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UPDATE

# Connected2045

Long-Range Transportation Plan for the St. Louis Region



# AAQ

***Air Quality Conformity  
Determination and Documentation  
8-Hour Ozone & PM<sub>2.5</sub>***



EAST-WEST GATEWAY  
Council of Governments

Creating Solutions Across Jurisdictional Boundaries

# Update to *Connected 2045*: Long Range Transportation Plan for the St. Louis Region

## *Air Quality Conformity Determination and Documentation for Eight-Hour Ozone and PM<sub>2.5</sub>*

***East-West Gateway Council of Governments (EWGCOG) hereby gives public notice that it is the policy of the agency to assure full compliance with Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987, Executive Order 12898 on Environmental Justice, and related statutes and regulations in all programs and activities. Title VI requires that no person in the United States of America, on the grounds of race, color, sex, or national origin, shall be excluded from the participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which EWGCOG receives federal financial assistance. Any person who believes they have been aggrieved by an unlawful discriminatory practice under Title VI has a right to file a formal complaint with EWGCOG. Any such complaint must be in writing and filed with EWGCOG's Title VI Coordinator within one hundred eighty (180) calendar days following the date of the alleged discriminatory occurrence. For more information, or to obtain a Title VI Nondiscrimination Complaint Form, please see EWGCOG's web site at <http://www.ewgateway.org/TitleVI> or call (314) 421-4220 or (618) 274-2750.***

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DRAFT

# Executive Summary

The expectation of a clean and healthy environment is one of the regional goals specified in the Update to *Connected 2045: Long Range Transportation Plan for the St. Louis Region* (*Connected2045* Update). Effective July 2012, EPA classified the eight-county St. Louis region as a “marginal” non-attainment area under the new, more protective 2008 eight-hour ozone standard. Jersey County, Illinois has been designated by EPA as being in attainment of the 2008 ozone standard. EPA designated the three Illinois counties as having attained this standard on March 1, 2018 and the Missouri counties on September 20, 2018. In 2018, EPA designated the following counties as a “marginal” non-attainment area for the 2015 eight-hour ozone standard: St. Charles and St. Louis Counties, the City of St. Louis and Boles Township in Franklin County in Missouri; and Madison and St. Clair Counties in Illinois (effective August 3, 2018). In January 2005, EPA designated the eight-county St. Louis region and Baldwin Township in Randolph County, Illinois as being in non-attainment of the 1997 annual fine particulate matter (PM<sub>2.5</sub>) standard. Effective October 2, 2018, EPA designated the Missouri counties to be in attainment of the PM<sub>2.5</sub> standard.

A major objective of the East-West Gateway Council of Governments transportation planning process is to ensure that the projects and policies set out in the *Connected2045* Update help to reduce and minimize air quality impacts of transportation projects in accordance with federal, state, and local air quality standards, regulations, and priorities. The specific procedures for reaching this objective are established under Federal law for ensuring conformity between transportation plans and air quality improvement plans. The conformity process is intended to ensure that the programs and activities proposed in long-range transportation plans and associated TIPs conform to the purpose of air quality State Implementation Plans, which set out benchmarks against which progress is measured in meeting national goals for cleaner and healthier air.

Under the Federal Regulations, the Council, as the region’s Metropolitan Planning Organization (MPO), is the agency responsible for conducting this determination of conformity. The transportation conformity finding relates to those precursor pollutants produced by automobiles and other on-road transportation, generally described as “mobile source emissions.” The pollutants of most concern in this region are ozone and its precursors of oxides of nitrogen (NO<sub>x</sub>) and volatile organic compounds (VOCs); and direct PM<sub>2.5</sub> (resulting from vehicle exhaust, brake wear, and tire wear) and NO<sub>x</sub> as a PM<sub>2.5</sub> precursor.

Ground-level ozone is not directly produced, but is formed when hydrocarbons, also known as VOCs, and NO<sub>x</sub> from vehicle and truck exhaust and other industrial processes chemically react, or “cook,” with oxygen in the lower atmosphere in the presence of strong sunlight and high temperatures. High levels of ozone can cause headaches; fatigue; and eye, nose, and respiratory tract irritation. Prolonged exposure to ozone can aggravate chronic heart disease and chronic respiratory ailments.

Particulate matter (PM) is a mix of solid particles and liquid droplets suspended in the air. Fine PM is considered to be less than or equal to 2.5 microns in diameter (about 1/30th the width of a human hair). Fine PM is made up of a variety of components, including acids, organic chemicals, metals, dirt, or dust particles. Fine PM is able to penetrate and lodge in deep areas of the lungs. Health effects include irritation of the eyes, sore throat, coughing, chest tightness, and shortness of breath. PM also can trigger asthma attacks. People most at risk from exposure include those with asthma, heart disease, or lung disease; children; and the elderly.

The primary purpose of the conformity process is to demonstrate that predicted future emissions from motor vehicles fall within criteria specified in air quality implementation plans (Federal or State). Future

# Executive Summary

levels of mobile-source emissions are influenced by a number of factors, each of which is accounted for in the forecasting process.

1. All forms of pollution are affected by the number of people living in the region and the strength of the regional economy. Projections developed for Update to *Connected 2045 Update: Long Range Transportation Plan for the St. Louis Region* (*Connected2045 Update*) serve as a basis for the Air Quality analysis of the Plan and TIP. Forecast levels of population growth and economic activity are a major determinant of how much travel is generated, which directly influences the amount of mobile source emissions.
2. Estimates of future travel are made using the Council's travel demand modeling procedures. These procedures document a range of factors that affect personal and commercial travel. These include the composition and income of households, trends in trip making, use of transit, vehicle occupancy, and various algorithms that replicate trip length and route choice. The result of this inventory of procedures is a model of predicted future travel patterns. The primary determinants of pollution from vehicle exhaust are the number of vehicles, how far they travel, and the speed at which they travel. The last is important because the amount of pollution generated by a given amount of travel is very much higher under "stop-and-go" conditions than if traffic is flowing smoothly, although vehicle emissions tend to rise as vehicle speeds exceed 60 mph. The travel demand model is used to develop predictions of vehicle miles of travel (VMT) and vehicle speed.
3. There is a strong correlation between VMT, travel speeds, and emission levels. These relationships are modified by local characteristics of the vehicle fleet (such as the age of vehicles), the effect of vehicle emissions testing and other programs designed to reduce emissions (such as the use of reformulated gasoline), and assumptions about predicted changes in vehicle technology. These travel characteristics are used as inputs into the EPA's Motor Vehicle Emissions Simulator (MOVES) model. This model is used to predict regional mobile source emission levels.

It should be noted that many current trends such as the growth in regional population, employment, and travel would have the effect of increasing emissions if not for the offsets created by improvement in vehicle technology, more extensive vehicle emissions testing regimens and the introduction of reformulated gasoline. Slow to moderate growth in travel has been more than offset by the general introduction of newer pollution-reducing technology. This trend is expected to continue into the future.

Based on the conformity analysis, the projects and programs included in the *Connected2045 Update* have met all applicable budget tests as required by the regional emissions analysis and, therefore, are found to be in conformity with the requirements of the Clean Air Act Amendments of 1990, the relevant sections of the Final Conformity Rule 40 CFR Part 93, and the Missouri State Conformity Regulations 10 CSR 10-5.480.

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# Conformity Process

## 1.0 Air Quality Conformity Finding

The Update to *Connected2045*: Long Range Transportation Plan for the St. Louis Region (*Connected2045* Update) has been prepared by the East-West Gateway Council of Governments (EWG) which is the designated Metropolitan Planning Organization (MPO) for the St. Louis region. In accordance with the Clean Air Act Amendments (CAAA) of 1990 and related federal regulations, both the Transportation Plan and TIP must be found to be in conformity with the requirements of those regulations and with all applicable State Implementation Plans (SIPs) before the Plan may be approved by the MPO. The analysis described in this document has resulted in a Determination that the projects and programs included in the *Connected2045* Update conform to the relevant sections of the Federal Conformity Rule and to the applicable sections of the Missouri and Illinois SIPs for air quality. Jersey County and Baldwin Township in Randolph County, Illinois are also included in this Conformity Determination.

This report makes the determination that the region's transportation plan and program satisfy all applicable criteria and procedures in the conformity regulations.

The transportation *Air Quality Conformity Determination and Documentation (8-Hour Ozone & PM<sub>2.5</sub>) for the Connected2045 Update* documentation is the subject of a public comment period running from May 8, 2019 through June 7, 2019. Upon close of the public comment period the EWG Board will recognize, consider, and respond to all comments received.

## 2.0 Background

This report describes the transportation air quality Conformity Determination conducted as part of the development of the *Connected2045* Update as related to the 2008 and 2015 eight-hour ozone National Ambient Air Quality Standards (NAAQS or standard) and the 1997 annual PM<sub>2.5</sub> standard. The *Connected2045* Update and related air quality Conformity Determination are to be acted on by the East-West Gateway Council of Governments (EWG) on June 26, 2019 and, if approved, subsequently reviewed by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Transportation (DOT) for compliance with Transportation Conformity rules and regulations.

The EWG finds that the *Connected2045* Update conform to the State Implementation Plans (SIPs) adopted by the Missouri Department of Natural Resources (MoDNR) and Illinois Environmental Protection Agency (Illinois EPA) for the 2008 and 2015 eight-hour ozone standards and the 1997 annual fine particulate matter (PM<sub>2.5</sub>) standard based on the results of this conformity analysis. The regionally significant project located in Jersey County, Illinois was found to conform to the 1997 eight-hour ozone standard.

For the 2008 and 2015 eight-hour ozone standards, the Conformity Determination addresses those ozone-forming pollutants (volatile organic compounds or VOC and oxides of nitrogen or NO<sub>x</sub>) produced by automobiles and other on-road transportation, generally described as "mobile source emissions". For the 1997 annual PM<sub>2.5</sub> standard, this Conformity Determination addresses emissions of direct PM<sub>2.5</sub> and NO<sub>x</sub> (a pollutant which is a potential precursor of PM<sub>2.5</sub>),

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which are produced by automobiles and other on-road transportation. While this chapter outlines the evaluation process involved in the Conformity Determination, a more detailed description of the complex technical analysis is provided in the Appendices. Appendix A lists all of the projects considered as part of the Regional Travel Demand Model, which are included in the regional emissions analysis. Appendices B, C and D describe the planning assumptions and methods used to forecast vehicle travel and resulting emissions. Appendices E and F summarize the calculations supporting the Conformity Determination for the 2008 and 2015 eight-hour ozone standard and the 1997 annual PM<sub>2.5</sub> standard respectively. Appendix G describes the PM<sub>2.5</sub> Conformity Determination process for Baldwin Township in Randolph County, Illinois. Appendix H describes the 1997 eight-hour ozone standard Conformity Determination process for Jersey County, Illinois. In a separate document Appendix I contains the input and output files documentation for the Motor Vehicle Emissions Simulator (MOVES) mobile source emissions model.

## 3.0 Conformity Guidelines

The expectation of *"a clean and healthy environment"* is one of the regional goals of the Council, as first set out in *Transportation Redefined I* and reaffirmed in *Connected2045 Update*. To that end, the Council has set out the following objective for the transportation planning process:

*"To reduce transportation related air pollution..... in accordance with federal, state, and local health standards and priorities."*

The specific procedures for reaching that objective are those established under Federal law for ensuring conformity between transportation plans and air quality improvement plans. The Conformity Determination process is intended to ensure that the programs and activities proposed in the Transportation Plan, the TIP and TIP amendments, conform to the purpose of the CAAA of 1990 and the SIPs. As stated in the CAAA of 1990, this means *"...conformity to the (implementation) plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards..."*. The provisions of the CAAA of 1990 in relation to conformity are amplified in the U.S. Environmental Protection Agency (EPA) Final Rule, 40 CFR Part 93, as amended July 1, 2004, May 6, 2005 and January 2008, March 2010 and March 2012. The July 2004 revisions amended the current Conformity rule to: provide conformity procedures under the new eight-hour ozone and PM<sub>2.5</sub> air quality standards; incorporate existing federal guidance into the Conformity rule consistent with the March 2, 1999 U.S. Court of Appeals decisions; and streamline and improve the rule. With the May 2005 revision, the following transportation-related potential precursors of PM<sub>2.5</sub> have been added to the Conformity regulation: oxides of nitrogen (NO<sub>x</sub>), volatile organic compounds (VOC), sulfur oxides (SO<sub>x</sub>) and ammonia (NH<sub>3</sub>). The regulation also specified when each of these precursors must be considered in Conformity Determinations in PM<sub>2.5</sub> non-attainment and maintenance areas before and after the submission of State Implementation Plans (SIPs). The January 2008 amendments were made so the rule was consistent with the Clean Air Act section 176(c) as amended by the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) including: changes to the regulations to reflect that the Clean Air Act now provides more time for state and local governments to meet conformity requirements; provides a one-year grace period before the

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consequences of not meeting certain conformity requirements apply; and allows the option of shortening the conformity determination timeframe. Other conformity provisions were streamlined. This Conformity Determination also meets the new timelines and procedures as set out in SAFETEA-LU. The March 2010 amendment primarily affects the implementation of conformity in the PM<sub>2.5</sub> (24-hour) and PM<sub>10</sub> non-attainment and maintenance areas. In March 2012 the Conformity rule was restructured so that existing rule requirements clearly apply to areas designated for future new or revised NAAQS. Revision also allows PM<sub>2.5</sub> areas with clean air quality data to take advantage of conformity flexibilities that are currently only available to ozone areas.

Based on 2000-2002 air quality monitoring data, the St. Louis region was found to meet the one-hour ozone standard. On May 12, 2003, EPA approved the re-designation to attainment requests and Maintenance Plans prepared by MoDNR and Illinois EPA. The entire eight-county St. Louis region is now classified as a maintenance area for the one-hour ozone standard.

In 2004, EPA designated the St. Louis area as a “moderate” non-attainment area for the 1997 eight-hour ozone standard. The non-attainment area included: Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis in Missouri; and Jersey, Madison, Monroe and St. Clair Counties in Illinois. EWG, as the MPO, had until June 15, 2005 to perform a Conformity Determination under this eight-hour ozone standard. In March 2005 EWG conducted a Conformity Determination for *Legacy 2030*, The Transportation Plan for the St. Louis Region, which satisfied the June 15 statutory deadline requirement. On June 12, 2012, EPA approved the following items: the request by Illinois to re-designate the Illinois counties to attainment of the 1997 eight-hour ozone standard; and the Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 1997 8-Hour Ozone National Ambient Air Quality Standard (IL 8-Hour Ozone Maintenance Plan for the 1997 standard) containing 2008 and 2025 motor vehicle emissions budgets. On February 20, 2015, EPA approved Missouri’s request to re-designate the Missouri counties as being in attainment of the 1997 eight-hour ozone standard and approved the associated maintenance plan. Effective April 6, 2015, EPA revoked the 1997 eight-hour ozone standard in all areas.

Effective July 2012, the St. Louis area was designated by EPA as a “marginal” non-attainment area for the 2008 eight-hour ozone standard. The non-attainment area includes: Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis in Missouri; and Madison, Monroe and St. Clair Counties in Illinois. (See Figure 1) EWG, as the MPO, had until July 19, 2013 to perform a Conformity Determination under this eight-hour ozone standard. The January 30, 2013 Conformity Determination for the Amendment to the FY 2013-2016 TIP and related amendments to the *Regional Transportation Plan 2040* was performed with the Conformity procedure as relates to the 2008 eight-hour ozone standard. This Conformity Determination satisfied all requirements under the new “marginal” non-attainment area classification. In the March 1, 2018 Federal Register, EPA issued a final rule, effective March 1, 2018, re-designating Madison, Monroe and St. Clair Counties in Illinois as being in attainment of the 2008 eight-hour ozone standard, approving the Maintenance Plan for the Metro East St. Louis Ozone Nonattainment Area for the 2008 Ozone National Ambient Air Quality Standard (IL 8-Hour Maintenance Plan for 2008 standard) and finding the 2030 motor vehicle emissions budgets adequate for use in Conformity Determination. In the September 20, 2108 Federal Register, EPA

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issued a final rule approving the request by MoDNR to re-designate Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis to attainment for the 2008 ozone standard. EPA also approved Missouri's Maintenance Plan and the 2030 motor vehicle emission budgets for VOC and NO<sub>x</sub>.

On April 30, 2018, EPA designated the St. Louis area as a "marginal" non-attainment area for the 2015 eight-hour ozone standard (effective August 3, 2018). The non-attainment area includes: in Missouri, St. Charles and St. Louis Counties, the City of St. Louis and Boles Township in Franklin County; and Madison and St. Clair Counties in Illinois. EWG, as the MPO, has until August 3, 2019 to perform a Conformity Determination under this eight-hour ozone standard. The Conformity Determination for the *Connected2045* Update will address the 2015 eight-hour ozone standard.

The regional emissions analysis provisions in 40 CFR 93.109 (e)(2)(iii) of the Conformity Rule are to be followed. The ozone regional emissions analysis for the two ozone standards in the Missouri maintenance and non-attainment counties will use 2015 motor vehicle emissions budgets for VOC and NO<sub>x</sub> from the Early Progress Plan for the Missouri Portion of the St. Louis Nonattainment Area for the 2008 8-Hour Ground Level Ozone National Ambient Air Quality Standard (MO Early Progress Plan). These budgets were developed using MOVES2010 and were found adequate by EPA (letter to MoDNR dated October 28, 2013). In the January 14, 2016 Federal Register, EPA issued a final rule approving the MO Early Progress Plan (effective March 14, 2016). The ozone regional emissions analysis for the Missouri counties will also use 2030 motor vehicle emissions budgets for VOC and NO<sub>x</sub> from the February 2018 Technical Correction to the Re-designation Request and Maintenance Plan for the St. Louis (Missouri) 2008 Ozone Standard (MO Maintenance Plan). These budgets were developed using MOVES2014a and were found adequate by EPA (letter to MoDNR dated May 15, 2018). In the June 8, 2018 Federal Register, EPA issued a final rule approving the motor vehicle emissions budgets from the MO Maintenance Plan for use in Conformity Determination process (effective June 22, 2018). The MO Maintenance Plan was approved by EPA on September 20, 2018.

The ozone regional emissions analysis for the Illinois maintenance and non-attainment areas for both ozone standards will utilize the 2008 and 2025 VOC and NO<sub>x</sub> motor vehicle emissions budgets from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard. EPA has found these MOVES2010-derived budgets adequate for Conformity Determination purposes and approved this Maintenance Plan in June 2012. The 2030 motor vehicle emissions budgets for VOC and NO<sub>x</sub> from the IL 8-Hour Ozone Maintenance Plan for 2008 standard will also be used in this Conformity Determination. These budgets were developed using MOVES2014a and were found adequate by EPA (September 26, 2017 letter to Illinois EPA). In the December 11, 2017 Federal Register, a final rule (effective December 26, 2017) was issued by EPA finding the 2030 budgets adequate for conformity purposes. In the March 1, 2018 Federal Register, EPA issued a final rule, effective March 1, 2018, finding the 2030 motor vehicle emissions budgets adequate for use in Conformity Determination.

Jersey County was designated by EPA as a maintenance area for the 1997 ozone standard. In 2012 this county was designated by EPA as being in attainment of the 2008 ozone standard. In the July 2012 Transportation Conformity Guidance for 2008 Ozone Nonattainment Areas, EPA stated that transportation conformity requirements for counties like Jersey cease to apply on July 20, 2013 and

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that no further conformity determinations for the 1997 ozone standard are required on or after that date. As the 1997 ozone standard has been revoked (March 6, 2015), no further conformity determinations for this ozone standard were required.

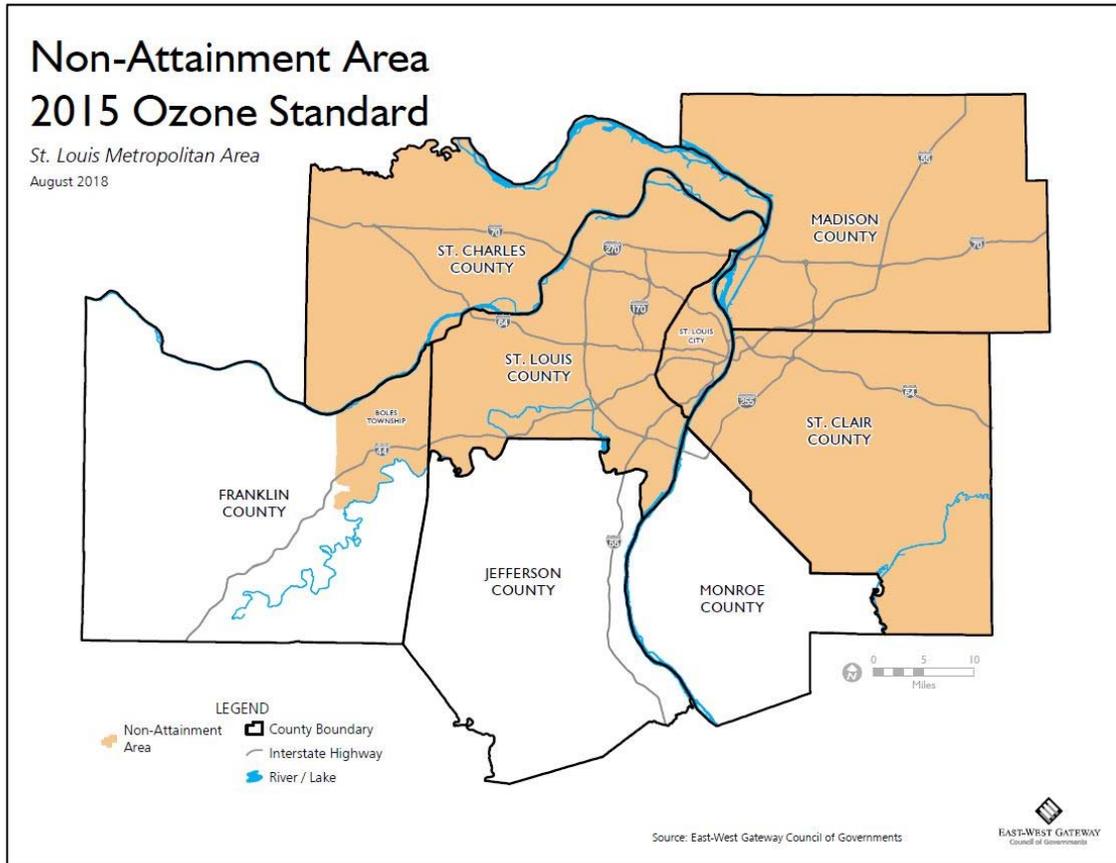
On February 16, 2018, the U.S. Court of Appeals for the District of Columbia issued a ruling in the South Coast Air Quality Management District vs. EPA case challenging EPA's final rule for implementing the 2008 ozone National Ambient Air Quality Standard (NAAQS) or 2008 ozone NAAQS State Implementation Plan (SIP) requirements rule. The court vacated portions of this rule but upheld EPA's revocation of the 1997 ozone standard in 2015. In its decision, the court used the term "orphan areas" to describe those 1997 ozone standard non-attainment or maintenance areas which EPA had designated as being attainment of the 2008 ozone standard. This decision has been under review by EPA, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). FHWA and FTA released interim guidance in April and October 2018 delineating the conformity process for the 1997 ozone standard for the 82 orphan areas. The eight-county St. Louis (MO-IL) region and Jersey County Illinois was identified as an orphan area. The interim guidance was used to prepare the Conformity Determination for the FY 2019-2022 Transportation Improvement Program (TIP) and related Amendments to Connected2045. Only regionally significant projects in Jersey County were affected by the interim guidance.

