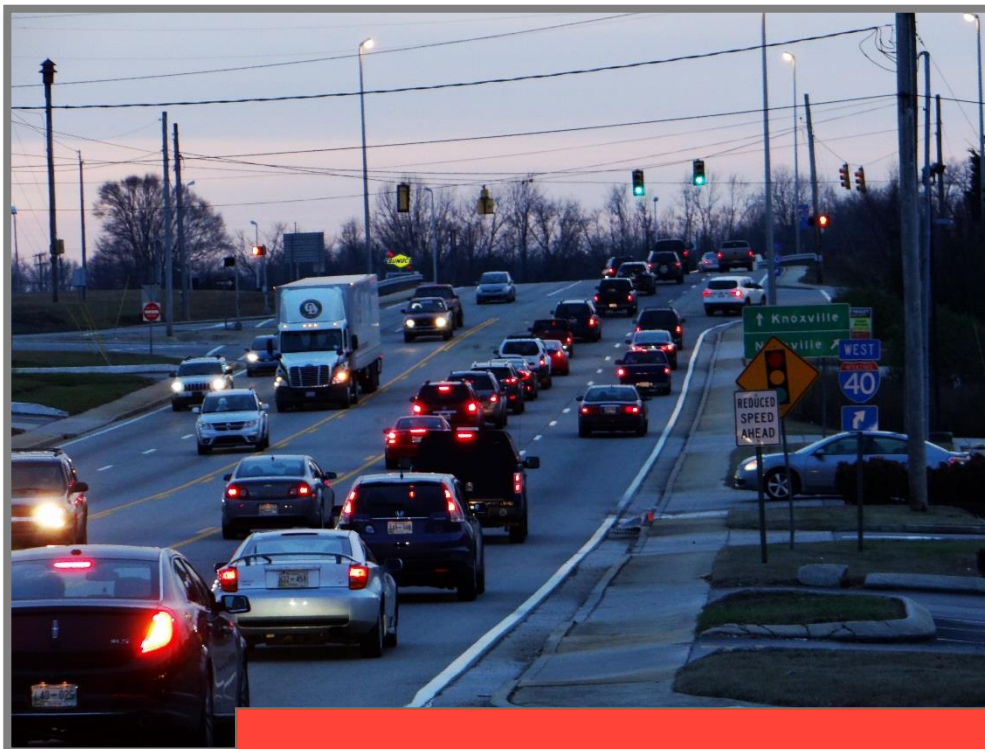




City of Cookeville Major Street Plan Update

October 2017

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1. Introduction

Part of the update to the City's Major Street Plan involves estimating the current level of service (LOS) for each functionally classified road. This technical memo discusses data collection, the analysis method used, and recommends an annual growth rate to be applied to existing traffic volumes to forecast future year traffic. It then presents updated roadway LOS for existing conditions (2015) and compares those values to the LOS projections developed for the 2003 Cookeville Major Route Transportation Plan.

2. Data Collection

Average Annual Daily Traffic (AADT) counts were obtained from Tennessee Department of Transportation (TDOT) traffic history¹ and supplemented with AADT counts performed by the City of Cookeville. At the majority of the locations, the most recent traffic counts were from 2015. Counts that were collected prior to 2015 were "grown" to 2015 volumes using the same growth rates assumed for projecting future year AADT (see Section 4, *Growth Rate Methodology*).

At a few locations where 2015 forecasts were based on much older count data, new counts were conducted by TDOT in September 2017 to verify AADT volume trends. The 2017 counts were found to be lower than the forecasted 2015 counts. To be conservative, the higher 2015 forecasts were used for projecting future year AADT. This traffic forecasting analysis used the highest volume along a segment when AADT counts were available at multiple locations along the segment.

3. Roadway Segment Level of Service Analysis

3.1. Methodology

The methods used to calculate LOS for the 2003 MRTP were reviewed with the goal of using a comparable approach so that values could be compared between the old and new plans.

The 2003 MRTP used 2002 traffic volumes to determine segment LOS values along street and roadway segments throughout Cookeville. The 2002 traffic volumes were projected to what were then future years of 2007 and 2027, and LOS values were determined for each of these two horizon years. Roadway segment LOS was estimated based on using the Florida Department of Transportation (FDOT) generalized planning methodology. The thresholds for the tables referenced in 2003 are shown graphically in **Figure 1**. As shown in the figure, link level of service values were determined using the number of lanes, signal spacing, and the link volume as inputs.

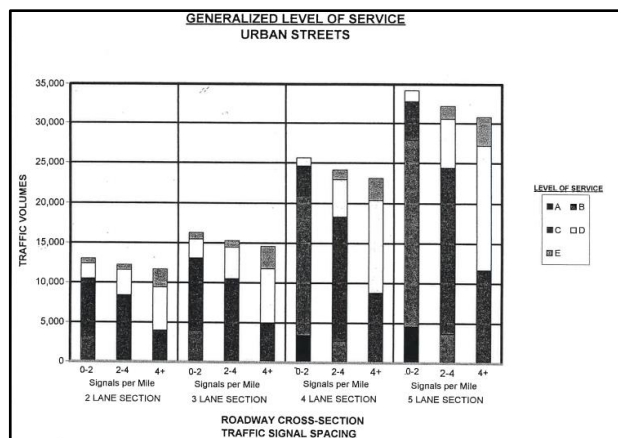
To facilitate a reasonable comparison with the 2003 MRTP, this analysis therefore uses the latest (2013) FDOT generalized service planning tables to determine the existing LOS for each roadway functional class, by segment. The LOS volume thresholds in the latest FDOT tables² vary based on the following factors:

- Population of surrounding area (Urbanized, Transitioning, Rural)
- Facility Type (signalized arterial, freeway, uninterrupted flow highway)
- Posted speed limit
- Geometry (number of lanes, median type, presence of turn lanes, etc.)

¹ <https://www.tdot.tn.gov/APPLICATIONS/traffichistory>

² <http://www.fdot.gov/planning/systems/programs/sm/los/pdfs/fdot%202012%20generalized%20service%20volume%20tables.pdf>

Figure 1: FDOT Generalized Service Volumes (figure referenced in Cookeville 2003 MRTPT)



The 2003 MRTPT update states that the thresholds in the Class I and Class II Signalized Arterials section of Table 2 of the FDOT tables were used to determine the segment LOS. However, it is not clear how the LOS of *unsignalized* street and roadway segments was determined in the 2003 MRTPT, and there is no guidance included with criteria reference shown in Figure 1. The 2013 Florida Quality/Level of Service Handbook³, which provides guidance for using the current generalized planning tables, also does not include guidance for unsignalized street and roadway segments.

This study therefore used the thresholds for a 2-lane undivided roadway in the Class II Signalized Arterials section of Table 2 of the FDOT tables with a 10% reduction in thresholds for non-state roadways as the base thresholds for unsignalized road segments. This provides a relatively conservative estimate for LOS thresholds for these roadways. Fisk Road, which has three lanes (center lane is reversible), was analyzed as a 2-lane roadway to be conservative.

3.2. Level of Service Results

Figure 2 shows the existing LOS for each functionally classified roadway in the city, by segment. In urban areas, LOS C and D are considered adequate, while LOS F represents undesirable operating conditions.

Table 1 lists each roadway segment and its current LOS, compared to the values from the 2003 MRTPT for the years 2002, 2007, and 2027. Three roadway segments currently operate at a failing level of service (LOS E or F):

- E. Spring Street (US 70N/SR 24) from SR 111 to I-40 (LOS E)
- E. 10th Street from Washington Avenue (SR 136) to Chocolate Drive (LOS F)
- E. Spring Street (US 70N/SR 24 from Avery Trace Middle School to Broad Street (LOS F)

E. 10th Street serves as a key corridor for those accessing Cookeville from north and east of the city but has limited capacity (two lanes plus a center turn lane). The relative importance of this segment is evidenced by the AADT, which exceeded 17,000 vehicles per day in 2015. This volume is higher than the traffic volumes on SR 24/US 70N in Cookeville and is high enough to result in an LOS F for this 3-lane

³ <http://www.fdot.gov/planning/systems/programs/SM/los/pdfs/2013%20QLOS%20Handbook.pdf>

facility. In addition to the traffic volumes, several factors along E. 10th Street further exacerbate the congestion issues including uncoordinated traffic signals and close spacing between driveways.

Similarly, E. Spring Street (US 70N/SR 24) serves as a key east-west corridor into and out of Cookeville to and from points south and east of the city. The two failing segments are both located east of downtown. The segment operating at LOS F, just east of downtown, has seen an increase of 1,800 vehicles per day in traffic volume since the 2003 MRTP report, which also documented this segment as operating at LOS F. Since the 2003 report was completed, this segment has been widened for a short distance to provide a center turn amidst multi-family residential and commercial driveways; however, the analysis still shows the segment operating at LOS F. The segment operating at LOS E is a two-lane segment with limited right or left-turn lanes that serves primarily suburban and semi-rural land uses.

As part of the existing conditions analysis it was noted that a reversible lane operation exists on Fisk Road between E. 10th Street and Shag Rag Road. A safety analysis of this segment determined that there is presently no significant crash history along this segment. However, as traffic on this roadway segment continues to increase this segment should be monitored to ensure that it continues to operate safely. Details of the crash history and safety analysis can be found in the Safety Report.

