

TENNESSEE DEPARTMENT OF TRANSPORTATION



INTERSTATE ACCESS REQUEST

INTERSTATE 65 AT BUCKNER ROAD EXTENSION WILLIAMSON COUNTY

Prepared by Volkert for:

Williamson County, City of Spring Hill, and for the
Tennessee Department of Transportation Strategic Transportation Investments Division

May 2014
Rev. 1 October 2017
Rev. 2 January 2018

EXECUTIVE SUMMARY

This I-65 Interstate Access Request (IAR) is being made by the following local municipalities: Williamson County and the City of Spring Hill. The proposed interchange is in the Nashville Area MPO 2040 Regional Transportation Plan as an illustrative project. This potential interchange is not in the Nashville Transportation Management Area (TMA).

The primary purpose and need for the new I-65 interchange between Saturn Parkway (SR 396) and I-840 (see Figure E1 on page iii) is to address regional mobility, accessibility and encourage economic development for the City of Spring Hill, southern Williamson County, and northern Maury County. Along I-65, the SR 396 (Saturn Parkway), I-840, and Goose Creek Bypass interchanges are separated by 4.5 miles and 1.5 miles, respectively measured from the nearest gore of all the interchanges. The I-840 and Goose Creek Bypass interchange on I-65 offers regional access to Spring Hill, southern Williamson County and northern Maury County. Motorists on SR 396 (Saturn Parkway) utilize the Port Royal Road, Kedron Road, or US 31 (Columbia Pike) interchanges to gain direct access to this area. The operation at these three (3) interchanges is reaching capacity which is limiting the development in the area. The addition of a new interchange on I-65 with direct access to Spring Hill will improve the traffic operations at these existing interchanges due to the redistribution of traffic that will result in lower delays when compared to not building a new interchange (see Appendix C).

Additionally, in the northwest and southwest quadrant of the preferred interchange location, there is approximately 781 acres of undeveloped land that has been approved by Spring Hill for a large mixed use development. This land, while currently undeveloped, is currently entitled and zoned as Planned Unit Development (PUD)/Gateway District. The PUD vision is a regional development that would need a new interchange to provide regional access and relieve congestion from the I-840 Thompson's Station interchanges and the SR 396 (Saturn Parkway) interchanges. A new interchange on I-65 in Williamson County would also stimulate additional development and boost the regional economy.

There is currently one thru lane in each direction along US 31 (Columbia Pike) which experiences a poor level of service (LOS) with a 2015 average daily traffic volume as recorded by TDOT of 16,290 just north of Duplex Road and 19,620 north of Thompson's Station Road. The City of Spring Hill is currently constructing intersection improvements along US 31 (Columbia Pike) to improve the traffic operations. Based on the current regional network access locations, lower classified roads in the City of Spring Hill like Buckner Lane, Thompson's Station Road, Clayton Arnold Road, Pantall Road, Buckner Road, and Critz Lane are being utilized to make regional trips and gain access to southern Williamson County. To alleviate some of the congestion the City of Spring Hill is widening Duplex Road and improving Port Royal Road. There are also improvements planned at the SR-396 Ramps and Port Royal Road. However, these improvements alone are not expected to alleviate the congestion caused by the stifled regional mobility.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

One (1) Build alternative location was considered at the proposed extension of Buckner Road. This extension would run on new alignment from Buckner Lane to US 431 (Lewisburg Pike).

Four (4) Build Alternatives were considered for the new interchange at I-65 and the Buckner Road extension: No Build Alternative, Tight Urban Diamond Interchange (TUDI), Diverging Diamond Interchange (DDI), and Partial Cloverleaf Interchange (Parclo).

The No Build Alternative includes the planned projects in Spring Hill and improvements expected through the 2041 design year, but exclude the new interchange on I-65 at the new Buckner Road extension and the Buckner Road extension from I-65 to US 431 (Lewisburg Pike). The three interchanges in the area expected to be impacted by a new I-65 interchange according to the analysis are expected to operate at a poor LOS during the AM and PM peak hours for the No Build alternative. These interchanges include the I-840 eastbound and westbound ramps at US 31 (Columbia Pike), the I-840 eastbound ramp at US 431 (Lewisburg Pike), and the SR 396 (Saturn Parkway) eastbound and westbound ramps at Port Royal Road.

The 2041 Build analysis included the same improvements as those in the 2041 No Build with the addition of the new interchange and Buckner Road extension to US 431 (Lewisburg Pike). The new interchange will impact the network interchanges on I-840 and SR 396 (Saturn Parkway) the most. These interchanges are expected to experience lower delays which will help the regional mobility in the area. The analysis shows that the interchange will not substantially alleviate traffic on the local network which is impacted largely by local trips and will require more improvements by the local municipalities.

Build Alternative 1 analyzed the safety and functionality of a TUDI on I-65 at the Buckner Road extension. This analysis resulted in 577 predicted crashes along I-65 and 864 predicted crashes on the new Buckner Road extensions at the ramp terminals from 2021 to 2041. Based on the feasible geometry of the interchange, the I-65 northbound ramp is expected to operate poorly.

Build Alternative 2 analyzed the safety and operation of a DDI on I-65 at the Buckner Road extension. This analysis resulted in 496 predicted crashes along I-65 and 942 predicted crashes on the new Buckner Road extension at the ramp terminals from 2021 to 2041. In addition, the DDI had the fewest number of predicted severe crashes when compared to the other two build alternatives. Based on the feasible geometry of the DDI, the level of service at the I-65 northbound and southbound ramps and the Buckner Road extension at US 431 (Lewisburg Pike) intersection are expected to operate adequately.

Build Alternative 3 analyzed the safety and operation of a Parclo on I-65 at the Buckner Road extension. This analysis resulted in 550 predicted crashes along I-65 and 880 predicted crashes on the new Buckner Road extension at the ramp terminals from 2021 to 2041. Based on the feasible geometry of the Parclo, the level of service at the I-65 northbound and southbound ramps and the Buckner Road extension at US 431 (Lewisburg Pike) intersection are expected to operate adequately.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Build Alternative 2 (DDI) is the preferred alternative because it provides adequate operations and the fewest predicted severe crashes when compared to the other build alternatives.

The costs associated with Build Alternative 2, a new DDI interchange on I-65 at the extension of, but not including, Buckner Road are as follows:

ROW Acquisition:	\$983,000
Construction:	\$27,521,000
Utility Relocation:	\$528,800
TOTAL:	\$29,032,800

This study analyzes the engineering feasibility and defines the required improvements best suited to meet the current and future regional needs for the City of Spring Hill, Williamson County, and Maury County. This report will be submitted by the Tennessee Department of Transportation (TDOT) to the Federal Highway Administration (FHWA) for a determination of engineering and operational acceptability. Receipt of this determination does not guarantee approval of any new access or changes to current access. Final approval of the Interstate Access Request will be requested once all National Environmental Policy Act (NEPA) requirements have been met and a determination that this document and any potential changes from the NEPA process have been addressed.

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

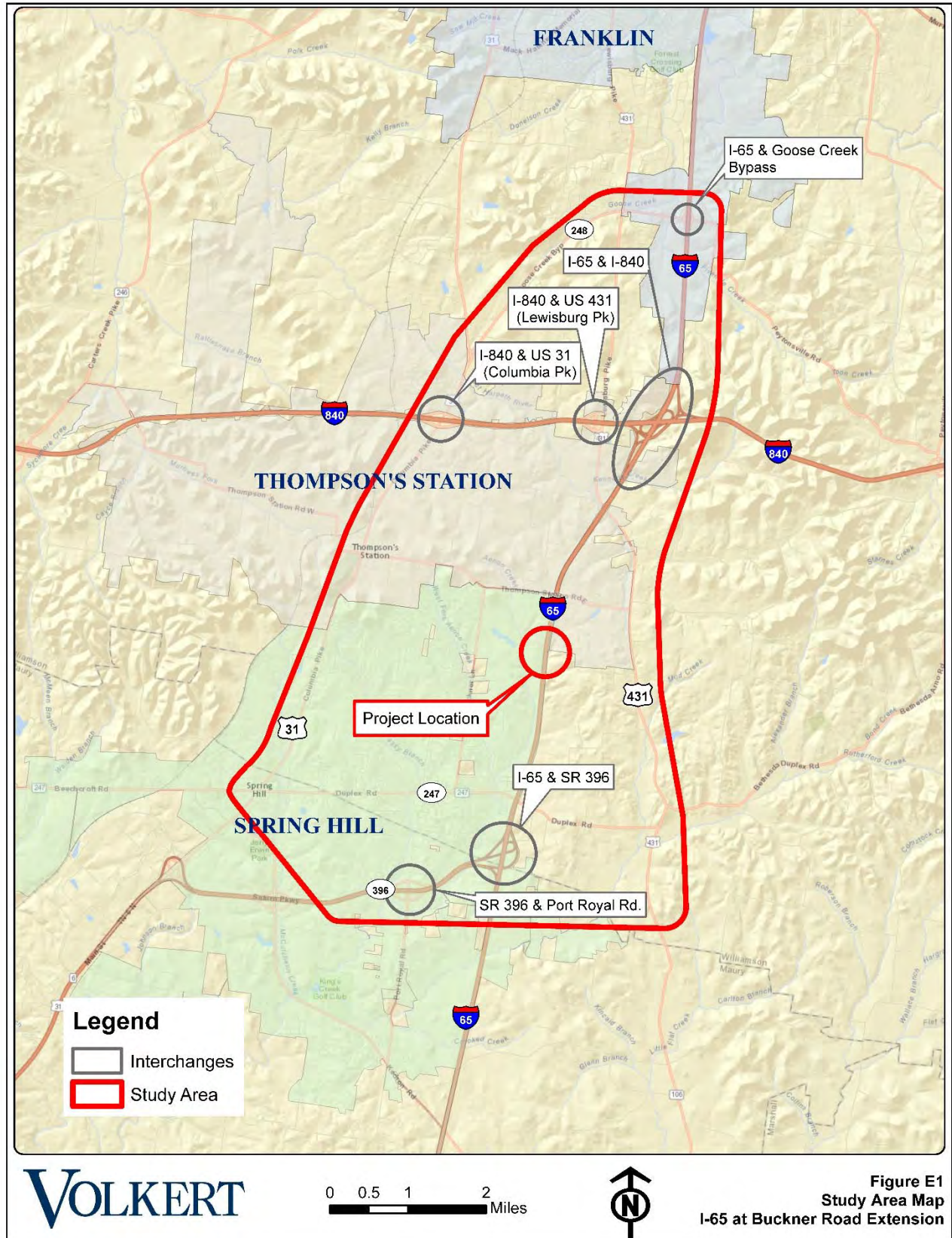


TABLE OF CONTENTS

EXECUTIVE SUMMARY i

1. INTRODUCTION 1

 A. STUDY BACKGROUND 1

 B. DESCRIPTION OF STUDY AREA 3

 C. PURPOSE AND NEED 5

2. EXISTING CONDITIONS 7

 A. EXISTING NETWORK 7

 B. CRASH HISTORY AND ANALYSIS 9

 C. GEOMETRIC DEFICIENCIES 9

 D. EXISTING TRAFFIC 12

 E. EXISTING LAND USE AND ZONING 15

 F. PRELIMINARY ENVIRONMENTAL CONSTRAINTS 17

3. FUTURE CONDITIONS 19

 A. FUTURE TRAFFIC VOLUMES 19

 B. FUTURE LAND USE 24

4. CONCEPTUAL ALTERNATIVES 26

 A. NO BUILD ALTERNATIVE 26

 B. BUILD ALTERNATIVE 1 – TIGHT URBAN DIAMOND INTERCHANGE (TUDI) 26

 C. BUILD ALTERNATIVE 2 – DIVERGING DIAMOND INTERCHANGE (DDI) 27

 D. BUILD ALTERNATIVE 3 – PARTIAL CLOVERLEAF INTERCHANGE (Parclo) 28

5. TRAFFIC ANALYSIS 30

 A. CAPACITY ANALYSIS METHODOLOGY AND ASSUMPTIONS 30

 B. BASELINE 2021 NO BUILD WITH SPOT IMPROVEMENTS – SCENARIO 1 34

 C. FUTURE 2041 NO BUILD WITH SPOT IMPROVEMENTS – SCENARIO 2 37

 D. FUTURE 2041 BUILD ANALYSIS 42

 E. ANALYSIS OF ALTERNATIVE CONCEPTS 48

 F. SAFETY ANALYSIS 50

6. CONSTRUCTION 52

 A. CONSTRUCTABILITY 52

 B. INITIAL COST ESTIMATE OF EACH BUILD ALTERNATIVE 52

7. SUMMARY 54

 A. DISCUSSION OF FHWA 8 POINTS 54

 B. CONCLUSIONS AND RECOMMENDATIONS 68

 C. NEXT STEPS 68

 D. TDOT DESIGN CONCURRENCE LETTER 69

 E. TDOT TRAFFIC APPROVAL LETTER 70

 F. LETTERS OF SUPPORT 71

 G. FUNCTIONAL PLANS 76

APPENDIX

 A. 2016 TURNING MOVEMENT COUNTS

 B. FEMA FLOOD MAPS AND USDA SOILS MAPS

 C. NO BUILD AND BUILD ALTERNATIVES TRAFFIC ANALYSES

 D. 2660 BUCKNER LANE TRAFFIC IMPACT STUDY

 E. BUCKNER LANE ENGINEERING STUDY

 F. BUCKNER ROAD TRANSPORTATION STUDY

 G. ISATe SAFETY ANALYSIS

 H. BUILD ALTERNATIVE COST ESTIMATES

 I. HCM 2010 ANALYSIS

TABLE OF FIGURES

FIGURE E1	STUDY AREA	iv
FIGURE 1	VICINITY MAP	2
FIGURE 2	STUDY AREA	4
FIGURE 3	EXISTING ROAD NETWORK	8
FIGURE 4A	CRASH SUMMARY: INTERCHANGES	10
FIGURE 4B	CRASH SUMMARY: SEGMENTS	11
FIGURE 5A	2016 AVERAGE DAILY TRAFFIC VOLUMES	13
FIGURE 5B	2016 PEAK HOUR TURNING MOVEMENT DATA	14
FIGURE 6	SPRING HILL POPULATION 1980-2016	15
FIGURE 7	STUDY AREA TOPOGRAPHY	18
FIGURE 8	2021 PROPOSED GEOMETRY	22
FIGURE 9	2041 PROPOSED GEOMETRY WITH INTERCHANGE	23
FIGURE 10	SPRING HILL FUTURE LAND USE MAP	25
FIGURE 11	TIGHT URBAN DIAMOND INTERCHANGE	27
FIGURE 12	DIVERGING DIAMOND INTERCHANGE	28
FIGURE 13	PARTIAL CLOVERLEAF INTERCHANGE	29
FIGURE 14	BUCKNER LANE DEVELOPMENT PLAN	31
FIGURE 15	2021 BASELINE NO BUILD (SCENARIO 1) LOS	36
FIGURE 16	2041 NO BUILD (SCENARIO 2) LOS	40
FIGURE 17	2041 BUILD (SCENARIO 2) LOS	44
FIGURE 18	2041 BUILD (SCENARIO 3) LOS	47

TABLE OF TABLES

Table 1	Western Half Development Trip Generation per Scenario	20
Table 2	Level of Service Definition for Intersections	32
Table 3	Level of Service Definition for Freeway Links	32
Table 4	Level of Service Definition for Freeway Ramp Areas	33
Table 5	Daily Traffic Level of Service Limits for Class II Two Lane Highways	33
Table 6	Intersection Level of Service: 2021 Baseline No Build (Scenario 1)	35
Table 7	Segment Level of Service: Baseline 2021 No Build	37
Table 8	Intersection Level of Service: 2041 No Build (Scenario 2)	39
Table 9	Segment Level of Service: 2041 Interchange Build and No Build	41
Table 10	Intersection Level of Service: 2041 Build (Scenario 2)	43
Table 11	Intersection Level of Service: 2041 Build (Scenario 3)	46
Table 12	Interchange Level of Service: 2041 Build (Scenario 3)	49
Table 13	Interchange Alternatives Merge LOS: 2041 Build (Scenario 3)	49
Table 14	2021-2041 ISATe Predictive Model Crash Summary	51
Table 15	Summary of Cost Estimates	53

CHAPTER 1

INTRODUCTION

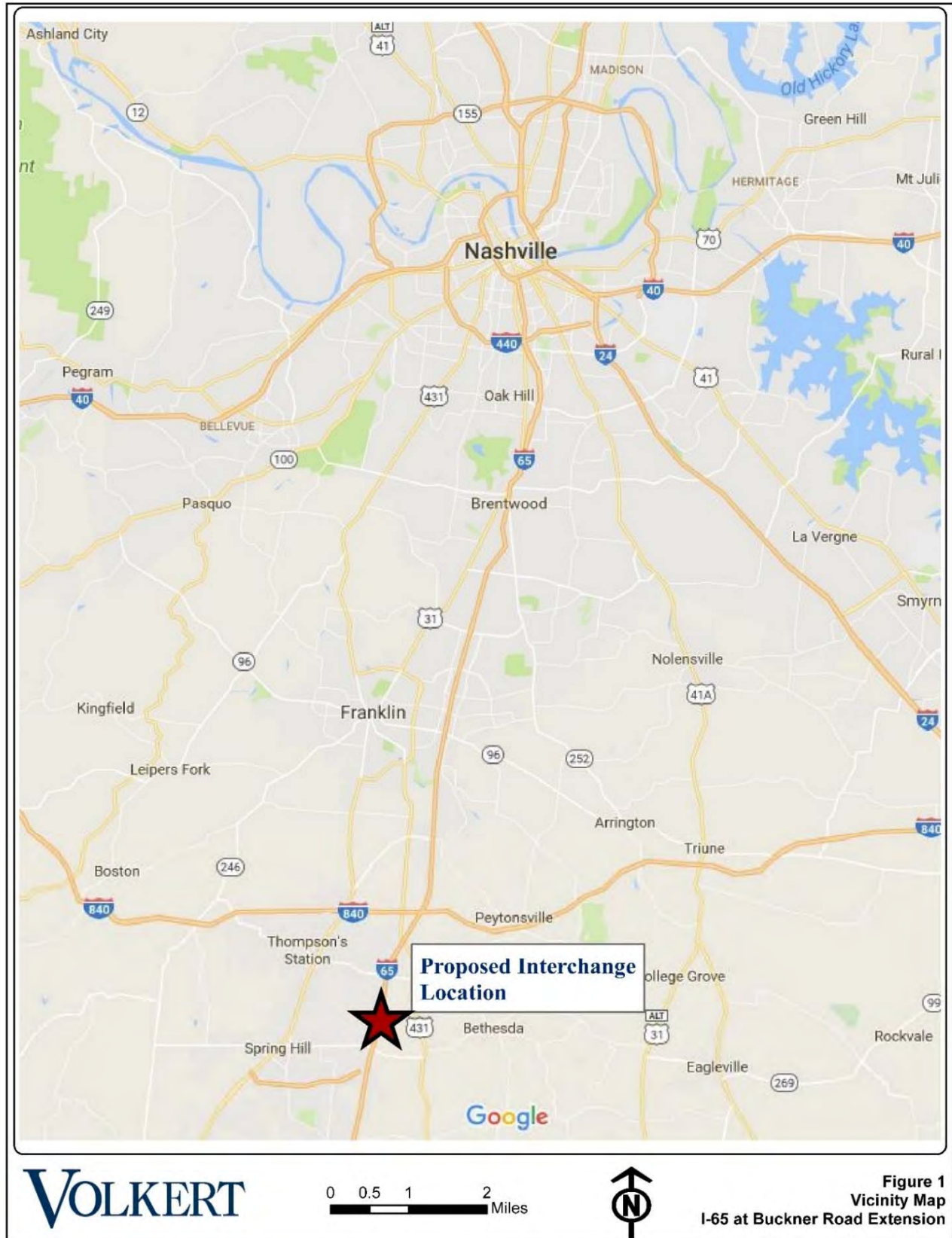
A. STUDY BACKGROUND

This study, to add an interchange on Interstate 65 at the Buckner Road Extension, is the result of a joint effort between Williamson County and the City of Spring Hill. See Figure 1 for the Vicinity Map for this project. The governmental entities recognize the potential need for an additional interstate access point in southern Williamson County and commissioned this study, by Volkert, Inc., to determine if one is justified. Williamson County has grown rapidly over the past thirty years and continues to experience tremendous growth pressures. Economic investment and development continues apace within Williamson County, and interest in the undeveloped land in the area of the interchange indicates that growth will continue in the coming years.

Spring Hill has been a magnet for much of the County's growth, with a 2016 certified population estimate of 36,530. Williamson County is noted for excellent schools and the most exclusive jobs base in the region, including the Nissan North America headquarters and Mars Pet Care headquarters. In addition, Spring Hill is home to the General Motors Assembly Plant. With this onslaught of growth, it has become clear that the area's regional transportation network is insufficient. The primary concerns include a lack of multi-lane roadway facilities to accommodate the efficient movement of people and goods. This is exacerbated by the lack of an interstate access point that is central to the population base of the Spring Hill community. This study provides an assessment of existing land uses; descriptions of future land uses; and traffic impacts within the Study Area in order to assess the potential for a new Interstate 65 interchange.

The proposed interchange on I-65 is part of the Illustrative Project List in the Nashville Area MPO 2040 Regional Transportation Plan (LRTP). This status as an illustrative project will need to change to a short-term project that would require planning, design, and construction to occur within eight years. The Spring Hill Major Thoroughfare Plan also includes a proposed I-65 interchange, to be located at an extension of Buckner Road between I-840 and Saturn Parkway (SR 396).

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County



B. DESCRIPTION OF STUDY AREA

The proposed interchange along I-65 at the proposed Buckner Road extension would be located in Spring Hill, Tennessee in Williamson County, south of Nashville. Figure 2 depicts the overall study area. Three (3) interchanges on I-65 included in the study area are Goose Creek Bypass (SR 248), I-840, and Saturn Parkway (SR 396). I-840 to the north and Saturn Parkway (SR 396) to the south are the nearest existing interchanges on I-65 and are approximately 23,760 feet apart, or 4.5 miles. The proposed interchange location is approximately 2.2 miles south of the I-840 interchange ramps and 2.3 miles north of the Saturn Parkway (SR 396) ramps.

An interchange on I-65 at the proposed Buckner Road extension would have widespread impacts to the surrounding street system in both Williamson and Maury Counties. The network of US, state, and local roads shown in Figure 2 will realize impacts. The impacts would be seen on the regional routes such as I-840, Saturn Parkway (SR 396) and I-65 as well as on the connector roads moving vehicles from Spring Hill to the I-840 and Saturn Parkway (SR 396) interchanges. The I-840 and US 431 (Lewisburg Pike) interchange and the Port Royal Road and Saturn Parkway (SR 396) interchange are experiencing excessive ramp queues based on field observations and are expected to see improvement. Three north-south oriented roads: US 31 (Columbia Pike), US 431 (Lewisburg Pike), and Buckner Lane will see a redistribution of traffic. The new interchange is expected to accommodate a substantial amount of commuter trips between Spring Hill, Williamson County and Nashville that currently travel north to I-840 or south to Saturn Parkway (SR 396) to access I-65. In addition, this interchange is expected to accommodate the trips generated by the new mixed-use development planned west of the new interchange.

East-west oriented roads that will be impacted by a new interchange on I-65 include Saturn Parkway (SR 396), Duplex Road (SR 247), Buckner Road, Thompson's Station Road, Critz Lane, and I-840. These roads currently serve trips originating in Spring Hill and traveling to a destination north, south, or east of Spring Hill.

