



City of Lebanon, Tennessee

Major Thoroughfare Plan





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CHAPTER ONE

Introduction

Like many Middle Tennessee communities, the city of Lebanon, Tennessee is expected to see continual growth and development over the next several years, placing increasing demands on the city's transportation network. From 1990 to 2000 the city of Lebanon experienced a tremendous amount of growth – 33 percent in ten years. The city grew from 15,208 in 1990 to 20,235 in 2000. This growth pattern has continued with an additional 1,630 people counted in the 2004 Special Census, bringing the total population to 21,865 and representing an 8 percent population increase from 2000 to 2004. The Major Thoroughfare Plan (MTP) is designed to accommodate both current and projected travel demands associated with this unprecedented growth. By analyzing the existing roadway network, anticipated population and employment growth over the next 30 years, and the roadway network's ability to handle the growing traffic, alternatives for roadway improvements were developed that will result in needed mobility and access improvements.

1.1 Purpose of the Plan

This plan updates Lebanon's 2020 Major Thoroughfare Plan that was adopted in August 2002 to reflect changes to Lebanon's roadway network and surrounding land uses as well as projected increases in population and traffic volumes through the year 2030. Along with providing the city with an analysis of existing traffic conditions for 2006, this Major Thoroughfare Plan (MTP) also provides an assessment of expected traffic conditions for the year 2030 based upon anticipated growth within the city and the resulting increases in traffic as projected by the Nashville Area MPO travel demand model. This analysis provides the city with the necessary data to develop and prioritize road improvements to accommodate forthcoming increases in traffic.

The purpose of this plan is to provide a tool to the city of Lebanon that helps in the decision making process resulting in informed decisions relative to transportation improvements. A broader goal of the MTP is to offer a safe and connected transportation system that will meet the present and future needs for mobility and access for the city of Lebanon as it continues to grow. The following are guiding principles that led to the development of this plan:

- Provide an efficient, safe, and connected transportation system that is coordinated with existing and projected needs and takes into consideration future growth



- Provide a transportation system that is economical and responsive to land use principles
- Provide a transportation system that is compatible with the city of Lebanon Future Land Use Plan
- Promote interconnectivity between development plans and the existing and future roadway network
- Consider planned development patterns, accessibility, and mobility needs

Implementing the guiding principles of this plan and maintaining an acceptable level of mobility for people and goods in the future will require implementation of designated roadway improvements proposed in this document. These proposed improvements will help maintain a desirable level of service (LOS) and help provide an efficient means of transportation. The MTP establishes recommendations for roadway improvements, offers a priority ranking for their implementation, and provides facility guidelines for Lebanon's transportation system based on functional classification. In conjunction with recently completed future land use planning efforts, the city now has the opportunity to integrate its Future Land Use Plan with the analysis and recommended improvements offered in the MTP.

1.2 Transportation and Future Land Use Plan Coordination

Land use and growth patterns were carefully considered in the development of this Major Thoroughfare Plan. Coordinating land use and transportation decisions are important to ensuring orderly growth and development. Recommended future roadway extensions, new alignments, and the location and design of major intersections will influence future development patterns across the city. Coordinating transportation projects with the desired land use patterns stated in the Future Land Use Plan helps ensure the efficient use of infrastructure such as roads, bridges, and municipal services while reducing the impact on the environment.

The pace and location of development can greatly influence travel patterns and, in turn, the degree of access provided by the transportation system can affect land use distribution. Land use planning requires consideration of the transportation system's impact on neighborhood quality, pedestrian and bicycle mobility and safety, community aesthetics and corridor quality, and accessibility of shopping and entertainment districts, and major public facilities. Thoroughfare planning aims to ensure the orderly and progressive development of roadways to serve mobility and access needs, but is also critical to future land use, housing, the environment, and public utilities management. Roadway functional classifications, and design and access management strategies, must all be geared toward prospective development for the area to be served. For instance, residential traffic makes approximately 10 trips per day on average. Local streets, possibly with sidewalks, trails, or bikeways, accommodating limited vehicular traffic and encouraging safe, enjoyable short-distance trips close to home or work, would accommodate these daily functions and coordinate best with single family developments. In contrast, high-capacity, controlled access facilities are best for longer distances.

By integrating land use and transportation planning, decision makers take a holistic approach to development by considering its effects on residents' quality of life, the transportation network, and the economy as a whole.¹ With better access and less congestion, an efficient transportation system can decrease traffic noise, improve mobility, and create more jobs. Likewise, types of land uses and their intensity impact traffic demands and patterns. By designing a well organized transportation system that considers the existing and future land uses, this plan can shape development patterns and influence the natural environment to improve the economy and the quality of life for Lebanon residents. With the help of this Major Thoroughfare Plan along with other development tools, such as the city's subdivision and zoning ordinances and Future Land Use Plan, Lebanon will be able to effectively continue to coordinate land use and transportation decisions.

¹ http://ftp.nashville.gov/web/mpo/downloads/The_Metropolitan_Transportation_Planning_Process_Key_Issues.pdf

1.3 Project Development Process

The intent of the MTP is to provide a safe comprehensive transportation network that will maintain mobility and accessibility for the city of Lebanon. In order to prepare for this successful transportation network, the project team and city of Lebanon staff worked diligently to assess existing and future transportation development needs within the study boundary.

The kick-off meeting for the MTP process was held in July 2006. Members of the project team included Lebanon staff, such as the Commissioner of Public Works and the Director of Planning, Wilbur Smith Associates staff, and a representative of the Nashville Area Metropolitan Planning Organization (MPO). The project team began by assessing the city's existing transportation facilities and resulting LOS. They also looked at the initial results of the travel demand model (TDM) used to develop LOS projections for the year 2030. The team met several times throughout the process and provided key input into the development of the MTP.

Analyses of the 2030 traffic projections were conducted, and transportation related deficiencies were identified. A list of recommended improvements to the transportation network was then developed based on the model. Recommendations for functionally classified roadway cross sections that will complement and enhance the thoroughfare plan were also included. The final thoroughfare plan map shows the transportation network as if all the planned and recommended projects are completed. Results of the model and proposed projects are addressed in greater detail later in this document.

1.4 Public Involvement

A successful plan depends on acceptance from local leaders as well as the wider public. This acceptance is more easily achieved through a broad, all-inclusive planning process. Two public meetings were conducted during the planning process to obtain the community's valuable input which was essential in establishing a transportation network that reflects the community's desires.



The purpose of the first meeting, held August 8, 2006 at 6:00 p.m. at the City of Lebanon Council Chambers, was to gain the public's input and perception of transportation problems. Approximately 20 people were in attendance, including city staff, elected officials, consultants, and public participants. Through close collaboration with the project team and city officials, Lebanon residents were able to work together to identify areas of current and potential congestion, as well as issues, opportunities, and constraints facing their city's roadway network. They

were encouraged to illustrate their thoughts on large maps provided. These maps showed the Levels of Service for 2006 and 2030 for the major roadways inside the Urban Growth Boundary. Following the public input session, the results were compiled for technical analysis by the consultant and reviewed by the project team. The following is a list of concerns voiced by the citizens regarding Lebanon's transportation system:

- Want more five lane roads, like Hartman Drive – more concerned with function than aesthetic appeal
- Widen 231 North to five lanes
- Widen Hickory Ridge Road to four or five lanes
- Widen Sparta Pike to four lanes
- Concerned with the proposed rerouting of truck traffic that will occur from closing a portion of Maddox-Simpson Parkway and rerouting it farther away from the I-40 exit ramp along Sparta Pike, creating a dangerous intersection with several left turns
- “Nothing less than three lanes”
- Congestion on Murfreesboro Road, south of I-40
- Congestion on South Maple Street, from Leeville Pike south to I-40
- Congestion / dangerous intersections at Main Street and Hartman Drive, and Baddour Parkway and Hartman Drive
- Extend Hartman Drive east around the city and connect to I-40
- Widen Hunters Point Pike to four or five lanes
- North on Hunters Point Pike and the area surrounding High Street are areas where crashes tend to occur
- Need for east/west connections across S.R. 840; need for connection in all directions south of I-40, between S.R. 840 and Old Murfreesboro Road
- Full interchange at S.R. 840 and I-40 and extend S.R. 840 north to Leeville Pike
- Need north/south connection somewhere between Leeville Pike and Hickory Ridge Road
- Need signalization at the intersection of Hwy. 109 and Hickory Ridge Road – fatal accident has occurred within the last year
- Widen Lebanon Road, west of Hwy. 109, to five lanes
- Need more connection to Hwy. 109, north of Main Street
- Need east/west connector from Blair Lane to Highway 109
- Questioning whether the 2030 LOS on Palmer Road is accurate because the traffic count seems low
- Widen to four lanes and enhance Hickory Ridge Road, east of Hwy. 109
- The intersection of Hartman Drive and West Main Street continues to be a problem – tight intersections and lanes
- Need turning arrows at the intersection of West Main and Castle Heights
- There are school and peak hour back ups along Castle Heights, at Coles Ferry Pike
- There is existing 4-lane backup at Maple Street and Leeville Pike
- Intersections of College Street and Tennessee Blvd, and S. Cumberland and Tennessee Blvd. are very close together causing stacking issues with area school

- The connection between Cumberland and College should be enhanced to help the traffic on Short Street
- The by-pass along Baddour Parkway is no longer a by-pass
- Widen College Street at I-40
- Extend Maddox-Simpson Pkwy east and connect to the Hartman Drive extension to create an interchange at I-40
- Maddox-Simpson at Sparta Pike is a high accident area
- More improvements are needed along Hunters Pointe Pike
- Comment sheets were passed around the room and the group was encouraged to leave comments or concerns with the consulting team. The following comments were submitted to Wilbur Smith Associates:
- “Very informative meeting. Need present traffic lights at Maddox Simpson and Sparta Pike. Please don’t move intersection 500 feet, as TDOT requests. See you Thursday night at the TDOT meeting.” - Rick Jones
- “Very informative. Thank you!” - Sandi Jones

The final list of identified improvement projects is based on project information collected through the public involvement process, and technical analysis of existing and future transportation conditions in the area. Each project was evaluated on how well the alternative improved the transportation system by addressing safety concerns, reducing future congestion, and considering public/agency support. Another round of public involvement meetings was held to present the proposed roadway improvements, and to solicit public input and opinion related to the potential improvement options.

An updated list of proposed improvements was presented at the second public meeting, held January 15, 2008 at 5:00 p.m. in the City of Lebanon Council Chambers, to once again gain the public’s input. Approximately 15 people were in attendance including city staff, elected officials, consultants, and public participants. After a brief presentation on the process to date, handouts were distributed that contained a list of the proposed projects and a corresponding map. Those in attendance were encouraged to ask questions or express their concerns regarding the draft plan presented. Utilizing the public’s input, along with an assessment of local needs, the project team engaged in follow-up analyses to revise several of the potential projects for the City of Lebanon Major Thoroughfare Plan.

The final list of roadway improvement projects was presented at the third and final public meeting held July 8, 2008 at 5:30 p.m. in the City of Lebanon Council Chambers. Approximately 7 people attended which included city staff, members of the planning commission, and consultants. Updated handouts of the proposed project map and list of projects were distributed to the group and a brief presentation on the process to date was presented showing that the most recent revisions to the projects improved Lebanon’s future roadway system. These projects are identified in Chapter 4 of the plan.

1.5 Plan Organization

The Plan is a culmination of technical analysis, public opinion and input, local needs assessment, and future forecasts completed as part of the major thoroughfare planning process. This information is organized into the following chapters:

Chapter 1: *Introduction - establishes the purpose of the document and explains the project development process*

Chapter 2: *Existing Conditions - defines the parameters of the study area and explains the Traffic Analysis Zones*

Chapter One

within Lebanon's UGB. It also offers an analysis of the existing transportation facilities throughout Lebanon including Interstate, Arterial, and Collector roadways

Chapter 3: *Future Conditions - provides an assessment of the anticipated traffic conditions in the year 2030*

Chapter 4: *Recommended Improvements - establishes the needed roadway improvement projects that will help provide for an acceptable level of mobility for both people and goods in the Lebanon area*

Chapter 5: *Roadway Design Guidelines - provides design guidelines for roadway improvements based on roadway functional class*



CHAPTER TWO

Existing Conditions

2.1 Study Area

The study area for this project is the City of Lebanon and the area within its Urban Growth Boundary, shown in Figure 2.1, Study Area. Lebanon is located approximately 31 miles east of Nashville and shares common borders with the city of Mt. Juliet to the west. According to the city of Lebanon, as of March 2006, there were 36.27 square miles within the Lebanon city limits. (The city was only 22.95 square miles in 1996). In 2005, the US Census Bureau estimated Lebanon's population at 23,043 – a 5 percent increase from the Special Census conducted in 2004, which showed the city of Lebanon having a population of 21,865.

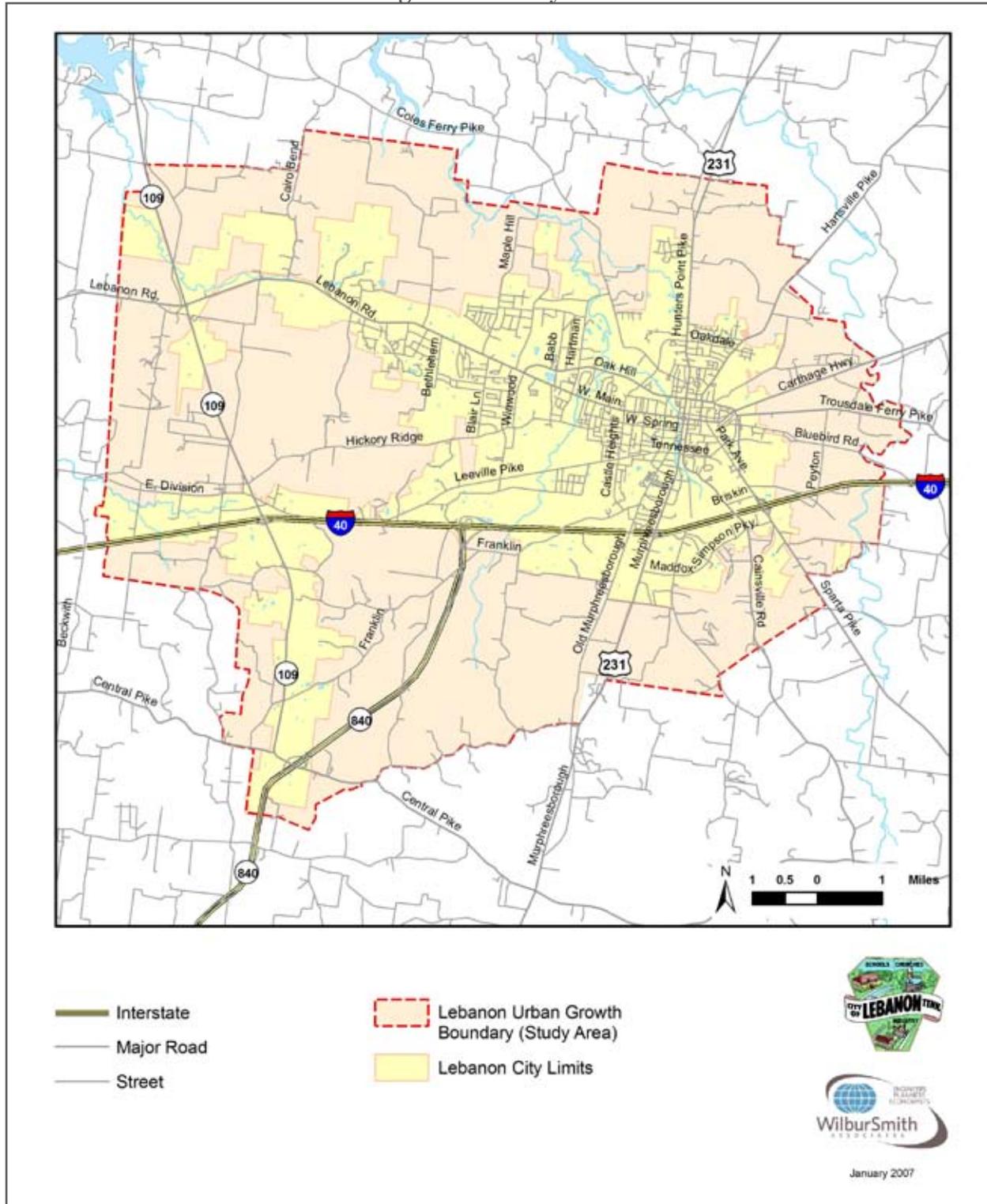
Lebanon is served by one interstate and several arterial and collector facilities that provide the basic framework of the transportation facilities in the area. The US Highways and State Routes that serve the study area include Interstate 40, US Highway 70 (Lebanon Road / State Route 24), US Highway 231 (Murfreesboro Road / State Route 10), State Route 141 (Hartsville Pike), State Route 109, and State Route 840. These roadways facilitate movement into, within, and through the study area.

The Lebanon Municipal Airport is located 2 miles southeast of the Public Square and accommodates and services a wide variety of commercial and private aircraft. The airport provides fuel and maintenance services and rental car services. The Nashville and Eastern Railroad Corporation provides the city's rail service. In addition there are 2 air freight companies, 19 motor freight companies, 7 terminal facilities, and no carrier services. The Cumberland River is the nearest navigable waterway and is located 28 miles away.¹

The Music City Star commuter rail, Tennessee's first rail service, also originates in the city of Lebanon on Baddour Parkway. Currently, the commuter rail has one line that runs from Lebanon to downtown Nashville's riverfront. Future destinations are planned to continue throughout middle Tennessee.

¹ <http://www.lebanontn.org/general.aspx>

Figure 2.1: Study Area



2.2 Multi-Modal Systems & HOV Lanes

Growing traffic congestion is one of the top issues for the city of Lebanon, and as a result, an interest in multi-modal systems and High Occupancy Vehicle (HOV) lanes has emerged. The city supports the use of HOV facilities as a means of maximizing existing highway capacity and encouraging carpooling. An HOV lane, sometimes

called a carpool lane, is a special lane reserved for the use of carpools, vanpools and buses. HOV lanes are usually located next to the regular, or unrestricted, lanes. TDOT currently operates and maintains HOV lanes along I-40 from Old Hickory Boulevard in Davidson County to Mt. Juliet Road. These special lanes enable those who carpool, or ride the bus, to bypass the traffic in the adjacent, unrestricted (“general purpose”) lanes. In Tennessee, vehicles carrying two or more people receive this designation and may travel on freeways, expressways, and other large volume roads in lanes designated for high occupancy vehicles. Motorcycles are also authorized to use these lanes.²

HOV facilities are an effective means of moving people; they encourage a significant number of commuters to ride a bus, vanpool, or carpool. This increases the average number of persons per vehicle and reduces the growth in vehicle miles of travel, which has beneficial impacts on mobility, air quality, and energy consumption. The effectiveness of HOV lanes is accomplished by altering the manner in which a roadway is designed or operated, to provide travel time advantages – both a travel time savings and a more predictable trip time – to those persons who travel in high-occupancy vehicles. The travel time advantages serve as incentives for commuters to choose to ride a bus or carpool rather than drive by themselves. These facilities offer a means for helping to address regional concerns relating to traffic congestion, air quality, and energy consumption. They are often the best means of using the limited available right-of-way. By addressing mobility needs and congestion, through limited capacity expansion, and new operational strategies that manage travel demand and improve transit, and other forms of ridesharing; the HOV lane concept is an effective approach to the efficient use of a highway facility and maintaining an acceptable level of service (LOS).³

In addition to HOV lanes as an alternative mode of transportation, Lebanon is the origination point for the Music City Star East Corridor Commuter Rail – Tennessee’s first commuter rail service. There are two rail stations located within the Lebanon city limits, one on Baddour Parkway, and another at Lebanon Road and State Route 109. This service is provided by the Regional Transit Authority (RTA) and began on September 18, 2006. The early morning train service makes stops at other stations along the route before arriving at Riverfront in downtown Nashville from Lebanon. This service is one of the only public transit opportunities offered by the city of Lebanon, as there are no local or inner city bus services currently available to residents. However, the RTA provides ride matching services for residents of Lebanon who are interested in van pooling or car pooling, and maintains a park and ride lot located on Safari Camp Road at the Highway 109 exit.

2.3 Traffic Analysis Zones (TAZs)

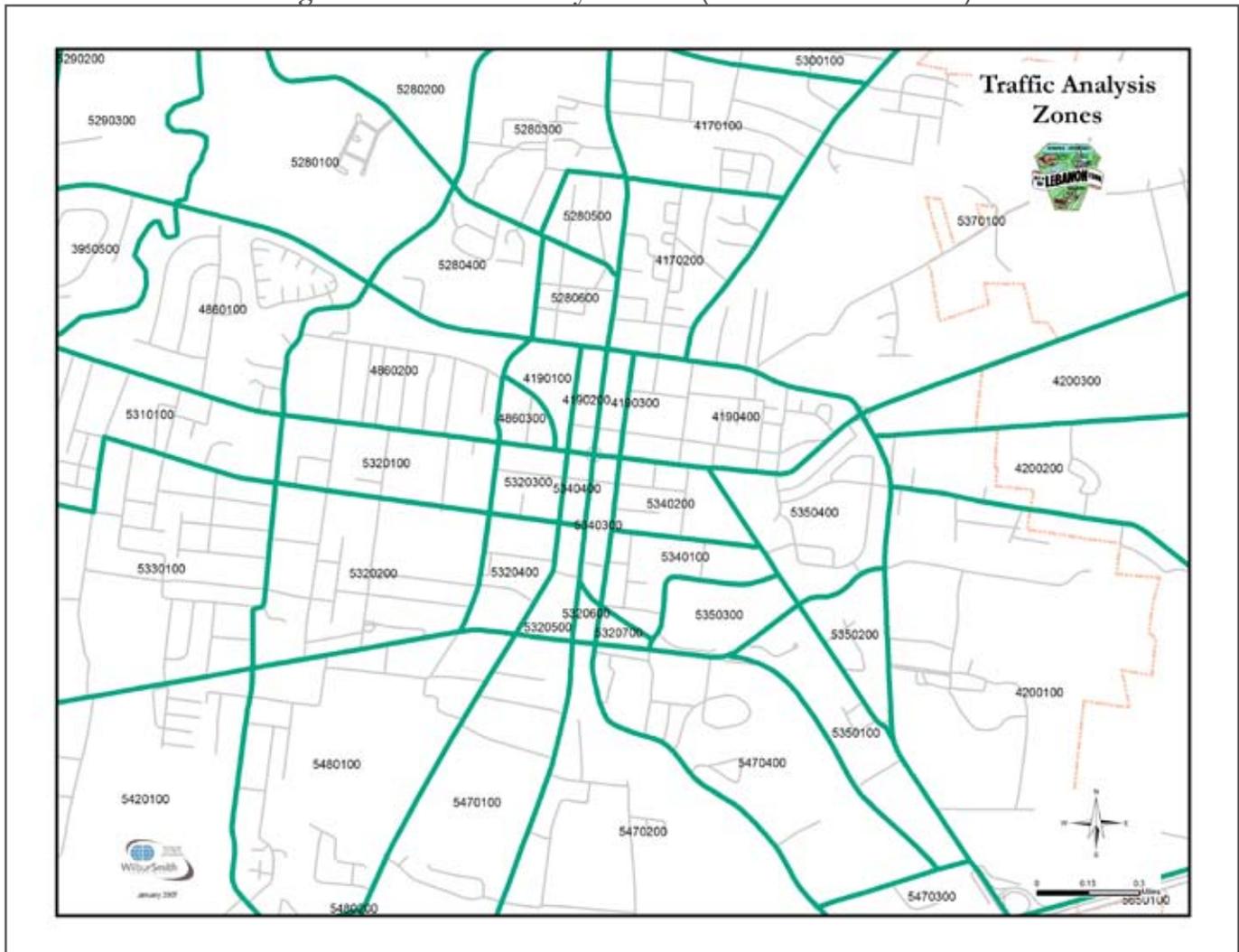
Traffic Analysis Zones (TAZs) are special areas delineated by state and/or local transportation officials for tabulating traffic-related data – especially journey-to-work and place-of-work statistics. A TAZ usually consists of one or more census blocks, block groups, or census tracts.⁴ The Nashville Area MPO travel demand model includes all of Wilson County and is responsible for delineating the TAZs for the city of Lebanon. Each TAZ represents specific population and employment data that is used to project the estimated number of trips taken to and from the TAZ. There are 88 TAZs within Lebanon’s UGB, shown in **Figure 2.2, Traffic Analysis Zones**. A closer view of the TAZs in the downtown area is shown in **Figure 2.3**.

² <http://ops.fhwa.dot.gov/freewaymgmt/publications/hov/00101628.pdf>

³ http://hovpfs.ops.fhwa.dot.gov/cfprojects/uploaded_files/HOV%20Fact%20Sheet6-16-06.pdf

⁴ http://www.census.gov/geo/www/cob/tz_metadata.html

Figure 2.3: Traffic Analysis Zone (Downtown Lebanon)

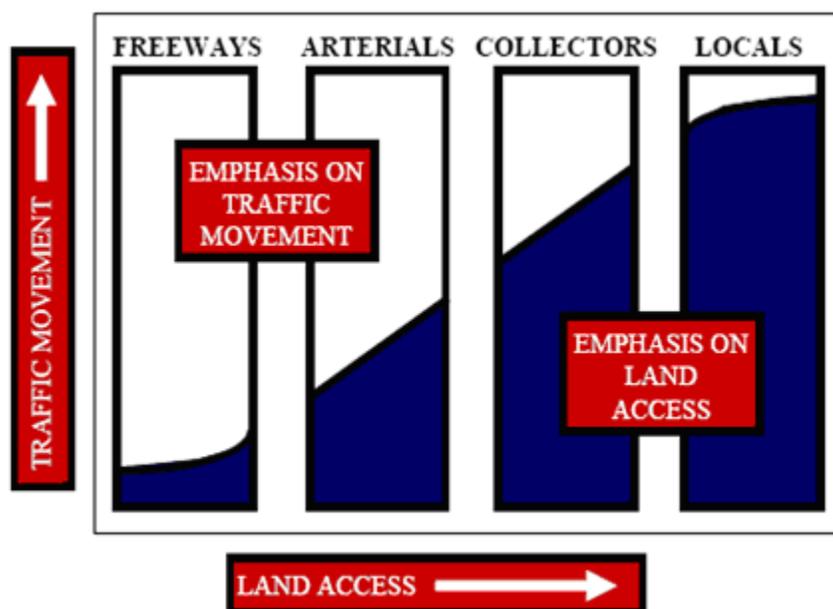


2.4 Transportation Facilities

The existing transportation facilities in the city of Lebanon are each classified according to the amount of access and mobility the roadway provides, or how it functions. According to the Federal Highway Administration (FHWA), functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. It is a hierarchical organization of streets and highways that facilitates the safe and efficient operation of vehicles along different types of facilities. It then becomes necessary to determine how travel can be channeled within the transportation network in a logical and efficient manner. Functional classification defines the nature of this channelization process by defining the part that any particular road or street should play in serving the flow of trips through a highway network.⁵

⁵ <http://www.fhwa.dot.gov/planning/ftoc.htm>

The diagram below shows schematically how various street classifications relate to each other in terms of movement and access.