Figure 2: Existing Level of Service (2015) by Roadway Segment

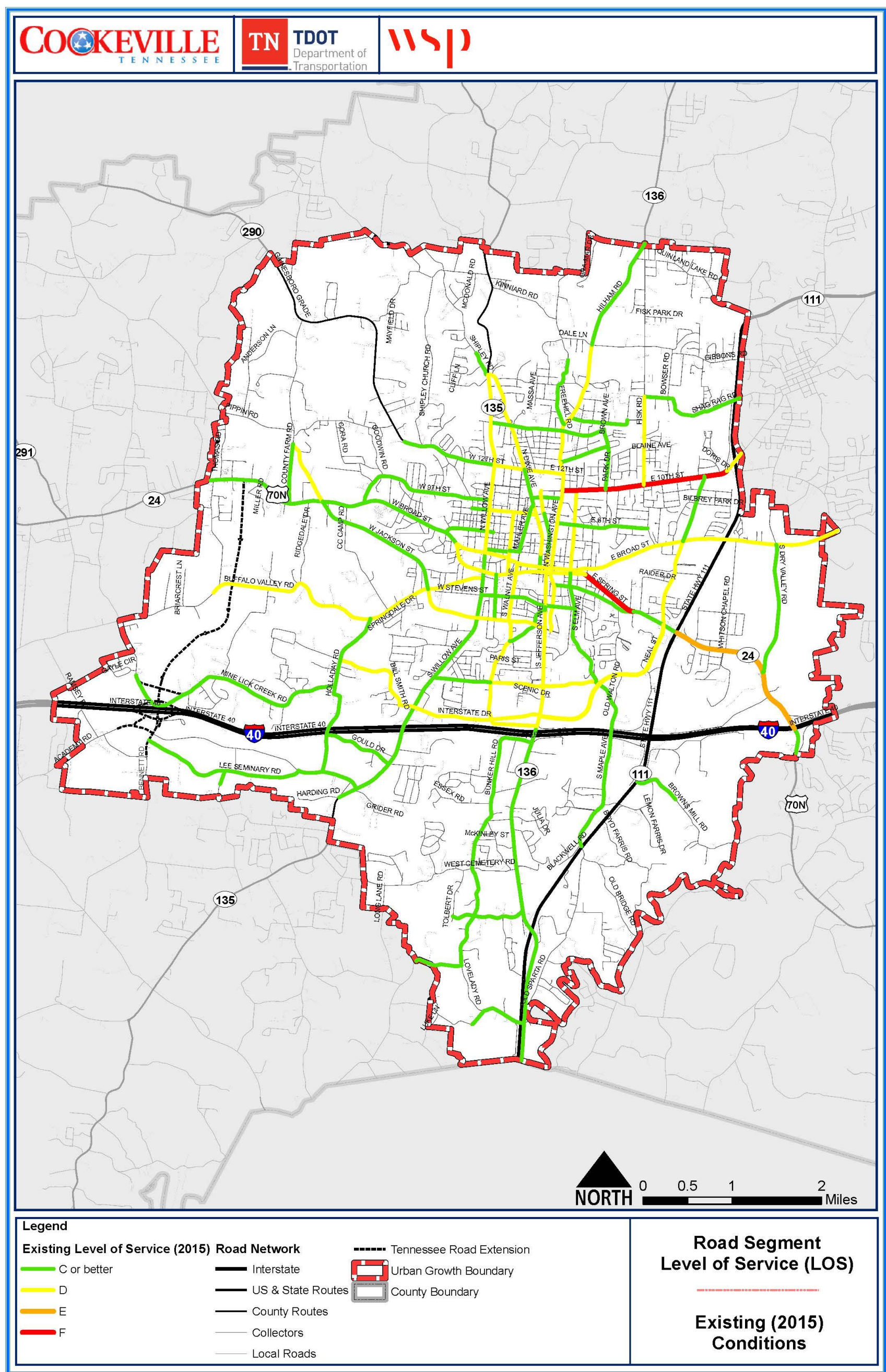


Table 1: Existing LOS (2015) by Roadway Segment, Compared to 2003 MRTF

Street	From	To	Class	2015 AADT	2015 LOS	2002 AADT	2002 LOS	Projected 2007 LOS	Projected 2027 LOS
1st Street West	Cedar Ave	Walnut Ave	Minor Collector	4,200	C				
1st Street East	Willow Ave	Cedar Ave	Minor Collector	948	C				
4th Street West	Broad St	Whitney Ave	Minor Collector	1,966	C	1,525	B	B	B
6th Street East	Washington Ave	Fisk Rd	Minor Collector	1967*	C	1,334	B	B	B
7th Street	Willow Ave	Dixie Ave	Major Collector	8,414	D	8,711	D	D	F
7th Street West	Franklin Ave	Willow Ave	Minor Collector	3,523	C	2,778	B	B	C
9th Street East	Dixie Ave	Washington Ave	Minor Collector	1,150†	C				
9th Street West/Crescent Drive	Broad St	Willow Ave	Minor Collector	3,083	C	2,360			
10th Street East	Washington Ave	Chocolate	Major Arterial	17,505	F	14,127	D	E	F
10th Street East	Chocolate	City Limits	Major Arterial	13,907	D	12,536	B	B	B
12th Street (SR 290)	City Limits	Franklin Ave	Minor Arterial	9,700†	C	7,500	C	C	D
12th Street (SR 290)	Franklin Ave	Willow Ave	Minor Arterial	9,283	C	8,272	B	B	B
12th Street	Willow Ave	Mississippi Ave	Minor Arterial	13796*	D	7,157	C	C	C
12th Street	Mississippi Ave	Washington Ave	Minor Arterial	10,116	D	5,093	C	C	C
15th Street East	Washington Ave	Brown Ave	Minor Arterial	1,677	C	1,369	B	B	B
20th Street East	Washington Ave	Summerfield Rd	Minor Collector	3,232	C	2,851	B	B	C
Bill Smith Road / Foreman Drive	Holladay Rd	Willow Ave	Major Collector	4,936	D	4,386	C	C	C
Broad Street / US 70N	City Limits	Jackson St	Major Arterial	8,362	C	8,588	C	C	F
Broad Street / US 70N	Jackson St	Spring St	Major Arterial	7,789	C	8,588	C	C	F
Broad Street	Spring St	Cedar Ave	Major Collector	6,687	D	6,171	C	C	C
Broad Street	Cedar Ave	Washington Ave	Major Collector	6992*	D	7,030	D	D	D
Broad Street	Washington Ave	Spring Extension	Major Collector	7941*	D	7,568	C	C	D
Broad Street	Spring Extension	US 111	Major Collector	5,461	D	4,300	C	C	C
Broad Street / Buck Mt. Road	US 111	City Limits	Major Collector	4,750	D	3,248	C	C	C
Brown Avenue	10th St.	Jere Whitson Rd	Minor Collector	2,646	C	2,531	B	B	C
Brown's Mill Road	US 111	City Limits	Minor Collector	900†	C				

†AADT is factored 2017 value

*AADT value was forecasted from 2013 AADT value

**AADT value was forecasted from 2012 AADT value

***AADT value was forecasted from 2007 AADT value

Table 1: Existing LOS (2015) by Roadway Segment, Compared to 2003 MRTP

Street	From	To	Class	2015 AADT	2015 LOS	2002 AADT	2002 LOS	Projected 2007 LOS	Projected 2027 LOS
Buffalo Valley Road	City Limits	Jackson St	Major Collector	6,508	D	4,651	C	C	C
Buffalo Valley Road	Jackson St	Willow Ave	Minor Collector	5,543	D	4,016	C	C	C
Bunker Hill Road	City Limits	Davis Rd	Major Collector	2516*	C	2,000	B	B	C
Bunker Hill Road	Davis Rd	S Jefferson Ave	Minor Collector	4,482	C	719	B	B	B
Cane Creek Road	City Limits	Lee Seminary Rd	Major Collector	328**	C				
Cedar Avenue	Spring St	7th St	Major Collector	4985*	D	3,784	C	C	C
County Farm Road	Spring St / US 70N	Pippin Rd	Minor Collector	923	C	Segment added to provide context			
Dixie Avenue	Spring St	1st St	Major Collector	4,520	C	7,109	D	D	D
Dixie Avenue	1st St	Mahler Ave	Major Collector	4769*	D	7,109	C	C	D
Dixie Avenue	Mahler Ave	12th St	Major Collector	8,353	C	7,308	C	C	D
Dixie Avenue	12th St	Willow Ave	Major Collector	4828*	D	6,606	C	C	D
Dry Valley Road	US 70N	Buck Mountain Rd	Major Collector	2,688	C	2,234	B	B	C
Fairground Street	Willow Ave	Walnut Ave	Major Collector	4124*	C	2,182	B	B	C
Fisk Road	10th St	City Limits	Major Collector	6,116	D	4,118	C	C	C
Foutch Drive	Walnut Ave	Jefferson Ave	Minor Collector	751	C	2,635	B	B	C
Freehill Road	Washington Ave	City Limits	Minor Collector	1275*	C	1,141	B	B	B
Gould Drive	Holladay Rd	Willow Ave	Minor Collector	2254*	C	2,362	B	B	C
Hawkins Crawford Road	City Limits	Mine Lick Creek Rd	Minor Collector	2,000	C				
Holladay Road	Lee Seminary Rd	Buffalo Valley Rd	Minor Collector	889*	C	3,700	C	C	C
Hudgens Street	Lowe Ave	Spring St	Minor Collector	2,854	C	2,944	B	C	C
Interstate Drive	Willow Ave	Jefferson Ave	Major Arterial	15,197	D	12,929	B	B	B

†AADT is factored 2017 value

*AADT value was forecasted from 2013 AADT value

**AADT value was forecasted from 2012 AADT value

***AADT value was forecasted from 2007 AADT value

Table 1: Existing LOS (2015) by Roadway Segment, Compared to 2003 MRTP

Street	From	To	Class	2015 AADT	2015 LOS	2002 AADT	2002 LOS	Projected 2007 LOS	Projected 2027 LOS
Jackson Street	Broad St	Cane Creek Elementary	Major Arterial	10,132	C	8,138	B	B	B
Jackson Street	Cane Creek Elementary	Buffalo Valley Rd	Major Arterial	11,161	C	9,088	C	C	C
Jackson Street	Buffalo Valley Rd	Willow Ave	Major Arterial	18,260	D	11,281	C	C	C
Jackson Street	Willow Ave	Scott Ave	Minor Arterial	13182***	D	13,117	D	D	D
Jackson Street	Scott Ave	Walnut Ave	Minor Arterial	13,048	D	13,117	D	D	E
Jackson Street	Walnut Ave	Jefferson Ave	Minor Arterial	13,246	D	13,117	B	B	B
Jefferson Avenue	City Limits	US 111 NB Ramps	Minor Collector	2,598	C	2,427	B	B	C
Jefferson Avenue (SR 136)	US 111 NB Ramps	Davis Rd	Major Arterial	11,270	C	13,331	D	D	F
Jefferson Avenue (SR 136)	Davis Rd	Bunker Hill Rd	Major Arterial	14,836	C	13,331	B	B	C
Jefferson Avenue (SR 136)	Bunker Hill Rd	I-40	Major Arterial	14,836	C	13,331	D	D	D
Jefferson Avenue (SR 136)	I-40	Stevens St	Major Arterial	24,357	D	25,551	D	D	F
Jefferson Avenue (SR 136)	Stevens St	Spring St	Major Arterial	15,138	D	15,280	D	D	F
Jefferson Avenue	Spring St	1st St	Minor Collector	7874***	D	1,924	C	C	C
Jefferson Avenue	1st St	7th St	Minor Collector	2221*	C	2,060	B	B	C
Jefferson Avenue	7th St	10th St	Minor Collector	5,870	D	4,828	C	C	C
Jere Whitson Road	Willow Ave	Brown Ave	Minor Collector	4184*	C	4,166	C	C	C
Lee Seminary Road	Bennett Rd	Holladay Rd	Minor Collector	910	C				
Lee Seminary Road	Holladay Rd	Burgess Falls Rd	Minor Collector	1,063	C				
Lovelady Road	City Limits	Jefferson Ave	Minor Collector	441	C	533	B	B	B
Lowe Avenue	Jackson St	Spring St	Minor Arterial	11048***	D	11,870	D	D	D
Mahler Avenue	1st St	6th St	Major Collector	4,209	C	2,702	B	B	C
Mahler Avenue	6th St	Dixie Ave	Major Collector	4,209	C	2,702	B	B	C
Maple Avenue	10th St	Broad St	Major Collector	6154**	D	2,983	B	C	C
Maple Avenue	Broad St	Hudgens St	Major Collector	4602*	C	1,392	B		
Maple Avenue	Hudgens St	Veterans Dr	Major Collector	3,647	C	2,123	B	B	C
Maple Avenue	Veterans Dr	I-40 Overpass	Minor Collector	4,204	C	2,196	B	B	B
Maple Avenue	I-40 Overpass	US 111	Minor Collector	2,626	C	3,517	C	C	C
Mine Lick Creek Road	City Limits	Holladay Rd	Minor Collector	1148*	C				
Neal Street	Jefferson Ave	Spring St	Major Arterial	14,630	D	11,269	B	B	B

