



## MULTIMODAL CORRIDOR FEASIBILITY STUDY



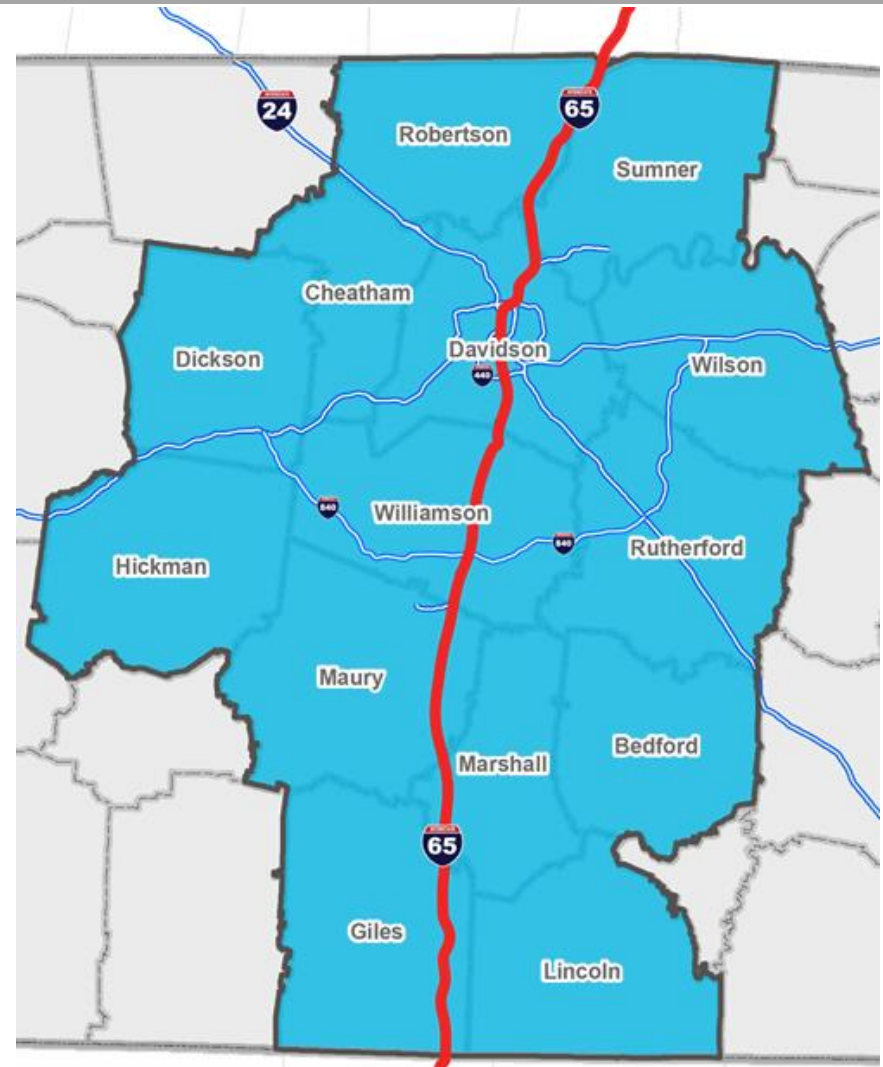
### Public Workshop

June 20, 2017



# Today's Agenda

1. Welcome & Introductions
2. Recap Corridor Deficiencies & Needs
3. Review Phase 1 Multimodal Solutions
4. Discuss Additional Solutions & Priorities
5. Next Steps





**TN**

# Project Schedule & Public Workshops

**TN**

## Phase One – Existing & Future Deficiencies

Study Corridor  
Definition

Data Collection &  
Analysis

Trend Scenario

Goals, Objectives  
and Performance  
Measures

Open House #1



## Phase Two – Multimodal Solutions

Scenario Definition

Scenario Evaluation  
Phase 1

Open House #2

Scenario Evaluation  
Phase 2



## Phase Three – Project Priorities

Priority Setting & Phasing Tool

Priority Improvements

# Public Workshops

- **Monday, June 12 – Goodlettsville**  
Delmas Long Community Center, 200 Memorial Drive
- **Tuesday, June 20 – Brentwood**  
Brentwood Library, 8109 Concord Road
- **Thursday, June 22 – Spring Hill**  
Spring Hill City Hall, 199 Town Center Parkway



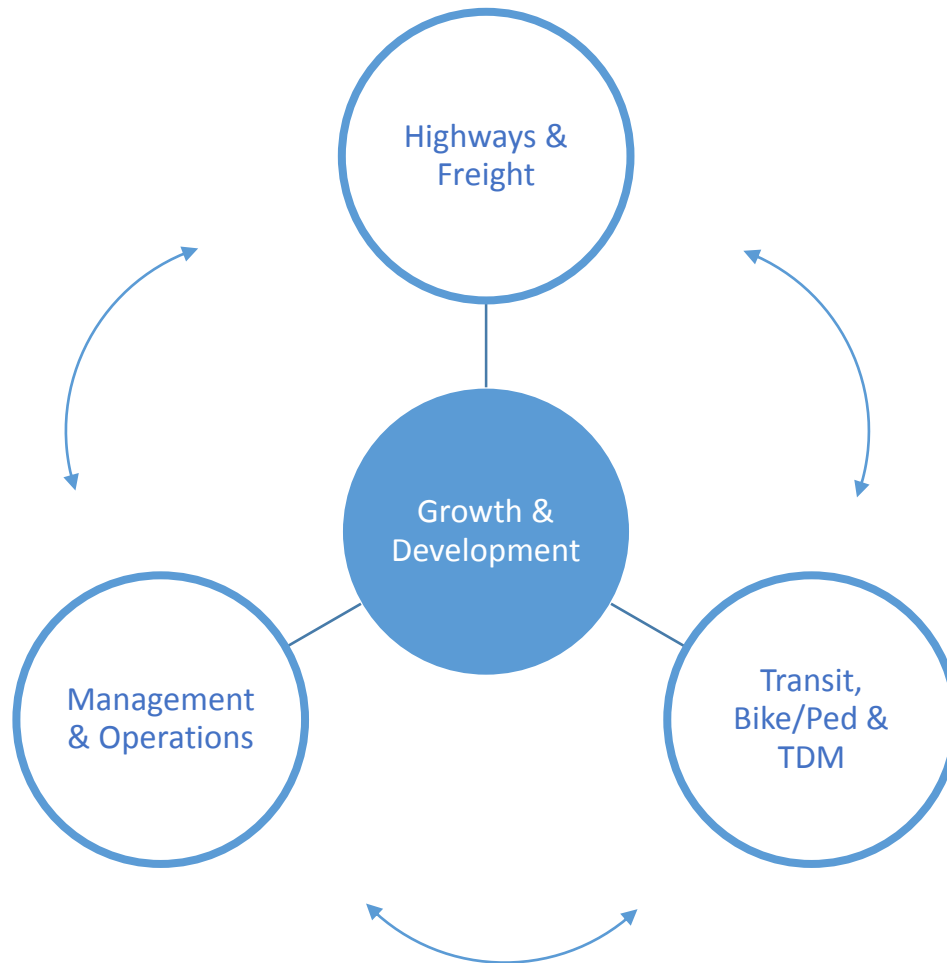


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# Corridor Deficiencies & Needs

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# Deficiencies & Needs

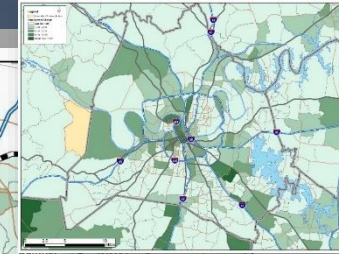
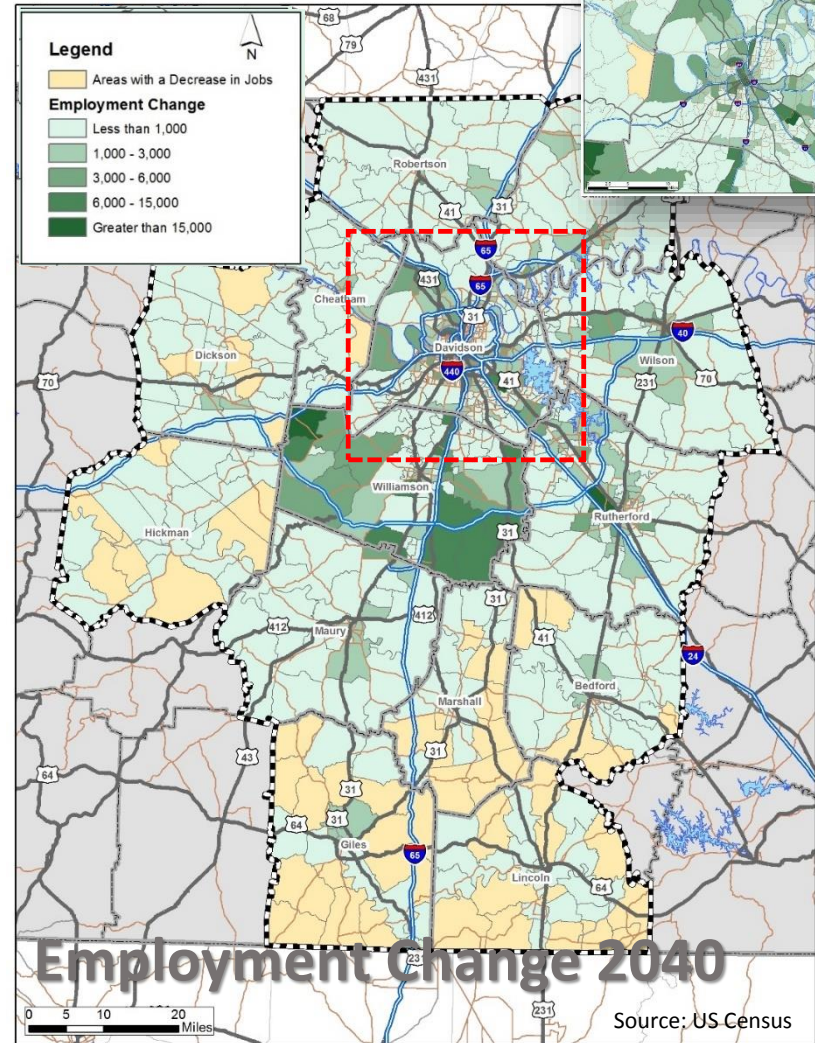
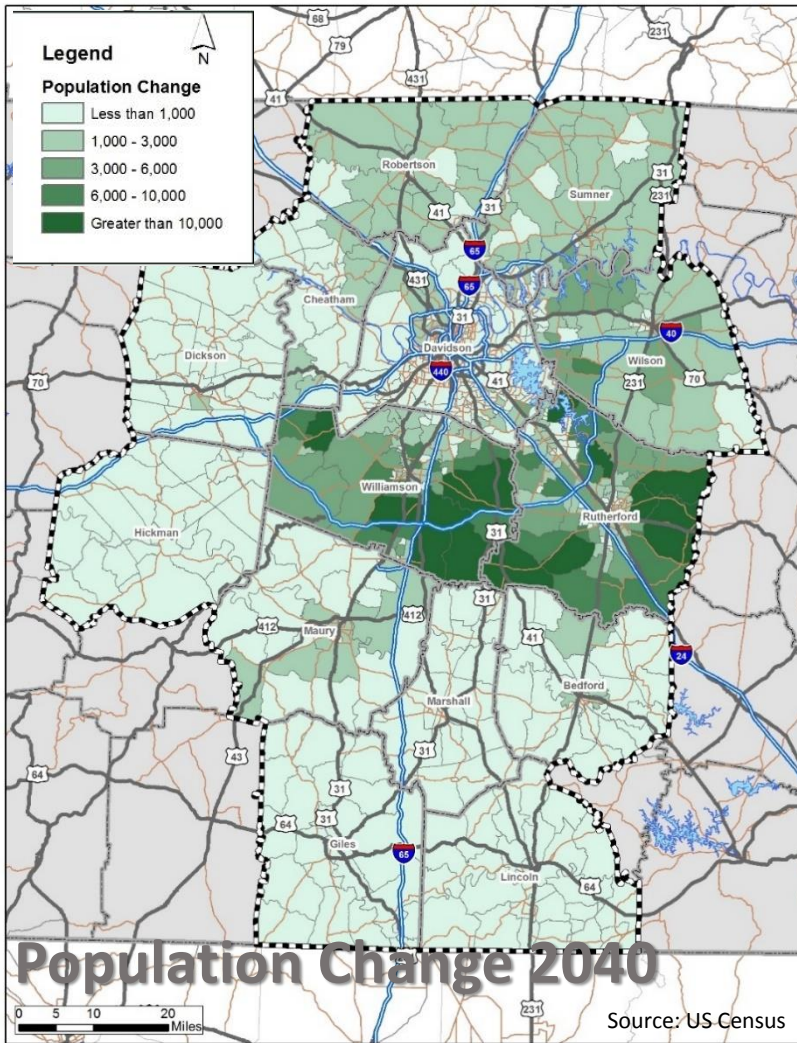


