

10.0 | Project Development and Prioritization

This chapter summarizes how transportation projects were developed and evaluated in the 2045 MTP.

10.1 | Project Development

PROJECT IDENTIFICATION

Roadway capacity and intersection improvement projects were identified from the:

- Public Outreach Survey,
- MPO staff,
- KYTC,
- TDOT, and
- previous plans.

Public Transit projects and programs were identified from the CTS Comprehensive Operation Analysis and the MPO's TIP under the assumption that public transit will continue to operate at similar levels in the future. There was no anticipated change in the level of service for the MTP. Bicycle and pedestrian projects were identified from the Public Outreach Survey and the Clarksville-Montgomery County Greenway and Blueway Master Plan.

PROJECT COST ESTIMATES

Roadway Project Cost Estimates

Cost estimates for some projects (those that are in the current TIP) were available from KYTC, TDOT, or local public agencies. For project types without provided cost estimates, it was necessary to develop them. Where such construction estimates were not available, the study team prepared order-of-magnitude cost estimates, in 2017 dollars, based on projects in the historic funding database. The typical construction cost estimates for various types of improvements are shown in Table 10.1.

No cost estimates were made for maintenance projects such as bridge and pavement projects, other than overlays.

TABLE 10.1 CLARKSVILLE URBANIZED AREA MTP 2045 TYPICAL PROJECT COST BY IMPROVEMENT TYPE (2017 DOLLARS)

IMPROVEMENT TYPE	AVG. COST	UNIT
New 2 Lane Roadway	\$4,500,000	Mile
New 4 Lane Arterial	\$10,000,000	Mile
Interstate Widening	\$10,000,000	Mile
Arterial Widening	\$5,200,000	Mile
Center Turn Lane	\$2,800,000	Mile
Reconstruction	\$1,950,000	Mile
Overlay	\$500,000	Mile
Intersection Improvement	\$900,000	Each
Interchange Improvement	\$5,650,000	Each
New Interchange	\$25,000,000	Each

Source: KYTC and TDOT Historic Project Lettings 2014-2017, NSI 2018

Public Transit Project Cost Estimates

The annual cost of operating public transit in the MPO was taken from the current levels of expenditures shown in the CTS Comprehensive Operational Analysis (COA). It was assumed that any local costs above and beyond those required to match federal funds in the TIP will grow in proportion to the increase in revenues. This increase will continue to be paid by local sources. CTS uses the funds it receives to satisfy operating needs first. Any remaining funds are then used to repair and replace assets as needed to maintain a State of Good Repair; with safety concerns being placed first.

The City of Oak Grove has proposed a transit system for the city that would operate a single 15 passenger bus. The cost estimates for this project include \$61,000 in initial capital costs and \$75,000 in yearly operating costs.

THE COA ALSO IDENTIFIES FIVE POTENTIAL CAPACITY PROJECTS. THESE ARE:

- The creation of a downtown circulator for \$294,000.
- Creating a circulator route on Fort Campbell for \$324,000.
- Splitting Route 5 for \$267,000.
- Splitting Route 8, which is expected to have a negligible cost.
- Discontinuing Route 812, which will result in a savings of \$30,600.

The CTS COA identifies cost estimates for projects from FY2017 through FY 2022. Project cost estimates for CTS after FY2022 are unavailable. Figures 10.1 through 10.3 display the project costs identified in the CTS COA.

FIGURE 10.1 CTS ACTION PLAN COSTS

Task ID	Tasks to be Implemented	Costs	Funding Sources
Administration			
A1	New Bus Operator Training should include working with motorized wheelchairs	\$1,500	Section 5307 - Operating
A2	Purchase and install Paratransit Scheduling software	\$250,000	Section 5339
A3	Consider scheduling Paratransit Rider interviews twice a month (exceptions can be made if warranted by special circumstances)	\$850	Section 5307 - Operating
A4	Provide an automated way to collect Section 15 data	\$1,200	Section 5339
A5	Initiate paper transfers	\$150	Section 5307 - Operating
A6	Provide an annual survey and community outreach at the Rivers and Spires Festival	\$600	Section 5307 - Operating
A7	Continue to assess the feasibility of a new location for a transfer center	CUAMPO is funding this study	Section 5303
A8	Initiate a bus stop signage review	\$40,000	Section 5339
A9	Develop a Quarterly CTS Newsletter	\$700	Section 5307 - Operating
A10	Collaboration with Austin Peay State University	\$2,500	Section 5307 - Operating
A11	Consider a 10-Ride Ticket book to be sold for \$13.50 (one free ride)	\$900	Section 5307 - Operating
A12	Offer a 30-Ride Ticket book to be sold for \$47.00 (two free rides) in place of the 31-day Liberty Pass	\$3,200	Section 5307 - Operating
A13	Become a partner in the National Safe Place Network	\$700	Section 5307 - Operating
A14	Consider implementing a Student Transit Ambassador program	\$1,800	Section 5307 - Operating
A15	Consider implementing a "Commuter Benefit" program.	\$2,400	Section 5307 - Operating
A16	System Map and Schedule Updates	\$11,000	Section 5307 - Operating
A17	Software Annual Fees	\$60,000	Section 5307 - Capital
Operating			
O1	Create downtown circulator: - Veterans Plaza/Health Dept. - AJAX Senior Center - Madison Street - CTS Transfer Facility	\$294,000	Section 5307 - Operating
O2	Initiate a circulator route on the Fort Campbell military installation	\$324,000	Section 5307 - Operating
O3	Route #5 Split	\$267,000	Section 5307 - Operating
O4	Route #8 Split	Costs expected to be negligible	Section 5307 - Operating
O5	Discontinue Route #812	\$(30,600)	CMAQ - Commuter
Capital			
C1	Replace vehicles meeting FTA useful life	Refer to Section 5.2 Capital Improvement Plan	CMAQ
C2	Provide additional shelters, including the Wal-Mart on Fort Campbell Blvd. location	\$30,000	Section 5307 - Capital
C3	Consider procuring Automatic Passenger Counters (APC)	\$250,000	Section 5339
C4	Procure additional buses	\$2,700,000	CMAQ
C5	Transition from diesel fixed route bus fleet to hybrid fleet	Costs are reflected in Task C1	CMAQ

CTS No.	Vehicle Description	FY 2016 Mileage	Years in Service	Avg. Annual Mileage	Replacement Year	FY 17 Mileage	FY 18 Mileage	FY 19 Mileage	FY 20 Mileage	FY 21 Mileage	FY 22 Mileage
716	Gillig (2001)	836,221	15	55,748	FY 2017	891,969	-	-	-	-	-
709	Gillig (2003)	737,851	13	56,758	FY 2017	794,609	-	-	-	-	-
711	Gillig (2003)	756,615	13	58,201	FY 2017	814,816	-	-	-	-	-
717	Gillig (2003)	754,635	13	58,049	FY 2017	812,684	-	-	-	-	-
718	Gillig (2005)	611,203	11	55,564	FY 2017	666,767	-	-	-	-	-
719	Gillig (2005)	639,980	11	58,180	FY 2018	698,160	756,340	-	-	-	-
720	Gillig (2005)	625,520	11	56,865	FY 2018	682,385	739,251	-	-	-	-
721	Gillig (2005)	638,385	11	58,035	FY 2018	696,420	754,455	-	-	-	-
T-2	Supreme Trolley (2005)	85,331	11	7,757	FY 2017	93,088	-	-	-	-	-
T-3	Supreme Trolley (2005)	84,663	11	7,697	FY 2017	92,360	-	-	-	-	-
722	Gillig (2006)	557,807	10	55,781	FY 2018	613,588	669,368	-	-	-	-
723	Gillig (2006)	556,615	10	55,662	FY 2018	612,277	667,938	-	-	-	-
724	Gillig (2006)	549,312	10	54,931	FY 2018	604,243	659,174	-	-	-	-
725	Gillig (2010)	342,665	6	57,111	FY 2019	399,776	456,887	513,998	-	-	-
726	Gillig (2010)	341,203	6	56,867	FY 2019	398,070	454,937	511,805	-	-	-
727	Gillig (2010)	294,795	5	58,959	FY 2021	353,754	412,713	471,672	530,631	589,590	-
728	Gillig (2010)	286,991	5	57,398	FY 2021	344,389	401,787	459,186	516,584	573,982	-
729	Gillig (2010)	286,479	5	57,296	FY 2022	343,775	401,071	458,366	515,662	572,958	630,254
730	Gillig (2010)	311,042	5	62,208	FY 2020	373,250	435,459	497,667	559,376	-	-
731	Gillig (2015)	55,641	1	55,641	FY 2022	111,282	166,923	222,564	278,205	333,846	389,487
732	Gillig (2015)	56,477	1	56,477	FY 2022	112,954	169,431	225,908	282,385	338,862	395,339
733	Gillig (2015)	56,415	1	56,415	FY 2022	112,830	169,245	225,660	282,075	338,490	394,905
734	Gillig (2015)	55,781	1	55,781	FY 2022	111,562	167,343	223,124	278,905	334,686	390,467
Vehicles Replaced:						7	6	2	1	2	5
Total Cost (\$M):						\$4,982,922	\$4,221,529	\$1,434,898	\$731,583	\$1,491,990	\$3,803,455
Local Match (10%):						\$498,292	\$422,153	\$143,490	\$73,158	\$149,199	\$380,345

FIGURE 10.2 CTS FIXED ROUTE FLEET CAPITAL PLAN

CTS No.	Vehicle Description	FY 2016 Mileage	Years in Service	Avg. Annual Mileage	Replacement Year	FY 17 Mileage	FY 18 Mileage	FY 19 Mileage	FY 20 Mileage	FY 21 Mileage	FY 22 Mileage
523	Ford E150 Conv Van (2009)	243,484	7	34,783	FY 2019	278,267	313,051	347,834	-	-	-
524	Ford E150 Conv Van (2009)	221,065	7	31,581	FY 2019	252,646	284,226	315,807	-	-	-
525	Ford E150 Conv Van (2009)	238,362	7	34,052	FY 2019	272,414	306,465	340,517	-	-	-
526	Ford E150 Conv Van (2009)	248,300	7	35,471	FY 2020	283,771	319,243	354,714	390,186	-	-
527	Ford E150 Conv Van (2009)	228,036	7	32,577	FY 2020	260,613	293,189	325,766	358,342	-	-
528	Ford / Goshen Coach (2009)	231,440	7	33,063	FY 2020	264,503	297,566	330,629	363,691	-	-
529	Ford / Goshen Coach (2009)	230,538	7	32,934	FY 2021	263,472	296,406	329,340	362,274	395,208	-
530	Ford / Goshen Coach (2010)	234,419	6	39,070	FY 2021	273,489	312,559	351,629	390,698	429,768	-
531	Dodge Grand Caravan Van (2013)	53,941	3	17,980	FY 2021	71,921	89,902	107,882	125,862	143,843	-
532	Dodge Grand Caravan Van (2014)	25,895	2	12,948	FY 2022	38,843	51,790	64,738	77,685	90,633	103,580
533	Ford E150 Conv Van	54,868	1	54,868	FY 2022	109,736	164,604	219,472	274,340	329,208	384,076

FIGURE 10.3 CTS DEMAND RESPONSE FLEET CAPITAL PLAN

Bicycle and Pedestrian Project Cost Estimates

Many of the projects identified in the Greenway and Blueway Master Plan are anticipated to be built as part of another roadway project. These project costs are assumed to be part of the larger roadway project cost.

For those bike and pedestrian projects that are not part of another roadway project, the average cost for a 5-foot wide sidewalk is \$205,000 per mile. The average cost of an 10-foot multi-use path is \$410,000.



10.2 | Roadway Project Prioritization

To maximize the amount of limited funding available within the MPA, roadway capacity projects were prioritized. ITS projects that are part of, or conform, to the ITS Architecture justified by local/state departments do not require prioritization. The same applies to high priority Maintenance and Operations (MO) projects. They can be implemented by the MPO and its partner agencies, and are funded through the various programs highlighted in Chapter 9: Forecasting Future Available Funding.

Table 10.2 shows the criteria and weights that were utilized to prioritize the identified roadway capacity projects. Table 10.3 shows how these criteria were measured. The results of this prioritization exercise are shown in Table 10.4 and illustrated in Figure 10.4.