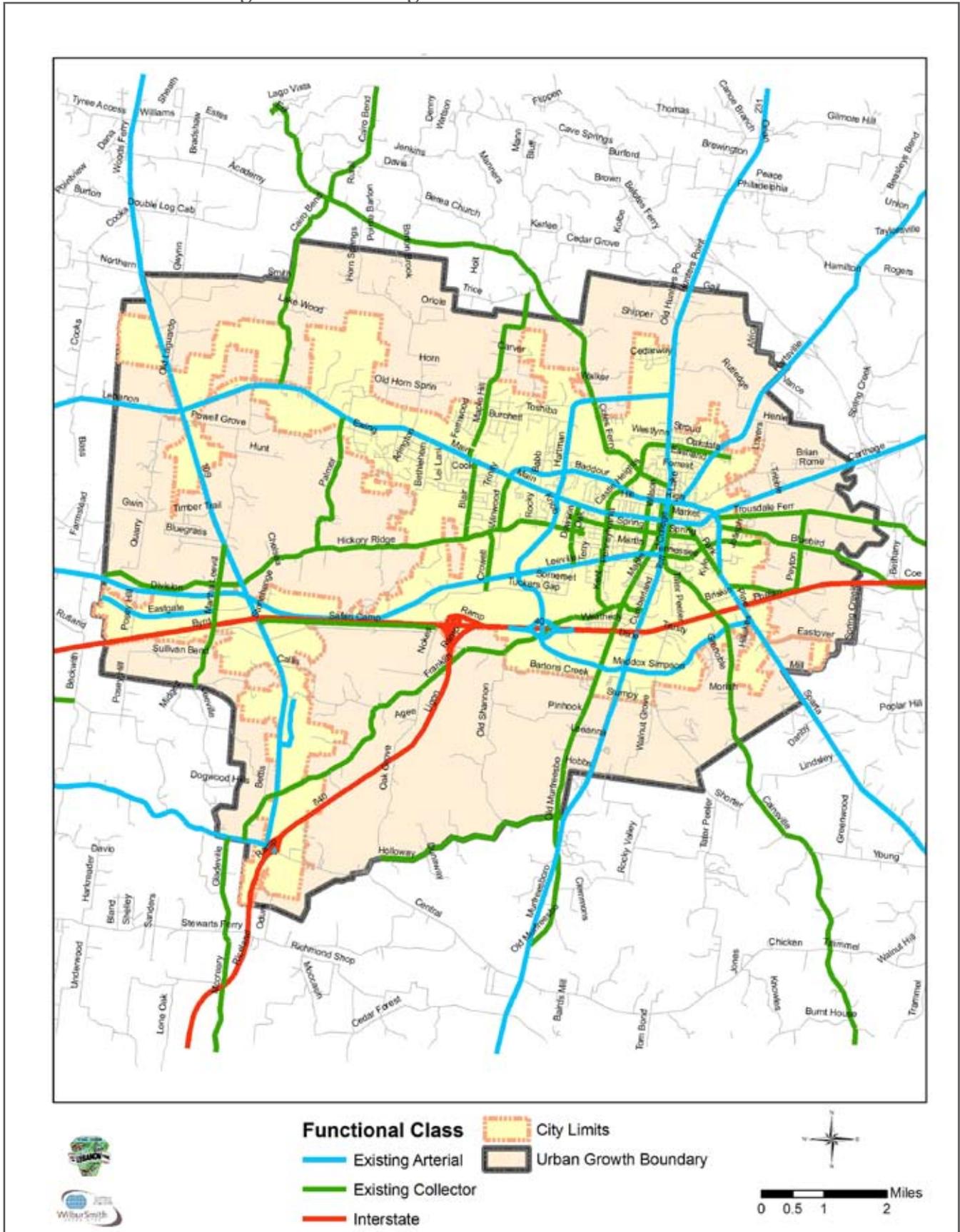


The federal functional classification of existing facilities is required in order to be eligible for federal funding under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). SAFETEA-LU states that a roadway must be “functionally classified” as a collector or higher to be eligible for federal funds designated for roadway improvement projects. SAFETEA-LU replaces the Transportation Equity Act for the 21st Century (TEA-21) that identified the planning requirements of Metropolitan Transportation Planning Organizations from 1998 to 2003. SAFETEA-LU authorizes the federal surface transportation programs for highways, highway safety, and transit for the 5-year period 2005-2009.

The functional classification of existing facilities is also significant because it specifies the desired amount of access control or locations where vehicles can enter or leave a roadway. When there is no access control, intersecting roads or driveways may connect to the mainline at any point. Typically, local roads have no access control. With partial control of access there is a minimum spacing of access locations. With full control of access, connections are only allowed at major crossroads. Full or partial control of access helps reduce traffic conflicts.⁶ **Figure 2.4** is a map of all functionally classified roadways within the study area.

⁶ <http://www.tdot.state.tn.us/sr475/glossary.htm>

Figure 2.4: Existing Functional Class Urban Growth



The city of Lebanon’s roadway classification system includes three functional classes: interstate/freeway, arterial, and collector. Roads not classified by any of these three functional classes are considered local roads. **Table 2.1** lists the classification of Lebanon’s existing facilities. This Major Thoroughfare Plan will address collectors, arterials, and interstates/freeways. To enable roadways to accomplish their intended function, the planning and design of the facilities should consider those elements that support the intended functions. Below is a description of each classification according to the FHWA.

Interstate

A divided arterial highway for through traffic, with full or partial control of access, and grade separations at major intersections. Interstate 40 and State Route 840 function as interstates in the study area. Both of these facilities are fully access controlled. While State Route 840 functions as an interstate, it is not designated as one.

Arterial

A class of roads serving major traffic movements (high-speed, high volume) for travel between major points. Arterials emphasize a high level of mobility for through movement. While they may provide access to abutting land, their primary function is to serve traffic moving through the area; therefore arterials require a much higher level of access control than collectors or local streets. Shared or cross access could be used to manage access along arterial roadways. State Route 109, US 231, Hartman Drive, Hartsville Pike, and Lebanon Road are all examples of arterials within the study area.

Collector

In rural areas, routes that serve intra-county rather than statewide travel. In urban areas, streets that provide direct access to neighborhoods and arterials. As their name suggests, collector roadways have the primary purpose of collecting traffic from local roadways and distributing it to its destination or to an arterial roadway. Collectors offer a compromise between mobility and access. Franklin Road, Hickory Ridge Road, Maple Hill Road, Carver Lane, and Castle Heights Avenue, are all classified as collectors within the study area.

As indicated in the adjacent diagram, a functional roadway system facilitates a progressive transition in the flow of traffic, from the provision of access to the provision of movement. Interstate (or Freeways) and arterial facilities primarily provide the function of moving vehicles, while collector and local streets concentrate more on providing access to property.

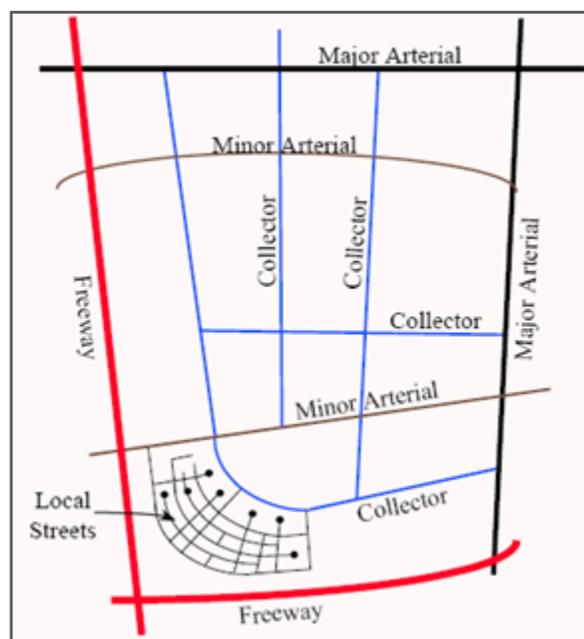


Table 2.1: Functional Classification of Existing Facilities

Road Name	From	To	Classification
Interstate 40	Eastern Boundary	Western Boundary	Interstate
Main St./Lebanon Rd./Carthage Hwy. (S.R. 24)	Eastern Boundary	Western Boundary	Arterial
Hartsville Pike (S.R. 141)	NE Boundary	High St	Arterial
Hunters Point Pk./Cumberland St./Murfreesboro Rd. (US 231)	Northern Boundary	Southern Boundary	Arterial
Baddour Pkwy./High St.	W. Main	Southern Boundary	Arterial
Hartman Drive	231 N.	231 S.	Arterial
Maddox Simpson Pkwy	Sparta Pike (S.R. 26)	231 S.	Arterial
Leeville Pike	S.R. 109	S. Hartmann	Arterial
Division Street	S.R. 109	Western Boundary	Arterial
State Route 840	Interstate 40	Interstate	Arterial
State Route 109	Northern Boundary	S.R. 840	Arterial
Central Pike	S.R. 840	Western UGB	Arterial
Eastgate Blvd	S.R. 109	Western Boundary	Arterial
Leeville Pike	S. Hartmann	231 S.	Collector
Leeville Road	S.R. 109	Growth Boundary	Collector
Franklin Road	Hartmann Dr	Growth Boundary	Collector
Trousdale Ferry Pike	Baddour Pkwy	Eastern Boundary	Collector
Bluebird Rd	Baddour Pkwy	Eastern Boundary	Collector
Peyton Rd	Trousdale Ferry	Sparta Pike	Collector
Tennessee Boulevard	231 S.	dead end	Collector
Park Avenue	E. Main St	Sparta Pike	Collector
Spring St. E.	Park Ave	College St	Collector
Spring St. W.	231 S.	Clearview St	Collector
College St / Cainsville Rd (S.R. 266)	High St	Southern Boundary	Collector
Oakdale Drive / Castle Heights Avenue	Jacquelin Drive	Franklin Rd	Collector
Dawson Lane	W. Main St	Leeville Pike	Collector
Winwood Dr	W. Main St	Hickory Ridge Rd	Collector
Crowell Ln	Hickory Ridge Rd	Tuckers Gap	Collector
Blair Lane	W. Main St	Hickory Ridge Rd	Collector
Maple St / Old Murfreesboro Rd	Baddour Pkwy	Southern Boundary	Collector
Greenwood St	Baddour Pkwy	Hobbs Ave	Collector
Holloway Dr / Franklin Rd	231 S.	Hartmann Dr	Collector
Hickory Ridge Rd	Keaton St	Growth Boundary	Collector
Coles Ferry Pike	231 N.	County Line	Collector
Maple Hill Rd	Growth Boundary	W. Main St	Collector
Palmer Rd	Main St	Hickory Ridge Rd	Collector
Cairo Bend Rd	W. Main St	Growth Boundary	Collector
Safari Camp Rd	S.R. 109	Nokes Rd	Collector

2.5 Historic Traffic Volumes

Much of Lebanon's traffic history is provided by the Tennessee Department of Transportation (TDOT). The data reflects the Average Annual Daily Traffic (AADT) count along specific locations on Lebanon's road network. The AADT counts are supplied by traffic count stations positioned along roadways throughout the area. As shown in **Figure 2.5**, TDOT provides 81 traffic counting stations that offer sufficient coverage of the study area through 2005. In addition to TDOT's 81 stations, Lebanon has traffic counting equipment which could supplement the traffic data if necessary, but were not used for this MTP. **Table 2.2** lists the specific location of each station and the respective traffic counts.

Figure 2.5: 2005 Traffic Counts

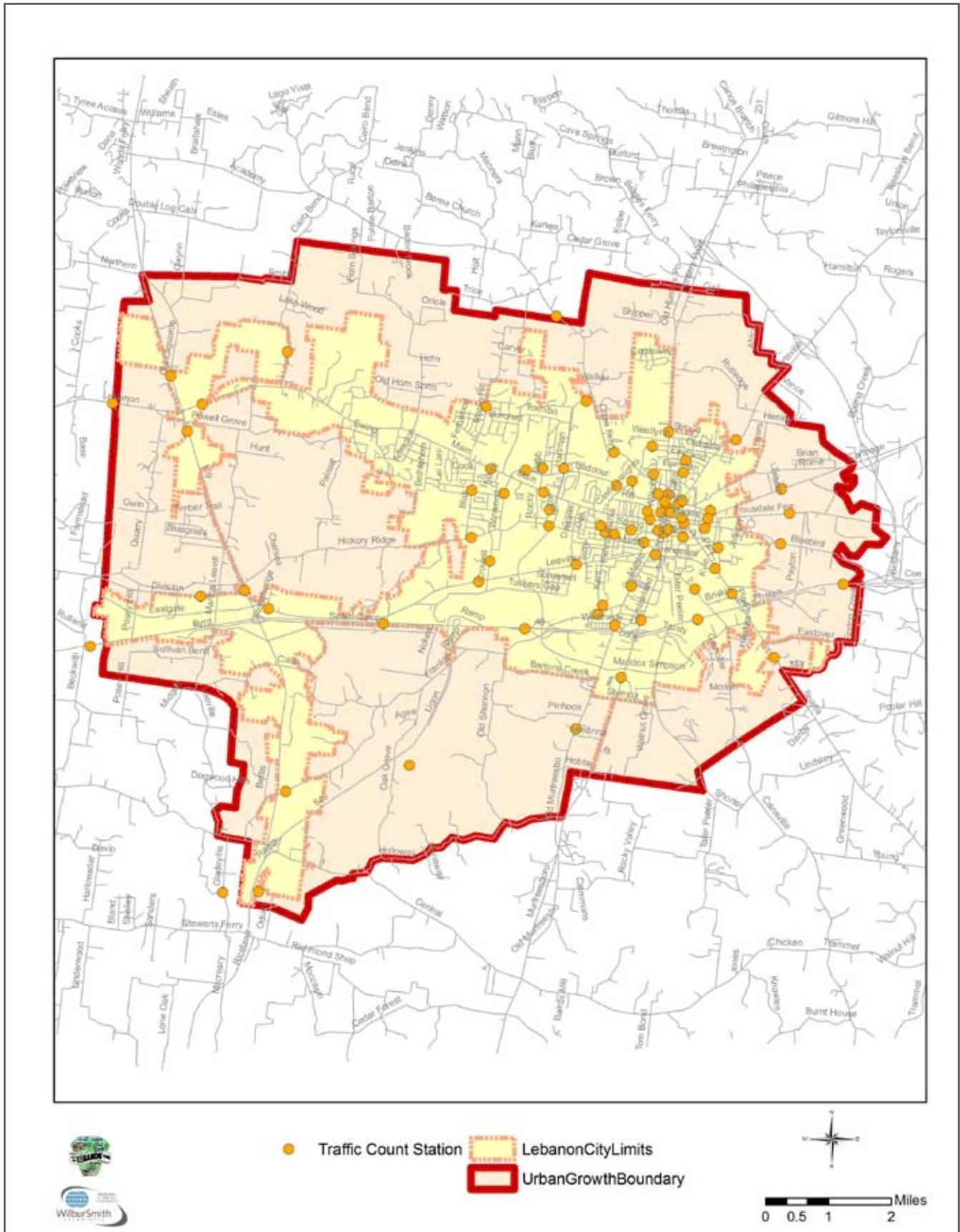


Table 2.2: 2000 - 2005 Traffic Counts

Location	2000	2001	2002	2003	2004	2005
Hwy. 109 N. Of Jct S.R. 24 and S.R.109	13,922	15,496	16,275	18,231	17,787	17,023
Cairo Bend Rd. N.E. Jct S.R. 24 and S.R.109	1,090	1,229	1,275	1,224	1,556	1,600
Maple Hill Rd. N.W. of Lebanon and S.R. 24	1,982	2,084	2,544	3,396	3,711	3,822
W. Main St. N.W. Lebanon	20,441	18,466	19,047	19,140	21,248	24,059
Hickory Ridge Rd. N.W. Lebanon	3,410	3,518	3,346	2,852	2,152	2,200
Franklin Rd. S.W. Lebanon near I-40	2,334	2,454	2,705	2,523	3,292	3,390
Leeville Pk. S.W. Lebanon	5,474	5,793	5,612	5,765	6,654	6,850
S. Maple St. S. Lebanon	3,503	3,782	3,596	3,704	3,556	3,660
S. College St. S.E. of Lebanon	3,286	3,011	3,087	3,514	3,632	3,168
Park Ave S.E. Lebanon	3,923	3,481	3,459	3,563	3,531	3,680
Coles Ferry Pk N.W. Lebanon	5,347	6,175	5,538	5,957	6,133	6,310
N. Cumberland St. N. Lebanon	11,573	11,137	10,705	11,749	12,249	12,570
Hartsville Pk N.E. Lebanon	6,241	5,957	5,608	3,113	6,308	6,416
Carthage Hwy. E. of Lebanon	5,878	6,295	6,433	6,121	6,687	6,037
Trousdale Ferry Pk. E. of Lebanon	2,354	2,384	2,120	1,832	2,064	1,969
Blue Bird Rd. E. of Lebanon	477	494	594	612	674	650
Franklin Rd. S.W. of Lebanon	646	620	629	695	708	720
Hwy. 109 N. of I-40 and S.R. 109 Jct.	15,125	17,101	19,592	22,093	20,538	18,891
E. Division St. N.W. of I-40 and S.R. 109 Jct.	2,594	2,202	2,262	2,606	3,349	3,450
S. Cumberland St. S. Lebanon	25,224	23,706	24,509	25,244	22,311	20,065
W. Baddour Pkwy W. Lebanon	11,966	12,430	12,946	13,668	10,075	10,321
E. High St. N.E. Lebanon	15,059	18,327	18,398	17,547	18,605	16,439
E. High St. E. Lebanon	12,984	14,615	15,839	15,306	15,650	14,779
S. Cumberland St. S. of Lebanon	14,694	10,150	10,196	13,785	9,932	9,622
Sparta Pk. S.E. of Lebanon	9,436	9,888	9,785	9,397	9,686	9,544
I-40 S.W. Lebanon	44,420	46,876	51,322	53,156	57,220	58,936
I-40 S. of Lebanon	45,286	46,397	44,296	49,824	49,983	52,753
W. Main St. E. of Jct. S.R. 24 and S.R.109	10,385	11,138	11,169	11,772	10,734	11,060
I-40 E. of Lebanon	34,887	37,612	40,184	44,161	38,975	42,185
York St. E. Lebanon	6,067	4,705	4,087	4,155	4,745	4,499
E. Main St. E. Central Lebanon	7,779	6,570	6,326	6,595	6,250	5,549
N. Cumberland St. N. Central Lebanon	12,451	12,440	13,518	13,924	12,520	12,828
W. Main St. W. Central Lebanon	13,230	12,190	11,671	11,721	11,232	11,197
Cedar St. E. Central Lebanon	3,184	2,909	2,780	2,797	3,169	3,260
W. Main St. W. Lebanon	17,905	18,529	15,584	19,069	17,363	17,880
Winwood Dr. W. Lebanon	4,329	4,856	5,203	4,988	3,558	3,660
Leeville Pk. S.W. of Lebanon	6,749	7,558	6,854	7,060	7,280	7,490
S. Cumberland St. South Lebanon	13,198	13,981	16,860	13,870	13,033	12,918
N. Cumberland St. N. Lebanon	14,932	14,977	15,061	15,002	15,548	16,810
W. High St. North Lebanon	19,335	18,052	16,514	15,442	14,577	13,417

Table 2.2: 2000 - 2005 Traffic Counts (continued)

Location	2000	2001	2002	2003	2004	2005
W. Baddour Pkwy N.W. Lebanon	21,412	21,099	16,550	17,048	15,325	15,659
Baddour Pkwy S.E. Lebanon	12,932	13,123	15,019	15,557	13,252	13,706
Blue Bird Rd. E. Lebanon	587	481	442	469	495	510
Hwy. 109 W. of Lebanon	14,659	16,784	17,292	19,722	18,570	16,783
Baddour Pkwy S.E. Lebanon	14,768	15,897	16,369	16,629	18,893	19,460
Leeville Pk. W. of Lebanon	5,276	5,278	5,676	5,846	4,565	4,700
Crowell Ln. S.W. of Lebanon	5,326	5,997	6,595	6,330	6,539	6,750
Old Murfreesboro Rd. S. of Lebanon	1,325	1,522	1,464	1,520	1,575	1,630
Blair Ln. W. Lebanon	2,315	2,426	2,519	2,595	2,433	2,610
Castle Heights Ave. S.W. Lebanon	4,051	4,355	4,413	4,475	3,360	3,470
W. Spring St. W. Lebanon	3,776	3,447	2,986	3,094	3,022	3,260
N. Greenwood St. W. Lebanon near CBD	2,475	2,738	2,693	2,774	3,500	3,610
N. Maple St. W. Lebanon	2,566	2,605	2,725	2,578	2,295	2,500
E. Forrest Ave. N. Lebanon	1,507	1,447	1,535	1,580	1,616	1,660
S. Maple St. S. Lebanon	3,518	4,841	4,615	4,753	3,820	3,930
N. College St. Lebanon	4,692	3,540	3,657	3,612	3,888	4,100
S. Greenwood St. Lebanon	3,339	3,409	3,492	3,577	3,033	3,170
Castle Heights Ave. S.W. Lebanon	4,396	4,559	4,458	4,665	2,707	2,810
Hickory Ridge Rd.	955	1,047	1,253	1,234	1,319	1,350
Westhill Dr.	2,643	2,382	2,666	2,648	376	390
W. Spring St.	2,788	2,688	2,591	2,423	2,187	2,250
Pennsylvania Ave.	770	826	789	889	813	840
S. College St.	5,960	5,738	5,636	6,168	5,916	5,757
S. Maple St.	5,620	5,190	5,226	5,041	4,831	4,970
Hartsville Pk. North Lebanon	6,683	6,580	6,729	7,359	7,386	7,610
Fairview Ave. Lebanon N. of S.R. 26	1,713	1,859	1,887	2,134	1,725	1,800
N. Greenwood Ext.	724	550	364	797	847	872
Oakdale Dr. E. of Cumberland	837	807	796	738	821	840
Hartman Dr.	6,683	6,713	7,298	7,838	8,743	9,000
Babb Dr.	4,019	4,301	4,563	5,074	4,316	4,450
Hartman Dr N.	3,810	4,025	4,368	4,250	4,579	4,720
S.R. 840 between I-40 and S.R. 265	11,325	13,647	10,066	11,212	12,996	13,390
S.R. 840 B\N S.R. 265 and Stewarts Ferry	11,157	14,056	16,580	18,472	20,928	19,666
Oakdale Dr.	7,884	8,550	8,559	8,693	8,759	9,020
Oakdale Dr.	8,801	9,796	9,656	10,755	10,533	10,850
I-40 West of S.R. 840	46,501	52,026	43,467	48,709	45,365	48,716
Leeville Pk.	8,551	8,276	8,420	9,214	7,961	8,200

See TDOT's website for updates to these traffic counts: <http://ww3.tdot.state.tn.us/trafficHistory/>

The table above provides just one of the tools for the analysis of congestion levels on Lebanon’s roadways for the total number of vehicles traveling in both directions; it is worthy to note a few of the roadways with the most significant volume increases since 2000. Maple Hill Road experienced the most dramatic increase in traffic volume from 2000 – 2005 with a 93 percent increase in volume, shown in **Table 2.3, Top 10 Most Significant Increases in Traffic from 2000 to 2005**. Other significant increases in traffic occurred on State Route 840, Cairo Bend Road, N. Greenwood Street, Franklin Road, and Hickory Ridge Road. Each of these roadways experienced a greater than 40 percent increase in AADT on at least one segment of the roadway from 2000 to 2005. These increases are typical for a city experiencing Lebanon’s level of growth.

Table 2.3: Top 10 Most Significant Increases In Traffic from 2001 to 2005

Location	2000	2001	2002	2003	2004	2005
Maple Hill Rd. N.W. of Lebanon and S.R. 24	1,982	2,084	2,544	3,396	3,711	3,822
S.R. 840 B\N S.R. 265 and Stewarts Ferry	11,157	14,056	16,580	18,472	20,928	19,666
Cairo Bend Rd. N.E. Jct S.R. 24 and S.R. 109	1,090	1,229	1,275	1,224	1,556	1,600
N. Greenwood St. W. Lebanon near CBD	2,475	2,738	2,693	2,774	3,500	3,610
Franklin Rd. S.W. Lebanon near I-40	2,334	2,454	2,705	2,523	3,292	3,390
Hickory Ridge Rd.	955	1,047	1,253	1,234	1,319	1,350
Blue Bird Rd. E. of Lebanon	477	494	594	612	674	650
Hartman Dr.	6,683	6,713	7,298	7,838	8,743	9,000
I-40 S.W. Lebanon	44,420	46,876	51,322	53,156	57,220	58,936
E. Division St. N.W. of I-40 & S.R. 109 Jct.	2,594	2,202	2,262	2,606	3,349	3,450

2.6 2006 Levels of Service

LOS is a qualitative measurement of roadway operation that is based on several factors – including the capacity of a roadway and the actual traffic volume for the roadway (roadway capacity is based on functional class and number of lanes). LOS utilizes a letter grade system to indicate how well a roadway operates; with letters ranging from “A” to “F” – “A” being excellent and “F” failing (see diagram to the right). LOS C is considered to be acceptable for typical roadway function, according to national roadway standards. It is typically cost prohibitive to strive for LOS A due to the fact that road construction funds are scarce. While road improvements may not always be feasible in an attempt to improve the LOS, traffic signalization is a cheaper alternative that can improve LOS; projects such as signal timing and coordination, can be effective in improving the level of service on roadways at key intersections on the transportation network. **Table 2.4** lists the daily service volumes related to level of service and **Table 2.5** provides a general description of each LOS rating.