# Deficiencies & Needs – Growth and Development

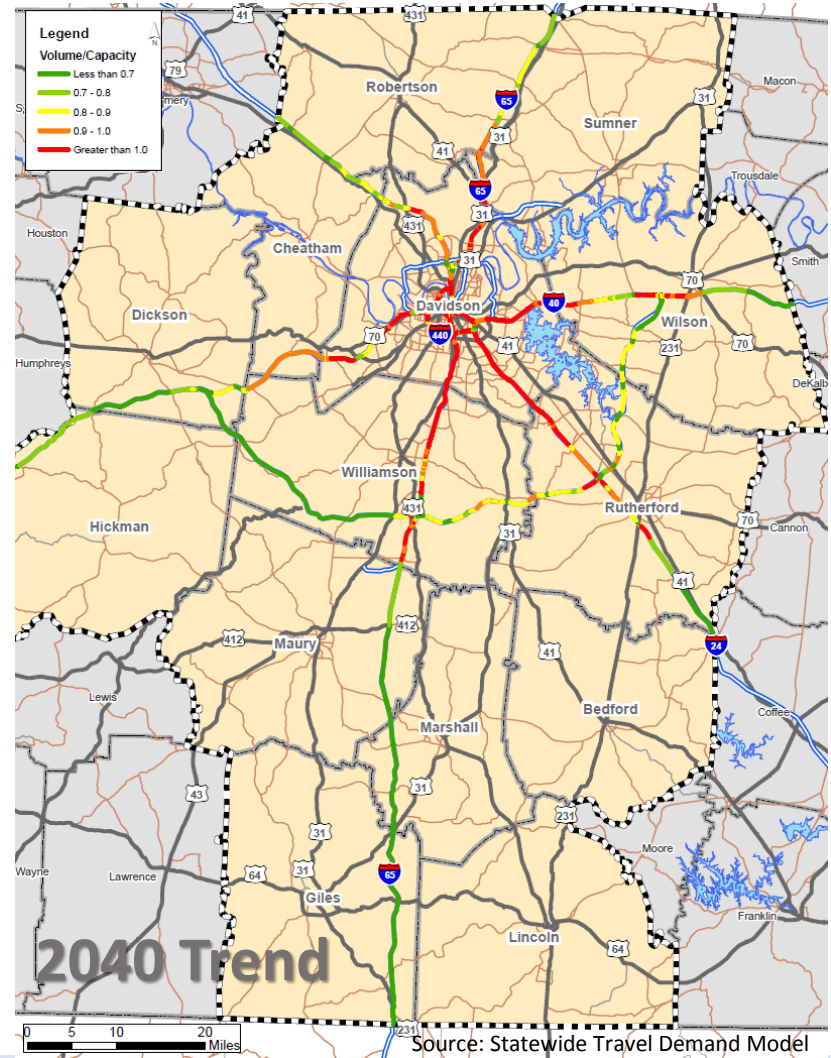
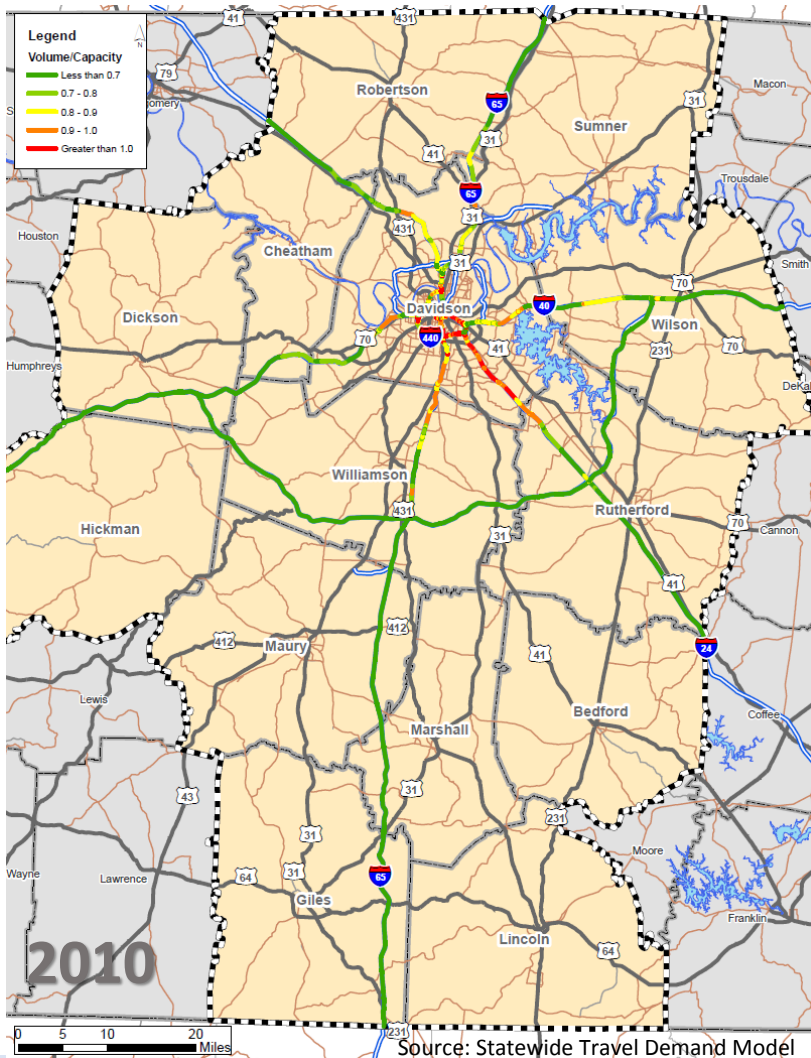
Sub-Area	County	Population				Employment			
		2010 Total	2040 Total	Change from 2010	% Change from 2010	2010 Total	2040 Total	Change from 2010	% Change from 2010
North	Cheatham	39,107	57,804	18,697	48%	15,899	26,281	10,382	65%
	Dickson	49,664	66,896	17,232	35%	22,469	32,608	10,139	45%
	Robertson	66,283	112,851	46,568	70%	28,067	47,190	19,123	68%
	Sumner	160,645	241,698	81,053	50%	55,354	95,970	40,616	73%
	<b>SUB-TOTAL</b>	<b>315,699</b>	<b>479,249</b>	<b>163,550</b>	<b>52%</b>	<b>121,789</b>	<b>202,049</b>	<b>80,260</b>	<b>66%</b>
Central	Davidson	626,682	780,507	153,825	25%	542,773	869,137	326,364	60%
	Rutherford	262,604	602,977	340,373	130%	133,803	271,416	137,613	103%
	Williamson	183,182	537,377	354,195	193%	120,266	307,836	187,570	156%
	Wilson	113,993	233,085	119,092	104%	51,640	102,437	50,797	98%
	<b>SUB-TOTAL</b>	<b>1,186,461</b>	<b>2,153,946</b>	<b>967,485</b>	<b>82%</b>	<b>848,481</b>	<b>1,550,826</b>	<b>702,345</b>	<b>83%</b>
South	Bedford	45,058	64,748	19,690	44%	25,809	36,448	10,639	41%
	Giles	29,485	34,199	4,714	16%	14,153	18,704	4,551	32%
	Hickman	24,690	30,967	6,277	25%	6,543	8,495	1,952	30%
	Lincoln	33,361	38,984	5,623	17%	14,892	19,104	4,212	28%
	Marshall	30,617	40,995	10,378	34%	12,004	14,520	2,516	21%
	Maury	80,956	116,514	35,558	44%	39,996	65,609	25,613	64%
	<b>SUB-TOTAL</b>	<b>244,167</b>	<b>326,407</b>	<b>82,240</b>	<b>34%</b>	<b>113,397</b>	<b>162,880</b>	<b>49,483</b>	<b>44%</b>
<b>TOTAL</b>	<b>1,746,327</b>	<b>2,959,602</b>	<b>1,213,275</b>	<b>69%</b>	<b>1,083,668</b>	<b>1,915,755</b>	<b>832,087</b>	<b>77%</b>	