In April 2018 EPA requested a rehearing by the court of certain aspects of the February decision. On September 14, 2018 the court agreed to stay its vacatur of the portion of the EPA rule "that exempts orphan areas from transportation conformity" until February 16, 2019 and denied the other aspects of rehearing request. EPA then issued guidance in November 2018 describing how transportation conformity determination can be made in the total or partial orphan areas which were either in non-attainment or maintenance for the 1997 ozone standard at the time it was revoked in March 2015.

According to the EPA guidance, a partial orphan maintenance has attained the 1997 ozone standard and is maintaining the standard as of March 6, 2015 and is not included in the smaller 2008 ozone nonattainment area. The eight-county St. Louis (MO-IL) region and Jersey County Illinois was identified as a partial orphan maintenance area. Jersey County is considered the orphan area because EPA found it to be in maintenance for the 1997 ozone standard and in attainment for the 2008 and 2015 ozone standards. Transportation conformity for the revoked 1997 ozone standard is to be performed for orphan areas containing regionally significant projects, such as Jersey County.

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Figure 1 – St. Louis Non-Attainment Area - 2015 Ozone Standard



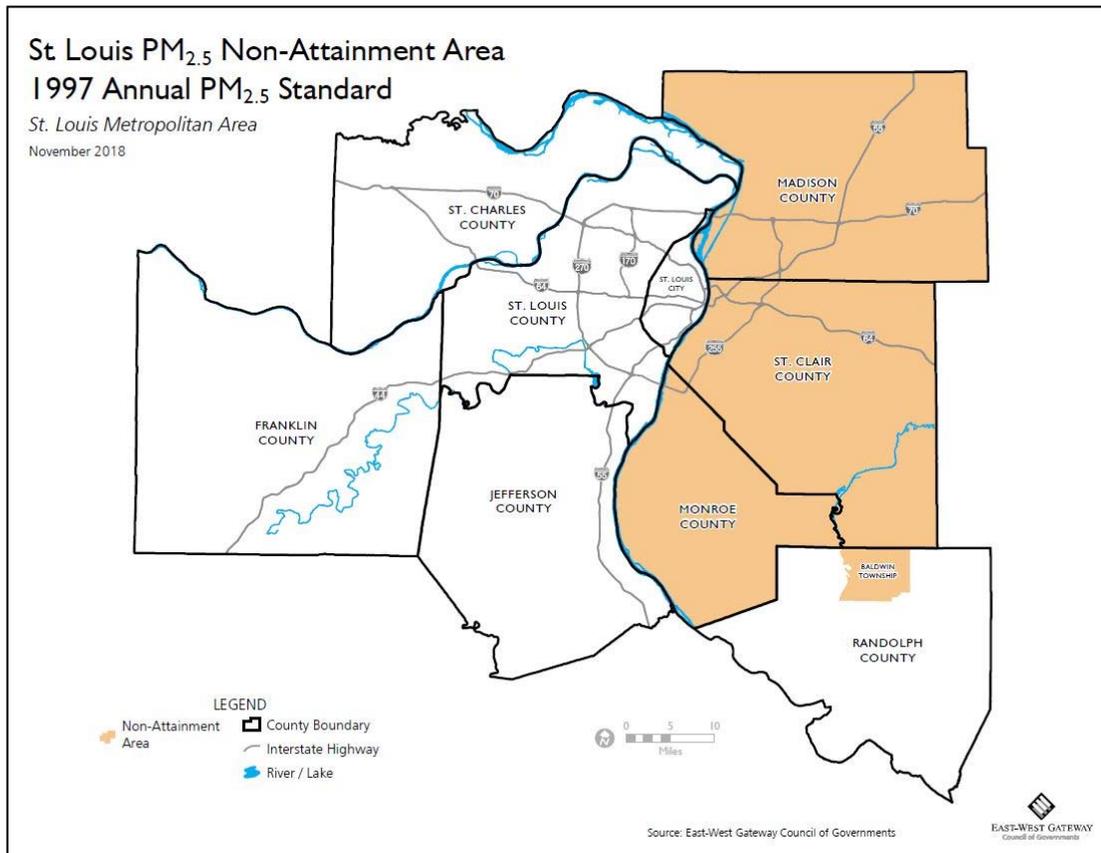
In 2005, EPA designated the eight-county St. Louis region as being in non-attainment of the 1997 annual  $PM_{2.5}$  standard. (See Figure 2) The non-attainment area includes: Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis in Missouri; and Madison, Monroe and St. Clair Counties in Illinois. Baldwin Township in Randolph County, Illinois is also part of the non-attainment area. EWG, as the MPO, was required to demonstrate Conformity with the current Transportation Plan and TIP for the  $PM_{2.5}$  standard by April 5, 2006. In February 2006 EWG conducted a Conformity Determination on the FY 2006-2009 TIP and related amendments to Legacy 2030, The Transportation Plan for the St. Louis Region, which satisfied this statutory deadline requirement. Effective October 2, 2018, EPA re-designated the Missouri counties to attainment for this standard. Based on the 2016 Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements: Final Rule, when an area is re-designated to attainment for the 1997 standard, the 1997 standard is revoked and conformity requirements no longer apply. The Conformity Determination for the *Connected2045* Update has been performed for the Illinois non-attainment area with the Conformity procedure set out for the 1997 annual  $PM_{2.5}$  standard.

In December 2014 (effective April 15, 2015), EPA found that it could not determine, based on available data, whether the eight-county St. Louis region and Baldwin Township in Randolph

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County, Illinois met the 2012 annual PM<sub>2.5</sub> standard or was contributing to a nearby violation. EPA has identified this area as “unclassifiable”. With no air quality plans in place for this “unclassifiable area for the 2012 annual PM<sub>2.5</sub> standard, transportation air quality Conformity Determination is not needed with respect to this standard.

Figure 2 – St. Louis Non-Attainment Area – PM<sub>2.5</sub> Standard



The regional emissions analysis provisions in 40 CFR 93.109 and 119, as relates to areas in non-attainment of the 1997 PM<sub>2.5</sub> standard, of the Conformity Rule have been followed. Baldwin Township in Randolph County, Illinois (outside the EWG MPO boundary) is part of the St. Louis annual PM<sub>2.5</sub> non-attainment area. Through the Inter Agency Consultation process, consensus was reached that the Illinois Department of Transportation (IDOT) would be the lead agency in overseeing the Baldwin Township PM<sub>2.5</sub> Conformity Determination process. Furthermore, IDOT has provided EWG staff with the VMT information for Baldwin Township. PM<sub>2.5</sub> emissions for Baldwin Township were calculated by utilizing the IDOT VMT information. These estimated and projected emissions were added to the emissions totals for Madison, Monroe and St. Clair Counties. Baldwin Township has been found to be in compliance with all applicable Conformity rules and procedures (see Appendix G).

Within PM non-attainment or maintenance areas, as part of the NEPA process, a transportation project sponsor has to determine if proposed major transportation project would be considered to

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be a “project of air quality concern.” A project of air quality concern usually involves either large traffic volumes and/or significant diesel traffic (i.e., bridge, bus or rail terminals). If a project were deemed a project of concern, a project-level PM hot-spot Conformity Determination would be required. However, the development of the hot-spot analysis is the responsibility of the project sponsor and not the MPO.<sup>1</sup> For example, in 2006 a qualitative PM hot-spot analysis was done by IDOT for the New Mississippi River Bridge project.

Part of the region, consisting of the City of St. Louis and that portion of St. Louis County within the I-270 loop, is classified as a limited maintenance area for carbon monoxide (CO). On June 17, 1997 the MoDNR submitted The Missouri State Implementation Plan for Carbon Monoxide - St. Louis Metropolitan Area: Maintenance Provisions and Re-designation Request, October 1996 to EPA. The re-designation request was approved by EPA on March 31, 1999. MoDNR submitted their second CO maintenance plan, Revision to the Limited Maintenance Plan for the St. Louis Nonclassifiable Maintenance Area for the 8-Hour Carbon Monoxide National Ambient Air Quality Standard to EPA on April 3, 2014. The plan adequately demonstrated that the area will maintain the CO standard through 2022 and EPA plan approval was published in the October 2, 2015 Federal Register. As a result, the Limited Carbon Monoxide Maintenance Plan option allows plan conformity without a technical analysis.

Under the provisions of the CAAA of 1990, EWG, as the MPO for the region, is the agency responsible for making the Conformity Determination. The Conformity Determination described in this document was performed in accordance with DOT and EPA guidance and procedures. Procedures were implemented in accordance with all applicable provisions of 40 CFR Part 93, specific sections 93.109, 113 and 118 and relevant guidelines and documentation issued by DOT and EPA<sup>2</sup>.

In 2007, MoDNR prepared a St. Louis Transportation Conformity Rule and in 2010 MoDNR proposed changes to the 2007 Transportation Conformity Rule. These rule changes were submitted to the Missouri Air Conservation Commission (MACC). In October 2010, the MACC approved the changes to the St. Louis Transportation Conformity Rule based on the January 2009 “Guidance for Developing Transportation Conformity State Implementation Plans (SIPs)” by EPA. The updated rule was effective February 28, 2011. Final approval of this rule by EPA took place on October 28, 2013. As the Illinois Transportation Conformity SIP is still under review by EPA, the Illinois part of the region remains subject to the provisions of the Federal Transportation Conformity Rule.

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<sup>1</sup>None of the projects in this Conformity Determination required a PM<sub>2.5</sub> hot-spot analysis. No projects exceeded the federal guidelines for AADT and percent of diesel truck traffic.

<sup>2</sup> EPA, *Transportation Conformity Regulations as of April 2012*, April 2012; EPA, *Transportation Conformity Guidance for 2008 Ozone NAAQS Nonattainment Areas*, July 2012; EPA, *MOVES2010b User Guide*, July 2012; EPA, *Policy Guidance for Use of MOVES2010 and Subsequent Minor Revisions for State Implementation Plan Development, Transportation Conformity, and Other Purposes*, April 2012; EPA, *Guidance for Transportation Conformity Implementation in Multi-jurisdictional Nonattainment and Maintenance Areas*, July 2012; EPA, *Volume IV: Mobile Sources, Procedures for Emission Inventory Preparation*, EPA-450/4-81-026d (revised), July 1992; FHWA, *Transportation Conformity Guide: A Basic Guide for State and Local Officials*, revised 2010.

## 4.0 Conformity Determination Process

### 4.1 1997 Eight-Hour Ozone Standard

On February 16, 2018, the U.S. Court of Appeals for the District of Columbia issued a decision in the South Coast Air Quality Management District vs. EPA case challenging EPA's final rule for implementing the 2008 ozone National Ambient Air Quality Standard (NAAQS) or 2008 ozone NAAQS State Implementation Plan (SIP) Requirements rule. The court vacated portions of this rule but upheld EPA's revocation of the 1997 ozone standard on March 6, 2015. In its decision, the court used the term "orphan areas" to describe those 1997 ozone standard non-attainment or maintenance areas which EPA had designated as being in attainment of the 2008 ozone standard. This decision has been under review by EPA, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). FHWA and FTA released interim guidance in April and October 2018 which delineated the conformity process for the 1997 ozone standard for the 82 orphan areas. The eight county St. Louis (MO-IL) region and Jersey County Illinois was identified as an orphan area. EWG used this interim guidance to prepare the Conformity Determination for the FY 2019-2022 Transportation Improvement Program (TIP) and Related Amendments to *Connected2045*. Only regionally significant projects in Jersey County were affected by this interim guidance.

In April 2018 EPA requested a rehearing by the court of certain aspects of the February decision. On September 14, 2018, the court agreed to stay its vacatur of the portion of the EPA rule "that exempts orphan areas from transportation conformity" until February 16, 2019 and denied the other aspects of the rehearing request. Transportation conformity for the revoked 1997 ozone standard is to be performed for orphan areas starting February 16, 2019. EPA then issued guidance in November 2018 describing how transportation conformity determinations can be made in the total or partial orphan areas which were either in nonattainment or maintenance for the 1997 ozone standard at the time that standard was revoked in 2015. A partial orphan maintenance area is considered to be an area which was in maintenance (had attained) for the 1997 ozone standard as of March 6, 2015 but for which the non-attainment area for the 2008 ozone standard is smaller.

The eight-county St. Louis (MO-IL) region and Jersey County Illinois were identified as a partial orphan maintenance area. Jersey County is considered the orphan area because EPA found it to be in maintenance for the 1997 ozone standard and in attainment for both the 2008 and 2015 ozone standards. Regionally significant projects in Jersey County have to be part of the Conformity Determination process. Through the Inter Agency Consultation process, the Illinois Department of Transportation (IDOT) indicated there is one such project in Jersey County and provided project information. For this project in Jersey County, conformity determination will be performed in relation to the 1997 eight-hour ozone standard.

The current transportation conformity regulation states that a regional emissions analysis is required starting one year after a non-attainment designation for a particular standard and continues until the effective date of the revocation of that standard by EPA. As the February 2018

# Conformity Process

court decision upheld EPA's revocation of the 1997 ozone standard, a regional emissions analysis is not required in a conformity determination for that standard in orphan areas. For the regionally significant project in Jersey County, the determination of conformity for the 1997 ozone standard is to be demonstrated by showing the following criteria delineated in the Final Conformity Rule 40 CFR Part 93 have been met: use of latest planning assumptions for Transportation Control Measures (TCMs) in approved State Implementation Plan (SIP) if TCMs are in that SIP; consultation requirements; timely implementation of any approved SIP TCMs if TCMs are in that SIP; and fiscal constraint. The use of the latest emissions model and either the emissions budget test or the interim emissions test is not required. The conformity analysis for the 1997 ozone standard for Jersey County was shown to satisfy: inter agency and public consultation has taken place (see Section 5; and fiscal constraint of the regionally significant project (described in Appendix H). As the IL 8-Hour Ozone Maintenance Plan for the 1997 Standard does not contain TCMs, the first and third criteria do not apply. Documentation for this item and the process to determine conformity for the 1997 ozone standard can be found in Appendix H of the Conformity document. Conformity for the 1997 ozone standard has been satisfied.

## 4.2 2008 and 2015 Eight-Hour Ozone Standards

### 4.2.1 State Implementation Plans

An ozone control strategy SIP contains measures and policies for reducing ozone-forming emissions of VOC and NO<sub>x</sub>. A Maintenance Plan demonstrates how an area that has attained an air quality standard will continue to attain the relevant standard for a minimum ten-year period. The plan also contains strategies that can be implemented in the event the region's air quality subsequently violates the applicable standard. Mobile sources, essentially road-based transportation, are one of several broad categories of pollution sources. The Maintenance Plan SIP contains estimates of attainment year emissions from all source categories and projects future year emissions. Future year emissions estimates must be lower than the emissions estimated for the attainment year. In addition, the total emissions projected for on-road mobile sources in specific future years are established as motor vehicle emissions budgets for the purposes of conducting transportation conformity. Preparation of the SIP is the responsibility of the State. A SIP must be submitted to EPA in accordance with a schedule delineated in Federal regulation. EPA approval is required for all SIPs. Motor vehicle emissions budgets contained in a submitted SIP may be used as a basis for Conformity Determination findings before the SIP is formally approved, provided EPA has issued a specific Finding of Adequacy.

The process EPA uses to determine the adequacy of submitted SIP budgets for conformity is contained in a May 14, 1999 Memorandum from EPA entitled "*Conformity Guidance on Implementation of the March 2, 1999 Conformity Court Decision*" and the July 2004 Conformity rule revision.

For the Missouri 2008 eight-hour ozone maintenance area (five counties), the Conformity Determination is made in relation to the 2015 motor vehicle emissions budgets from the Missouri Early Progress Plan for the 2008 standard. These budgets were established with the MOVES2010 model. In a letter to MoDNR dated October 28, 2013, EPA found these budgets

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adequate for Conformity Determination purposes. In the March 5, 2014 Federal Register, EPA issued a notice of adequacy for the 2015 budgets for Conformity purposes (effective March 19, 2014). In the January 14, 2016 Federal Register, EPA issued a final rule approving the MO Early Progress Plan (effective March 14, 2016). The Conformity Determination is also made in relation to the 2030 motor vehicle emissions budgets from the February 2018 technical correction MO Maintenance Plan for the 2008 standard. These budgets were established with the MOVES2014a model. In a letter to MoDNR dated May 15, 2018, EPA found these budgets adequate for Conformity Determination purposes. In the June 8, 2018 Federal Register, EPA issued a notice of adequacy for the 2030 budgets for Conformity purposes (effective June 22, 2018). In the September 20, 2018 Federal Register EPA issued a final rule approving the request by MoDNR and re-designated Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis as being in attainment of the 2008 ozone standard. EPA also approved Missouri's Maintenance Plan and the 2030 motor vehicle emission budgets for VOC and NO<sub>x</sub>.

For the Missouri 2015 eight-hour ozone non-attainment area (see Figure 1), the Conformity Determination is made in relation to the 2015 motor vehicle emissions budgets from the Missouri Early Progress Plan for the 2008 standard. The Conformity Determination is also made in relation to the 2030 motor vehicle emissions budgets from the February 2018 technical correction MO Maintenance Plan for the 2008 standard.

At this time, Missouri does not have motor vehicle emissions budgets for the 2015 eight-hour ozone standard which have been approved or found adequate for conformity purposes by EPA. Approved or adequate motor vehicle emissions budgets from an applicable SIP or SIP submission for another (previous) ozone standard can be used in the regional emissions analysis. Since the Missouri non-attainment area for the 2015 eight-hour ozone standard has a smaller geographic area than what was established for the 2008 eight-hour ozone standard, EPA's Transportation Conformity Regulation sets out the option to either use the corresponding portion of the previous budgets which matches the 2015 non-attainment area in the regional emissions analysis or to use the existing budgets as is. EWG, after inter agency consultation, decided to use the existing motor vehicle emissions budgets from the Missouri SIPs as is.

For the Illinois 2008 eight-hour ozone standard maintenance area (Madison, Monroe and St. Clair counties), the Conformity Determination is made in relation to the 2025 motor vehicle emissions budgets contained in the IL 8-Hour Ozone Maintenance Plan for the 1997 standard. These budgets were developed using the MOVES2010 model. On December 22, 2011, EPA found the 2008 and 2025 budgets in this Maintenance Plan adequate for Conformity Determination purposes. On June 12, 2012, EPA approved the IL 8-Hour Ozone Maintenance Plan for the 1997 standard and the 2008 and 2025 motor vehicle emissions budgets. For the remaining analysis years, the Conformity Determination is made in relation to the 2030 motor vehicle emissions budgets from the IL 8-Hour Maintenance Plan for 2008 standard. These budgets were developed using MOVES2014a and were adequate by EPA (September 26, 2017 letter to Illinois EPA). In the December 11, 2017 Federal Register, EPA issued a final rule approving these 2030 budgets which was effective December 26, 2017. In the March 1, 2018 Federal Register, EPA issued a final rule, effective March 1, 2018, re-designating Madison, Monroe and St. Clair Counties in Illinois as being in attainment of the 2008 eight-hour ozone standard, approving the Maintenance Plan for the Metro East St. Louis Ozone Nonattainment Area for the 2008 Ozone National

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Ambient Air Quality Standard (IL 8-Hour Maintenance Plan for 2008 standard) and finding the 2030 motor vehicle emissions budgets adequate for use in Conformity Determination.

For the Illinois 2015 eight-hour ozone standard non-attainment area (see Figure 1) the Conformity Determination is made in relation to the 2008 and 2025 motor vehicle emissions budgets contained in the IL 8-Hour Ozone Maintenance Plan for the 1997 standard. For the remaining analysis years, the Conformity Determination is made in relation to the 2030 motor vehicle emissions budgets from the IL 8-Hour Maintenance Plan for the 2015 standard.

At this time, Illinois does not have motor vehicle emissions budgets for the 2015 eight-hour ozone standard which have been approved or found adequate for conformity purposes by EPA. Approved or adequate motor vehicle emissions budgets from an applicable SIP or SIP submission for another (previous) ozone standard can be used in the regional emissions analysis. Since the Illinois non-attainment area for the 2015 eight-hour ozone standard has a smaller geographic area than what was established for the 2008 eight-hour ozone standard, EPA's Transportation Conformity Regulation sets out the option to either use the corresponding portion of the previous budgets which matches the 2015 non-attainment area in the regional emissions analysis or to use the existing budgets as is. EWG, after inter agency consultation, decided to use the existing motor vehicle emissions budgets from the Illinois SIPs as is.

## 4.2.2 Regional Emissions Analysis: Emissions Budget Tests

The principal step toward making a Conformity Determination for the 2008 eight-hour ozone standard for the analysis years 2025, 2030, 2035 and 2045 is to demonstrate that the anticipated emission levels of ozone precursor pollutants which will result from planned and programmed transportation projects (the "Action" scenario) will be less than the level defined in the motor vehicle emissions budgets from the MO Early Progress Plan for the 2008 standard, the MO Maintenance Plan for the 2008 standard, the IL 8-Hour Ozone Maintenance Plan for the 1997 standard and the IL 8-Hour Ozone Maintenance Plan for the 2008 standard. The SIP motor vehicle emissions budgets from the MO Early Progress Plan for the 2008 standard and the IL 8-Hour Ozone Maintenance Plan for the 1997 standard were established using the MOVES2010 model for the two sets of pollutants which are precursors of ozone formation, VOC, primarily hydrocarbons, and NO<sub>x</sub>. The VOC and NO<sub>x</sub> motor vehicle emissions budgets from the MO Maintenance Plan for the 2008 standard and the IL 8-Hour Ozone Maintenance Plan for the 2008 standard were established using the MOVES2014a model.

The principal step toward making a Conformity Determination for the 2015 eight-hour ozone standard for the analysis years 2020, 2025, 2030, 2035 and 2045 is to demonstrate that the anticipated emission levels of ozone precursor pollutants which will result from planned and programmed transportation projects (the "Action" scenario) will be less than the level defined in the motor vehicle emissions budgets from the MO Early Progress Plan for the 2008 standard, the MO Maintenance Plan for the 2008 standard, the IL 8-Hour Ozone Maintenance Plan for the 1997 standard and the IL 8-Hour Ozone Maintenance Plan for the 2008 standard.

