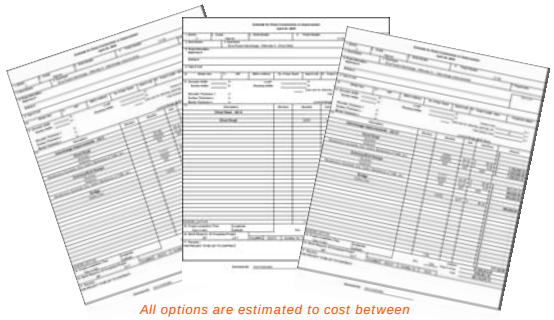
Slide 13

wms1 Suggest this slide be made two slides so images can be bigger. Is 3-lane section still needed? Is ramp section needed?
seymouw, 5/28/2008

Slide 15

wms3 Suggest this slide be made two slides so images can be bigger. Is 3-lane section still needed? Is ramp section needed?
seymouw, 5/28/2008

Cost Estimates for each Alternative and for each Option



All options are estimated to cost between $8 to $12 million dollars in 2008 dollars.

Comparison of Interchange Options

A

Diamond Interchange West of Existing Overpass

- Minimizes impacts to properties surrounding the interchange.
- Impacts properties on Smallhouse Road northwest of overpass.
- Requires connector road(s) to existing Elrod Road.

B

Diamond Interchange Immediately West of Existing Overpass

- Minimizes impacts to properties surrounding the interchange.
- Minimizes non-accessible land on WKU Agricultural Farm.
- Impacts properties on Elrod Road north of overpass.
- Requires the existing overpass to be demolished.

C

Flop Diamond Interchange West of Existing Overpass

- Minimizes the footprint and utilize as much of the existing Elrod Road as possible.
- Minimizes impacts to access to properties along existing Elrod Road in the vicinity of the interchange.
- Creates maintenance of traffic difficulties during construction.

Comparison of Elrod/Smallhouse Intersection Options

Continuous Flow From Elrod to Smallhouse

- Eliminate the 3-way stop.
- Includes a stop sign for one leg of the intersection.
- Favors movements with highest traffic; traffic volumes will determine which leg has to stop.

Four Way Stop at Elrod and Smallhouse

- Creates a four-way stop that allows access to the existing south leg of Elrod Road.
- Does not favor any movement.

Continuous Flow From Elrod to Smallhouse with Smallhouse East Realigned

- Eliminate the 3-way stop.
- Includes a stop sign for one leg of the intersection.

Comparison of Smallhouse Road Options – Elrod to Cave Mill

Smallhouse to Cave Mill Reconstruction

- Upgrades the roadway to a 3-lane curb and gutter section including a center turn lane.
- Allows for turning movements along corridor.

Comparison of Smallhouse Road Options - from Elrod to Three Springs

Smallhouse to Three Springs Straightening

- Re-aligns Smallhouse Road to eliminate 90 degree turns near the park.
- Impacts "front door" of Trinity FWB Church.

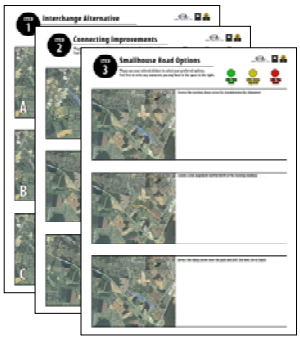
Smallhouse to Three Springs Realignment

- Shifts Smallhouse Road to the northeast on a new alignment.
- Ties back into Elrod near same location as it is now.

Elrod/Smallhouse to Three Springs Realignment Intersection

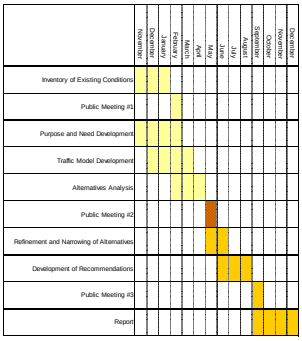
- Re-aligns Smallhouse Road to eliminate 90 degree turns near the park.
- Impacts "front door" of Trinity FWB Church.
- Relocates the intersection at Elrod Road.

Exercise Overview
We need your input!



- You will be given three sets of stickers to use at three different board locations.
- You are allowed to use the stickers however you see fit!
  - **GREEN = Like the Best**
  - **YELLOW = Like some aspects**
  - **RED = Like the Least**
- Please use them to give us a quick snapshot idea of your initial thoughts, then use the questionnaire to provide more detailed input.

Study Schedule



Next Steps

- Public Meeting #2 May 29th
- Refine Alternatives

Why are You Here?

We want your opinion!!

1. Please look at the displays and talk to us.
2. Add your dots to the issues board so we know what is most important to you.
3. Complete a survey questionnaire and return it before leaving the meeting, or take an envelope to send it to us by mail.

Your input will be taken into consideration as these alternatives are evaluated!

Comments?

Please send your comment form or any future comments and questions to:

KYTC Project Manager:

Jeff Moore, AICP
Planning Branch Manager
KYTC, District 3
PO Box 599
Bowling Green, KY 40210-1599
or

Jeff.Moore@ky.gov

GS&P Project Manager:

Karen Mohammadi, PE, AICP, PTOE
Gresham, Smith and Partners
101 South Fifth Street
Suite 1400
Louisville, KY 40202
or

Karen_Mohammadi@gspnet.com

Elrod Road/Natcher Parkway Interchange Study

Warren County • Item 3-130.00

KENTUCKY TRANSPORTATION CABINET

G S & P

Final Recommendation

Project Purpose

The purpose of this interchange study is to improve the safety and efficiency of travel in the Elrod Road/Smallhouse Road area and to provide better connection for travelers along this existing transportation network to the Natcher Parkway while minimizing disruption to existing neighborhoods .

Comparison of Interchange Options

- Minimizes impacts to properties surrounding the interchange.
- Impacts properties on Smallhouse Road northwest of overpass and WKU.
- Requires connector road(s) to existing Elrod Road.
- Costs $9.2m
- Does not improve congestion
- Preferred by public but only by a small margin.

- Minimizes impacts to properties surrounding the interchange.
- Minimizes non-accessible land on WKU Agricultural Farm.
- Impacts properties on Elrod Road north of overpass.
- Requires the existing overpass to be removed.
- Costs $7.1m
- Does not improve congestion
- Not preferred by public.

- Minimizes the footprint and utilizes as much of the existing Elrod Road as possible.
- Minimizes impacts to access for properties along existing Elrod Road in the vicinity of the interchange.
- Creates maintenance of traffic difficulties during construction.
- Costs $6.8m
- Does not improve congestion.
- Least preferred by public.

PUBLIC MEETING EXERCISE RESULTS

Public Meeting #2: May 29, 2008

Interchange Alternative	Like the Best	Like Some Aspects	Like the Least	Composite (Percent of Possible Points)
A	19	13	9	30.1%
B	13	17	12	27.8%
C	12	9	36	29.4%
Do Nothing	13	0	0	12.7%
Total Responses	57	39	57	306

EVALUATION FACTORS

Evaluation Factor	No Build	Alt. A	Alt. B	Alt. C
1. Purpose and Need	Poor	Fair	Fair	Fair
2. Disruption to Existing Neighborhoods	Good	Fair	Fair	Good
3. Economic Development	Fair	Good	Good	Good
4. Property Impacts	Good	Fair	Poor	Good
5. WKU Impacts	Good	Poor	Fair	Fair
6. Impacts to Churches	Good	Good	Poor	Fair
7. Impacts to Parks	Good	Good	Good	Good
8. Costs	Good	Fair	Fair	Good
9. Impact on New School	Fair	Good	Good	Good
10. Alignment	Fair	Good	Good	Good
11. Lane/Shoulder Widths	Poor	Good	Good	Good
12. Multi-modal	Poor	Fair	Fair	Fair
13. Public Acceptance	Fair	Fair	Fair	Fair
14. Constructability		Good	Fair	Fair

Good Fair Poor

Conclusions

- The alternatives range from $6.8 to $9.2 and would aid in economic development (residential growth) in the area.
- None of the alternatives would reduce traffic congestion in the area.
- Public support for the alternatives was not strong. Parishioners who live outside the area seemed to be the most vocal supporters.
- All alternatives would result in some level of disruption to either homes, WKU or the churches, and Alternatives B and C would be difficult to build while maintaining traffic flow due to removing the existing overpass.
- Development of an interchange would require City/County to complete the road projects on Smallhouse Road and Elrod Road in Study Area first.

Final Recommendation

- *NO INTERCHANGE BE BUILT AT THIS LOCATION*
- *SAFETY IMPROVEMENTS BE MADE ALONG SMALLHOUSE ROAD*
- *INTERCHANGE FEASIBILITY STUDY BE CONDUCTED FOR SITE SOUTH OF THE I-65/NATCHER PARKWAY.*

Elrod Road / Natcher Parkway Interchange Study
Traffic Forecasting Report

Warren County, Kentucky • Item No. 3-130.00
December 2008

GRESHAM SMITH AND PARTNERS

Contents **Section**

Travel Demand Model Refinements	1
No Build Alternative	2
Build Alternatives	3
Turning Movement Forecasts	4

1. Travel Demand Model Refinements

The current Bowling Green/Warren County Travel Demand Model (TDM) was completed in March of 2004 retaining the MINUTP software platform of its August 2000 processor. The current TDM has a base year of 2000 and a future year of 2030. While BLA is in the process of converting the TDM to the TRANSCAD software platform, moving up the base year to 2008 and pushing out the future year to 2040, the updated travel model will not be available until late fall of 2008 under another KYTC contract.

