

AIR QUALITY CONFORMITY DETERMINATION REPORT

For The:

MOBILITY PLAN 2045

And Amendments to the:

Fiscal Year 2020-2023

TRANSPORTATION IMPROVEMENT PROGRAM

And the:

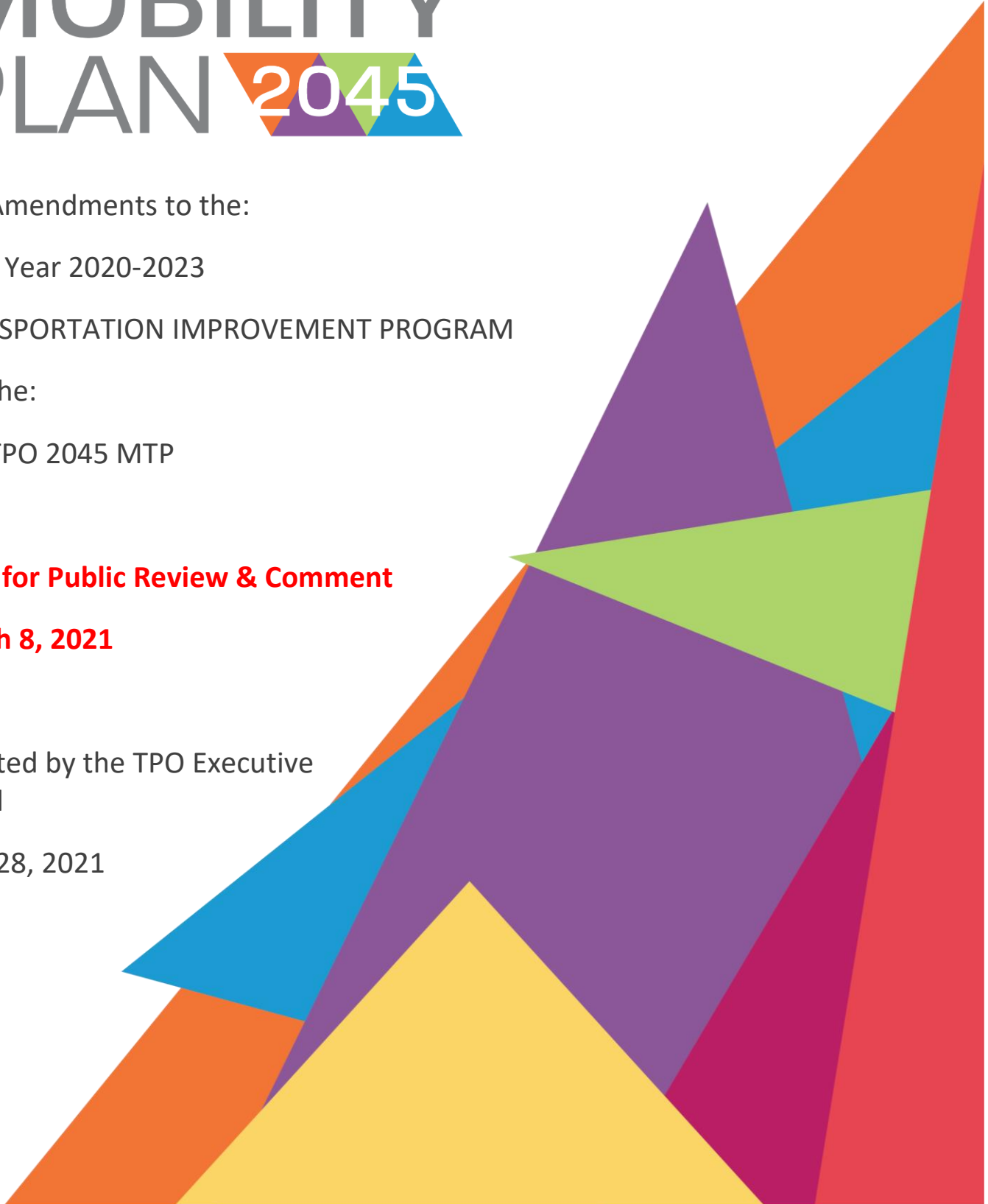
LAMTPO 2045 MTP

Draft for Public Review & Comment

March 8, 2021

Adopted by the TPO Executive
Board

April 28, 2021





**Air Quality Conformity Determination Report for the
Knoxville Regional TPO 2021 Update of the
Metropolitan Transportation Plan, known as the
“Mobility Plan 2045”
and
the accompanying Knoxville Regional TPO
FY 2020-2023 Transportation Improvement Program**

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Adopting Resolution by Knoxville Regional TPO Executive Board for Mobility Plan 2045 and Air Quality Conformity Determination

**A RESOLUTION BY THE EXECUTIVE BOARD
OF THE KNOXVILLE REGIONAL
TRANSPORTATION PLANNING ORGANIZATION (TPO)
ADOPTING AMENDMENTS TO THE MOBILITY PLAN 2045 &
UPDATED AIR QUALITY CONFORMITY DETERMINATION REPORT**

WHEREAS, the Fixing America’s Surface Transportation Act (FAST Act) requires that each MPO have a current metropolitan transportation plan; and,

WHEREAS, the guidance for the development of the metropolitan transportation plan, as found in the Final Rule for Metropolitan Transportation Planning and Programming in the Federal Register under section 23 CFR 450.322, was followed and,

WHEREAS, the metropolitan transportation plan must address all modes of transportation in an urban area, have a planning horizon of at least 20 years, and be financially constrained; and,

WHEREAS, the Clean Air Act Amendments of 1990 (CAAA) and the FAST Act require that transportation plans and programs conform to air quality goals established by the State Implementation Plan (SIP) for regions in nonattainment of an air pollution standard; and,

WHEREAS, the Knoxville Region is subject to air quality conformity requirements under the 1997 and 2008 8-Hour Ozone Standards and the 2006 Daily PM2.5 Standard; and,

WHEREAS, an Air Quality Conformity Determination Report was prepared to quantitatively demonstrate conformity of the Mobility Plan 2045 and FY 2020-2023 Transportation Improvement Program based on the required emissions tests and using the latest emissions model from the Environmental Protection Agency; and,

WHEREAS, the TPO’s public outreach and Interagency Consultation procedures were adhered to with Mobility Plan 2045 and the Air Quality Determination being circulated for public review, presented at more than two open public meetings and coordinated with stakeholder and regulatory agencies through the Interagency Consultation process; and,

WHEREAS, the TPO Technical Committee has recommended the adoption of Amended Mobility Plan 2045; and,

NOW, THEREFORE, BE IT RESOLVED BY THE KNOXVILLE REGIONAL TRANSPORTATION PLANNING ORGANIZATION EXECUTIVE BOARD:

That Mobility Plan 2045 and the Air Quality Conformity Determination Report as Amended be adopted as the basis for transportation planning decisions in the areas subject to air quality conformity in the Knoxville Region including the TPO Planning area.

April 28, 2021
Date

Mayor Terry Frank
City of Clinton
TPO Executive Board Chair

Jeffrey A. Welch, AICP
TPO Director

Adopting Resolution by Knoxville Regional TPO Executive Board
for FY 2020-2023 TIP Amendments

TBD

Adopting Resolution by Lakeway Area Metropolitan Transportation Planning Organization Executive Board for Air Quality Conformity Determination

Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO)

Morristown, TN – Jefferson City, TN – White Pine, TN – Hamblen County, TN – Jefferson County, TN

Resolution Number: 2021-004

A RESOLUTION APPROVING THE AIR QUALITY CONFORMITY DETERMINATION REPORT AS PREPARED BY THE KNOXVILLE TPO

WHEREAS, a comprehensive, cooperative, and continuing transportation planning process is to be carried out in the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO) study area; and

WHEREAS, The Executive Board of the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO) serves as a forum for cooperative decision making on transportation issues in the Urbanized Area; and

WHEREAS, the Lakeway Area Metropolitan Transportation Planning Organization promotes the safety, protection, and enhancement of transportation corridors within its jurisdictional boundaries, and

WHEREAS, the Lakeway Area Metropolitan Transportation Planning Organization and the Knoxville TPO are within the same area previously designated nonattainment for the 1997 8-Hour Ozone Standard and have a Memorandum of Agreement to cooperatively address transportation conformity requirements for ozone, and

WHEREAS, the Knoxville TPO has prepared Air Quality Conformity Determination that cover the entire Ozone Maintenance Area, including the LAMTPO planning area within Jefferson County, which has determined that all current plans and programs within LAMTPO meet the air quality conformity requirements.

NOW, THEREFORE, BE IT RESOLVED, that the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO) Executive Board approves the air quality conformity determination as prepared by the Knoxville TPO.

This Resolution shall be effective upon its passage and approval.

ATTEST:

Chairman
LAMTPO Executive Board

April 28, 2021

Date

Approval Letter by U.S. DOT for Air Quality Conformity Determination

Pending

Executive Summary

OVERVIEW AND PURPOSE

The Knoxville Regional Transportation Planning Organization (KRTPO) has conducted a regional emissions analysis to support an air quality conformity demonstration for the regular 4-year update to its Metropolitan Long-Range Transportation Plan (LRTP) known as the Mobility Plan 2045 and for resulting amendments to its FY 2020-2023 Transportation Improvement Program (TIP) to ensure that the TIP is a direct subset of the LRTP. The purpose of this report is to document that the updated LRTP and TIP conform to federal regulations from the latest surface transportation act known as “Fixing America’s Surface Transportation Act” (FAST Act) and the Clean Air Act Amendments of 1990.

An Air Quality Conformity Determination for transportation plans and programs within the Knoxville Region is required since it is currently designated as a “Maintenance Area” for the 8-Hour Ozone Standard as well as the Particulate Matter 2.5 (PM2.5) Daily Standard. The United States Environmental Protection Agency (EPA) sets air quality standards through the Clean Air Act in order to protect human health and the environment from unsafe levels of pollution. The transportation conformity process is used to ensure that federal funds will not be spent on projects that cause or contribute to any new violations of the National Ambient Air Quality Standards (NAAQS); increase the frequency or severity of NAAQS violations; or delay timely attainment of the NAAQS or any required interim milestone.

The Knoxville Region is currently subject to transportation conformity requirements based on the designations under three separate NAAQS in the following specific geographic locations:

- Maintenance for **2008 8-hour Ozone Standard** – Blount, Knox, and part of Anderson counties
- Maintenance for **2006 Daily PM2.5 Standard** – Anderson, Blount, Knox, Loudon and part of Roane counties
- **1997 8-hour Ozone Standard** – Anderson, Blount, Jefferson, Knox, Loudon, Sevier and part of Cocke counties. This standard was revoked by EPA, but transportation conformity remains as an anti-backsliding measure and with fewer requirements that need to be met compared with the above two NAAQS.

Note, the above geographies extend beyond the base planning area boundary of the KRTPO and the intent of this conformity determination is to cover the entirety of the area subject to conformity in coordination with TDOT and the Lakeway Area MTPO.

EMISSIONS ANALYSIS SUMMARY

In order to be able to demonstrate conformity of the TPO's transportation plans with the applicable NAAQS, a regional emissions analysis is performed using outputs from a regional transportation model and a mobile source emissions model from EPA known as "MOVES" (Motor Vehicle Emission Simulator). An estimate of emissions is generated for various required analysis years between the present year and the final year of the LRTP and compared against allowable amounts that have been formally set as part of a State Implementation Plan known as "Motor Vehicle Emissions Budgets" (MVEB).

2006 DAILY PM2.5 STANDARD

The PM2.5 air quality standard consists of two different measurement timeframes – an annual level and a daily level – based on the health effects that can occur for short-term versus long-term exposures. The designation as a nonattainment area under the Annual PM2.5 Standard became effective on April 5, 2005 and the designation as a nonattainment area for the Daily PM2.5 Standard became effective on December 14, 2009. The EPA approved a redesignation of the area to Attainment with a Maintenance Plan effective on August 28 and 29, 2017 for the daily and annual standards respectively. The Region is meeting the current (2012) Annual PM2.5 Standard of 12 µg/m³ and the 1997 Standard has been revoked by EPA, thereby removing the requirement to demonstrate conformity for the Annual Standard.

The EPA published a notice announcing a finding that the 2014 and 2028 Motor Vehicle Emissions Budgets (MVEB) for Direct PM2.5 and Oxides of Nitrogen (a PM2.5 precursor pollutant) included in the Maintenance SIP are adequate for the purposes of transportation conformity in the Federal Register / Vol. 82, No. 46, page 13347 on March 10, 2017. A regional emissions analysis was conducted using inputs consistent with both the SIP and other latest planning assumptions. The computed emissions from on-road mobile sources compared against the MVEB in the 2006 Daily PM2.5 Maintenance Area for the analysis years of 2026, 2028 (interpolated), 2035 and 2045 are shown in Table 1.

Table 1: MVEB Test for 2006 Daily PM2.5 Standard

Direct Particulate Matter 2.5:	Analysis Year			
	2026	2028	2035	2045
Motor Vehicle Emissions Budget (MVEB)	1.22	0.67	0.67	0.67
Projected Emissions	0.42 ✓	0.40 ✓	0.34 ✓	0.36 ✓
Oxides of Nitrogen (NOx):	2026	2028	2035	2045
Motor Vehicle Emissions Budget (MVEB)	42.73	19.65	19.65	19.65
Projected Emissions	13.05 ✓	12.05 ✓	8.57 ✓	8.78 ✓

Emissions in tons per day

2008 OZONE STANDARD

The nonattainment designation for the 2008 8-hour Ozone Standard became effective on July 20, 2012. A redesignation request to Attainment with a Maintenance Plan was submitted to EPA by the Tennessee Department of Environment and Conservation (TDEC) in November 2014 and approved by EPA on July 13, 2015 with an effective date of August 12, 2015. Therefore, as of August 12, 2015 the Knoxville Region is considered a “Maintenance Area” for the 2008 Ozone Standard.

The EPA published a notice announcing a finding that the 2011 and 2026 Motor Vehicle Emissions Budgets (MVEB) for NOx and VOC included in the Maintenance SIP are adequate for the purposes of transportation conformity in the Federal Register / Vol. 80, No. 133, page 39970 on July 13, 2015.

A regional emissions analysis was conducted using inputs consistent with both the SIP and other latest planning assumptions, which are documented in Chapter 3 of this report. The computed emissions from on-road mobile sources compared against the MVEB in the 2008 Ozone Maintenance Area for the analysis years of 2026, 2035 and 2045 are shown in Table 2.

Table 2: MVEB Test for 2008 Ozone Standard

	Analysis Year		
	2026	2035	2045
Volatile Organic Compounds (VOC):			
Motor Vehicle Emissions Budget (MVEB)	10.49	10.49	10.49
Projected Emissions	5.15 ✓	3.76 ✓	3.38 ✓
Oxides of Nitrogen (NOx):			
Motor Vehicle Emissions Budget (MVEB)	17.69	17.69	17.69
Projected Emissions	10.29 ✓	6.77 ✓	6.94 ✓

Emissions in tons per day

1997 OZONE STANDARD

The 1997 8-Hour Ozone conformity analysis consists of an abbreviated process since a regional emissions analysis is not required per EPA guidance for this revoked NAAQS. A full description of the requirements to demonstrate conformity for this standard is provided in the main report which essentially boil down to meeting interagency consultation requirements and fiscal constraint of the applicable Plans.

SUMMARY CONFORMITY STATEMENT

In summary, the emissions analysis performed by the KRTPO demonstrates that the projected emissions from the proposed transportation system are less than the allowable amount for each of the required analysis years and thus conformity for the 2008 8-Hour Ozone, 1997 8-hour Ozone, and Daily PM2.5 standards has been demonstrated for the affected current transportation plans and the project amendments thereto.

The conformity determination was coordinated with stakeholder and regulatory agencies through an Interagency Consultation process and a 30-day public review and comment period was held. A summary of comments that were received and responses is included in the report.

Chapter 1 - Introduction and Background Information

1.0 INTRODUCTION

The primary purpose of this document is to demonstrate that update to the Knoxville TPO Metropolitan Long Range Transportation Plan, known as “Mobility Plan 2045” and the Knoxville Regional Transportation Planning Organization (KRTPO) FY 2020-2023 Transportation Improvement Program (TIP) meet Transportation/Air Quality Conformity requirements of the Clean Air Act and Fixing America’s Surface Transportation Act (FAST Act).

Federal Transportation Planning Regulations (23 CFR 450) require Metropolitan Planning Organizations to prepare a comprehensive Long Range Transportation Plan (LRTP) that covers a minimum 20-year horizon. The LRTP is required to be updated every four years in air quality nonattainment/maintenance areas in order to ensure that the underlying planning assumptions are still valid. The TPO is also required to prepare a four-year program of projects known as a Transportation Improvement Program (TIP) that must be consistent with the approved LRTP.

1.1 BACKGROUND ON TRANSPORTATION CONFORMITY

Transportation Conformity is required in nonattainment and maintenance areas by federal regulations (40 CFR Parts 51 and 93) and is the mechanism through which on-road mobile source emissions are addressed in the area’s goals for cleaner air. The air quality conformity process is used to ensure that federal funds will not be spent on projects that cause or contribute to any new violations of the National Ambient Air Quality Standards (NAAQS); increase the frequency or severity of NAAQS violations; or delay timely attainment of the NAAQS or any required interim milestone. The CAA requires that metropolitan transportation plans, metropolitan transportation improvement programs (TIPs) and Federal projects conform to the purpose of the State Implementation Plan (SIP), which details the emissions levels from each sector including mobile sources needed to regain compliance with the air quality standard. If conformity is not demonstrated then the area may enter what is known as a conformity “lapse” period, which can trigger highway sanctions by the EPA under the authority of the Clean Air Act (CAA) meaning only very specific projects may move forward, while funding is essentially frozen for most new roadway

construction or widening projects. Under section 179(b)(1) of the CAA, once EPA imposes highway sanctions the FHWA may not approve or award any grants in the sanctioned area except those that are specifically exempted such as safety and air quality improvement projects that do not encourage single occupancy vehicle capacity. The conformity regulations in 40 CFR 93.104(f) allow for a 12-month lapse grace period during which projects that were in the most recent conforming plan and TIP can continue to move forward, but new non-exempt projects cannot be added.

The general criteria and procedures for determining conformity of transportation plans are described in 40 CFR 93.109 as:

- Latest Planning Assumptions (40 CFR 93.110)
- Latest Emissions Model (40 CFR 93.111)
- Consultation (40 CFR 93.112)
- TCMs (40 CFR 93.113)
- Emissions Budget (40 CFR 93.118)

Subsequent sections of this report document the assumptions, model inputs and procedures used to satisfy the above requirements in conducting the regional emissions analysis to demonstrate transportation conformity for the amendments to the Mobility Plan 2045 and the FY 2020-2023 TIP.

1.2 BACKGROUND ON THE KNOXVILLE REGION OZONE AND PM2.5 MAINTENANCE AREAS

The Clean Air Act requires the United States Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for six “Criteria Pollutants” – Particulate Matter, Ozone, Nitrogen Dioxide, Carbon Monoxide, Sulfur Dioxide, and Lead in order to protect human health and the environment from unsafe levels of these pollutants. These pollutants are regulated through the EPA setting maximum limits on exposure levels that must be reviewed periodically. Regions, which are found to be out of compliance with those limits, may be designated as a “Nonattainment Area”.

The Knoxville Region has previously been in non-attainment for two criteria pollutants (ground-level ozone and fine particulate matter) under federal NAAQS with detailed history of EPA designations for Ozone and PM2.5 following sections:

1.2.1 OZONE

The region's first nonattainment designation for ground-level ozone became effective in January 1992 under the "1-Hour Ozone Standard" and included only Knox County. The area was able to demonstrate attainment with that standard effective in October 1993 and was then considered a "Maintenance Area".

EPA promulgated a more stringent ozone standard in 1997 known as the "1997 8-Hour Ozone Standard" which was set at 80 parts per billion (ppb). The EPA designated the counties of Anderson, Blount, Jefferson, Knox, Loudon, Sevier, and a portion of Cocke within the Great Smoky Mountains National Park in non-attainment of the 1997 8-hour standard for ground level ozone. This nonattainment designation became effective on June 15, 2004. The area demonstrated attainment with this standard effective in March 2011 and was considered a Maintenance Area. This standard was subsequently revoked with the effective date of the more stringent 2008 8-hour Ozone Standard thereby eliminating the maintenance designation and conformity requirements however a court ruling made in 2018 reinstated the conformity requirement as an anti-backsliding measure. EPA has released specific guidance as to how to address conformity for this revoked standard which is explained in a subsequent section of this report. An important aspect of this geographical area is that it overlaps with a separate adjacent MPO area known as the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO) specifically in the Jefferson County area. Conformity findings for plans and projects in this overlapping area must be coordinated as with this particular conformity determination report which covers the entire area.

EPA again strengthened the ozone standard in 2008 based on an updated review of scientific and medical data. This standard is known as the "2008 8-hour Ozone Standard" and it was set at 75 ppb. A formal designation of nonattainment areas for this standard became effective on July 20, 2012 and included the counties of Blount and Knox plus a portion of Anderson County surrounding the TVA Bull Run Fossil Plant. The EPA approved a re-designation of the area to Attainment with a Maintenance Plan effective on August 12, 2015.

Figures 1 & 2 on the following page show the affected geographies for the 1997 and 2008 Ozone Standards:

Figure 1: Knoxville 1997 8-Hour Ozone "Conformity" Area

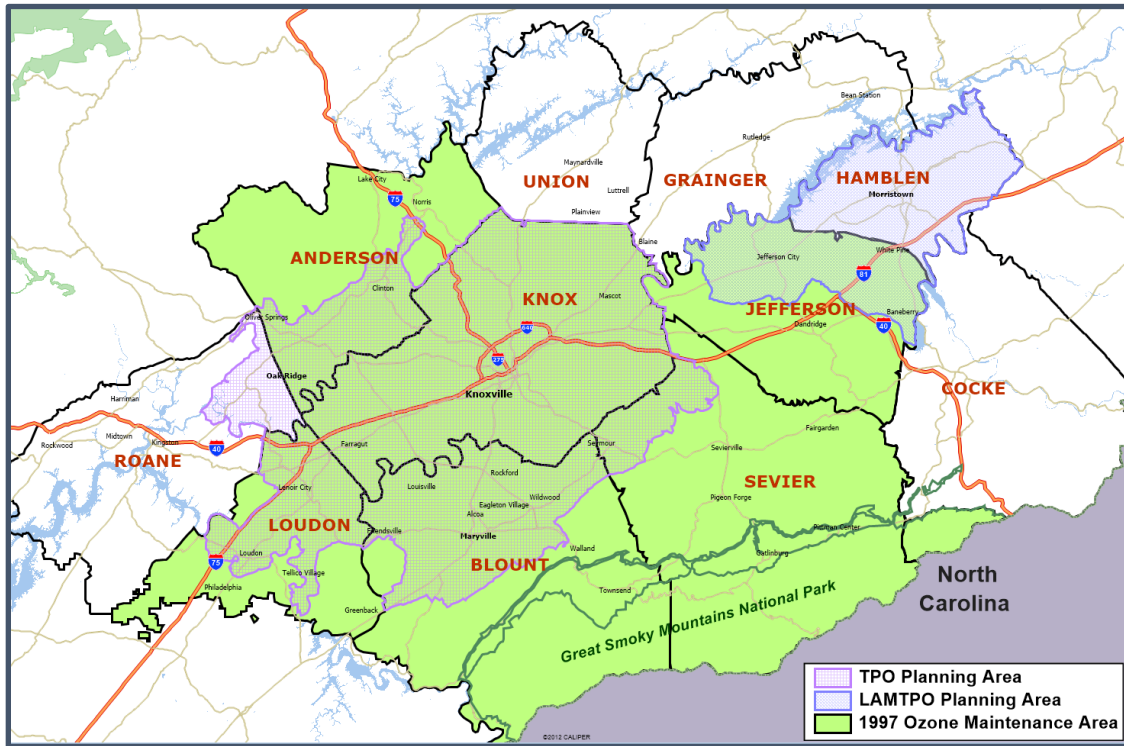
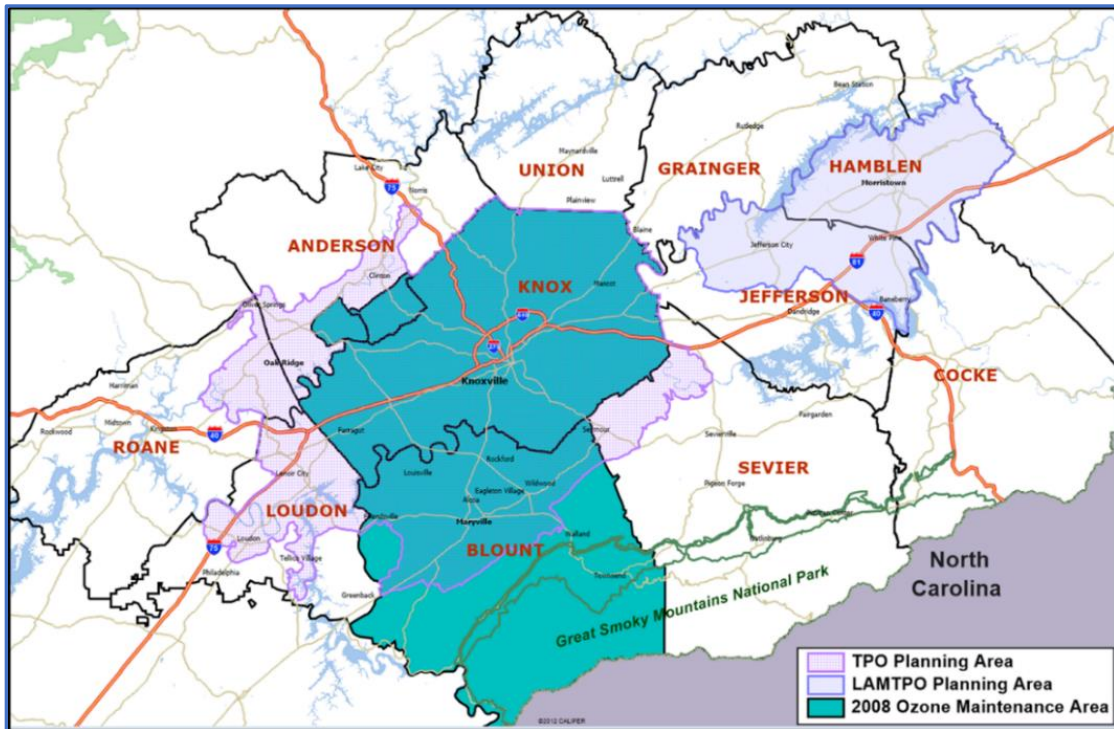


Figure 2: Knoxville 8-Hour Ozone Maintenance Area



1.2.2 PM2.5

The EPA first promulgated air quality standards for fine particulate matter less than 2.5 microns in diameter (PM2.5) in 1997 due to evidence that these fine particles pose a significant health risk because of their ability to bypass the nose and throat defenses and lodge deeply within the lungs. The PM2.5 air quality standard consists of two different measurement timeframes – an annual level and a daily level – based on the health effects that can occur for short-term versus long-term exposures. The EPA set these initial standards on a daily (65 micrograms/cubic meter) and an annual (15 micrograms/cubic meter) basis for levels of PM2.5.

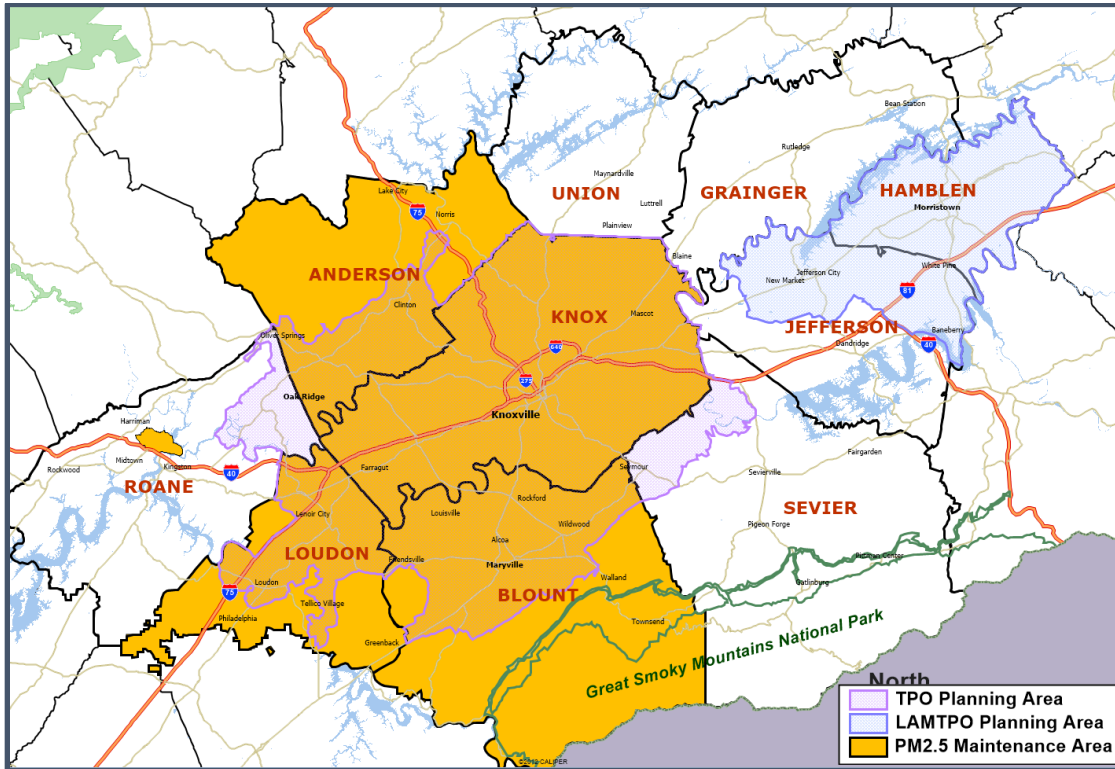
On April 5, 2005, the EPA formally designated the counties of Anderson, Blount, Knox, Loudon, and a portion of Roane in non-attainment for the 1997 Annual PM2.5 Standard. As a result of the PM2.5 designation, the TPO updated the Mobility Plan in 2006, expanding the Knoxville Region to include that portion of Roane County not included in the original Plan and prepared an updated conformity determination.