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

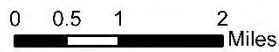
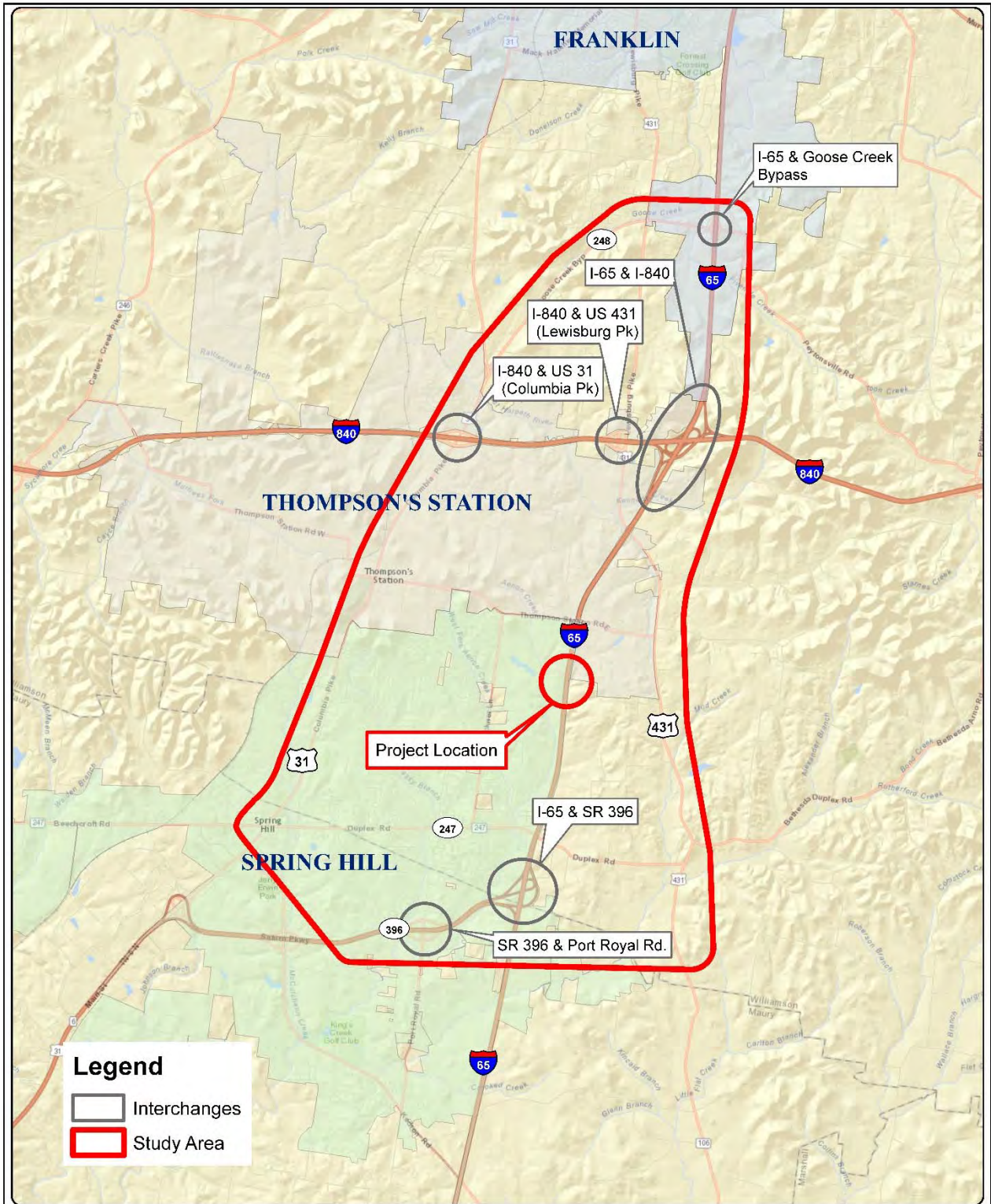


Figure 2
 Study Area Map
 I-65 at Buckner Road Extension

C. PURPOSE AND NEED

Middle Tennessee has experienced rapid growth over the past decade. Much of this growth has been focused in Williamson County, Spring Hill, and Thompson's Station. This growth and development over the last thirty years has resulted in ever increasing congestion within the regional transportation network. This growth is projected to continue, along with increased congestion in the transportation network. The Study Area, generally bound by Goose Creek Bypass (SR 248) to the north, Saturn Parkway (SR 396) on the south, I-65 and US 431 (Lewisburg Pike) on the east, and US 31 (Columbia Pike) on the west, and encompassing the City of Spring Hill, the Town of Thompson's Station, Williamson and Maury Counties, experiences a significant amount of commuter trips that occur between the area and Nashville, Franklin, Brentwood, and Murfreesboro.

Commuters between the area and cities to the north utilize the major north-south arterials; US 31 (Columbia Pike) and US 431 (Lewisburg Pike), as well as I-65. Commuters using I-65 have to access the area from: Goose Creek Bypass interchange, I-840, or Saturn Parkway (SR 396). All three of these locations indirectly serve the population of Spring Hill and as the only connections to I-65 will make the development west of the proposed interchange difficult.

The I-65 and I-840 interchange and I-65 and Saturn Parkway (SR 396) interchange are separated by 4.5 miles. This separation between interchanges and indirect access locations have resulted in congestion and increased delays on the local and regional network limiting development.

A proposed new interchange on I-65 would provide the following benefits related to regional accessibility:

- Provide a direct connection to the regional interstate system for the City of Spring Hill and the majority of its population
- Encourage economic development in the vicinity of the new interchange location
- Improve safety on I-65 near Saturn Parkway (SR 396)
- Improve safety and levels of service at the US 431 (Lewisburg Pike) interchange on I-840
- Improve safety and levels of service on Saturn Parkway (SR 396) at the Port Royal interchange
- Improve safety and levels of service at the US 31 (Columbia Pike) interchange on I-840

A proposed new interchange on I-65 at the new Buckner Road extension will improve regional accessibility for the local communities and relieve congestion at the existing interchanges. Regional operations are expected to see improvements at the I-840 and US 431, I-840 and US 31, and SR-396 (Saturn Parkway) at Port Royal Road interchanges. Without the interchange, these ramps that carry the regional trips in this area are expected to experience poor levels of service during either the AM or PM peak hours and on three of these interchanges during both peak hours. With the construction of the proposed interchange, the 2041 Build analysis shows that only US 431 at I-840 eastbound ramps will operate at a poor level of service during both peak hours, and all intersections will experience reductions in delay times. This is discussed in more detail in Chapter 5.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

A new interchange on I-65 will also stimulate economic development around the area of the interchange and the surrounding subarea, which would benefit from better I-65 access. West of the new interchange, there is a 781 acre undeveloped tract of land that was recently entitled for a PUD master plan with 774 single family homes, 2,152 multifamily homes, 1.2 million square feet of retail/restaurants, 3.9 million square feet of office, and a 400 room hotel. The build-out year targeted by the PUD Master Plan is 2037. Spring Hill's Land Use Plan, *Spring Hill Rising: 2040*, designates the future land use policy for this area as Gateway Area, suitable for the highest intensity and density development within the City. Primary future land uses identified by the PUD Master Plan include regional level development, corporate headquarters, mixed residential uses, and retail uses. High density residential uses are suggested as a secondary future land use in this policy area. The Land Use policy for this area enables the City to adequately incorporate major transportation elements, such as a new I-65 Interchange, into the overall development pattern at this location. The approved PUD Master Plan anticipates major, regional transportation elements as part of its entitlements. Improved regional accessibility would facilitate the implementation of this PUD Master Plan to ensure quality land uses that would improve the regional economy.

CHAPTER 2

EXISTING CONDITIONS

A. EXISTING NETWORK

As mentioned previously the roadway network included in the study area is bound by Columbia Pike (US 31) to the west, Goose Creek Bypass (SR 248) to the north, SR 396 (Saturn Parkway) to the south and I-65 and US 431 (Lewisburg Pike) to the east.

Near the proposed interchange at the Buckner Road extension, I-65 carries two lanes in each direction and has a posted speed limit of 70 mph. The grade is relatively flat in the immediate area of the potential interchange, but is considered rolling in the overall study area based on Spring Hill topographic GIS data.

The northern boundary of the study area is the interchange on I-65 located at Goose Creek Bypass. The Goose Creek Bypass interchange completed improvements in 2016 as part of a widening of I-65. This interchange is included in the analysis but does not serve a large number of regional trips from the southern portion of Williamson County and Maury County. The impact at this interchange is expected to be minimal.

I-840 between the I-65 interchange and US 31 (Columbia Pike) interchange has two lanes in each direction of travel for traffic. The posted speed limit is 70 mph. There is an additional interchange along this segment of I-840 at US 431 (Lewisburg Pike) that will be impacted by the new interchange

SR 396 (Saturn Parkway) is a limited access control facility that provides two lanes for travel in each direction between the I-65 interchange and US 31 (Columbia Pike) interchange. The posted speed limit is 65 mph. There are three interchanges along this segment of roadway. One is located at Port Royal Road, another is at Kedron Road, and the third is at US 31 (Columbia Pike). For the purposes of this study, it is believed impacts of a new interchange on I-65 will be seen at the Port Royal Road interchange.

Figure 3 on page 8 illustrates the road system in the proposed interchange environs and the geometrics (number of approach lanes) at key intersections. It also shows traffic control devices at these key intersections. I-65, I-840, and Saturn Parkway (SR 396) from I-65 to US 431 (Lewisburg Pike) have two (2) lanes per direction. All of the other roads within the study area have one (1) lane in each direction.

B. CRASH HISTORY AND ANALYSIS

Figures 4A and 4B summarize crash data from 2013 through 2015 on I-840, I-65, and SR 396 (Saturn Parkway). The data are divided into four major categories: property damage only, non-incapacitating injury, incapacitating injury, and fatality. The crash data for the interchanges and segments are mutually exclusive so double counting does not occur.

I-65 Crash Patterns

Along I-65 between SR 248 (Goose Creek Bypass) and I-840 there were 325 crashes and between I-840 and SR 396 (Saturn Parkway) there were 251 crashes. The interchange on I-65 at Goose Creek Bypass (SR 248) experienced 148 total crashes with 6 being ramp related. From 2013-2015 there was one (1) fatal crash along each segment of I-65 in the study area.

I-840 Crash Patterns

The segment of I-840 between I-65 and US 31 (Columbia Pike) saw 33 crashes. Interchange crashes on I-840 between the I-65 interchange and US 31 (Columbia Pike) totaled 287 crashes with 111 being ramp related. The I-65 and I-840 interchange experienced 186 crashes alone. The I-840 and US 431 (Lewisburg Pike) interchange experienced 96 crashes.

SR 396 (Saturn Parkway)

The I-65 and SR 396 (Saturn Parkway) interchange experienced 58 total crashes from 2013 to 2015. At the SR 396 (Saturn Parkway) and Port Royal Road interchange, 13 crashes were reported. A total of 80 interchange crashes occurred on SR 396 (Saturn Parkway) between I-65 and US 31 (Columbia Pike).

SR 396 (Saturn Parkway) between I-65 and Port Royal Road saw 40 crashes and between Port Royal Road and US 31 (Columbia Pike) there were 62 crashes. During this time period, both segments of roadway saw one fatal crash.

C. GEOMETRIC DEFICIENCIES

I-65 is a standard 12-foot per lane, two-lane per direction freeway with four-foot shoulders on the inside and 10-foot shoulders on the outside. Both shoulders have rumble strips. Consequently, geometric deficiencies do not exist.

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

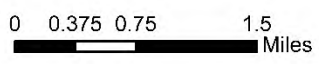
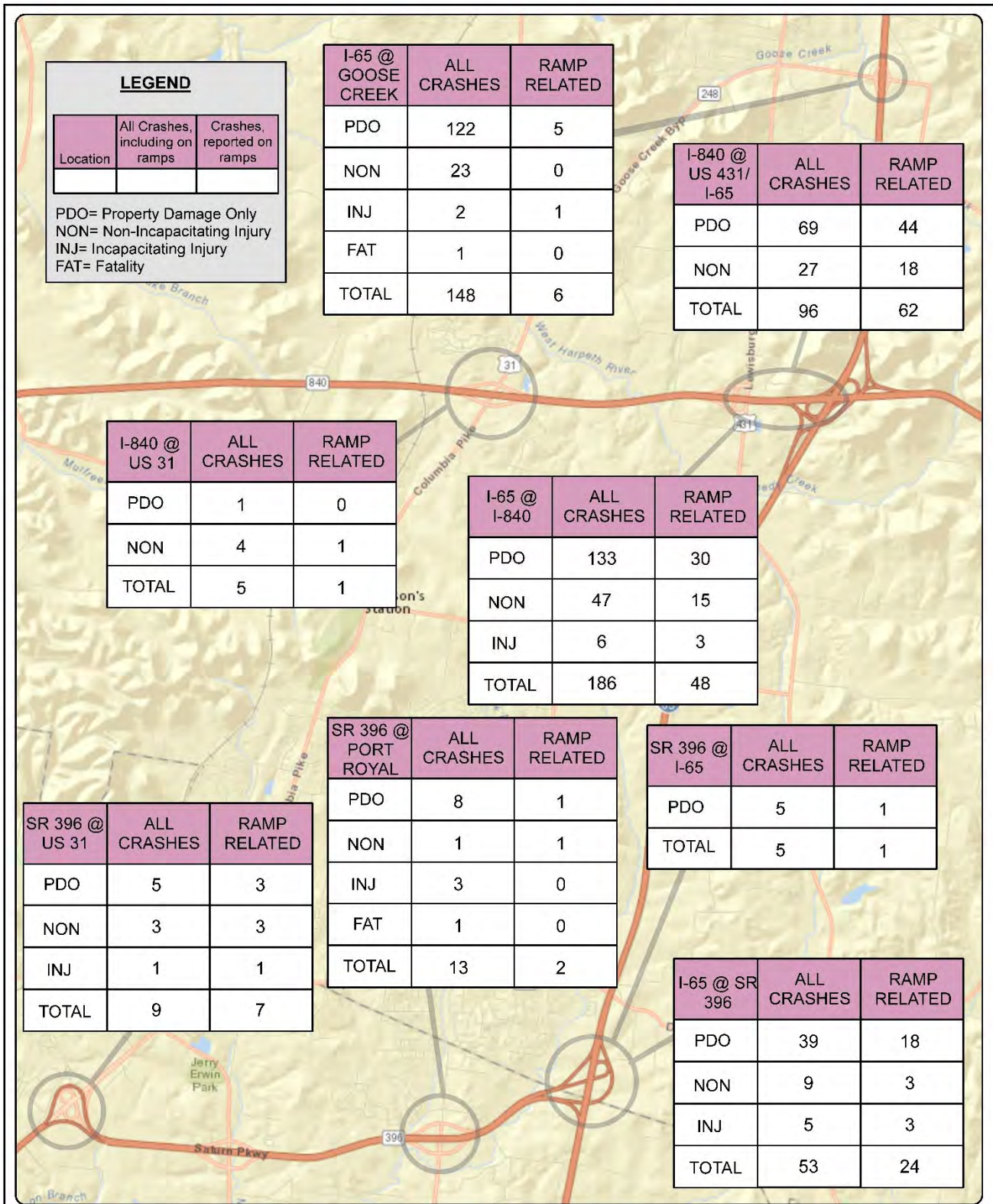


Figure 4A.
 Crash Summary: Interchanges
 I-65 at Buckner Road Extension

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

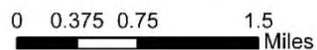
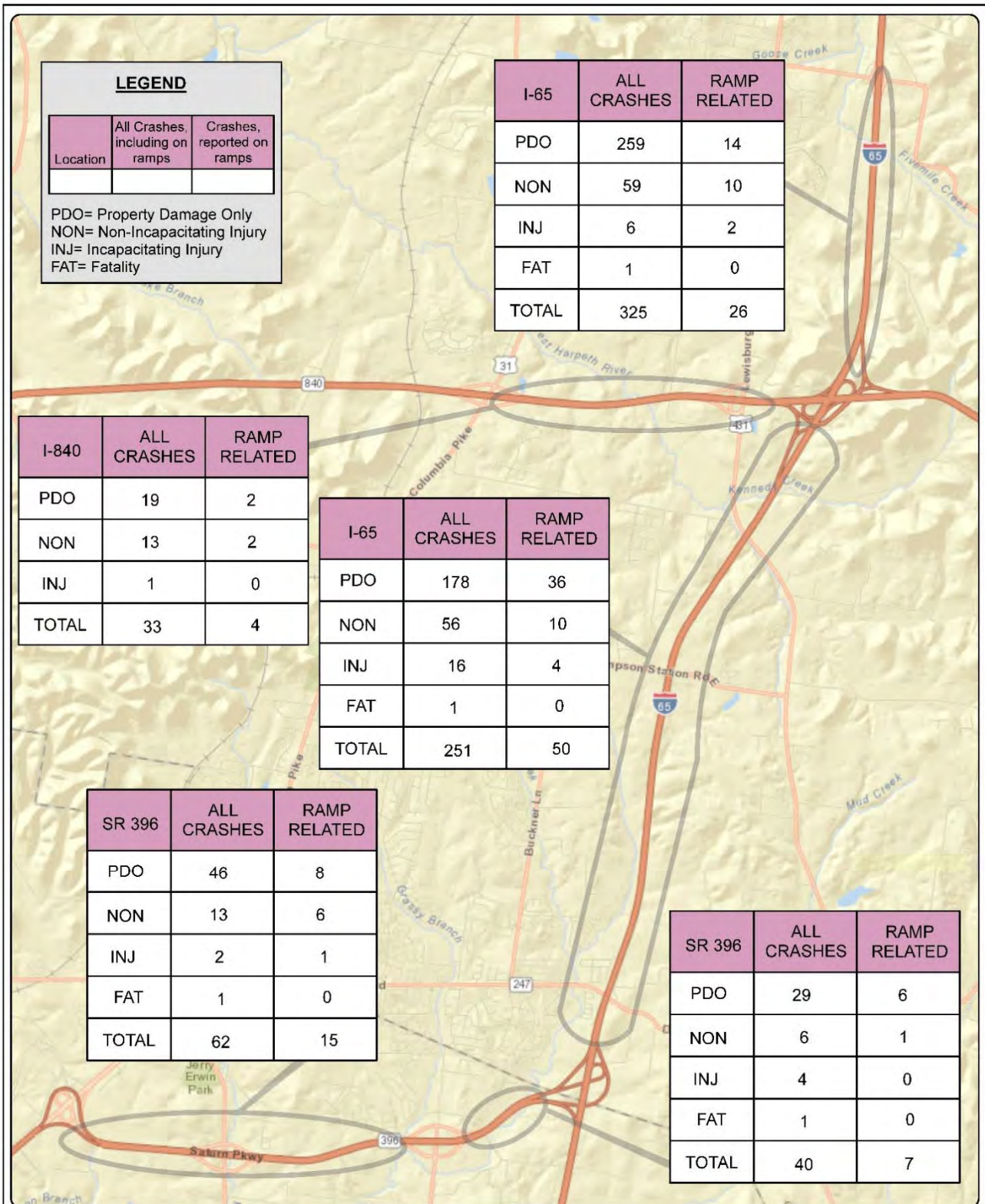


Figure 4B.
 Crash Summary: Segments
 I-65 at Buckner Road Extension

D. EXISTING TRAFFIC

Tube counts were conducted by Spring Hill in 2016 on Buckner Lane, Buckner Road, Thompson's Station Road, and Duplex Road in the study area and were supplemented with 2015 TDOT counts conducted in the study area. Figure 5A shows the 2015 ADT volumes taken from the TDOT counts and the ADT volumes from the Spring Hill tube counts conducted in 2016.

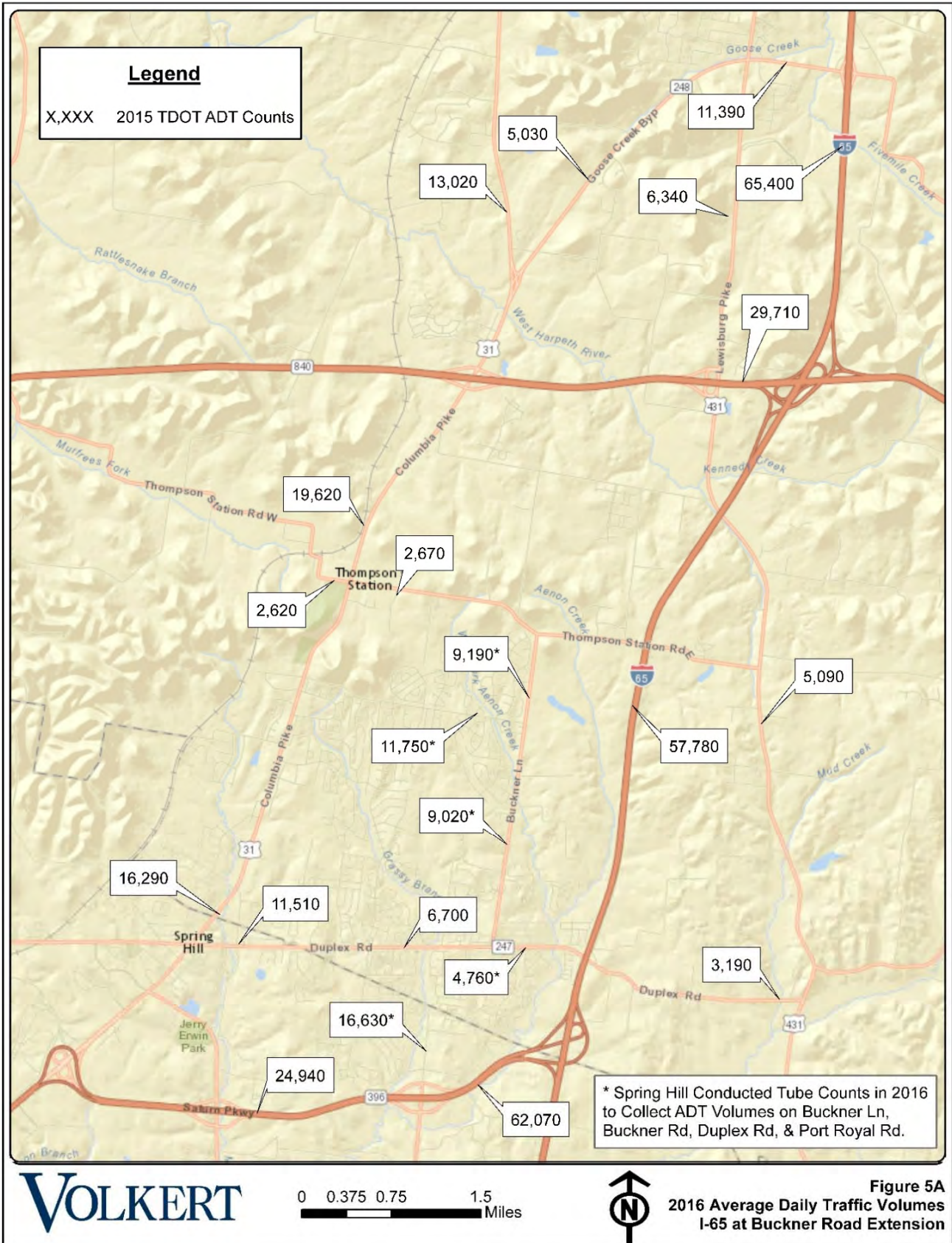
In 2015, I-65 accommodated an Average Annual Daily Traffic (AADT) volume of 57,780 between SR 396 (Saturn Parkway) and I-840. Saturn Parkway's 2015 AADT was 62,070 vehicles per day (vpd) between I-65 and Port Royal Road and 24,940 vpd between Port Royal Road and Kedron Road. US 31 (Columbia Pike) accommodates between 16,290 vpd in the southern part of the study area and 19,620 vpd near I-840. US 431 (Lewisburg Pike) has AADTs ranging from 6,340 vpd north of Thompson's Station Road to 5,090 vpd north of Duplex Road. Spring Hill collected 24-hour tube counts in 2016 on additional roadway segments relevant to this study. Those counts are included on Figure 5A.

In addition, turning movement counts were conducted at 19 intersections in the study area as listed below:

- US 31 (Columbia Pike) at I-840 EB Ramps
- US 31 (Columbia Pike) at I-840 WB Ramps
- US 431 (Lewisburg Pike) at I-840 EB Ramps
- US 431 (Lewisburg Pike) at I-840 WB Ramps
- Buckner Lane at Thompson's Station Road
- Buckner Lane at Buckner Road
- Buckner Lane at Duplex Road
- US 31 at Goose Creek Bypass
- US 31 (Columbia Pike) at Critz Lane
- US 31 (Columbia Pike) at Thompson's Station Road
- US 31 (Columbia Pike) at Buckner Road
- Port Royal Road at Saturn Parkway (SR 396) EB Ramps
- Port Royal Road at Saturn Parkway (SR 396) WB Ramps
- Critz Lane at US 431 (Lewisburg Pike)
- Thompson's station Road at US 431 (Lewisburg Pike)
- Duplex Road at US 431 (Lewisburg Pike)
- Goose Creek Bypass at US 431 (Lewisburg Pike)
- Goose Creek Bypass at I-65 SB Ramps
- Goose Creek Bypass at I-65 NB Ramps

Turning movement volumes at the intersections were collected between 6:00-9:00 AM and 4:00-7:00 PM during a typical fall weekday. For the entire study area, the AM peak hour is from 6:45 to 7:45 and the PM peak hour is from 4:45 to 5:45 on a typical weekday. The peak hour volumes are shown on Figure 5B. Detailed turning movement count data is included in Appendix A.