Table 2.4: Daily Service Volumes Related to Level of Service

Road Type	LOS A	LOS B	LOS C	LOS D	LOS E
Four Lane Freeway	31,700	45,300	56,200	68,000	90,700
Two Lane Arterial Urban	6,500	9,400	11,600	14,000	18,700
Three Lane Arterial Urban	8,200	11,600	14,400	17,500	23,300
Four Lane Arterial Urban	10,700	15,400	19,000	23,000	30,700
Five Lane Arterial Urban	12,400	17,600	21,900	26,500	35,300
Two Lane Arterial Rural	8,400	12,000	14,900	18,000	24,000
Three Lane Arterial Rural	10,500	15,000	18,600	22,500	30,000
Two Lane Collector Urban	5,100	7,400	9,100	11,000	14,700
Three Lane Collector Urban	6,400	9,200	11,300	13,700	18,300
Four Lane Collector Urban	8,400	12,000	14,900	18,000	24,000
Five Lane Collector Urban	10,700	15,400	19,000	23,000	30,700
Two Lane Collector Rural	6,500	9,400	11,600	14,000	18,700
Three Lane Collector Rural	8,200	11,600	14,500	17,500	23,300

Source: Alabama DOT and Maryland SHA

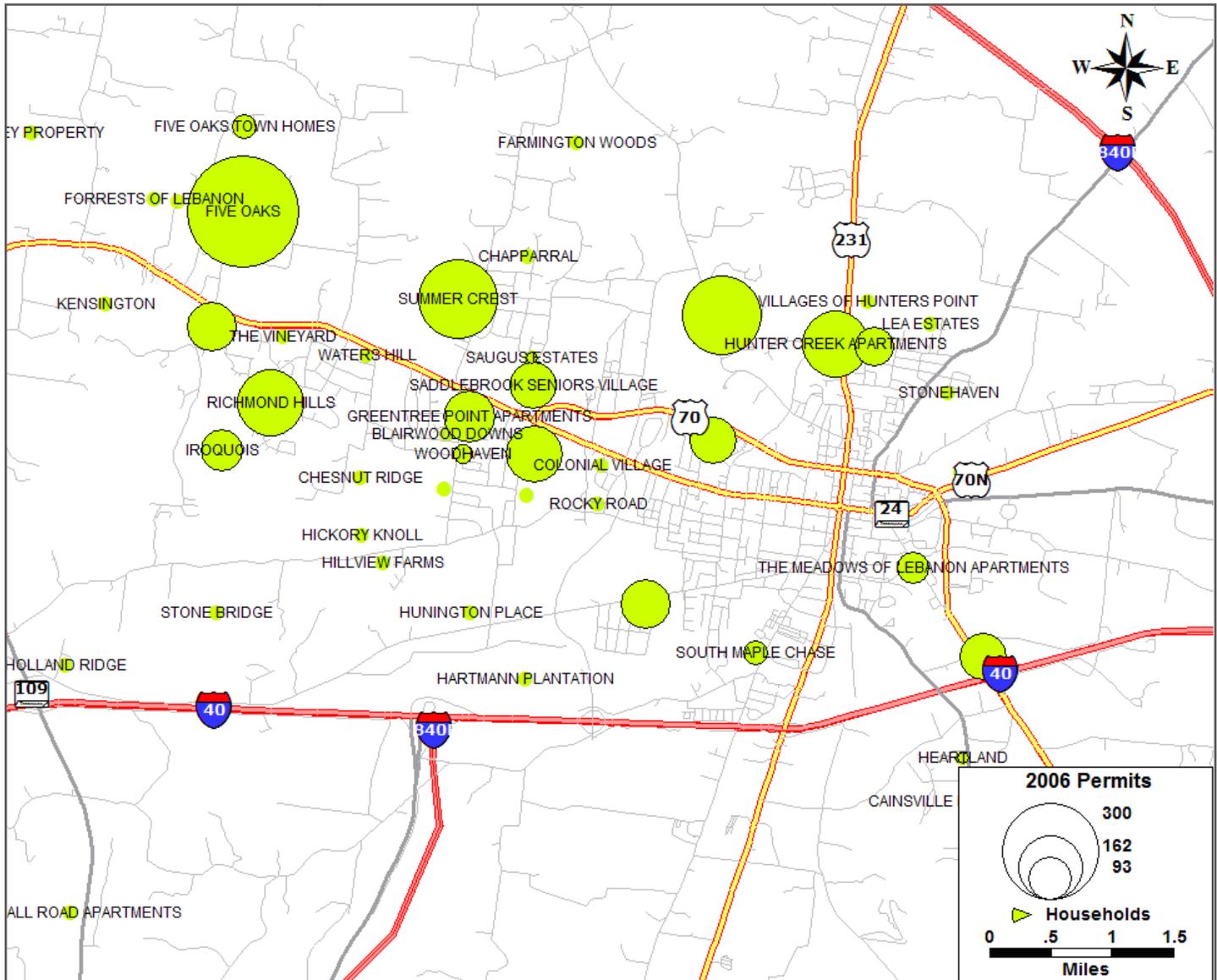
Table 2.5: LOS Description

Level of Service	Description
A	Represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high.
B	Within the range of stable flow, but the presence of others in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A.
C	Within the range of stable flow, but LOS C marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream .
D	LOS D represents high-density, but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.
E	LOS E represents operating conditions at or near capacity levels. Freedom to maneuver within the traffic stream is extremely difficult. Comfort and convenience levels are extremely poor, and driver frustration is generally high.
F	LOS F is used to define forced or breakdown flow. This condition exists when the amount of traffic approaching a point exceeds the amount which can traverse the point.

Source: Highway Capacity Manual, TRB Special Report 209

In order to determine the 2006 LOS, the Nashville Area MPO travel demand model was utilized. The model was originally calibrated for the year 2002. However, as noted in the introduction, the Lebanon area has experienced substantial increases in development since 2002. Therefore, in order to accurately reflect existing traffic patterns, the socio-economic data (population and employment) was updated by procuring building permits and employment data for the study area that developed from 2002 through 2006. **Figure 2.6** shows new housing units in the Lebanon area since 2002. More than 900 housing units have been added since 2002, which resulted in over 9,000 additional trips in the study area. With the update of the socioeconomic data, 2006 was established as the base year model for the plan.

Figure 2.6: New Developments in the Lebanon area between 2002 and 2006



Based on the updated travel demand model, the 2006 Levels of Service for Lebanon are displayed below. **Figure 2.7** reveals that under 2006 conditions, roadways function at acceptable levels of service during peak hour conditions, with only a few corridors operating at LOS D. Peak hour volume is the traffic condition during the typical rush hour periods of 6 A.M. to 9 A.M. and 3 P.M. to 6 P.M. **Figure 2.8** shows the 2006 peak hour level of service for downtown Lebanon.

Figure 2.7: 2006 Peak Hour Level of Service

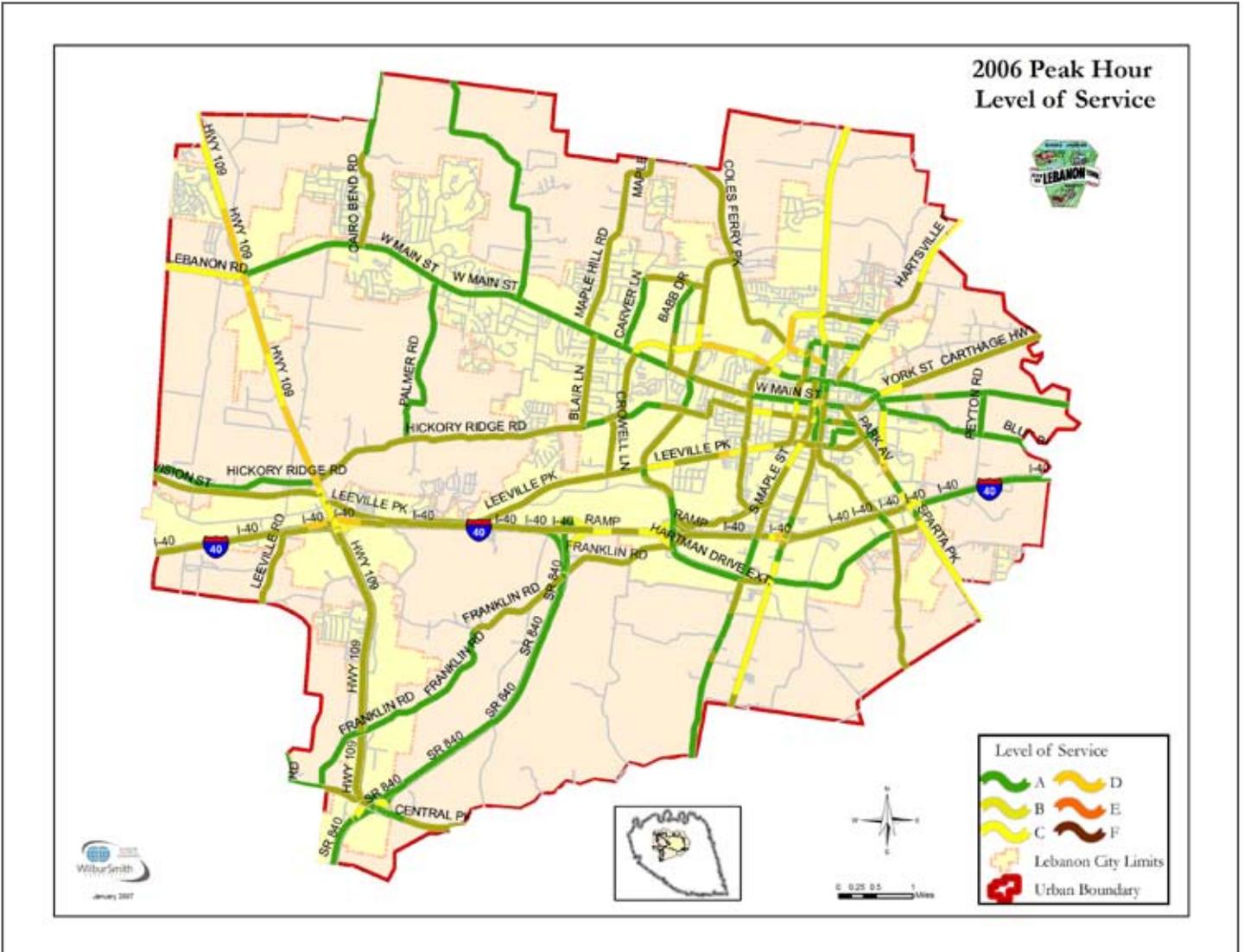


Figure 2.8: 2006 Level of Service (Downtown Lebanon)





CHAPTER THREE

Future Conditions

3.1 Existing Plus Committed (E+C) Transportation Network

The Nashville area Metropolitan Planning Organization (MPO) is a regional transportation planning organization that serves 5 counties, including Wilson County and the city of Lebanon, within the Middle Tennessee region and supervises both federal and state funding programs. The MPO maintains a Long Range Transportation Plan (LRTP) that identifies planned transportation improvements for the region over a 20 to 30 year period. The MPO also maintains a Transportation Improvement Program (TIP), which consists of committed projects, for which funding has already been allocated. **Table 3.1** summarizes the committed projects that are located within the study area.

Table 3.1 Committed (Funded) Projects

Project Location	Termini	Length (Mi)	Project Description
Maddox-Simpson Parkway	S.R. 26/U.S. 70	0.00	Relocate Maddox Simpson Pkwy., install turn lanes on S.R. 26, and install traffic signal at new intersection
S.R. 109	Division St. to South of Lebanon Pk. (S.R. 24/ U.S. 70)	2.90	Widen from two to five lanes

3.2 Analysis of the E+C Transportation Network

The E+C transportation network for the year 2030 was analyzed using the MPO travel demand model. For this analysis, the travel demand model uses projected socio-economic data (population and employment) for the year 2030 that is provided by the MPO. This data resulted in trip forecasts that were used by the travel demand model to estimate traffic conditions in the study area for the year 2030. The E+C network analysis is based on the completion of the committed projects and does not account for any other roadway or transportation improvements.

The results of the E+C travel demand model analysis are presented in **Figure 3.1**, and the results for the downtown area are presented in **Figure 3.2**. As shown, traffic operations in the area are expected to deteriorate, with traffic operations falling below acceptable levels during the peak hours on several segments of the area's major roadways. Poor peak hour LOS can be expected on segments of Castle Heights Avenue, West Baddour Parkway, Baddour Parkway, South Greenwood Street, North Maple Street, North College Street, Tennessee Boulevard, Highway 109, and various on/off ramps to Interstate 40.

Figure 3.1: 2030 Peak Hour Level of Service

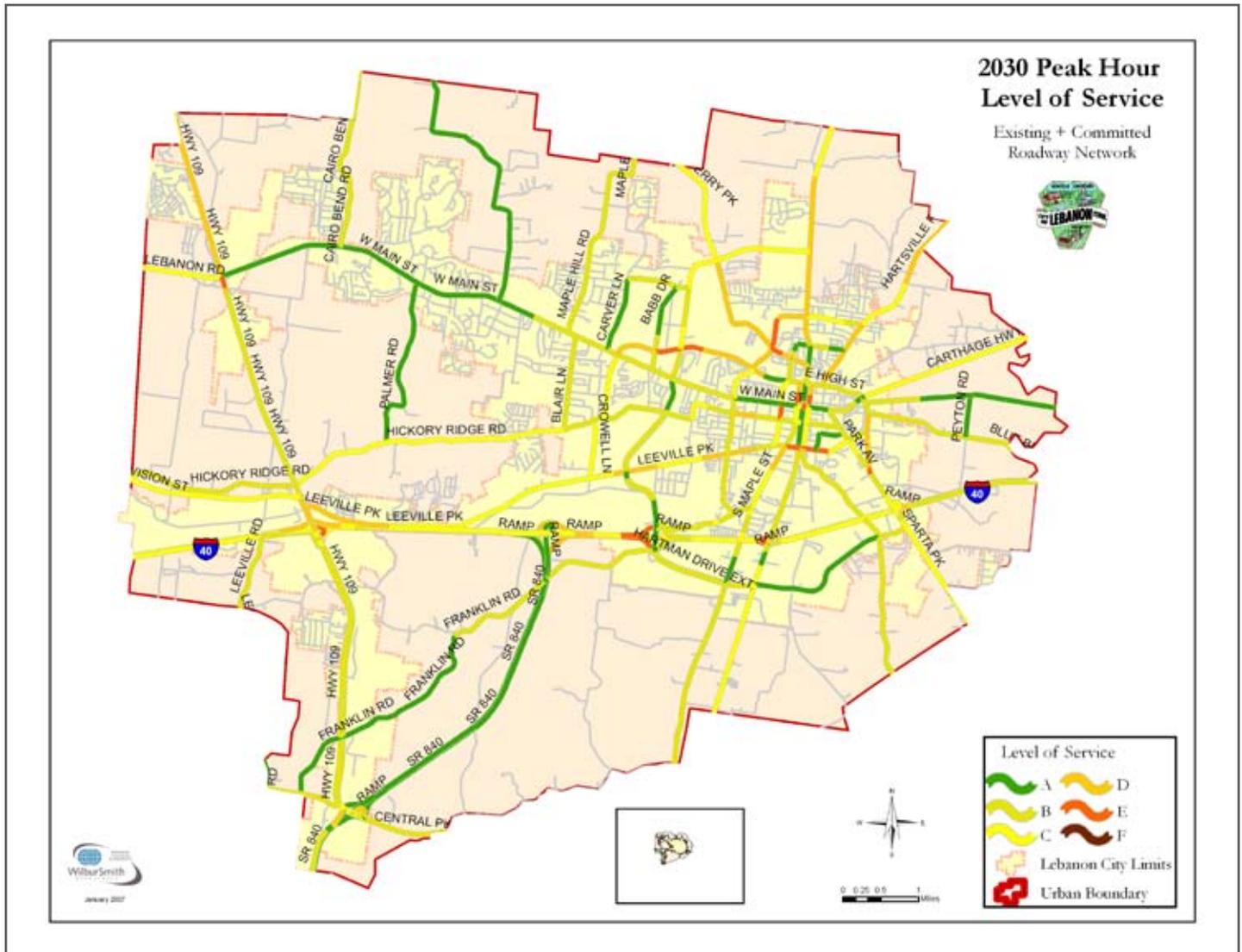


Figure 3.2: 2030 Level of Service (Downtown Lebanon)

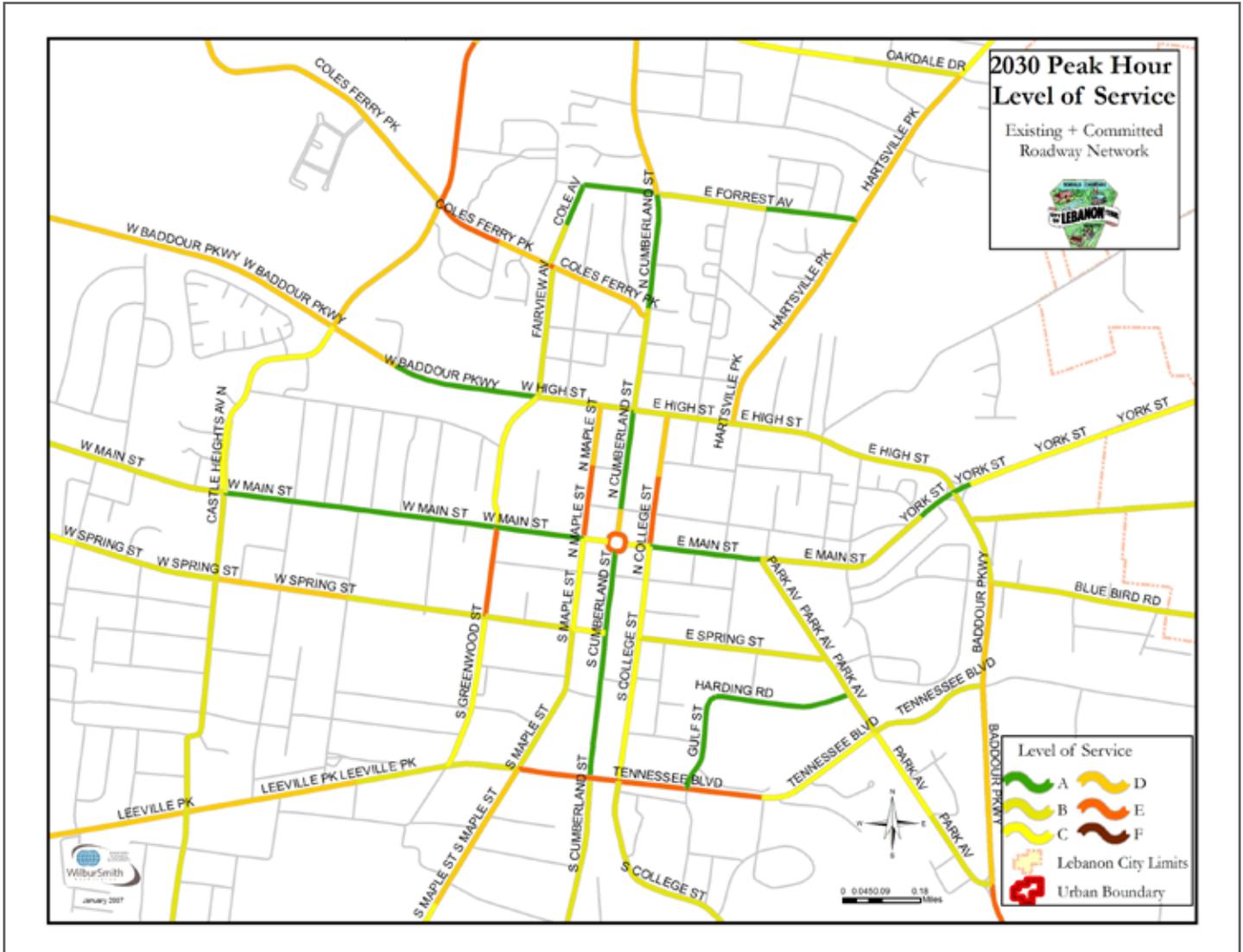


Table 3.2 shows the percentage of road miles by LOS for the base 2006 network and the E+C 2030 network. As shown, even if the committed projects are completed, the number of road miles operating at or below LOS D will increase from three percent to 10 percent. The number of road miles operating at LOS C will increase from 12 percent to 25 percent. The number of road miles operating at LOS A and B will decrease from 84 percent to 64 percent. These results show that traffic operations on the roadways, within the study area, are expected to deteriorate unless additional roadway improvements are made.

Table 3.2: Percentage of Road Miles by LOS

LOS	Base Year 2006	E+C Year 2030
A	32%	20%
B	53%	45%
C	12%	25%
D	3%	8%
E	0%	2%
F	0%	0%

3.3 Existing Plus Committed Plus Improvements (E+C+I) Transportation Network

The analysis of the E+C transportation network indicates that completion of the committed projects will not be enough to maintain acceptable traffic operations on the area's roadways in the year 2030. Additional improvements will be needed to address the area's anticipated transportation deficiencies. Specific improvements to address these deficiencies are discussed in detail in **Chapter 4: Recommendations**. The E+C+I transportation network consists of the existing roadway network, plus the completion of the committed projects, plus the completion of the additional improvements that are identified in Chapter 4.

3.4 Analysis of the E+C+I Transportation Network

The travel demand model was used to evaluate the E+C+I transportation network, and, in particular, to evaluate the proposed improvement projects. The results of the E+C+I travel demand model analysis are presented in **Figure 3.3**, and the results for the downtown area are presented in **Figure 3.4**. As shown, with the completion of the recommended improvements, almost all of the area's roadways will operate at an acceptable LOS during the peak hours. The only roadway segments that are expected to operate at LOS D during the peak hours consist of a short segment of Main Street in the downtown area and a few of the on/off ramps to Interstate 40.

Figure 3.3: Proposed Improvements

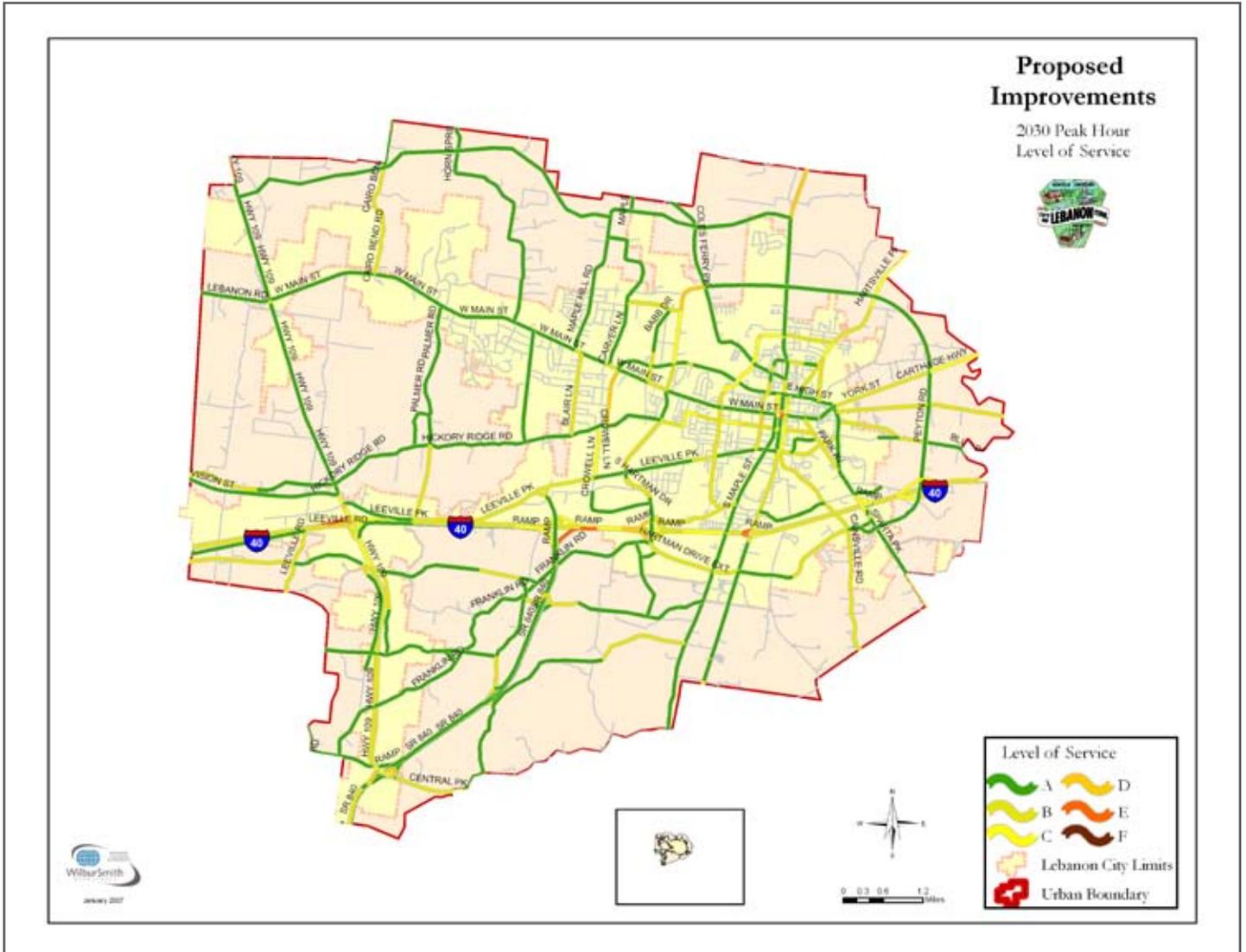


Figure 3.4 Proposed Improvements (Downtown Lebanon)

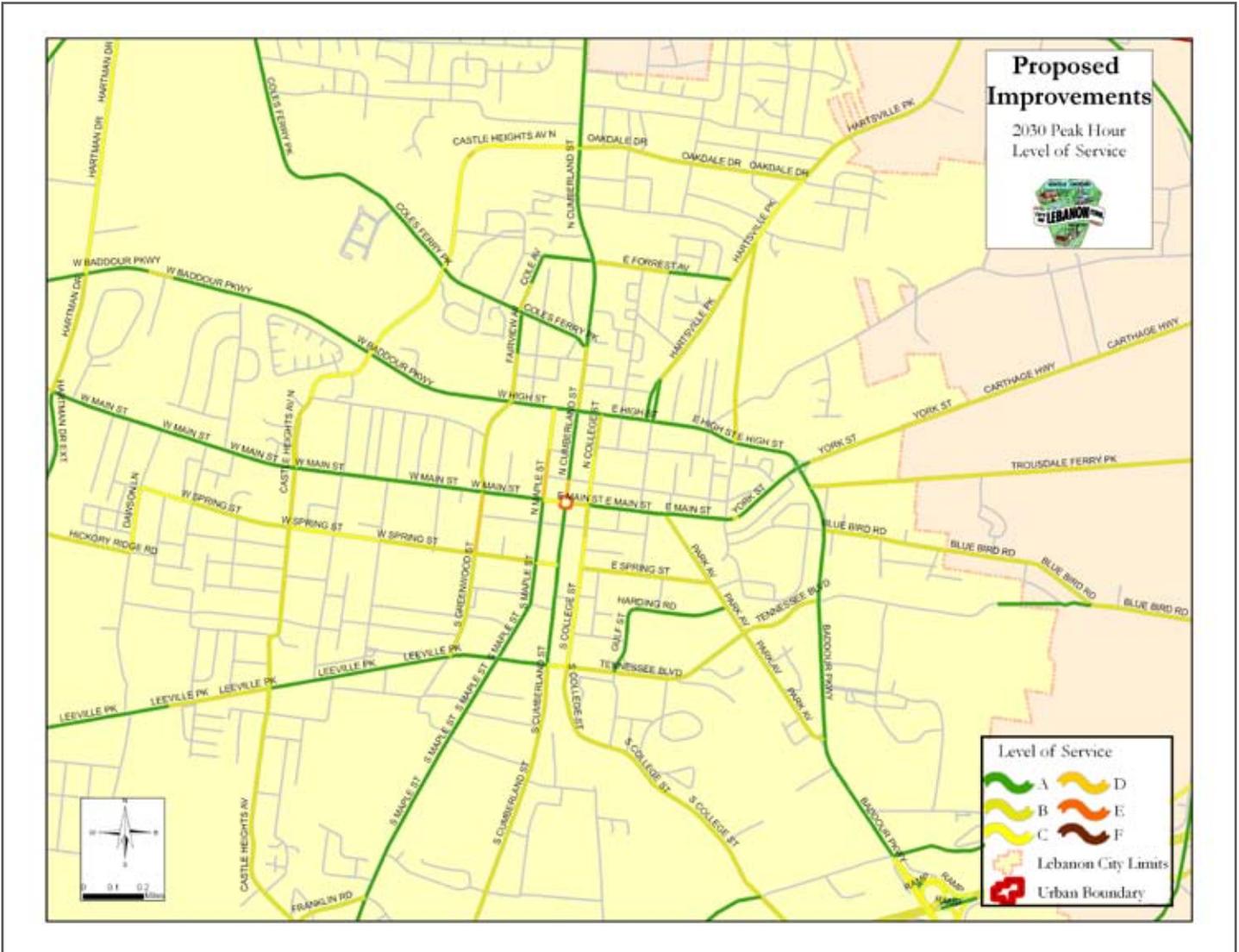


Table 3.3 shows the percentage of road miles by LOS for the E+C 2030 network and the E+C+I 2030 network. As shown, if the recommended improvements are made, very minimal road mileage will operate below LOS D (approximately 1 percent), and the number of road miles operating at LOS D will decrease from 8 percent to 3 percent. The number of road miles operating at LOS C will decrease from 25 percent to 12 percent. The number of road miles operating at LOS A and B will increase from 65 percent to 84 percent. These results show that the recommended roadway improvements will significantly improve traffic operations on the roadways within the study area.