New Travel Analysis Zones

For the Elrod Road/Natcher Parkway Interchange Study, the first refinement to the current TDM involved disaggregating the existing TAZs in the Study Area generally bounded by Campbell Lane (US 231) on the north, Scottsville Road (US 231) and Drakes Creek on the east, the Warren-Simpson County Line on the south, and Russellville Road (US 68/KY 80) on the west. As can be seen in Figure 1, existing TAZs were split along Elrod Road (Natcher Parkway to Smallhouse Road), the Natcher Parkway Extension (I-65 to US 231) and Rich Pond Road (KY 242 from US 31W to KY 622). The new TAZs begin with the number “9” followed by the parent zone number.

FIGURE 1: NEW TRAVEL ANALYSIS ZONES

Having created a new TAZ structure in the Elrod Road Interchange Study Area, the TAZ socio-economic database for the year 2000 was generated by re-aggregating the 2000 Census demographics (population, group quarters, households and housing units) to match the new TAZ geography and re-aggregating the address-specific employment information (Employment Securities 202 database for year 2000) for the new zones.

Next, the population and employment forecasts for the year 2030 were assigned preliminarily to the new TAZ geography based on aerial photography and information from the Kentucky Cabinet of Economic Development on available industrial sites (i.e., South Central Kentucky Industrial Park, Murphy Industrial Property and Berry Industrial Property). The Countywide 2030 forecasts of 142,185 persons and 100,320 non-farm jobs were retained, up from 92,552 persons and 63,044 non-farm jobs in year 2000. Likewise, the Study Area 2030 forecasts of 43,400 persons and 28,048 jobs were retained, up from 21,595 persons and 16,721 jobs in year 2000.

These preliminary population and employment change forecasts by TAZ were reviewed by a group of transportation and development officials on February 7, 2008, with follow-up communications with the City-County Planning Commission of Warren County staff. Based on this input, the TAZ forecasts were finalized as shown in Figure 2-population change and Figure 3-employment change and Table 1.

FIGURE 2: 2000-2030 POPULATION CHANGE

FIGURE 3: 2000-2030 EMPLOYMENT CHANGE

TABLE 1: Population and Employment Forecasts for Years 2000 and 2030

New Base Network

Starting with the year 2000 roadway network of the existing TDM, roadways improvements were identified that added capacity (i.e., "capacity expansion" projects) to the network:

1) Ken Bale Boulevard → new 4-lane road from Scottsville Road (US 231)/ Three Springs Road (KY 844) intersection to Shive Lane west of Shire Boulevard
2) US 231 → widened to 4 lanes from existing 4-lane segment near Cypress Wood Lane to Allen County Line
3) I-65 → widening to 6 lanes from Carter-Sims Road to Natcher Parkway, widening to 8 lanes from Natcher Parkway to Scottsville Road (US 231), and widening to 6 lanes from Scottsville Road(US 231) to Barren County Line
4) Lovers Lane (KY 880) → widened to 4 lanes from north of Fruit of the Loom Drive to Fairview Avenue/Cemetery Road (KY 234)
5) Veterans Memorial Boulevard (KY 880) → widening to 4 lanes from Russellville Road (US 68/KY 80) to Old Barren River Road
6) 6th Street (KY 880) → widening to 4 lanes from Gordon Avenue to Kentucky Street
7) 6th Street (KY 234) → change to 2-lanes westbound between Center Street and Kentucky Street
8) 6th to 7th Connector (KY 234) → add 2-lane eastbound connector from 6th at Kentucky Street to 7th at Center Street
9) Glasgow Road (US 68/KY 80) → widening to 4 lanes from Louisville Road (US 31W) to Cosma Drive (in TransPark)
10) Big Red Way (Avenue of Champions) → 1-lane in each direction from University Boulevard (Business US 231) to Center Street
11) Morgantown Road (Business US 231) → 4-lanes from Russellville Road (US 68/KY 80) intersection to University Boulevard (coding error)
12) Gordon Avenue (KY 185) → 4-lanes from 6th Street to Double Springs Road (coding error)
13) Old Louisville Road → 4-lanes from State Street/College Street intersection to Louisville Road (US 31W) (coding error) (KY 3225)
14) College Street → add 2-lanes southbound from State Street/College Street to 6th Street
15) State Street → 2-lanes northbound from 6th Street to College Street/Old Louisville Road intersection (coding error)

The addition of these major roadway improvements to the year 2000 network established the new base network for the year 2008. Travel demand model runs were made for the new 2008 base network for the years 2000 and 2030 for review purposes only, referring to Figures 4 and 5.

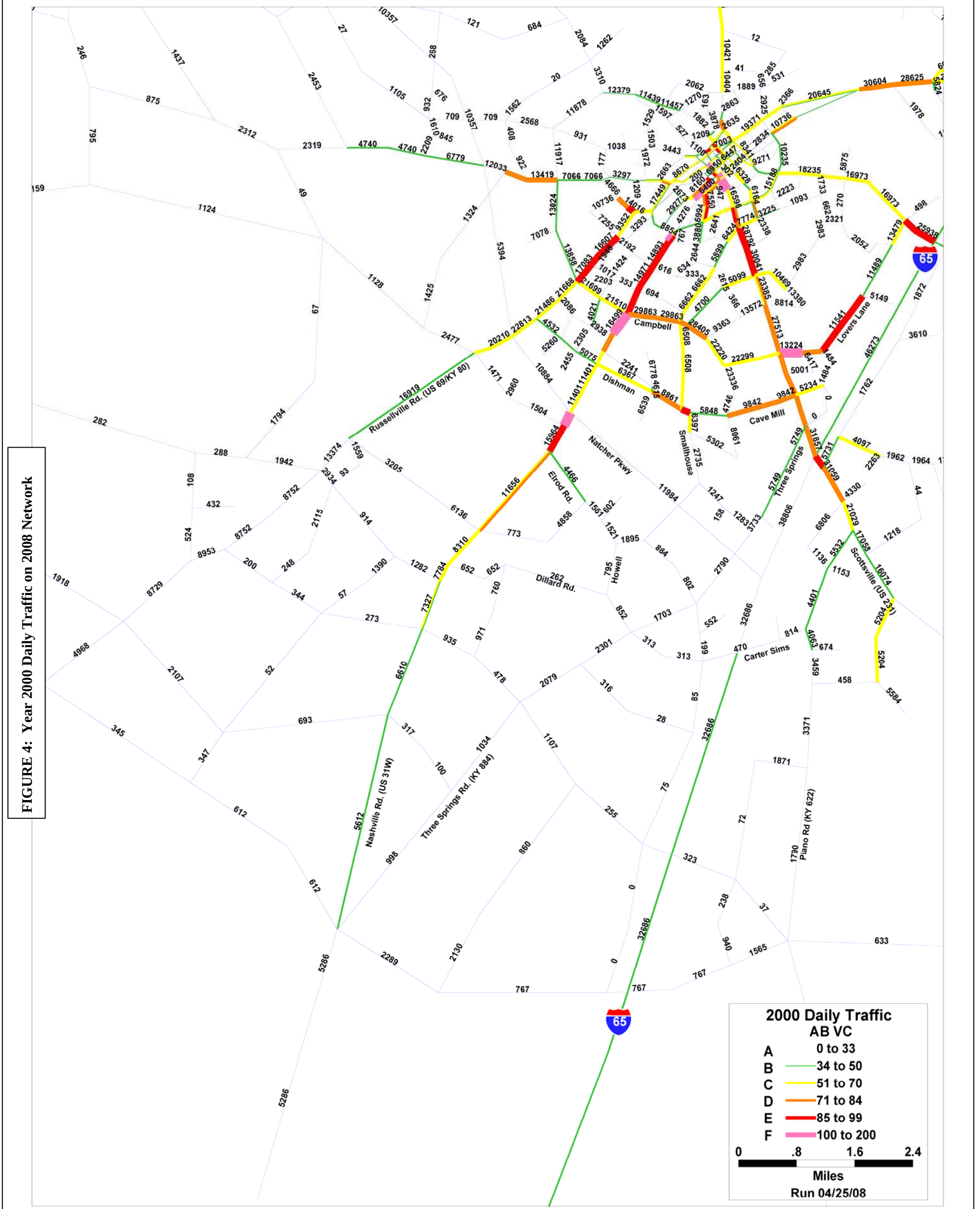
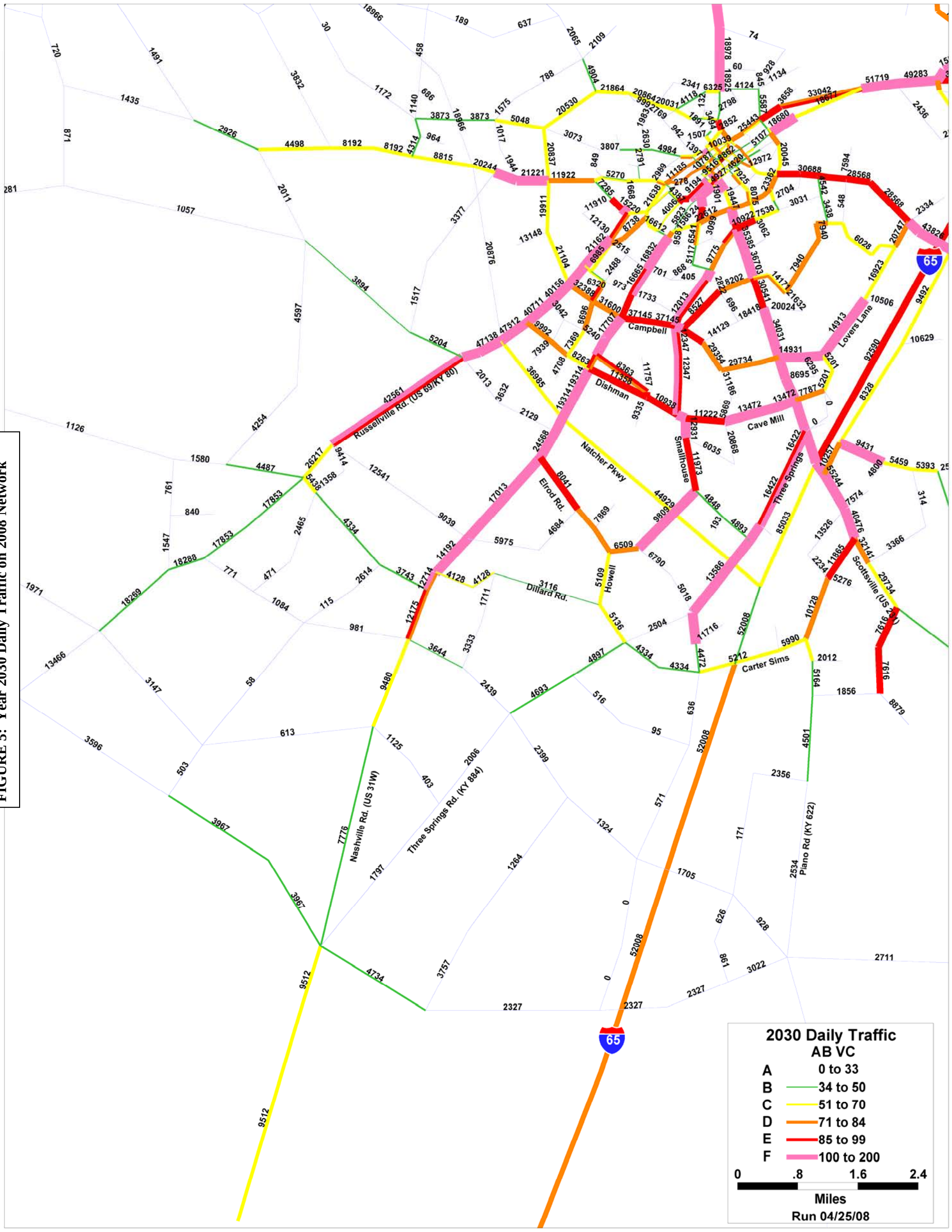