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County



Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

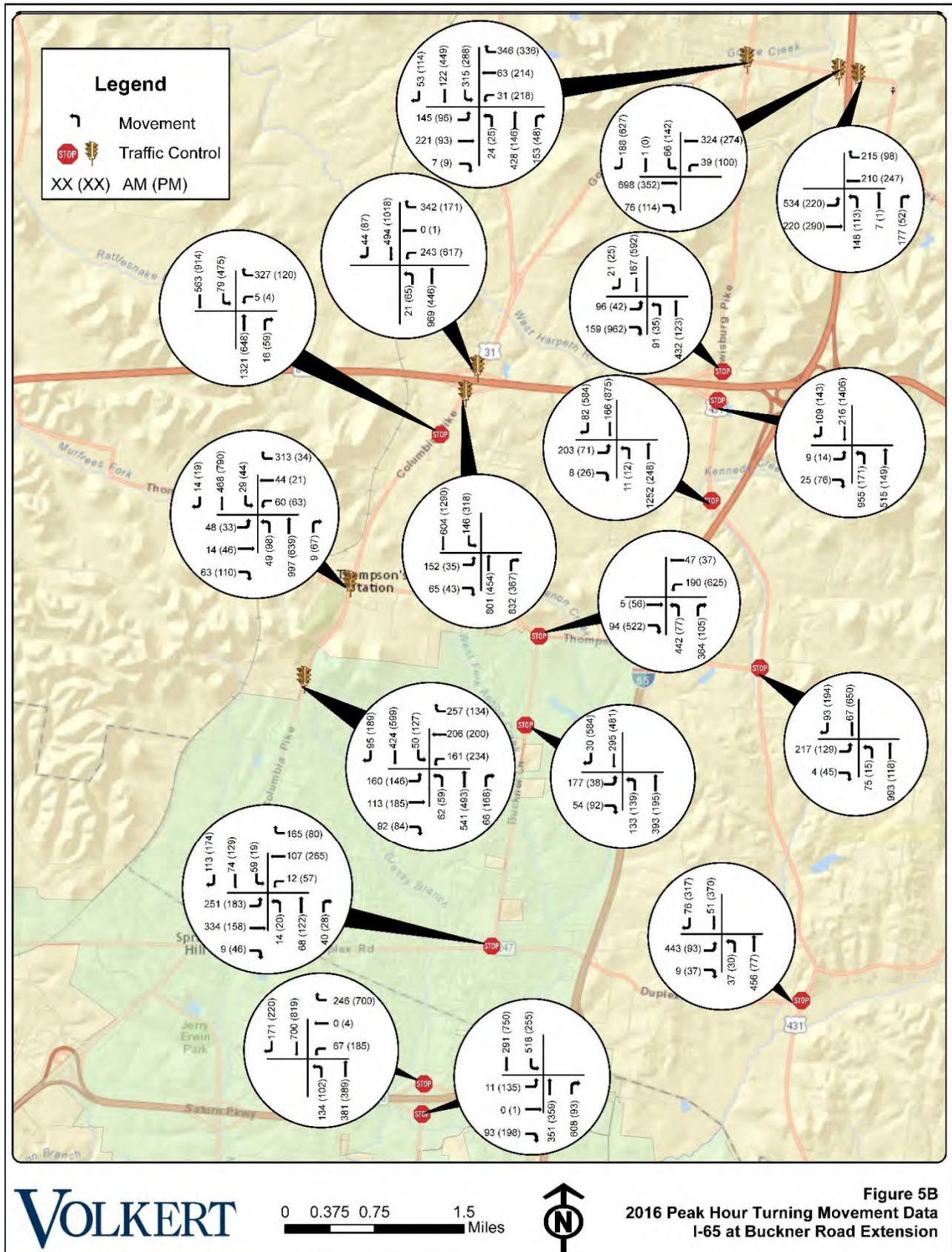


Figure 5B
 2016 Peak Hour Turning Movement Data
 I-65 at Buckner Road Extension

E. EXISTING LAND USE AND ZONING

Site Context

Spring Hill, Tennessee is located 35 miles south of Nashville and spans both Williamson and Maury Counties. Spring Hill, like most other communities within the Nashville-Davidson-Franklin-Murfreesboro MSA, experienced tremendous growth between 1990 and 2016. However, the population growth experienced by the City of Spring Hill surpasses the typical growth rates of other cities in the region. While the typical, annual growth rate of other nearby communities has averaged 4-5%, Spring Hill has experienced annual growth rates far higher. Spring Hill's population was certified, through a Special Census, at 36,530 in 2016. Chart 1 depicts the growth rate in the City from 1980 through 2016.

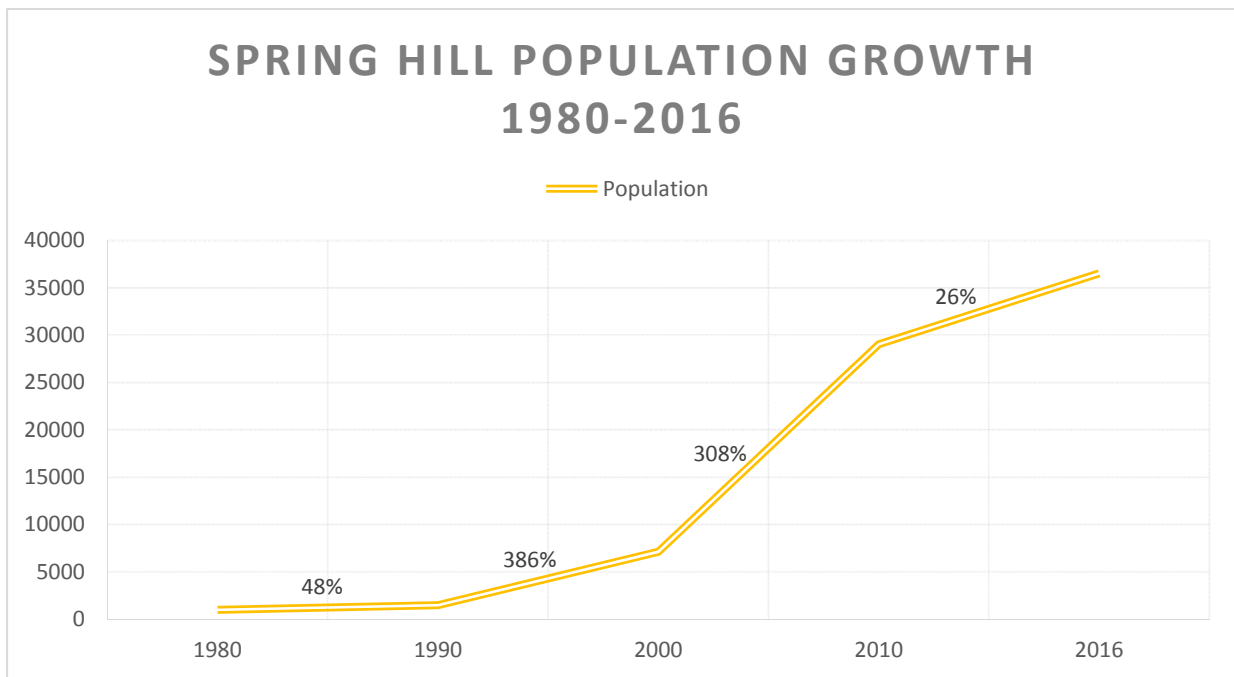


Figure 6: Spring Hill Population 1980-2016

This equates to a 3,605% increase in population from 1980 to 2016. The increase from the 2010 decennial census to 2016 is 26% for a six-year period. This amount of growth has been the result of several factors including, but not limited to:

- The opening of the General Motors (GM) automotive plant in 1990
- Proximity to major employment centers such as Franklin, Brentwood, and Nashville
- Proximity to Interstates 65 and 840
- Highly rated public schools
- Regionally affordable housing

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

- Overall growth in the Nashville-Davidson-Franklin-Murfreesboro Metropolitan Statistical Area (MSA)

Land uses within the City are predominantly residential, commercial, public, and quasi-public, with some industrial uses. Residential uses are the most predominant within the City. The primary commercial areas of Spring Hill are at the Saturn Parkway/Port Royal Road interchange, Saturn Parkway/U.S. 31 interchange, and the entire length of U.S. 31 from Saturn Parkway to the Buckner Road intersection. The industrial uses, south of SR 396 (Saturn Parkway) and west of U.S. 31 (Columbia Pike) influence regional traffic patterns to, from, and through the study area.

Existing Land Use

The Buckner Road Extension at the I-65 proposed interchange location consists of four quadrants. Two of the four are in the corporate limits of the City of Spring Hill. The other two quadrants are in the Town of Thompson's Station and unincorporated portion of Williamson County. The existing land uses on these 4 quadrants are as follows:

- **Northeast Quadrant of Buckner Road Extension and I-65** – Rural Agriculture and Low Density Residential
- **Northwest Quadrant of Buckner Road Extension and I-65** – Rural Agriculture
- **Southeast Quadrant of Buckner Road Extension and I-65** – Rural Agriculture
- **Southwest Quadrant of Buckner Road Extension and I-65** – Rural Agriculture

All four quadrants of the Buckner Road Extension interchange are rural/ agricultural in nature with some large lot single family housing. However, there are heavy residential populations and two schools, Summit High School and Spring Station Middle School, in very close proximity.

The zoning for the two quadrants that fall within the corporate limits of the City of Spring Hill is as follows:

- **Northwest Quadrant of Buckner Road Extension and I-65** – Planned Unit Development / Gateway District Zoning- Intended to provide a high intensity and density mixed-used environment of commercial, office, and residential uses. This district is governed by a master plan that sets forth the general site design, lot sizes, block sizes, building heights, development character, and mixture of uses. This district will serve as a gateway into Spring Hill from I-65 and is designed to include both regional and local services.
- **Southwest Quadrant of Buckner Road Extension and I-65** – Planned Unit Development / Gateway District Zoning- Intended to provide a high intensity and density mixed-used environment of commercial, office, and residential uses. This district is governed by a master plan that sets forth the general site design, lot sizes, block sizes, building heights, development character, and mixture of uses. This district will serve as a gateway into Spring Hill from I-65 and is designed to include both regional and local services.

The Zoning for the one quadrant that falls within the corporate limits of the Town of Thompson's Station is as follows:

- **Northeast Quadrant of Buckner Road Extension and I-65** – Low Intensity zoning – Intended for low density residential development designed to maintain a rural character. This district will consist of single-family detached dwellings and their accessory structures. Minimum lot size is 1 acre.

The Zoning for the one quadrant that is within Williamson County is as follows:

Southeast Quadrant of Buckner Road Extension and I-65 – Rural Development 1 zoning – Intended to support and protect the rural character of Williamson County east of I-65 but also allow for low-density residential development where appropriate infrastructure is available. The district is also intended to support agricultural uses that are more prevalent in the eastern areas of the County. The RD-1 zoning district is intended to allow for low density, residential development with a focus on conservation subdivisions designed to respect the natural environment. Any proposed development that is a permitted use in RD-1 zoning and meets all other RD-1 district requirements would be permitted by-right.

- Maximum gross residential density = 1 unit per acre.
- Minimum lot area for traditional subdivisions = 1 acre.
- Minimum lot area for conservation subdivision = 10,000 square feet.

F. PRELIMINARY ENVIRONMENTAL CONSTRAINTS

Environmental Constraints

A preliminary overview of the environmental constraints in the study area was conducted. A more detailed study that follows the National Environmental Policy Act (NEPA) process will need to be prepared as this project progresses. The proposed interchange on I-65 is not expected to have significant impacts to any environmentally sensitive areas. Right-of-way for the new interchange would need to be purchased.

National Ambient Air Quality Standards (NAAQS) are used to classify geographic areas as "attainment" or "non-attainment" per the Environmental Policy Act (EPA). A geographical area with air quality that meets the NAAQS for certain pollutants is referred to as an attainment area, and an area that does not meet the NAAQS is classified as a nonattainment area. The Nashville area MPO has been designated as an attainment area since 2009.

The overview of the possible environmental constraints in the new interchange location are briefly described in the following. According to the United States Geological Survey (USGS), a blue-line stream, Aenon Creek, runs north-south within the study area between Buckner Lane and I-65. In addition, unnamed tributaries to Aenon Creek run north-south both west and east of I-65 within the study area. According to the Tennessee Department of Environment and Conservation

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

(TDEC), neither Aeon Creek nor its tributaries are known exceptional waters or 303(d) listed streams.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) indicates that no flood zones are located within the study limits of the proposed Buckner Road Extension. These maps are included in Appendix B.

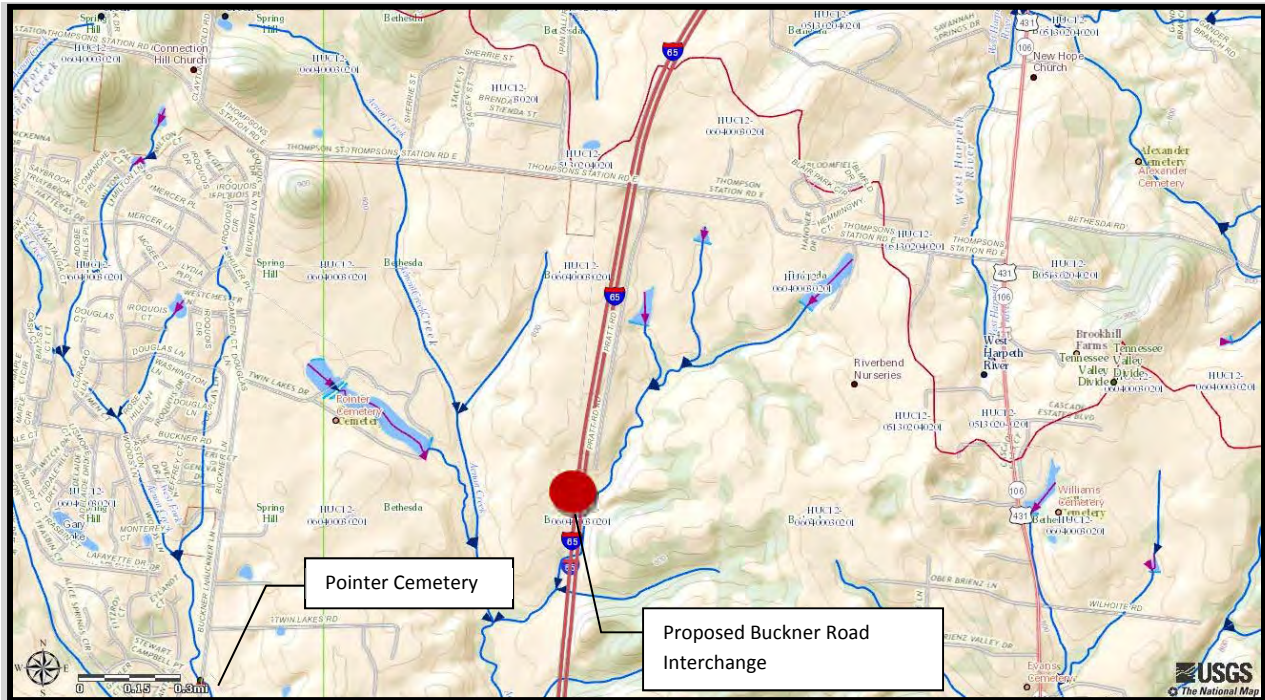


FIGURE 7- STUDY AREA TOPOGRAPHY

The topography within the study area (see Figure 7 above on this page) is rolling to mountainous according to the USGS. According to the United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) Web Soil Survey, several soil types are present. They include Armor silt loams (ArB, ArB2, and ArC2), Culleoka silt loams (CkD, CkD3, and CkE), Donerail silt loams (DoC2), Egam silt loams (Eg), Huntington silt loams (Hu), Maury silt loams (MbB, MbB2, and MbC2), Stiversville clay loams (SrC3), and Stiversville silt loams (StB2 and StC2). Slopes range from 2 to 20 percent, with a majority in the 5 to 12 percent range. The soil survey map is included in Appendix B.

Finally, according to the USGS, a cemetery named Pointer Cemetery is located between Buckner Lane and I-65 and south of the proposed Buckner Road Extension. This cemetery is not expected to be impacted by the interchange.

CHAPTER 3

FUTURE CONDITIONS

A. FUTURE TRAFFIC VOLUMES

In order to develop the future traffic volumes, the Nashville MPO travel demand model (TDM) was used to calculate a yearly growth rate to apply to the existing traffic volumes for Base Year 2021 and Design Year 2041. Traffic from a proposed regional development west of the interchange was also applied to the study area network based on three scenarios from the Traffic Impact Study for the development. TDOT approved the 2021 and 2041 ADT and turning movement volumes used in the study area.

Using the Nashville MPO Travel Demand Model (TDM) for the base year 2010 and future year 2040, a yearly growth rate was calculated and approved by TDOT (approval letter is on page 70). This methodology assures that future traffic is well grounded in actual existing traffic patterns. Based on the Nashville TDM model, the study area is expected to see an average growth rate of 3.5% per year from 2016 to 2041 which is approximately 87.5% growth over the 25-year time period. This yearly growth rate was applied to the existing traffic volumes resulting in the base year 2021 ADT and turning movement volumes and design year 2041 ADT and turning movement volumes shown in Appendix C as Figures C1 and C2, respectively. The background growth rates were also applied to the turning movement counts resulting in the 2021 and 2041 turning movement volumes shown included in Appendix C as Figures C3(a,b) and Figures C4(a,b), respectively.

A review of the land use data supports this growth rate in the study area; the area has significant growth potential with substantial undeveloped property available and utilities either readily available or available at a relatively low cost. In addition, a regional mixed-use development has been proposed that will increase traffic volumes in the study area.

The traffic study prepared for the proposed regional mixed-use development on the western half of the new interchange with I-65 is included in Appendix D. Table 1 summarizes the three scenarios, land use, and trip generation included in the traffic study. The traffic volumes for each scenario included in the study area analysis are included in Appendix C as Figures C5(a,b), C6(a,b), C7(a,b), and Figures C8(a,b). Based on the construction horizon year for each scenario in the traffic impact study, traffic from Scenario 1 is added to the base year 2021 trips at each intersection for the No Build analysis, shown in Figure C9(a,b) in Appendix C. The No Build 2041 analysis includes the traffic volumes from Scenario 2 (Figures C6(a,b)) added to the background growth traffic (Figures C4(a,b)) resulting in the 2041 No Build (Scenario 2) traffic volumes shown in Figures C10(a,b) in Appendix C. Scenario 3, which is the development scenario that would be built only if the interchange is constructed, includes trips shown in Figures C8(a,b) in Appendix C, which results in the total traffic shown in Figures C14(a,b).

Table 1- Western Half Development Trip Generation per Scenario

SCENARIO	LAND USE & SIZE					HORIZON YEAR
	SINGLE FAMILY (D.U.)	MULTI-FAMILY (D.U.)	RETAIL/RESTAURANT (S.F.)	OFFICE (S.F.)	HOTEL (ROOMS)	
1	159		280,962			2021
2	342	1238	751,410			2026
3	774	2152	1,281,862	3,902,250	400	2037

Roadway improvements are expected to occur by 2021 on Buckner Lane and at several intersections in the study area. As shown in Figure 8, Buckner Lane at Duplex Road and SR 396 (Saturn Parkway) eastbound and westbound ramps at Port Royal Road are expected to be signalized and have some geometric changes. Also, the intersection of US 31 (Columbia Pike) at Critz Lane is expected to be improved and signalized by 2021. The only roadway widening expected by 2021 is Buckner Lane between Thompson’s Station Road and Buckner Road. A study conducted related to improvements to Buckner Lane is included in Appendix E. Also, included in the 2021 analysis is the extension of Buckner Road to the east to provide an access for the new development.

From 2021 to 2041, minor intersection improvements can be expected to occur to mitigate local traffic congestion. These minor improvements will take the form of turn lanes and traffic signals. These improvements are expected to occur as traffic volumes increase. It would not be accurate to evaluate the effect of a new interchange on I-65 without assuming that some localized improvements will be made in the interim. The recommended spot improvements include traffic signals at most of the intersections not currently signalized and turn lanes to the maximum extent possible to mitigate delays.

Figure 9 illustrates the projects expected to be constructed by 2041 based on the City of Spring Hill plans and the Traffic Impact Study completed for the proposed mix-use development in the western half of the interchange. All of these projects have a direct or indirect bearing on the proposed new I-65 interchange. Figure 9 categorizes the projects for Build and No Build analyses. It shows that the three new intersections included in the build analyses are the I-65 northbound ramp at the Buckner Road Extension, I-65 southbound ramp at the Buckner Road Extension, and US 431 (Lewisburg Pike) at the Buckner Road Extension. As shown in Figure 9, by 2041, the roadway widenings expected include Buckner Lane from Buckner Road to Duplex Road, Buckner Road from US 31 (Columbia Pike) to US 431 (Lewisburg Pike), and US 31 (Columbia Pike) from Buckner Road to Miles Johnson Parkway.

The Buckner Road Extension typical cross section will include a four-lane roadway with either a median or two-way left turn lane in the 2041 Build Analysis. Approximately 300 feet east and west of the proposed interchange ramps with I-65, Buckner Road Extension will need to be three lanes

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

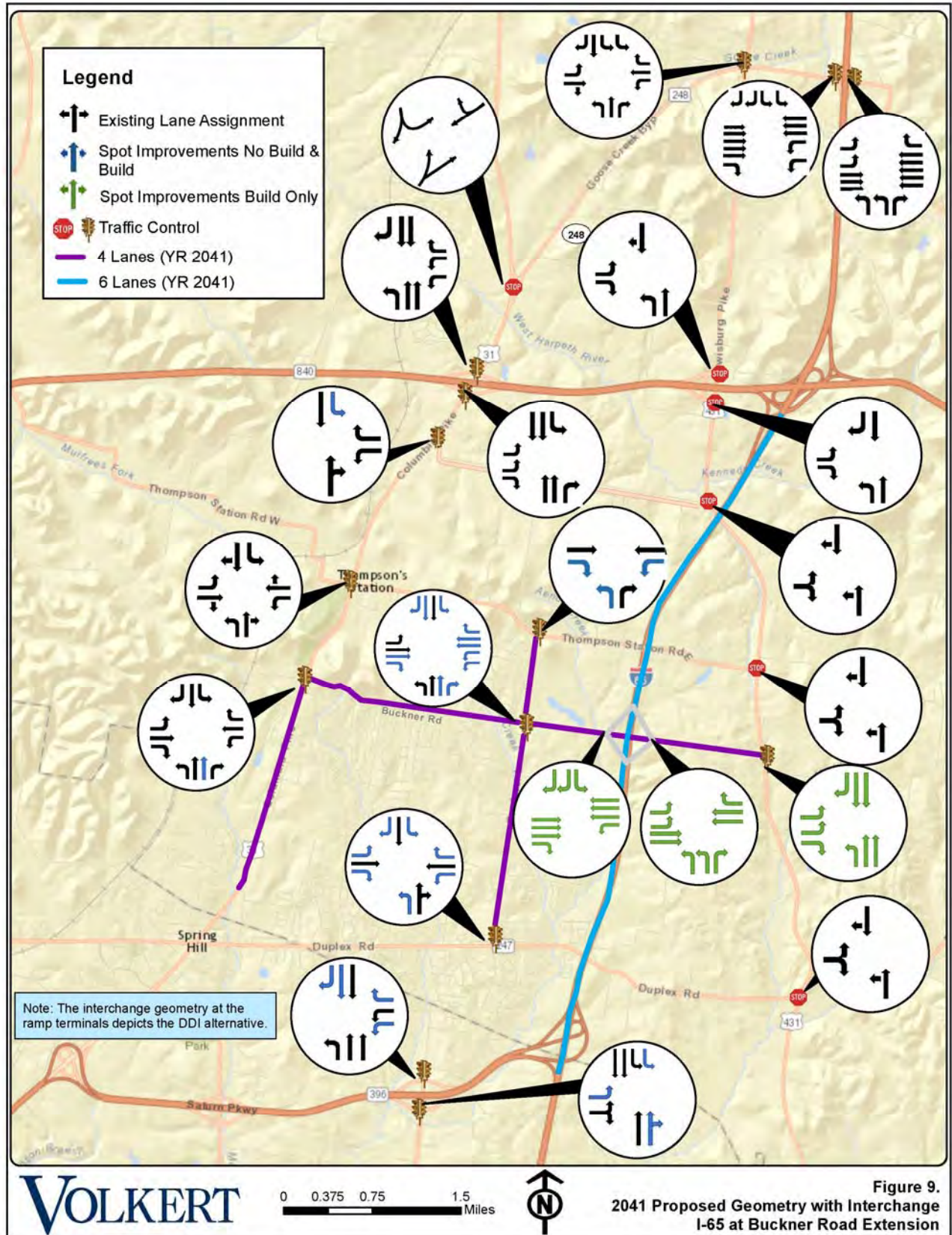
in both directions. Figure 9 depicts the concept including proposed traffic signals, the proposed intersection geometrics, and typical section of the proposed Buckner Road extension. Further analysis of three alternative interchanges was conducted to determine if a tight urban diamond, diverging diamond, or partial cloverleaf is best for this location. This is discussed in detail in Chapter 5.