EPA strengthened the PM2.5 standard in 2006 by reducing the permissible daily levels of PM2.5 from 65 to 35 micrograms per cubic meter. The same counties that were designated under the 1997 Annual PM2.5 Standard were formally designated nonattainment for the 2006 Daily PM2.5 Standard effective December 2009.

The EPA approved a redesignation of the area to Attainment with a Maintenance Plan effective on August 28 and 29, 2017 for the daily and annual standards respectively. The Region is meeting the current (2012) Annual PM2.5 Standard of 12 µg/m³ and the 1997 Standard has been revoked by EPA, thereby removing the requirement to demonstrate conformity for the Annual Standard.

The current Knoxville Region Maintenance Areas for the 2006 Daily PM2.5 Standard is shown in Figure 3 on the next page:

Figure 3: Knoxville PM2.5 Daily Standard Maintenance Area



1.3 EMISSIONS ANALYSIS BACKGROUND

Transportation Conformity is demonstrated through a technical process known as an “emissions analysis”, in which future estimates of emissions from the transportation system are compared against what has been determined to be sufficient to allow the area to re-attain the air quality standard. Different types of emissions are involved in the production of Ozone and PM2.5 pollution as described below:

- **Ozone:** Ozone is not directly emitted into the atmosphere; rather it is formed through a chemical reaction between “Volatile Organic Compounds” (VOC) and “Oxides of Nitrogen” (NOx) in the presence of sunlight. Mobile-sources contribute both sources of emissions – VOC are primarily formed from the evaporation of motor fuel, while NOx is formed from the internal combustion process and emitted in vehicle exhaust.
- **PM 2.5:** There are some PM2.5 emissions, known as “Direct PM2.5”, that are directly emitted from motor vehicles. Direct PM2.5 emissions consist of elements contained in vehicle exhaust as well as particles resulting from brake and tire wear. In addition, it is believed that NOx emissions can contribute to secondary formation of PM2.5 so it is also included in the emissions analysis.

1.4 EMISSIONS ANALYSIS PROCEDURE

The emissions analysis is performed primarily using two different models – a Travel Demand Forecasting Model (TDFM), developed by the KRTPO and the MOVES3 mobile source emissions model, which was developed by the EPA and allows the user to input localized parameters. The TDFM provides outputs of the estimated Vehicle Miles of Travel (VMT) on the transportation system and associated average speeds by functional classification. The MOVES3 model uses the activity data from the TDFM and combines it with other inputs describing the analysis area to derive an overall emissions amount. This procedure is known as the “Inventory Mode” of MOVES3, which was chosen for this analysis as opposed to the “Emission Rate Mode”, which produces emissions rates that must be subsequently post processed with the TDFM activity data. Appendix B of this document describes the MOVES3 inputs that were used in the emissions analysis.

Finally, the emissions analysis must also be performed for different years throughout the life of the LRTP. Since the timeframe covered by the LRTP is from 2021-2045, and MVEBs are available for both Ozone and PM2.5, 40 CFR part 93.118 establishes the required analysis years and emissions tests. In general, the required analysis years include:

- Attainment Year for applicable pollutants
- Last Year of the maintenance plan for applicable pollutants
- Any other years for which the maintenance plan establishes budgets
- Last year of the timeframe of the conformity determination
- Years such that there are no more than 10 years between analysis years

Following are the analysis years that were selected to meet the above requirements:

- 2026 – First Analysis Year and also Last Year of 2008 Ozone Standard Maintenance Plan
- 2028 – Applies only to PM2.5 as the Last Year of the 2006 Daily PM2.5 Standards Maintenance Plan (interpolated)
- 2035 – Year no greater than 10 years apart
- 2045 – Last Year of Transportation Plan

Note, 2028 is designated as being interpolated per the conformity regulations in 40 CFR 93.118(d) which states “the emissions for years for which consistency with motor vehicle emission budgets must be demonstrated may be determined by interpolating between the years for which the regional emissions analysis is performed”. The interpolation is performed as a linear regression between the two emissions

outputs for years 2026 and 2035 and is a much simpler analysis than setting up a travel demand model and MOVES model run to specifically quantify emissions for those years.

Chapter 2 – Planning Assumptions for Regional Emissions Analysis

2.0 INTRODUCTION

An important component of the conformity determination is to ensure that the latest planning assumptions are used in developing the inputs to both the regional travel demand model, which provides the majority of the activity data (vehicle speeds and miles driven) for the various analysis years and the emissions rate model, which requires other locality-specific characteristics. The latest planning assumptions requirements are contained in 40 CFR 93.110 and were discussed through the Interagency Consultation (IAC) process as required by 40 CFR 93.105. The draft planning assumptions document provided to the IAC is included in Appendix C. The following sections of this chapter summarize the primary planning assumptions used to support the regional emissions analysis that was conducted as part of this conformity determination.

2.1 PLANNING ASSUMPTIONS FOR DEVELOPING TRAVEL DEMAND

FORECASTS:

The TPO uses a TDFM that was originally finalized in 2012 based on regional travel surveys conducted in 2008 and validated to a 2010 base year. The model has been maintained since that time and other minor updates conducted for previous Mobility Plans. The model has been re-validated to a base year of 2018 to coincide with the latest available traffic and land use data at the time of the model update development and all standard FHWA validation targets have been achieved. Following is a summary of the travel model development and additional information regarding model validation is included in Appendix I of the main 2045 Mobility Plan document.

The model outputs for total vehicle miles of travel (VMT) by roadway functional classification have been compared against the estimated actual amount of VMT as reported to FHWA for the Highway Performance Monitoring System (HPMS) and appropriate HPMS adjustment factors have been developed to ensure accurate replication of the amount of travel in the region. The travel demand model

encompasses a total of 10 counties in the Knoxville Region and includes the entirety of the previously noted maintenance/nonattainment areas as shown on figures 1, 2 and 3.

The county-level data for base year 2018 population and household characteristics is primarily derived from the U.S. Census Bureau's inter-censal Population Estimates data and American Community Survey (ACS) whereas employment data was obtained through various sources such as the Bureau of Economic Analysis (BEA) and Bureau of Labor Statistics (BLS). The future year 2045 county-level population and employment control totals were developed through a review of available sources of projection data including proprietary data from Woods & Poole Economics, the University of Tennessee Center for Business & Economic Research and previous custom projections developed by a consultant for the TPO. It was determined that the most appropriate source of future year projections was the Woods & Poole Economics, inc data source and these projections were endorsed by the TPO Executive Board at its February 26, 2020 meeting.

The travel demand model summarizes socioeconomic characteristics (population, employment, household income, etc) into sub-county geographic units of somewhat homogenous land use known as Traffic Analysis Zones (TAZ). The county-level estimates for the base and future analysis years must be allocated to the TAZs. In the case of the base year, population data from the 2010 decennial census is available at very small geographic units known as Census Blocks which are aggregated to the TAZ-level. The net change in population for each county between 2010 and 2018 was then allocated based on recent trends in residential building permit activity and using the previous model base year 2014 as a starting point. Employment data was allocated based on a proprietary data set known as InfoGroup obtained through TDOT, which provides detailed establishment level information of employment counts by industry type geocoded to its actual location.

In order to allocate the future growth of population and employment from the county control totals to the smaller TAZs, the TPO staff consulted with planning staffs and stakeholders from each jurisdiction within the TPO and LAMTPO area. TPO staff obtained information on proposed developments and other likely development areas in the various jurisdictions to inform the allocation. Stakeholders reviewed the outputs to determine the overall reasonableness. This exercise is inherently challenging due to the unforeseen things that can influence development patterns, but provides a "best guess," and can be updated as needed to account for major changes with each subsequent Mobility Plan update.

2.2 LATEST EMISSIONS MODEL:

The EPA officially released an emissions factor model known as “MOVES3” through a Federal Register Notice of Availability on January 7, 2021, which set a 2-year grace period for its use instead of the prior version known as “MOVES2014b”. The release of MOVES3 occurred subsequent to the development of planning assumptions for the emissions model inputs which were started based on MOVES2014b being the latest available model. Since very few changes were required to adapt to MOVES3 the TPO staff decided to use it instead of MOVES2014b even though it was technically not yet required until January 9, 2023. The input default database for the latest version of MOVES3 used to determine the total on-road emissions of the pollutants of concern for this conformity analysis is known as “movesdb20201105”.

2.3 EMISSIONS TESTS:

The emissions tests used for this conformity analysis follow the requirements listed in 40 CFR 93.118 based on the fact that a Motor Vehicle Emissions Budget (MVEB) is available for all pollutants. The following subsections of this chapter document the specific MVEBs for each pollutant and note their applicability in terms of the analysis years that were selected as documented in Section 1.4.

2.3.1 FOR 2008 8-HOUR OZONE STANDARD

The emissions test for the 2008 8-Hour Ozone Standard is based on an MVEB set for both an interim year (2011) and the last year of the Maintenance Plan (2026). The EPA published a notice announcing a finding that the 2011 and 2026 Motor Vehicle Emissions Budgets (MVEB) for NO_x and VOC included in the Maintenance SIP are adequate for the purposes of transportation conformity in the Federal Register / Vol. 80, No. 133, page 39970 on July 13, 2015. Table 3 shows the MVEB for the 2008 Ozone Standard:

Table 3: MVEB for 2008 Ozone Standard

Pollutant	2011	2026
	(tons/day)	
VOC	19.71	10.49
NO _x	41.62	17.69

The emissions tests are performed for the analysis years previously identified in Section 1.5 of this report of 2026, 2035 and 2045. Since all of these analysis years are from 2026 and later the emissions for those years are compared against the MVEB for 2026.

2.3.2 FOR 2006 “DAILY” PM2.5 STANDARD

The EPA published a notice announcing a finding that the 2014 and 2028 Motor Vehicle Emissions Budgets (MVEB) for Direct PM2.5 (including direct exhaust PM2.5 emissions and from brake and tire wear) and Oxides of Nitrogen (a PM2.5 precursor pollutant) included in the Maintenance SIP are adequate for the purposes of transportation conformity in the Federal Register / Vol. 82, No. 46, page 13347 on March 10, 2017. These emissions are actually calculated for an annual situation and converted to daily amounts by dividing by 365. Table 4 shows the MVEB for the 2006 Daily PM2.5 Standard:

Table 4: MVEB for 2006 Daily PM2.5 Standard

Pollutant	2014	2028
	(tons/day)	
PM2.5	1.22	0.67
NOx	42.73	19.65

The emissions tests are performed for the analysis years previously identified in Section 1.4 of this report of 2026, 2028, 2035 and 2045. Analysis years prior to 2028 (the 2026 analysis year) use the MVEB for 2014 while all other analysis years are compared against the MVEB for 2028. The year 2028 emissions are interpolated between the 2026 and 2035 analysis year outputs from the emissions modeling process.

2.4 MOVES3 INPUTS AND RUNSPEC DEVELOPMENT:

In order to set up a MOVES3 model run the user must first define the “run specification” or “Runspec” for short, which establishes the specific model domain such as the county, time period, road types, vehicle types and pollutants being modeled for. Following the Runspec, the user enters specific input data for the county being modeled through an interface known as a “County Data Manager”. The County Data Manager allows inputs for a variety of characteristics affecting emissions generation including the number of vehicles, vehicle miles of travel, average speeds, meteorological information, fuel types and average

vehicle fleet age by vehicle type among others. The following sub-sections detail the Runspec and County Data Manager parameters used for this conformity analysis.

2.4.1 MOVES3 RUNSPEC PARAMETERS

The MOVES model run is first set up based on a number of parameters to define the appropriate geographic scale and other aspects of the modeling domain to be utilized in the analysis, which is referred to as a “run specification” or runspec for short. Following is a list of the MOVES runspec panels and how they were set up for the KRMP conformity analysis and based on appropriate technical guidance documentation from EPA:

1.) Scale:

- Both Pollutants – County level scale – Inventory mode

2.) Time Spans:

- Both Pollutants – Year (based on analysis years as ultimately selected, 2026, 2035 and 2045), by Hour, all hours
- Ozone – July weekday
- PM2.5 – All months, all days

3.) Geographic Bounds:

- 2008 Ozone – Anderson (partial), Blount and Knox counties
- PM2.5 – Anderson, Blount, Knox, Loudon and Roane (partial) counties

4.) Onroad Vehicles:

- Both Pollutants – Gasoline, CNG, ethanol (E85) and diesel fuels, all valid vehicle combinations

5.) Road Type:

- Both Pollutants – All road types

6.) Pollutants and Processes:

- Ozone – NOx and VOC and all other required supporting prerequisite pollutants
- PM2.5 – Primary PM2.5 (exhaust, brake and tire wear), NOx and all supporting prerequisite pollutants
- Note – unchecked the “Refueling Displacement Vapor Loss” and “Refueling Spillage Loss” to exclude refueling emissions that are instead included in the Area source emissions inventory.

7.) Output options:

Both Pollutants –

- General Output tab: Units = grams, joules, miles; Activity: checked “Distance Traveled” and “Population”
- Output Emissions Detail tab: checked “Road Type” and “Source Use Type”

2.4.2 MOVES3 COUNTY DATA MANAGER INPUT DEVELOPMENT

For the locality-specific inputs required in the “County Data Manager” section of MOVES, the following general information is being provided for how they were developed, additional technical details and example input files are provided in Appendix B.

CDM 1.) Meteorology – this input consists of locality specific values of temperature and humidity covering the required analysis time frame, i.e. summer months for Ozone and all months for annual PM2.5. It is generally required that the conformity analysis must use consistent inputs for meteorology that were developed for an applicable SIP and its MVEBs. Since MVEBs are available in all cases the direct MOVES inputs used in their development will be utilized for this analysis.

- Analysis Year Variation – This input is held constant for all analysis years.

CDM2.) Source Type Population – this input defines the vehicle population within the study area by type of vehicle and must be generated using local-specific data. This input is derived from various sources, the primary of which is vehicle registration data that is maintained by the Tennessee Department of Revenue in terms of the “light duty” categories of vehicles and other national sources and default data for the “heavy duty” categories. Future-year projections are also necessary to account for growth in population and corresponding vehicle ownership and these are described in more detail in the Appendix.

- Analysis Year Variation – This input is varied for each analysis year based on the projected growth in total vehicles.

CDM3.) Age Distribution – vehicle age distribution datasets are tied somewhat with the source type population input since the same data sources that track vehicle ownership also contain information about vehicle age. Locality specific data is critical for this input as there can be wide variation in vehicle fleet age depending on the specific geographic area being analyzed.

- Analysis Year Variation – This input is held constant for all analysis years.

CDM4.) Vehicle Type VMT – this MOVES input actually consists of four separate input files related to the estimated vehicle miles of travel in the area being analyzed including:

HPMSVTypeYear – this is the total amount of VMT estimated for each of the analysis years by Source Type. TDOT annually reports total VMT by roadway functional classification to the FHWA’s Highway Performance Monitoring System (HPMS) and the most recent available year of data when the conformity analysis was started was for 2018. Statewide vehicle classification data was used to derive urban/rural factors by road type and vehicle (source) types and compiled for a 2014 base year by the University of Tennessee on behalf of TDOT. These factors were applied to the 2018 data to obtain the required format of VMT by source type for this input. Future year projections of VMT are derived from the TPO’s travel demand forecasting model.

- Analysis Year Variation – This input is varied for each analysis year based on the projected growth in VMT.

Month – this input accounts for the variability in travel throughout the months of the year. These inputs were developed by UT from traffic count data collected by TDOT.

- Analysis Year Variation – This input is held constant for all analysis years.

Day – this input accounts for the differences in weekday travel versus weekend travel and are also available from the UT study.

- Analysis Year Variation – This input is held constant for all analysis years.

Hour – this input accounts for the hourly variation in travel and is provided by the regional travel demand forecasting model.

- Analysis Year Variation – This input is varied for each analysis year based on the results of the travel demand model run.

CDM5.) Average Speed Distribution – this input was developed using the travel demand model and additional built-in post processing steps to derive the needed format for MOVES.

- Analysis Year Variation – This input is varied for each analysis year based on the results of the travel demand model run.

CDM6.) Road Type Distribution – this input provides the distribution of VMT on each road type by source type. This input is also derived from post processing the travel demand model outputs.

- **Analysis Year Variation** – This input is held constant for all analysis years.

CDM7.) Fuel – Consists of four separate inputs (Fuel Supply, Fuel Formulation, Fuel Usage Fraction and AVFT). These inputs are provided by TDEC based on EPA guidance to reflect fuels used in the Knoxville Region. Transit fleet data from Knoxville Area Transit (KAT) was used to develop fuel type profiles for transit buses (sourceType 42), which consist only of gasoline and diesel fuel vehicles (no CNG).

- **Analysis Year Variation** – This input is held constant for the most part with the exception of phase-in of various fuel formulation regulatory information in the appropriate timeframes.

CDM8.) Starts – local information for this input is not currently available and therefore MOVES defaults are utilized for all analysis years.

CDM9.) Hotelling – local information for this input is not currently available and therefore MOVES defaults are utilized for all analysis years.

CDM10.) I/M Programs – this is not applicable to the Knoxville Region as it does not currently have any inspection and maintenance programs.

Chapter 3 – Mobile Source Emissions Analysis and Applicable Governing Regulations

3.0 INTRODUCTION

The Metropolitan Planning Regulations of the FAST Act (23 CFR Parts 450 and 771, May 27, 2016) and the USEPA Transportation Conformity Rule (40 CFR Parts 51 and 93, August 15, 1997 and amended most recently on March 14, 2012) specify certain minimum requirements that must be addressed in performing a mobile source emissions analysis in order to determine conformity of a Long Range Transportation Plan (LRTP). The following sections in this chapter discuss these requirements and how they were addressed by the KRTPO in making the determination of conformity on the updated Mobility Plan 2045 and amended FY2020-2023 Transportation Improvement Program.

3.1 REGULATIONS RELATED TO DEVELOPMENT OF LRTP AND TRANSPORTATION CONFORMITY

The Metropolitan Planning Regulations found in 23 CFR Part 450 specify the content of Long Range Transportation Plans and relevant aspects related to Transportation Conformity.

- **23 CFR 450.322(a)** – The LRTP must have a minimum 20-year planning horizon. The LRTP covers the period of 2021-2045, which meets the requirement for a minimum 20-year planning horizon. The LRTP is known as the Mobility Plan 2045.
- **23 CFR 450.322(b)(6)** – The LRTP must “include design concept and scope descriptions of all existing and proposed transportation facilities in sufficient detail, regardless of the source of funding, in nonattainment and maintenance areas to permit conformity determinations under the U.S. EPA conformity regulations at 40 CFR part 51. In all areas, all proposed improvements shall be described in sufficient detail to develop cost estimates”. The project list included in the Mobility Plan document and in Appendix D covers the necessary detail and project scopes to develop cost estimates as accurately as possible.
- **23 CFR 450.322(b)(11)** – The LRTP must “include a financial plan that demonstrates the consistency of proposed transportation investments with already available and projected

sources of revenue...” The Mobility Plan 2045 main document contains a financial analysis that demonstrates financial constraint.

3.2 REGULATIONS GOVERNING MOBILE SOURCE EMISSIONS ANALYSES

The Transportation Conformity Rule was first promulgated by EPA on November 24, 1993 (58 FR 62188). It has subsequently been amended several times to cover changes such as the implementation of the 1997 8-Hour Ozone and PM2.5 National Ambient Air Quality Standards on July 1, 2004. The most recent amendment to the Transportation Conformity Rule was published in the Federal Register on March 14, 2012 (75 FR 14979), which was a restructuring of several sections such that the Conformity Rule would not need to be revised each time a new or revised NAAQS is issued by EPA. Applicable guidelines from the Transportation Conformity Rule and how they have been addressed in this conformity determination are as follows:

- **40 CFR 93.106(a)** – The transportation plan must specifically describe the transportation system envisioned for certain future years, which are called horizon years and are subject to the following restrictions:
 - The horizon years may be no more than 10 years apart;
 - The first horizon year may not be more than 10 years from the base year used to validate the transportation demand planning model;
 - If the attainment year is in the time span of the transportation plan, the attainment year must be a horizon year, and;
 - The last horizon year must be the last year of the transportation plan’s forecast period.

The base year for validation of the KRTPO’s transportation demand planning model is 2018 and the KRMP’s forecast period is from 2021 to 2045. Therefore, the analysis years used in developing the conformity analysis are:

Analysis Years for 2008 8-hour Ozone Standard:

- 2026 – First horizon year within 10 years from base year used to validate the transportation demand planning model, also is the Final year of the Ozone Maintenance Plan
- 2035 – Year such that there are no more than 10 years between analysis years
- 2045 – Final year of Mobility Plan 2045

Analysis Years for 2006 Daily PM2.5 Standard:

- 2026 – First horizon year within 10 years from base year used to validate the transportation demand planning model
 - 2028 – Final year of the Maintenance Plan (interpolated)
 - 2035 – Year such that there are no more than 10 years between analysis years
 - 2045 – Final year of Mobility Plan 2045
-
- **40 CFR 93.106(a)(2)(i)** – The transportation plan shall quantify and document the demographic and employment factors influencing the expected transportation demand.

The summary of county-level estimates of socioeconomic data and growth projections for all study years is available upon request. The travel demand model used the following socioeconomic characteristics in order to determine estimates of travel for each analysis year:

- Total Population
- Household Population
- Group Quarters Population
- Number of Households
- Average Persons per Household
- Average Median Household Income
- Workers per Household
- Vehicles per Household
- Students per Household
- School Enrollment (K-12)
- University Student Enrollment
- Total Employment
- Basic Employment
- Industrial Employment
- Retail Trade Employment
- Services Employment

Further information regarding the development of the transportation model socioeconomic data is presented in Appendix I of the Mobility Plan document.

- **40 CFR 93.106(a)(2)(i)** – The highway and transit system shall be described in terms of the regionally significant additions or modifications to the existing transportation network which the transportation plan envisions to be operational in the horizon years.

The transportation system is described in the travel demand model through a GIS-based network of links and nodes with attributes describing the character of roadway. Some of the key attributes that were used to account for the improvement projects that are being proposed include:

- FHWA Functional Classification
- Divided or Un-divided Roadway
- Level of Access Control
- Number of Lanes in each direction
- Lane Width
- Posted Speed Limit
- Area Type (Rural, Suburban, Urban or Major Employment District)

Transit mode usage is also estimated as part of the travel demand model as it relates to the fixed route transit service that is provided by Knoxville Area Transit (KAT).

- **40 CFR 93.110** – The conformity determination must be based upon the most recent planning assumptions in force at the time of the conformity determination. The KRTPO documented its assumptions and planning data with the Interagency Consultation Group, which is summarized in the meeting information included in the Appendix C. The demographic and transportation modeling assumptions are documented in Chapter 3.
- **40 CFR 93.111** – The conformity determination must be based on the latest emission estimation model available. This conformity determination utilized the most recent available version of MOVES –MOVES3, with default database “movesdb20201105”.
- **40 CFR 93.112** – The conformity determination must satisfy consultation requirements in the applicable implementation plan. Chapter 6 and documentation in the appendix relate to the interagency consultation process.
- **40 CFR 93.118 and 93.119** – Motor vehicle emissions budget and other applicable conformity tests that must be used. Chapter 5 of this report documents the emissions tests that were used to demonstrate conformity. The emissions tests were discussed in the Interagency Consultation process to determine their appropriateness.
- **40 CFR 93.122** – Procedures for determining transportation-related emissions. The TPO documented its assumptions and methodology for determining future growth in vehicle miles of travel on the regionally significant transportation system with the Interagency Consultation Group. The primary source for projecting future vehicle activity is the travel demand forecasting model, which includes all regionally significant roadways and represents all regionally significant highway projects being proposed for implementation in the Mobility Plan 2045 and FY 2017-2020 TIP by analysis year. All counties in the nonattainment area are represented in the travel demand model.

- **40 CFR 93.126 and 93.127** – Projects exempt from regional emissions analysis. The highway project list included in the Appendix D of this document describes which projects were determined to be exempt from air quality analysis. These projects were deliberated through the Interagency Consultation process to ensure that there was full agreement on the exempt status for projects.

Examples of exempt projects include:

- Bridge Replacement Project – A project that only entails rehabilitating or replacing the existing bridge in-kind without any additional laneage being constructed.
- Pedestrian Improvement Project
- Interchange Reconfiguration Project
- Intersection Project – This could include any type of project that involves only a single intersection such as adding turn lanes (channelization) or a traffic signal.
- Street Lighting
- Pavement Resurfacing
- Reconstruction of a 2-lane roadway, which is only improving the width and geometrics of the roadway and perhaps some additional turn lanes.

3.3 AVAILABILITY OF TECHNICAL INFORMATION RELATED TO EMISSIONS ANALYSES

Additional information regarding specific MOVES3 emissions model inputs and outputs and travel demand model assumptions is available upon request.

Chapter 4 – Statement of Conformity

4.0 INTRODUCTION

This section of the report covers the conformity requirements for the Knoxville Region under both the 8-Hour Ozone Standard as well as the PM_{2.5} Standard. The conformity report complies with all applicable requirements found in the State Implementation Plan (SIP), Clean Air Act, Tennessee Transportation Conformity Regulation and the MPO Planning Regulations from FAST ACT (23 CFR 450.322).

4.1 STATEMENT OF CONFORMITY – 1997 8-HOUR OZONE STANDARD

4.1.1 OVERVIEW OF SOUTH COAST VERSUS EPA DECISION

On February 16, 2018, the United States Court of Appeals for the District of Columbia Circuit in *South Coast Air Quality Mgmt. District v. EPA* (“South Coast II,” 882 F.3d 1138) held that transportation conformity determinations must be made in areas that were either nonattainment or maintenance for the 1997 ozone national ambient air quality standard (NAAQS) and attainment for the 2008 ozone NAAQS when the 1997 ozone NAAQS was revoked. The Knoxville Region was designated as a “maintenance area” at the time of the 1997 ozone NAAQS revocation on April 6, 2015 and was also designated attainment for the 2008 ozone NAAQS on May 21, 2012.

Per the court’s decision in *South Coast II*, beginning February 16, 2019, a transportation conformity determination for the 1997 ozone NAAQS is needed in 1997 ozone NAAQS nonattainment and maintenance areas identified by EPA for certain transportation activities, including updated or amended metropolitan MTPs and TIPs.

4.1.2 APPLICABLE GEOGRAPHY INCLUDED IN 1997 8-HOUR OZONE ORPHAN AREA

This section of the conformity determination report is specifically intended to cover what is known as the “orphan area”, which are the parts of the 1997 8-hour Ozone Standard that were not included within the 2008 8-hour Ozone Standard nonattainment designation. Figure 1 in Section 1.2 above shows the geography in the Knoxville Region affected by the 1997 8-hour Ozone Standard and its relationship to the planning areas for the KRTPO and the LAMTPO. Areas entirely in green shading are considered part of the TDOT FY 2020-2023 rural area STIP, whereas those areas in green with either purple or blue overlay are covered by Knoxville and Lakeway respectively.

4.1.3 ORPHAN AREA CONFORMITY REQUIREMENTS

For the 1997 ozone NAAQS areas, transportation conformity for MTPs and TIPs for the 1997 ozone NAAQS can be demonstrated without a regional emissions analysis, per 40 CFR 93.109(c). This provision states that the regional emissions analysis requirement applies one year after the effective date of EPA's nonattainment designation for a NAAQS and until the effective date of revocation of such NAAQS for an area. The 1997 ozone NAAQS revocation was effective on April 6, 2015, and the South Coast II court upheld the revocation. As no regional emission analysis is required for this conformity determination, there is no requirement to use the latest emissions model, or budget or interim emissions tests.

Therefore, transportation conformity for the 1997 ozone NAAQS for the Knoxville and Lakeway Metropolitan Transportation Plan updates can be demonstrated by showing the remaining requirements in Table 1 in 40 CFR 93.109 have been met. These requirements, which are laid out in Section 2.4 of EPA's guidance and addressed below, include:

- Latest planning assumptions (93.110)
- Consultation (93.112)
- Transportation Control Measures (93.113)
- Fiscal constraint (93.108)

4.1.4 LATEST PLANNING ASSUMPTIONS

The use of latest planning assumptions in 40 CFR 93.110 of the conformity rule generally apply to regional emissions analysis. In the 1997 ozone NAAQS areas, the use of latest planning assumptions requirement applies to assumptions about transportation control measures (TCMs) in an approved SIP.

The Tennessee SIP does not include any TCMs, see also Section 4.1.6.

4.1.5 CONSULTATION REQUIREMENTS

The consultation requirements in 40 CFR 93.112 were addressed both for interagency consultation and public consultation. Interagency consultation was conducted with the Knoxville-Area Interagency Consultation group which includes federal partners such as FHWA, FTA, and EPA as well as state and local partners. Interagency consultation was conducted consistent with the Tennessee Conformity SIP and the conformity regulation's requirements at 40 CFR 93.105. Refer to Chapter 5 of this report for additional information on interagency consultation.

Public consultation was conducted consistent with planning rule requirements in 23 CFR 450. Refer to Chapter 6 for additional information on public consultation.

4.1.6 TIMELY IMPLEMENTATION OF TCMS

The Tennessee SIP does not include any TCMS, therefore this does not apply in the Knoxville Region.