*AADT is factored 2017 value

*AADT value was forecasted from 2013 AADT value

**AADT value was forecasted from 2012 AADT value

***AADT value was forecasted from 2007 AADT value

Table 1: Existing LOS (2015) by Roadway Segment, Compared to 2003 MRTF

Street	From	To	Class	2015 AADT	2015 LOS	2002 AADT	2002 LOS	Projected 2007 LOS	Projected 2027 LOS
Old Kentucky Road	Spring St	Broad St	Major Collector	7,732	D	5,701	C	C	C
Old Kentucky Road	Broad St	10th St	Major Collector	5,837	C	Segment added to provide context			
Pigeon Roost Creek Road	City Limits	Jefferson Ave	Minor Collector	1,127	C	1,247	B	B	B
Pippin Road	US 70N	County Farm Rd	Minor Collector	5656*	D	Segment added to provide context			
Scott Avenue	Jackson St	Spring St	Minor Collector	3797*	C	2,827	C	C	C
Summerfield Road / Shag Rag Road	Fisk Rd	City Limits	Minor Collector	1,579	C	1,712	B	B	B
Shipley Road	City Limits	Willow Ave	Minor Collector	2382*	C	2,343	B	B	C
Stevens Street	Willow Ave	Maple Avenue	Minor Collector	4,478	C	3,369	C	C	C
Veterans Drive	Walnut Ave	Neal St	Minor Collector	8,255	D	5,068	C	C	C
Walnut Avenue	Broad St	Interstate Dr	Major Collector	8,931	D	4,845	C	C	C
Walnut Avenue	Interstate Dr	Jefferson Ave	Minor Collector	5,879	D	4,056	D	D	D
N Washington Ave (SR 136)	Spring St	Broad Ave	Major Arterial	10301***	D	12,495	E	E	F
N Washington Ave (SR 136)	Broad Ave	1st St	Major Arterial	11,523	D	12,495	C	C	C
N Washington Ave (SR 136)	1st St	10th St	Major Arterial	16,640	D	13,484	D	E	F
N Washington Ave (SR 136)	10th St	15 St/17th*	Major Arterial	15,256	D	9,446	B	B	B
N Washington Ave (SR 136)	15 St/17th	Whitaker Springs	Major Arterial	9660*	D	5,582	D	D	D
N Washington Ave (SR 136)	Whitaker Springs	City Limits	Minor Arterial	4,867	C	5,671	C	C	C
N Willow Ave (SR 135)	Dixie Ave	12th St	Major Arterial	8,495	D	7,711	C	C	E
N Willow Ave (SR 135)	12th St	Broad St	Major Arterial	16,076	D	15,361	C	C	F
S Willow Ave (SR 135)	Broad St	I-40	Major Arterial	24,690	C	23,878	C	D	F
S Willow Ave (SR 135)	I-40	City Limits	Major Arterial	14,925	C	14,943	F	F	F
Spring St East (US 70N)	City Limits	I-40	Major Arterial	8,623	C	8,170	C	C	F
Spring St East (US 70N)	I-40	US 111	Major Arterial	11,256	E				
Spring St East (US 70N)	US 111	Old Kentucky Rd	Major Arterial	17,034	C	12,294	D	D	D
Spring St East (US 70N)	Old Kentucky Rd	School	Major Arterial	13,802	C	13,495	D	D	F
Spring St East (US 70N)	School	Split	Major Arterial	15269*	F	13,495	F	F	F
Spring St East (US 70N)	Split	Walnut Ave	Major Arterial	10,760	D	10,312	D	D	F
Spring St East (US 70N)	Walnut Ave	Broad St	Major Arterial	8,341	D	8,415	C	C	D

†AADT is factored 2017 value

*AADT value was forecasted from 2013 AADT value

**AADT value was forecasted from 2012 AADT value

***AADT value was forecasted from 2007 AADT value

4. Growth Rate Methodology

Before projecting future roadway LOS, it is necessary to determine the traffic growth rates to be applied.

Growth rates for the SR 135, SR 136 and SR 24/US 70N corridors have already been proposed and documented separately in the Corridor Analysis Existing Conditions Report. (See Table 9 in that report.)

A 1 percent annual growth rate is recommended for use on the city's other arterial corridors, based on analysis of historical growth rates across all count locations in Cookeville, excluding I-40 and SR 111. As shown in **Table 2**, the average of the 5, 10, and 15-year historical traffic growth rate for these stations is just over 1 percent.

Table 2: Annual Growth Rate Based on Historical Traffic Counts

Count Stations	Annual Growth Rate			Average
	5-year	10-year	15-year	
<i>Cookeville Stations</i>	0.29%	1.28%	1.45%	1.01%

With a conservative assumption that the major arterials will reach saturation, causing motorists to use non-arterial routes, it is reasonable to assume that traffic volumes will grow at a higher rate for non-arterial roadways. Accordingly, a 1.5 percent annual growth rate in traffic volumes has been used to project future volumes on corridors that are not functionally classified as arterials.

5. Future Roadway Segment Level of Service Analysis

5.1. Future Volume Development

Annual Average Daily Traffic (AADT) volumes were forecast for the 2040 conditions using the growth rates listed in **Table 3** and the 2015 AADT volumes (**Table 1**, Section 3.2).

Table 3: Growth Rates Used to Forecast 2040 AADT Volumes

Corridor	Growth Rate
S. Willow Ave./N. Willow Ave. (SR 135)	0.50%
S. Jefferson Ave./N. Washington Ave. (SR 136)	0.75%
Spring Street/Broad Street (US 70N, SR 24)	2.00%
E. 10th Street	1.00%
Broad Street	0.50%
All Other Arterial Corridors	1.00%
All Other Collector Corridors	1.50%

Source: *Cookeville Corridor Analysis, WSP, 2017.*

Future volumes were forecast using a growth formula based on the following equation and rounded-up to the nearest multiple of 25:

$$\text{Future AADT} = \text{Existing AADT} \times [1 + \text{growth rate}(\text{future year} - \text{existing year})]$$

Once 2040 volumes were forecast, the 2040 Level of Service (LOS) for each roadway segment was determined using the most recent Florida Department of Transportation (FDOT) generalized service planning tables⁴. The Existing Roadway LOS report also used the FDOT service planning tables.

5.2. Programmed Improvements

The current list of proposed improvements to the transportation network in Cookeville is found in the Cookeville 2030 Plan⁵. A list of all projects and their status as of October 2017 is shown in **Table 4** and depicted in map form in **Figure 3**. This list was reviewed with City of Cookeville staff to document the current status of each project (categorized as completed, in progress, funded, or not funded). At the time of writing, of the 38 total projects, six projects have been completed, two projects are in progress and two projects are funded.

Projects in progress include the construction of the new “5th exit” interchange on I-40 (Project 1) and the Bennett Road Extension project (now called Tennessee Avenue) to connect the new interchange to West Broad Street (US 70N, SR 24) (Project 2). The remaining length of Tennessee Avenue, from West Broad Street (US 70N, SR 24 north to Gainesboro Grade (SR 290) is not currently programmed for funds.

⁴ <http://www.fdot.gov/planning/systems/programs/sm/los/pdfs/fdot%202012%20generalized%20service%20volume%20tables.pdf>

⁵ <http://www.cookeville-tn.gov/uploads/planning/files/compplan/Cookeville2030Plan.pdf>

Table 4: Current Status of Projects in the 2030 Cookeville Plan (as of October 2017)

Project No.	Project Name	Limits	Description	Status
1	Construction of I-40 interchange at Mine Lick Creek Rd			In Progress
2	Construction of Western North-South Connector	I-40 to US 70N in progress. US 70N to SR 290 not funded.		In Progress (Partial Project)
3	Construction of Southern East-West Connector	SR 111 in White County to new interchange	E-W connection S. of I-40 from SR 111, SR 136, and SR 135 to I-40	
4	Construction of Northern East-West Connector		E-W connection N. of Cookeville from SR 111, SR 136, and SR 135 to SR 290.	
5	Construction of Regional Industrial/Business Park Street		Highlands Park Boulevard	Complete
6	Extension and Widening of Lee Seminary Rd			Complete
7	Widening of S. Willow Ave. (SR 135)	South of I-40	Increase capacity on SR 135 South of I-40	
8	Construction of Bunker Hill Rd. Tunnel/Bridge	Connect Bunker Hill Road to S. Walnut Avenue	N-S connection parallel to and between SR 135 and SR 136	
9	Construction of I-40 Parallel Access Street	Bunker Hill Road S. of I-40 to Green Gate Lane	E-W connection S. of I-40 from SR 136 to SR 135	
10	Extension of W. Cemetery Rd	Bunker Hill Road to SR 136		Complete

(continued from previous page)

Project No.	Project Name	Limits	Description	Status
11	Extension of Farrell Dr.		E-W connection from SR 136 to S. Maple Ave	
12	Widening of E. Spring St. (US 70N, SR 24)	SR 111 to I-40	Widen US 70N to 5 lanes	
13	Widening of E. Spring Street (US 70N, SR 24)	Avery Trace MS (near SR 111) to Broad Street	Widen to 3 or 5 lanes	
14	Widening of W. Broad Street (US 70N, SR 24)	W. Spring St. to N-S Road in Project No. 2	Widen to 3 or 5 lanes	
15	Improvements to East Hudgens St. and S. Maple Ave. Intersection			Complete
16	Widening of E. 10th St.	SR 111 to SR 136	Widen to 5 lanes	
17	Extension of Foreman Dr.	SR 135 to Holladay Rd	Construct Road	
18	Extension of Commerce Ave. to Veterans Dr.	Whitson Ave to Veterans Dr	Construct Road	
19	Construction of turn lane on W. Jackson St.	SR 135 to SR 136	Add center turn lane	
20	Improvements to Buffalo Valley Rd. at W. Jackson St. Intersection			Funded
21	Widening of N. Willow Ave. (SR 135)	Broad St. to 12th St	Add center turn lane	
22	Improvements to E. 7th St.			Complete

(continued from previous page)

