I-75 Corridor Feasibility Study

Assessment of Deficiencies

Technical Memorandum

April 24, 2009

EXECUTIVE SUMMARY

Tennessee's 25-Year Long Range Transportation Plan (LRTP), PLAN Go, the result of an extensive public planning process throughout the State, consists of three principal elements: the 25-Year Vision Plan, a 10-Year Strategic Investments Program (SIP), and a 3-Year Project Evaluation System (PES).

Of these elements, the Strategic Investments Program (SIP) identifies priorities and policy initiatives that address many of Tennessee's transportation needs and help implement the LRTP over the next ten years. The SIP established three interrelated core investment initiatives: congestion relief, transportation choices, and key corridors.

The Interstate 75 Corridor through Tennessee was identified through the LRTP planning effort in the SIP as a corridor that is significant to Tennessee's economic development, particularly with regard to freight movement. The purpose of the I-75 Corridor Feasibility Study is to obtain a more detailed understanding of the deficiencies of the corridor and develop corridor level multi-modal solutions to address these deficiencies.

The study area for the I-75 Corridor Feasibility Study extends from the Georgia State Line in Chattanooga to the Kentucky State Line in Jellico (see **Figure E-1**), a distance of approximately 162 miles. The corridor includes I-75, parallel Class I railroads, and parallel major arterial routes. The corridor traverses eight counties, three Rural Planning Organization (RPO) areas, and three Metropolitan Planning Organization (MPO) areas. Cities along the route, such as Chattanooga, Cleveland, Athens, and Knoxville, depend on this corridor for commerce, tourism, and daily commuting.

The study's final product will be a prioritized listing of multi-modal projects that can be considered by TDOT for the State's Transportation Improvement Program (TIP). Identified multi-modal solutions will address capacity, operations and maintenance, safety, freight movement, inter-modal connections, and economic access issues along the study corridor.

The Assessment of Deficiencies, Task 2, identifies issues within the study corridor associated with:

- Capacity and Congestion - Chapter 3 summarizes congestion analysis methodologies, and identifies areas of congestion based on analysis results, stakeholder interviews, and public information meetings.
- Geometric Analysis – Chapter 4 identifies segments of I-75 with deficiencies related to cross sectional elements, horizontal and vertical geometry, interchange configuration, and structurally deficient bridges, as well as areas on I-75 where poor geometrics may impact traffic flow.
- Operations and Maintenance – Chapter 5 identifies existing and committed Intelligent Transportation System (ITS) projects, limits of HELP Truck operations, and areas along I-75 with rock fall or rock slide issues. This Chapter also identifies planned ITS expansion.
- Safety and Security – Chapter 6 identifies spot and segment locations on I-75 that have a crash rate significantly higher than the statewide average for similar facilities and

locations of safety concern identified through stakeholder interviews and based on input from public information meetings.

- Freight Flow and Diversion – Chapter 7 summarizes the findings of the I-75 Lane Widening and Truck Lane Analysis, identifies corridor segments where steep grades slow truck movements and potentially impact operations along I-75, identifies issues associated with truck parking, and describes the analysis for the potential to divert truck freight to rail or waterways to be used in the later phases of the study.
- Economic Access – Chapter 8 identifies proposed interchange locations along I-75 to improve access to new developments based on planning documents prepared by TDOT, Metropolitan Planning Organizations (MPO), or Rural Planning Organizations (RPO). Other new interchanges to accommodate future land use development along the corridor were identified based on stakeholder interviews.
- Commuter Travel Patterns – Chapter 9 identifies existing and planned park and ride facilities along the corridor and displays commuting patterns in the urban areas along the route based on Census data.
- Intermodal Facilities – Chapter 10 identifies locations and key operating characteristics of port, rail, and truck intermodal facilities along the study corridor.

To identify segments of I-75 that have the most serious deficiencies, the 162 mile corridor was divided into 30 independent sections. Deficiencies for each segment were evaluated. The analysis included identification of deficiencies associated with capacity and level of service for 2011, 2016, and 2030; geometric deficiencies; deficiencies that lead to difficulties with operations and maintenance; safety and security; freight flows; economic access; and commuter travel. **Table E-1** provides a listing of the I-75 corridor study segments and the associated deficiencies.

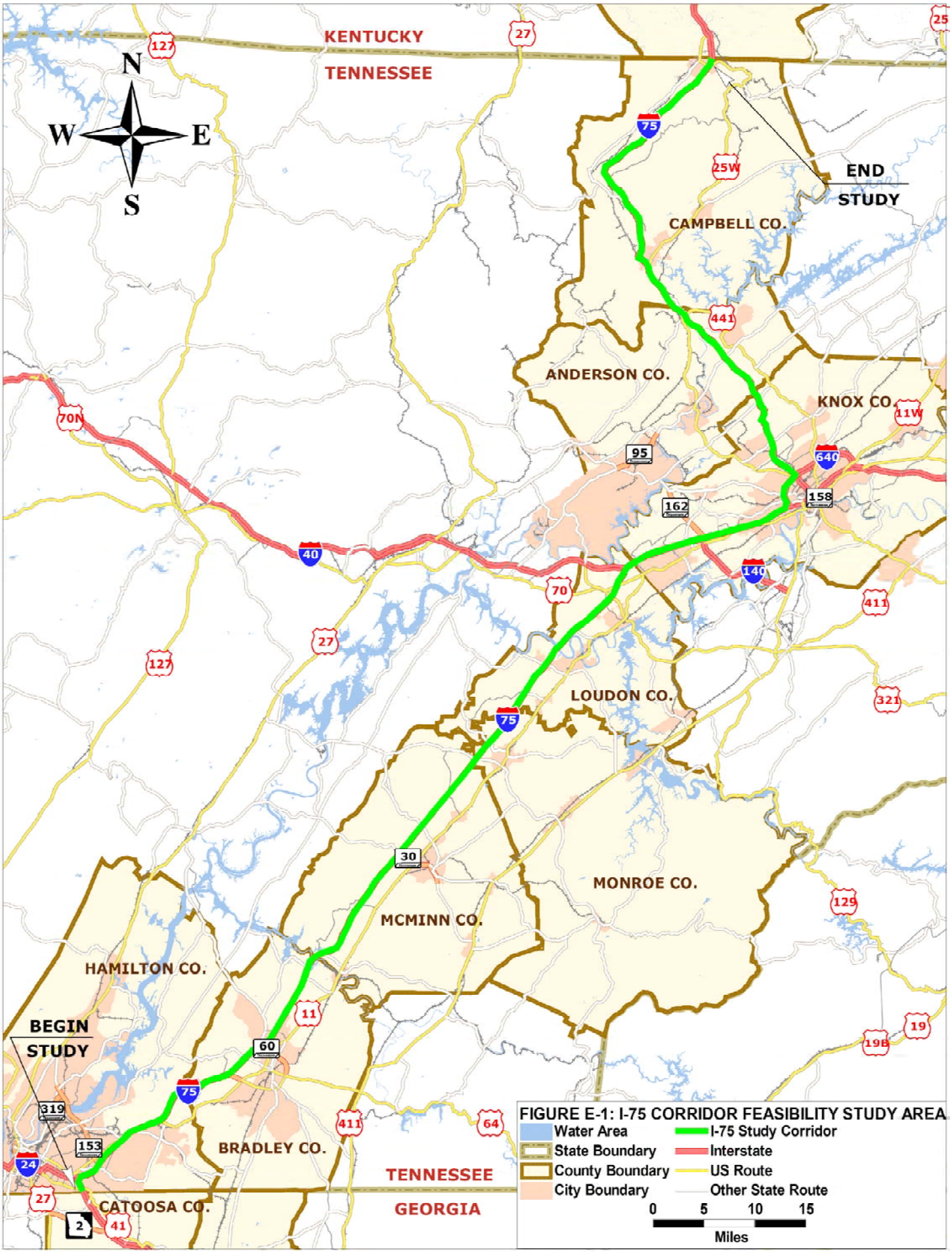
KENTUCKY
TENNESSEE
N
W
E
S
END
STUDY
CAMPBELL CO.
ANDERSON CO.
KNOX CO.
LOUDON CO.
MONROE CO.
MCMINN CO.
HAMILTON CO.
BRADLEY CO.
CATOOSA CO.
TENNESSEE
GEORGIA
BEGIN
STUDY
FIGURE E-1: I-75 CORRIDOR FEASIBILITY STUDY AREA
Water Area
State Boundary
County Boundary
City Boundary
I-75 Study Corridor
Interstate
US Route
Other State Route
0 5 10 15
Miles

Table E-1 Summary of Deficiencies

Segment ID	Location	Capacity Constraints (by Analysis Year)			Geometric Deficiencies	Operations and Maintenance	Safety and Security	Freight Flows	Economic Access	Commuter Travel Issues
		2011	2016	2030						
1	Georgia State Line to SR 153	⊙	⊙	⊙	●	○	●	⊙	○	◘
2	SR 153 to Volunteer Ordnance Road	⊙	⊙	⊙		○	○	○		◘
3	Volunteer Ordnance Road to Hamilton/Bradley County Line	⊙	⊙	⊙		○	○		○	◘
4	Hamilton/Bradley County Line to Mile Post 20	⊙	⊙	⊙	◘	○	●	○		⊙
5	Mile Post 20 to SR 60 (25th Street)			○			○		⊙	⊙
6	SR 60 (25th Street) to Hooper Gap Road			⊙			○		◘	⊙
7	Hooper Gap Road to SR 163 (Lamontville Road)			○		◘	⊙			○
8	SR 163 (Lamontville Road) to Mile Post 40			○	⊙	◘	○			○
9	Mile Post 40 to Rest Area at Mile Post 46			○		◘	●			○
10	Rest Area at Mile Post 46 to Mile Post 51	○	○	○			○		◘	○
11	Mile Post 51 to SR 309 (Union Grove Road)		○	○			○			○
12	SR 309 (Union Grove Road) to SR 68		⊙	⊙			○			○
13	SR 68 to Monroe/Loudon County Line		⊙	⊙			○			○
14	Monroe/Loudon County Line to Matlock Bend Road			⊙			○			○
15	Matlock Bend Road to Hotchkiss Valley Road			⊙			○			⊙
16	Hotchkiss Valley Road to I-40/I-75 Interchange (West)	⊙	⊙	⊙			○	○		⊙
17	I-40/I75 Interchange (West) to Campbell Station Road	⊙	⊙	⊙	○		○	◘	○	◘
18	Campbell Station Road to Bridgewater Road	⊙	⊙	⊙	○		⊙			◘
19	Bridgewater Road to I-40/I-640/I-75 Interchange	⊙	⊙	⊙	○		●			◘
20	I-40/I-640/I-75 Interchange to I-640/I-275 Interchange	○	○	○	◘		⊙			◘

Segment ID	Location	Capacity Constraints (by Analysis Year)			Geometric Deficiencies	Operations and Maintenance	Safety and Security	Freight Flows	Economic Access	Commuter Travel Issues
		2011	2016	2030						
21	I-640/I-275 Interchange to SR 131 (W. Emory Road)	○	○	○	⊙		○	○		◘
22	SR 131 (W. Emory Road) to Mile Post 118			○	◘	○	○		○	⊙
23	Mile Post 118 to Mile Post 124			○			○		◘	○
24	Mile Post 124 to SR 116 (Cherry Bottom Road)			○	○		⊙	○	◘	○
25	SR 116 (Cherry Bottom Road) to SR 9 (Appalachian Hwy)	⊙	⊙	⊙	⊙		●	○		○
26	SR 9 (Appalachian Highway) to SR 63 (Howard Baker Road)			○	●	◘	⊙			○
27	SR 63 (Howard Baker Road) to Mile Post 146		○	○		◘	○			○
28	Mile Post 146 to Mile Post 151			◘		◘	●			○
29	Mile Post 151 to Rarity Mountain Road			⊙		◘	⊙			○
30	Rarity Mountain Road to Kentucky State Line			⊙	⊙	◘	◘	○		○

Legend: ○ - Low level of deficiencies/issues
⊙ - Medium level of deficiencies/issues
◘ - High level of deficiencies/issues
● - Severe level of deficiencies/issues

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ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ADAM	Advanced Traffic Data Analysis and Management Software
AADT	Annual Average Daily Traffic
AL	Alabama
AV	Avenue
CARTA	Chattanooga Area Regional Transportation Authority
CBD	Central Business District
CBER	University of Tennessee Center for Business and Economic Research
CCTV	Closed-Circuit Television
CHCNGA	Chattanooga Hamilton County North Georgia
CMAQ	Congestion Mitigation and Air Quality
CMS	Congestion Management System
CTPP	Census Transportation Planning Package Data
CUAMPO	Cleveland Urban Area MPO
DMS	Dynamic Message Signs
DOD	Department of Defense
DOT	Department of Transportation
EPA	Environmental Protection Agency
ETHRA	East Tennessee Human Resources Agency
EVE	Evaluation of Roadway Efficiency System
FAA	Federal Aviation Administration
FDS	Fog Detection System
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GA	Georgia
GDOT	Georgia Department of Transportation
GIS	Geographic Information System
HAR	Highway Advisory Radio
HCM	Highway Capacity Manual
HCRT	Hamilton County Rural Transportation
HELP	Incident Management Program
HOV	High Occupancy Vehicle
HWY	Highway
ID	Identification
IJS	Interchange Justification Studies
IMS	Interchange Modification Studies
IRRIS	Intelligent Road / Rail Information Server
ITS	Intelligent Transportation System
JCT	Junction
KAT	Knoxville Area Transit
KY	Kentucky
LOS	Level of Service
LPG	Liquid Propane Gas
LRTP	Long Range Transportation Plan
MM	Mile Marker
MPC	Metropolitan Planning Commission
MPH	Miles per Hour
MPO	Metropolitan Planning Organization

MS	Mississippi
MTA	Metro Transit Authority
NC	North Carolina
NEPA	National Environmental Policy Act
NHS	National Highway System
NOx	Nitrogen Oxides
NSRR	Norfolk Southern Railroad
PES	Project Evaluation System
PND	Ports for National Defense
RDS	Radio Data System
RND	Railroads for National Defense
RPA	Regional Planning Agency
RPO	Rural Planning Organization
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act
SIP	State Implementation Plan (for air quality)
SIP	Strategic Investment Plan
SR	State Route
STIP	State Transportation Improvement Program
STP	Surface Transportation Program
STRACNET	Strategic Rail Corridor Network
STRAHNET	Strategic Highway Network
TAZ	Traffic Analysis Zone
TDM	Transportation Demand Management
TDOT	Tennessee Department of Transportation
THP	Tennessee Highway Patrol
TIP	Transportation Improvement Program
TMA	Transportation Management Association
TMC	Transportation Management Center
TN	Tennessee
TPO	Transportation Planning Organization
TPR	Transportation Planning Report
TRIMS	Tennessee Roadway Information Management System
TSIS	TDOT Smartway Information System
TSM	Transportation System Management
V/C	Volume to Capacity Ratio
VHT	Vehicles Hours Traveled
VMT	Vehicle Miles Traveled

1.0 INTRODUCTION

1.1 Project Background

PLAN Go, Tennessee's first 25-Year Long Range Transportation Plan (LRTP), was completed in 2005. The Plan was the result of an extensive public planning process throughout the State and consists of three principal elements:

- 25-Year Vision Plan, which broadly defines how Tennessee will respond to the trends and challenges facing the transportation system,
- 10-Year Strategic Investments Program (SIP), which identifies critical investments that warrant accelerated funding or special attention over the next 10 years, and a
- 3-Year Project Evaluation System (PES), which guides the selection of the 3-year program of projects giving state and local leaders a broader view of projects under development.

Of these elements, the Strategic Investments Program (SIP) identifies proposed spending priorities and policy initiatives that will address many of Tennessee's transportation needs and help implement the LRTP over the next ten years. The SIP established three interrelated core investment initiatives: congestion relief, transportation choices, and key corridors.

The Interstate 75 Corridor from Chattanooga to the Kentucky State Line was identified through the LRTP planning effort in the SIP as a corridor that is significant to Tennessee's economic development, particularly with regard to freight movement. The purpose of the I-75 Corridor Feasibility Study is to obtain a more detailed understanding of the deficiencies of the corridor and then develop corridor level multi-modal solutions to address these deficiencies.

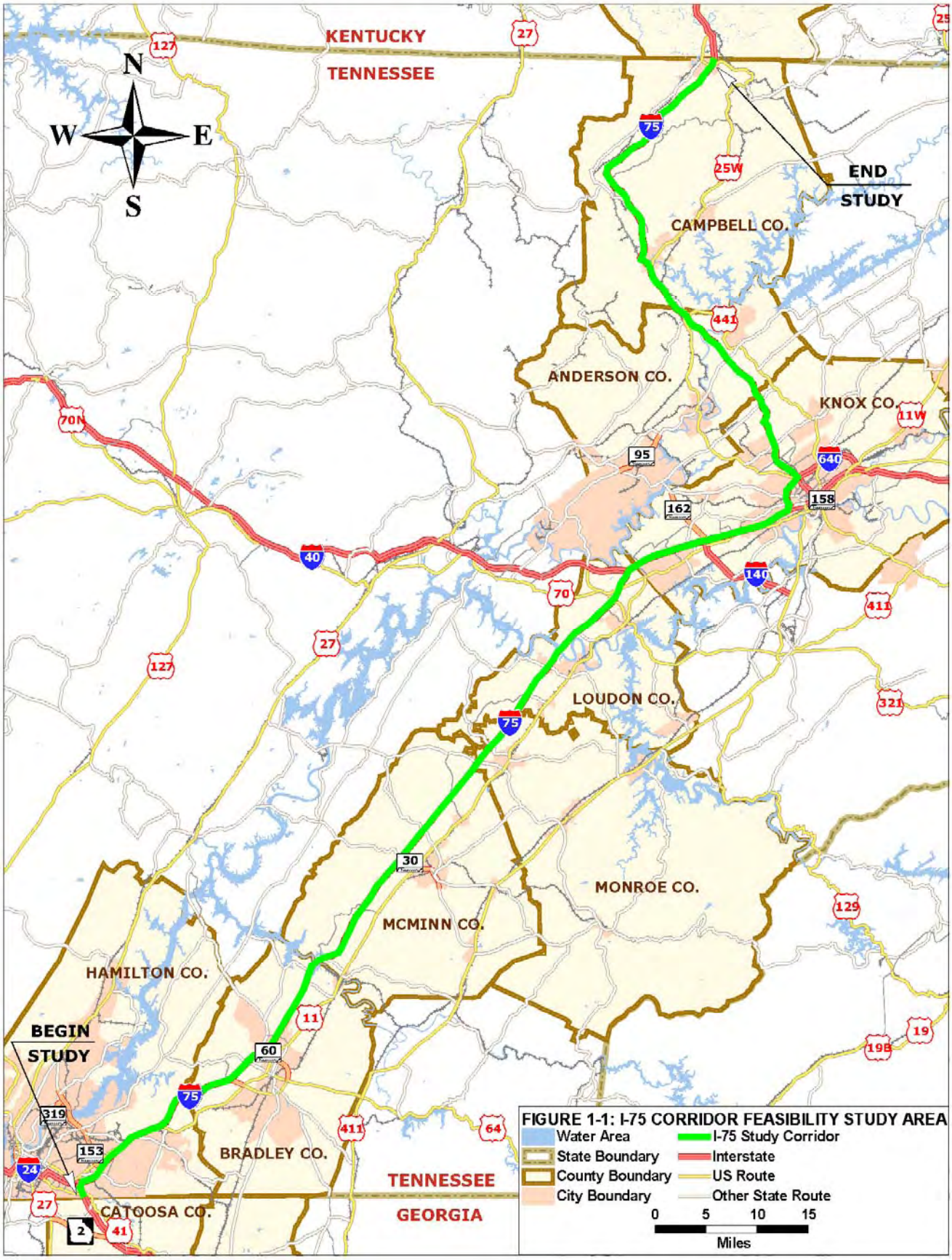
The study area for the I-75 Corridor Feasibility Study extends from the Georgia State Line in Chattanooga to the Kentucky State Line in Jellico (see **Figure 1-1**), a distance of approximately 162 miles. The corridor includes I-75, parallel Class I railroads, and parallel major arterial routes. The corridor traverses eight counties, three Rural Planning Organization (RPO) areas, and three Metropolitan Planning Organization (MPO) areas. Cities along the route, such as Chattanooga, Cleveland, Athens, and Knoxville, depend on this corridor for commerce, tourism, and daily commuting.

1.2 Purpose of the Report

The purpose of the report is to document the deficiencies along I-75 associated with:

- Capacity and Congestion,
- Horizontal and Vertical Geometry,
- Operations and Maintenance,
- Safety and Security,
- Freight Movement and Diversion,
- Economic Access, and
- Intermodal Facilities.

As the plan will identify short, mid, and long-term solutions, the deficiencies are identified for the time horizons of 2011, 2016, and 2030, respectively.



1.3 Organization and Content

The systems inventory, data collection, deficiencies, and corridor issues identified in this memorandum are provided as follows:

- Chapter 2 - Systems Inventory and Data Collection, describes the information collected in the development of the study, provides review of information collected, and describes the classification and mapping used in the study.
- Chapter 3 – Capacity and Congestion, summarizes congestion analysis methodologies, and identifies areas of congestion based on analysis results, stakeholder interviews, and public information meetings.
- Chapter 4 – Geometric Analysis, identifies segments of I-75 with deficiencies related to cross sectional elements, horizontal and vertical geometry, interchange configuration, and structurally deficient bridges, as well as areas on I-75 where poor geometrics may impact traffic flow.
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- Chapter 8 – Economic Access, identifies proposed interchange locations along I-75 to improve access to new developments based on planning documents prepared by TDOT, Metropolitan Planning Organizations (MPO), or Rural Planning Organizations (RPO). Other new interchanges to accommodate future land use development along the corridor were identified based on stakeholder interviews.
- Chapter 9 – Commuter Travel Patterns, identifies existing and planned park and ride facilities along the corridor and displays commuting patterns in the urban areas along the route based on Census data.
- Chapter 10 – Intermodal Facilities, identifies locations and key operating characteristics of port, rail, and truck intermodal facilities along the study corridor
- Chapter 11 – Summary of Deficiencies, provides a summary of the deficiencies identified as part of Task 2.

2.0 SYSTEM INVENTORY AND DATA COLLECTION

Information from the following sources was obtained for use in the study to aid in the identification of deficiencies and in the analysis of potential solutions. Many of the data sources obtained, such as transportation planning documents, also provide a listing of projects that may mitigate some identified deficiencies.

- Travel Demand Models and Model Documentation
  - Tennessee Statewide Model
  - Chattanooga Travel Demand Model
  - Cleveland Travel Demand Model
  - Knoxville Travel Demand Model
- Tennessee Department of Transportation Count and Inventory Data
  - Tennessee Roadway Information Management System (TRIMS)
  - Advanced Traffic Data Analysis and Management Software (ADAM)
  - Evaluation of Roadway Efficiency System (EVE)
  - Vehicle Classification Count Data
- Transportation Planning Documents
  - Tennessee State Long Range Transportation Plan (LRTP)
  - Tennessee State Transportation Improvement Program (STIP)
  - Georgia and Kentucky LRTP and STIP
  - Chattanooga, Cleveland and Knoxville LRTP and TIP
  - TDOT Transportation Planning Reports (TPR)
  - Interchange Modification Studies (IMS) and Justification Studies (IJS)
  - Statewide Rail Plan and High Speed Trains Nashville/Chattanooga/Atlanta Study
  - University of Tennessee – Evaluation of Tennessee's Rail Plan
  - Chattanooga TPO Freight Transportation Study and Plan – Phase I
  - U.S. Army Corps of Engineers Tennessee Waterways Assessment
- Aerial Photography
- Census Transportation Planning Package Data (CTPP)

Information from the Tennessee Roadway Information Management System (TRIMS) was compiled for I-75 in a Geographic Information System (GIS) database. Historic traffic volume data along the route was taken from the Advanced Traffic Data Analysis and Management (ADAM) software.

2.1 Review of Transportation Planning Documents

The Statewide and Metropolitan Planning Organizations' (MPO) Long Range Transportation Plans and Transportation Improvement Programs (TIP) were reviewed to identify projects in the vicinity of the I-75 corridor. Projects along the I-75 corridor ranged from interstate widening projects to construction of park and ride facilities to bicycle and pedestrian facilities on parallel routes. Planned projects from these documents are shown in **Table 2-1** and **Figure 2-1** through **2-7**. There are several projects on I-75 in Georgia that are included in the Chattanooga TIP and LRTP. Those projects are not included in Table 2-1 or Figures 2-1 through 2-7.

Table 2-1 Transportation Projects Identified in Planning Reports

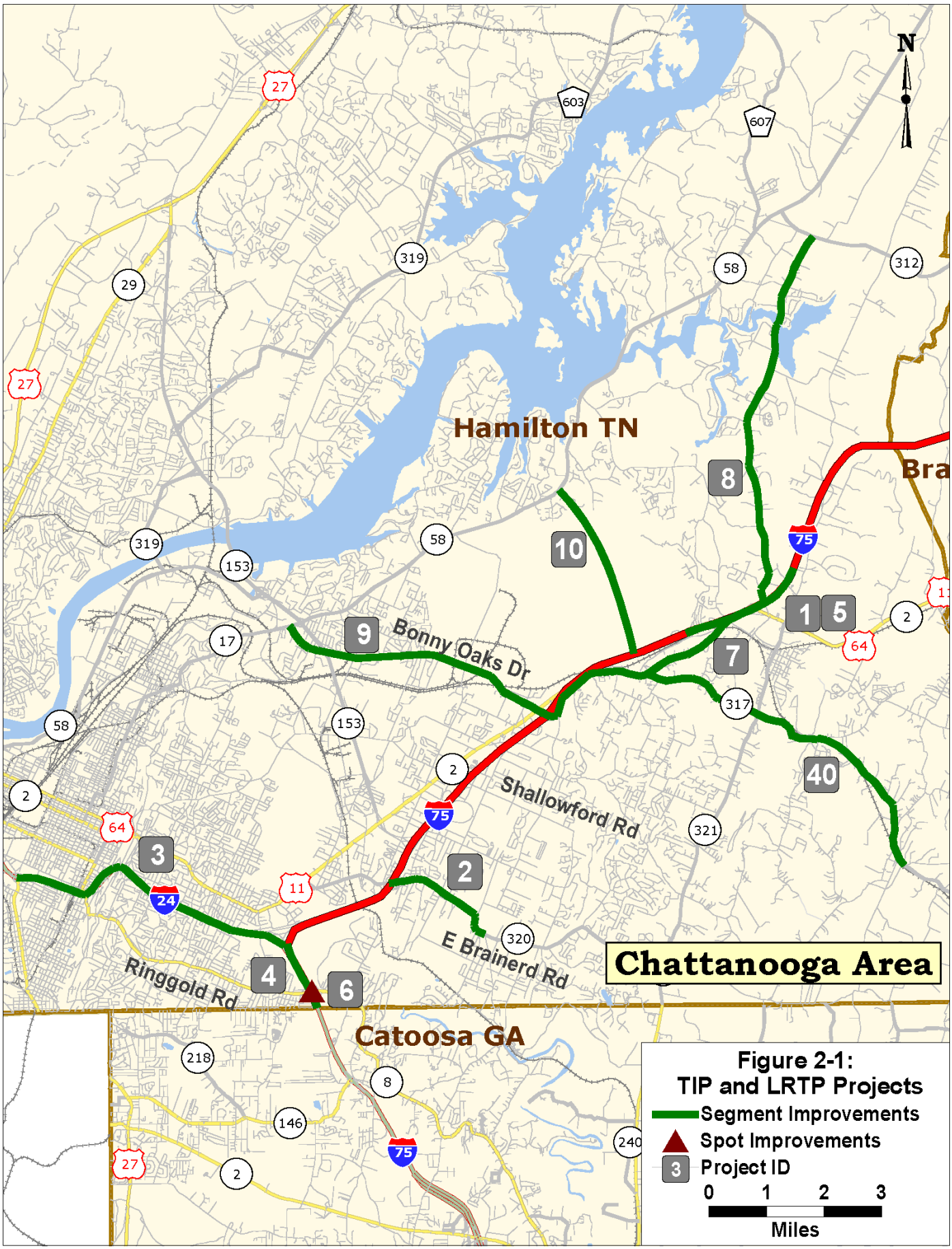
Source	ID	Route and Project Limits	Improvement	Cost	Year	Lead Agency / Funding Type	LRTP# or TIP#
Chattanooga TIP	1	I-75 from 1.1 mi south of SR 2 (US 11) to 1.2 mi north of SR 2 (US 11), Hamilton County	Widen to 6 lanes	$32,000,000	2006-2008	TDOT	TN06-ST003
Chattanooga LRTP	2	East Brainerd Road from I-75 to Graysville Road	Closed loop traffic signal system	$80,000	2008-2030		
	3	I-24 from I-75 to US 27, Hamilton County	Construct High Occupancy Vehicle (HOV) lanes	$75,964,635	2010		
	4	I-75 from I-24 to study area boundary	Construct HOV lanes	$11,595,098	2010		
	5	I-75 from 1.2 miles south of SR 2 to north of SR 2	Widen from 4 lanes to 8 lanes	$35,995,648	2010		
	6	I-75 at Ringgold Road Interchange and Welcome Center	Interchange reconstruction	$4,915,656	2010		
	7	Old Lee Highway from I-75 to SR 317, Hamilton County	Widen from 2 lane to 4 lane	$21,857,424	2020		
	8	Snow Hill Road from I-75 to SR 312/Manhan Gap Road	Widen from 2 lane to 4 lane	$22,553,516	Beyond 2030		
	9	SR 317 (Bonny Oaks Drive) from SR 58 to I-75	Widen from 2 to 4 lanes and use shoulder for bike lane	$19,175,671	2010		
	10	Volunteer Site Connector Route from I-75 to SR58	Construct New Roadway	$20,150,957	2010		
Cleveland TIP	11	I-75, Bradley County	Fog System Upgrade				
	12	I-75 Exit 20 to Blackburn Road, Bradley County	Intelligent Transportation System (ITS) (APD40)	$300,000	2007	Cleveland	2007-05
	13	US-64, SR-311(APD) adjacent to I-75 Exit 20, Bradley County	Environmental study	$20,000,000	2007	TDOT	TIP# 2007-08
Cleveland LRTP	14	I-75, Bradley County	Fog System Upgrade	$7,400,000	2006-2016		
	15	I-75 at Exit 20, Bradley County	Widening bridge and improving intersection	$3,000,000	2006-2016	NHS	
	16	I-75 at Hooper Gap Road, Bradley County	Construct new interchange	unfunded			

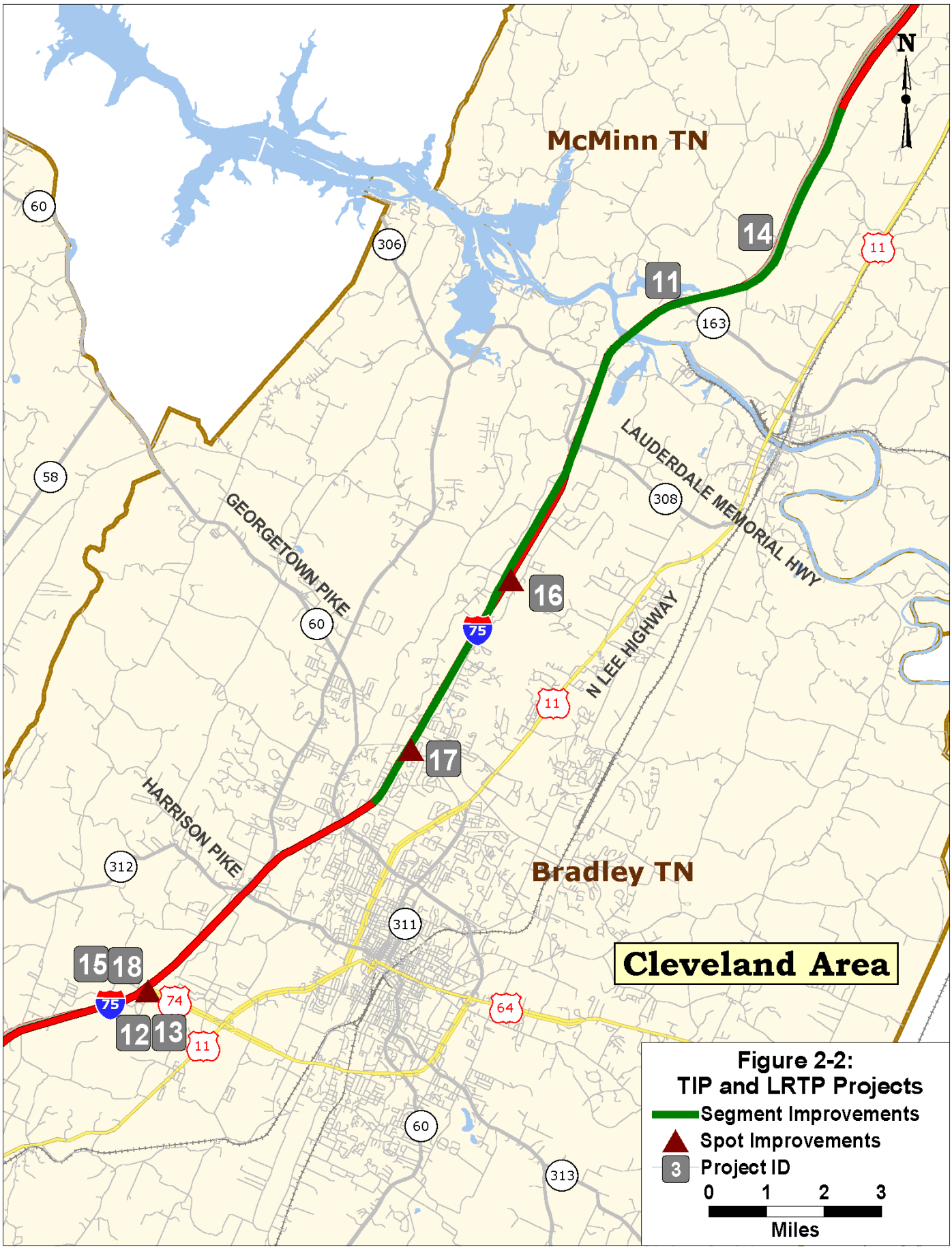
Table 2-1 Transportation Projects Identified in Planning Reports (cont.)

Source	ID	Route and Project Limits	Improvement	Cost	Year	Lead Agency / Funding Type	LRTP# or TIP#
	17	I-75 at Exit 27, Bradley County	Widen from 4 lanes to 6 lanes with time controlled HOV lanes	unfunded			
	18	Exit 20 to US-11	New 3 lane urban street with curbs	unfunded			
Knoxville TIP	19	Emory Road from I-75 to Connor Rd, Knox County	Upgrade Traffic Signal Timing	$35,000	2008	Knoxville / CMAQ	2008-019
	20	I-75/I-40 at Papermill/Weisgarber interchange, Knox County	Landscaping of interchange and including pedestrian and bicycle facilities			TDOT	2006-010
	21	Campbell Station Park-n-Ride Lot	Construct an expansion of the existing park-n-ride facility to serve the express buses between Oak Ridge and Downtown	$100,000	2008	Farragut / CMAQ-Local	2008-011
	22	I-75 from 4th Street to Industrial Park Rd, Anderson County	Install Type II Noise Walls	$2,040,000	2008	TDOT / NHS	1012
	23	Knoxville Parkway in Loudon, Anderson, and Knox County	Construct new 4 lane access controlled highway from I-40/75 west in Loudon County to I-75 north in Anderson County			TDOT	2006-013
	24	Morrell Road / I-40 Corridor from West Town way to Northshore Dr, Knox County	Upgrade Traffic Signal Timing near I-40/I-75	$68,000	2008	Knoxville / CMAQ	2008-034
	25	Smartfix 40 from Broadway at Western and I-640 to Merchants Drive, Knox County	New interchange and addition of auxiliary lanes			TDOT	2006-025
	26	Smartfix40 at I-640 and I-75, Knox County	Add through lanes on I-640 at I-75			TDOT	2006-108
	27	Ten Mile Creek Greenway from north of I-40/75 to Kingston Pike/ N Peters Rd, Knox County	Extension of Greenway			TDOT	2006-035
	28	North of I-40/75 to Middlebrook Pike, Knox County	Sidewalk Construction		2006		2006-103
	29	US-321 Scenic and Cultural Corridor Plan, 7 counties in the Knoxville Region	Develop a Corridor Management Plan for US highway 321 from just west of the junction between I-40 and I-75 in Loudon county, traversing seven counties in northeastern TN to the TN/NC line in Carter County.	$125,000	2008	Knoxville TPO/MPC / Local and NSBP	2008-104

Table 2-1 Transportation Projects Identified in Planning Reports (cont.)