# Deficiencies & Needs – Growth and Development

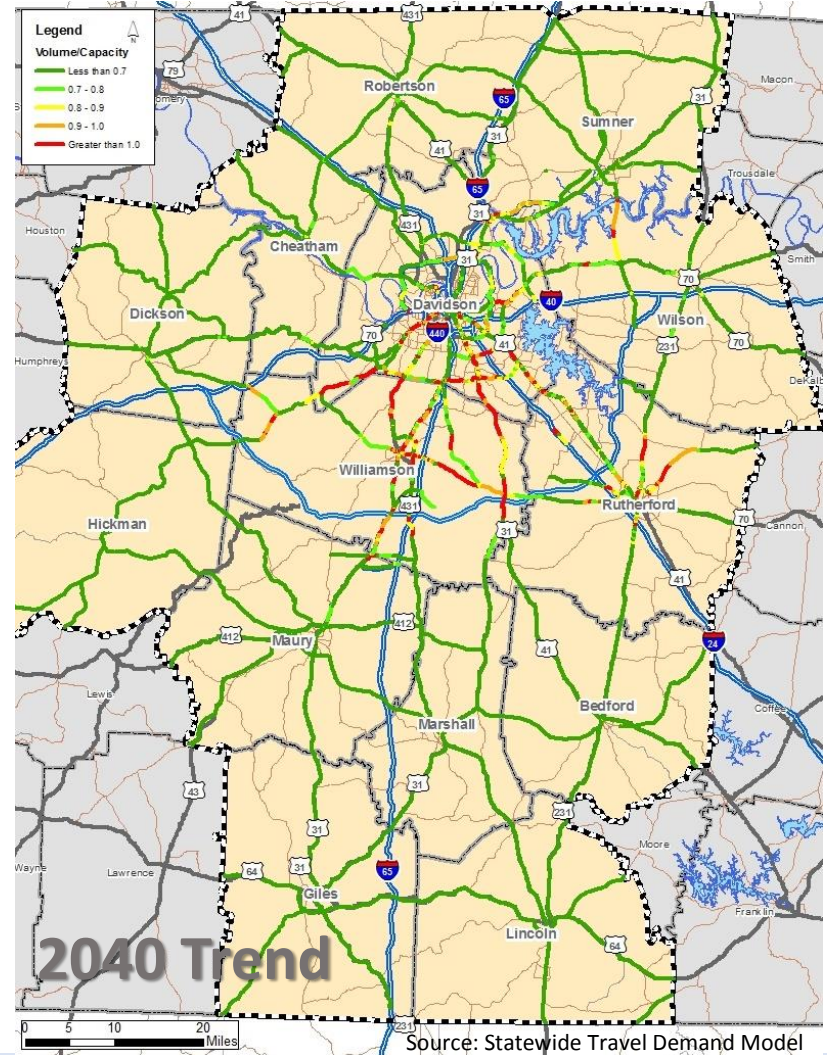
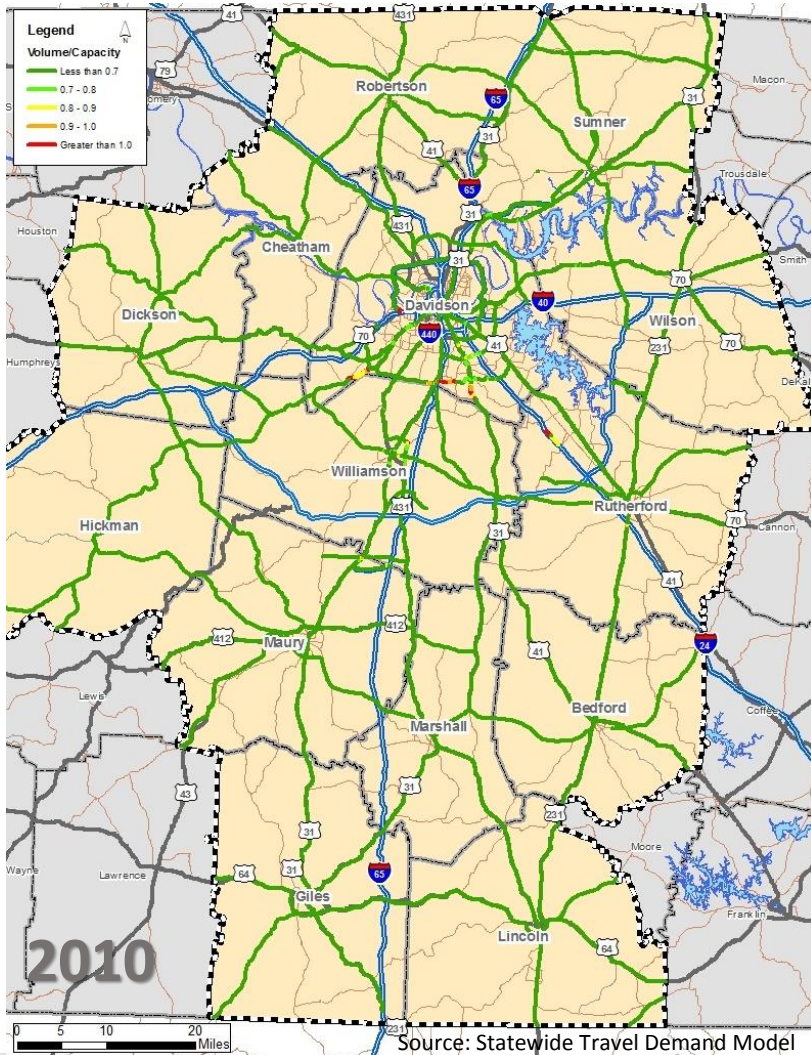


# Deficiencies & Needs – Highways: Interstate Capacity





# Deficiencies & Needs – Highways: Arterial Capacity



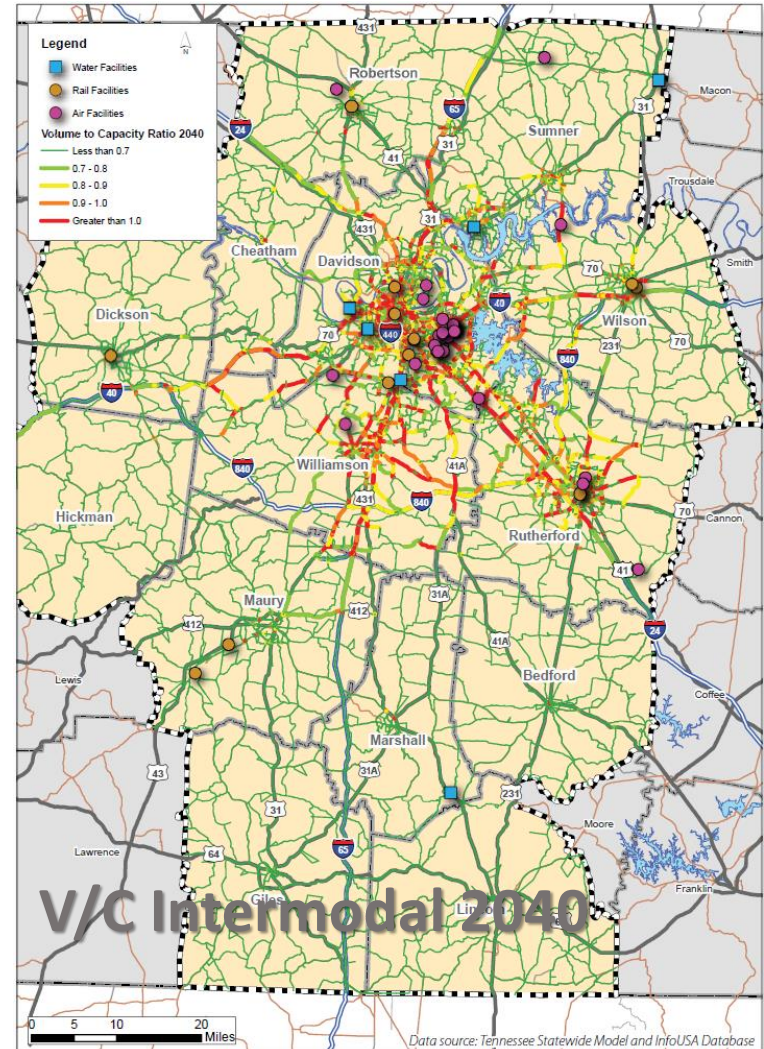
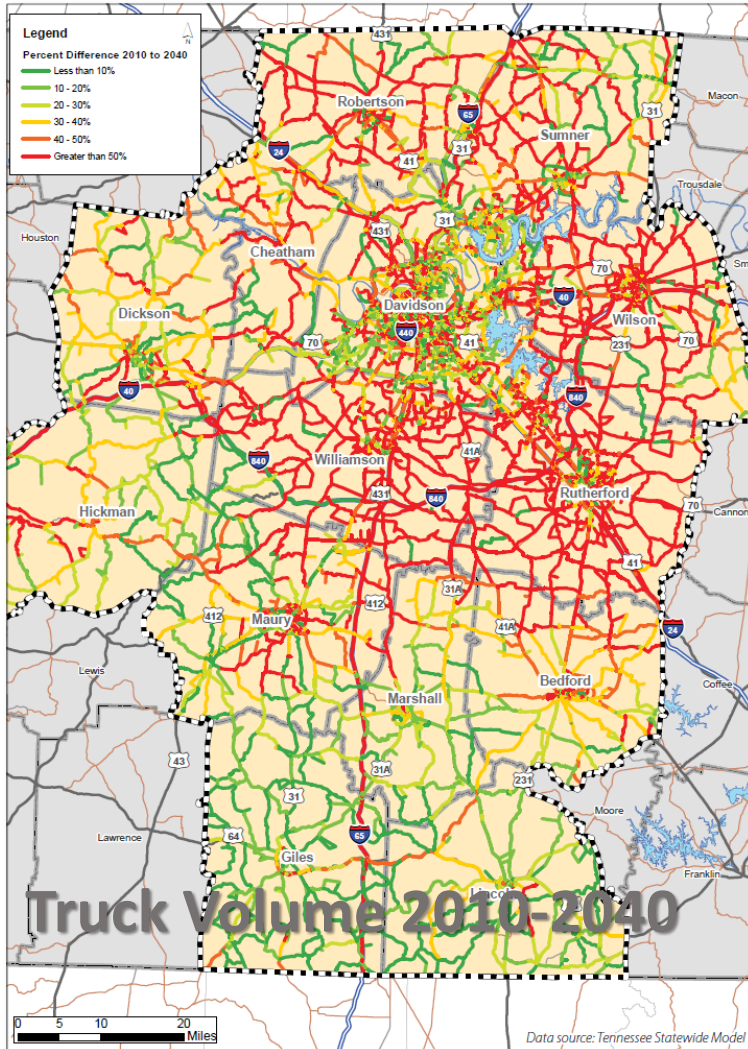
# Deficiencies & Needs – Highways: Interstate Travel Times

I-65 Travel Markets	Travel Time (min)			
	2010	2040	Change (min)	% Change
Portland to Nashville Core	41	47	6	15%
Hendersonville to Nashville Core	25	32	7	28%
South Nashville to Nashville Core	16	30	14	88%
South Nashville to Franklin	22	37	15	68%
Brentwood to Franklin	11	22	11	100%
Franklin to Brentwood	10	21	11	110%
Franklin to Nashville Core	29	59	30	103%
Spring Hill to Nashville Core	36	64	28	78%
Spring Hill to Franklin	20	36	16	80%
Giles County to Franklin	56	69	13	23%