# Conformity Process

## 4.2.2.1 Missouri

To conduct a Conformity Determination for the 2008 eight-hour ozone standard for the 2025 analysis year, it is necessary to demonstrate that the anticipated emission levels of precursor pollutants of ozone formation (VOC, primarily hydrocarbons, and NO<sub>x</sub>) which will result from the “Action” scenario will be less than the 2015 motor vehicle emissions budgets (Table 1) from the MO Early Progress Plan for the 2008 standard. These budgets were developed with the MOVES2010 model. In a letter to MoDNR dated October 28, 2013, EPA issued an adequacy finding for the 2015 VOC and NO<sub>x</sub> motor vehicle emissions budgets. In the March 5, 2014 Federal Register, EPA issued a notice of adequacy for the 2015 budgets for Conformity purposes (effective March 19, 2014). These budgets can be used in the Conformity Determination process. In the January 14, 2016 Federal Register, EPA issued a final rule approving the MO Early Progress Plan (effective March 14, 2016). To conduct a Conformity Determination for the analysis years of 2030, 2035 and 2045, it is necessary to demonstrate that the anticipated emission levels VOC and NO<sub>x</sub> which will result from the “Action” scenario will be less than the 2030 motor vehicle emissions budgets from the MO Maintenance Plan for the 2008 standard. These budgets were developed with the MOVES2014a model. In a letter to MoDNR dated May 15, 2018, EPA issued an adequacy finding for the 2030 VOC and NO<sub>x</sub> motor vehicle emissions budgets. In the June 8, 2018 Federal Register, EPA issued a notice of adequacy for the 2015 budgets for Conformity purposes (effective June 22, 2018). These budgets can be used in the Conformity Determination process. In the September 20, 2108 Federal Register EPA issued a final rule approving the request by MoDNR and re-designated Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis as being in attainment of the 2008 ozone standard. EPA also approved Missouri’s Maintenance Plan and the 2030 motor vehicle emission budgets for VOC and NO<sub>x</sub>.

To conduct a Conformity Determination for the 2015 eight-hour ozone standard for the 2020 and 2025 analysis years, it is necessary to demonstrate that the anticipated emission levels of precursor pollutants of ozone formation (VOC, primarily hydrocarbons, and NO<sub>x</sub>) which will result from the “Action” scenario will be less than the 2015 motor vehicle emissions budgets (Table 1) from the MO Early Progress Plan for the 2008 standard. To conduct a Conformity Determination for the analysis years of 2030, 2035 and 2045, it is necessary to demonstrate that the anticipated emission levels VOC and NO<sub>x</sub> which will result from the “Action” scenario will be less than the 2030 motor vehicle emissions budgets from the MO Maintenance Plan for the 2008 standard.

The 2015 and 2030 motor vehicle emissions budgets are summarized in Table 1.

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Table 1 Missouri Motor Vehicle Emissions Budgets (US tons per day)		
Pollutant	2015 MO Early Progress Plan	2030 MO Maintenance Plan
Volatile Organic Compounds (VOC)	32.70	22.00
Oxides of Nitrogen (NO <sub>x</sub> )	76.70	40.00

## 4.2.2.2 Illinois

To conduct a Conformity Determination for the 2008 eight-hour ozone standard for the analysis year 2025 it is necessary to demonstrate that the anticipated emission levels of atmospheric pollutants which will result from planned and programmed transportation projects (the "Action" scenario) will be less than the level defined in the 2025 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard. The SIP motor vehicle emissions budgets were established using the MOVES2010 model for the two sets of pollutants which are precursors of ozone formation, VOC, primarily hydrocarbons, and NO<sub>x</sub>. A finding of adequacy for the 2025 budgets was issued by EPA and published in the December 22, 2011 Federal Register. On June 12, 2012, EPA approved the IL 8-Hour Ozone Maintenance Plan for the 1997 standard. For the analysis years of 2030, 2035 and 2045 it is necessary to demonstrate that the anticipated emission levels of atmospheric pollutants which will result from the "Action" scenario will be less than the level defined in the 2030 motor vehicle emissions budgets from the IL 8-Hour Ozone Maintenance Plan for the 2008 standard. The SIP motor vehicle emissions budgets for VOC and NO<sub>x</sub> were established using the MOVES2014a model. A finding of adequacy for the 2030 budgets was issued by EPA and published in the December 11, 2017 Federal Register and to be effective December 26, 2017. On March 1, 2018, EPA approved the IL 8-Hour Ozone Maintenance Plan for the 2008 standard including the 2030 budgets.

To conduct a Conformity Determination for the 2015 eight-hour ozone standard for the analysis year 2020 it is necessary to demonstrate that the anticipated emission levels of atmospheric pollutants which will result from planned and programmed transportation projects (the "Action" scenario) will be less than the level defined in the 2008 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard. To conduct a Conformity Determination for the analysis year 2025, it is necessary to demonstrate the anticipated emission levels of atmospheric pollutants which will result from planned and programmed transportation projects (the "Action" scenario) will be less than the level defined in the 2025 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard. The 2008 and 2025 SIP motor vehicle emissions budgets were established using the MOVES2010 model for the two sets of pollutants which are precursors of ozone formation, VOC, primarily hydrocarbons, and NO<sub>x</sub>. A finding of adequacy for the 2008 and 2025 budgets was issued by EPA and published in the December 22, 2011 Federal Register. On June 12, 2012, EPA approved the IL 8-Hour Ozone Maintenance Plan for the 1997 standard. For the analysis years of

# Conformity Process

2030, 2035, and 2045 it is necessary to demonstrate that the anticipated emission levels of atmospheric pollutants which will result from the “Action” scenario will be less than the level defined in the 2030 motor vehicle emissions budgets from the IL 8-Hour Ozone Maintenance Plan for the 2008 standard. The SIP motor vehicle emissions budgets for VOC and NO<sub>x</sub> were established using the MOVES2014a model. A finding of adequacy for the 2030 budgets was issued by EPA and published in the December 11, 2017 Federal Register and to be effective December 26, 2017. On March 1, 2018, EPA approved the IL 8-Hour Ozone Maintenance Plan for the 2008 standard including the 2030 budgets.

The 2008, 2025 and 2030 motor vehicle emissions budgets are summarized in Table 2.

Pollutant	2008 Illinois 8-Hour Ozone Maintenance Plan for 1997 Standard	2025 Illinois 8-Hour Ozone Maintenance Plan for 1997 Standard	2030 Illinois 8-Hour Ozone Maintenance Plan for 2008 Standard
Volatile Organic Compounds (VOC)	17.27	5.68	9.05
Oxides of Nitrogen (NO <sub>x</sub> )	52.57	15.22	16.68

### 4.2.3 Conformity Tests: Analysis Years

For the *Connected2045* Update the tests detailed in Sections 4.2.2 addressing the 2008 eight-hour ozone standard have to be satisfied for those transportation projects and programs expected to be operational by the analysis year of 2045 (horizon year of the regional transportation plan) and for the analysis years 2025, 2030 and 2035.

For the *Connected2045* Update the tests detailed in Sections 4.2.2 addressing the 2015 eight-hour ozone standard have to be satisfied for those transportation projects and programs expected to be operational by the analysis year of 2045 (horizon year of the regional transportation plan) and for the analysis years 2020, 2025, 2030 and 2035.

### 4.2.4 Conformity Tests for the *Connected2045* Update- Summary - Missouri and Illinois

In accordance with current EPA guidance, and in consultation with the Inter Agency Consultation Group (IACG), EWG is utilizing the following mobile source emissions tests for determining conformity on the Plan and TIP. This Conformity Determination has been prepared in relation to the budgets and tests applicable as of October 30, 2018 and on the most current planning

# Conformity Process

assumptions as agreed to by the IACG. The MOVES2014a model was utilized in completing the conformity budgets tests for Missouri and Illinois.

## **Pollutants**

### Missouri and Illinois

Volatile Organic Compounds (VOC)

Oxides of Nitrogen (NO<sub>x</sub>)

### Missouri only

Carbon Monoxide (CO): no tests are required in the limited maintenance area

## **Analysis Years – 2008 Eight-Hour Ozone Standard**

2025 – First analysis year (IL 8-Hour Ozone Maintenance Plan for the 1997 standard has 2025 budgets)

2030 – Intermediate analysis year (MO Maintenance Plan and IL Maintenance Plan for the 2008 standard both have 2030 budgets)

2035 - Intermediate analysis year

2045 - Horizon year for *Connected2045* Update

## **Tests of Conformity – 2008 Eight-Hour Ozone Standard**

### Missouri

“Action” scenario compared with the 2015 motor vehicle emissions budget from the MO Early Progress Plan for 2008 standard for VOC for 2025

“Action” scenario compared with the 2015 motor vehicle emissions budget from the MO Early Progress Plan for 2008 standard for NO<sub>x</sub> for 2025

“Action” scenario compared with the 2030 motor vehicle emissions budget from the MO Maintenance Plan for 2008 standard for VOC for 2030, 2035 and 2045

“Action” scenario compared with the 2030 motor vehicle emissions budget from the MO Maintenance Plan for 2008 standard for NO<sub>x</sub> for 2030, 2035 and 2045

### Illinois

“Action” scenario compared with the 2025 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard for VOC for 2025

“Action” scenario compared with the 2025 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard for NO<sub>x</sub> for 2025

“Action” scenario compared with the 2030 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 2008 standard for VOC for 2030, 2035 and 2045

“Action” scenario compared with the 2030 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 2008 standard, for NO<sub>x</sub> for 2030, 2035 and 2045

## **Analysis Years – 2015 Eight-Hour Ozone Standard**

2020 – Attainment year for the areas designated as marginal non-attainment for the 2015 eight-hour ozone standard

2025 – Intermediate analysis year (IL 8-Hour Ozone Maintenance Plan for the 1997 standard has 2025 budgets)

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2030 – Intermediate analysis year (MO Maintenance Plan and IL Maintenance Plan for the 2008 standard both have 2030 budgets)

2035 - Intermediate analysis year

2045 - Horizon year for *Connected2045* Update

## Tests of Conformity – 2015 Eight-Hour Ozone Standard

### Missouri

“Action” scenario compared with the 2015 motor vehicle emissions budget from the MO Early Progress Plan for 2008 standard for VOC for 2020 and 2025

“Action” scenario compared with the 2015 motor vehicle emissions budget from the MO Early Progress Plan for 2008 standard for NO<sub>x</sub> for 2020 and 2025

“Action” scenario compared with the 2030 motor vehicle emissions budget from the MO Maintenance Plan for 2008 standard for VOC for 2030, 2035 and 2045

“Action” scenario compared with the 2030 motor vehicle emissions budget from the MO Maintenance Plan for 2008 standard for NO<sub>x</sub> for 2030, 2035 and 2045

### Illinois

“Action” scenario compared with the 2008 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard for VOC for 2020

“Action” scenario compared with the 2008 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard for NO<sub>x</sub> for 2020

“Action” scenario compared with the 2025 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard for VOC for 2025

“Action” scenario compared with the 2025 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 1997 standard for NO<sub>x</sub> for 2025

“Action” scenario compared with the 2030 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 2008 standard for VOC for 2030, 2035 and 2045

“Action” scenario compared with the 2030 motor vehicle emissions budget from the IL 8-Hour Ozone Maintenance Plan for the 2008 standard, for NO<sub>x</sub> for 2030, 2035 and 2045

## 4.2.5 Transportation Control Measures

Another element of a Conformity Determination is an assessment of progress in implementing Transportation Control Measures (TCMs). These measures are intended to reduce emissions or concentrations of pollutants from transportation sources by reducing vehicle use or otherwise reducing vehicle emissions. For the St. Louis region, the 15 Percent Rate-of-Progress ozone SIPs included categories of TCMs, together with estimates of the anticipated emissions benefits. The 1997 report: *Transportation Control Measures in the St. Louis Region: Completion Report* documented the implementation of TCMs by general SIP category of control measures. Currently the State does not have any TCMs in their SIP and therefore no TCMs are part of the Regional Emissions Analysis. However, the Congestion Mitigation Air Quality (CMAQ) program is ongoing and has produced emission reduction projects that EWG monitors. EWG maintains a database of CMAQ projects and their related emission reduction benefits.

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## 4.2.6 Conformity Determination Technical Methodology

The calculation of VOC and NO<sub>x</sub> mobile source emissions is a two-step process for each analysis year. First, all regionally significant transportation facilities are included in EWG's regional travel demand model. This includes all projects from the *Connected2045* Update. Appendix A lists the projects included in the regional emissions analysis. Utilizing the project list from Appendix A, the travel demand model is used to forecast vehicle miles of travel in the region. The underlying assumptions regarding population and employment changes in the region are set out for reference in Appendix B. The travel demand modeling assumptions and procedures are discussed in Appendix C.

Second, the MOVES2014a emissions model is used to develop emissions factors that indicate how much of each pollutant is produced per vehicle mile of travel. These factors are applied to the forecasts from the travel demand model to derive a modeled total of vehicle emissions for each of the two pollutants in each of the four analysis periods. These procedures are discussed, and the results summarized, in Appendix D and Appendix E. Appendix I contains documentation of input and output files associated with the MOVES2014a model.

In all, emissions have to be estimated for both pollutants (i.e. VOC and NO<sub>x</sub>) related to three time periods (a.m. peak, p.m. peak and off-peak), for both states in the Plan's analysis years and for the inspection and maintenance (I/M) test area and non I/M test area, giving multiple sets of emissions calculations. The predicted emissions that result from these modeling procedures are then subject to each of the tests of conformity outlined above. The results are shown in Tables 3 through 6 below and also in Appendix E.

Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Emissions	2015 Budget	Emissions	2015 Budget
2025	11.56	32.70	18.19	76.70
Analysis Year	Emissions	2030 Budget	Emissions	2030 Budget
2030	8.96	22.00	13.10	40.00
2035	7.84	22.00	11.00	40.00
2045	6.94	22.00	10.02	40.00
All tests have been passed for all years.				

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Table 4 Regional Emissions Analysis: Conformity Tests – ILLINOIS Based on Conformity Requirements for 2008 Eight-Hour Ozone Standard (US tons per day)				
Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Emissions	2025 Budget	Emissions	2025 Budget
2025	5.49	5.68	7.86	15.22
Analysis Year	Emissions	2030 Budget	Oxides of Nitrogen	
			Emissions	2030 Budget
2030	4.16	9.05	5.66	16.68
2035	3.44	9.05	4.65	16.68
2045	3.05	9.05	4.40	16.68
All tests have been passed for all years.				

Table 5 Regional Emissions Analysis: Conformity Tests - MISSOURI Based on Conformity Requirements for 2015 Eight-Hour Ozone Standard 3 County and 1 Township Non-Attainment Area				
Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Action	2015 Budget	Action	2015 Budget
2020	13.12	32.70	24.65	76.70
2025	9.84	32.70	15.36	76.70
		2030 Budget		2030 Budget
2030	7.61	22.00	11.01	40.00
2035	6.64	22.00	9.20	40.00
2045	5.8613	22.00	8.3180	40.00
All tests have been passed for all years.				

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Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Action	2008 Budget	Action	2008 Budget
2020	6.91	17.27	11.74	52.57
		2025 Budget		2025 Budget
2025	5.16	5.68	7.42	15.22
		2030 Budget		2030 Budget
2030	3.90	9.05	5.33	16.68
2035	3.33	9.05	4.52	16.68
2045	2.87	9.05	4.16	16.68

All tests have been passed for all years.

## 4.3 Fine Particulate Matter (PM<sub>2.5</sub>)

### 4.3.1 State Implementation Plans

A PM<sub>2.5</sub> control strategy SIP contains measures and policies for reducing emissions of direct PM<sub>2.5</sub> and NO<sub>x</sub>, as a precursor to PM<sub>2.5</sub> formation. MoDNR submitted Missouri's Redesignation Demonstration and Maintenance Plan for the Missouri Portion of the St. Louis Non-Attainment Area for the 1997 Annual Fine Particulate National Ambient Air Quality Standard (Missouri Annual PM<sub>2.5</sub> Maintenance Plan) to EPA in August 2011. This plan was prepared for Franklin, Jefferson, St. Charles and St. Louis counties and the City of St. Louis. The Missouri Air Conservation Commission approved a technical supplement for this plan on March 24, 2014 which included PM<sub>2.5</sub> and NO<sub>x</sub> (as a precursor) motor vehicle emission budgets, request for redesignation to attainment and 2008 base year emissions inventory. MoDNR conducted modeling exercises and demonstrated that VOC, NH<sub>3</sub> and SO<sub>2</sub> were not significant contributors to the PM<sub>2.5</sub> problem and budgets for them did not need to be developed. Effective October 2, 2018, EPA redesignated this area to attainment of the 1997 annual PM<sub>2.5</sub> standard and approved the Missouri Annual PM<sub>2.5</sub> Maintenance Plan. Illinois is in the process of completing its annual PM<sub>2.5</sub> Maintenance Plan SIP for submittal to EPA. A Maintenance Plan demonstrates how an area that has attained an air quality standard will continue to attain the relevant standard for a minimum ten-year period. The plan also contains strategies that can be implemented in the event the region's air quality subsequently violates the applicable standard. Mobile sources, essentially road-based transportation, are one of several broad categories of pollution sources. The Maintenance Plan contains estimates of attainment year emissions from all source categories and projects future year emissions. Future year emissions estimates must be lower than the emissions estimated for the attainment year. In addition, the total emissions projected for on-road mobile sources in specific future years are established as motor vehicle emissions budgets for the purpose of conducting transportation conformity. EPA approval is required for all SIPs. Motor vehicle emissions budgets contained in a submitted SIP may be used as a basis for Conformity

# Conformity Process

Determination findings before the SIP is formally approved, provided EPA has issued a specific Finding of Adequacy.

## 4.3.2 Attainment of the 1997 Annual PM<sub>2.5</sub> Standard and Conformity Requirements

In the August 24, 2016 Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements: Final Rule, one item EPA addressed was the timing of the revocation of the 1997 annual PM<sub>2.5</sub> standard and associated conformity determination obligations. This rule laid out the requirements state, local and tribal air agencies will have to meet to implement current and future PM<sub>2.5</sub> standards. Effective October 24, 2016, the 1997 standard is to be revoked (for all purposes) in those areas previously designated by EPA as being in attainment. This includes areas initially designated attainment for the 1997 standard and non-attainment areas EPA re-designated to attainment prior to that date.

According to this rule, the 1997 standard will remain in effect after October 2016 in those areas which have not been re-designated to attainment and the requirement to perform a conformity determination will continue. On the effective date of EPA's re-designation of an area to attainment of this standard after October 2016, the 1997 standard will be revoked for that area and conformity requirements no longer apply.

Effective October 2, 2018, EPA re-designated the Missouri portion of the St. Louis PM<sub>2.5</sub> non-attainment area to attainment for the 1997 annual PM<sub>2.5</sub> standard and approved the Missouri Annual PM<sub>2.5</sub> Maintenance Plan. Since the 1997 standard has been revoked, conducting a conformity determination for this standard for the Missouri counties is no longer required.

Because the Illinois portion of the area remains non-attainment for the 1997 annual PM<sub>2.5</sub> standard, it remains subject to transportation conformity.

## 4.3.3 Regional Emissions Analysis – Pollutants

Mobile source-related direct PM<sub>2.5</sub> is to be included in the regional emissions analysis. Direct PM<sub>2.5</sub> emissions come from vehicle exhaust, brake wear and tire wear.

The following transportation-related pollutants are considered to be potential precursors of PM<sub>2.5</sub> formation: NO<sub>x</sub>; VOC; SO<sub>x</sub>; and NH<sub>3</sub> (according to the May 2005 Final Conformity Rule). Before SIP motor vehicle emissions budgets have been found adequate or approved by EPA, NO<sub>x</sub> is to be included in the regional emissions analysis component of a Conformity Determination unless it is found to be an insignificant contributor to the air quality problem by the state air agency and the EPA Regional Office. Since such a finding has not been made for either the Missouri portion or the Illinois portion of the St. Louis PM<sub>2.5</sub> non-attainment area, the PM<sub>2.5</sub> Conformity Determination will include the precursor NO<sub>x</sub> emissions.

The May 2005 Final Conformity Rule also stated that before SIP motor vehicle emissions budgets are found adequate or approved by EPA, inclusion in the regional emissions analysis is not required for VOC, SO<sub>x</sub> and NH<sub>3</sub> unless the state air agency or the EPA Regional Office finds that the on-road emissions of any of these pollutants/precursors are a significant contributor to the PM<sub>2.5</sub> problem of an area.

# Conformity Process

Currently, Illinois is in the process of finalizing its annual PM<sub>2.5</sub> SIP and nothing definitive has been reached concerning the significance and/or insignificance of PM<sub>2.5</sub> precursor mobile source emissions. These findings were discussed at the December 2005 IACG meeting, which resulted in a MoDNR e-mail, which documented the IACG consensus.

## 4.3.4 Regional Emissions Analysis: Interim Emissions Test

Illinois is in the process of completing its annual PM<sub>2.5</sub> SIP Maintenance Plan, including motor vehicle emissions budgets, for submittal to EPA. Federal regulations set out an interim process to follow for a Conformity Determination. This process is to be used to demonstrate Conformity until EPA finds adequate or approves the motor vehicle emissions budgets. Either the no-greater-than-2002 baseline test or the build-less-than-or-equal-to-no-build test can be selected. EWG, with the consensus of the IACG, decided that the most appropriate test for the St. Louis (Missouri-Illinois) PM<sub>2.5</sub> non-attainment area would be the no-greater-than-2002 baseline test.

The principal step toward making a Conformity Determination for the selected analysis years is to demonstrate that the anticipated emission levels of atmospheric pollutants which will result from planned and programmed transportation projects (the "Action" scenario) will be less than the 2002 baseline emissions inventory for the Illinois PM<sub>2.5</sub> non-attainment area. In order to ensure consistency in the regional emissions analysis, EWG, with input of Illinois EPA, developed 2002 baseline emission estimate using the MOVES2010 model (see Table 7). As the Illinois portion St. Louis area is in non-attainment of the annual PM<sub>2.5</sub> standard, the regional emissions analysis has to use annual emissions.

Through the Inter Agency Consultation process, it was agreed that for each of the analysis years, estimated emissions data for Baldwin Township in Randolph County, Illinois would be added to the Illinois 2002 baseline emissions and the Illinois "Action" scenario for the "Action"/2002 Baseline tests.

State	Direct PM <sub>2.5</sub>	Oxides of Nitrogen (NO <sub>x</sub> )
Illinois*	809.55	21,788.78
<b>Non-Attainment Area Total</b>	<b>3,496.71</b>	<b>91,707.65</b>

\* Includes Baldwin Township in Randolph County

## 4.3.5 Conformity Test: Analysis Years

For the *Connected2045* Update, the test detailed in Sections 4.3.3 have to be satisfied for those transportation projects and programs expected to be operational by the analysis year 2045 (horizon year of the regional transportation plan) and for the analysis years 2020, 2030 and 2035.

# Conformity Process

## 4.3.6 PM<sub>2.5</sub> Conformity Test for the *Connected2045* Update – Summary

In accordance with current EPA guidance, and in consultation with the IACG, EWG has decided to adopt the following mobile source emissions test for determining conformity on the Plan and TIP. This Air Quality Conformity Determination has been prepared in relation to the tests applicable as of October 30, 2018 and on the most current planning assumptions as agreed to by the IACG. The MOVES2014a model was used to complete the baseline tests for the Illinois non-attainment area.

### **Pollutants**

Direct PM<sub>2.5</sub>  
Oxides of Nitrogen (NO<sub>x</sub>), as a precursor of PM<sub>2.5</sub>

### **Analysis Years**

2020 - First analysis year (Near term year between one and five years in future)  
2030 – Interim analysis year  
2035 - Intermediate analysis year  
2045 - Horizon year for *Connected2045* Update

### **Test of Conformity**

“Action” scenario compared with the 2002 baseline emissions test for direct PM<sub>2.5</sub> for Illinois non-attainment area  
“Action” scenario compared with the 2002 baseline emissions test for NO<sub>x</sub> (as a precursor) for Illinois non-attainment area

## 4.3.7 Transportation Control Measures

Potential PM<sub>2.5</sub> Transportation Control Measures (TCMs) have yet to be identified in the Illinois SIP development process. Consequently, PM<sub>2.5</sub> emissions benefits related to any future TCMs projects have not been calculated nor included in any emissions analysis.