As seen in Figure 9, the 2021 alignments of Buckner Road and alignment of Buckner Lane will need to be two (2) lanes in each direction with left turn lanes at intersections. The intersection of Buckner Road and Buckner Lane will need to be signalized and have left and right turn lanes on most approaches. In fact, a dual westbound left turn lane will be required from the proposed Buckner Road Extension to southbound Buckner Lane to accommodate the projected traffic.

Buckner Road will also be improved by the City of Spring Hill from Buckner Lane to US 31 to include general alignment enhancements, widening, and access management improvements. In fact, a study of the proposed improvements is included in Appendix F. These improvements to Buckner Road, along with the proposed extension of Buckner Road to I-65, will allow motorists to have a good direct east-west connection between I-65 and US 31 (Columbia Pike) through southern Williamson County.

The 2041 Build analysis was conducted using the volumes from the Traffic Impact Study Scenarios 2 and 3 added to the reassigned background volumes for 2041. Construction of the proposed interchange will cause traffic patterns to shift. Based on this assumption, Figures C11 (a,b) in Appendix C show the reassigned traffic volumes in the study area and Figures C12(a,b) show the 2041 reassigned volumes with the background growth. Figures depicting the turning movement volumes for 2041 Build (Scenario 2) and 2041 Build (Scenario 3) are included in Appendix C as Figures C13(a,b) and Figures C14(a,b), respectively. According to the Traffic Impact Study prepared for the proposed mix-use development, Scenario 3 will not be constructed without the new interchange on I-65. The 2041 Build Analysis (Scenario 3) traffic volumes were used to analyze the traffic operations of the alternative interchange geometries.

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County



B. FUTURE LAND USE

Future land use descriptions have been developed in Land Use Plans for Williamson County, Thompson's Station, and Spring Hill. This information, shown in Figure 10 on Page 25, was used to describe future land use in the vicinity of the Buckner Road interchange.

Future Land Use

The future land uses of the 4 quadrants of the Buckner Road interchange are as follows:

- **Northwest Quadrant of Buckner Road Extension and I-65** – *Spring Hill Rising: 2040*, designates the future land use policy for this parcel as Gateway Area, suitable for the highest intensity and density development within the City. Primary future land uses suggested by the Plan include technology and research, conference centers, corporate headquarters, and similar type use. High density residential uses are suggested as a secondary future land use in this policy area. The Land Use policy for this area enables the City to adequately incorporate major transportation elements, such as a new I-65 Interchange, into the overall development pattern at this location.
- **Southwest Quadrant of Buckner Road Extension and I-65** – *Spring Hill Rising: 2040*, designates the future land use policy for this parcel as Gateway Area, suitable for the highest intensity and density development within the City. Primary future land uses suggested by the Plan include technology and research, conference centers, corporate headquarters, and similar type use. High density residential uses are suggested as a secondary future land use in this policy area. The Land Use policy for this area enables the City to adequately incorporate major transportation elements, such as a new I-65 Interchange, into the overall development pattern at this location.
- **Northeast Quadrant of Buckner Road Extension and I-65** – Thompson's Station, in the *Comprehensive Plan for Thompson's Station*, wants to preserve the rural characteristics of the community. Currently, the quadrant has Low Intensity zoning, which consists of residential lots of at least one (1) acre in size. It is expected that this zoning will remain in place unless and until Thompson's Station revisits the issue if an interchange is constructed at this location.
- **Southeast Quadrant of Buckner Road Extension and I-65** – Williamson County's Comprehensive Land Use Plan classifies this area as a Municipal Growth Area (MGA). These MGAs are future land use policy areas that are adjacent to municipal Urban Growth Boundaries and, since they are near water, sewer, and roadway infrastructure, often experience higher growth pressures than other parts of the unincorporated County. The Williamson County Comprehensive Land Use Plan was designed, in cooperation with the County's municipalities, to funnel dense development adjacent to municipalities into those municipalities. Therefore, any development that is not consistent with by-right uses permitted in the County's RD-1 zoning would trigger annexation of property into the adjacent municipality. In this case, the City of Spring Hill, which would allow for more dense development than would be possible in Williamson County.

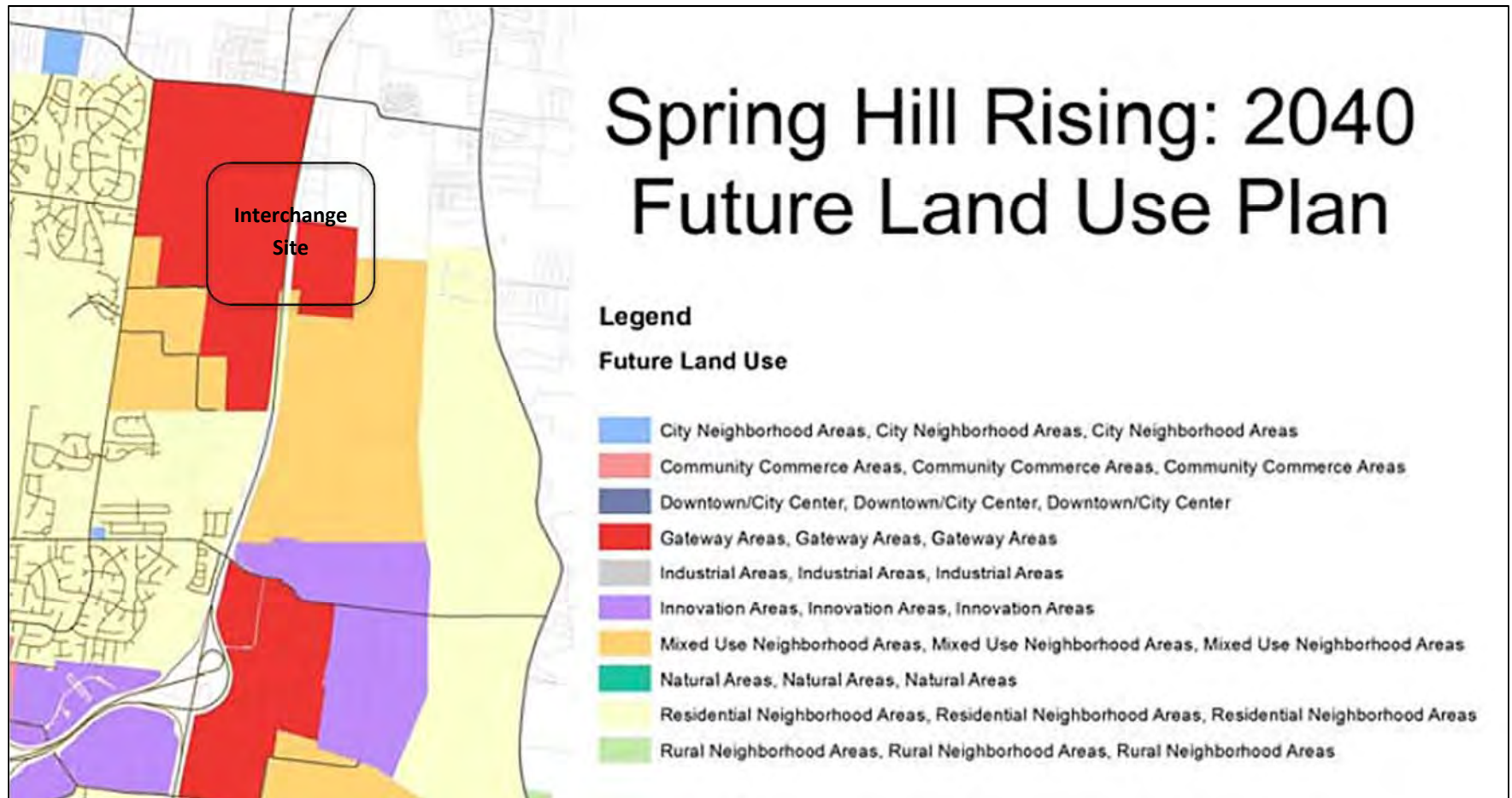


FIGURE 10- SPRING HILL FUTURE LAND USE MAP

CHAPTER 4

CONCEPTUAL ALTERNATIVES

Conceptual alternatives of the three (3) geometric interchanges considered as part of this Interchange Access Request: (1) Tight Urban Diamond Interchange; (2) Diverging Diamond Interchange; and (3) Partial Cloverleaf Interchange. Each alternative is described below. Chapters 5-7 provide the analysis on the selected alternative in this IAR.

A. NO BUILD ALTERNATIVE

The no build alternative does not include a new I-65 interchange in Williamson County near Spring Hill.

B. BUILD ALTERNATIVE 1 - TIGHT URBAN DIAMOND INTERCHANGE (TUDI)

A Tight Urban Diamond Interchange is typically known for the following design elements: four (4) ramps; the roadway intersecting with the interstate is grade-separated, typically crossing over the interstate by a bridge; off-ramps diverge slightly from the interstate and run directly into the minor roadway, while on-ramps begin as a turn and then gradually merge with the interstate from the minor roadway; three-phase or four-phase signal operation; and the points where the ramps meet the minor roadway are generally treated as conventional intersections. In general, a Diamond Interchange uses less area than other types of interchanges. This interchange also avoids the interweaving of vehicles that occur with other interchanges.

The TUDI geometry analyzed for this IAR is shown in Figure 11. Based on the traffic analysis, the southbound off-ramp is two (2) left turn lanes and a slip lane for the right turn. The southbound on ramp will serve the Buckner Road extension eastbound right turning traffic with a slip lane and a dual left turn that will serve the westbound traffic on the Buckner Road extension. The northbound off ramp will have two (2) left turn lanes and one (1) right turn lane. The northbound on ramp will serve the Buckner Road extension eastbound with two (2) left turn lanes and one (1) slip lane will serve the westbound right turn movement. There will be three (3) through lanes on the Buckner Road Extension with a fourth lane added for the southbound on and off ramp slip lanes. Both ramp terminals will be signal controlled.

Diamond Interchanges are effective in situations where traffic volumes are low and land values are high. In situations where traffic volumes are high, a Tight Urban Diamond Interchange may require additional lanes dedicated to turning traffic, increasing the area needed for the interchange.

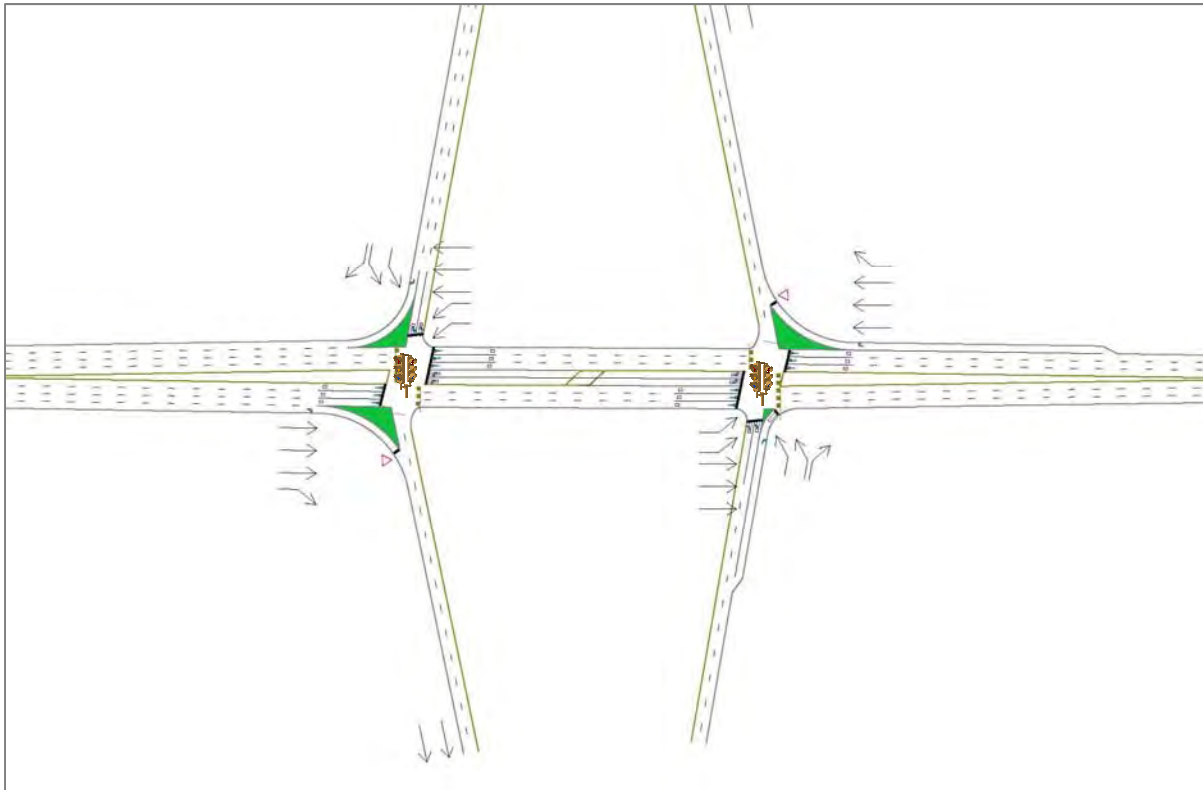


FIGURE 11- Tight Urban Diamond Interchange

C. BUILD ALTERNATIVE 2 - DIVERGING DIAMOND INTERCHANGE (DDI)

A Diverging Diamond Interchange (DDI) is typically known for the following design elements: two-phase signals with short-cycle lengths, which reduces delay times; reduced horizontal curvature, which lessens the risk of off-road crashes; increased turning movement capacity to and from the ramps; minimizes the area utilized for the interchange by reducing the amount of land on the crossroads; increases the capacity of turning movements both to and from ramps; the roadway intersecting with the interstate is grade-separated, typically crossing over the interstate by a bridge; and two directions of traffic on the arterial cross to the opposite side on both sides of the bridge at the interstate.

The DDI geometry analyzed for this interchange is shown in Figure 12. Based on the traffic analysis, the southbound off ramp contains one (1) left turn lane with a merge condition and two (2) right turn lanes at the Buckner Road extension. The southbound on ramp contains one (1) eastbound and one (1) westbound lane that merge at the southern diamond point. The northbound off ramp contains one (1) left turn lane and one shared left/right turn lane at the Buckner Road extension. The northbound on ramp contains one westbound right turn lane and two (2) eastbound left turn lanes. The ramp terminals and conflicting crossover points are signalized. The westbound right turn movement onto the northbound on ramp as well as the northbound right turn movement on the off ramp are yield controlled.

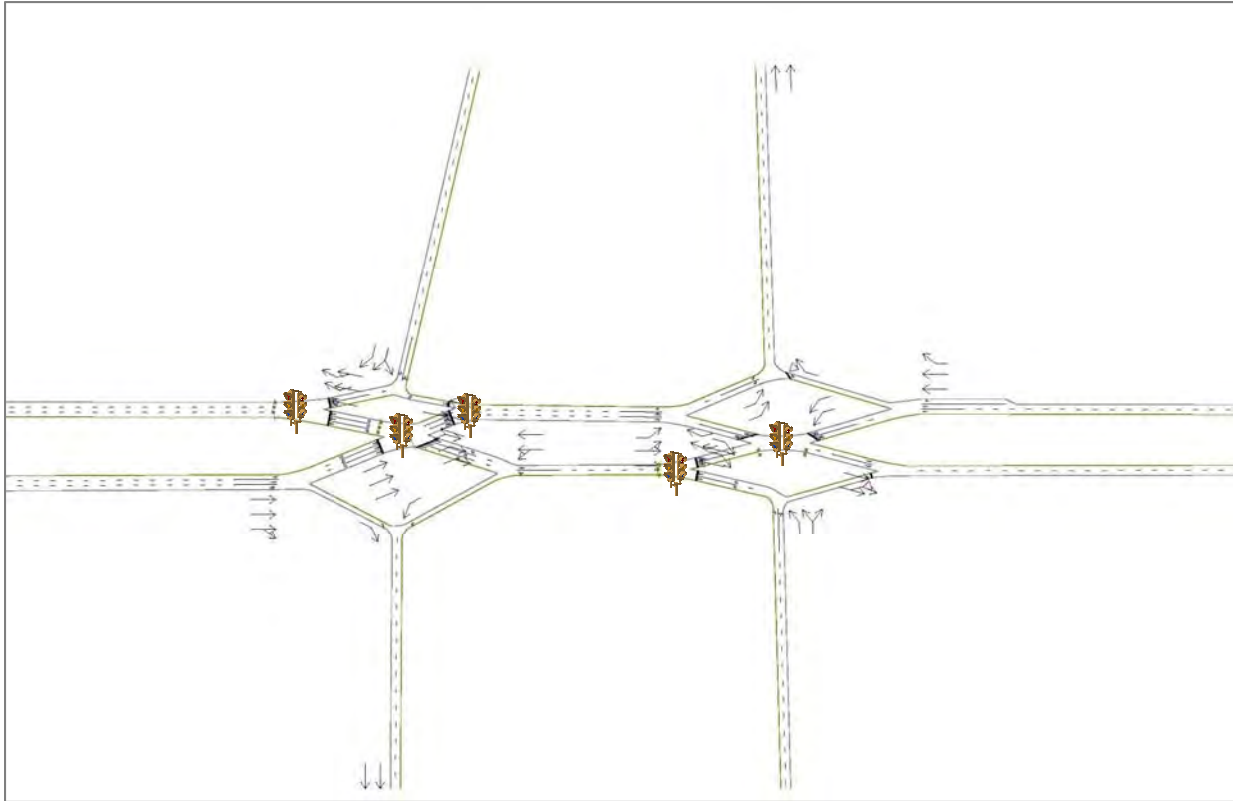


FIGURE 12- Diverging Diamond Interchange

In general, a Diverging Diamond Interchange reduces the number of conflict points and thereby improves safety, although many drivers are not familiar with this interchange configuration, especially the merging maneuvering required for cross-over traffic entering or leaving the interstate. In situations where traffic volumes are high, a Diverging Diamond Interchange may generally increase the overall efficiency of an interchange.

D. BUILD ALTERNATIVE 3 - PARTIAL CLOVERLEAF INTERCHANGE (Parclo)

A Partial Cloverleaf Interchange is similar to the cloverleaf interchange configuration, but, while the cloverleaf has four (4) full loops and is fully grade separated, a parclo typically just has one (1) or two (2) loops and is only partially grade separated. A parclo is typically known for the following design elements: four (4) to six (6) ramps, depending on the site specific configuration; the roadway intersecting with the interstate is grade-separated, typically crossing over the interstate by a bridge; off-ramps that consist of either a loop ramp or a directional ramp, depending on the specific configuration of the parclo; and some parclos have a right-turning directional on-ramp leaving an arterial, which allows traffic the option of turning right to use the directional on-ramp to enter the interstate.

The Parclo geometry analyzed for this interchange is shown in Figure 13. Based on the traffic analysis, the southbound off ramp will have two (2) left turn lanes and one (1) right turn slip lane at the Buckner Road extension. The southbound on ramp will be fed by an eastbound right turn slip lane and two (2) westbound left turn lanes. A three (3) lane northbound off ramp will have two

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

(2) left turn lanes and one (1) right turn lane at the Buckner Road extension. The northbound on ramp from west of the interchange will be served by a two (2) lane loop ramp for eastbound traffic on Buckner Road. The northbound on ramp from east of the interchange will be served by one (1) slip lane westbound from Buckner Road.



FIGURE 13- Partial Cloverleaf Interchange

In general, a parclo is utilized in situations to allow for more acceleration and deceleration space on an interstate. This interchange has been called the most popular interchange design configuration in the United States. This interchange also lessens the interweaving of vehicles. Parclo Interchanges are versatile and highly configurable to many site constraints.

CHAPTER 5

TRAFFIC ANALYSIS

A. CAPACITY ANALYSIS METHODOLOGY AND ASSUMPTIONS

Analysis for this study was conducted for the I-65 segment between I-840 and the SR-396 (Saturn Parkway) exit, the new interchange ramp merge and diverge segments for all three alternatives, and the study area intersections. Capacity analysis was conducted for the Study Area intersections, both signalized and unsignalized, using the Synchro software. Freeway segment, merge, and diverge maneuvers were analyzed using the 2010 Highway Capacity Software that is based on the 2010 HCM published by the Transportation Research Board (TRB).

Also included in the analysis are three (3) development scenarios for the proposed regional development west of the interchange. Scenario 1 is the amount of development expected by 2021. Scenario 2 is the amount of development expected by 2026 and the ultimate buildout if the interchange is not built. Scenario 3 is the ultimate buildout expected by 2037 if the interchange is built. The development plan is depicted in Figure 14. AM and PM peak hour Level of Service (LOS) analyses were performed for the 2021 baseline No Build (Scenario 1) and 2041 No Build (Scenario 2), the 2041 Build (Scenario 2) and 2041 Build (Scenario 3). For the No Build 2021, No Build 2041, and Build 2041 analyses, the recommended improvements are depicted in Figures 8 and 9 on pages 22 and 23. For the 2041 Build (Scenarios 2 and 3), the new interchange and new intersection of the Buckner Road extension and US 431 (Lewisburg Pike) were assumed to be constructed, several of the roadway widening projects in the study area were assumed to be complete, and roads immediately adjacent to the proposed interchange were sized according to the traffic impact study for the proposed development of the interchange.

The freeway LOS analysis was based on 12 foot lanes, 10 foot shoulders, no lateral obstructions, rolling terrain, 16 percent trucks, no recreational vehicles, a 70 mph free flow speed, a peak hour factor (PHF) of 0.90, and a ramp density of 1 per 4.5 miles.

Signalized and unsignalized intersections were evaluated based on established industry standards for the LOS. LOS is the measurement of an intersection's ability to accommodate traffic volumes and ranges from A to F with an LOS A being the best and LOS F being the worst. For signalized intersections, a LOS of A has an average estimated intersection delay of less than 10 seconds, and LOS F has an estimated delay of greater than 80 seconds. Within urban areas, a LOS D, delay between 35 and 55 seconds, is considered acceptable by the Institute of Transportation Engineers (ITE) for signalized intersections.

For unsignalized intersections, LOS has lower thresholds of delay. A LOS F exceeds estimated delays of 50 seconds. Minor approaches to urban arterials frequently experience a poor LOS of E or F. A LOS description for signalized and unsignalized intersections is presented in Table 2.

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

Table 3 presents the LOS definition for freeway links, which is based on lane density and is expressed as passenger cars per mile per lane.

Merge and diverge maneuvers are also evaluated according to density with the criteria being passenger cars per mile per lane. Table 4 presents LOS density ranges for on and off ramps.