Source	ID	Route and Project Limits	Improvement	Cost	Year	Lead Agency / Funding Type	LRTP# or TIP#
Knoxville LRTP	30	I-640 interchange with I-75 and I-275, Knox County	Widen I-75 underpass/add eastbound through lane		2009		
	31	I-75 interchange with Emory Rd, Knox County	Modify interchange	$19,968,578	2014		
	32	I-75 interchange with Callahan Road, Knox County	Modify interchange	$42,397,036	2020		
	33	I-75 interchange with Merchant Drive, Knox County	Modify interchange	$50,875,443	2020		139
	34	I-75 from Emory Rd to Anderson County Line, Knox County	Widen 4-lane to 6-lane	$26,528,854	2030		
	35	I-75 interchange with Raccoon Valley Rd, Knox County	Modify interchange	$72,351,421	2030		
	36	Knoxville Regional Parkway from I-40 in Loudon County to I-75 in Anderson County	Construct new 4 lane highway	$593,558,501	2020		
	37	Raccoon Valley Road from Norris Freeway to I-75, Knox County	Widen 2-lane to 4-lane	$24,117,140	2030		
	38	Sugar Limb Road from US 11 to I-75, Loudon County	Widen from 2 lane to 4 lane	$13,978,005	2014		
	39	I-40/I-75 interchange at Watt Road, Knox County	Modify interchange	$60,292,851	2030		
TDOT LRTP	40	SR 317 from I-75 to Apison	Widen shoulder for bicycle route	$3,187,500			
	41	US 25W from Jellico to I-75, Campbell County	Widen shoulder for bicycle route	$200,000			


N
Hamilton TN
Chattanooga Area
Catoosa GA
Bonny Oaks Dr
Shallowford Rd
E Brainerd Rd
Ringgold Rd
Figure 2-1:
TIP and LRTP Projects
Segment Improvements
Spot Improvements
Project ID
0 1 2 3
Miles


McMinn TN
Bradley TN
Cleveland Area
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GEORGETOWN PIKE
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HARRISON PIKE
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LAUDERDALE MEMORIAL HWY
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11
64
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Figure 2-2:
TIP and LRTP Projects
Segment Improvements
Spot Improvements
3 Project ID
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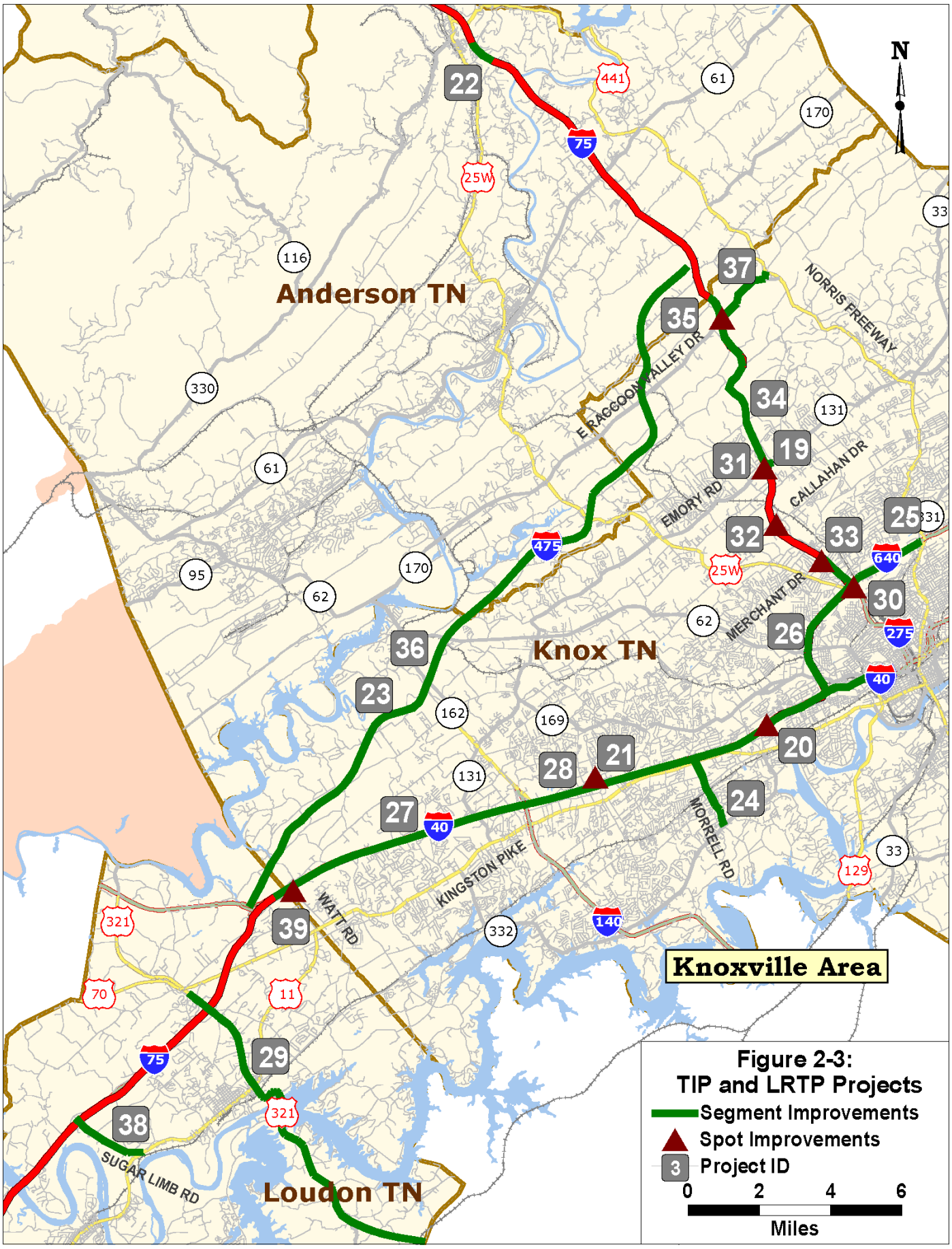
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Anderson TN
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E RACCOON VALLEY DR
EMORY RD
CALLAHAN DR
MERCHANT DR
KINGSTON PIKE
MORRELL RD
WATT RD
SUGAR LIMB RD
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275
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61
170
116
330
95
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162
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Figure 2-3:
TIP and LRTP Projects
Segment Improvements
Spot Improvements
3 Project ID
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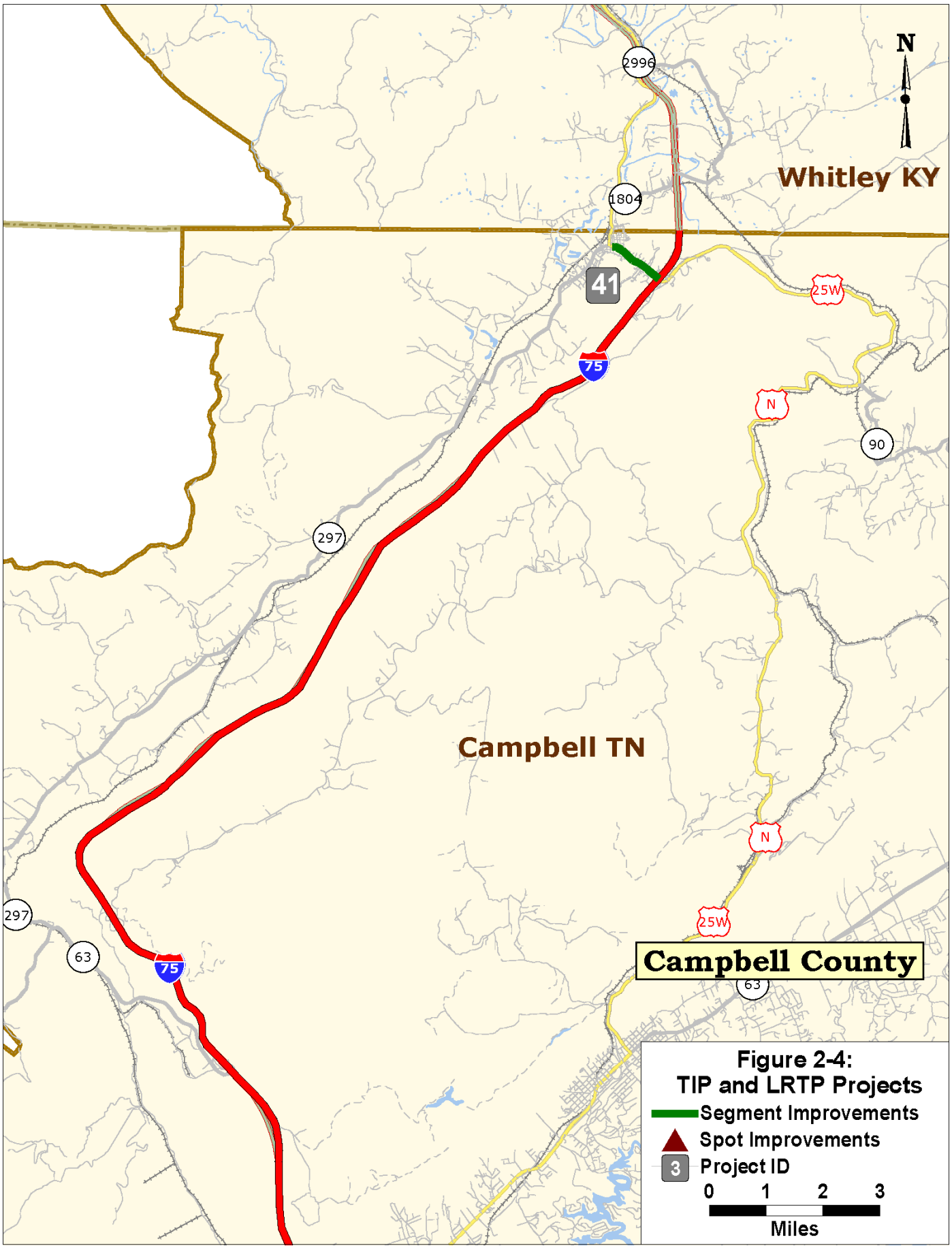
Miles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297
Campbell TN
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25W
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63
75
Campbell County
63
Figure 2-4:
TIP and LRTP Projects
Segment Improvements
Spot Improvements
3
Project ID
0 1 2 3
Miles

2.2 Review Of Travel Demand Models

The State and each Metropolitan Planning Organization (MPO) maintain separate travel demand models along the study corridor. The travel demand model structures, capabilities and limitations for each of the models available along the study corridor were reviewed. The Tennessee Statewide Model, the Chattanooga-Hamilton County / North Georgia (CHCNGA) TPO model, Cleveland MPO model, and Knoxville TPO model were obtained and reviewed for use in the study.

The Statewide model network includes all interstate routes in the US and all US routes in and out of the State of Tennessee. The first two counties adjacent to Tennessee in each state are treated as separate Traffic Analysis Zones (TAZs). In addition, all states other than Tennessee are treated as separate TAZs. The Statewide model has a base year of 2003 and a horizon year of 2030. The model does not have interim year capabilities and does not have time-of-day model. The horizon year 2030 model provides two trip tables; one for automobiles and one for trucks. Trucks can be assigned to the network first as a preload assignment. The auto demand is assigned next as a user-equilibrium assignment with the preloaded truck volumes as the background traffic.

The CHCNGA TPO model covers all of Hamilton County in Tennessee and portions of Catoosa, Dade, and Walker Counties in Georgia. The model has a base year of 2000, an interim year of 2015, and the horizon year of 2030. The model has a truck component to model the internal truck trips in three categories: light, medium and heavy trucks. Through trips are modeled in an external-external trip table for each model year. The mode choice model is based on percentage of mode splits by each trip purpose. The assignment results are conducted for daily, AM peak hour, and PM peak hour. No transit component exists for the Chattanooga model.

The Cleveland MPO model covers all of Bradley County in Tennessee. The boundary of the Cleveland model is adjacent with the boundary of the Chattanooga model. The model has a base year of 2000 and horizon year of 2030. The model does not have a truck component. Through trips are modeled in an external-external trip table for each model year. The assignment results are conducted hourly for each of the 24 hours. The daily volumes are the sum of the hourly assignment results. A mode choice model is not included in the Cleveland model. There is no transit component in the Cleveland model.

Knoxville TPO is currently in the process of updating their travel demand model and the Long Range Transportation Plan and have provided a draft version of the travel demand model for use in this project. The Knoxville TPO expects more accurate forecasts from the new model. Due to time constraints for this project, it was determined that the previous TPO model would be used to conduct the deficiency analysis for year 2030, and the new TPO model will be used to conduct the scenario analysis and identify solutions. The old TPO model covers 7 counties (Knox, Blount, Anderson, Jefferson, Sevier, Union, and Loudon counties) and portions of Grainger, Roane and Morgan counties. The old model has a base year of 2000 and the horizon year of 2030. Trucks are treated separately in each of the four step processes. The time-of-day model has three time periods: AM, Off-peak, and PM. The assignment results provide truck and auto volumes separately for each time-of-day period and daily. The old TPO model can only run under TransCAD version 4.5. The official assignment results were obtained from the TPO for the 2030 land use scenario for the existing plus committed network. These results were used for the deficiency analysis.

3.0 CAPACITY AND CONGESTION

The planning horizons for the I-75 Corridor Feasibility Study are 2011, 2016, and 2030. Anticipated congestion for these three horizon years along the I-75 corridor was identified using the following sources or methodologies:

- TDOT's Evaluation of Roadway Efficiency System (EVE)
- TDOT's Statewide travel demand model and urban travel demand models for Chattanooga, Cleveland, and Knoxville.

Segments of I-75 were identified as being congested based on one or both of these sources. The definition of congestion is based on the concept of Level of Service (LOS). LOS defines the quality of operations on a roadway. LOS values range from A through F. **Table 3-1** describes the quality of operations with each LOS.

Table 3-1 Level of Service Description

Level of Service	Description of Traffic Conditions
A	Free-flow traffic operations at average travel speeds. Vehicles completely unimpeded in ability to maneuver.
B	Reasonably unimpeded traffic operations at average travel speeds. Vehicle maneuverability slightly restricted. Low traffic delays.
C	Stable traffic operations. Lane changes becoming more restricted. Travel speeds reduced to half of average free flow travel speeds.
D	Small increases in traffic flow can cause increased delays. Delays likely attributable to increased traffic.
E	Significant delays. Travel speeds reduced to one third of average free flow travel speed.
F	Extremely low speeds. Long delays.

For the purposes of this study, LOS D or worse is considered congested in rural areas, and LOS E or worse is considered congested in urban areas. Following this analysis, stakeholders were interviewed to determine if there were any additional existing congested segments not yet identified. Improvements identified in the Long Range Transportation Plans (LRTP) for the urban areas to mitigate this anticipated congestion along the study corridor were summarized.

3.1 Congested Segments Based on EVE

TDOT's Evaluation of Roadway Efficiency System (EVE) estimates future levels of service based on traffic projections from the Advanced Traffic Data Analysis and Management Software (ADAM) and roadway characteristics from the Tennessee Roadway Information Management System (TRIMS). In EVE, level of service is determined by comparing the capacity of the roadway with the volume at some horizon year. The capacity of the roadway is based on the facility type, the number of lanes, area type, and a number of other roadway characteristics. Thresholds of the ratio of volume to capacity, or v/c ratio, are used to categorize level of service

as shown in **Table 3-2**. As the volume approaches the capacity, the level of service is degraded.

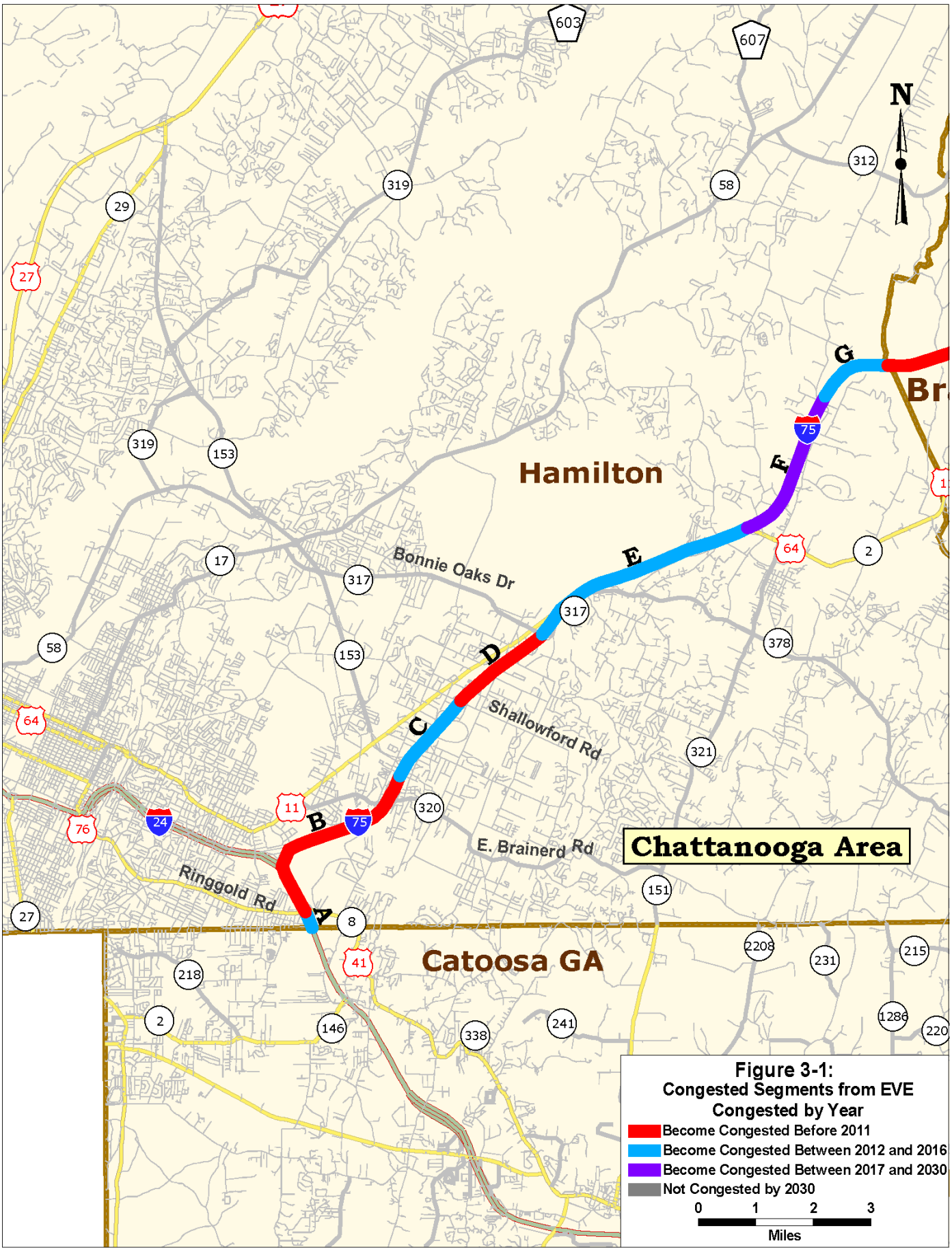
Table 3-2 Freeway Level of Service Criteria from EVE

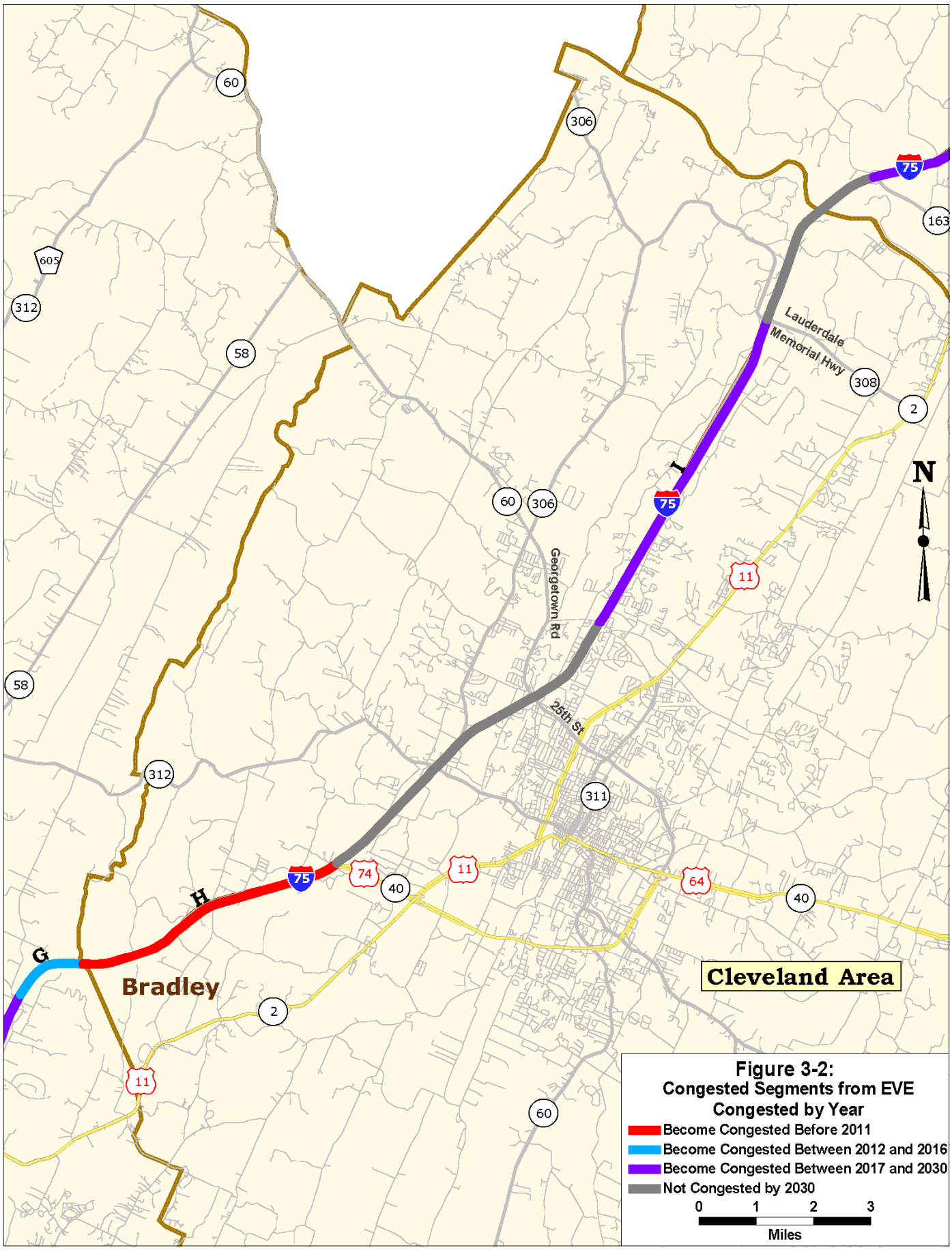
Area Type	Number of Lanes	Level of Service					
		A	B	C	D	E	F
Urban	Less than 6 lanes	0.272	0.436	0.655	0.829	1.000	> 1.000
	6 lanes or greater	0.261	0.417	0.626	0.793	1.000	> 1.000
Rural	Less than 6 lanes	0.318	0.509	0.747	0.916	1.000	> 1.000
	6 lanes or greater	0.304	0.487	0.715	0.876	1.000	> 1.000

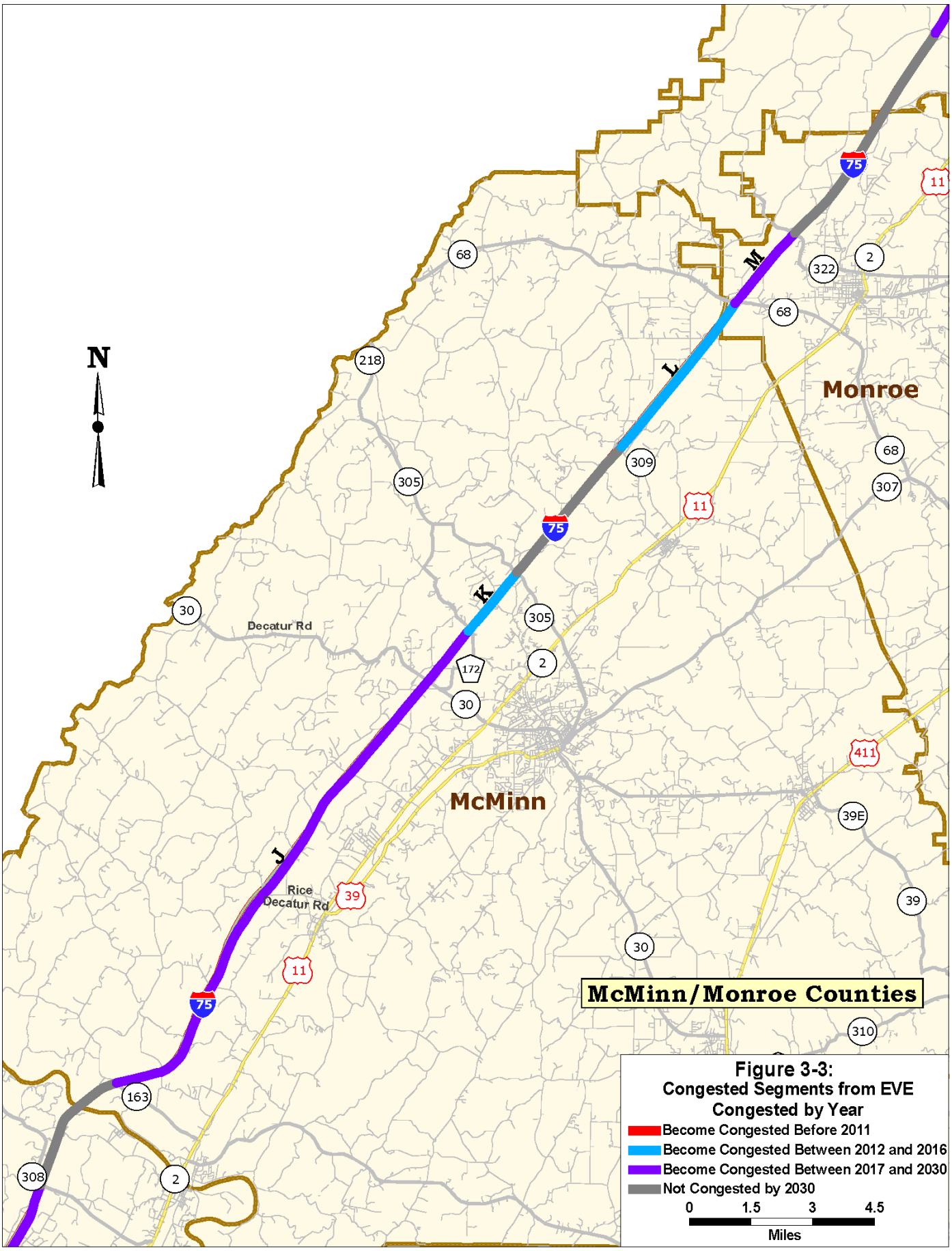
Congested segments from the EVE analysis were identified for the analysis years of 2011, 2016, and 2030. For the purposes of this study, and consistent with the Statewide Long Range Transportation Plan, congestion is defined as levels of service D, E, and F for rural areas, and E and F for urban areas. **Table 3-3** lists the congested segments and the analysis year that they are projected to become congested. **Figures 3-1** through **3-7** show the congested corridor segments.

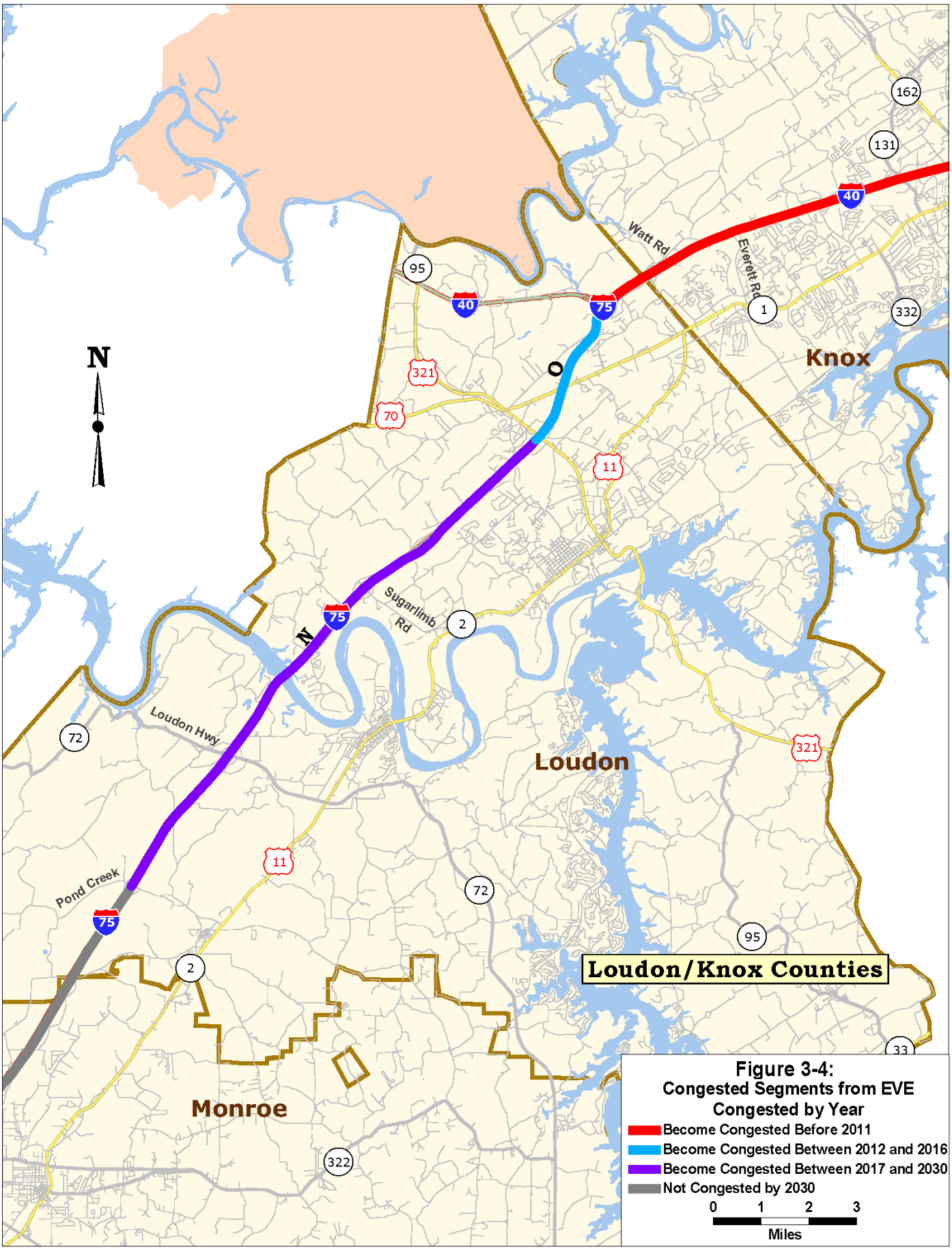
Table 3-3 Congested Segments Based on EVE Data

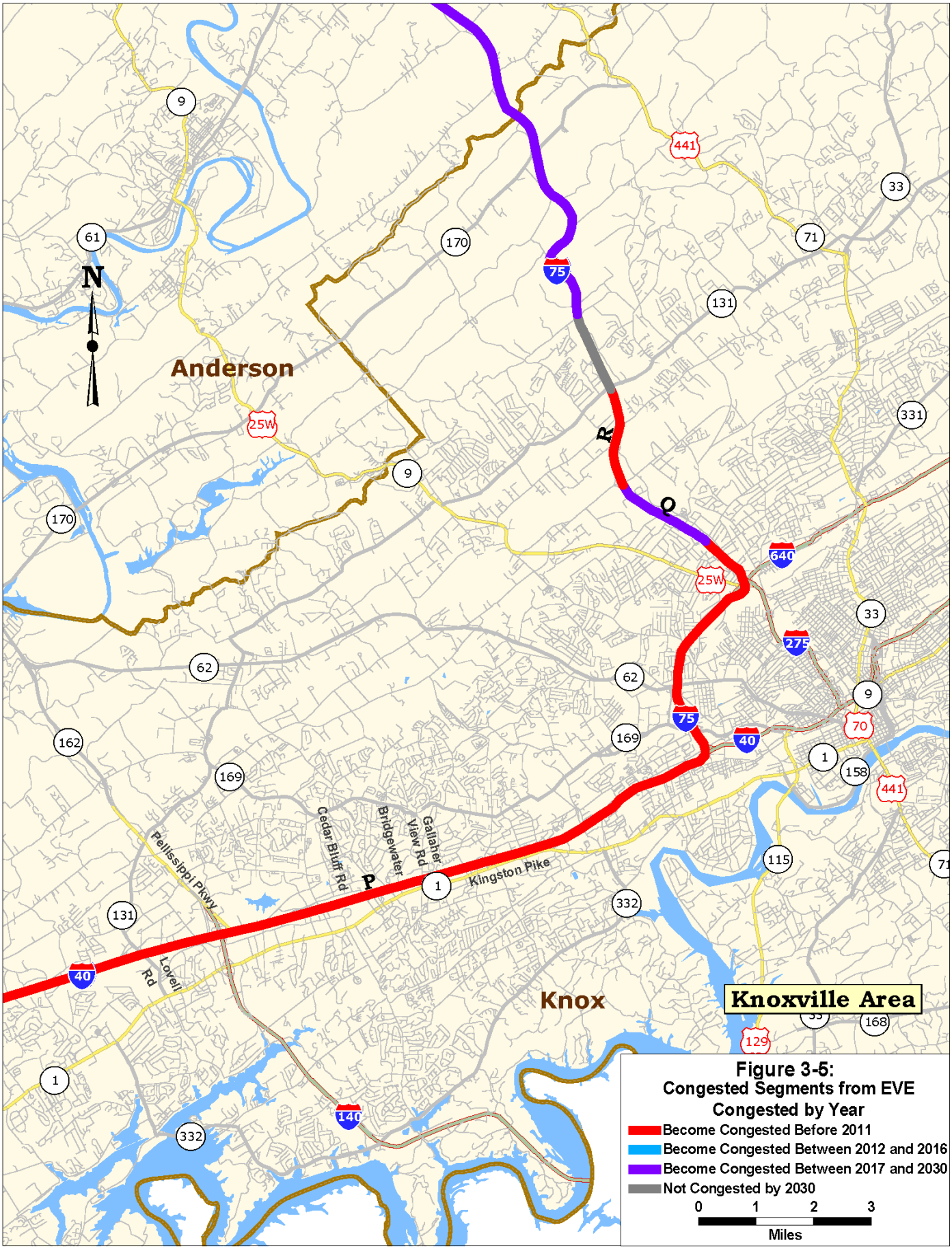
ID	Route	From	To	Congested by Year
A	I-75	GA-TN State Line	SR 8 (Ringgold Rd)	2016
B	I-75	SR 8 (Ringgold Rd)	SR 153	2011
C	I-75	SR 153	Shallowford Rd	2016
D	I-75	Shallowford Rd	SR 317 (Bonnie Oaks Dr)	2011
E	I-75	SR 317 (Bonnie Oaks Dr)	US Highway 64	2016
F	I-75	US Highway 64	SR 321 (Ooltewah Georgetown Rd)	2030
G	I-75	SR 321 (Ooltewah Georgetown Rd)	Hamilton-Bradley County Line	2016
H	I-75	Hamilton-Bradley County Line	US Highway 74	2011
I	I-75	Paul Huff Pkwy	SR 308	2030
J	I-75	SR 163	Lee Erwin Rd	2030
K	I-75	Lee Erwin Rd	SR 305	2016
L	I-75	SR 309	SR 68	2016
M	I-75	SR 68	SR 322	2030
N	I-75	Pond Creek Rd	US Highway 321	2030
O	I-75	US Highway 321	I-40/I-75 JCT	2016
P	I-75/I-40	I-40/I-75 JCT	Merchants Dr	2011
Q	I-75	Merchants Dr	Callahan Dr	2030
R	I-75	Callahan Dr	SR 131 (Emory Rd)	2011
S	I-75	Copeland Dr	SR 71 (Norris Fwy)	2030
T	I-75	SR 116 (N Main Ave)	Anderson-Campbell County Line	2030
U	I-75	Anderson-Campbell County Line	SR 9 (Old Hwy 63)	2011
V	I-75	SR 9 (Old Hwy 63)	SR 63 (Howard Baker Hwy)	2030
W	I-75	SR 63 (Howard Baker Hwy)	Stinking Creek Rd	2016
X	I-75	Stinking Creek Rd	SR 9 (US N 25w)	2030

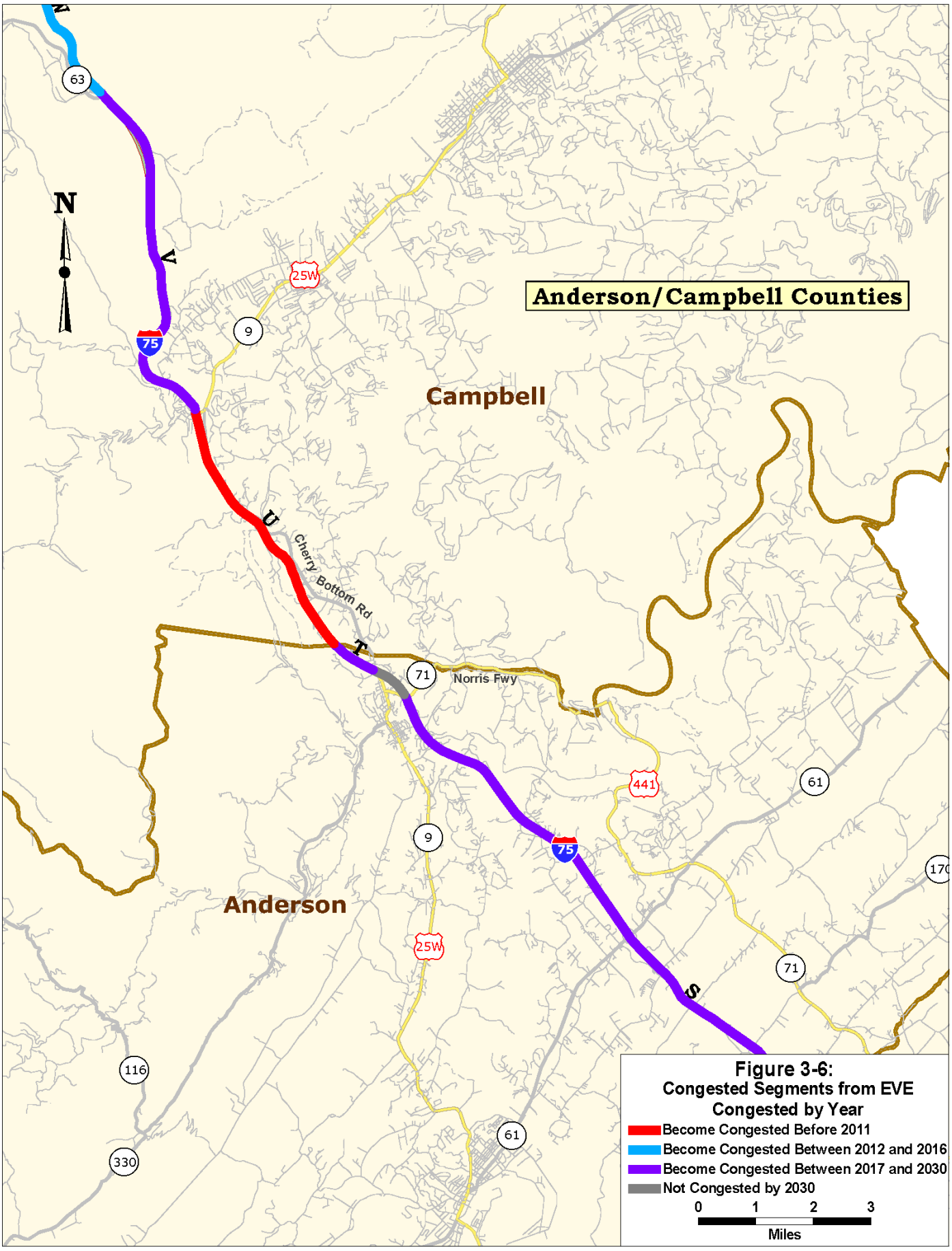

N
Hamilton
Chattanooga Area
Catoosa GA
Bonnie Oaks Dr
Shallowford Rd
E. Brainerd Rd
Ringgold Rd
A
B
C
D
E
F
G
Figure 3-1:
Congested Segments from EVE
Congested by Year
Become Congested Before 2011
Become Congested Between 2012 and 2016
Become Congested Between 2017 and 2030
Not Congested by 2030
0 1 2 3
Miles

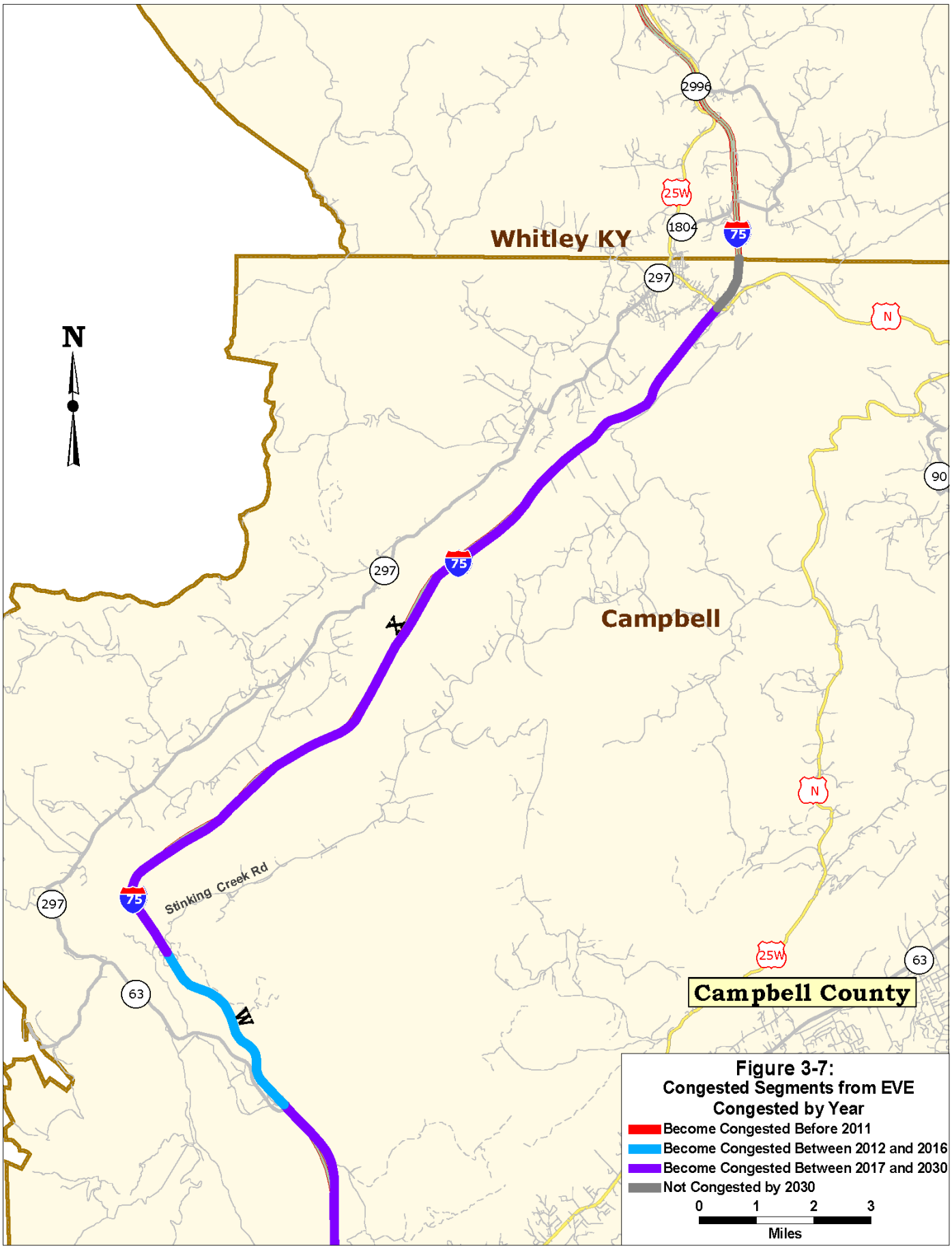

60
306
75
163
605
312
58
Lauderdale
Memorial Hwy
308
2
N
60
306
75
Georgetown Rd
11
58
25th St
312
311
H
75
74
40
11
64
40
G
Bradley
Cleveland Area
2
11
60
Figure 3-2:
Congested Segments from EVE
Congested by Year
Become Congested Before 2011
Become Congested Between 2012 and 2016
Become Congested Between 2017 and 2030
Not Congested by 2030
0 1 2 3
Miles


N
McMinn/Monroe Counties
McMinn
Monroe
Decatur Rd
Rice
Decatur Rd
J
K
L
M
75
11
68
2
322
218
309
305
307
30
172
39
411
39E
163
308
310
Figure 3-3:
Congested Segments from EVE
Congested by Year
Become Congested Before 2011
Become Congested Between 2012 and 2016
Become Congested Between 2017 and 2030
Not Congested by 2030
0 1.5 3 4.5
Miles


N
Knox
Loudon
Monroe
Loudon/Knox Counties
Watt Rd
Everett Rd
Sugarlimb Rd
Loudon Hwy
Pond Creek
40
75
95
162
131
1
332
321
70
11
2
72
322
33
Figure 3-4:
Congested Segments from EVE
Congested by Year
Become Congested Before 2011
Become Congested Between 2012 and 2016
Become Congested Between 2017 and 2030
Not Congested by 2030
0 1 2 3
Miles


N
Anderson
Knox
Knoxville Area
Kingston Pike
Cedar Bluff Rd
Bridgewater
Gallaher View Rd
Pellissippi Pkwy
Lovell Rd
P
Q
R
Figure 3-5:
Congested Segments from EVE
Congested by Year
Become Congested Before 2011
Become Congested Between 2012 and 2016
Become Congested Between 2017 and 2030
Not Congested by 2030
0 1 2 3
Miles


Anderson/Campbell Counties
Campbell
Anderson
Cherry Bottom Rd
Norris Fwy
63
75
25W
9
71
441
61
116
330
170
N
V
U
T
S
Figure 3-6:
Congested Segments from EVE
Congested by Year
Become Congested Before 2011
Become Congested Between 2012 and 2016
Become Congested Between 2017 and 2030
Not Congested by 2030
0 1 2 3
Miles


Whitley KY
Campbell
Campbell County
Stinking Creek Rd
N
2996
25W
1804
75
297
90
63
Figure 3-7:
Congested Segments from EVE
Congested by Year
Become Congested Before 2011
Become Congested Between 2012 and 2016
Become Congested Between 2017 and 2030
Not Congested by 2030
0 1 2 3
Miles

3.2 Congested Segments Based on Travel Demand Model Output

As an alternative analysis method, the Statewide Travel Demand Model and the travel models for each of the MPOs along the study corridor were also used to estimate future traffic volumes. Using these volumes and the existing and committed roadway characteristics, the Highway Capacity Manual methodology and EVE volume to capacity ratios were used to determine the level of service along the study corridor for each of the analysis years.