Project No.	Project Name	Limits	Description	Status
23	Improvements to Broad St. and Cedar St. Intersection		Realign intersection	
24	Extension of E. 15th St.	Brown Ave. to Fisk Rd.	Construct Road	
25	Widening of S. Jefferson Ave. (SR 136)	I-40 to SR 111	Widen existing road from 2 to 5 lanes; 11 foot lanes, curb and gutter, sidewalk	Funded
26	Construction of Connector Street from Bunker Hill Rd. to S. Jefferson Ave. (SR 136)	Bunker Hill Road S. of I-40 to SR 136	Construct 3 lane roadway	
27	Construction of Connector Street from SR 111 to Salem Church Rd	SR 111 to Salem Church Rd.	Signalize intersection and construct 3 lane road	
28	Widening of W. Cemetery Rd.	Bunker Hill Road to SR 135		
29	Improvements to Stevens St.	S. Lowe Ave to Buffalo Valley Rd.	Widen and realign intersection at Jackson St.	
30	Widening of W. 12th Street	Mississippi Ave to SR 136	Widen to match cross section west of project	
31	Extension of and improvements to Old Walton Rd.	Neal St to US 70N	Widen and add sidewalks	
32	Improvements to Holladay Rd.	Lee Seminary to Buffalo Valley	Widen and add sidewalks	
33	Construction of I-40 Parallel Access Street	SR 111 S. of I-40 to US 70N	Construct 2 or 3 lane roadway	

(continued from previous page)

Project No.	Project Name	Limits	Description	Status
34	Widening of W. Jackson St.	US 70N to Buffalo Valley	Add center turn lane	
35	Construction of Intersection and Connecting Street on Tennessee Ave	700 ft S. of Nashville and Eastern RR ROW	Construct roadway and intersection to encourage development	
36	Construction of Intersection and Connecting Street on Tennessee Ave	1400 ft S. of Buffalo Valley Road	Construct roadway and intersection to encourage development	
37	Construction of Intersection and Connecting Street on Tennessee Ave	1500 ft S. of Project No. 36	Construct roadway and intersection to encourage development	
38	Construction of Intersection and Connecting Street on Tennessee Ave	1500 ft north of I-40	Construct roadway and intersection to encourage development	

Projects 21 and 25 (widening N. Willow Avenue from Broad Street north to W. 12th Street, and widening S. Jefferson Avenue from I-40 to SR 111) will be funded through Tennessee's IMPROVE Act motor fuel tax increase. It was therefore assumed in the 2040 No-Build analysis that these widening projects would be completed by the year 2040. In addition, a new roadway segment, Stevens Street from Jackson Street to Willow Avenue (SR 135), was added to the 2040 analysis as a result of the planned intersection improvements at Buffalo Valley Road and Stevens Street.

With the exception of the projects noted above, 2040 No-Build LOS conditions were determined based on current roadway geometries along with 2040 forecast AADT volumes. Tennessee Avenue, which is currently under construction, was not included in the analysis since there are no existing traffic volumes to use as a base to forecast future volumes. It is assumed that Tennessee Avenue has been designed to operate at an LOS D or better in the year 2040.

5.3. 2040 No-Build Level of Service Results

Using the methodology documented in Section 3.1, the 2040 No-Build LOS was computed for each functionally classified roadway in the city, by segment. **Figure 4** shows the 2040 No-Build LOS for these roadway segments on a map; **Table 5** shows the projected AADT and LOS for the 2040 No-Build scenario, along with the existing conditions (2015) AADT and segment LOS.

Note that in urban areas, LOS C and D are considered adequate, while LOS E and F represent undesirable operating conditions.

Figure 3: Current Status of Transportation Projects in the Cookeville 2030 Plan

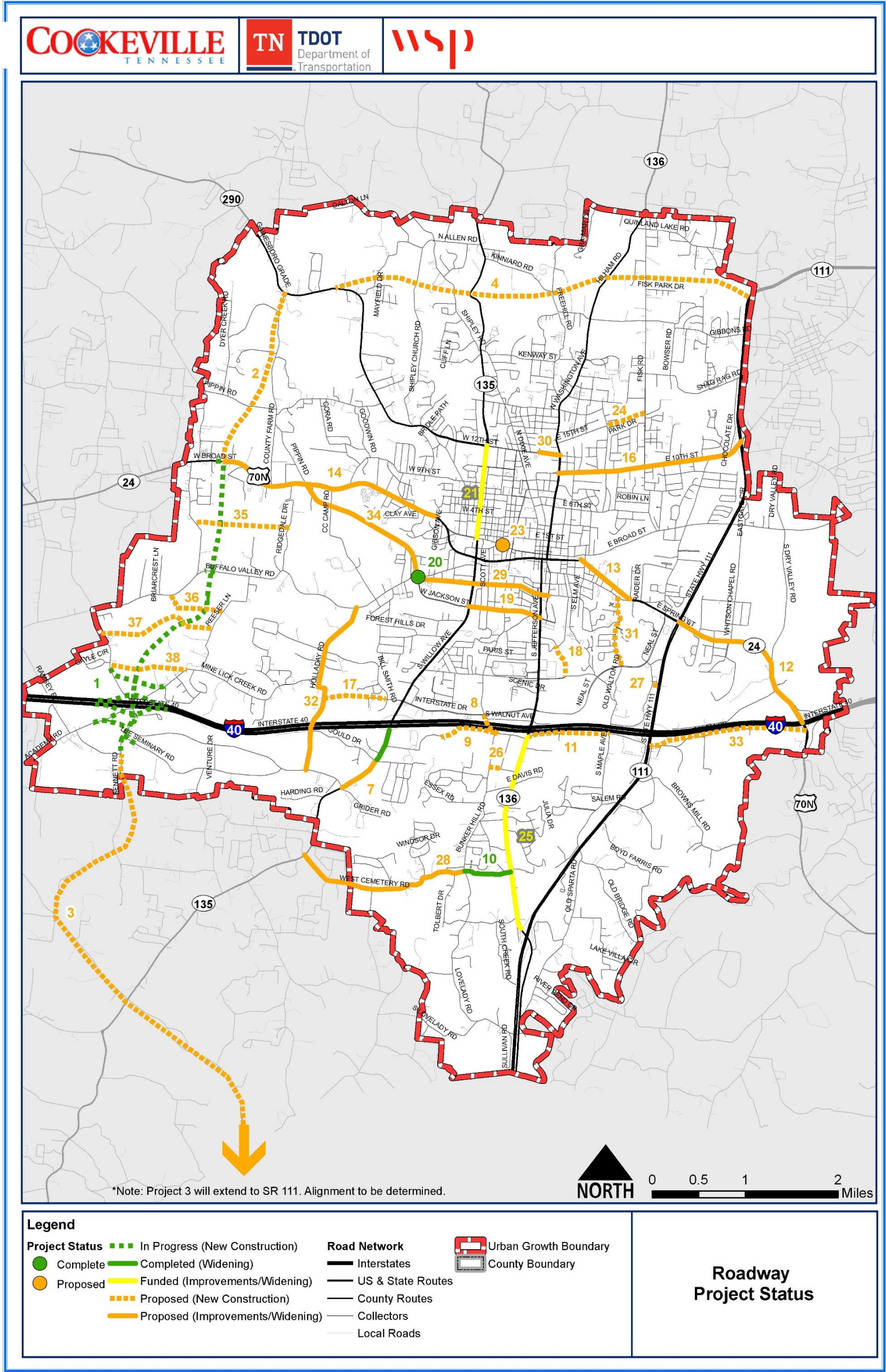


Figure 4: Projected Level of Service by Roadway Segment, 2040 No-Build Conditions