4.1.7 FISCAL CONSTRAINT

Transportation conformity requirements in 40 CFR 93.108 state that transportation plans and TIPs must be fiscally constrained consistent with DOT's metropolitan planning regulations at 23 CFR part 450. The 2045 MTP's for the Knoxville and Lakeway areas and the FY 2020 – 2023 TIP's for KRTPO and LAMTPO and the TDOT FY 2020 – 2023 STIP are fiscally constrained, as demonstrated in applicable sections of those documents.

4.1.8 ORPHAN AREA PROJECTS

Table D-2 in Appendix D of this report provides a listing of the projects within the geography of the 1997 8-Hour Ozone Standard "orphan area" as previously described. These include all projects currently under development by TDOT as well as the projects included in the LAMTPO 2045 MTP update. Guidance from EPA indicates that IAC consultation is still required for projects within the orphan area to determine whether they are exempt or non-exempt, but a regional significance determination is no longer required since that aspect was only applicable to the regional emissions analysis requirement. A project listing within the conformity determination report noting the project's exempt/non-exempt status is necessary because non-exempt projects need to have a conformity determination, and exempt projects do not. Also, if there's a change to a non-exempt project, then the plan/TIP will need to be amended and a new conformity determination done for the plan/TIP. If there's a change to an exempt project, determining conformity for the plan/TIP is not necessary.

4.1.9 SUMMARY OF 1997 8-HOUR STANDARD CONFORMITY ANALYSIS

The KRTPO staff has determined that the Mobility Plan 2045, LAMTPO 2045 MTP, and FY20-23 TIPs are demonstrating conformity with the 1997 8-hr Ozone standard based on the qualitative analysis performed by TPO staff and demonstrated in the CDR. Compliance with the regulations of the Clean Air Act, 40 CFR Parts 51 and 93 (Transportation Conformity Rule) and 23 CFR Part 450 (Metropolitan Planning Regulations established by FAST Act) has also been demonstrated.

4.2 STATEMENT OF CONFORMITY – 2008 OZONE STANDARD

The nonattainment designation for the 2008 Ozone Standard became effective on July 20, 2012 and included the counties of Blount, Knox and the portion of Anderson County surrounding the TVA Bull Run Fossil Plant (2000 Census Tracts 202 and 213.02). A redesignation to Attainment for this Standard was approved by EPA through a Federal Register notice on July 13, 2015 and made effective on August 12, 2015. The conformity analysis documented in this report utilizes the newly approved Motor Vehicle Emissions Budgets (MVEB).

An emissions analysis was conducted for the required analysis years of 2026, 2035 and 2045.

Table 5 below summarizes the MVEB test for all analysis years:

Table 5: MVEB Test for 2008 Ozone Standard

Volatile Organic Compounds (VOC):	Analysis Year		
	2026	2035	2045
Motor Vehicle Emissions Budget (MVEB)	10.49	10.49	10.49
Projected Emissions	5.15 ✓	3.76 ✓	3.38 ✓
Oxides of Nitrogen (NOx):	2026	2035	2045
Motor Vehicle Emissions Budget (MVEB)	17.69	17.69	17.69
Projected Emissions	10.29 ✓	6.77 ✓	6.94 ✓

Emissions in tons per day

4.2.1 SUMMARY OF 2008 8-HOUR STANDARD CONFORMITY ANALYSIS

Based on the quantitative conformity analysis the KRTPO staff has determined that the Mobility Plan 2045 and the KRTPOFY 2020-2023 TIP demonstrate conformity for the 2006 Daily PM2.5 Standard using the

necessary emissions tests. Compliance with the regulations of the Clean Air Act, 40 CFR Parts 51 and 93 (Transportation Conformity Rule) and 23 CFR Part 450 (Metropolitan Planning Regulations established by FAST Act) has also been demonstrated.

4.3 STATEMENT OF CONFORMITY – 2006 DAILY PM2.5 STANDARD

The Daily PM2.5 conformity analysis consists of an MVEB test for the annual PM2.5-related emissions from on-road mobile sources resulting from components such as brake and tire wear and vehicle exhaust known as “Direct PM2.5” and “Oxides of Nitrogen” (NOx) which can act as precursors to PM2.5 formation. An emissions analysis was conducted for the required analysis years of 2026, 2028, 2035 and 2045, with year 2028 being interpolated between 2026 and 2035. The results of the emissions analysis are summarized in Table 6:

Table 6: MVEB Test for 2006 Daily PM2.5 Standard

	Analysis Year			
Direct Particulate Matter 2.5:	2026	2028	2035	2045
Motor Vehicle Emissions Budget (MVEB)	1.22	0.67	0.67	0.67
Projected Emissions	0.42 ✓	0.40 ✓	0.34 ✓	0.36 ✓
Oxides of Nitrogen (NOx):	2026	2028	2035	2045
Motor Vehicle Emissions Budget (MVEB)	42.73	19.65	19.65	19.65
Projected Emissions	13.05 ✓	12.05 ✓	8.57 ✓	8.78 ✓

4.3.1 SUMMARY OF 2006 DAILY PM2.5 STANDARD CONFORMITY ANALYSIS

Based on the quantitative conformity analysis the KRTPO staff has determined that the Mobility Plan 2045 and the KRTPOFY 2020-2023 TIP demonstrate conformity for the 2006 Daily PM2.5 Standard using the necessary emissions tests. Compliance with the regulations of the Clean Air Act, 40 CFR Parts 51 and 93 (Transportation Conformity Rule) and 23 CFR Part 450 (Metropolitan Planning Regulations established by FAST Act) has also been demonstrated.

Chapter 5 – Interagency Consultation

5.0 INTRODUCTION

The Transportation Conformity Rule in 40 CFR Part 93.105 requires that Interagency Consultation be a part of conformity determinations. Interagency Consultation allows for formal deliberation of any issues that arise as part of the conformity analysis and allows for input from all stakeholder agencies into the process. Specific consultation procedures are specified in the Tennessee Transportation Conformity Regulation found in 1200-3-34-.01(3) of the Tennessee State Code.

5.1 PARTICIPATING AGENCIES

The Interagency Consultation Participants included representatives from the following agencies:

- Knoxville Regional TPO
- Knox County Department of Air Quality Management
- Tennessee Department of Transportation
- Tennessee Department of Environment & Conservation
- Federal Highway Administration
- United States Environmental Protection Agency
- Federal Transit Administration
- Lakeway Area Metropolitan TPO
- Great Smoky Mountains National Park Service

A list of participant names is included in Appendix C.

5.2 OVERVIEW OF CONSULTATION PROCESS

The development of this conformity determination was coordinated with the Knoxville-area Interagency Consultation group. The process began with a kickoff of the Mobility Plan 2045 development and preliminary discussion of latest planning assumptions and required model inputs on an IAC conference call held on March 20, 2020. Subsequent calls were held to further discuss various assumptions and to review drafts of the emissions analysis and documentation. The draft Conformity Determination Report was provided to the IAC group for a 30-day review between January 29, 2021 to March 1, 2021. Appendix C contains the minutes of each of the interagency meetings as well as comments and responses to the draft Conformity Determination Report.

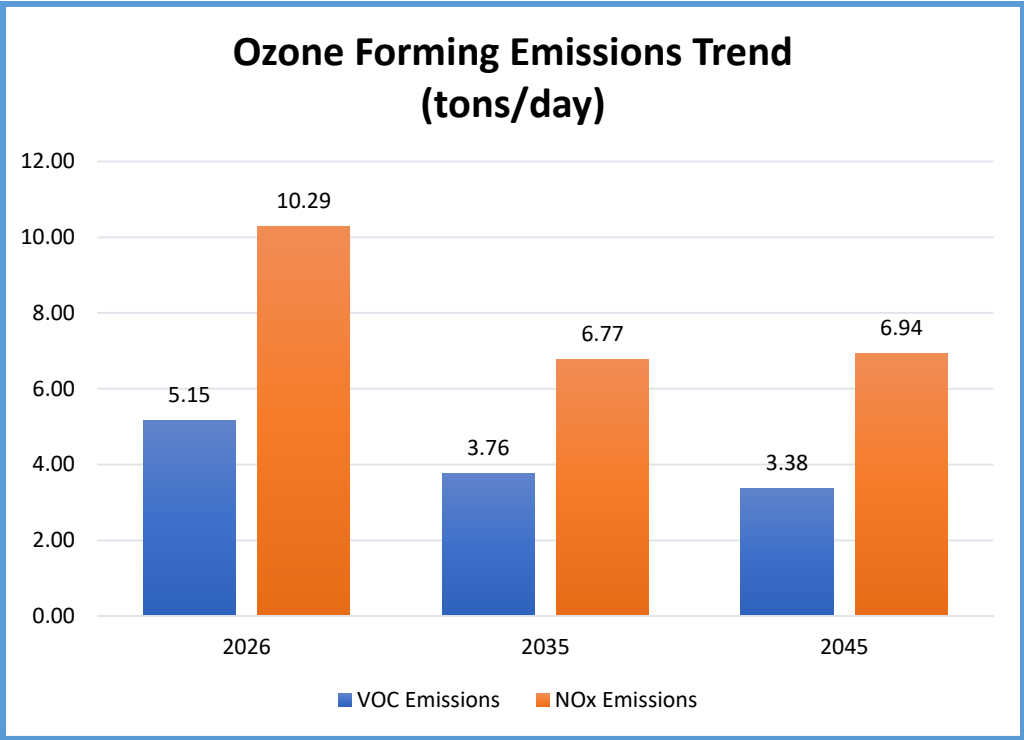
Chapter 6 – Conclusion and Summary of Comments Received

6.0 CONCLUSION

The analysis included in this report has demonstrated that the KRTPO Mobility Plan 2045 and LAMTPO 2045 Metropolitan Transportation Plan along with their accompanying FY 2020-2023 Transportation Improvement Programs as amended are in conformity with air quality regulations found in the Clean Air Act Amendments of 1990 and FAST Act.

Although Vehicle Miles of Travel are projected to increase steadily in the future, the corresponding emissions rates from vehicles are expected to decrease even more significantly according to the modeling performed by the KRTPO. It should be noted however that the downward trend in emissions does start to slow and even start to curve back upward for the NOx emissions after the year 2035 (see Figure 4 below).

Figure 4: Ozone Emissions Trends for Life of Mobility Plan 2045



The primary reason that emission rates are projected to decline is due to stricter tailpipe emission standards enacted by EPA, most notably the “Tier 2” standards that were enacted in 1999 and phased in between 2004 to 2009. The Tier Two standards represented a 77 to 86 percent reduction in nitrogen oxide emissions for cars and a 92 to 95 percent reduction for trucks from previous standards. A primary mechanism used to reduce emissions was through the reduction in fuel sulfur levels (both gasoline and diesel). More recently the “Tier 3” standards promulgated in 2014 and effective beginning in 2017 have further addressed tailpipe emissions from motor vehicles and will continue to become more prevalent as the fleet turns over. The MOVES model incorporates these regulations into its calculations and determines their impacts, which increase over time as the vehicle fleet turns over and includes more of the vehicles affected by the new regulations.

6.1 TRANSPORTATION CONTROL MEASURES

Currently there are no transportation control measures (TCMs) in the Tennessee SIP for the Knoxville 8-hour ozone and PM2.5 nonattainment areas. However, should TCMs be introduced in the area, nothing in the KRMP nor the Transportation Improvement Program will prohibit the timely implementation of any that are approved in the SIP for the Knoxville area.

6.2 PUBLIC INVOLVEMENT SUMMARY

The Knoxville Regional TPO conducted a 30-day comment period between xx, 2021 and xx, 2021 to allow for public review and comment on the 2045 Mobility Plan and accompanying Air Quality Conformity Determination. Public hearings were held on April 13, 2021 and April 28, 2021.

Copies of the Conformity Determination Report were made available on the KRTPO web site. Public notice and advertisements for the hearings and locations to view the draft conformity determination report were placed in newspapers by both KRTPO and LAMTPO including: The Knoxville News Sentinel, Maryville Daily Times, The Oak Ridger, Loudon County News Herald, Mountain Press, Citizen Tribune, Jefferson Standard Banner, Enlightener (paper targeted toward minority population) and Mundo Hispano (papers targeted toward Hispanic population).

6.3 PUBLIC COMMENT AND RESPONSE

TBD

Appendix A – Emissions Analysis Summary

A.1 EMISSIONS FOR THE 2008 8-HOUR OZONE STANDARD ANALYSIS

Table A-1 – Volatile Organic Compounds (VOC) emissions summary by county for 2008 8-Hour Ozone Standard

	VOC Emissions (tons per day)		
	Analysis Year		
	2026	2035	2045
Anderson (partial)	0.18	0.12	0.10
Blount	1.22	0.89	0.79
Knox	3.76	2.75	2.48
Total	5.15	3.76	3.38
MVEB	10.49	10.49	10.49

Table A-2 – Oxides of Nitrogen (NOx) emissions summary by county for 2008 8-Hour Ozone Standard

	NOx Emissions (tons per day)		
	Analysis Year		
	2026	2035	2045
Anderson (partial)	0.19	0.08	0.07
Blount	1.40	0.82	0.79
Knox	8.70	5.87	6.09
Total	10.29	6.77	6.94
MVEB	17.69	17.69	17.69

A.2 EMISSIONS FOR THE 2006 DAILY PM2.5 STANDARD

Table A-3 –MOVES Emissions Outputs for Daily Direct PM2.5 Emissions by County

	NOx Emissions (tons per day)			
	Analysis Year			
	2026	2028 (interpolated)	2035	2045
Anderson	1.31	1.19	0.75	0.73
Blount	1.39	1.27	0.83	0.81
Knox	8.74	8.12	5.97	6.22
Loudon	1.50	1.38	0.95	0.95
Roane (partial)	0.11	0.10	0.06	0.06
Total	13.05	12.05	8.57	8.78
MVEB	42.73	19.65	19.65	19.65

Table A-4 –MOVES Emissions Outputs for Daily NOx Emissions by County

	PM2.5 Emissions (tons per day)			
	Analysis Year			
	2026	2028 (interpolated)	2035	2045
Anderson	0.04	0.04	0.03	0.03
Blount	0.05	0.05	0.05	0.05
Knox	0.29	0.28	0.24	0.25
Loudon	0.04	0.04	0.03	0.03
Roane (partial)	0.00	0.00	0.00	0.00
Total	0.42	0.40	0.34	0.36
MVEB	1.22	0.67	0.67	0.67

Appendix B – MOVES3 Input Development Documentation

B.1 BACKGROUND

General information regarding the MOVES2014 runspec and county data manager input development was provided in Section 2.4 of this report. The purpose of this appendix is to provide additional details and example input files used for the county data manager. Several of the inputs were derived based on methodology developed as part of other efforts, primarily the development of the onroad mobile source emissions inventories to support both recent Redesignation Requests and Maintenance Plans for Ozone and PM2.5 prepared by the Tennessee Department of Environment & Conservation (TDEC). A primary source of inputs utilized by TDEC was from a report and research conducted by the University of Tennessee, Knoxville Department of Civil & Environmental Engineering, titled “Methodology for Developing Input Datasets for the MOVES Model”, August 2014. These additional reference materials are not repeated in this document, but are available upon request.

B.2 MOVES COUNTY DATA MANAGER INPUT DATA SOURCES

Several of the following data sets required for MOVES are extremely large and impossible to fully copy into the following sections. Some of the smaller datasets, or parts of datasets for illustration, are included in this document and general descriptions of how each were derived are provided as well, with full data sets being available upon request to KRTPO staff.

B.2.1 METEOROLOGY

Meteorology defined in a relevant SIP for which a MVEB is being used should be incorporated into the relevant analysis. The meteorology inputs (temperature and humidity) were developed and documented by TDEC in the Redesignation Requests and Maintenance Plans for both Ozone and PM2.5 following the appropriate EPA Technical Guidance. The 1997 8-hour Ozone inputs are based on the Maintenance Plan which used a min/max temperature of 66/96 and default humidity inputs for MOBILE6.2 that have now been put through the MOBILE6 to MOVES converter. The 2008 8-hour Ozone inputs are based on an average of 3-years between 2009-2011 while the PM2.5 inputs are based on a 3-

year average spanning 2012-2014. This input is the same for all counties and all analysis years for the applicable pollutant.

B.2.2 SOURCE TYPE POPULATION

Source type (i.e., vehicle type) population is used by MOVES to calculate start and evaporative emissions. In MOVES, start and resting evaporative emissions are related to the population of vehicles in an area. Since vehicle type population directly determines start and evaporative emission, users must develop local data for this input. MOVES classifies vehicles based on the way vehicles are classified in the Federal Highway Administration's HPMS (Highway Performance Monitoring System) rather than on the way they are classified in the EPA's emissions regulations. MOVES categorizes vehicles into 13 source types, which are subsets of 6 HPMS vehicle types.

Multiple potential sources of Source Type Population were reviewed for the 2045 Mobility Plan regional emissions analysis and ultimately a hybrid approach was selected depending on the specific type of vehicle and what was determined by TPO staff to be the most reasonable data source. The most recent prior modeling efforts utilized the data obtained from U.T. which developed county level estimates of source type population for all 95 counties in Tennessee for the year 2014. The U.T. methodology utilized a combination of vehicle registration data obtained from the Tennessee Department of Revenue (TDOR) as well as national default methods for some vehicle types that are not included in the TDOR data such as long-haul trucks.

In order to meet the requirement of using the "latest planning assumptions" for this conformity analysis, the TPO staff reviewed and compared data sources that could be used to develop a baseline source type population for year 2018 to be consistent with the base year of other data sources and travel demand model being utilized for the regional emissions analysis. The most recent complete data sources available for this effort were developed for year 2017 and used to support efforts to compile the required 3-year interval of the National Emissions Inventory (NEI). The two 2017 NEI data sources were:

1. Tennessee Department of Transportation (TDOT) 2017 NEI Dataset Development
2. Coordinating Research Council (CRC) Project No. A-115, "Developing Improved Population Inputs for the 2017 National Emissions Inventory" April 2019.

The TDOT source was largely based on the methodology used in the U.T. 2014 source type population input development, but utilizing a more recent dataset from the TDOR and updating the national default local data (NDLD) method for non-covered source types using year 2017 vehicle miles traveled (VMT) data. Unfortunately, the staff person directly involved with the TDOT dataset development left the

agency and specific documentation of the input development process was never finalized nor was any formal statewide IAC involvement provided to allow for outside review and comment on the information.

The CRC information for Project A-115 was fully documented and will just be summarized for purposes of this overview. In summary, the purpose of the CRC study was to provide a national dataset of source type population and age distributions that could be used to improve the on-road sector of the NEI and provide a consistent nationwide process to supplement areas without the ability to derive specific local data for these important MOVES model inputs. It utilized a proprietary source of vehicle registration data from a company known as “IHS Markit” (formerly Polk Automotive). It should be noted that the 2014 U.T. data development process also utilized this company’s data as a validation source and for some inputs. Project A-115 developed source type population and age distributions for all counties in the U.S. and also included four total scenarios – a base scenario and three additional ones to account for a possible over-representation of older “antique” vehicles in the dataset. The three scenarios only affected the “Light-Duty” (LD) source types of Passenger Car, Passenger Truck and Light Commercial Truck and can be summarized as follows:

1. No adjustments
2. Remove all LD antique vehicles
3. Apply the LD 2014 New Jersey based reductions nationally
4. Apply the LD 2014 NJ-based reductions nationally and remove all LD antique vehicles

The TPO staff decided to utilize Scenario #2 above, the CRC documentation states “Scenario 2 removes the relatively small number of LD vehicles that self-report to their state DMV as ‘antique’. In order to be registered as an antique vehicle (lower annual registration fee) in Tennessee the vehicle “must be over twenty-five years old and with a non-modified engine and body and can only be used for general transportation on Saturdays, Sundays, and federal holidays”.

Other specific data sources were utilized for some source types where information was available, which included transit buses and school buses where data is available from the transit agencies and local school districts respectively.

Following is a summary of data source used for each vehicle (source) type for this regional emissions analysis:

- Source Type 11 (Motorcycle) – Utilized TDOT 2017 NEI data. It was decided that motorcycles should be represented in an unambiguous fashion in the TDOR data obtained by TDOT and

the total numbers were consistent with the 2014 input data appearing more reasonable than the CRC data.

- Source Type 21 (Passenger Car) – Utilized CRC A-115 Scenario 2
- Source Type 31 (Passenger Truck) – Utilized CRC A-115 Scenario 2
- Source Type 32 (Light Commercial Truck) – Utilized CRC A-115 Scenario 2
- Source Type 41 (Intercity Bus) – Use National Default Local Data Method applied to 2018 VMT
- Source Type 42 (Transit Bus) – Utilized 2018 National Transit Database (NTD) information (Knox County only county in study area with transit buses).
- Source Type 43 (School Bus) – Utilized TN Department of Education school bus database provided in 9/2020 and information from Knox County Schools 2018.
- Source Type 51 (Refuse Truck) – Use National Default Local Data Method applied to 2018 VMT
- Source Type 52 (Single Unit Short-Haul Truck) – Utilized CRC A-115 Scenario 2
- Source Type 53 (Single Unit Long-Haul Truck) – Use National Default Local Data Method applied to 2018 VMT
- Source Type 54 (Motorhome) – Use National Default Local Data Method applied to 2018 VMT
- Source Type 61 (Combination Short-Haul Truck) – Use National Default Local Data Method applied to 2018 VMT
- Source Type 62 (Combination Long-Haul Truck) – Use National Default Local Data Method applied to 2018 VMT

Source types 11, 21 and 31 were grown from the available data year of 2017 to the baseline year 2018 by utilizing the household vehicle ownership growth rates obtained from the TPO travel demand model between the previous model base year of 2014 and the new base year of 2018. The growth rates for 2017 to 2018 for source types 32 and 52 were developed using the NDLD method and the growth rate between 2014 and 2018.

Source type population projections for future years are based on various methods as follows based on the specific vehicle type:

- Source Types 11, 21 and 31 - Growth in household vehicle ownership derived from the Knoxville Regional TPO's Travel Demand Model (TDM). The TDM has a vehicle ownership sub-model that allocates vehicle ownership based on population as part of its household population synthesizer. The vehicle ownership is used in helping the TDM determine vehicle mode choice and vehicle activity. As people population increases, the TDM adjusts the vehicle ownership in accordance with population growth and other socioeconomic characteristics. The household vehicle ownership is aggregated to the TDM Traffic Analysis Zone (TAZ) level and then further aggregated to the county level to develop an independent growth rate from the base year 2018 to future analysis years 2026, 2035 and 2045 for each county subject to air quality conformity.
- Source Type 32 – The growth in passenger vehicle VMT from the TDM is applied to the base year 2018 for each analysis year.

- Source Type 41 – The growth in overall VMT from the TDM is applied to the base year 2018 for each analysis year.
- Source Type 42 – Since transit buses (as defined by EPA in MOVES) only operate in Knox County, it was decided to utilize the overall population growth in Knox County to determine transit bus growth rate since it would be logical to assume that transit usage would increase relative to population growth.
- Source Type 43 – Growth in student population by county as calculated by the TDM household population synthesizer.
- Source Types 51, 52, 53 and 54 – The growth in “single-unit” truck VMT from the TDM is applied to the base year 2018 for each analysis year.
- Source Types 61 and 62 – The growth in “multi-unit” truck VMT from the TDM is applied to the base year 2018 for each analysis year.

Since there are two partial counties included within the nonattainment/maintenance areas for the Knoxville Region, special attention was paid to those areas to develop the sub-area source type populations for the specific affected areas.

- Anderson County – Partial Area included in the 2008 8-hour Ozone Nonattainment Areas covering the portion of Anderson County surrounding the TVA Bull Run Fossil Plant, which corresponds to Anderson County 2000 Census Tracts 202 and 213.02. In order to be consistent with past methodology used in developing the SIP MVEB, a constant factor of 0.21 is multiplied by each Source Type to derive the partial area vehicle counts. This was based on comparing population and vehicle counts in the partial area relative to the entire county.
- Roane County – Partial Area included in the 1997 Annual and 2006 Daily PM2.5 Nonattainment Areas covering the portion of Roane County surrounding the TVA Kingston Fossil Plant, which corresponds to 2000 Census Block Group 471450307002. In order to be consistent with past methodology used in developing the SIP MVEB, a constant factor of 0.013 is multiplied by each Source Type to derive the partial area vehicle counts. This was based on comparing population and vehicle counts in the partial area relative to the entire county.

In general, it is believed that the adoption of the above assumptions will lead to a conservative (high) estimate of total source type population. A comparison of the county with the largest source type population in the region (Knox County) showing the total estimated vehicle count for the previous base year of 2014 to 2018 is provided in table B-1:

Table B-1 – Knox County Source Type Population Comparison of Previous 2014 and New 2018 Base Year

Source Type ID	2014 Population	2018 Population
11	8,817	9,180
21	171,062	182,950
31	140,750	194,417
32	24,722	17,457
41	6	7
42	153	154
43	383	449
51	184	213
52	7,683	8,699
53	271	313
54	1,683	1,919
61	3,217	3,547
62	3,503	4,061
TOTAL	362,434	423,366

Table B-2 below and continued on the following page provides the breakdown of vehicle population growth by source type and county:

Table B-2 – Source Type Population Growth by County 2018 – 2045

Source Type	2018	2026	2035	2045
Anderson County - Full County for PM2.5 Analysis Only				
<i>Motorcycle</i>	2,544	2,595	2,651	2,698
<i>Passenger Car</i>	32,672	33,337	34,051	34,649
<i>Passenger Truck</i>	40,728	41,557	42,447	43,193
<i>Light Commercial Truck</i>	1,919	1,980	2,082	2,252
<i>Other Buses</i>	1	1	1	1
<i>Transit Bus</i>	0	0	0	0
<i>School Bus</i>	86	82	84	85
<i>Refuse Truck</i>	35	37	39	43
<i>Single Unit Short-haul Truck</i>	1,020	1,073	1,129	1,239
<i>Single Unit Long-haul Truck</i>	46	48	51	56
<i>Motor Home</i>	266	280	294	323
<i>Combination Short-haul Truck</i>	487	511	538	611
<i>Combination Long-haul Truck</i>	565	593	624	709
TOTAL	80,369	82,094	83,991	85,859

Table B-2 – Source Type Population Growth by County 2018 – 2045 (Continued)

Source Type	2018	2026	2035	2045
Blount County				
<i>Motorcycle</i>	5,070	5,423	5,817	6,270
<i>Passenger Car</i>	59,894	64,068	68,723	74,074
<i>Passenger Truck</i>	70,745	75,674	81,173	87,494
<i>Light Commercial Truck</i>	9,354	10,574	11,518	12,625
<i>Other Buses</i>	1	1	1	1
<i>Transit Bus</i>	0	0	0	0
<i>School Bus</i>	164	155	172	196
<i>Refuse Truck</i>	33	35	38	41
<i>Single Unit Short-haul Truck</i>	1,778	1,900	2,043	2,210
<i>Single Unit Long-haul Truck</i>	55	59	63	68
<i>Motor Home</i>	355	379	408	441
<i>Combination Short-haul Truck</i>	322	341	365	411
<i>Combination Long-haul Truck</i>	361	382	409	461
TOTAL	148,132	158,991	170,730	184,292
Knox County				
<i>Motorcycle</i>	9,180	9,758	10,456	11,252
<i>Passenger Car</i>	182,950	194,464	208,380	224,232
<i>Passenger Truck</i>	194,417	206,653	221,441	238,287
<i>Light Commercial Truck</i>	17,457	19,098	20,556	22,286
<i>Other Buses</i>	7	8	8	9
<i>Transit Bus</i>	154	165	177	189
<i>School Bus</i>	449	472	536	604
<i>Refuse Truck</i>	213	230	245	264
<i>Single Unit Short-haul Truck</i>	8,699	9,402	10,004	10,794
<i>Single Unit Long-haul Truck</i>	313	338	360	388
<i>Motor Home</i>	1,919	2,074	2,207	2,381
<i>Combination Short-haul Truck</i>	3,547	3,861	4,017	4,542
<i>Combination Long-haul Truck</i>	4,061	4,421	4,599	5,200
TOTAL	423,366	450,944	482,986	520,428
Loudon County				
<i>Motorcycle</i>	1,855	1,989	2,175	2,374
<i>Passenger Car</i>	22,005	23,601	25,808	28,169
<i>Passenger Truck</i>	30,295	32,493	35,531	38,782
<i>Light Commercial Truck</i>	996	1,070	1,152	1,306
<i>Other Buses</i>	1	1	1	1
<i>Transit Bus</i>	0	0	0	0
<i>School Bus</i>	63	63	66	72
<i>Refuse Truck</i>	44	47	50	54
<i>Single Unit Short-haul Truck</i>	921	984	1,044	1,137
<i>Single Unit Long-haul Truck</i>	50	53	57	62
<i>Motor Home</i>	259	277	294	320
<i>Combination Short-haul Truck</i>	685	739	760	870
<i>Combination Long-haul Truck</i>	810	874	899	1,028
TOTAL	57,984	62,191	67,837	74,175

Table B-2 – Source Type Population Growth by County 2018 – 2045 (Continued)

Source Type	2018	2026	2035	2045
Anderson County - Partial County for Ozone Analysis				
<i>Motorcycle</i>	534	545	557	566
<i>Passenger Car</i>	6,861	7,001	7,151	7,276
<i>Passenger Truck</i>	8,553	8,727	8,914	9,071
<i>Light Commercial Truck</i>	403	415	452	480
<i>Other Buses</i>	0	1	1	1
<i>Transit Bus</i>	0	0	0	0
<i>School Bus</i>	18	17	18	18
<i>Refuse Truck</i>	7	8	8	9
<i>Single Unit Short-haul Truck</i>	214	226	239	250
<i>Single Unit Long-haul Truck</i>	10	10	11	11
<i>Motor Home</i>	56	59	62	65
<i>Combination Short-haul Truck</i>	102	109	114	115
<i>Combination Long-haul Truck</i>	119	126	132	134
TOTAL	16,878	17,244	17,659	17,996
Roane County - Partial County for PM2.5 Analysis				
<i>Motorcycle</i>	22	23	23	23
<i>Passenger Car</i>	289	293	294	296
<i>Passenger Truck</i>	389	393	396	398
<i>Light Commercial Truck</i>	10	11	11	13
<i>Other Buses</i>	0	1	1	1
<i>Transit Bus</i>	0	0	0	0
<i>School Bus</i>	1	1	1	1
<i>Refuse Truck</i>	0	1	1	1
<i>Single Unit Short-haul Truck</i>	12	12	13	15
<i>Single Unit Long-haul Truck</i>	1	1	1	1
<i>Motor Home</i>	3	3	3	4
<i>Combination Short-haul Truck</i>	7	8	8	9
<i>Combination Long-haul Truck</i>	8	9	9	11
TOTAL	744	756	761	773

B.2.3 AGE DISTRIBUTION

The EPA strongly recommends the use of local specific data for vehicle age distribution as it can vary greatly for various areas based on a number of factors. This input is important because of the fact that older vehicles generally exhibit higher emissions than newer vehicles due to fewer controls required to meet newer emissions standards and deterioration of other emissions control systems components. The Age Distribution inputs for this regional emissions analysis were developed using an approach of attempting to blend consistent data sources with what was used to develop the overall Source Type

Population for each vehicle type as described in the previous section. For example, cases where the CRC A-115 data source was used for vehicle population its corresponding age distribution that was provided in the same overall dataset was utilized. For source types in which the NDLD method was used it was decided to use the MOVES default age distributions that were developed on a national scale and available from a spreadsheet calculator tool provided by the EPA at: <https://www.epa.gov/moves/tools-develop-or-convert-moves-inputs>. For these source types the analysis year in the spreadsheet tool was set to “2018”. Local data was used for age of transit and school buses.