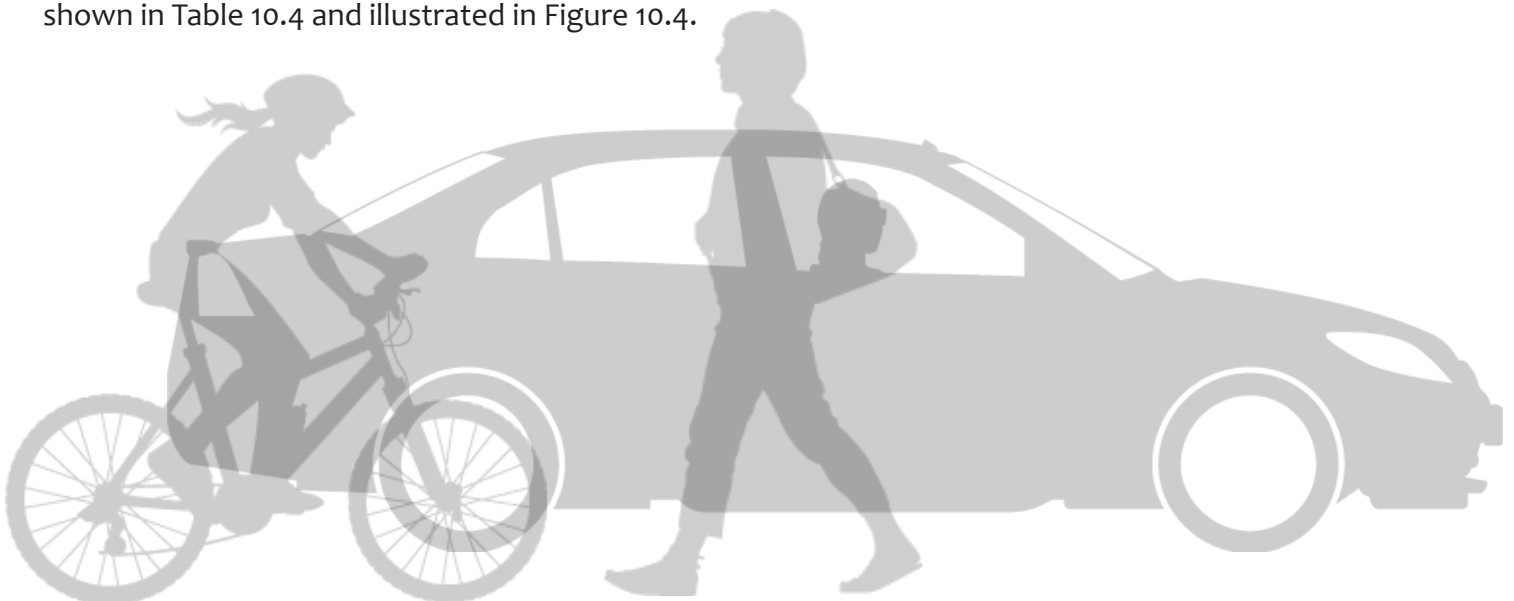


TABLE 10.2 ROADWAY CAPACITY PROJECT PRIORITIZATION CRITERIA

CRITERIA	RATIONALE	MAXIMUM POINTS	ADDRESSES MTP GOAL
Reduce Congestion	Prioritize projects with congestion reduction.	20	Goal 4
Improve Safety	Unsafe areas should receive priority over other areas.	20	Goal 1 and Goal 2
Minimize Impacts on Natural Environment, Preserve Air Quality	Avoid negative and costly environmental impacts.	15	Goal 3 and Goal 5
Balance Benefit vs Cost	Projects with benefits exceeding construction costs should be considered first, and maximize limited federal funds.	10	Goal 5
Potential Impact to Minority and Low-Income Population*	Avoid disproportionately high and adverse impacts to Environmental Justice (EJ) groups.	10	Goal 5
Provide Pedestrian and Bicycle Facilities	Encourage projects that have the potential to improve bicycle and pedestrian conditions.	10	Goal 3
Improve Freight Movement, Support Economic Development	Encourage projects that benefit the movement of people and goods. Encourage projects that may result in the growth of economic corridors.	10	Goal 3, Goal 4, and Goal 5
Plan Consistency	Encourage projects that have been vetted in locally-adopted plans or existing studies or plans.	5	Goal 3

*If a roadway project going through an Environmental Justice area receives support from its minority and low-income community, a project will receive maximum points for this criterion.

PROJECT SCORING BREAKDOWN

The project scoring criteria developed from the public participation process are used only for the roadway capacity projects analyzed in the MTP. Maintenance projects cannot be modeled, and therefore cannot be scored. However, the MPO's maintenance needs are covered in line-item funding. Prioritization of the maintenance projects is on a case-by-case basis, determined by the MPO.



TABLE 10.3 ROADWAY CAPACITY PROJECT PRIORITIZATION CRITERIA MEASURES

CRITERION	MEASURE	SCORING SCALE (POINTS POSSIBLE)				
		0	5	10	15	20
Reduce Congestion	Reduction in VHD from Existing + Committed Network	Points awarded in increments of 5 based upon the effectiveness of a project in reducing overall roadway network delay.				
Improve Safety	Qualitative assessment based on crash data, bridge conditions, and engineering analysis.	No safety benefits	Minimal safety benefits	Mild safety benefits	Moderate safety benefits	Considerable safety benefits
Minimize Impacts on Natural Environment and Preserve Air Quality	Proximity to community or natural resources like historic sites, recreational areas, churches, cemeteries, preserves, etc.	Scaled 0-15, with score reduced based on project's proximity to, or impacts upon, natural or community resources.				
Balance Benefit vs Cost	Benefit/Cost Ratio. Annual dollars saved from reduced delay divided by project cost.	Points awarded in increments of 5 based upon the effectiveness of a project in providing benefits greater than the project cost.				
Potential Impact to Minority and Low-Income Population*	Percentage of population in Environmental Justice group along project route.	Project disproportionately impacts both EJ groups	Project disproportionately impacts one EJ group	Project impacts neither EJ group		
Provide Pedestrian and Bicycle Facilities	Bike and pedestrian facilities located along the project limits. Identification in local bike/pedestrian plans.	No bike or ped access	Partial bike or ped access	MPO or community Bike/Ped Plan facility. Full bike or ped access		
Improve Freight Movement, Support Economic Development	Type of roadway and estimated truck delay reduction. Projects that ease congestion on the established freight system.	Fewer than 100 daily hours of truck delay reduction. Will not spur economic development.	100-1,000 daily hours of truck delay reduction. Moderate economic development potential.	More than 1,000 daily hours of truck delay reduction. Part of state freight network. High economic development potential.		
Plan Consistency	In previous locally-adopted plan or in preliminary study.	Not in previous plan	In previous MTP, local comprehensive plan, or preliminary study			

*If a roadway project going through an Environmental Justice area receives support from its minority and low-income community, a project will receive maximum points for this criterion.

Source: NSI, CUAMPO

TABLE 10.4 ROADWAY CAPACITY PROJECT PRIORITIZATION RESULTS

PROJECT ID	MTP 2040 ID	ROUTE	DESCRIPTION	LOCATION	TOTAL COST IN 2017 DOLLARS	CONGESTION SCORE	SAFETY SCORE	AIR QUALITY & ENVIRONMENT SCORE	BALANCED BENEFIT/COST SCORE	EJ SCORE	WALKING AND BIKING SCORE	FREIGHT AND ECON. DEVELOPMENT SCORE	PLAN CONSISTENCY SCORE	TOTAL SCORE	RANK
104	T-16	North-East Connector Ph 1	New 4/5 Lane Roadway	Ted Crozier Blvd to Wilma Rudolf Blvd to Trenton Rd	\$39,522,000	20	10	8	10	10	10	10	5	83	1
203	T-35	North-East Connector Ph 2	New 4 Lane Roadway	SR-48 (Trenton Rd) to Peachers Mill Rd	\$73,200,000	20	10	8	5	10	10	10	5	78	2
103	T-41	SR-374 (North Pkwy)	Widen from 2 to 5 Lanes	Dunbar Cave Rd to Stokes Rd	\$30,902,000	15	5	13	10	10	10	10	5	78	3
201	T-40	SR-374 (Warfield Blvd)	Widen from 2 to 4 Lanes	Memorial Dr to Dunbar Cave Rd	\$49,900,000	20	0	9	10	10	10	10	5	74	4
406	I-7	Kennedy Ln Ext	New 2 Lane Roadway	Extension to Meriwether Rd	\$9,900,000	15	0	12	10	10	10	10	5	72	5
507	N/A	I-24	New interchange	@ Dixie Bee Road	\$25,000,000	20	0	15	10	10	0	10	5	70	6
101	T-33	US 79/SR-13 (Guthrie Hwy)	Widen from 2/3 to 5 Lanes	Cracker Barrel Dr to International Blvd	\$27,480,000	15	5	14	5	10	5	10	5	69	7
403	I-4	International Blvd Ext	New 2 Lane Roadway	SR-237 (Rossvie Rd) to SR-76 to Trough Springs Rd	\$40,700,000	20	5	9	10	5	5	10	5	69	8
405	I-6	SR-374 (Richview Rd) Ext	New 4 Lane Roadway	SR-112 (Madison St) to US 41A Bypass	\$13,000,000	10	10	14	10	5	5	10	5	69	9
302	T-37	I-24	Widen from 4 to 6 Lanes	SR-76 to SR-256 in Robertson County	\$148,000,000	20	0	13	10	10	0	10	5	68	10
515	N/A	Wilma Rudolf Boulevard	Widen to 6 Lanes	Kraft St to SR 374	\$54,000,000	20	0	8	10	10	5	10	5	68	11
409	I-11	8th St connector	New 2 Lane Roadway	Needmore Rd to Patterson Ln	\$20,900,000	15	5	7	5	10	10	10	5	67	12

Source: NSI, CUAMPO

TABLE 10.4 ROADWAY CAPACITY PROJECT PRIORITIZATION RESULTS

PROJECT ID	MTP 2040 ID	ROUTE	DESCRIPTION	LOCATION	TOTAL COST IN 2017 DOLLARS	CONGESTION SCORE	SAFETY SCORE	AIR QUALITY & ENVIRONMENT SCORE	BALANCED BENEFIT/COST SCORE	EJ SCORE	WALKING AND BIKING SCORE	FREIGHT AND ECON. DEVELOPMENT SCORE	PLAN CONSISTENCY SCORE	TOTAL SCORE	RANK
108	K-06	KY-400 (State Line Rd)	Reconstruct with CTL	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	\$16,200,000	5	20	15	0	10	10	0	5	65	13
102	T-43	SR-149/SR-13	Widen from 2/3 to 5 Lanes	River Rd to Zinc Plant Rd	\$82,526,000	15	5	9	5	10	5	10	5	64	14
506	N/A	Providence Blvd (US 79)	Widen to 6 Lanes	US 41 to Red River	\$27,000,000	15	0	13	10	10	5	10	0	63	15
301	T-06	I-24	Widen from 4 to 6 Lanes	KY/TN State Line to SR-76	\$193,900,000	20	0	7	10	10	0	10	5	62	16
401	I-1	New Roadway	New 3 Lane Roadway	Fair Brook Place to Needmore Rd	\$7,920,000	10	10	11	10	10	0	5	5	61	17
504	N/A	SR 13/48	Center Turn Lane	River Road to Old Highway 48	\$10,725,000	5	5	15	0	10	10	10	5	60	18
508	N/A	I-24	Widen to 2 Lanes	@ Exit 8 WB Off Ramp	\$5,400,000	10	5	15	10	10	0	10	0	60	19
111	K-12	Oatts-Riggins Rd	New 3 Lane Roadway	KY-400 (State Line Rd) to KY-911 (Thompsonville Ln)	\$9,900,000	5	5	9	5	10	10	10	5	59	20
204	T-36	Peachers Mill Rd	Widen from 3 to 4 Lanes	Pine Mountain Rd to Stonecrossing Dr	\$6,300,000	15	0	13	10	5	5	5	5	58	21
207	K-10	KY-117	New 5 Lane Roadway	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	\$19,600,000	0	10	8	5	10	10	10	5	58	22
402	I-2	Professional Park Dr Ext	New 2 Lane Roadway	Extension to Cardinal Ln	\$11,000,000	10	5	8	10	10	5	5	5	58	23
105	T-22	Jack Miller Blvd Ext	New 4 Lane Roadway	Tobacco Rd to Peachers Mill Rd	\$29,500,000	10	5	10	5	5	5	10	5	55	24

Source: NSI, CUAMPO

TABLE 10.4 ROADWAY CAPACITY PROJECT PRIORITIZATION RESULTS

PROJECT ID	MTP 2040 ID	ROUTE	DESCRIPTION	LOCATION	TOTAL COST IN 2017 DOLLARS	CONGESTION SCORE	SAFETY SCORE	AIR QUALITY & ENVIRONMENT SCORE	BALANCED BENEFIT/COST SCORE	EJ SCORE	WALKING AND BIKING SCORE	FREIGHT AND ECON. DEVELOPMENT SCORE	PLAN CONSISTENCY SCORE	TOTAL SCORE	RANK
109	K-07	KY-115 (Pembroke-Oak Grove Rd)	Reconstruct with CTL	KY-400 (State Line Rd) to I-24	\$28,200,000	5	10	15	0	10	5	5	5	55	25
110	K-08	KY-115 (Pembroke)	Reconstruct with CTL	I-24 to KY-1453 (Barker's Mill Rd)	\$13,700,000	5	5	15	0	10	10	5	5	55	26
306	K-04	I-24	Widen from 4 to 6 Lanes	US 41A (Ft Campbell Blvd) to TN State Line	\$112,000,000	20	0	5	5	10	0	10	5	55	27
304	T-05C	SR-48 (Trenton Rd)	Widen from 2 to 5 Lanes	SR-13/US79 (Wilma Rudolph Blvd) to SR-374	\$25,000,000	10	0	13	5	10	5	5	5	53	28
411	I-14	SR-374 (Richview Rd)	Widen from 3 to 5 Lanes	Memorial Dr to US 41A (Madison St)	\$14,400,000	10	0	13	5	10	5	5	5	53	29
503	N/A	Dunbar Cave Road	Widen to 4 Lanes	Wilma Rudolph Rd (US 79) to Rossvie Rd (SR 37)	\$72,000,000	15	0	6	5	10	5	10	0	51	30
509	N/A	Madison Street	Widen to 4 Lanes	10th Street to Pageant Lane	\$9,000,000	15	0	1	10	10	10	5	0	51	31
514	N/A	Tylertown Road	Widen to 4 Lanes	Trenton Rd to Oakland Rd	\$30,600,000	10	0	11	5	10	10	5	0	51	32
112	K-13	KY-1453 (Elmo Rd)	Reconstruct with CTL	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	\$21,700,000	5	5	15	0	10	10	0	5	50	33
202	T-23	US 41A Bypass (Ashland City Rd)	Widen from 2/3 to 5 Lanes	US 41A/SR-112 to SR-13	\$134,300,000	20	0	0	5	5	5	10	5	50	34