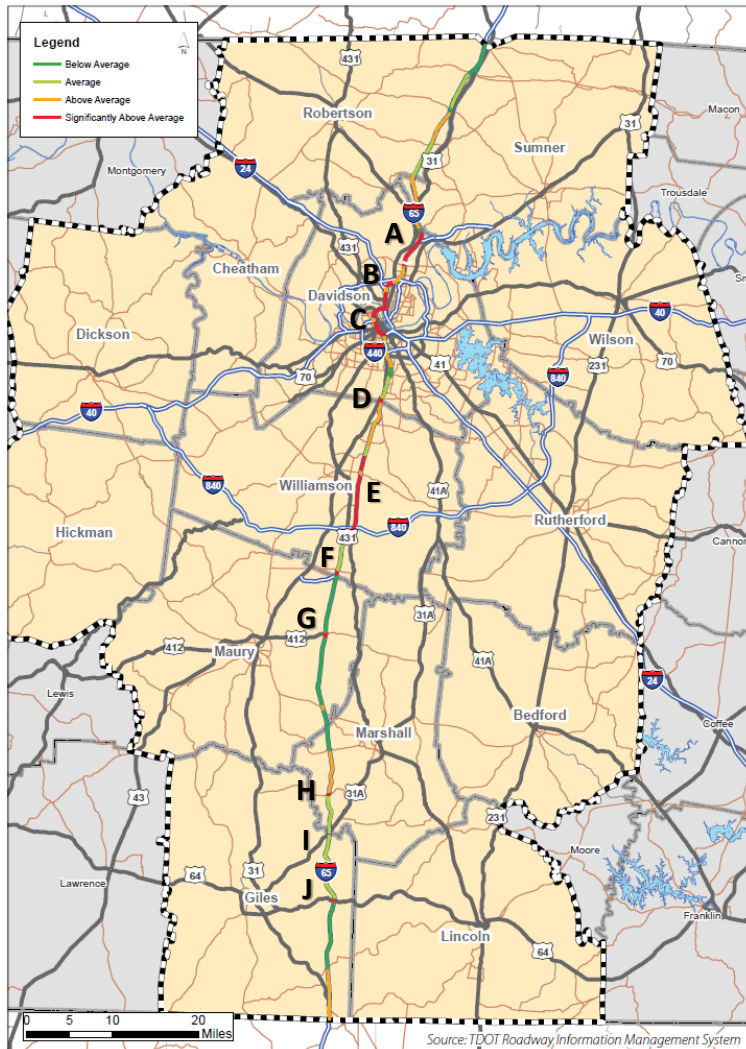
Source: Statewide Travel Demand Model



# Deficiencies & Needs – Highways: Freight



# Deficiencies & Needs – Highways: Safety



	Hotspot Location Description (2013-2015)	Statewide Crash Rate	Segment Crash Rate	Segment v. Statewide
A	Exit 97: SR 174/Long Hollow Pike to Exit 92: SR 45/Old Hickory Blvd	0.512	1.16 - 2.248	125-338%
B	Exit 90: SR 155/US 41 to Exit 88: I-24 West	1.036	2.395	131%
C	Nashville Downtown: Exit 88: I-24 West to Exit 210: the I-65/I-40 Interchange	1.036	2.145 - 5.668	107-447%
D	Exit 74: SR 254 West/Old Hickory Blvd Interchange	0.512	2.622	412%
E	Exit 68: Cool Springs Blvd to Exit 59: SR 840	0.512	1.312 - 1.778	155-246%
F	Exit 53: SR 396/Saturn Pkwy Interchange	0.512	1.559	204%
G	Exit 46: US 412/SR 99 Interchange	0.512	1.098	114%
H	Exit 27: SR 129/Lynnville Highway Interchange	0.512	1.035	102%
I	Exit 22: SR 11/US 31A Interchange	0.512	2.459	380%
J	Exit 14: US 64/SR 15 Interchange	0.512	1.213	137%

Source: TRIMS

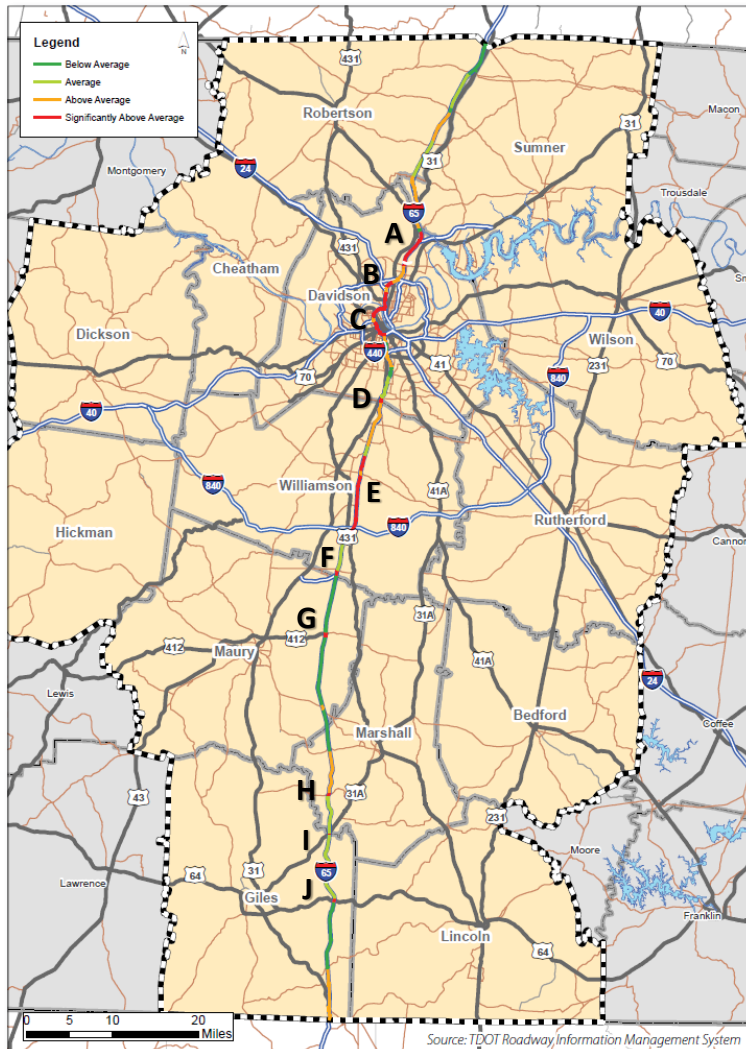
# Deficiencies & Needs – Transit, Bike/Ped & TDM

Commuter Mode Share				
Market	Mode			
	Single Occupancy Vehicle	Rideshare	Transit	Other Travel Mode (Bike, Ped, Tele)
Portland to Nashville Core	85.8%	14.2%	0.0%	0.0%
Hendersonville to Nashville Core	86.6%	11.8%	1.0%	0.2%
South Nashville to Nashville Core	85.8%	10.6%	1.6%	1.8%
South Nashville to Franklin	86.3%	13.3%	0.0%	0.3%
Brentwood to Franklin	89.4%	10.4%	0.6%	0.0%
Franklin to Brentwood	86.9%	12.1%	0.6%	0.5%
Franklin to Nashville Core	86.0%	14.0%	0.2%	0.0%
Spring Hill to Nashville Core	83.2%	15.9%	0.0%	0.9%
Spring Hill to Franklin	87.2%	12.4%	0.0%	0.4%
Giles to Franklin	76.4%	23.6%	0.0%	0.0%
<b>Study Area</b>	82.2%	10.4%	0.9%	6.4%
<b>Tennessee</b>	83.9%	9.6%	0.8%	5.8%
<b>Nationwide</b>	76.4%	9.7%	5.0%	8.8%

Source: US Census Bureau



# Deficiencies & Needs – Highways: Safety



	Hotspot Location Description (2013-2015)	Statewide Crash Rate	Segment Crash Rate	Segment v. Statewide
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Source: TRIMS





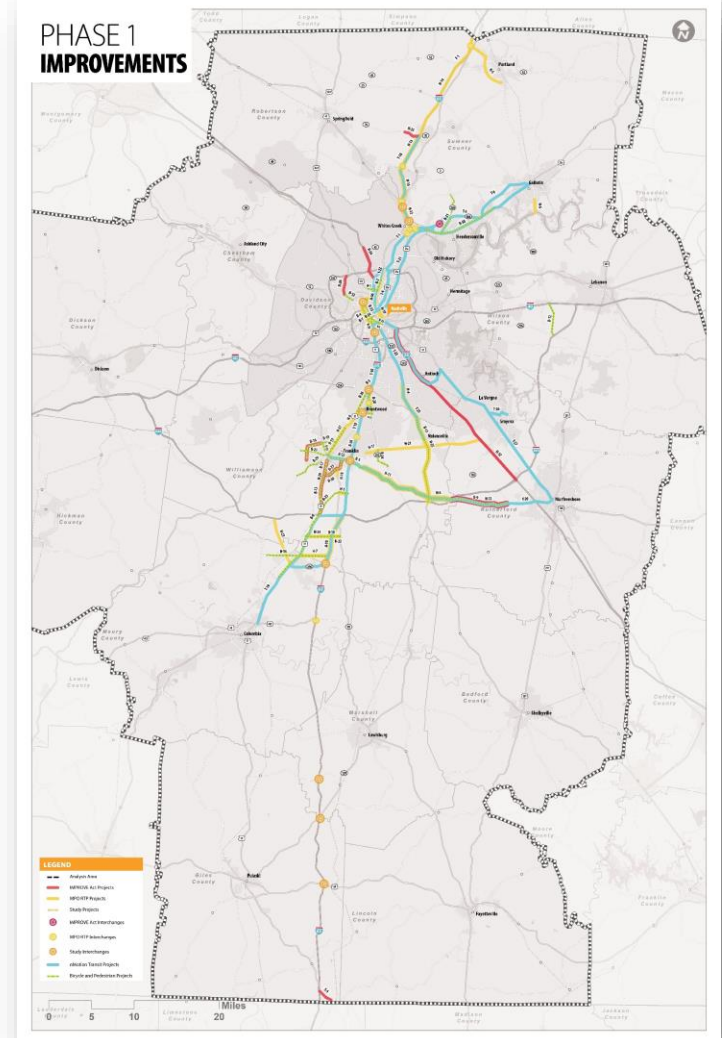


# Multimodal Solutions – Phase 1



# Multimodal Solutions – Phase 1

- 61 Highway, Freight and Safety Projects
- 27 Transit Projects
- 40 Bike/Ped Projects
- 19 ITS Projects
- TDM Coordinated and Expanded Services
- Other Potential Strategies and Solutions