B.2.4 VEHICLE TYPE VEHICLE MILES TRAVELED (VMT)

MOVES defines roadways into five different functional types: Off-Network, Rural Restricted Access, Rural Unrestricted Access, Urban Restricted Access and Urban Unrestricted Access. The TPO’s Travel Demand Model uses a different roadway classification system, however it is easily converted to the MOVES road types as the Restricted categories involve roadways with no direct access such as Interstates and the Unrestricted road type includes all other types of roadways. The Vehicle Miles Traveled (VMT) from the TDM were then aggregated into the respective MOVES road types

The Knoxville Regional TPO’s TDM predicts average weekday traffic volumes for all arterials and collectors and some major local roads in the 10-county modeling region. The model’s roadway network covers over 7,500 lane miles in total over an area of 3,725 square miles represented by 1,186 traffic analysis zones. The current version of the model also predicts the Knoxville Area Transit (KAT) average weekday system ridership and the number of average weekday bicycle and pedestrian trips within the region. All current nonattainment/maintenance area counties are included in the TDM.

The methodology used to grow VMT to the future analysis years was to compare the base year 2018 VMT developed from actual traffic count data and reported by the Tennessee Department of Transportation for the federal Highway Performance Monitoring System (HPMS) to the travel demand model VMT. Correction factors for the model volume were developed and then subsequently applied to the growth rates exhibited for each future network year of the travel demand model based on changes in population and proposed transportation projects included in the Long Range Transportation Plan.

The travel demand model forecasts VMT growth for four different vehicle types of: Passenger Vehicles, Four-Tire Commercial Vehicles, Single-Unit Trucks and Multi-Unit Trucks. Growth factors for each vehicle type were applied to the base year data separately. A special model post-processor was developed for the current TPO TDM which automates the previous process of compiling the VMT by vehicle type into

a spreadsheet format and calculating growth factors to apply to each HPMS vehicle type. Table B-3 below displays this model-generated VMT growth calculator spreadsheet for the specific example of the 2045 analysis year for the 2008 Ozone Standard geography:

Table B-3 – Example VMT Growth Calculator for MOVES HPMSVType Year Input

County	HPMSVTypeID	HPMS_2018o3_vmt	growth	HPMS2045o3_vmt
Anderson	10	1,905,431	1.19	2,268,627
Anderson	25	233,651,944	1.19	278,188,602
Anderson	40	146,472	1.17	171,061
Anderson	50	3,943,287	1.17	4,605,278
Anderson	60	2,257,398	1.13	2,540,006
Blount	10	7,996,420	1.35	10,792,967
Blount	25	1,181,311,185	1.35	1,594,445,027
Blount	40	458,075	1.24	569,303
Blount	50	21,590,845	1.24	26,833,459
Blount	60	43,263,450	1.28	55,191,887
Knox	10	33,790,605	1.28	43,138,148
Knox	25	5,587,211,950	1.28	7,132,810,347
Knox	40	4,915,090	1.24	6,098,708
Knox	50	122,615,180	1.24	152,142,511
Knox	60	484,040,370	1.28	619,776,213

In order to more simply document the projected growth in VMT for each analysis year covered in this conformity determination, the table on the following page (Table B-4) depicts only the total county-level Daily VMT for each analysis year. Subsequent to running the MOVES3 model, the TPO staff reviewed the detailed activity outputs from the model run to ensure that the output VMT matched the input VMT so that it could be verified that all emissions were properly accounted for.

Table B-4 – Growth in Total Daily VMT (by Source Type)

	2018 Actual	2026	2035	2045
Anderson - P	N/A	683,410.2	742,642.3	788,420.8
Blount	3,437,315	3,873,328.7	4,215,883.9	4,624,199.0
Knox	17,075,543	18,668,489.5	20,037,385.4	21,791,687.5
Anderson Full	2,566,316	2,652,169.9	2,788,648.3	3,028,149.1
Loudon	2,420,082	2,600,045.6	2,784,487.3	3,156,888.5
Roane - P	N/A	170,522.6	177,855.6	199,714.7

EPA’s MOVES model uses fractions to parse out monthly, daily, and hourly VMT. These fractions are often locally developed to represent local conditions as much as possible. The report developed by the University of Tennessee (UT) for TDOT discusses the development of month and day VMT fractions. These fractions were developed from historical 5-year average HPMS data. These fractions for July were used to adjust annual average weekday VMT to July average weekday VMT for the Ozone analysis. Note, this same data source (UT, 2014) was carried forward to the current analysis since the 2017 TDOT NEI effort did not provide new documentation for how these were modified and they appeared to be generally inconsistent with what would be expected.

Hourly VMT fractions by road type were developed from the TPO’s travel demand model using a new post processor created specifically for developing MOVES-ready inputs. The post-processor is required in order to disaggregate the TDM traffic volume outputs from three time periods (AM, PM and rest of day) into individual hourly volumes for each of the twenty-four hours in a day. The hourly volumes are developed primarily by pattern matching based on the MOVES defaults for VMT by hour, which vary by road type (urban and rural) but not source type. The PPSUITE software uses the four vehicle types from the TDM (passenger vehicles, four-tire commercial vehicles, single-unit trucks and multi-unit trucks) to generate hourly VMT fractions for the different source types that are associated with those categories. In addition, special hourly distributions were applied to source types 42 and 43 (transit bus and school bus) to reflect the unique operating characteristics of these vehicles; for example, school buses basically only operate during school beginning and dismissal periods. Further documentation of the new post-processor is provided in a separate document that was produced by the TPO’s modeling consultant.

B.2.5 AVERAGE SPEED DISTRIBUTION

Average speed distribution is the speed of each source type by road type for each hour of the day. MOVES uses 16 speed bins to group source type speed fractions. These fractions represent the amount of time a source type spends traveling at that speed on a particular road type. Note, these fractions represent the time spent in these speed bins; these fractions do not reflect instantaneous speeds, but the average speed, including delays like congestion and traffic signals. Average speed distribution for the Knoxville Nonattainment Area is developed by the TPO's TDM along with the aforementioned model post-processor. Similar to the hourly VMT fractions, there is a need for post processing of the raw TDM outputs for average speeds on roadway links primarily for the disaggregate level of detail needed for MOVES inputs. Speed is a direct function of several roadway characteristics and the amount of congestion that is present. The model post-processor develops separate 24-hour traffic volumes for each direction of travel on every roadway link in the model network and determines the average speed based on the amount of congestion (link volume-to-capacity ratio) and other characteristics, such as presence of traffic signals. A separate speed distribution for multi-unit trucks was developed and validated against real-world speed information obtained through the National Performance Measure Research Dataset (NPMRDS). The speeds change over the course of the analysis years in this conformity analysis. The difference accounts for increased congestion and the impact of any changes to the transportation network such as road widening or new roadway construction projects.

B.2.6 ROAD TYPE DISTRIBUTION

Road type distribution is the distribution of VMT on each roadtype by sourcetype. Road type distribution data is developed using the TDM post-processor which automatically tabulates the aggregate VMT (HPMS model adjusted model volumes) by road type and calculates the percent on each road type.

B.2.7 FUELS

Data for this input was developed and provided by TDEC. A copy of the methodology is provided as follows:

Fuel Type and Technology was formerly called Alternative Vehicle Fuels & Technology (AVFT). This input allows users to define the split between different fuel types, including gasoline, diesel and CNG (compressed natural gas) for each vehicle type and model year.

EPA's guidance recommends the use of local data where available. Default information can be used where no local information is available. The default information for transit buses (sourceType 42)

includes CNG buses as part of the fleet mix. In most areas of Tennessee there are no transit buses fueled with CNG. Therefore, at a minimum, these buses should be allocated to diesel fuel.

Local information for the Knoxville Area Transit (KAT) fleet was obtained by the Knoxville Regional TPO. This information included bus size, fuel type, model year and number of miles driven in the last year. This data was examined for use in developing local fuelEngFraction fractions. Table B-5 illustrates the data developed into MOVES fuelEngFraction format. The last column, fuelEngFraction, contains the fraction of miles driven for each model year by fuel type (1 = gasoline, 2 = diesel). Note, the KAT fleet does not have any model year 2006 or 2010 buses or vans (sourceType 42 is defined by EPA as passenger vehicles with a capacity of 15 or more persons primarily used for transport within cities).

Table B-5. Local fuelEngFraction From KAT Data.

sourceTypeID	modelYearID	fuelTypeID	engTechID	fuelEngFraction
42	2002	1	1	0
42	2003	1	1	0
42	2004	1	1	0
42	2005	1	1	0
42	2007	1	1	1
42	2008	1	1	0
42	2009	1	1	0
42	2011	1	1	0.389721741
42	2012	1	1	0.623587602
42	2013	1	1	0
42	2002	2	1	1
42	2003	2	1	1
42	2004	2	1	1
42	2005	2	1	1
42	2007	2	1	0
42	2008	2	1	1
42	2009	2	1	1
42	2011	2	1	0.610278259
42	2012	2	1	0.376412398
42	2013	2	1	1

Some model year vehicles in the KAT fleet are comprised strictly of gas or diesel powered vehicles. Only a couple model years have both gas and diesel vehicles. EPA states in their Technical Guidance: “In making projections, users should assume no future changes in activity associated with alternate fuel or engine technologies unless those alternate fuels or technologies are required by regulation or law. This necessitates the assumption that all future-year analyses will need to have the same distribution. After examining the distribution of gasoline and diesel transit buses and their VMT in the last year, a more homogenized approach was considered. The VMT were used to develop overall fractions based on fuel type (Table B-6).

Table B-6. Overall KAT Fleet Statistics

	VMT	Fraction
Gasoline:	712,109	0.25798
Diesel:	2,048,262	0.74202
Total:	2,760,371	1

Using the total fraction of VMT attributable to gasoline vehicles versus diesel vehicles homogenizes the distribution of VMT across all model years while still maintaining the contribution from both diesel vehicles and gasoline vehicles to the overall vehicle miles traveled (approximately 26 percent gasoline and 74 percent diesel) by the transit fleet. This approach is more appropriate for the application of future-year analysis since the specific model year makeup in the future is unknown.

Applying the revised values for the transit bus fleet results in the values contained below in Table B-7. Note fuelTypeID 3 is CNG. These values are set to zero since there are no CNG buses in the KAT fleet. For any future year these same fractions would be applied.

Table B-7. Revised AVFT Values for sourceType 42

sourceTypeID	modelYearID	fuelTypeID	engTechID	fuelEngFraction
42	2002	1	1	0.25797583
42	2003	1	1	0.25797583
42	2004	1	1	0.25797583
42	2005	1	1	0.25797583
42	2006	1	1	0.25797583
42	2007	1	1	0.25797583
42	2008	1	1	0.25797583
42	2009	1	1	0.25797583
42	2010	1	1	0.25797583
42	2011	1	1	0.25797583
42	2012	1	1	0.25797583
42	2013	1	1	0.25797583
42	2002	2	1	0.74202417
42	2003	2	1	0.74202417
42	2004	2	1	0.74202417
42	2005	2	1	0.74202417
42	2006	2	1	0.74202417
42	2007	2	1	0.74202417
42	2008	2	1	0.74202417
42	2009	2	1	0.74202417
42	2010	2	1	0.74202417
42	2011	2	1	0.74202417
42	2012	2	1	0.74202417
42	2013	2	1	0.74202417
42	2002	3	1	0
42	2003	3	1	0
42	2004	3	1	0
42	2005	3	1	0
42	2006	3	1	0
42	2007	3	1	0
42	2008	3	1	0
42	2009	3	1	0
42	2010	3	1	0
42	2011	3	1	0
42	2012	3	1	0
42	2013	3	1	0

The other portions of the required fuels input was also developed and provided by TDEC based on EPA guidance. Essentially the fuels inputs reflect the maximum regulatory RVP levels by month for

Tennessee. In addition, since EPA anticipates (based on the 2012 fuel formulations and supply information in MOVES) that essentially all gasoline sold in Tennessee in 2012 and later will contain at least nine percent ethanol, an additional 1.0 PSI waiver applies to the RVP values. Therefore, the RVP values developed are 1.0 PSI above the listed regulatory maximum as allowed by the 1.0 PSI waiver. Additionally, the fuels input provided by TDEC to the TPO includes the appropriate “fuel region” for Knoxville. For the historical baseline year analyses of 2002 and 2008, the MOVES default fuels were used as exported from the County Data Manager for each analysis county.

B.2.8 I/M PROGRAMS

Not applicable to the Knoxville Region

Appendix C – Interagency Consultation

C.1 INTERAGENCY CONSULTATION PARTICIPANTS

Table C-1 shows the current participants in the Knoxville Interagency Consultation process

Table C-1 – Knoxville IAC Participants

Agency	Representative(s)
Knoxville Regional Transportation Planning Organization (TPO) 400 Main Street, Suite 403 Knoxville, TN 37902 (865) 215-2500 FAX: (865) 215-2068	Jeff Welch, TPO Director Mike Conger, Transportation Engineer Craig Luebke, Transportation Planner
Knox County Department of Air Quality Management 140 Dameron Avenue Knoxville, TN 37917 (865) 215-5900 FAX: (865) 215-5902	Brian Rivera, Director Coby Webster, Engineer
Tennessee Department of Transportation (TDOT) 505 Deaderick Street Nashville, TN 37243 (615) 741-2848 FAX: (615) 532-8451	Deborah Fleming, MPO Program Manager
Tennessee Department of Environment and Conservation (TDEC), Air Pollution Control Division Tennessee Tower, 15 th Floor 312 Rosa L. Parks Ave. Nashville, TN 37243 (615) 532-0616	Marc Corrigan, Environmental Consultant Greg Riggs, Environmental Consultant 3
Federal Highway Administration, Tennessee Division 404 BNA Drive, Building 200, Suite 508 Nashville, TN 37217 (615) 781-5767 FAX: (615) 781-5773	Sean Santalla, Planning & Air Quality Specialist
U.S. Environmental Protection Agency (EPA), Region 4 61 Forsyth Street Atlanta, GA 30303 (404) 562-9077 FAX: (404) 562-9019	Kelly Sheckler, Environmental Planner Dianna Myers, Environmental Scientist Richard Wong, Air Dispersion and Mobile Modeler
Federal Transit Administration (FTA), Region 4 (Atlanta) 61 Forsyth Street Atlanta, GA 30303 (404) 562-3500 FAX: (404) 562-3505	Andres Ramirez, Community Planner

Agency	Representative(s)
Lakeway Area Metropolitan Transportation Planning Organization (TPO) 100 W. 1st North Street Morristown, TN 37814 (423)581-0100 FAX: (423) 585-4679	Rich DesGrosseillers, MTPO Director
Great Smoky Mountains National Park (GSMNP), Resource Management & Science Division 1314 Cherokee Orchard Road Gatlinburg, TN 37738 (865)436-1708 FAX: (865) 430-4753	Jim Renfro, Air Quality Branch Chief Teresa Cantrell, Transportation Planner

C.2 INTERAGENCY CONSULTATION MEETING MINUTES

The following meeting minutes were applicable to this transportation conformity determination:

C.2.1 MEETING MINUTES FOR IAC CONFERENCE CALL ON 3/20/2020

Knoxville Air Quality Interagency Consultation Conference Call Meeting Minutes for 3/20/2020

Roll Call

Call Participants:

Knoxville TPO:

Mike Conger
 Craig Luebke
 Jeff Welch

EPA:

Kelly Sheckler
 Sarah Larocca

FHWA:

Sean Santalla

FTA:

None

Tennessee Department of Transportation:

Deborah Fleming
 Brianna Benson
 Rashad Pinckney

Chasity Stinson
Jennifer Marshall

Tennessee Department of Environment & Conservation:
Marc Corrigan

Knox County Air Quality Management:
Coby Webster

Lakeway Area MTPO:
None

National Park Service:
None

Discussion Items:

1.) Discussion of April 2020 TIP Amendment & Short Conformity Report

Mike Conger provided an overview of the draft short conformity report (SCR) for a set of two proposed TIP amendments that was submitted to the IAC on March 4th. Mike described the two project amendments and the use of a SCR report process that allows demonstration of conformity without a full regional emissions analysis. Mike briefly described the four major conditions that must be satisfied in the SCR process and how each of the two amendments complied with such. He noted that today was the final day for IAC comment and that the 30-day public comment was set to begin on March 23rd prior to being heard for adoption at the April 22nd TPO Executive Board meeting.

Marc Corrigan asked whether it was the intention to make a conformity finding for the Annual PM_{2.5} Standard as was stated under the "Statement of Conformity" section on page 3 of the SCR. Mike replied that was not the intention since that standard was no longer in effect and that statement had mistakenly been carried forward from a prior document that had been used as a template. Mike stated that the SCR would be revised as appropriate to remove that statement for the public comment version.

2.) Discussion of Conformity Determination and Regional Emissions Analysis Process for 2045 Mobility Plan

Mike Conger stated that the TPO was in the beginning stages of the next major 4-year update of its long-range transportation plan, known as the 2045 Mobility Plan. He noted a full regional emissions analysis would be required to demonstrate transportation conformity so the purpose of today's discussion was to act as a kick-off of that process to discuss some of the primary planning assumptions with the IAC group. Mike referred to the process overview document that was prepared and sent to the IAC group before the call to lead the discussion. He provided an overview of the general timeline of the process and likely IAC engagement points. Next, he discussed the current air quality status of the Knoxville Region and which NAAQS were applicable in terms of being

currently designated as a maintenance area. There was follow-up discussion after the conference call regarding the clarification of the status relative to the 1997 8-hour Ozone NAAQS between the TPO, TDEC and EPA. This section of the document has been revised to clarify that the Knoxville Region consisting of Jefferson, Loudon, Sevier and parts of Anderson and Cocke counties is still considered to be a Maintenance Area for the 1997 8-Hour Ozone Standard, but that conformity can be demonstrated without a regional emissions analysis. This area is the so-called "Orphan Area" of counties included under the 1997 8-hour Ozone Standard, but outside of the area that is currently a Maintenance Area under the 2008 8-hour Ozone Standard (Blount, Knox and part of Anderson County). In other words, the conformity analysis for the 2008 8-hour Ozone Standard essentially satisfies requirements for both the 1997 and 2008 8-hour Ozone standards for that particular geography (Blount, Knox and part of Anderson counties). The process document was revised to clarify this situation and sent back to the IAC with these minutes.

Mike discussed the proposed analysis years in relation to the requirements from the conformity regulations. He asked the IAC group for guidance on what the first analysis year requirement was since he was considering either 2025 or 2026 and was unsure about a possible requirement for a first analysis year within the first 5-years. Kelly Sheckler responded that there was no requirement for an analysis year in the first years since budgets were in place. Mike replied with that being the case then he would move forward assuming that the analysis years would be: 2026, 2028 (only for PM2.5 and interpolated), 2035 and 2045. The process document will be revised and sent back to the IAC and this will be incorporated into the more formal planning assumptions document that will be later developed for IAC review. There was also a brief discussion about the possibility for shortening the conformity timeframe as per 40 CFR 93.106(d)(2) and whether pursuing that made sense at the current time for the Knoxville Region. Marc Corrigan noted that such an effort was undertaken for the Memphis Region relative to their Carbon Monoxide Maintenance situation. He stated that he would have to refresh his memory on the details of that and a separate discussion could be had if needed. Mike stated that he was just in the exploration phase of this avenue and did not plan to implement it for the current conformity effort so he stated he could just follow up separately on this matter with TDEC and/or EPA as needed.

Mike provided an overview/presentation of the population projections that are being used for the 2045 Mobility Plan, which differ from the prior long-range plan in that we are seeing a reduced population growth rate based on data that shows a continued decline in birth rates coming out of the 2008-2009 recession period. Mike also discussed the plan for updating the travel demand model that will be used to support the regional emissions analysis, which will not be a major update but instead a minor calibration/validation effort to update the base year to 2018, which is the latest year available with all of the necessary input (socioeconomic data) and validation (traffic count and VMT data) information. He noted that more information regarding specifics and the process to build the post-processing components to derive specific MOVES inputs would be provided to the IAC at a later date.

Finally, there was brief discussion regarding the other required MOVES inputs and the potential of using recent TDOT work done to support the 2017 National Emissions

Inventory (NEI) development for those. Mike noted that some information on TDOT MOVES input development had been provided at a prior Tennessee Statewide IAC conference call by Jaehoon Kim from TDOT and he asked about the status of that effort. Marc Corrigan replied that he didn't think that formal documentation was ever completed for that data and that Dr. Kim had recently left TDOT so it may not get completed. Marc noted that there may be other information available to compare the vehicle registration data inputs that are so critical to the modeling effort from national sources and that he would check into that further for a follow-up discussion. Mike stated that he would plan to follow-up with Marc directly on this aspect to further investigate our options prior to the next full IAC discussion.

C.2.2 MEETING MINUTES FOR IAC CONFERENCE CALL ON 8/13/2020

Knoxville Air Quality Interagency Consultation Conference Call Meeting Minutes for 8/13/2020

Roll Call

Call Participants:

Knoxville TPO:

Mike Conger
Jeff Welch

EPA:

Dianna Myers
Kelly Sheckler
Sarah Larocca
Richard Montieth

FHWA:

Theresa Claxton

FTA:

None

Tennessee Department of Transportation:

Brianna Benson
Rashad Pinckney
Jennifer Marshall
Michelle Christian
Troy Ebbert

Tennessee Department of Environment & Conservation:

Marc Corrigan
Greg Riggs

Knox County Air Quality Management:
Coby Webster

Lakeway Area MTPO:
Rich DesGrosseillers

National Park Service:
Jim Renfro

Discussion Items:

1.) Discussion of Conformity Determination and Regional Emissions Analysis Process for 2045 Mobility Plan

There were multiple related discussion items as follows:

- Review of Overall Proposed Conformity Analysis Approach – Mike Conger provided an overview of this document which lays out the primary components of the upcoming regional emissions analysis assumptions. He noted that the intent was to update this document after each IAC discussion with relevant agreed-upon assumptions as a living document leading towards the actual analysis and model runs. The primary updates made following the last IAC call in March dealt with the status of the 1997 8-hour Ozone Standard and the selection of analysis years. Further updates based on today’s call will be made and provided prior to the next IAC meeting.
- Travel Demand Model and Socioeconomic Data Update – Mike reviewed the summary document that was provided to the IAC regarding the preparation of updated base year 2018 model input data and the validation statistics of the model output versus the actual traffic count data. One item that was highlighted, which was also presented on the previous IAC call was the reduction in forecasted population growth relative to the previous projections made for the prior Mobility Plan update. Marc Corrigan from TDEC asked about the magnitude of the difference in the future year. Jeff Welch from TPO staff was able to find the information for the TPO Planning Area which showed a difference of about 11% less population. Mike also explained that recent speed limit changes on Interstates throughout the Knoxville Region by TDOT were incorporated into the travel demand model and before/after maps were provided to show which segments were affected. Jim Renfro from the National Park Service asked why Cocke County was not included on the map and Mike responded that the map specifically showed the TPO model counties of which Cocke County was not included and he noted that speed limits had not been affected on the Interstate in Cocke County. Marc also brought up the issue of COVID-19 and its effects on major reduction of employment levels in the short term and whether that can be accounted for given that nobody really knows what the long-term impact will be. Mike responded that this was something the TPO staff was thinking about but agreed that it was still too early to know if employment will bounce back entirely or not. He noted that this type of thing was exactly why the TPO updates its

Plan every 4 years so we can catch up to major trends in a fairly short window of time relative to the overall transportation project implementation process. He also stated that employment was less of a key driver of overall traffic in the model in terms of not generating trips but instead affecting trip distribution. Finally, he noted that the TPO was going to be looking further into this aspect through developing special scenarios for its travel demand model to adjust trip generation rates for work trips to account for likely continuation of the trend towards more telecommuting.

- Discussion of MOVES model input sources – Mike discussed a summary table showing the required “County Data Manager” inputs for MOVES and where the TPO staff was proposing to source the data from. He also highlighted whether the particular input would be applicable for multiple horizon years or instead would vary for that as well as for each particular county in the study area. He stated that the purpose of today’s discussion was to lay out a proposed approach and likely sources but not make the final determination. He also mentioned that some data sources are derived from area conditions such as meteorology while others come from the travel demand model. He stated that a consultant is developing a new post-processor to take the raw model outputs and prepare them in the format needed for MOVES. A memo was provided to describe the overall approach for developing those inputs and described to the IAC. Mike stated that one of the key inputs is the average speed distribution, which could vary for the various horizon years based on future population/employment growth and the programmed transportation projects in terms of their effect on congestion and speeds. The consultant will be compiling real-world speed data available from the National Performance Measure Research Data Set (NPMRDS) and using that to calibrate the model post-processor. Mike noted that the benefit of the NPMRDS data was that it also includes separate speeds for cars and tractor-trailer trucks such that it may be possible to derive separate model speed outputs by those vehicle types which has not been done previously. Further information will be provided at the next IAC meeting. One item that the post-processor would need to account for is the “local road” portion of travel and making sure to include the speeds on those roads which are not represented in the travel demand model nor the NPMRDS data set. Mike stated that the staff was considering the use of a default local road speed of either 20 or 25 mph and he asked for any comments from the IAC on this assumption. There were no comments from the IAC so Mike said he would continue looking into this further including reviewing what other areas might be doing in this regard.
- Discussion of specific MOVES inputs for Source Type Population and Age – Mike stated that special attention was being paid to these two MOVES inputs in particular and a review of new data sources was being done to determine the most appropriate one to use. Mike noted that he had been having several discussions with Marc Corrigan about these since Marc was very familiar with the data sources from past efforts of using them. The previous regional emissions analysis was performed using a year 2014 data set that was compiled by University of Tennessee under contract with TDOT and included a significant effort to compile vehicle registration data from the Tennessee Department of Revenue. An update was begun for year 2017 by TDOT staff although the person directly involved left TDOT several months ago and is not available to describe the exact process and limited written documentation is available. Mike noted that there were some differences in numbers that were a general cause for concern and that another national

data source from a Coordinated Research Council (CRC) report that acquired 3rd party proprietary vehicle registration data was also consulted as a source for 2017 data. The latest iteration of review has led towards a possible hybrid approach of averaging certain "light-duty" vehicle types between the TDOT 2017 and CRC 2017 data sources and relying on EPA's MOVES input guidance for the truck source types using a "National Default Local Data" method, which replicates the procedure done for the 2014 data prepared by UT. This approach will be revisited with the IAC and presented with an official TPO staff recommendation at the next IAC meeting. Mike noted that one concern with a significant modification to the approach and assumptions is that the resulting effect means less consistency between the new analysis and the way it was done in the State Implementation Plan (SIP) to derive the emissions budgets. He illustrated this by showing that the new approach results in a large increase in vehicle population for Knox County that outpaces the people-population growth by about three times.

2.) Other Business/Next Steps

Mike reviewed the conformity timeline and noted the next major steps in the IAC engagement process including a subsequent discussion of MOVES inputs in the month of September and then another meeting that will likely involve a detailed review of the Mobility Plan 2045 project list for the project exempt/non-exempt status to follow in the October to December timeframe.

C.2.3 MEETING MINUTES FOR IAC CONFERENCE CALL ON 10/21/2020

Knoxville Air Quality Interagency Consultation Conference Call Meeting Minutes for 10/21/2020

Roll Call

Call Participants:

Knoxville TPO:

Mike Conger
Craig Luebke

EPA:

Dianna Myers
Kelly Sheckler
Richard Montieth
Richard Wong

FHWA:

Sean Santalla

FTA:

Mike Sherman

Tennessee Department of Transportation:

Chasity Stinson
Deborah Fleming
Jennifer Marshall
Troy Ebbert

Tennessee Department of Environment & Conservation:

Marc Corrigan
Greg Riggs

Knox County Air Quality Management:

Coby Webster

Lakeway Area MTPO:

Rich DesGrosseillers

National Park Service:

None

Discussion Items:

1.) Finalize Planning Assumptions for Conformity Determination and Regional Emissions Analysis Process for 2045 Mobility Plan

There were multiple related discussion items as follows:

- Review of Overall Proposed Conformity Analysis Approach – Mike Conger provided an overview of this document which lays out the primary components of the upcoming regional emissions analysis assumptions. He noted that the intent was to update this document after each IAC discussion with relevant agreed-upon assumptions as a living document leading towards the actual analysis and model runs. The following bullets cover new information added to this document as presented to the IAC during this conference call
- Socioeconomic Data Planning Assumptions and Forecasts – Mike stated that he had added additional information as Attachment B to this document that summarizes the process used to allocate the future-year population and employment control totals at the county level down to the smaller geography of Traffic Analysis Zones (TAZ) Mike reviewed the general process of consulting with local planning staffs and determining likely locations of growth based on new subdivisions and other developments already being planned and discussed the maps showing a dot-density of growth patterns and base year population and employment. Note, following the call Mike discovered that the

legend on the 2018 population map was incorrect and should have stated "total population" rather than "population density". A revised document was sent with these minutes.