Source: NSI, CUAMPO

TABLE 10.4 ROADWAY CAPACITY PROJECT PRIORITIZATION RESULTS

PROJECT ID	MTP 2040 ID	ROUTE	DESCRIPTION	LOCATION	TOTAL COST IN 2017 DOLLARS	CONGESTION SCORE	SAFETY SCORE	AIR QUALITY & ENVIRONMENT SCORE	BALANCED BENEFIT/COST SCORE	EJ SCORE	WALKING AND BIKING SCORE	FREIGHT AND ECON. DEVELOPMENT SCORE	PLAN CONSISTENCY SCORE	TOTAL SCORE	RANK
205	K-02	Hugh Hunter/ Gritton Church Rd	Reconstruction	KY-911 (Thompsonville Ln) to Allen Rd	\$14,200,000	5	5	15	0	10	10	0	5	50	35
209	K-14	KY-109 (Bradshaw Rd)	Reconstruct with CTL	KY-1453 (Elmo Rd) to Bradshaw- Fidelio Rd	\$6,800,000	5	5	15	0	10	10	0	5	50	36
303	T-01	Needmore Rd	Reconstruct with CTL	Hazelwood Rd to SR-236 (Tiny Town Rd)	\$13,600,000	5	10	15	0	10	5	0	5	50	37
404	I-5	Dixie Bee Rd Ext	New 2 Lane Roadway	Sango Rd to US 41A	\$7,700,000	0	5	15	0	10	10	5	5	50	38
510	N/A	Needmore Road	Widen to 4 Lanes	Wilma Rudolph Road to Trenton Road	\$16,200,000	0	0	15	10	10	5	5	5	50	39
511	N/A	Riverside Drive	Reduce to 3 Lanes, Add Bike/Ped	Providence Blvd to Cumberland Dr	\$3,000,000	0	15	10	0	10	10	5	0	50	40
412	I-15	Hazelwood Rd	Widen from 2 to 5 Lanes	Trenton Rd to Needmore	\$36,000,000	10	5	13	0	5	5	5	5	48	41
512	N/A	Rossvie Road	Widen to 5 Lanes	Wilma Rudolph Blvd (US 79) to Dunbar Cave Rd	\$50,400,000	10	0	13	5	10	5	5	0	48	42
106	T-29	Lafayette Rd	Widen from 2 to 5 Lanes	Walnut Grove Rd to Ft Campbell Gate	\$2,438,000	5	5	11	0	10	10	0	5	46	43
208	K-11	Ft Campbell Gate 5 Ext	New 2 Lane Roadway	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke- Oak Grove Rd)	\$26,900,000	0	5	6	0	10	10	10	5	46	44

Source: NSI, CUAMPO

TABLE 10.4 ROADWAY CAPACITY PROJECT PRIORITIZATION RESULTS

PROJECT ID	MTP 2040 ID	ROUTE	DESCRIPTION	LOCATION	TOTAL COST IN 2017 DOLLARS	CONGESTION SCORE	SAFETY SCORE	AIR QUALITY & ENVIRONMENT SCORE	BALANCED BENEFIT/COST SCORE	EJ SCORE	WALKING AND BIKING SCORE	FREIGHT AND ECON. DEVELOPMENT SCORE	PLAN CONSISTENCY SCORE	TOTAL SCORE	RANK
305	T-18	Whitfield Rd/ Old Trenton Rd	Reconstruct with CTL	Needmore Rd to SR-374	\$5,200,000	0	5	15	0	10	5	5	5	45	45
513	N/A	Tiny Town Road	Widen to 6 Lanes	US 41A to Trenton Rd	\$122,400,000	15	0	5	5	5	5	10	0	45	46
407	I-8	SR-236 (Tiny Town Rd) Ext	New 2 Lane Roadway	Extension to Meriwether Rd	\$7,700,000	0	5	15	5	5	0	5	5	40	47
408	I-10	New Roadway	New 2 Lane Roadway	9th St to 10th St	\$1,100,000	5	0	15	10	0	0	5	5	40	48
501	N/A	College St (SR 48)	Widen to 6 Lanes	N 2nd St (US 41A) to Kraft St	\$25,200,000	15	0	0	5	10	0	10	0	40	49
206	K-05	Ft Campbell Gate 4 Ext	New 2 Lane Roadway	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	\$19,400,000	0	5	11	0	5	5	5	5	36	50
505	N/A	College St (SR 48)	Widen to 4 Lanes	Riverside Dr to N 2nd St (US 41A)	\$5,400,000	10	0	0	0	10	0	10	5	35	51
410	I-12	I-24	New Interstate Interchange	Dunlop Ln	\$25,000,000	0	0	10	0	5	0	10	5	30	52
502	N/A	Cumberland Dr	Widen to 4 Lanes	Ashland City Rd (SR 12) to Madison St (SR 76)	\$32,400,000	0	0	1	0	10	0	0	0	11	53

Source: NSJ, CUAMPO

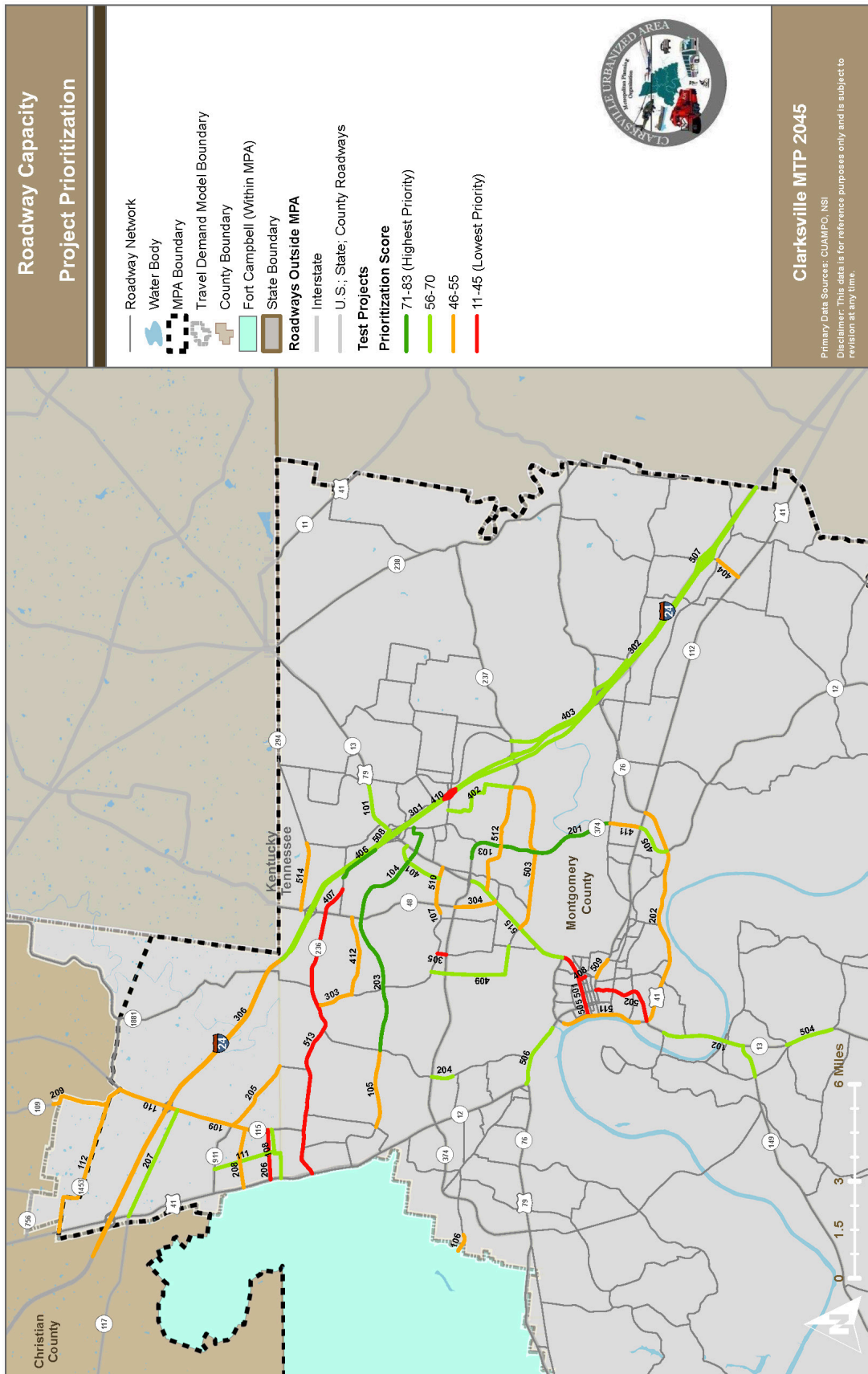


FIGURE 10.4 ROADWAY CAPACITY PROJECT PRIORITIZATION

10.3 | Transit, Bicycle, and Pedestrian Projects

The potential transit projects for the MPA were discussed in Section 10.1. Potential bicycle and pedestrian projects are displayed in Table 10.5.

Additional projects may be developed from the priorities listed in the Greenway and Blueway Master Plan, and the Sidewalk Construction Priority Map.

TABLE 10.5 BICYCLE AND PEDESTRIAN TRANSPORTATION PROJECTS

LOCATION	FROM	TO	IMPROVEMENT
8th Street	College Street	Kraft Street	Stripe shared lanes for autos and bikes and allow on-street parking on west side
Farris Drive	Drane Street	8th Street	Stripe shared lanes for autos and bikes and allow on-street parking on west side
2nd Street	College Street	Commerce Street	Replace western travel lane with angled back-in on-street parking and mark eastern travel lanes as shared lane for autos and bikes
2nd Street	Commerce Street	Madison Street	Replace western travel lane with parallel on-street parking and mark eastern travel lanes as shared lane for autos and bikes
3rd Street	Madison Street	Commerce Street	Replace western travel lane with angled back-in on-street parking and mark eastern travel lanes as shared lane for autos and bikes
3rd Street	Commerce Street	College Street	Replace to include parallel on-street parking on east side, one northbound travel lane, and a 5' bike lane
College Street	2nd Street	Riverside Drive	Stripe 7-foot bike lane on both sides
Marion Street	1st Street	8th Street	Stripe 4-foot bike lane on both sides
Kraft Streetscape	College Street	Riverside Drive	Reconstruct roadway including median and urban curb and gutter drainage with bike lanes and sidewalk
College Streetscape	Ford	2nd Street	Implement cross section with wide outside shoulders
Residential Sidewalks	All	All	Construct sidewalk on residential streets where none exist
Main Streetscape	Riverside	2nd Street	Construct sidewalk (Riverside to 1st), add bulbouts with trees and/or bioswales (Public Square to 2nd)

Source: Downtown Clarksville Parking and Street Network Study

continued

TABLE 10.5 BICYCLE AND PEDESTRIAN TRANSPORTATION PROJECTS

LOCATION	FROM	TO	IMPROVEMENT
Commerce Streetscape	3rd Street	University	Implement cross section with on-street parking and sidewalks
Spring Streetscape	Adams	Union	Implement cross section with on-street parking and sidewalks
Spring Streetscape	Commerce Street	Riverside Drive	Implement cross section with on-street parking and sidewalks
Jefferson/West/Home	Riverside	College Street	Implement cross section with on-street parking and sidewalks
1st Streetscape	Commerce Street	Franklin	Implement cross section with on-street parking and sidewalks
Union Streetscape	2nd Street	Madison Street	Implement cross section with on-street parking and sidewalks
Kraft Streetscape	College Street	Riverside Drive	Reconstruct roadway including median and urban curb and gutter drainage with bike lanes and sidewalk
College Streetscape	Ford	2nd Street	Implement cross section with wide outside shoulders

Source: Downtown Clarksville Parking and Street Network Study

10.4 | Intersection Projects

Currently, most of the congested roadway segments within the MPA are near intersections or Interstate interchanges with high traffic volumes. Intersection improvements such as signal retiming, additional turn lanes, ITS improvements, and more could reduce congestion and delay on the MPA's street and highway network. Many of these projects can also increase intersection safety. These improvements are low-cost and can be implemented in a timely manner. Some intersection improvements, such as the addition of traffic signals, will require additional studies to see if they are warranted.

The intersection projects displayed in Table 10.6 were developed from the comments received in the Public Outreach Survey. According to the respondents, these locations experience high congestion or safety concerns. Table 10.7 displays the intersection projects that the CUAMPO analyzed for potential inclusion in the MTP.