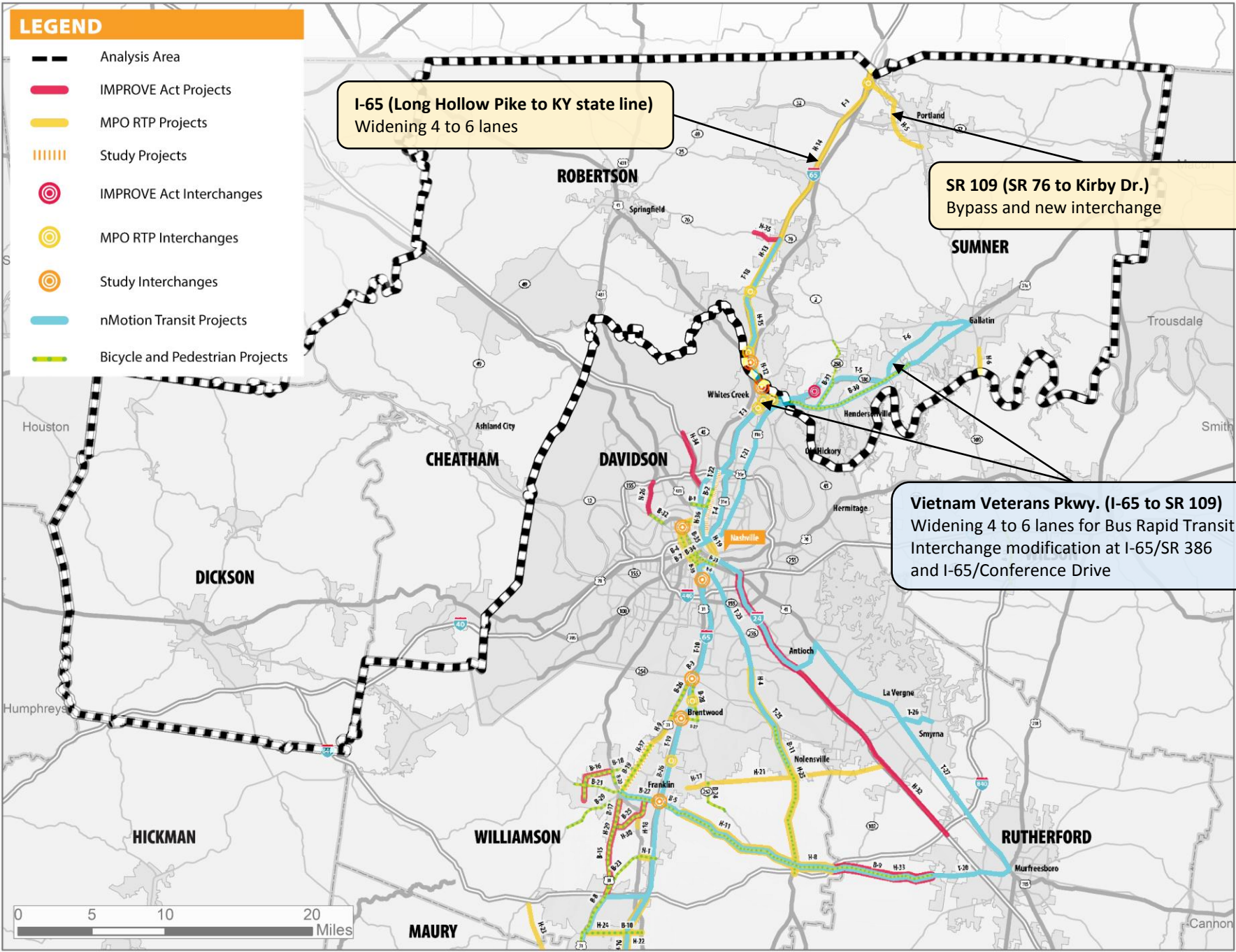
# LEGEND

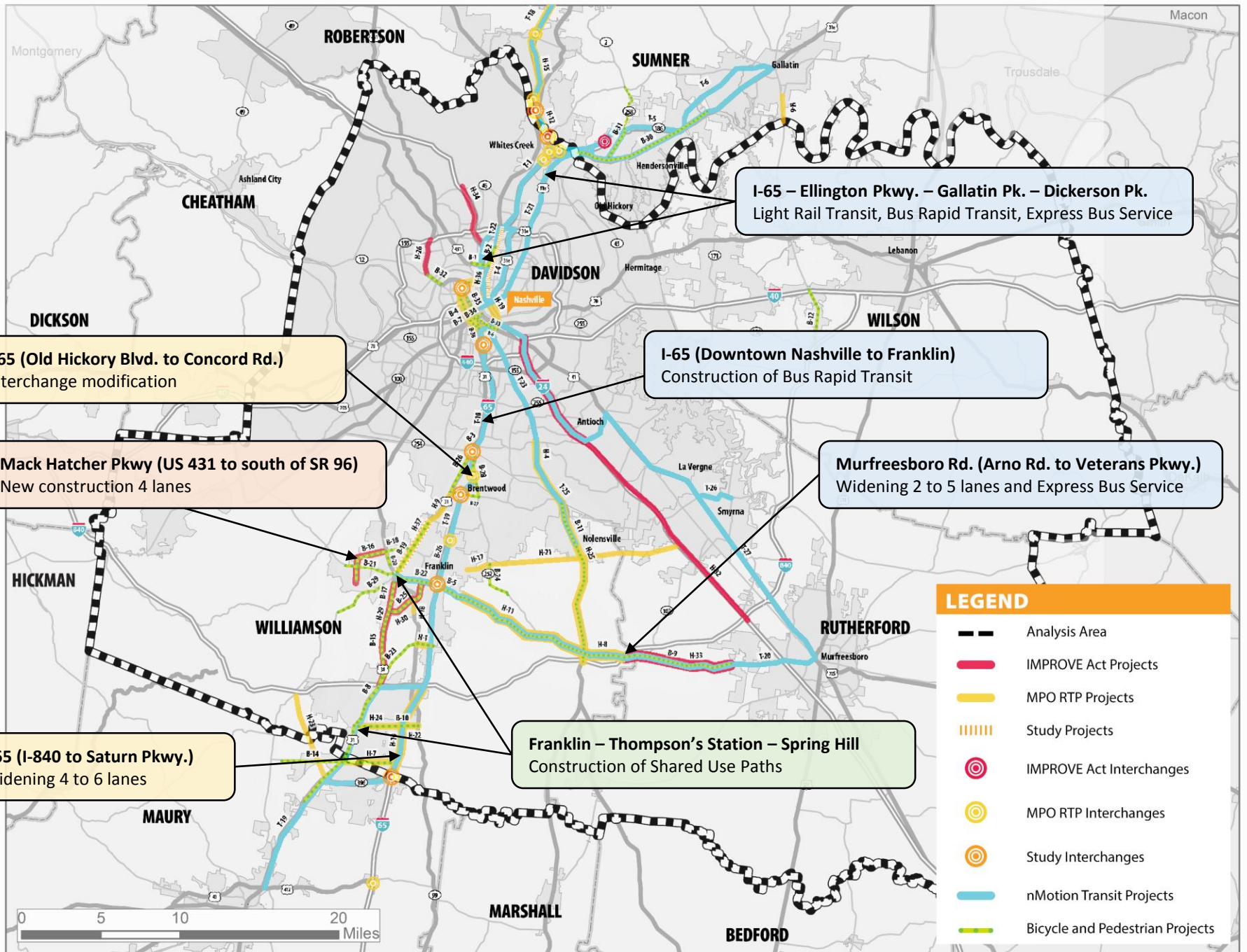
- Analysis Area
- IMPROVE Act Projects
- MPO RTP Projects
- Study Projects
- IMPROVE Act Interchanges
- MPO RTP Interchanges
- Study Interchanges
- nMotion Transit Projects
- Bicycle and Pedestrian Projects

**I-65 (Long Hollow Pike to KY state line)**  
Widening 4 to 6 lanes

**SR 109 (SR 76 to Kirby Dr.)**  
Bypass and new interchange

**Vietnam Veterans Pkwy. (I-65 to SR 109)**  
Widening 4 to 6 lanes for Bus Rapid Transit  
Interchange modification at I-65/SR 386  
and I-65/Conference Drive





**I-65 (Old Hickory Blvd. to Concord Rd.)**  
Interchange modification

**I-65 (Downtown Nashville to Franklin)**  
Construction of Bus Rapid Transit

**Mack Hatcher Pkwy (US 431 to south of SR 96)**  
New construction 4 lanes

**Murfreesboro Rd. (Arno Rd. to Veterans Pkwy.)**  
Widening 2 to 5 lanes and Express Bus Service

**I-65 - Ellington Pkwy. - Gallatin Pk. - Dickerson Pk.**  
Light Rail Transit, Bus Rapid Transit, Express Bus Service

**I-65 (I-840 to Saturn Pkwy.)**  
Widening 4 to 6 lanes

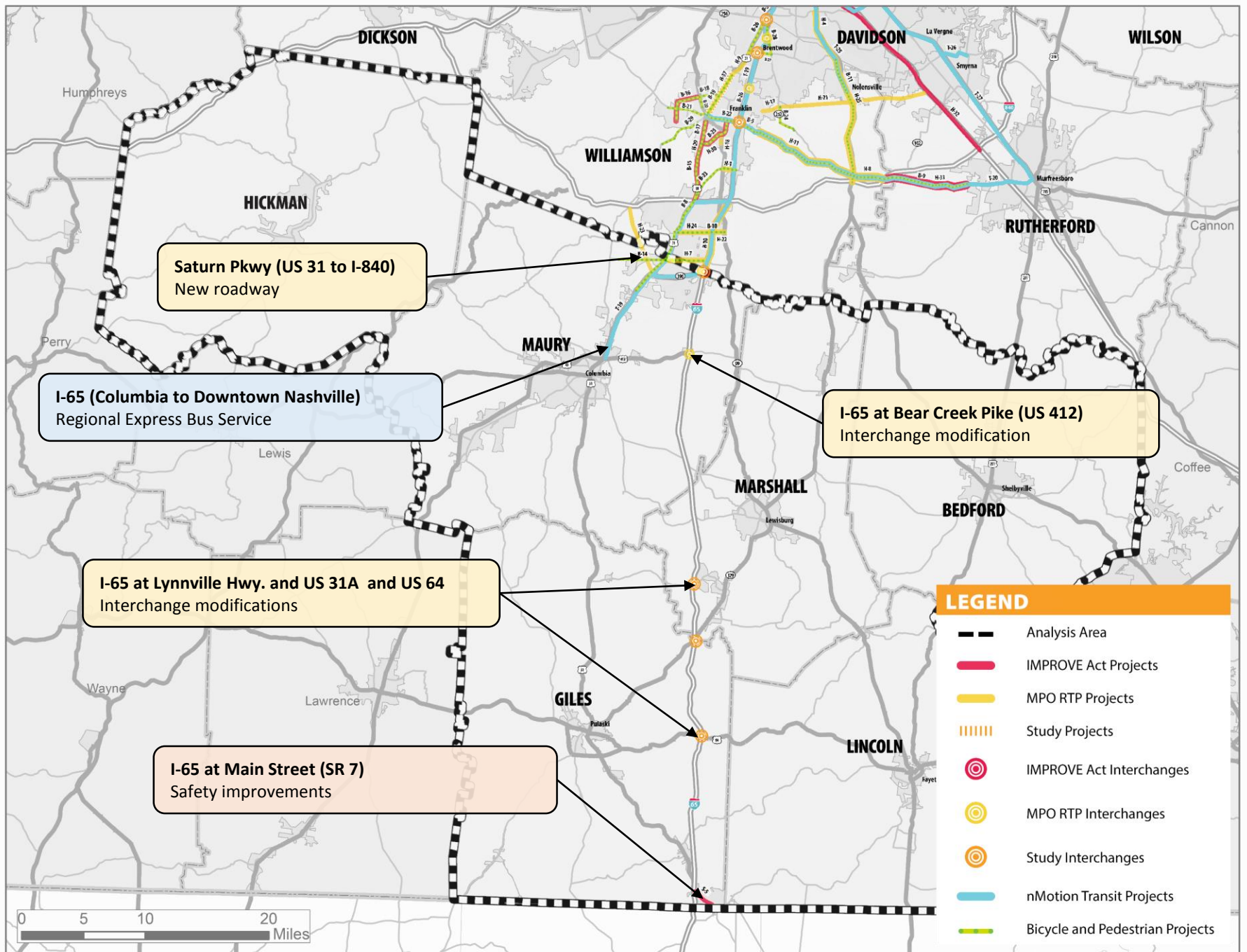
**Franklin - Thompson's Station - Spring Hill**  
Construction of Shared Use Paths