From the Highway Capacity Manual, there are three performance measures to evaluate the operating characteristics of a freeway segment. These interrelated measures include density, speed, and volume to capacity ratio. The primary determinant of level of service is density in terms of passenger cars per lane per mile. The density thresholds for a basic freeway segment are shown in **Table 3-4**.

Table 3-4 Density and Level of Service

	Level of Service					
	A	**B**	**C**	**D**	**E**	**F**
Density Range (passenger cars per hour per lane)	0-11	> 11-18	>18-26	>26-35	>35-45	>45

The density calculations used in the I-75 analysis accounted for number of lanes, terrain, free-flow speed, and percentage of trucks in the traffic stream. Trucks have a much greater impact on highway capacity than cars, especially when the freeway has long, steep grades. The level of service is worse on a facility with a higher percentage of trucks. For this capacity analysis, the effect of heavy trucks was incorporated using a heavy-vehicle adjustment factor based on the percent trucks in the traffic stream and the appropriate passenger car equivalent for trucks. Passenger car equivalency is a way to represent a number of passenger cars that would use the same amount of freeway capacity as one truck under the prevailing roadway and traffic conditions. Passenger car equivalents vary from 1.5 in level terrain to 4.5 in mountainous terrain.

In addition to using the Highway Capacity Manual methodology to estimate level of service from the travel model volumes, EVE volume to capacity ratio ranges as shown in **Table 3-2** were also used to estimate level of service.

Table 3-5 identifies deficient segments based on the travel model volumes and the two alternative methodologies described in Section 3.2.

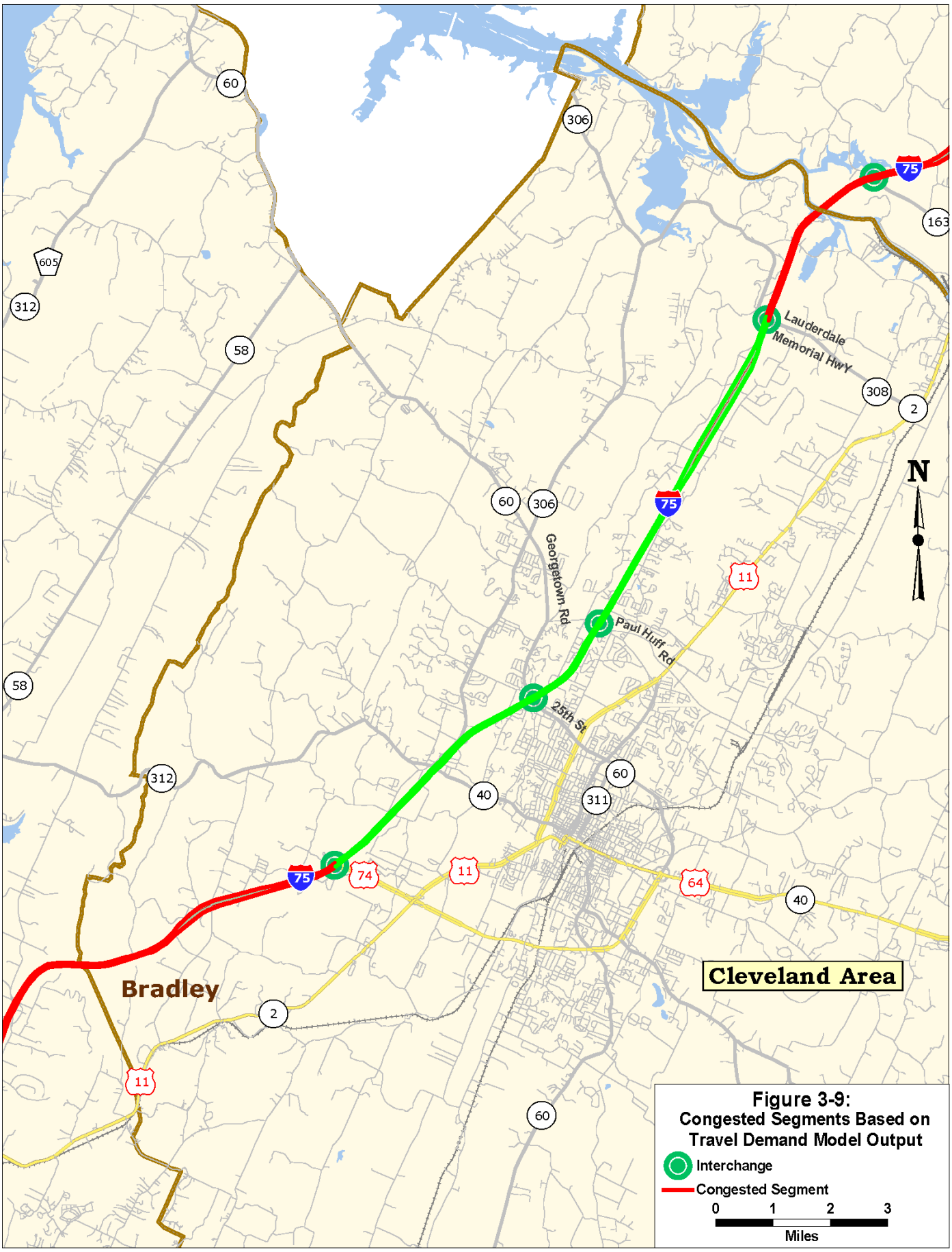
Table 3-5 Deficient Segments of I-75 in 2030 Based on Travel Model Output

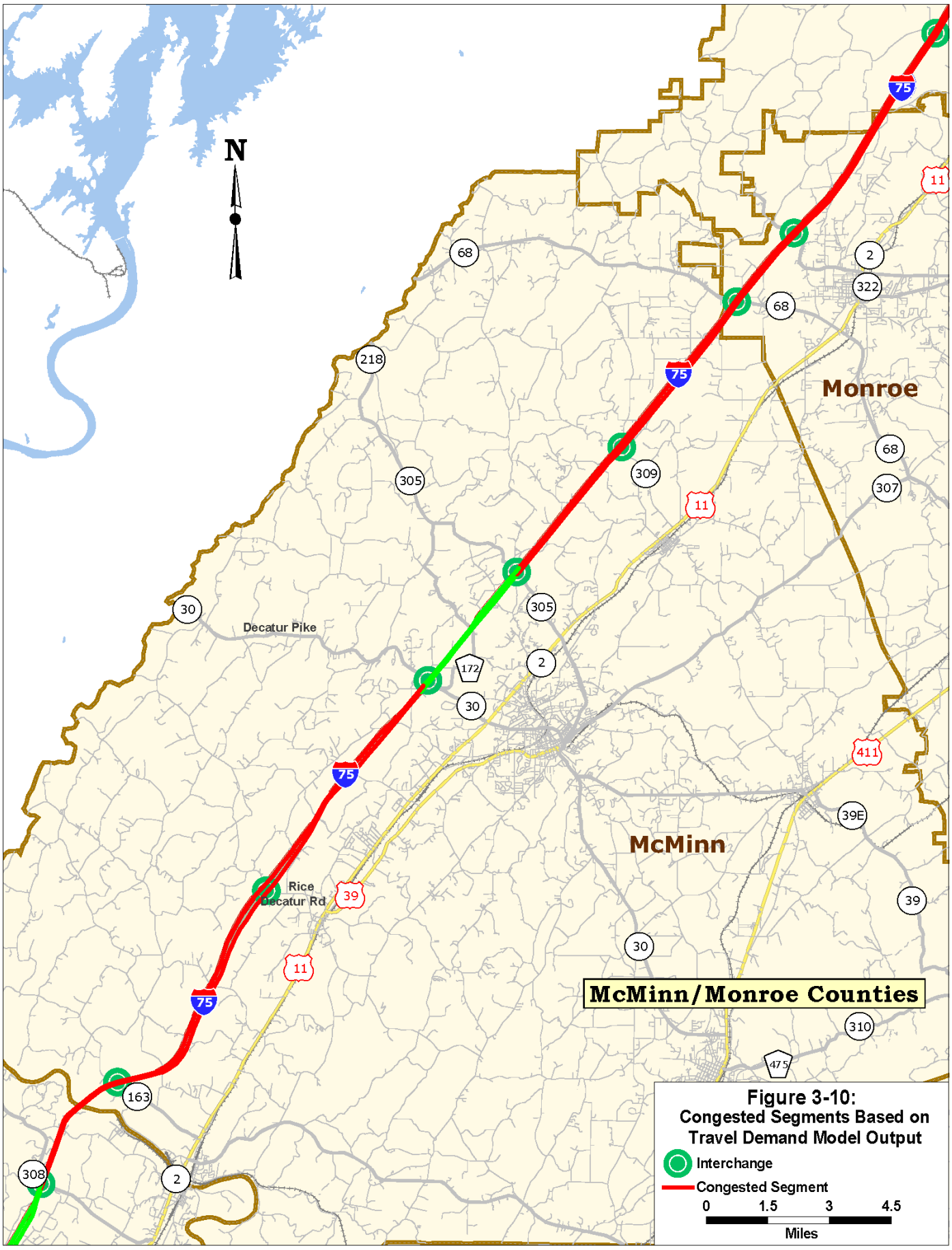
Route	From	To
I-75	Georgia/Tennessee State Line	US 64 Bypass at Cleveland
I-75	Lauderdale Memorial Hwy (SR 308)	Decatur Pike (SR 30)
I-75	SR 305	US 321 (SR 95)
I-75/I-40	I-40/I-75 Junction east of Knoxville	I-640
I-75/I-640	I-40 at I-640	I-640/I-275 at I-75
I-75	I-640/I-275	Emory Road (SR 131)
I-75	SR 61	0.7 miles north of Howard Baker Rd (SR 63)
I-75	0.6 miles south of Stinking Creek Rd	0.3 miles north of Stinking Creek Rd
I-75	0.7 miles north of Rarity Mountain Rd	1.0 miles north of Rarity Mountain Rd
I-75	1.0 miles south of US 25W	0.6 miles south of US 25W

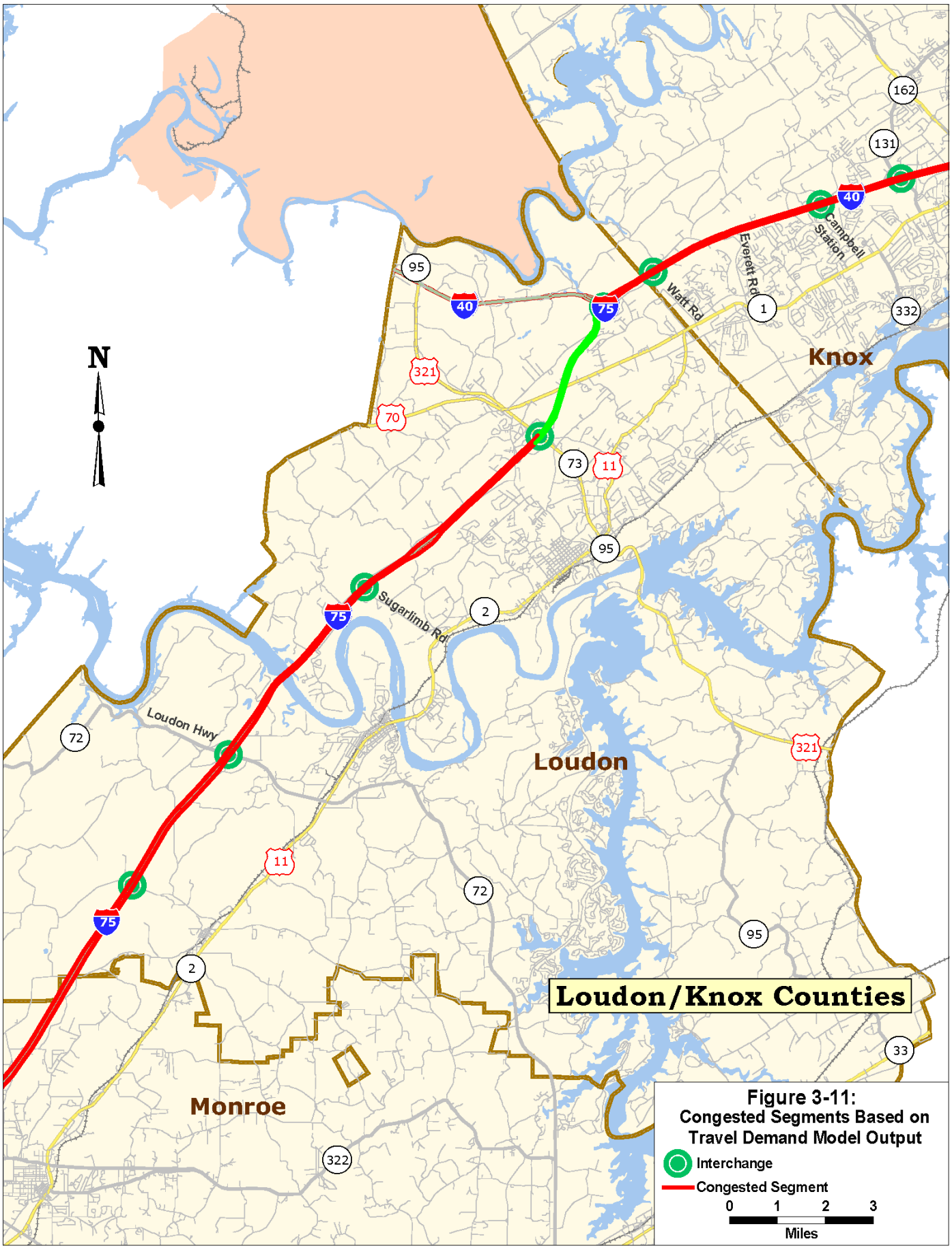
Figures 3-8 through **3-14** show the congested segments based on the analysis using 2030 travel demand model volumes.

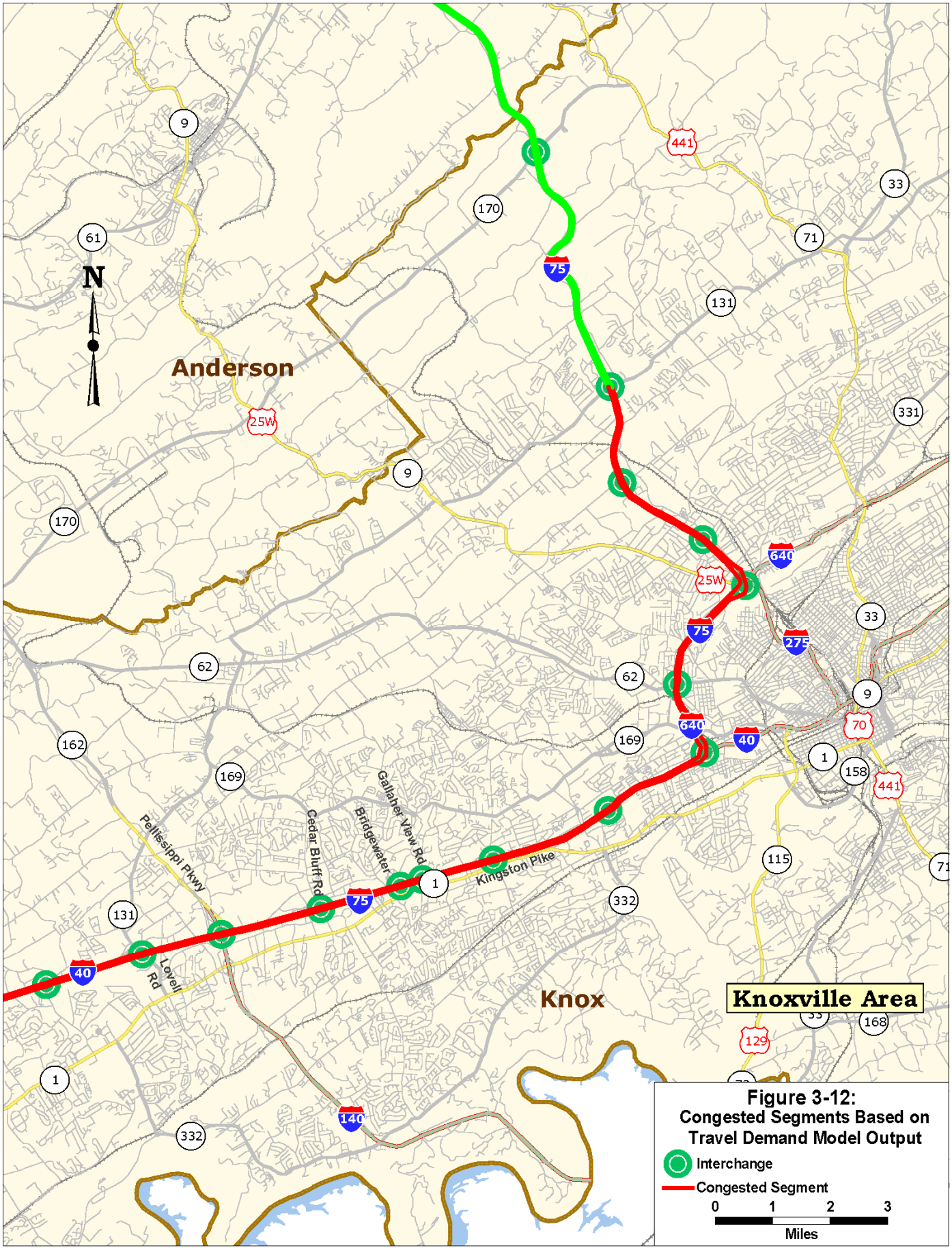
Comments regarding capacity and congestion were sought from stakeholders. It was noted that the most congested segments of I-75 are in the urban areas at or near interstate interchanges. In the Chattanooga region, I-75 at I-24 was cited as a bottleneck due to a reduction in the number of lanes through the interchange. Similarly, I-75 at I-640 in Knoxville was cited as a bottleneck due to a reduction in the total number of lanes through the interchange. Stakeholders commented that the I-75/I-640/I-275 interchange is the region's number one priority for improvements to reduce congestion.


N
Hamilton TN
Chattanooga Area
Catoosa GA
Bonnie Oaks Dr
Old Lee Hwy
Shallowford Rd.
E. Brainerd Rd
Ringgold Rd.
Figure 3-8:
Congested Segments Based on
Travel Demand Model Output
Interchange
Congested Segment
0 1 2 3
Miles


60
306
75
163
605
312
58
Lauderdale
Memorial Hwy
308
2
N
60
306
75
Georgetown Rd
11
Paul Huff Rd
58
25th St
312
60
40
311
74
11
64
40
Bradley
Cleveland Area
2
11
60
Figure 3-9:
Congested Segments Based on
Travel Demand Model Output
Interchange
Congested Segment
0 1 2 3
Miles


N
Monroe
McMinn
McMinn/Monroe Counties
Decatur Pike
Rice
Decatur Rd
75
11
68
2
322
218
309
305
307
30
172
39
411
39E
310
475
163
308
Figure 3-10:
Congested Segments Based on
Travel Demand Model Output
Interchange
Congested Segment
0
1.5
3
4.5
Miles


N
Knox
Loudon
Monroe
Loudon/Knox Counties
Sugarlimb Rd
Loudon Hwy
Watt Rd
Everett Rd
Campbell Station
Figure 3-11:
Congested Segments Based on
Travel Demand Model Output
Interchange
Congested Segment
0 1 2 3
Miles


N
Anderson
Knox
Knoxville Area
Kingston Pike
Cedar Bluff Rd
Bridgewater
Gallaher View Rd
Pellissippi Pkwy
Lovell Rd
Figure 3-12:
Congested Segments Based on
Travel Demand Model Output
Interchange
Congested Segment
0 1 2 3
Miles

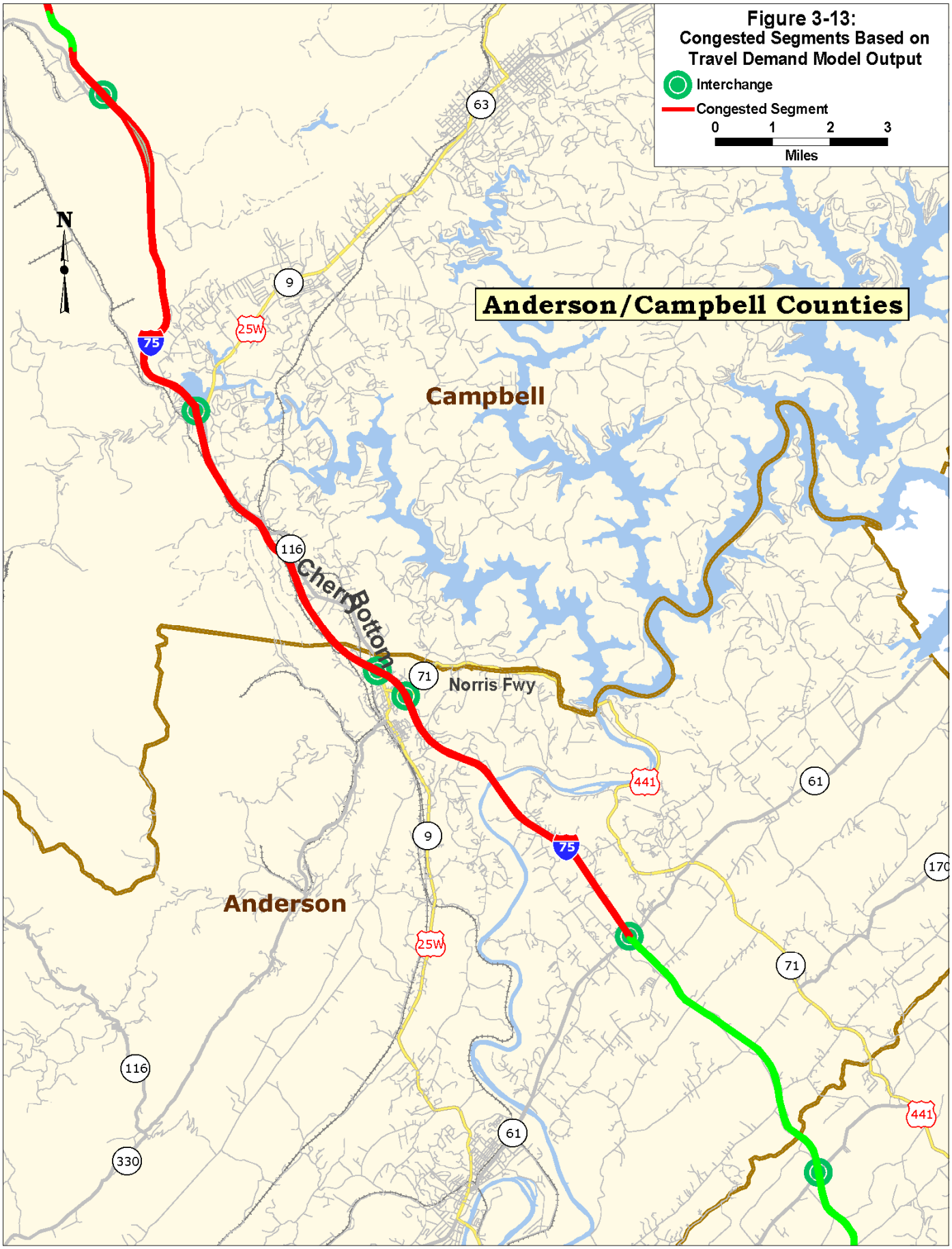
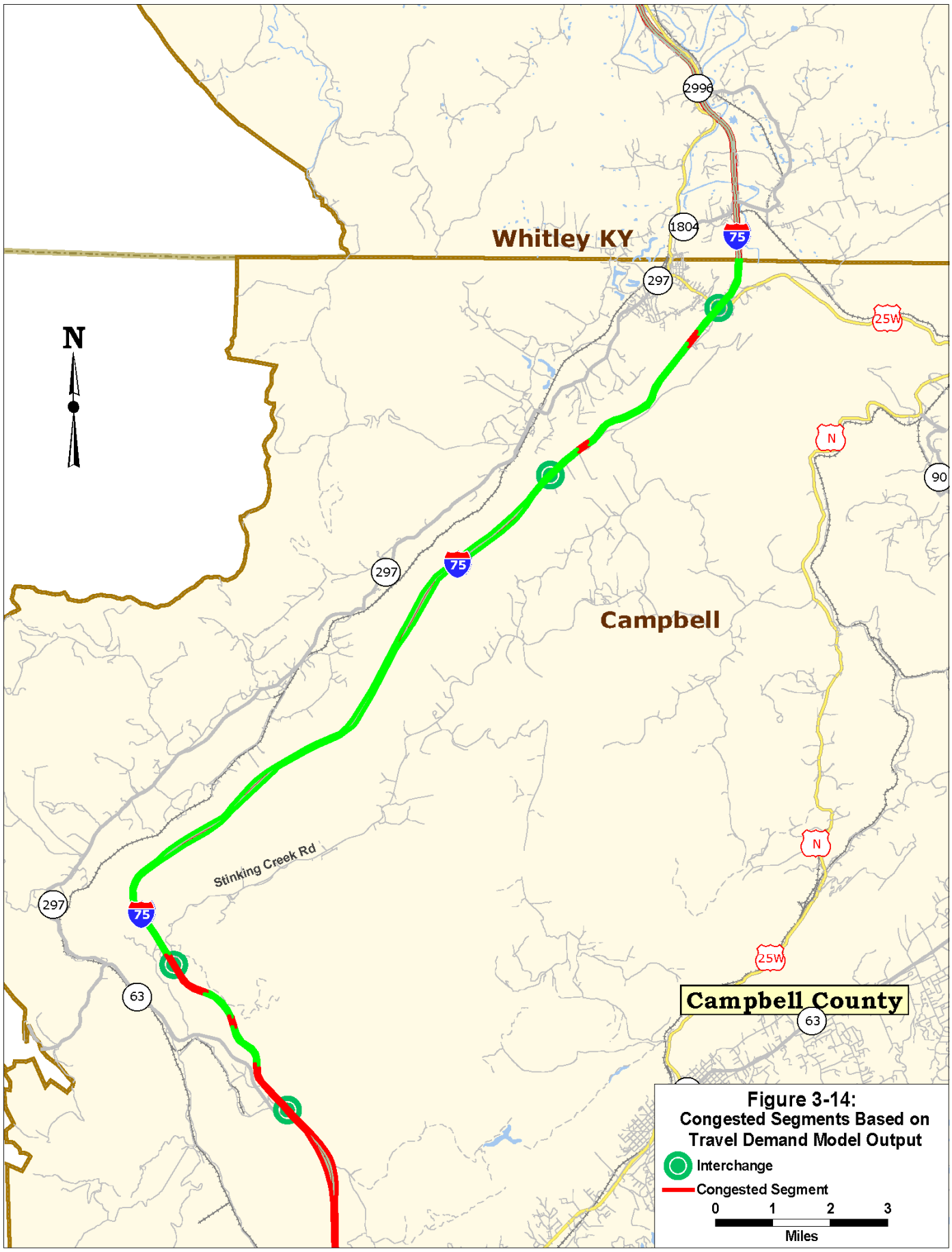


Figure 3-13:
Congested Segments Based on
Travel Demand Model Output
Interchange
Congested Segment
0 1 2 3
Miles
N
Anderson/Campbell Counties
Campbell
Anderson
Norris Fwy
Cherry Bottom
63
9
25W
75
116
71
441
61
330


2996
Whitley KY
1804
75
297
25W
N
90
N
297
75
Campbell
Stinking Creek Rd
297
75
N
25W
63
Campbell County
63
N
Figure 3-14:
Congested Segments Based on
Travel Demand Model Output
Interchange
Congested Segment
0 1 2 3
Miles

3.3 Projects Identified in Plans and Reports

The Long Range Transportation Plans for Chattanooga, Cleveland, and Knoxville include widening projects to address congestion issues along I-75. TDOT has also identified improvements to improve interchange capacity along the corridor as shown in the Department's Interchange Modification and Justification studies. These projects are listed in **Table 3-6**.

Table 3-6 Projects to address Congestion Deficiencies from Previous Plans and Reports

ID	Route / Project Limits	Improvement	Year	Source
1	I-75 at Ringgold Road Interchange and Welcome Center, Hamilton County	Interchange reconstruction	2010	Chattanooga LRTP
2	I-24 from I-75 to US 27, Hamilton County	Construct HOV Lanes	2010	Chattanooga LRTP
3	I-75 from I-24 to Study Area Boundary	Construct HOV Lanes	2010	Chattanooga LRTP
4	I-75 from 1.1 mi South of SR 2 (US11) to 1.2 mi North of SR 2 (US11), Hamilton County	Widen to 6 lanes	2010	Chattanooga TIP and LRTP
5	Volunteer Site Connector Road from I-75 to SR 58, Hamilton County	Construct New Roadway	2010	Chattanooga LRTP
6	I-75 at SR 2 (US 11/Lee Highway), Hamilton County	Interchange reconstruction	2007	TDOT Interchange Modification Study
7	I-75 at US-64, SR-311(APD) adjacent to I-75 Exit 20, Bradley County	Interchange reconstruction and roadway improvements	2006-2016	Cleveland TIP, LRTP, and TDOT Interchange Modification Study
8	I-75 at Exit 27, Bradley County	Widen from 4 lanes to 6 lanes with HOV lanes		Cleveland LRTP
9	I-75 at Hooper Gap Road, Bradley County	New interchange	Beyond 2030	Cleveland LRTP
10	I-75 between Rocky Mount Union Chapel Road and Coile Road, McMinn County	Construct new interchange at Athens Bypass	-	TDOT Interchange Justification Study
11	Knoxville Parkway from I-40/I75 in Loudon County to I-75 in Anderson County	Construct new 4 lane access controlled highway	2020	Knoxville TIP, Knoxville LRTP
12	I-75/I-40 at Watt Road, Knox County	Modify interchange	2030	Knoxville LRTP
13	Smartfix40, from Broadway at Western and I-640 to Merchants Drive, Knox County	New interchange and addition of auxiliary lanes		Knoxville TIP

ID	Route / Project Limits	Improvement	Year	Source
14	I-640 Interchange with I-75 and I-275, Knox County	Widen I-75 underpass/add eastbound through lane	2009	Knoxville LRTP
15	I-75 at Merchant Drive Interchange, Knox County	Modify interchange	2020	Knoxville LRTP
16	I-75 at Callahan Road Interchange, Knox County	Modify interchange	2020	Knoxville LRTP
17	I-75 Interchange with SR 131 (Emory Road), Knox County	Interchange Reconstruction	2014	Knoxville LRTP and TDOT Interchange Modification Study
18	I-75 from Emory Rd to Anderson County Line, Knox County	Widen 4-lane to 6-lane	2030	Knoxville LRTP
19	I-75 at Raccoon Valley Rd Interchange, Knox County	Modify interchange	2030	Knoxville LRTP
20	Raccoon Valley Road from Norris Freeway to I-75, Knox County	Widen 2-lane to 4-lane	2030	Knoxville LRTP

4.0 GEOMETRIC ANALYSIS

A standards-based approach was used to identify geometric deficiencies in the study corridor. Existing conditions were evaluated against published design standards of TDOT and the American Association of State Highway and Transportation Officials (AASHTO) as appropriate. Data on existing geometric conditions was compiled from the following sources:

- TDOT *Tennessee Roadway Information Management System* (TRIMS) database
- TDOT *Tennessee Bridge Inventory and Appraisal* reports
- Scaled aerial photography (*Aerials Express* proprietary software)
- Unscaled aerial photography (*Google Earth* open-source software)
- Previous reports by TDOT and other agencies

The following geometric factors were examined as a part of this analysis:

- ***Cross Section Elements***. Factors examined include lane widths, inside and outside shoulder widths, and median widths. Data taken from the TRIMS database was compared against the applicable TDOT standard drawings. These drawings include RD01-TS-5 *Design Standards Freeways with Depressed Medians*, RD01-TS-5 *Design Standards Freeways with Independent Roadways*, and RD01-TS-5B *Design Standards Freeways with Median Barrier*.
- ***Horizontal Geometry***. Factors examined include horizontal curve radii and distances between successive curves. Unless information from Stakeholder interviews provided specific information, it was assumed for this analysis that all horizontal curves were superelevated in accordance with the TDOT design standard for that facility cross-section and speed. Available distances between successive curves were examined to ensure that proper superelevation transitions were possible. Allowable transition rates and distances were taken from TDOT Standard Drawing RD01-SE-3 *Rural Superelevation Details*.
- ***Vertical Geometry***. Vertical grade data from the TRIMS database was compared against the allowable grade for the terrain type of the study area (level, rolling, or mountainous) as defined in the applicable TDOT standard drawing (RD-01-TS5 series). Grades were also evaluated to determine if the length over which they occur was greater than the critical length that would reduce truck speeds by 10 mph and suggest the need for the addition of truck climbing lanes.
- ***Interchange Configuration***. The spacing of interchanges along the I-75 corridor was compared to the guideline presented in the AASHTO standards of allowing a minimum of 1 mile separation in urban areas and 2 miles in rural areas. Allowable weaving sections and lane balance between interchanges was also examined. Finally, ramp configurations were examined with respect to driver expectation and current practice. Any interchange ramp configuration that violated driver expectation or current design best practices (for example, the use of left-side exit ramps) was identified as a geometric deficiency.
- ***Bridge Conditions***. The applicable *Tennessee Bridge Inventory and Appraisal* reports were examined for all structures on the study route. Any structures that were identified as being “structurally deficient” in that inventory have been included in this report of geometric deficiencies.