Marc Corrigan asked about the 2045 Horizon Year being used relative to the timeline of the Mobility Plan update in which the next Plan will be due in 2025 to ensure the 20-year horizon period. Mike responded that the TPO was choosing to extend the horizon period an additional 5-years on each 4-year update such that the next Plan will likely go out to 2050 he also noted that the requirement is that the Plan must go out 20 years from the adoption date so therefore the current Mobility Plan would technically only need to go to 2041.

Sean Santalla asked about a possible Planning Area revision after the 2020 Census based on Mike noting that the growth by TAZ analysis can be used by the TPO to help determine the likely urbanized areas in a 20-year forecast period which is one of the requirements of setting the boundary. Mike said that the process used by Census Bureau to delineate urbanized areas was very complicated so it is still too early to say whether we might expand or not.

- Latest Emissions Model – Mike discussed this new section of the document that shows the version of MOVES that the TPO will be using for this conformity analysis. He also noted that he had run into some issues with getting erroneous results from the MOVES2014b version he was using and tracked down the issue with help of EPA OTAQ staff to be a problem with the MySQL database and this was switched to MariaDB at EPA's suggestion. He noted that EPA was planning to use MariaDB in the next version of MOVES.
- MOVES2014b Runspec Parameters – Mike briefly reviewed this new section of the document that shows the basic settings used for the MOVES runs and it mirrors what has been done for previous conformity analyses.
- MOVES2014b County Data Manager Data Sources and Specific MOVES Input Sources – Mike provided an overview of the MOVES County Data Manager section and referred to a new separate document that has been prepared to specifically show how local inputs are being derived. Mike noted that most inputs are straightforward in terms of basing them off of previous analyses but that a significant amount of effort was made to update the Source Type Population and Age Distribution since this is a key input and needed to be updated based on the latest available information. Mike discussed that the TPO was planning to use the CRC data source for light duty vehicles and specifically the scenario 2 which eliminates antique vehicles from the fleet numbers. Sean Santalla asked for clarification about the removal of antique vehicles. Mike replied that it was a situation where the MOVES model is looking for the vehicles actually in operation in the given study area and since the Tennessee requirement to have a vehicle registered as an antique imposes strict requirements about only operating it on weekends and holidays that these were not representative of the daily vehicle mix. Marc Corrigan added that there is also an issue of older vehicles not being regularly deleted from the registration

database in TN and this accounts for some of that issue which would otherwise skew the age distribution and put too many vehicles in the 30+ years old category.

Mike next discussed the MOVES inputs that were being produced by the new travel demand model post-processor developed by the TPO's consultant. He walked through the post-processor documentation and highlighted the aspect of average speeds which are now able to be compared against real-world data from the NPMRDS dataset. Additionally, he noted that for the first time we are able to apply adjustment factors to account for different operating speeds of large trucks versus passenger vehicles since those are split out in the NPMRDS data.

- Knoxville Regional Travel Model Revalidation – Mike noted that a process was conducted in parallel with the development of the new travel model post-processor to bring the entire model up to date with the current version of TransCAD software (from version 6.0 to 8.0). He noted that in that process it was discovered that some of the software algorithms had changed which affected some components of the travel demand model, particularly in the steps related to traffic assignment. Therefore the TPO's model consultant, RSG, also performed a model recalibration and validation effort that was documented in a memo that Mike showed to the group on the screenshare and is sent out with these minutes. Mike noted that nothing major was changed with the underlying model components and overall just minor tweaks were made which ensure that the model is still meeting recommended validation targets from FHWA and TNMUG. Finally, Mike also noted that along with the minor model update that the TPO had requested the consultant to build in an optional COVID-19 scenario testing tool which allows the model trip generation rates to be adjusted by selected factors. Mike stated that the TPO was interested in testing out various scenarios to see if long-term reductions in trips for aspects like increased telecommuting or virtual school options might impact the traffic and ultimately project types that are programmed. He noted that it is still too early to say which effects will be long-term and we should have a better idea for the next 4-year update of the Mobility Plan. There was additional discussion among the group including Richard Wong from EPA who noted that this is an evolving situation that we will need to see how plays out.

2.) Other Business/Next Steps

Mike reviewed the conformity timeline and noted the next major steps in the IAC engagement process stating that the next meeting will likely involve a detailed review of the Mobility Plan 2045 project list for the project exempt/non-exempt status to follow in the December timeframe.

C.2.4 MEETING MINUTES FOR IAC CONFERENCE CALL ON 12/17/2020

Knoxville Air Quality Interagency Consultation Conference Call Meeting Minutes for 12/17/2020

Roll Call

Call Participants:

Knoxville TPO:

Mike Conger
Craig Luebke

EPA:

Dianna Myers
Kelly Sheckler
Richard Montieth
Richard Wong
Sarah LaRocca

FHWA:

Sean Santalla

FTA:

None

Tennessee Department of Transportation:

Deborah Fleming
Michelle Christian
Troy Ebbert

Tennessee Department of Environment & Conservation:

Marc Corrigan

Knox County Air Quality Management:

Coby Webster

Lakeway Area MTPO:

None

National Park Service:

Jim Renfro

Others:

Kayla Ferguson, KCI (TPO Consultant)

Discussion Items:

- 1.) Draft 2045 Mobility Plan Project List and Regional Projects for Exempt and Regional Significance Status**

- Mike Conger provided a brief update on process of developing the draft project list and presented the draft list by organized by horizon year (including Illustrative projects)
- Mike Conger gave a general explanation of the proposed Air Quality status (exempt v. non-exempt), justification for such determination and regional significance status.
- Status of projects listed outside the TPO Planning Area was also reviewed
- Jim Renfro from NPS provided an overview of a proposed project involving construction of an access road and recreational mountain bike trails within the footprint of the unbuilt section of Foothills Parkway in Wears Valley known as Segment 8D. Proposed preferred alternative includes 0.93 new road construction south of US 321 to access the 11.8 miles of bike trails and 2.4 miles of pedestrian only trails. Jim noted that the 0.93 miles of road would essentially be the first segment of a larger potential project to complete Segment 8D of the Foothills Parkway that would connect US 321 in Wears Valley to the Gatlinburg Spur but that there was currently no identified funding to make that overall project happen. Mike Conger stated that his initial impression would be to declare this project as Exempt since it would not be modeled as just a dead end road at this time. Dianna Myers inquired about the status of selecting a final alternative for the project. Jim responded that a final decision had not been made yet but NPS would like to do so in the near future. Mike asked about which horizon year the project should be placed and if it might be completed by the first horizon year of 2026. Jim responded that he felt this was a big enough priority of NPS that it would be likely to be built by that time. Sean Santalla inquired into the aspects that would qualify this project as being exempt in terms of the categories listed in the conformity regulations since it does involve roadway construction. Mike replied that that was a good point and perhaps it would better to classify the project as not regionally significant rather than exempt based on that. Dianna Myers noted that since this project was within the 1997 Ozone Maintenance area only that it was not subject to a regional emissions analysis and that the only effect of declaring it as non-exempt would be if a conformity lapse occurred. Mike proposed updating the status on the next version of the project list and it was reiterated that the primary purpose for this discussion was to ensure that the project has been vetted through the Interagency Consultation process so that can be documented in any required environmental assessments for the project.
- Sean Santalla asked about emissions modeling for projects outside the TPO Planning Area and within the 1997 Ozone Maintenance area – Mike replied that no formal emissions modeling would be done for these projects however the projects themselves were still plugged into the regional travel demand model so that they are accounted for in that way.
- Troy Ebbert inquired about possible micro-model for Sevier County area – Mike replied that this was currently on hold and would be revisited at a later date with the appropriate Sevier County stakeholders.
- Mike brought up a specific project and corridor that he wanted to discuss with the IAC on its exempt status, which is the project 09-626 for Chapman Highway Operational

and Safety Improvements. Mike noted that this is a unique project in that it identifies an entire 10 mile corridor for various improvements which have not yet been specifically defined. The primary improvement type however will be to add a center turn lane in various sections where it is missing. Mike discussed the interpretations about the exempt status of auxiliary lanes made by EPA and that these center turn lanes of less than 1 mile in length could potentially fall under that category. He noted that there is a gray area however in that while the individual projects may be less than 1 mile that they would be tying together existing turn lanes to provide for continuous turn lane throughout the full 10 miles. Mike noted that the primary purpose of these turn lanes is as a safety component and not to provide additional capacity since the road already had 4 lanes and provides turn lanes at major signalized intersections. Sean Santalla noted that he agreed with the initial assumption about these being safety-related rather than capacity projects but asked Mike about how this would be modeled and if it had an effect on capacity. Mike replied that the model did consider whether or not a median is provided and that it would modestly affect the overall capacity of the roadway. Dianna Myers noted that she was somewhat uncomfortable calling the project exempt due to the overall 10+ mile project length listed. Deborah Fleming noted that the project as it stands right now is really more of a "parent" study and specific smaller projects, i.e. child PIN's would likely be split out later. There was discussion about clarifying the project as a study in the project list as a way to possibly justify an exempt status and then each individual project that is later produced can be discussed on a case by case basis or perhaps most of those might just move forward in the safety grouping and not have to be individually identified. Mike closed with stating he could have further discussions about this particular project with EPA and FHWA before the CDR project list is finalized.

- Morganton Road – Mike Conger raised this issue for discussion – project description revision to reflect continuous center-turn lane. Project status revised to non-exempt.
- Mike Conger gave a quick review of the proposed new projects to the plan. No questions were raised on the new projects.
- Mike Conger noted that an updated project list will be sent to the IAC with the minutes of this meeting and that if any member had further questions or comments about any of the projects to reach out to him by phone or email.

2.) Update on MOVES Modeling – discuss use of MOVES3

Mike noted that EPA had recently released an update to MOVES known as MOVES3 and the TPO staff was exploring the use of it for this conformity analysis. Mike stated that he was working with Marc Corrigan in particular in trying to understand any changing input requirements for the new model and to test it out in order to see what impacts it has on the emissions numbers compared to our existing motor vehicle emissions budgets. Marc Corrigan stated that he was getting up to speed with it and provided information that he had heard on a recent Memphis MPO IAC call where effects had been noted of increased NOx emissions in

the scenarios tested there. Richard Wong clarified that there will be a 24-month grace period following the official release of the model being documented in the federal register which had not taken place yet prior to MOVES3 being required for use in conformity analyses. Mike noted that there can be further discussions with the IAC once the TPO has had more time to test the new model.

3.) Other Business/Next Steps

Mike reviewed the conformity timeline and noted that the next identified IAC conference call was on the schedule for February and the purpose would be to discuss the draft CDR but he stated that there may be a need for a preliminary call before proceeding forward with the draft CDR. He stated that he would be following up with the group as necessary in order to discuss any other specific project changes or MOVES modeling information.

C.2.5 MEETING MINUTES FOR IAC CONFERENCE CALL ON 2/10/2021

Knoxville Air Quality Interagency Consultation Conference Call Meeting Minutes for 2/10/2021

1.) Roll Call

Call Participants:

Knoxville TPO:

Mike Conger
Craig Luebke
Jeff Welch

EPA:

Dianna Myers
Kelly Sheckler
Richard Montieth
Richard Wong
Sarah LaRocca

FHWA:

Sean Santalla

FTA:

None

Tennessee Department of Transportation:

Deborah Fleming
Brianna Benson
Troy Ebbert
Jennifer Marshall

Tennessee Department of Environment & Conservation:
Marc Corrigan

Knox County Air Quality Management:
Coby Webster

Lakeway Area MTPO:
None

National Park Service:
Jim Renfro

Others:
Kayla Ferguson, KCI (TPO Consultant)

Discussion Items:

2.) Discuss Draft Conformity Report for 2045 Mobility Plan

- Mike Conger provided an overview of the MOVES3 model run inputs
- Richard Wong – commented that he appreciated the thorough effort that Mike put into documenting his efforts. Marc Corrigan followed up to concur and asked for a summary explanation of vehicle emission growth factors used.
- Mike Conger responded to clarify the data sources used and projection method applied, as the process is mixed pending available data.
- Mike Conger and Marc Corrigan briefly discussed some of the differences from MOVES 2014b to MOVES3
- MOVES3 Outputs discussion: Mike Conger summarized the outputs and data reporting to document modeled emissions by area and analysis year. Marc Corrigan commented that some totals do not sum correctly (more significant than rounding would entail) and asked that Mike review the totals and provide a follow up. **Note – upon further review it was determined that this resulted from a simple copy-paste error in creating the table with PM2.5 emissions analysis by county. The table was created by copying the Ozone table which contains 3 counties instead of the 5 counties involved with PM2.5. Rows were inserted into the table for the additional counties (Loudon and Roane) but the formula in the “Total” row was not updated to add in the numbers from the new rows. Overall the difference is fairly minor since the 2 counties in question are not large contributors so this does not change the finding that the emissions budgets are met for each analysis year. A revised CDR will be sent to the IAC with these minutes with updated tables reflecting the correct amount of**

emissions for PM2.5 and NOx in the PM2.5 analysis and statement of conformity.

- Mike Conger introduced the Draft Air Quality Conformity Determination Report by first reviewing the format and table of contents. Mike then pointed out two items on the draft project list for comment:
 - Chapman Highway Improvements projects was noted to verify that there are no concerns with the project description.
 - Another project specifically called out is the Great Smoky Mountains NP Road access to proposed mountain bike trails. Jim Renfro indicated that there is no significant progress to report at this point.
- Mike Conger introduced the internal Draft Plan Website, which is being not publicly available, but is being used for draft document distribution/review.
- Deborah Fleming asked about date of adoption and if there will be coordinated TIP amendments at the same time. Mike confirmed that that is the plan and the goal is to adopt at the TPO April Executive Board meeting.
- Marc Corrigan commented to commend the detail and organization in the report, which makes review easier. Dianna Myers echoed Marc's feedback.
- Sean Santalla – commented that FHWA also appreciates the detail provided. He raised questions about Section 4 in Conformity Report – about upward NOx trend for 2045 period. Mike C. responded that this is largely due to the way that the MOVES model factors in turnover of the vehicle fleet and that in future years the entire fleet will have incorporated the stricter tailpipe standards that have recently been phased in. Once that happens then for some pollutant types such as PM2.5 they become much more affected by factors like brake and tire wear which increase proportionally with VMT and have emission controls. Marc Corrigan and Richard Wong also noted similar phenomenon dealing with Oxides of Nitrogen from heavy duty trucks which are subject to fewer controls and become a larger part of the emissions contribution in the future as light duty vehicles become cleaner.
- Further discussion was had on some of the difference between MOVES2014 and MOVES3 including the effects observed for urban areas where NOx emissions are greater in MOVES3 than MOVES2014b. Mike mentioned that he has been investigating this issue further with Marc Corrigan as well as a person at the Georgia EPD office who is looking into it for the Atlanta area.

3.) Other Business/Next Steps

- Mike reminded everyone that IAC review comments are requested by Monday, March 1st with the 30-day Public Comment slated to begin Monday, March 8th. He stated that he is available to address any detailed questions that may come up from IAC members by phone or email.

C.3 PLANNING ASSUMPTIONS FOR IAC REVIEW



Knoxville TPO 2021 Long Range Transportation Plan Update (2045 Mobility Plan) Air Quality Conformity Process Overview and Latest Planning Assumptions

**For IAC Discussion: October 21, 2020
Updated January 26, 2021**

I. Purpose

The intent of this document is to provide the Knoxville-Area Interagency Consultation (IAC) group with background on the proposed process that the Knoxville Regional TPO is planning to conduct to determine air quality conformity for the update of its Long Range Transportation Plan (LRTP). This document is provided for discussion purposes during each IAC conference call and updated as appropriate in order to compile a final documentation of agreed-upon assumptions for model inputs and other planning factors.

II. Plan Update Schedule

A conformity determination is required for each major update to the LRTP and the federal conformity regulations require the LRTP to be updated at a minimum of every 4 years. The current LRTP, known as the Knoxville Regional Mobility Plan 2040 was adopted in April 2017 with a Conformity approval date of May 31, 2017. Therefore, the next LRTP conformity approval is due by **May 31, 2021**. A conformity process timeline has been developed showing the major milestones and potential IAC review stages.

III. Current Nonattainment Status

As of the current date (March 2020), the Knoxville Region is currently designated as a Maintenance Area for 3 separate NAAQS –

- 2008 8-hour Ozone Standard – Blount, Knox and part of Anderson counties

- 2006 Daily PM2.5 Standard – Anderson, Blount, Knox, Loudon and part of Roane counties
- 1997 8-hour Ozone Standard – Jefferson, Loudon, Sevier and parts of Anderson and Cocke counties. This standard had previously been revoked, but maintenance and conformity were found to still apply based on a court decision in a 2018 case known as “South Coast v. EPA”. Since the maintenance area for the 1997 8-hour Ozone Standard is larger than and includes the entirety of the geographic area covered by the 2008 8-hour Ozone Standard, a conformity determination must only be done for the so-called “Orphan Area” that is outside of the 2008 8-hour Ozone Standard area. Additionally, EPA guidance has been provided that states a regional emissions analysis is not required to demonstrate conformity for the 1997 8-hour Ozone Standard and instead a condensed process of certain key elements such as documentation of IAC consultation and fiscal constraint is sufficient. Further information will be provided at a future IAC discussion.

See Attachment A for maps showing the geographic coverage for each applicable NAAQS.

IV. Conformity of 2045 Mobility Plan Update

The TPO plans to conduct a full regional emissions analysis for the regular 4-year update cycle of the regional Long Range Transportation Plan (LRTP). The LRTP must go out a minimum of 20-years into the future and the TPO is proposing an ultimate horizon year of 2045 for this update and it is planned to be called the “2045 Mobility Plan”. The current FY 2020 – 2023 Transportation Improvement Program (TIP) will be amended as necessary to ensure that any new projects or other changes affecting regionally significant projects are accounted for and remain consistent between the two plans. It is expected that the plan adoptions will occur in the March/April 2021 time frame. Further information will be provided to the IAC in the near future regarding specific establishment of planning assumptions and review of project lists.

V. Current Motor Vehicle Emissions Budgets (MVEB)

Ozone:

An MVEB is available from the Maintenance Plan approved for the 2008 8-Hour Ozone NAAQS. The Maintenance Plan contains the following MVEBs set for 2011 and 2026:

Table 1: MVEB for 2008 Ozone Standard

Pollutant	2011	2026
	(tons/day)	
VOC	19.71	10.49
NOx	41.62	17.69

PM2.5:

An MVEB is available from the Maintenance Plan approved for the 2006 Daily PM2.5 NAAQS. The Maintenance Plan contains the following MVEBs set for 2014 and 2028:

Table 2: MVEB for 2006 Daily PM2.5 Standard

Pollutant	2014	2028
	(tons/day)	
PM2.5	1.22	0.67
NOx	42.73	19.65

VI. Proposed Analysis Years

Analysis year requirements are described in 40 CFR 93.118 (Motor Vehicle Emissions Budget - MVEB) and 40 CFR 93.119 (Interim Emissions Tests). Since the timeframe covered by the LRTP is from 2021-2045, and MVEBs are available for both Ozone and PM2.5, 40 CFR part 93.118 establishes the required analysis years and emissions tests. In general, the required analysis years include:

- Attainment Year for applicable pollutants – This will not apply as all attainment years are in the past.
- Last year of the timeframe of the conformity determination – This will be 2045.
- Years such that there are no more than 10 years between analysis years
- Consistency with motor vehicle emissions budget(s) must be demonstrated for each year where the applicable SIP specifically establishes an MVEB – This means 2026 (for Ozone) and 2028 (for PM2.5) must be assessed, but this can be achieved through linear interpolation between other analysis years.

Following are the proposed and agreed upon analysis years for the 2045 Mobility Plan conformity determination based on the above requirements:

- 2026 – Last Year of 2008 Ozone Standard Maintenance Plan and year such that analysis years are no more than 10 years apart. (Test done for Ozone and PM2.5)
- 2028 – Last Year of the 2006 Daily PM2.5 Standard Maintenance Plan (**interpolated and test only applicable to PM2.5, not Ozone**)
- 2035 – Year no greater than 10 years apart (both Ozone and PM2.5)
- 2045 – Last Year of Transportation Plan (both Ozone and PM2.5)

VII. Emissions Tests

Emissions tests will be against the MVEBs shown above and dependent on analysis year. In terms of Ozone, since all analysis years are 2026 and later, the 2026 Ozone MVEBs must be used in all cases. For PM2.5, the 2026 analysis year will be compared against the 2014 PM2.5 MVEBs and the subsequent analysis years will use the 2028 PM2.5 MVEBs.

VIII. Socioeconomic Data Planning Assumptions and Forecasts

The TPO staff reviewed two primary sources of population projection data – “2018 – 2070 Projections” from U.T. Center for Business & Economic Research (CBER) and “2019 Regional Projections” from Woods & Poole, Inc. (W&P). TPO staff recommended using the W&P source for the 2045 Knoxville Regional Mobility Plan demographic forecasts as it is similar to CBER’s forecast for population changes and it also provides projections for several other needed socioeconomic variables.

The use of W&P for the forecasts of socioeconomic variables was endorsed by the TPO Technical Committee and Executive Board on **February 11, 2020 and February 26, 2020** respectively.

See accompanying report “Mobility Plan 2045 Travel Demand Model Update Documentation” for more information. Attachment B summarizes the population and employment growth in each county in the Knoxville Region that is subject to conformity.

IX. Travel Demand Forecasting Model Overview

Background:

The Knoxville Regional TPO maintains a 10-county travel demand forecasting model to support transportation planning activities including air quality conformity analyses. The current model is based on a special hybrid platform that blends elements of traditional trip-based (4-step) models with newer tour-based (activity) models. This hybrid model was first delivered to the TPO by the consulting firm Bernardin, Lochmueller and Associates (BLA) in 2009 and has undergone a couple of updates since that time. The first major update was completed in 2012 again by BLA and consisted primarily of validating to a 2010 base year and expanding the model geography to include all of the Lakeway Area MTPO planning area. The second update was completed by TPO staff in 2016 and consisted of updating to a base year of 2014 and other minor modifications to support development of the 2040 Mobility Plan that was adopted in April 2017.

A peer review was held in early 2019 through the Federal Highway Administration’s Travel Model Improvement Program (TMIP) process to review the TPO model and specifically discuss approaches towards the next major model update. The primary conclusions from that review was that the current model platform was still serving the TPO well and that more

sophisticated approaches such as a full Activity-Based Model platform were likely unnecessary. Some recommendations were made for consideration of more operations-based approaches such as “Dynamic Traffic Assignment” since the current framework does not lend itself well for non-recurring congestion modeling and associated improvement strategies.

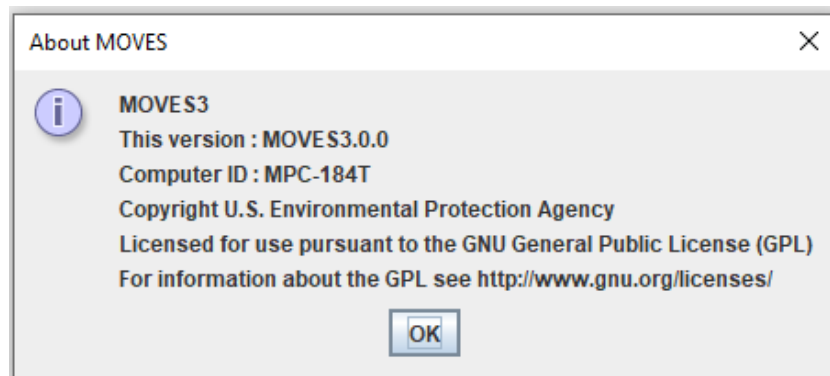
As an outcome from the peer review, the TPO staff has decided to postpone a “major” model upgrade until after the 2020 Census is complete, which will provide important disaggregate population and household information. For the 2045 Mobility Plan and associated conformity analysis, the TPO staff is developing a new 2018 base year roadway network and associated 2018 socioeconomic base year data set for the Traffic Analysis Zones (TAZ). The year 2018 was chosen since it represents the latest available complete data set for important information such as Census socioeconomic characteristics from the 5-year American Community Survey (2014 – 2018 ACS) and the system-wide Vehicle Miles Travelled (VMT) data that is produced by TDOT at the county-level for the FHWA Highway Performance Management System (HPMS) submittal.

A consultant also upgraded the model platform to run in the latest version of TransCAD software and developed a post-processor for providing necessary MOVES inputs as the TPO is no longer maintaining the previous post-processing software known as “PPSUITE”.

See accompanying reports “Mobility Plan 2045 Travel Demand Model Update Documentation” and “Knoxville TDM MOVES Post-Processor Development Plan” for more information.

X. Latest Emissions Model

The latest on-road emissions model from EPA as of this document’s writing is known as MOVES3, with default database of “movesdb20201105” – see below for screenshot showing specific release and version information. This is the model that will be utilized to determine the total on-road emissions of the pollutants of concern related to Ozone and PM2.5 for each required analysis year.



Note, MOVES3 is a very recent release, first becoming available for download from EPA in mid-November 2020 which was well after the conformity process for the 2045 Mobility Plan had begun. The TPO was initially planning to utilize the prior model known as MOVES2014b for the conformity analysis, and this remained an option following the release of MOVES3 since EPA initiated a 2-year grace period starting with the official announcement of MOVES3 being available in the January 7, 2021 Federal Register. The 2-year grace period means that MOVES3 does not have to be used for conformity until January 9, 2023. The TPO staff has decided to go ahead and utilize MOVES3 since the majority of the required inputs and basic model functions are identical to MOVES2014b and through preliminary testing staff was able to determine that outputs from MOVES3 would be within the magnitude necessary to continue to be able to meet required on-road motor vehicle emissions budgets.

XI. MOVES3 Runspec Parameters

NOTE: The following section is unchanged from the previous documentation sent to IAC for MOVES2014b since no significant changes have been made to how Runspec parameters are set in MOVES3. The MOVES model run is first set up based on a number of parameters to define the appropriate geographic scale and other aspects of the modeling domain to be utilized in the analysis, which is referred to as a “run specification” or runspec for short. Following is a list of the MOVES runspec panels and how they are proposed to be set up for the KRMP conformity analysis and based on appropriate technical guidance documentation from EPA:

1.) Scale:

- Both Pollutants – County level scale – Inventory mode

2.) Time Spans:

- Both Pollutants – Year (based on analysis years as ultimately selected, 2026, 2035 and 2045), by Hour, all hours
- Ozone – July weekday
- PM2.5 – All months, all days

3.) Geographic Bounds:

- 2008 Ozone – Anderson (partial), Blount and Knox counties
- PM2.5 – Anderson, Blount, Knox, Loudon and Roane (partial) counties

4.) Onroad Vehicles:

- Both Pollutants – Gasoline, CNG, ethanol (E85) and diesel fuels, all valid vehicle combinations

5.) Road Type:

- Both Pollutants – All road types

6.) Pollutants and Processes:

- Ozone – NOx and VOC and all other required supporting prerequisite pollutants
- PM2.5 – Primary PM2.5 (exhaust, brake and tire wear), NOx and all supporting prerequisite pollutants
- Note – unchecked the “Refueling Displacement Vapor Loss” and “Refueling Spillage Loss” to exclude refueling emissions that are instead included in the Area source emissions inventory.

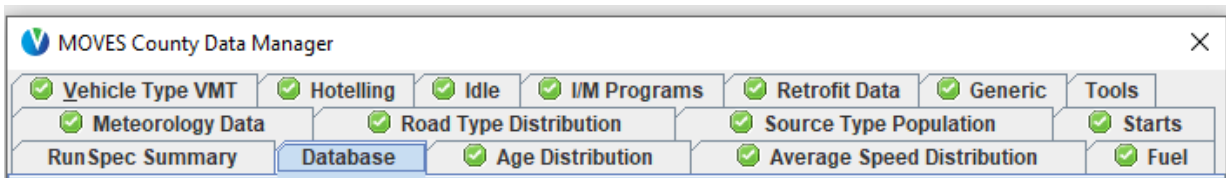
7.) Output options:

- Both Pollutants –
 - General Output tab: Units = grams, joules, miles; Activity: checked “Distance Traveled” and “Population”
 - Output Emissions Detail tab: checked “Road Type” and “Source Use Type”

XII. MOVES3 County Data Manager Input Data Sources and Assumptions

The “County Data Manager” portion of MOVES allows the user to input specific data for several required inputs that effect and are used to compute emissions. Locality-specific data is required for some inputs and is always desired if available rather than using national defaults. For purposes of the pre-analysis consensus plan this document will only cover the general proposed sources for each input and further review of specific inputs will occur as part of the forthcoming analysis.