FIGURE 4: Year 2000 Daily Traffic on 2008 Network

FIGURE 5: Year 2030 Daily Traffic on 2008 Network



2. No Build Alternative

The No Build Alternative consists of the existing network in the year 2008 plus committed projects that are anticipated to be completed accordingly to the Bowling Green/Warren County Metropolitan Planning Organization's adopted Transportation Improvement Program. This Existing-plus-Committed Network establishes the benchmark for the evaluation of the Build Alternatives.

The committed "capacity expansion" projects are:

1) Cumberland Trace (KY 2158) → relocation of intersection with Scottsville Road (US 231) at Mel Browning Street to Cherry Farm Lane at Scottsville Road (US 231)
2) Natcher Parkway Extension → 4-lane freeway from I-65 to US 231W at Upton Road (east of Dye Ford Road) with interchange at Plano Road (KY 622)
3) I-65 → widening to six lanes from Carter-Sims Road southward to Tennessee State Line
4) I-65/US 231 interchange reconstruction (replace existing rural diamond interchange with single-point-urban-diamond interchange)
5) Lovers Lane (KY 880) → widening to 4 lanes from Cemetery Road (KY 234) to Scottsville Road (US 231)
6) Three Springs Road (KY 844) → widening to 4 lanes from Scottsville Road (US 231) to Flea Land Road (south of Sutherland Drive and Fieldstone Boulevard, use TAZ connector)
7) Nashville Road (US 31W) → widening to 4 lanes from Campbell Lane (US 231) to Dillard Road

No Build Alternative Conditions

Year 2030 traffic forecasts for the No Build Alternative(Figure 6) show significant congestion on arterial facilities in the northern portion of the Elrod Road Interchange Study Area even with the widening of Nashville Road (US 31W) to four lanes. The daily traffic capacity from the TDM is found below in Table 2, and is based on a K-factor (i.e, ratio of peak-hour to daily traffic) of 10%.

A level-of-service (LOS) of D is generally considered the minimum acceptable level-of-service in urban areas. Thus, facilities with a LOS E (operating at capacity = volume-to-capacity ratio of 0.85 to 0.99) or LOS F (unstable flow = volume-to-capacity of 1.00 or greater) are considered to have significant congestion. These facilities include:

- Russellville Road (US 68/KY 80) from south of Morgantown Road (Business US 231) to north of KY 1083
- Nashville Road (US 31W) from University Drive (Business US 231) to north of Dillard Road
- Elrod Road from Herman Avenue to Smallhouse Road
- Three Springs Road (KY 884) from Matlock Road to north of Smallhouse Road
- Dishman Road-Cave Mill Road from Nashville Road (US 31W) to Scottsville Road (US 231)
- Elrod Road from Nashville Road (US 31W) to Earlston Street

It should be noted that, among the north-south roadways in the Study Area, Three Springs Road (KY 884) is under-utilized as a four-lane roadway from Smallhouse Road to Scottsville Road (US 231).