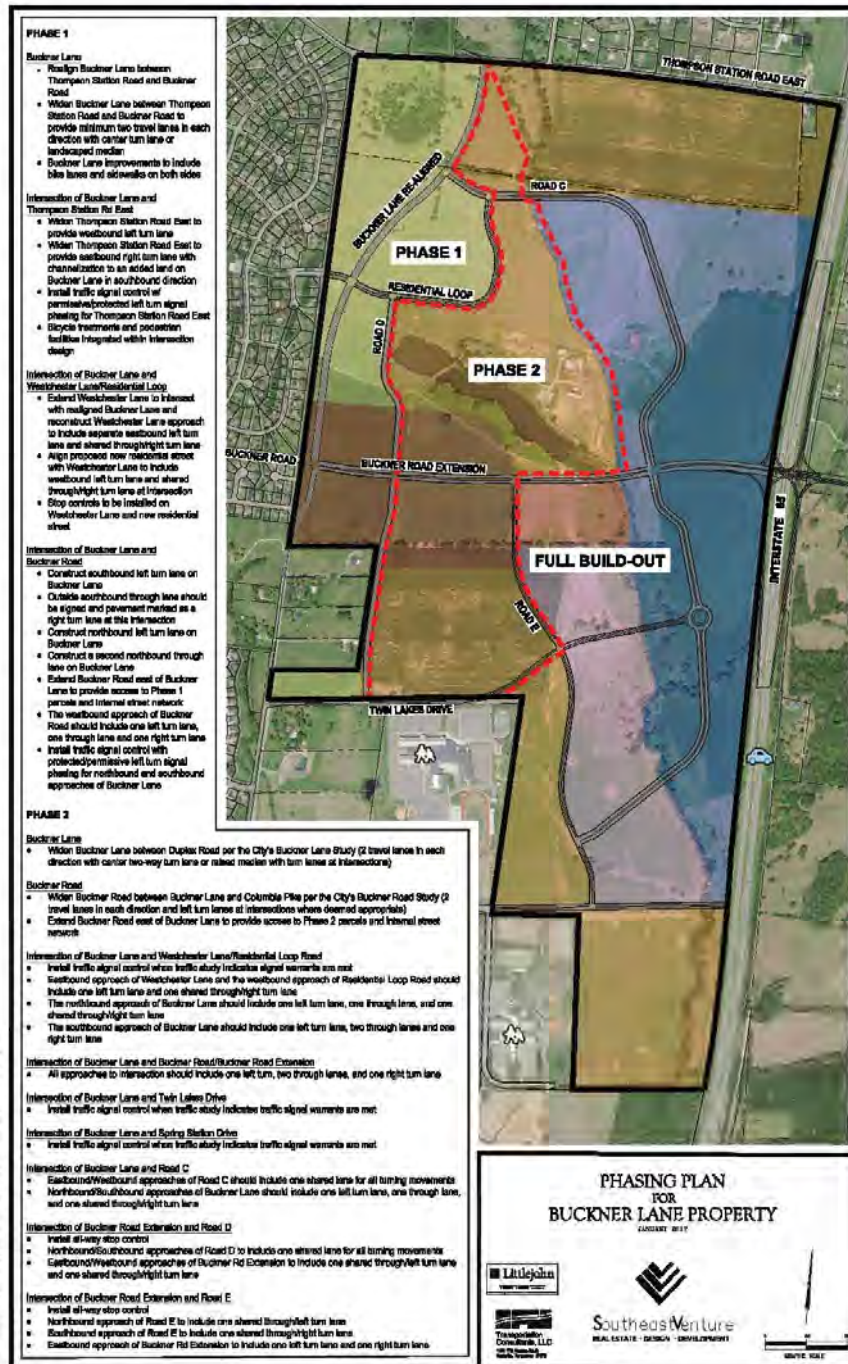


FIGURE 14- Buckner Lane Development Plan

Table 2 – Level of Service Definition for Intersections

LEVEL OF SERVICE	INTERSECTION DELAY (SECONDS/VEHICLE)	
	SIGNALIZED	UNSIGNALIZED
A	0-10	0-10
B	10-20	10-15
C	20-35	15-25
D	35-55	25-35
E	55-80	35-50
F	>80	>50

Source: Exhibit 18-4; Chapter 18/Signalized Intersection
Exhibit 19-1; Chapter 19/Two-Way Stop-Controlled Intersections in the 2010 Highway Capacity Manual

Table 3- Level of Service Definition for Freeway Links

LEVEL OF SERVICE	FREEWAY TRAFFIC FLOW CONDITIONS	DENSITY (PC/MILE/LANE)
A	Motorist are able to travel at free flow speeds and are almost completely unimpeded in their ability to maneuver in the traffic stream.	0-10
B	Free flow speeds are maintained and the ability to maneuver within the traffic stream is only slightly restricted. The general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and breakdowns is easily absorbed.	10-18
C	Traffic flow at near the free-flow speeds. Freedom to maneuver in the traffic stream is noticeably restricted and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed, but local determination in service quality will be significant.	18-26
D	Speeds begin to decline with increasing flows, with density increasing more quickly. Freedom to maneuver within the traffic stream is seriously limited and drivers experience reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing because the stream has little space to absorb disruptions.	26-35
E	Freeway is operating at capacity. Operations are highly volatile because there are virtually no usable gaps within the traffic stream, leaving little room to maneuver. Any disruption to the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can establish a disruption wave that propagates throughout the upstream traffic flow.	35-45
F	Breakdown, or unstable flow.	>45

Source: Exhibit 11-5; Chapter 10/Basic Freeway Segments in the 2010 Highway Capacity Manual

Table 4- Level of Service Definition for Freeway Ramp Areas

LEVEL OF SERVICE	RAMP AREA TRAFFIC FLOW CONDITIONS	DENSITY (PC/MILE/LANE)
A	Unrestricted operation.	0-10
B	Merging and diverging maneuvers noticeable to drivers.	10-20
C	Influence area speeds begin to decline.	20-28
D	Influence area turbulence becomes intrusive.	28-35
E	Turbulence felt by virtually all drivers.	>35
F	Ramp and freeway queues form.	Demand Exceeds Capacity

Source: Exhibit 13-2; Chapter 13/Freeway Merge and Diverge Segments in the 2010 Highway Capacity Manual

Table 5 describes general daily traffic LOS limits for Class II two lane roadways as per Chapter 15 of the 2010 HCM.

Table 5- Daily Traffic Level of Service Limits for Class II Two Lane Highways

K-Factor	D-Factor	Class II Level			
		LOS B	LOS C	LOS D	LOS E
0.10	50%	4,400	8,800	16,300	28,000
0.10	55%	3,700	7,900	14,400	27,100
0.10	60%	3,300	7,100	13,100	24,900
0.10	65%	3,000	5,300	11,900	23,000
0.12	50%	3,700	7,400	13,600	23,400
0.12	55%	3,100	6,500	12,000	22,600
0.12	60%	2,700	5,900	10,900	20,700
0.12	65%	2,400	4,400	9,900	19,100

Source: Exhibit 15-30; Chapter 15/Two Lane Highways in the 2010 Highway Capacity Manual

According to the 2010 HCM, Class II two lane highways are facilities where motorists do not necessarily expect to travel at high speeds. The HCM also says they are most often used for relatively short trips. Class III highways serve moderately developed areas often passing through small towns or recreational areas. Local traffic often mixes with through traffic. US 31 (Columbia Pike) is a cross between a Class II and Class III highway. However, the HCM does not provide a planning LOS for Type III highways, so the Type II LOS criteria are being used.

B. BASELINE 2021 NO BUILD WITH SPOT IMPROVEMENTS – SCENARIO 1

Intersection capacity and LOS analysis were performed for the 2021 baseline conditions and the results are shown in Table 6 AND Figure 15. The LOS analysis used the 2021 existing roadway geometries and traffic control. A 2021 baseline capacity and LOS analyses were also conducted for the I-65 northbound and southbound freeway segments between SR 396 (Saturn Parkway) and I-840. Unlike the intersections, no freeway improvements were assumed to have occurred in 2021. The results of the 2021 freeway analysis are displayed in Table 7.

The results of the 2021 No Build analysis show that the regional trips traveling through the interchanges at US 31 and I-840 eastbound and westbound experience relatively low delays and the intersections are expected to operate at an acceptable LOS D or better during the AM and PM peak hours. The ramp approaches at the interchanges of US 431 (Lewisburg Pike) and I-840 are expected to operate poorly which is expected for a minor approach to an arterial. The PM peak at the SR 396 (Saturn Parkway) westbound ramp at Port Royal Road is expected to operate at LOS F.

According to 2015 TDOT tube counts, US 31 (Columbia Pike) accommodates up to 19,620 vpd as shown on Figure 5A on page 13. Traffic is directional on US 31(Columbia Pike), especially near I-840 with peak hour distributions measured at 62% based on the Tennessee Roadway Information Management System (TRIMS) data from TDOT. Using the Class II highway analysis, this segment of US 31 (Columbia Pike) operates at LOS E. With an ADT of 23,740 expected by 2021 as shown in Figure C1 in Appendix C, it is expected to operate at LOS F.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Table 6- Intersection Level of Service: Baseline 2021 No Build (Scenario 1)

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2021		
			V/C	DELAY	LOS
Buckner Lane at Duplex Road	STOP EBL/WBL	AM		8.4	A
		PM		10.0	A
US 31 at Thompson's Ridge Road/Bucker Road	SIGNAL	AM		68.6	E
		PM		109.5	F
US 31 at Thompson's Station Road	SIGNAL	AM		274.8	F
		PM		66.3	E
US 31 at I-840 EB Ramps	SIGNAL	AM		13.2	B
		PM		54.1	D
US 431 at Duplex Road	STOP EB/NBL	AM	7.05/0.07	2784.1/8.0	F/A
		PM	0.52/0.05	26.4/10.0	D/A
US 431 at Thompson's Station Road	STOP EB/NBL	AM	3.26/0.07	1118.2/7.9	F/A
		PM	1.01/0.03	106.5/10.8	F/B
US 31 at I-840 WB Ramps	SIGNAL	AM		10.0	B
		PM		21.0	C
Buckner Road at Buckner Lane	SIGNAL	AM		14.6	B
		PM		34.0	C
Buckner Lane at Thompson's Station Road	SIGNAL	AM		10.5	B
		PM		115.5	F
US 31 at Critz Lane	SIGNAL	AM		133.9	F
		PM		68.6	E
US 431 at Critz Lane	STOP EB/NBL	AM	4.43/0.01	1663.8/8	F/A
		PM	2.12/0.05	624.9/17.3	F/C
US 431 at I-840 WB Ramp	STOP EBL/EBR/NBL	AM	0.52/0.29/0.09	36.0/11.3/8.0	E/B/A
		PM	0.23/3.24/0.06	24.9/1034.7/9.7	C/F/A
US 431 at I-840 EB Ramp	STOP EBL/EBR/NBL	AM	0.0/0.04/1.0	0.0/10.2/43.9	X/B/E
		PM	2.48/1.04/0.77	1681.9/187.7/44.6	F/F/E
US 431 at Goose Creek Bypass	SIGNAL	AM		42.6	D
		PM		38.0	D
I-65 SB Ramps at Goose Creek Bypass	SIGNAL	AM		10.8	B
		PM		212.9	F
I-65 NB Ramps at Goose Creek Bypass	SIGNAL	AM		18.0	B
		PM		12.4	B
SR 396 WB Ramps at Port Royal Road	SIGNAL	AM		31.3	C
		PM		84.8	F
SR 396 EB Ramps at Port Royal Road	SIGNAL	AM		24.4	C
		PM		12.5	B

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

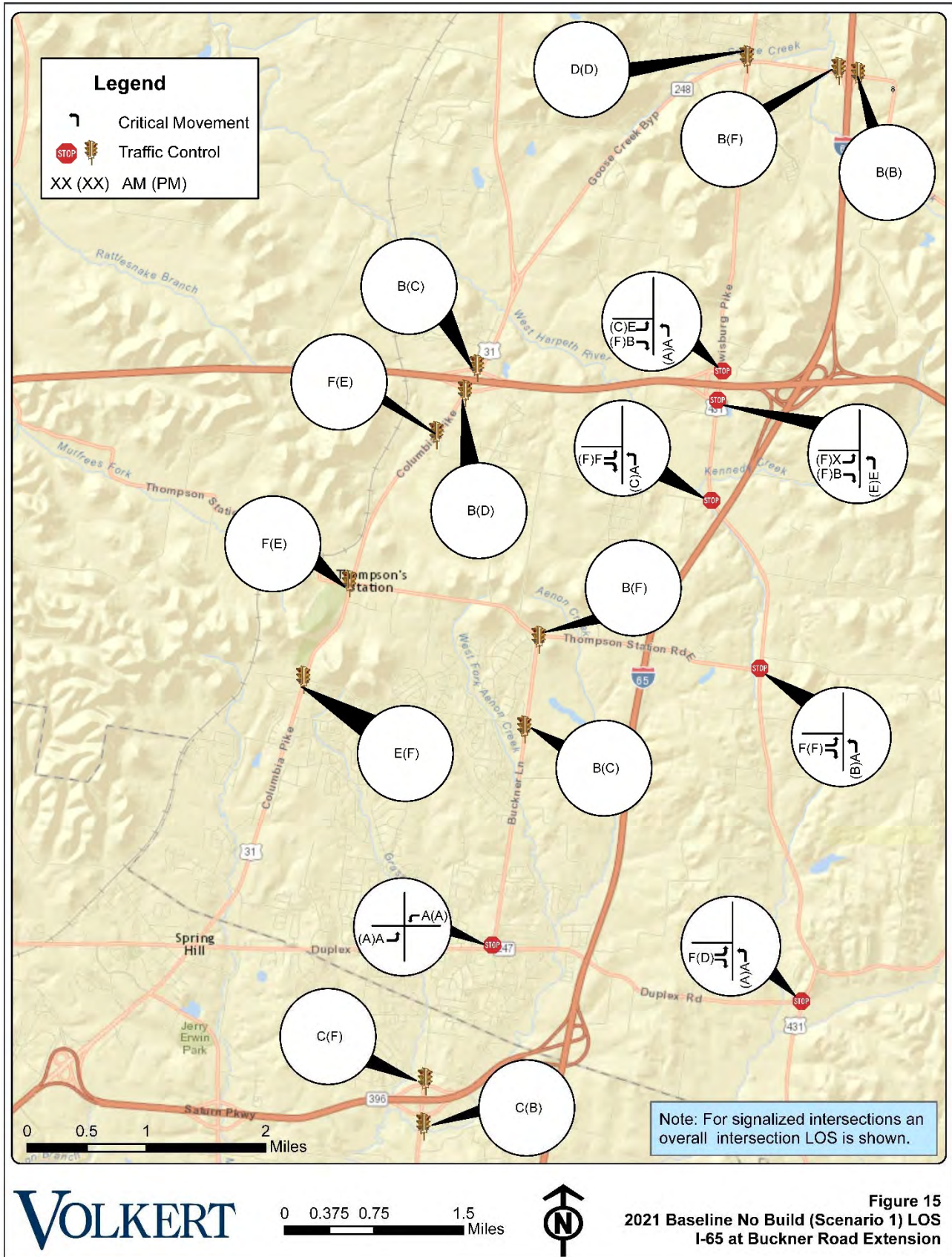


Table 7 - Segment Level of Service: Baseline 2021 No Build

SEGMENT	LOCATION	PEAK PERIOD	SPACE MEAN SPEED (MPH)	DENSITY (PC/M/LN)	LOS
Southbound I-65	I-840 to SR 396 (Saturn Pkwy)	AM	64.9	28.7	D
		PM	40.4	69.2	F
Northbound I-65	SR 396 (Saturn Pkwy) to I-840	AM	39.3	71.9	F
		PM	64.6	29.2	D

C. FUTURE 2041 NO BUILD WITH SPOT IMPROVEMENTS – SCENARIO 2

The Projected 2041 No Build (Scenario 2) analysis was conducted assuming the improvements shown in Figure 9 on page 23 are complete except for the interchange. This figure depicts the roadway projects in planning or design that are expected to be completed within the study area by 2041. These road projects were part of the 2041 No Build scenario analysis with the exception of the eastern portion of the Buckner Road extension and the proposed interchange. Year 2041 No Build (Scenario 2) intersection traffic projections are shown in Figures C10(a,b) in Appendix C.

Widening US 31 (Columbia Pike), which is a State of Tennessee IMPROVE Act project, is expected to occur between Buckner Road and Miles Johnson Parkway as a multi-lane typical section by 2041. Also, Buckner Road and Buckner Lane are both expected to be widened by 2041 as shown in Figure 9. The extension of Buckner Road from the new development access to US 431(Lewisburg Pike) is only expected to be completed if the new interchange is constructed.

The expected operation results of the Year 2041 No Build (Scenario 2) are summarized in Table 8 and Figure 16. As previously discussed, some improvements were assumed and are included in the scenario analysis. Most of the unsignalized intersections will require a traffic signal by 2041. With signalization and optimum turn lanes, there are eight intersections in the study area that are expected to operate below an acceptable LOS during the AM and PM peak hours including:

- US 31 at Thompson’s Ridge Road/Buckner Road
- US 31 at Thompson’s Station Road
- US 31 at I-840 EB Ramps
- Buckner Lane at Thompson’s Station Road
- US-31 at Critz Lane
- US-431 at I-840 EB Ramp
- US-431 at Goose Creek Bypass

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

- SR 396 (Saturn Parkway) at WB Ramps

Also, there are three (3) signalized intersections that will operate below LOS D during the AM or PM peak including:

- US-31 at I-840 WB Ramps
- Buckner Road at Buckner Lane
- SR 396 (Saturn Parkway) at EB Ramps

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Table 8- Intersection Level of Service: 2041 No Build (Scenario 2)

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2041		
			V/C	DELAY	LOS
Buckner Lane at Duplex Road	SIGNAL	AM		46.0	D
		PM		48.2	D
US 31 at Thompson's Ridge Road/Bucker Road	SIGNAL	AM		>300.0	F
		PM		296.6	F
US 31 at Thompson's Station Road	SIGNAL	AM		>300.0	F
		PM		>300.0	F
US 31 at I-840 EB Ramps	SIGNAL	AM		62.1	E
		PM		>300.0	F
US 431 at Duplex Road	STOP EB/NBL	AM	7.05/0.07	>300.0/8.0	F/A
		PM	0.17/2.31	>300.0/14.8	F/A
US 431 at Thompson's Station Road	STOP EB/NBL	AM	3.26/0.07	>300.0/7.9	F/A
		PM	2.64/0.08	>300.0/12.6	F/B
US 31 at I-840 WB Ramps	SIGNAL	AM		51.5	D
		PM		122.0	F
Buckner Road at Buckner Lane	SIGNAL	AM		29.0	C
		PM		108.0	F
Buckner Lane at Thompson's Station Road	SIGNAL	AM		89.8	F
		PM		>300.0	F
US 31 at Critz Lane	SIGNAL	AM		>300.0	F
		PM		>300.0	F
US 431 at Critz Lane	STOP EB/NBL	AM	61.96/0.03	>300.0/8.9	F/A
		PM	44.41/0.30	>300.0/64.1	F/F
US 431 at I-840 WB Ramp	SIGNAL	AM		7.7	A
		PM		14.8	B
US 431 at I-840 EB Ramp	SIGNAL	AM		>300.0	F
		PM		>300.0	F
US 431 at Goose Creek Bypass	SIGNAL	AM		177.0	F
		PM		89.8	F
I-65 SB Ramps at Goose Creek Bypass	SIGNAL	AM		19.3	B
		PM		44.6	D
I-65 NB Ramps at Goose Creek Bypass	SIGNAL	AM		20.7	C
		PM		27.2	C
SR 396 WB Ramps at Port Royal Road	SIGNAL	AM		60.7	E
		PM		285.5	F
SR 396 EB Ramps at Port Royal Road	SIGNAL	AM		25.8	C
		PM		29.8	C

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

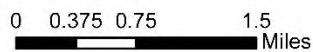
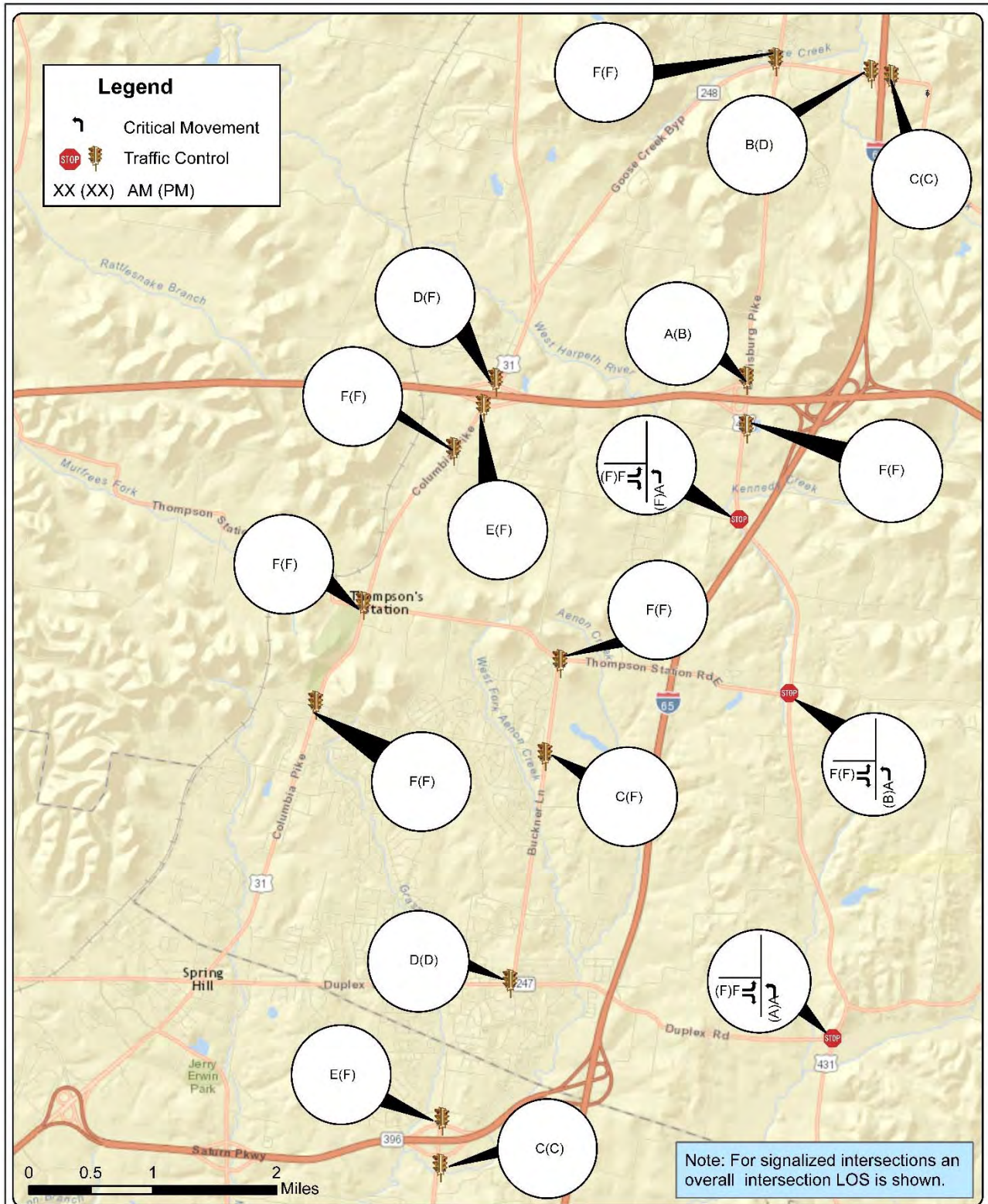


Figure 16
 2041 No Build (Scenario 2) LOS
 I-65 at Buckner Road Extension

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

The 2041 ADT volumes were used to estimate peak hour traffic on I-65, SR 396 (Saturn Parkway), and the surrounding arterial and collector street network. The ADT volumes are included in Appendix C as Figure C2. The segment analysis conducted on I-65 assumes that an additional lane will be constructed northbound and southbound between I-840 and SR 396 (Saturn Parkway) resulting in three (3) lanes per direction. This is based on the fact that widening of I-65 from four (4) lanes to six (6) lanes is included in the 2040 Nashville Area MPO Regional Transportation Plan as a short-term (2020) project. The results of the 2041 freeway analysis are displayed in Table 9. Southbound I-65 will operate at LOS D during the AM peak hour and northbound I-65 will operate at LOS D during the PM peak hour. The peak hour volumes were calculated using a 10% peak hour factor and a 60%/40% directional split of the ADT volumes with 60% in the peak hour direction.

Table 9 - Segment Level of Service: 2041 Interchange Build and No Build

SEGMENT	LOCATION	PEAK PERIOD	SPACE MEAN SPEED (MPH)	DENSITY (PC/M/LN)	LOS
Southbound I-65	I-840 to SR 396 (Saturn Pkwy)	AM	63.2	31	D
		PM	34.7	84.8	F
Northbound I-65	SR 396 (Saturn Pkwy) to I-840	AM	33.4	89.1	F
		PM	62.9	31.6	D

D. FUTURE 2041 BUILD ANALYSIS

A new interchange at the Buckner Road extension on I-65 would result in peak hour traffic patterns changing at several of the intersections in the study area. The traffic reassignment is shown in Figures C11(a,b) and the new 2041 background growth is shown in Figures C12(a,b). Although the peak hour traffic patterns are expected to show a decrease in some of the interchange intersections, the new mixed-use development at the interchange location is expected to increase traffic. Year 2041 Build (Scenario 2) projected daily traffic volumes are depicted in Figures C13(a,b). The analysis shown in Table 9 and Figure 17 includes the 2041 Build (Scenario 2) traffic with the network improvements shown previously in Figure 9 on page 23.

Regional trips between Nashville, Williamson County, and Maury County that use US 431 (Lewisburg Pike), US 31 (Columbia Pike) and Thompson's Station Road will benefit from a new interchange on I-65 at the Buckner Road extension. Moreover, regional trips currently using SR 396 (Saturn Parkway) and Port Royal Road will also find the new interchange useful.

The regional mixed-use development proposed for the area will require the new interchange for adequate traffic operations. Without this interchange, traffic traveling to and from the new development would have to travel on US 31 (Columbia Pike), SR 396 (Saturn Parkway), and US 431 (Lewisburg Pike), which are all expected to be operating at or over capacity in 2041. In addition, the interchanges that move regional traffic from the interstate to the area are expected to be at capacity, causing choke points for the regional traffic traveling to and from the new development if the interchange were not constructed.