Table 3.3: Percentage of Road Miles by LOS for E+C+I Network

LOS	E+C YEAR 2030	E+C+I YEAR 2030
A	20%	46%
B	45%	38%
C	25%	12%
D	8%	3%
E	2%	0.7%
F	0%	0.3%



CHAPTER FOUR

Recommendations

4.1 Current Transportation Initiatives

As previously mentioned, the city of Lebanon is a member of the Nashville Area Metropolitan Planning Organization (MPO) - a regional transportation planning body made up of city and county governments in the five county region (Davidson, Rutherford, Sumner, Williamson, and Wilson Counties). The MPO is a federally mandated transportation planning organization that produces the region's Long Range Transportation Plan (LRTP). The LRTP is a plan for all regionally significant transportation-related projects, including transit and roadway projects that should be implemented within a 20 to 30 year time frame. The plan is based on several factors, including projected population and employment growth, funding availability, mobility-related air quality requirements, and project necessity (e.g., traffic congestion).

In the fall of 2005, the MPO's 2030 Long Range Transportation Plan was adopted by the MPO Executive Board, which is made up of elected officials from the MPO member jurisdictions discussed in the previous paragraph. Table 4.1 lists the transportation projects that are proposed as part of the adopted LRTP that will have a significant impact on the Lebanon transportation system.

The LRTP details a list of all the projects proposed for completion in the MPO region by the year 2030. Projects in the 2030 LRTP are divided into three groups:

- 1) Short-term needs – proposed for completion by 2016
- 2) Mid-term needs – proposed for completion by 2025
- 3) Long-term needs – proposed for completion by 2030

In order for a project to be included in the Transportation Improvement Program (TIP), and thus eligible for funding, it must appear in the short-term list of projects in the LRTP.

The TIP lists the projects selected for funding and implementation during the next four years from the LRTP. The TIP provides the opportunity to select projects to implement the transportation planning goals expressed in the region's adopted LRTP.

Table 4.1: MPO Proposed Projects

Location	Termini From	Termini To	Distance	Functional Class	Recommendation
S.R. 109	Division St.	S. of Lebanon Pk. (S.R. 24/U.S. 70)	2.9	Arterial	Widen from two to five lanes, including center turn lane
S.R. 26	I-40	S.R. 24	1.6	Arterial	Widen from three to five lanes including shoulders
Baddour Parkway (S.R. 26)	S.R. 24	Fairview Rd.	1.1	Arterial	Widen from three to five lanes including shoulders
S.R. 26_2	Fairview Rd.	S.R. 24	2.50	Arterial	Widen from four to five lanes and provide left and right turn lanes at intersections
S.R. 141 (Hartsville Pike)	S.R. 26	N. of Lealand Ln.	1.80	Arterial	Relocate S.R. 141 and add traffic signal
Interstate 40	S.R. 840	U.S. 70	5.00	Interstate	Add HOV lanes
S.R. 24/U.S. 70	Castle Heights Ave.		0.00	Arterial	Intersection realignment and signal improvement
U.S. 231 North (Cumberland)	S.R. 26	City Limits	2.64	Arterial	Widen from two to five lanes including shoulders
S.R. 10 (U.S. 231)	I-40	Walnut Grove Rd.	2.10	Arterial	Widen from two to five lanes, including center turn lane

4.2 Recommended Improvements

This section identifies the roadway improvements recommended as part of the Lebanon Major Thoroughfare Plan. The recommended set of improvements is the result of public input and technical analysis performed during the major thoroughfare planning process. The recommended projects are based on road construction costs, available funding, and some improvements being constructed by developers. Future improvements also consider important issues such as connectivity and land use. Interconnectivity aids in traffic congestion relief by providing alternate routes to drivers and pedestrians, while land use impacts development patterns and infrastructure.

Connectivity is emphasized through the recommended improvements presented in this Major Thoroughfare Plan. It is important to note that the city of Lebanon intends to provide interconnected neighborhoods; therefore, stub streets may be required to facilitate connectivity in the future. When a street stubs to a property line (either as a stub or a temporary cul de sac) such street is intended to be extended through the adjacent property. This is not illustrated in the project descriptions below, but should be used as a guiding principle for future development.

Another guiding principle for future development involves the role of the development community in creating an interconnected roadway network in the city of Lebanon. Developers should be viewed as part of the solution to funding improvements to the city's transportation system. The development community should be expected to participate in constructing road projects whenever developing property adjacent to or containing transportation

improvements shown in this Major Thoroughfare Plan – regardless of priority assigned to the projects in this planning document.

Land use also impacted the recommended roadway improvements presented in this document. As mentioned in section 1.2, Transportation and Future Land Use Plan Coordination, coordinating land use and transportation decisions are important to ensuring orderly growth and development. Recommended future roadway extensions, new alignments, and the location and design of major intersections will influence future development patterns across Lebanon. Coordinating transportation projects with the desired land use patterns, stated in the Future Land Use Plan, help ensure the efficient use of infrastructure such as roads, bridges, and municipal services, while reducing the impact on the environment.

There are several recommended improvements and recommended new alignments that are influenced by existing and future land uses. For instance, project number 9, Sullivan Bend Extension Two from Sullivan Bend Extension One to State Route 840 U.S. 231 Connector, offers a connection from State Route 109 East to Franklin Road. The proposed roadway would provide an east-west connection between State Route 109 and State Route 840 from Interstate 40. Although it is almost entirely surrounded by rural countryside, this area is recommended to develop as Commercial, Commercial/Office, and Residential Mixed Use as it grows, which would possibly be stimulated by the future extension. This extension will likely be funded and built by private developers as development occurs.

Project number 6 State Route 840 Extension, from State Route 840 terminus at Interstate 40 to Leeville Pike, would provide much needed access to/from State Route 840 and Interstate 40, while creating an opportunity to develop the Commercial/Office, Commercial, Medium Density Residential, and Residential Mixed Use recommended by the Future Land Use Plan. Project number 44, Leeville Pike Widening from State Route 109 to the State Route 840 Extension, was also recommended as a result of the proposed Commercial/Office in the vicinity of the terminus of the State Route 840 extension. This project will increase the capacity along Leeville Pike from State Route 840 West to State Route 109.

These projects are just a few examples of integrating existing and future land use, and transportation planning. Types of land uses and its intensity, impact traffic demands and patterns. By taking a holistic approach to planning the transportation network, and considering the effects of transportation on development, Lebanon will be able to effectively continue to coordinate land use and transportation decisions.

The Lebanon MTP includes 44 projects; ranging from major reconstruction of existing routes, re-alignment of existing routes, and new connections to new roads. The list of projects, including the MPO's LRTP projects, is identified in **Table 4.2**, including general locations within the planning area and recommended improvements. The projects listed in Table 4.2 are illustrated in **Figure 4.1**. In addition, a project summary sheet is included for each of the identified improvements. The project summaries include a project description, cost estimate, priority, and supporting graphics. Cost estimates are prepared in an effort to assist in long range budget/capital improvement project planning. The opinion of probable cost for each recommended project, with the exception of MPO LRTP projects, was developed using the Tennessee Department of Transportation's (TDOT) planning level cost estimating methodology - the cost of Right of Way (ROW) plus the cost of construction.

The TDOT cost estimating methodology assumes the base per mile ROW cost at \$845,000, and the base per mile construction cost at \$2,684,000. The area, terrain, and construction factors are also provided in the TDOT methodology. The cost of ROW is figured by multiplying the ROW cost per mile, area factor, terrain factor, and distance of recommended improvement. The construction cost is determined by multiplying the construction cost per mile, terrain factor, construction factor, and distance, resulting in the formula below.

$(\text{ROW Cost per Mile} \times \text{Area Factor} \times \text{Terrain Factor} \times \text{Distance}) + (\text{Construction Cost per Mile} \times \text{Terrain Factor} \times \text{Construction Factor} \times \text{Distance}) = \text{Opinion of Probable Cost}$

The construction factor is based on the number of lanes that will need to be built, while the terrain factor adjusts the costs of construction based on the topography of the location. For example, the factor is higher for rugged terrain, since it is more costly to develop on steep topography.

Table 4.2 Proposed Projects

Lebanon Major Thoroughfare Plan Project List							
Location		Termini From	Termini To	Distance	Functional Class	Recommendation	TOTAL
1	Hickory Ridge Road Improvements	Hwy. 109	Hartmann Drive	5.18	Collector	Reconstruct three lane	\$28,031,959
2	Bethlehem Road Extension	West Main St.	Hickory Ridge Rd.	1.68	Collector	New two lane/ reconstruct two lane	\$9,091,446
3	Hickory Ridge Road Connector	Safari Camp Rd.	U.S. 70	3.38+ Bridge	Collector	New two lane/ reconstruct two lane	\$26,070,095
4	Carver Lane Improvements	U.S. 70	Maple Hill Rd.	2.49	Collector	Reconstruct three lane	\$13,706,828
5	Maple Hill Road Improvements	U.S. 70	UGB	2.70	Collector	Reconstruct three lane	\$14,862,825
6	S.R. 840 Extension	S.R. 840 terminus at I-40	Leeville Pk.	0.6	Interstate	New four lane interstate	\$6,304,440
7	Interstate 40 Frontage Road	Hwy. 109	Beckwith Rd.	3.02	Collector	Reconstruct three lane	\$8,000,000
8	Sullivan Bend Extension One	Posey Hill Rd.	Bettis Rd.	3.85	Collector	New two lane/ reconstruct two lane	\$13,586,650
9	Sullivan Bend Extension Two	Sullivan Bend Ext. 1	S.R. 840 U.S. 231 Connector	2.84	Collector	New two lane	\$13,029,068
10	Industrial Connector	Leeville Rd.	Oak Grove Rd.	3.11	Collector	New two lane	\$14,267,747
11	S.R. 840 Interchange at Oak Grove Rd.	S.R. 840	S.R. 840	N/A	Interchange	New interchange	\$12,500,000
12	Leeanna Lane Extention	Old Murfreesboro Rd.	Oak Grove Rd.	3.26	Collector	New two lane	\$14,955,902
13	S.R. 840 U.S. 231 Connector	Oak Grove Rd.	Stumpy Ln.	3.02	Collector	New two lane	\$12,571,505
14	S.R. 840 Interchange at S.R. 840/U.S. 231 Connector	S.R. 840	S.R. 840	N/A	Interchange	New interchange	\$12,500,000

Lebanon Major Thoroughfare Plan Project List

Location		Termini From	Termini To	Distance	Functional Class	Recommendation	TOTAL
15	Industrial Connector/Sullivan Bend Extension Two Connector	Industrial Connector	Sullivan Bend Ext. 2	1.27	Arterial	New two lane	\$6,872,700
16	Franklin Road Connector	Franklin Rd.	S.R. 840 U.S. 231 Connector	1.20	Collector	New two lane	\$4,234,800
17	Franklin Road Connector to Hartmann Drive	Hartmann Drive Ext.	Franklin Rd. Connector	0.23	Collector	New two lane	\$811,670
18	Old Murfreesboro Road	W. Main St.	Hobbs Lane	4.24	Collector	Reconstruct three lane	\$28,714,340
19	Holloway Drive Extension	S. Cumberland St.	S. College St.	1.06	Collector	New two lane	\$4,412,515
20	Briskin Lane Extension	Baddour Pkwy	Peyton Rd.	0.43	Collector	New two lane	\$1,789,983
21	Hartmann Drive Extension One	U.S. 231	Hartsville Pk.	1.33	Arterial	New four lane	\$11,838,031
22	Hartmann Drive Extension Two	Hartsville Pk.	Cainsville Road	4.68	Arterial	New four lane	\$102,589,012
23	Maple Hill Connector	Hwy. 109	Hunters Point Pk	9.00	Collector	New two lane	\$41,289,300
24	McGregor Street Extension	E. High St.	Hartsville Pk.	0.68	Collector	New two lane	\$3,692,570
25	Blue Bird Road Extension	Blue Bird Rd.	Tennessee Blvd.	0.32	Collector	New two lane/ reconstruct two lane	\$1,129,280
26	Interstate 40 Interchange at Peyton Road	I-40	I-40	N/A	Interstate	New interchange	\$16,000,000
27	Safari Camp Road Improvements	Hwy. 109	Nokes Rd.	2.82	Collector	Reconstruct three lane	\$20,180,414
28	S.R. 109	Division St.	S. of Lebanon Pk. (S.R. 24/U.S. 70)	2.90	Arterial	Widen from two to five lanes, including center turn lane	\$18,800,000
29	S.R. 26	I-40	S.R. 24	1.60	Arterial	Widen from three to five lanes including shoulders	\$6,490,000

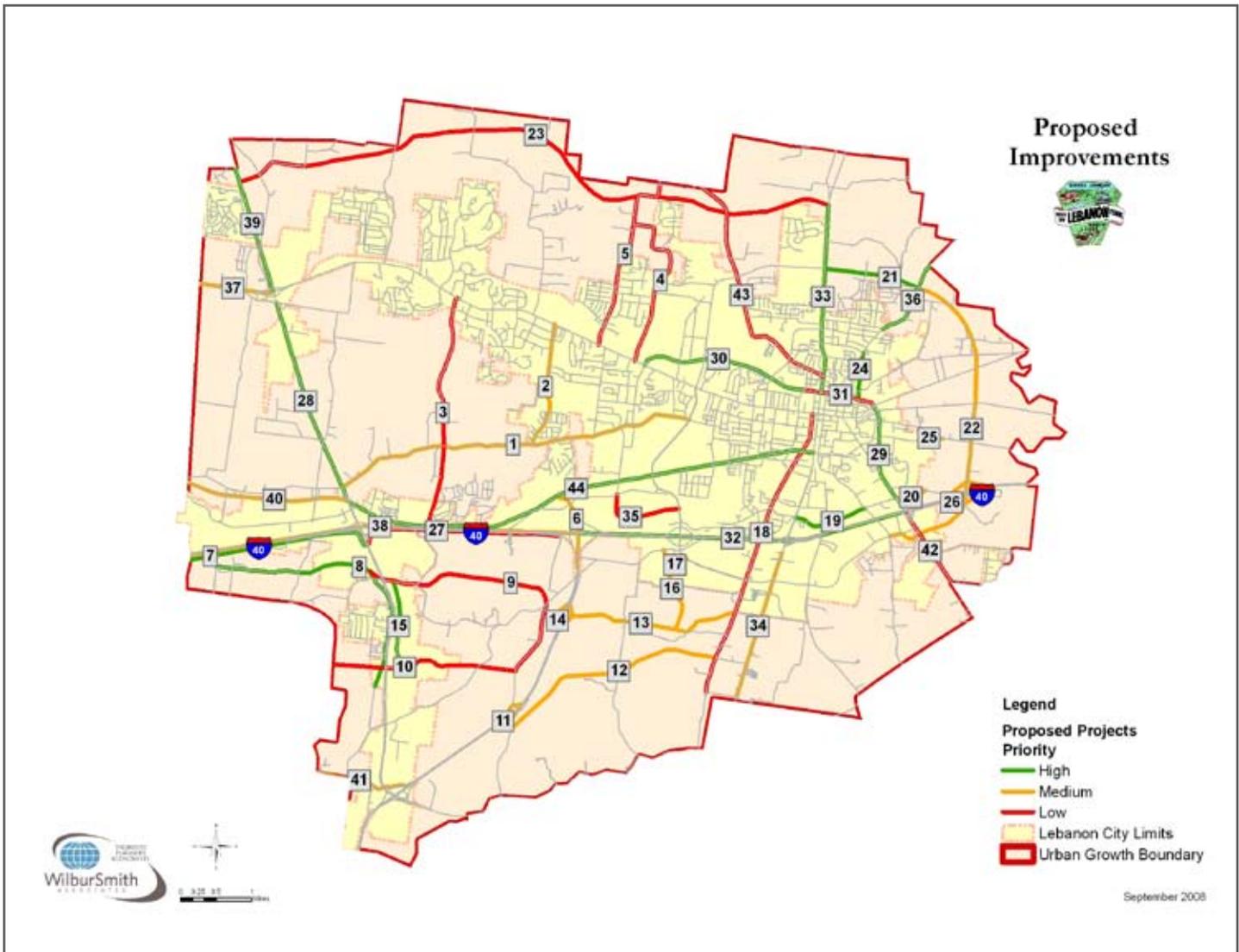
Lebanon Major Thoroughfare Plan Project List

Location		Termini From	Termini To	Distance	Functional Class	Recommendation	TOTAL
30	Baddour Parkway (S.R. 26)	S.R. 24	Fairview Rd.	1.10	Arterial	Widen from three to five lanes including shoulders	\$3,250,000
31	S.R. 26_2	Fairview Rd.	S.R. 24	2.50	Arterial	Widen from four to five lanes and provide left and right turn lanes at intersections	\$9,300,000
32	Interstate 40 (East)	S.R. 840	U.S. 70	5.00	Interstate	Add HOV lanes	\$18,774,250
33	U.S. 231 (Cumberland)	S.R. 26	City Limits	2.66	Arterial	Widen from two to five lanes including shoulders	\$5,520,000
34	S.R. 10 (U.S. 231)	I-40	Walnut Grove Rd.	2.10	Arterial	Widen from two to five lanes, including center turn lane	\$12,100,000
35	Crowell Lane Extention	Tuckers Gap	Hartmann Dr.	2.12	Collector	New two lane	\$7,481,480
36	S.R. 141	Hartman Dr. Ext.	Trousdale Co. line	7.10	Arterial	Reconstruct two lane roadway and reserve ROW for future four lane roadway	\$20,215,000
37	Lebanon Pike (S.R. 24/U.S. 70)	E. of Cedar Creek	S.R. 109	4.20	Arterial	Widen from two to four lanes - includes cost for adding bike route facilities	\$15,652,500
38	Interstate 40	E. of Mt. Juliet Rd.	S.R. 840	9.00	Interstate	Add HOV lanes	\$66,300,000
39	S.R. 109	U.S. 70	Bridge over the Cumberland River	10.60	Arterial	Widen from two to five lanes including center turn lane	\$26,320,000
40	East Division Street	S.R. 171	S.R. 109	6.40	Collector	Widen from two to three lane sections - purchase ROW for 4/5 lanes	\$9,100,000
41	Central Pike (S.R. 265)	S.R. 171	S.R. 840	7.00	Collector	Widen from two to five lanes, including center turn lane	\$19,320,000

Lebanon Major Thoroughfare Plan Project List

Location		Termini From	Termini To	Distance	Functional Class	Recommendation	TOTAL
42	S.R. 26/U.S. 70	I-40	Dekalb Co. line	15.10	Arterial	Rebuild to 12'lanes, provide center turn lane through Watertown	\$36,800,000
43	Coles Ferry Pike/ Academy Road	S.R. 10	S.R. 109	11.00	Collector	Widen from three to five lanes	\$26,720,000
44	Leeville Pike Widening	S.R. 109	S. Cumberland St.	6.81	Arterial	Widen from two to four lanes	\$36,852,826
TOTAL							\$782,029,134

Figure 4.1: Proposed Project Locations



The following are project summaries that further describe each proposed roadway improvement, including the project's location, termini, length, priority ranking, estimated cost, and a brief summary of the project. It is important to note that cost estimates are based on TDOT's cost estimating methodology, described above, and are subject to change based on the many variables involved in calculating project costs. In addition, the city of Lebanon only has jurisdiction over the area within its city limits, and possibly the urban growth boundary (through the annexation process), however, this does not always make logical sense for the alignment of proposed projects. For this reason, proposed roadways will be shown outside of Lebanon's city limits only to represent connectivity with outlying areas. Alignments outside of the city limits are for illustration purposes and are included in the cost estimate.

Project prioritization is based on technical analysis of roadway connectivity, congestion, capacity issues, land uses, etc., and is subject to change based on traffic patterns or land uses. Each project is assigned a priority level of high, medium, or low based on the aforementioned criteria. It is intended to assist with the prioritization of funding. As some projects will be developer-driven and constructed, the prioritization does not have an impact on projects proposed by developers. Developers are responsible for dedication of right of way and construction of a project regardless of the project's priority ranking.

Finally, the 2030 travel demand model assumes certain natural increases in traffic resulting from factors such as increases in population, employment, and commuter traffic. The travel demand model also assumes that all proposed roadways will be built by the year 2030. However, constructing all improvements is unlikely; therefore, the model represents the best case scenario. Instances of worsening 2030 levels of service, as a result of a recommended project, may be explained by these same natural increases in traffic that result from the factors previously listed.

Project 1: Hickory Ridge Road Improvements

Project Location

Termini: From State Route 109 to Hartmann Drive

Length: 5.18 miles

Description: Widen from two to three lanes

Priority: Medium

Estimated Cost: \$28,031,959

Project Summary

Widening Hickory Ridge Road from two to three lanes will improve this east-west connection to State Route 109 from Hartmann Drive to address the community's desire for increased east-west connectivity in this area. Improvements to the existing 2-lane collector would help alleviate traffic to/from State Route 109. Hickory Ridge Road runs through Lebanon's existing rural landscape and the proposed Low Density Residential, Residential Mixed Use, and Commercial future land uses. This connector is expected to operate at LOS A in 2030.



Project 2: Bethlehem Road Extension

Project Location

Termini: *From West Main Street to Hickory Ridge Road*

Length: *1.68 miles*

Description: *Reconstruct 2-lane/New 2-lane Collector*

Priority: *Medium*

Estimated Cost: **\$9,091,446**

Project Summary

The proposed 2-lane collector includes portions of the existing Bethlehem Road and extends approximately .8 miles from the existing 2-lane road to connect to Hickory Ridge Road. Existing Bethlehem Road will be upgraded to meet collector design standards as established in this document. The extension will create a north-south connection between West Main Street and Hickory Ridge Road. The Bethlehem Road Extension is approximately .75 miles from Blair Lane and 3.5 miles from State Route 109. It is situated in medium to light density residential and rural land uses. These land uses are recommended for Low and Medium Density Residential in the Future Land Use Plan. With the new proposed extension, Bethlehem Road is expected to operate at LOS A in 2030.