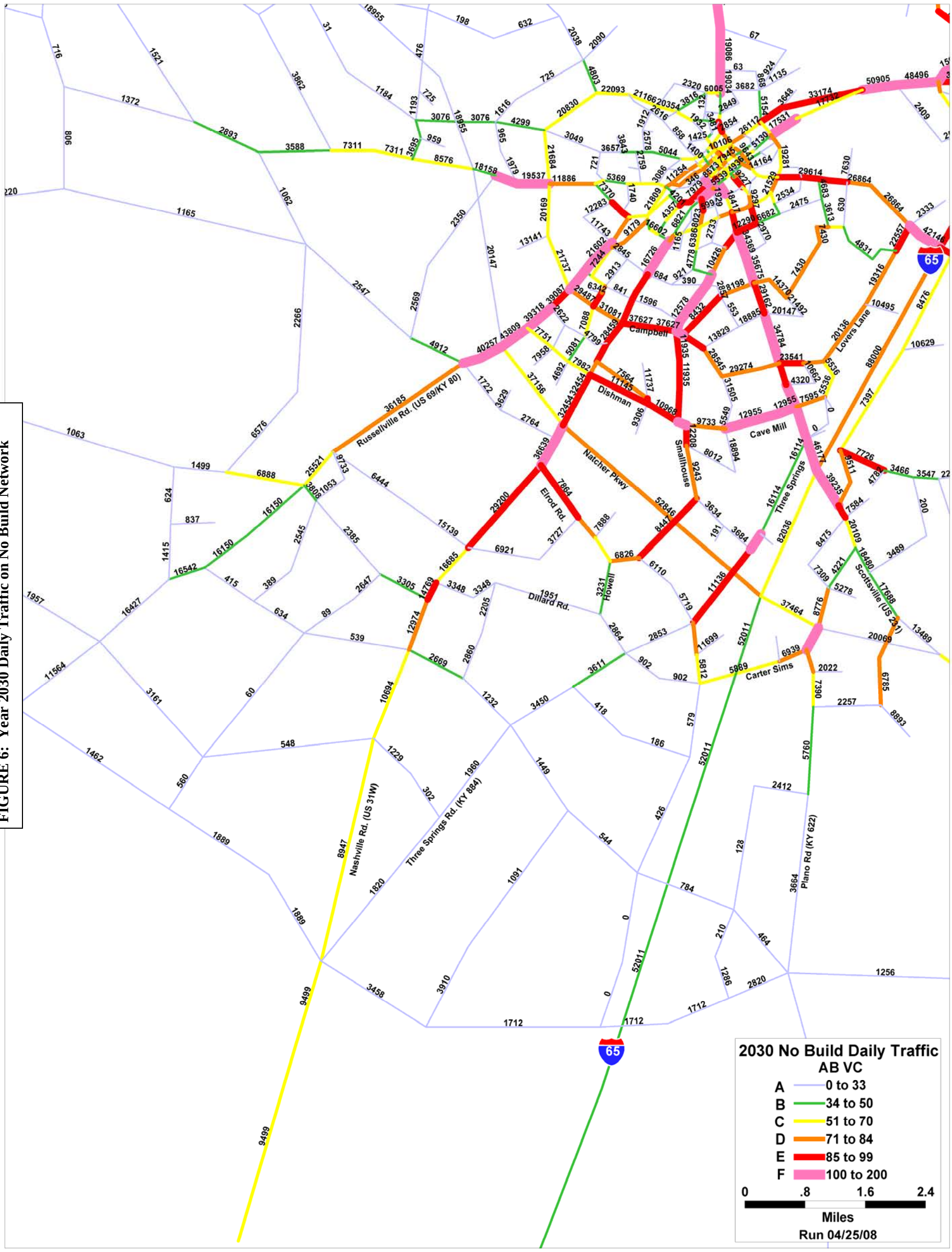


FIGURE 6: Year 2030 Daily Traffic on No Build Network

Table 2: Daily Traffic Capacity (LOS = E) by Area Type and Functional Class

Area Type	Lanes	Urban Freeway (FC 11)	Urban Expressway (FC 12)	Urban Major Arterial (FC 14)	Urban Minor Arterial (FC 16)	Urban Collector (FC 17)		Urban Local (FC 19)
Central Business District	Two			15,500	13,000	10,500		8,000
	Four	60,000	56,000	31,000	26,000	21,000		16,000
Center City	Two			17,500	15,000	11,500		9,000
	Four	68,000	64,000	35,000	30,000	23,000		18,000
Suburban	Two			19,500	16,500	12,500		10,000
	Four	72,000	68,000	39,000	33,000	25,000		20,000
		Rural Freeway (FC 1)	Rural Expressway (FC 2)	Rural Major Arterial (FC 4)	Rural Minor Arterial (FC 6)	Rural Major Collector (FC 7)	Rural Minor Collector (FC 8)	Rural Local (FC 9)
Exurban	Two			21,500	18,500	14,000	12,000	9,000
	Four	72,000	68,000	43,000	37,000	28,000	24,000	18,000
Rural	Two			25,000	21,000	16,000	11,500	8,000
	Four	72,000	68,000	50,000	42,000	32,000	23,000	16,000

Source: Bowling Green/Warren County Travel Demand Model "Documentation and User's Guide": prepared by Bernardin ● Lochmueller & Associates, Inc. for KYTC; March 25, 2004; page 7.

3. Build Alternatives

Three Build Alternatives have been developed for the proposed Elrod Road interchange with associated "optional improvements" (in blue) and "additional improvements" (in brown), referring to Figures 7 through 9 in the descriptions that follow.

Alternative Descriptions

Alternative A (Figure 7) involves location of a diamond interchange on the Natcher Parkway about ¼-mile northwest of the present Elrod Road grade-separation (which is assumed to be closed for travel modeling purposes). Optional improvements are proposed to several roadways feeding the new interchange, including improvements to Elrod Road from new Elrod Road to Nashville Road, improvements to Smallhouse Road from Elrod Road to Cave Mill Road, the extension of Neal Howell Road to new Elrod Road, and the realignment of Smallhouse Road from Elrod Road to Three Springs Road. The extension of Neal Howell Road to the new alignment of Elrod Road is important in providing access to the south without using the present residentially lined Elrod Road with 90-degree curves. Of even greater importance is the realignment of existing Smallhouse Road from Elrod Road to Three Springs Road to improve the existing vertical and horizontal alignment, particularly the 90-degree curves. This realignment is necessary to improve the operating speed along Smallhouse Road and thereby the use of the programmed four-laning of Three Springs to Scottsville Road (US 231). Additional options are being examined for Alternative A that are labeled:

- A1→ a realignment of new Elrod Road to tie into existing Elrod Road.
- A2→ a new alignment for Smallhouse Road from Elrod Road to Three Springs Road.
- A3→ a roundabout at the intersection of Elrod Road with Smallhouse Road.

Of the additional options, only A2 can be replicated in the travel demand model because the TDM is not sensitive to minor alignment changes or intersection configurations.

Alternative B involves location of a diamond interchange on the Natcher Parkway about 500 feet northwest of the present Elrod Road grade separation and closure of the existing grade separation. Optional improvements include improving Elrod Road from Nashville Road to the new alignment portion of Elrod Road and realignment of Smallhouse Road from Elrod Road to Three Spring Road to remove two 90-degree curves. Additional options are being examined for Alternative B that are labeled:

- B1 → a connection from new Elrod Road to existing Elrod Road immediately south of the interchange dropping the extension of Neal Howell Road to new Elrod Road.
- B2 → a new alignment for Smallhouse Road from Elrod Road to Three Springs Road.

Of the additional options, only B2 can be replicated in the travel demand model because the TDM is not sensitive to minor alignment changes and cannot assign traffic to parallel roadways that are very close to one another (i.e., B1 option).