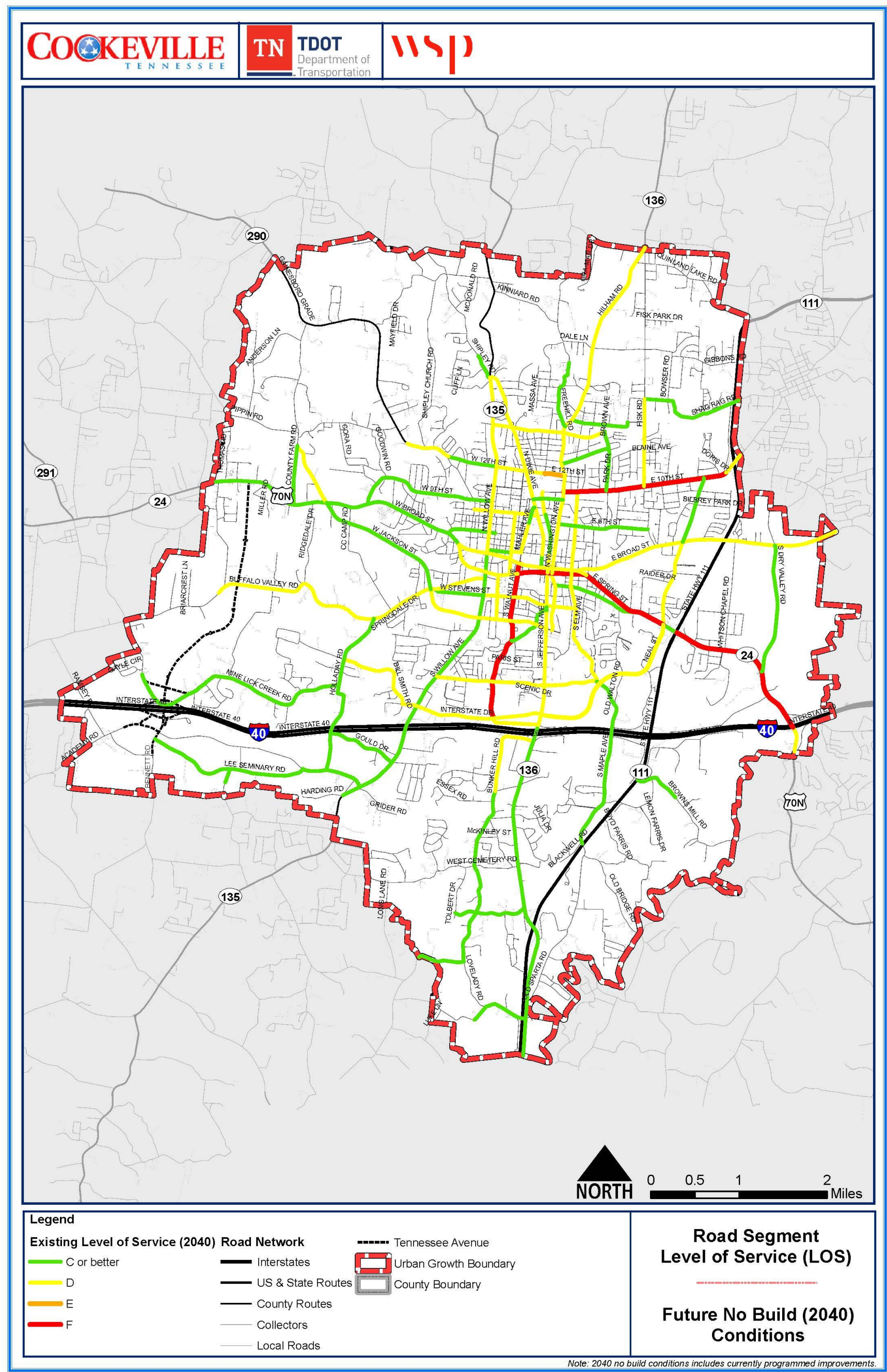


Table 5: 2040 No-Build Roadway Segment Level of Service

Street Name	From	To	Class	2015 AADT	2015 LOS	2040 AADT	2040 No-Build LOS
1st Street West	Cedar Ave	Walnut Ave	Minor Collector	4,200	C	5,775	D
1st Street East	Willow Ave	Cedar Ave	Minor Collector	948	C	1,325	C
4th Street West	Broad St	Whitney Ave	Minor Collector	1,966	C	2,725	C
6th Street East	Washington Ave	Fisk Rd	Minor Collector	1967*	C	2,725	C
7th Street	Willow Ave	Dixie Ave	Major Collector	8,414	D	11,575	D
7th Street West	Franklin Ave	Willow Ave	Minor Collector	3,523	C	4,850	D
9th Street East	Dixie Ave	Washington Ave	Minor Collector	1,150†	C	1,550	C
9th Street West/Crescent Drive	Broad St	Willow Ave	Minor Collector	3,083	C	4,250	C
10th Street East	Washington Ave	Chocolate	Major Arterial	17,505	F	21,900	F
10th Street East	Chocolate	City Limits	Major Arterial	13,907	D	17,400	D
12th Street (SR 290)	City Limits	Franklin Ave	Minor Arterial	9,700†	C	11,900	D
12th Street (SR 290)	Franklin Ave	Willow Ave	Minor Arterial	9,283	C	11,625	C
12th Street	Willow Ave	Mississippi Ave	Minor Arterial	13796*	D	17,250	D
12th Street	Mississippi Ave	Washington Ave	Minor Arterial	10,116	D	12,650	E
15th Street East	Washington Ave	Brown Ave	Minor Arterial	1,677	C	2,100	C
20th Street East	Washington Ave	Summerfield Rd	Minor Collector	3,232	C	4,450	C
Bill Smith Road / Foreman Drive	Holladay Rd	Willow Ave	Major Collector	4,936	D	6,800	D
Broad Street / US 70N	City Limits	Jackson St	Major Arterial	8,362	C	12,550	C
Broad Street / US 70N	Jackson St	Spring St	Major Arterial	7,789	C	11,700	C
Broad Street	Spring St	Cedar Ave	Major Collector	6,687	D	7,525	D
Broad Street	Cedar Ave	Washington Ave	Major Collector	6992*	D	7,875	D
Broad Street	Washington Ave	Spring Extension	Major Collector	7941*	D	8,950	D
Broad Street	Spring Extension	US 111	Major Collector	5,461	D	7,525	D
Broad Street / Buck Mt. Road	US 111	City Limits	Major Collector	4,750	D	6,550	D

†AADT is 2017 value

*AADT value was forecasted from 2013 AADT value

**AADT value was forecasted from 2012 AADT value

***AADT value was forecasted from 2007 AADT value

Table 5: 2040 No-Build Roadway Segment Level of Service

Street Name	From	To	Class	2015 AADT	2015 LOS	2040 AADT	2040 No-Build LOS
Brown Avenue	10th St.	Jere Whitson Rd	Minor Collector	2,646	C	3,650	C
Brown's Mill Road	US 111	City Limits	Minor Collector	900†	C	1,225	C
Buffalo Valley Road	City Limits	Jackson St	Major Collector	6,508	D	8,950	D
Buffalo Valley Road	Jackson St	Willow Ave	Minor Collector	5,543	D	7,625	D
Bunker Hill Road	City Limits	Davis Rd	Major Collector	2516*	C	3,475	C
Bunker Hill Road	Davis Rd	S Jefferson Ave	Minor Collector	4,482	C	6,175	D
Cane Creek Road	City Limits	Lee Seminary Rd	Major Collector	328**	C	475	C
Cedar Avenue	Spring St	7th St	Major Collector	4985*	D	6,875	D
County Farm Road	Spring St / US 70N	Pippin Rd	Minor Collector	923	C	1,275	C
Dixie Avenue	Spring St	1st St	Major Collector	4,520	C	6,225	C
Dixie Avenue	1st St	Mahler Ave	Major Collector	4769*	D	6,575	D
Dixie Avenue	Mahler Ave	12th St	Major Collector	8,353	C	11,500	D
Dixie Avenue	12th St	Willow Ave	Major Collector	4828*	D	6,650	D
Dry Valley Road	US 70N	Buck Mountain Rd	Major Collector	2,688	C	3,700	C
Fairground Street	Willow Ave	Walnut Ave	Major Collector	4124*	C	5,675	D
Fisk Road	10th St	City Limits	Major Collector	6,116	D	8,425	D
Foutch Drive	Walnut Ave	Jefferson Ave	Minor Collector	751	C	1,050	C
Freehill Road	Washington Ave	City Limits	Minor Collector	1275*	C	1,775	C
Gould Drive	Holladay Rd	Willow Ave	Minor Collector	2254*	C	3,100	C

†AADT is 2017 value

*AADT value was forecasted from 2013 AADT value

**AADT value was forecasted from 2012 AADT value

***AADT value was forecasted from 2007 AADT value

Table 5: 2040 No-Build Roadway Segment Level of Service

Street Name	From	To	Class	2015 AADT	2015 LOS	2040 AADT	2040 No-Build LOS
Hawkins Crawford Road	City Limits	Mine Lick Creek Rd	Minor Collector	2,000	C	2,750	C
Holladay Road	Lee Seminary Rd	Buffalo Valley Rd	Minor Collector	889*	C	1,225	C
Hudgens Street	Lowe Ave	Spring St	Minor Collector	2,854	C	3,925	C
Interstate Drive	Willow Ave	Jefferson Ave	Major Arterial	15,197	D	19,000	D
Jackson Street	Broad St	Cane Creek Elementary	Major Arterial	10,132	C	12,675	C
Jackson Street	Cane Creek Elementary	Buffalo Valley Rd	Major Arterial	11,161	C	13,975	C
Jackson Street	Buffalo Valley Rd	Willow Ave	Major Arterial	18,260	D	22,825	D
Jackson Street	Willow Ave	Scott Ave	Minor Arterial	13182***	D	16,500	D
Jackson Street	Scott Ave	Walnut Ave	Minor Arterial	13,048	D	16,325	D
Jackson Street	Walnut Ave	Jefferson Ave	Minor Arterial	13,246	D	16,575	D
Jefferson Avenue	City Limits	US 111 NB Ramps	Minor Collector	2,598	C	3,100	C
Jefferson Avenue (SR 136)	US 111 NB Ramps	Davis Rd	Major Arterial	11,270	C	13,400	C
Jefferson Avenue (SR 136)	Davis Rd	Bunker Hill Rd	Major Arterial	14,836	C	17,625	C
Jefferson Avenue (SR 136)	Bunker Hill Rd	I-40	Major Arterial	14,836	C	17,625	C
Jefferson Avenue (SR 136)	I-40	Stevens St	Major Arterial	24,357	D	28,925	D
Jefferson Avenue (SR 136)	Stevens St	Spring St	Major Arterial	15,138	D	18,000	D
Jefferson Avenue	Spring St	1st St	Minor Collector	7874***	D	10,850	D
Jefferson Avenue	1st St	7th St	Minor Collector	2221*	C	3,075	C
Jefferson Avenue	7th St	10th St	Minor Collector	5,870	D	8,075	D
Jere Whitson Road	Willow Ave	Brown Ave	Minor Collector	4184*	C	5,775	D
Lee Seminary Road	Bennett Rd	Holladay Rd	Minor Collector	910	C	1,275	C
Lee Seminary Road	Holladay Rd	Burgess Falls Rd	Minor Collector	1,063	C	1,475	C
Lovelady Road	City Limits	Jefferson Ave	Minor Collector	441	C	625	C
Lowe Avenue	Jackson St	Spring St	Minor Arterial	11048***	D	13,825	D

†AADT is 2017 value

*AADT value was forecasted from 2013 AADT value

**AADT value was forecasted from 2012 AADT value

***AADT value was forecasted from 2007 AADT value

Table 5: 2040 No-Build Roadway Segment Level of Service

Street Name	From	To	Class	2015 AADT	2015 LOS	2040 AADT	2040 No-Build LOS
Mahler Avenue	1st St	6th St	Major Collector	4,209	C	5,800	D
Mahler Avenue	6th St	Dixie Ave	Major Collector	4,209	C	5,800	C
Maple Avenue	10th St	Broad St	Major Collector	6154**	D	8,475	D
Maple Avenue	Broad St	Hudgens St	Major Collector	4602*	C	6,350	D
Maple Avenue	Hudgens St	Veterans Dr	Major Collector	3,647	C	5,025	D
Maple Avenue	Veterans Dr	I-40 Overpass	Minor Collector	4,204	C	5,800	C
Maple Avenue	I-40 Overpass	US 111	Minor Collector	2,626	C	3,625	C
Mine Lick Creek Road	City Limits	Holladay Rd	Minor Collector	1148*	C	1,600	C
Neal Street	Jefferson Ave	Spring St	Major Arterial	14,630	D	18,300	D
Old Kentucky Road	Spring St	Broad St	Major Collector	7,732	D	10,650	D
Old Kentucky Road	Broad St	10th St	Major Collector	5,837	C	8,050	C
Pigeon Roost Creek Road	City Limits	Jefferson Ave	Minor Collector	1,127	C	1,550	C
Pippin Road	US 70N	County Farm Rd	Minor Collector	5656*	D	7,800	D
Scott Avenue	Jackson St	Spring St	Minor Collector	3797*	C	5,225	D
Summerfield Road / Shag Rag Road	Fisk Rd	City Limits	Minor Collector	1,579	C	2,175	C
Shipley Road	City Limits	Willow Ave	Minor Collector	2382*	C	3,300	C
Stevens Street	Buffalo Valley Rd	Willow Ave	Minor Collector	-	-	3,950	C
Stevens Street	Willow Ave	Maple Avenue	Minor Collector	4,478	C	6,175	D
Veterans Drive	Walnut Ave	Neal St	Minor Collector	8,255	D	11,375	D
Walnut Avenue	Broad St	Interstate Dr	Major Collector	8,931	D	12,300	F
Walnut Avenue	Interstate Dr	Jefferson Ave	Minor Collector	5,879	D	8,100	D