## 4.3.8 Conformity Determination Technical Methodology

The calculation of on-road mobile source emissions is a three-step process for each analysis year. First, all regionally significant transportation facilities are included in EWG’s regional travel demand model. This includes all projects from the *Connected2045* Update. Appendix A lists the projects included in the regional emissions analysis. Utilizing the project list from Appendix A, the travel demand model is used to forecast vehicle miles of travel in the region. The underlying assumptions regarding population and employment changes in the region are set out for reference in Appendix B. These modeling assumptions and procedures are discussed in Appendix C.

Second, the MOVES2014a emissions model is used to develop emissions factors that indicate how much of each pollutant is produced per vehicle mile of travel. These factors are applied to the forecasts from the travel demand model to derive a modeled total of vehicle emissions for each of the two pollutants in each of the five analysis periods. These procedures are discussed,

# Conformity Process

and the results summarized, in Appendix D and Appendix F. Appendix I contains documentation of input and output files associated with the MOVES2014a model.

Finally, annual emissions have to be calculated for both pollutants (i.e., direct PM<sub>2.5</sub> and NO<sub>x</sub>), for Illinois in four different analysis years and for the inspection and maintenance (I/M) test area and non-I/M test area. There are numerous sets of emissions calculations for each state which then are summed together to develop emissions estimates for the PM<sub>2.5</sub> non-attainment area.

The predicted emissions that result from these modeling procedures are then subject to each of the tests of conformity outlined above. The results are shown in Table 8 and also in Appendix F.

Table 8 Regional Emissions Analysis: Conformity Tests for Illinois* Based on Conformity Requirements for Annual PM <sub>2.5</sub> Standard (US tons per year)				
Analysis Year	Direct PM <sub>2.5</sub>		Oxides of Nitrogen	
	Action	Baseline	Action	Baseline
2020	206.5016	809.55	4,547.6352	21,788.78
2030	128.1168	809.55	2,100.8429	21,788.78
2035	117.6981	809.55	1,765.2300	21,788.78
2045	116.8264	809.55	1,684.3398	21,788.78

All tests have been passed for all years.  
\*Includes Baldwin Township

# Consultation and Public Participation

## 5.0 Consultation and Public Participation

### 5.1 Consultation: Conformity Procedures

Federal regulation requires that Conformity Determinations must be made:

- Each time a new RTP or TIP is adopted
- Each time a new RTP or TIP is amended, unless the amendment merely adds or deletes exempt projects
- Within 24 months of the effective date of a EPA finding that motor vehicle emissions budgets from an initially submitted control strategy SIP or maintenance plan are adequate for Conformity Determination purposes
- Within 24 months of the effective date of a EPA approval of a control strategy SIP revision or maintenance plan which establishes or revises a motor vehicle emissions budget if that budget has not yet been used in a conformity determination prior to approval
- Within 24 months of the effective date of a EPA promulgation of an implementation plan which establishes or revises a motor vehicle emissions budget
- Not less frequently than every four years
- Within 12 months of a newly designated non-attainment area

MPOs responsible for making conformity determinations must follow procedures for inter-agency and public consultation and review as described in DOT and EPA regulations. These include by reference the requirements of the Missouri state conformity regulations (10CSR-5.480), as adopted by the Missouri Air Conservation Commission in August 1996, effective in December 1996. In October 2010, the Missouri Air Conservation Commission approved changes to the state's Transportation Conformity Rule based on the January 2009 "Guidance for Developing Transportation Conformity State Implementation Plans (SIPs)" by EPA. The updated rule was effective February 28, 2011. Final approval of this rule by EPA took place on October 28, 2013. Federal Highway Administration (FHWA), EPA, MoDNR and Illinois EPA may comment on Conformity Determinations.

The principal forum for the discussion of technical issues relating to conformity is the Inter Agency Consultation Group (IACG). The role of this group in the conformity process is defined in both the Missouri and the Illinois Conformity Regulations. Membership in this group is shown below.

# Consultation and Public Participation

<b>Inter Agency Consultation Group</b>	
East-West Gateway Council of Governments	Federal Highway Administration, Missouri Division
Illinois Department of Transportation	Federal Highway Administration, Illinois Division
Illinois Environmental Protection Agency	Federal Transit Administration, Region VII
Missouri Department of Natural Resources	U.S. Environmental Protection Agency, Region 5
Missouri Department of Transportation	U.S. Environmental Protection Agency, Region 7
Metro	Madison County Transit District
St. Louis County Department of Health	Madison County Highway Department
St. Louis County Department of Highways and Traffic	St. Clair County Transit District
City of St. Louis Department of Health	St. Clair County Department of Roads and Bridges

During the preparation of the Conformity Determination for the *Connected2045* Update, the IACG met on October 30, 2018, January 29, 2019, and March 26, 2019 to determine the best course of action. The general approach to the Conformity Determination, the procedures used and all of the major assumptions have been subject to discussion, review and, where appropriate, consensus approval by this group. In addition, many other agencies are involved in the process leading to a Conformity Determination through their involvement in EWG's Air Quality Advisory Committee and Executive Advisory Committee.

## 5.2 When Conformity Analysis Begins

At the February 2009 meeting, the IACG reached consensus that the start of the Conformity Analysis would be defined as the date of the initiation of the operation of the travel demand model for Conformity Determination purposes. For this Determination, that date is October 30, 2018.

## 5.3 Public Participation for the *Connected2045* Update and Conformity Determination and Documentation (8-Hour Ozone & PM<sub>2.5</sub>)

Federal legislation and the metropolitan transportation planning regulations require MPOs to have an enhanced public participation process. Citizen interest in transportation planning has continued to grow as EWG has taken actions to increase public awareness of the transportation decision-making process.

EWG uses a variety of methods to achieve greater public participation. Among these are the extensive use of all types of media to explain the planning process, face-to-face meetings with citizens' groups, and easy-to-understand publications that are distributed via mail, email and on the EWG web site. The underlying premise of the public participation process is that more citizens will participate in the planning process if they understand the factors that influence transportation decisions.

The *Public Involvement Plan*, adopted by the EWG Board in May 2014 establishes the mechanisms by which EWG reaches out to its many stakeholders and the public.

The EWG web site, [www.ewgateway.org](http://www.ewgateway.org), includes information about EWG, its planning partners, MPO activities and opportunities for citizens to learn and participate in transportation

# Consultation and Public Participation

decisions. Meetings of all EWG committees, task forces and other groups, as well as notes from past meetings are regularly posted on the site. The Web site also includes links to many other transportation resources. The *Connected2045* Update materials are accessible through the site.

Additionally, all implementing agencies have citizen participation mechanisms that allow public input throughout the transportation planning process.

The official public comment period is from May 8, 2019 to June 7, 2019. Public review of the *Connected2045* Update and Air Quality Conformity Determination and Documentation (8-Hour Ozone & PM<sub>2.5</sub>) will take place through several different means. Two public open-house style meetings are scheduled for May. Persons requiring special accommodations should notify Roz Rodgers at least 48 hours prior to the open house at 314-421-4220 or 618-274-2750 or email at [titlevi@ewgateway.org](mailto:titlevi@ewgateway.org).

At the public open houses, copies of the *Connected2045* Update and Air Quality Conformity Determination and Documentation (8-Hour Ozone & PM<sub>2.5</sub>), as well as supplemental materials will be available for review, discussion, and comment. These same materials will be available on the Council's website. Citizens and members of organizations are invited to attend the public open house meeting that is most convenient for them.

The schedule for the public open-house style meetings for the *Connected2045* Update and Air Quality Conformity Determination and Documentation (8-Hour Ozone & PM<sub>2.5</sub>) is shown below. The schedule is available on postcards that have been distributed throughout the region, on the Council's website, in the Council's *Local Government Briefings* electronic newsletter and local newspapers (St. Louis Post-Dispatch, etc.)

- Monday, May 13, 2019: 11:30 AM to 2:30 PM – Missouri – The Heights Community Center, 8001 Dale Avenue, Richmond Heights, MO
- Monday, May 20, 2019: 2:30 PM to 4:30 PM – Illinois – Metro East Park and Recreation District, 104 United Drive Collinsville, IL

Comment forms are available at the public open houses or comments could be submitted by email. Comments on the draft air quality Conformity Determination document must be received or postmarked by Friday, June 7, 2019. Comments can be sent to [lrp@ewgateway.org](mailto:lrp@ewgateway.org) or East-West Gateway Council of Governments, Attn: *Connected2045* Update at One S. Memorial Drive, Suite 1600, St. Louis, Missouri 63102.

# Consultation and Public Participation

## Declaration of Conformity for 1997 Eight-Hour Ozone

Based on the analysis, the regionally significant project in Jersey County Illinois is found to be in conformity with the requirements of the Clean Air Act Amendments of 1990, the relevant sections of the Final Conformity Rule 40 CFR Part 93 and the procedures set forth in the Missouri State Conformity Regulations 10 CSR 10-5.480 for the revoked 1997 eight-hour ozone standard.

## Declaration of Conformity for 2008 Eight-Hour Ozone

Based on the analysis, the projects and programs included in the *Connected2045* Update are found to be in conformity with the requirements of the Clean Air Act Amendments of 1990, the relevant sections of the Final Conformity Rule 40 CFR Part 93 and the procedures set forth in the Missouri State Conformity Regulations 10 CSR 10-5.480 for the 2008 eight-hour ozone standard. This Conformity Determination covers the St. Louis 2008 eight-hour ozone maintenance area: Franklin, Jefferson, St. Charles and St. Louis counties and the City of St. Louis in Missouri; and Madison, Monroe and St. Clair counties in Illinois.

## Declaration of Conformity for 2015 Eight-Hour Ozone

Based on the analysis, the projects and programs included in the *Connected2045* Update are found to be in conformity with the requirements of the Clean Air Act Amendments of 1990, the relevant sections of the Final Conformity Rule 40 CFR Part 93 and the procedures set forth in the Missouri State Conformity Regulations 10 CSR 10-5.480 for the 2008 eight-hour ozone standard. This Conformity Determination covers the St. Louis 2015 eight-hour ozone non-attainment

# Consultation and Public Participation

area: St. Charles and St. Louis counties, the City of St. Louis and Boles Township in Franklin County in Missouri; and Madison and St. Clair counties in Illinois.

## Declaration of Conformity for PM<sub>2.5</sub>

Based on the analysis, the projects and programs included in the *Connected2045* Update are found to be in conformity with the requirements of the Clean Air Act Amendments of 1990, the relevant sections of the Final Conformity Rule 40 CFR Part 93 and the procedures set forth in the Missouri State Conformity Regulations 10 CSR 10-5.480 for the 1997 annual PM<sub>2.5</sub> standard. This Conformity Determination covers the Illinois non-attainment area (Madison, Monroe and St. Clair Counties and Baldwin Township in Randolph County).

# Consultation and Public Participation

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# Update to *Connected2045*: Long Range Transportation Plan for the St. Louis Region

## *Air Quality Conformity Determination and Documentation for Eight-Hour Ozone and PM<sub>2.5</sub> Appendices*

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# Appendix A

## Transportation Planning Projects

The project descriptions described below were used for the purposes of travel demand modeling and air quality analysis, and form the basis of the Air Quality Conformity Determination for the Update to *Connected2045: Long Range Transportation Plan for the St. Louis Region* (*Connected2045* Update). Included in the Table A-1 are all the projects capable of being modeled from the *Connected2045* Update. Information is listed on the route, the location and/or limits of the project, the description of the project or planning assumptions made for the purposes of analysis, and the analysis year in which the project is expected to be complete.

The definition of "regional significance" is that contained in the *St. Louis Transportation Conformity SIP*, as amplified through the inter-agency consultation procedures established in that document and in 40 CFR Part 93 §93.101, "...*Regionally significant project* means a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves) and would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel." The February 28, 2012 Regionally Significant Screening Criteria document was utilized to delineate the air quality classification of projects.

The lists include all regionally significant projects that involve changes to the capacity or performance of the highway or transit system in ways that potentially affect mobile source emissions. Certain types of projects, such as interchange improvements, may be deemed non-exempt but are not regionally significant. In such cases, these projects have been included in the regionally significant projects listing for tracking and informational purposes. In addition, the list may include the planning assumptions made with regard to Major Transportation Investment Analyses (MTIAs) and other corridor studies. Maps displaying these projects and a more detailed description of the projects can be found in the *Connected2045* Update.

As noted in the Overview, air quality analyses have been performed for each of the following analysis years: for the 2008 eight-hour ozone standard in Missouri and Illinois, 2025, 2030, 2035 and 2045; for the 2015 eight-hour ozone standard in Missouri and Illinois, 2020, 2025, 2030, 2035, and 2045; and for the PM<sub>2.5</sub> non-attainment area in Illinois, 2020, 2030, 2035 and 2045.

# Appendix A Transportation Planning Projects

**Table A-1  
Projects Considered as Part of the Regional Travel Demand Model (TDM) – Conformity Determination for  
Connected2045 Update**

<b>Project ID</b>	<b>Sponsor/ County</b>	<b>Project/ Corridor</b>	<b>Location</b>	<b>Description</b>	<b>Analysis Period</b>
182045031	Madison/ St. Louis	I-270	Over Mississippi River	New Mississippi River bridge	2020 - 2029
2045052	St. Louis City	I-64	Vandeventer bridge	Bridge rehabilitation	2020 - 2029
182045001	St. Louis (Southwest)	I-255	Jefferson Barracks Bridge	Rehabilitate bridge	2020 - 2029
182045004	Jefferson / St. Louis (Southwest)	I-55	Over the Meramec River	Rehabilitate bridge	2020 - 2029
182045032	St. Louis/ St. Charles	MO 370	Over the Missouri River	Repair Bridge	2020 - 2029
182045033	St. Louis/ St. Charles	MO 364	Over the Missouri River	Repair Bridge	2020 - 2029
182045034	St. Louis City/ St. Clair	MO 799 – Martin Luther King Bridge	Over the Mississippi River	Replace Bridge	2020 - 2029
2045018	St. Louis (North)	I-270	Old Halls Ferry to Hanley/Graham	Improve Interstate, interchanges, and outer roads.	2020 - 2029
2045019	St. Louis (North)	I-270	I-170 to Lindbergh	Improve interstate and interchange	2020 - 2029
2045041	St. Charles	I-70 (partial)	Fairground to Cave Springs	Rehabilitate pavement, improve interchanges, add lanes	2020 - 2029
2045004	St. Charles	I-70	I-64 to MO T/W	Add capacity and improve interchanges	2020 - 2029
2045053	St. Louis City	Metrolink extension	Grand to Chippewa, via Cass or Florissant	Construct new rail line. NS/SS extension	2020 - 2029

# Appendix A Transportation Planning Projects

**Table A-1  
Projects Considered as Part of the Regional Travel Demand Model (TDM) – Conformity Determination for  
Connected2045 Update**

Project ID	Sponsor/ County	Project/ Corridor	Location	Description	Analysis Period
2045069	St. Charles	David Hoekel Pkwy phases 2 and 3	Interstate Dr. to Meyer Rd., Point Prairie Rd. to Peine Rd.	Construct new roadway	2020 - 2029
2045069	St. Charles	David Hoekel Pkwy phase 4 (partial)	Meyer Rd. to Point Prairie Rd.	Construct new roadway	2020 - 2029
182045008	St. Clair	I-64	Green Mount Rd. to IL 158	Widening to 6 lanes	2020 - 2029
2045021	St. Louis (North)	I-270	McDonnell Blvd to MO 370	Improve interstate and interchanges	2030 - 2039
2045020	St. Louis (North)	I-270	MO H to Bellefontaine	Rehabilitate pavement and bridges; add capacity, modify interchanges and outer roads	2030 - 2039
2045022	St. Louis (North)	I-270	MO 367 interchange	Improve interchange	2030 - 2039
2045040	Jefferson	I-55	MO Z to US 67	Rehabilitate pavement and bridges, add capacity, improve interchanges	2030 - 2039
2045069	St. Charles	David Hoekel Pkwy phase 4 (partial)	Meyer Rd. to Point Prairie Rd.	Construct new roadway	2030 - 2039
2045069	St. Charles	David Hoekel Pkwy phase 5	Jackson Rd. to Interstate Dr.	Construct new roadway	2030 - 2039
2045046	Madison	I-270	IL 157 to Mississippi River	Widening to 6 lanes	2030 - 2039
2045023	St. Louis (North)	I-270	Dorsett to MO 370	Improve interchange	2040 - 2045

# Appendix A

## Transportation Planning Projects

**Table A-1**  
**Projects Considered as Part of the Regional Travel Demand Model (TDM) – Conformity Determination for**  
***Connected2045* Update**

<b>Project ID</b>	<b>Sponsor/ County</b>	<b>Project/ Corridor</b>	<b>Location</b>	<b>Description</b>	<b>Analysis Period</b>
2045057	St. Louis (North)	I-270	MO D Interchange	Revise interchange ramps	2040 - 2045
182045007	St. Louis City	I-44	Hampton, Kingshighway, Vandeventer, & Jefferson	Interchange improvements	2040 - 2045
2045043	St. Louis City	I-64	Grand/Market Interchange	Revise interchange	2040 - 2045
2045066	St. Louis City	I-64	Final split	Expand eastbound I-64 from two to three lanes between 6th street and Poplar Street Bridge.	2040 - 2045
182045003	St. Charles	I-70	I-64 Interchange	Interchange improvements	2040 - 2045
182045011	St. Clair	Rt 3 connector	Exchange Ave. intersection to IL 203	New -lane roadway	2040 - 2045

# Appendix B

## Population and Employment Forecasts

### B-1. Background

Population and employment projections are a key input into this air quality analysis. These projections are used to determine future travel demand and travel patterns and the effect these will have on mobile source emissions. The population and employment projections used in this analysis are based upon census data and American Community Survey (ACS) estimates. The projections extend out in ten-year increments to the year 2045, which is the horizon year of the Plan.

### B-2. 2016 Base Year

The base year for this analysis is 2016. The baseline for population-incorporated population counts is from the 2016 Census Population Estimates. Employment baselines were created using a blending of sources, including Dun and Bradstreet, the Longitudinal Employer-Household Dynamics (LEHD) data set, American Community Survey, as well as county and regional employment estimates from the U.S. Bureau of Labor Statistics and the U.S. Bureau of Economic Analysis.

### B-3. Projection Methodology

Population and employment projections were developed at regional, county, and small-area scales. The regional population projection was based on a cohort-survival model. Forecasts were then compared with local plans and county forecasts prepared by state government agencies, with input from local planners.

County-level employment and population projections were allocated to the transportation analysis zone level, which is the disaggregate level of geography used in travel demand forecasting. Assumptions guiding the allocation model included zonal development attractiveness or probability values, the influence of existing development patterns and development trends, and zonal holding capacity. Aggregate development attractiveness values were derived for each zone via a spatial analysis process which considered distances of 30 meter by 30 meter cells from various spatial interaction factors. The factors considered during this process included employment location, interstate highway interchanges, major highway intersections, bus service, MetroLink service and free-standing communities.

Population and employment projections through 2045 are shown in Tables B-1 and B-2.

# Appendix B

## Population and Employment Forecasts

<b>Table B-1</b>						
<b>Population Projections by County: 2016 - 2045</b>						
<b>Jurisdiction</b>	<b>2016</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2045</b>
<b>Missouri</b>						
City of St. Louis	311,491	310,343	308,919	307,503	306,089	303,291
St. Louis County	998,499	999,015	999,583	999,959	1,000,124	999,846
St. Charles County	390,910	410,307	430,162	443,416	449,231	439,298
Jefferson County	224,226	229,980	235,883	239,812	241,539	238,595
Franklin County	102,836	105,256	107,736	109,394	110,118	108,881
<b>Illinois</b>						
Madison County	265,757	267,546	269,393	270,614	271,157	270,239
St. Clair County	262,763	262,894	263,052	263,144	263,191	263,112
Monroe County	34,064	35,335	36,629	37,502	37,883	37,231
<b>Region</b>	<b>2,590,546</b>	<b>2,620,676</b>	<b>2,651,357</b>	<b>2,671,344</b>	<b>2,679,332</b>	<b>2,660,493</b>
Source: East-West Gateway Council of Governments						

<b>Table B-2</b>						
<b>Employment Projections by County: 2016 - 2045</b>						
<b>Jurisdiction</b>	<b>2016</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2045</b>
<b>Missouri</b>						
City of St. Louis	282,054	284,549	287,272	289,682	292,036	296,766
St. Louis County	796,514	799,394	802,146	804,897	807,547	812,928
St. Charles County	200,552	204,000	207,215	210,329	213,345	219,441
Jefferson County	71,209	71,722	72,198	72,699	73,205	74,301
Franklin County	56,569	57,107	57,640	58,201	58,766	60,013
<b>Illinois</b>						
Madison County	129,130	129,864	130,642	131,449	132,283	134,122
St. Clair County	128,014	128,578	129,196	129,859	130,573	132,367
Monroe County	12,901	13,080	13,271	13,474	13,699	14,258
<b>Region</b>	<b>1,676,943</b>	<b>1,688,294</b>	<b>1,699,580</b>	<b>1,710,590</b>	<b>1,721,454</b>	<b>1,744,196</b>
Source: East-West Gateway Council of Governments						

# Appendix C

## Travel Demand Modeling Procedures, Assumptions and Forecasts

### C-1. Overview

The current Transportation Improvement Program (TIP) FY 2019-2022 conformity analysis meets the specific latest planning requirements as outlined in 40 CFR §93.110 and further clarified in the joint memorandum issued by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Transportation (DOT) on January 18, 2001. Section 176(c)(1)(B)(iii) of the Clean Air Act (CAA) states that "...[t]he determination of conformity shall be based on the most recent estimates of emissions, and such estimates shall be determined from the most recent population, employment, travel, and congestion estimates as determined by the MPO or other agency authorized to make such estimates."

### C-2. Latest Planning Assumptions

Several areas have been highlighted by EPA and US DOT that fall under the use of latest planning assumptions:

1. Travel Demand Model
2. Land Use, Population and Employment Assumptions
3. Transit Service Policy Changes, Toll Changes
4. Travel and Congestion Estimates
5. Interagency Consultation

#### C-2.1 Travel Demand Model

The outputs from the East West Gateway (EWG) Travel Demand Model (TDM) are being used in this conformity analysis. The base year for this model is 2013. EWG has developed an accurate base year network, and is continuously making updates to highway and transit networks to accurately represent the future analysis year networks. The analysis years for both pollutants, ozone and PM<sub>2.5</sub>, and both states have been discussed in more detail in the main Air Quality Determination document.