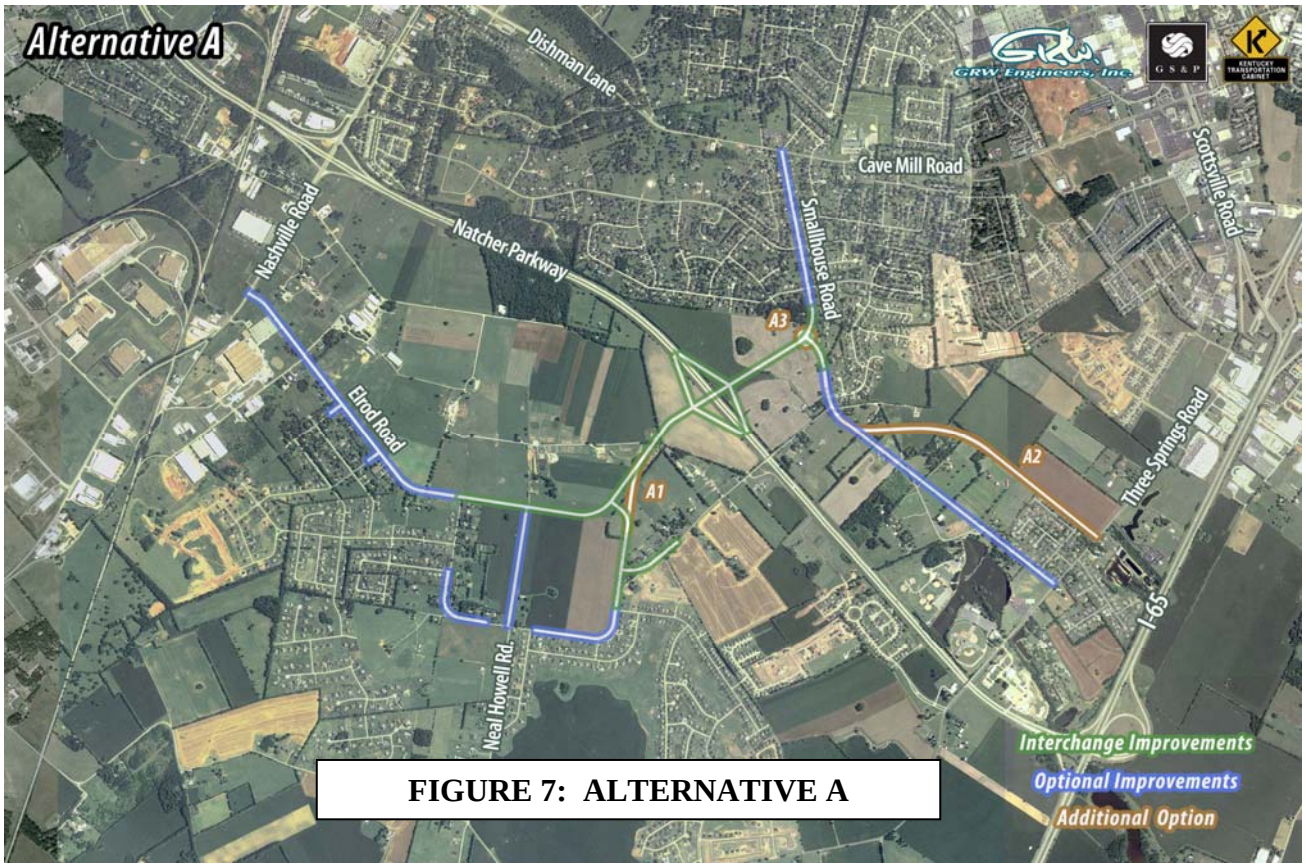


FIGURE 7: ALTERNATIVE A

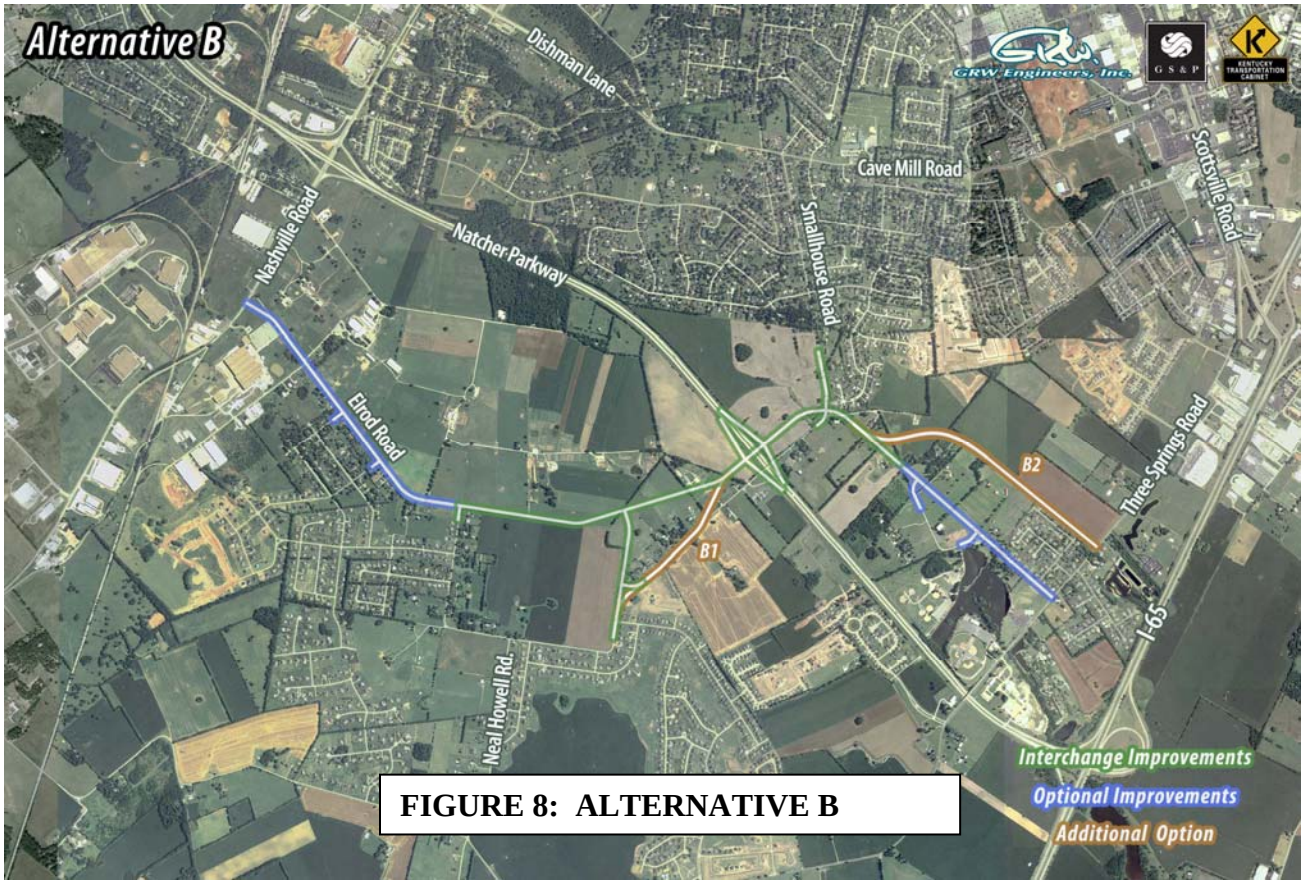


FIGURE 8: ALTERNATIVE B

Alternative C involves placing a folded diamond interchange on the alignment of the existing Elrod Road grade separation of Natcher Parkway. Optional improvements are proposed to several roadways feeding the new interchange, including improvements to Elrod Road from the interchange to Nashville Road, improvements to existing Elrod Road as its make two 90-degree bends, improvements to Smallhouse Road from Elrod Road to Cave Mill Road, and the realignment of Smallhouse Road from Elrod Road to Three Springs Road. The additional option (C1) involves a new alignment for Smallhouse Road from Elrod Road to Three Springs Road, similar to options A2 and B2.

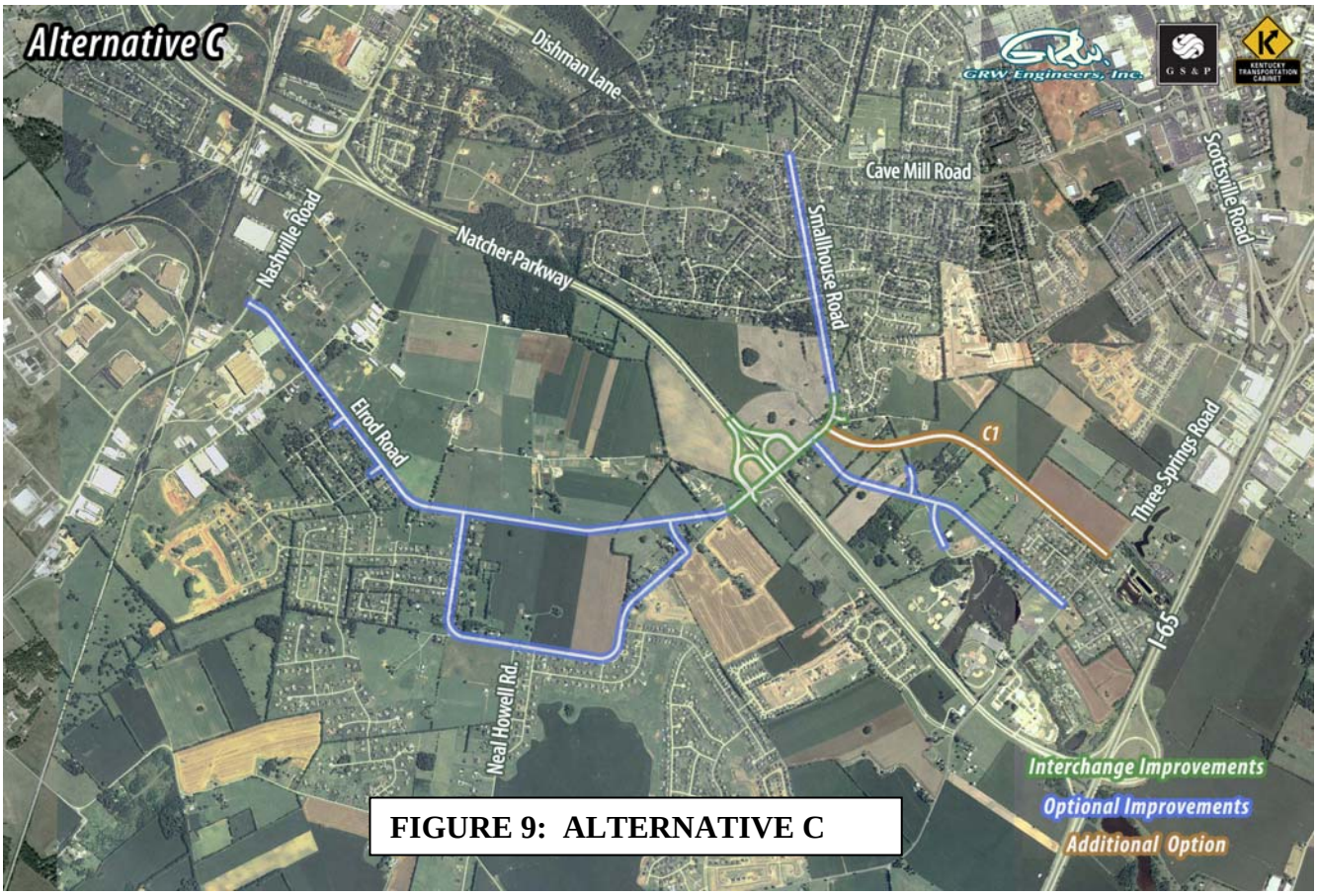


FIGURE 9: ALTERNATIVE C

Alternatives Modeled

The MINUTP version of the Bowling Green/Warren Travel Demand Model (TDM) must be carefully applied in making traffic forecasts for geometric alternatives. Foremost, the computerized roadway network in the MINUTP TDM is a gross representation of the actual roadway network because of the lack of geographic coordinates. (In other words, the roadway network does not match the road alignments of aerial photographs.) Thus, minor differences, adjustments and changes to roadway alignment in roadway design cannot be represented in the travel model to yield meaningful results.

With due consideration to the travel model limitations of this MINUPT TDM, travel model forecasts were generated for the following Building Alternatives:

1) Alternative A with the realignment of existing Smallhouse Road from Elrod Road to Three Springs Road (represented in the TDM by increasing the operating speed from 27 mph to 42 mph) and the improvement of Elrod Road from new Elrod Road to Nashville Road (represented in the TDM by increasing the operating speed form 27 mph to 35 mph). To reflect the new interchange with the Natcher Parkway, the existing alignment of Elrod Road was shifted ¼-mile to the northwest, was connected to Natcher Parkway, and was

assigned an operating speed of 42 mph with a higher daily two-lane capacity than the existing Elrod Road grade separation.

2) Alternative A2 with Smallhouse Road on new alignment from Elrod Road to Three Springs Road with an operating speed of 42 mph.
3) Alternative C with the realignment of existing Smallhouse Road from Elrod Road to Three Springs Road (represented in the TDM by increasing the operating speed from 27 mph to 42 mph). The new interchange with the Natcher Parkway is placed on the alignment of the existing grade separation, and the operating speed has been improved on Elrod Road between Smallhouse Road and Nashville Road like Alternative A.

Thus, the three options examine two major geometric features:

- The location of the interchange on the Natcher Parkway northwest of the existing Elrod Road grade separation (Alternative A) versus on the alignment of the existing Elrod Road grade separation (Alternative C).
- The traffic attraction to Smallhouse Road between Elrod Road to Three Springs Road comparing road realignment (Alternative A) to new location (Alternative A2).

Build Alternative Results

Comparing the daily traffic assignment for the Build Alternatives (Figures 10, 11 and 12) to the No Build Alternative (Figure 6) and Table 3, the observations are made for the year 2030:

1) The LOS improves on →
    a. Russellville Road (US 68/KY 80) south of the Natcher Parkway.
    b. Three Springs Road (KY 884) between Matlock Road and Smallhouse Road.
    c. Dishman Road from Nashville Road (US 31W) to Cave Mill Road.
    d. Cave Mill Road from Grinder Pond Road to Scottsville Road (US 231).
    e. Smallhouse Road from Campbell Lane (US 231) to Cave Mill Road.
    f. Elrod Road from Nashville Road (US 31W) to west of Howell Road (due to the proposed Improvement of two-lane Elrod Road).