Project 3: Hickory Ridge Road Connector

Project Location

Termini: From Safari Camp Road to Hickory Ridge Road

Length: 3.38 miles

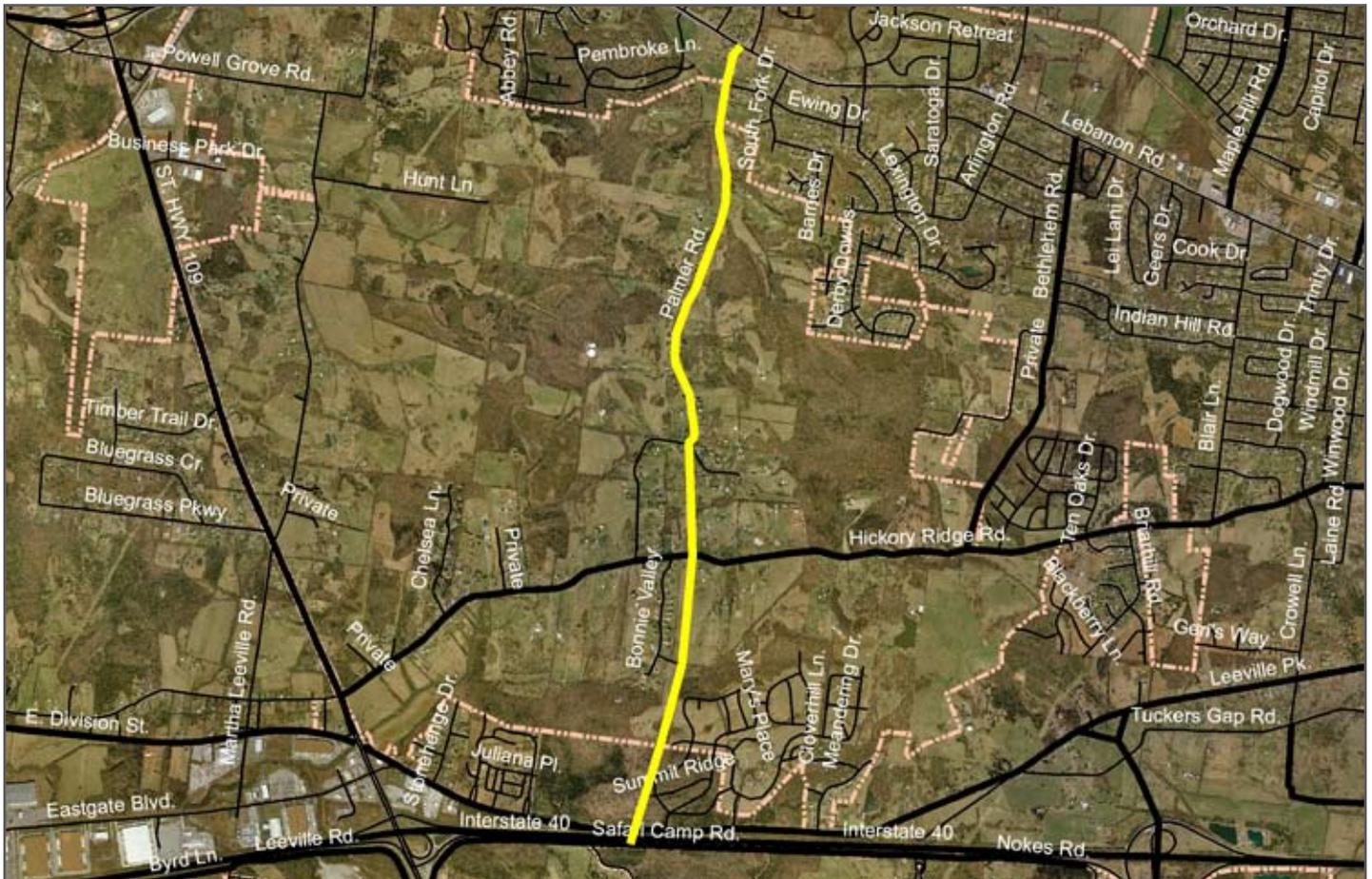
Description: Reconstruct 2-lane/New 2-lane Collector including a bridge over Interstate 40

Priority: Low

Estimated Cost: \$26,070,095

Project Summary

This north-south connection is intended to provide access from U.S. 70 to Safari Camp Road, south of Interstate 40. The new 2-lane collector will bridge Interstate 40 from Safari Camp Road and continue north to existing Palmer Road. Existing Palmer Road will be improved from here to U.S. 70. The Hickory Ridge Road Connector is approximately 1.4 miles from Bethlehem Road and 1.7 miles from State Route 109. The adjacent land use consists of residential development and is proposed for future Low Density Residential. Existing Palmer Road connects to West Main Street to the north and operates at LOS A. The proposed Hickory Ridge Road Connector is expected to operate at LOS A in 2030.



Project 4: Carver Lane Improvements

Project Location

Termini: From U.S. 70 to Maple Hill Road

Length: 2.49 miles

Description: Reconstruct 3-lane

Priority: Low

Estimated Cost: \$13,706,828

Project Summary

Widening Carver Lane from two to three lanes will improve north-south access from U.S. 70. Just west of downtown Lebanon, Carver Lane connects U.S. 70 to Maple Hill Road, which connects to Proposed Project #23, Maple Hill Road Connector, which provides east-west connectivity to State Route 109. The adjacent land uses transition from commercial development along Lebanon Road, to industrial, to rural and low density residential. The future land uses along Carver Lane are Commercial, High Density Residential, Residential Mixed Use, Medium Density Residential, and Industrial. The proposed 3-lane collector is expected to operate at LOS A in 2030.



Project 5: Maple Hill Road Improvements

Project Location

Termini: From U.S. 70 to Urban Growth Boundary

Length: 2.7 miles

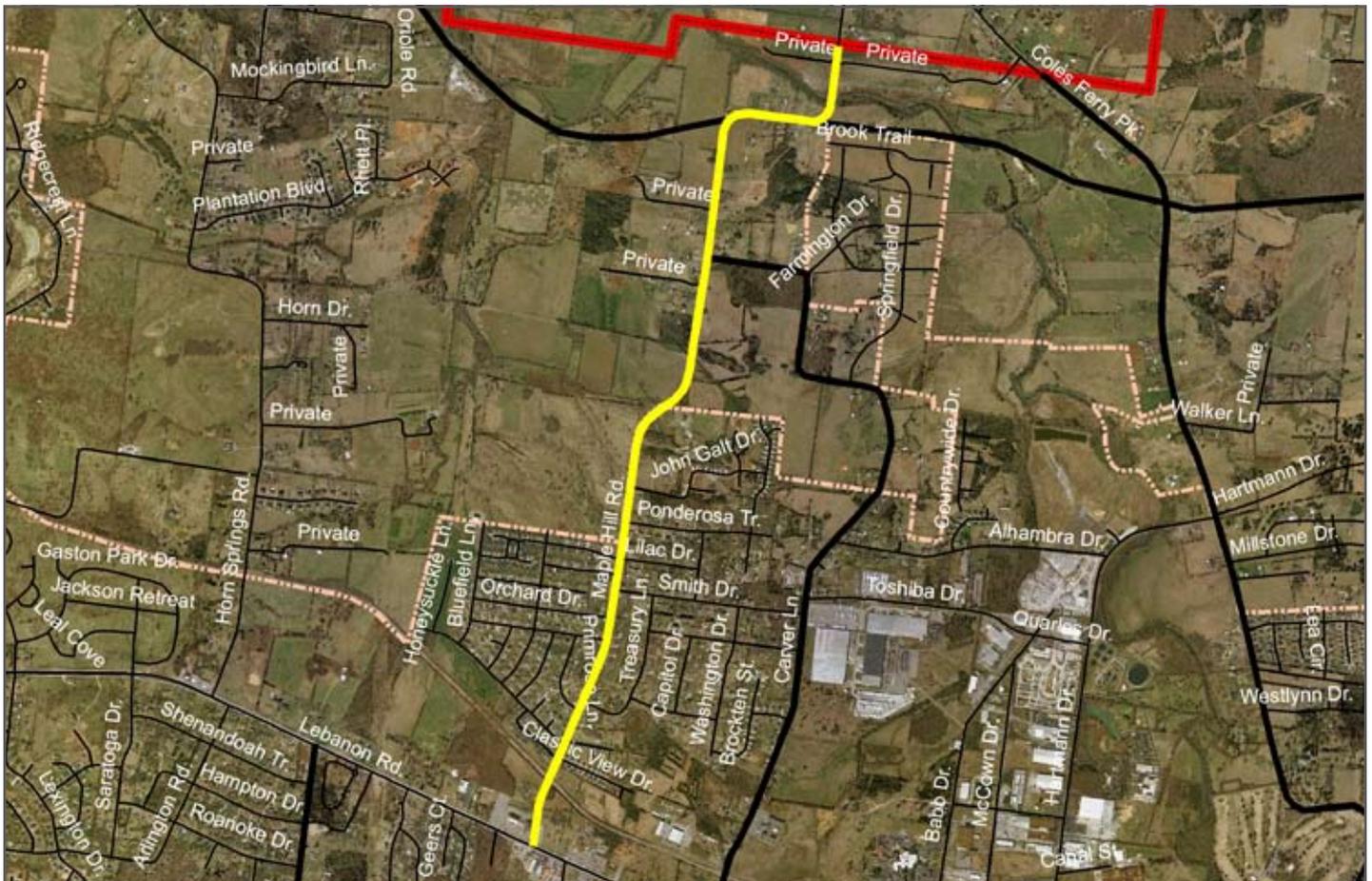
Description: Reconstruct 3-lane

Priority: Low

Estimated Cost: \$14,862,825

Project Summary

Improvements to Maple Hill Road will extend north from U.S. 70 to the Urban Growth Boundary. Maple Hill Road also intersects Proposed Project #23, Maple Hill Road Connector, improvements there include widening Maple Hill Road from two to three lanes. Currently, Maple Hill Road extends through commercial, medium density residential, and rural land uses. The proposed 3-lane collector is expected to operate at LOS A in 2030 and run through Commercial, High Density Residential, Medium Density Residential, and Low Density Residential future land uses.



Project 6: State Route 840 Extension

Project Location

Termini: *From State Route 840 terminus at Interstate 40 to Leeville Pike*

Length: *.6 miles*

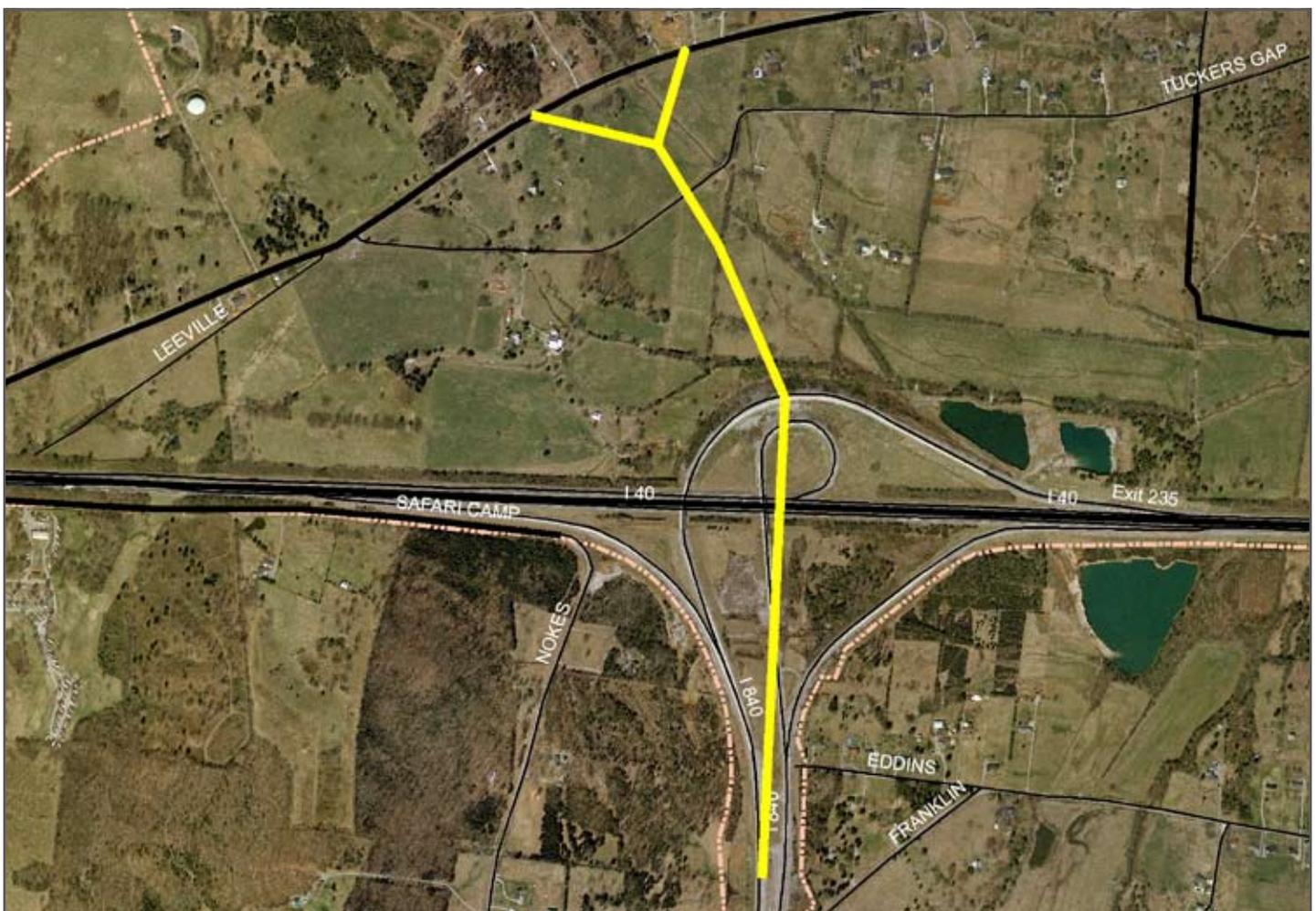
Description: *New 4-lane Interstate*

Priority: *Medium*

Estimated Cost: **\$6,304,440**

Project Summary

This extension of State Route 840 across Interstate 40 would provide much needed access to/from State Route 840 and Interstate 40, while creating an opportunity to develop the Commercial/Office, Commercial, Medium Density Residential, and Residential Mixed Use recommended by the Future Land Use Plan. This roadway, which functions as an interstate, would provide direct access from State Route 840 and Interstate 40 to Leeville Pike and Blair Lane. The proposed project is located approximately 1.5 miles west of Hartmann Drive. In addition, the proposed 4-lane facility should help alleviate congestion at the other Interstate 40 interchanges (State Route 109 and Hartmann Drive) and is expected to operate at LOS A and B in 2030. The State Route 840 Extension should also provide easier access to developing parts of town.



Project 7: Interstate 40 Frontage Road

Project Location

Termini: *From Hwy. 109 to Beckwith Road*

Length: *3.02 miles*

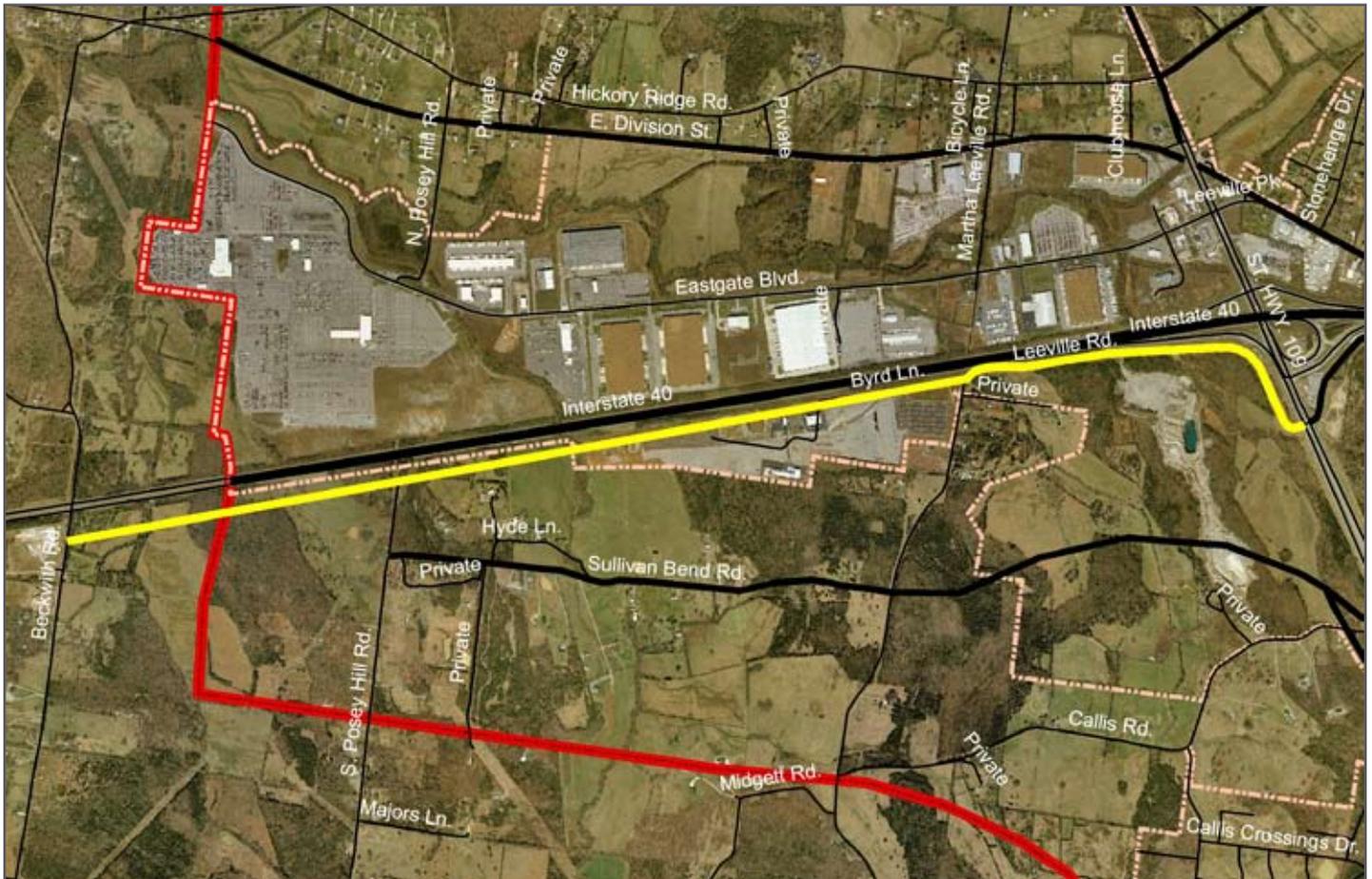
Description: *New 3-lane Collector*

Priority: *High*

Estimated Cost: **\$8,000,000**

Project Summary

The proposed 2-lane collector extends from State Route 109 just south of Interstate 40, west to the new Beckwith Road interchange. This new roadway would run through proposed Commercial/Office and Commercial future land uses, which fit with the existing industrial developments. In 2030, this frontage road is expected to operate at LOS A east of Leeville Road and LOS B from Leeville Road to State Route 109. It is located approximately .1 mile south of the interstate.



Project 8: Sullivan Bend Extension One

Project Location

Termini: *From Posey Hill Road to Bettis Road*

Length: *3.85 miles*

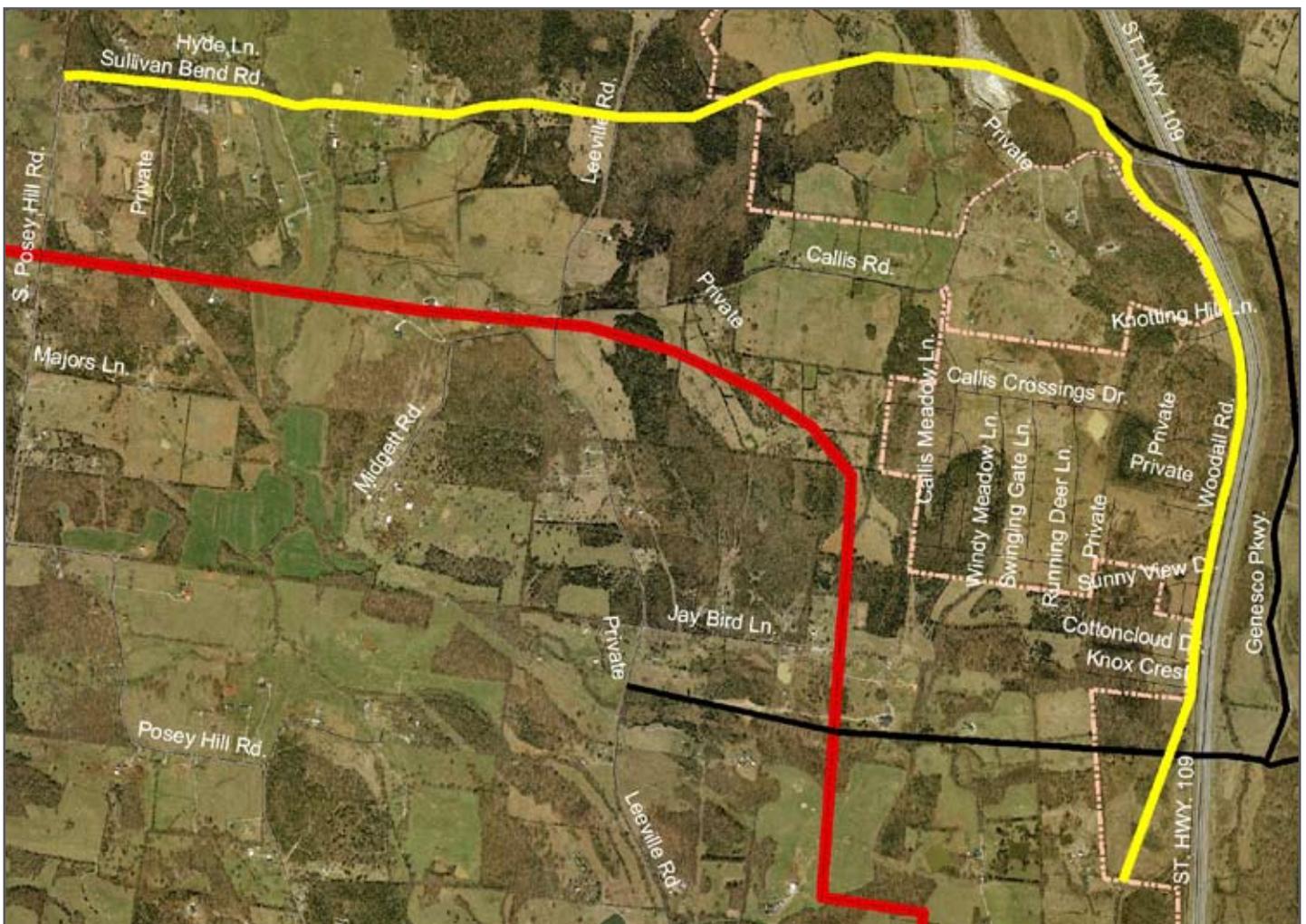
Description: *Reconstruct 2-lane/New 2-lane Collector*

Priority: *High*

Estimated Cost: **\$13,586,650**

Project Summary

Approximately .5 miles south of Interstate 40 and .2 miles west of State Route 109, the proposed 2-lane collector would improve existing Sullivan Bend Road, which begins at Posey Hill Road and extends to connect with Bettis Road. The proposed roadway would run alongside State Route 109 and intersect the proposed Industrial Connector that would provide an east-west connection. Although it is almost entirely surrounded by rural countryside, this area is recommended to develop as Commercial/Office, Industrial, Commercial, High Density Residential, and Medium Density Residential as it grows. This new roadway is expected to operate at LOS A and B in 2030.



Project 9: Sullivan Bend Extension Two

Project Location

Termini: From Sullivan Bend Extension One to State Route 840 U.S. 231 Connector

Length: 2.84 miles

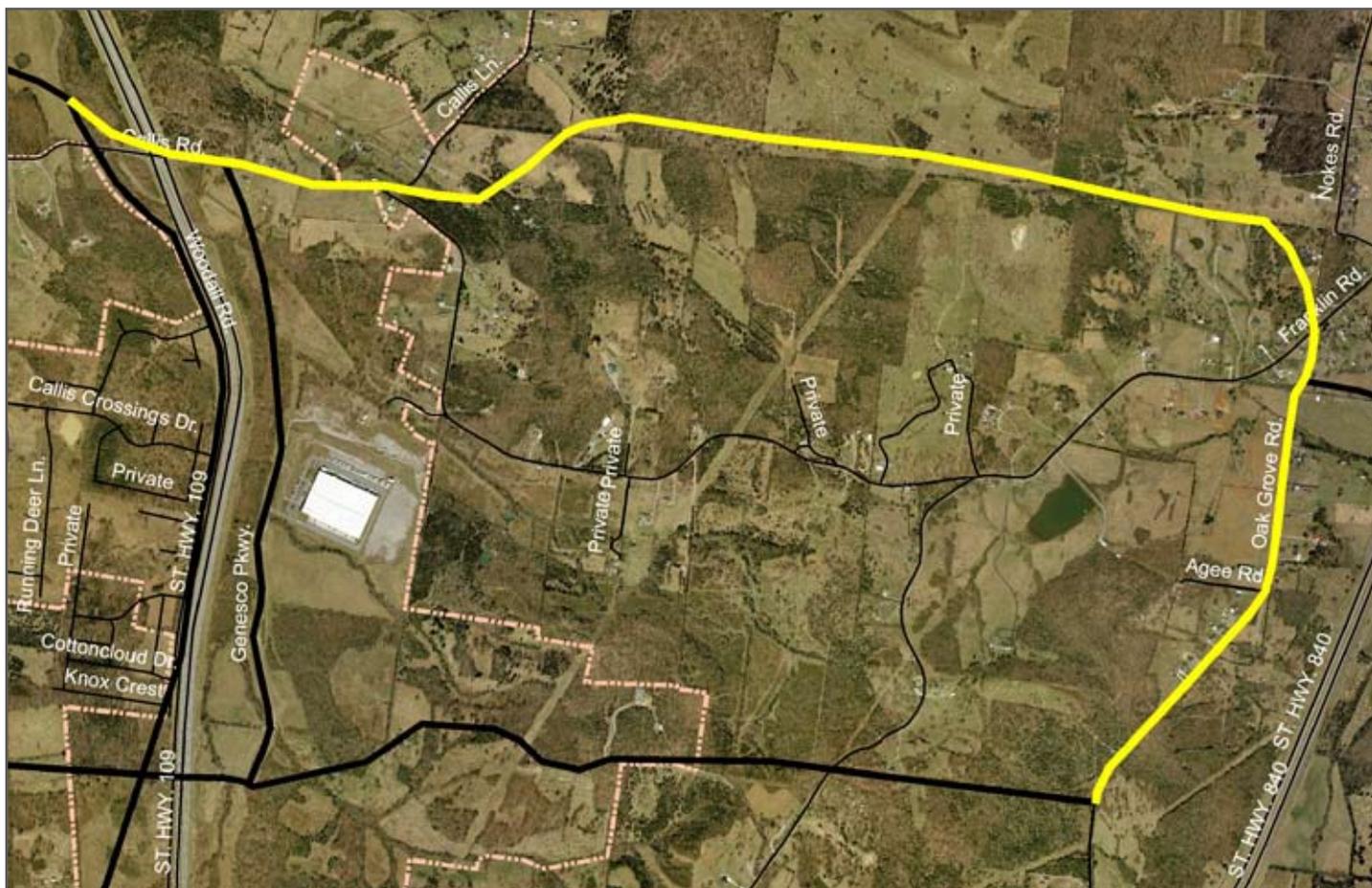
Description: New 2-lane Collector

Priority: Low

Estimated Cost: \$13,029,068

Project Summary

Offering a connection from State Route 109 East to Franklin Road, the proposed 2-lane collector would extend Sullivan Bend Road to the State Route 840 U.S. 231 Connector at Oak Grove Road. The proposed roadway would provide an east-west connection between State Route 109 and State Route 840 and is approximately .7 miles from Interstate 40. Although it is almost entirely surrounded by rural countryside, this area is recommended to develop as Commercial, Commercial/Office, and Residential Mixed Use as it grows. This new roadway is expected to operate at LOS A and B in 2030.