†AADT is 2017 value

*AADT value was forecasted from 2013 AADT value

**AADT value was forecasted from 2012 AADT value

***AADT value was forecasted from 2007 AADT value

Table 5: 2040 No-Build Roadway Segment Level of Service

Street Name	From	To	Class	2015 AADT	2015 LOS	2040 AADT	2040 No-Build LOS
N Washington Ave (SR 136)	Spring St	Broad Ave	Major Arterial	10301***	D	12,250	D
N Washington Ave (SR 136)	Broad Ave	1st St	Major Arterial	11,523	D	13,700	D
N Washington Ave (SR 136)	1st St	10th St	Major Arterial	16,640	D	19,775	D
N Washington Ave (SR 136)	10th St	15 St/17th*	Major Arterial	15,256	D	18,125	D
N Washington Ave (SR 136)	15 St/17th	Whitaker Springs	Major Arterial	9660*	D	11,475	D
N Washington Ave (SR 136)	Whitaker Springs	City Limits	Minor Arterial	4,867	C	5,800	D
N Willow Ave (SR 135)	Dixie Ave	12th St	Major Arterial	8,495	D	9,575	D
N Willow Ave (SR 135)	12th St	Broad St	Major Arterial	16,076	D	18,100	D
S Willow Ave (SR 135)	Broad St	I-40	Major Arterial	24,690	C	27,800	C
S Willow Ave (SR 135)	I-40	City Limits	Major Arterial	14,925	C	16,800	C
Spring St East (US 70N)	City Limits	I-40	Major Arterial	8,623	C	12,950	D
Spring St East (US 70N)	I-40	SR 111	Major Arterial	11,256	E	16,900	F
Spring St East (US 70N)	SR 111	Old Kentucky Rd	Major Arterial	17,034	C	25,575	C
Spring St East (US 70N)	Old Kentucky Rd	School	Major Arterial	13,802	C	20,725	F
Spring St East (US 70N)	School	Split	Major Arterial	15269*	F	22,925	F
Spring St East (US 70N)	Split	Walnut Ave	Major Arterial	10,760	D	16,150	F
Spring St East (US 70N)	Walnut Ave	Broad St	Major Arterial	8,341	D	12,525	D

†AADT is 2017 value

*AADT value was forecasted from 2013 AADT value

**AADT value was forecasted from 2012 AADT value

***AADT value was forecasted from 2007 AADT value

Based on this analysis, seven roadway segments are forecast to operate at a failing LOS in 2040 No-Build conditions, even with the completion of projects already in progress and those already funded. The road segments projected to be over capacity by 2040 are shown below in **Table 6**.

Table 6: Roadway Segments Failing in 2040 No-Build conditions (Summarized from Table 5)

Route	From	To	2040 No-Build LOS
E. 10 th St.	N. Washington Ave. (SR 136)	Chocolate Dr.	F
W. 12 th St.	Mississippi Ave.	N. Washington Ave. (SR 136)	E
S. Walnut Ave.	Broad St.	Interstate Dr.	F
E. Spring St. (US 70N, SR 24)	I-40	SR 111	F
E. Spring St. (US 70N, SR 24)	S. Old Kentucky Rd./Neal St.	Avery Trace Middle School	F
E. Spring St. (US 70N, SR 24)	Avery Trace Middle School	Broad St.	F
E. Spring St. (US 70N, SR 24)	Broad St.	Walnut Ave.	F

Since the section of E. 10th Street shown in the table is already operating at LOS F, its deficiencies were discussed in the existing LOS results (Section 3.2). As traffic volumes continue to grow, the operations on this segment will further deteriorate unless there is an increase in roadway capacity or reduction in vehicular demand on this corridor.

Similarly, two segments along Spring Street (US 70N, SR 24) are already operating at a failing LOS in existing conditions: SR 111 to I-40, and Avery Trace Middle School to Broad Street. Future year forecasts indicate traffic volumes will cause two additional segments of Spring Street to operate at a failing LOS in 2040.

The section of W. 12th Street that is failing in the 2040 LOS analysis is a short (approximately 0.25 mile) two-lane segment of the W. 12th Street corridor. There is a four-lane undivided cross section on the west side of the segment, an at-grade railroad crossing in the middle of the segment, and a traffic signal on the east side of the segment. The transition from a four-lane roadway to a two-lane roadway results in an eastbound choke point at Mississippi Avenue.

S. Walnut Avenue, as a two-lane roadway with center turn lane, currently operates at LOS C. It is one of only three north-south corridors, including S. Willow Avenue (SR 135) and S. Jefferson Avenue (SR 136), which connect downtown Cookeville and Interstate Drive. Traffic volumes on this corridor are projected to exceed the roadway capacity and operate at an LOS F by 2040.

6. Projects to Address Corridors with Failing LOS

Several of the projects in the current (2003) Major Street Plan will help to address delays and operational issues on the corridors where demand is expected to exceed roadway capacity. As further discussed below, these projects should be carried forward into the new MSP to help meet the adopted goals and policies of the *Cookeville 2030 Plan*. This includes the policy that “all segments of the transportation system should be designed and located to meet future as well as present demands.”

There are two significant areas that are projected to have roadway capacity problems, but are not directly addressed by any projects in the current plan: S. Walnut Street, and E. Spring Street between Walnut Avenue and Broad Street. Although these segments could be considered for widening, adding lanes would have a major impact on adjoining land uses and may not be consistent with the City’s other goals for livability and community development. The policies in the *Cookeville 2030 Plan* call for major streets to be “located in a manner that will minimize disruption to neighborhoods, open space and recreational areas, and/or environmentally sensitive areas.” As further discussed below, some relief might be provided in these areas through targeted improvements to other streets to help distribute traffic demand across a greater number of facilities.

Providing multiple routes among a community’s major origins and destinations has a variety of benefits: in addition to improving traffic circulation, it greatly enhances local safety and security. Emergency and homeland security officials often use the terms “resiliency” and “redundancy” to describe a desirable road network. Large residential subdivisions are typically required to have more than one entrance so that emergency responders can reach them (or residents can evacuate) even if the primary entrance is blocked. Similarly, a city that has multiple routes to its critical facilities (*redundancy*) is more *resilient* to disasters, whether they are natural or intentionally caused.

6.1. Construction of Northern East-West Connector

This project, included in the *Cookeville 2030 Plan* (Project 4), proposes to construct a three to five-lane major arterial roadway connecting SR 111 west to SR 290. This project would likely help moderate growing demand on E. 10th Street – which is already over capacity in existing conditions — by providing a continuous east-west corridor connecting SR 111, N. Washington Avenue (SR 136), N. Willow Avenue (SR 135) and Gainesboro Grade (SR 290) north of the city.

6.2. Widening of Highway 70N near I-40

This project, included as part of the *Cookeville 2030 Plan* (Project 12), proposes to widen E. Spring Street (US 70N, SR 24) between SR 111 and I-40 from a two-lane roadway to a five-lane roadway. The project is significant because this segment already operates at LOS E in existing conditions and is forecast to operate at LOS F without any improvements by 2040. Widening this section is expected to improve roadway operations in 2040 from LOS F to LOS C.

6.3. Widening of East Spring Street east of downtown

This project, included as part of the *Cookeville 2030 Plan* (Project 13), proposes to widen E. Spring Street (US 70N, SR 24) between Avery Trace Middle School and the Broad Street split east of downtown Cookeville to a consistent three-lane or five-lane roadway section. This section currently operates at LOS F in existing conditions, and operations will likely continue to degrade as new development at the edges

of the city generates additional traffic. Widening to five lanes is expected to improve 2040 operations from LOS F to LOS C.

6.4. Widening of West 12th Street

This project, included as part of the Cookeville 2030 Plan (Project 30), proposes to widen W. 12th Street between Mississippi Avenue and N. Washington Avenue (SR 136) to a four-lane undivided roadway to match the 12th Street cross section west of the project. This will eliminate the current eastbound choke point and increase capacity. Roadway operations in 2040 are projected to improve from LOS E to LOS D as a result of the widening project.

6.5. East 10th Street

This project, included as part of the Cookeville 2030 Plan (Project 16), proposes to widen E. 10th Street from a three-lane to a five-lane roadway. This segment currently operates at LOS F in existing conditions, and operations will likely continue to degrade if demand increases at the current rate.

Widening to five lanes would be expected to improve roadway operations in 2040 from LOS F to LOS D. LOS D is the minimum acceptable level of service for roadways in urban areas. Given the projected cost (\$24.2 million in 2017 dollars) and the impact to adjoining property owners, the City may wish to first explore other means of improving traffic along E. 10th Street.

It is possible that capacity improvements to adjacent routes and the construction of new roadways could divert traffic demand away from East 10th Street to the point where it might not be necessary to widen to five lanes. Projects already mentioned in this section that may contribute to this scenario include the widening of E. Spring Street and US 70N (Projects 12 & 13) and the construction of a Northern East-West connector (Project 4). When one or more of these projects is complete a new analysis of 10th Street could be undertaken to assess the traffic volumes and determine future traffic demand for the corridor.

The Cookeville area is likely, after the 2020 Census, to reach the population threshold at which it would become a federally designated Metropolitan Planning Organization (MPO). While smaller MPOs are not required to have a travel demand model, it has been the standard practice in Tennessee for all MPOs to have a travel demand model. MPO designation within the next few years could therefore lead to the availability of additional planning tools (e.g., a travel demand model) that can more precisely identify the shifts in traffic flows and demand associated with various roadway improvements. Such analysis can help guide decisions about using limited funds and resources, to avoid unnecessary improvements or make more strategic decisions about the E. 10th Street corridor.

6.6. S. Walnut Avenue

No improvements to S. Walnut Avenue are proposed in the City's current plans. By the year 2040, the route is projected to be over capacity from Broad Street to Interstate Drive. Widening S. Walnut Avenue from 3 lanes to 5 lanes would improve operations from LOS F to LOS D. However, adding lanes to this section of S. Walnut Avenue would significantly impact the surrounding land uses, including parks and single-family homes, many of which are immediately adjacent to the roadway. Limiting the widening project to the portion not directly adjacent to residential communities (i.e. south of E. Veterans Drive) would likely not mitigate congestion, as traffic volumes are relatively consistent throughout the segment.

Given the capacity concerns and limitations on widening, the City may wish to weigh the desirability of extending S. Walnut Avenue south of I-40 to Bunker Hill Road, as proposed in the current MSP (Project 8).

The project's key advantage is to create additional network connectivity by providing an alternative north-south connection to the busy S. Willow Avenue (SR 135) and S. Jefferson Avenue (SR 136) corridors. However, both SR 135 and SR 136 are proposed for improvements, including signal system optimization and targeted intersection projects. Neither corridor is projected to be over capacity in 2040, whereas S. Walnut Avenue is expected to reach LOS F even if it is not connected to the expanding road network south of the interstate.

6.7. E. Spring Street from Walnut Avenue to Broad Street

The section of E. Spring Street (US 70N, SR 24) between Walnut Avenue and Broad Street – currently operating at LOS D – is projected to worsen to LOS F by 2040. Similar to S. Walnut Avenue, widening this segment of Spring Street may not be a context-sensitive nor practical solution. This section runs through the historic downtown area where there are high levels of pedestrian traffic, and where available right-of-way is very constrained due to historic buildings.