The signalized intersections expected to show an acceptable level of service during the 2041 Build (Scenario 2) include:

- Buckner Lane at Duplex Road
- US 31 at I-840 EB Ramps
- US 31 at I-840 WB Ramp (AM peak)
- Buckner Lane at Thompson's Station Road (AM peak)
- US 431 at I-840 WB Ramp
- I-65 SB Ramps at Goose Creek Bypass
- I-65 NB Ramps at Goose Creek Bypass
- SR 396 WB Ramps at Port Royal Road (PM peak)
- SR 396 EB Ramps at Port Royal Road (AM peak)

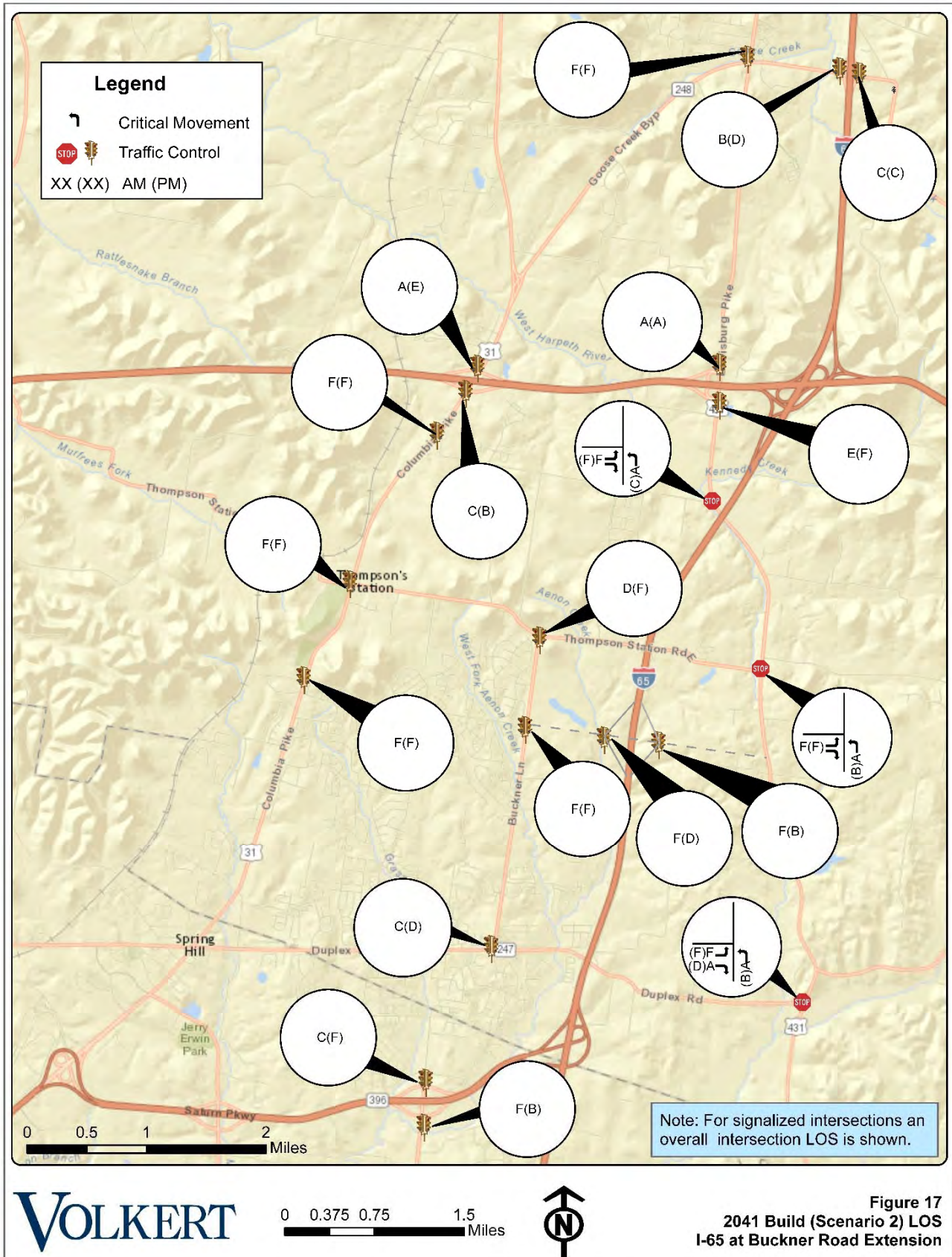
The remaining signalized intersections are expected to operate at LOS D or lower during at least one of the peak hours. These intersections will require improvements by the local municipalities to increase the operations to an acceptable level. It is important to note the US 31 (Columbia Pike) at I-840 ramps, US 431 (Lewisburg Pike) at the I-840 westbound ramp, and the SR 396 (Saturn Parkway) ramps are expected to operate at acceptable levels of service for either one or both peak hours with the new interchange. At the unsignalized intersection on US 431 (Lewisburg Pike) at the I-840 westbound ramp, the minor approach to the arterial is expected to operate at an LOS F. This type of LOS is expected at a minor approach to an arterial.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Table 10 - Intersection Level of Service: 2041 Build (Scenario 2)

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2041		
			V/C	DELAY	LOS
Buckner Lane at Duplex Road	SIGNAL	AM		25.6	C
		PM		35.1	D
US 31 at Thompson's Ridge Road/Buckner Road	SIGNAL	AM		146.0	F
		PM		250.1	F
US 31 at Thompson's Station Road	SIGNAL	AM		361.7	F
		PM		234.0	F
US 31 at I-840 EB Ramps	SIGNAL	AM		29.4	C
		PM		19.6	B
US 431 at Duplex Road	STOP NBL/EBL/EBR	AM	0.07/6.96/0.03	8/2742.7/9.4	A/F/A
		PM	0.16/1.72/0.35	13.9/417.9/26.5	B/F/D
US 431 at Thompson's Station Road	STOP EB/NBL	AM	6.63/0.13	>300.0/8.2	F/A
		PM	2.67/0.08	>300.0/12.6	F/B
US 31 at I-840 WB Ramps	SIGNAL	AM		5.9	A
		PM		58.9	E
Buckner Road at Buckner Lane	SIGNAL	AM		93.8	F
		PM		195.3	F
Buckner Lane at Thompson's Station Road	SIGNAL	AM		43.8	D
		PM		604.1	F
US 31 at Critz Lane	SIGNAL	AM		>300.0	F
		PM		>300.0	F
US 431 at Critz Lane	STOP EB/NBL	AM	9.2/0.02	>300.0/8.2	F/A
		PM	5.3/0.12	>300.0/24.4	F/C
US 431 at I-840 WB Ramp	SIGNAL	AM		9.8	A
		PM		6.6	A
US 431 at I-840 EB Ramp	SIGNAL	AM		65.0	E
		PM		197.7	F
US 431 at Goose Creek Bypass	SIGNAL	AM		142.1	F
		PM		86.0	F
I-65 SB Ramps at Goose Creek Bypass	SIGNAL	AM		14.2	B
		PM		37.0	D
I-65 NB Ramps at Goose Creek Bypass	SIGNAL	AM		23.6	C
		PM		20.2	C
SR 396 WB Ramps at Port Royal Road	SIGNAL	AM		28.2	C
		PM		127.7	F
SR 396 EB Ramps at Port Royal Road	SIGNAL	AM		219.9	F
		PM		15.4	B
US 31 at Buckner Road	SIGNAL	AM		713.2	F
		PM		368.9	F
I-65 SB Ramps at Buckner Road	SIGNAL	AM		170.7	F
		PM		38.9	D
I-65 NB Ramps at Buckner Road	SIGNAL	AM		107.5	F
		PM		13.6	B

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County



Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Based on the Traffic Impact Study, Scenario 3 will not be constructed unless the interchange is built. Figures C14(a,b) in Appendix C show the intersection traffic assuming Scenario 3 is developed. Table 11 and Figure 18 show the analysis results using the 2041 Build (Scenario 3) traffic with the improvements shown in Figure 9 on page 23.

The increase in trips to the study area for this scenario show the signalized intersections expected to operate at LOS D or better include:

- US 31 at I-840 EB Ramps
- US 31 at I-840 WB Ramps (AM peak)
- US 431 at I-840 WB Ramps
- I-65 SB Ramps at Goose Creek Bypass
- I-65 NB Ramps at Goose Creek Bypass
- SR 396 WB Ramps at Port Royal Road (AM Peak)
- SR 396 EB Ramps at Port Royal Road (PM Peak)

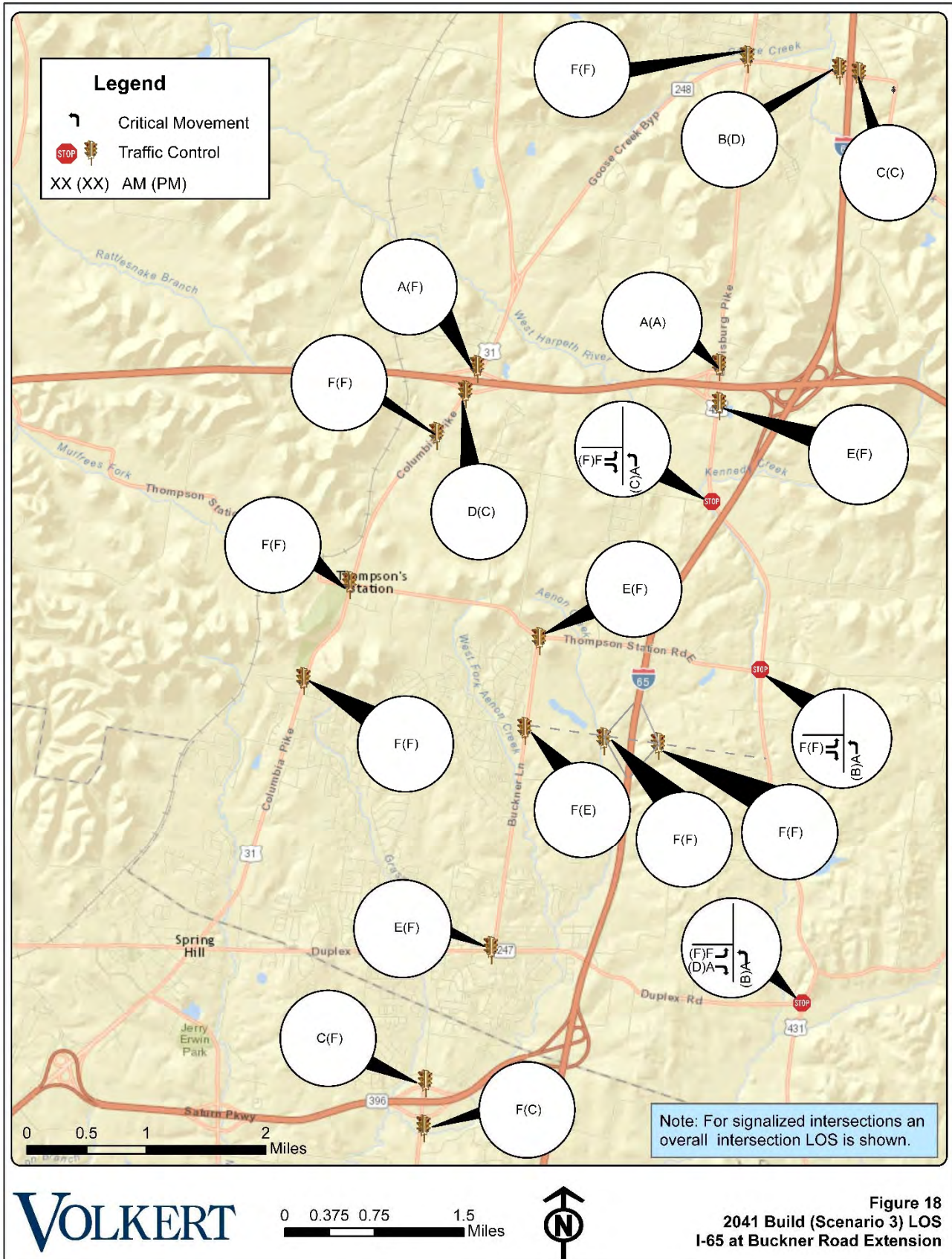
The remaining signalized intersections are expected to operate at LOS E or F during at least one of the peak hours. These intersections will require improvements to increase the operations to an acceptable level. As shown with the 2041 Build (Scenario 2) analysis, the new interchange will help traffic operations at the US 31 (Columbia Pike) and I-840 ramps, US 431 (Lewisburg Pike) at I-840 ramps, and the SR 396 (Saturn Parkway) at Port Royal Road ramps. Although some of the ramps are expected to operate at a poor LOS, the delay is expected to be lower than if the interchange were not built.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Table 11 - Intersection Level of Service: 2041 Build (Scenario 3)

INTERSECTION	TRAFFIC CONTROL	PEAK PERIOD	2041		
			V/C	DELAY	LOS
Buckner Lane at Duplex Road	SIGNAL	AM		65.1	E
		PM		100.7	F
US 31 at Thompsons Ridge Road/Buckner Road	SIGNAL	AM		209.1	F
		PM		280.8	F
US 31 at Thompsons Station Road	SIGNAL	AM		430.7	F
		PM		319.1	F
US 31 at I-840 EB Ramps	SIGNAL	AM		46.9	D
		PM		28.5	C
US 431 at Duplex Road	STOP NBL/EBL/EBR	AM	0.09/8.35/0.03	8.1/3378/9.5	A/F/A
		PM	0.18/1.99/0.51	14.1/539.6/33	B/F/D
US 431 at Thompsons Station Road	STOP EB/NBL	AM	22.5/0.14	10016.8/8.5	F/A
		PM	3.01/0.07	978.6/12.7	F/B
US 31 at I-840 WB Ramps	SIGNAL	AM		6.4	A
		PM		91.9	F
Buckner Road at Buckner Lane	SIGNAL	AM		184.2	F
		PM		73.7	E
Buckner Lane at Thompson's Station Road	SIGNAL	AM		62.0	E
		PM		710.0	F
US 31 at Critz Lane	SIGNAL	AM		>300.0	F
		PM		>300.0	F
US 431 at Critz Lane	STOP EB/NBL	AM	9.85/0.02	4199.4/8.4	F/A
		PM	5.95/0.12	2435.7/24	F/C
US 431 at I-840 WB Ramp	SIGNAL	AM		9.5	A
		PM		6.5	A
US 431 at I-840 EB Ramp	SIGNAL	AM		76.7	E
		PM		139.2	F
US 431 at Goose Creek Bypass	SIGNAL	AM		144.1	F
		PM		141.7	F
I-65 SB Ramps at Goose Creek Bypass	SIGNAL	AM		14.2	B
		PM		37.0	D
I-65 NB Ramps at Goose Creek Bypass	SIGNAL	AM		23.6	C
		PM		20.2	C
SR 396 WB Ramps at Port Royal Road	SIGNAL	AM		28.4	C
		PM		122.8	F
SR 396 EB Ramps at Port Royal Road	SIGNAL	AM		235.6	F
		PM		24.8	C
US 31 at Buckner Road	SIGNAL	AM		537.1	F
		PM		423.7	F
I-65 SB Ramps at Buckner Road	SIGNAL	AM		237.9	F
		PM		135.9	F
I-65 NB Ramps at Buckner Road	SIGNAL	AM		278.2	F
		PM		>300.0	F

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County



E. ANALYSIS OF ALTERNATIVE CONCEPTS

The 2041 Build Alternatives evaluate three (3) geometric interchanges as described previously. The geometry of the three (3) interchanges evaluated are shown in Figures 11, 12, and 13 in Chapter 4. The traffic volumes used are the 2041 Build (Scenario 3) shown in Figures C14(a,b) in Appendix C. The analysis of the three (3) alternative interchanges is presented in Table 12.

The geometry for each of the alternatives was discussed in detail in Chapter 4. The operation of each alternative was analyzed with the feasible geometry required for each of the alternatives to operate at an acceptable LOS. The exception is the I-65 northbound ramp at the Buckner Road Extension, which is expected to operate at LOS E or F during the AM and PM peak hours. The required geometry for this ramp to operate adequately was not a possible construction geometry.

In addition to the intersection analysis at the ramp terminals and the new intersection of US 431 (Lewisburg Pike) at the Buckner Road Extension, the merge and diverge areas of the ramps were analyzed using the HCS 2010 software. The merge and diverge ramp segments on I-65 for both Alternative 1 (TUDI) and Alternative 2 (DDI) carry the same number of vehicular trips. Alternative 3 (Parclo) will move the same number of vehicles on the southbound ramps but the northbound ramps will separate the eastbound Buckner Road on ramp traffic from the westbound Buckner Road on ramp traffic. Table 13 shows the results of the merge and diverge ramp segments. The number of merge and diverge ramp areas expected to operate at a poor LOS is caused partially by the high number of trucks seen on this corridor. The 16% trucks is the current volume counted by TDOT in 2015. The other issues causing the poor LOS is the traffic volume for this segment of I-65. In 2041, it is projected to see an ADT of 110,410. For a six lane freeway, the LOS typically falls below an acceptable level when the trips reach 102,000.

From an operations standpoint, Alternative 2 (DDI) will perform as well as or better than the other alternatives when comparing LOS and delay.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Table 12 - Interchange Level of Service: 2041 Build (Scenario 3)

ALTERNATIVE	INTERSECTION	PEAK PERIOD	AVERAGE DELAY (SEC/VEH)	LOS
Alternative 1 Tight Urban Diamond Interchange	I-65 SB at Buckner Road Extension	AM	8.4	A
		PM	16.2	B
	I-65 NB at Buckner Road Extension	AM	101.5	F
		PM	70.1	E
	Buckner Road Extension at US 431	AM	19.8	B
		PM	48.1	D
Alternative 2 Diverging Diamond Interchange*	I-65 SB at Buckner Road Extension	AM	24.7	C
		PM	36.1	D
	I-65 NB at Buckner Road Extension	AM	22.1	C
		PM	15.9	B
	Buckner Road Extension at US 431	AM	19.8	B
		PM	48.1	D
Alternative 3 Partial Cloverleaf Interchange	I-65 SB at Buckner Road Extension	AM	24.3	C
		PM	21.5	C
	I-65 NB at Buckner Road Extension	AM	28.6	C
		PM	22	C
	Buckner Road Extension at US 431	AM	19.8	B
		PM	48.1	D

* Diverging Diamond Interchange can not be analyzed using HCS 2010 software but was analyzed using HCS 2000. The intersection delay and LOS shown is where the opposite paths of travel intersect.

Table 13 – Interchange Alternatives Merge LOS: 2041 Build (Scenario 3)

Condition	Ramp Junction	Turning Movement	Level of Service					
			AM LOS	AM DR (pc/mi/hr)	AM SR (mph)	PM LOS	PM DR (pc/mi/hr)	PM SR (mph)
Alt. 1 Tight Urban Diamond & Alt. 2 Diverging Diamond	Buckner Road and I-65 SB	Southbound Off Ramp	C	22.8	53.9	F	45.7	51.8
		Southbound On Ramp	F	36.3	45.0	F	31.0	47
	Buckner Road and I-65 NB	Northbound On Ramp	F	60.7	0.0	F	37.8	40.8
		Northbound Off Ramp	F	45.7	54.8	C	22.8	53.9
Alt. 3 Partial Cloverleaf	Buckner Road and I-65 SB	Southbound Off Ramp	C	22.8	53.9	F	45.7	51.8
		Southbound On Ramp	F	36.3	45.0	F	31.0	47
	Buckner Road and I-65 NB	Northbound On Ramp**	F	33.3	46.0	C	26.0	59
		Northbound On Ramp*	D	31.4	49.0	F	35.3	47.3
		Northbound Off Ramp	F	45.7	54.8	C	22.8	53.9

* EB on Buckner Road Ext.

** WB on Buckner Rd Ext.

F. SAFETY ANALYSIS

The *Highway Safety Manual* (HSM) provides tools for analyzing the safety of thoroughfares. Two (2) additional safety analysis tools are the Enhanced Interchange Safety Analysis Tool (ISATe) and the Interactive Highway Safety Design Model (IHSDM). ISATe was chosen as the better tool for this study, as the purpose of this IAR is to select and propose a new interchange on I-65. The ISATe model is a simple and effective model for freeway segments and interchanges. ISATe is an Excel-based model used primarily for predicting crash frequencies at interchanges. Although the ISATe model calculates predicted crash frequencies, it is more important to use it as a tool to compare relative crash frequencies of interchange alternatives. This safety analysis in combination with analysis of the traffic operations and construction costs of the alternatives can be used to select a preferred alternative.

For the purposes of this safety analysis, four (4) different configurations were evaluated using ISATe. The first, designed simply to serve as a baseline, is the No Build option. The remaining three (3) are each of the evaluated interchange alternatives, which are the Tight Urban Diamond Interchange (TUDI), the Diverging Diamond Interchange (DDI) and the Partial Cloverleaf Interchange (Parclo).

Inputs in the model are categorized into freeway segments, ramp segment, and ramp terminals. Data that can be input into the model include:

- Number of Lanes
- Lane Widths
- Shoulder Widths
- Median Widths
- Segment Lengths
- Horizontal Curvature
- Rumble Strip Information
- Median/Roadside Barrier Information
- Ramp Lengths
- Freeway and Ramp Segment AADTs
- Average Traffic Speed
- Historical Crash Data
- Intersection/Ramp Terminal Traffic Control Information
- Ramp Terminal Configurations
- Crossroad Information

Output of modeled crash data is presented in a similar fashion, being categorized into freeway segments, ramp segments, and ramp terminals. Predicted crashes are further categorized by fatal crashes, serious injury crashes, evidential injury crashes, possible injury crashes, and property damage only (PDO) crashes. In addition, the crashes are broken down into multiple vehicle and single vehicle crashes, head-on crashes, right-angle crashes, rear-end crashes, sideswipe

Interstate Access Request
 I-65 at Buckner Road Extension
 Williamson County

crashes, crashes with animals, crashes with fixed objects, crashes with parked vehicles, and other crashes.

Predicted crashes from the ISATe analysis for this study are shown in Table 14 below:

Table 14- 2021-2041 ISATe Predictive Model Crash Summary

Interchange Alternative	Predicted Crashes						
	Freeway Segment Crashes	Ramp Segment Crashes	Ramp Terminal Crashes	Total Crashes	Total Fatal Crashes	Total Serious Injury Crashes	Total Crashes per Year
No Build	274.4	N/A	N/A	274.4	2.6	6.2	13.1
TUDI	577.2	86.0	778.1	1441.4	5.5	20.3	68.6
DDI	495.9	101.6	840.4	1437.9	4.9	19.4	68.5
Parclo	550.3	110.5	769.6	1430.5	5.5	22.1	68.1

The predicted crashes in the No Build alternative is significantly lower than the predicted crashes for each of the interchange alternatives. This is true for a couple of reasons. First, the No Build alternative has no ramps, so there are no ramp segment or terminal crashes in this alternative. Second, the freeway segment predicted crashes are lower because there are no conflict points due to intersecting ramps as there are in the three (3) interchange alternatives. However, the No Build Option does not address the purpose and need of the project, which is to provide accessibility, economic development and regional mobility. As the output shows, the predicted crash totals for all three (3) interchange alternatives are essentially the same. However, when reviewing the predicted critical crashes (fatal and serious injury crashes), the DDI has a slightly lower number of those types of crashes when compared to the other interchange alternatives. The predicted crashes for the DDI are conservative due to the fact that no Crash Modification Factors (CMFs) have been applied. According to the CMF Clearinghouse (www.cmfclearinghouse.org), a CMF is “a multiplicative factor used to compute the number of crashes after implementing a given countermeasure at a specific site. A CMF reflects the safety effect of a countermeasure, whether it is a decrease in crashes (CMF below 1.0), increase in crashes (CMF above 1.0), or no change in crashes (CMF of 1.0)”. There are several CMFs for converting a diamond interchange to a DDI. However, none of the factors were applied in this case because TDOT has yet to calibrate these CMFs for Tennessee. Therefore, it was determined to not apply CMFs at this time. The entire ISATe model input and output for all alternatives are provided in Appendix G.

CHAPTER 6

CONSTRUCTION

A. CONSTRUCTABILITY

Three (3) alternatives for a new interchange on I-65 at a proposed extension of Buckner Road are each shown in detail in the Chapter 4. Alternative 1 is a new tight urban diamond interchange (TUDI), Alternative 2 is a new diverging diamond interchange (DDI), and Alternative 3 is a new partial cloverleaf interchange (Parclo). From a constructability standpoint, it is assumed that a portion of the Buckner Road Extension will be built by the City of Spring Hill from Buckner Lane to west of I-65 and from east of I-65 to Lewisburg Pike (US 431) prior to the interchange being built. It is recommended that any necessary lane closures on I-65 take place at night in order to minimize traffic disruption on the interstate.