Project 10: Industrial Connector

Project Location

Termini: *From Leeville Road to Oak Grove Road*

Length: *3.11 miles*

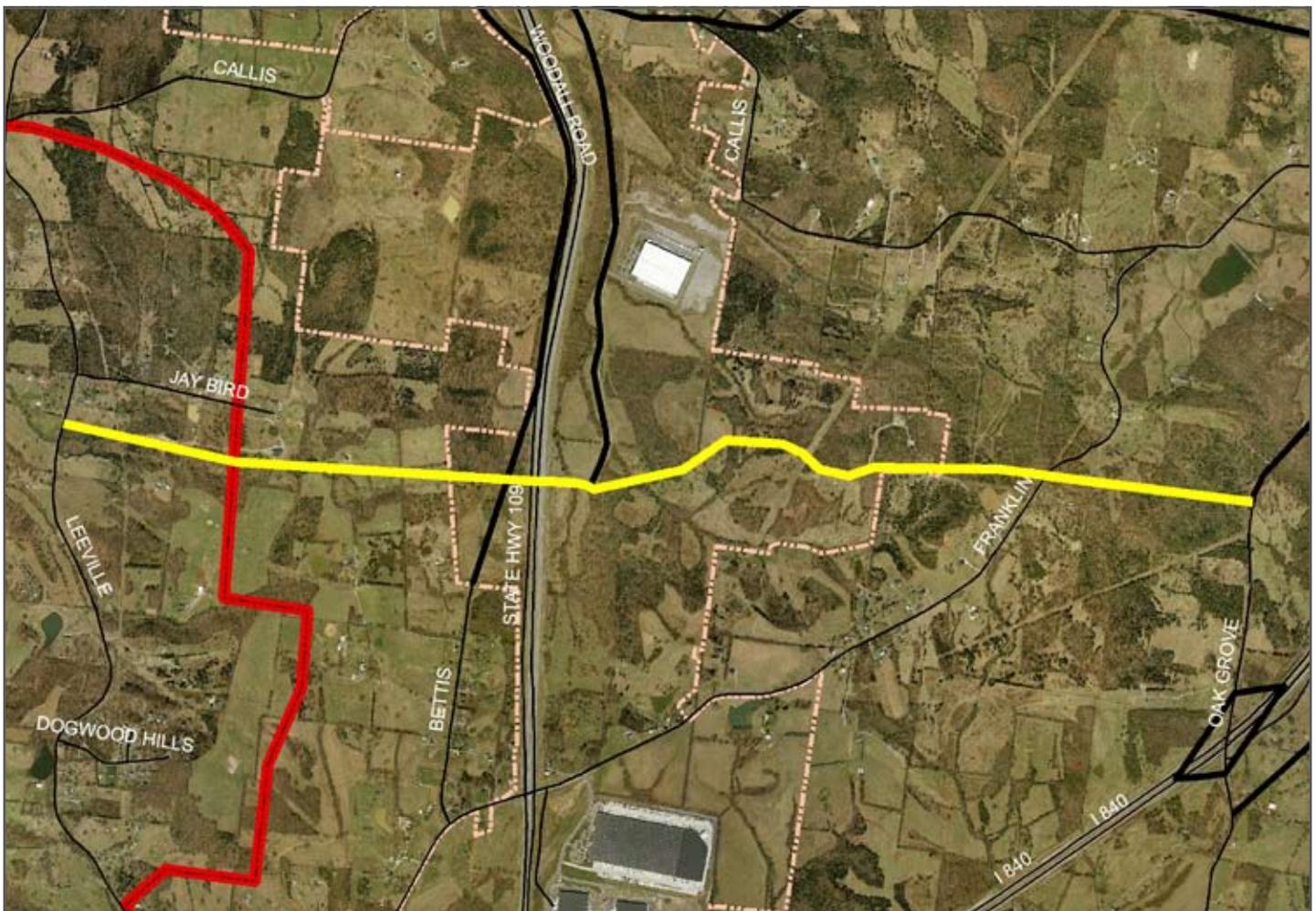
Description: *New 2-lane Collector*

Priority: *Low*

Estimated Cost: **\$14,267,747**

Project Summary

This proposed 2-lane collector would provide an east-west connection through the rural area that lies between State Route 109 and State Route 840. The roadway would run through a multitude of proposed future land uses; from Medium Density Residential to Commercial west of State Route 109, and Commercial, Industrial/Commercial, Commercial/Office, and Residential Mixed Use east of State Route 109. With connections to the proposed Sullivan Bend Extension, Central Pike Extension, Franklin Road, and Oak Grove Road, this new roadway should provide adequate access from major routes such as State Route 109 and State Route 840. This roadway is expected to operate at LOS A in 2030 and is approximately 2 miles from Interstate 40 and State Hwy. 265.



Project 11: State Route 840 Interchange at Oak Grove Road

Project Location

Termini: *State Route 840*

Length: *N/A*

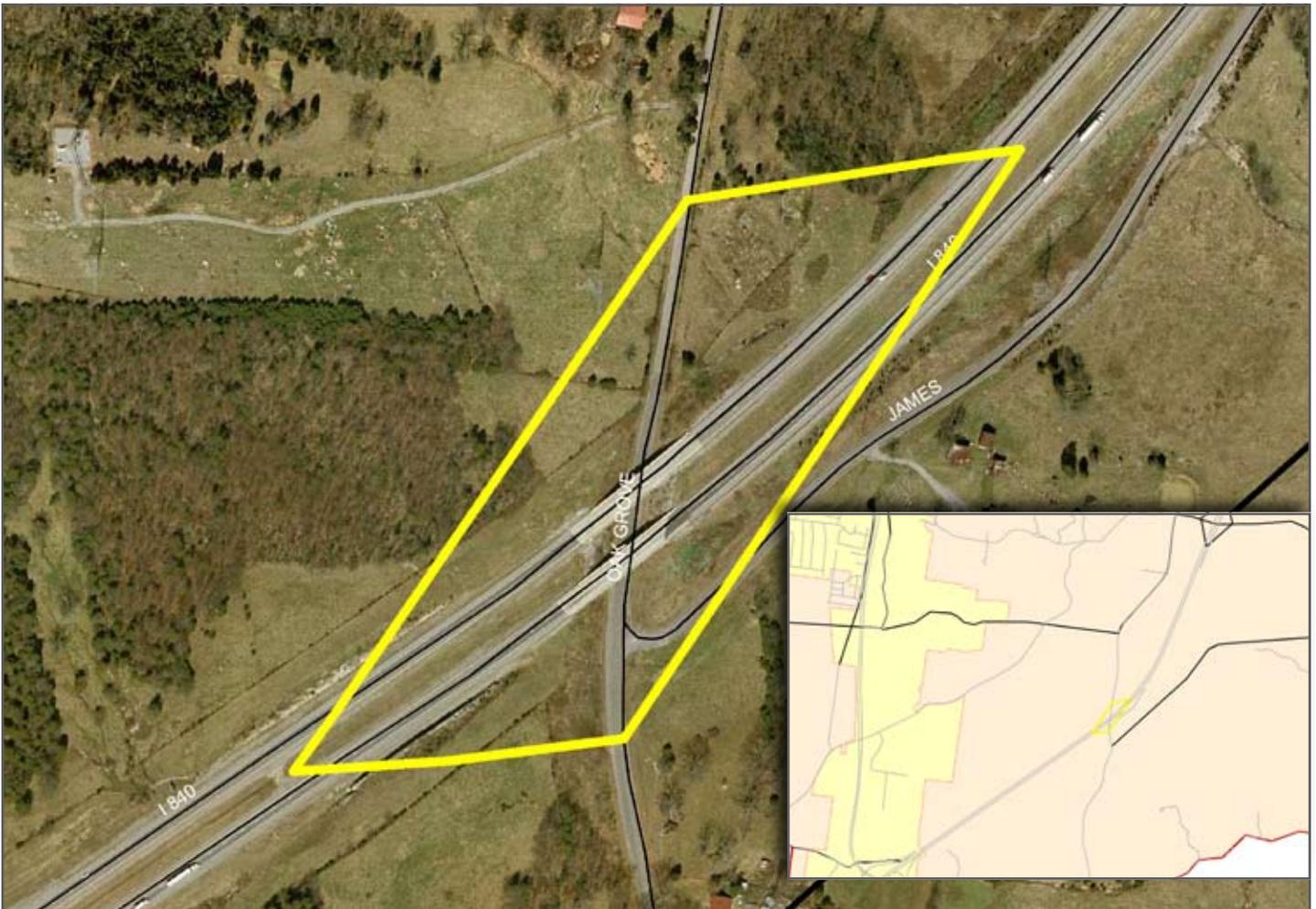
Description: *New Interchange*

Priority: *Medium*

Estimated Cost: \$12,500,000

Project Summary

In an effort to make State Route 840 more accessible, this proposed interchange would be one of 2 new access points along this state route. It is located approximately 1.6 miles south of the proposed interchange at State Route 840/U.S. 231 Connector (project 14) and 2 miles north of the State Route 109 interchange. The interchange would provide access to/from State Route 840 from Oak Grove Road, which provides a north-south connection and the opportunity to develop the Commercial/Office, Residential Mixed Use, and Medium Density Residential proposed in the adjacent area. It would only be a short distance along Oak Grove Road, from this ramp, to the proposed Leeanna Lane Extension and proposed Industrial Connector that offer east-west connections throughout southern Lebanon.



Project 12: Leeanna Lane Extension

Project Location

Termini: *From Old Murfreesboro Road to Oak Grove Road*

Length: *3.26 miles*

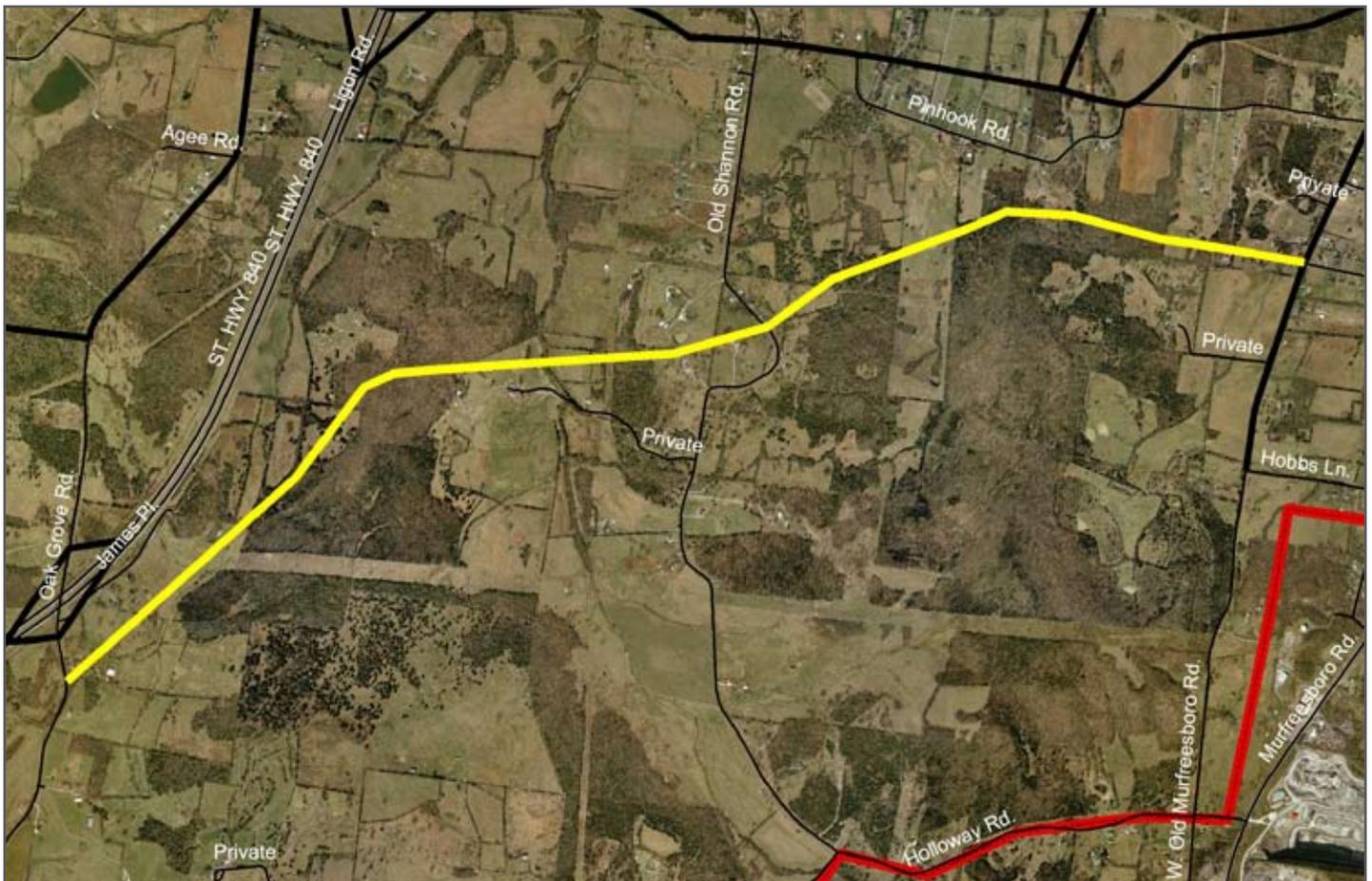
Description: *New 2-lane Collector*

Priority: *Medium*

Estimated Cost: **\$14,955,902**

Project Summary

The proposed 2-lane collector would provide a north-east connection to Old Murfreesboro Road through rural portions of southern Lebanon. It is approximately 2 miles south of Interstate 40. The Leeanna Lane Extension would pass through proposed Medium Density Residential and Low Density Residential. This roadway is expected to operate at LOS A and B in 2030.



Project 13: State Route 840/U.S. 231 Connector

Project Location

Termini: *From Oak Grove Road to Stumpy Lane*

Length: *3.02 miles*

Description: *New 2-lane Collector*

Priority: *Medium*

Estimated Cost: **\$12,571,505**

Project Summary

The desire for additional access to State Route 840, and east-west connection in this area, has been identified as a community concern. The proposed 2-lane collector will offer an east-west connection approximately 1.3 miles south of Interstate 40 and serve to increase access to/from State Route 840. Such a connection is estimated to operate at a LOS of A and B in 2030 and would run through existing rural and light residential areas, future Medium Density Residential, and Residential Mixed Use. It also runs along a portion of the Pinhook Road alignment, thus alleviating some of the horizontal alignment issues.



Project 14: State Route 840 Interchange at State Route 840/U.S. 231 Connector

Project Location

Termini: *State Route 840 Interchange*

Length: *N/A*

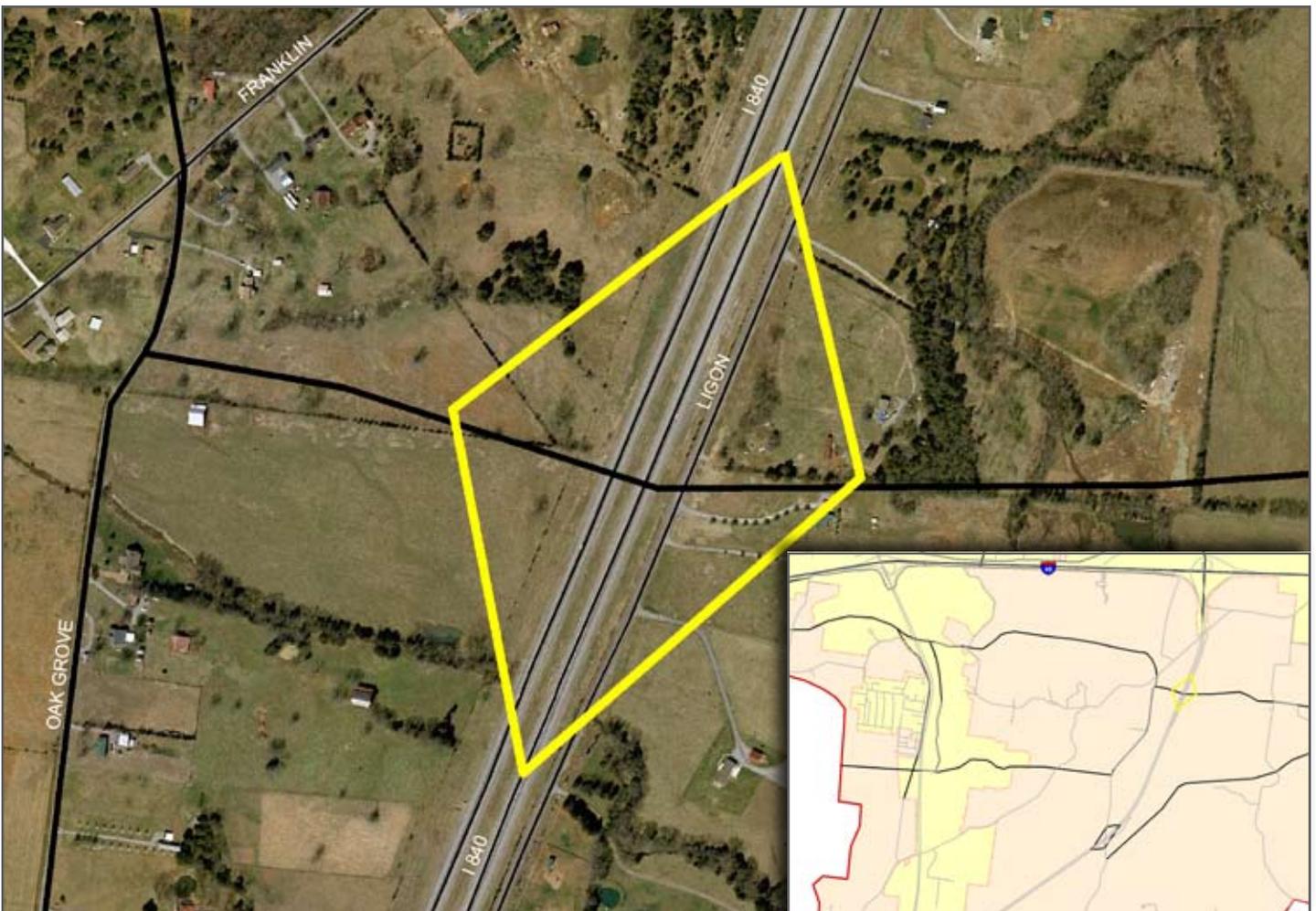
Description: *New Interchange*

Priority: *Medium*

Estimated Cost: \$12,500,000

Project Summary

One of 2 proposed interchanges along State Route 840, this interchange would provide access to/from State Route 840 at the State Route 840 U.S. 231 Connector. It is located approximately 1.2 miles south of the Interstate 40 interchange and 1.6 miles north of the State Route 840/Oak Grove Road interchange. This proposed interchange would serve the area south of Interstate 40, between State Route 109 to U.S. Hwy. 231, which is currently composed of rural and light residential development, and recommended for Residential Mixed Use in the future.



Project 15: Industrial Connector/Sullivan Bend Extension Two Connector

Project Location

Termini: From Industrial Connector to Sullivan Bend Extension Two

Length: 1.27 miles

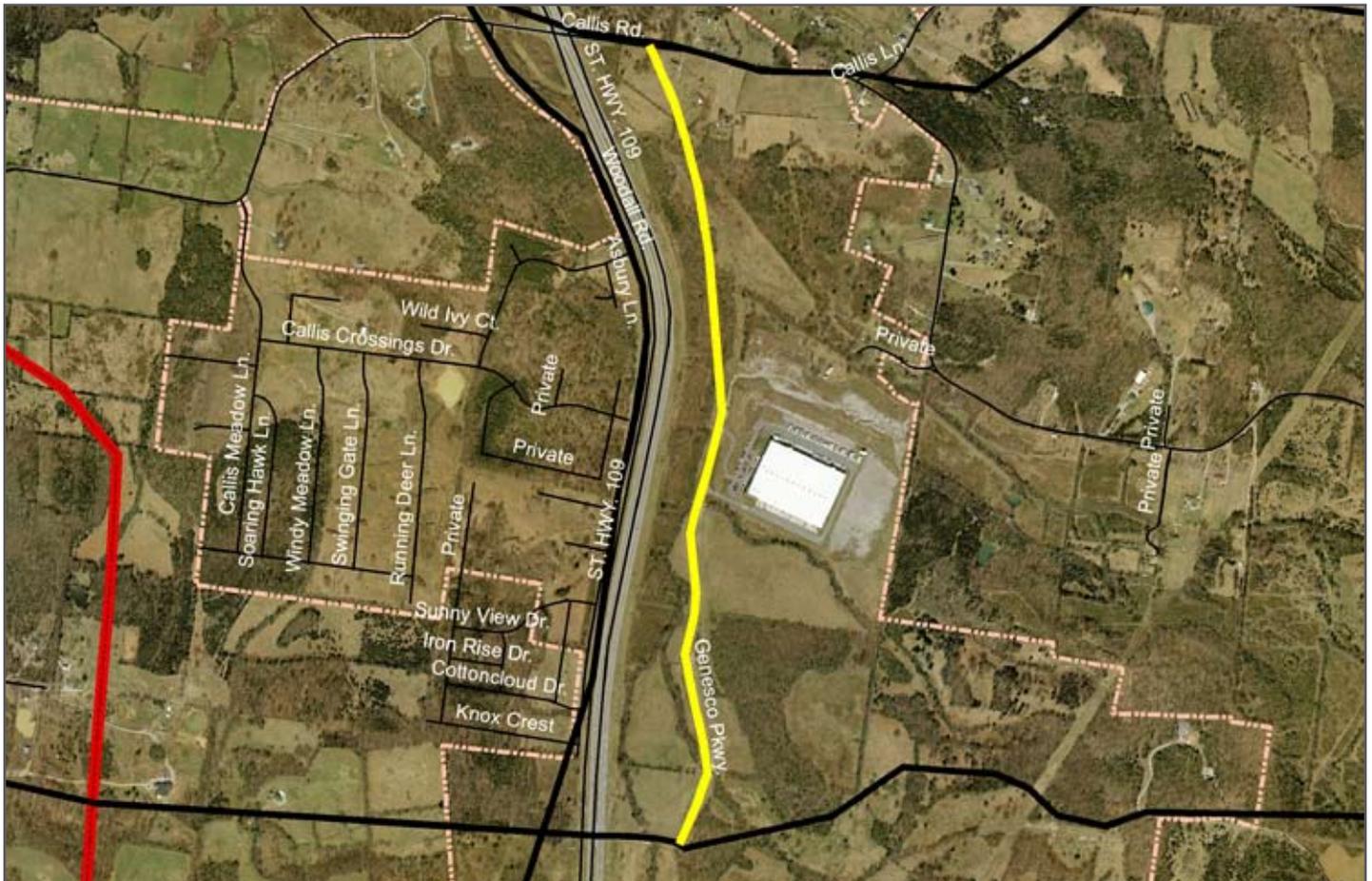
Description: New 2-lane Arterial

Priority: High

Estimated Cost: \$6,872,700

Project Summary

This roadway would run parallel to State Route 109, near State Route 840, and connect to the proposed Sullivan Bend Extension Two. The proposed 2-lane arterial would run through existing industrial development and rural areas and proposed Commercial, Commercial/Office, and Industrial land uses. It is expected to operate at LOS A and Bin 2030.



Project 16: Franklin Road Connector

Project Location

Termini: *From Franklin Road to State Route 840 U.S. 231 Connector*

Length: *1.2 miles*

Description: *New 2-lane Collector*

Priority: *Medium*

Estimated Cost: **\$4,234,800**

Project Summary

The proposed 2-lane collector would be a north-south connection from the proposed State Route 840 U.S. 231 Connector, also offering access to Hartmann Drive, via Franklin Road and the proposed Franklin Road Connector. This roadway is approximately 1.4 miles west of U.S. Hwy. 231 and 1.3 miles east of State Route 840. The Franklin Road Connector would maneuver through the existing rural landscape and proposed Commercial, Residential Mixed Use, and Medium Density Residential future land uses. It is expected to operate at LOS A in 2030.



Project 17: Franklin Road Connector to Hartmann Drive

Project Location

Termini: *From Hartmann Drive Extension to Franklin Road Connector*

Length: *.23 mile*

Description: *New 2-lane Collector*

Priority: *Medium*

Estimated Cost: **\$811,670**

Project Summary

This 2-lane collector would provide a connection to the Hartmann Drive Extension from the proposed Franklin Road Connector south of Interstate 40. Currently situated in rural landscape, this new roadway is expected to operate at LOS A in 2030 through proposed Commercial future land uses. It would be situated approximately .2 miles south of Franklin Road and .3 miles north of Bartons Creek Road.



Project 19: Holloway Drive Extension

Project Location

Termini: *From South Cumberland Street to South College Street*

Length: *1.06 miles*

Description: *New 2-lane Collector*

Priority: *High*

Estimated Cost: **\$4,412,515**

Project Summary

The proposed 2-lane collector would extend Holloway Drive, at U.S. 231 South, east to Briskin Lane. Just .1 mile north of Interstate 40, this roadway would connect existing commercial property near Cumberland to existing industrial development at the Briskin Lane/Cainsville Road intersection. This connection would promote further development of this type in the rural area between the termini, which corresponds with the recommended Commercial future land use. The extension is expected to operate at a LOS A in 2030.



Project 20: Briskin Lane Extension

Project Location

Termini: *From Baddour Parkway to Peyton Road*

Length: *.43 mile*

Description: *New 2-lane Collector*

Priority: *Medium*

Estimated Cost: **\$1,789,983**

Project Summary

The proposed 2-lane collector would extend Briskin Lane, across State Route 26, east to Peyton Road and .2 miles north of Interstate 40. This roadway would promote further development of High Density Residential in this area and is recommended for future High Density Residential and Commercial/Office development. The extension is expected to operate at LOS A in 2030.



Project 21: Hartmann Drive Extension One

Project Location

Termini: From existing Hartmann Drive terminus at U.S. Hwy. 231 to Hartsville Pike

Length: 1.33 miles

Description: New 4-lane Arterial

Priority: High

Estimated Cost: \$11,838,031

Project Summary

This is the first phase of the Hartmann Drive Extensions, which is one of the most significant projects recommended in terms of the facility's impact to the city, cost, and size. The project begins north of downtown Lebanon at the Hartmann Drive terminus, at U.S. Hwy. 231, and extends to Hartsville Pike (State Hwy. 141). Combined with Hartmann Drive Extension Two, this 4-lane arterial will create a continuous loop around downtown Lebanon. This portion of the extension will pass through mostly rural landscape and some existing residential developments closer to State Hwy. 141. A variety of future land uses are recommended within the expanse of the entire new 4-lane roadway, with the majority of future uses recommended being varying densities of residential. This portion of the extension is recommended as Low Density Residential and Medium Density Residential. However, land uses could be changed in the future as these projects come closer to fruition. This portion of the extension is expected to operate at LOS A in 2030.