TABLE 10.6 INTERSECTION PROJECTS IDENTIFIED IN PUBLIC OUTREACH SURVEY

LOCATION	IMPROVEMENT
101st Airborne Parkway/Warfield Boulevard @ Wilma Rudolph Boulevard	Add signage
Ashland City Road @ Glendale Drive	Add turn lanes
Beechaven winery @ Dunlop road	Add traffic signal or roundabout
College Street @ Hornberger Road	Add turn lanes
Crossland Avenue @ Pageant Lane	Intersection improvements
Dover Road @ High Point Road	Intersection improvements
Dunbar Cave Road @ Rossvie Road	Intersection improvements
Garrettsburg Road @ Purple Heart Parkway	Add traffic signal
Greenland Farms @ Highway 48	Intersection improvements
Guthrie Highway @ Oakland Road	Add traffic signal
Hazelwood Road @ Needmore Road	Add lighting
Highway 12 @ US 41A Bypass/SR-12/SR-13/SR-48/S Riverside Drive	Add signage
Highway 48 @ Highway 13	Intersection improvements

Source: NSI, CUAMPO

continued

TABLE 10.6 INTERSECTION PROJECTS IDENTIFIED IN PUBLIC OUTREACH SURVEY

LOCATION	IMPROVEMENT
Highway 76 @ Clarksville Christian School	Add turn lanes
Highway 76 @ Vaughn Road	Intersection improvements
I-24 @ Exit 1	Add traffic signal
I-24 @ Exit 4	Add traffic signal
MLK Parkway @ Vaughn Road	Add traffic signal or improve signage
Needmore Road @ Wilma Rudolph Road	Add turn lanes
Pageant Ln @ Madison Terrace	Traffic light not aligned properly
Powell Road @ Rossvie Road	Add turn lanes
Ringgold Road @ 101st Airborne Road	Add traffic signal
Ringgold Road @ Fort Campbell Boulevard	Retime traffic signal
Rossvie Road @ Rollow Lane	Add turn lanes
Rossvie Road @ Basham	Improve sight distance
Seven Mile Ferry Road @ SR-13	Add traffic signal
Talley Drive/Clark Street @ Senior Center	Reconstruction
Ted Crozier Boulevard @ Weatherly Drive	Add traffic signal
Tiny Town Road @ Needmore Road	Add school zone sign
Tiny Town Road @ Barkers Mill Road	Add traffic signal
Trenton Road @ Hazelwood	Add traffic signal
Trenton Road @ Meriweather Road	Add traffic signal
Trenton Road @ Northeast High	Add traffic signal
US 79 @ Dotsonville Road	Add traffic signal

Source: NSI, CUAMPO

continued

TABLE 10.6 INTERSECTION PROJECTS IDENTIFIED IN PUBLIC OUTREACH SURVEY

LOCATION	IMPROVEMENT
W Dunbar Cave Road @ Industrial Drive	Add traffic signal
Warfield Boulevard @ Stokes Road	Add traffic signal
Whitfield Road @ 101st Airborne Parkway	Add turn lanes
Wilma Rudolph Boulevard @ Athletic Drive	Intersection improvements
Wilma Rudolph Boulevard @ Dunbar Cave Road	Intersection improvements
Wilma Rudolph Boulevard @ Walmart	Traffic signal improvements
101st Airborne Parkway/Warfield Boulevard @ Wilma Rudolph Boulevard	Add signage
Ashland City Road @ Glendale Drive	Add turn lanes

Source: NSI, CUAMPO

TABLE 10.7 INTERSECTION PROJECTS FOR POTENTIAL PROGRAMMING

LOCATION	IMPROVEMENT
Crossland Avenue @ Pageant Lane	Intersection improvements
Ringgold Road @ 101st Airborne Road	Add traffic signal
Ringgold Road @ Fort Campbell Boulevard	Retime traffic signal
Rossvie Road @ Rollow Lane	Add turn lanes
SR-112 @ SR-76 Improvement	Intersection Improvements
Ted Crozier Boulevard @ Weatherly Drive	Add traffic signal
Tiny Town Road @ Needmore Road	Add school zone sign
Trenton Road @ Hazelwood	Add traffic signal
Trenton Road @ Meriweather Road	Add traffic signal
Trenton Road @ Northeast High	Add traffic signal
US 79 @ Dotsonville Road	Add traffic signal
Whitfield Road @ 101st Airborne Road	Add turn lanes
Wilma Rudolph Boulevard @ Athletic Drive	Intersection improvements

Source: NSI, CUAMPO

11.0 | Implementation Plan

11.1 | Fiscally-Constrained Staged Improvement Program

THE 2045 MTP'S STAGED IMPROVEMENT PROGRAM IS A FISCALLY-CONSTRAINED LIST OF TRANSPORTATION PROJECTS THAT REPRESENT THE CLARKSVILLE MPA'S PLANNED FUTURE TRANSPORTATION IMPROVEMENTS.

Projects included in the staged improvement plan become eligible for federal and/or state funding assistance through the funding sources listed in Chapter 9.

During plan development, the approach was to identify the region's transportation needs and consider multiple alternatives for meeting them. In many cases, additional studies may be required in order to determine the most effective and feasible improvement alternative.

The projects identified in the staged improvement program are meant to convey the type of improvement that would make the most sense based on currently available information.

This approach acknowledges the inability to avoid all future traffic congestion by simply building as much roadway capacity as the anticipated demand for travel would seem to require. It also recognizes the reality of induced demand, a condition where more of a good is consumed in response to an increase in supply. For roadways, this results in increased traffic being generated as a response to increased roadway capacity.

One principle that guided the plan development was the idea that alternative travel options should be made available wherever possible.

Possibilities include new or improved parallel routes or modal choices that serve the same origins and destinations. Where a need for additional roadway capacity is projected, the preferred response may not be a wider facility, but enhanced operational efficiency. Improvements can be achieved using access management, Transportation System Management (TSM), TDM, or ITS strategies that serve to optimize the performance of a facility.

PROJECT STAGING PHASES AND APPLYING FISCAL CONSTRAINT

The staged improvement program is a long-range plan for transportation improvements in the Clarksville MPA. The plan covers the 27-year period from 2016 to 2045. Note that the tables and references for the Staged Improvement Program show Stage I beginning in 2018 as the years 2016 and 2017 have already passed.

Recommended improvements are distributed among three stages:

- Stage I covers the short-term period from 2018 through 2026;
- Stage II corresponds to the intermediate period from 2027 through 2036; and
- Stage III is the long-range period from 2037 through 2045.

The assignment of a given project to a particular stage was largely determined by:

- The prioritization of projects discussed in Chapter 10
- Estimated funding available for each stage of the plan
- Project cost
- Other mobility-related considerations (such as safety, emergency evacuation, access to developable areas, etc.)

Table 11.1 summarizes the total costs of the projects selected to be funded in the 2045 MTP, including Line Item funding. Line item funding includes operations, maintenance, and funding for non-capacity improvements. Data from the MPO's partners and public outreach survey were used to develop a 2017 average annual cost for line item funding and is shown in Appendix F. The forecast development for these funding categories is also shown in Appendix F. The total cost of transit, pedestrian, intersection, and bikeway projects selected from those in Chapter 10 for funding through the MTP cannot exceed the funding from the Line Item categories in the Staged Improvement Program. The table also displays all forecast state and federal revenues, (with local match funding) anticipated to be available for implementing transportation projects through 2045. The anticipated state and federal roadway funding, with local match funding, for the plan period (2018–2045), was calculated to be \$2.15 billion. **The estimated total cost of improvements, as identified in the staged improvement program, is \$2.15 billion.**

This falls within acceptable programming limits of available funding. Therefore, the 2045 MTP is fiscally-constrained.

TABLE 11.1 FISCAL CONSTRAINT FOR ROADWAY PROJECTS

	STAGE I 2018-2026	STAGE II 2027 - 2036	STAGE III 2037 - 2045	TOTAL 2016 - 2045
Estimated Funding Availability**	\$495,569,550	\$746,615,925	\$904,749,962	\$2,146,935,437
Estimated Fiscally-Constrained MTP Project Costs	\$536,773,000	\$730,595,000	\$879,589,000	\$2,146,957,000
			Vision Needs*	\$551,193,000
			Total Needs Plan	\$ 2,698,150,000

*Vision Needs describe additional projects that cannot be funded in the fiscally-constrained staged improvement program. These projects and their costs can be found on Page 11-10 and Table 11.8

** Estimated Funding Availability also includes transit funding.

Note: Annual Inflation Factors – 3.0% in the State of Tennessee, 4.0% in the State of Kentucky

TABLE 11.2 FISCAL CONSTRAINT FOR PUBLIC TRANSIT OPERATIONS

	STAGE I 2018-2026	STAGE II 2027 - 2036	STAGE III 2037 - 2045	TOTAL 2016 - 2045
Estimated Funding Available	\$61,784,942	\$90,969,074	\$108,340,270	\$261,094,286

STAGED IMPROVEMENT PLAN AND CONFORMITY

Since the CUAMPO must conduct conformity analysis for its MPA, projects identified in the MTP must be identified as being Exempt, Non-Exempt, or Regionally Significant. Projects that are exempt are not subject to the transportation conformity rule. Projects that are non-exempt must be shown in the region’s conformity analysis. Projects that are regionally significant are non-exempt projects that are on roadways that serve regional needs, such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals.

The tables for each stage of the Staged Improvement Program display the conformity status of each project. The transit projects identified in Chapter 10 were determined to be exempt from conformity analysis.

PROJECT COSTS AND LINE ITEMS

The initial project costs developed in Chapter 10 were in 2017 dollars. Due to inflation, these projects costs will increase over time and it was necessary to adjust the costs based on the stage in which a project is programmed to be built. This was accomplished by multiplying the 2017 cost by a factor that is based upon the state inflation rates and mid-point of the stage time period. These calculations are shown in Appendix F.

Line item funding covers a variety of transportation projects that provide non-capacity improvements or maintenance needs. These line items include enhancements, safety, bridges, overlays, and maintenance.

- Enhancement projects include bicycle/pedestrian facilities, multi-use trails, lighting, and landscaping.
- Safety projects include turn lanes, roundabouts, traffic signals, guard rails, and signage.
- Bridge projects include bridge replacements and new bridges.
- Overlay projects are those that resurface a roadway with asphalt.
- Maintenance projects include pothole repairs, surface sealant, guard rail repair, sign replacements, debris removal, and roadway sweeping.

The development of the line items funding breakdowns is discussed in Appendix F.

STAGE I (2018-2026) PROJECTS

Stage I is planned for improvements in the years 2018 to 2026. A list of these projects is shown in Table 11.3. These planned improvements are projected to cost \$536.7 million and will be funded with local, state, and federal funds. Project improvements consist of roadway widening, new roadway construction, and reconstruction.

TABLE 11.3 2045 MTP STAGED IMPROVEMENT PROGRAM - STAGE I (2018-2026)

ID	MODE	ROUTE	LOCATION	PROJECT DESCRIPTION	PROJECT COST (\$'000)	CONFORMITY STATUS
1	Roadway	SR-374 Ext	Dotsonville Rd to US 79/SR 6 (Dover Rd)	New 4 Lane Roadway	\$45,400	Non-Exempt
2	Roadway	SR-374 Ext/SR-149	Dotsonville Rd to SR-149; SR-374 to River Rd	New 4 Lane Roadway & Bridge, Widen to 5 Lanes	\$120,375	Non-Exempt
3	Roadway	SR-237 (Rossvie Rd) & Dunbar Cave Rd	I-24 to 400 ft west of Keysburg Rd	Widen from 2 to 3/5 Lanes & Realignment	\$13,300	Non-Exempt
4	Roadway	KY-911 (Thompsonville Rd)	US 41A to KY-115 (Pembroke Rd)	Widen from 2 to 3 Lanes	\$14,810	Non-Exempt
7	Roadway	SR-48 (Trenton Rd)	SR-374 to I-24	Widen from 2 to 5 Lanes	\$40,000	Non-Exempt
101*	Roadway	US 79/SR-13 (Guthrie Hwy)	Cracker Barrel Dr to International Blvd	Widen from 2/3 to 5 Lanes	Under Const	Non-Exempt
102*	Roadway	SR-149/SR-13	River Rd to SR-13; SR-149 to Zinc Plant Rd	Widen from 2/3 to 5 Lanes	Under Const	Non-Exempt
103*	Roadway	SR-374 (Warfield Blvd)	Dunbar Cave Rd to Stokes Rd	Widen from 2 to 5 Lanes	Under Const	Non-Exempt
104	Roadway	North-East Connector Phase 1	Ted Crozier Blvd to Wilma Rudolf Blvd to Trenton Rd	New 4/5 Lane Roadway	\$39,522	Non-Exempt
106	Roadway	Lafayette Rd	Walnut Grove Rd through Ft Campbell Gate	Widen from 2 to 5 Lanes	\$2,438	Non-Exempt
107*	Roadway	SR-48 (Trenton Rd)	Needmore Rd	Intersection Improvement	Completed	Exempt

continued

TABLE 11.3 2045 MTP STAGED IMPROVEMENT PROGRAM - STAGE I (2018-2026)

ID	MODE	ROUTE	LOCATION	PROJECT DESCRIPTION	PROJECT COST (\$000)	CONFORMITY STATUS
108	Roadway	KY-400 (State Line Rd)	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	Reconstruct with CTL	\$5,486	Non-Exempt
109	Roadway	KY-115 (Pembroke-Oak Grove Rd)	KY-400 (State Line Rd) to I-24	Reconstruct with CTL	\$11,364	Non-Exempt
110	Roadway	KY-115 (Pembroke)	I-24 to KY-1453 (Barker's Mill Rd)	Reconstruct with CTL	\$7,446	Non-Exempt
Line Item	Roadway	Various	Various	Enhancement	\$3,497	Exempt
Line Item	Roadway	Various	Various	Safety	\$17,485	Exempt
Line Item	Roadway	Various	Various	Bridge	\$48,083	Exempt
Line Item	Roadway	Various	Various	Overlay	\$34,969	Exempt
Line Item	Roadway	Various	Various	Maintenance	\$5,245	Exempt
Line Item	Roadway	Various	Various	Reconstruction	\$65,568	Exempt
Line Item	Transit	--	--	CTS Funding	\$61,785	Exempt
Total Stage I					\$536,773	

* Project received funding, or was completed, after the identification of the E+C projects and before the development of the Staged Improvement Program. These projects are not subject to fiscal constraint.