##### C-2.1.1 Introduction

Among EWG's responsibilities is the development and maintenance of a regional travel demand model. The St. Louis regional travel demand model, known as "TransEVAL", has been developed for use in regional transportation planning and corridor planning. It provides multi-modal travel demand forecasts for motorized and non-motorized modes for the entire

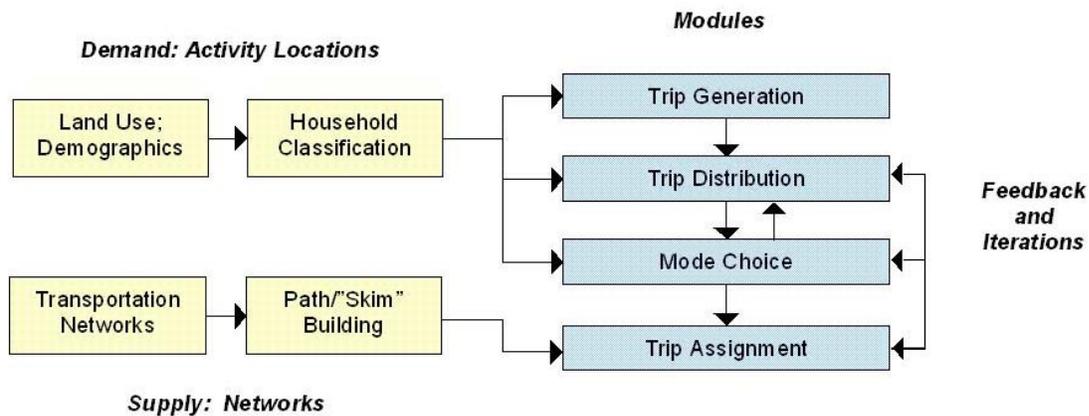
# Appendix C

## Travel Demand Modeling Procedures, Assumptions and Forecasts

East-West Gateway planning area. This documentation is intended to provide an overview of the model and its validation.

As the first step for any travel model development, local travel patterns are surveyed and documented. The 2002 St. Louis Home interview Survey was re-expanded to represent 2013 conditions. This dataset contains a total of 5,094 households and represented a sample of about 0.5 percent of the modeled area. As a part of this study, the weighting and expansion factors for the households, persons and trips were re-calculated based on observed data from the 2010 census, Longitudinal Employer-Household Dynamics (LEHD) data set and American Community Survey (ACS) data. In 2013, EWG conducted an on-board transit passenger survey to observe and document transit travel patterns. This survey included 18,129 responses, and an additional 9,260 trips were gathered from respondents' reverse trips, for a total of 27,389 observed trips, for about 25% of the overall ridership on an average weekday. These local travel patterns and conditions form the basis for model updates and recalibration. Latest planning assumptions and land use information was applied, as well as making use of American Community Survey data.

TransEval is a traditional four-step trip-based model, as shown in Figure 1, that is implemented for the entire region, including the City of St. Louis, the Missouri counties of St. Louis, St. Charles, Franklin, Jefferson and the Illinois counties of Madison, St. Clair and Monroe. Figure 2 shows the entire EWG planning area included in the model.



**Figure 1: TransEval—Four Step Trip Based Model**

Primary inputs for TransEval model include regional land use and demographic data as well as the highway and transit networks. For forecasting purposes, the St. Louis region is disaggregated into 3,500 traffic analysis zones (TAZ) aggregated into either a 35 district or 17 super-district systems. Land use, population, and economic activities in each TAZ are estimated for each forecast year. Highway networks are directionally coded for divided

# Appendix C

## Travel Demand Modeling Procedures, Assumptions and Forecasts

highways and arterials and include any roadway functionally classified as a collector or higher. Transit networks include bus and light rail systems owned and operated by Metro, St. Clair County Transit District and Madison County Transit District and include park and ride lots as well.

### East-West Gateway Planning Area

St. Louis Metropolitan Area

May 2017

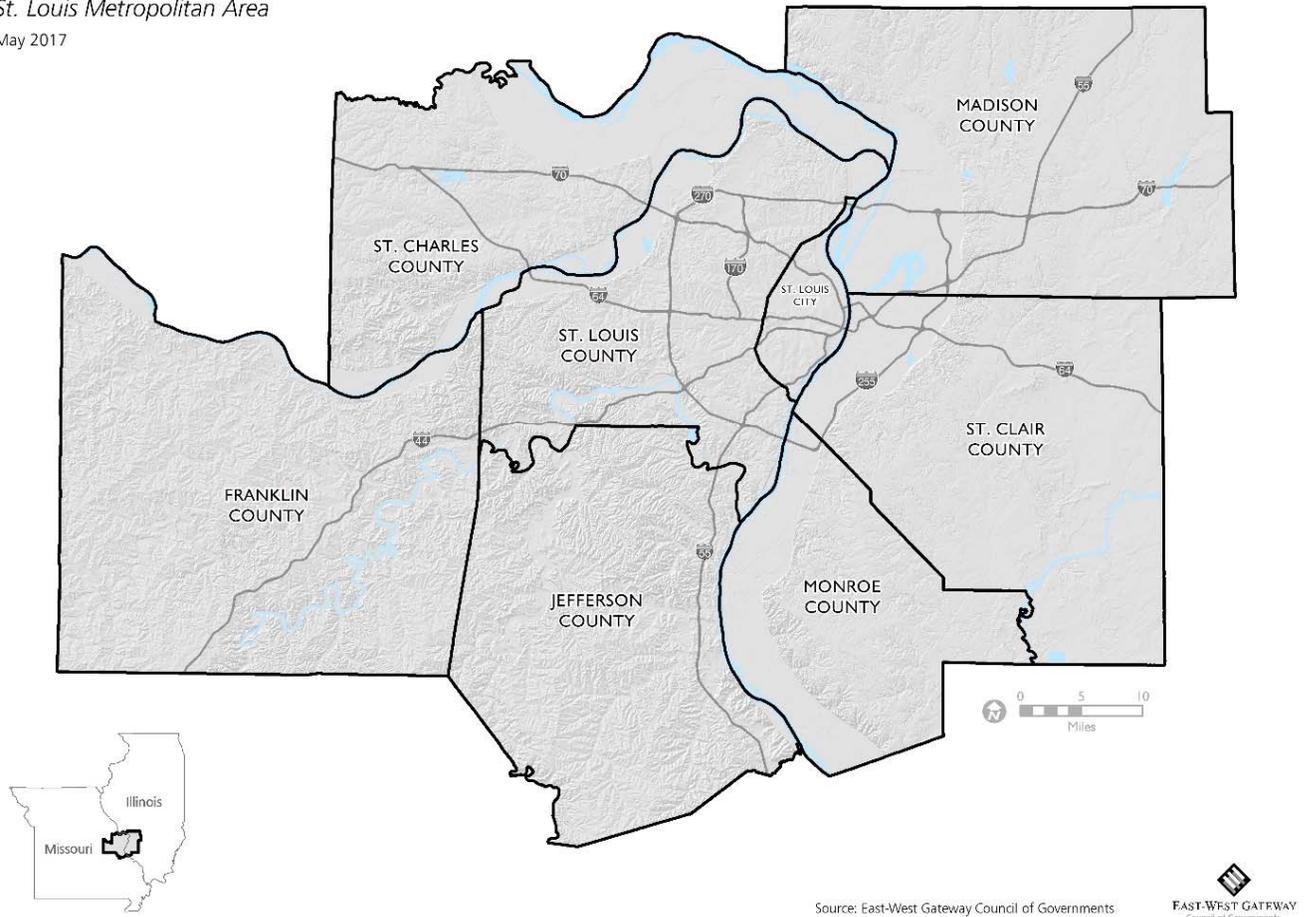


Figure 2: EWG Planning Area

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## Travel Demand Modeling Procedures, Assumptions and Forecasts

### C-2.1.2 Model Summary

#### **Population and Land-Use Forecasts**

Population and employment projections are a key input to the travel demand model. These projections are used to determine future travel demand and travel patterns and the effect this demand will have on the various travel options available.

The baseline for 2013 population incorporates population counts from the 2010 Census. Employment baselines were created using a blending of sources, including the Census Transportation Planning Package (CTPP), the LEHD data set, and commercial business lists, as well as county and regional employment estimates from the U.S. Bureau of Labor Statistics and the U.S. Bureau of Economic Analysis. For more details, please refer to Appendix B: “Population and Employment Forecasts”.

#### **Traffic Analysis Zones**

In TransEval, the eight county St. Louis region is disaggregated into 3,500 traffic analysis zones (TAZ), with land use, population, and economic activities in each TAZ estimated for each forecast year. The size for each TAZ is related to the land use, for areas that have dense land use, either in terms of population or economic activity, the TAZ size is smaller. The TAZs are aggregated into 35 districts for the purpose of summarizing model outputs and conducting reasonableness checks. The model has six area types—rural, suburban, urban, core, business and entertainment, and central business district—that are used for calibration and highway link capacity calculations.

#### **Highway Network**

The highway network encompasses the eight county planning area. As is typical for regional models, the network generally goes down to the collector level, although it contains a few smaller roads to accommodate the transit network. Also a limited number of local roads are included in the highway network. The highway network also has 68 external stations.

The network includes posted speed limits, number of lanes, distance, functional class, and average annual daily traffic (AADT) for 2013. The distances for all centroid connectors for a zone represent the average distance required for a person to travel in or out of a zone. The free-flow speed is equal to the posted speed limit. The model estimates lane capacity using design criteria from the 2000 edition of the Highway Capacity Manual. Capacity estimates are based on functional class, area type, posted speed, and number of lanes.

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## Travel Demand Modeling Procedures, Assumptions and Forecasts

### Transit Network

The St. Louis area transit network currently comprises three modes: local buses, express buses, and MetroLink light rail. TransEval includes a detailed network of the transit facilities including all local and express bus routes, MetroLink rail lines, walk access and egress routes are also generated. Bus routes follow the highway links and their speeds are a function of highway link speed adjusted for dwell time at stops. MetroLink rail speed is schedule based, the base year model has 2013 schedules coded in. Besides walk to transit, kiss and ride (KNR), drive to transit or travel to Park and Ride Lots are also modeled.

The network has two transit networks; for morning peak travel (6 to 9 a.m.) and for off-peak travel (9 a.m. to 2 p.m.). Transit fares are also used in mode selection. For the base year the corresponding 2013 fares are used.

### Trip Generation

The model uses a cross-classification trip production technique that calculates productions using household size and automobile availability. There are a total of 17 trip purposes, with home based work, home based other, non-home based, and home based shopping being the one that generate the most trips. In determining the auto ownership, transit accessibility is taken into account as well. For home-based work trips, the model also uses the number of workers in a household and household income group. In addition to the core calculations of productions, several submodels are employed to provide information necessary to support the trip production calculations. These submodels are shown in Figure 3:

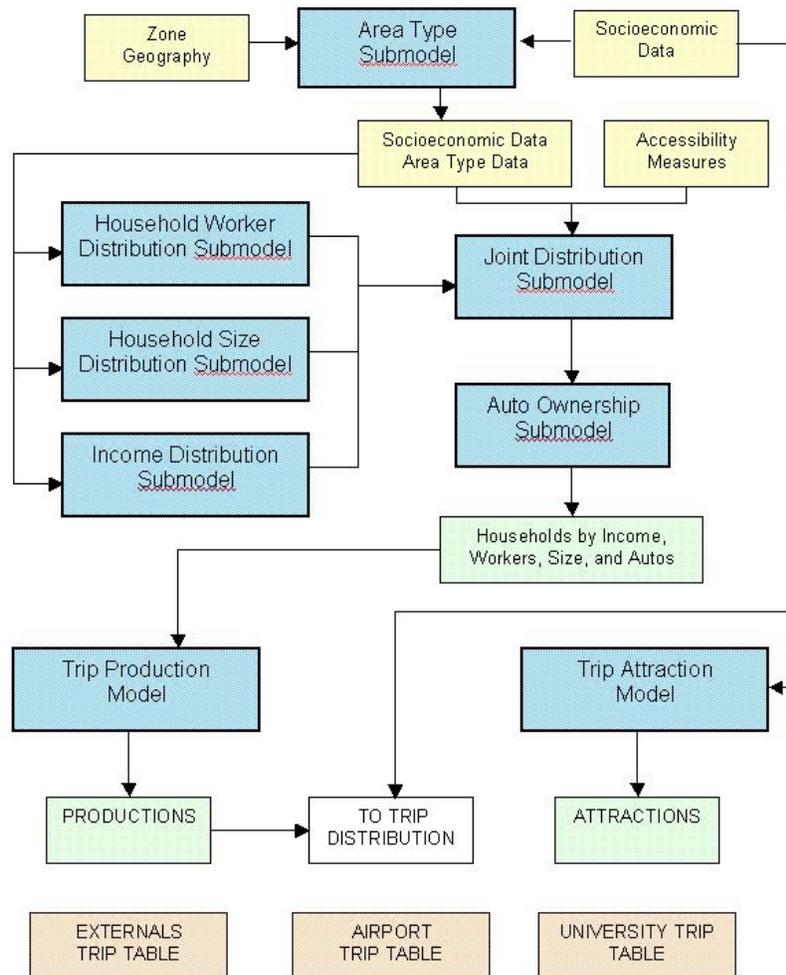
- Area type
- Automobile ownership
- Household size distribution
- Household worker distribution
- Household income distribution
- Joint distribution

The trip attraction model is based on a set of linear equations using aggregated zone-based socioeconomic data, which generate independent estimates of attractions. Employment and household data are used as attractor variables.

There are also three asserted models: airport trips, university trips and a truck model. External trips are fixed percentages for truck trips, through-traffic trips, work trips, and non-work-based trips, based off of an external station volume forecast.

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## Travel Demand Modeling Procedures, Assumptions and Forecasts



**Figure 3: Trip Generation Sub-models Flow Chart**

### Trip Distribution

The destination choice (trip distribution) and mode choice modules are the second and third major program steps within the 4-step model process. In TransEval application, both the mode choice and the destination choice steps are computed jointly by production zone. The logsum from mode choice is used as the primary variable to determine impedance.

The destination choice model estimates the probability of selecting a particular attraction zone for a given zone of production, as defined by the regional network and zone system. The model is a “destination choice” type because it is based on behavioral data describing

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individual choice behavior and uses a logit-based formulation to estimate the probability of a traveler selecting a particular attraction zone. The home-based work trip purposes are now doubly-constrained to both productions and attractions.

The model also uses a series of standard gravity distribution models to estimate the distribution of special-purpose trips, including airport trips, truck trips, on-campus university trips, and external trips. A gravity model assigns larger numbers of trips between zones with a lot of development and that are close together, and fewer trips between smaller zones with a small amount of development and that are farther apart.

To better predict destination choice behavior, the model includes a distance variable and transformations of the distance variable (2nd and 3rd power, natural log). Other variables in the distribution model are dummy variables and associated constants for intrazonal trips, river crossings, intercounty movements, inter-state travel, and movements between specific destination and production area types. The destination choice model includes the following variables:

- Relative attractions based on employment
- Mode choice logsums
- Distance impedance
- Area type at production and attraction ends
- Intrazonal factors
- Illinois-Missouri crossing
- County crossing
- Income group (for home-based work trips)

### Mode Choice

Using the 2013 transit survey data, the mode choice model was updated to better reflect the current transit usage. Important updates to the mode choice model includes the addition of a station-choice/station capacity restraint model which presents choice probabilities for four alternative drive-access paths for light rail transit (LRT), Express and bus rapid transit/commuter rail (for future options) (BRT/CR) modes, in addition to KNR path. The mode choice model uses a nested logit structure comprising 13 mode alternatives and a future-mode alternative, as well as a joint mode choice/destination choice algorithm. Productions are distributed simultaneously to zones and are split into modes. Mode choice variables include:

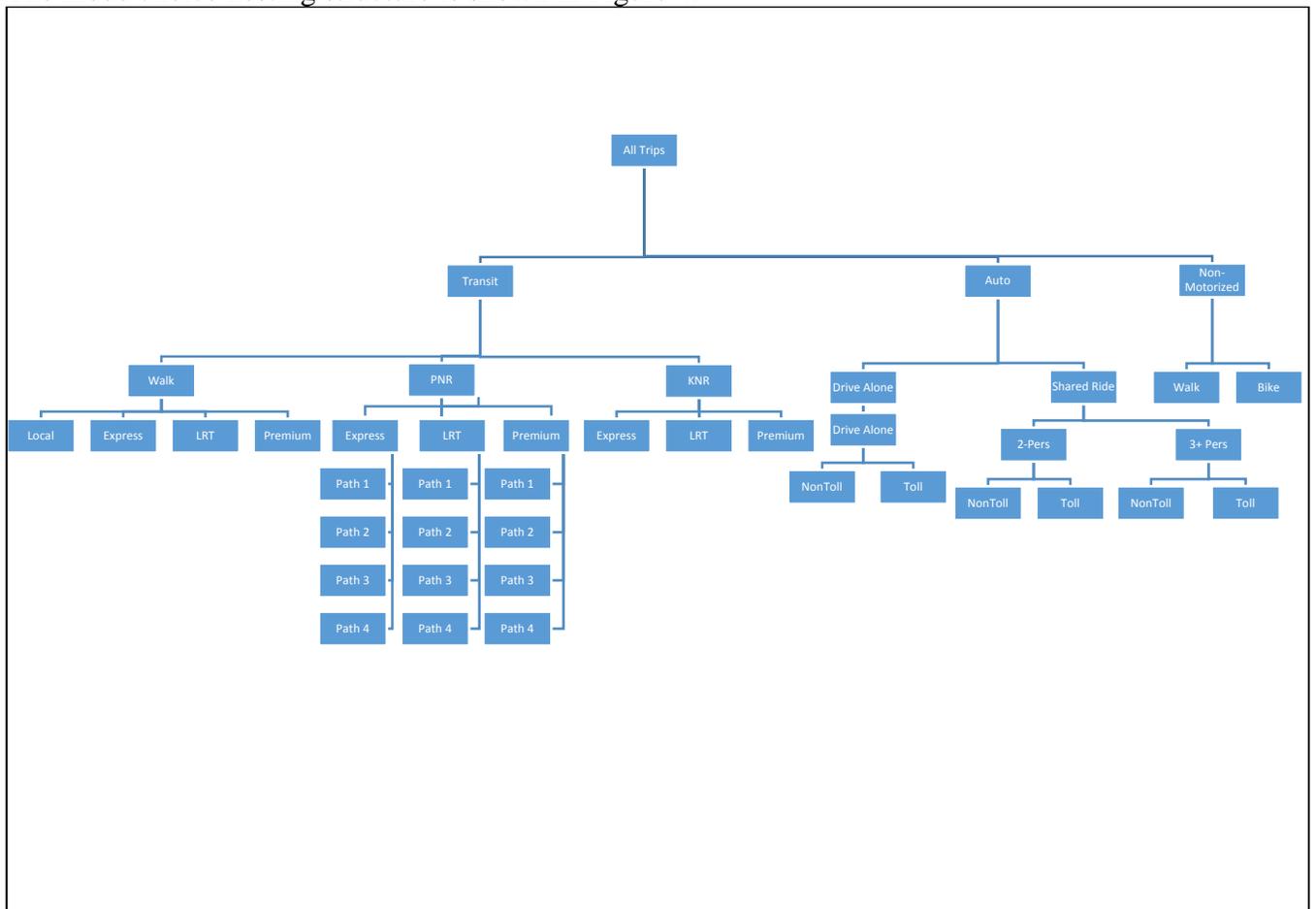
- Trip purpose
- Income
- In-vehicle time (transit and autos)
- Egress and access times

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- Transfer time
- Wait time
- Transit fare (stratified by income)
- Auto operating cost (stratified by income)
- Parking cost (stratified by income)
- Area Type

The mode choice nesting structure is shown in Figure 4.



**Figure 4: Mode Choice Nested Logit Structure**

Where:

2-Pers = 2 Persons in car

3+ Pers = 3 or more Persons in Car

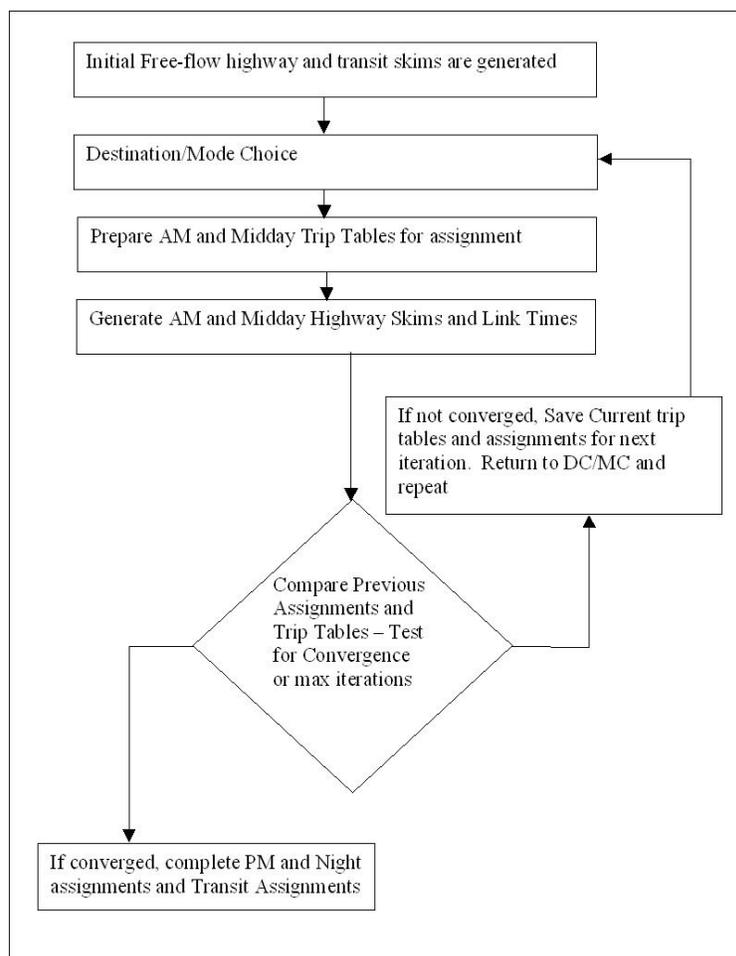
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### Feedback Loop

In TransEval there is a feedback loop from assignment to trip distribution step, with a tight convergence criteria. This step feeds back the congested travel time, both highways and transit, into the distribution step as zone to zone congested travel time skims to ensure equilibration between travel times going into the destination choice model and what is coming out of the same step to ensure that there is stability in the choice of mode and destination.

In TransEval there are both highway and transit skims, for peak congested conditions as well as for off-peak conditions, that are fed back to the distributions step. This is to ensure that the model is sensitive to changes in travel time, cost, and other factors affecting travel choices in the different time periods of the day and by mode. Figure 5 shows the feedback loop.



**Figure 5: TransEval Feedback Loop**

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## Travel Demand Modeling Procedures, Assumptions and Forecasts

### Time of Day

The time of day model is applied before the traffic assignment step. Inputs include all of the purpose-specific person-trip tables and both the hourly and directional factors by trip purpose. The resulting output is tables by time period prepared for assignment, both for highways and transit networks.

The time periods estimated by the model include:

- AM: 6:00am – 9:00am
- Midday: 9:00am – 2:00pm
- PM: 2:00pm – 7:00pm
- Night: 7:00pm – 6:00am

In addition to the diurnal factors, another set of factors is used to estimate the peak hour share of each period. The peak hour factors are:

- AM Peak: 0.423 (3 hour period)
- Midday Peak: 0.224 (5 hour period)
- PM Peak: 0.237 (5 hour period)
- Night Peak: 0.273 (11 hour period)

The actual shares were based on “trips in motion” which uses the number of trips reported in motion during any given hour, which is consistent with the way in which trips are assigned in the model.