2) The LOS deteriorates on →
    a. Smallhouse Road from Cave Mill Road to Elrod Road (due to increased traffic assessing the new Interchange).
    b. Elrod Road from east of Howell Road through the Natcher Parkway interchange area to Smallhouse Road.

Because the proposed three-lane section of Elrod Road through the interchange area has insufficient capacity to handle forecasted Natcher Parkway interchange traffic, the LOS deteriorates on Elrod Road at the Natcher Parkway for all Build Alternatives.

The off-set intersection of Smallhouse Road at Cave Mill Road is already a serious congestion point in the roadway network. With increased traffic passing through these two close intersections on Cave Mill Road to assess the proposed interchange, this congestion point is exacerbated by all Build Alternatives.

Alternative A Results

Comparing the daily traffic assignment for Alternative A (Figure 10) to the No Build Alternative (Figure 6) and Table 3, the following occurs:

1) A 3% reduction in daily traffic volumes on Nashville Road (US 31W) north of the Natcher Parkway.
2) A 5% reduction in daily traffic volumes on Russellville Road (US 68/KY 80) and an 8% reduction in daily traffic volumes on Nashville Road (US 31W), south of the Natcher Parkway.

Table 3: Alternatives 2030 Daily Traffic Volumes

(minimum acceptable LOS D)

		Existing	No Build		Alternative A		Alternative A2		Alternative C	
Route	Termini	Daily Traffic Count (date)	ADT	V/C Ratio	ADT	V/C Ratio	ADT	V/C Ratio	ADT	V/C Ratio
Russellville Road (US 68/KY80)	Memphis Junction Rd. to Natcher Pkwy	22643 ('04)	40257	F	38113	E	37895	E	37546	E
Russellville Road (US 68/KY80)	Natcher Pkwy to Dishman Rd.	23584 ('04)	43809	F	43701	F	42294	F	44192	F
Nashville Road (US 31W)	Memphis Junction Rd. to Natcher Pkwy	11005 ('04)	37860	F	34696	F	34905	F	35661	F
Nashville Road (US 31W)	Natcher Pkwy to Dishman Rd.	18910 ('01)	32454	E	31710	E	31706	E	31763	E
Three Springs Road (KY 884)	Matlock Rd. to Old Smallhouse Road	5193 ('01)	11136	E	9285	D	8862	D	8848	D
Three Springs Road (KY 884)	Old Smallhouse Rd. to New Smallhouse Rd.		12197	F	9084	D	8945	D	10687	E
Three Springs Road (KY 884)	New Smallhouse Rd. to Scottsville Rd. (US 231)	6829 ('01)	16114	B	10510	A	12466	B	10778	A
Dishman Road	Russellville Rd.(US 68) to Nashville Rd. US 31W)	10917 ('03)	8341	C	8187	C	8050	C	8173	C
Dishman Road	Nashville Rd. US 31W) to Cave Mill Rd.	8311 ('04)	11145	E	8407	C	8548	C	8866	D
Cave Mill Road	Dishman Rd. to Smallhouse Rd.	13660 ('02)	10968	E	10908	E	10589	D	10178	D
Cave Mill Road	Smallhouse Rd. to Grinder Pond Rd.	10526 ('03)	9733	D	10784	E	10548	D	10175	D
Cave Mill Road	Grinder Pond Rd. to Scottsville Rd. (US 231)	12569 ('04)	12955	F	11287	E	11708	E	11891	E
Smallhouse Road	Campbell Ln. (US 231) to Cave Mill Rd.	12270 ('03)	11935	E	10160	D	10171	D	10372	D
Smallhouse Road	Cave Mill Rd. to Elrod Road	5951 ('07)	12208	E	15109	F	13835	F	12498	F
Smallhouse Road	Elrod Rd. to Three Springs Rd.	2333 ('07)	3634	A	6129	A	92	A	8955	B
New Smallhouse	Elrod Rd. to Three Springs Rd..						7093	B		

Road (A2)										
Natcher Parkway	Russellville Rd. (US 68) to Nashville Rd. (US 31W)	16804 ('04)	37156	C	39554	C	39729	C	40208	C
Natcher Parkway	Nashville Rd. (US 31W) to Elrod Road	17341 ('04)	52846	D	51829	D	52082	D	52437	D
Natcher Parkway	Elrod Rd. to I-65	17341 ('04)	52846	D	57945	E	56401	D	56546	D
Natcher Parkway	I-65 to Plano Rd. (KY 662)		37464	C	36705	D	35625	C	36446	C
Natcher Parkway	Plano Rd. (KY 662) to Scottsville Rd. (US 231)		20069	A	19279	A	18575	A	19204	A
Neal Howell Road	Elrod Rd. to Dillard Rd.	2360 ('07)	3231	B	4071	B	4051	B	3563	B
Elrod Road	Nashville Rd. to New Elrod Rd (west of Howell Rd.)	5350 ('07)	7864	E	9226	C	9355	C	9148	C
New Elrod Road.	West of Howell Rd. to East of Howell Road		6826	D	11996	D	12045	D	11318	D
New Elrod Road	East of Howell Rd. to Natcher Parkway	3363 ('07)	8447	E	20707	F	21297	F	21069	F
New Elrod Road	Natcher Parkway to Smallhouse Road	3363 ('07)	8447	E	17993	E	17272	E	18485	F
I-65	Natcher Parkway to Scottsville Rd. (US 231)	43800 ('04)	82036	C	79859	C	77320	C	77965	C
Scottsville Road (US 231)	Three Springs Rd. (KY 884) to I-65	37114 ('04)	46177	F	41171	-F	42473	F	41818	F
I-65	Scottsville Rd. (US 231) to Cemetery Rd. (KY 234)	45676 ('04)	88000	D	88203	D	88007	D	88004	D
Scottsville Road (US 231)	I-65 to Cumberland Trace (KY 2158)	23938 ('04)	39235	F	38319	E	39411	F	38785	F

3) A 17% reduction in daily traffic volumes on Three Springs Road (KY 884) south of Smallhouse Road.
4) A 35% reduction in traffic on Three Springs Road between Smallhouse Road and Scottsville Road as traffic from the area bounded by Smallhouse, Cave Mill and Three Springs uses the new interchange rather than traveling Three Springs Road to the Scottsville Road /I-65 interchange.
5) A 213% increase in traffic on new Elrod Road north of the Natcher Parkway (increasing from 8400 vpd to 18000 vpd) and a 245% increase in traffic on new Elrod Road south of the Natcher Parkway (increasing form 8400 vpd to 20700 vpd).
6) A 24% increase in traffic on Smallhouse Road between Elrod Road and Cave Mill Road as traffic from the area bounded by Smallhouse, Cave Mill and Three Springs uses the new interchange rather than traveling along Cave Mill Road and Dishman Road to the existing Natcher Parkway/Nashville Road interchange. This pushes the LOS on this section of Smallhouse Road to LOS F.

7) A 26% increase in traffic on Howell Road south of Elrod Road, yet LOS B is retained.
8) A 17% increase in traffic on Elrod Road from Nashville Road to Howell Road although a LOS C is attained through reconstruction of the road.
9) A 3.1% reduction in daily traffic volumes passing through the I-65/US 231 interchange, including a 11% reduction in daily traffic on US 231 immediately north of I-65.

The placement of the new interchange with Natcher Parkway about ¼-mile northwest of the existing Elrod Road grade separation emphasizes Smallhouse Road northward to Cave Mill Road over Three Springs Road as the primary access route for existing and future development located north of the Natcher Parkway. Of the three Build Alternatives examined, Alternative A results in the greatest increase in daily traffic on Smallhouse Road to Cave Mill Road and the least daily traffic on Three Springs Road (programmed to be widen to five lanes) to Scottsville Road. If Alternative A becomes the preferred alternative, the provision of outlets to Three Springs Road and Smallhouse Road (east of Elrod Road) from the forecasted residential development in the area bounded by Smallhouse Road, Cave Mill Road and Three Springs Road is important to provide relief to Smallhouse Road south of Cave Mill Road as the primary access route to the new Elrod Road interchange.

Alternative A2 Results
Comparing the daily traffic assignment for Alternative A2 (Figure 11) to the No Build Alternative (Figure 6) and Table 3, the following occurs:

1) A 3% to 4% reduction in daily traffic volumes on Russellville Road (US 68/KY 80) and Nashville Road (US 31W), north of the Natcher Parkway.
2) An 8% to 9% reduction in daily traffic volumes on Russellville Road (US 68/KY 80) and Nashville Road (US 31W), south of the Natcher Parkway.
3) A 20% reduction in daily traffic volumes on Three Springs Road (KY 884) south of Smallhouse Road.
4) A diversion of most of the 3600 vpd on Smallhouse Road between Elrod Road and Three Springs Road, and a total of 7100 vpd on relocated Smallhouse Road (A3) from Elrod Road to Three Springs Road.
5) A 23% reduction in traffic on Three Springs Road between Smallhouse Road and Scottsville Road as traffic from the area bounded by Smallhouse, Cave Mill and Three Springs uses the new interchange rather than traveling Three Springs Road to the Scottsville Road /I-65 interchange.
6) A 204% increase in traffic on new Elrod Road north of the Natcher Parkway (increasing from 8400 vpd to 17300 vpd) and a 252% increase in traffic on new Elrod Road south of the Natcher Parkway (increasing form 8400 vpd to 21300 vpd).
7) A 13% increase in traffic on Smallhouse Road between Elrod Road and Cave Mill Road as traffic from the area bounded by Smallhouse, Cave Mill and Three Springs uses the new interchange rather than traveling along Cave Mill/Dishman to the existing Natcher Parkway/Nashville Road interchange.
8) A 25% increase in traffic on Howell Road south of Elrod Road, yet LOS B is retained.
9) A 19% increase in traffic on Elrod Road from Nashville Road to Howell Road. although a LOS C is attained through reconstruction of the road.
10) A 3.3% reduction in daily traffic volumes passing through the I-65/US 231 interchange, including an 8% reduction in daily traffic on US 231 immediately north of I-65.