**LEGEND**

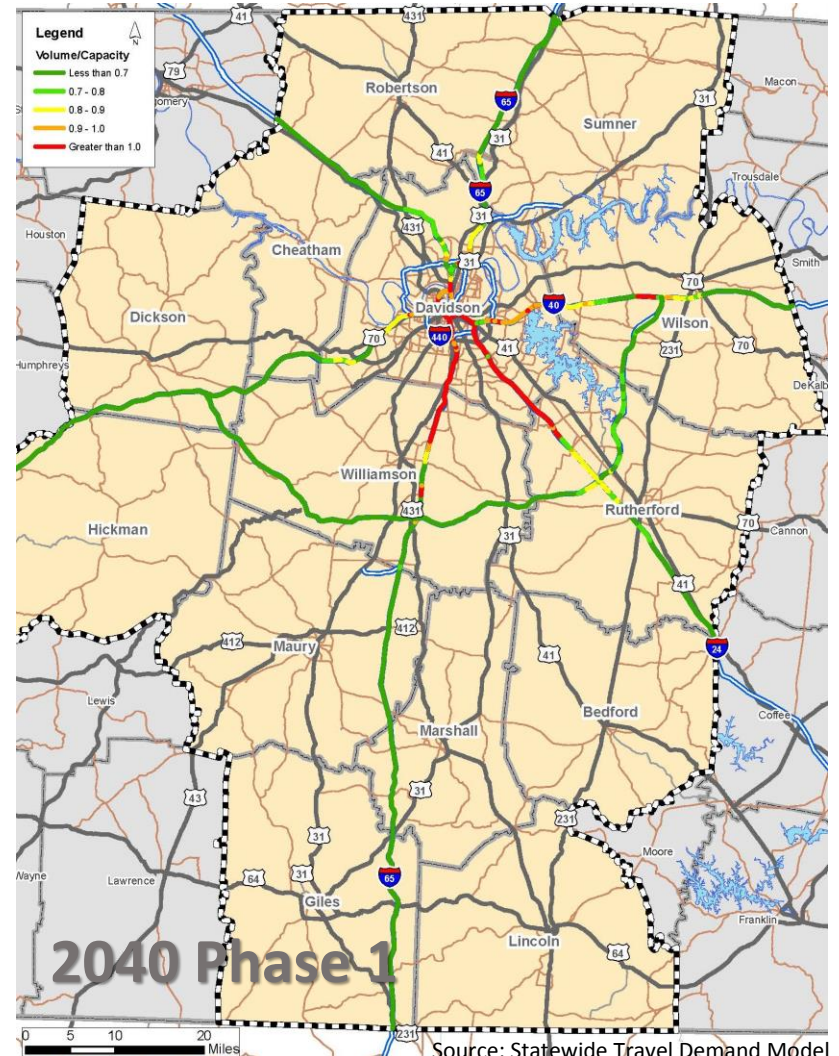
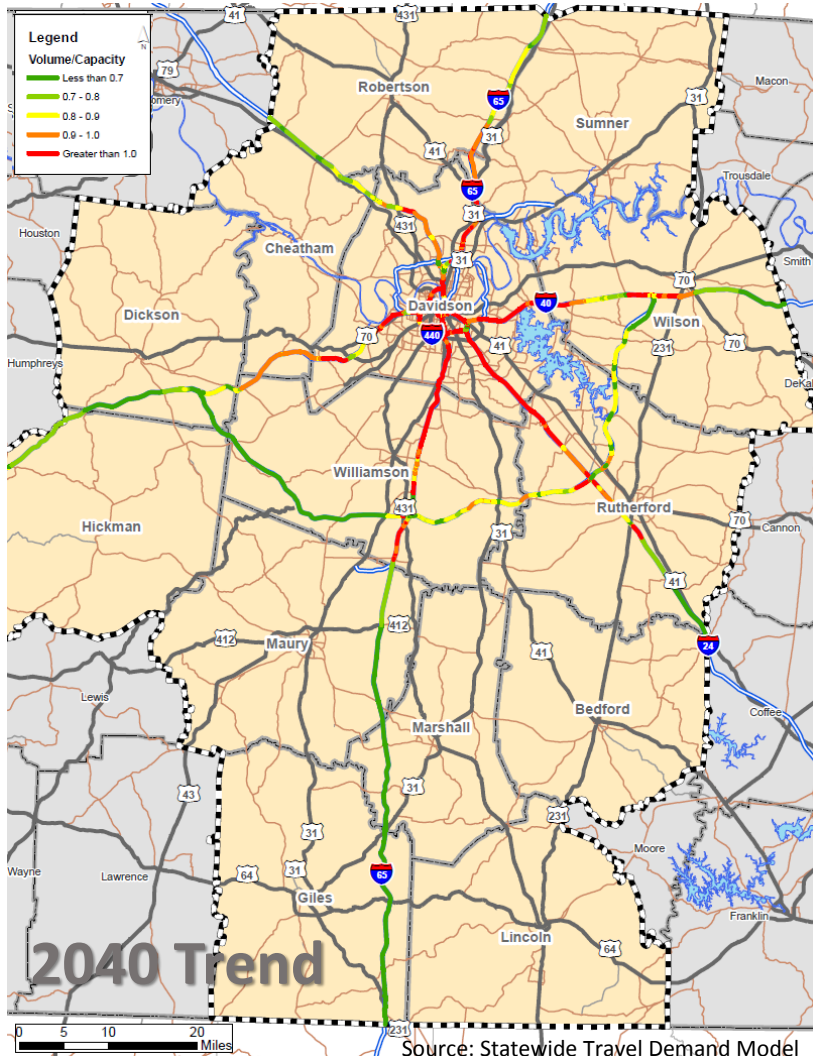
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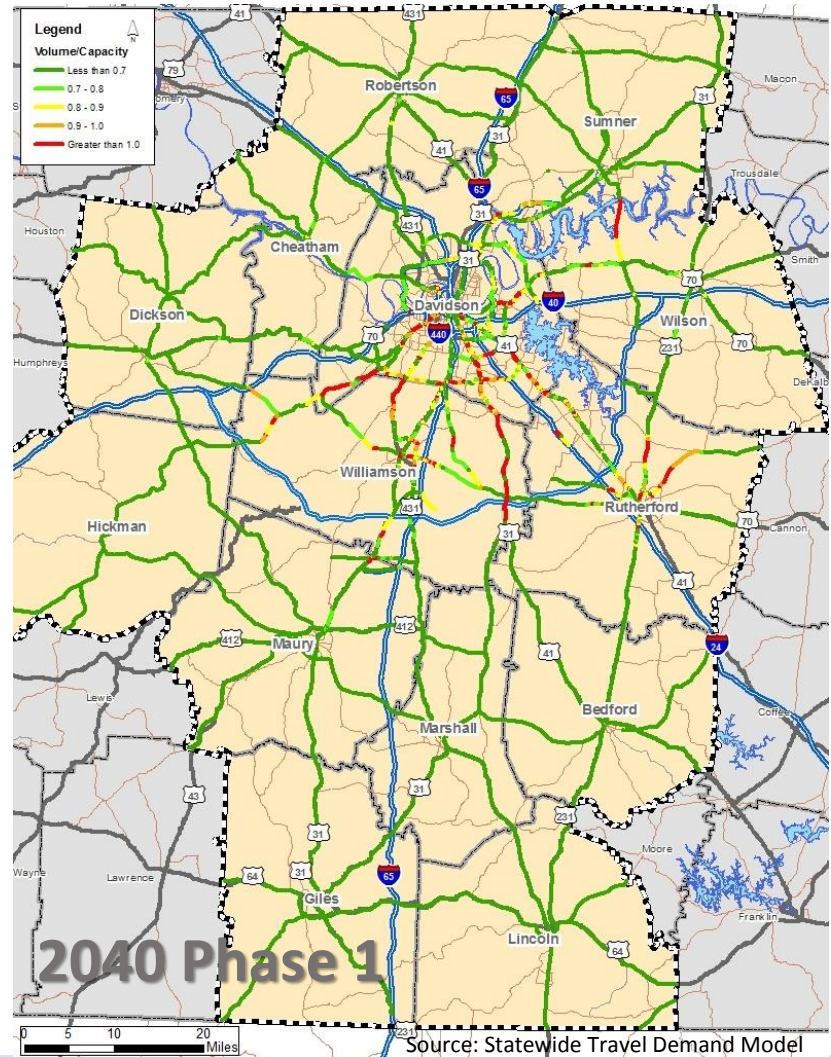
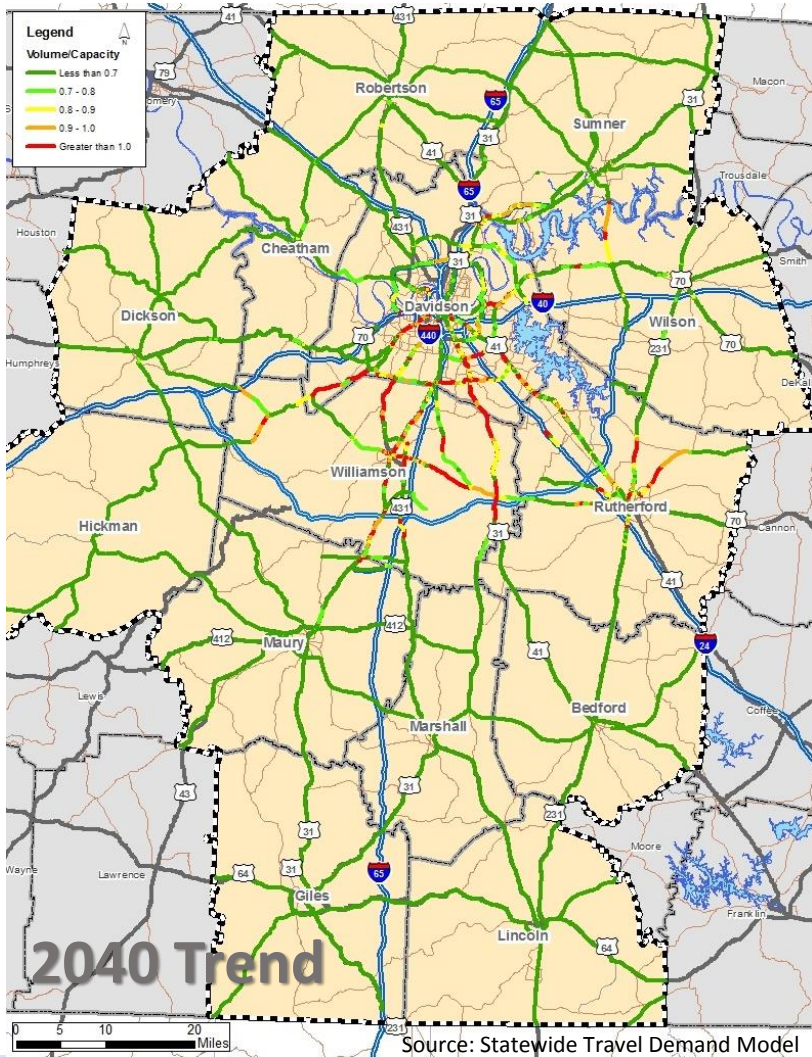