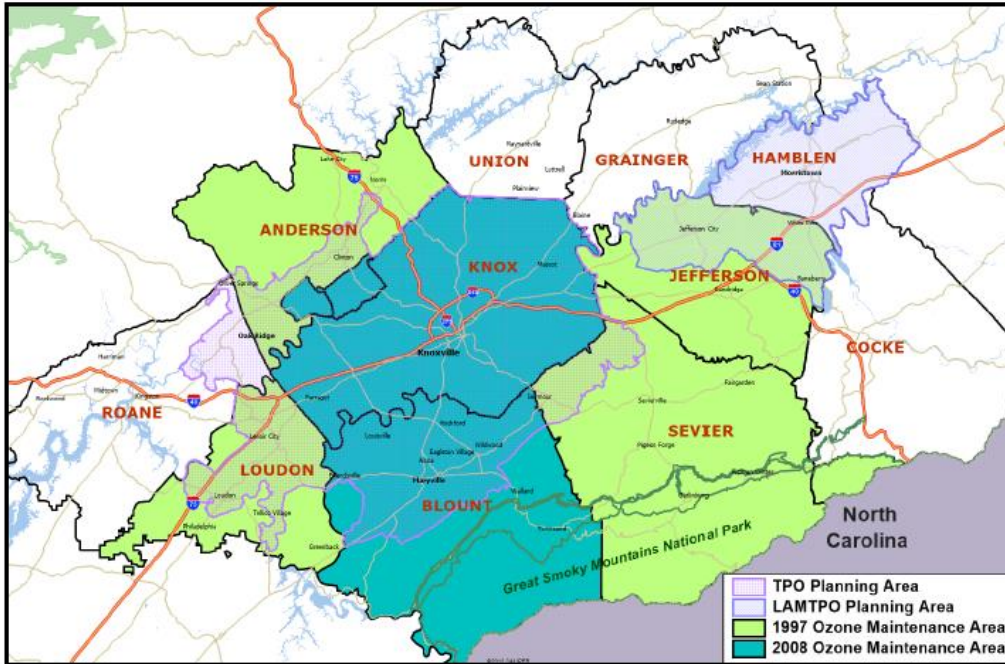
Below is a screenshot showing the county data manager tabs in the MOVES software where the data is loaded for each input and following that is an overview of each input and its data source.



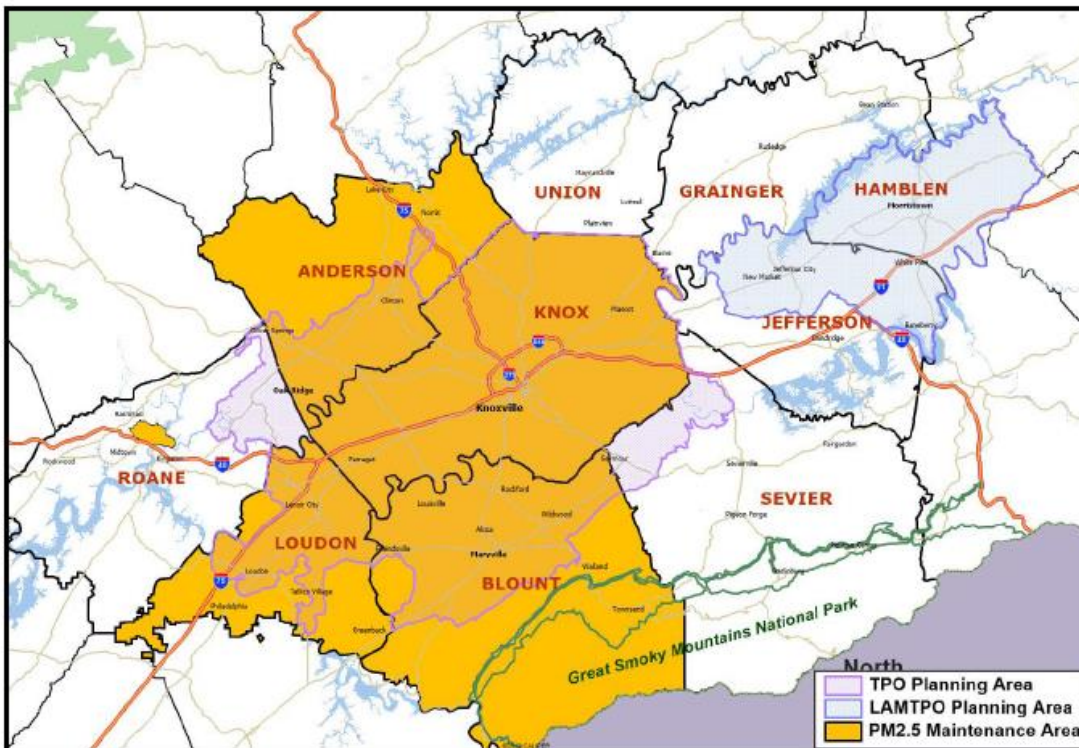
Specific MOVES model input sources are summarized in a separate document “MOVES Input Description for 2045 Mobility Plan Update Conformity Process” and will be discussed with the IAC for agreement on all assumptions and sources used. In particular, the selection of the inputs for “Source Type Population” and “Source Type Age Distribution” will require input from the IAC group on a preferred source among multiple options available.

Attachment A – Maps of Maintenance Areas

1997 and 2008 Ozone Maintenance Areas



2006 Daily PM2.5 Maintenance Area



Attachment B – Population and Employment Growth Summary

I. County-Level Growth

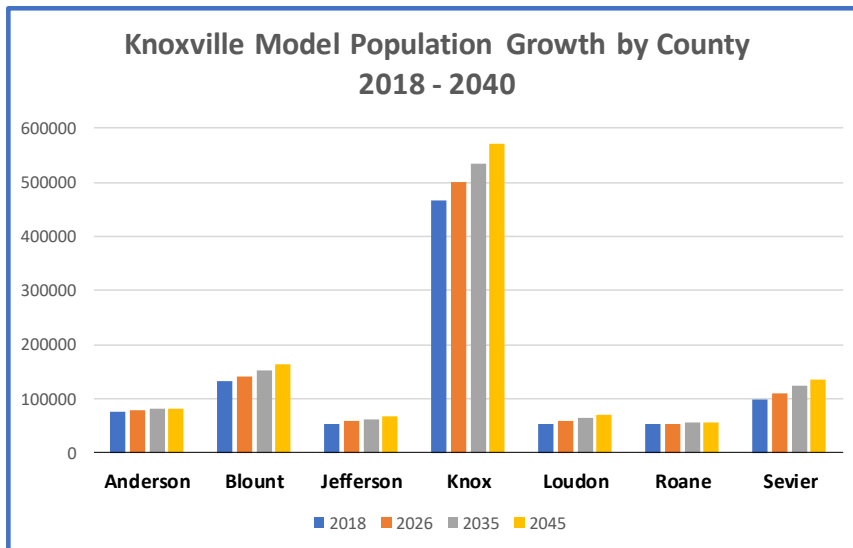
The Knoxville Regional Travel Demand Model (KRTM) contains ten counties altogether and seven of these are subject to transportation conformity – Anderson, Blount, Jefferson, Knox, Loudon, Roane (partial) and Sevier. County-level control totals of population and employment were developed previously as part of the preparation of the most recent regional long-range transportation plan known as the Mobility Plan 2040. Significant growth in population and employment is expected, which in turn impacts the transportation system in terms of vehicle miles of travel and average speeds which are two of the major factors used to determine total mobile source emissions that are expected to be generated for the conformity analysis. The following tables and charts depict the growth in population and employment by county.

A.) Population Growth:

Population Growth by County 2018 - 2045

County	2018	2026	2035	2045
Anderson	76,482	79,239	81,472	82,896
Blount	131,349	141,681	152,873	164,108
Jefferson	54,012	58,627	63,211	67,800
Knox	465,289	499,998	535,601	570,352
Loudon	53,054	57,731	63,236	69,028
Roane	53,140	54,460	55,334	55,563
Sevier	97,892	110,029	122,690	136,609
Total	931,218	1,001,765	1,074,417	1,146,356

Total Population Growth 215,138
 Growth % 23%

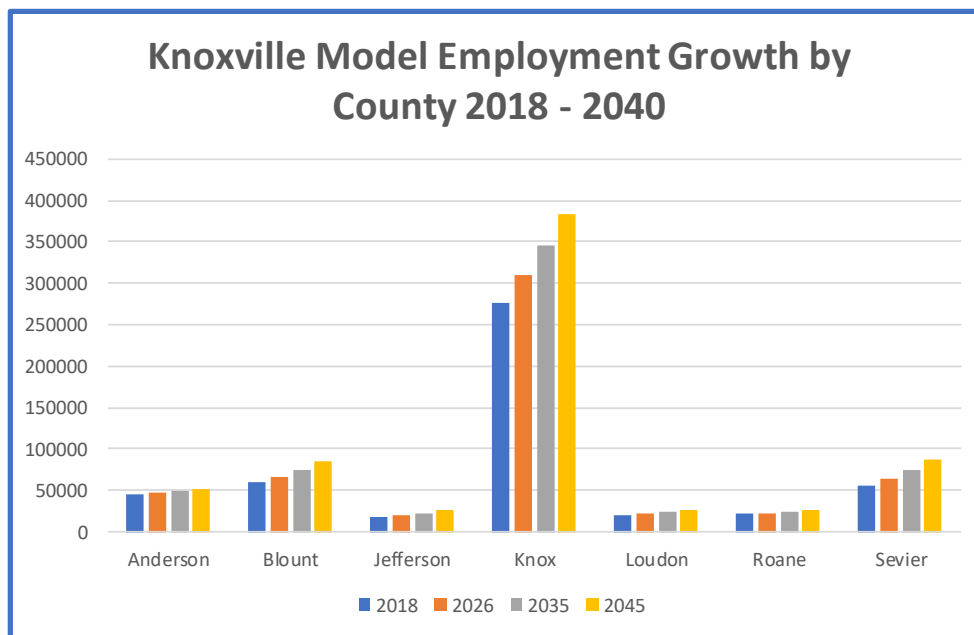


B.) Employment Growth:

Employment Growth by County 2018 - 2045

County	2018	2026	2035	2045
Anderson	44,399	47,425	50,274	52,536
Blount	59,662	67,165	75,568	84,839
Jefferson	17,371	19,650	22,404	25,773
Knox	276,450	309,197	345,590	383,318
Loudon	19,993	22,026	24,219	26,507
Roane	21,755	23,154	24,497	25,638
Sevier	55,952	64,365	74,448	86,823
Total	541,611	601,438	667,667	737,863

Total Employment Growth 196,252
Growth % 36%



II. Growth Allocated to Traffic Analysis Zone (TAZ) Level

The KRTM utilizes smaller units of geography known as a “Traffic Analysis Zone” with which to generate activity and assign travel to the roadway network. The county level control totals are allocated to TAZs through a process of reviewing land use patterns and available vacant land. Below are depictions of the growth in both population and employment based on the current expectation of growth patterns between the base year 2018 and ultimate horizon year 2045. The ability to forecast growth at these smaller levels of geography is extremely challenging and subject to many market forces and unforeseen circumstances, which is one reason why the long-range transportation plan is updated every 4-years.

The methodology used to allocate both population and employment growth consisted of primarily local input from agency planning staffs from the jurisdictions included in the TPO model area. Those agencies were to provide geographic locations of where known developments were slated to occur, such as already approved subdivisions and shopping centers. This information was coded with other available information such as vacant land by land use type available from state and local tax assessor data to obtain a comprehensive GIS layer of population and employment growth areas.

The figures on the following pages depict the base and future year population and employment allocations. The base year (2018) information is shown in terms of the TAZ-level amounts of population and employment, while the future year (2045) information is shown in terms of just the growth in a dot-density format.

Figure B-1 – Population Growth Maps

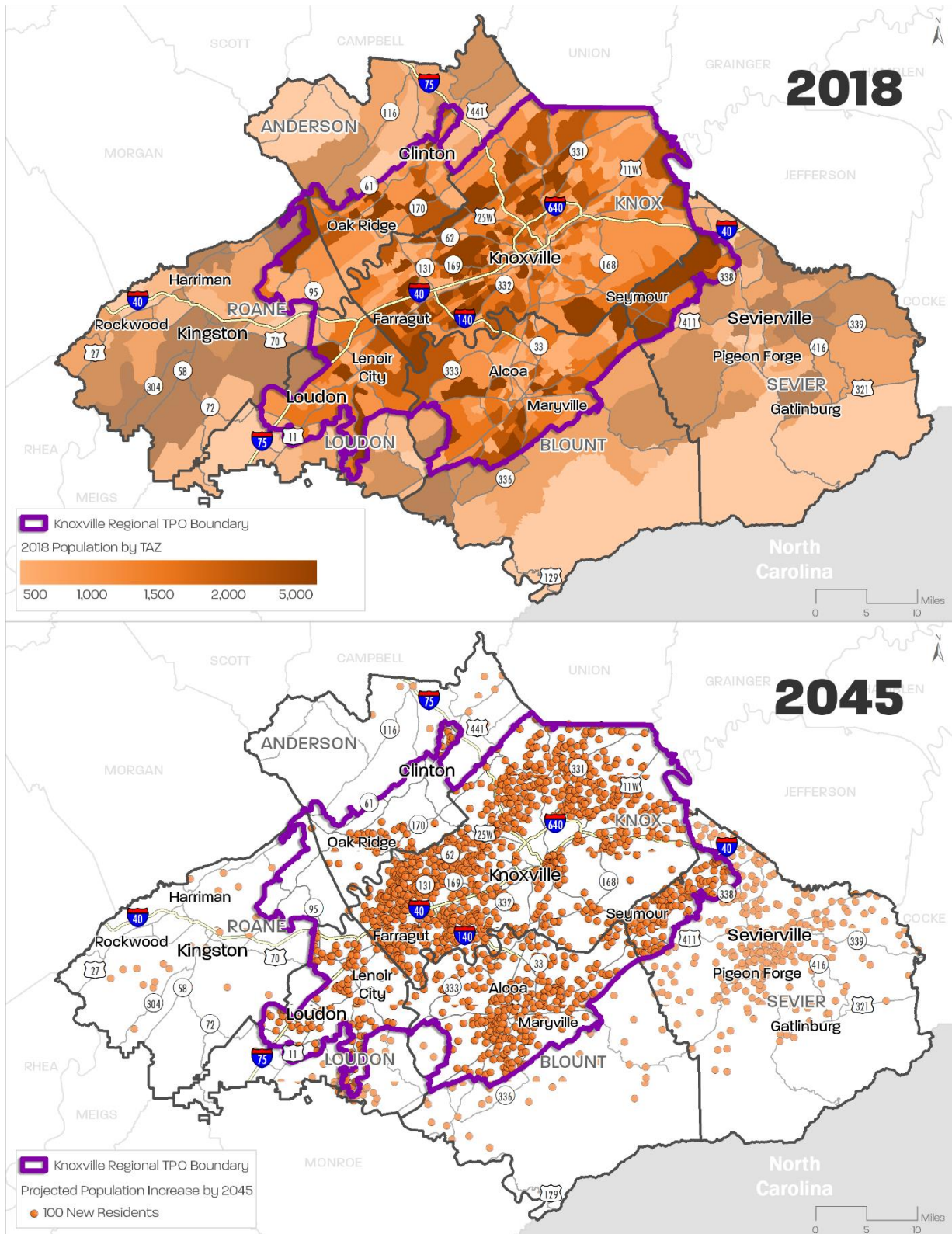
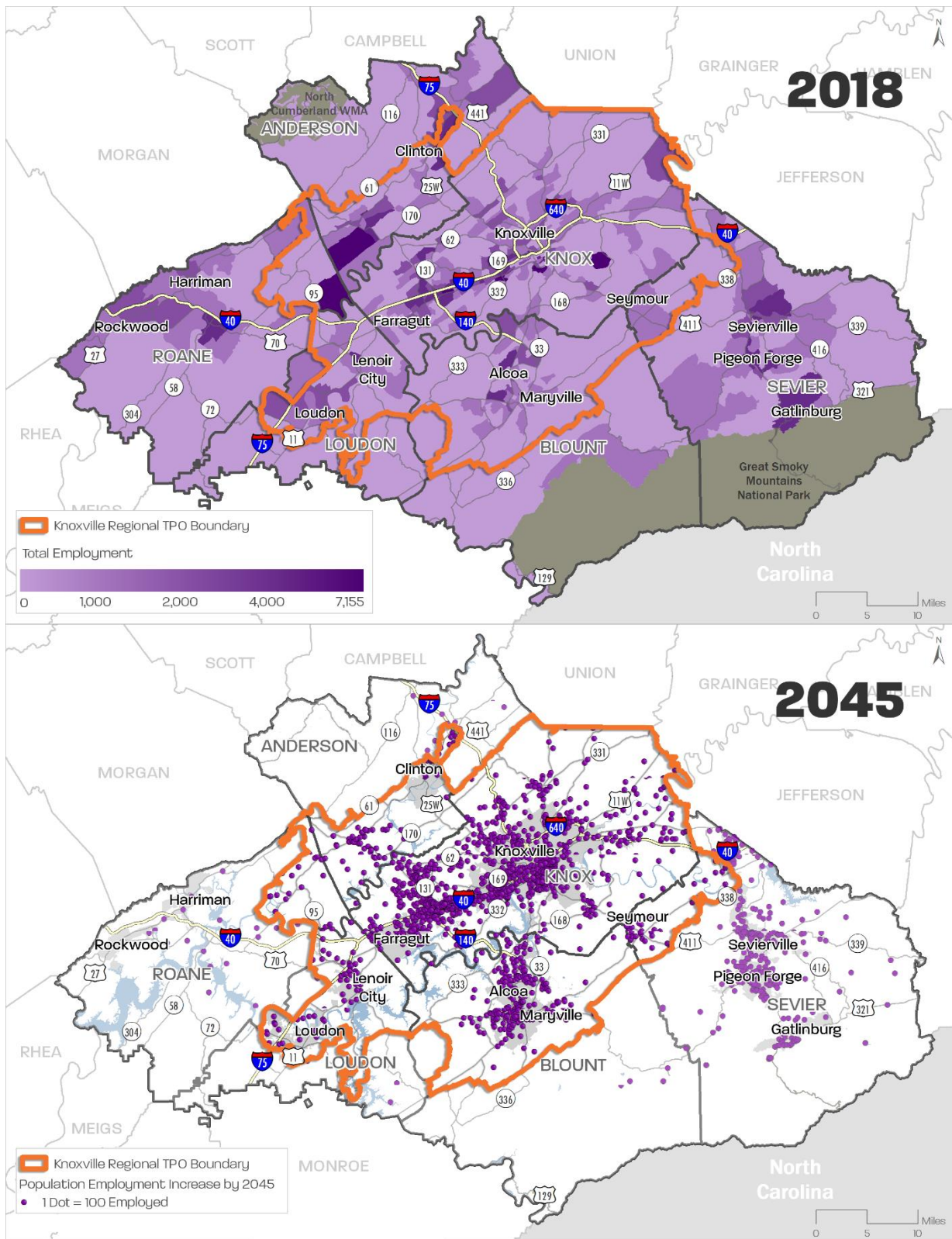


Figure B-2 – Employment Growth Maps



C.4 PARTIAL AREA EMISSIONS METHODOLOGY

I. Background:

The purpose of this document is to summarize the methodology used to account for the on-road mobile source emissions that are generated within the partial county areas subject to transportation conformity in the Knoxville Region. There are three separate partial counties as designated by EPA for various NAAQS as follows and shown in the maps at the end of this section:

- Anderson County – Partial area designated with 2008 8-Hr Ozone Standard consisting of the area surrounding the TVA Bull Run Fossil Plant and corresponding to 2000 Census Tracts 202 and 213.02. Size of area = 35.0 sq. miles, 2010 Population = 15,372.
- Cocke County – Partial area designated with 1997 8-Hr Ozone Standard consisting of the portion within the Great Smoky Mountains National Park boundary and corresponding to 2010 Census Tract 9801. Size of area = 26.5 sq. miles, 2010 Population = 4.
- Roane County – Partial area designated with 1997 and 2006 PM2.5 Annual & Daily Standards consisting of the area surrounding the TVA Kingston Fossil Plant and corresponding to 2000 Census Block Group 471450307002. Size of area = 5.8 sq. miles, 2010 Population = 711.

II. Specific Input Development for Partial Area Source Type Population:

A. Anderson County Partial Area:

In previous analyses for establishment of the Maintenance Plan and subsequent conformity determinations it was determined that an acceptable assumption would be to base the source type (vehicle) population of the Anderson County partial area on the percent of people residing within that portion of the county. A value of 21% was derived based on the latest (2010) decennial census which has the most reliable estimates of population at both the county and census tract levels. The 2010 total county population was 75,129 and the population of the partial area (census tracts 202.01, 202.02 and 213.02) was 15,553.

B. Roane County Partial Area:

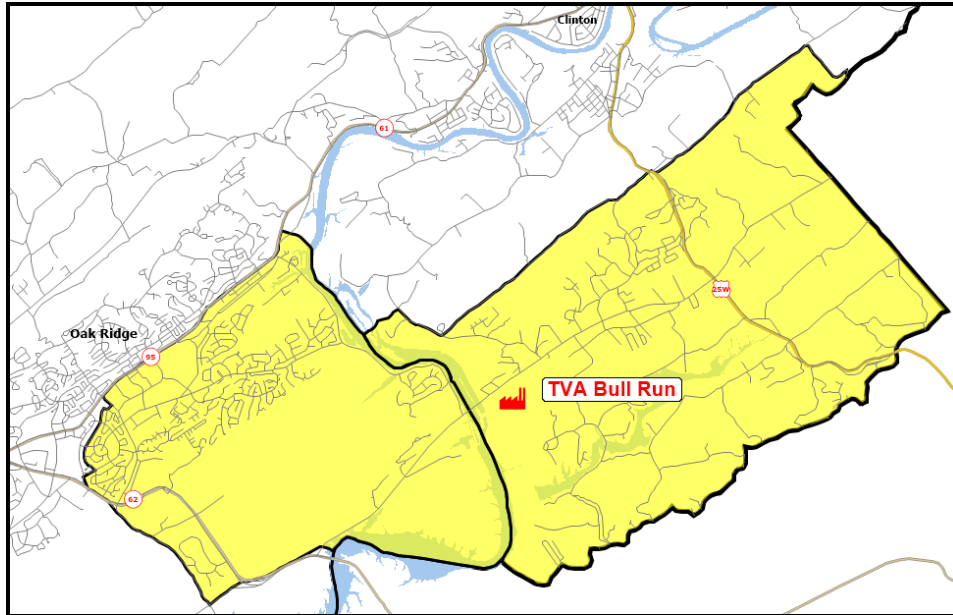
The derivation of inputs for the Roane County Partial Area is essentially identical to that of the Anderson County Partial Area. The Roane County area is much smaller in terms of population however and the source type population is therefore much less. The derivation of the source type population was done using the travel demand model estimation of number of vehicles within the partial area compared with the whole county as being slightly more conservative than the percentage of people population at 1.3%. The table below is copied from the PM2.5 Maintenance Plan and shows the various metrics looked at for the partial area source type population.

Roane County Nonattainment Area Statistics for 2010: Percentages of Entire County ^a	
Census People Population	1.1%
Census Number of Households	1.1%
Census Household Vehicles ^b	1.0%
Travel Demand Model Predicted Vehicles	1.3%

^aCensus Block Group 471450307002
^b2010 Vehicle ownership is from 2010-2014 ACS 5-year estimate (margin of error +/- 140 for partial area)

C. **Cocke County Partial Area:** Since a regional emissions analysis is not required no further input development is needed.

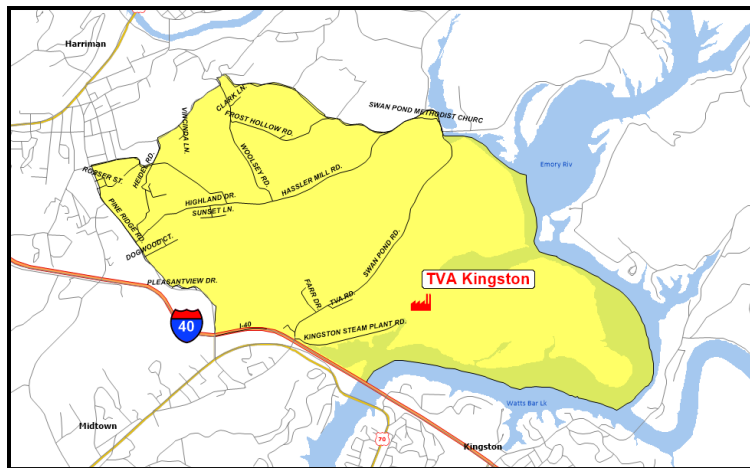
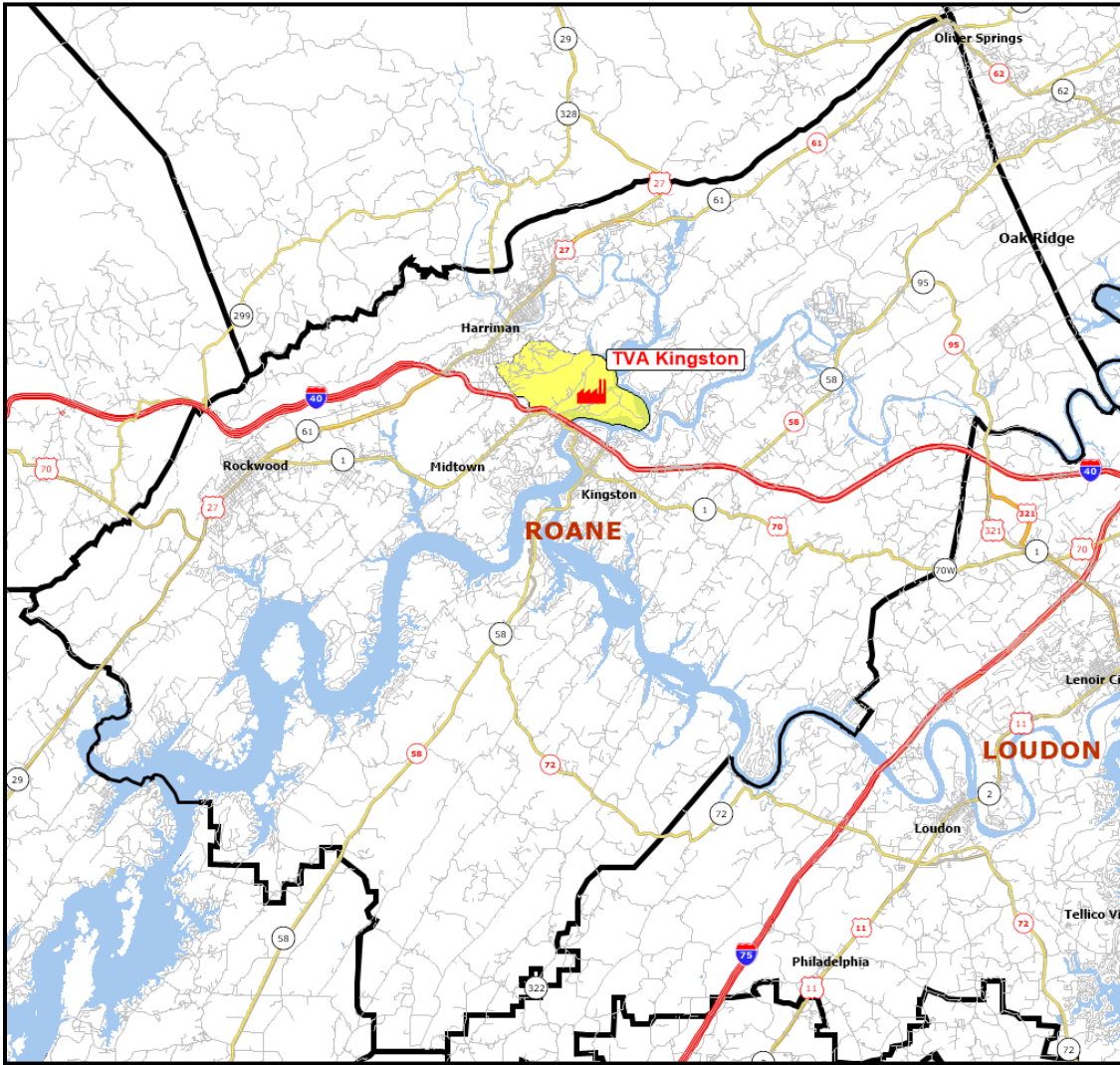
Map 1 – Anderson County Partial Area



Map 2 – Cocke County Partial Area



Map 3 – Roane County Partial Area



C.5 RESPONSES TO COMMENTS FROM IAC PARTICIPANTS

Comments from TDEC:

- In reviewing the CDR, I noticed in section B.1, in the first line MOVES2014 is referenced, should that be MOVES3?

Response: Yes, reference updated to MOVES3

Comments from FHWA:

- Section 4.1, Pages 26-28: Consider stating that KRTPO staff has determined that the Mobility Plan 2045, LAMTPO 2045 MTP, and FY20-23 TIPs are demonstrating conformity with the 1997 8-hr Ozone standard based on the qualitative analysis performed by TPO staff and demonstrated in the CDR – a similar type of statement as found in Sections 4.2.1 and 4.3.1, but revised for the 1997 8-hr Ozone standard and the slightly different method for determining conformity for this standard.

Response: Good suggestion – additional text provided for clarity as suggested in added Section 4.1.9 on page 28.

- Sections 4.2.1 and 4.3.1, Pages 29-30: Typo – should read “KRTPO FY 2020-2023 TIP”.

Response: Typos corrected.

Appendix D – Mobility Plan 2045 project list with exempt and regional significance status

D.1 BACKGROUND

The purpose of this list is to specifically document the current projected horizon year for each project and to identify each project’s air quality conformity exempt/non-exempt status as well as whether it has been determined to be regionally significant. It should be noted that the Mobility Plan 2045 identifies separate interim horizon years of 2030 and 2040 that were used to better define a project’s priority within the required 10 year intervals for conformity purposes, however these are still consistent with the conformity project list.