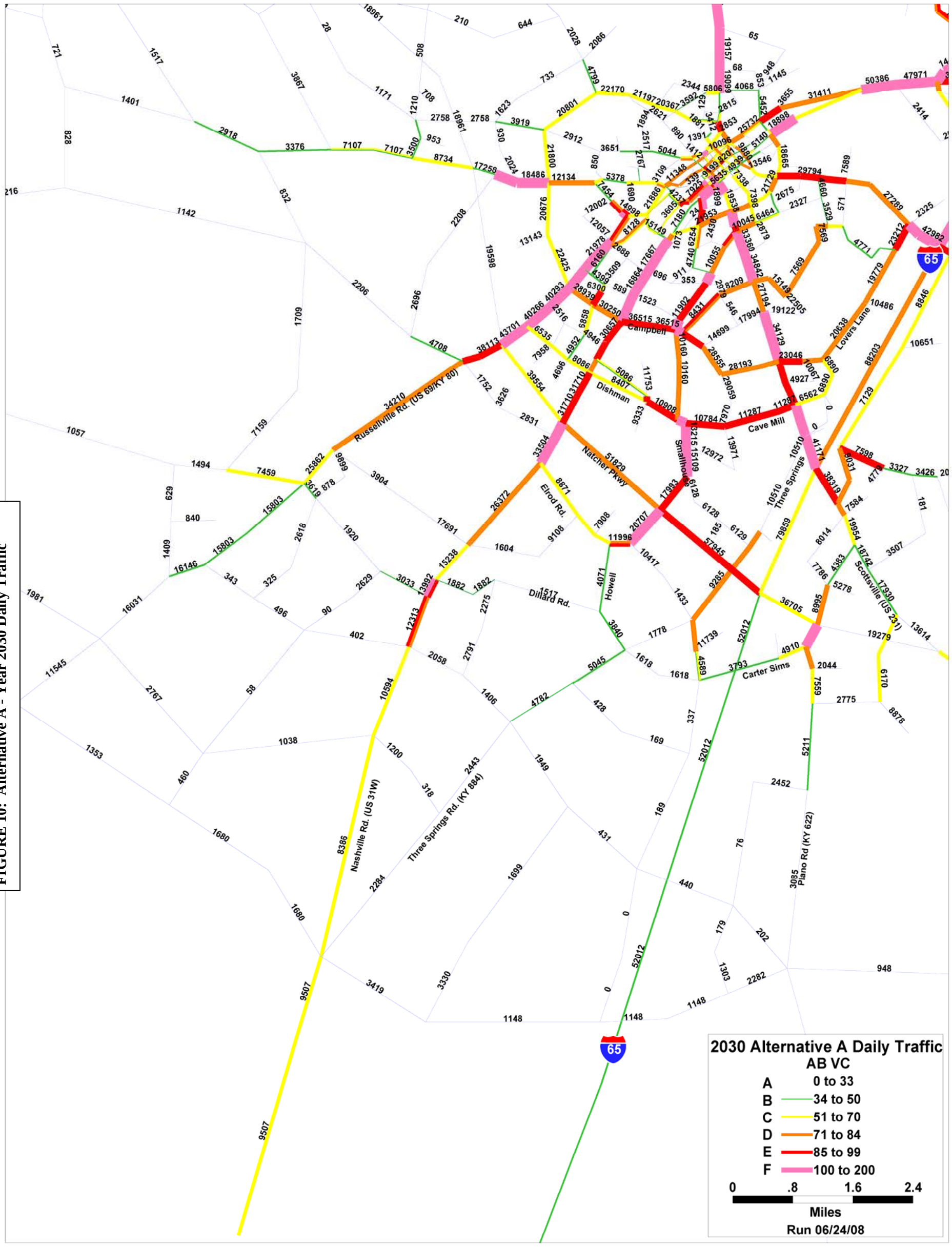


FIGURE 10: Alternative A - Year 2030 Daily Traffic

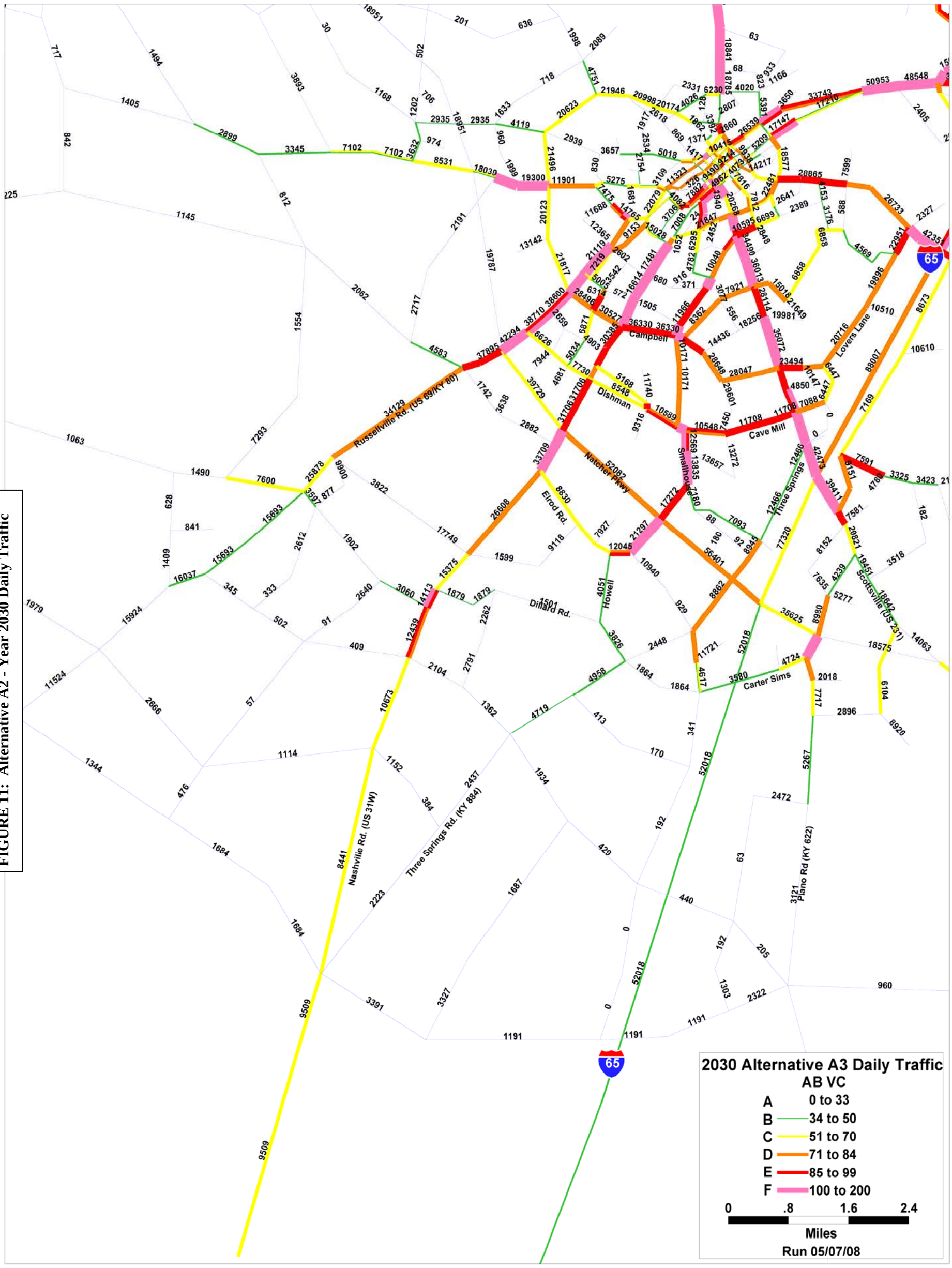


FIGURE 11: Alternative A2 - Year 2030 Daily Traffic

Alternative A2 is slightly more effective than Alternatives A and C are in reducing traffic on Russellville Road (US 68/KY 80) and Nashville Road (US 31W) south of the Natcher Parkway. This alternative results in slightly more traffic on Elrod Road south of the Natcher Parkway and slightly more traffic on Elrod Road north of the Natcher Parkway than Alternatives A and C. **Alternative A2 results in the least reduction in traffic on Three Springs Road north of Smallhouse Road**.

Alternative A2 falls between Alternative A and Alternative C in increasing traffic on Smallhouse Road from Elrod Road to Cave Mill Road. The benefits of Alternative A2 are traffic reductions on Russellville Road, Nashville Road, Three Springs Road (north of Smallhouse) and existing Smallhouse Road from Elrod Road to Three Springs Road. This adverse impact on Smallhouse Road south of Cave Mill Road can be mitigated by providing a connection from relocated Smallhouse Road (and/or from Three Springs Road) to the residential area bounded by Smallhouse Road, Cave Mill Road and Three Springs Road.