### Assignment

Highway and transit assignments are carried out separately. For highways, the 24 hour day is divided into 4 time periods, each period is assigned separately. Within each period, the peak hour flows are also calculated. To assign trips to the highway network, TransEval employs the user equilibrium process. The user equilibrium process assigns the trips between each origin and each destination zone in such a way that, at the end of the process, no trip can reduce its travel time by changing its path. In other words, taking into account the congestion produced by all other trips in the region, each trip is taking the shortest path.

The highway assignment uses a multi-class assignment approach, with the following vehicle classes:

- 1. SOV non-toll auto
- 2. HOV non-toll/non-HOV facility auto

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- 3. Truck
- 4. SOV toll auto
- 5. HOV toll or HOV facility use auto

Highway route choice also takes into account any tolls costs involved. Volume for each user class is tracked and saved. Highway assignment uses the Conical Volume Delay functions for calculating the congested travel times, with the parameters being calibrated to the locally observed speed-delay data.

Transit assignment is performed at the daily level as well, using both the peak and off-peak. Transit assignment uses the all-or-nothing algorithm, where the path is selected based on the minimum cost. Route selection includes the option of driving to a park and ride lot then transferring to a transit line.

### Calibration and Validation

A travel demand model needs to be reflective of the recent changes in trip making behavior, economy and other societal shifts. The calibration and validation process is an on-going, systematic analysis of each model step as that step was being developed. This is important since errors in initial steps will be propagated to subsequent model steps due to the sequential nature of the modeling process. Therefore, available observed data has been used to compare trip generation, distribution and mode choice results, in addition to comparing assigned highway volumes against observed counts.

The calibration and validation of the TransEval model involves the comparison of base year 2013 model results with observed data from home interview and transit on-board surveys and traffic counts. The goal is to match, with reasonable accuracy, the model-estimated results with those observed from survey data while maintaining a logical and defensible model design. Ultimately, an additional comparison is made with observed traffic counts and transit boardings. This is achieved through systematic and justifiable adjustments to model parameters, including trip rates, distribution impedance parameters, mode choice coefficients and volume-delay functions.

An important aspect of calibration and validation is the development and use of observed target values. Observed traffic counts, transit ridership and screen line comparisons were used in the validation process.

The conformity regulation 40 CFR §§ 93.122 (b) (3) states that Highway Performance Monitoring System (HPMS) estimates of vehicle miles traveled (VMT) shall be considered the primary measure of VMT for the classes of roadways included in HPMS. The regulation

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also allows the use of locally developed count-based programs. EWG COG used both these sources as a part of calibration and validation.

*For areas with network-based travel models, a factor (or factors) may be developed to reconcile and calibrate the network-based travel model estimates of VMT in the base year of its validation to the HPMS estimates for the same period.*

*Excerpt from 40 CFR §§ 93.122 (b) (3)*

Based on the 2010 Census, the urban area boundary for the EWG planning area was redefined. Starting 2015, the state count programs report the HPMS urban and rural VMT based on this updated urban area boundary. Since 2015 is the first year when such data were provided, this year is being used for developing the factors for reconciling the travel model estimates of VMT to the HPMS estimates. The adjustment factors are developed by county and by functional class. These are then applied consistently for all future analysis years and scenarios.

### C-3.2 Land Use, Population and Employment Assumptions

Section §93.110 of the Federal Conformity Regulations outlines that the most recent planning assumptions in place at the time of conformity determination must be used. These assumptions should be based on the latest estimates of existing and future population, households and employment developed by the MPO. Details on these assumptions and the forecasts are provided in Appendix B: “Population and Employment Forecasts”, accompanying the main Air Quality document.

### C-3.3 Transit Service Policy, Toll Changes

The principal transit agency for the St. Louis metropolitan area is Metro (Bi-State Development Agency). The agency operates MetroLink, the regional light rail line, and bus service in the City of St. Louis and St. Louis County with limited service in St. Charles County. Metro also operates bus service in St. Clair and Monroe Counties under an agreement with the St. Clair County Transit District. Since 1985, the Madison County Transit District has assumed an expanding role in the provision of bus service in that County, and now provides all scheduled bus service within and between Madison County and other areas. There is no fixed route transit service in either Franklin or Jefferson Counties.

AMTRAK provides inter-city rail service to downtown St. Louis as well as to Alton, Illinois and Kirkwood and Washington, Missouri. There is no commuter rail service in the region.

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## Travel Demand Modeling Procedures, Assumptions and Forecasts

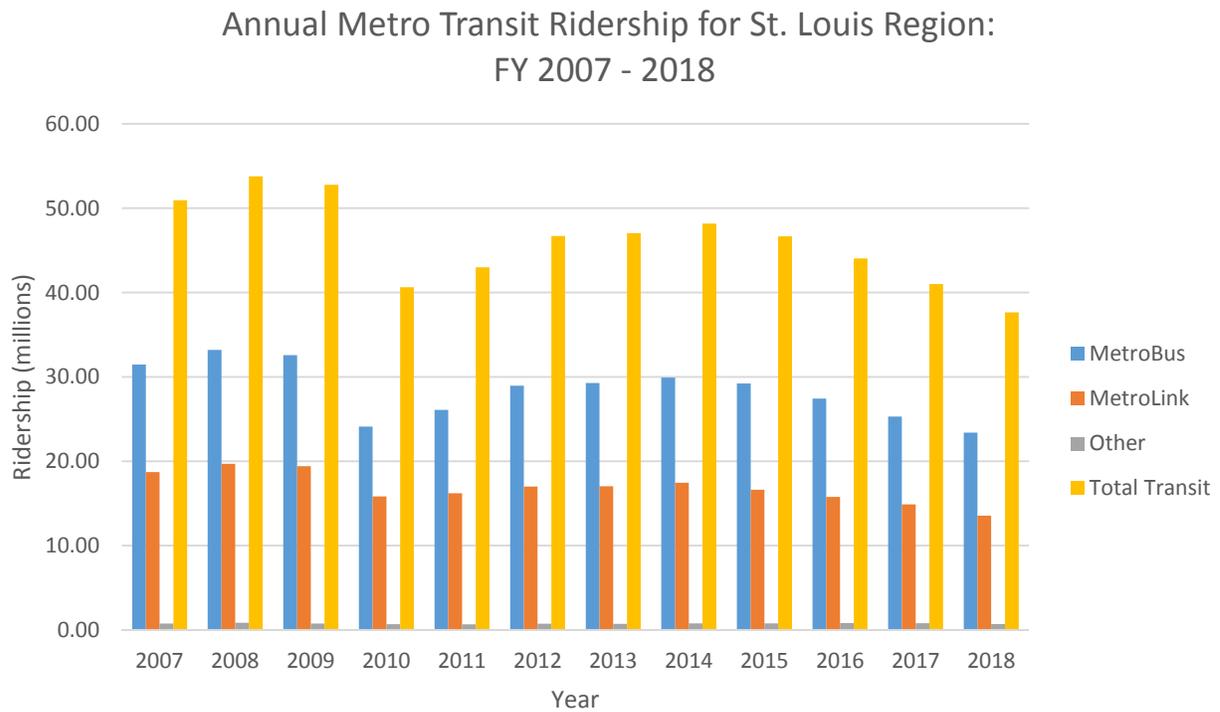


Figure 6: Metro Transit Ridership

Madison County Transit (MCT) also provides bus service within the county, park and ride options and also express bus links to downtown St. Louis. The annual ridership on the MCT system is shown in Figure 7.

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## Travel Demand Modeling Procedures, Assumptions and Forecasts

Annual MCT Bus Ridership for St. Louis Region:  
FY 2007 - 2018

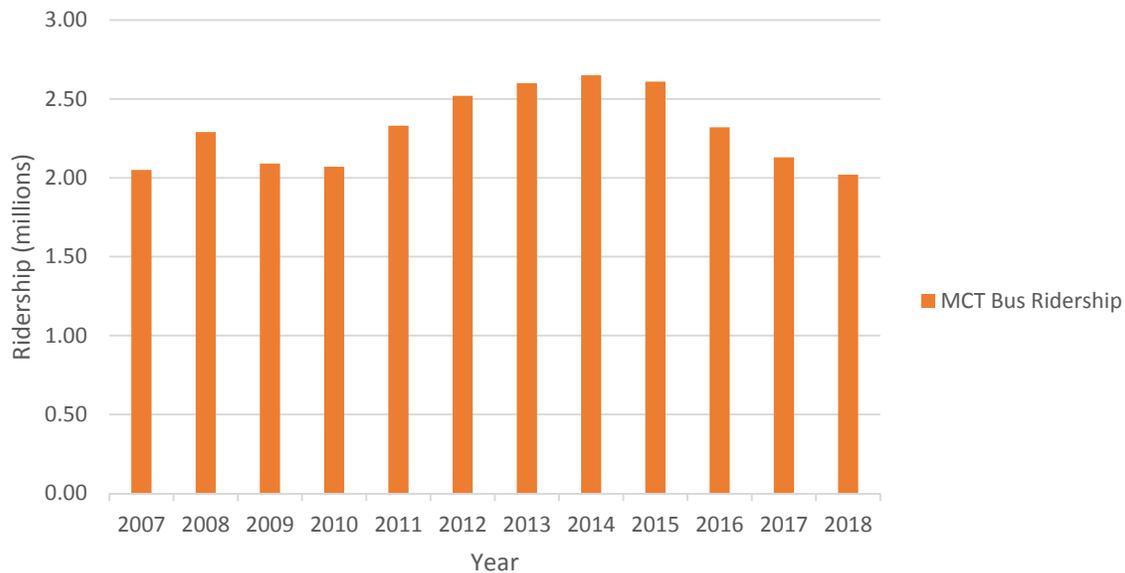


Figure 7: Madison County Transit Ridership

Since *Legacy 2035*, Metro's service to the region has been considerably restructured. After the 2006 cross-county extension of Metrolink, Metro reduced service in 2009-2010 to the region following financial constraints. Subsequent approval of the half-cent tax by the St. Louis County has resulted in restoration of the bus and train services to the region. Metro outlines the agency's goals and implementation plan in its first long range plan, *Moving Transit Forward*, released in spring 2010. The plan outlines the different phases of implementation that include:

- Immediate Action Steps
- Short Range (1-5 years)
- Mid Range (5-10 years)
- Long Range (10-30 years)

Some of the projects outlined in the Transit Plan are identified as illustrative projects in East-West Gateway's Long Range Plan. However, the Light Rail line planned along the North Side- South Side corridor is included in the fiscally constrained Tier I project. This new rail extension will be supported by new feeder MetroBus lines that will increase access and

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ridership for the rail line. Improvements were made for the North Side- South Side Rail Line starting horizon year of 2030.

The Eads Bridge was formerly a toll facility but after its rehabilitation and reopening in 2003, it is now toll free. The only other toll facility in the region was the McKinley Bridge over the Mississippi River. It had been closed for rehabilitation and was reopened in December 2007. Now, it is also a toll-free facility.

### C-3.4 Travel and Congestion Estimates

The development of a TDM highway network begins with the identification of type and location of the recommended "regionally significant", capacity modifying transportation projects selected for inclusion in the current TIP and the latest Long-Range Transportation Plan (LRP) for the St. Louis Region, for each non-attainment area in each state. The projects included in the long-range plan were drawn from past long-range planning efforts, Major Transportation Investment Analysis (MTIA), other corridor and subarea planning studies, and an assessment of future network conditions. The definition of "regional significance" is that contained in the *St. Louis Transportation Conformity State Implementation Plan (SIP)* (MO 10 CSR 10-5.480), as amplified through the inter-agency consultation procedures established in that document and in 40 CFR Part 93 §93.101.

Projects are categorized by anticipated year of completion, and built into a network representing each of the analysis years. For the current Connected2045: Long Range Transportation Plan for the St. Louis Region (Connected2045) analysis, through Inter Agency Consultation Group (IACG) consultation it has been agreed to use the following years for regional emission analysis: 2020, 2025, 2030, 2035 and 2045. Appendix A identifies projects that are included in the network development. Each analysis year network forms the basis for the next future year network, ensuring that all projects in the prior years are captured as the starting point or base network for that year. This way the changes in the highway and transit network keep rolling forward in a compounding manner.

EPA's Office of Transportation and Air Quality (OTAQ) has developed the **MO**tor **V**ehicle **E**mission **S**imulator (MOVES). This emission modeling system estimates emissions for mobile sources covering a broad range of pollutants and allows multiple scale analysis. For this emission analysis, the latest version, MOVES2014a, was used. MOVES2014a currently estimates emissions from thirteen vehicles types including cars, trucks & motorcycles. Through interagency consultation the emissions modeling methodology has also been updated to reflect the current conditions and parameters used in running the updated EPA MOVES2014a model. EWG has worked closely with EPA regional office and the both Missouri and Illinois State air agencies to ensure consistency between the inputs and assumptions for the emission analysis and SIP development efforts.

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## Travel Demand Modeling Procedures, Assumptions and Forecasts

### C-3.5 Interagency Consultation

As required by the final rule under section §93.105, the transportation conformity process includes a significant level of cooperative interaction among the many regional, state, and federal agencies in the bi-state non-attainment area.

The East-West Gateway COG established the Air Quality Advisory Committee (AQAC) in 1992. The AQAC has an advisory role to the East-West Gateway Board of Directors and serves as a public forum for the dissemination of information and receipt of feedback about air quality issues. The Committee is also responsible for the coordination of air quality and transportation planning activities in the region. The AQAC includes members representing citizens and various agencies in the region. Member details can be found at:

<https://www.ewgateway.org/community-planning/environmental/air-quality/committees-and-programs/> .

The East-West Gateway COG also formulated a peer group, the IACG. This group involves peers from other State and local air quality planning agencies, local transportation agencies, EPA, and DOT with the intent of focusing on air quality conformity issues. In line with the requirements under section §93.105, IACG deliberates on issues such as air quality model and method selection, and assumptions to be used in hot spot and regional emissions analysis.

### C-4. Estimates of Vehicle Miles of Travel

The assignment of vehicle trips to the roadway network can be summarized in terms of vehicle miles of travel (VMT), to present the general effect of changes in the roadway network in relation to the population and employment growth for each horizon year and an alternative network scenario. The base year 2013 roadway network represents, as best as possible, all the roads functionally classified as collectors or higher. The centroid connectors reflect an accurate estimate of time and distance for each intrazonal trip and provide a reasonable reflection of intrazonal activity, or local road travel, for emission estimation purposes.

Future year highway and transit networks for 2020, 2025, 2030, 2035, and 2045 networks were built by adding the regionally significant projects, SIP, TIP and LRP projects to the base network, as well as any locally funded project that the IACG deemed as significant or staff considered as impacting the VMT or travel patterns. Appendix A lists these projects in Table A-1 by analysis year, which were added to the corresponding year highway and/or transit network.

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The production of exhaust emissions is actually highest during the colder months of the year. However, increased temperatures and sunlight contribute to increased photochemical production of ozone, with the result that ozone concentrations typically reach their peak in the summer. Since the travel demand model estimates an average weekday travel, the output of the model is adjusted to provide an estimate of the travel that takes place under typical summer conditions.

EWG uses the approach described under the conformity rule §93.122 (b)(3). This has been discussed in detail under the **Calibration and Validation** section. Table C-3 presents aggregate adjustment factors for the St. Louis Region based on 2015 HPMS daily data.

<b>Table C-3</b>			
<b>Year 2015 Vehicle-Miles of Travel (Daily) Adjustments</b>			
	<b>Region</b>	<b>Missouri</b>	<b>Illinois</b>
2015 HPMS VMT	67,160,400	50,572,800	16,587,600
2015 Modeled VMT	66,997,400	52,369,900	14,627,500
HPMS Adj Factor	1.002	0.966	1.134

Table C-4 presents annual VMT estimates for the eight county St. Louis Region obtained by multiplying the average summer weekday VMT by 365.

<b>Table C-4</b>			
<b>Projected Annual Vehicle Miles of Travel</b>			
<b>Analysis Year</b>	<b>Missouri</b>	<b>Illinois</b>	<b>Region</b>
	<b>Regional Adjusted Annual VMT (Based on Summer Weekday VMT)</b>		
2020	21,591,315,500	5,736,256,400	27,327,571,900
2025	22,100,038,600	5,888,613,600	27,988,652,200
2030	22,572,892,100	6,028,665,900	28,601,558,000
2035	22,962,968,000	6,171,191,500	29,134,159,500
2045	23,565,554,900	6,452,847,400	30,018,402,300

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## Travel Demand Modeling Procedures, Assumptions and Forecasts

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# Appendix D

## MOVES2014 Model

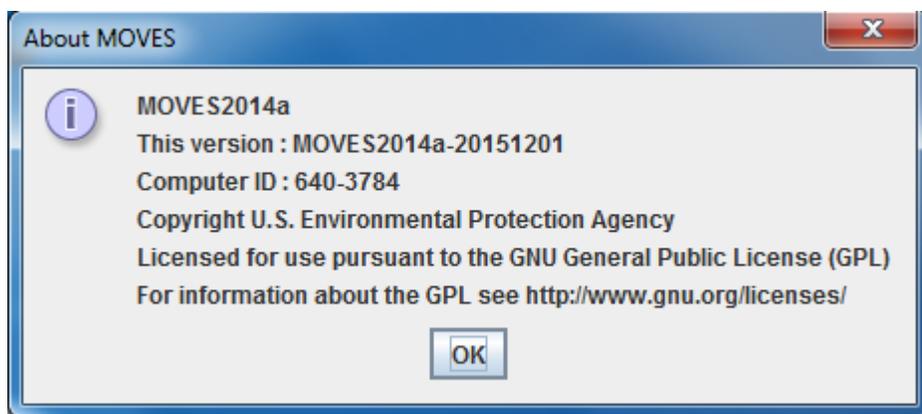
### 1 MOr Vehicle Emissions Simulation (MOVES) model Emissions methodology

The U.S. Environmental Protection Agency's (EPA) Office of Transportation and Air Quality (OTAQ) developed the computer program MOr Vehicle Emission Simulator (MOVES). This emission modeling system projects emissions for mobile sources covering a broad range of pollutants and allows multiple scale analysis. MOVES estimates running, project exhaust, and evaporative emissions as well as brake and tire wear emissions from all types of on-road vehicles.

Since 2012, East-West Gateway (EWGCOG) uses the EPA approved air quality model MOVES in regional emissions analysis for transportation conformity determinations.

For the current ozone and fine particulate (PM<sub>2.5</sub>) emissions analyses, EWGCOG uses the EPA moves model MOVES version 14a released in November 2016.

**Figure 1: MOVES official version used**



#### 1.1 Data requirements

Data sources derive from consultation with regional EPA offices, Illinois state Environmental Protection Agency (Illinois EPA), Missouri Department of Natural Resources (MoDNR), local agencies, and the State Implementation Plan (SIP) development agencies. The Inter Agency Consultation Group (IACG) is the platform for this consultation process.

#### 1.1.2 Interfacing with Travel Demand Model (TDM)

MOVES software is based on a different platform and structured differently than the TDM. The traditional source type (refers to vehicle type), road type stratification typically used in the TDM may not provide enough information needed by MOVES. This poses the need for new equivalence files, and pre-MOVES and post-MOVES processing.

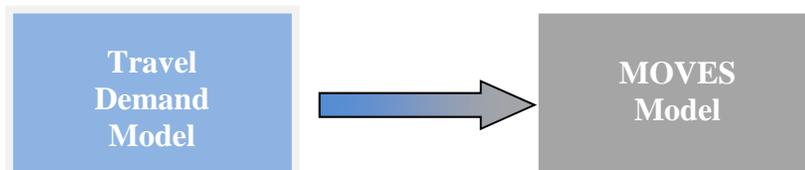
# Appendix D

## MOVES2014 Model

### 2 Applying MOVES in Regional Emission Analysis

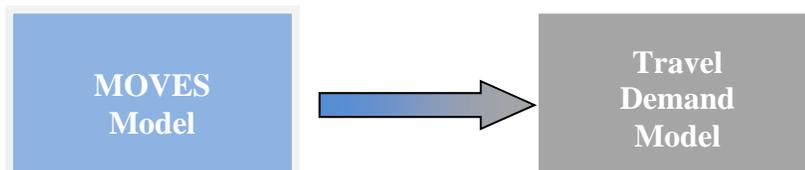
There are two main options available for applying MOVES in the regional emission analysis.

#### 2.1 Option 1: Inventory Mode



MOVES can be run in inventory mode. In this mode, it requires the loaded TDM network, with the traffic projection as an input into MOVES. The disadvantage to this option is that this requires running MOVES for every modification to the TDM.

#### 2.2 Option 2: Emission Rates Mode



When run in the emission rates mode, MOVES produces stratified mobile source emission rate projections for each pollutant type and process. These emission rates are then applied to the projections of vehicle miles of travel generated by the regional TDM, using the same stratification. EWGCOG uses this approach in the current regional emission analysis for the St. Louis planning region ozone and PM<sub>2.5</sub> analysis, based on consultation with EPA and various Metropolitan Planning Organizations (MPOs) regarding the use of MOVES.

### 3 Moves Run Specification Parameters

To use MOVES for determining emission rates or inventory, the first step is to prepare a Run Specification (RunSpec) file, to define the scale, location, time, vehicle, road, fuel, emission producing process, and pollutant parameters. These data are stored in a run specification (RunSpec) XML file.

The RunSpec file can be edited and executed directly or with the MOVES Graphical User Interface (GUI). The navigation panel in the GUI is simple and easy to use. The run spec files hold the

# Appendix D

## MOVES2014 Model

parameters listed above, that define the run details for the various analysis years. Listed in Table 1, are the parameters specified in the RunSpec files for various analysis years used in this analysis:

**Table1: Run Spec File Parameters**

Parameter	Settings
Moves Version	MOVES2014a, Default database movesdb20151028
Scale	County
Calculation Type	Emission Rates
Time Span	Time aggregation = Hour Month of July for ozone; Month of April for PM <sub>2.5</sub> All hours of day selected Weekdays
Geographic Bounds	Zone and Link
On Road Vehicle Equipment	All Source Types and Fuel Combinations
Road Type	All road types, including off-road
Pollutant and Processes	For Ozone:  NO <sub>x</sub> , VOC, Total Gaseous Hydrocarbons, Non-Methane Hydrocarbons  For PM <sub>2.5</sub> :  NO <sub>x</sub> , Primary Exhaust PM <sub>2.5</sub> (total), Organic Carbon, Elemental Carbon, Sulfate Particulate, Brake wear Particulate, Tire wear Particulate, and Total Energy Consumption
General Output	Output database created Units; Mass units grams Energy units Joules Distance units miles Activity, distance traveled and source type population
Output Emissions Detail	Hour, pollutant, emission process, on and off road, source type, road type

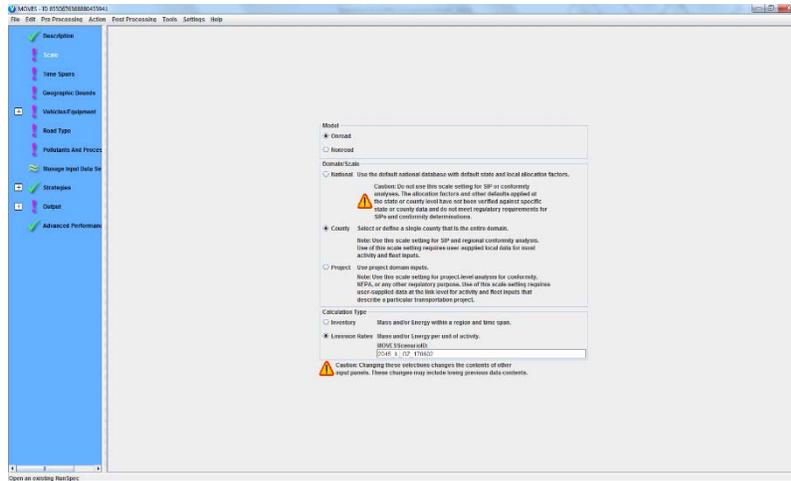
# Appendix D MOVES2014 Model

The following screen shots capture the settings tabulated above. These settings are consistent across all analysis years.