# Multimodal Solutions – Highways: Interstate Capacity





# Multimodal Solutions – Highways: Arterial Capacity



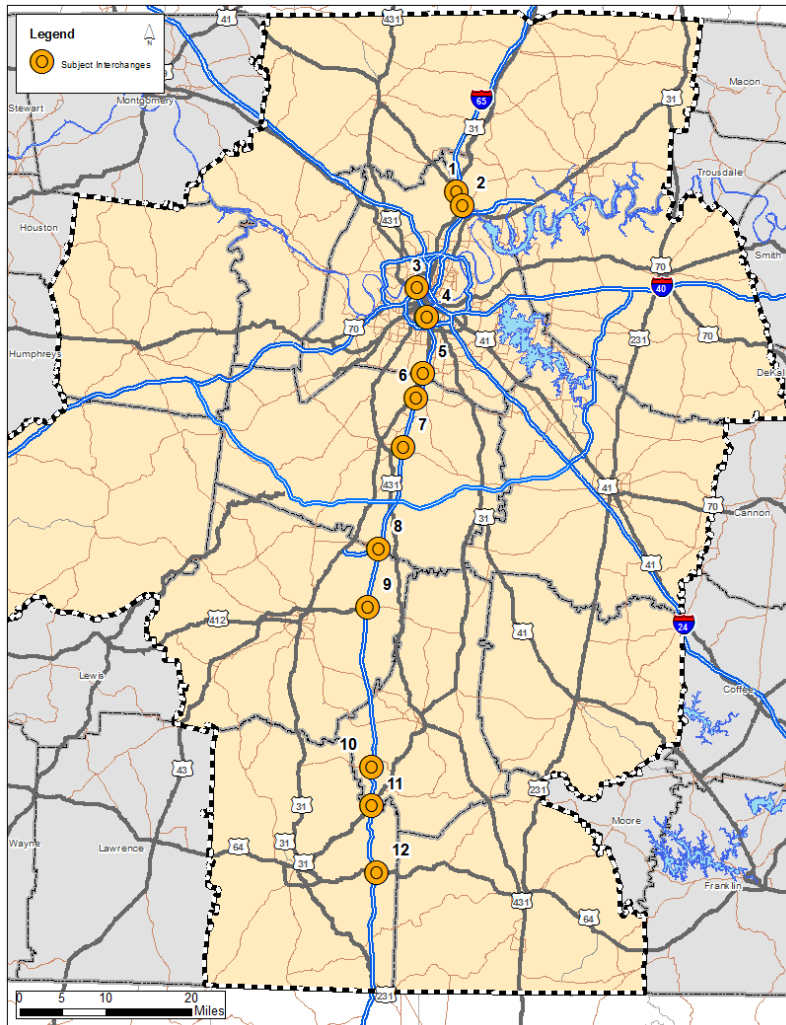


# Multimodal Solutions – Highways: Interstate Travel Times

I-65 Travel Markets	Travel Time (min)		
	2010	2040	2040 Phase 1
Portland to Nashville Core	41	47	46
Hendersonville to Nashville Core	25	32	31
South Nashville to Nashville Core	16	30	29
South Nashville to Franklin	22	37	36
Brentwood to Franklin	11	22	20
Franklin to Brentwood	10	21	17
Franklin to Nashville Core	29	59	53
Spring Hill to Nashville Core	36	64	62
Spring Hill to Franklin	20	36	29
Giles County to Franklin	56	69	63

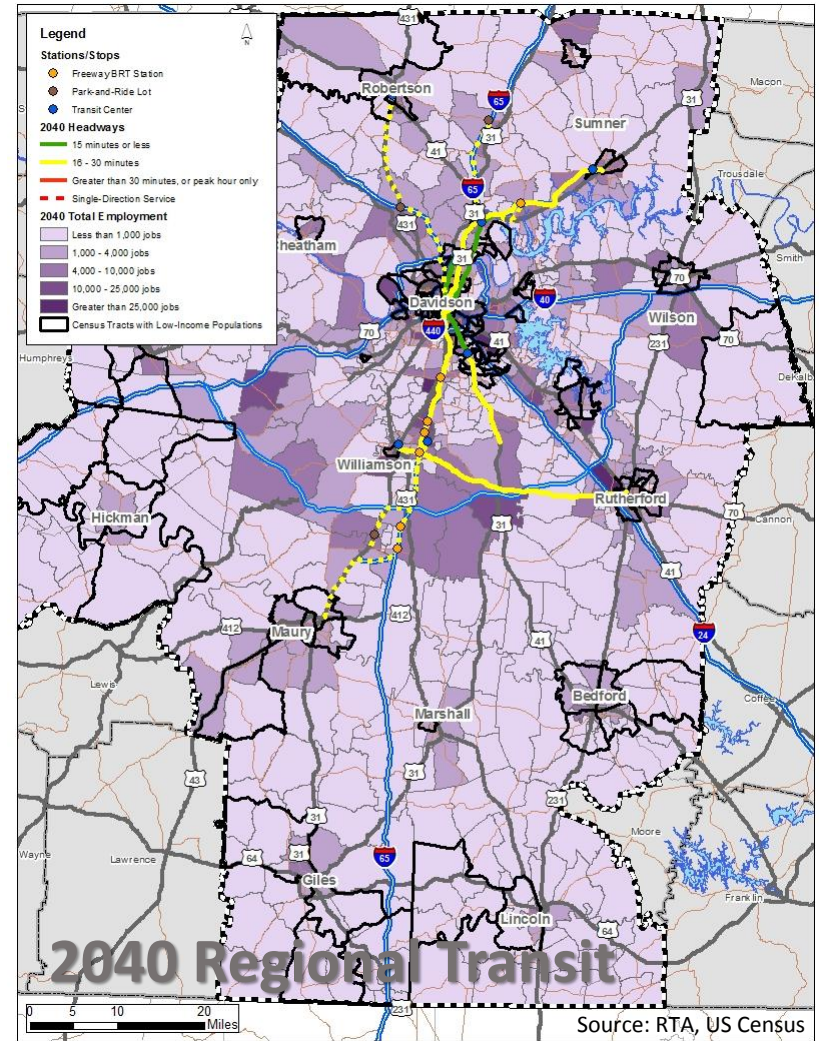
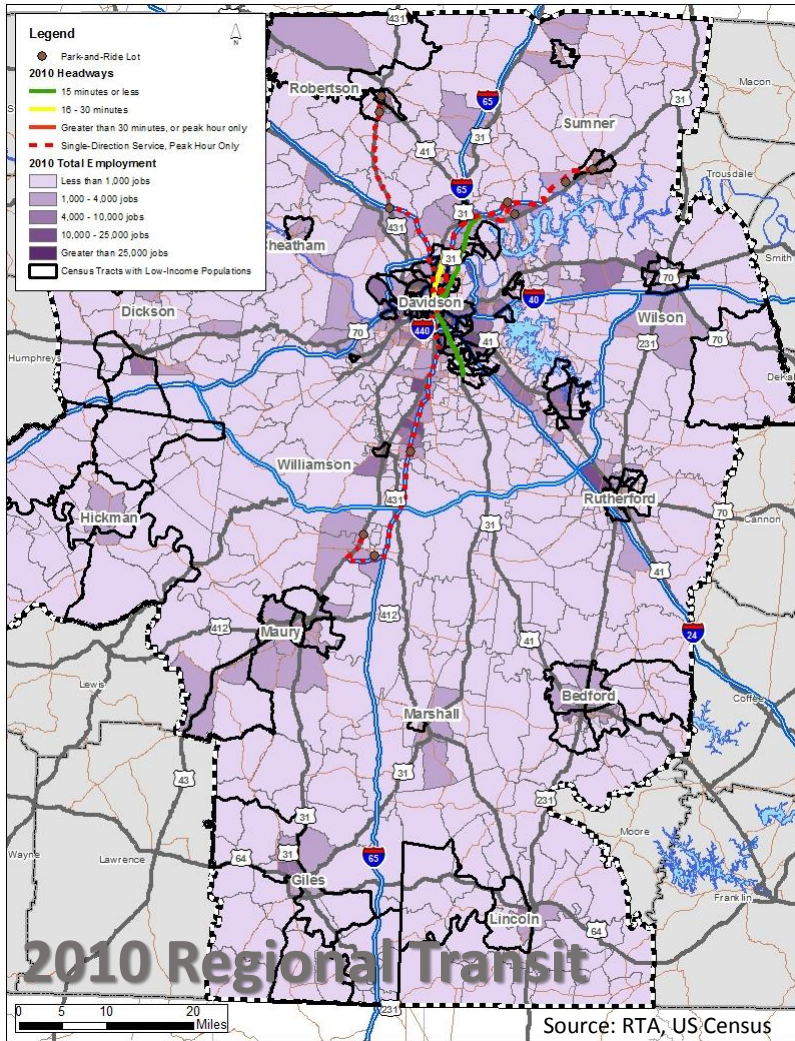
Source: Statewide Travel Demand Model

# Interchange Improvements



No.	Interchange	Daily Delay Savings (hrs.)	Crash Modification Factor
1	Exit 98: US-31W	7.4	0.7
2	Exit 97: SR-174 (Long Hollow Pike)	60.1	0.7
3	Exit 85: Rosa Parks Blvd	265.1	0.8
4	Exit 81: Wedgewood Ave	112.8	--
5	Exit 74: SR-254 (Old Hickory Blvd)	286.9	--
6	Exit 71: SR-253 (Concord Rd)	183.3	--
7	Exit 65: SR-96 (Murfreesboro Rd)	219.2	--
8	Exit 53: SR-396 (Saturn Pkwy)	--	0.7
9	Exit 46: SR-99/US-412	--	0.656
10	Exit 27: SR-129 (Lynnville Hwy)	--	--
11	Exit 22: SR-11/US-31A	--	0.656
12	Exit 14: SR-15/US-64	--	0.656