STAGE II (2027-2036) PROJECTS

Stage II is planned for improvements in the years 2027 to 2036. A list of these projects is shown in Table 11.4. These planned improvements are projected to cost \$730.6 million and represent improvements consisting of roadway widening, new roadway construction, reconstruction, and center turn lane addition.

TABLE 11.4 2045 MTP STAGED IMPROVEMENT PROGRAM - STAGE II (2027-2036)

ID	MODE	ROUTE	LOCATION	PROJECT DESCRIPTION	PROJECT COST (\$'000)	CONFORMITY STATUS
105	Roadway	Jack Miller Blvd Ext	Tobacco Rd to Peachers Mill Rd	New 4 Lane Roadway	\$41,445	Non-Exempt
201	Roadway	SR-374 (Warfield Blvd)	Memorial Dr to Dunbar Cave Rd	Widen from 2 to 4 Lanes	\$22,629	Non-Exempt
203	Roadway	North-East Connector Phase 2	SR-48 (Trenton Rd) to Peachers Mill Rd	New 4 Lane Roadway	\$76,673	Non-Exempt
204	Roadway	Peachers Mill Rd	Pine Mountain Rd to Stonecrossing Dr	Widen from 3 to 4 Lanes	\$4,310	Non-Exempt
207	Roadway	KY-117	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	New 5 Lane Roadway	\$71,523	Non-Exempt
209	Roadway	KY-109 (Bradshaw Rd)	KY-1453 (Elmo Rd) to Bradshaw-Fidelio Rd	Reconstruct with CTL	\$5,687	Non-Exempt
304	Roadway	SR-48 (Trenton Rd)	SR-13/US79 (Wilma Rudolph Blvd) to SR-374	Widen from 2 to 5 Lanes	\$10,776	Non-Exempt
401	Roadway	New Roadway	Fair Brook Place to Needmore Rd	New 3 Lane Roadway	\$11,190	Non-Exempt
402	Roadway	Professional Park Dr Ext	Extension to Cardinal Ln	New 2 Lane Roadway	\$9,325	Non-Exempt
403	Roadway	International Blvd Ext	SR-237 (Rossvie Rd) to SR-76 to Trough Springs Rd	New 2 Lane Roadway	\$34,503	Non-Exempt
405	Roadway	SR-374 (Richview Rd) Ext	SR-12 (Madison St) to US 41A Bypass	New 4 Lane Roadway	\$20,723	Non-Exempt
406	Roadway	Kennedy Ln Ext	Extension to Meriwether Rd	New 2 Lane Roadway	\$8,393	Non-Exempt

continued

TABLE 11.4 2045 MTP STAGED IMPROVEMENT PROGRAM - STAGE II (2027-2036)

ID	MODE	ROUTE	LOCATION	PROJECT DESCRIPTION	PROJECT COST (\$000)	CONFORMITY STATUS
409	Roadway	8th St connector	Needmore Rd to Peterson Ln	New 2 Lane Roadway	\$17,718	Non-Exempt
411	Roadway	SR-374 (Richview Rd)	Memorial Dr to US 41A (Madison St)	Widen from 3 to 5 Lanes	\$8,621	Non-Exempt
504	Roadway	SR 13/48	River Road to Old Highway 48	Center Turn Lane	\$6,426	Non-Exempt
508	Roadway	I-24	@ Exit 8 EB Off Ramp	Widen to 2 Lanes	\$9,106	Non-Exempt
514	Roadway	Tylertown Road	Trenton Rd to Oakland Rd	Widen to 4 Lanes	\$18,319	Non-Exempt
Line Item	Roadway	Various	Various	Enhancement	\$5,245	Exempt
Line Item	Roadway	Various	Various	Safety	\$26,226	Exempt
Line Item	Roadway	Various	Various	Bridge	\$72,121	Exempt
Line Item	Roadway	Various	Various	Overlay	\$52,452	Exempt
Line Item	Roadway	Various	Various	Maintenance	\$7,868	Exempt
Line Item	Roadway	Various	Various	Reconstruction	\$98,347	Exempt
Line Item	Transit	--	--	CTS Funding	\$90,969	Exempt
Total Stage II					\$730,595	

STAGE III (2037-2045) PROJECTS

Stage III is planned for improvements in the years 2037 to 2045. A list of the projects is shown in Table 11.5. These planned improvements are projected to cost \$879.6 million and represent improvements consisting of roadway widening, new roadway construction, and reconstruction.

TABLE 11.5 2045 MTP STAGED IMPROVEMENT PROGRAM - STAGE III (2037-2045)

ID	MODE	ROUTE	LOCATION	PROJECT DESCRIPTION	PROJECT COST (\$)	CONFORMITY STATUS
111	Roadway	Oatts-Riggins Rd	KY-400 (State Line Rd) to KY-911 (Thompsonville Ln)	New 3 Lane Roadway	\$23,355	Non-Exempt
112	Roadway	KY-1453 (Elmo Rd)	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	Reconstruct with CTL	\$33,837	Non-Exempt
202	Roadway	US 41A Bypass (Ashland City Rd)	US 41A/SR-112 to SR-13	Widen from 2/3 to 5 Lanes	\$78,494	Non-Exempt
205	Roadway	Hugh Hunter/ Gritton Church Rd	KY-911 (Thompsonville Ln) to Allen Rd	Reconstruction	\$10,920	Exempt
208	Roadway	Ft Campbell Gate 5 Ext	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	New 2 Lane Roadway	\$23,355	Non-Exempt
303	Roadway	Needmore Rd	Hazelwood Rd to SR-236 (Tiny Town Rd)	Reconstruct with CTL	\$5,892	Non-Exempt
305	Roadway	Whitfield Rd/ Old Trenton Rd	Needmore Rd to SR-374	Reconstruct with CTL	\$1,309	Non-Exempt
404	Roadway	Dixie Bee Rd Ext	Sango Rd to US 41A	New 2 Lane Roadway	\$8,645	Non-Exempt
407	Roadway	SR-236 (Tiny Town Rd) Ext	Extension to Meriwether Rd	New 2 Lane Roadway	\$8,645	Non-Exempt
408	Roadway	New Roadway	9th St to 10th St	New 2 Lane Roadway	\$1,235	Non-Exempt
412	Roadway	Hazelwood Rd	Trenton Rd to Needmore	Widen from 2 to 5 Lanes	\$28,543	Non-Exempt
502	Roadway	Cumberland Dr	Ashland City Rd (SR 12) to Madison St (SR 76)	Widen to 4 Lanes	\$25,689	Non-Exempt
503	Roadway	Dunbar Cave Road	Wilma Rudolph Blvd (US 79/SR 13) to Rossvie Rd (SR 237)	Widen to 4 Lanes	\$57,087	Non-Exempt

continued

TABLE 11.5 2045 MTP STAGED IMPROVEMENT PROGRAM - STAGE III (2037-2045)

ID	MODE	ROUTE	LOCATION	PROJECT DESCRIPTION	PROJECT COST (\$)	CONFORMITY STATUS
507	Roadway	I-24	@ Dixie Bee Road	New interchange	\$68,614	Non-Exempt
510	Roadway	Needmore Road	Wilma Rudolph Blvd to Trenton Road	Widen to 4 Lanes	\$12,844	Non-Exempt
512	Roadway	Rossvie Road	SR 374 to Dunbar Cave Rd	Widen to 5 Lanes	\$21,407	Non-Exempt
515	Roadway	Wilma Rudolph Boulevard	Kraft St to SR 374	Widen to 6 Lanes	\$42,815	Non-Exempt
Line Item	Roadway	Various	Various	Enhancement	\$6,371	Exempt
Line Item	Roadway	Various	Various	Safety	\$31,856	Exempt
Line Item	Roadway	Various	Various	Bridge	\$87,605	Exempt
Line Item	Roadway	Various	Various	Overlay	\$63,713	Exempt
Line Item	Roadway	Various	Various	Maintenance	\$9,557	Exempt
Line Item	Roadway	Various	Various	Reconstruction	\$119,461	Exempt
Line Item	Transit	--	--	CTS Funding	\$108,340	Exempt
Total Stage III					\$879,589	

EFFECTIVENESS OF FISCALLY-CONSTRAINED PROJECTS

Tables 11.6 and 11.7 show the travel impacts of implementing the capacity projects in the fiscally-constrained project list. The tables compare network statistics against the “No Build” E+C network. Figure 11.1 displays these projects.

WHILE DAILY VEHICLE MILES TRAVELED DECREASE BY LESS THAN ONE (1) PERCENT, THE DAILY VEHICLE HOURS TRAVELLED AND DAILY HOURS OF DELAY DECREASE BY THIRTY-FOUR (34) AND FORTY-SEVEN (47) PERCENT RESPECTIVELY BY IMPLEMENTING THE PROJECTS RECOMMENDED IN THE 2045 MTP.

TABLE 11.6 TRAVEL IMPACTS OF FISCALLY-CONSTRAINED 2045 MTP ROADWAY CAPACITY PROJECTS

MEASURE	2045 EXISTING AND COMMITTED	2045 FISCALLY CONSTRAINED MTP	DIFFERENCE	PERCENT DIFFERENCE
Daily Vehicle Miles Traveled	6,923,236	6,954,406	31,170	0.5%
Daily Vehicle Hours Traveled	522,963	345,200	-177,763	-34.0%
Daily Hours of Delay	375,722	198,147	-177,575	-47.3%

Source: Clarksville Travel Demand Model, NSI

Note: Values in this table include all facilities modeled and do not match the values in other tables regarding VMT, VHT, and VHD.

TABLE 11.7 TRAVEL IMPACTS OF FISCALLY CONSTRAINED 2045 MTP PROJECTS BY ROADWAY FUNCTIONAL CLASS

CENTERLINE MILES OF ROADWAYS				
CLASSIFICATION	2045 (E+C PROJECTS)	2045 MTP	DIFFERENCE	PERCENT DIFFERENCE
Interstate	25.6	25.6	0.0	0.00%
Principal Arterial	61.6	61.6	0.0	0.00%
Minor Arterial	115.7	128.9	13.2	11.41%
Collector	222.7	225.0	2.3	1.03%
Total	425.6	441.1	15.5	3.64%
DAILY VEHICLE MILES TRAVELED (VMT)				
CLASSIFICATION	2045 (E+C PROJECTS)	2045 MTP	DIFFERENCE	PERCENT DIFFERENCE
Interstate	1,726,719	1,564,899	-161,820	-9.37%
Principal Arterial	1,950,292	1,959,421	9,129	0.47%
Minor Arterial	2,230,573	2,501,550	270,977	12.15%
Collector	1,015,652	928,536	-87,116	-8.58%
Total	6,923,236	6,954,406	31,170	0.45%
DAILY VEHICLE HOURS TRAVELED (VHT)				
CLASSIFICATION	2045 (E+C PROJECTS)	2045 MTP	DIFFERENCE	PERCENT DIFFERENCE
Interstate	228,960	105,376	-123,584	-53.98%
Principal Arterial	107,577	77,890	-29,687	-27.60%
Minor Arterial	128,386	116,921	-11,465	-8.93%
Collector	58,040	45,013	-13,027	-22.44%
Total	522,963	345,200	-177,763	-33.99%

Note: E+C is future scenario with only Existing and Committed transportation projects.

Source: Clarksville Travel Demand Model, NSI

continued

TABLE 11.7 TRAVEL IMPACTS OF FISCALLY CONSTRAINED 2045 MTP PROJECTS BY ROADWAY FUNCTIONAL CLASS

DAILY VEHICLE HOURS OF DELAY (VHD)				
CLASSIFICATION	2045 (E+C PROJECTS)	2045 MTP	DIFFERENCE	PERCENT DIFFERENCE
Interstate	201,806	80,719	-121,087	-60.00%
Principal Arterial	66,053	36,755	-29,298	-44.36%
Minor Arterial	77,057	60,134	-16,923	-21.96%
Collector	30,806	20,539	-10,267	-33.33%
Total	375,722	198,147	-177,575	-47.26%

Note: E+C is future scenario with only Existing and Committed transportation projects.