## 3.1 MOVES Navigator

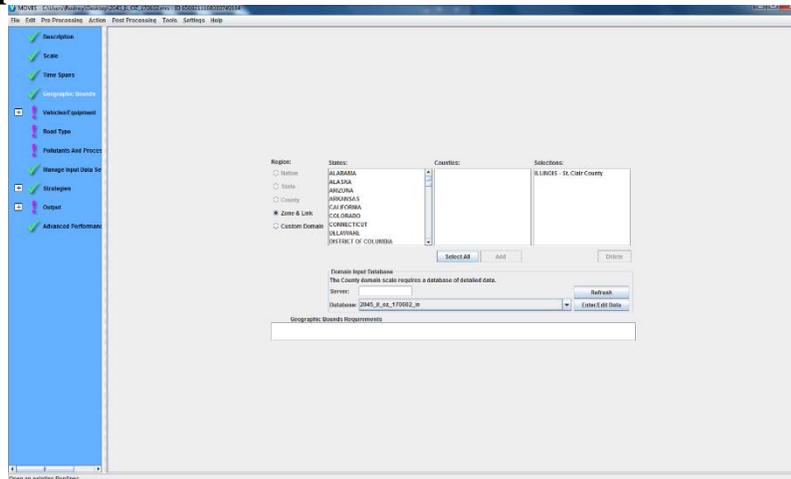
Some important screen shots are shown below in order to clearly indicate the RunSpec file parameters.

### 3.1.1 Scale



In this option, the Domain/Scale and calculation type is specified. The Domain specifies the level of default data needed to use for analysis and also the scale of the analysis. EWGCOG has used the county scale. The county scale requires user supplied local data for most inputs. We have selected “Emission Rates” as the calculation type.

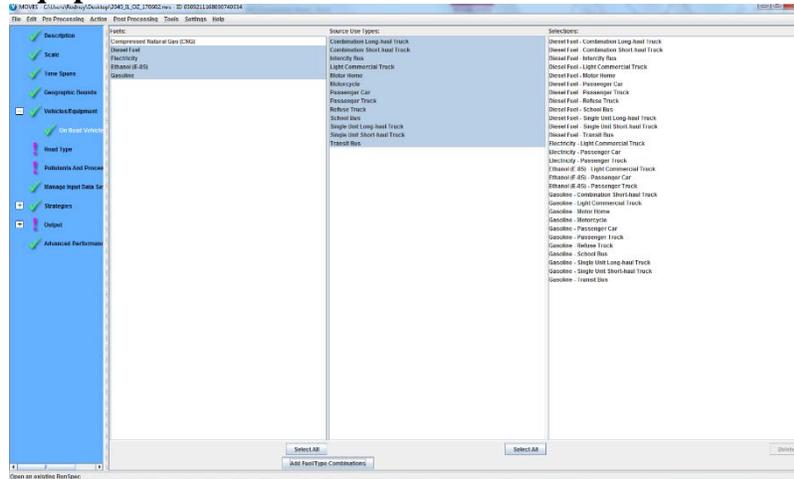
### 3.1.2 Geographic Bounds



# Appendix D MOVES2014 Model

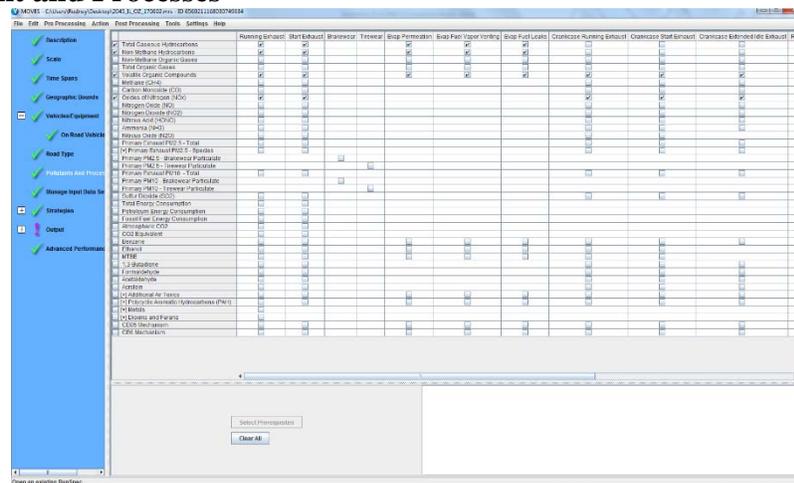
This is indicating that for Illinois, the proxy county used, St Clair in this analysis, and the region level selected, and the input database. For Missouri, St. Louis County was the proxy county.

## 3.1.3 Vehicle Equipment



All Source Types and Gasoline, Diesel, Ethanol (E-85), and Electricity combinations were selected.

## 3.1.4 Pollutant and Processes

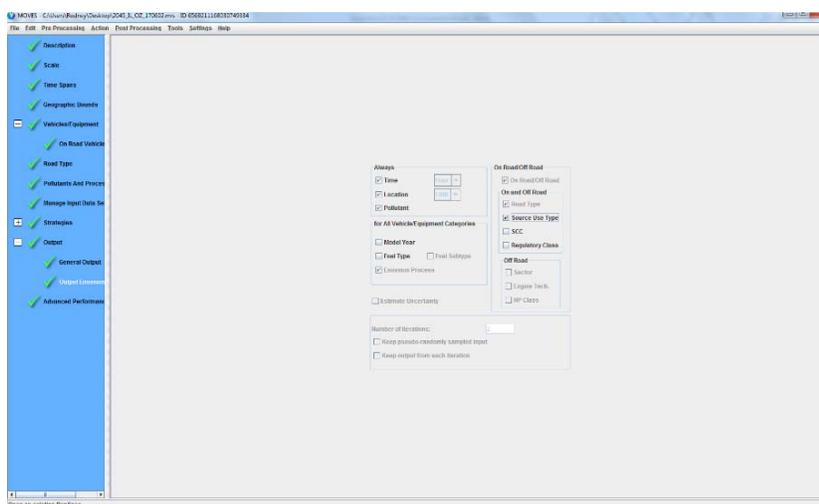
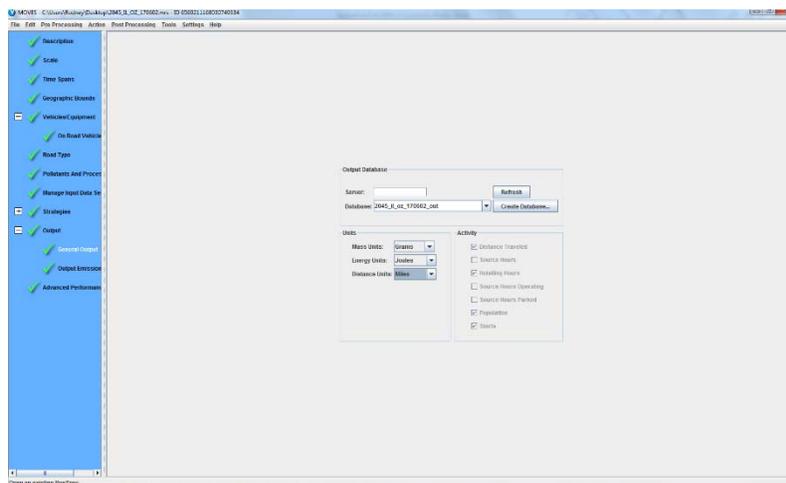


Above is shown that NO<sub>x</sub>, VOC, Total Gaseous Hydrocarbons, Non-Methane Hydrocarbons were selected here for ozone. For PM<sub>2.5</sub> the pollutant and processes were: NO<sub>x</sub>; primary exhaust PM<sub>2.5</sub> (total); organic carbon; elemental carbon; sulfate particulate; brake wear particulate; tire wear particulate; and total energy consumption.

## 3.1.5 Output

These screen shots indicate the general outputs and the units selected. They also show the output stratification used in this analysis.

# Appendix D MOVES2014 Model



## 4 County Data Manager

The County Data Manager (CDM) is used to simplify importing specific local data for the county or a user-defined custom domain without requiring direct interaction with the underlying MySQL database. Table 2 lists input files for the CDM, and their development.

**Table 2: MOVES input files**

File Name	Source
IM Coverage	Illinois EPA/MoDNR

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## MOVES2014 Model

File Name	Source
AVFT	MOVES defaults adjusted for no CNG transit buses
Fuel Supply	Illinois MOVES defaults/MoDNR
Fuel Formulation	Illinois MOVES defaults/MoDNR
Meteorological Data	Illinois EPA/MoDNR
Avg Speed Distribution	Illinois EPA/MoDNR
Road Type Distribution	Illinois EPA/MoDNR
Ramp Fraction	TDM
HPMSvTypeYear	EPA Calculators and theTDM
Hour VMT Fraction	MOVES defaults
Month VMT Fraction	MOVES defaults
Day VMT Fraction	MOVES defaults
Source Type Age Distribution	Illinois EPA/MoDNR
Source Type Population	Technical Guidance MOVES14a, Procedure Section 4.3

Consensus on the above files, occurred through discussion with the Inter Agency Consultation Group (IACG), the regional EPA offices and the MOVES technical guidance group.

The regional TDM generates vehicle miles traveled (VMT) for conformity determination purposes. EWGCOG receives VMT data for Baldwin Township from Illinois EPA, ensuring that the same VMT assumptions used in conformity were used in SIP development.

For Illinois, it was agreed to use the “proxy county approach”, that is to combine all the three Illinois counties and analyze them as one proxy county. It was agreed to use St. Clair as the proxy county, again this is in line with the SIP development process and was done in close collaboration with IACG and Illinois EPA. For Missouri, it was also agreed to use the “proxy county approach”, and to use St. Louis County as the proxy county. Again this was done in close collaboration with IACG, MoDNR and the regional EPA office.

#### 4.1 I/M Coverage

The I/M Importer allows the user to import data relating to inspection and maintenance programs. Illinois EPA provides input data, which is the I/M program in effect going forward. MoDNR provides input data on the Missouri I/M program.

#### 4.2 Fuel Supply, Fuel Formulation, and AVFT

Together use of Fuel Formulation, Fuel Supply, and alternative vehicle and fuels technology (AVFT) importers input appropriate fuel data in the correct MOVES format. Illinois EPA and MoDNR provided the necessary files with the exception of a modified MOVES default AVFT for conformity analysis.

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### 4.3 Meteorological Data

In the Meteorological Data Importer, this dataset has data items such as month ID, Zone ID, hour ID, Temperature and Relative Humidity. Illinois EPA provides the 25-year average of meteorological data collected at Lambert International Airport for use in this conformity determination. For Missouri, the MoDNR provided these data. These are suitable for use in the various analysis years by IACG, Illinois EPA, and MoDNR.

### 4.4 Average Speed Distribution

The CDM allows the user to input average speed data specific to road type, source type, time of day, and type of day combination. The MOVES model defines 16 speed bins which describe the average driving speed on each road type. Thus, for each combination of vehicle type, road type, and hour/day type, there is a corresponding fraction for each speed bin, these fractions together equal one. EPA Illinois EPA and MoDNR provide these data in the format required by MOVES.

### 4.5 Road Type Distribution

The fraction of VMT by road type varies from area to area and can have a significant effect on overall emissions from on-road mobile sources. The VMT fractions by road type used in inventory modeling for SIPs and regional conformity analyses should be consistent with the most recent information used for transportation planning. For each source type, the Road Type Distribution table stores the distribution of VMT by road type (e.g., the fraction of passenger car VMT on each of the road types). Illinois EPA and MoDNR provided these data, after adjusting for available local data. The VMT used here as input was the output from the regional TDM. In the emission rates mode, these data only relatively impact non-running emission rate processes.

### 4.6 Ramp Fraction

Use of the Ramp Fraction tab is optional; if the user does not import local data the default value is 8 percent. For all analysis years, the TDM outputs were used to generate these data.

### 4.7 Vehicle Type VMT

EPA recommends the use of locally developed VMT projections for SIPs and regional conformity analyses. Travel demand forecasting models are often the source of information used by MPOs to project VMT. EWGCOG uses the approach described under the conformity rule §93.122 (b)(3). This allows areas with network-based travel models to develop factors, which reconcile and calibrate the network-based travel model projections of VMT in the base year of its validation to the Highway Performance Monitoring System (HPMS) projections for the same period. Section 3, “Developing Locality-Specific Inputs from Travel Demand Models,” of the EPA document, “Volume IV: Chapter 2, Use of Locality-Specific Transportation Data for the Development of Mobile Source Emission Inventories,” (September 1996), discusses the procedure followed to reconcile traffic demand model results with HPMS VMT projections.

MOVES requires VMT by source type, month, day, and hour VMT fractions. The TDM gives output as the average annual daily traffic. In order to develop the detailed fractions required by MOVES, EWGCOG uses EPA created converters. These converters allow users to input average annual daily VMT from the TDM along with other local information such as monthly and weekend day adjustment

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factors. The output of these converters is the equivalent MOVES tables of VMT by HPMS class, VMT fractions by month, by day and by hour. MoDNR and Illinois EPA used local information, where available, to improve the outputs such that they better reflect local conditions. EWGCOG use these converters in this analysis to get the MOVES files in the right format.

### 4.8 Source Type Age Distribution

The age distribution of vehicle fleets can vary significantly from area to area. Fleets with a higher percentage of older vehicles will have higher emissions. For emission calculation, MOVES requires vehicle age distribution by source type. Vehicle age distribution is divided into 30 years based on vehicle model years. Surveys of registration data indicate considerable local variability in vehicle age distributions. For this reason, Illinois EPA and MoDNR used local vehicle registration information to develop a localized and updated version. MOVES requires a age distribution by source type, the same file is used for all analysis years as required by EPA, and is consistent with the file used in SIP development.

### 4.9 Source Type Population

MOVES uses source type population to calculate start and evaporative emissions. The Source Type Population Importer allows the user to input the number of vehicles in the geographic, for each vehicle type or source type selected for modeling in the Run Spec file. MOVES categorizes vehicles into 13 source types, which are subsets of five HPMS vehicle types. Detailed vehicle information was not available at the local level. Therefore, EWGCOG used the procedure described in MOVES (version 14a) Technical Guidance, Section 4.3. This involves basing population projections on the VMT projections for a particular source type and the ratio of MOVES default population to VMT by source type. Running MOVES at the national scale generates default populations and VMT for the city of St. Louis and the seven counties in consideration. Local VMT multiplied by the ratio of default population to default VMT, calculates a projection of local population based on local VMT. This was repeated for each analysis year, since projections differ for each year.

## 5 Emission Rates Output

For transportation related ozone emissions, the sources include exhaust and evaporative emissions that occur while vehicles are on “real roads”, starts, extended idle, and evaporative emissions (with the exception of refueling) that occur while a vehicle is parked. The combined sum of all these emissions gives the total transportation related emissions.

When running MOVES in the emissions rates mode, the three key output tables are:

1. **rateperdistance:** When “Emission Rates” is selected on the Scale panel, the RatePerDistance table stores emissions as rates per distance (e.g. grams per mile) with the units depending on those selected in the run specification. This table includes rates for exhaust and evaporative emissions that occur while vehicles are on “real roads”, but does not include rates for starts, extended idle, or evaporative emissions (with the exception of refueling) that occur while a vehicle is parked.
2. **rateprofile:** When “Emission Rates” is selected on the Scale panel, the RatePerProfile table stores vapor venting emissions from parked vehicles as rates per vehicle (e.g. grams per vehicle).

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Note that the denominator is the total vehicle population—not just the vehicles that are parked. The temperature profile ID in this table refers to a particular daily pattern of temperatures. This is important because vapor venting depends on temperatures in both the current and previous hours.

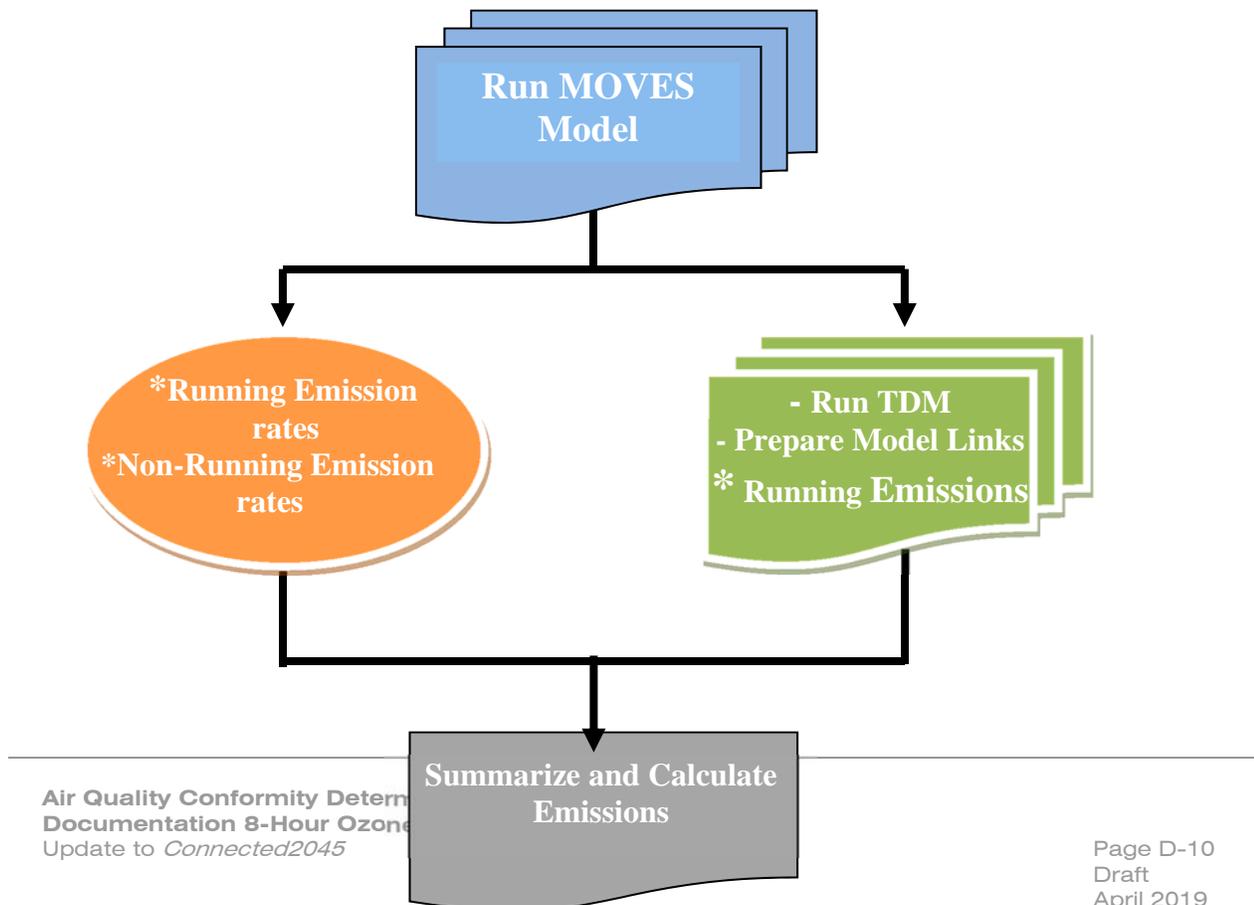
3. **ratepervehicle:** When “Emission Rates” is selected on the Scale panel, the RatePerProfile table stores emissions from starts and extended idle, and some evaporative emissions (permeation and liquid leaks) from parked vehicles as rates per vehicle (e.g. grams per vehicle). The denominator for county level runs is the total vehicle population—not just parked vehicles.

## 6 Travel Demand Model Output

The output from running MOVES in emission rates mode is a set of emission rates, as mentioned in the section above. The stratification of running emission rates include; source type, road type, pollutant and process, speed bin, month, type of day (week vs weekend) and hour. In order to calculate the total running emissions, the emission rate per mile has to be multiplied by the total VMT for that strata and summed. For the starts, extended idle and evaporative emissions, the rate is per vehicle. So the rate per profile and rate per vehicle tables have to be multiplied by the appropriate source type population and summed to get the total non-running emissions. Combining the running and non-running emissions will give the total emissions. This is shown in Figure 2, in a simplified schematic.

For details regarding the TDM housed and maintained by EWGCOG, please refer to Appendix C.

**Figure 2: Emission Calculation using MOVES in Emission Rate Mode**



# Appendix D

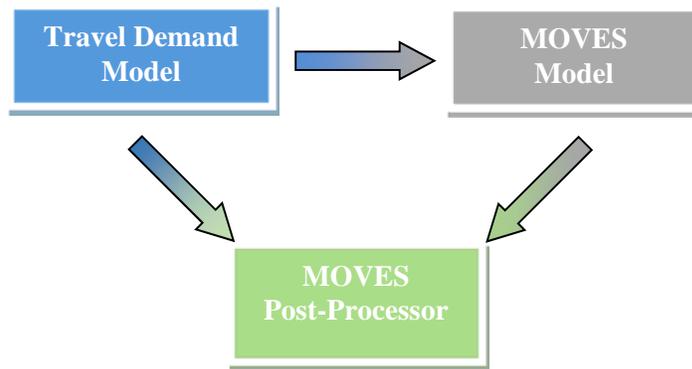
## MOVES2014 Model

### 7 Calculation of Total Emission Amounts—MOVES Post Processor

The execution of the MOVES2014a software (MOVES) in emission rates mode requires more time and computational resources than execution in inventory mode. The advantage of the emission rates mode is that minor changes in the network do not require another execution of MOVES. Frequently, an MPO's work involves such minor network changes, which then change the overall vehicle miles of travel (VMT).

To calculate the total emission amounts that must be reported for air quality conformity purposes, EWG staff developed a post-processing program, MOVES Post Processor (MPP), using the programming language Python. Python is an open source, cross platform, object-oriented language.

This section briefly discusses the MPP and how it uses the VMT from the TDM along with MOVES input and output databases to calculate the total emission amounts.