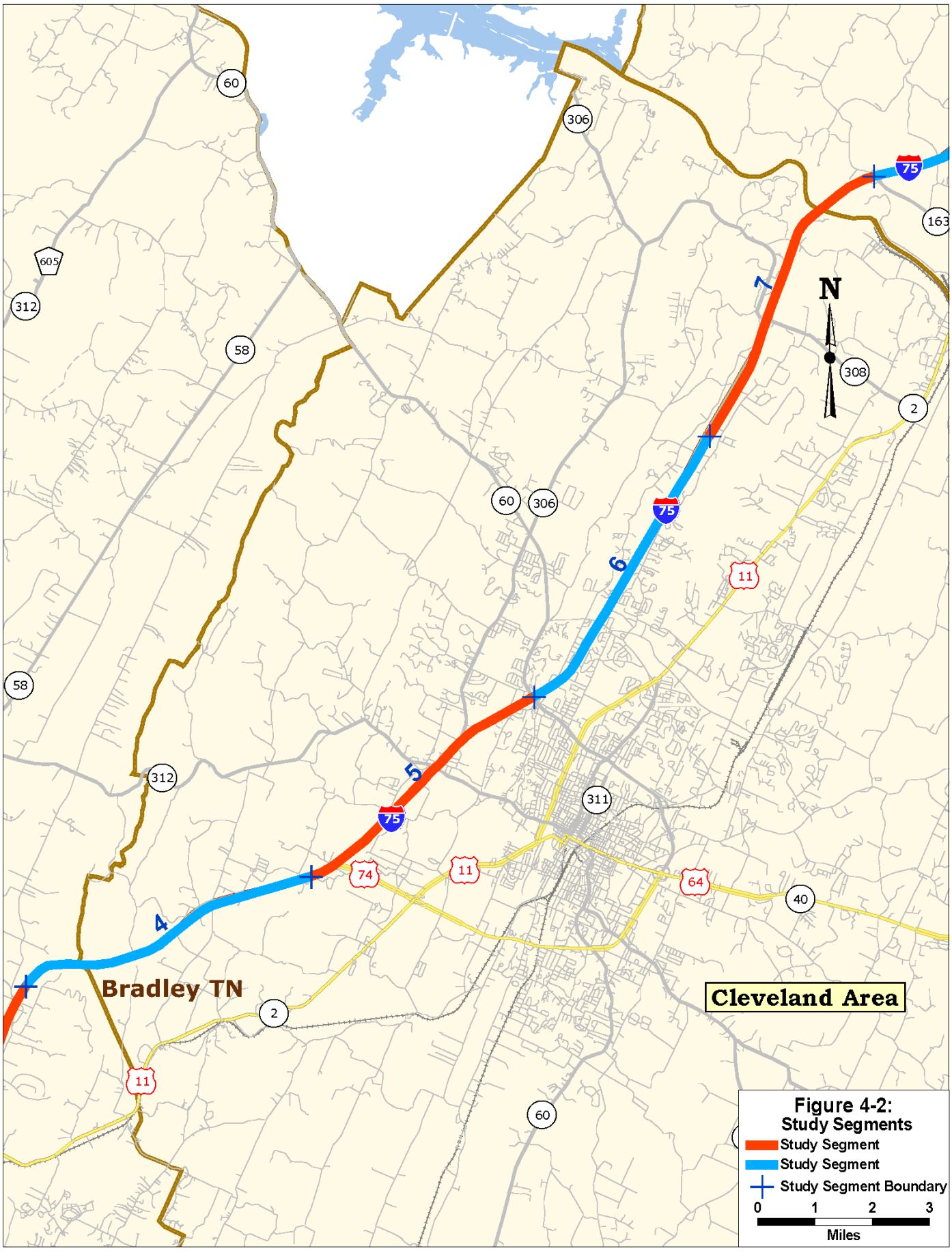
Segments of I-75 for analysis were defined, in part, based on the *I-75 Lane Widening and Truck Lane Analysis*, January, 2008 by TDOT. These segments were assessed based on existing county and MPO/TPO/RPO boundaries, cross-section characteristics, and logical termini.

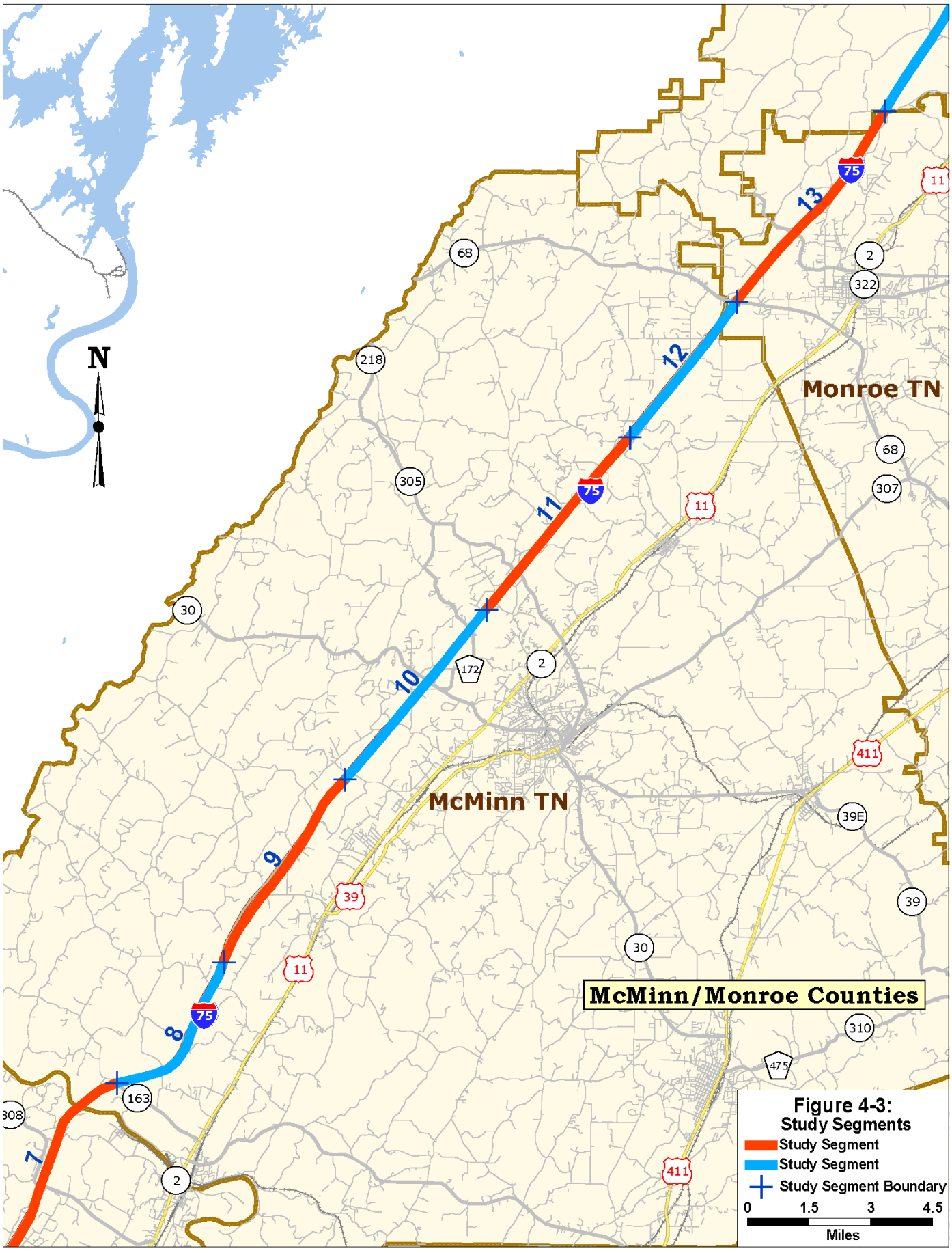
Table 4-1 presents a summary of the geometric deficiencies that were identified in this analysis, reported by segment of independent utility. **Figure 4-1** through **4-7** show the limits of each segment along I-75. A complete listing of the deficiencies can be found in **Appendix A**, Geometric Deficiencies.

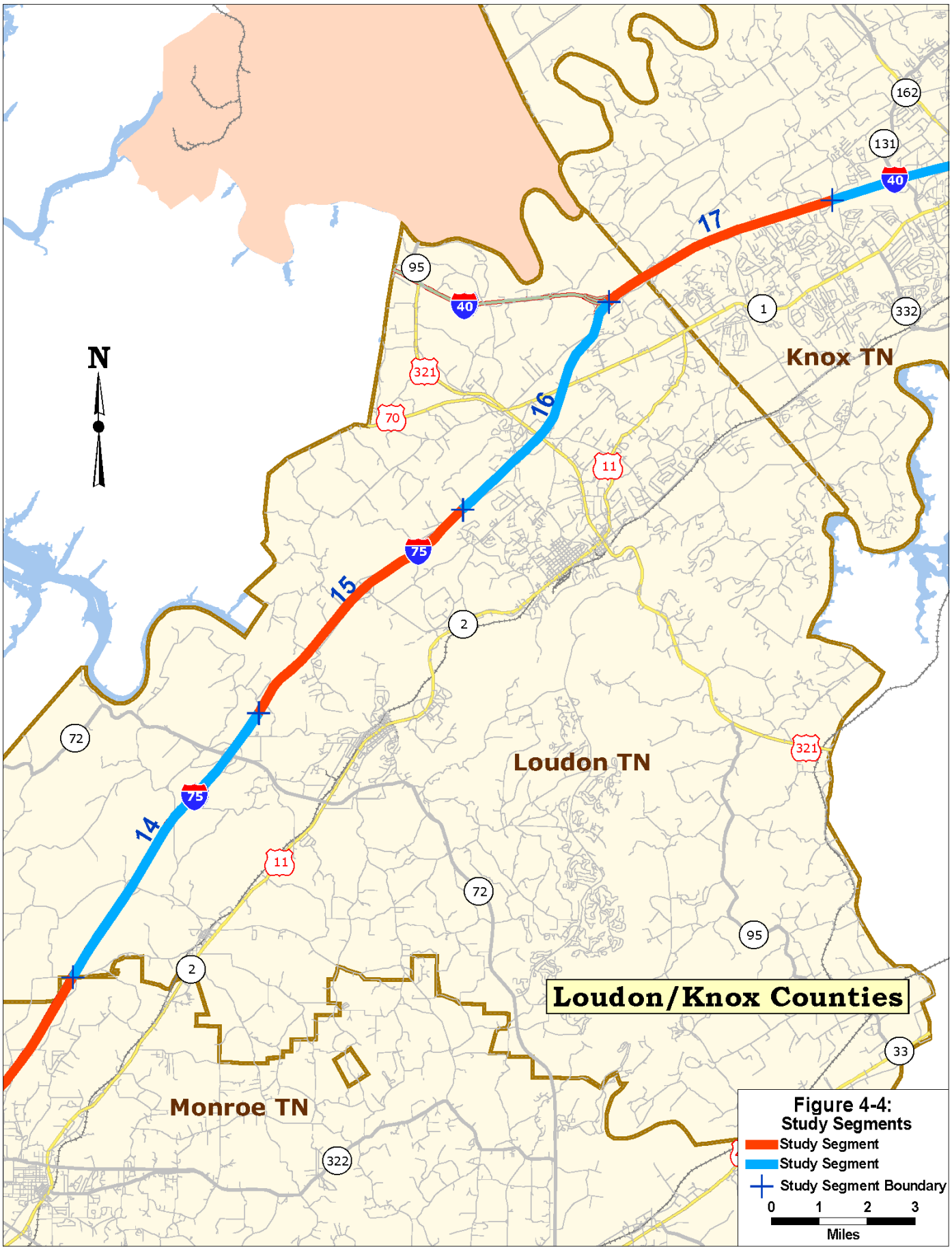
Table 4-1. Summary of Geometric Deficiencies

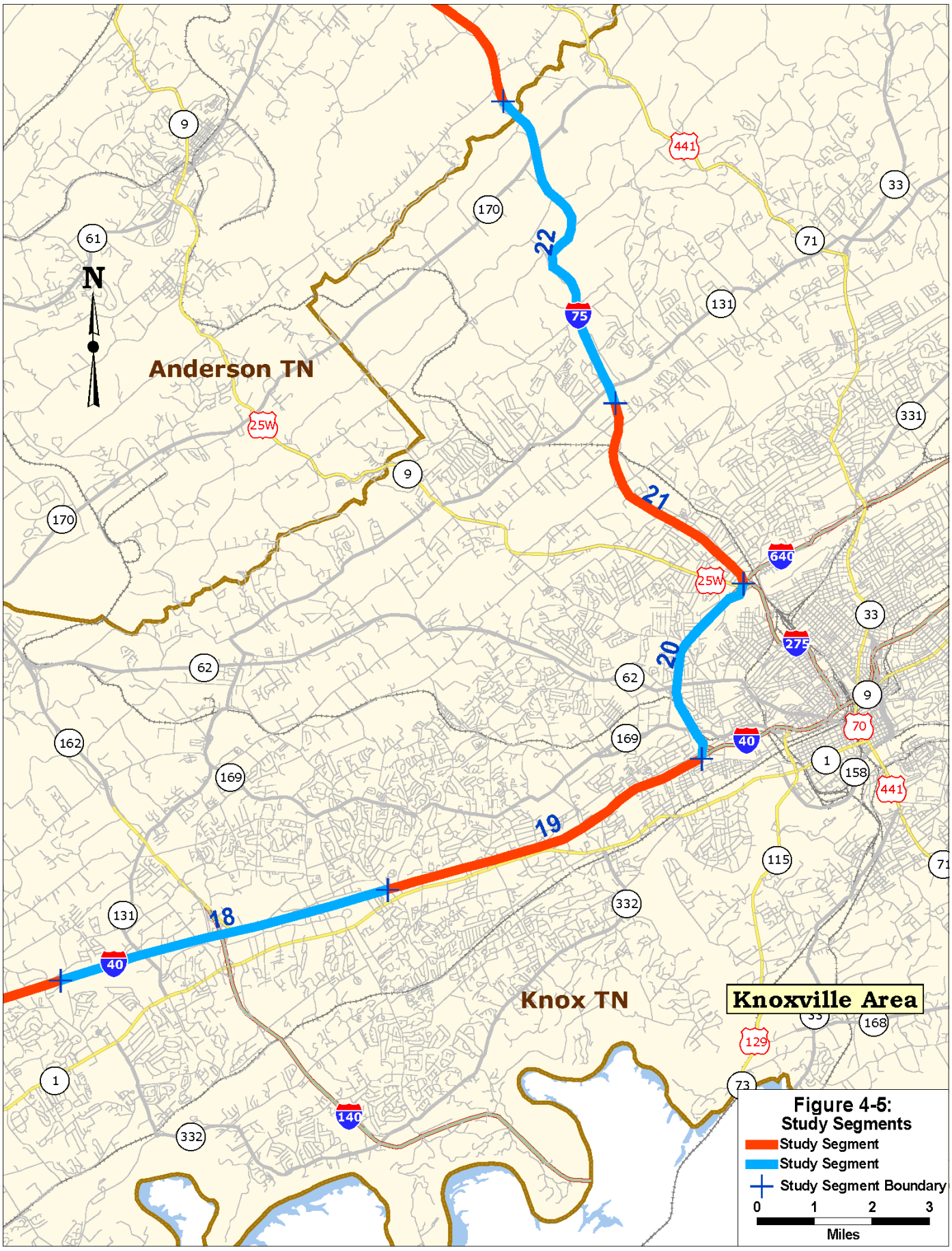
Segment ID	Cross Section Elements	Horizontal Geometry	Vertical Geometry	Interchange Configuration	Bridge Conditions
1	X			X	X
2	X				
3	X		X		
4	X		X		
5			X		
6			X		
7					
8					
9					
10					
11			X		
12					
13			X		
14			X		
15	X		X		
16		X	X		
17	X		X		
18	X		X		
19	X		X		
20	X		X		
21	X		X		
22	X	X	X		
23			X		
24			X	X	
25	X		X		
26			X		X
27			X		
28			X		
29			X		
30	X		X		

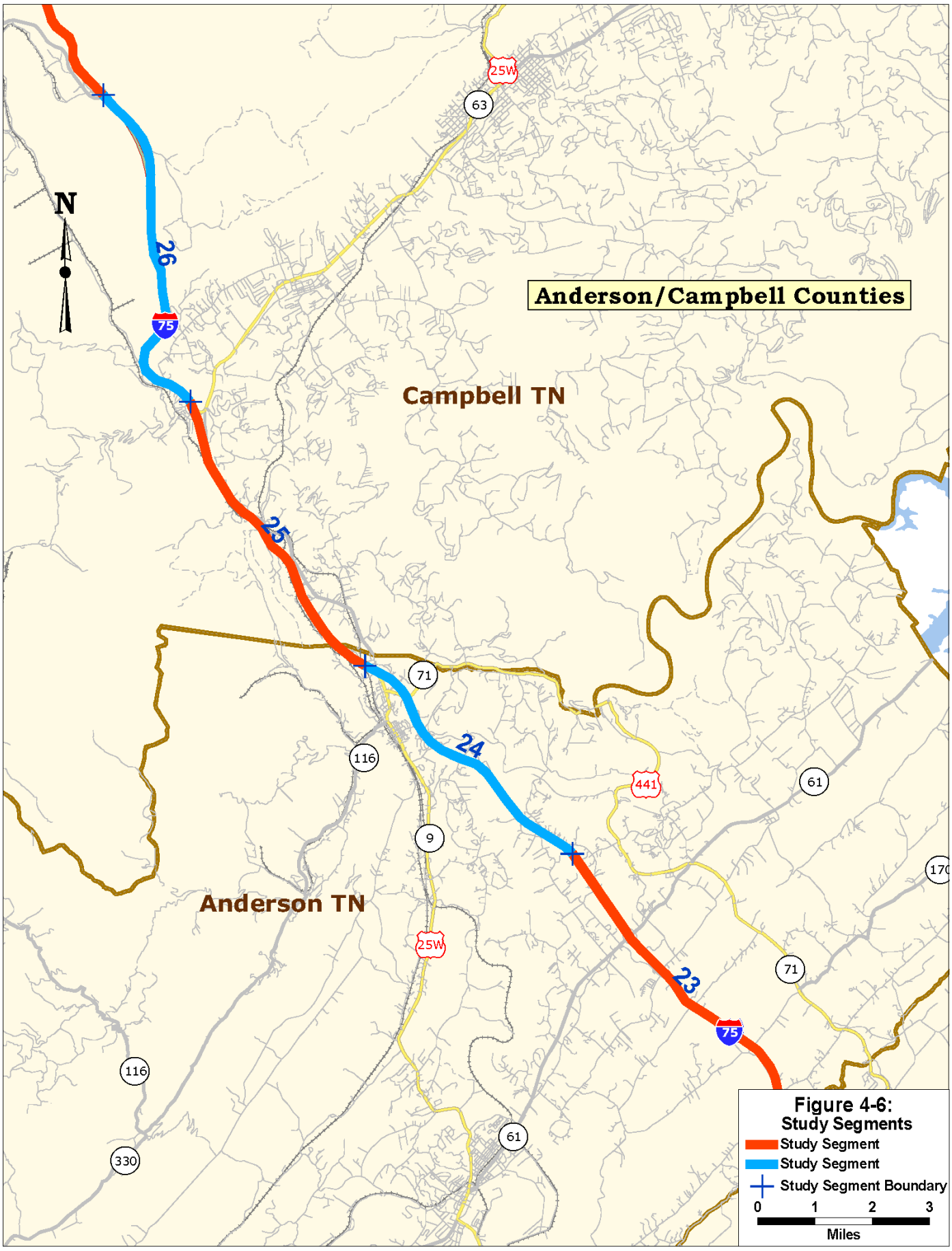

N
Hamilton TN
Chattanooga Area
Catoosa GA
Bra
1
2
3
Figure 4-1:
Study Segments
Study Segment
Study Segment
Study Segment Boundary
0 1 2 3
Miles

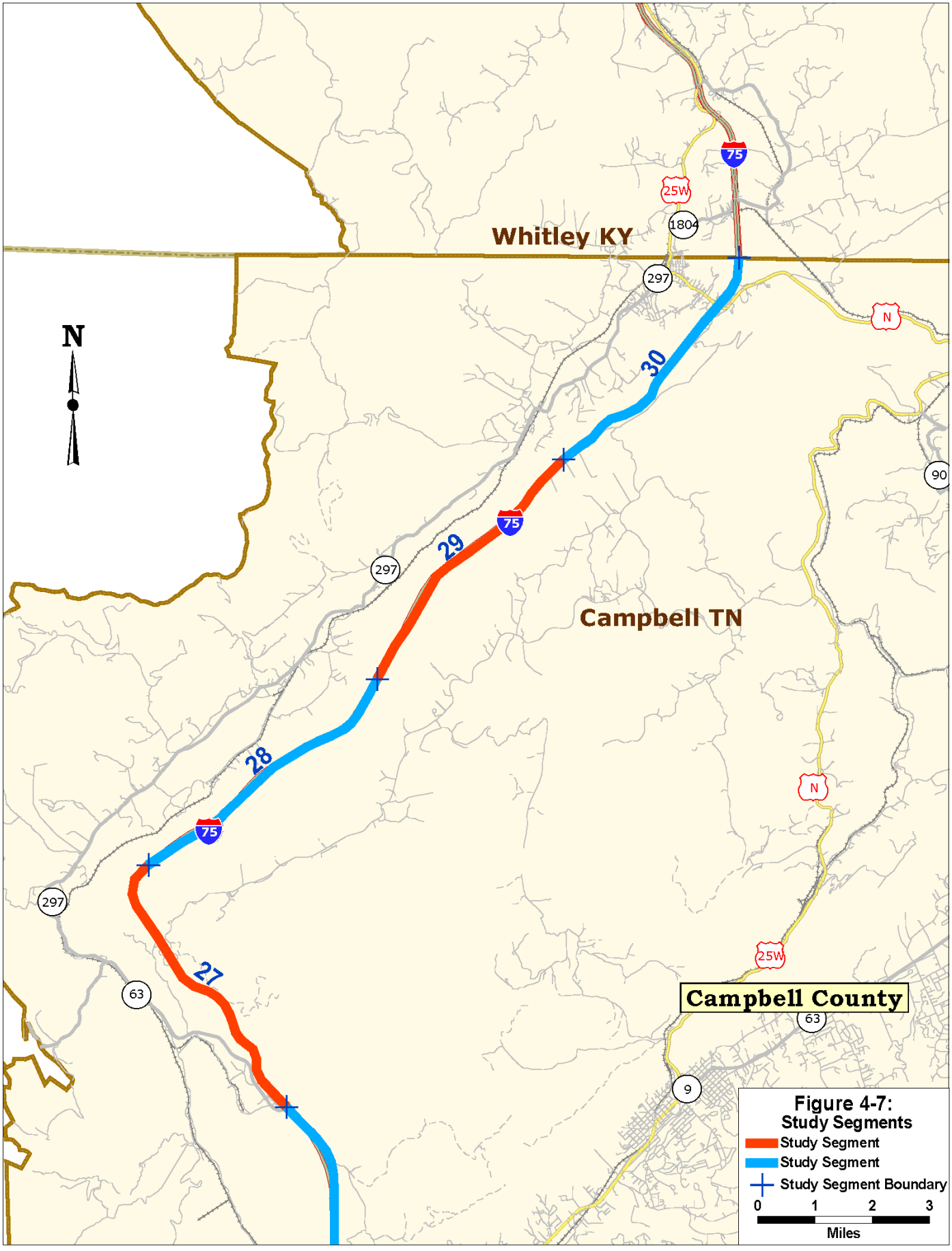

60
306
605
312
58
75
163
N
308
2
7
6
5
4
74
11
64
40
311
Bradley TN
Cleveland Area
Figure 4-2:
Study Segments
Study Segment
Study Segment
Study Segment Boundary
0 1 2 3
Miles


N
Monroe TN
McMinn TN
McMinn/Monroe Counties
7
8
9
10
11
12
13
75
11
68
2
322
218
305
307
30
172
39
39E
411
310
475
163
308
Figure 4-3:
Study Segments
Study Segment
Study Segment
Study Segment Boundary
0
1.5
3
4.5
Miles


N
Knox TN
Loudon TN
Monroe TN
Loudon/Knox Counties
14
15
16
17
40
75
11
321
70
95
1
332
162
131
72
2
322
33
Figure 4-4:
Study Segments
Study Segment
Study Segment
Study Segment Boundary
0 1 2 3
Miles


N
Anderson TN
Knox TN
Knoxville Area
22
21
20
19
18
75
40
640
275
441
25W
Figure 4-5:
Study Segments
Study Segment
Study Segment
Study Segment Boundary
0 1 2 3
Miles


Anderson/Campbell Counties
Campbell TN
Anderson TN
N
26
25
24
23
75
25W
63
71
116
441
61
9
170
330
Figure 4-6:
Study Segments
Study Segment
Study Segment
Study Segment Boundary
0 1 2 3
Miles


Whitley KY
Campbell TN
Campbell County
N
75
25W
1804
297
N
30
90
29
75
297
28
75
297
27
63
25W
63
9
Figure 4-7:
Study Segments
Study Segment
Study Segment
Study Segment Boundary
0 1 2 3
Miles

In 2008, TDOT completed the I-75 Lane Widening and Truck Lane Analysis. This study examines the need for and feasibility of constructing additional general purpose lanes on sections of I-75 in Tennessee that have less than three lanes in each direction. The 23 predefined segments of I-75 were rated based on their ease of construction, measured in cost per mile, and their relative need for widening, measured by the point in time that level of service D (rural areas) or E (urban areas) conditions are reached. Each segment was then assigned to one of the six categories shown in the matrix below.

Table 4-2: Index of Constructability from I-75 Lane Widening Analysis

	Need (time period deficient)		
Construction	1 (2006-2011)	2 (2012-2017)	3 (after 2017)
Easy (+)	High Priority Easy to Build	Medium Priority Easy to Build	Low Priority Easy to Build
Difficult (-)	High Priority Difficult to Build	Medium Priority Difficult to Build	Low Priority Difficult to Build

In addition, this study also examined locations where both the steepness and length of grade along I-75 were most significant (generally at least a 3 percent grade). These sections were highlighted as potential locations for truck climbing lanes. Approximately 10 miles in Campbell County, and nearly 2 miles in Knox County were identified as potential truck climbing lane priorities. It should also be noted that the vertical geometry column, shown previously in Table 4-1, notes deficiencies for all of the sections for which potential truck climbing lanes are identified.

5.0 OPERATIONS AND MAINTENANCE

5.1 Overview of Incident Management and Intelligent Transportation Systems

The Intelligent Transportation Systems (ITS) deployed and planned in Tennessee consist of many elements, including incident management, real-time traveler information systems, freeway management systems and fog detection systems. Those elements that are deployed along the I-75 corridor are described below.

5.1.1 Incident Management

TDOT operates Incident Management Program (HELP) trucks in Tennessee's most heavily congested urban areas including Knoxville and Chattanooga. The program began in 1999 in Knoxville for the purpose of reducing traffic congestion, improving safety, and assisting motorists in distress. The Chattanooga HELP program came on line in 2000.

TDOT HELP operates on 47 miles of interstate and state routes in Chattanooga and Hamilton County, including 12 miles of I-75. TDOT HELP provides services on over 18 miles of I-75 in Knoxville and Knox County. These service patrols can be dispatched to any of the major state routes seven days a week in an effort to mitigate congestion caused by roadway incidents. In both cities, HELP operators have regular routes to patrol along the freeway system. In Knoxville, they are also dispatched by the Transportation Management Center (TMC) when incidents are detected. TDOT HELP has provided assistance to over 170,000 motorists in Knoxville and over 130,000 motorists in Chattanooga since the inception of those programs.

5.1.2 Intelligent Transportation Systems

The I-75 corridor has three existing ITS deployments and a fourth under construction. In 2005, the Knoxville Smartway freeway management system was opened. This system contains seventy (70) Closed-Circuit Television (CCTV) cameras, sixteen (16) Dynamic Message Signs (DMS), and highway advisory radio covering the 44 miles of freeway in the Knoxville area, including the 18 miles of I-75.

One of the first rural ITS applications in the United States was the fog warning system on I-75 across the Hiwassee River near Calhoun, TN, just north of Chattanooga. This system was originally deployed in 1994 and went through a major upgrade in 2008. This system detects low visibility conditions along the freeway and is capable of implementing a number of steps to warn motorists, such as DMS and variable speed limit signs, and is also capable of initiating the closure of the entrance ramps to I-75 under extreme conditions. The system also includes CCTV cameras and vehicular detection systems.

The Jellico Mountain rural ITS system was deployed in 2007 and consists of strategic deployments of two (2) DMS and highway advisory radio for disseminating traveler information through this area.

In addition, the Chattanooga Smartway freeway management system is presently under construction. When completed it will contain seventy-two (72) CCTV cameras, sixteen (16) DMS, and highway advisory radio covering 64 miles of highway in the Chattanooga area, including 12 miles of I-75.

One other element of ITS that TDOT has deployed is a statewide 511 traveler information system. This system provides real time information through an automated voice response system and a web site regarding incidents, weather, construction, and other important roadway conditions. Information can be obtained for specific roadways or regions. Implemented in 2006, the system and website are updated through the TDOT Smartway Information System (TSIS) by the TMCs, HELP dispatchers, THP dispatchers, and TDOT regional field staff. In addition, through a series of weather stations that were deployed across the state and monitored by TDOT regional maintenance office any weather incidents that may affect travel are immediately reported to the regional TMCs and the statewide 511 system.

A detailed description of the distribution of ITS devices along the I-75 corridor is as follows:

TDOT has installed, from the Georgia state line at Mile Marker (MM) 0 to approximately MM 13, CCTV cameras at roughly ¾ mile spacing as part of an early deployment ITS project in the Chattanooga urban area. The existing CCTV deployment is controlled from an interim TMC on the existing TDOT Region 2 Campus. A separate ITS project is presently underway that will add Radio Data System (RDS) at roughly ½ mile spacing in each direction to monitor flow conditions, six (6) DMS, and two (2) Highway Advisory Radio (HAR) transmitters broadcasting on the AM radio band to provide information to travelers. Additionally, TDOT is constructing a fiber optic communication backbone to support all ITS elements through this segment. Control of the expanded ITS deployment in the Chattanooga urban area will move to a new TMC facility that is currently under construction within the future TDOT Region 2 campus.

From MM 14 to MM 17 TDOT has a deployment project underway that will construct a fiber optic communications backbone and install CCTV cameras at roughly 1 mile intervals through this segment. No other ITS instrumentation is presently planned for this segment of I-75. From MM 17 to MM 25 TDOT is presently constructing a fiber optic communication backbone but has no existing plans to install any ITS devices through this segment.

The I-75 Fog Detection System begins at MM 25 and ends at MM 44. This system is presently operational and includes 21 CCTV cameras, nine (9) DMS, ten (10) Changeable Speed Limit Signs, nine (9) Fog Detection System (FDS), fourteen (14) RDS, and two (2) HAR transmitters supported by a fiber optic communication backbone. The Fog Detection System is controlled from the Tennessee Highway Patrol District Headquarters in Chattanooga. This system will be capable of joint control from the new TDOT Region 2 TMC once the fiber optic communication backbone extension from MM17 to MM25 is complete.

The only ITS instrumentation from MM 44 to MM 374 (I-40/75) includes two (2) isolated HAR transmitters accessible by dial-up telephone lease service and one (1) isolated CCTV camera that is accessible via microwave wireless link. No other ITS device deployments are presently planned through this segment. These devices are controlled from the TDOT Region 1 TMC in Knoxville.

The existing Knoxville SmartWay urban deployment begins at MM 374 (I-40/75) and continues to approximately MM 110 (I-75) with CCTV cameras at roughly ¾ mile spacing and RDS at roughly 1/3 mile spacing in each direction to monitor flow conditions. There are six (6) DMS and two (2) permanent HAR transmitters along this section of I-75 as well. All of these devices are connected via a fiber-optic communication backbone that runs throughout the Knoxville metropolitan area and are controlled by the TDOT Region 1 TMC in Knoxville. This facility is manned 24 hours a day seven days a week.

There are no further ITS devices north of MM 110 until approaching the Jellico Mountain area. From approximately MM 128 to MM 130 there is a single DMS, a single HAR transmitter, and a single HAR flashing beacon to communicate to northbound travelers through the Jellico Mountain area. TDOT has deployed another DMS, HAR transmitter, and HAR flashing beacon in Kentucky beginning at the Kentucky Welcome Center and continuing to approximately MM 10 to communicate with southbound travelers through the Jellico Mountain area. Communications to these devices are by way of leased telephone circuits. These devices are controlled from the TDOT Region 1 TMC in Knoxville.

5.2 Operational Deficiencies

Operation and maintenance deficiencies along I-75 were primarily identified through the stakeholder interview process. Geometric and other deficiencies related to traffic operations and maintenance were identified through interviews with TDOT's Region Offices and TDOT's Incident Management Program managers.

Additional interviews were conducted with representatives of the Tennessee Department of Safety including the Tennessee Highway Patrol and the Commercial Vehicle Compliance office to obtain their input based on field observations. Through these interviews, potential actions to expand Tennessee's ITS and HELP were identified.

Geometric, weather related, truck parking, weigh station, and other issues lead to operational issues. Deficiencies identified in the stakeholder interviews along the corridor are listed below:

- Lane closures cause major traffic backups along rural sections. In areas where there are no alternate routes available, additional lanes are necessary to provide capacity during these normal maintenance operations.
- Additional capacity is needed from the Georgia/Tennessee State Line to SR-153.
- Additional capacity is needed at the I-75/I-24 Interchange.
    - Northbound ramp to I-24 decreases from two lanes to one lane, creating a bottleneck.
    - Traffic queues from the interchange along I-24 to SR-27.
    - Weaving problems occur at I-75S to I-24W and I-75N to I-24W.
- I-75 in the fog zone near Calhoun is currently two lanes in each direction. Three lanes in each direction are necessary during fog times.
- Major safety and capacity issues are present at I-75 near Exit 40 in Bradley County.
- Three lanes are needed in each direction from Georgetown Rd to Big Spring-Calhoun Rd./Lamontville Rd.
- US 11 is currently two lanes and should be improved to four lanes to be used as an alternate to I-75.
- Loudon County experiences a significant amount of truck crashes due to traffic transitioning from the rural area to a more congested urbanized facility.
- Trucks parking overnight on interchange ramps are a problem throughout the corridor.
- Several points in the Knoxville area experience major congestion.
    - Watt Rd. has three major truck stops.

    - Lovell Rd. to Pellissippi Parkway backs up to Cedar Bluff Rd. An auxiliary lane is needed from Cedar Bluff Rd. west to Campbell Station Rd.
    - Truck stops at Lovell Rd. contribute heavily to congestion.
    - I-640/I-75 interchange flyover consists of one lane ramps, creating bottlenecks. Additional capacity is necessary to alleviate the congestion.
    - The Callahan Drive ramp backs up onto I-75.
- I-75 to eastbound I-640 is a tight curve which leads to truck overturns.
- In Campbell County steep grades exist north of the Caryville exit. Auxiliary truck lanes will be beneficial.

5.3 Recommended ITS and HELP Program Improvements

Based on the operation all deficiencies identified in the previous section, the following improvements for ITS, HELP and other operational programs were recommended by stakeholders.

5.3.1 ITS Deployment Recommendations

- Allow Tennessee Highway Patrol live feed of ITS cameras in Hamilton County.
- A fiber-optic communication backbone is presently under construction to link the I-75 Fog Detection System in Bradley and McMinn Counties to the TDOT Region 2 TMC. Infill of CCTV cameras and vehicular flow detection devices can be achieved in this area between the northern Chattanooga SmartWay urban deployment limits to the southern I-75 Fog Detection System deployment limits.
- Allow Tennessee Highway Patrol live feed of ITS cameras in Knox County.
- DMS in current Knoxville Smartway urban area deployment currently stop at Papermill Rd. These should be extended beyond the I-40/I-75 split.
- Knoxville urban area ITS deployment does not extend to the limits of the urban area along the I-75 corridor. Full urban area Smartway ITS instrumentation should be provided to beyond the I-40/I-75 Split to the south and to beyond Emory Road to the north.
- Installation of fog detection equipment in Campbell County from Lake City to the Kentucky state line.
- ITS system should be expanded in rural areas.

- In areas where limited initial deployment of traveler information devices have been strategically deployed, such as the Jellico Mountain area, limited strategic deployment of video surveillance and other methods of vehicular flow detection is needed for these initial investments to achieve their full value.
- In areas with no current ITS elements, such as from the northern limits of the current I-75 FDS to the I-40/I-75 split, limited strategic deployment of DMS capable of isolated communication are needed.

5.3.2 HELP Program Recommendations

- Deicing equipment for bridges can reduce the number of crashes.
- Build crossovers in rock slide areas in Campbell County.
- Implement a rock slide mitigation project just south of the Kentucky state line.

5.3.3 Other Operational Improvement Recommendations

- Post and enforce ramp parking restrictions for trucks
- Create openings in median barriers for emergency vehicle access
- Improve signing at Bonnie Oaks interchange
- Reconstruct I-75/ I-40 interchange
- Provide median cross overs in rock slide areas

5.4 Maintenance

As the I-75 corridor traverses through mountainous terrain, maintenance issues related to rock slides and rock fall are of concern. TDOT has conducted an assessment and has identified sites that have a moderate or high risk for rock fall. Although there may be other sites that pose a slight risk along the corridor, the primary problem areas are in Knox County and Campbell County. **Table 5-1** lists the locations of concern for rock fall and the locations are shown in **Figures 6-5** through **6-7**.

Table 5-1 Potential Rock Fall Locations

ID	County	Location
1	Knox	0.8 miles south of Brushy Valley Road on the east side of I-75
2	Knox	0.7 miles south of SR 170 (Raccoon Valley Road) on the east side of I-75
3	Knox	0.3 miles north of SR 170 (Raccoon Valley Road) on the east side of I-75
4	Campbell	1.8 miles north of Cove Creek on the west side of I-75
5	Campbell	2.8 miles north of Cove Creek on the east side of I-75
6	Campbell	1.2 miles north of Stinking Creek Road on the east side of I-75
7	Campbell	2.7 miles north of Stinking Creek Road on the east and west side of I-75
8	Campbell	2.9 miles north of Stinking Creek Road on the east side of I-75
9	Campbell	3.2 miles north of Stinking Creek Road on the east side of I-75
10	Campbell	3.7 miles north of Stinking Creek Road on the east side of I-75
11	Campbell	4.1 miles north of Stinking Creek Road on the east side of I-75
12	Campbell	4.7 miles north of Stinking Creek Road on the east side of I-75
13	Campbell	4.1 miles south of Rarity Mountain Road on the west side of I-75
14	Campbell	3.9 miles south of Rarity Mountain Road on the west side of I-75
15	Campbell	3.5 miles south of Rarity Mountain Road on the east and west side of I-75
16	Campbell	South of Rarity Mountain Road on the east side of I-75
17	Campbell	Near Mile Post 158 on the east side of I-75

A rock fall fence is currently being installed for the Campbell County site near Mile Post 158 on the east side of I-75 (rock fall location ID 18). This site will be reassessed by TDOT Geotechnical Engineering Section after the fence is in place.

6.0 SAFETY AND SECURITY

6.1 Safety

Issues related to safety were identified using historic data from the Tennessee Roadway Information Management System (TRIMS), through stakeholder interviews with the Tennessee Highway Patrol and the Directors of TDOT's Incident Management Program, and from comments from the general public. It should be noted that this document is covered by *23 USC Section 409*, and its production pursuant to a public document records request does not waive the provisions of *Section 409*.