Source: Clarksville Travel Demand Model, NSI

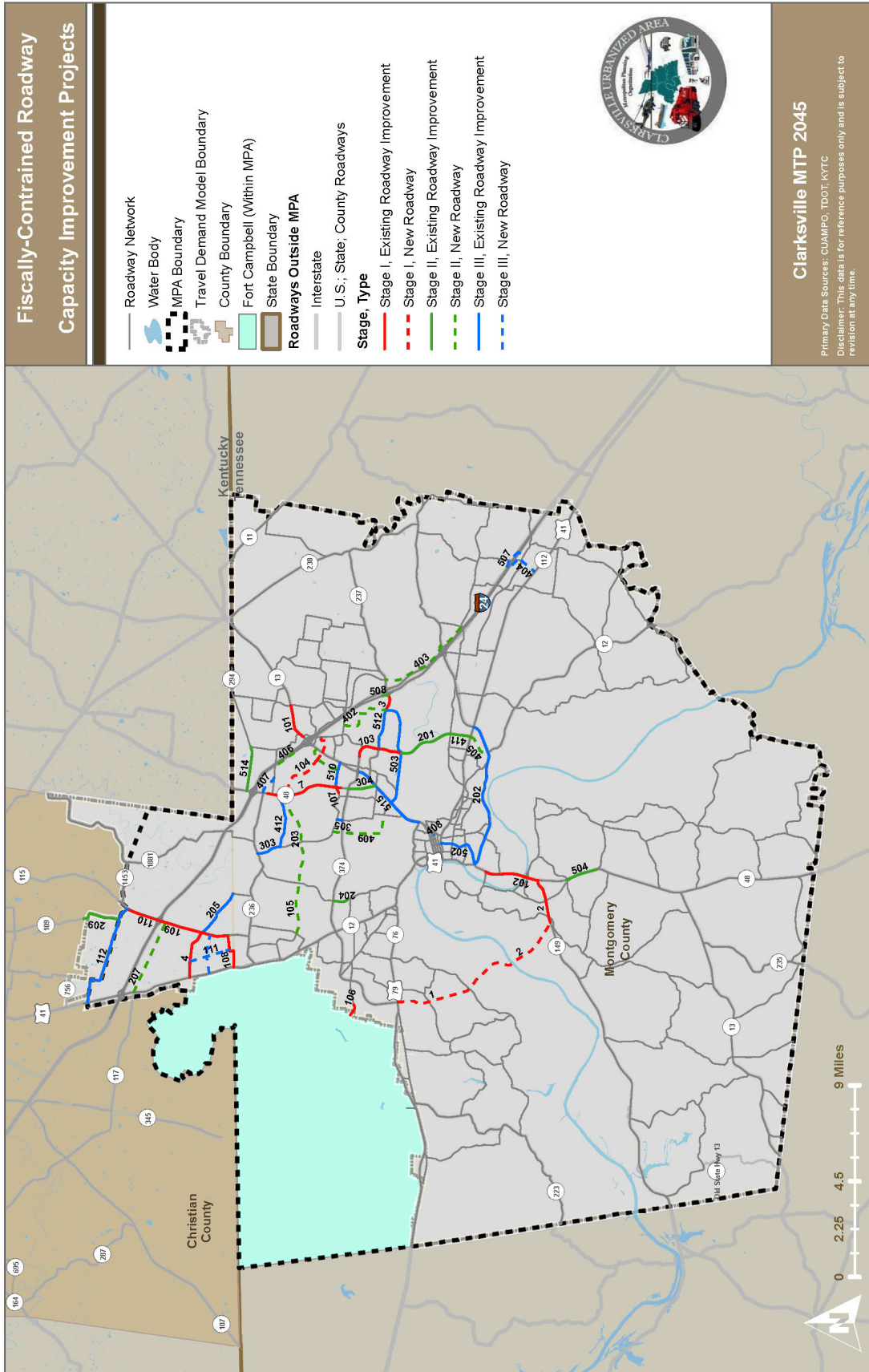


FIGURE 11.1 FISCALLY-CONSTRAINED ROADWAY CAPACITY IMPROVEMENT PROJECTS

11.2 | Visionary (Unfunded) Roadway Projects

The previous section addressed transportation improvements with identified funding sources. However, many unfunded transportation improvements may further improve travel conditions. These projects have been included in a Visionary Needs list to keep a record of future needs.

Unfunded transportation improvements are not necessarily less important or effective; they just cannot be accommodated within the financially constrained budget. Delayed funding for an improvement project may be the result of its:

- size
- cost
- design complexity
- acquisition difficulties
- jurisdictional concerns
- environmental concerns

A project may be delayed if its efficiency is minimized until other projects are completed; or it does not alleviate existing transportation deficiencies.

2045

Clarksville Urbanized Area

CHAPTER 11

The estimated cost, in 2017 dollars, to implement the unfunded projects is \$530.8 million. The Visionary Needs list is shown in Table 11.8 and the projects are shown in Figure 11.2.

TABLE 11.8 2045 MTP VISIONARY NEEDS LIST

ID	ROUTE	LOCATION	IMPROVEMENT	MILES	PROJECT COST (2017 \$,000)
206	Ft Campbell Gate 4 Ext	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	New 2 Lane Roadway	1.20	\$7,290
301	I-24	KY/TN State Line to SR-76	Widen from 4 to 6 Lanes	10.70	\$123,050
302	I-24	SR-76 to SR-256 in Robertson County	Widen from 4 to 6 Lanes	8.60	\$98,900
306	I-24	US 41A (Ft Campbell Blvd) to TN State Line	Widen from 4 to 6 Lanes	7.80	\$89,700
410	I-24	Dunlop Ln	New Interstate Interchange	--	\$33,750
501	SR 48 (College St)	N 2nd St (US 41A) to Kraft St	Widen to 6 Lanes	1.40	\$9,828
505	SR 48 (College St)	Riverside Dr to N 2nd St (US 41A)	Widen to 4 Lanes	0.30	\$2,106
506	US 79 (Providence Blvd)	US 41 to Red River Providence	Widen to 6 Lanes	1.50	\$10,530
509	Madison Street	10th Street to Pageant Lane	Widen to 4 Lanes	0.50	\$3,510
511	Riverside Drive	Providence Blvd to Cumberland Dr	Road Diet	2.30	\$3,150
513	Tiny Town Road	US 41A to Trenton Rd	Widen to 6 Lanes	6.80	\$47,736
516*	SR-374 Ext	SR-13/48 to SR-12	New 2 Lane Roadway & Bridge	5.50	\$101,250
517**	SR 237 (Rossvie Rd)	International Blvd to Browning Way	Reconstruct with CTL	1.60	\$5,152
518**	SR 76	I-24 to Woodson Rd	Reconstruct with CTL	0.70	\$2,254
519**	KY-911	US 41A to KY-115	Widen from 3 to 5 Lanes	1.85	\$12,987
Total Vision					\$551,193

*Project 516 was added to the MTP process after project scoring was completed.

**Projects 517 through 519 were added to the Vision List based on comments received during the public review period.

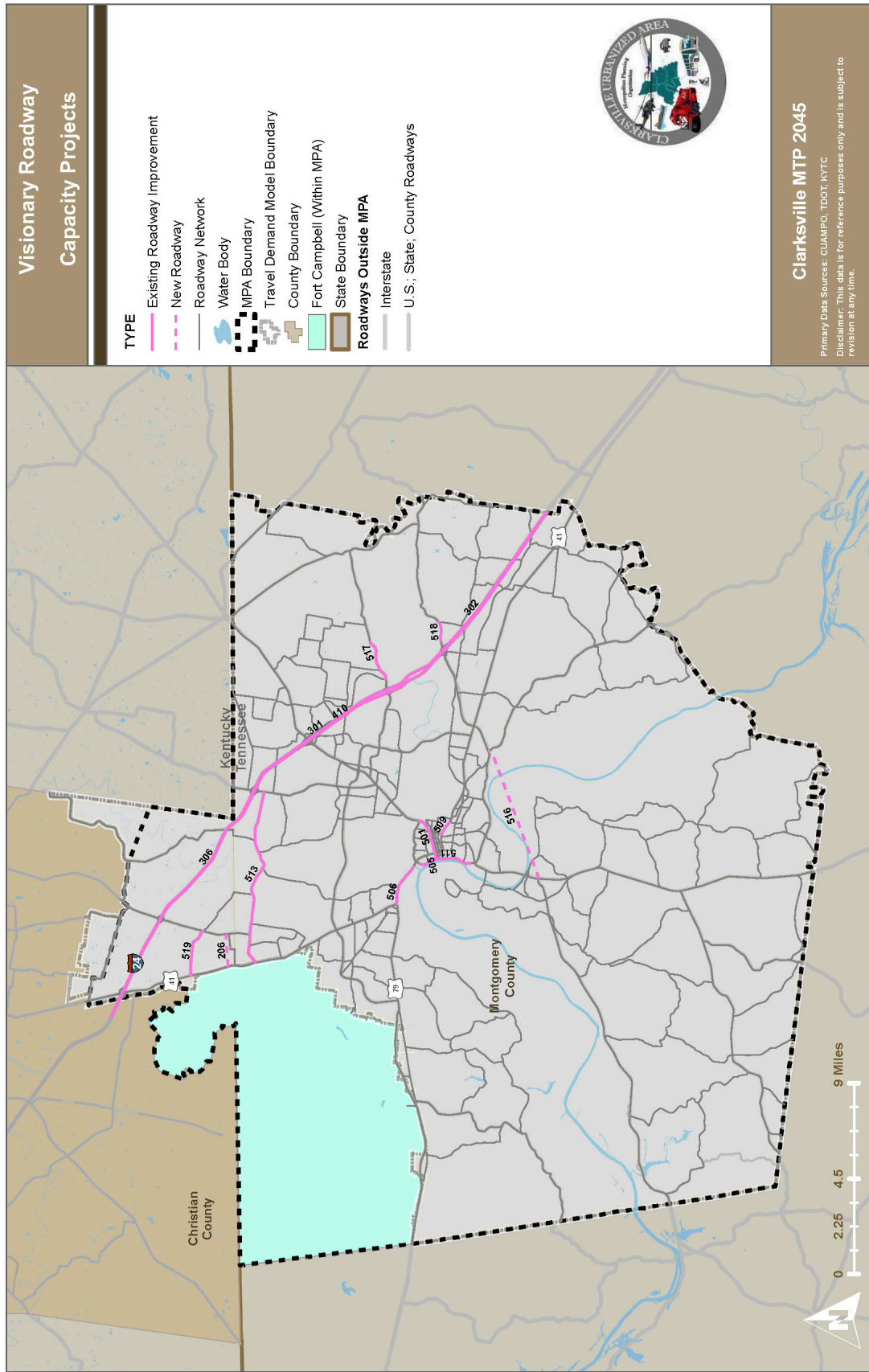
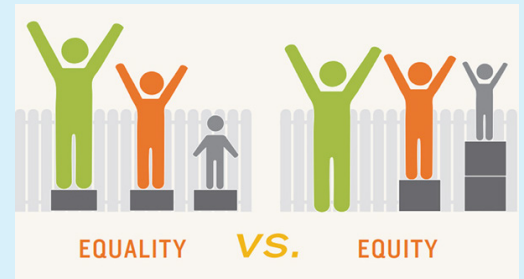


FIGURE 11.2 VISIONARY ROADWAY CAPACITY PROJECTS

11.3 | Allocation of Funds to Communities of Concern

Communities of concern are cities and communities where the percentage of low-income households or minorities is greater than that of the entire MPA. Within the MPA, 27 percent of the population are minority persons, while 18 percent of the households are below the poverty line. In order to ensure equity in the plan, an analysis was conducted to determine the level of investment that will occur near these identified populations.



Highway Projects

The staged improvement program contains \$1.13 billion in capacity projects throughout the MPA. Of that amount, \$982.8 million is located within (completely or partially) or bordering communities of concern. This represents approximately 88 percent of the total dollars invested in capacity projects. The staged improvement plan projects that are within or bordering communities of concern are shown in Table 11.9. The MTP projects and communities of concern are displayed in Figure 11.3.

Each of the projects in Table 11.9 received an assessment of the likely impacts to residential properties, businesses, and community facilities in order to determine a “Level of Concern”. The majority of these projects involve widenings or roadway extensions into primarily undeveloped areas, or areas with few right-of-way concerns. Overall, the level of concern for each of the projects is relatively low. However, the scope and resources of the MTP only allow for a preliminary analysis to be conducted. Further research will need to be done as a project progresses through the development process.