A comparison of the geometric differences between Alternatives A and A2 indicates that the relocation of Smallhouse Road on new alignment from Elrod Road to Three Springs Road (per Alternative A2) results in the most effective use of the programmed four-laning of Three Springs Road and reduces the traffic increase on Smallhouse Road south of Cave Mill Road (although not as effective as Alternative C).

Alternative C Results

Comparing the daily traffic assignment for Alternative C (Figure 12) to the No Build Alternative (Figure 6) and Table 3, the following result:

1) A 1% increase in daily traffic volumes on Russellville Road (US 68/KY 80) and a 2% reduction in daily traffic volumes on Nashville Road (US 31W), north of the Natcher Parkway.
2) A 6% to 7% reduction in daily traffic volumes on Russellville Road (US 68/KY 80) and Nashville Road (US 31W), south of the Natcher Parkway.
3) A 21% reduction in daily traffic volumes on Three Springs Road (KY 884) south of Smallhouse Road.
4) A 33% reduction in traffic on Three Springs Road between Smallhouse Road and Scottsville Road as traffic from the area bounded by Smallhouse, Cave Mill and Three Springs uses the new interchange rather than traveling Three Springs Road to the Scottsville Road /I-65 interchange.
5) A 218% increase in traffic on new Elrod Road north of the Natcher Parkway (increasing from 8400 vpd to 18500 vpd) and a 249% increase in traffic on new Elrod Road south of the Natcher Parkway (increasing form 8400 vpd to 21100 vpd).
6) A 13% increase in traffic on Smallhouse Road between Elrod Road and Cave Mill Road as traffic from the area bounded by Smallhouse, Cave Mill and Three Springs uses the new interchange rather than traveling along Cave Mill/Dishman to the existing Natcher Parkway/Nashville Road interchange.
7) A 10% increase in traffic on Howell Road south of Elrod Road.
8) A 16% increase in traffic on Elrod Road from Nashville Road to Howell Road.
9) A 3.5% reduction in daily traffic volumes passing through the I-65/US 231 interchange, including a 10% reduction in daily traffic on US 231 immediately north of I-65.

Thus, Alternative C is the least effective in reducing traffic at existing Natcher Parkway interchanges at Russellville Road (US 68/KY 80) and Nashville Road (US 31W), but is the most effect in reducing traffic on Three Springs Road south of Smallhouse Road, reducing traffic through the I-65/Scottsville Road (US 231) interchange, and in **minimizing the increase in traffic on Smallhouse Road south of Cave Mill Road**. This alternative falls between Alternatives A and A2 relative to the reduction in traffic on Three Springs Road north of Smallhouse Road. This interchange location results in the highest traffic volumes on Elrod Road north of the Natcher Parkway and falls between the Alternatives A and A2 in the traffic attracted to Elrod Road south of the Natcher Parkway.

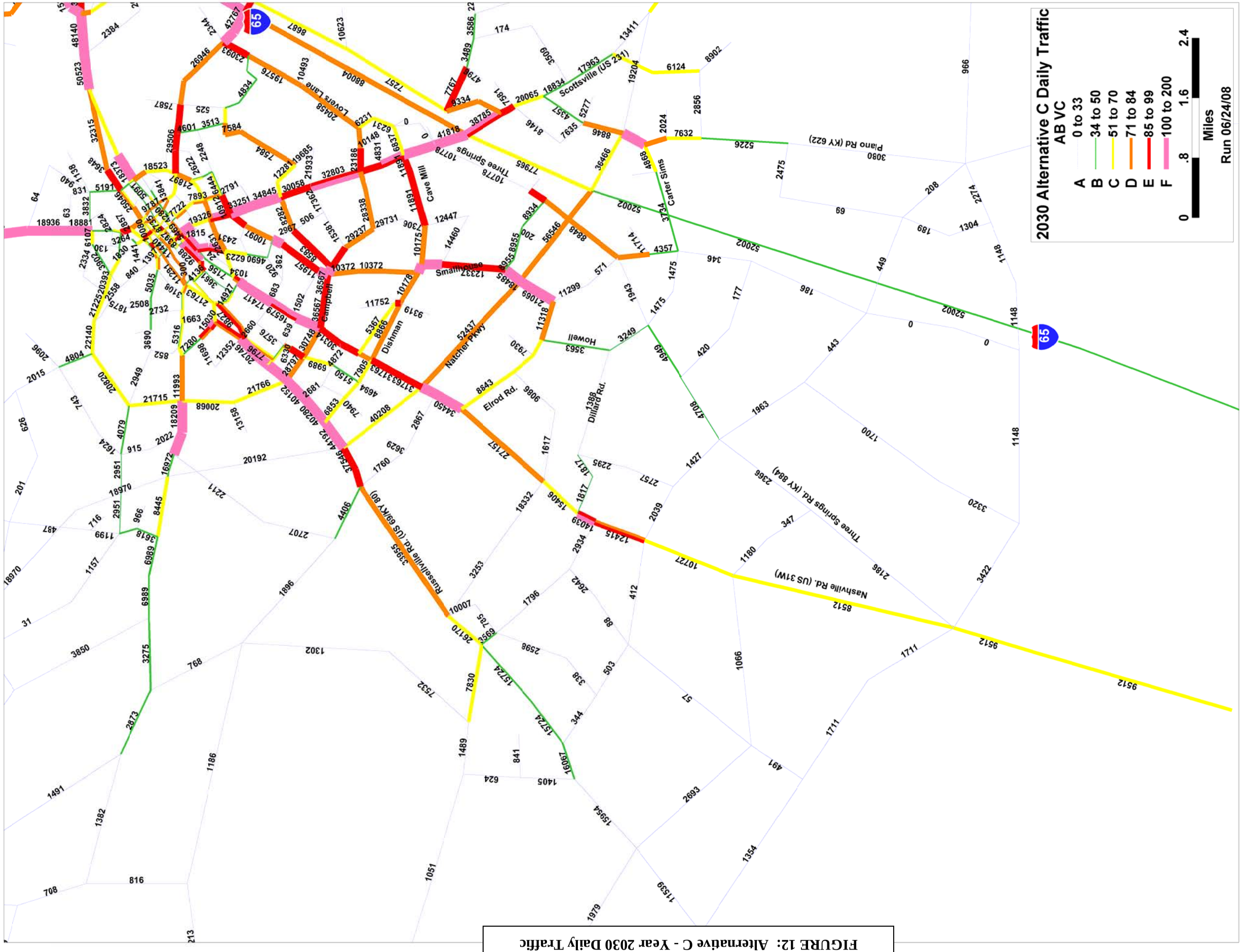


FIGURE 12: Alternative C - Year 2030 Daily Traffic

4. Turning Movement Forecasts

Turning movement forecasts are provided at the end of this report for the No Build Alternative and Build Alternatives A, A2 and C to facilitate more in depth intersection capacity analyses for geometric design decisions. Daily turning movement forecasts are provided for the following locations:

- New Elrod Road Interchange at Natcher Parkway
- Natcher Parkway @ US 68 (south)
- Natcher Parkway @ US 31W (south)
- Natcher Parkway @ I-65
- Natcher Parkway @ Plano Road
- Natcher Parkway @ Scottsville Road [US 231 (east)]
- I-65 @ Scottsville Road [US 231 (east)]
- Elrod Road @ Smallhouse Road
- Elrod Road @ Howell Road

5. Conclusions

From an evaluation of Build Alternatives, the following conclusion may be reached:

1) Regardless of the alternatives, the off-set intersection of Smallhouse Road with Cave Mill Road is a major congestion point that will be exacerbated with any of the Build Alternatives due to additional traffic assessing the new interchange through the intersection.
2) Regardless of the alternatives, outlets to Three Springs Road north of Smallhouse Road and to Smallhouse Road east of Elrod Road are important to relieve Smallhouse Road south of Cave Mill Road as significant residential growth is forecasted in the area bounded by Smallhouse Road, Cave Mill Road and Three Springs Road.
3) None of the Build Alternatives results in the sufficient diversion of traffic on Russellville Road (US 68/KY 80) or Nashville Road (US 31W) through the Natcher Parkway interchange areas to achieve an minimum acceptable level–of-service in the year 2030. However, placing the proposed Elrod Road interchange farther northwest from the existing grade separation (i.e., Alternatives A and A2) does provide minor traffic relief to the Natcher Parkway interchanges at Russellville Road and Nashville Road.
4) Regardless of the Build Alternative, forecasted traffic for the proposed Elrod Road interchange indicates that the Elrod Road through the interchange area will eventually have to be widened to four through lanes to accommodate year 2030 traffic.
5) All Build Alternatives provide relief to Three Springs Road south of Smallhouse Road in the year 2030.
6) Alternative A2 results in the most effective use of the programmed four-laning of Three Springs Road north of Smallhouse Road.
7) Alternative C results in the least increase in traffic on Smallhouse Road from Elrod Road to Cave Mill Road and provides the most relief to theI-65/US 231 interchange.

In conclusion, except for the impact of increased traffic on Smallhouse Road from Elrod Road to Cave Mill Road (that may be mitigated through additional outlets to Three Springs Road and Smallhouse Road east of Elrod), there are no conclusive differences between the Build Alternatives regarding traffic performance. **Thus, traffic circulation considerations, community and environmental impacts, agency costs (project costs and maintenance costs) and public input are more important in reaching the decision on appropriate action (i.e., choice of a preferred alternative) for this improvement project.**