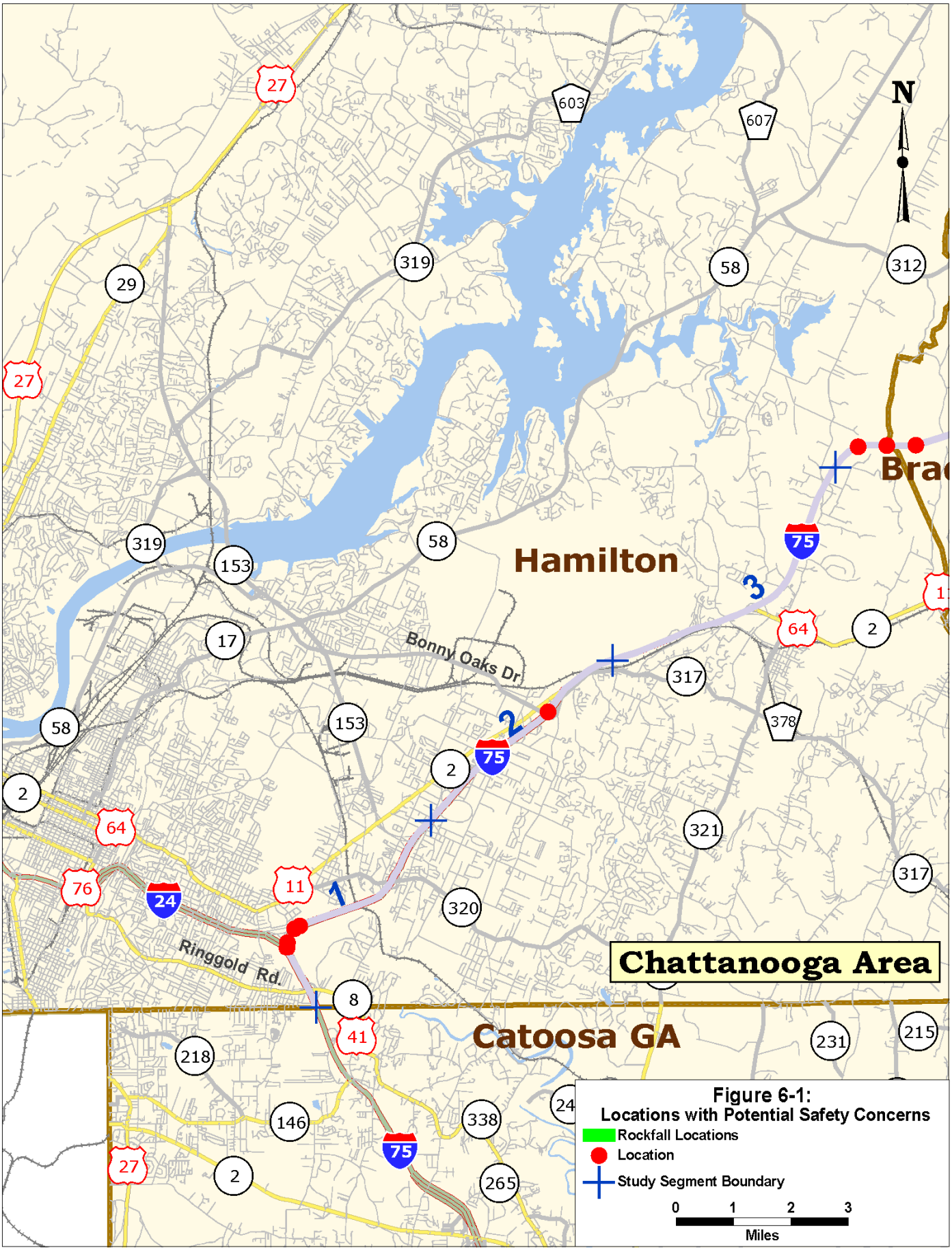
Locations along the study corridor that have experienced a significant number of crashes were identified based on the three most recent years of available crash records in the Tennessee Roadway Information Management System (TRIMS). Areas of concern were defined as spots and segments of roadway that have between three and four times the statewide average rate with a minimum of five crashes for a rural or urban interstate facility. The use of this measure indicates that these locations should receive a higher priority in implementation of safety improvements due to some unfavorable characteristic of local conditions. Spot and segment locations with crash rates that qualify for a safety program are already being addressed by the Tennessee Department of Transportation, and therefore are not addressed by this study.

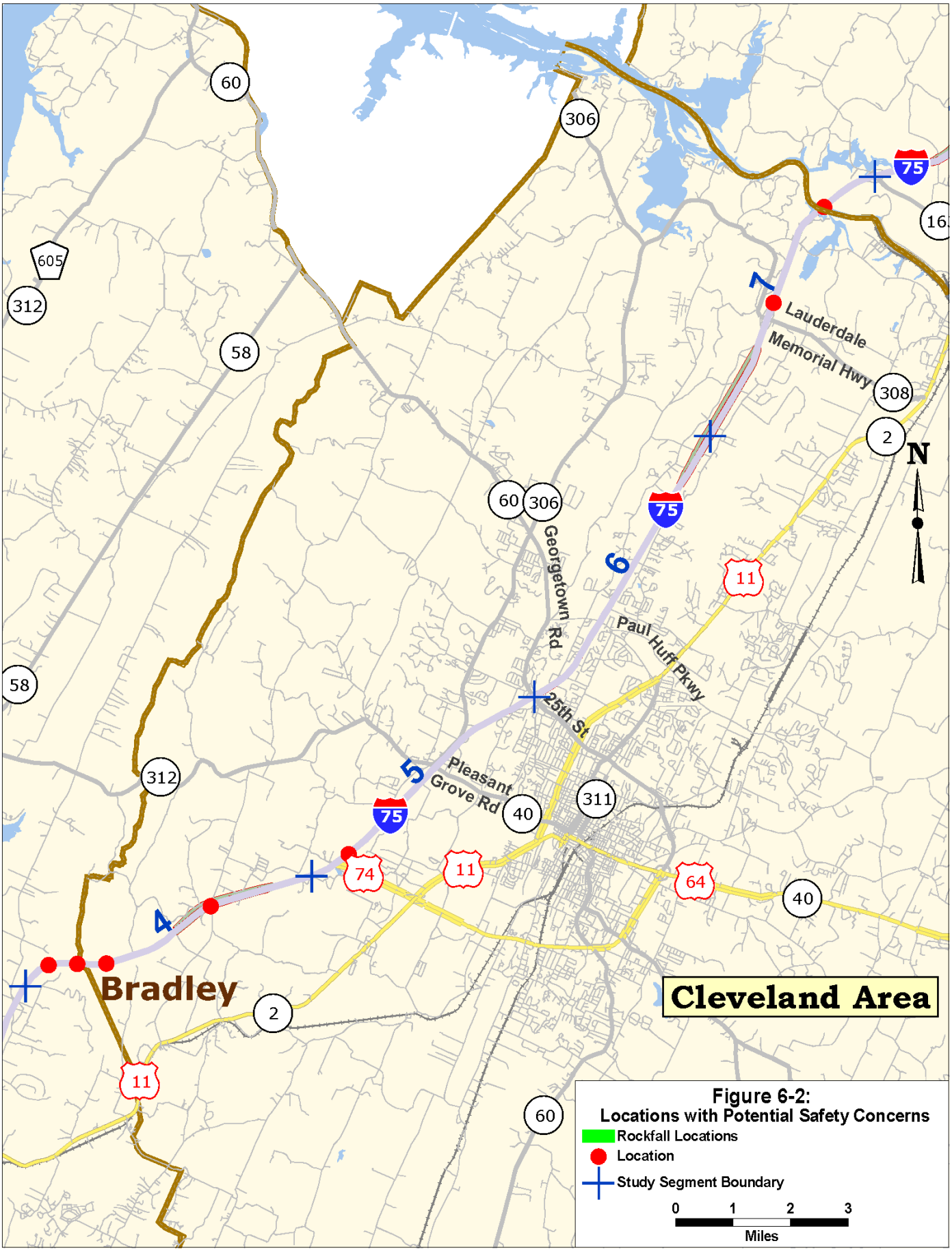
Table 6-1 lists the number of spot locations that are areas of safety concern in each of the study corridor segments. **Figures 6-1** through **6-7** show the location of areas of safety concern.

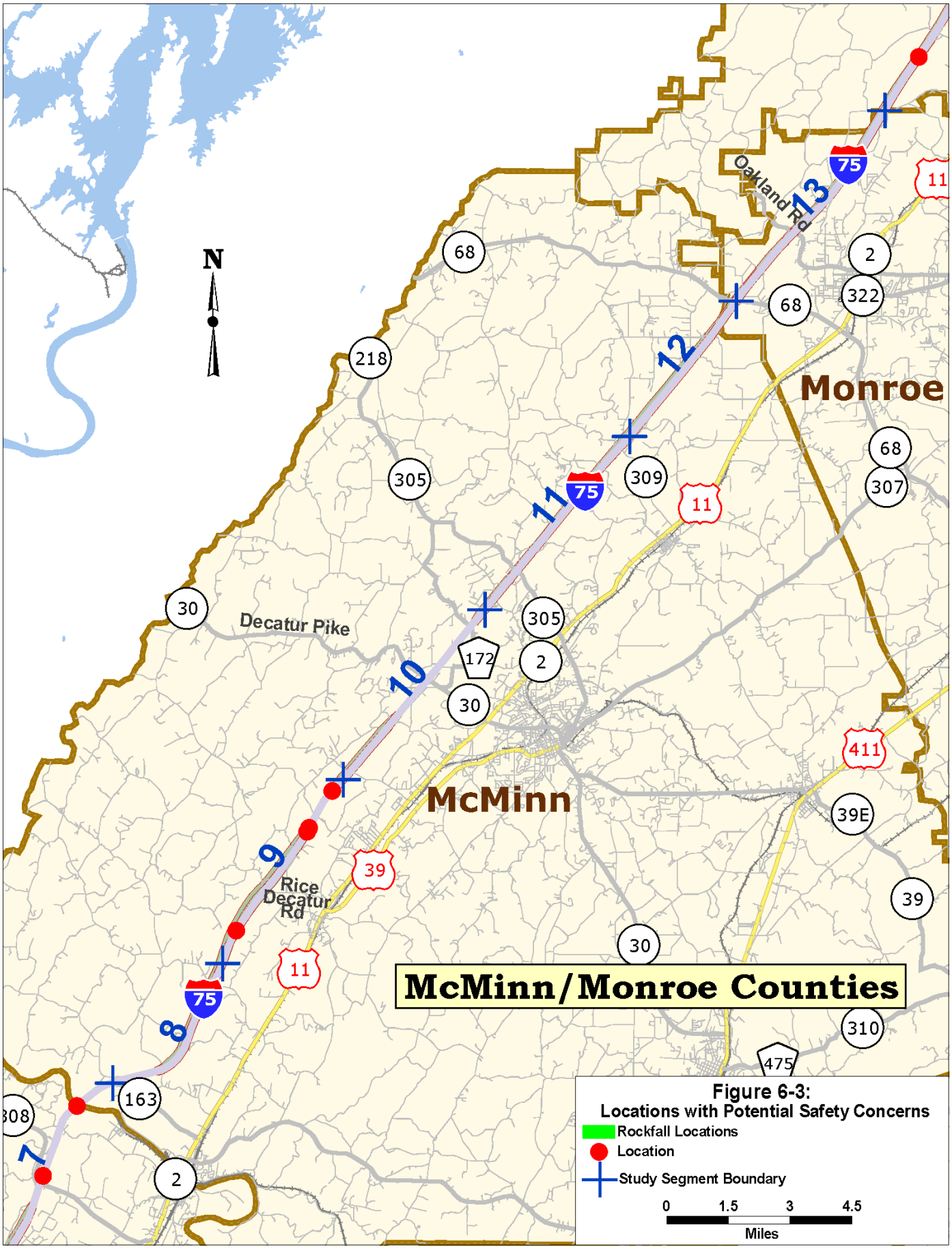
Table 6-1. Areas of Safety Concern

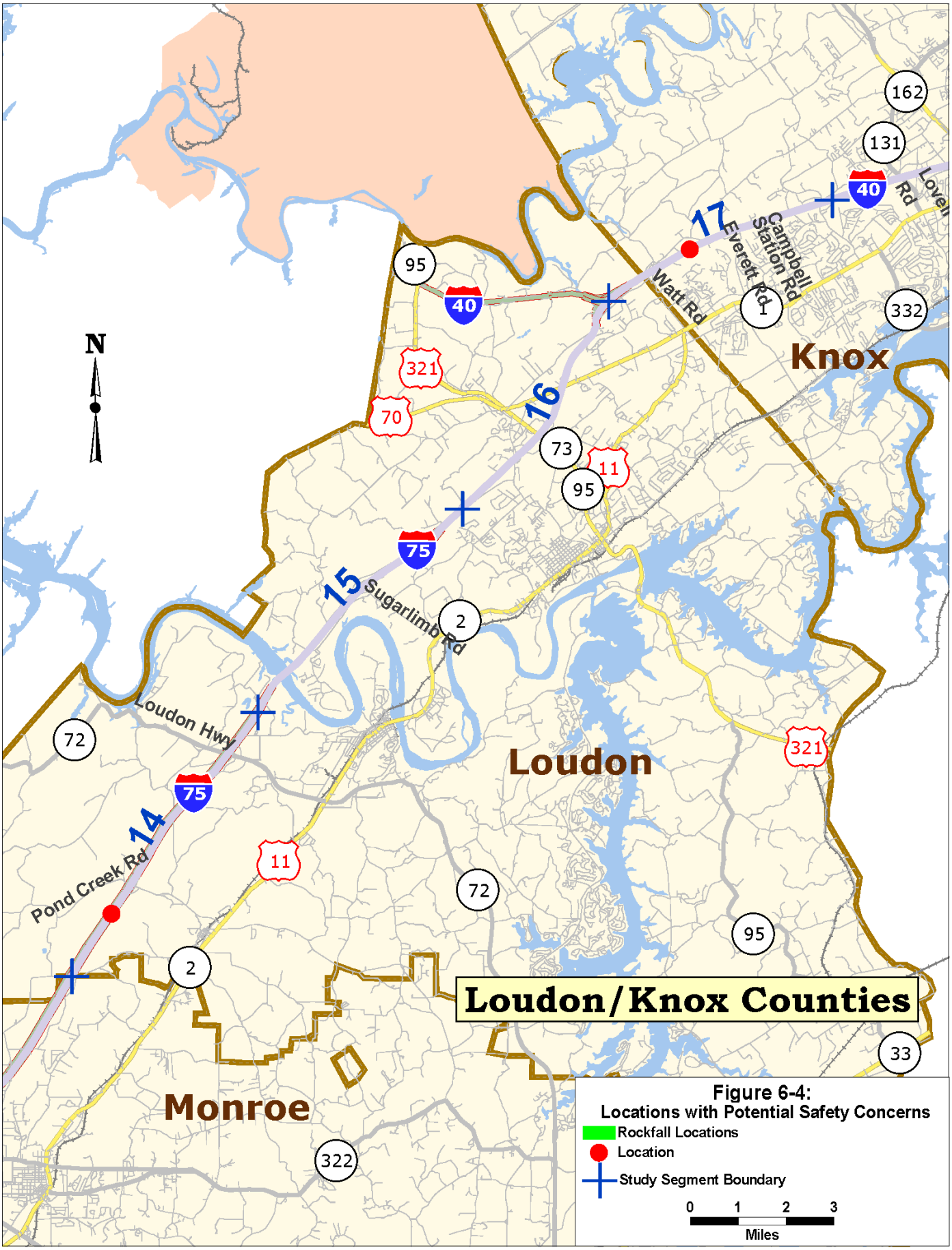
ID	Route	From	To	No. of Spots
1	I-75	Georgia State Line	SR 153	4
2	I-75	SR 153	Volunteer Ordnance Road	1
3	I-75	Volunteer Ordnance Road	Hamilton/Bradley County Line	0
4	I-75	Hamilton/Bradley County Line	Mile Post 20	4
5	I-75	Mile Post 20	SR 60 (25th Street)	1
6	I-75	SR 60 (25th Street)	Hooper Gap Road	0
7	I-75	Hooper Gap Road	SR 163 (Lamontville Road)	2
8	I-75	SR 163 (Lamontville Road)	Mile Post 40	0
9	I-75	Mile Post 40	Rest Area at Mile Post 46	4
10	I-75	Rest Area at Mile Post 46	Mile Post 51	0
11	I-75	Mile Post 51	SR 309 (Union Grove Road)	0
12	I-75	SR 309 (Union Grove Road)	SR 68	0
13	I-75	SR 68	Monroe/Loudon County Line	0
14	I-75	Monroe/Loudon County Line	Matlock Bend Road	1
15	I-75	Matlock Bend Road	Hotchkiss Valley Road	0
16	I-75	Hotchkiss Valley Road	I-40/I-75 Interchange (West)	0

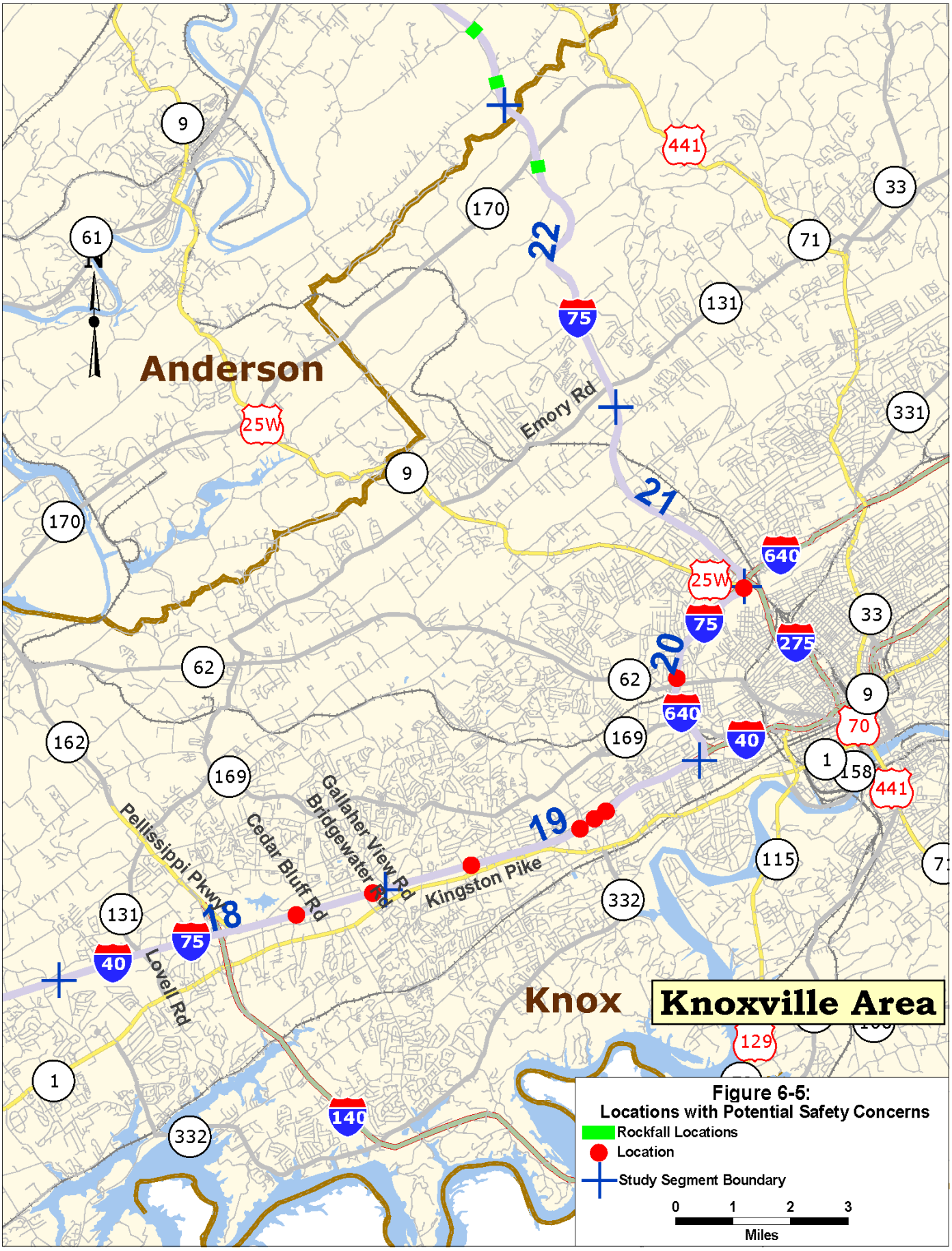
ID	Route	From	To	No. of Spots
17	I-40	I-40/I75 Interchange (West)	Campbell Station Road	1
18	I-40	Campbell Station Road	Bridgewater Road	2
19	I-40	Bridgewater Road	I-40/I-640/I-75 Interchange	4
20	I-75	I-40/I-640/I-75 Interchange	I-640/I-275 Interchange	2
21	I-75	I-640/I-275 Interchange	SR 131 (W. Emory Road)	0
22	I-75	SR 131 (W. Emory Road)	Mile Post 118	0
23	I-75	Mile Post 118	Mile Post 124	0
24	I-75	Mile Post 124	SR 116 (Cherry Bottom Road)	2
25	I-75	SR 116 (Cherry Bottom Road)	SR 9 (Appalachian Highway)	4
26	I-75	SR 9 (Appalachian Highway)	SR 63 (Howard Baker Road)	2
27	I-75	SR 63 (Howard Baker Road)	Mile Post 146	4
28	I-75	Mile Post 146	Mile Post 151	0
29	I-75	Mile Post 151	Rarity Mountain Road	2
30	I-75	Rarity Mountain Road	Kentucky State Line	3

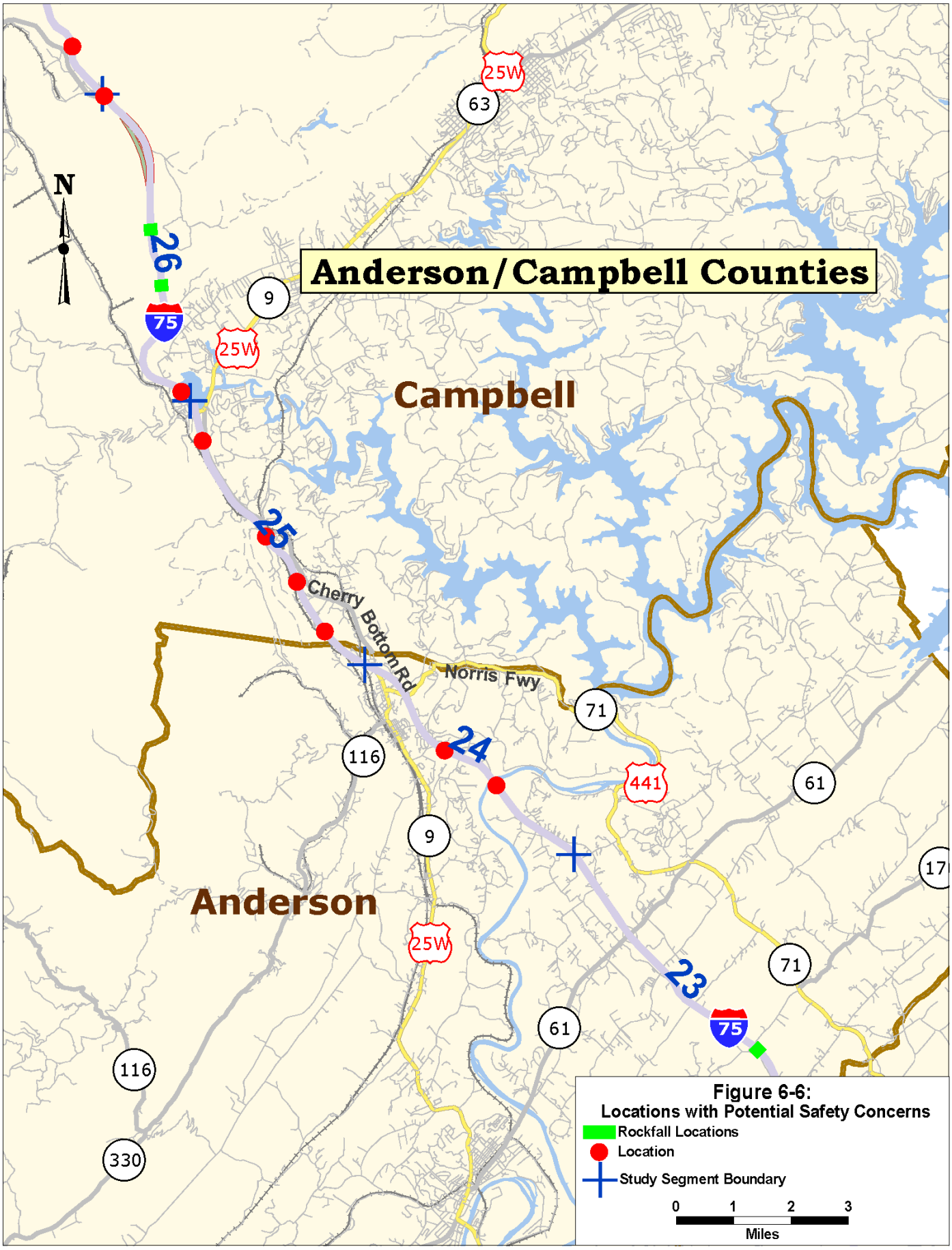

N
Hamilton
Chattanooga Area
Catoosa GA
Bonny Oaks Dr
Ringgold Rd.
1
2
3
Figure 6-1:
Locations with Potential Safety Concerns
Rockfall Locations
Location
Study Segment Boundary
0 1 2 3
Miles

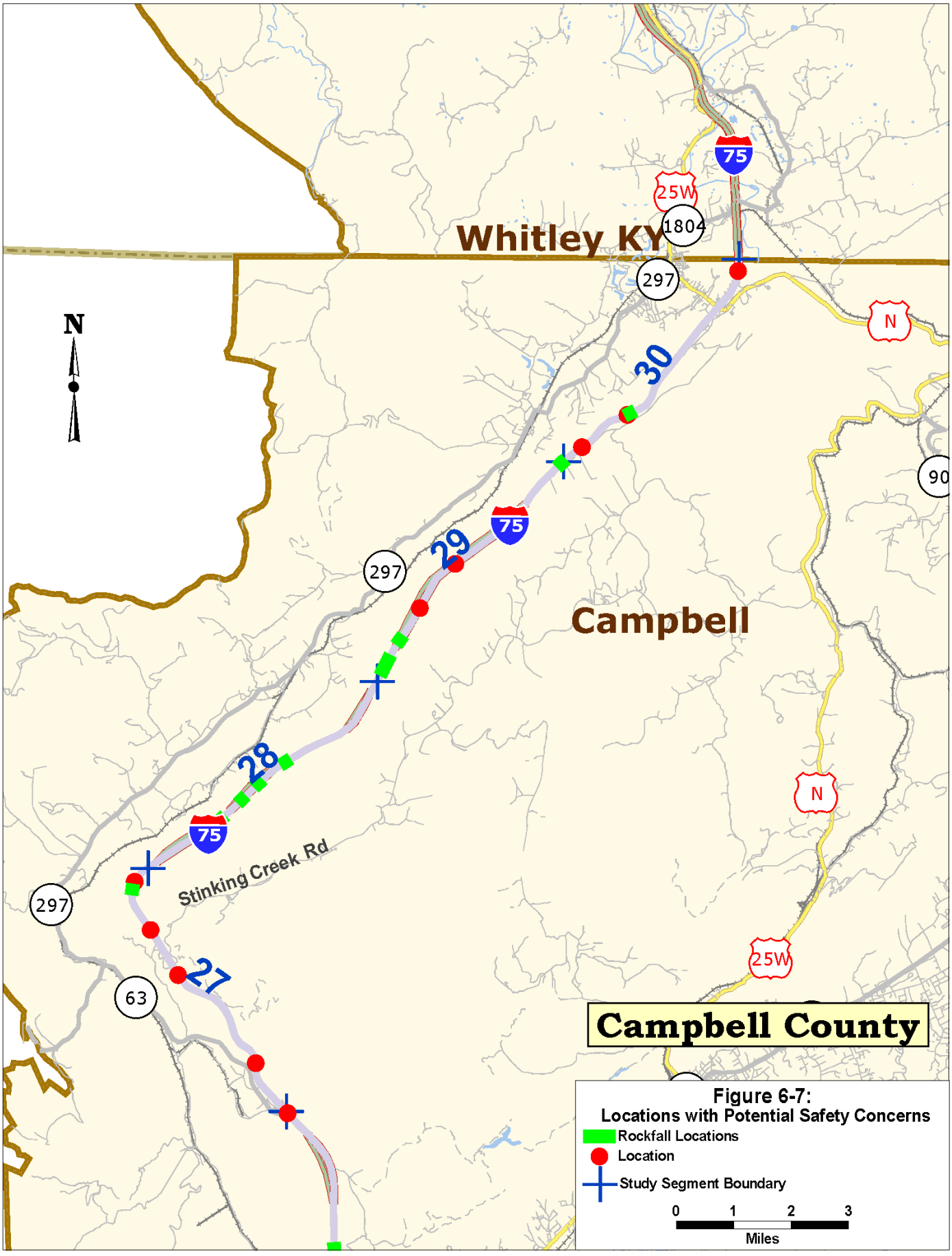

60
306
605
312
58
75
7
Lauderdale
Memorial Hwy
308
2
N
60
306
Georgetown Rd
6
75
11
Paul Huff Pkwy
58
25th St
312
5
Pleasant
Grove Rd
40
311
75
74
11
64
40
4
Bradley
2
Cleveland Area
11
60
Figure 6-2:
Locations with Potential Safety Concerns
Rockfall Locations
Location
Study Segment Boundary
0 1 2 3
Miles


N
Monroe
McMinn
McMinn/Monroe Counties
Oakland Rd
Decatur Pike
Rice Decatur Rd
7
8
9
10
11
12
13
75
11
68
2
322
218
309
305
307
30
172
39
39E
411
163
308
310
475
Figure 6-3:
Locations with Potential Safety Concerns
Rockfall Locations
Location
Study Segment Boundary
0 1.5 3 4.5
Miles

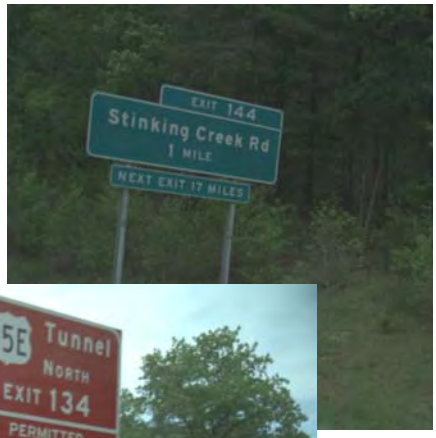

N
Knox
Loudon
Monroe
Loudon/Knox Counties
Watt Rd
Everett Rd
Campbell Station Rd
Sugarlimb Rd
Loudon Hwy
Pond Creek Rd
17
16
15
14
40
75
95
162
131
1
332
321
70
73
11
2
72
33
322
Figure 6-4:
Locations with Potential Safety Concerns
Rockfall Locations
Location
Study Segment Boundary
0 1 2 3
Miles


Anderson
Knox
Knoxville Area
Emory Rd
Cedar Bluff Rd
Gallaher View Rd
Bridgewater Rd
Kingston Pike
Pellissippi Pkwy
Lovell Rd
22
21
20
19
18
Figure 6-5:
Locations with Potential Safety Concerns
Rockfall Locations
Location
Study Segment Boundary
0 1 2 3
Miles


Anderson/Campbell Counties
Campbell
Anderson
N
26
25
24
23
75
25W
63
9
Cherry Bottom Rd
Norris Fwy
71
116
441
61
17
330
Figure 6-6:
Locations with Potential Safety Concerns
Rockfall Locations
Location
Study Segment Boundary
0 1 2 3
Miles


Whitley KY
Campbell
Campbell County
Stinking Creek Rd
75
25W
1804
297
N
30
29
28
27
90
63
Figure 6-7:
Locations with Potential Safety Concerns
Rockfall Locations
Location
Study Segment Boundary
0 1 2 3
Miles

In addition to the crash concerns identified from analysis of the crash records, Department of Safety officials noted that high winds on a two mile segment of I-75 north of Stinking Creek Road pose a hazard for vehicles traversing the area. This is especially the case with panel trucks and tractor trailer vehicles. On I-75 at I-24 Department of Safety officials noted that trucks are prone to overturn at the interchange due to a combination of excessive speed and roadway geometry.



There are a couple of segments along I-75 in Bradley County and in Campbell County that experience excessive fog conditions at times that presents a safety hazard. See Chapter 5 for a discussion of the existing and planned operations and maintenance activities associated with this hazard. It was also expressed in stakeholder interviews that visibility and winter weather are major safety concerns on streches of I-75 between Caryville (Exit 134) and Jellico (Exit 160).

It was noted by members of the public in the information meetings and in follow up comments, that trucks maneuvering to pass slower moving trucks on long steep grades on I-75 present a safety hazard for motorists. Specific recommendations for safety improvements will be identified in the Technical Memorandum – Development of Multi-Modal Solutions.

6.2 Security

6.2.1 National Highway System

The National Highway System (NHS) is a set of roadway subsystems made up of approximately 160,000 miles of roadway. These routes are important to the nation's economy, defense, and mobility. The subsystems that make up the NHS include:

- Interstate system,
- Other principle arterials,
- Strategic Highway Network (STRAHNET),
- Major Strategic Highway Network Connectors, and
- Intermodal Connectors.

The Tennessee Department of Transportation has placed 47 surveillance cameras in the study area. Specifically, these cameras have been located along I-75 in Chattanooga and I-40/I-75, I-640/1-75 and I-75 in Knoxville. Most of the cameras monitor traffic movement along portions of the interstate to assist emergency responders. These cameras can also offer support to programs such as the AMBER Alert Program. See Chapter 5 for additional information about ITS elements.

Many interstate facilities across the country are designated as evacuation routes for use in times of emergency. For example, I-75 is signed as an evacuation route in Georgia between the Florida State Line and Atlanta. During times of emergency, such as an approaching

hurricane, I-75 is converted to contra-flow and all available lanes are used to depart the area of concern. Although many motorists use I-75 through the project study area during times of emergency, I-75 is not designated or signed as an evacuation route in Tennessee.

6.2.2 National Security and the Defense Department

The Department of Defense (DOD) maintains several programs to ensure the readiness of the transportation network to meet their needs during peacetime and to support their defense deployment. These efforts are coordinated with other Federal transportation agencies, state and local governments, as well as private entities as necessary. Several of these programs include the following:

- Strategic Highway Network (STRAHNET),
- Railroads for National Defense (RND) Program, and
- Ports for National Defense (PND) Program.

STRAHNET is a roadway system that is designated by FHWA with input from the Department of Defense. The roadways include connector links to important military installations and ports. There are approximately 61,000 miles of roadway included in the STRAHNET system. The network is made up of about 45,400 miles of Interstate and defense highways and about 15,600 miles of other public highways. Included in the other public highways are approximately 2,000 miles of connector roadways that link military installations and port facilities. In the Study Corridor, I-75, I-24, I-40, I-640, I-275, I-140/SR 162, US 321, US 64, US 25, and SR 153 are all part of the STRAHNET system.

Since heavy tracked vehicles deploy by rail to seaports of embarkation, rail transportation is very important to the Defense Department and to our national security. Since many of these rail facilities are owned and operated by the civil sector, the RND program integrates the defense needs into the planning efforts of the Nation's railroad system. The Strategic Rail Corridor Network (STRACNET) was established by the RND Program in conjunction with the Federal Railroad Administration (FRA). Based on information from the DOD, STRACNET is a continuous and interconnected rail line that consists of over 38,000 miles of track serving over 170 defense installations. The track operated by Norfolk Southern between Chattanooga and Knoxville is a part of the STRACNET system.

The primary goal of the Ports for National Defense (PND) program is to ensure the identification, adequacy, and responsiveness of port infrastructure for ports that are important for our defense. The DOD implements this Program by:

- visiting ports,
- analyzing strategic planning documents,
- providing input into the deliberate planning process,
- coordinating workload requirements, and
- working with governmental agencies such as the Maritime Administration.

The Department of Defense is able to retrieve specific transportation related information through the Intelligent Road / Rail Information Server (IRRIS) system. The system accesses multiple military databases concurrently including:

- strategic seaports,
- military installations,
- National Bridge Inventory,
- National Railroad Network, and
- National Highway Planning Network.

7.0 FREIGHT FLOW AND DIVERSION

An assessment of deficiencies associated with freight flow was conducted for truck, rail, and waterway modes of transportation.

7.1 Truck Movements

Truck movements have a disproportionately high impact on capacity, maintenance of pavement, and safety of the roadway system compared to passenger cars due to their length, weight, and operating characteristics. They are, however, important to the economy of the region, the State, and the nation. Truck activity along the I-75 corridor was summarized using information provided by the Statewide Long-Range Transportation Plan (LRTP), the statewide travel demand model, traffic count data, and stakeholder interviews.

The Statewide LRTP identified several issues related to freight transportation. Truck transportation is an important mode for the movement of freight since trucks carry 74 percent of the total freight in the State. The interstate system in Tennessee represents 1.2 percent of the total road mileage, while 80 percent of the State's truck travel occurs on the interstate system. I-75 begins near the Atlantic coast near Ft. Lauderdale and terminates at the northern tip of Michigan at the Canadian border. An indicator of the importance of I-75 to interstate commerce is the fact that the majority of truck trips on the interstate system in Tennessee are through trips.

Trucks make up a significant portion of the total number of vehicles on Tennessee's interstate system. Existing year 2008 truck volumes obtained from vehicle classification counts at count stations along I-75 indicate that on average, trucks on I-75 make up about 22% of the total volume. On rural segments of I-75 in Campbell County, the truck percentage is greater than 40%.

A travel demand model was developed for the Statewide LRTP that includes the interstate system and major routes throughout the State. The model projects future travel for both passenger cars and trucks. The base year of the model is 2003 and the horizon year is 2030. A preliminary truck model run was performed for 2030 to develop estimates of future truck activity along the corridor. Model output shows the following results related to truck activity:

- Vehicle miles traveled (VMT) by trucks are expected to increase by 129 percent between 2003 and 2030, while total VMT is expected to increase by only 60 percent. Therefore, issues related to trucks are likely to have a greater impact.
- Operational performance of the freeway system is expected to worsen. The average speeds on the freeway system in the State are expected to drop from 66 mph to 57 mph due to the increase in congestion.
- Intercity travel times are projected to increase.
- Close to 100 percent of the system mileage on the I-75 corridor is projected to be at LOS D or worse in 2030.

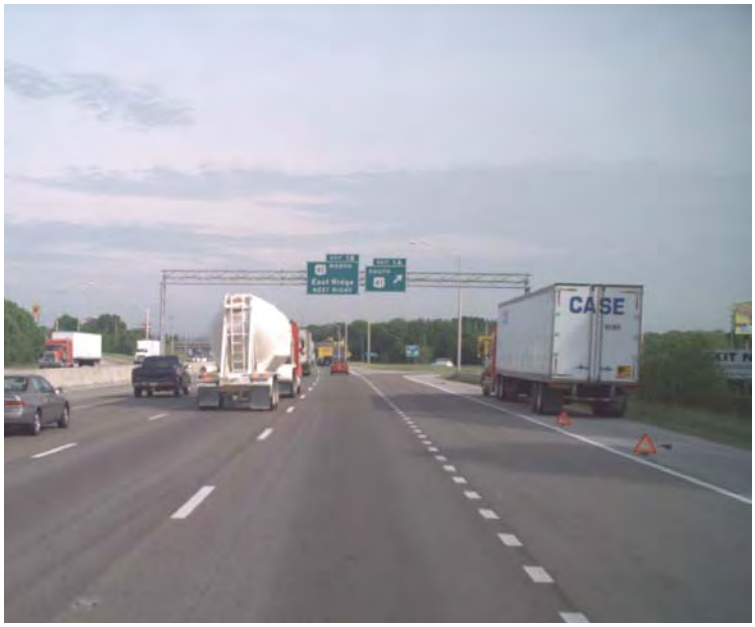
The truck volumes shown in vehicles per day for 2008 (the most current year available) and the horizon year of 2030, as well as the percent growth in volume is shown in **Table 7-1**.