Project 22: Hartmann Drive Extension Two

Project Location

Termini: *From Hartsville Pike to Cainsville Road*

Length: *4.68 miles*

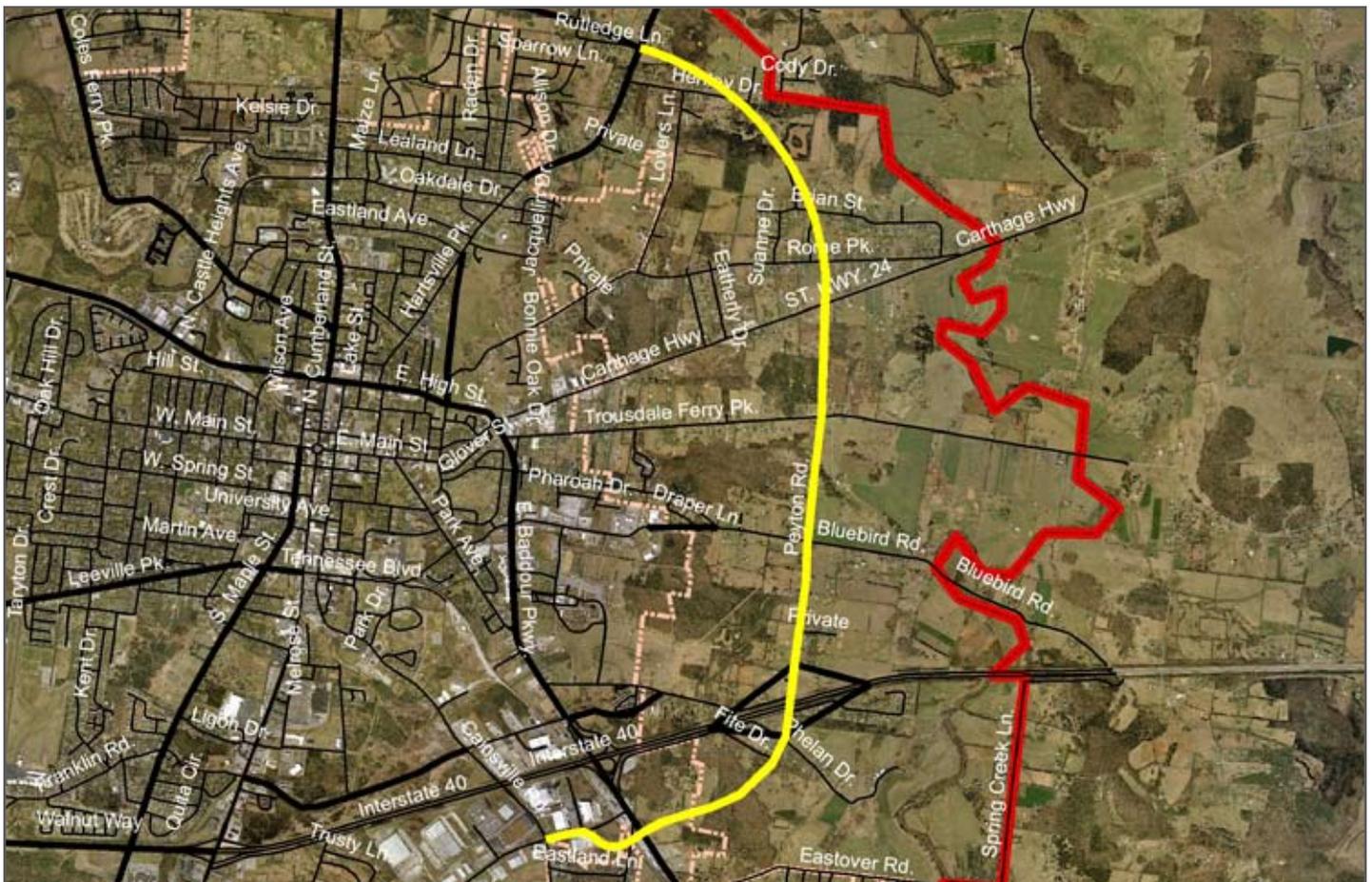
Description: *New 4-lane Arterial*

Priority: *Medium*

Estimated Cost: **\$102,589,011**

Project Summary

The second portion of this new 4-lane arterial would connect to Hartmann Drive Extension One, creating a continuous loop around downtown Lebanon. Many new intersections will result from this extension, including a new interchange at Interstate 40, east of State Route 26, creating more access opportunities in and around downtown. This extension would cover a large area, mostly through existing residential developments and rural landscape. A variety of future land uses are recommended within the expanse of this new 4-lane roadway; with the majority of future uses recommended being varying densities of residential. However, land uses could be changed in the future as these projects come closer to fruition. This portion of the extension is expected to operate at LOS A in 2030. The majority of the existing Hartmann Drive operates at an LOS B, with some areas operating at LOS A, and the area adjacent to West Baddour Parkway at LOS C. It is important to note that this project could be broken into phases.



Project 23: Maple Hill Road Connector

Project Location

Termini: *From Hwy. 109 to Hunters Point Pike*

Length: *9.00 miles*

Description: *New 2-lane Collector*

Priority: *Low*

Estimated Cost: **\$41,289,300**

Project Summary

The proposed 2-lane collector would provide an east-west connection, northwest of downtown Lebanon, to Highway 109. Located outside of the city limits, this proposed roadway will involve Lebanon's existing rural landscape and some sparsely located residential development. The existing rural landscape is meant to be preserved through proposed Low Density and Medium Density Residential future land uses, which run almost the entire length of the proposed roadway. Existing Maple Hill Road currently operates at an LOS B. The proposed roadway would be situated approximately 1 mile north of Hartmann Drive and is expected to operate at LOS A in 2030.



Project 24: McGregor Street Extension (rerouting of State Route 141)

Project Location

Termini: From East High Street to Hartsville Pike

Length: .68 mile

Description: New 2-lane Collector

Priority: High

Estimated Cost: \$3,692,570

Project Summary

The proposed 2-lane collector extends McGregor Street North, across East High Street, to connect to Hartsville Pike (State Hwy. 141). It extends through a mostly undeveloped area close to downtown Lebanon and would not directly impact residential development. However, it is within close proximity to medium density residential along Hartsville Pike and approximately .5 miles east of U.S. Hwy. 231. The future land uses intended for this area are Commercial and High Density Residential close to East High Street, and Medium Density Residential further north as it reaches Hartsville Pike. The existing portion of Hartsville Pike, which this new road would intersect, operates at a LOS B.



Project 25: Blue Bird Road Extension

Project Location

Termini: *From Blue Bird Road to Tennessee Boulevard*

Length: *.32 mile*

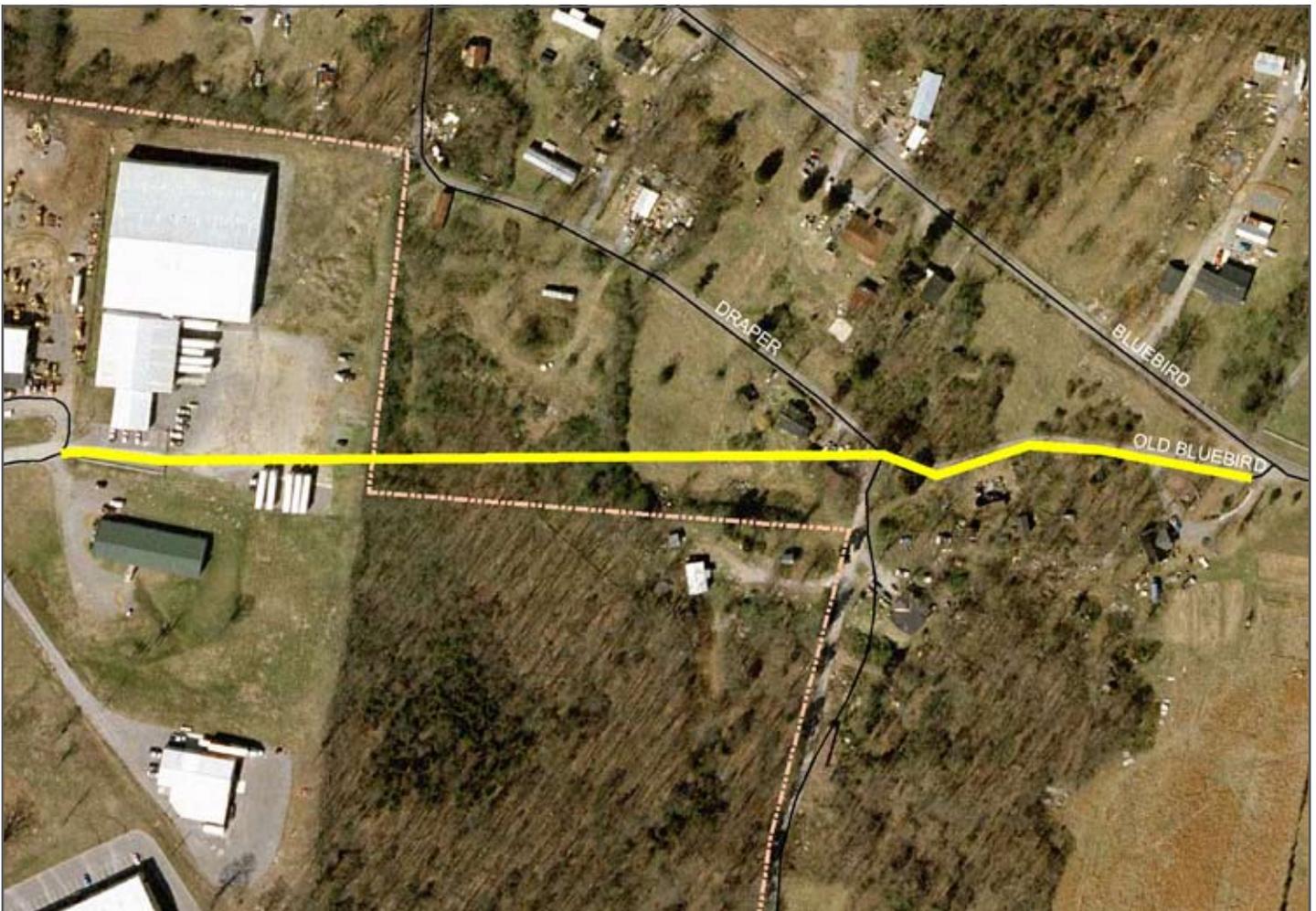
Description: *Reconstruct Existing 2-lane/New 2-lane Collector*

Priority: *Medium*

Estimated Cost: **\$1,129,280**

Project Summary

This proposed 2-lane collector would extend Blue Bird Road to Tennessee Boulevard, where there is existing and proposed future Industrial land uses. Blue Bird Road intersects the proposed Hartmann Drive Extension to the east. With the proposed Interstate 40 interchange approximately 1 mile south and Hartmann Drive Extension .6 miles to the east, this new roadway would provide interstate access for trucks. This is intended to alleviate congestion on State Route 26 where there is currently LOS C at the Tennessee Boulevard intersection and LOS D moving south toward the interstate.



Project 26: Interstate 40 Interchange at Peyton Road

Project Location

Termini: *Interstate 40 Ramp, east of State Route 26*

Length: *N/A*

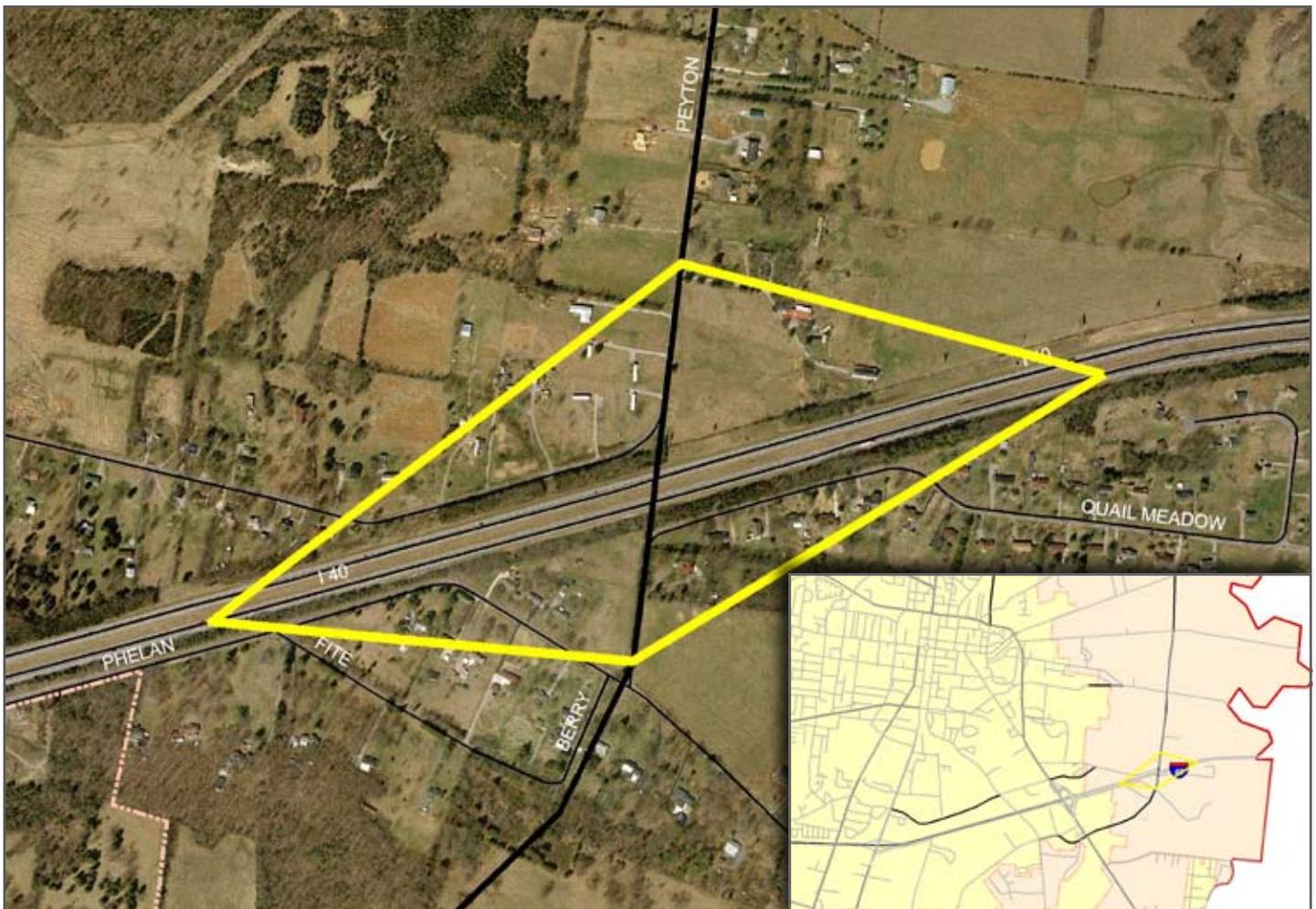
Description: *New Interchange*

Priority: *Medium*

Estimated Cost: \$16,000,000

Project Summary

In an effort to complete the Hartmann Drive loop around the city, this proposed ramp would provide the Hartmann Drive Extension with an eastern access point to Interstate 40. This interchange would be located approximately .9 miles east of the Interstate 40/U.S. Hwy. 70 interchange and 2.6 miles east of the Interstate 40/U.S. Hwy. 231 interchange. The Interstate 40 interchange at Peyton Road would be situated in and around existing residential development and provide the opportunity to develop the area land uses as recommended in the Future Land Use Plan with High Density Residential, Medium Density Residential, Residential Mixed Use, and Commercial/Office.



Project 27: Safari Camp Road Improvements

Project Location

Termini: From State Route 109 to Nokes Road

Length: 2.82 miles

Description: Reconstruct to 3-lane

Priority: Low

Estimated Cost: \$20,180,414

Project Summary

Widening this 2-lane collector to 3 lanes would provide an improved east-west connection from Highway 109 to Nokes Road, which intersects Franklin Road. Located just south of Interstate 40, this proposed roadway will involve Lebanon's existing rural landscape and some sparsely located residential development. Commercial future land uses are recommended along the entire length of this roadway. Safari Camp Road is expected to operate at LOS A in 2030.



Project 28: State Route 109

Project Location

Termini: From Division Street to south of Lebanon Pike (State Route 24/U.S. 70)

Length: 2.9 miles

Description: Widen from two to five lanes, including center turn lane

Priority: High

Estimated Cost: \$18,800,000

Project Summary

To address LOS issues, this project proposes widening State Route 109, from two to five lanes, north of Interstate 40. Existing LOS on this portion of State Route 109 operates at an LOS D and LOS C. The surrounding land uses along State Route 109 are a mix of rural, low density residential, commercial, and industrial. Proposed future land uses in the area include some Residential Mixed Use, Commercial/Office, Commercial, Medium Density Residential, and Industrial. With the proposed improvement, this new 5 lane arterial is expected to operate at LOS A in 2030.



Project 30: Baddour Parkway (State Route 26)

Project Location

Termini: From State Route 24 at Winwood to Fairview Road

Length: 1.1 miles

Description: Widen from three to five lanes including shoulders

Priority: High

Estimated Cost: \$3,250,000

Project Summary

This project proposes widening Baddour Parkway (State Route 26), just west of downtown and approximately .5 miles north of West Main Street, from three to five lanes to address LOS issues. Existing LOS on this portion of Baddour Parkway worsens from LOS C and LOS D near West Main Street then improves to LOS A closer to Fairview Road. This roadway extends through a variety of existing developments and proposed future land uses such as: Commercial, Commercial/Office, Residential Mixed Use, and Industrial which would benefit from increased access. With the proposed improvement, this 5 lane arterial is expected to operate at LOS A and B in 2030.



Project 31: State Route 26 (2)

Project Location

Termini: From Fairview Road to State Route 24

Length: 2.5 miles

Description: Widen from four to five lanes adding a center turn lane and providing left and right turn lanes at intersections

Priority: Low

Estimated Cost: \$9,300,000

Project Summary

This project proposes widening the portion of State Route 26, just north of downtown and .3 miles north of Main Street, from four to five lanes. Existing LOS on this portion of Baddour Parkway operates at LOS A and extends through a variety of commercial and residential development. Proposed future land uses include Commercial, Commercial/Office, High Density Residential, and Residential/Public/Commercial, which would benefit from increased access. With the proposed improvement, this 5 lane arterial is expected to operate at LOS A in 2030.



Project 32: Interstate 40 (East)

Project Location

Termini: *From State Route 840 to U.S. 70*

Length: *5.0 miles*

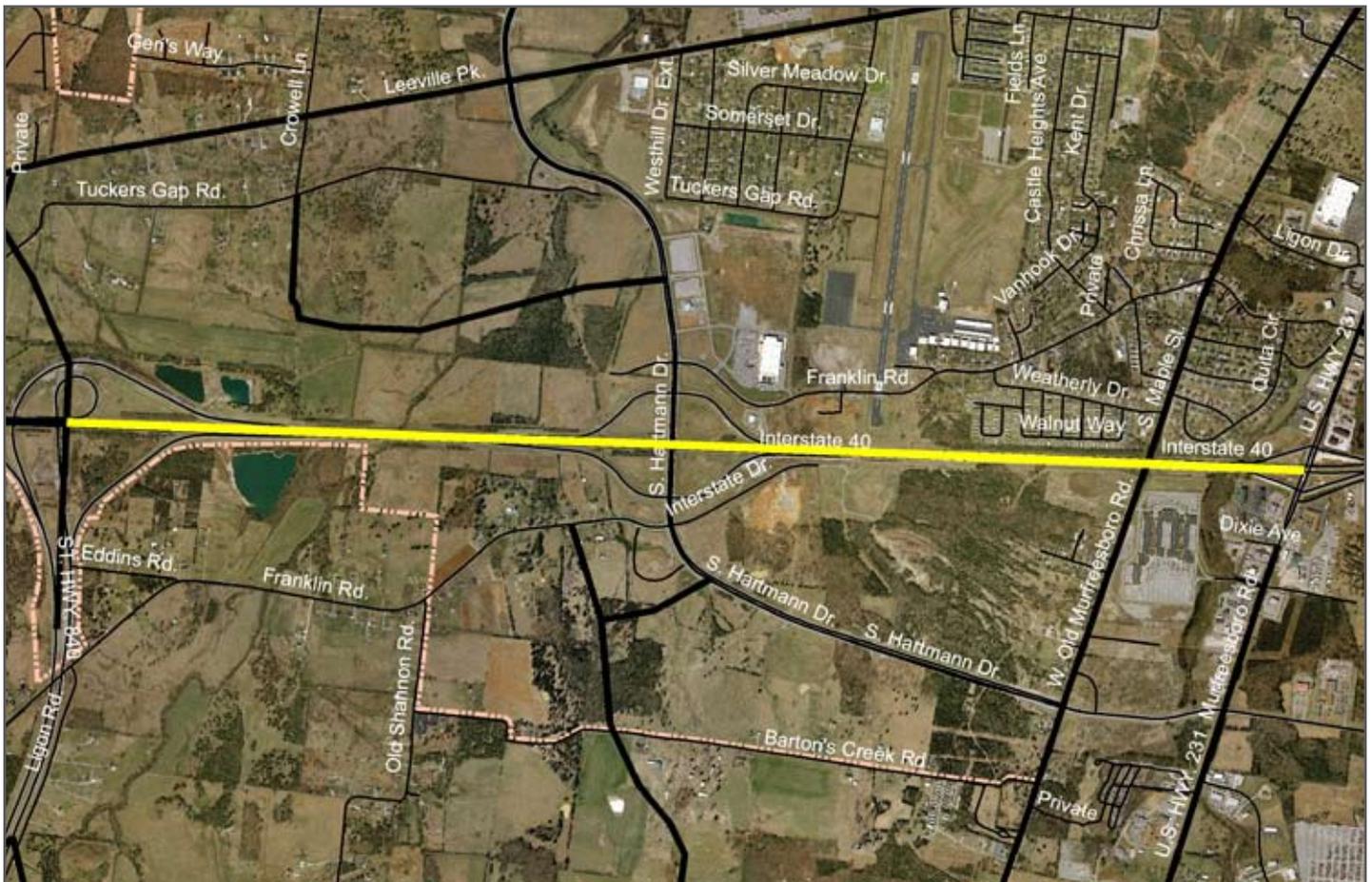
Description: *Add HOV lanes*

Priority: *High*

Estimated Cost: *\$18,774,250*

Project Summary

This project proposes the addition of HOV lanes for 5 miles of Interstate 40, from U.S. 70 West to State Route 840. This project is meant to improve the commute to/from Nashville. This portion of Interstate 40 currently operates at LOS B and is expected to continue operating at this level of service.



Project 33: U.S. 231 (Cumberland)

Project Location

Termini: From U.S. Hwy. 70 (Baddour Pkwy) to Maple Hill Road Extension

Length: 2.66 mile

Description: Widen from two to five lanes including shoulders

Priority: High

Estimated Cost: \$5,520,000

Project Summary

This project proposes widening the portion of Cumberland Street extending north from East High Street. This portion of the roadway operates at LOS C and LOS A. The area along this roadway has a variety of developments including residential, office, and commercial. Future land uses also include Medium Density Residential, Low Density Residential, Residential Mixed Use, Commercial, and Commercial/Office which would benefit from the increased capacity. The entire portion of this project is expected to operate at LOS A in 2030.



Project 34: State Route 10 (U.S. 231)

Project Location

Termini: *From Interstate 40 to Walnut Grove Road*

Length: *2.1 miles*

Description: *Widen from two to five lanes, including center turn lane*

Priority: *Medium*

Estimated Cost: **\$12,100,000**

Project Summary

This project proposes widening the portion of State Route 10 (Murfreesboro Road) south of Interstate 40 to Murfreesboro. The majority of this roadway currently operates at LOS C. It services traffic from the Interstate 40 interchange and Outlet Mall. There is also a considerable amount of residential development along the roadway. Commercial, Commercial/Office, Residential Mixed Use, and Low Density Residential are all future land uses proposed along this roadway. This portion of U.S. Hwy. 231 is expected to operate at LOS A in 2030.