Planned improvements to other nearby east-west routes, such as Stevens Street and W. Jackson Street, should help to draw some traffic demand from E. Spring Street. The *Cookeville Corridor Analysis* also identifies other possible operational improvements in the downtown area which may help reduce delay along E. Spring Street, including relocation of mid-block crosswalks, removal of certain on-street parking spaces, and/or designating the downtown portions of Broad and Spring Streets as a one-way pair.

6.8. East-West Connectivity near I-40

Three projects in the current MSP are focused on the creation of new access roads running parallel to I-40 on the south side of the interstate. One possible benefit is to provide a continuous alternate route for local traffic that may currently be using I-40 for short trips between interchanges. If this is one of the City's goals, then it may be valuable to discuss with TDOT the potential for making this local access road function somewhat similar to a collector-distributor (CD) system along I-40 connecting the interchanges serving Cookeville. This could improve traffic flow on the interstate as well as the local roadways through the City of Cookeville. TDOT is about to begin updating its statewide plan for the I-40/81 corridor (completed in 2008) so this would be a timely discussion.

Another potential purpose for these new roads is to provide access for proposed commercial land uses shown in the Cookeville 2030 Plan. Since the new access roads would essentially create a continuous link between SR 135, S. Jefferson Avenue (SR 136), SR 111 and E. Spring Street (US 70, SR 24), their intersections with these major routes are likely to significantly change traffic patterns.

As currently shown, the new access roads would intersect each of these major arterials very close to the I-40 interchanges. It is important to avoid creating future backups that block access to the interstate ramps. As the city further defines the function and alignment of the new routes, detailed traffic analysis should be performed to ensure that new major intersections are adequately spaced from the busy I-40 interchanges. For example, west of S. Jefferson Avenue, the new local access road could tie in at Henley Street rather than following Bunker Hill Road.

7. Recommendations From 2017 Cookeville Corridor Analysis

As noted above, a separate, more detailed analysis of traffic operations and safety was conducted for several of the City's key corridors:

- Willow Avenue (SR 135)
- Jefferson Avenue/Washington Avenue (SR 136)
- Spring and Broad Streets (US 70N / SR 24)
- E. 10th Street

That 2017 report (the *Cookeville Corridor Analysis*) resulted in recommended signal timing and optimization plans for the City to implement immediately. However, it also includes a set of capital projects recommended for implementation on these key corridors. The recommended corridor improvements are primarily located at intersections, and consist mainly of adding turn lanes and channelizing existing turn lanes.

It is recommended that the City include these proposed improvements into the new MSP, to consolidate all of its transportation projects in one document for reference and planning purposes.

Figure 5 shows the location of proposed improvement projects from the *Cookeville Corridor Analysis*. **Table 7** lists the projects in recommended order of implementation, based on a number of considerations. These factors include whether the location is already operating below acceptable LOS, and whether there are also immediate safety concerns that would be addressed by the improvement. Near-term priority was assigned to projects that can yield temporary improvement at low cost while a longer-term solution is being designed for the same corridor. Consideration was also given to whether locations need to be addressed as a group.

8. All Recommended MSP Projects

Table 8 consolidates the list of all recommended projects for the Major Street Plan. This list reflects the level of service analysis and other issues discussed in this report, and incorporates the additional recommendations from the *Cookeville Corridor Analysis*.

Figure 5: Improvements Recommended by the Cookeville Corridor Analysis

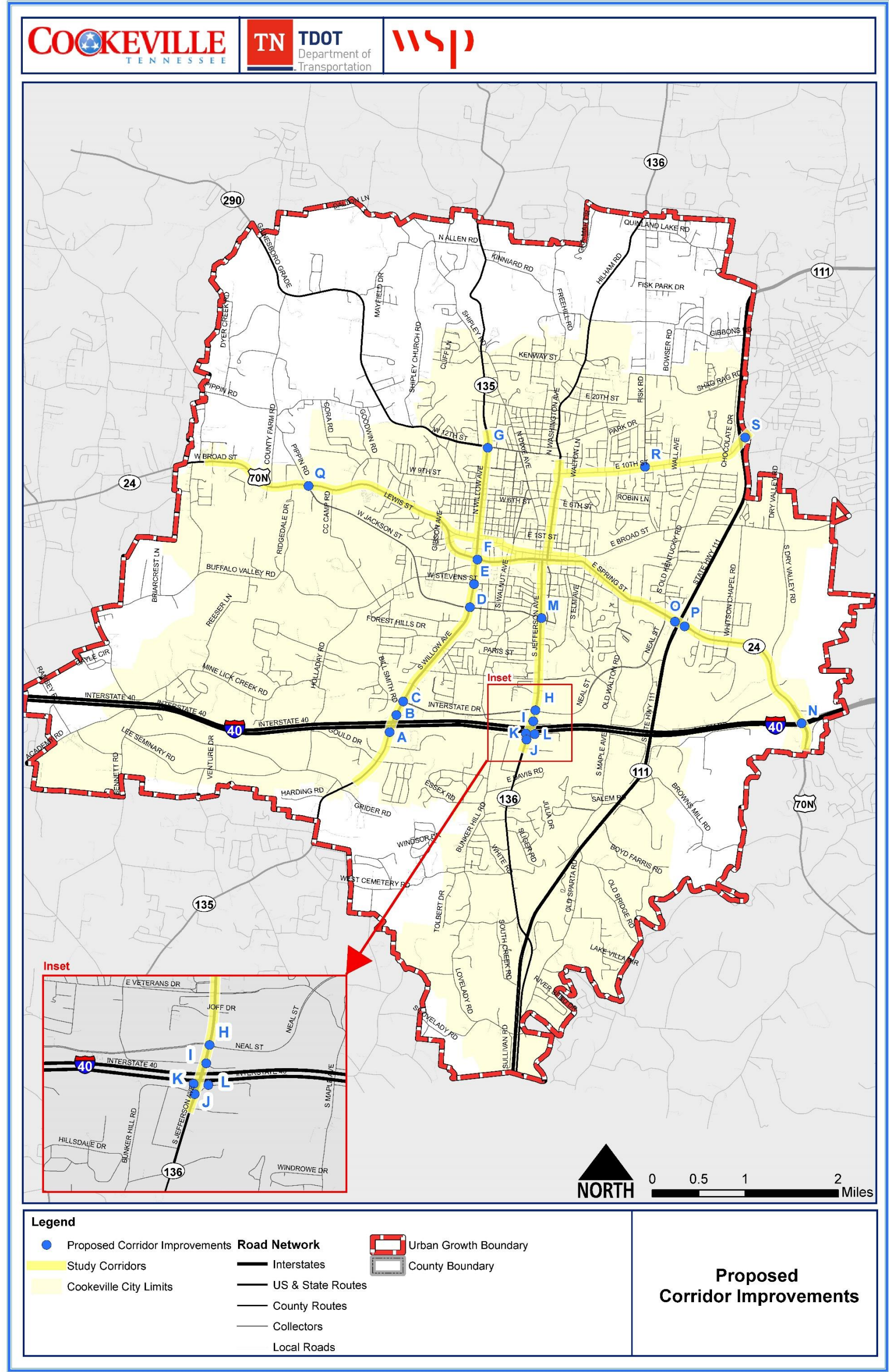


Table 7: Proposed Improvements from Cookeville Corridor Analysis

Project No.	Location of Proposed Improvement	Priority	Est. Cost (2017 Dollars)
A	S. Willow Ave. (SR 135) at Interstate 40 Eastbound	Near-term	\$75,000
B	S. Willow Ave. (SR 135) at Interstate 40 Westbound	Near-term	\$40,000
D	S. Willow Ave. (SR 135) at W. Jackson St.	Near-term	\$592,000
21 (MSP)	N. Willow Ave. (SR 135) from W. Broad St. to W. 12th St. (includes EB and WB right-turn lanes at W. 3 rd , W. 4 th and W. 9 th St. intersections)	Near-term	\$36,982,000
G	N. Willow Ave. (SR 135) at W. 12th St. (SR 290)	Near-term	\$55,000
R	E. 10th St. at Fisk Rd.	Near-term	\$354,000
F	S. Willow Ave. (SR 135) at W. Spring St. (US 70N, SR 24)	Mid-term	\$640,000
H	S. Jefferson Ave. (SR 136) at Bunker Hill Rd.	Mid-term	\$50,000
I	S. Jefferson Ave. (SR 136) at Interstate 40 Eastbound ramp		\$98,000
J	S. Jefferson Ave. (SR 136) at Interstate 40 Westbound ramp		\$10,000
K	S. Jefferson Ave. (SR 136) at S. Walnut Ave. / Dubois St.		\$35,000
L	S. Jefferson Ave. (SR 136) at Interstate Dr. / Neal St.		\$441,000
O	E. Spring St. (US 70N, SR 24) at SR 111 Southbound ramp	Mid-term	\$15,000
P	E. Spring St. (US 70N, SR 24) at SR 111 Northbound ramp		\$346,000
Q	W. Broad St. (US 70N, SR 24) at W. Jackson St.	Mid-term	\$197,000
16 (MSP)	E. 10th St. from N. Washington Ave. (SR 136) to Chocolate Dr.	Mid-term	\$27,924,000
S	E. 10th St. at SR 111 Northbound ramp	Mid-term	\$108,000
C	S. Willow Ave. (SR 135) at Interstate Drive / Foreman Drive	Long-term	\$260,000
E	S. Willow Avenue (SR 135) at W. Stevens St.	Long-term	\$222,000
M	S. Jefferson Avenue (SR 136) at Jackson St.	Long-term	\$245,000
N	E. Spring St. (US 70N, SR 24) at Interstate 40	Long-term	\$30,000
GRAND TOTAL			\$68,719,000