Table 7-1: Existing and Future Truck Volumes

Route and General Location	Truck Volumes (vehicles/day)		
	2008	2030	Growth
I-75 - North of Georgia State Line, Hamilton County	22,400	32,800	46%
I-75 - North of Shallowford Road, Hamilton County	14,600	24,200	66%
I-75 - Bradley County, just east of Hamilton County	13,400	24,100	80%
I-75 - North of SR 1, Loudon County	14,300	25,200	76%
I-75/I-40 - East of Everett Road, Knox County	14,900	44,200	197%
I-75 - North of I-640, Knox County	10,500	26,800	155%
I-75 - North of SR 61, Anderson County	11,500	26,400	130%
I-75 - East of Jellico, Campbell County	10,300	26,300	155%
I-75 - Near Kentucky State Line, Campbell County	13,200	26,300	99%

Truck volumes in 2008 along most of the I-75 corridor range from 10,300 to 14,600 vehicles per day. This is consistent with the idea that most of these trips are through truck trips. Base year truck trips are twice as high for the segment of I-75 north of the Georgia State Line due to the shared I-75/I-24 route. Growth in truck volumes on I-75 are projected to vary based on general location and range from a 46% increase at the Georgia State Line to nearly 200% on I-75/I-40 in Knox County east of Everett Road.

Stakeholder interviews were conducted with representatives of the Department of Transportation and the Department of Safety to identify issues and deficiencies related to truck traffic along the I-75 corridor. Overnight truck parking at interchange locations is an issue along the route. No parking signs are posted on a number of interchange entrance and exit ramps to prohibit this practice. The locations of State-owned rest areas, truck stations, and weigh stations where truck parking is allowed are listed below and shown in **Figures 7-1** through **7-7**.



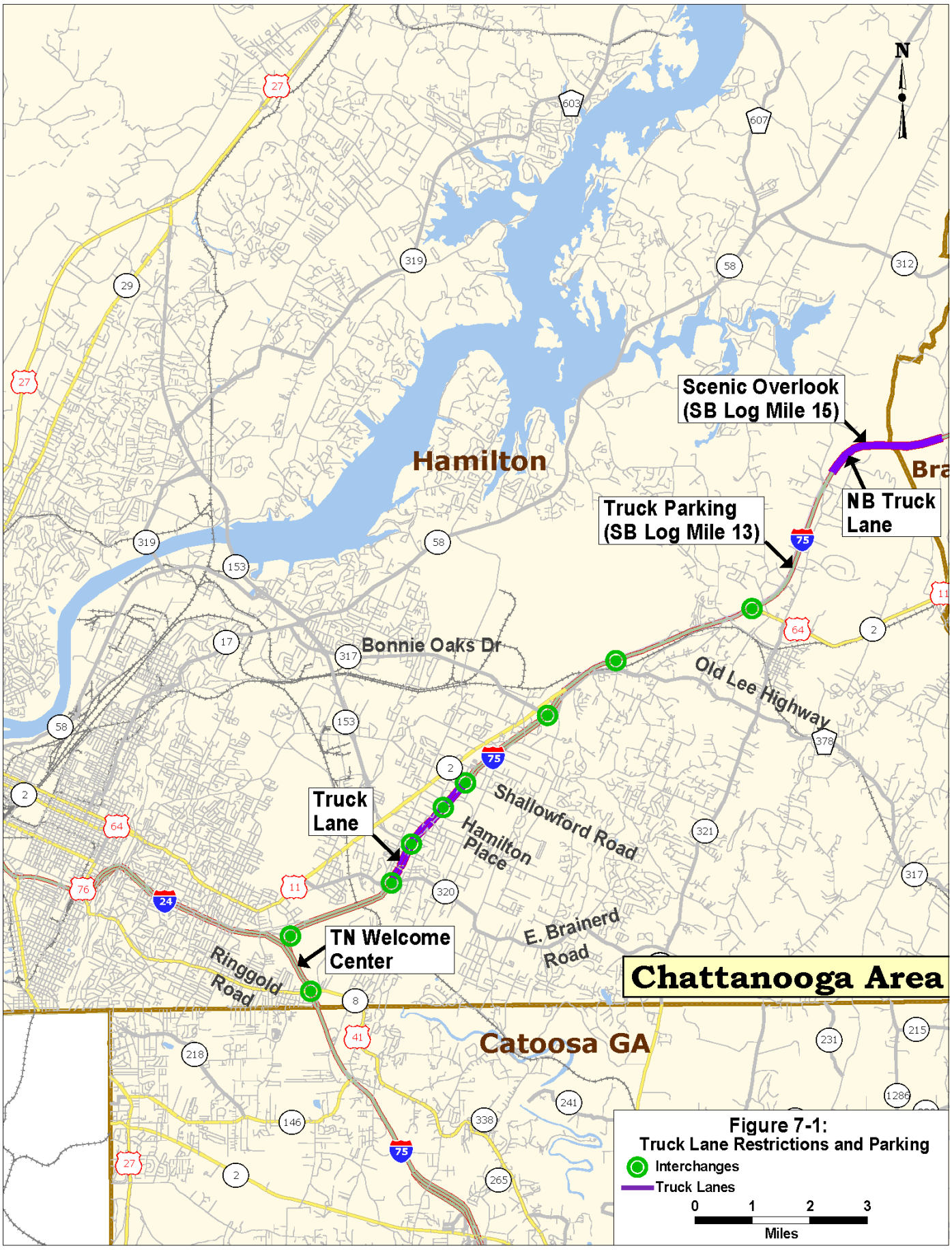
- Tennessee Welcome Center just north of Ringgold Road, Hamilton County
- Scenic Overlook (Exit 13 - Southbound), Hamilton County
- Truck Station (Exit 24), Bradley County
- Rest Area (Exit 45), McMinn County
- Weigh Station (Exit 371), Knox County
- Weigh Station (Exit 130), Campbell County
- Tennessee Welcome Center (Exit 161), Campbell County

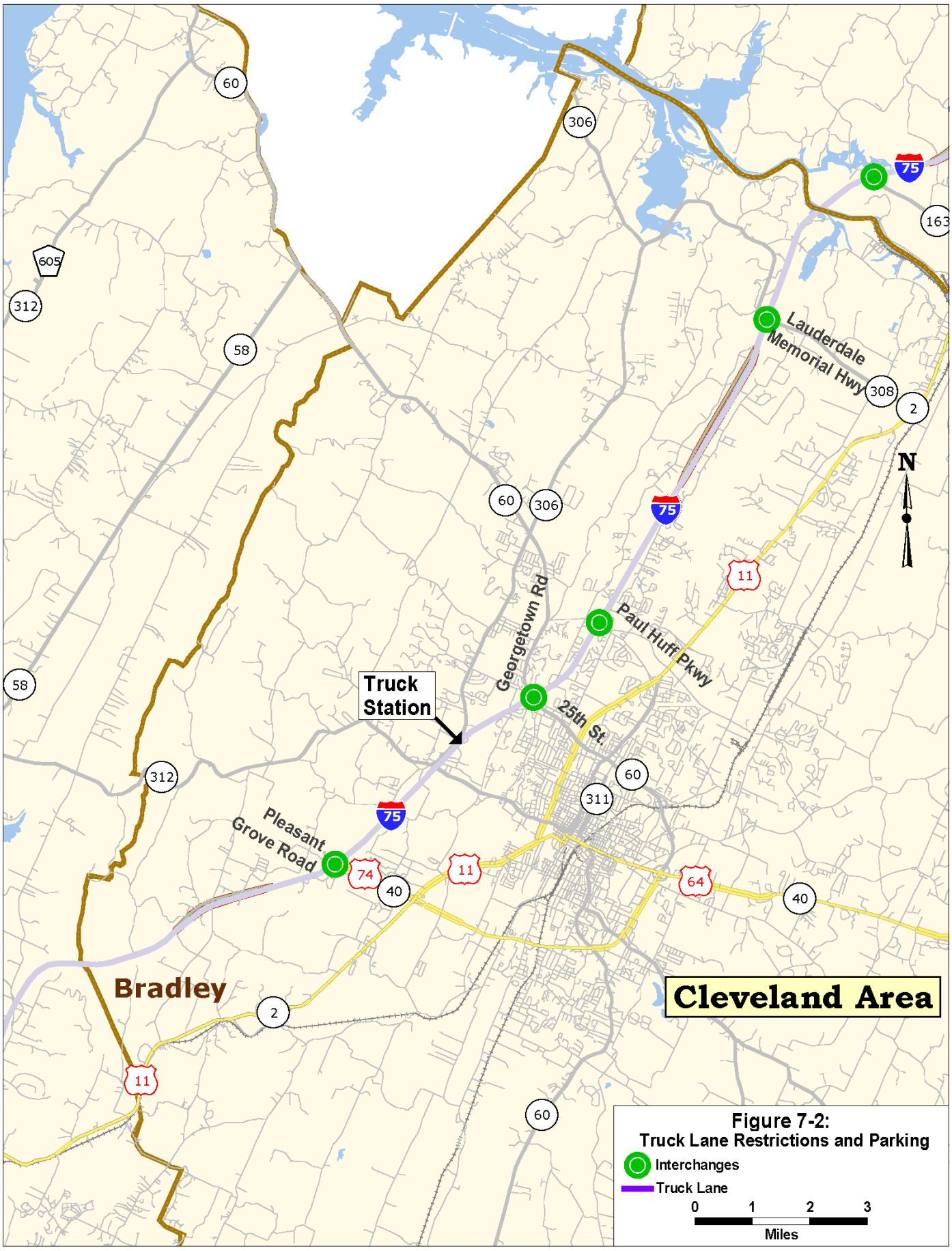
There are a couple of locations where truck parking is no longer available. The rest area on I-75 in McMinn County at log mile 45 is closed. The truck weigh station and parking area on I-75 at the Campbell/Anderson County line (Milepost 130) is closed.

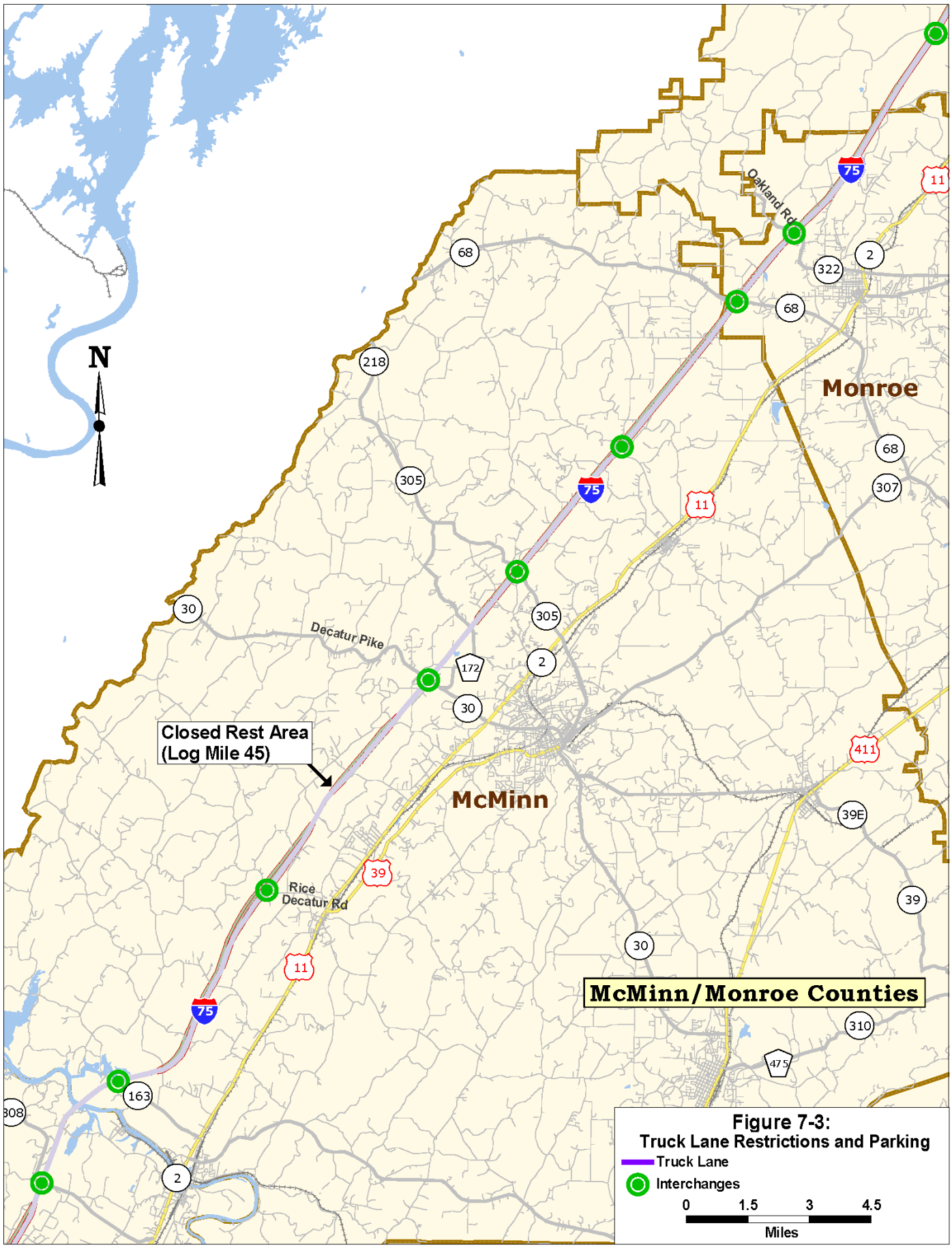
Roadway geometry impacts truck movements at several areas along I-75. A truck zone exists along a six mile segment of I-75 north of US 25W in Campbell County due to the mountainous terrain. In this area, trucks are restricted from passing. In urban areas, truck lane restrictions exist on I-75 from SR 320 (East Brainerd Road) to Shallowford Road in Chattanooga and from Everett Road to Walker Springs Road in Knoxville. A Lane Widening and Truck Lane Analysis was conducted by the Department of Transportation and is summarized in Chapter 4 of this memorandum.

A tunnel is located on US 25E in Campbell County, a parallel route to I-75. Certain types of freight are prohibited from using this tunnel and therefore must use I-75 through this area.

Public information meetings were held in Knoxville and Chattanooga to provide information about the study and solicit information regarding deficiencies along the I-75 corridor. Many of those that attended commented that truck traffic is heavy on I-75. Citizens have observed and noted that some of the steep grades encountered on I-75 result in variable truck speeds. The faster moving trucks often create congestion when they try to pass through these segments of roadway. The variable speed of vehicles in the traffic stream also increases the potential for crashes.


N
Scenic Overlook
(SB Log Mile 15)
NB Truck
Lane
Truck Parking
(SB Log Mile 13)
Truck
Lane
TN Welcome
Center
Hamilton
Chattanooga Area
Catoosa GA
Bonnie Oaks Dr
Old Lee Highway
Shallowford Road
Hamilton
Place
E. Brainerd
Road
Ringgold
Road
Figure 7-1:
Truck Lane Restrictions and Parking
Interchanges
Truck Lanes
0 1 2 3
Miles


Truck Station
Lauderdale Memorial Hwy
Georgetown Rd
Paul Huff Pkwy
25th St.
Pleasant Grove Road
Bradley
Cleveland Area
N
60
306
75
163
605
312
58
308
2
11
311
74
40
64
Figure 7-2:
Truck Lane Restrictions and Parking
Interchanges
Truck Lane
0 1 2 3
Miles


N
Monroe
McMinn
McMinn/Monroe Counties
Closed Rest Area
(Log Mile 45)
Oakland Rd
Decatur Pike
Rice
Decatur Rd
75
11
68
2
322
218
305
307
30
172
39
39E
411
163
308
310
475
Figure 7-3:
Truck Lane Restrictions and Parking
Truck Lane
Interchanges
0
1.5
3
4.5
Miles

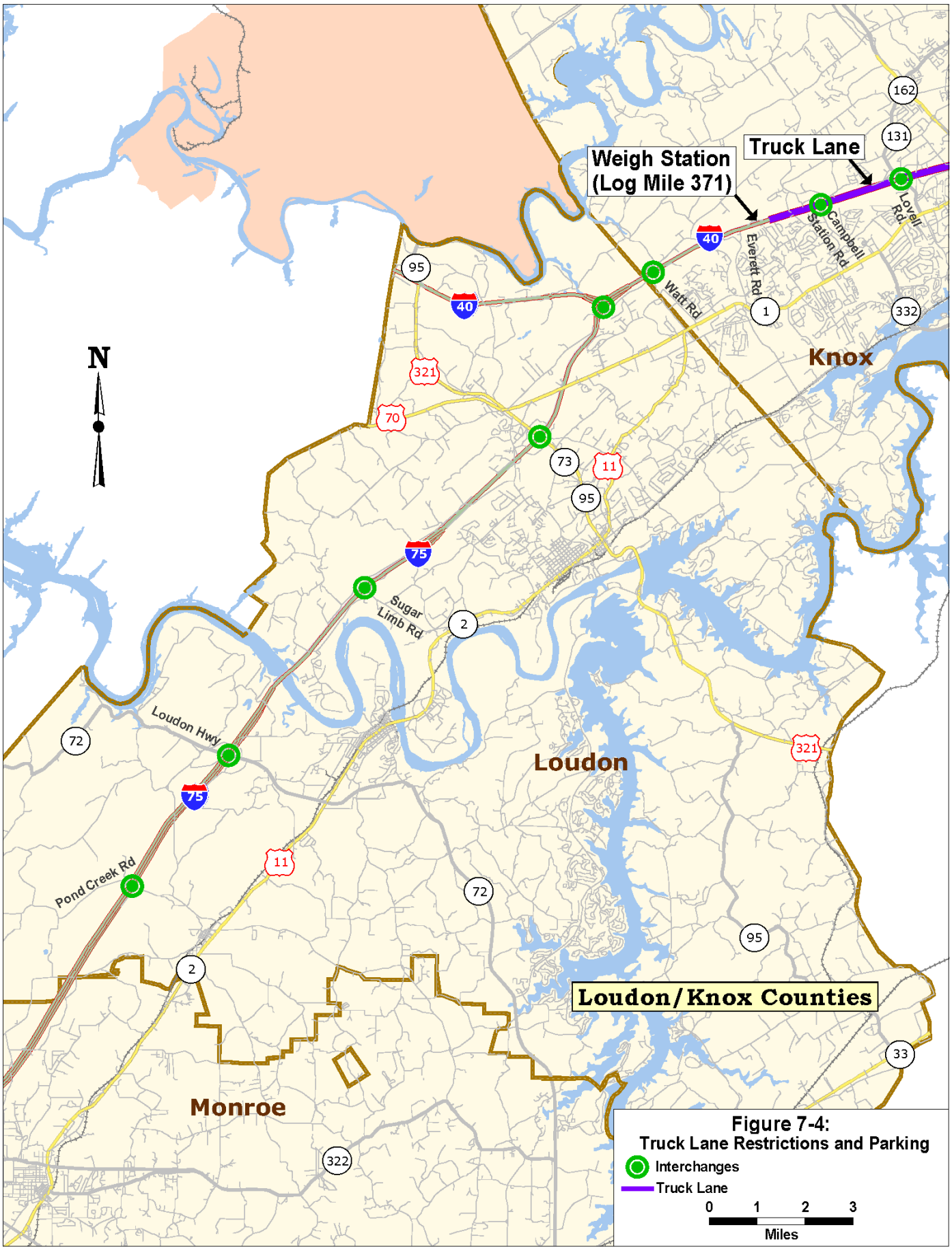


Figure 7-4:
Truck Lane Restrictions and Parking

Interchanges

Truck Lane

0 1 2 3

Miles

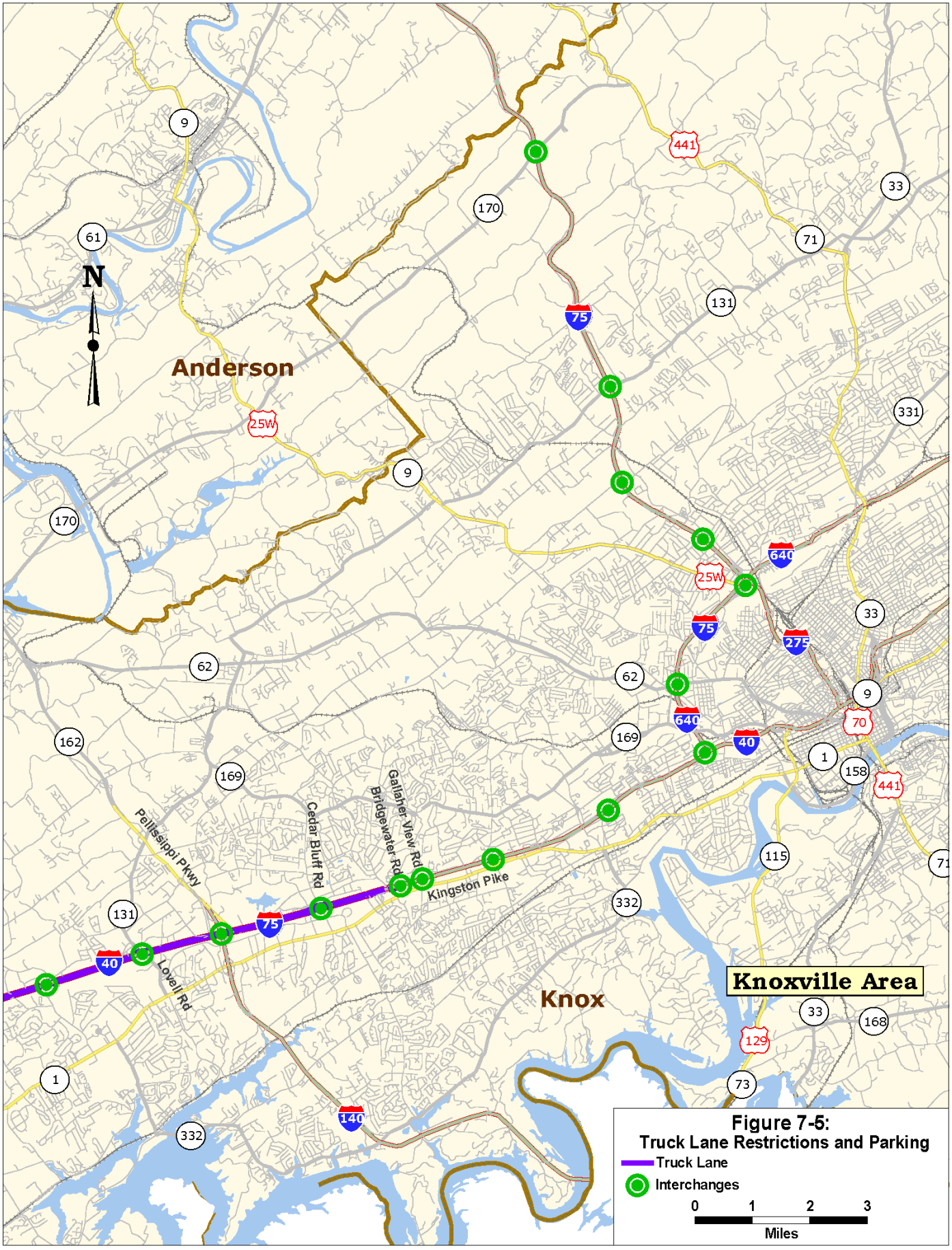

N
Anderson
Knox
Knoxville Area
Kingston Pike
Bridgewater Rd
Gallaher View Rd
Cedar Bluff Rd
Pellissippi Pkwy
Lovell Rd
9
61
170
441
33
71
131
75
331
25W
62
640
275
70
169
40
1
158
115
332
168
129
73
140
162
Figure 7-5:
Truck Lane Restrictions and Parking
Truck Lane
Interchanges
0 1 2 3
Miles

Figure 7-6:
Truck Lane Restrictions and Parking

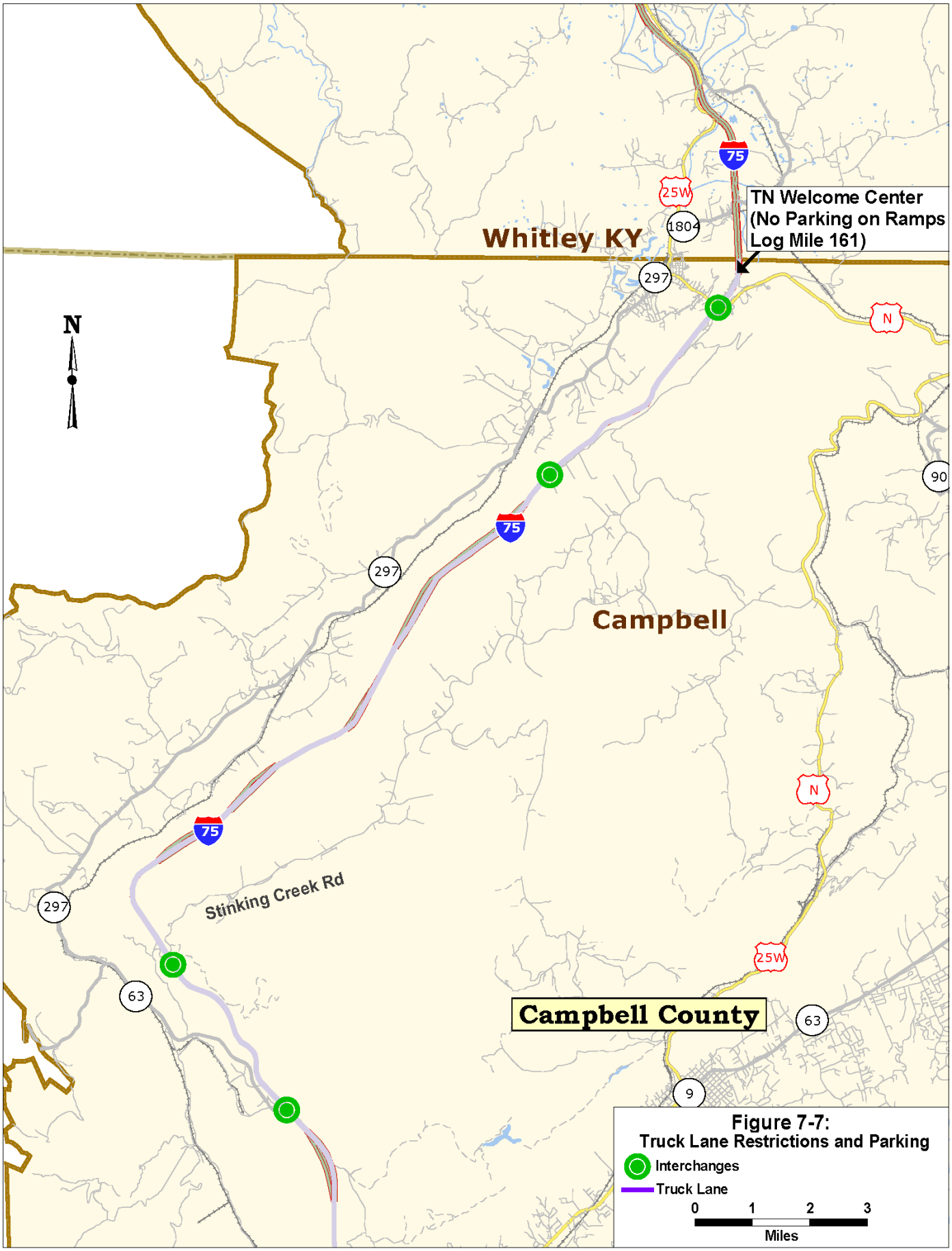


Figure 7-7:
Truck Lane Restrictions and Parking

7.2 Rail Movements

There are six Class I railroads operating on more than 2,300 miles of track in Tennessee. The dominant carriers are CSX and Norfolk Southern, with 85 percent of the Class I miles. From the *Shortlines Across Tennessee* railroad directory (TDOT Office of Rail and Water, 2005), there are 22 shortline railroads providing service over branch lines and connecting to the Class I railroads. The shortlines operate approximately 830 miles of track (roughly 1/3 of the Class I railroads). In 1999, Class I railroads moved more than 57 million tons of freight on more than 1.9 million carloads. In 2001, shortline railroads moved 4 million tons of freight on 48,000 carloads. Most rail movements through the State occur in one of several north/south corridors. According to the Statewide LRTP, rail freight volumes are projected to increase by 50 percent over current levels by 2030. **Figure 7-8** shows the Class I and shortline railroads in the State of Tennessee as identified in the LRTP.

There are no reported height clearance or double stack train issues in Tennessee. The primary mainline capacity issues for the rail system are related to the movement of mining and agricultural products. Bulk rail cars for mining and agricultural products are often loaded to 315,000 pounds and much of the rail infrastructure must be upgraded to accommodate this increased weight. This contrasts with typical intermodal containers which weigh much less than bulk rail cars due to the need for the containers to also be carried by trucks, which are restricted to 80,000 pounds total or roughly 44,000 pounds per container. The Statewide LRTP reports that there are some particular line segments that are important to intermodal and passenger movements, and these lines are experiencing capacity issues.

The *Tennessee Rail System Plan*, completed in 2003, analyzed the gap in Tennessee's east-west rail infrastructure between Knoxville and Nashville over the Cumberland Plateau. The Rail System Plan concluded that the Trans-Tennessee corridor was not feasible and that no foreseeable rail improvements could be implemented on facilities in Tennessee to produce enough commodity diversion to significantly improve operating conditions on the interstate system. The study further concluded that with an improved multi-state or national network, the resulting freight diversions would likely preserve interstate system capacity for one to five years.

In addition to the I-40/I-81 analysis, the University of Tennessee Center for Business and Economic Research (CBER) preformed an evaluation of the Tennessee Rail Plan's treatment of a Trans-Tennessee Rail Routing in July 2005. While the analysis methodology was different than that used in the Rail System Plan, the results of the studies' findings were consistent with one another.

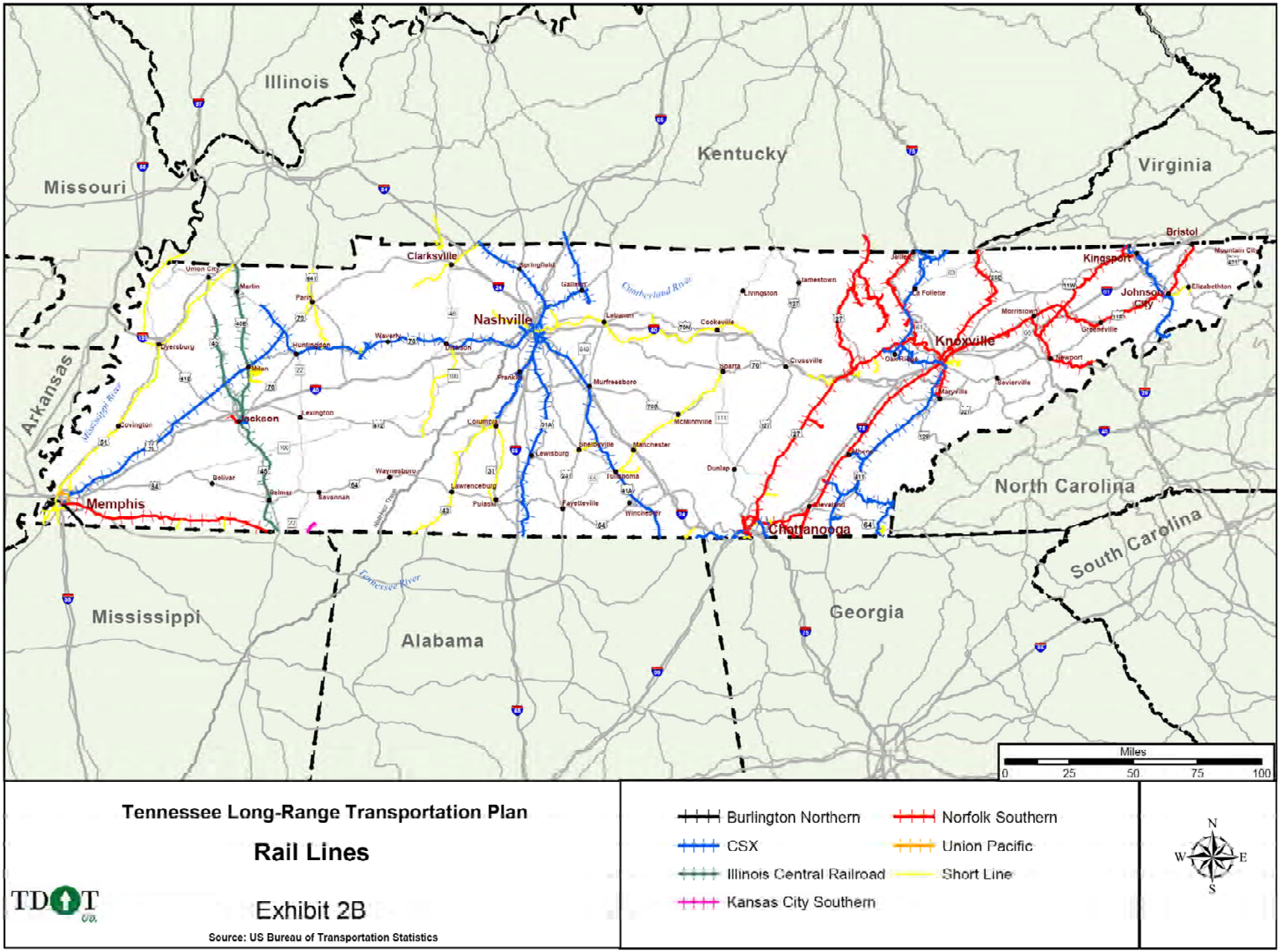


Figure 7-8. Tennessee Rail Infrastructure from TDOT's LRTP

Rail improvements were categorized in the Rail System Plan. The following is a listing of categories and projects related to the I-75 Corridor identified in the Rail System Plan:

- Rail Safety/Congestion Relief Improvements
  - Proposed Improvement: NS Corridor Safety and Capacity Improvements in Eastern Tennessee from Bristol to Chattanooga to mitigate potential capacity, operating speed, and safety issues associated with increased intermodal traffic. Rail capacity and safety upgrades are an integral component of a strategy to redirect I-81 and I-40 truck traffic.
- Proposed System Connections
  - Proposed Improvement: Pulaski, TN/Athens, AL Tennessee Southern Railroad Connection to enhance operations on the Tennessee Southern Railroad for southbound freight movements and to provide an alternative route for passenger rail service on less congested rail infrastructure.
- Intermodal Facility Improvements
  - Proposed Improvement: Eastern Tennessee Intermodal Facility to facilitate intermodal freight transfers for Eastbound Outbound and Westbound Inbound Interstate freight. The Knoxville TPO has suggested that the Old Coster Shop railyard be developed as an intermodal facility.

The I-40/I-81 Corridor Feasibility Study included development of a freight/passenger diversion to rail tool to aid in estimating the benefits of restoring this rail link versus using alternative routes for serving freight movements. The approach used the existing TDOT freight rail network and assignment methodology along with the capability for change in mode of a specific commodity type between rail and truck. Two rail-focused solutions were assessed in the I-40/I-81 study: the Trans-Tennessee Rail Corridor, and the Norfolk Southern Crescent Corridor. The cost of the Trans-Tennessee Corridor was high and the identified benefits were low due to an existing parallel east/west route just south of Tennessee.

The Norfolk Southern Crescent Corridor is a package of rail improvements planned by the Norfolk Southern Railroad on their existing rail lines from New Jersey to Memphis and New Orleans. The package includes track improvements to increase capacity and speeds, and intermodal improvements to allow more terminal operations. **Figure 7-9** shows the Crescent Corridor rail lines and the locations of route improvements. Norfolk Southern is heavily marketing the corridor based on

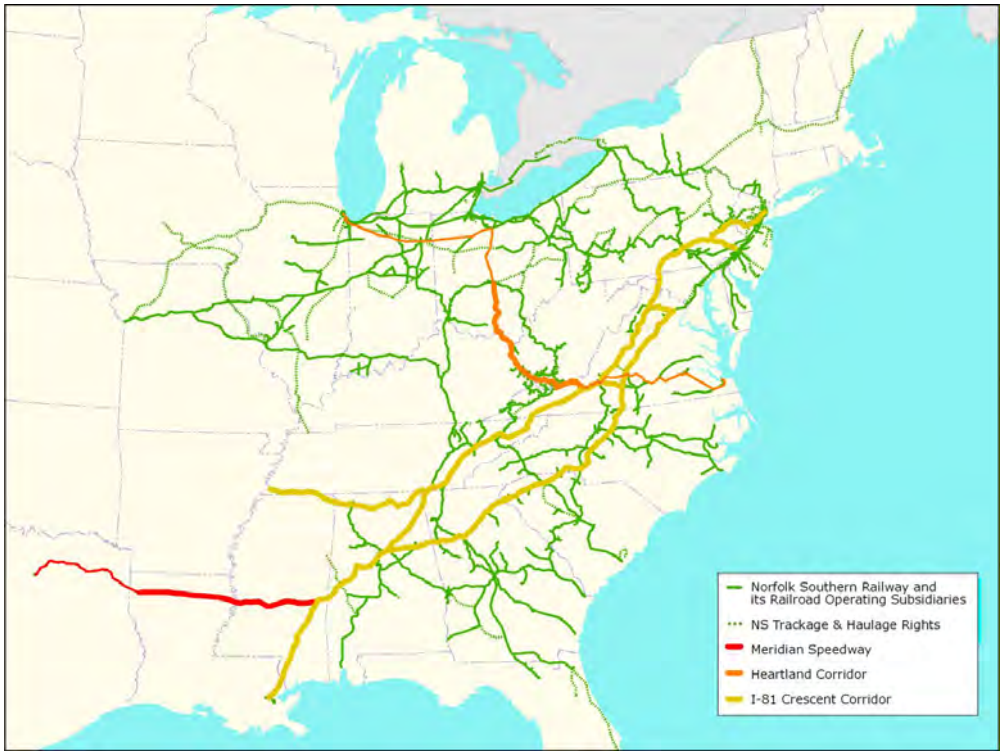


Figure 7-9: Norfolk Southern Corridor 1

the idea that long-haul intermodal services along I-20, I-40, I-75, I-85, and I-81are largely undeveloped and many of these interstates are congested. Norfolk Southern is attempting to provide services in the corridor that are competitive with single drive transit times. The new service will require 28 new trains to be added to their network in the region. Norfolk Southern's preliminary estimate is that there are over one million divertible truckloads in the Crescent Corridor. Because of the anticipated diversion of freight from truck to rail and the resulting benefit to motorists and the general public, the Federal government and several states in the corridor have agreed to fund a portion of the estimated $2 billion dollar cost.

One of the improvements identified in the Crescent Corridor plan includes a new intermodal facility in East Tennessee. Norfolk Southern has expressed an interest in the development of an intermodal facility on their mainline located somewhere East of Knoxville by either modifying an existing "hump" yard or identifying a "green field" location that is more strategically located. The terrain in Eastern Tennessee is extremely hilly, which would most likely require a substantial amount of grading and site development to establish an intermodal facility.