D.2 LIST OF MOBILITY PLAN PROJECTS BY COUNTY AND HORIZON YEAR

The following project lists (Tables D-1 and D-2) represent the final Mobility Plan 2045 and Regional 1997 Ozone “Orphan Area” projects respectively that are being covered by this regional emissions analysis and conformity determination. The last two columns in this table are important for transportation conformity as they indicate (1) whether a project has been determined to be Exempt or Non-Exempt with respect to the requirement to demonstrate conformity, i.e. generally any project affecting roadway capacity will be considered “Non-exempt” and (2) whether a project is Regionally Significant or not. The regional significance of a project can affect whether a regional emissions analysis may be required for the project or a project change as non-regionally significant projects may be able to rely on a previous regional emissions analysis to determine conformity.

The project list is sorted by county and conformity analysis year as follows:

Counties:

- Anderson
- Blount
- Knox
- Loudon
- Sevier
- Transit Capital Projects
- TPO Regional Projects
- Regional Orphan Area Projects (Table D-2)

Conformity Analysis Years:

- 2026
- 2035
- 2045

Table D-1 – Projects from Knoxville TPO 2045 Mobility Plan Subject to Conformity

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
Anderson County Projects									
Emory Valley Road at Melton Lake Drive Roundabout	13-101		Intersection		0	Construct roundabout	2026	Exempt	N/A - Exempt
Oak Ridge Signal Timing Optimization Program: Phase 2	13-802	20-2017-053	Illinois Ave	Florida Ave	2.85	Continues implementation of Advanced Traffic Management Systems (ATMS) which are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations. This project primarily covers the Oak Ridge Turnpike	2026	Exempt	N/A - Exempt
Oak Ridge Signal Timing Optimization Program: Phase 3	19-100	20-2017-064	Various		3.44	Continues implementation of City's Advanced Traffic Management Systems (ATMS) which are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations. This project primarily covers Illinois Ave and Lafayette Dr	2026	Exempt	N/A - Exempt
Oak Ridge Rails to Trails	13-830	20-2017-046	Melton Lake Rd/Greenway	Scarboro Rd	4.5	Rails to Trails project on abandoned rails from Elza Gate Park at the Oak Ridge Turnpike to the Y-12 National Security Complex on Scarboro Road, and along Belgrade Road, Warehouse Road, Fairbanks Road, and Lafayette Drive.	2026	Exempt	N/A - Exempt
Emory Valley Road at Lafayette Drive Intersection	17-101		Intersection		0	Remove dedicated right turn lane from Emory Valley (west) to Lafayette Drive (north) with standard right turn lane.	2026	Exempt	N/A - Exempt
TVA Bull Run Site Study	19-708	20-2020-305			N/A	Study to evaluate the redevelopment opportunities and transportation impacts of the TVA Bull Run Fossil Plant facility following its closure by the end of 2023	2026	Exempt	N/A - Exempt
Edgemoor Road (SR-170) - Phase 1	09-101a	20-2017-037	Oak Ridge Hwy (SR-62)	Melton Lake Dr	2.6	Widen from 2-lanes to 4-lanes with median and/or center turn lane. Also includes bicycle/pedestrian facilities and a new bridge over the Clinch River.	2035	Non-Exempt	Regionally Significant
Edgemoor Road (SR-170) - Phase 2	09-101b	20-2017-037	Melton Lake Dr	Clinton Hwy (US-25W/SR-9)	3.6	Widen from 2-lanes to 4-lanes with median and/or center turn lane. Also includes bicycle/pedestrian facilities and a new bridge over the Clinch River.	2035	Non-Exempt	Regionally Significant
Tulane Avenue at Pennsylvania Avenue Roundabout Construction	13-102		Intersection		0	Construct roundabout	2035	Exempt	N/A - Exempt
Lafayette Drive Bicycle and Pedestrian Safety Improvements	21-100		From S Illinois (SR 62)	Oak Ridge Turnpike (SR 95)	1.5	Widen Lafayette Dr to add bicycle lanes on both sides between S. Illinois (SR-62) and Oak Ridge Turnpike (SR-95), construct 1.5 miles of sidewalk with curb along the entire west side of the street, and add one new crosswalk at the Manchester/Hendrix intersection to provide direct connection to the Rails to Trails greenway	2035	Exempt	N/A - Exempt
West End Corridor Intersection Improvements	21-101		Renovare Boulevard	Broadberry Avenue at Gallaher Road (SR 58)	N/A	Intersection improvements along Oak Ridge Turnpike (SR-95/SR-58) at Renovare Blvd, Novus Dr, Heritage Center Blvd, and Broadberry Ave at Gallaher Rd	2035	Exempt	N/A - Exempt
Blount County Projects									
Morganton Road Reconstruction - Phase 1	09-211	20-2014-060	William Blount Dr (SR-335)	Foothills Mall Dr	2.3	Reconstruct 2-lane road with addition of continuous center turn lane and bicycle/pedestrian facilities	2026	Non-Exempt	Not Regionally Significant - Minor Arterial and minor widening

Table D-1 – Projects from Knoxville TPO 2045 Mobility Plan Subject to Conformity (continued)

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
Sevierville Rd (SR-35/US-411) Widening	09-214	20-2014-059	Washington St (SR-35)	Walnut St	0.58	Reconstruct from two lanes to three lanes, curb and gutter, and sidewalks with intersection improvements.	2026	Non-Exempt	Regionally Significant
Carpenters Grade Rd Reconstruction and Intersection Improvements	09-223	20-2017-042	Raulston Rd	Cochran Rd	0.89	Reconstruct 2-lane road with addition of turn lanes and sidewalk. Construct a signalized intersection at Peterson Ln, Cochran Rd and Raulston Rd intersection.	2026	Exempt	N/A - Exempt
Pellissippi Pkwy (SR-162) Extension	09-232	20-2014-025	Old Knoxville Hwy (SR-33)	Lamar Alexander Pkwy (US-321/SR-73)	4.4	Construct new 4-lane highway	2026	Non-Exempt	Regionally Significant
Relocated Alcoa Hwy (SR-115/US-129)	09-257	20-2014-035	Proposed Interchange at Tyson Blvd	Pellissippi Pkwy (SR-162)	2.9	Construct new 4-lane divided highway with auxiliary lanes and new interchanges at McGhee Tyson Airport access, Wright Rd and Pellissippi Pkwy (SR-162)	2026	Non-Exempt	Regionally Significant
Relocated Alcoa Hwy (SR-115/US-129)	09-258	17-2014-084	Pellissippi Pkwy (SR-162)	South Singleton Station Rd	1.3	Construct new 4-lane divided highway with auxiliary lanes and new interchange at Singleton Station Rd	2026	Non-Exempt	Regionally Significant
Foothills Mall Drive Extension Phase II	10-260	20-2020-005	Foch Street	McCammom Ave	0.7	Construct new 2-lane road with center turn lane and sidewalks	2026	Non-Exempt	Not Regionally Significant
North Park Blvd & Airbase Rd Safety Improvements	13-210		Intersection		0.3	Realign North Park Boulevard to Airbase Road	2026	Exempt	N/A - Exempt
Old Lowes Ferry Rd at Louisville Rd (SR-333) Intersection Improvements	13-214		Intersection		0	Realign intersection and add turn lanes	2026	Exempt	N/A - Exempt
Maryville to Townsend Greenway - Phase 1 (Brown Creek)	13-833	20-2017-006	Harper Ave Trailhead	US 321	1.2	Construction of a shared use path/Greenway from an existing trailhead at Harper Ave. (near Aluminum Ave.) to Lamar Alexander Pkwy along Brown Creek.	2026	Exempt	N/A - Exempt
US 129 Widening	17-202	20-2017-005	Hall Rd (SR-35)	US 321	2.9	Widen from 4 to 6 lanes	2026	Non-Exempt	Regionally Significant
Alcoa Hwy (SR-115/US-129) ITS Expansion - Ph 1	18-200a	20-2020-010	I-140	Topside Rd	2.2	ITS Smartway Geographic Expansion	2026	Exempt	N/A - Exempt
I-140 ITS Expansion	18-201	20-2017-050	Near MM 2	Near MM 11 (SR-115/US-129/Alcoa Hwy)	9.2	I-140 ITS Expansion to include the installation of a power and communication network and ITS Devices such as CCTV cameras, DMS, and RDS	2026	Exempt	N/A - Exempt
Blount County Greenway Trail - Phase 1	18-202	20-2017-048	US 321 at NW corner of Helton Rd	Perry's Mill Parking Area	3.3	Greenway trail contained completely within US Highway 321 right-of-way from Heritage High School to Perry's Mill Parking area. It will also include additional bike access link to Old Walland Highway across Melrose Station Bridge.	2026	Exempt	N/A - Exempt
Denso Greenway Trail Extension	19-800	20-2020-305	Atchley Dr.	Louisville Rd.	0.7	Construction of multi-modal greenway - Project includes a pedestrian bridge, ADA upgrades and pedestrian lighting	2026	Exempt	N/A - Exempt
Robert C Jackson Dr Extension - Ph I	09-202		Middlesettlements Rd	Louisville Rd (SR-334)	0.7	Construct new 4-lane roadway	2035	Non-Exempt	Regionally Significant
Alcoa Hwy (SR-115/US-129) Widening	09-216	20-2014-003	Pellissippi Pkwy (SR-162)	south of Little River	2.71	Reconstruct SR-115 from 4-lanes to 6-lanes, including a frontage road system with two new interchanges at Singleton Station Road and Topside Road (SR-333), modify the existing SR-115 and SR-162 interchange, and construct a multi-use path.	2035	Non-Exempt	Regionally Significant
Sandy Springs Rd at Montgomery Ln Intersection Improvements	09-240		Intersection		0	Intersection improvements including turn lanes and new traffic signal	2035	Exempt	N/A - Exempt

Table D-1 – Projects from Knoxville TPO 2045 Mobility Plan Subject to Conformity (continued)

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
W Broadway Ave (SR-33/US-411) Improvements	09-242	20-2020-006	S Cedar St	US 321	0.5	Construct additional westbound left turn lane at intersection with Lamar Alexander Pkwy and convert continuous center turn lane to additional westbound through lane along W Broadway Avenue. Project includes construction of new shared use path and other bicycle/pedestrian enhancements	2035	Non-Exempt	Regionally Significant
Montvale Rd (SR-336) Widening	09-262	20-2011-082	Montvale Station Rd	US 321	0.6	Widen existing roadway to 2 - 12 foot travel lanes with a 12 foot center turn lane including curb and gutter, sidewalk and a multiuse path. Close SR-73 EB and WB access to Highland Ave. to construct EB right-turn lane onto SR-336; lengthen WB SR-73 left turn lane near Highland Ave	2035	Non-Exempt	Not Regionally Significant
Sevierville Rd (SR-35/US-411) Widening	09-245		Everett High Rd	Maryville City Limits (Nina Delozier Rd)	2	Reconstruct 2-lane road with addition of continuous center turn lane and bicycle/pedestrian facilities	2035	Non-Exempt	Regionally Significant
Middlesettlements Rd at Miser Station Rd Intersection Improvements	13-218		Intersection		0	Realign intersection and add turn lanes	2035	Exempt	N/A - Exempt
Alcoa Hwy (SR-115/US-129) ITS Expansion - Ph 2	18-200b	20-2020-009	Topside Rd	Cherokee Trail Interchange	5.55	ITS Smartway Geographic Expansion	2035	Exempt	N/A - Exempt
Old Niles Ferry Road Widening	21-202		Savannah Park Drive	W. Broadway Avenue	1.5	Widen existing 2-lane roadway to include curb, gutter, and sidewalk on both sides	2035	Exempt	N/A - Exempt
W. Broadway Avenue (S.R. 33) Improvements from Old Niles Ferry Road to S. Cedar Street	21-203		Old Niles Ferry Road	S. Cedar Street	0.5	Widen existing 2-lane roadway to include concrete curb, gutter, and sidewalk on both sides of the roadway and installation of auxiliary turning lanes where needed. Modification of an existing traffic signal at Magnolia Ave. Realignment and geometric improvements at the intersection of Old Niles Ferry Rd, which will include Best St	2035	Exempt	N/A - Exempt
Washington Street Improvements from E. Broadway Ave. to U.S. 321	21-204		E. Broadway Avenue (S.R. 33)	E. Lamar Alexander Parkway (U.S. 321/S.R. 73)	0.4	Reconstruction of the existing 5-lane roadway to contain standard width lanes, curb, gutter, and sidewalk, along with a pedestrian buffer along both sides of the roadway	2035	Exempt	N/A - Exempt
Harvest Lane Extension	13-208		Existing Harvest Ln terminus	Louisville Rd (SR-334)	0.2	Construct new 2-lane road with sidewalks	2035	Non-Exempt	Not Regionally Significant
Wrights Ferry Road Center Turn Lane Improvements	09-207		Airbase Rd	Topside Rd	1.4	Reconstruct 2-lane road with addition of continuous center turn lane and bicycle/pedestrian facilities	2045	Non-Exempt	Not Regionally Significant
Ellejoy Rd Reconstruction	09-209		Tuckaleechee Pike	Jeffries Hollow Road	3.7	Reconstruct 2-lane road with addition of turn lanes	2045	Exempt	N/A - Exempt
Old Knoxville Hwy (SR-33) Reconstruction	09-212		Wildwood Rd	E. Hunt Rd (SR-335)	1.3	Reconstruct 2-lane road with addition of turn lanes	2045	Exempt	N/A - Exempt
Old Niles Ferry Road Reconstruction	09-213		Calderwood Hwy (SR-115)	Maryville City Limits	3.3	Reconstruct 2-lane road with addition of turn lanes	2045	Exempt	N/A - Exempt
Home Avenue Extension	09-220		McCammon Ave	Calderwood St	0.2	Construct new 2-lane road with center turn lane to extend Home Ave through existing shopping center to Calderwood St	2045	Non-Exempt	Not Regionally Significant
Montvale Rd (SR-336) Widening	09-239		Montvale Station Rd	Maryville South City Limits (Grandview Dr)	2.4	Reconstruct 2-lane road with addition of continuous center turn lane and bicycle/pedestrian facilities	2045	Non-Exempt	Not Regionally Significant

Table D-1 – Projects from Knoxville TPO 2045 Mobility Plan Subject to Conformity (continued)

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
Tuckaleechee Pike Reconstruction	09-241		US 321	Grandview Dr	1.1	Reconstruct 2-lane road with addition of turn lanes and sidewalk	2045	Exempt	N/A - Exempt
Wilkinson Pike Widening	09-243		Court Street	Maryville City Limits (Grandview Dr)	0.9	Reconstruct 2-lane road with addition of turn lanes and sidewalk	2045	Exempt	N/A - Exempt
Topside Road (SR-333) Improvements	09-248		Wrights Ferry Rd	Alcoa Hwy (SR-115/US-129)	1.3	Reconstruct 2-lane road with addition of continuous center turn lane and bicycle/pedestrian facilities	2045	Non-Exempt	Not Regionally Significant
Sevierville Rd (SR-35/US-411) Reconstruction	09-250		Swanee Dr (Maryville City Limits)	Chapman Hwy (US-441/SR 71)	11.9	Reconstruct 2-lane road with addition of turn lanes	2045	Exempt	N/A - Exempt
Robert C Jackson Dr Extension - Ph II	13-203		Louisville Rd (SR-334)	US 129 Bypass (SR-115)	0.5	Construct new 4-lane roadway and grade separated interchange connecting US-129 and Associates Boulevard	2045	Non-Exempt	Regionally Significant
Jeffries Hollow Road	21-200		Ellejoy Road	Sevier County Line	2.8	Reconstruct 2-lane roadway with addition of turn lanes	2045	Exempt	N/A - Exempt
Intersection Improvements on U.S. 321 Realign Amerine Road and Grandview Drive	21-201				0	Intersection improvements on Lamar Alexander Pkwy (SR-73/US-321) near Grandview Drive and Amerine Road/Janet Lane to include realignment and signalization	2045	Exempt	N/A - Exempt
Knox County Projects									
Washington Pike	09-615	20-2014-038	I-640	Murphy Rd	1.7	Widen from 2-lanes to 4-lanes including pedestrian and bicycle facilities.	2026	Non-Exempt	Regionally Significant
Pleasant Ridge Road	09-616	20-2014-037	Merchant Dr	Knoxville City Limits (Country Brook Dr)	1.6	Reconstruct 2-lane road with addition of turn lanes and bicycle/pedestrian facilities	2026	Exempt	N/A - Exempt
South Knoxville Waterfront Roadway Improvements	09-617	20-2014-032	Davenport Rd	Island Home Ave	0.3	Construct roadway streetscape improvements and utility relocations along Sevier Ave and new roundabout at the intersection of Foggy Bottom/Seiver Ave/Island Home Ave.	2026	Exempt	N/A - Exempt
Schaad Rd Widening	09-625	20-2014-006	Oak Ridge Hwy (SR-62)	Pleasant Ridge Rd	1.5	Widen from 2 to 4 lanes with addition of sidewalks	2026	Non-Exempt	Regionally Significant
Chapman Hwy (US-441/SR-71)	09-626d	HSIP	Hendron Chapel Rd	Simpson Rd	0.9	Add center turn lane	2026	Exempt	
Virtue Road Reconstruction	09-630	20-2020-002	Boyd Station Rd	2200' S of Broadwood Dr	0.95	Widen Virtue Rd. to two 11' lanes with curb and gutter, and provide shared use path connection to existing and planned bike/ped facilities.	2026	Exempt	N/A - Exempt
Pellissippi Pkwy (SR-162)/Oak Ridge Hwy Interchange	09-649	20-2017-057	Interchange at Oak Ridge Hwy (SR-62)		0.45	Reconstruct interchange to a Single Point Urban Interchange and provide connection to Solway Rd	2026	Non-Exempt	Regionally Significant
I-40/I-75/Watt Rd Interchange	09-651		Interchange at Watt Rd		0	Reconfigure existing interchange to improve capacity, safety and operations.	2026	Exempt	N/A - Exempt
I-75 at Emory Rd (SR-131) Interchange	09-652				0	Reconfigure existing interchange to a Diverging Diamond Interchange to improve capacity, safety and operations.	2026	Exempt	N/A - Exempt
Alcoa Hwy (SR-115/US-129) Widening	09-653	20-2014-069	Woodson Dr	Cherokee Trail Interchange	1.6	Widen 4-lane to 6-lane including pedestrian and bicycle facilities.	2026	Non-Exempt	Regionally Significant

Table D-1 – Projects from Knoxville TPO 2045 Mobility Plan Subject to Conformity (continued)

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
Union Rd/N Hobbs Rd Reconstruction	13-601	20-2014-082	Everett Rd	Kingston Pike (SR-1)	1	Reconstruct 2-lane road with addition of turn lanes and bicycle/pedestrian facilities	2026	Exempt	N/A - Exempt
Traffic Control Equipment Upgrade - Knoxville (Advanced Traffic Management System - Phase 1)	13-602	20-2014-042	Various		19.5	Advanced Traffic Management Systems (ATMS) are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations. This project covers two primary corridors of Broadway and Kingston Pk	2026	Exempt	N/A - Exempt
Chapman Highway Advanced Traffic Management System	13-1003	20-2014-078	Mountain Grove Dr	Blount Ave	6.3	Advanced Traffic Management Systems (ATMS) are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations	2026	Exempt	N/A - Exempt
Liberty Street Multimodal Project	13-1004	20-2014-080	Middlebrook Pk (SR 169)	Sutherland Ave	1.1	Addition of sidewalks and bicycle facilities along Liberty and Division Streets.	2026	Exempt	N/A - Exempt
Farragut Advanced Traffic Management System - Phase 1	13-813	20-2017-024	Various		N/A	Advanced Traffic Management Systems (ATMS) are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations. This project includes the Town's entire signal system.	2026	Exempt	N/A - Exempt
Knoxville Northwest Greenway Connector Ph. 2	13-858	20-2020-305	Middlebrook Pk. at Third Creek Rd.	SR 62 Western Ave. pedestrian bridge	1.7	New trail connecting from Middlebrook Pk. At Third Creek Rd. to SR 62 Western Ave. pedestrian bridge. ADA upgrades and pedestrian lighting.	2026	Exempt	N/A - Exempt
Atlantic Avenue Sidewalk	13-880	20-2020-305	Pershing St	Broadway	0.6	Construct 3,000 linear feet of sidewalks on Atlantic Ave between Pershing St and Broadway	2026	Exempt	N/A - Exempt
Chapman Highway Multiuse Path	13-884		Young High Pk	Stone Rd	0.8	Construct a new shared use path along Chapman Highway from Young High Pike to Stone Road	2026	Exempt	N/A - Exempt
KAT Express Transit Service Enhancement - Broadway Transit Signal Priority Implementation	17-1006	20-2017-028	Knoxville Station	N Broadway at Colonial Circle	6.5	The project will consist of six BRT bus stops (one for each direction totaling 12 stations), Passenger Information Systems (PIS) at each station, TSP software integrated into the City's ATMS central software, and a number of queue jump locations, which will be determined during preliminary design efforts.	2026	Exempt	N/A - Exempt
First Creek Greenway - Broadway Streetscape	13-838	20-2017-009	Woodland Ave	Cecil Ave	0.3	Construct a new shared use path extending First Creek Greenway from near Cecil Ave to near Woodland Ave	2026	Exempt	N/A - Exempt
Magnolia Avenue Streetscape - Phase 3	17-608a	20-2017-017	N. Bertrand St	N. Kyle St	0.2	Construct streetscape improvements in the existing right of way that include raised medians replacing center left-turn lane, signal improvements, bike lanes, improved sidewalks, bus pull-offs, and amenities	2026	Exempt	N/A - Exempt
Magnolia Avenue Streetscape - Phase 4	17-608b		N. Kyle St	Spruce St	0.3	Construct streetscape improvements in the existing right of way that include raised medians replacing center left-turn lane, signal improvements, bike lanes, improved sidewalks, bus pull-offs, and amenities	2026	Exempt	N/A - Exempt
South Waterfront Greenway - East of Suttree	17-850	20-2017-049	Suttree Landing Park	Island Home Ave Riverwalk	0.6	Construct riverwalk trail connecting the 0.10 mile section of cantilevered riverwalk along Island Home Avenue to Suttree Landing Park riverwalk that is just east of Foggy Bottom Street along the Tennessee River.	2026	Exempt	N/A - Exempt

Table D-1 – Projects from Knoxville TPO 2045 Mobility Plan Subject to Conformity (continued)

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
East Knox Greenway - Phase 1	17-901	20-2017-011	Willow Ave	Knoxville Botanical Gardens	1.6	Construct a new shared use path connecting First Creek Greenway to Knoxville Botanical Gardens and Arboretum	2026	Exempt	N/A - Exempt
Tyson Fort Sanders Bike Connection	17-911	20-2020-305	Fort Sanders Neighborhood	Tyson Park	0.5	Construct new shared use path between Fort Sanders Neighborhood and Tyson Park	2026	Exempt	N/A - Exempt
I-75 ITS Expansion	18-600	20-2017-034	MM 109.6	SR-61 (Exit 122)	13.03	ITS expansion includes the deployment of CCTV cameras at critical interchanges. Install power and communications infrastructure and at Least 2 CCTV Cameras at each Interchange.	2026	Exempt	N/A - Exempt
Middlebrook Pike (SR-169) ATMS Expansion	18-603	20-2017-051	College St	Joe Hinton Rd	6.5	Advanced Traffic Management Systems (ATMS) are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations.	2026	Exempt	N/A - Exempt
Traffic Signal Improvements for the U.T. Area	19-603	20-2017-061	Various		N/A	Includes Advanced Traffic Management Systems (ATMS) which are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations. Project covers several roadways in and around UT campus	2026	Exempt	N/A - Exempt
Knox County Advanced Traffic Management System - Phase II	19-604	20-2017-063	Various		N/A	Continues implementation of County's Advanced Traffic Management Systems (ATMS) which are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations. This project primarily covers E. Emory Rd, Norris Freeway and Maynardville Pk	2026	Exempt	N/A - Exempt
Woodland Ave. Complete Street	19-606	20-2020-004	N. Broadway	Glenwood Ave	0.5	Install bike lanes, sidewalks, and pedestrian crossing improvements. Project connects a greenway to existing bike lanes.	2026	Exempt	N/A - Exempt
Jamestowne Boulevard Study	19-703	20-2020-305	SR-1 (Kingston Pike)	Campbell Station Road	N/A	Feasibility and planning study to determine needed improvements to Jamestowne Boulevard in Farragut to provide additional route for motorists and pedestrians to bypass intersection of Kingston Pike at Campbell Station Road.	2026	Exempt	N/A - Exempt
County-wide Transportation Study (Knox)	19-707	20-2020-305			N/A	Prepare a countywide transportation plan in conjunction with the General Plan update in order to determine priorities for transportation improvements that address existing and proposed land use	2026	Exempt	N/A - Exempt
Intersection Improvement at Beaver Ridge Road and West Emory Road	21-602				0	Installation of turn lanes and signalization at Beaver Ridge Rd and W. Emory Rd in Karns	2026	Exempt	N/A - Exempt
Tazewell Pike and Fairview Road Intersection Realignment	21-604				0	Tazewell Pk and Fairview Rd Intersection Realignment (Intersection improvement with turn lanes and traffic signal)	2026	Exempt	N/A - Exempt
James White Parkway Roadway improvements	21-606		Sevierville Pk	Bridge over TN River	1.2	This project will relocate the two northbound travel lanes to share the existing pavement for the southbound lanes while maintaining 2 travel lanes in each direction. This will allow the current northbound travel lanes and adjacent excess land to be repurposed to a linear park.	2026	Exempt	N/A - Exempt
South Knoxville Bridge Greenway	21-800		Anita Dr	Morningside Greenway at Riverside Dr	0.6	Construct multi-modal path along James White Pkwy	2026	Exempt	N/A - Exempt

Table D-1 – Projects from Knoxville TPO 2045 Mobility Plan Subject to Conformity (continued)

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
Gibbs Schools Pedestrian Bridge	21-801				N/A	Pedestrian Bridge over Tazewell Pk to serve Gibbs Elementary, Middle, and High Schools	2026	Exempt	N/A - Exempt
Chapman Hwy (SR-71/US-441) Operational and Safety Improvements	09-626	20-2017-040	SR-338 (Boys Creek Hwy)	Blount Ave	10.3	Corridor safety and operational improvements, including intersection improvements and/or driveway improvements and/or left turn lanes at various locations throughout the project area	2035	Exempt	
I-40/I-75/Campbell Station Road Interchange	09-629				0	Reconfigure existing interchange to improve capacity, safety and operations.	2035	Exempt	N/A - Exempt
Lovell Rd Widening (SR-131)	09-637	20-2014-002	Cedardale Ln	Middlebrook Pk	1.7	Widen 2-lane to 4-lane, including pedestrian and bicycle facilities.	2035	Non-Exempt	Regionally Significant
Oak Ridge Hwy (SR-62)	09-638		Schaad Rd	Byington Beaver Ridge Rd	4.2	Widen from 2 to 4 lanes	2035	Non-Exempt	Regionally Significant
Emory Rd (SR-131)	09-643	20-2017-036	Maynardville Hwy (SR-33)	Tazewell Pk (SR-331)	4.8	Widen from 2 to 4 lanes with median and/or center turn lane, including bicycle and pedestrian facilities	2035	Non-Exempt	Regionally Significant
Gov John Sevier Hwy (SR-168)	09-644		Alcoa Hwy (SR-115/US-129)	Chapman Hwy (US-441/SR-71)	6.5	Widen from 3 to 4-lane divided roadway	2035	Non-Exempt	Regionally Significant
Northshore Dr (SR-332)	09-645		Morrell Rd	Ebenezer Rd	3.5	Reconstruct 2-lane road with addition of turn lanes and bicycle/pedestrian facilities	2035	Exempt	N/A - Exempt
Pellissippi Pkwy (SR-162)	09-647		Edgemoor Rd (SR-170)	Dutchtown Rd	6	Corridor safety and capacity improvements to include access control, interchange reconstruction, frontage roads, additional/auxiliary lanes and provision for a shared use path	2035	Non-Exempt	Regionally Significant
I-75/I-640/I-275 Interchange	09-654	20-2017-038	Interchange at I-640/I-275 (Sharps Gap).		0.57	Interchange reconstruction along with the addition of auxiliary lanes in each direction on I-75.	2035	Non-Exempt	Regionally Significant
Northshore Drive at Kingston Pike Intersection Improvements	09-658	20-2017-039	Intersection		0.5	Intersection improvements including additional turn lanes and sidewalk extensions. Replace bridge over Fourth Creek on Kingston Pike.	2035	Exempt	N/A - Exempt
Oak Ridge Hwy (SR-62)	09-673		Byington Beaver Ridge Rd (SR-131)	Pellissippi Pkwy (SR-162)	4.2	Widen from 2 to 4 lanes	2035	Non-Exempt	Regionally Significant
Papermill Drive Complete Street	09-689		Weisgarber Rd	Kingston Pike (SR-1)	0.6	Reconstruct 2-lane road with addition of turn lanes and bicycle/pedestrian facilities	2035	Exempt	N/A - Exempt
I-40/75 Widening	09-691		I-40/75 Interchange	Campbell Station Rd Interchange	5.3	Widen from 6 to 8 lanes	2035	Non-Exempt	Regionally Significant
I-75 Widening	09-692	20-2017-056	Emory Rd (SR-131)	Raccoon Valley Rd (SR-170)	4.85	Widen from 4 to 6 lanes	2035	Non-Exempt	Regionally Significant
Campbell Station Rd Improvements	10-700		I-40	Hardin Valley Road	3.3	Widening and realignment of Campbell Station Rd from I-40 to Hardin Valley Rd	2035	Non-Exempt	Regionally Significant
I-40/75 Auxiliary Lanes	13-603		Campbell Station Rd Interchange	Lovell Rd Interchange	1.4	Construct eastbound and westbound auxiliary lanes between interchanges	2035	Non-Exempt	Regionally Significant
First Creek Greenway - Downtown East	13-844		Caswell Park	Morningside Park	1.4	Construct a new shared use path along First Creek connecting Caswell Greenway to Morningside Greenway	2035	Exempt	N/A - Exempt
First Creek Greenway - North Knox	13-855		Edgewood Park	Mineral Springs Ave	1.3	Construct a new shared use path along First Creek connecting Edgewood Park to the proposed First Creek Greenway - Old Broadway segment at Mineral Springs Avenue	2035	Exempt	N/A - Exempt