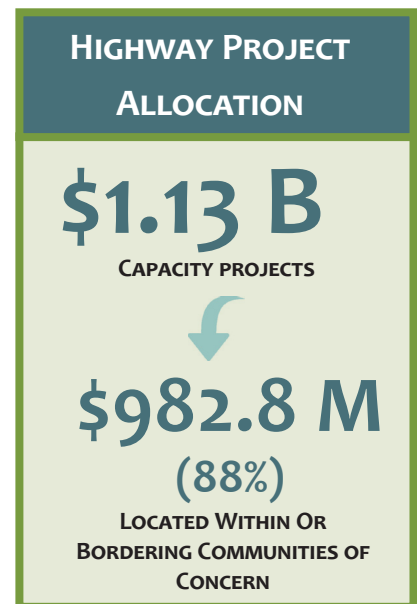


TABLE 11.9 LEVEL OF CONCERN FOR STAGED IMPROVEMENT PROGRAM

ID	STAGE	ROUTE	LOCATION	IMPROVEMENT	LEVEL OF CONCERN
1	Stage I	SR-374 Ext	Dotsonville Rd to US 79/SR 6 (Dover Rd)	New 2 Lane Roadway	Low
2	Stage I	SR-374 Ext/SR-149	Dotsonville Rd to SR-149; SR-374 to River Rd	New 2 Lane Roadway & Bridge	Low
3	Stage I	SR-237 (Rossvie Rd) & Dunbar Cave Rd	I-24 to 400 ft. west of Keysburg Rd	Widen from 2 to 3/5 Lanes & Realignment	Low
4	Stage I	KY-911 (Thompsonville Rd)	US 41A to KY-115 (Pembroke Rd)	Widen from 2 to 3 Lanes	Low
7	Stage I	SR-48 (Trenton Rd)	SR-374 to I-24	Widen from 2 to 5 Lanes	Low
101	Stage I	US 79/SR-13 (Guthrie Hwy)	Cracker Barrel Dr to International Blvd	Widen from 2/3 to 5 Lanes	Low
102	Stage I	SR-149/SR-13	River Rd to SR-13; SR-149 to Zinc Plant Rd	Widen from 2/3 to 5 Lanes	Low
103	Stage I	SR-374 (North Pkwy)	Dunbar Cave Rd to Stokes Rd	Widen from 2 to 5 Lanes	Low
104	Stage I	North-East Connector Ph 1	Ted Crozier Blvd to Wilma Rudolph Blvd to Trenton Rd	New 4/5 Lane Roadway	Low
106	Stage I	Lafayette Rd	Walnut Grove Rd through Ft Campbell Gate	Widen from 2 to 5 Lanes	Low
107	Stage I	SR-48 (Trenton Rd)	Needmore Rd	Intersection Improvement	Low
108	Stage I	KY-400 (State Line Rd)	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	Reconstruct with CTL	Low
109	Stage I	KY-115 (Pembroke-Oak Grove Rd)	KY-400 (State Line Rd) to I-24	Reconstruct with CTL	Low
110	Stage I	KY-115 (Pembroke)	I-24 to KY-1453 (Barker's Mill Rd)	Reconstruct with CTL	Low

Source: NSI, CUAMPO

continued

TABLE 11.9 LEVEL OF CONCERN FOR STAGED IMPROVEMENT PROGRAM

ID	STAGE	ROUTE	LOCATION	IMPROVEMENT	LEVEL OF CONCERN
105	Stage II	Jack Miller Blvd Ext	Tobacco Rd to Peachers Mill Rd	New 4 Lane Roadway	Could impact minorities
201	Stage II	SR-374 (Warfield Blvd)	Memorial Dr to Dunbar Cave Rd	Widen from 2 to 4 Lanes	Low
203	Stage II	North-East Connector Ph 2	SR-48 (Trenton Rd) to Peachers Mill Rd	New 4 Lane Roadway	Low
204	Stage II	Peachers Mill Rd	Pine Mountain Rd to Stonecrossing Dr	Widen from 3 to 4 Lanes	Could impact minorities
207	Stage II	KY-117	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	New 5 Lane Roadway	Low
209	Stage II	KY-109 (Bradshaw Rd)	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	New 5 Lane Roadway	Low
209	Stage II	KY-109 (Bradshaw Rd)	KY-1453 (Elmo Rd) to Bradshaw-Fidelio Rd	Reconstruct with CTL	Low
304	Stage II	SR-48 (Trenton Rd)	SR-13/US79 (Wilma Rudolph Blvd) to SR-374	Widen from 2 to 5 Lanes	Low
401	Stage II	New Roadway	Fair Brook Place to Needmore Rd	New 3 Lane Roadway	Low
402	Stage II	Professional Park Dr Ext	Extension to Cardinal Ln	New 2 Lane Roadway	Low
403	Stage II	International Blvd Ext	SR-237 (Rossvie Rd) to SR-76 to Trough Springs Rd	New 2 Lane Roadway	Could impact minorities
405	Stage II	SR-374 (Richview Rd) Ext	SR-12 (Madison St) to US 41A Bypass	New 4 Lane Roadway	Could impact minorities
406	Stage II	Kennedy Ln Ext	Extension to Meriwether Rd	New 2 Lane Roadway	Low
409	Stage II	8th St connector	Needmore Rd to Patterson Ln	New 2 Lane Roadway	Low
504	Stage II	SR 13/48	River Road to Old Highway 48	Center Turn Lane	Low

Source: NSI, CUAMPO

continued

TABLE 11.9 LEVEL OF CONCERN FOR STAGED IMPROVEMENT PROGRAM

ID	STAGE	ROUTE	LOCATION	IMPROVEMENT	LEVEL OF CONCERN
111	Stage III	Oatts-Riggins Rd	KY-400 (State Line Rd) to KY-911 (Thompsonville Ln)	New 3 Lane Roadway	Low
202	Stage III	US 41A Bypass (Ashland City Rd)	US 41A/SR-112 to SR-13	Widen from 2/3 to 5 Lanes	Could impact minorities
205	Stage III	Hugh Hunter/ Gritton Church Rd	KY-911 (Thompsonville Ln) to Allen Rd	Reconstruction	Low
303	Stage III	Needmore Rd	Hazelwood Rd to SR-236 (Tiny Town Rd)	Reconstruct with CTL	Low
305	Stage III	Whitfield Rd/Old Trenton Rd	Needmore Rd to SR-374	Reconstruct with CTL	Low
407	Stage III	SR-236 (Tiny Town Rd) Ext	Extension to Meriwether Rd	New 2 Lane Roadway	Could impact minorities
408	Stage III	New Roadway	9th St to 10th St	New 2 Lane Roadway	Could impact low income and minorities
412	Stage III	Hazelwood Rd	Trenton Rd to Needmore	Widen from 2 to 5 Lanes	Could impact minorities
502	Stage III	Cumberland Dr	Ashland City Rd (SR 12) to Madison St (SR 76)	Widen to 4 Lanes	Low
503	Stage III	Dunbar Cave Road	Wilma Rudolph Blvd (US 79) to Rossvie Rd (SR 37)	Widen to 4 Lanes	Low
510	Stage III	Needmore Road	Wilma Rudolph Blvd to Trenton Road	Widen to 4 Lanes	Low
512	Stage III	Rossvie Road	SR 374 to Dunbar Cave Rd	Widen to 5 Lanes	Low
515	Stage III	Wilma Rudolph Boulevard	Kraft St to SR 374	Widen to 6 Lanes	Low

Source: NSI, CUAMPO

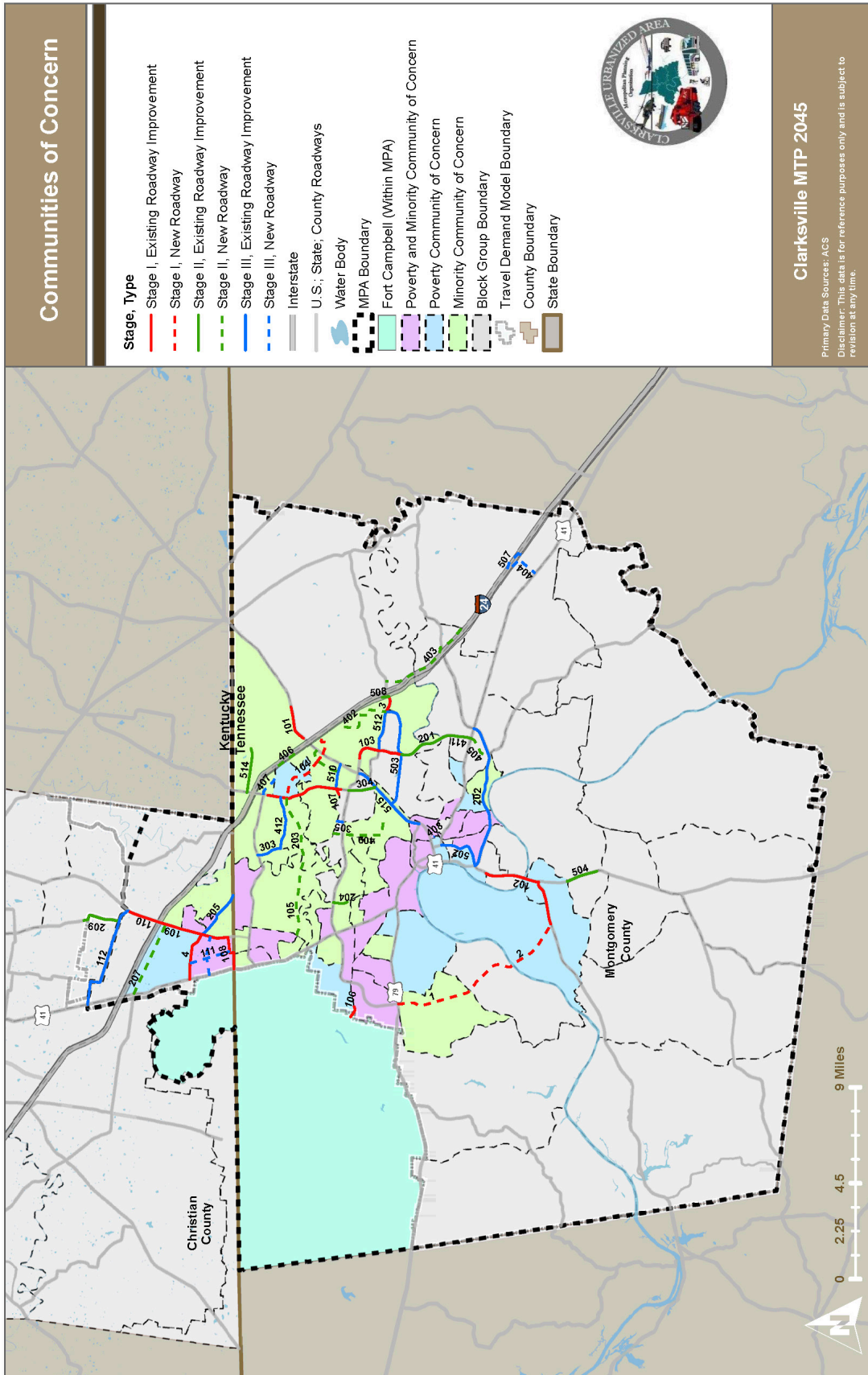


FIGURE 11.3 COMMUNITIES OF CONCERN

Roadway Safety and ITS Projects

These projects often require little or no right-of-way acquisition. They also provide positive impacts on the residents and businesses due to increased safety and reduced congestion issues. As such, these projects will only benefit communities of concern. Roadway safety and ITS projects can be developed at the same time as other highway improvements. The MPO has also identified the Dynamic Message Signs on I-24 within the Tennessee portion of the MPA as a visionary ITS project, based on the Regional ITS Architecture.

Transit Projects

The identified transit projects in Chapter 10 continue operating assistance for transit services and capital assistance for bus replacements, replacement and upgrade of miscellaneous capital equipment, and upgrading existing facilities. There are no proposed capital investments that involve right-of-way acquisition. Within the MPA, most of the areas that contain communities of concern are well-served by the current transit routes. These communities will benefit from the plan's transit projects through increased and more reliable service.

Bicycle and Pedestrian Projects

The 2045 MTP contains recommendations for sidewalks along major commercial corridors. These sidewalks would provide additional access to transit facilities for all people, including the communities of concern. The bicycle projects identified by the Clarksville Cycling Club would promote healthier communities and create access to facilities for all residents and workers in the MPA, benefiting communities of concern. The projects identified in Chapter 10 can be located throughout the MPA. Many of these bicycle and pedestrian projects are on roadways that TDOT and KYTC currently have no planned improvements for. However, these projects may be undertaken at the same time as other TDOT or KYTC projects that may occur in the future.

11.4 | Strategies to Improve Freight Conditions

DEPLOY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS (ITS) INCIDENT MANAGEMENT SYSTEM

The MPO works with its partner agencies to maintain the Clarksville Regional Intelligent Transportation System. This system helps to manage traffic incidents and promote more efficient traffic operations. The continuation of this system will assist in reducing freight delay in the future.

IMPLEMENT MTP ROADWAY PROJECTS

Table 11.10 shows the roadway projects funded in the 2045 MTP that are along major freight corridors or roadway segments with 500 or more estimated daily trucks. The projects are shown in Figure 11.4. These projects should create reductions in delay and safety incidents for passenger and commercial traffic in the MPA.