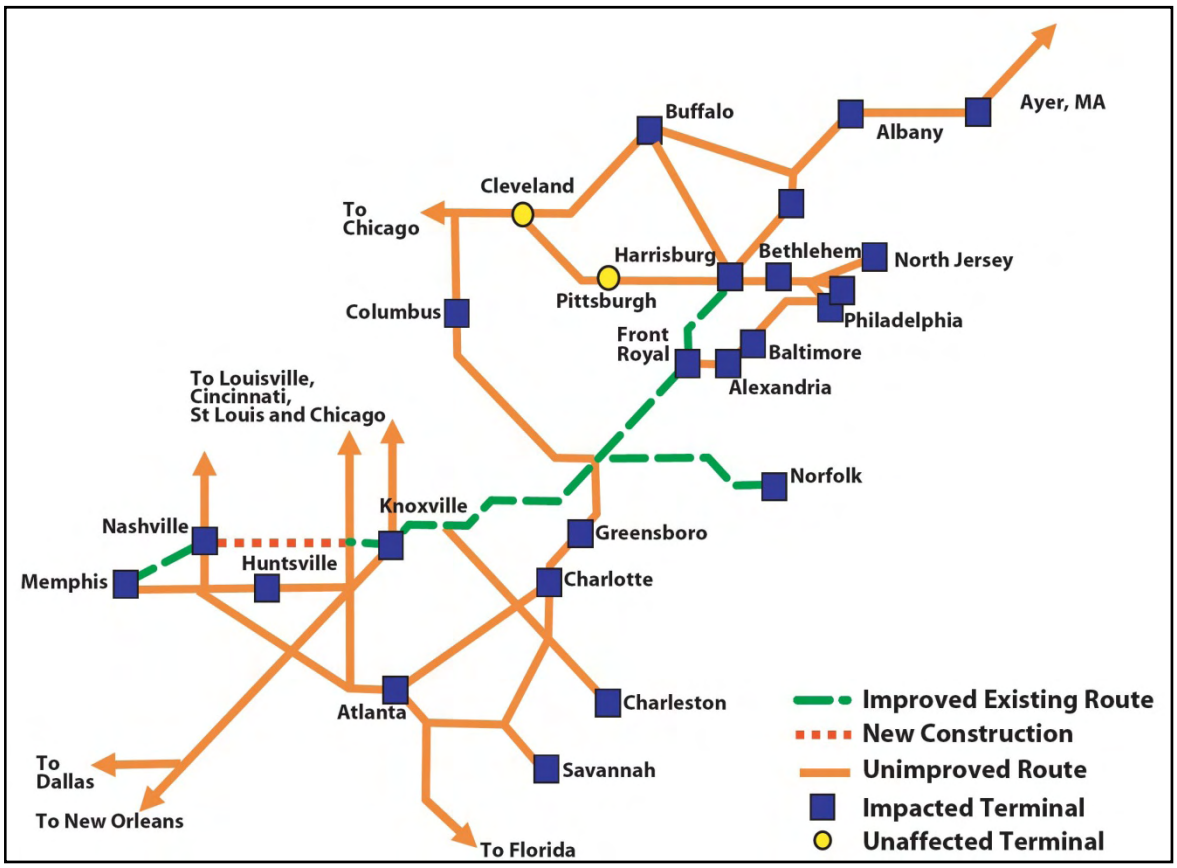


Figure 7-10: Crescent Corridor Rail Improvements

7.3 Waterway Movements

Tennessee, with 172 ports, ranks fifth in the nation for the size of its navigable inland waterways. The Gulf of Mexico can be accessed by means of the Mississippi River in the western portion of the state and via the Tennessee-Tombigbee waterway system in the eastern portion of the state. **Figure 7-11** shows the Tennessee River and Interconnected inland waterway system. A variety of commodities are shipped along the Tennessee River including coal, aggregates, cement and lime, steel, grain, petroleum, and chemical products.

Nationally, freight shipments are anticipated to double within the next twenty years. In order for Tennessee to enhance its contribution to freight movement, the state's waterway system must be improved. Since 2000, there has been a decline in the tonnage of freight shipped on the Tennessee River between Chattanooga and Knoxville. This primarily can be attributed to the structural problems of the Chickamauga Lock.

One improvement listed in the Chattanooga LRTP is the replacement of the Chickamauga Lock. The lock currently has the capacity to handle one standard size barge at a time with an eight hour average process time for each tow. The new lock, located adjacent to the existing lock, is anticipated to reduce the average tow time in half, encouraging new river industry to develop in the region. The reduction in tow time could also entice truck freight movement to divert to barge movement.

In Loudon County, capacity constraints hinder barge movement at Fort Loudon Lock. The lock handles one barge at a time taking around 45 minutes to complete an operation. Sediment deposits along the Tennessee River have narrowed the depth of the channel, impacting the draft depth.

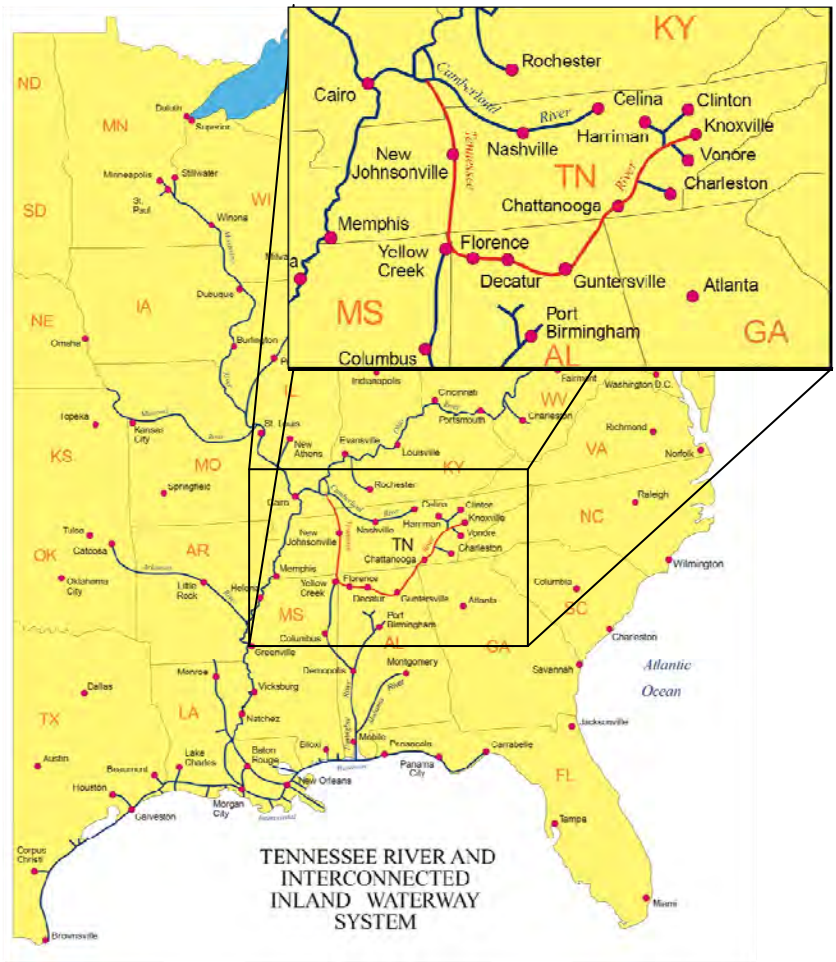


Figure 7-11 Tennessee River and Interconnected Waterway System

7.4 Summary of Freight Issues and Studies in MPO Plans

A Freight Transportation Study and Plan (Phase I) was conducted by the Chattanooga-Hamilton County North Georgia Transportation Planning Organization in 2008 for the purpose of improving the freight planning process in the region. The objective of the study was to:

- Assess current state of freight planning and develop benchmarks for use by the TPO,
- Identify relevant freight planning data for TPO planning activities, and
- Develop a framework for moving forward with freight planning in the TPO area.

Phase II of the Chattanooga TPO Freight Transportation Study will be to identify capital investments, operational improvements, and other initiatives that will improve the efficient movement of goods through the region and contribute to the region's economic development objectives.

The Chattanooga TPO has recommended that a freight subcommittee of the TPO be established to meet the growing freight needs in the region. The Freight Task Force could ensure that the freight community's concerns and priorities are taken into account in regional transportation planning activities. Specifically, the task force should seek to:

- Provide the freight community with general and mode-specific information about the transportation program;
- Educate decision-makers about the freight community's concerns;
- Comment on transportation projects that address the freight community's needs;
- Participate in planning studies to address high-priority issues; and
- Provide information for transportation planning purposes.

In the Knoxville area, the TPO plans to research funding opportunities for freight related projects and continue to coordinate meetings of the Knoxville Freight Advisory Committee. One of the goals listed in the Cleveland LRTP is to develop a transportation system that serves the needs of passengers as well as freight movements across and between modes. Specifically, the plans are to:

- Design roadways and bridges to accommodate the appropriate level of truck traffic,
- Improve needed capacity, pavement maintenance, and design of roadways and bridges connecting to I-75,
- Consider passenger and freight needs in planning the expansion of Hardwick Field, and
- Evaluate the need for improved rail facilities and rail/truck intermodal facilities.

8.0 ECONOMIC ACCESS

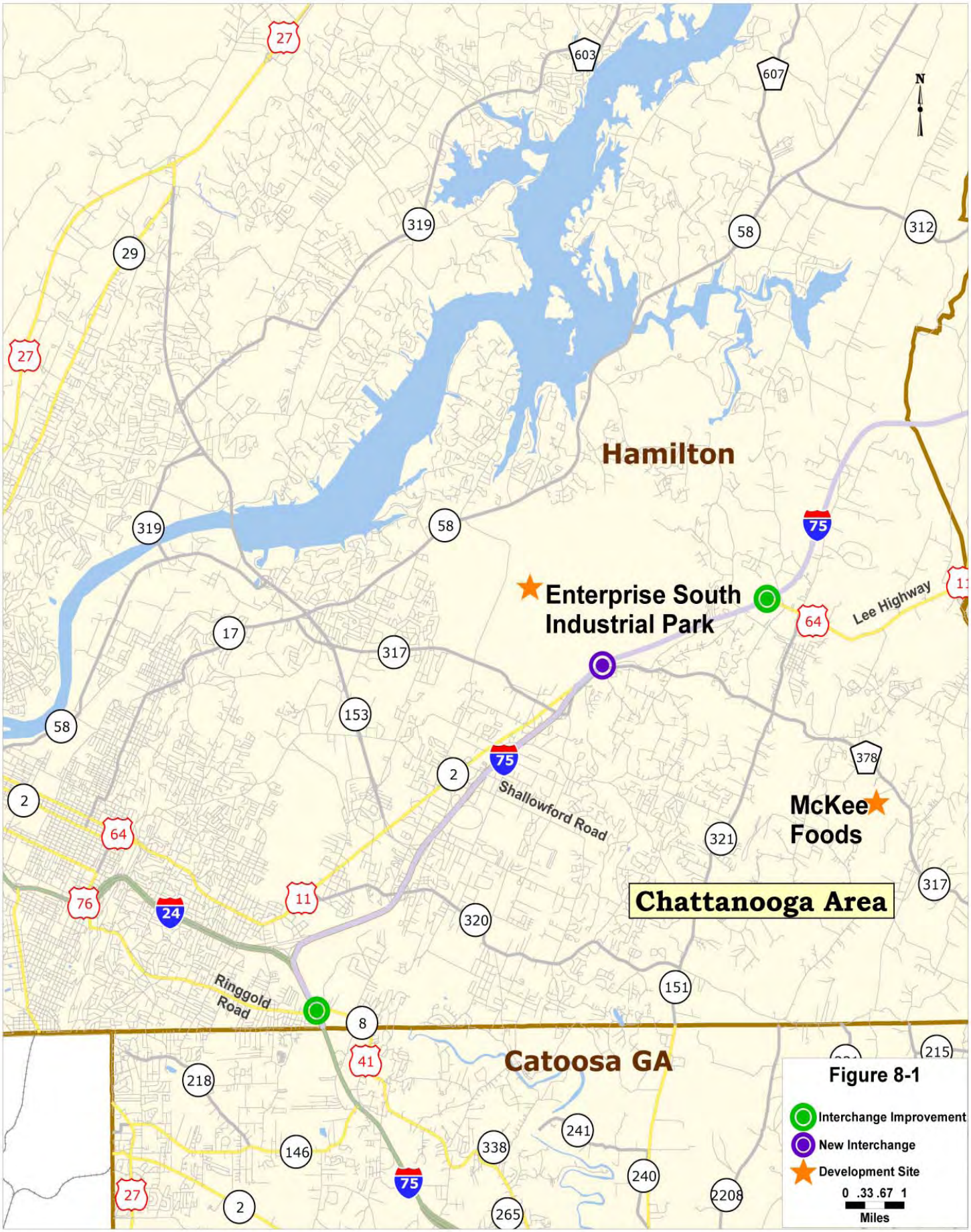
The need for additional or improved interchange access to I-75 was identified from a review of the long range transportation plans of the urban areas in the study corridor, a review of other transportation planning studies conducted by the Department of Transportation, and stakeholder interviews.

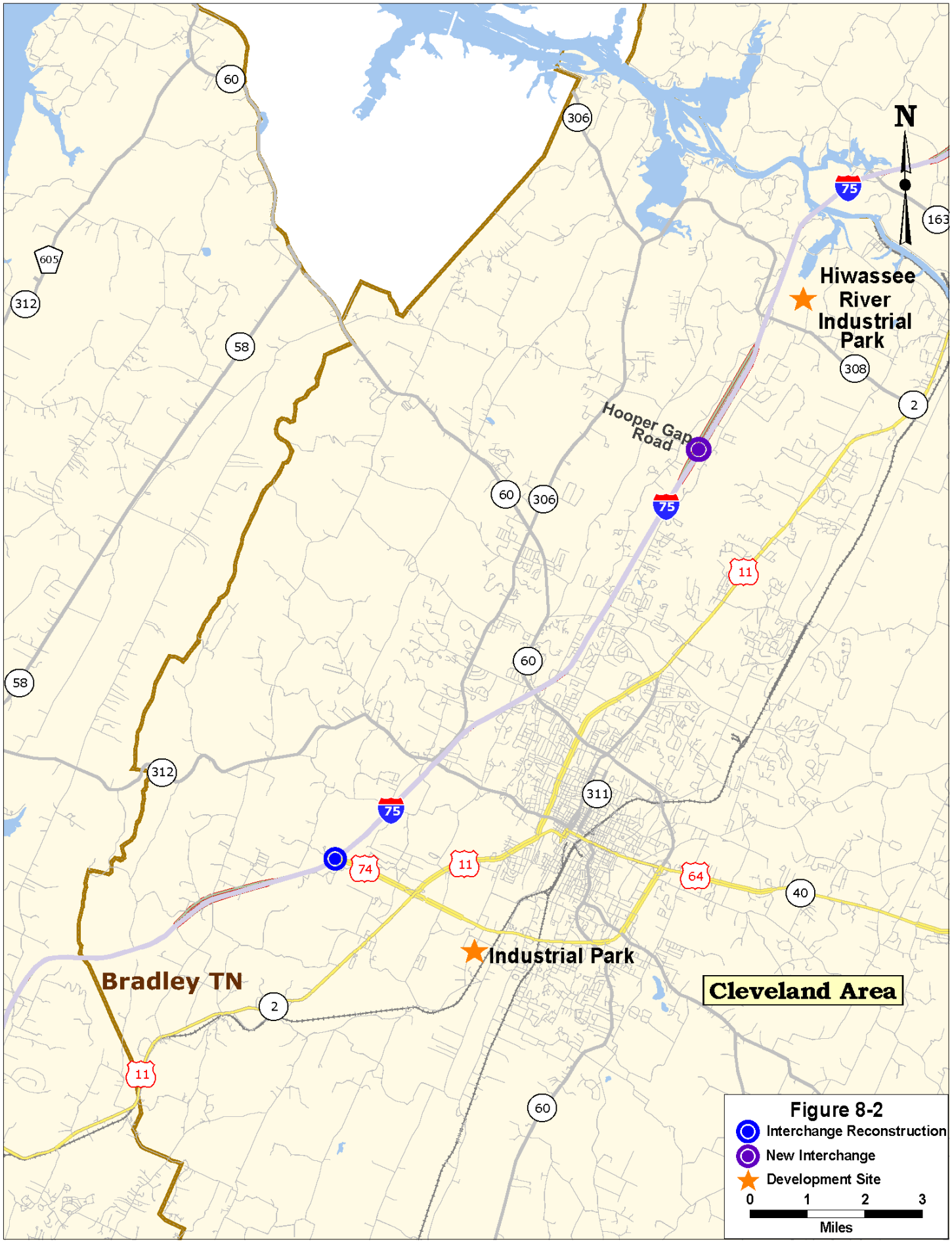
For urban areas, new interchange access or modification is generally identified through the long range planning process of the Metropolitan Planning Organizations. For rural areas, the need for new or improved interchange access is generally identified through the statewide long range planning process. Interchange modification or justification studies can be requested by local officials.

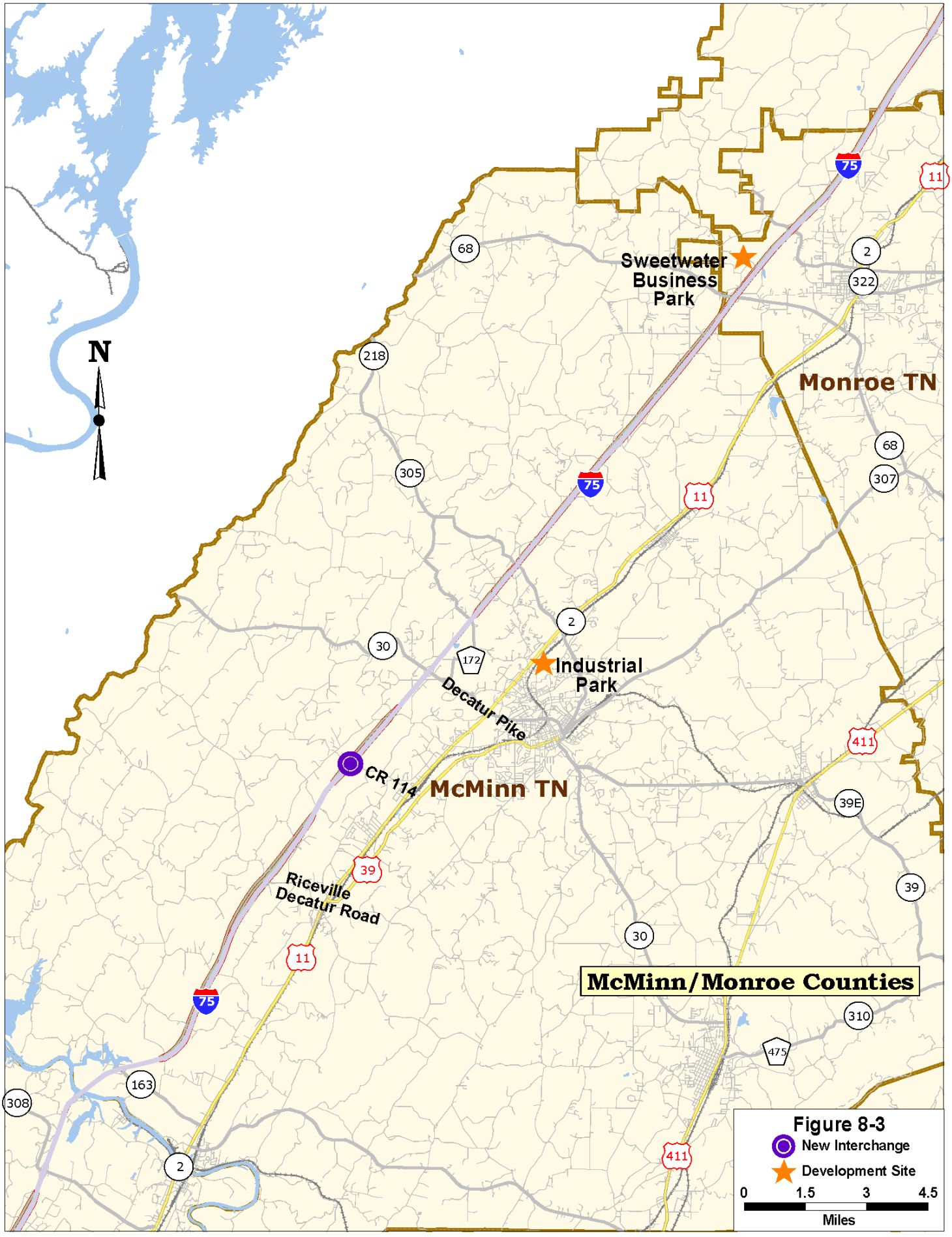
Table 8-1 lists the locations of proposed new interchanges or existing interchanges identified for improvement. **Figures 8-1** through **8-6** show the locations of the proposed interchanges or interchange improvements.

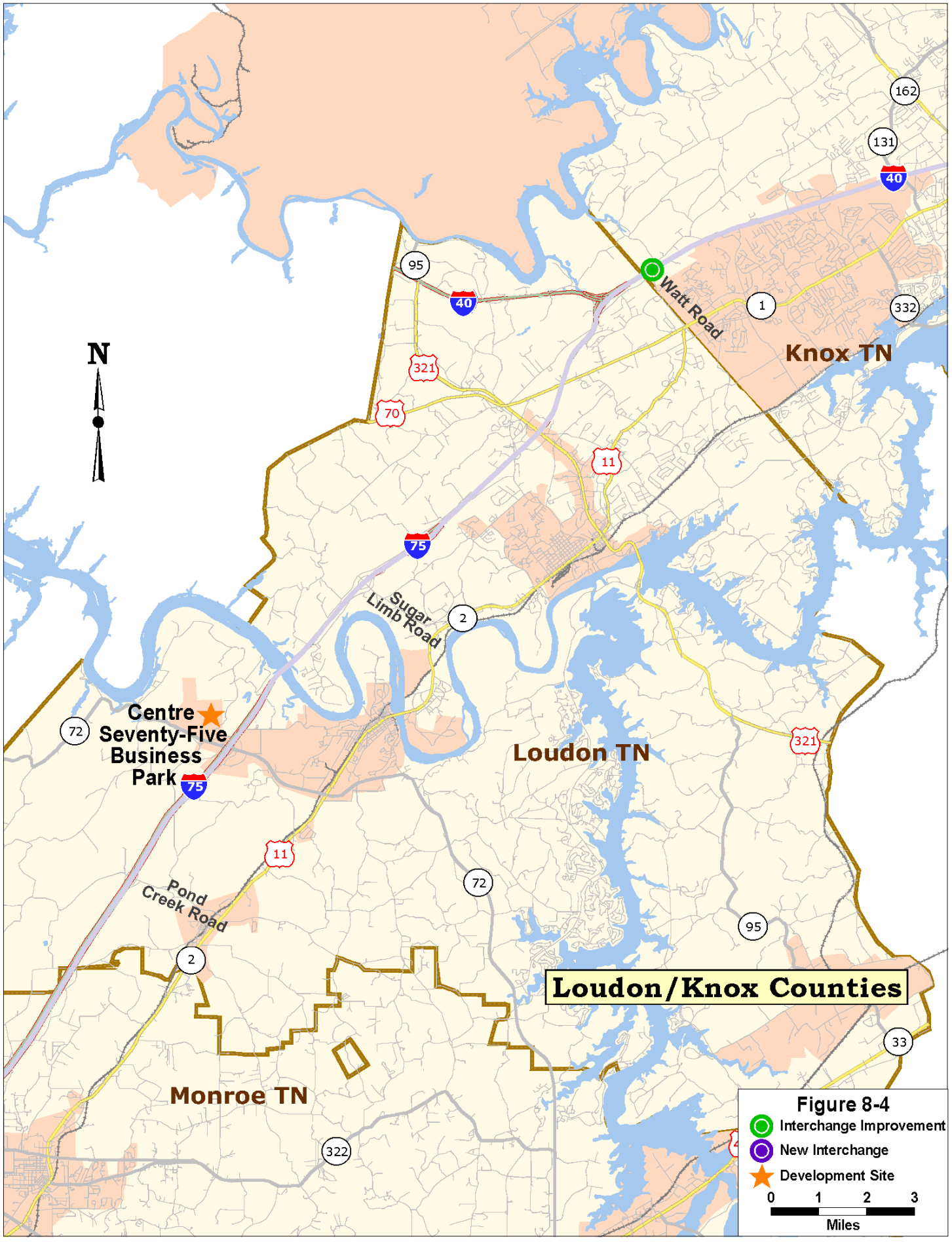
Table 8-1: New Interchanges or Interchange Improvements for Economic Access

Project Limits	Improvement	Source	Year
I-75 at Ringgold Road Interchange and Welcome Center, Hamilton County	Interchange reconstruction	Chattanooga LRTP	2006-2008
I-75 at SR 2 (US 11/Lee Highway), Hamilton County	Interchange reconstruction	Under Construction	2009
I-75 at US-64, SR-311(APD) adjacent to I-75 Exit 20, Bradley County	Interchange reconstruction and roadway improvements	Cleveland TIP, LRTP	2006-2016
I-75 at Hooper Gap Road, Bradley County	New interchange	Cleveland LRTP	Beyond 2030
I-75 between Rocky Mount Union Chapel Road and Coile Road, McMinn County	Construct new interchange at proposed Athens Bypass	TDOT Interchange Needs Assessment requested by City of Athens	-
I-75 interchange with SR 131 (Emory Road), Knox County	Interchange Reconstruction	Knoxville LRTP and TDOT Interchange Modification Study	2014
Knoxville Regional Parkway - I-40 in Loudon County to I-75 in Anderson County	Construct new 4 lane highway	Knoxville TIP and LRTP	2020
I-75/I-40 Watt Road	Modify interchange	Knoxville LRTP	2030


Hamilton
Enterprise South Industrial Park
McKee Foods
Chattanooga Area
Catoosa GA
Shallowford Road
Ringgold Road
Lee Highway
Figure 8-1
Interchange Improvement
New Interchange
Development Site
0 .33 .67 1
Miles


N
Hiwassee River Industrial Park
Hooper Gap Road
Industrial Park
Bradley TN
Cleveland Area
60
306
75
163
605
312
58
308
2
11
74
64
40
311
Figure 8-2
Interchange Reconstruction
New Interchange
Development Site
0 1 2 3
Miles


N
Sweetwater Business Park
Monroe TN
Industrial Park
Decatur Pike
CR 114
McMinn TN
Riceville Decatur Road
McMinn/Monroe Counties
75
11
68
2
322
218
305
307
30
172
39
411
39E
310
475
163
308
Figure 8-3
New Interchange
Development Site
0
1.5
3
4.5
Miles


N
Watt Road
Knox TN
Sugar Limb Road
Centre Seventy-Five Business Park
Loudon TN
Pond Creek Road
Monroe TN
Loudon/Knox Counties
Figure 8-4
Interchange Improvement
New Interchange
Development Site
0 1 2 3
Miles


N
Anderson TN
Knox TN
Knoxville Area
Business Park
Brookside Mills Business Park
Emory Road
Callahan Drive
Merchant Drive
Papermill Road
Cedar Bluff Road
Gallaher View Road
Morrell Road
Campbell Station Road
9
61
170
441
33
71
75
131
331
25W
640
275
62
169
40
162
1
158
70
115
332
140
129
168
73
Figure 8-5
Interchange Improvements
New Interchange
Development Site
0 1 2 3
Miles

9.0 COMMUTER TRAVEL PATTERNS

Commuting patterns were reviewed using 2000 Census data from the Census Transportation Planning Package (CTPP) for each metropolitan planning organization (MPO) or Transportation Planning Organization (TPO) along the I-75 corridor. Commuter sheds were created for each TPO or MPO area based on likely travel routes to the central business district (CBD). The commuter sheds were developed in an attempt to isolate areas that have residents that would typically use I-40 as part of their commuting route.

It was assumed that residents living relatively close to the CBD would be less likely to use the interstate system. This area was defined as the central area. A CBD was defined within the central area as a major destination point for commuters. Other major destination points may exist; however, the CBD was considered the most likely candidate for considering improvements to alternative modes of transportation or providing incentives for car pooling.

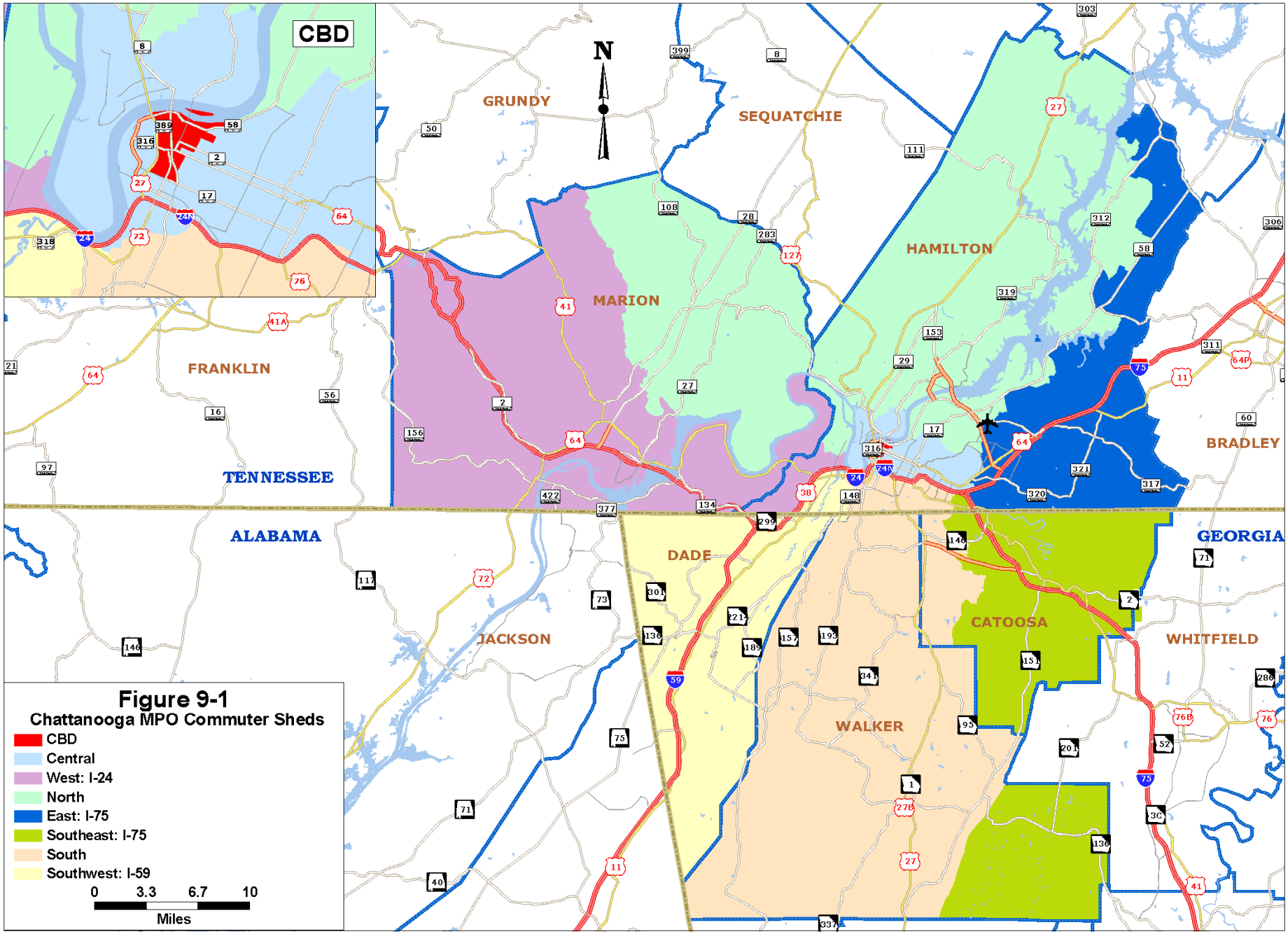
Existing and proposed park-and-ride facilities within a five-mile radius of existing interchanges were identified within each metropolitan area. In some areas, the regional long-range transportation plan designated funding for future park-and-ride facilities, but specific locations of these lots have not been established.

9.1 Chattanooga

The Chattanooga TPO includes Marion and Hamilton Counties in Tennessee, and Dade, Walker, and Catoosa Counties in Georgia. The Chattanooga TPO region was divided into seven general commuter sheds: East: I-75, Southeast: I-75, North, South, West: I-24, Southwest: I-59, and Central (**Figure 9-1**). It was assumed that most commuters traveling from the East and Southeast commuter sheds would potentially use I-75 as part of their route to the CBD. The West commuter shed area would be more likely to use I-24 to reach the CBD. The Southwest commuter shed area would be more likely use I-59 to reach the CBD. It was assumed that those living in the North, South, and Central area would use local routes.

The CTPP database indicates 152,370 commuter trips with a destination within Hamilton County (**Table 9-1**). Of these trips, 21,893 (14 percent) have a destination within the CBD. The two regions covering the I-75 corridor represents 22 percent of those commuting to the CBD. Eight-four percent of all commuters destined for the CBD drive alone. For the two regions covering the I-75 corridor, 85 percent drive alone to the CBD.

Chattanooga Area Regional Transit Authority (CARTA) operates three park and ride facilities near I-75, as shown in **Figure 9-2**. The Chattanooga Long Range Transportation Plan (LRTP) suggests that a study is to be conducted to identify areas in which park and ride facilities should be constructed. These facilities are expected to offer transit service within Chattanooga as well as service to Chattanooga from outlying areas.


CBD
N
GRUNDY
SEQUATCHIE
HAMILTON
MARION
FRANKLIN
TENNESSEE
ALABAMA
GEORGIA
DADE
CATOOSA
WHITFIELD
WALKER
JACKSON
BRADLEY
Figure 9-1
Chattanooga MPO Commuter Sheds
CBD
Central
West: I-24
North
East: I-75
Southeast: I-75
South
Southwest: I-59
0 3.3 6.7 10
Miles

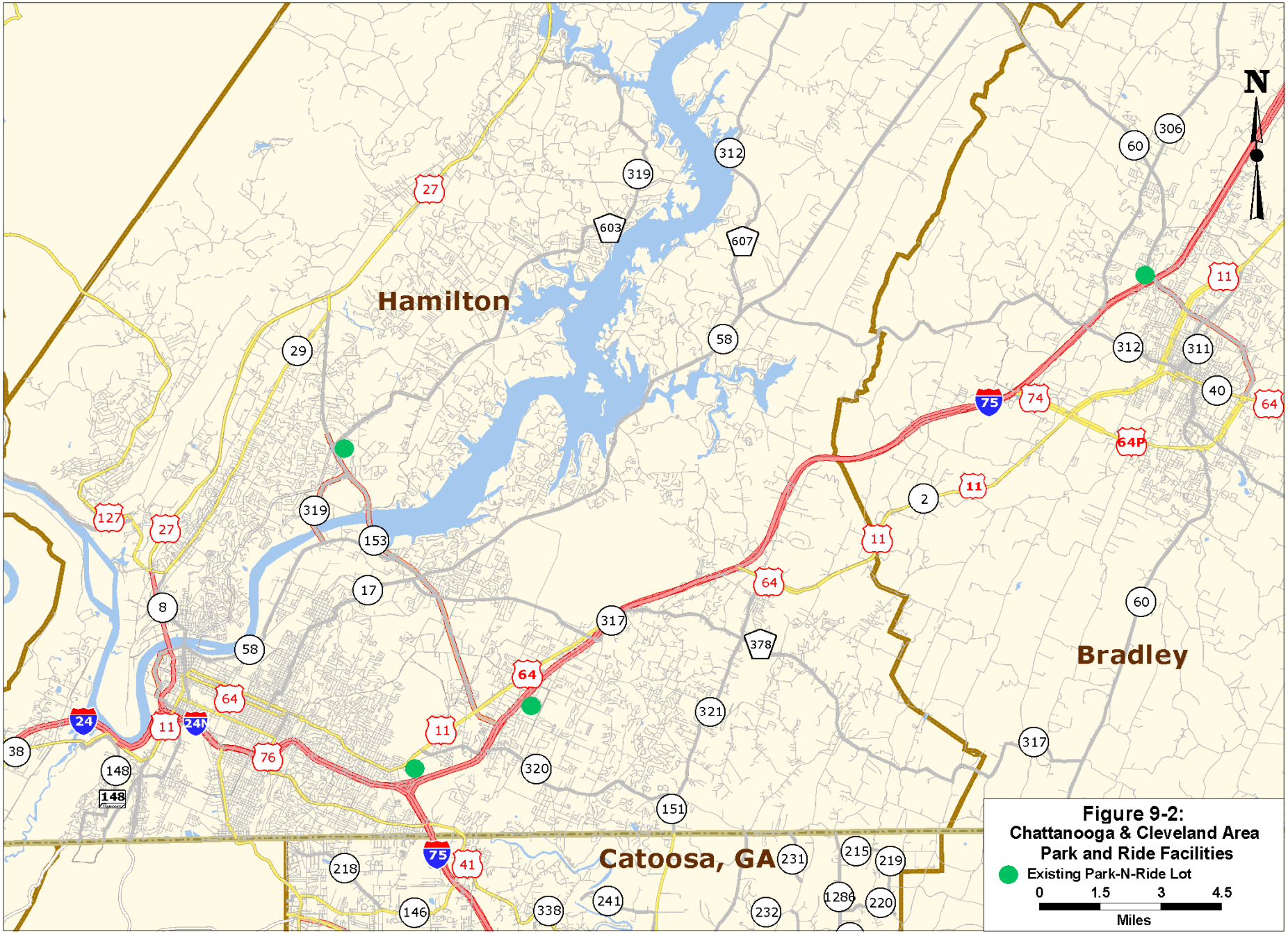

Hamilton
Bradley
Catoosa, GA
N
Figure 9-2:
Chattanooga & Cleveland Area
Park and Ride Facilities
Existing Park-N-Ride Lot
0 1.5 3 4.5
Miles

Table 9-1: Commuting Patterns to Chattanooga CBD

From	Commuting Trips to CBD		
	Total	Drive Alone	Drive Alone (%)
East: I-75	3,641	3,076	84%
Southeast: I-75	1,090	925	85%
North	9,360	8,234	88%
South	3,089	2,657	86%
West: I-24	508	422	83%
Southwest: I-59	782	677	87%
Central	3,168	2,198	69%
CBD	255	120	47%
Total	**21,893**	**18,309**	**84%**

9.1.1 Chattanooga Transit Planned Improvements

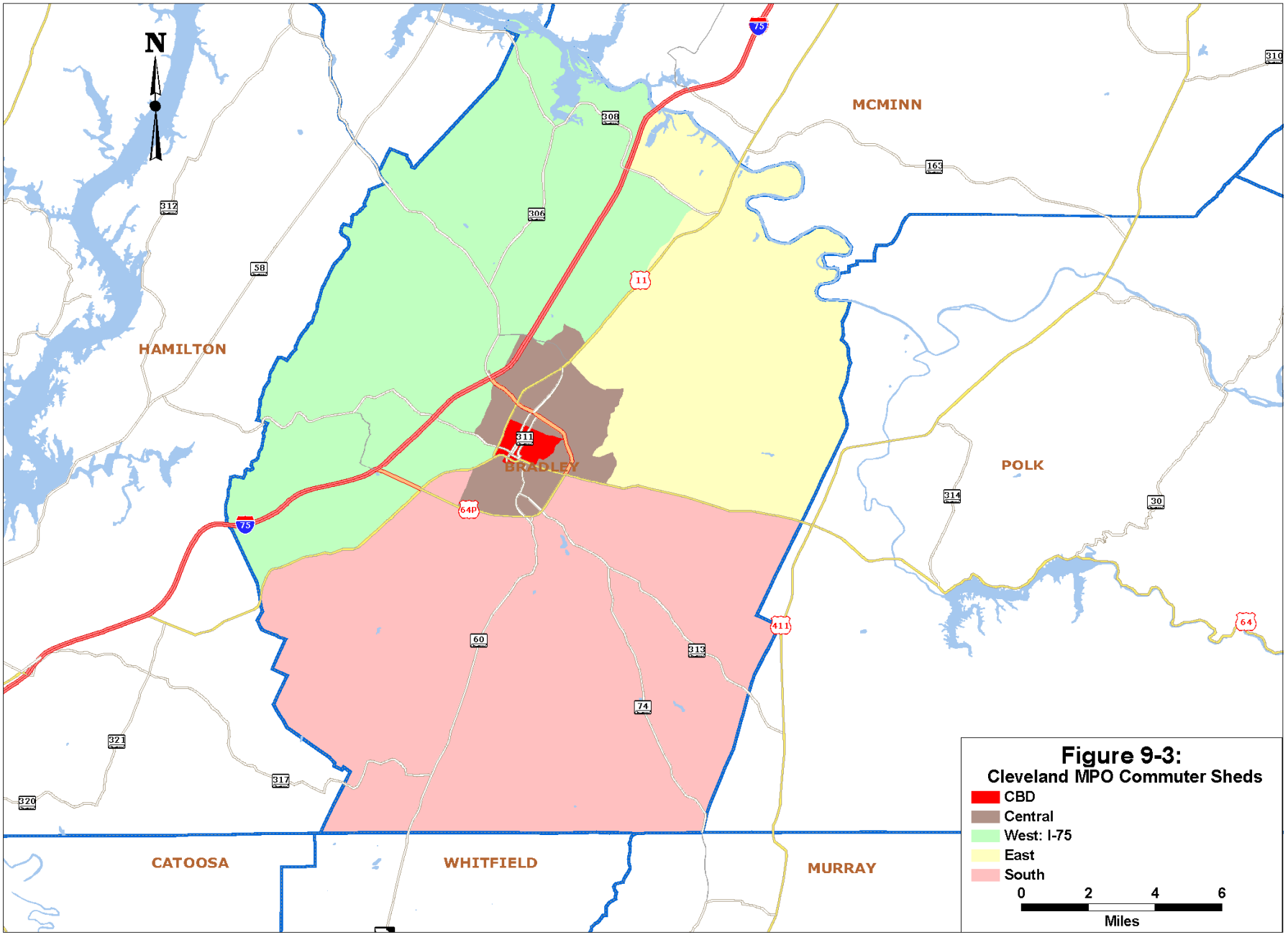
The Chattanooga Area LRTP identifies several projects necessary to enhance the services of CARTA. These projects include:

- Care-a-Van route increases,
- Route expansions,
- Shuttle expansions,
- Downtown bus shelters,
- Bus shelters (outside of downtown), and
- Bus replacements.