# Deficiencies & Needs – Regional Transit



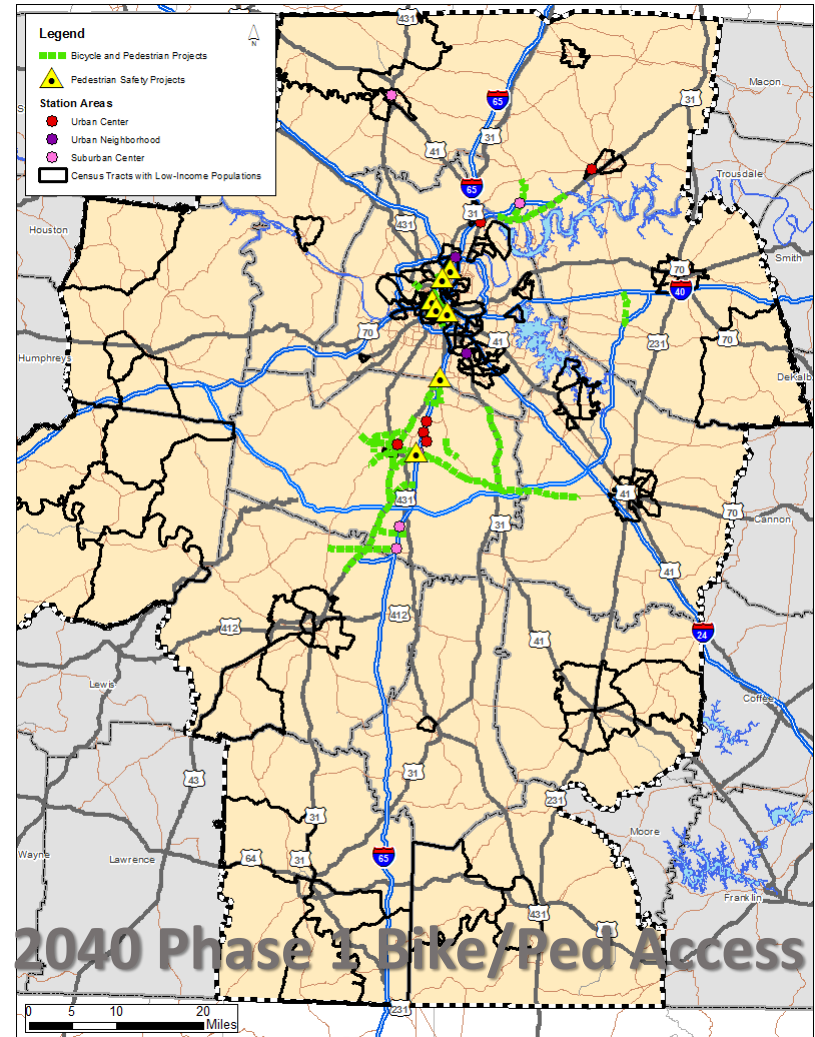
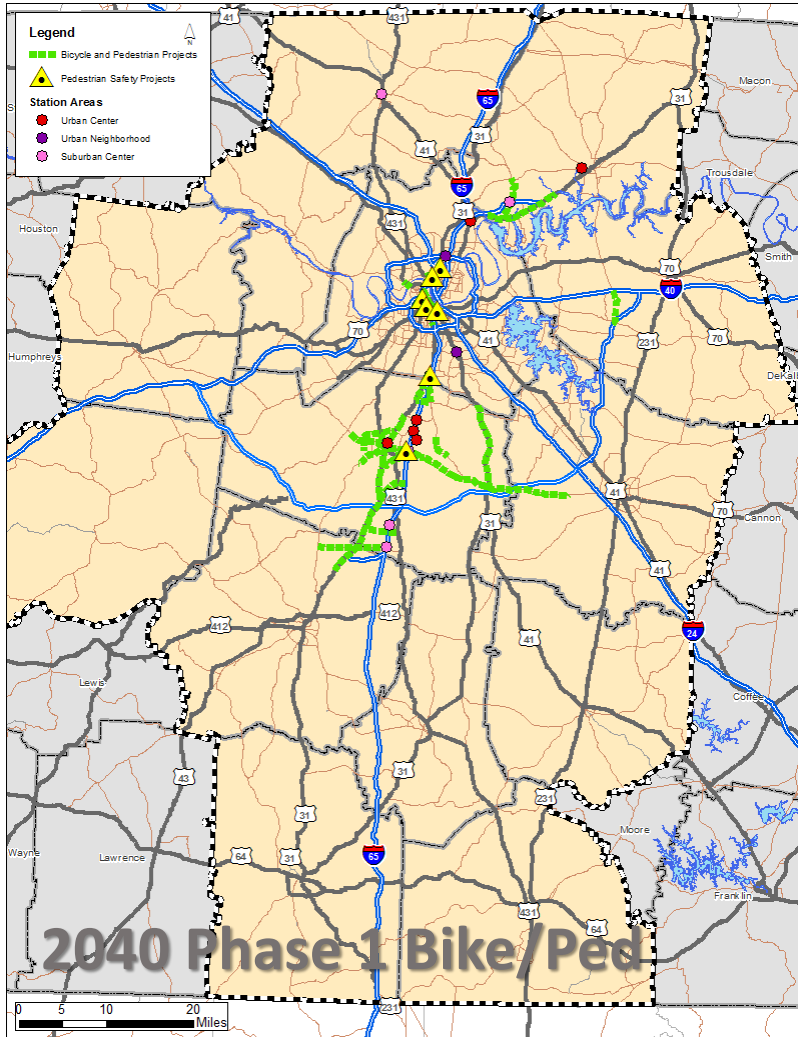
# Multimodal Solutions – Regional Transit

Regional Transit Station Area Development Densities								
	2040 Trend Totals				2040 Phase 1 Totals			
Station Areas	Total Population	Total Employment	Total People + Jobs	People + Jobs Density	Total Population	Total Employment	Total People + Jobs	People + Jobs Density
Urban Center	3,284	17,928	21,212	24	26,400	26,400	52,800	60
Urban Neighborhood	3,183	5,937	9,120	15	17,584	7,536	25,120	40
Suburban Center	4,050	7,675	11,725	9	15,072	10,048	25,120	20
<b>Total</b>	<b>10,517</b>	<b>31,540</b>	<b>42,057</b>	<b>15</b>	<b>59,056</b>	<b>43,984</b>	<b>103,040</b>	<b>38</b>

\* Excludes Music City Central

Accessibility & Equity			
Performance Measure	Unit	Trend (2040)	Phase 1 (2040)
People within a 5-Minute Walk or Bike Ride to a Station	Total People	Walk: 10,517 Bike: 138,611	Walk: 59,056 Bike: 187,150

# Multimodal Solutions – Bike/Ped





# Multimodal Solutions – Management & Operations

1. Intelligent Transportation Systems – CCTV, DMS
2. Adaptive Ramp Metering (ARM)
3. Active Arterial Management (AAM)
4. Dynamic On-Ramp Assignment
5. Connected Vehicle Technology Deployment
6. Conversion to Virtual Weigh Stations
7. Smart Truck Parking
8. Rapid Incident Scene Clearance (RISC) – Corridor Wide
9. Traffic Incident Management Team – Corridor Wide

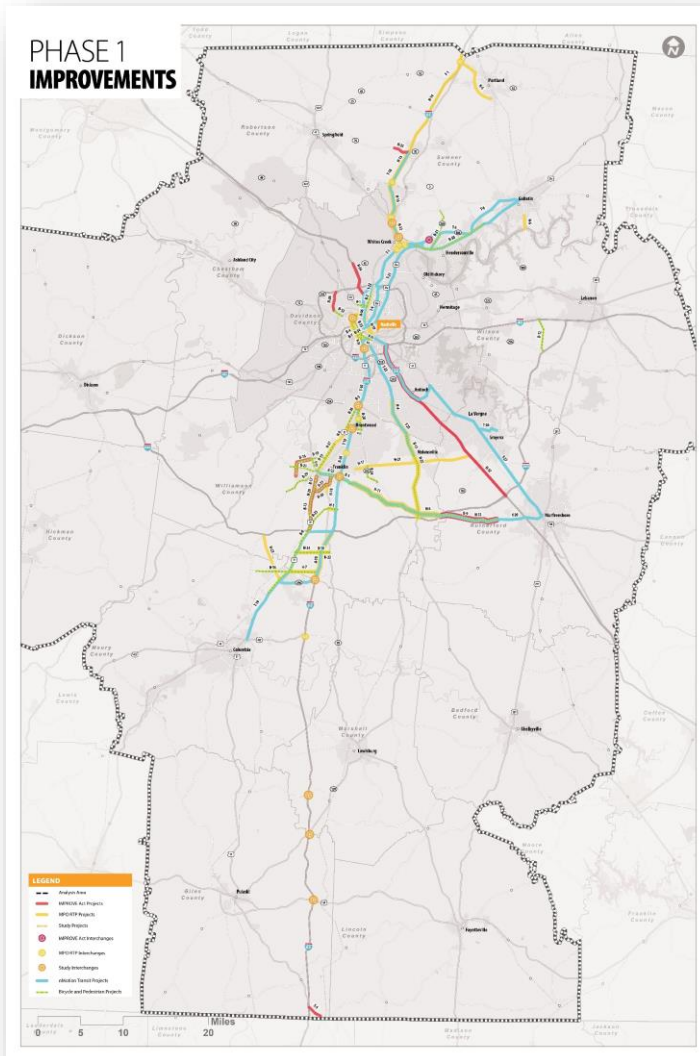
	Crash Reduction			Incident Duration			Corridor Throughput			Travel Times		
	Low	High	Median	Low	High	Median	Low	High	Median	Low	High	Median
2. Adaptive Ramp Metering (ARM)	-15%	-30%	-23%				5%	30%	18%	-13%	-26%	-20%
3. Active Arterial Management (AAM)			-30%							-7%	-35%	-21%
9. Traffic Incident Management Team				-30%	-40%	-35%				-8%	-13%	-11%

Source: FHWA

# Multimodal Solutions – Performance Measures

	Performance Measure	Unit	Base (2010)	Trend (2040)	Phase 1 (2040)
<b>Moving Autos and Trucks</b>	Auto Travel Times	Minutes	See "Auto Travel Times"		
	Auto Vehicle Miles Traveled (VMT)	Miles (1,000s)	173,652	279,757	279,885
	Auto Vehicle Hours of Delay (VHD)	Hours	101,746	431,384	391,309
	Truck Vehicles Miles Traveled (VMT)	Miles (1,000s)	6,524	12,030	12,090
	Truck Vehicle Hours of Delay (VHD)	Hours	16,204	27,147	27,103
<b>Moving People</b>	Person Throughput	Persons per Day	Vehicle: 177,086 (N) Transit: 483 (N)	Vehicle: 229,304 (N) Transit: 23,511 (N)	Vehicle: 231,676 (N) Transit: 28,213 (N)
			Vehicle: 204,464 (S) Transit: 612 (S)	Vehicle: 264,399 (S) Transit: 10,677 (S)	Vehicle: 277,375 (S) Transit: 12,813 (S)
<b>Safety</b>	Presence of Countermeasures at Safety Hotspots	High, Medium, or Low	See "Interchange & Bike/Ped Recommendations"		
<b>Land Use Coordination</b>	Presence of TOD at Stations	Total People and Jobs	27,995	42,057	103,040
<b>Equity and Accessibility</b>	People within a 5-Minute Walk or Bike Ride to a Station	Total People	Walk: 1,314 Bike: 43,953	Walk: 10,517 Bike: 138,611	Walk: 59,056 Bike: 187,150
<b>Air Quality/ Emissions</b>	Carbon Intensity	Pounds per Day per Person	99.07	96.35	96.47

# Multimodal Solutions – Phase 1 Summary



## Goal: World Class Transportation System that is Seamless, Efficient & Accessible

- ✓ Highway improvements will address capacity and related safety needs in many parts of the corridor
- ✓ Congested areas will continue to result in longer travel times for people and goods
- ✓ There are a series of smaller, short-term investments that can address operational and safety issues in a number of locations
- ✓ In order to support increased growth and travel demand, transit, bike/ped, TDM, and ITS infrastructure and services need to expand



# Multimodal Solutions – Additional Strategies

- Transit Station Area Planning
- Regional Commuter Services
- Hard Shoulder Running on Interstates
- Ramp Metering on Interstates
- HOV Performance & Enforcement
- Access Management in Interchange Areas