Construction of each alternative must be phased in order maintain traffic at acceptable levels on I-65 as well as the surrounding roadway network. The construction phasing options have been developed to address several critical items:

- Maximize traffic operations during construction while recognizing that motorists will experience some additional delays due to construction
- Minimize the number of phases required
- Maintain the existing number of lanes on I-65 during ramp construction
- Maintain safety for both motorists and construction workers

Each alternative will be phased similarly. They will include the following phases:

- Phase 1 – Relocate Pratt Road in preparation for the interchange.
- Phase 2 – Construct bridge(s) over I-65 for the interchange. Maintain traffic on I-65 during construction of the bridge(s).
- Phase 3 – Construct retaining walls, interchange ramps and tie the Buckner Road Extension into the interchange on both sides. Open to traffic.

B. INITIAL COST ESTIMATE OF EACH BUILD ALTERNATIVE

The Buckner Road Extension will be built by the City of Spring Hill prior to or in conjunction with the interchange construction. Therefore, the cost for each interchange includes only the cost of building the interchange.

The estimated cost for constructing Alternatives 1, 2 and 3 are summarized in Table 15. Separate costs are provided for each of the major construction items.

Detailed cost estimates are included in Appendix H.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Table 15- Summary of Cost Estimates

Cost Component	Alternative 1 TUDI	Alternative 2 DDI	Alternative 3 Parclo
Right-of-Way	\$ 812,000	\$ 983,000	\$ 1,530,000
Clearing and Grubbing	\$ 100,000	\$ 110,000	\$ 140,000
Earthwork	\$ 491,600	\$ 840,400	\$ 390,000
Drainage	\$ 584,800	\$ 815,900	\$ 315,400
Utilities	\$ 470,000	\$ 528,800	\$ 587,500
Structures	\$ 3,397,500	\$ 3,147,500	\$ 2,460,000
Paving	\$ 7,440,000	\$ 6,895,500	\$ 7,207,300
Roadway and Pavement Appurtenances	\$ 352,100	\$ 472,100	\$ 109,300
Retaining Walls	\$ 1,245,000	\$ 120,000	\$ 90,000
Topsoil	\$ 95,700	\$ 114,900	\$ 143,600
Seeding	\$ 58,500	\$ 61,300	\$ 73,700
Fencing	\$ 115,000	\$ 120,000	\$ 150,000
Signing	\$ 358,700	\$ 361,200	\$ 242,900
Pavement Markings	\$ 49,000	\$ 58,000	\$ 43,800
Signalization	\$ 280,000	\$ 450,000	\$ 280,000
Guardrail	\$ 179,500	\$ 187,300	\$ 170,300
Other Construction Items (25%)	\$ 4,007,400	\$ 3,816,500	\$ 3,483,500
Maintenance of Traffic	\$ 1,001,800	\$ 954,100	\$ 870,900
Mobilization (5%)	\$ 1,051,900	\$ 1,001,800	\$ 914,400
Engineering and Contingency (10%)	\$ 3,313,600	\$ 3,155,700	\$ 2,880,400
Preliminary Engineering (10%)	\$ 2,540,400	\$ 2,419,400	\$ 2,208,300
Const. Engineering & Inspection (10%)	\$ 2,540,400	\$ 2,419,400	\$ 2,208,300
Total Cost	\$ 30,484,900	\$ 29,032,800	\$ 26,499,600

CHAPTER 7

SUMMARY

A. DISCUSSION OF FHWA 8 POINTS

Policy Point 1: *“The need being addressed by the request cannot be adequately satisfied by existing interchanges to the interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such that as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays, or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFT 625.2(a)).”*

I-65 has three (3) interchanges serving this area of Williamson and Maury Counties that are the subject of this Interstate Access Request (IAR). They are Goose Creek Bypass (SR 248), I-840 and SR 396 (Saturn Parkway). The two (2) northern interchanges, Goose Creek Bypass (SR 248) and I-840 are approximately 2.6 miles apart and I-840 and SR 396 (Saturn Parkway) are approximately 4.5 miles apart. Regional trips from this area in Middle Tennessee commonly travel through the SR 396 (Saturn Parkway) at Port Royal interchange, the I-840 at US-31 interchange, and the I-840 at US 431 interchange traversing to I-65. The Goose Creek Bypass (SR 248) interchange serves a limited number of regional trips from this area.

As shown in the analysis, by the build year of 2041, US 31 (Columbia Pike) at I-840, US 431 (Lewisburg Pike) at the I-840 EB ramps, and SR 396 (Saturn Parkway) are expected to operate at LOS E or F. The US 431 (Lewisburg Pike) at I-840 WB Ramp is expected to operate adequately. However, the analysis for the 2041 Build (Scenario 2) and 2041 Build (Scenario 3) show that these interchanges will improve. Although they will not all operate at LOS D or better, the delay time for the movements expected to operate at LOS F are lower than in the 2041 No Build scenario. This analysis is shown in Tables 8, 10, and 11 in Chapter 5.

Also shown in the report in Figure 9 on page 23 are the improvements planned for the roadways and intersections in the study area. Even with these roadway widenings, signalization, and additional turn lanes at the intersections, several of the study intersections will operate at a poor level of service causing delays for regional traffic and causing problems for the development of future land in the area. The additional interchange will be needed for regional trips (including goods movement) to be made in an adequate amount of time and for construction of a regional mixed-use development.

Policy Point 2: *“The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit and HOV facilities), geometric design, and alternative improvements to the interstate without the proposed change in access (23 CFR 625.2(a)).”*

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

The need for a new interchange on I-65 between SR 396 (Saturn Parkway) and I-840 is being generated by insufficient north-south corridor capacity and a lack of accessibility to the area. The existing interchanges on I-65 at I-840 and SR 396 (Saturn Parkway) have plans for improvements at the ramp terminals and I-65 is expected to be widened to three lanes in each direction by 2041. The analysis includes the planned signalization and geometric improvements to the network, but these will not by themselves meet the access needs of the area adequately in the design year of 2041 as shown in Table 8 of Chapter 5.

Regionally, accessibility deficiencies cannot be mitigated with transportation system management improvements like HOV lanes and ramp metering. Although I-65 will experience LOS deficiencies in 2041 and these may be relieved in part with TSM improvements, the need for regional accessibility cannot be met with those types of improvements.

The Regional Transit Authority (RTA) operates an express bus service route, 95X, from Spring Hill to downtown Nashville that utilizes I-65 and makes a counterclockwise loop around the study area (SR 396 (Saturn Parkway), US 31 (Columbia Pike), and I-840) of this IAR. A vanpool service offered by the Transportation Management Group serves Williamson and Maury Counties. In the long term, better transit service is desirable for Williamson and Maury Counties, but the existing and anticipated future development patterns do not and will not result in land use density sufficient to make it effective in substantially relieving traffic congestion. The Nashville Area MPO TDM takes into consideration transit use, so the projected traffic volumes on the street network were made accordingly.

Policy Point 3: *“An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility or on the local street network based on both the current and the planned future traffic projections. The analyses shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625(a), 655.603(d), and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625 2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the interstate facility, ramps, intersections of ramps with cross road and local street network (23 CFR 625 2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d).”*

A new interchange on I-65 at the Buckner Road extension will be nearly equidistant between two existing interchanges that are about 4.5 miles apart. As such, the merge and diverge operations of the new interchange, in either location, will not have an impact on the SR 396 (Saturn Parkway) or I-840 on and off ramps. The ramp terminal intersections at Buckner Road will operate at LOS

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

C or better in 2041 and lane storage capacity can be provided to minimize queues so that queues do not extend back to I-65.

Side friction created by merge and diverge maneuvers are inevitable with a new interchange, but the impact can be minimized with proper design. In the AM peak hour, the northbound merge and diverge maneuvers for all Build scenarios will operate at LOS F with I-65 improving to three (3) lanes per direction. In the PM peak hour, the southbound diverge maneuver off I-65 will operate at LOS F. The number of merge and diverge ramp areas expected to operate at a poor LOS is caused partially by the high number of trucks seen on this corridor. The 16% trucks is the current volume counted by TDOT in 2015. The other issues causing the poor LOS is the traffic volume for this segment of I-65. In 2041, it is projected to see an ADT of 110,410. For a six lane freeway, the LOS typically falls below an acceptable level when the trips reach 102,000.

ISATe analysis was performed for the No Build scenario and each of the three (3) Build Alternatives. According to the analysis, each of the three (3) interchanges will experience a similar number of crashes between 2021 and 2041. However, the diverging diamond interchange (DDI) will experience fewer severe crashes, which are fatal and serious injury crashes. The detailed ISATe analysis is provided in Appendix G.

Policy Point 4: *“The proposed access connects to a public road only and will provide for all movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g. transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).”*

Three (3) geometric alternative interchanges were evaluated and a diverging diamond is proposed for the Build scenario, which reduces the number of conflict points and improves safety. It will also increase the efficiency of the interchange that is expected to have high volumes with the regional mixed-use development expected in the design year 2041. The interchange will connect to the Buckner Road extension, which is a public road.

Policy Point 5: *“The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving the final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP) and the Congestion Management Process within the transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.”*

Design year traffic projections for the proposed new I-65 access point were based on the future model of the Nashville Area MPO Travel Demand Model (TDM) and the expected traffic from a proposed regional mixed-use development. Additionally, the analysis in this I-65 access request is based on the known projects in the Spring Hill area as well as some spot improvements expected by the year 2041.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

A proposed new interchange on I-65 between SR-396 (Saturn Parkway) and I-840 is in the Nashville Area MPO 2040 Regional Transportation Plan as an illustrative project.

A proposed new interchange is also included as a priority project in the Spring Hill Major Thoroughfare Plan and is consistent with the City's Comprehensive Plan.

Policy Point 6: *"In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 625.2(a), 655.603(d) and 771.111)."*

There are no potential future interchanges in the I-65 corridor between SR-396 (Saturn Parkway) and I-840 other than the one presented in this IAR. A new interchange on I-65 at the Buckner Road extension will meet the long term 2041 access and mobility needs of the area. Moreover, the ramp terminals at a new interchange (2041 Build (Scenario 2 or 3)) should operate at an acceptable level of service based on the functional design plans provided at the end of this chapter. This Interstate Access Request (IAR) is being funded by the city and county governments in the area including Williamson County and the City of Spring Hill. As such, these communities are working together and the results of this study are supported by all of them.

Policy Point 7: *"When a new or revised access point is due to a new, expanded or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with adjoining local street network and interstate access point (23 CFR 625.2(a) and 655.603(d))."*

The proposed new interchange on I-65 between SR-396 (Saturn Parkway) and I-840 is being proposed as a result of existing and expected traffic growth and the proposed regional mixed-use development on the western half of the interchange. The Traffic Impact Study (Appendix D) prepared for this development includes operational and geometric roadway recommendations in the study area for each phase of development. The recommendations listed below include those that affect the proposed interchange.

Phase 1

- Widen Buckner Lane to five (5) lanes or four (4) lanes with a median from Thompson's Station Road to Buckner Road
- Buckner Lane and Thompson's Station Road – Construct westbound left turn lane, eastbound right turn lane with channelization, and install traffic signals
- Buckner Lane and Buckner Road – Construct southbound left turn lane, southbound outside thru lane will become right turn lane, northbound left turn lane and additional thru lane, westbound left turn lane, thru lane, and right turn lane, and install traffic signals with protected/permitted phasing for the northbound and southbound left turns

Phase 2

- Widen Buckner Lane to five (5) lanes or four (4) lanes with a median from Buckner Road to Duplex Road
- Widen Buckner Road from US 31 east to Buckner Lane to five (5) lanes or four (4) lanes with a median with left turn lanes at the intersections
- Construct the new Buckner Road extension from Buckner Lane to the new development access as five (5) lanes or four (4) lanes with a median
- Buckner Road and Buckner Lane – left and right turn lanes for every approach

The developer will provide funding for these improvements based on the amount of traffic expected for the new development.

Phase 3 of the proposed regional development was not fully studied since it depends on the approval of the interstate access request. The developer will have further commitments if phase 3 is constructed.

Policy Point 8: *“The proposal can be expected to be included as an alternative in the requested environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).”*

Section 2.E of this IAR discusses known social and environmental issues that could be affected by a new interchange on I-65 at the Buckner Road extension. The preliminary review of environmental characteristics in the area did not uncover any issues that would prevent the proposed new I-65 interchange project from moving forward. The conclusions of this report will be presented to FHWA for their review. The local communities sponsoring this access request realize that this is only the first step of environmental assessment and subsequent approval. The full NEPA process will begin after a determination of IAR engineering and operational acceptability by the Federal Highway Administration (FHWA).

Prompt List for Review of Interstate System Access Change Requests

Adequately Addressed?		FHWA Interstate Access Policy Points
Yes	No	
X		Policy Point 1: The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).
X		Policy Point 2: The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).
X		Policy Point 3: An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).
X		Policy Point 4: The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).
X		Policy Point 5: The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.
X		Policy Point 6: In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).
X		Policy Point 7: When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).

Prompt List for Review of Interstate System Access Change Requests

FHWA Interstate Access Policy Points		
Adequately Addressed?		
X	Policy Point 8: The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).	

Policy Point 1: “The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 625.2(a)).”

Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the access request clearly describe the need and purpose of the proposal and identify project goals and objectives that are specific and measurable?	<i>Chapter 1.C</i>
X			Is the proposal in the best interest of the public, or does it merely serve a narrow interest?	<i>Chapters 1.C, 7.A (PPI)</i>
X			Is the proposal serving a regional transportation need, or is it merely compensating for deficiencies in the local network of arterials and collectors?	<i>Chapter 1.C, PPI</i>
X			In lieu of granting new access, is there any reasonable alternative consisting of improvements to the existing roadway(s) or adjacent access points that could serve the need and purpose?	<i>Chapter 5.C, Table 8</i>
X			Has the evaluation of existing interchanges and the local road network taken into account all proposed improvements currently identified in the State and/or Regional Long Range Plan?	<i>Chapter 4.A, Figure 9</i>
X			Will the proposed change in access result in needed upgrades or improvements to the cross road for a significant distance away from the interchange?	<i>Chapters 3.A, 4.C; 7.A (PP7)</i>

Policy Point 2: “The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).”

Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Was FHWA actively involved in preliminary studies and decisions? If not, then more detailed information may be required in support of proposed action.	<i>Chapter 1.C</i>
X			Did the study area cover sufficient area to allow for an evaluation of all reasonable alternatives?	<i>Chapter 1.B, Figure 2</i>
X			Was a No-Build Alternative evaluated?	<i>Chapter 5.C</i>
X			Considering the context of the proposal, is this the best location for the proposed new interchange?	<i>Chapter 7.B</i>

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

X			Were different interchange configurations (Tight diamond, SPDI, Parclo) considered?	<i>Chapters 4.B, 4.C, 4.D, 5.E, 5.F, 6.B, 7.B</i>
X			Were pedestrians and bicyclists considered in the alternative evaluation?	<i>Bicyclists and pedestrians will be considered as part of the project.</i>
X			Was there an evaluation of different intersection configurations (stop control, signal, roundabout, free right turns, etc?)	<i>Chapters 5.D, 5.E</i>
X			Have Transportation Systems Management (i.e. HOV, ITS, Ramp Metering, Transit etc.) options been evaluated as an alternative to a new or modification to an existing interchange?	<i>Chapter 7.A, PP2</i>
X			Did the report discuss how TSM alternatives were evaluated and eliminated from consideration?	<i>Chapter 7.A</i>
		X	Does the proposal consider any future planned TSM strategies and is the design consistent with the ability to implement the future TSM strategies?	<i>There are no planned TSM strategies.</i>

Policy Point 3: “An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).”

Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the report demonstrate that a proper traffic operational analysis was conducted? The analysis should include the applicable basic freeway segments, freeway weaving segments, freeway ramp segments, ramp junctions and crossroad intersections related to the proposed access point and at least the two adjacent interchanges.	<i>Chapters 5.C, 5.D, 5.E; Tables 6-13</i>
X			Does the report include a safety analysis of the mainline, ramps and intersections of the proposed access point and the nearest adjacent interchange (provided they are near enough that it is reasonable to assume there may be impacts)?	<i>Chapter 5.F</i>
X			Has the design traffic volume been validated?	<i>Chapters 2.D & 3.A; Traffic was approved by TDOT</i>
X			Does the report include verification that the data used in the traffic analysis is consistent with the traffic and air quality models MPOs use to develop their current Transportation Plan (20-year) and Transportation Improvement Program (TIP)?	<i>Chapter 2.D</i>
X			Does the report include a design period of 20 years commencing at the time of project approval (PS&E approval)?	<i>Chapter 3.A</i>

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

X			Does the report include quantitative analyses and results to identify operational differences between alternatives that are heavily congested?	<i>Chapters 5.C, 5.D, & 5.E</i>
X			Has a conceptual signing plan been provided?	<i>Chapter 7, Functional Plans</i>
X			Is guidance signing (i.e., way-finding or trail blazing signs) clear and simple?	MUTCD Chapter 2E: Guide Signs – Freeways and Expressways; Chapter 7, Functional Plans
X			Do the results of the operational analysis result in a significant adverse impact to existing or future conditions?	<i>Chapters 5.C, 5.D, & 5.E</i>
X			Will the proposed change in access result in needed upgrades or improvements to the cross road for a significant distance away from the interchange? If so, have impacts to the local network been disclosed and fully evaluated?"	<i>Chapters 3.A, Figure 9; 5.D, 7.A (PP7); Appendix D, E, F</i>
X			Are the cross roads or adjacent surface level roads and intersections affected by the proposed access point analyzed to the extent (length) where impacts caused or affecting the new proposed access point are disclosed to the appropriate managing jurisdiction?	<i>Chapters 3.A, 7.A; Appendix C, L</i>
		X	Are pedestrian and/or bicycle facilities included (as appropriate) and do these facilities provide for reasonable accommodation?	<i>Bike and pedestrian facilities can be included in design plans.</i>
X			Does the proposed access secure sufficient Limits of Access adjacent to the Interchange ramps?	AASHTO's "A Policy on Design Standards Interstate System, 2005" Pg. 2; NCHRP Synthesis 332 ;
X			Does the proximity of the nearest crossroad intersections to the ramps contribute to safety or operational problems? Can they be mitigated??"	<i>Chapters 5.F, 7.A (PP3); Appendix L</i>
X			In addition to HCS, what analysis tools were employed and were they appropriate?	<i>Chapter 5.A; Synchro</i>
X			Has the proposal distinguished between nominal safety (i.e. adherence to design policies and standards) and substantive safety (actual and expected safety performance)?	<i>The new interchange will be designed and constructed to AASHTO standards.</i>
X			Will any individual elements within the recommended alternative be degraded operationally as a result of this action? If yes, are reasons provided to accept them?	<i>Chapters 5.C, 5.D, & 5.E; PP3</i>
X			In evaluating whether the proposal has a "significant adverse impact" on safety, has the State Strategic Highway Safety Plan been used as a benchmark?	<i>Chapters 5.F, 7.A (PP3)</i>
X			Are the proposed interchange design configurations able to satisfactorily accommodate the design year traffic volumes?	<i>Chapter 5.D</i>
		X	If the project is to be built in stages, has the traffic operational and safety analyses considered the interim stages of the proposal?	<i>It will not be built in stages.</i>

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Policy Point 4: “The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).”

Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the proposed access connect to a public road?	<i>Chapters 4.B, 7.A (PP4)</i>
X			Are all traffic movements for full interchange access provided?	<i>Chapters 4.B, 7.A (PP4)</i>
		X	If not, is the proposed access for special purposes such as transit vehicles, HOVs, and/or a park and ride lot?	<i>Providing for a full interchange.</i>
		X	If a partial interchange is proposed, is there sufficient justification for providing only a partial interchange?	AASHTO Greenbook 2004 Pg. 821-823; <i>Full interchange</i>
		X	If a partial interchange is proposed; was a full interchange evaluated as an alternative and is there sufficient justification to eliminate or discard it?	<i>Full interchange</i>
		X	Is sufficient ROW available (or being acquired) to provide a full interchange at a future date (staged construction)?	<i>Full interchange</i>
		X	Are you comfortable with how the missing movements will be accommodated on the surface streets and adjacent interchanges?	<i>Full interchange</i>
		X	Does FHWA support the selection of design controls/criteria and desired operational goals?	<i>Full interchange</i>
X			Does the proposed access meet or exceed current design standards for the Interstate System?	AASHTO’s Greenbook and A Policy on Design Standards Interstate System, 2005; <i>Chapters 4.B, 7, Functional Plans</i>
		X	If not, have anticipated design exceptions been identified and reviewed (at least conceptually)?	<i>Concept meets current design standards.</i>
		X	If expected design exceptions could have significant operational impacts on the Interstate and/or Crossroad system, are mitigation measures described?	<i>N/A</i>
X			Will the length of access control along the crossroad provide for acceptable operations and safety? (100-300' is a minimum. Additional access control is strongly encouraged when needed for safety and operational enhancement)	AASHTO "A Policy on Design Standards Interstate System" 2005; <i>Chapters 4.B, 7, Functional Plans</i>
		X	Does FHWA support selection of opening and design years?	<i>N/A</i>
X			Has each movement of the proposal been "tested" for ease of operation?	AASHTO Greenbook 2004 Pg. 863; <i>Chapter 5.D</i>
Have all design criteria (including but not limited to the following) been adequately addressed?				
X			a. Sight distance at ramp terminals (Don't overlook signal heads obscured by structures.)	AASHTO Greenbook 2004 Pg. 841; <i>Chapters 4.B, 7.A (PP4), Functional Plans</i>

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Policy Point 4: “The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			b. Sufficient storage on ramp to prevent queues from spilling on to the Interstate (based on current and/or future projected traffic demand)	<i>Chapter 5.D</i>
X			c. Vertical clearance	AASHTO "A Policy on Design Standards Interstate System" 2005; <i>Chapters 4.B, 7.A (PP4), Functional Plans</i>
X			d. Pedestrian access through the interchange	AASHTO Greenbook 2004 Pg. 864; <i>Chapters 4.B, 7.A (PP4), Functional Plans</i>
X			e. Length of acceleration/deceleration lanes	AASHTO Greenbook 2004 Pg. 823, 847; <i>Chapters 4.B, 7.A (PP4), Functional Plans</i>
X			f. Length of tapers	AASHTO Greenbook 2004 Pg. 849; <i>Chapters 4.B, 7.A (PP4), Functional Plans</i>
X			g. Spacing between ramps	Greenbook pg 843 & Ex. 10-68 and operational analysis; <i>Chapters 4.B, 7.A (PP4), Functional Plans</i>
X			h. Lane continuity	AASHTO Greenbook 2004 Pg. 810; <i>Chapters 4.B, 7.A (PP4), Functional Plans</i>
X			i. Lane balance	AASHTO Greenbook 2004 Pg. 810 AASHTO Greenbook 2004 Pg. 807; <i>Chapters 4.B, 7.A (PP4), Functional Plans</i>
X			j. Uniformity in interchange design and operational patterns (i.e. right-side ramps, exit design consistent w/adjacent interchanges)	<i>Chapters 4.B, 7.A (PP4), Functional Plans</i>

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Policy Point 5: “The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.”

Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the IJR discuss or include (as appropriate) other project(s), studies or planned actions that may have an effect on the report analysis results?	<i>Appendix D, E, F</i>
X			Does the project conform to the local planning, MPO or other related plans?	<i>Exec. Summary, Chapter 1.A</i>
X			Does the report include an endorsement of land use plans by the appropriate government entity before it is utilized for traffic generation purposes?	<i>Chapter 3.B, Appendix D</i>
X			Is the access request located within a Transportation Management Areas? (TMAs are metropolitan areas of 200,000 or more in population)	http://hepgis.fhwa.dot.gov/hepgis_v2/Urbanboundaries/Map.aspx <i>IAR Location is not within a TMA</i>
X			Is the access request located within a non-attainment area for air quality? (requests for access in a non-attainment or maintenance areas for air quality must be a part of a conforming transportation plan)	<i>Chapter 2.F</i>
X			Is the project included in the TIP/STIP and LRTP?	<i>Chapters 1.A, 5.C, 7.A (PP5)</i>
X			Is the access point covered as a part of an Interstate corridor study or plan? (<i>especially important for areas where the potential exists for construction of future adjacent interchanges</i>)	<i>Chapter 5.A</i>

Policy Point 6: “In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).”

Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Is it possible that new interchange(s) not addressed in the IJR could be added within an area of influence to the proposed access point? (If so, could the proposal preclude or otherwise be affected by any future access points?)	<i>Chapter 7.A (PP6)</i>
		X	Does the IJR report include the traffic volumes generated by any future additional interchanges within a vicinity of influence that are proposed?	<i>N/A</i>
X			Does the IJR report fail to include any other proposed interstate access points within a vicinity of influence that are being proposed or are in the current long range construction program?	<i>Chapters 1.A, 7.A (PP6)</i>

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Policy Point 7: “When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Does the access request adequately demonstrate that an appropriate effort of coordination has been made with appropriate proposed developments?	<i>Chapter 7.A (PP6, PP7)</i>
X			Are the proposed improvements compatible with the existing street network or are other improvements needed?	<i>Chapters 3.A, 4.B, 7.A (PP7); Appendix D, E, F</i>
X			Are there any pre-condition contingencies required in regards to the timing of other improvements?	<i>Chapters 3.A, 7.A (PP7)</i>
X			Have all commitments to improve the local transportation network been included in a TIP/STIP/LRTP prior to the Interstate access approval (final approval of NEPA document)?	<i>Chapter 3.A, Figure 9</i>
		X	If pre-condition contingencies are required, are pertinent parties in agreement with these contingencies and is this documented?	<i>No pre-conditions required.</i>
X			If the proposed improvements are founded on the need for providing access to new development, are appropriate commitments in place to ensure that the development will likely occur as planned?	<i>Chapter 7.A (PP7); Appendix D</i>
		X	If project is privately funded, are appropriate measures in place to ensure improvements will be completed if the developer is unable to meet financial obligations?	<i>Project is not privately funded.</i>
X			If the purpose and need to accommodate new development/traffic demands aren't fully known, is a worst case scenario used for future traffic?	<i>Chapter 1.C</i>
		X	Does the project require financial or infrastructure commitments from other agencies, organizations, or private entities?	<i>N/A</i>

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Policy Point 8: “The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).”				
Addressed Adequately?			Question	Reference Location
Y	N	N/A		
X			Are there any known social or environmental issues that could affect the proposal?	<i>Chapters 2.F, 7.A (PP8)</i>
X			Is the project consistent with the current TIP/STIP and LRTP and/or proposed amendments to the plan?	<i>Chapters 1.A, 5.C 7.A (PP5)</i>
X			Although NEPA is a separate action, is an environmental overview for the proposed improvements included?	<i>Chapter 2.E</i>
X			Is it appropriate to emphasize to the project stakeholders that the access approval will be handled as a two-step process? (i.e. Step 1: Engineering and Operational Acceptability and Step 2: Environmental Approvals)	<i>Chapters 7.A (PP8), 7.C</i>
X			Are all funding commitments included in a TIP/STIP/LRTP prior to the Interstate access approval (prior to final approval of the NEPA document)?	<i>Chapter 7.A (PP5)</i>
X			Are all commitments included in a TIP/STIP/LRTP prior to the Interstate access approval (prior to final approval of the NEPA document)?	<i>Figure 9, Chapter 7.A (PP5)</i>

B. CONCLUSIONS AND RECOMMENDATIONS

Results of the analysis indicate that a new I-65 interchange at Buckner Road extension, Build Alternative 2 (DDI), will meet the purpose and need of this project by improving the operations of the interchanges on I-840 and SR 396 (Saturn Parkway) and therefore improving regional mobility. It will also provide direct access to I-65 for the majority of the City of Spring Hill population. Equally as important it shows that the development of the property east of Buckner Lane as a regional mixed-use development will require an additional interchange.

Safety and operational analysis and the construction cost of the three Build Alternatives show that Build Alternative 2, DDI, will be the best option because it operates as well as or better than the other Build Alternatives and it has the fewest number of predicted severe crashes from 2021 to 2041 when compared to the other alternatives. Operations of a DDI are difficult to fully evaluate with the industry standard software. However, the DDI limits the number of conflict points for the traffic entering and exiting I-65 which improves safety. Functional plans, including conceptual signing plans, for Build Alternative 2 (DDI) are included on the following pages.

C. NEXT STEPS

This report will be submitted to TDOT for submittal to FHWA for a determination of acceptability. If approved by FHWA, Build Alternative 2 (DDI) will be carried forward for NEPA evaluation. Once the environmental document has been completed, it will be submitted for final FHWA determination of engineering and operational acceptability.

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

D. TDOT DESIGN DIVISION CONCURRENCE LETTER



**STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION**

DESIGN DIVISION
SUITE 1300, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-2221

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

MEMORANDUM

TO: Steve Allen, Director, Strategic Transportation Investments Division
FROM: *JL* Jennifer Lloyd, Director, Design Division
DATE: May 5, 2014
SUBJECT: Interstate Access Request
Interstate 65 at Buckner Road Extension
Williamson County

The Interstate Access Request for the subject project has been received by my office and we concur with the conceptual plan for the preferred alternatives.

Please notify me if you need further assistance.

JL:sa

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

E. TDOT TRAFFIC APPROVAL LETTER



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
STRATEGIC TRANSPORTATION INVESTMENTS DIVISION
SUITE 1000, JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-1402
(615) 741-2208

JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

May 26, 2017

Mr. Robby Dickenson, PE
Volkert, Inc.
302 Innovation Drive Suite 100
Franklin TN 37067

RE: Traffic Volume Data
I-65 @ Buckner Road IAR
Spring Hill TN, Williamson County

Dear Mr. Dickenson,

The Special Projects Office has reviewed the revised traffic volume data you submitted on May 18, 2017 for the subject project. These traffic volumes have our approval for use in the study. If I can be of further assistance, please contact me.

Sincerely,

A handwritten signature in blue ink that reads "Tony Armstrong".

Tony Armstrong
Transportation Manager 1

cc : Shaun Armstrong
file

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

F. LETTERS OF SUPPORT

MARSHA BLACKBURN
7TH DISTRICT, TENNESSEE

DEPUTY WHIP

COMMITTEE ON
ENERGY AND COMMERCE
VICE-CHAIRMAN

COMMITTEE ON
THE BUDGET

Congress of the United States
House of Representatives
Washington, DC 20515-4207

WASHINGTON OFFICE:
2265 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
TELEPHONE: (202) 225-2811

DISTRICT OFFICES:
305 PUBLIC SQUARE, SUITE 212
FRANKLIN, TN 37064
TELEPHONE: (615) 597-5161
128 N. 2ND STREET, SUITE 202
CLARKSVILLE, TN 37040
TELEPHONE: (615) 503-6391

August 25, 2017

Mr. Paul Degges
Chief Engineer
Tennessee Department of Transportation
James K. Polk Building, Suite 700
505 Deaderick Street
Nashville, TN 37243

RE: Support for I-65 Interchange Between Saturn Parkway and I-840

Dear Mr. Degges:

As a member of the U.S. House of Representatives for the State of Tennessee-District 7, which includes Williamson County, I am writing to pledge my support for a new interchange on I-65 between Saturn Parkway and I-840.

I've had the honor of representing District 7 since 2003, which has allowed a first-hand view of the exponential population growth Williamson County has experienced in the last 20 years. Williamson is the most rapidly growing county in the state and Spring Hill, in southern Williamson County, has grown from a population of 1,464 in 1990 to 36,530 in 2016. This interchange is critical to provide better access and to alleviate congestion in southern Williamson County.

I ask that you give this interchange your considered judgment and submit the request to the FHWA based on the need for an interchange in our community.

Respectfully,



Marsha Blackburn
Member of Congress

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

JACK JOHNSON
SENATOR

11 LEGISLATIVE PLAZA
NASHVILLE, TENNESSEE 37243

(615) 741-2495
F: (615) 253-0321

sen.jack.johnson@capitol.tn.gov



Senate Chamber
State of Tennessee

NASHVILLE

CHAIRMAN
COMMERCE & LABOR

MEMBER
STATE & LOCAL
GOVERNMENT

September 6th, 2017

Mr. Paul Degges
Chief Engineer
Tennessee Department of Transportation
James K. Polk Building, Suite 700
505 Deaderick Street
Nashville, TN 37243

RE: Support for I-65 Interchange Between Saturn Parkway and I-840

Dear Mr. Degges:

As members of the Legislative Delegation representing Williamson County, we are writing to you to express our strong support for a new interchange on I-65 between Saturn Parkway and I-840.

Williamson County is one of the most rapidly growing counties in the state and Spring Hill specifically has seen exponential population growth over the last twenty years. This interchange is desperately needed to provide better access and to alleviate congestion in southern Williamson County.

We respectfully ask that you give this interchange your considered judgment and submit the request to the FHWA based on the need for an interchange in our community.

Respectfully,


Senator Jack Johnson


Representative Glen Casada


Representative Sam Whitson

23rd District
Williamson County

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

JOEY HENSLEY, MD
SENATOR

309 WAR MEMORIAL BUILDING
NASHVILLE, TENNESSEE 37243
(615) 741-3100
1-800-449-8366 EXT. 13100
FAX (615) 283-0231

855 SUMMERTOWN HIGHWAY
NASHVILLE, TENNESSEE 37482
(931) 796-2018
CELL (931) 212-8823

E-MAIL: sen.joey.hensley@capitol.tn.gov



Senate
State of Tennessee
NASHVILLE

28TH LEGISLATIVE DISTRICT
MAURY, LAWRENCE, LEWIS, PERRY,
GILES AND WAYNE COUNTIES

MEMBER OF COMMITTEES

FINANCE
EDUCATION
HEALTH

SECOND VICE-CHAIR

HEALTH CARE

CHAIRMAN
HIGHER EDUCATION
SUB-COMMITTEE

August 24, 2017

Mr. Paul Degges
Chief Engineer
Tennessee Department of Transportation
James K. Polk Building, Suite 700
505 Deaderick Street
Nashville, TN 37243

RE: Support for I-65 interchanges Between Saturn Parkway and I-340

Dear Mr. Degges:

~~As a member of the Tennessee State Senate representing State Senate District 28, which includes Giles, Lawrence, Lewis, Maury, Perry, and Wayne Counties including the Maury County portion of Spring Hill, I am writing to pledge my support for a new interchange on I-65 between Saturn Parkway and I-340.~~

~~Spring Hill is one of the most rapidly growing cities in the State of Tennessee, having grown from a population of 1,464 in 1990 to 36,530 in 2016. This interchange is needed to provide better access and to alleviate congestion in Spring Hill.~~

~~I ask that you give this interchange your considered judgment and submit the request to the FHWA based on the need for an interchange in our community.~~

Respectfully,

Joey Hensley, MD
State Senator
28th District

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County



August 24, 2017

Mr. Paul Degges
Chief Engineer
Tennessee Department of Transportation
James K. Polk Building, Suite 700
505 Deaderick Street
Nashville, TN 37243

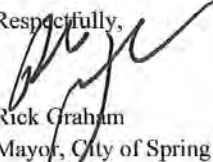
RE: Support for I-65 Interchange Between Saturn Parkway and I-840

Dear Mr. Degges:

As Mayor of the City of Spring Hill, I am writing to express my support for a new interchange on I-65 between Saturn Parkway and I-840.

The City of Spring Hill, along with the Town of Thompson's Station and Williamson County, committed funds in 2011 to fund a study to submit an Interstate Access Request (IAR) to the Federal Highway Administration (FHWA) for a new interchange on I-65 in Williamson County. On April 18, 2011, the City of Spring Hill Board of Mayor and Aldermen did unanimously adopt Resolution 11-43 funding \$35,000 of the cost of the IAR and pledging support for the interchange. This interchange is needed to provide better access and to alleviate congestion in southern Williamson County and northern Maury County, including Spring Hill and Thompson's Station.

I ask that you give this IAR your considered judgment and submit it to the FHWA based on the need for an interchange in our community.

Respectfully,

Rick Graham
Mayor, City of Spring Hill

Encl: Resolution 11-43

199 Town Center Parkway
P. O. Box 789
Spring Hill, TN 37174



Phone 931.486.2252
Fax 931.486.0516
www.springhilltn.org

Interstate Access Request
I-65 at Buckner Road Extension
Williamson County

Rogers C. Anderson
Williamson County Mayor



WILLIAMSON COUNTY GOVERNMENT

August 28, 2017

Mr. Paul Degges, Chief Engineer
Tennessee Department of Transportation
James K. Polk Building-Suite 700
505 Deaderick Street
Nashville, Tennessee 37243

Dear Mr. Degges:

As demonstrated in the Tennessee Department of Transportation's (TDOT) recent Region 3 Meeting, the population in Williamson County continues to be at the top of the charts for growth. With Tennessee's population is expected to increase by two (2) million people by the year 2040, and a 55% growth in the TDOT Region 3, transportation growth and infrastructure needs continue to need to be addressed in an expeditious manner.

In 2010, Williamson County partnered with the Town of Thompson's Station and the City of Spring Hill to contract with CDM Smith for a new Interchange Access Request (IAR) study to be located along the I-65 Corridor in southern Williamson County.

CDM Smith Property Manager, Robby Dickenson indicates that this study is being submitted to TDOT for review prior to the final document submittal to the Federal Highway Administration (FHWA) for approval. The addition of this new interchange would bring additional interstate access and help alleviate secondary road congestion in southern Williamson County.

As Mayor of Williamson County, I respectfully request that you give this IAR positive consideration for approval that can be provided to the FHWA.

If you need additional information or wish to discuss this proposal in further detail, feel free to contact me.

Sincerely,

Rogers C. Anderson, Mayor
Williamson County

RCA/dg



Index Of Sheets

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2-2A	TYPICAL SECTIONS
3-3A	OVERALL LAYOUT
4-13	FUNCTIONAL PLAN SHEETS
14-15	CONCEPTUAL SIGNING PLAN SHEETS

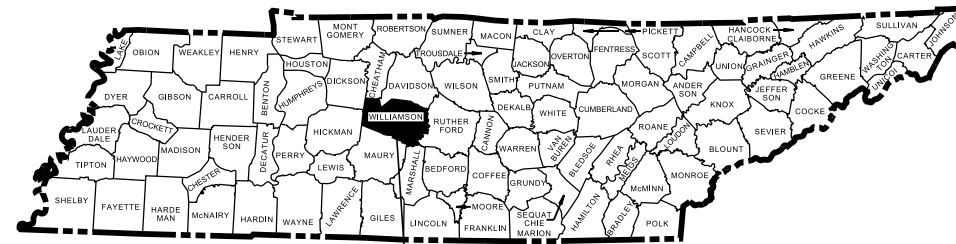
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING

WILLIAMSON COUNTY

INTERSTATE 65 AT BUCKNER ROAD EXTENSION

INTERSTATE ACCESS REQUEST

TENN.	YEAR	SHEET NO.
	2017	1
FED. AID PROJ. NO.		
STATE PROJ. NO.		



PROJECT LOCATION



PROJECT LOCATION

SPECIAL NOTES

PROPOSALS MAY BE REJECTED BY THE COMMISSIONER IF ANY OF THE UNIT PRICES CONTAINED THEREIN ARE OBVIOUSLY UNBALANCED, EITHER EXCESSIVE OR BELOW THE REASONABLE COST ANALYSIS VALUE.

THIS PROJECT TO BE CONSTRUCTED UNDER THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION DATED JANUARY 1, 2015 AND ADDITIONAL SPECIFICATIONS AND SPECIAL PROVISIONS CONTAINED IN THE PLANS AND IN THE PROPOSAL CONTRACT.

SEALED BY

APPROVED: _____

DATE: _____

APPROVED: _____

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

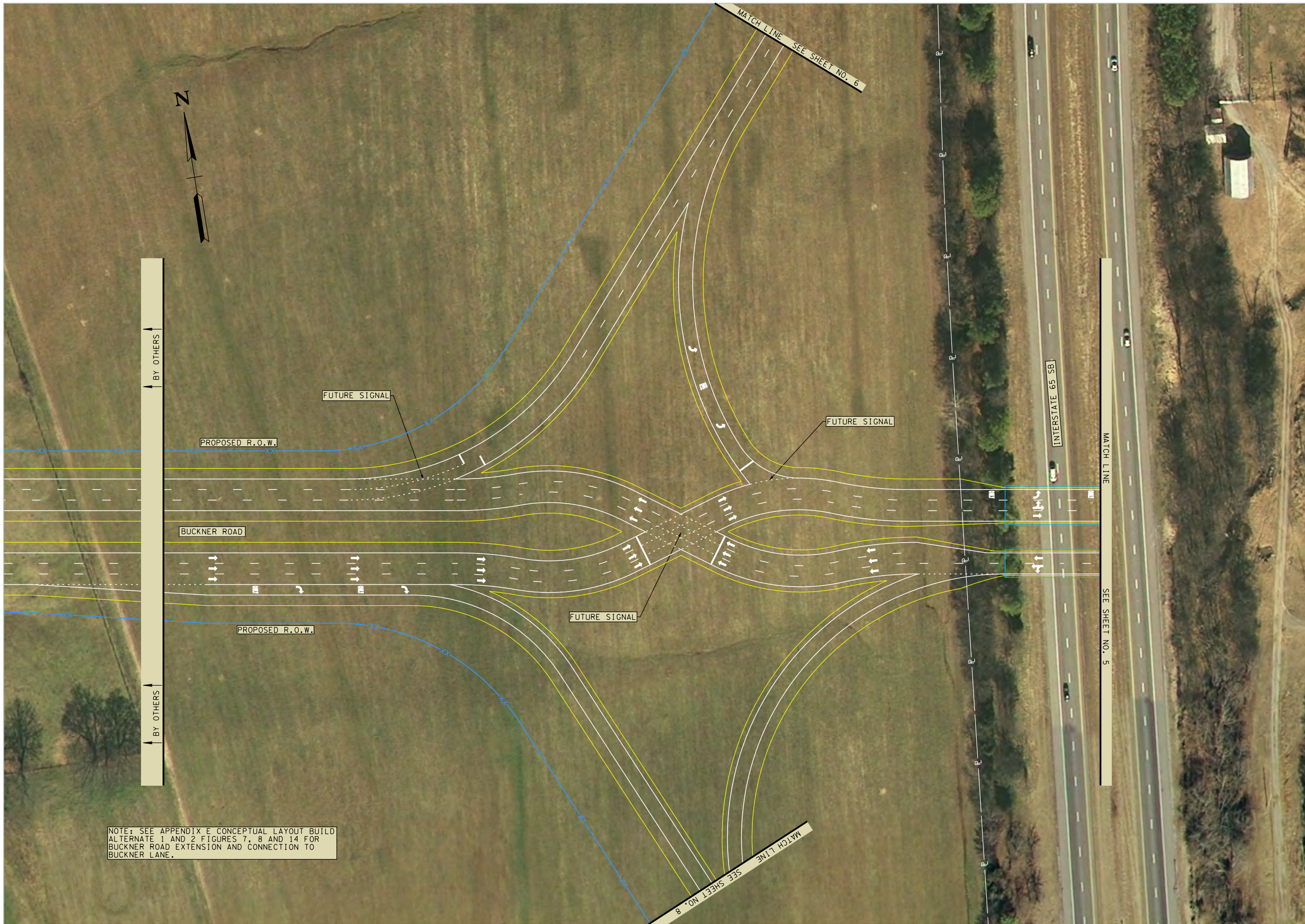
APPROVED: _____
DIVISION ADMINISTRATOR DATE

DESIGNER : VOLKERT, INC. CHECKED BY _____

P.E. NO. _____

PIN NO. _____

10/27/2017 1:43:43 PM \\franklin-data\Franklin Data\Projects\641800.17 Williamson County IAR\Functionals\001.sht



NOTE: SEE APPENDIX E CONCEPTUAL LAYOUT BUILD ALTERNATE 1 AND 2 FIGURES 7, 8 AND 14 FOR BUCKNER ROAD EXTENSION AND CONNECTION TO BUCKNER LANE.

WILLIAMSON COUNTY
 INTERSTATE ACCESS REQUEST
 INTERSTATE 65 AT BUCKNER ROAD EXTENSION
 DIVERGING DIAMOND OPTION

NO.	REVISION	DATE	SIG.

SCALE 1" = 50'

DRAWN xxx

DESIGN xxx

CHECKED xxx



APPROVED

JOB NO.
641800.17

DATE
10/9/17

SHEET
4

FILE NO.



WILLIAMSON COUNTY
 INTERSTATE ACCESS REQUEST
 INTERSTATE 65 AT BUCKNER ROAD EXTENSION
 DIVERGING DIAMOND OPTION

NO.	REVISION	DATE	SIG.

SCALE	1" = 50'
DRAWN	xxx
DESIGN	xxx
CHECKED	xxx

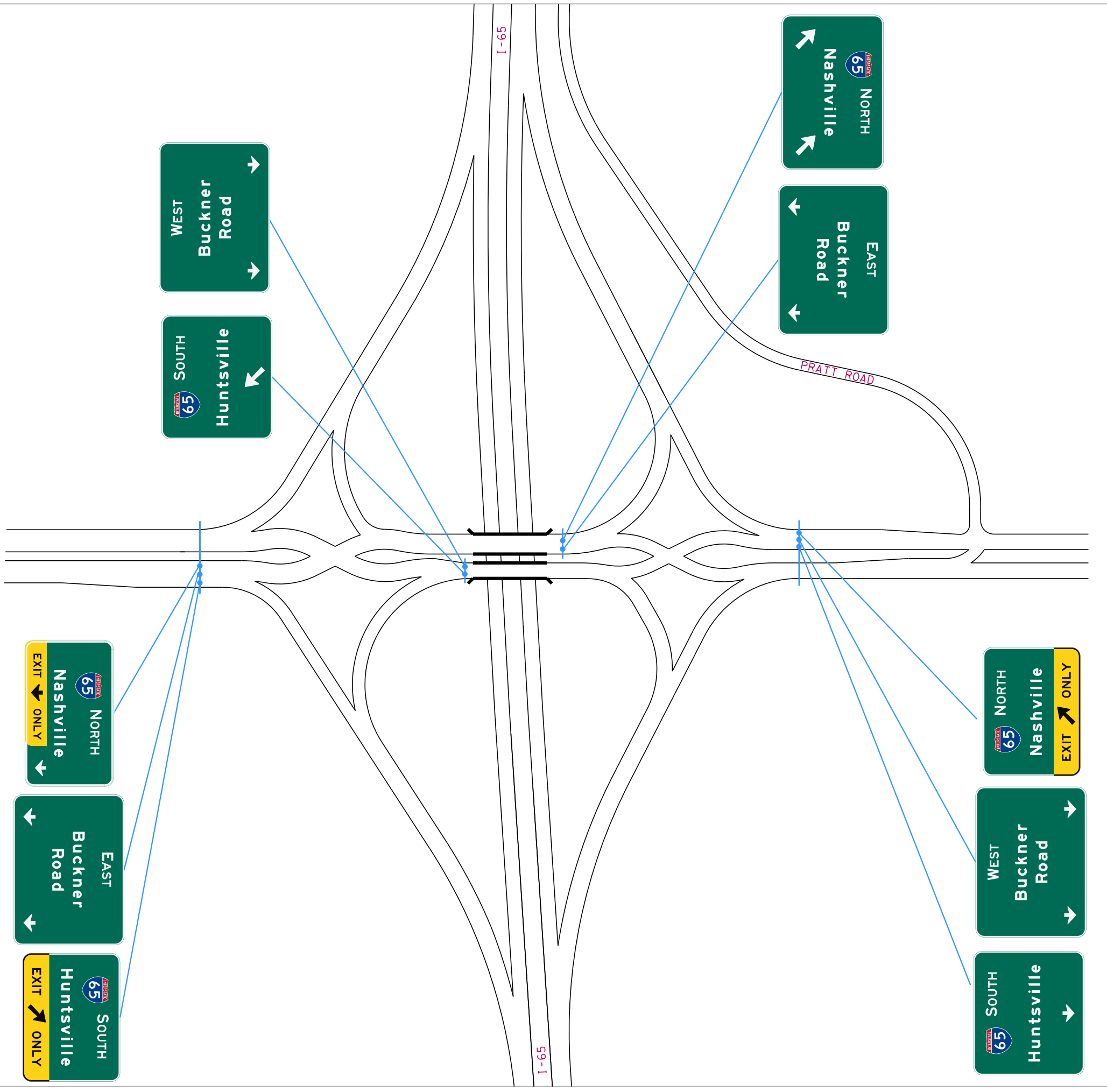
VOLKERT

APPROVED	
JOB NO.	641800.17
DATE	10/9/17
SHEET	8
FILE NO.	



BUCKNER ROAD

BUCKNER ROAD



EXIT ONLY
Nashville
65 NORTH
←

←
←
EAST
Buckner
Road
←

EXIT ONLY
Huntsville
65 SOUTH
↘

WEST
Buckner
Road
→
→

SOUTH
Huntsville
65
↙

65 NORTH
Nashville
↖
↖

EAST
Buckner
Road
←
←

65 NORTH
Nashville
EXIT ONLY
↗

WEST
Buckner
Road
→
→

65 SOUTH
Huntsville
→
→

WILLIAMSON COUNTY
INTERSTATE ACCESS REQUEST
INTERSTATE 65 AT BUCKNER ROAD EXTENSION
CONCEPTUAL SIGNING PLAN

NO.	REVISION	DATE	SIG.
SCALE	N.T.S.		
DRAWN	xxx		
DESIGN	xxx		
CHECKED	xxx		



APPROVED
JOB NO. 641800.17
DATE 10/9/17
SHEET 14
FILE NO.