9.2 Cleveland

The Cleveland MPO includes the City of Cleveland and portions of Bradley County in Tennessee. The MPO was officially designated in 2004. The Census 2000 CTPP data does not include a data set that is specifically reported for Cleveland. Instead, the "state DOT detailed geography flow" summary level data was used. The geographic zones in the Cleveland MPO area are the same as the Census tracts, which are relatively big and have limitations to representing accurate commuter sheds. The Cleveland MPO region was divided into four general commuter sheds: West: I-75, East, South, and Central **(Figure 9-3**). It was assumed that most commuters traveling from the West commuter shed would potentially use I-75 as part of their commuter route to the CBD. It was assumed that those living in the East, South, and Central area would use local routes.

The CTPP database indicates 36,419 commuter trips with a destination within Bradley County (**Figure 9-3**). Of these trips, 3,706 (10 percent) have a destination within the CBD. The West region covering the I-75 corridor contains 37 percent of those commuting to the CBD.


N
MCMINN
HAMILTON
BRADLEY
POLK
CATOOSA
WHITFIELD
MURRAY
Figure 9-3:
Cleveland MPO Commuter Sheds
CBD
Central
West: I-75
East
South
0 2 4 6
Miles

Eighty-one percent of all commuters destined for the CBD drive alone. For the West region covering the I-75 corridor, 85 percent drive alone to the CBD.

The Cleveland area contains one park and ride facility, as shown in **Figure 9-2**. Coordination efforts between the Cleveland MPO, Chattanooga MPO, Dalton MPO, transit providers, and the business community will aid in identifying potential locations of new park and ride facilities.

Table 9-2: Commuting Patterns to Cleveland CBD

From	Commuting Trips to CBD		
	Total	Drive Alone	Drive Alone (%)
West: I-75	1,384	1,174	85%
East	457	376	82%
South	620	534	86%
Central	905	705	78%
CBD	340	205	60%
Total	**3,706**	**2,994**	**81%**

9.2.1 Cleveland Transit Planned Improvements

The Cleveland Urban Area MPO (CUAMPO) LRTP identifies several transit improvement projects. Replacement buses as well as new buses will be added to support additional routes. Transit facility upgrades will include improvements to the parking lot, fencing, and a bus washing facility. A proposed bus shelter will consist of a waiting facility for transfers in the downtown area in addition to conventional shelters at selected bus stops.

9.3 Knoxville

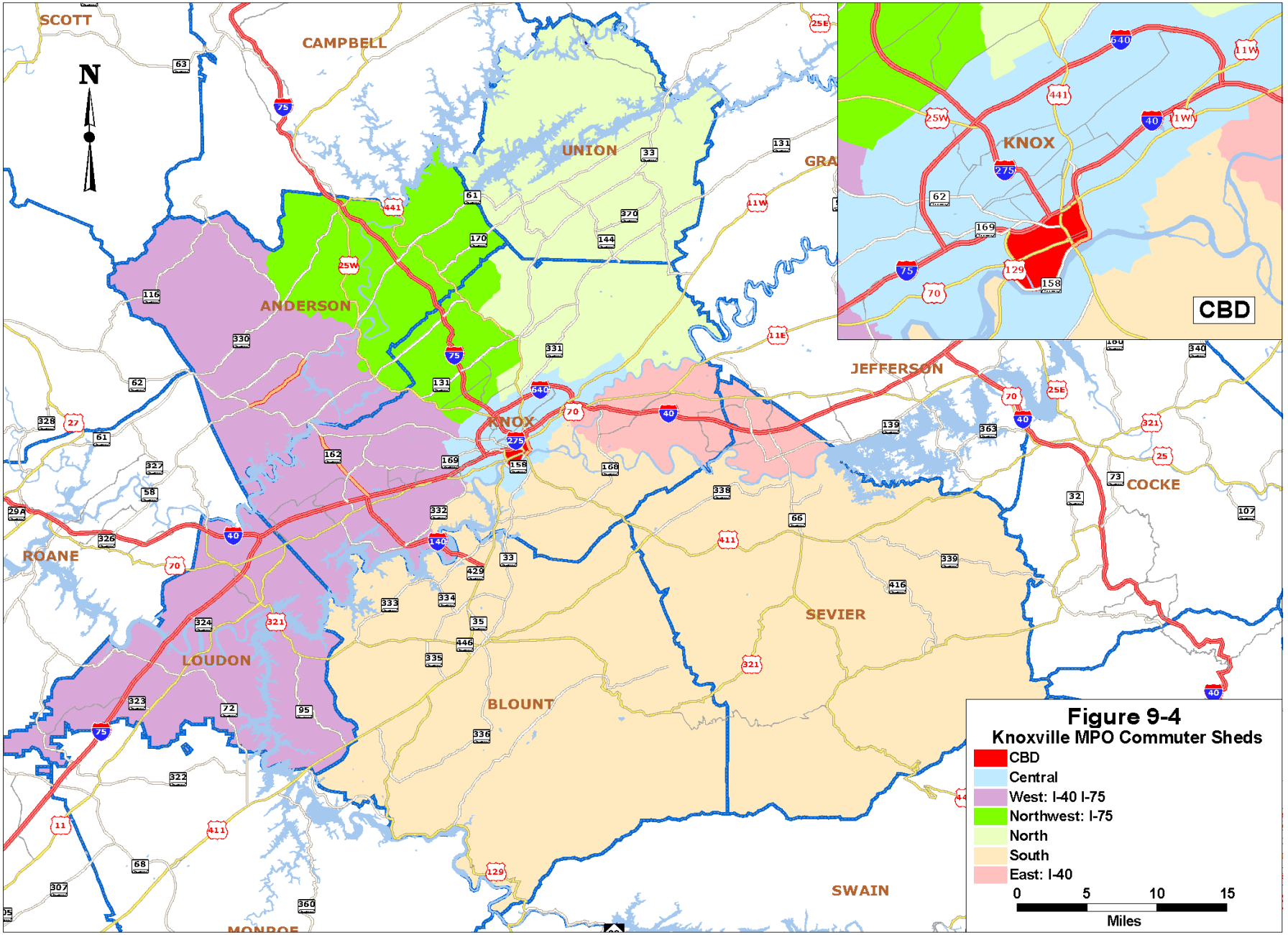
The Knoxville Regional TPO covers seven full counties in Tennessee: Knox, Blount, Anderson, Jefferson, Sevier, Union, and Loudon Counties. The “MPO detailed geography flow” data in the Census 2000 CTPP data set does not include Jefferson County. All trips from Jefferson County were treated as external trips in the Census data set. The Knoxville TPO region was divided into six general commuter sheds: West: I-40/I-75, Northwest: I-75, North, East: I-40, South, and Central **(Figure 9-4**). It was assumed that most commuters traveling from the West and Northwest commuter sheds would potentially use I-75 as part of their commuter route to the CBD. Commuters from the East region would likely use I-40 as part of their route to the CBD. It was assumed that those living in the North, South, and Central area would use local routes.

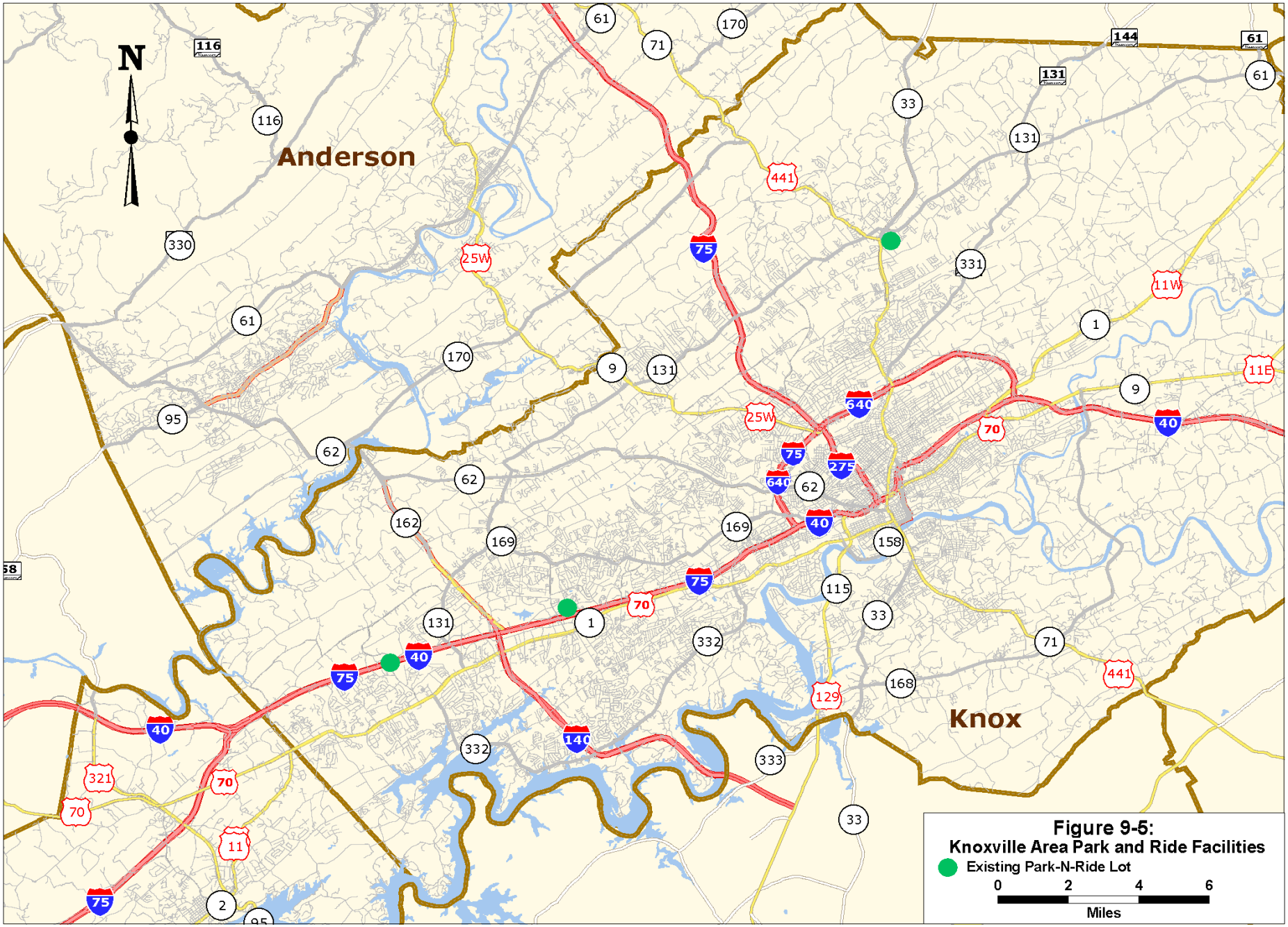
The CTPP database indicates 132,618 commuter trips with a destination within Knox County (**Table 9-3**). Of these trips, 31,854 (24 percent) have a destination within the CBD. The West and Northwest region covering the I-75 corridor represents 38 percent of those commuting to the CBD. Eighty-five percent of all commuters destined for the CBD drive alone. For the West and Northwest regions covering the I-75 corridor, 91 percent drive alone to the CBD.

Table 9-3: Commuting Patterns to Knoxville CBD

From	Commuting Trips to CBD		
	Total	**Drive Alone**	**Drive Alone (%)**
West: I-40/I-75	9,396	8,574	91%
Northwest: I-75	2,723	2,403	88%
North	3,275	2,966	91%
East: I-40	1,057	887	84%
South	7,028	6,193	88%
Central	6,730	5,473	81%
CBD	1,645	441	27%
Total	**31,854**	**26,937**	**85%**

Figure 9-5 shows the location of park and ride facilities near I-75 in the Knoxville area. The Knoxville Regional LRTP specifies the park and ride facility at Campbell Station Road as needing a parking lot expansion.


SCOTT
CAMPBELL
UNION
ANDERSON
KNOX
JEFFERSON
COCKE
ROANE
LOUDON
BLOUNT
SEVIER
SWAIN
MONROE
N
CBD
Figure 9-4
Knoxville MPO Commuter Sheds
CBD
Central
West: I-40 I-75
Northwest: I-75
North
South
East: I-40
0 5 10 15
Miles


N
Anderson
Knox
Figure 9-5:
Knoxville Area Park and Ride Facilities
Existing Park-N-Ride Lot
0 2 4 6
Miles

9.3.1 Knoxville Transit Planned Improvements

The LRTP identifies several projects to enhance the public transportation system. East Tennessee Human Resources Agency (ETHRA), Knox County CAC Transit, Knoxville Commuter Pool, and Knoxville Area Transit (KAT) improvements include the addition of vehicles. Additional KAT improvements include the implementation of ITS equipment, expanded service hours, and route expansions. The proposed Knoxville Central Station is expected to be a state-of-the-art bus transfer center located in downtown Knoxville. The indoor facility will offer transit riders a variety of services including retail, restaurants, and automatic teller machines.

9.4 Potential Inter-city Passenger Rail

The Statewide Rail Plan (2002) identifies which of the existing rail corridors in the state are the most feasible for the implementation of new inter-city passenger rail services. These services are intended to provide an alternative means of transportation between the state's major cities, adding capacity to the existing transportation system, and thereby reducing the need to expand the existing highway network. Two corridors in the study area were evaluated based upon the availability of track, required track and signal improvements, potential ridership, and operating costs.

Norfolk Southern currently operates a rail line paralleling I-75 between Chattanooga and Knoxville. This corridor was determined to have the weakest potential for intercity passenger rail in the state in terms of population, but it provides the opportunity for connections to Nashville and Bristol.

In addition to the Chattanooga-to-Knoxville corridor, passenger service along the Chattanooga-to-Atlanta corridor was investigated by the Federal Railroad Administration. The study concluded the favorable transportation mode for ground transportation is Maglev technology, which uses electromagnetic forces to move trains along a track. As a result, the State of Tennessee concluded that the addition of conventional passenger rail service will oppose the Chattanooga-Atlanta Maglev initiative. If, however, the Maglev system is not implemented, conventional passenger rail service is a viable alternative. Due to the significant amount of freight traffic along the existing CSX track, a separate track will most likely need to be installed in order to prevent disruption of the freight traffic.

The addition of passenger rail service from Chattanooga-to-Knoxville and Chattanooga-to-Atlanta will help provide connectivity throughout the region. However, the Chattanooga-to-Knoxville corridor is expected to experience low ridership and the Chattanooga-to-Atlanta corridor will require the addition of costly rail infrastructure. As a result, the likelihood of either route being developed is low.

10.0 INTERMODAL FACILITIES

Intermodal facilities allow for cargo to be transported by a combination of modes that optimize the time and cost of moving freight. The study area is equipped with several intermodal facilities whereby port, rail, airport, and highway infrastructure are integrated to provide a timely transfer of cargo from one transportation mode to another.

The current freight intermodal facility systems along I-75 were identified. Rail intermodal terminals, waterway ports, airports, and truck transfer facilities within 15 miles of the existing I-75 alignment were inventoried. These facilities allow for transfers such as container-on-barge to truck, truck to plane, ship to rail, and truck to rail. **Figures 10-1** through **10-3** show the general locations of these intermodal facilities.

10.1 Rail Facilities

The Class 1 railroad infrastructure is an important freight transport system over which intermodal freight and other commodities are moved through the study area. The study area is served by two Class 1 railroads - Norfolk Southern (NS) and CSX, providing connections to the national railroad network.

Three rail yards are in operation in the study area. Debutts Yard, located in Chattanooga, processes around 50 trains daily and serves trunk lines that access the major cities in each direction. Coster Shop Yard in Knoxville was formerly a primary switching yard for all the major railroads that access the region. In recent times, the yard's focus has shifted to limited switching operations between CSX, Norfolk Southern, and the smaller Knoxville and Holston River Railroad Company. Norfolk Southern's John Sevier Yard in Knoxville serves as a major classification terminal.

Norfolk Southern has the largest railroad presence in the study area. It is also the only railroad that provides connections with short lines in the area. **Table 10-1** lists the short lines in the study area.

10.2 Waterway Ports

Port facilities within the study area include general cargo ports as well as landside industrial developments which support the transfer of waterborne cargo to other transportation modes. The five general cargo ports and the activities that support them include:

- Centre South Riverport - Rail/truck/barge *(steel, dry bulk, and break-bulk)*
- JIT Terminals – Rail/truck/barge *(steel, chemicals, and propane)*
- Mid South Terminals – Rail/truck/barge *(iron, steel, coal, coke, grain and aggregates)* and liquid storage
- Fort Loudoun Terminal – Rail/truck/warehouse services*(iron, salt, forest products, alloys, fertilizers, sand, chemicals, coal, coke, grain and aggregates)*
- Burkhart Enterprises, Inc. – Rail/truck/barge/warehouse services *(iron, salt, sand, steel, coal, coke, and gravel)*: 500,000 tons of material annually

Several special purpose port facilities are located within the study area. These ports specialize in handling specific commodities and are typically located at industrial developments. **Table 10-2** lists the special purpose ports within the study area and their commodity handling services.

Table 10-1: Study Area Short Line Railroads

Railroad Company	County	Miles of Track in TN	Commodity	Annual Carloads
Chattanooga and Chickamauga	Hamilton	3.0	chemicals, plastics, agricultural products, scrap iron	N/A
East Chattanooga Belt Railway	Hamilton	11.0	paper, fabricated metal parts, chemicals and some passenger cars	50
Tennessee Valley Railroad Museum	Hamilton	N/A	primarily passenger service; zinc	200
Knoxville and Holston River Railroad	Knox	18.0	scrap iron, steel, brick, and LPG	2400

Table 10-2: Special Purpose Port Facilities

Facility	Terminal Type
Ashland Petroleum	Liquid
ADM, Chattanooga Oil Refining Dock	Liquid
Ergon, Inc	Liquid
Marathon Ashland Petroleum	Liquid
Marathon Ashland Petroleum	Liquid
Star Interproses	Liquid
Unocal Corps.	Liquid
Volunteer Asphalt Company	Liquid
Serodino,Inc. – Shipyard Pier	Navigation/Marine Service
Southern Electric Fleeting Co. Chattanooga Mooring	Navigation/Marine Service
US Coast Guard Pier	Navigation/Marine Service
American Limestone Co	Sand and Gravel
Rinker Materials	Sand and Gravel
Signal Mountain Cement Co, Bennett Lake Quarry Dock	Sand and Gravel
Vulcan Materials	Sand and Gravel
ADM , Chattanooga Oil Refining Dock	Grain
ADM Milling	Grain
Cargill, Inc	Grain
AE Stanley Manufacturing, Inc	On Site
Alston ABB Combustion	On Site
McKinnon Bridge Co., Loudon	On Site
Olin Corp.– Charleston Plant	On Site
Serodino, Inc. – Shipyard Pier	On Site
Southern Ionics, Inc.	On Site
Tennessee Valley Port	On Site
TVA Kingston Fossil Plant	On Site
TVA Sequoyah Nuclear Plant	On Site
TVA Watts Bar Fossil Plant	On Site
TVA Bull Run Fossil Plant	On Site
American Electrical Inds, Inc	Dry Bulk
Commercial Metal, Chattanooga Dock	Dry Bulk
Philip Services Corporation	Dry Bulk
Philip Services Corporation	Dry Bulk
Smoky Mountain Transfer Corporation	Dry Bulk
Tennessee Consolidated Coal Company	Dry Bulk
Cemex, Inc	Cement
Medusa Cement Co	Cement

10.3 Airports

The study area is home to seven airports that serve commercial passenger service, freight, military operations, and general aviation. The airports include:

- Chattanooga Metropolitan Airport *(commercial passenger, general aviation, and freight operations)*: 3,000 tons of cargo annually
- Collegedale Municipal Airport *(general aviation)*

- Hardwick Field *(general aviation)*
- Knoxville Downtown Island Airport *(general aviation)*
- McGhee Tyson Airport *(commercial passenger, general aviation, freight operations, and military operations)*: 40,000 tons of cargo annually
- McMinn County Airport *(general aviation)*
- Monroe County Airport *(general aviation)*

10.4 Truck Transfer Facilities

The trucking industry plays a vital role in the movement of cargo throughout the study area. The study corridor is home to several truck terminals and trucking companies that aid in the delivery of cargo to markets across the nation. Within the study area there are four truck transfer facilities that allow the transfer of goods from truck to rail and vice versa. These facilities include:

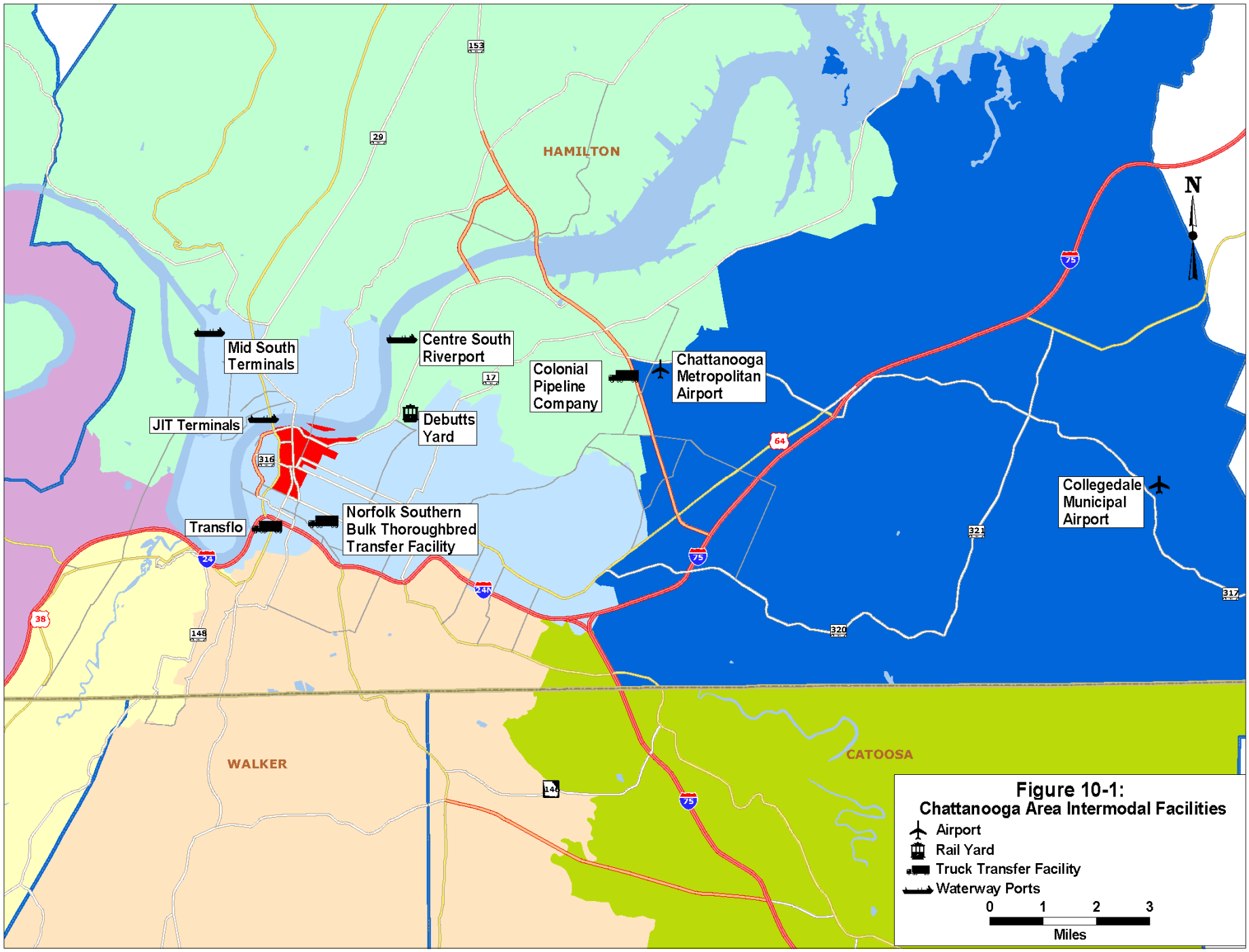
- Norfolk Southern Thoroughbred Bulk Transfer Facility, Chattanooga
- TRANSFLO Terminal, Chattanooga
- Fort Loudoun Terminal, Lenoir City
- TRANSFLO Terminal, Knoxville

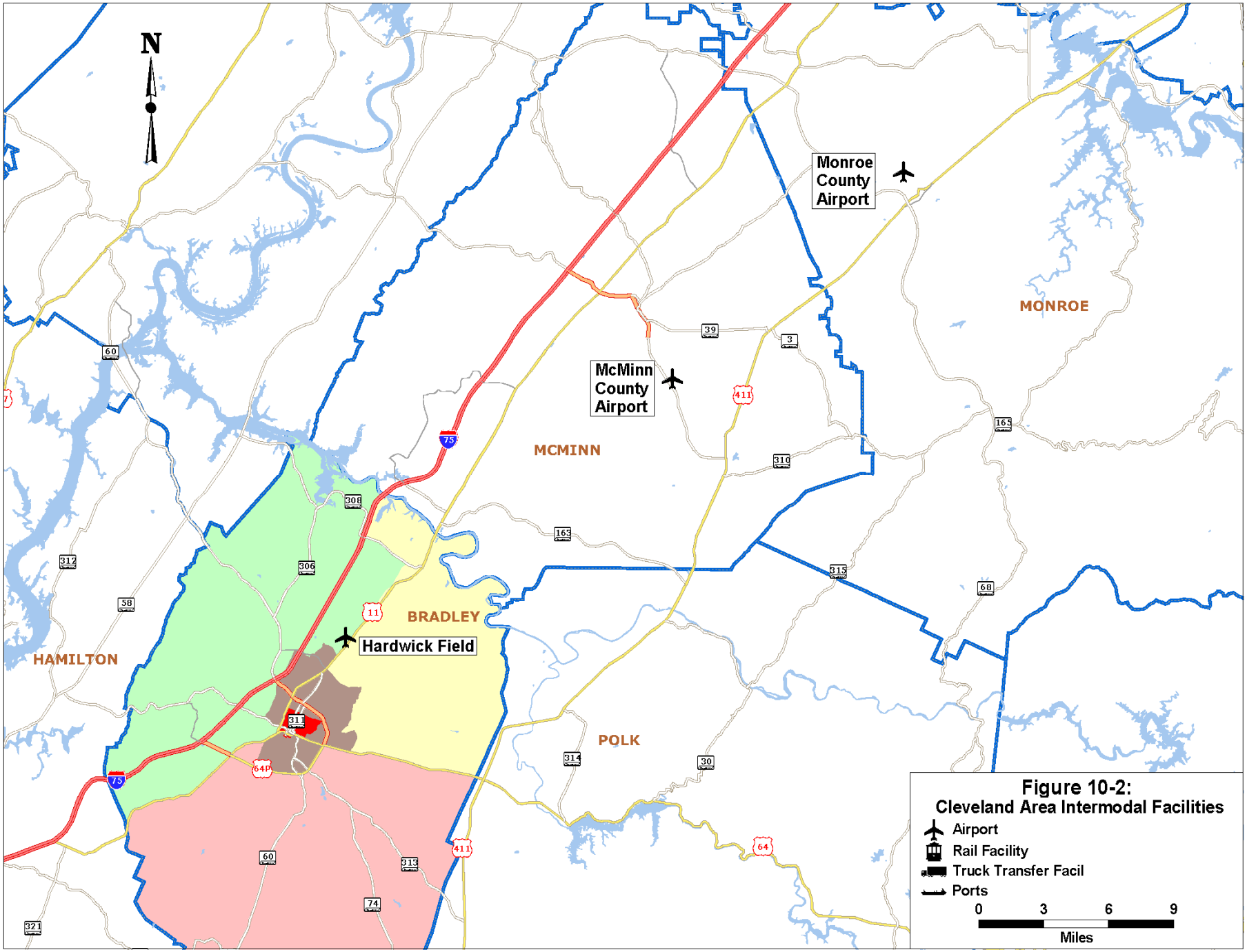
10.5 Intermodal Connector Facilities

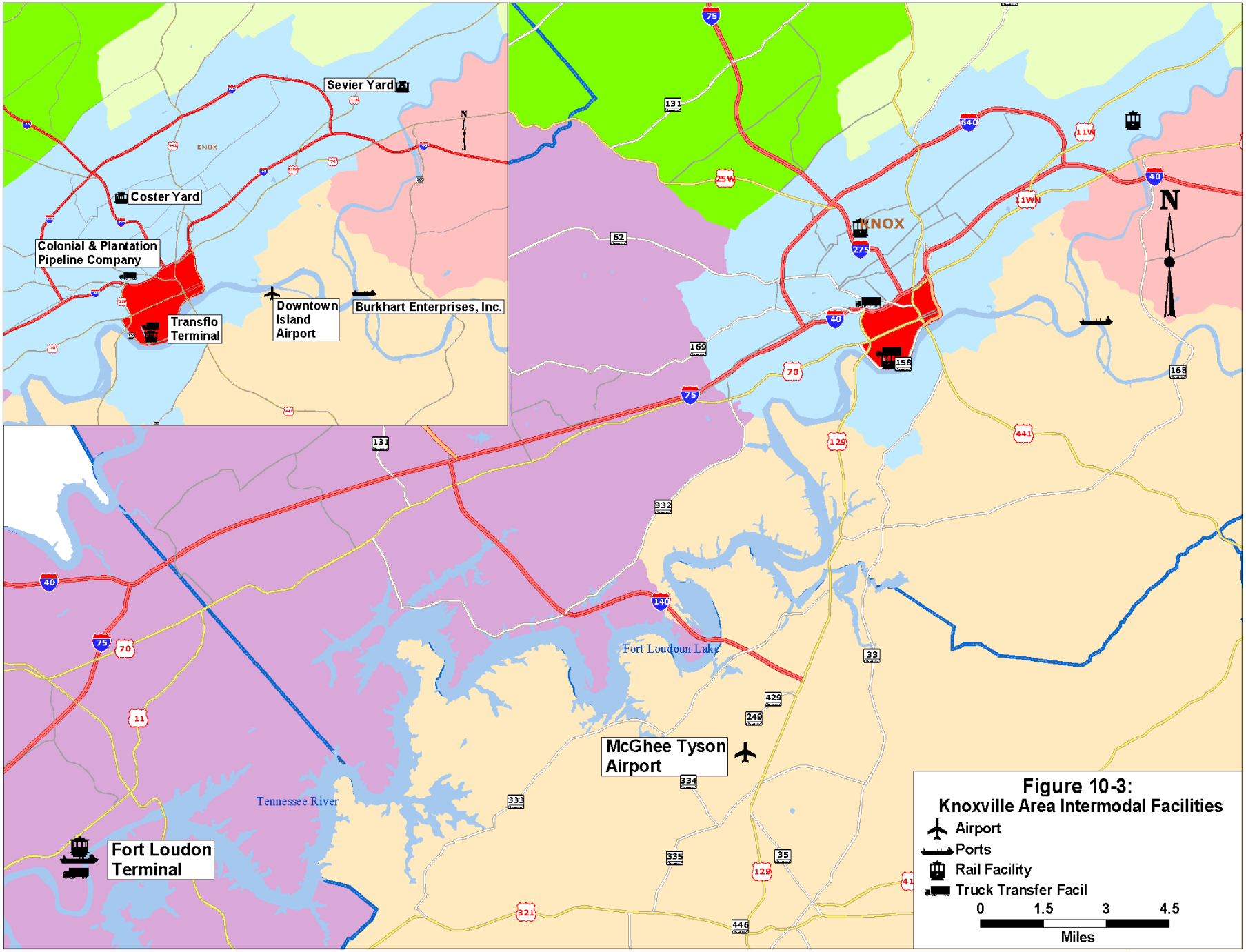
National Highway System (NHS) Intermodal Connectors are roads that provide access between major intermodal facilities and the National Highway System. **Table 10-3** lists the facilities within the study area and the NHS connectors.

Table 10-3: Intermodal Facilities and Intermodal Connectors

Facility	Type	Location	Connector Description
Chattanooga Metropolitan Airport	Airport	Chattanooga	Shepherd Road (Airport Connector) Between SR 153 and Airport Road
Colonial & Plantation Pipeline Company	Truck/ Pipeline Terminal	Knoxville	Middlebrook Pike (SR 169), 44th Street, Western Ave from the terminal entrance to I-75
Colonial Pipeline Company	Truck/ Pipeline Terminal	Chattanooga	Jersey Pike from Enterprise Park Drive to SR 153
J.I.T. Terminals	Port Terminal	Chattanooga	Manufacturers Road from SR 29 to Terminal Entrance
Mid South Terminals	Port Terminal	Chattanooga	Hudson Rd. to Pineville Rd. to Moccasin Bend Rd. to Hamm Rd. to SR 29
Southern Foundry Supply	Port Terminal	Chattanooga	West 19th Street from Riverfront Parkway (SR 58) to the port entrance
Vulcan Materials Company	Port Terminal	Chattanooga	River Street from Evans Street to Riverfront Parkway (SR 58)


HAMILTON
WALKER
CATOOSA
Mid South Terminals
Centre South Riverport
Colonial Pipeline Company
Chattanooga Metropolitan Airport
JIT Terminals
Debutts Yard
Transflo
Norfolk Southern Bulk Thoroughbred Transfer Facility
Collegedale Municipal Airport
N
Figure 10-1:
Chattanooga Area Intermodal Facilities
Airport
Rail Yard
Truck Transfer Facility
Waterway Ports
0 1 2 3
Miles


N
Monroe
County
Airport
MONROE
McMinn
County
Airport
MCMINN
BRADLEY
Hardwick Field
HAMILTON
POLK
Figure 10-2:
Cleveland Area Intermodal Facilities
Airport
Rail Facility
Truck Transfer Facil
Ports
0
3
6
9
Miles


Sevier Yard
Coster Yard
Colonial & Plantation Pipeline Company
Transflo Terminal
Downtown Island Airport
Burkhart Enterprises, Inc.
KNOX
Fort Loudoun Lake
McGhee Tyson Airport
Tennessee River
Fort Loudon Terminal
N
Figure 10-3:
Knoxville Area Intermodal Facilities
Airport
Ports
Rail Facility
Truck Transfer Facil
0 1.5 3 4.5
Miles

11.0 SUMMARY OF DEFICIENCIES

An analysis of deficiencies was conducted for I-75 through the study corridor. The analysis included identification of deficiencies associated with capacity and level of service for 2011, 2016, and 2030, geometric deficiencies, deficiencies that lead to difficulties with operations and maintenance, safety and security, freight flows, economic access, and commuter travel. **Table 11-1** provides a listing of the I-75 corridor study segments and the associated deficiencies. Refer to **Figure 4-1** through **4-7** for the specific locations of the study segments.

Table 11-1 Summary of Deficiencies

Legend: ○ Low ⊙ Medium ● Severe ⭘ High

Segment ID	Capacity Constraints (by Analysis Year)			Geometric Deficiencies	Operations and Maintenance	Safety and Security	Freight Flows	Economic Access	Commuter Travel Issues
	2011	2016	2030						
1	⊙	⊙	⊙	●	○	●	⊙	○	⭘
2	⊙	⊙	⊙		○	○	○		⭘
3	⊙	⊙	⊙		○	○		○	⭘
4	⊙	⊙	⊙	⭘	○	●	○		⊙
5			○			○		⊙	⊙
6			⊙			○		⭘	⊙
7			○		⭘	⊙			○
8			○	⊙	⭘	○			○
9			○		⭘	●			○
10	○	○	○			○		⭘	○
11		○	○			○			○
12		⊙	⊙			○			○
13		⊙	⊙			○			○
14			⊙			○			○
15			⊙			○			⊙
16	⊙	⊙	⊙			○	○		⊙
17	⊙	⊙	⊙	○		○	⭘	○	⭘
18	⊙	⊙	⊙	○		⊙			⭘
19	⊙	⊙	⊙	○		●			⭘
20	○	○	○	⭘		⊙			⭘
21	○	○	○	⊙		○	○		⭘
22			○	⭘	○	○		○	⊙
23			○			○		⭘	○
24			○	○		⊙	○	⭘	○
25	⊙	⊙	⊙	⊙		●	○		○
26			○	●	⭘	⊙			○
27		○	○		⭘	○			○
28			⭘		⭘	●			○
29			⊙		⭘	⊙			○
30			⊙	⊙	⭘	⭘	○		○