Project 35: Crowell Lane Extension

Project Location

Termini: *From Tuckers Gap to Hartmann Drive*

Length: *1.12 miles*

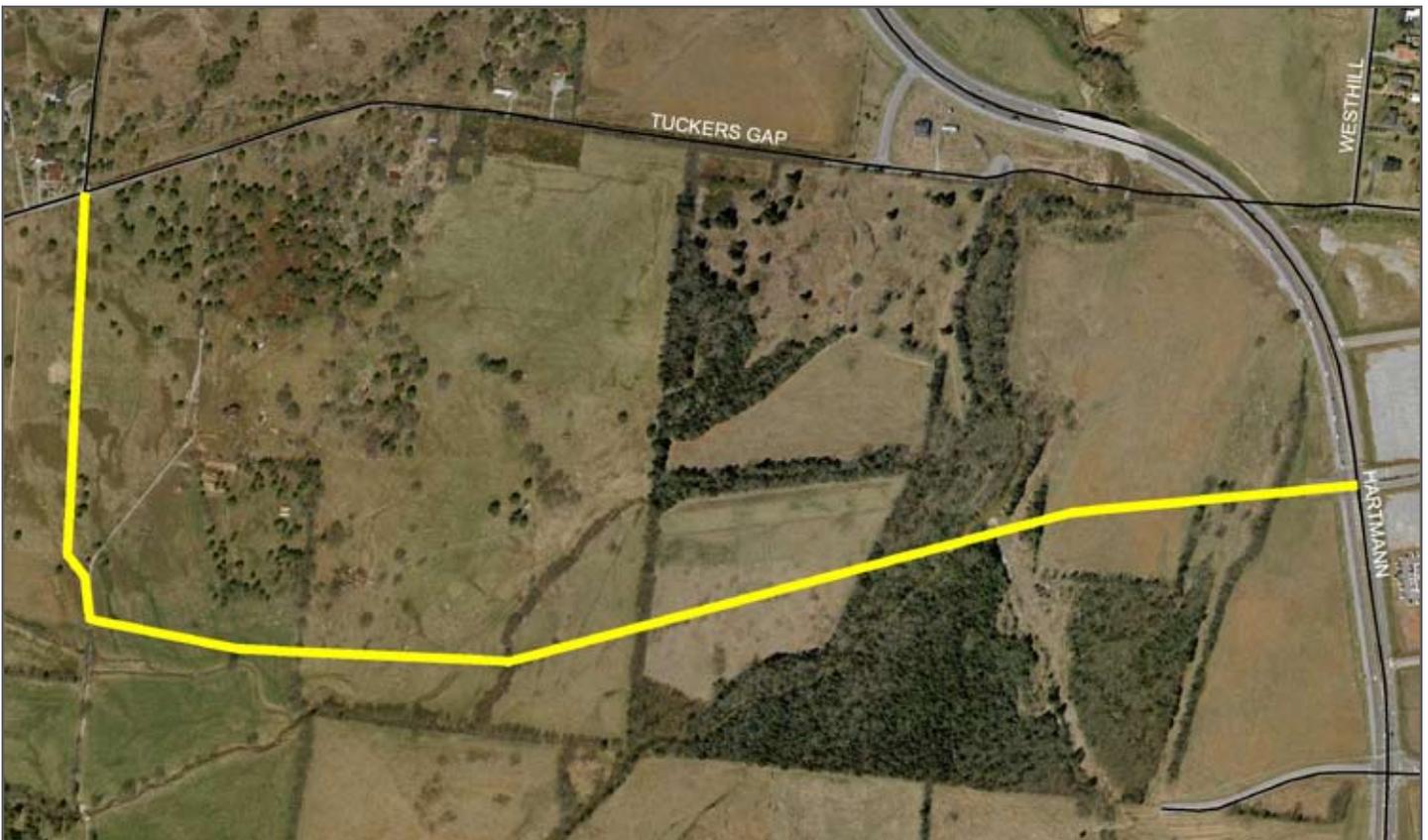
Description: *New 2-lane Collector*

Priority: *Low*

Estimated Cost: **\$7,481,480**

Project Summary

This project proposes extending Crowell Lane to provide an east-west connection from Hartmann Drive. Currently the adjacent area is mostly rural, but proposed future land uses envision Commercial, Commercial/Office, and High Density Residential development types in the future. This roadway is expected to operate at LOS A in 2030.



Project 36: State Route 141

Project Location

Termini: *From Hartmann Drive Extension to Trousdale County Line*

Length: *7.10 miles*

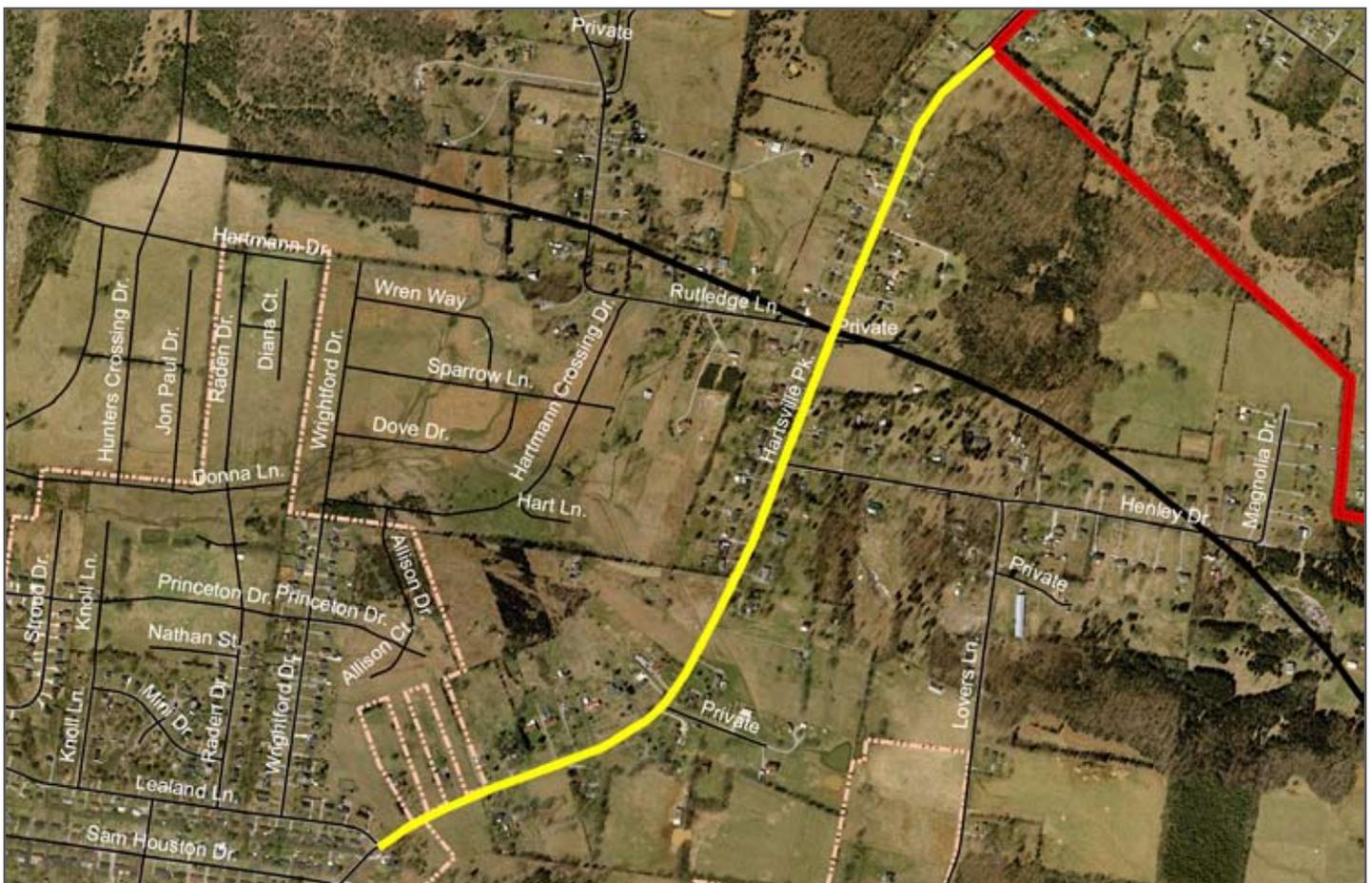
Description: *Reconstruct 2-lane roadway and reserve ROW for future 4-lane roadway*

Priority: *High*

Estimated Cost: **\$20,215,000**

Project Summary

This project proposes improving State Route 141/Hartsville Pike northeast to the Trousdale County Line. The existing portion of this road currently operates at LOS B and C. Adjacent land uses currently consist of low density residential and are proposed to stay Low Density Residential in the Future Land Use Plan. It is expected that this roadway will continue operating at LOS B and C in 2030.



Project 37: Lebanon Pike (State Route 24/U.S. 70)

Project Location

Termini: From east of Cedar Creek to State Route 109

Length: 4.20 miles

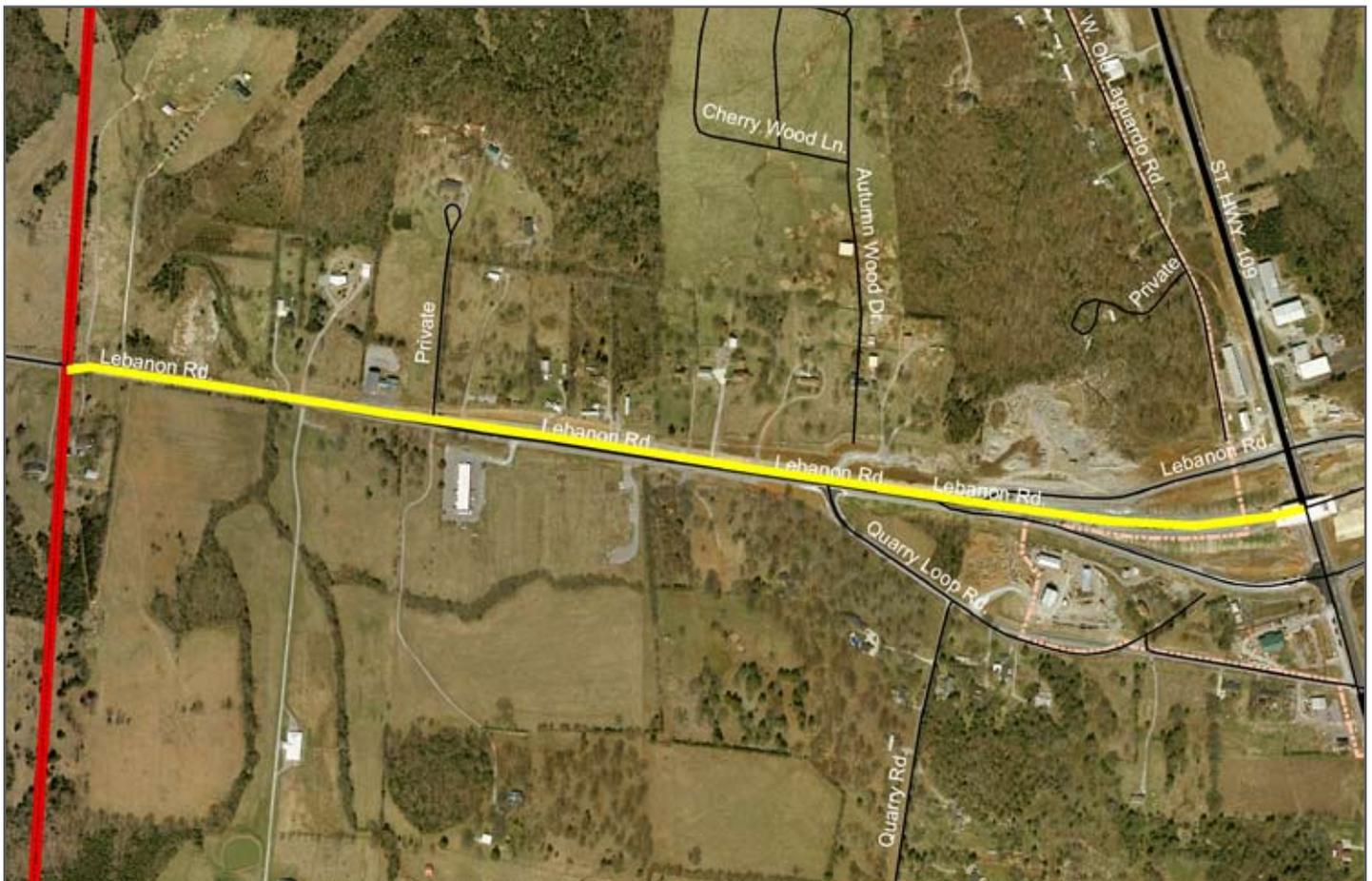
Description: Widen from two to four lanes – includes cost for adding bike route facilities

Priority: Medium

Estimated Cost: \$15,652,500

Project Summary

This project proposes widening U.S. 70, west of State Route 109, to 4 lanes. Currently this portion of U.S. 70 operates at LOS C. Existing land uses are low density residential except for developments near the State Route 109 intersection. Proposed future land uses in the area foresee Industrial/Commercial, Commercial/Office, and Residential Mixed Use development types in the future. This portion of Lebanon Road is expected to operate at LOS A in 2030.



Project 38: Interstate 40

Project Location

Termini: From east of Mt. Juliet Road to State Route 840

Length: 9.00 miles

Description: Add HOV lanes

Priority: Medium

Estimated Cost: \$66,300,000

Project Summary

This project proposes the addition of HOV lanes from east of Mount Juliet Road to State Route 840. This project is meant to improve the commute to/from Nashville. Currently, this portion of Interstate 40 mostly operates at LOS B and is expected to continue operating at LOS B in 2030.



Project 39: State Route 109

Project Location

Termini: From U.S. 70 to Bridge over the Cumberland River

Length: 10.60 miles

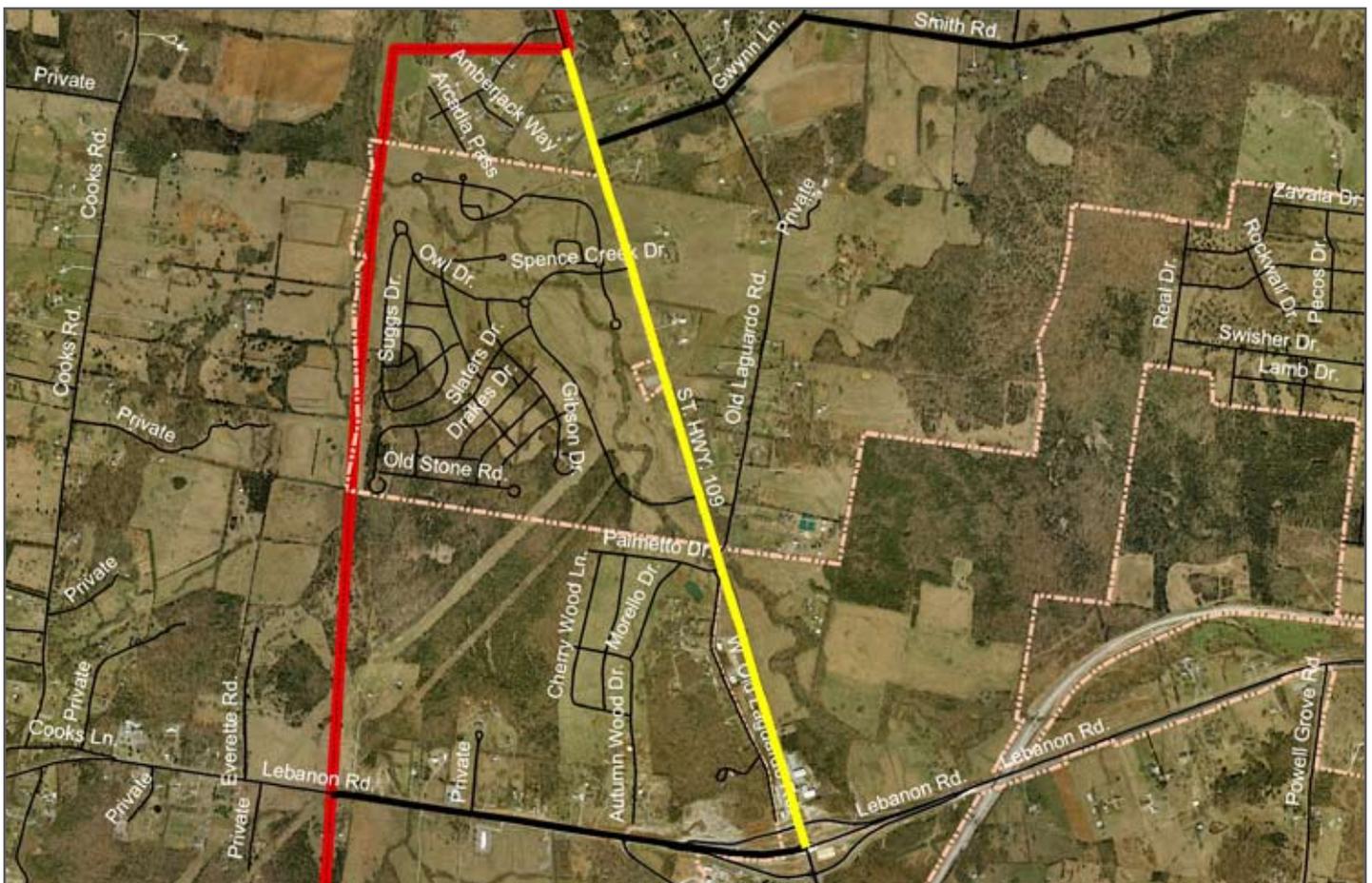
Description: Widen from two to five lanes including center turn lane

Priority: High

Estimated Cost: \$26,320,000

Project Summary

This project proposes widening State Route 109 from the U.S. 70 intersection going north. Future land uses within the Lebanon portion of this project include Industrial/Commercial, Residential Mixed Use, and Medium Density Residential. This portion of State Route 109 operates at LOS C and D. It is expected to operate at LOS A in 2030.



Project 40: East Division Street

Project Location

Termini: *From State Route 171 to State Route 109*

Length: *6.40 miles*

Description: *Widen from two to three lane sections – purchase ROW for 4/5 lanes*

Priority: *Medium*

Estimated Cost: **\$9,100,000**

Project Summary

This project proposes widening Division Street from State Route 109 going west. Industrial uses are recommended along this roadway in the future. The portion of East Division Street within the Lebanon UGB operates at LOS A.



Project 41: Central Pike (State Route 265)

Project Location

Termini: From State Route 171 to State Route 840

Length: 7.00 miles

Description: Widen from two to five lanes, including center turn lane

Priority: Medium

Estimated Cost: \$19,320,000

Project Summary

This project proposes widening Central Pike from State Route 840 going west. The Lebanon portion of this project begins near Wilson Central High School and runs through Public, Industrial, Commercial, and Medium Density Residential future land uses. It operates at LOS B until it reaches the Western UGB where it operates at LOS A. It is expected to operate at LOS A in 2030.



Project 42: State Route 26/U.S. Hwy. 70

Project Location

Termini: *From Interstate 40 to Dekalb County Line*

Length: *15.10 miles*

Description: *Rebuild to 12' lanes, provide center turn lane through Watertown*

Priority: *Low*

Estimated Cost: **\$36,800,000**

Project Summary

This project proposes improving State Highway 26/Sparta Pike from Interstate 40 going south. Industrial uses are recommended along this roadway in the future. This roadway operates at LOS C within the Lebanon UGB except where it operates at LOS B at the Interstate 40 interchange. Commercial/Office land uses are proposed near the Interstate 40 interchange, and Industrial/Commercial uses are proposed along the western road frontage, beginning near the proposed Hartmann Drive extension, going south. High Density Residential, Commercial, and Medium Density Residential future land uses are proposed to the east of State Route 26. The majority of this roadway is expected to operate at LOS A in 2030.



Project 43: Coles Ferry Pike/Academy Road

Project Location

Termini: From State Route 10 to State Route 109

Length: 11.00 miles

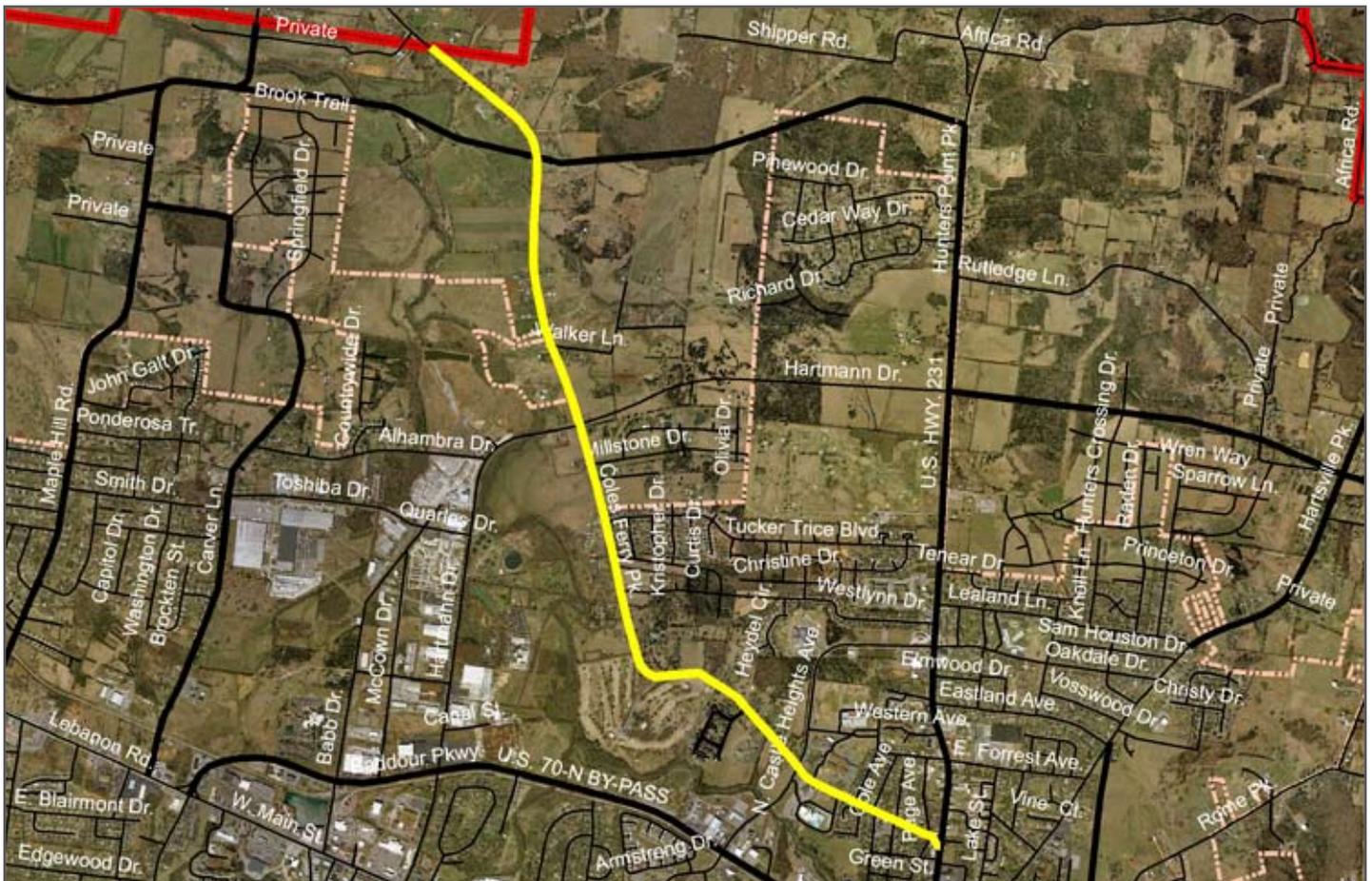
Description: Widen from three to five lanes

Priority: Low

Estimated Cost: \$26,720,000

Project Summary

This project proposes widening Coles Ferry Pike from Cumberland Avenue going north. A variety of future land uses are proposed along this roadway including Residential Mixed Use, Public, Medium Density Residential, and Low Density Residential. This roadway functions at LOS C and D near downtown but improves to LOS B as it moves north. It is expected to operate at LOS A in 2030.





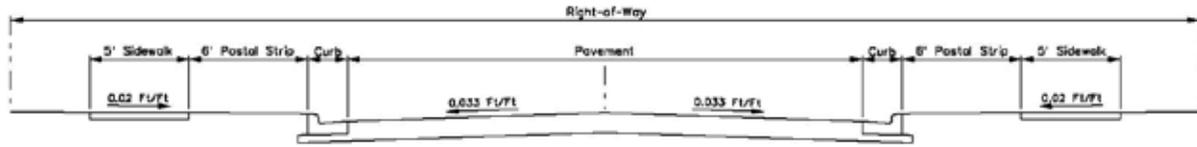
CHAPTER FIVE

Roadway Design Guidelines

5.1 Recommended Roadway Cross-Sections

The design standards to which a street is constructed determines how that street will function as part of the transportation network. As previously discussed, local streets, collector streets, and arterial streets each have their own function and should be designed to meet their intended purpose. The roadway design guidelines for Lebanon are included in the city's Subdivision Regulations, but are being made part of this MTP because of their impact on traffic operations within the study area. **Figure 5.1** presents the recommended street cross-section standards for local, collector, and arterial streets.

Figure 5.1 Street Cross-section Standards



STREET CROSS-SECTION STANDARDS	ARTERIAL		COLLECTOR			LOCAL	
	MAJOR (1)	MINOR (1)	MAJOR		MINOR RESIDENTIAL	COMMERCIAL AND INDUSTRIAL (1)	RESIDENTIAL (1)
			COMMERCIAL AND INDUSTRIAL	RESIDENTIAL			
RIGHT-OF-WAY WIDTH (MINIMUM) (2)	100 FT	80 FT	60 FT	60 FT	60 FT	60 FT	50 FT
NUMBER OF LANES (3)	3	3	2	2	2	2	2
TRAFFIC LANE WIDTH	12	12	12	12	12	12	12 (4)

NOTES:
 (1) See the standard drawing details for sidewalk locations, curb types, inlets, and alley requirements.
 (2) Where fill or cut slopes, utilities, roadway features, or other highway development must be included, additional right-of-way may be required.
 (3) These minimum values are subject to a traffic impact study. Additional lanes may be required based on the findings of the traffic impact study.
 (4) The Planning Commission may permit a pavement width of 22' based upon appropriate traffic study findings and a staff recommendation.



CITY OF LEBANON
MAJOR THOROUGHFARE PLAN

STREET CROSS-SECTION STANDARDS

Conclusion

The city of Lebanon has a tremendous opportunity to plan for its existing and future transportation network as the city continues to grow over the next 30 years. Lebanon’s Major Thoroughfare Plan is an important tool available to residents and leaders that ensures the continued orderly development of the Lebanon study area and results in informed decisions relative to transportation improvements. By analyzing the existing roadway network, anticipated population and employment growth, existing and future land uses, and the roadway network’s ability to handle growing traffic, alternatives for roadway improvements were developed that will result in needed mobility and access improvements.

Identifying and prioritizing roadway projects for Lebanon provides direction for the city to implement the plan and ensure it develops in a manner that fulfills the transportation needs of the city. Implementing the recommendations set forth in this Major Thoroughfare Plan will require a commitment from town staff, elected officials, and local residents to utilize the plan as part of Lebanon’s decision making process. Following the guiding principles listed below, and recommended activities established in this document, is the first step to a successful plan and to achieving a desired future roadway network offering a safe and connected transportation system that will meet the present and future needs for mobility and access for the city as it continues to grow. While changes occur and this plan evolves, the guiding principles of Lebanon will remain the same:

- Provide an efficient, safe and connective transportation system that is coordinated with existing and projected needs
- Provide a transportation system that is economical and responsive to environmental concerns and land use principles
- Provide a transportation system that is compatible with the City of Lebanon Future Land Use Plan
- Promote interconnectivity between development plans and the existing and future roadway network
- Consider planned development patterns, accessibility and mobility needs

As previously mentioned in the Introduction of this document, implementing the guiding principles of this plan, and maintaining an acceptable level of mobility for people and goods in the future, will require implementation of designated roadway improvements proposed in this document. These proposed improvements will help maintain a desirable level of service (LOS) and help provide an efficient means of transportation in conjunction with recently completed future land use planning efforts.

The future of Lebanon is promising, thanks to present day efforts that show foresight and great consideration. Staying focused and keeping the city's best interests in mind while using the Major Thoroughfare Plan as a guide, will produce results that the community wants - a flourishing city with an efficient, safe, and successful transportation system.