TABLE 11.10 2045 MTP ROADWAY PROJECTS WITH FREIGHT BENEFITS

ID	STAGE	ROUTE	LOCATION	IMPROVEMENT
1	Stage I	SR-374 Ext	Dotsonville Rd to US 79/SR 6 (Dover Rd)	New 4 Lane Roadway
2	Stage I	SR-374 Ext/SR-149	Dotsonville Rd to SR-149; SR-374 to River Rd	New 4 Lane Roadway & Bridge, Widen from 2 to 5 Lanes
3	Stage I	SR-237 (Rossvie Rd) & Dunbar Cave Rd	I-24 to 400 ft. west of Keysburg Rd	Widen from 2 to 3/5 Lanes & Realignment
4	Stage I	KY-911 (Thompsonville Rd)	US 41A to KY-115 (Pembroke Rd)	Widen from 2 to 3 Lanes
7	Stage I	SR-48 (Trenton Rd)	SR-374 to I-24	Widen from 2 to 5 Lanes
101	Stage I	US 79/SR-13 (Guthrie Hwy)	Cracker Barrel Dr to International Blvd	Widen from 2/3 to 5 Lanes
102	Stage I	SR-149/SR-13	River Rd to SR-13; SR-149 to Zinc Plant Rd	Widen from 2/3 to 5 Lanes
103	Stage I	SR-374 (Warfield Blvd)	Dunbar Cave Rd to Stokes Rd	Widen from 2 to 5 Lanes
104	Stage I	North-East Connector Ph 1	Ted Crozier Blvd to Wilma Rudolph Blvd to Trenton Rd	New 4/5 Lane Roadway
106	Stage I	Lafayette Rd	Walnut Grove Rd through Ft Campbell Gate	Widen from 2 to 5 Lanes
107	Stage I	SR-48 (Trenton Rd)	Needmore Rd	Intersection Improvement
109	Stage I	KY-115 (Pembroke-Oak Grove Rd)	KY-400 (State Line Rd) to I-24	Reconstruct with CTL
105	Stage II	Jack Miller Blvd Ext	Tobacco Rd to Peachers Mill Rd	New 4 Lane Roadway
201	Stage II	SR-374 (Warfield Blvd)	Memorial Dr to Dunbar Cave Rd	Widen from 2 to 4 Lanes
203	Stage II	North-East Connector Ph 2	SR-48 (Trenton Rd) to Peachers Mill Rd	New 4 Lane Roadway
204	Stage II	Peachers Mill Rd	Pine Mountain Rd to Stonecrossing Dr	Widen from 3 to 4 Lanes
207	Stage II	KY-117	US 41A (Ft Campbell Blvd) to KY-115 (Pembroke-Oak Grove Rd)	New 5 Lane Roadway

Source: NSI, CUAMPO

continued

TABLE 11.10 2045 MTP ROADWAY PROJECTS WITH FREIGHT BENEFITS

ID	STAGE	ROUTE	LOCATION	IMPROVEMENT
304	Stage II	SR-48 (Trenton Rd)	SR-13/US79 (Wilma Rudolph Blvd) to SR-374	Widen from 2 to 5 Lanes
401	Stage II	New Roadway	Fair Brook Place to Needmore Rd	New 3 Lane Roadway
402	Stage II	Professional Park Dr Ext	Extension to Cardinal Ln	New 2 Lane Roadway
403	Stage II	International Blvd Ext	SR-237 (Rossvie Rd) to SR-76 to Trough Springs Rd	New 2 Lane Roadway
405	Stage II	SR-374 (Richview Rd) Ext	SR-12 (Madison St) to US 41A Bypass	New 4 Lane Roadway
406	Stage II	Kennedy Ln Ext	Extension to Meriwether Rd	New 2 Lane Roadway
409	Stage II	8th St connector	Needmore Rd to Patterson Ln	New 2 Lane Roadway
411	Stage II	SR-374 (Richview Rd)	Memorial Dr to US 41A (Madison St)	Widen from 3 to 5 Lanes
504	Stage II	SR 13/48	River Road to Old Highway 48	Center Turn Lane
508	Stage II	I-24	@ Exit 8 EB Off Ramp	Widen to 2 Lanes
514	Stage II	Tylertown Road	Trenton Rd to Oakland Rd	Widen to 4 Lanes
202	Stage III	US 41A Bypass (Ashland City Rd)	US 41A/SR-112 to SR-13	Widen from 2/3 to 5 Lanes
205	Stage III	Hugh Hunter/ Gritton Church Rd	KY-911 (Thompsonville Ln) to Allen Rd	Reconstruction
303	Stage III	Needmore Rd	Hazelwood Rd to SR-236 (Tiny Town Rd)	Reconstruct with CTL
305	Stage III	Whitfield Rd/ Old Trenton Rd	Needmore Rd to SR-374	Reconstruct with CTL
404	Stage III	Dixie Bee Rd Ext	Sango Rd to US 41A	New 2 Lane Roadway
407	Stage III	SR-236 (Tiny Town Rd) Ext	Extension to Meriwether Rd	New 2 Lane Roadway
408	Stage III	New Roadway	9th St to 10th St	New 2 Lane Roadway

Source: NSI, CUAMPO

continued

TABLE 11.10 2045 MTP ROADWAY PROJECTS WITH FREIGHT BENEFITS

ID	STAGE	ROUTE	LOCATION	IMPROVEMENT
412	Stage III	Hazelwood Rd	Trenton Rd to Needmore	Widen from 2 ro 5 Lanes
502	Stage III	Cumberland Dr	Ashland City Rd (SR 12) to Madison St (SR 76)	Widen to 4 Lanes
507	Stage III	I-24	@ Dixie Bee Road	New interchange
510	Stage III	Needmore Road	Wilma Rudolph Blvd to Trenton Road	Widen to 4 Lanes
512	Stage III	Rossvie Road	SR 374 to Dunbar Cave Rd	Widen to 5 Lanes
515	Stage III	Wilma Rudolph Boulevard	Kraft St to SR 374	Widen to 6 Lanes

Source: NSI, CUAMPO

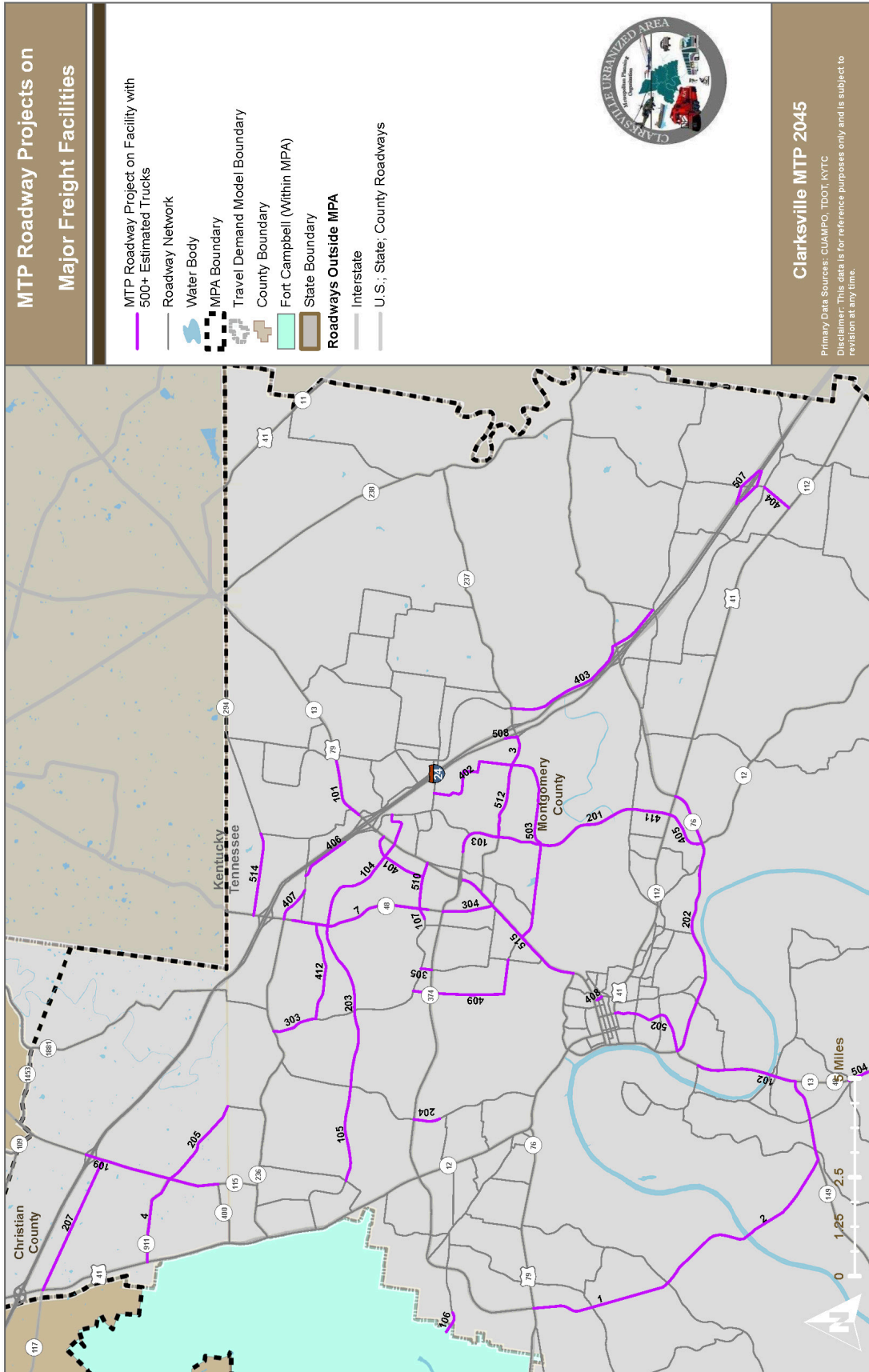


FIGURE 11.4 MTP ROADWAY PROJECTS ON MAJOR FREIGHT FACILITIES

11.5| Strategies to Improve Air Quality

The EPA offers education on air pollution caused by everyday transportation. Through their website, <https://www.epa.gov/air-pollution-transportation>, they provide users with:

- A history of reduction efforts for air pollution caused by transportation.
- An overview of how transportation contributes to air pollution.
- The types of air pollution caused by transportation.
- What users can do to reduce pollution from vehicles and engines.

Table 11.11 outlines actions the MPO can take to begin addressing the negative impacts of vehicle emissions on air quality and public health.

TABLE 11.11 ACTIONS TO REDUCE TRANSPORTATION-RELATED AIR POLLUTION EMISSIONS

STRATEGY	DESCRIPTION
Continue the deployment and update of the Clarksville Regional ITS Architecture as necessary.	This will improve the operational efficiency of the existing transportation system, reducing the higher level of vehicle emissions occurring at low speeds or while idling.
Encourage local governments to adopt land use regulations that encourage building urban, suburban and rural communities with housing and transportation choices near jobs, shops and schools.	Increasing the walkability of the MPO will reduce the need for trips to be made by driving an automobile. It can also be more energy efficient overall.
Implement transit and bicycle/pedestrian strategies outlined previously to reduce automobile trips.	Many of these actions will make walking, biking, and transit more attractive; thereby potentially reducing demand for travel by automobile.
Work with KYTC and TDOT to explore creating a Clean Cities coalition for Kentucky and Tennessee.	At the local level, coalitions leverage resources to create networks of local stakeholders and provide technical assistance to fleets implementing alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and emerging transportation technologies.
Perform studies to identify best programmatic, policy, and infrastructure strategies to reduce regional transportation-related air pollution emissions.	These studies should focus on improving system and operational efficiencies (e.g. idle reduction strategies and traffic management), reducing travel activity (e.g. Transportation Demand Management [TDM]), and increasing the utilization of alternative fuel vehicles (e.g. ethanol, biodiesel, natural gas, propane, synthetic fuels, hydrogen, and electricity).

11.6 | Wilma Rudolph Boulevard Corridor Study

DURING THE PUBLIC OUTREACH SURVEY, WILMA RUDOLPH BOULEVARD WAS IDENTIFIED MOST OFTEN AS THE CORRIDOR WITH THE MOST CONGESTION. DURING THE SURVEY, IT WAS ALSO IDENTIFIED MOST OFTEN AS THE CORRIDOR OF GREATEST SAFETY CONCERN.

Currently, the roadway is a five-lane urban arterial facility with two through lanes and a two-way left turn lane (TWLTL).

Crash data for the five-year period of 2012 through 2016 was used to calculate the crash rate. During that period, 3,055 crashes were reported. The average AADT of the corridor was 32,607 vehicle. The crash rate for this segment, expressed in accidents per million vehicle miles, is 10.23. The statewide average crash rate for a similar facility is 2.69. This results in a crash rate that is more than three times greater than the statewide average, indicating that the roadway is high risk.

The MTP 2045 recommends a safety and access management study be conducted on the Wilma Rudolph Boulevard corridor. Potential countermeasures that could be explored in the study include:

- Install a raised median
 - Replace the existing Two-way Left Turn Lane (TWLTL) with a raised median.
 - This treatment typically reduces the crash rates by 23 percent¹ compared to a TWLTL.
 - Could improve overall speed along study corridor by reducing disruptions from driveway traffic.
 - Reduces the number of conflict points.

WILMA RUDOLPH BLVD. CRASH RATE COMPARISON

10.23
ACCIDENTS PER MILLION
VEHICLE MILES

VS.
2.69

STATEWIDE AVERAGE FOR SIMILAR
(3X)
MORE THAN STATE AVERAGE

¹ http://www.cmfclearinghouse.org/study_detail.cfm?stid=165

- Driveway consolidations
 - Reduces the density of driveways along the major corridor by closing driveways, providing alternative vehicle access, access restrictions, creating shared driveways, and relocating entrances to side streets.
 - Improves traffic flow due to reduction in disruptions
- Intersection treatments
 - Add Restricted Crossing U-Turn (RCUT) for minor street traffic and optimize signal timing.
 - RCUT is an alternative intersection design characterized by prohibiting left turns and through movements from minor streets. These prohibited movements are accommodated by requiring motorists to turn right onto the major street, then make a U-turn maneuver at a median opening located 400 to 1,000 feet from the intersection.
 - RCUT intersections are operated with two phases, thereby increasing major street throughput and reducing delay and queues for the overall intersection.
 - RCUT intersections reduce the number of conflict points from 32 to 14.
 - Research shows that RCUT design could reduce overall crashes by 15 percent and injury crashes by 22 percent.

11.7 | Freight and Nonmotorized Travel Studies

According to the 2010 Census, the Clarksville MPA is not listed as a TMA. However, the population of the MPA, excluding Fort Campbell (which has a fluctuating population), is just below the TMA threshold. The region is likely to be classified as a TMA after the 2020 Census. This will require the MPO to develop a CMP as discussed in Chapter 1. As part of these efforts, the MPO could conduct additional studies to aid in the development of the CMP, as well as address some of the needs discussed in Chapter 8. The first study would be an analysis of freight needs and an identification of freight trip generation within the MPA. The second study would be a comprehensive analysis of bicycle and pedestrian facilities and needs.