TABLE 8: PROPOSED PROJECTS, MAJOR STREET PLAN

Proj. No.	Project Name	Limits	Description	Project Status	Priority	Comments
In Progress						
1	Construction of I-40 interchange at Mine Lick Creek Rd			In Progress	-	
2	Construction of Western North-South Connector	I-40 to SR 290		In Progress (partial project)	-	I-40 to US 70N in progress. US 70N to SR 290 not funded.
25	Widening of S. Jefferson Ave. (SR 136)	SR 111 to I-40	Widen existing road from 2 to 5 lanes; 11 foot lanes, curb and gutter, sidewalk	Funded	H	Will be fully funded through IMPROVE Act
21	Widening of N. Willow Ave. (SR 135)	W. Broad St. to W. 12th St.	Add center turn lane. Also add EB and WB right-turn lanes on W. 3rd, W. 4th and W. 9th Streets at intersections with N. Willow Avenue.	Funded	H	Will be fully funded through IMPROVE Act
Not Yet Underway						
A	S. Willow Ave. (SR 135) at I-40 eastbound ramp		Add right-turn channelization in southeast corner of the intersection. Move ped crossing from north side of intersection to south side.		H	Relatively low-cost, provides immediate safety benefits; keep future widening (Project #7) in mind when designing channelization.
B	S. Willow Ave. (SR 135) at I-40 westbound ramp		Move ped crossing from south side of intersection to north side.		H	Relatively low-cost, provides immediate safety benefits and more efficient signal timing
D	S. Willow Ave. (SR 135) at W. Jackson St.		Provide dual northbound left-turn lanes. Provide exclusive westbound right-turn lane. Review access points on eastbound approach.		H	Need to reduce PM peak hour congestion; also high crash area
G	N. Willow Ave. (SR 135) at W. 12th St. (SR 290)		Add a right-turn channelization island in the northwest corner of the intersection. Update crosswalk markings.		H	Relatively low-cost, provides immediate safety benefits to pedestrians, including students
R	E. 10th St. at Fisk Rd.		Provide dedicated left-turn lanes, both northbound and southbound		H	Can be implemented near-term to help with congestion prior to widening project
12	Widening of E. Spring St. (US 70N, SR 24)	SR 111 to I-40	Widen US 70N to 5 lanes		H	Critical east-west corridor into downtown
13	Widening of E. Spring St. (US 70N, SR 24)	E. Broad St. to SR 111	Widen to 5 lanes		H	Critical east-west corridor into downtown
30	Widening of W. 12th St.	Mississippi Ave. to N. Washington Ave. (SR 136)	Widen to match cross section west of project		H	Helps improve east-west connections as alternative to E. 10th St
4	Construction of Northern East-West Connector	SR 290 to SR 111	New east-west route north of Cookeville, including grade-separated interchange at SR 111 and Quinland Lake Rd.		H	Could serve as an east-west alternate and potentially alleviate traffic on 12th St. and E. 10th St. In near-term, enhance signal coordination between intersections at SR 136 & E. 10th St and SR 136 & E. 12th St. to improve traffic flow between 12th and E. 10th.
16	Widening of E. 10th St.	N. Washington Ave. (SR 136) to SR 111	Widen to 5 lanes		H	Critical east-west corridor into Cookeville to & from areas north and east. However, this is a high-cost, high-impact project. Building the Northern E-W Connector (Project #4) may help reduce demand.
29	Widening of Stevens St.	Buffalo Valley Rd. to S. Lowe Ave.	Widen to 3 lanes with sidewalks		H	In conjunction with redevelopment occurring in the area

TABLE 8: PROPOSED PROJECTS, MAJOR STREET PLAN

Proj. No.	Project Name	Limits	Description	Project Status	Priority	Comments
E	S. Willow Ave (SR 135) at W. Stevens St.		Add eastbound left-turn lane.		H	
H	S. Jefferson Ave. (SR 136) at Bunker Hill Rd.		Needs to include solution for Pilot truck stop access.		H	Projects H through L should be implemented together, and should be implemented in conjunction with Project #25 (Widening of SR 136 between I-40 and SR 111). Close proximity of these five intersections means that poor operations or queuing at one intersection can cause upstream effects.
I	S. Jefferson Ave. (SR 136) at I-40 eastbound ramp		Provide dual eastbound left-turn lanes.		H	
J	S. Jefferson Ave. (SR 136) at I-40 westbound ramp		Improve channelization of the two right-turn lanes. Implement no right-turn on red. Consider converting inner right-turn lane to shared right-left turn lane.		H	
K	S. Jefferson Ave. (SR 136) at S. Walnut Ave. / Dubois St.		Consider prohibiting westbound left turns.		H	
L	S. Jefferson Ave. (SR 136) at Interstate Dr./Neal St.		Add dual westbound left-turn lanes on Interstate Dr. Provide dual northbound left-turn lanes on S. Jefferson Ave.		H	
O	E. Spring St. (US 70N, SR 24) at SR 111 southbound ramp		Monitor, and signalize when traffic volumes warrant it.		M	Project P should be implemented in conjunction with Projects #12 and 13 (Widening of E. Spring St.) and Project O should be evaluated for signal warrants at the same time. Investigate interchange redesign, including non-conventional solutions such a Diverging Diamond Interchnage (DDI).
P	E. Spring St. (US 70N, SR 24) at SR 111 northbound ramp		Provide dual northbound left-turn lanes. Add receiving lane on the SR 111 on-ramp.		H	
F	S. Willow Ave. (SR 135) at W. Spring St. (US 70N, SR 24)		Provide right-turn lanes on eastbound and westbound approaches. Review access on westbound approach.		M	Critical node, but still acceptable LOS in 2017 after signal optimization.
Q	W. Broad St. (US 70N, SR 24) at W. Jackson St. / Pippin Rd.		Provide a southbound left-turn lane on Pippin Rd.		M	
S	E. 10th St. at SR 111 northbound ramp		Provide additional northbound right-turn lane. Restrict right turns on red.		M	
19	Construction of Turn Lane on W. Jackson St.	SR 135 to SR 136	Add center turn lane		M	Projected for LOS D in 2040. Could begin programming ROW acquisition, as Jackson St. serves as key east-west corridor
9	Construction of I-40 Parallel Access St.	Green Gate Ln. to Bunker Hill Rd. (S. of I-40)	E-W connection S. of I-40 from SR 135 to SR 136		M	Discuss with TDOT the possibility of a collector-distributor ramp system along eastbound I-40 between SR 135 and SR 136.
18	Extension of Commerce Ave. to E. Veterans Dr.	Whitson Ave. to E. Veterans Dr.	Construct new road		L	A new roadway could help mitigate congestion on SR 136 between I-40 & Commerce St. However, note that a previous geotechnical study revealed significant presence of caves and sinkholes, so this is likely to be a costly project.
34	Widening of W. Jackson St.	W. Broad Street (US 70N, SR 24) to Buffalo Valley Rd.	Add center turn lane		M	Evaluate after Tennessee Ave. is complete
14	Widening of W. Broad Street (US 70N, SR 24)	W. Spring St. to Tennessee Ave. (Project #2)	Widen to 3 or 5 lanes		M	Projected 2040 LOS is still acceptable on W. Broad Street west of Cookeville; recommend monitoring future growth
17	Extension of Foreman Drive	Holladay Rd. towards S. Willow Ave. (SR 135)	Construct new road to complete connection between Holladay Rd. and S. Willow Ave. (SR 135)		M	Consider in conjunction with improvements to Bill Smith Rd, outline ROW acquisition timeframe

TABLE 8: PROPOSED PROJECTS, MAJOR STREET PLAN

Proj. No.	Project Name	Limits	Description	Project Status	Priority	Comments
7	Widening of S. Willow Ave. (SR 135)	South of I-40	Increase capacity on SR 135 south of I-40	Complete from I-40 to Gould Drive	M	Once Highlands Business Park opens, and traffic from Academy Sports begins using the area, traffic volumes will increase.
23	Improvements to Broad St. and Cedar St. Intersection		Realign intersection		M	Additional studies needed, given proximity of railroad and potential historic resources
26	Extend Henley Dr. from Bunker Hill Rd. to existing terminus at Sams St.	Bunker Hill Rd. to S. Jefferson Ave. (SR 136) via Henley Dr.	Construct 3 lane roadway		M	Shift Sam's Club traffic to access SR 136 from Henley Dr. instead of using existing Bunker Hill /SR 136 intersection. This would improve operational issues along SR 136 near I-40.
3	Construction of Southern East-West Connector	New Tennessee Ave. interchange on I-40 to SR 111 in White County	E-W connection S. of I-40 from Tennessee Ave to SR 111 in White County (including interchanges with SR 135 and SR 136)		M	Provides east-west connectivity south of I-40 and alleviates use of I-40 as a local arterial
C	S. Willow Ave. (SR 135) at Interstate Dr/Foreman Dr.		Provide dual southbound left-turn lanes. Add eastbound through-right lane		L	
M	S. Jefferson Ave. (SR 136) at E. Jackson St.		Provide dual northbound left-turn lanes.		L	
N	E. Spring St. (US 70N, SR 24) at I-40 ramps		Monitor delay and queue lengths, and perform signal warrant analysis when delays increase.		L	
8	Construction of Bunker Hill Rd. Tunnel/Bridge (S. Walnut Ave. Extension)	Connect Bunker Hill Rd. to S. Walnut Avenue	N-S connection parallel to and between SR 135 and SR 136		L	Advise further study once S. Jefferson Ave. is continuously operating at LOS E, or if land use changes significantly
27	Construction of Connector Street from Salem Church Rd. to SR 111	Salem Church Rd. to SR 111	Signalize intersection and construct 3 lane road extending Osler Dr. (at the existing median U-turn facility on SR 111, entrance to Fortis Institute and Border States Electric properties).		L	Evaluate further (the need for signalization of the SR 111 and Osler Dr. intersection & extension to Salem Church Rd.) if development along Neal Street intensifies
28	Widening of W. Cemetery Rd.	Burgess Falls Rd. (SR 135) to Bunker Hill Rd.			L	Continue to evaluate as development increases south of I-40. As development intensifies, program ROW acquisition.
24	Extension of E. 15th St.	Brown Ave. to Fisk Rd.	Construct new road		L	Recommend more thorough study to assess which street (15th, 20th, Summerfield Rd) would be best to extend in this area of Cookeville
11	Extension of Ferrell Dr.	S. Jefferson Ave. (SR 136) to S. Maple Ave.	New east-west connection		L	Outline ROW acquisition timeline to provide future alternate E-W route south of I-40
31	Extension of and improvements to Old Walton Rd.	Neal St. to E. Spring St. (US 70N, SR 24)	Widen and add sidewalks		L	Recommend acquiring ROW when planning & constructing Project #13
32	Improvements to Holladay Rd.	Lee Seminary Rd. to Buffalo Valley Rd.	Widen and add sidewalks		L	Evaluate further as development west of S. Willow Avenue intensifies
33	Construction of I-40 Parallel Access Street	SR 111 S. of I-40 to E. Spring St. (US 70N, SR 24)	Construct 2 or 3 lane roadway		L	Evaluate further as development east of SR 111 intensifies, begin planning and programming ROW acquisition
35	Construction of Intersection and Connecting Street on Tennessee Ave	700 ft S. of Nashville & Eastern Rail ROW	Encourage development		L	Evaluate after Tennessee Ave. is complete
36	Construction of Intersection and Connecting Street on Tennessee Ave	1400 ft S. of Buffalo Valley Rd.	Encourage development		L	Evaluate after Tennessee Ave. is complete
37	Construction of Intersection and Connecting Street on Tennessee Ave	1500 ft S. of Project No. 36	Encourage development		L	Evaluate after Tennessee Ave. is complete
38	Construction of Intersection and Connecting Street on Tennessee Ave	1500 ft N. of I-40	Encourage development		L	Evaluate after Tennessee Ave. is complete