Table D-1 – Projects from Knoxville TPO 2045 Mobility Plan Subject to Conformity (continued)

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
Magnolia Avenue Streetscape - Phase 5	17-608c		Spruce St	N. Cherry St	0.4	Construct streetscape improvements in the existing right of way that include raised medians replacing center left-turn lane, signal improvements, bike lanes, improved sidewalks, bus pull-offs, and amenities	2035	Exempt	N/A - Exempt
Knoxville Advanced Traffic Management System - Phase 2	17-801				N/A	Additional upgrades of the City traffic signal system following Phase 1.	2035	Exempt	N/A - Exempt
Tazewell Pike Sidewalk	17-910	20-2017-047	Old Broadway	Jacksboro Pk	0.6	Construct sidewalk along Tazewell Pike from Old Broadway to Jacksboro Pike	2035	Exempt	N/A - Exempt
Magnolia Ave/Rutledge Pike/Asheville Hwy Interchange Improvements	21-600				0	Construct interchange improvements to consist of intersection improvements, bike lanes and enhanced sidewalks	2035	Exempt	N/A - Exempt
James White Parkway corridor improvements	21-605				1.2	Address vehicular, pedestrian, and cyclist needs in local roadway network adjacent to James White Pkwy. Includes: Hillwood Ave from Anita Dr to Island Home Ave, Anita Dr from Sevier Ave to Hillwood Ave and Sevierville Pk from Woodlawn Pk to Sevier Ave	2035	Exempt	N/A - Exempt
Adair to Old Broadway Connection	21-802		Old Broadway	N Broadway	0.2	Construct new multiuse path to connect existing path on Old Broadway to north of Adair Drive	2035	Exempt	N/A - Exempt
Northshore Dr (SR-332)	09-646		Pellissippi Pkwy (SR-162)	Concord Rd (SR-332)	4.5	Reconstruct 2-lane road with addition of turn lanes and bicycle/pedestrian facilities	2045	Exempt	N/A - Exempt
Kingston Pike (SR-1) Widening	09-668		Smith Rd	Campbell Station Rd	1.4	Widen from 4 to 6 lanes with addition of bicycle/pedestrian facilities	2045	Non-Exempt	Regionally Significant
Everett Road Improvements	09-669		Watt Rd	Split Rail Lane	2.5	Reconstruct 2-lane road with addition of continuous center turn lane and bicycle/pedestrian facilities	2045	Non-Exempt	Not Regionally Significant
Baker Creek Greenway	13-854		Maynard Glenn Park	Island Home Ave	1	Construct a new shared use path along Baker Creek, connecting Maynard Glenn Park, Mary James Park, to the proposed South Waterfront Greenway	2045	Exempt	N/A - Exempt
South Waterfront Greenway -West of Cityview (A riverwalk connector from the existing CityView Public Riverwalk to Scottish Pike Park)	17-859		City View Public Greenway	Scottish Pk Park	1.9	A riverwalk connector from the existing CityView Public Riverwalk to Scottish Pike Park	2045	Exempt	N/A - Exempt
I-40 Westbound Interchange at I-275	21-601		I-275	Near I-640	2	Interchange access improvements and extension of two existing lanes from US129 entrance ramp to WB mainline such that one lane continues through on I-40 mainline	2045	Non-Exempt	Regionally Significant
Loudon County Projects									
US 11 at Industrial Park Drive Intersection Improvement	17-407		Intersection of US 11 at Industrial Park Dr		0.2	Intersection improvements including turn lanes and new traffic signal	2026	Exempt	N/A - Exempt
Muddy Creek Road Intersection Realignment	17-416		Intersection		0.1	Realign intersection and add turn lanes	2026	Exempt	N/A - Exempt
Lenoir City CMAQ ITS Phase 2 (missing from original list)	19-400	20-2017-062	Various		8.6	Continues implementation of Advanced Traffic Management Systems (ATMS) which are a component of Intelligent Transportation Systems (ITS) that integrate various technologies specifically related to the traffic signal system to improve overall operations. This project primarily covers major corridors of US 321 and US 11	2026	Exempt	N/A - Exempt

Table D-1 – Projects from Knoxville TPO 2045 Mobility Plan Subject to Conformity (continued)

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
I-75 Widening	21-400		Pond Creek Rd (SR-323)	I-40/I-75 Junction	16.1	Widen from 4 to 6 lanes	2045	Non-Exempt	Regionally Significant
Sevier County Projects									
Boyd's Creek Highway (SR 338) at Old Knoxville Highway Intersection Improvements	18-500	20-2017-044	at Old Knoxville Highway Intersection		0	Reconfigure existing intersection to improve safety and operations through geometric layout changes, addition of turn lanes, and installation of a new traffic signal.	2026	Exempt	N/A - Exempt
Transit Capital Projects									
Knoxville-Knox County CAC Transit Capital Project	21-1000	20-2020-204			N/A	Purchase of demand response transit vehicles for fleet replacement	2026	Exempt	N/A - Exempt
Knoxville-Knox County CAC Transit Volunteer Assisted Transportation	21-1001				N/A	Purchase of vehicles for assisted demand response transit services	2026	Exempt	N/A - Exempt
ETHRA Transit Vehicle Replacement Project	21-1002	20-2020-203			N/A	Purchase of demand response transit vehicles for fleet replacement	2026	Exempt	N/A - Exempt
Purchase KAT Vehicles - Fixed Route Buses	21-1003	20-2020-205			N/A	Purchase of fixed-route buses for fleet replacement or minor expansion	2026	Exempt	N/A - Exempt
KAT Bus Engine Overhauls	21-1004	20-2020-210			N/A	Mid-life engine overhauls on 46 transit buses. An engine "overhaul" is a mid-life action on a major component that enables an asset to achieve its useful life and is an FTA-eligible activity under Circular 5010.1E	2026	Exempt	N/A - Exempt
TPO Projects									
Smart Trips	21-700	20-2014-207, 20-2017-209	TPO Planning Area		N/A	Continuation of Smart Trips program that encourages alternatives to driving alone through an online ridesharing and logging database, incentives, marketing and outreach. Operations funds are used for rideshare operations.	2026	Exempt	N/A - Exempt
Bike Parking	21-701	20-2014-225	TPO Planning Area		N/A	Provide convenient and secure bike parking destinations by reducing cost for businesses and agencies to provide bike parking for employees and customers.	2026	Exempt	N/A - Exempt
Resurfacing Program	21-702	20-2020-307	TPO Planning Area		N/A	Projects for preservation, rehabilitation, resurfacing and restoration of federal aid roadways	2026	Exempt	N/A - Exempt
Safety Improvements Program	21-703		TPO Planning Area		N/A	Projects for preservation, rehabilitation, resurfacing and restoration of federal aid roadways	2026	Exempt	N/A - Exempt

Table D-2 – Projects from the Regional “Orphan Area” Subject to 1997 8-Hour Ozone Standard Conformity

Project Name	KRMPID	FY 2020-2023 TIPID	From	To	Length (miles)	Final Description	Conformity Analysis Year	Exempt Status	Regional Significance
Regional Projects (In 1997 Ozone Maintenance Area but Outside TPO Planning Area)									
Intersection of US11E and SR 92/Old Andrew Johnson Hwy	LAMTPO-17		Intersection		0	Realign the intersection of US 11E and SR 92/Old Andrew Jackson Hwy; extend Overlook Rd	2026	Exempt	N/A - Exempt
Chucky Pike	LAMTPO-2008		Intersection		0	Reconstruct Chucky Pike with signal modifications at US 11E intersection	2026	Exempt	N/A - Exempt
SR 34/US 11E	LAMTPO-2051		Russell Rd	Odyssey Rd	1.9	Intersection and access management improvements along SR 34/US 11E from Russell Ave to Odyssey Rd	2026	Exempt	N/A - Exempt
Intersection of SR 32 (State St) and SR 113 (Main St)	LAMTPO-2052		Intersection		0	Intersection improvements at SR 32 (State St) and SR 113 (Main St): add left turn lanes on SR 32 (State St) and a left turn lane on	2026	Exempt	N/A - Exempt
Intersection of SR 341 (Roy Messer Hwy) and SR 113 (Main St)	LAMTPO-6003		Intersection		0	Signalize the intersection of SR 341 (Roy Messer Hwy) and SR 113 (Main St)	2026	Exempt	N/A - Exempt
Intersection of SR 34/US 11E and George Ave	LAMTPO-2060		Intersection		0	Intersection improvements at SR 34/US 11E and George Avenue: add NB right turn lane extending to Elmwood St.	2026	Exempt	N/A - Exempt
SR-73 (US-321)	100989.00	2078032	Buckhorn Rd	SR-416	1.4	Widen from 2 to 4 lane divided	2026	Non-Exempt	Regionally Significant
Intersection of SR 34/US 11E and Russell Ave	LAMTPO-2043		Intersection		0	Intersection improvements at SR 34/US 11E and Russell Ave: add right turn lanes on SR 34/US 11E, pedestrian signals and sidewalks on all approaches	2035	Exempt	N/A - Exempt
Intersection of SR 34/US 11E and George Ln	LAMTPO-2044		Intersection		0	Intersection improvements at SR 34/US 11E and George Lane: add right turn lanes on SR 34/US 11E, pedestrian signals and sidewalks on all approaches	2035	Exempt	N/A - Exempt
Intersection of SR 34/US 11E and E. Old Andrew Johnson Hwy and Municipal Dr	LAMTPO-2007		Intersection		0	Intersection improvements at SR 34/US 11E and E Old Andrew Jackson Highway: signalize the intersection	2035	Exempt	N/A - Exempt
Intersection of E. Old Andrew Johnson Hwy and Municipal Dr	LAMTPO-2009		Intersection		0	Intersection improvements at E Old Andrew Jackson Hwy and Municipal Dr: Add turn lanes	2035	Exempt	N/A - Exempt
I-81	LAMTPO-2049		Approximately 1 mile west of I-40 Interchange (Exit 1)	Near SR 341 (Roy Messer Hwy) - Exit 4	3.6	Widen I-81 from 4 to 6 lanes and add acceleration lane on I-40 WB	2045	Non-Exempt	Regionally Significant
Intersection of Old Andrew Johnson Hwy and E. Main St/N. Chucky Pike	LAMTPO-2012		Intersection		0	Intersection improvements at Old Andrew Jackson Hwy and E Main St./N Chucky Pike: realign offset intersection	2045	Exempt	N/A - Exempt
SR-35 (US-411)	TDOT-101401.01		near Sims Rd in Sevier County	near SR-92 in Jefferson County	4.5	Widen from 2-lanes to 5-lanes on existing and new alignment	2026	Non-Exempt	Regionally Significant
SR-449 Ext	TDOT-124788.00	2078080	SR-35	Robert Henderson Rd	0.4	Construct new 5-lane Facility	2026	Non-Exempt	Regionally Significant
Jake Thomas Connector	TDOT-124789.00	2078085	SR-71	SR-449 (Veterans Blvd)	2	Pavement Marking between SR-73 and Teaster Ln. Widen from 2-lane to 4-lane divided between Teaster Ln and New Ripkin Experience Ballpark. Construct new 5-lane from Ballpark to SR-449 (Veterans Blvd)	2026	Non-Exempt	Regionally Significant
SR-35 (US-411)	TDOT-121620.00	2078179	SR-448 (North Parkway)	Eastgate Rd	1.13	Capacity and Operational Improvements at the intersection of SR-35 and SR-449 with left turn lane restrictions between project limits	2026	Exempt	N/A - Exempt
Veterans Blvd (SR-449) Extension Phase 2	09-509		Henderson Rd	SR-66 at Gists Creek Rd	3.2	Construct new 4-lane Road	2035	Non-Exempt	Regionally Significant
Great Smoky Mountains National Park Road Access to Proposed Mountain Bike Trails	NPS-1		U.S. 321 (Wears Valley Rd)	Dead End at Parking Area	1	Construct New Dead End Access Road(s) for Proposed Mountain Bike Trails within the footprint of the unbuild portion of Foothills Parkway (Section 8D) in Wears Valley part of Sevier County	2026	Non-Exempt	Not Regionally Significant

D.3 EXISTING PLUS COMMITTED ROADWAY NETWORK

The primary purpose of the model is to forecast needs and deficiencies for the roadway network in the future assuming that population and economic activity continue to grow, but no improvement projects are undertaken beyond what is known as the “Existing plus Committed” or E+C network. The model roadway network was first updated to account for changes that have happened since the prior base year of 2014 to the new 2018 base year that was used in the validation process previously documented – this is known as the “Existing” network. The primary changes since 2014 resulted from roadway projects that were completed as well as some significant changes that TDOT implemented to increase speed limits on several segments of Interstate within the model study area. Figure D-1 shows Before/After maps of the segments of Interstate where the speed limits have been increased, with some taking effect in 2019. Table D-3 is a listing of major capacity-addition projects that were completed between 2014 and 2018.

Figure D-1 - Before/After Maps of Posted Speed Limit Changes in KRTM Study Area

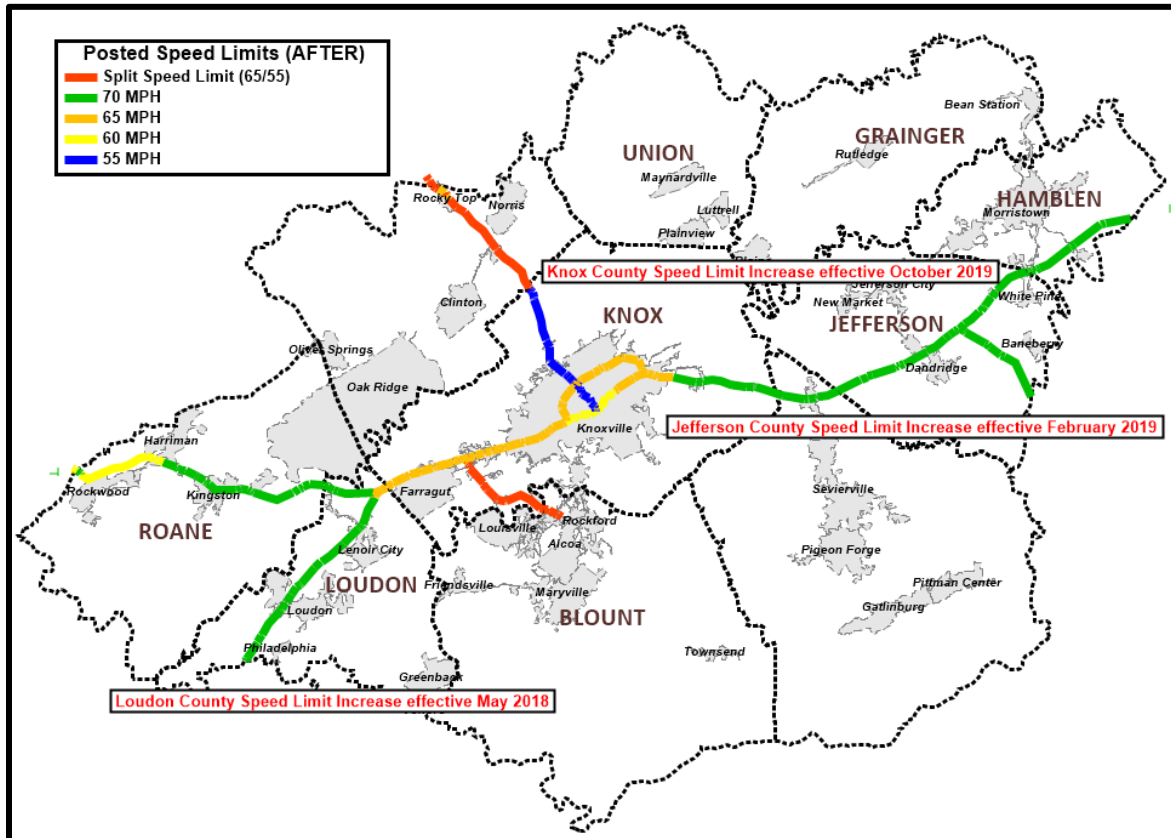
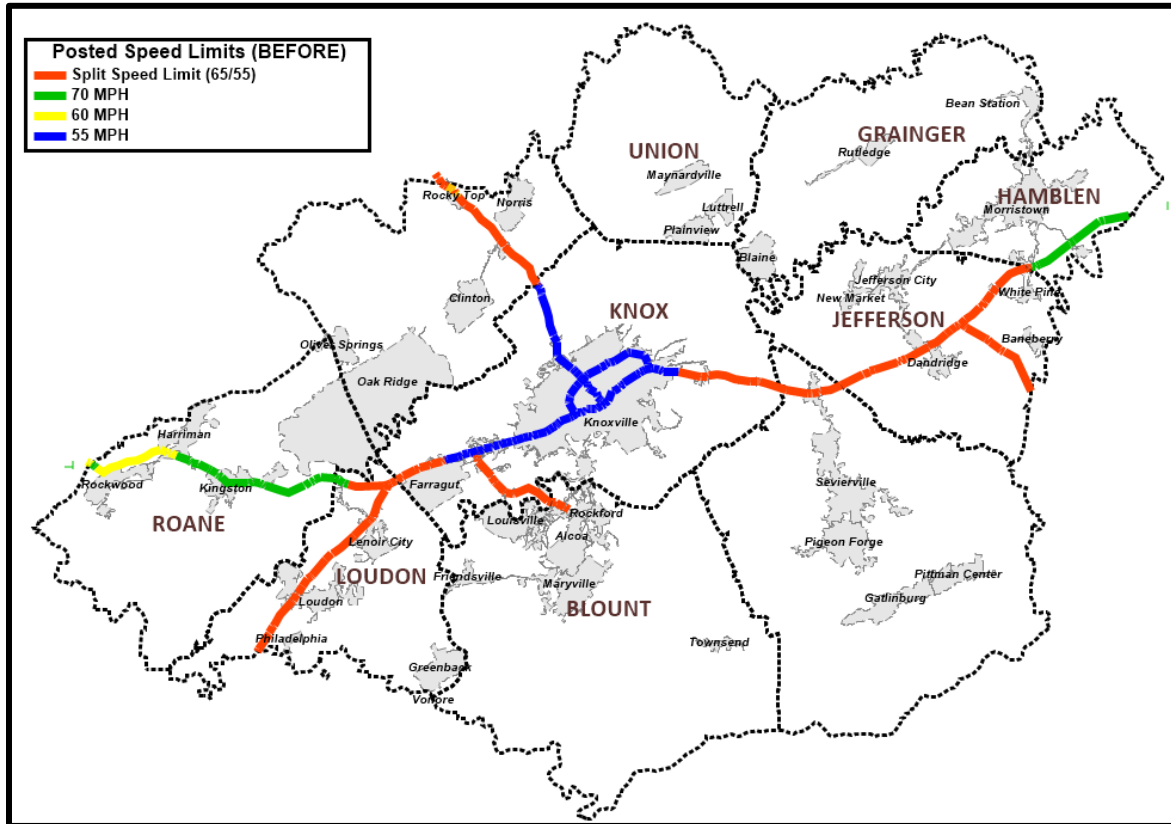


Table D-3 - Major Capacity-Impacting Projects Completed between 2014 and 2018

Project Name	KRMP ID	Termini	Length (miles)	Project Description	Status
Cumberland Ave Road Diet & Streetscaping	09-613b	22nd St to 16th St	0.5	Road diet and streetscape, reducing four lanes to two lanes with median and turn lanes	Completed in 2017
Dixie Lee Junction	09-406	Intersection of US 11 & US 70	0.2	Intersection Realignment & Signalization	Completed in 2018
Foothills Parkway	09-224	From U.S. 321 (SR-73) in Walland to U.S. 321 (SR-73) in Wears Valley	16	Construct a new 2-lane roadway	Completed in 2018
Karns Connector	09-635	Oak Ridge Hwy to Westcott Blvd	0.8	Construct new 2-lane road with center turn lane	Completed in 2018
Maynardville Hwy	09-604	North of SR-71 to Union County Line	6.2	Widen from 2 to 4/5 lanes	Completed in 2017
North Central Street Road Diet and Streetscape	10-697	Woodland Ave to Depot St	1.2	Road diet and streetscape along North Central Street, reducing four lanes to two lanes with center turn lane	Completed in 2019
Parkside Drive Widening	N/A	Mabry Hood Rd to Hayfield Rd		Widen from 2 to 5 lanes	Completed in 2017
Western Ave (SR-62) Widening	09-612	Schaad Rd to I-640	3.9	Widen from 2 to 5 lanes	Completed in 2018

In addition to the projects and speed limit changes that were completed by 2018, other projects are considered to be “Committed” since it is reasonably certain that these will occur based on current expectations. The specific definition of a “Committed Project” for the purposes of Mobility Plan 2045 is that the project has to either be currently under construction, or have construction funding programmed

during the current TPO Fiscal Year 2020-2023 Transportation Improvement Program (TIP). There is one minor exception to this rule that was made for two phases of Alcoa Highway (US-129/SR-115) which are not currently programmed for construction, but are assumed to be committed since all other segments of Alcoa Highway are either currently under construction or programmed for construction by FY 2023. The E+C projects form the baseline network with which subsequent roadway deficiency analyses and the Congestion Management Process analysis is undertaken with; however, it should be noted that this network does not necessarily represent the first air quality conformity horizon year (2026) since some projects such as a few Alcoa Highway segments are not projected to be open to traffic by that year given their large magnitude and length of time it will take for construction to be completed. Table D-4 provides a listing of the Committed projects and their status (either under construction or funded for construction) as of May 2020:

Table D-4 - Committed Project List

Project Name	KRMP ID	Termini	Length (miles)	Project Description	Status as of May 2020
Alcoa Hwy (SR-115/US-129)	09-627	Maloney Rd to Woodson Dr	1.4	Widen from 4-lane to 6-lane	Under Construction, Completion target of 12/30/2020
Alcoa Hwy (SR-115/US-129)	09-218	Hall Rd (SR-35) to proposed interchange at Tyson Blvd.	1.3	Widen from 4-lane divided to a 6-lane divided highway. Extend Tyson Boulevard under SR-115 and reconstruct Hunt Rd overpass.	Under Construction, Completion target of 11/30/2021
Alcoa Hwy (SR-115/US-129) Widening	09-216	Pellissippi Pwy (SR-162) to Little River (Knox/Blount C.L.)	3.2	Widen 4-lane to 6-lane with frontage road system and new interchange at Topside Rd (SR-333). Reconfigure existing interchange at Pellissippi Pkwy (SR-162) and signalize ramps	In ROW, No Construction Funds yet but Consider entire Alcoa Hwy corridor as committed at this point

Project Name	KRMP ID	Termini	Length (miles)	Project Description	Status as of May 2020
Alcoa Hwy (SR-115/US-129) Widening	09-628	North of Little River (Knox/Blount C.L.) to Maloney Rd	2.4	Widen from 4 to 6 lanes including pedestrian and bicycle facilities.	Under Construction, Completion target of 5/31/2023
Alcoa Hwy (SR-115/US-129) Widening	09-653	Woodson Dr. to Cherokee Trail interchange	1.3	Widen 4-lane to 6-lane including pedestrian and bicycle facilities.	In R-O-W stage, Construction Programmed in FY 2020
Relocated Alcoa Hwy (SR-115/US-129)	09-257	Proposed interchange at Tyson Blvd. to Pellissippi Pkwy (SR-162)	2.9	Construct new 4-lane divided highway with auxiliary lanes and new interchanges at McGhee Tyson Airport access, Wright Rd and Pellissippi Pkwy (SR-162)	In ROW, Construction Programmed for FY 2021
Relocated Alcoa Hwy (SR-115/US-129)	09-258	Pellissippi Pkwy (SR-162) to South Singleton Station Rd	1.3	Construct new 4-lane divided highway with auxiliary lanes and new interchange at Singleton Station Rd	In ROW, No Construction Funds yet but Consider entire Alcoa Hwy corridor as committed at this point
Associates Boulevard Extension, known as Marconi Blvd	13-206	Associates Blvd to East Edison St/Springbrook Rd (New Alignment)	0.8	Construct new 2-lane boulevard with bicycle/pedestrian facilities	Out for Construction Bids
Chapman Hwy (US-441/SR-71)	09-626b	Evans Rd to Burnett Ln	0.9	Add center turn lane	Under Construction, Completion target of 9/30/2020
Chapman Hwy (US-441/SR-71)	09-626d	Hendron Chapel Rd to Simpson Rd	0.9	Add center turn lane	In R-O-W stage, Construction within next year

Project Name	KRMP ID	Termini	Length (miles)	Project Description	Status as of May 2020
Chapman Hwy (US-441/SR-71) Widening	09-508	Boyds Creek Hwy (SR-338) to Macon Ln	1.2	Add center turn lane	Under Construction, Completion target of 12/31/2020
Concord Road (SR-332) Widening	09-632	Turkey Creek Rd. to Northshore Dr. (SR-332)	0.8	Widen roadway from 2 to 4-lanes w/median and new bicycle/pedestrian facilities	Under Construction, Completion target of 8/22/2021
Foothills Mall Drive Extension to Foch Street	13-211	US-129 Bypass (SR-115) to Foch St.	0.5	Construct new 2-lane road with center turn lane and sidewalks	In R-O-W stage, Construction Programmed in FY 2020
I-275 Industrial Park Access Improvements	09-618	Blackstock Ave: from W. Fifth Ave. to Bernard Ave., Marion St: from Bernard Ave. to Baxter Ave., Intersections of University Ave. with W. Fifth Ave. and Bernard Ave. Add greenway between W. Fifth Ave. and Baxter Ave.	0.5	Roadway and intersection improvements to enhance access to I-275 Business Park. Blackstock Ave: extend from Fifth Ave. to Bernard Ave.; Marion St: realign; University Ave: intersections with W Fifth Ave. and Bernard Ave.	Under Construction, expected completion in Fall 2021
I-640 at Broadway Interchange	09-611	I-640 at Broadway		Reconstruct and relocate ramps	Under Construction, Completion Soon
Montvale Rd (SR-336) Widening	09-262	Montvale Station Rd to Lamar Alexander Pkwy (US-321/SR-73)	0.6	Reconstruct 2-lane road with addition of continuous center turn lane and bicycle/pedestrian facilities	In Design, Construction Programmed in FY 2022
Morganton Road Reconstruction - Phase 1	09-211	Foothills Mall Dr to William Blount Dr (SR-335)	2.2	Reconstruct 2-lane road with addition of turn lanes	In NEPA, Construction Programmed for FY 2022

Project Name	KRMP ID	Termini	Length (miles)	Project Description	Status as of May 2020
Pellissippi Pkwy (SR-162)/Oak Ridge Hwy Interchange	09-649	Interchange at Oak Ridge Hwy (SR-62)		Reconstruct interchange to provide ramp for westbound to southbound movement	In Design, Construction Programmed in FY 2023
Pellissippi Pkwy (SR-162/I-140) and Dutchtown Rd Interchange	09-623	I-40 to Dutchtown Rd Interchange	0.4	Widen Pellissippi Pkwy from 1 to 2 lanes westbound and lengthen storage of westbound off-ramp at Dutchtown Road interchange	Under Construction, Comp. target of 7/31/2020
Pellissippi Pkwy/Hardin Valley Interchange	09-634	Interchange at Hardin Valley Rd		Reconfigure existing interchange to improve safety and operations. Add new northbound on-ramp in NE quadrant.	Under Construction, Comp. target of July 2021
Robert C. Jackson Drive Extension	09-238	Lamar Alexander Pkwy (US-321/SR-73) to Morganton Rd	1.2	Construct new 2-lane roadway with sidewalks	Under Construction, Comp. target of Spring 2020
Robert C. Jackson Drive SIA	NA	Lamar Alexander Pkwy (US-321/SR-73) to Middlesettlements Rd	1.2	Add center turn lane	Under Construction Comp. target of June 2022
Schaad Rd Extension	09-605	Middlebrook Pk (SR-169) to W of Oak Ridge Hwy (SR-62)	4.6	Construct new 4-lane roadway with sidewalks	Construction beginning by Summer 2020
Schaad Rd Widening	09-625	Oak Ridge Hwy. (SR-62) to Pleasant Ridge Rd.	1.5	Widen from 2 to 4 lanes with addition of sidewalks	In R-O-W stage, Construction within next year or so
Sevierville Rd (SR-35/US-411) Widening	09-214	Washington St (SR-35) to Walnut St	0.4	Reconstruct 2-lane road with addition of continuous center turn lane and bicycle/pedestrian facilities	In NEPA, Construction Programmed for FY 2023
US 129 Widening	17-203	Foothills Mall Dr to Mall Rd	0.3	Intersection improvements at Foothills Mall Dr/Montgomery Ln and addition of turn lanes	In R-O-W stage, Construction later in 2020

Project Name	KRMP ID	Termini	Length (miles)	Project Description	Status as of May 2020
US 129 Widening	17-204	Mall Rd to Lamar Alexander Pkwy (US-321/SR-73)	0.7	Intersection improvements at W. Lamar Alexander Pkwy (US-321/SR-73) and addition of turn lanes	Under Construction, Completion target of 3/20/2020
US-321 (SR-73) Widening	09-423	E. Simpson Rd to north of SR-2 (US-11) in Lenoir City	1.4	Widen from 4 to 6 lanes	Under Construction, Comp. Soon
Western Ave (SR-62) Widening	09-610	Texas Ave to Major Ave	0.8	Widen from 2 to 5 lanes	Under Construction, Comp. target of 6/7/2020