#### 7.1 MOVES Post Processor Development

The following criteria strictly guided the development of the MPP:

1. Conformance with EPA and Federal guidelines
2. Consistency in calculation methodology
3. Ease and flexibility in data entry
4. Pollutant versatility
5. Various levels of aggregation
6. User defined output

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Figure 3: MOVES Post Processor GUI

The screenshot displays the MOVES Post Processor GUI with the following sections:

- Enter names of input & output databases:** Includes text boxes for "BROWSE for Input Database" and "BROWSE for Output Database".
- Examine tables:** Three radio button options: "Examine tables in databases for presence of any records.", "Examine tables in databases in detail. Total execution time is greatly increased.", and "Do not examine tables in databases."
- Choose exactly 1 of the following 12 options:** A grid of 12 radio button options for different data selection criteria, including "OZ with HPMSBaseYear/VT" (selected).
- CUSTOM SELECTION:** A section for selecting at least 1 pollutant, 1 month, and 1 day type. It features four columns of checkboxes:
  - POLLUTANTS (pollutantID):** total gaseous hydrocarbons (1), oxides of nitrogen (NOX) (3), nitrous oxide (6), nitrogen oxide (32), non-methane organic gases (80), volatile organic compounds (VOC) (87), total energy consumption (91), primary exhaust PM2.5 - total (PM25EQ) (110), primary exhaust PM2.5 - elemental carbon (112), primary PM2.5 - brakewear particulate (PM25BW) (116).
  - POLLUTANTS (pollutantID):** carbon monoxide (2), methane (5), sulfur dioxide (31), non-methane hydrocarbons (79), total organic gases (86), atmospheric carbon dioxide (90), carbon dioxide equivalent (96), primary exhaust PM2.5 - organic carbon (111), primary exhaust PM2.5 - sulfate particulate (115), primary PM2.5 - tirewear particulate (PM25TW) (117).
  - MONTHS (monthID):** January (1) through December (12).
  - MONTHS (monthID):** February (2) through December (12).
  - DAY TYPES (dayID):** week day (5), weekend day (2).
- As indicated above, use the values entered below as the daily/annual VMT:** Five input fields for HPMS vehicle type IDs (10, 25, 40, 50, 60).
- Use the values entered below as the source type populations:** Twelve input fields for source type IDs (11 through 62).
- Footer:** "East West Gateway Council of Governments, MOVES Post Processor, version 1.2, updated 27 July 2017".
- Buttons:** "QUIT" and "SUBMIT".

The MPP automates many of the calculations for the total emission amounts, which significantly reduces the time required of the user and the potential for error. The MPP opens a graphical user interface (GUI), as shown in Figure 3, using which user specifies the names of the input and output databases generated by MOVES run and the pollutant(s) of interest. The MPP then performs a series of queries on various tables from both databases to obtain the total amounts of running, profile, and vehicle emissions for each of the selected pollutants. These total emission amounts, at various levels of aggregation, are inserted into newly created tables in the output database.

Extensive quality assurance (QA) and quality control (QC) procedures are embedded in the MPP. Additionally, extensive testing was performed to validate the output of the MPP by executing it with MOVES databases currently in use for Regional Emissions Analysis and comparing the output with that obtained by the previous method, where Microsoft Access was used to manually apply the queries to the tables in the databases.

## 7.2 Travel Demand Model Vehicle Miles of Travel

Using EPA calculators, the average weekday VMT from the TDM is formatted to fit the MOVES input requirements. Starting with the average week day VMT, the EPA calculator computes annual VMT for each of the 5 HPMS vehicle types as follows:

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Annual VMT =

$$\sum_{i=1}^{12} \left[ (AWDVMT)(MAF_i)(NUMDAYS_i) \left(\frac{5}{7}\right) + (AWDVMT)(MAF_i)(NUMDAYS_i) \left(\frac{2}{7}\right)(WEAF) \right]$$

Where

*AWDVMT* = Average week day VMT  
*MAF<sub>i</sub>* = Adjustment factor for month *i*  
*NUMDAYS<sub>i</sub>* = Number of days in month *i*  
*WEAF* = Adjustment factor for weekend days

The MPP establishes a connection with the local MySQL Server and then transmits various SQL queries to MySQL, which MySQL then performs on the input and output databases. These queries first format and stratify the TDM VMT according to the same categories as the emission rates tables.

The original VMT (either an annual or a daily value) is stratified according to HPMS vehicle type. These original VMT values are converted to average weekday VMT values for the appropriate month(s) and are then multiplied by corresponding factors from various tables in the databases to stratify the VMT according to 13 source types, 4 road types, 16 average speed bins, and the 24 hours of the day. With the VMT now stratified according to the same categories as the emission rates tables, the queries now execute the multiplication of the values of VMT with the corresponding values of the emission rates table to obtain emission amounts, which are then summed to yield total emission amounts by pollutant.

### 7.3 Data of Interest

For ozone, daily emission amounts are calculated for a typical weekday in July. For particulate matter PM<sub>2.5</sub>, annual emission amounts are calculated as the product of the emission rates for a typical week day in April and the annual value for each stratification of the VMT.

### 7.4 MOVES Emission Rates Tables

For the Regional Emissions Analysis, the pollutants of interest are ozone, which includes oxides of nitrogen (NOX) and volatile organic compounds (VOC), and particulate matter, which includes NOX and Particulate Matter 2.5 (PM<sub>2.5</sub>). Execution of MOVES in emission rates mode yields three tables that contain running and non-running emission rates.

#### Running Emissions—Rate Per Distance

The table 'rateperdistance' stores an emission rate in grams per VMT for each combination of pollutant, process, source type, road type, month, day type, hour of the day, and average speed bin.

For each combination of pollutant and process, the values in the tables 'HPMSFrac', 'roadTypeDistribution', 'monthVMTFraction' (only for ozone), 'weekendAdjustment' (only for custom

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selections), 'hourVMTFraction', and 'avgSpeedDistribution' are used to distribute the total VMT for each HPMS vehicle type among all of the combinations of values in these categories.

The values of VMT are then multiplied by the corresponding emission rates per mile to yield the emission amounts, which are then summed for each pollutant.

### **Non-Running Emissions—Rate Per Profile**

The table 'rateperprofile' stores emission rates in grams per vehicle for each combination of pollutant, process, source type, day type, and hour of the day.

### **Non-Running Emissions—Rate Per Vehicle**

The table 'ratepervehicle' stores an emissions rate in grams per vehicle for each combination of pollutant, process, source type, month, day type, and hour of the day.

For the calculation of both profile and vehicle emission amounts, the source type populations (i.e. numbers of vehicles) in the table 'sourcetypeyear' are multiplied by the corresponding emission rates per vehicle to yield the emission amounts, which are then summed for each pollutant.

## 8 Total Emissions—Running and Non-Running

By adding all the running and non-running emission summaries, we get the total emissions from transportation related sources for both Illinois and Missouri portions of the planning area.

## 9 Geography for Different Emission Standards

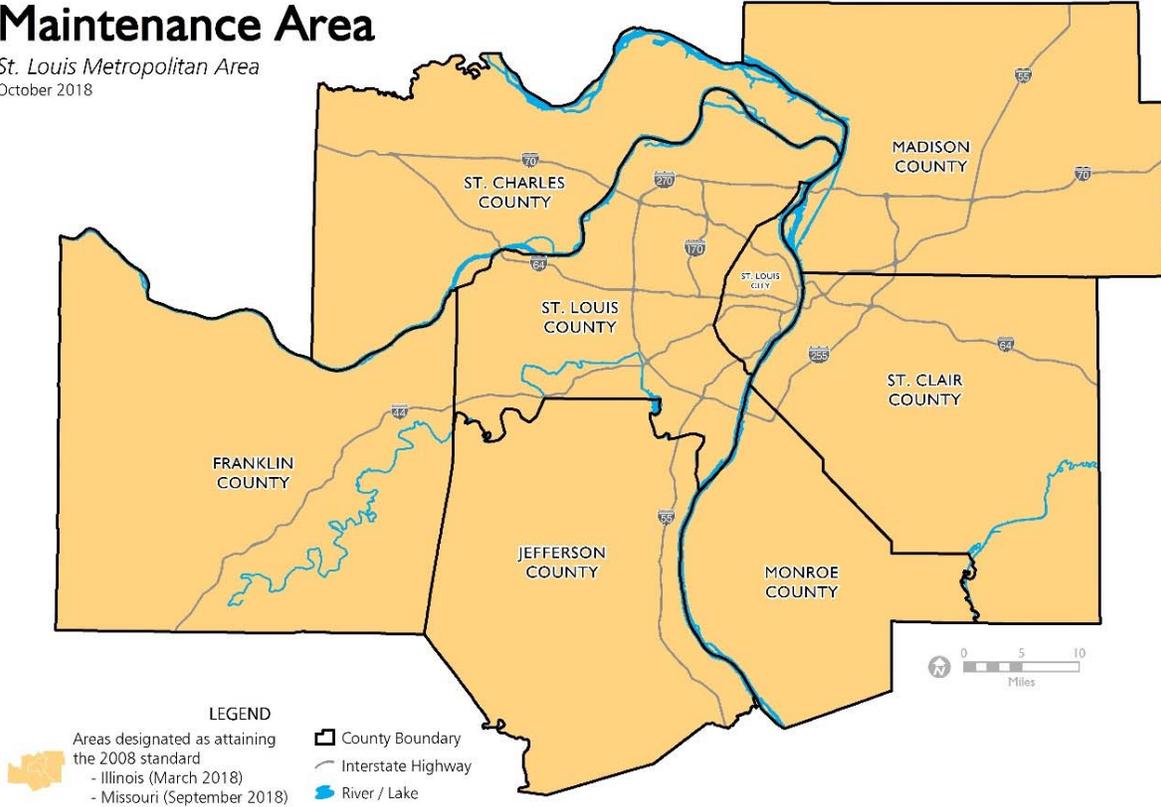
As discussed in section 4.2 of Overview of the Air Quality Transportation Conformity Process, multiple air quality standards needed to be met, each having different geography. Figures 4 – 6 highlight these geographies for the following three standards:

- 1997 PM<sub>2.5</sub> Standard
- 2008 Ozone Standard
- 2015 Ozone Standard

Figure 4: 2008 Ozone Standard Maintenance Area

## 2008 Ozone Standard Maintenance Area

St. Louis Metropolitan Area  
October 2018



Source: East-West Gateway Council of Governments

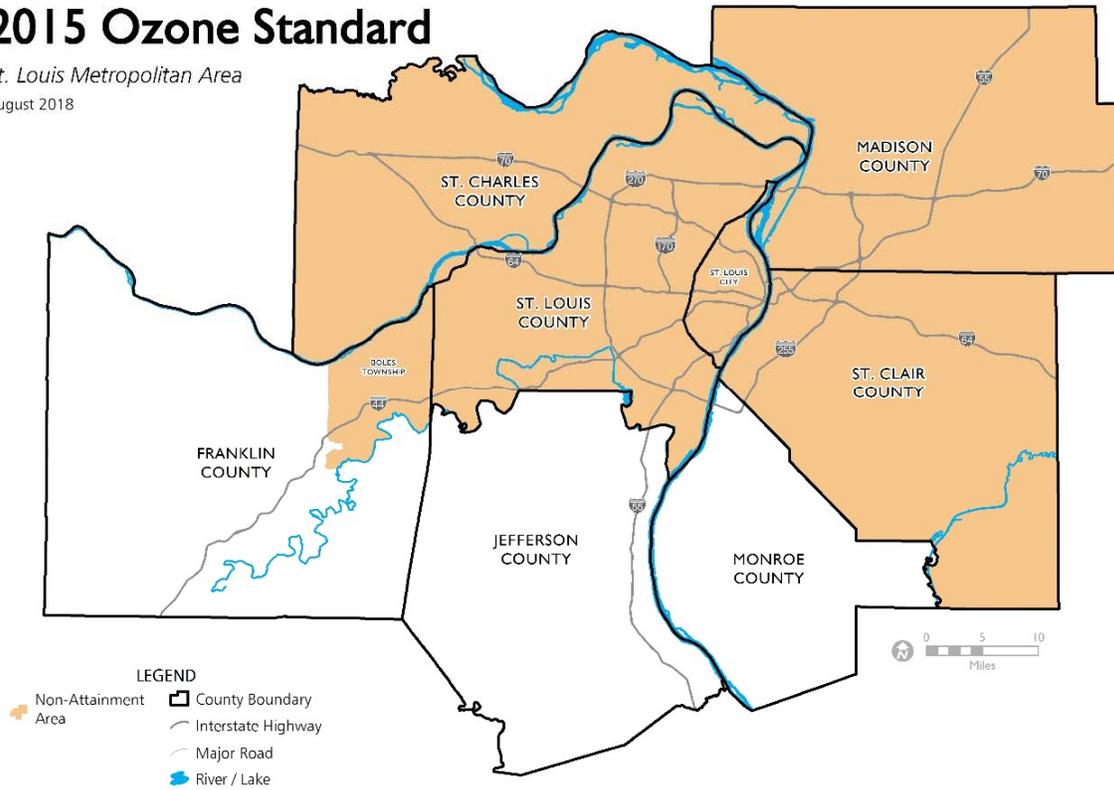


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Figure 5: 2015 Ozone Standard Non-Attainment Area

## Non-Attainment Area 2015 Ozone Standard

St. Louis Metropolitan Area  
August 2018



Sources: East-West Gateway Council of Governments

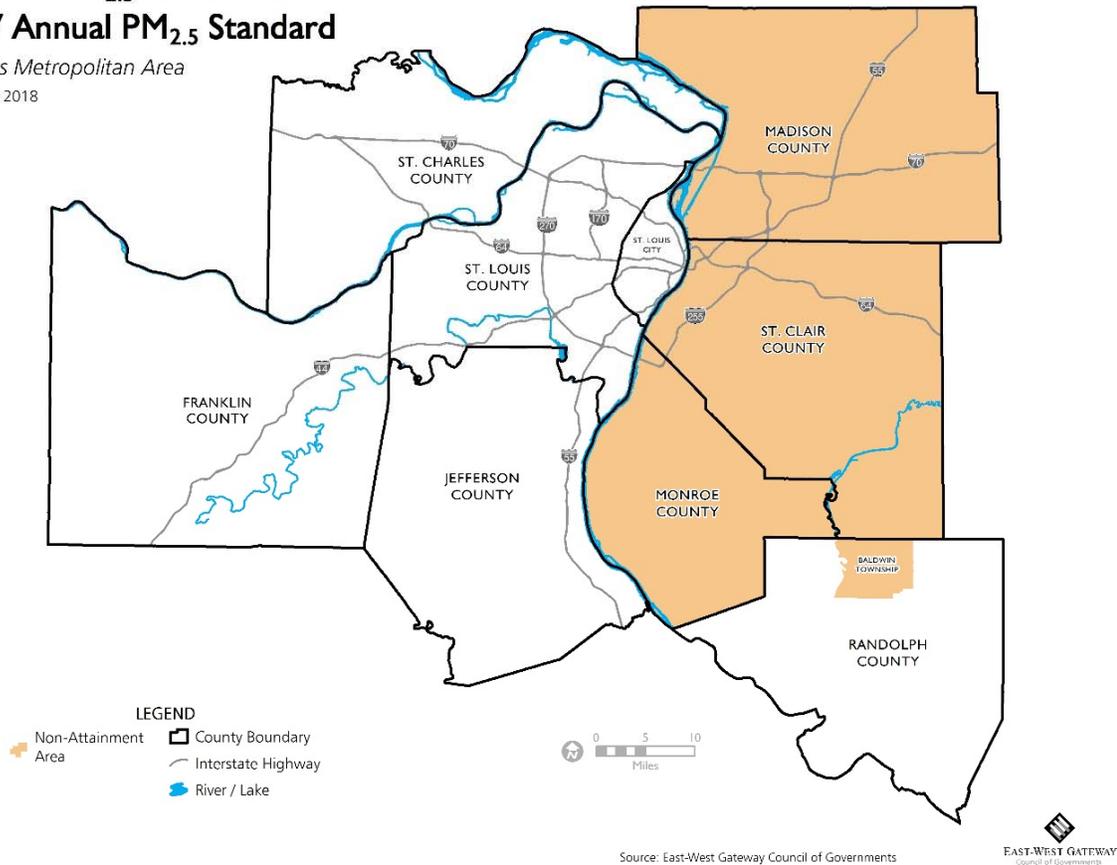


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**Figure 6: 1997 PM<sub>2.5</sub> Standard Non-Attainment Area**

## St. Louis PM<sub>2.5</sub> Non-Attainment Area 1997 Annual PM<sub>2.5</sub> Standard

St. Louis Metropolitan Area  
November 2018



## 10 Detailed Emission Tables

For all of the analysis years, the emissions calculated for the regional emissions analysis using the EPA approved MOVES model (version 14a) fall below the budgets or appropriate test, in line with the EPA guidance and discussions.

Shown below, Tables 3-7 compare modeled emissions to EPA approved budgets followed by Figures 7 – 12 that chart total emissions for the various standards and relevant analysis years.

*For all Illinois analysis years, Baldwin township was included in all PM<sub>2.5</sub> analysis. For both Missouri and Illinois, units for ozone emission tables below are US tons per **day**, and units for all PM<sub>2.5</sub> emissions tables below are US tons per **year**.*

**Table 3: Missouri Ozone (2008 Eight-Hour Standard)**

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Missouri – Regional Emissions Analysis: Ozone Conformity Tests Based on Conformity Requirements for 2008 Eight-Hour Ozone Standard (US tons per day)				
Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Emissions	2015 Budget	Emissions	2015 Budget
2025	11.5585	32.70	18.1907	76.70
Analysis Year	Emissions	2030 Budget*	Emissions	2030 Budget*
2030	8.9559	22.00	13.0975	40.00
2035	7.8367	22.00	11.0021	40.00
2045	6.9449	22.00	10.0219	40.00

\* EPA stated in a May 15, 2018 letter to MoDNR that the 2030 budgets from the Technical Correction to the Redesignation Request and Maintenance Plan for the St. Louis (Missouri) 2008 Nonattainment Area (February 2018) were adequate for use in the Conformity Determination process.

**Table 4: Illinois Ozone (2008 Eight-Hour Standard)**

ILLINOIS – Regional Emissions Analysis: Ozone Conformity Tests Based on Conformity Requirements for 2008 Eight-Hour Ozone Standard (US tons per day)				
Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Emissions	2025 Budget	Emissions	2025 Budget
2025	5.4865	5.68	7.8605	15.22
Analysis Year	Emissions	2030 Budget	Emissions	2030 Budget
2030	4.1586	9.05	5.6630	16.68
2035	3.4424	9.05	4.6497	16.68
2045	3.0540	9.05	4.4003	16.68

**Table 5: Missouri Ozone (2015 Standard)**

Missouri – Regional Emissions Analysis: Ozone Conformity Tests Based on Conformity Requirements for 2015 Eight-Hour Ozone Standard 3 County and 1 Township Non-Attainment Area (US tons per day)				
Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Action	2015 Budget	Action	2015 Budget
2020	13.1161	32.70	24.6523	76.70
2025	9.8414	32.70	15.3573	76.70
		2030 Budget		2030 Budget
2030	7.6079	22.00	11.0054	40.00
2035	6.6418	22.00	9.2010	40.00
2045	5.8613	22.00	8.3180	40.00

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**Table 6: Illinois Ozone (2015 Standard)**

ILLINOIS – Regional Emissions Analysis: Ozone Conformity Tests Based on Conformity Requirements for 2015 Eight-Hour Ozone Standard 2 County Non-Attainment Area (US tons per day)				
Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Action	2008 Budget	Action	2008 Budget
2020	6.9081	17.27	11.7423	52.57
		2025 Budget		2025 Budget
2025	5.1582	5.68	7.4153	15.22
		2030 Budget		2030 Budget
2030	3.8981	9.05	5.3329	16.68
2035	3.3344	9.05	4.5213	16.68
2045	2.8720	9.05	4.1624	16.68

**Table 7: PM<sub>2.5</sub> for Illinois**

ILLINOIS* – Regional Emissions Analysis: PM <sub>2.5</sub> Conformity Tests Based on Conformity Requirements for 1997 Annual PM <sub>2.5</sub> Standard (US tons per year)				
Analysis Year	Direct PM <sub>2.5</sub>		Oxides of Nitrogen	
	Action	Baseline	Action	Baseline
2020	206.5016	809.55	4547.6352	21,788.78
2030	128.1168	809.55	2100.8429	21,788.78
2035	117.6981	809.55	1765.2300	21,788.78
2045	116.8264	809.55	1684.3398	21,788.78

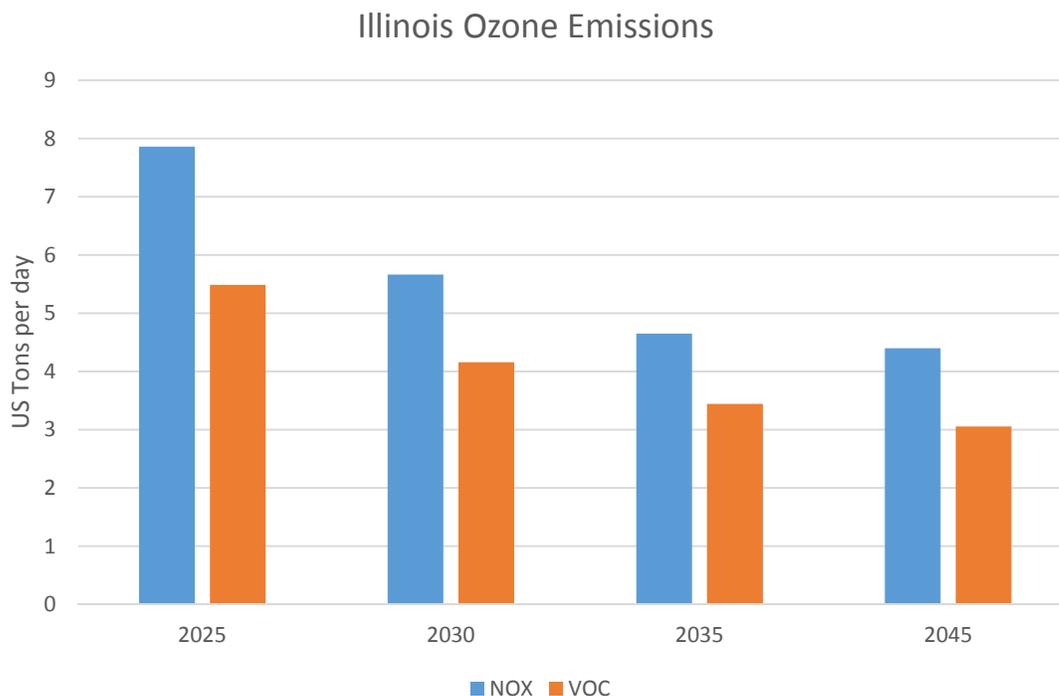
\* Includes Baldwin Township

Please note – Effective October 2, 2018, EPA redesignated the Missouri portion of the St. Louis PM<sub>2.5</sub> non-attainment area to attainment of the 1997 annual PM<sub>2.5</sub> standard. With the redesignation, the 1997 standard was revoked and conformity does not have to be performed for these counties. For additional information please see Section 4.2.2 in the Overview of the Air Quality Transportation Conformity Process.

# Appendix D MOVES2014 Model

## Illinois: Ozone

**Figure 7: Total VOC and NOx in U.S. Tons per day by analysis year, 2008 Standard**



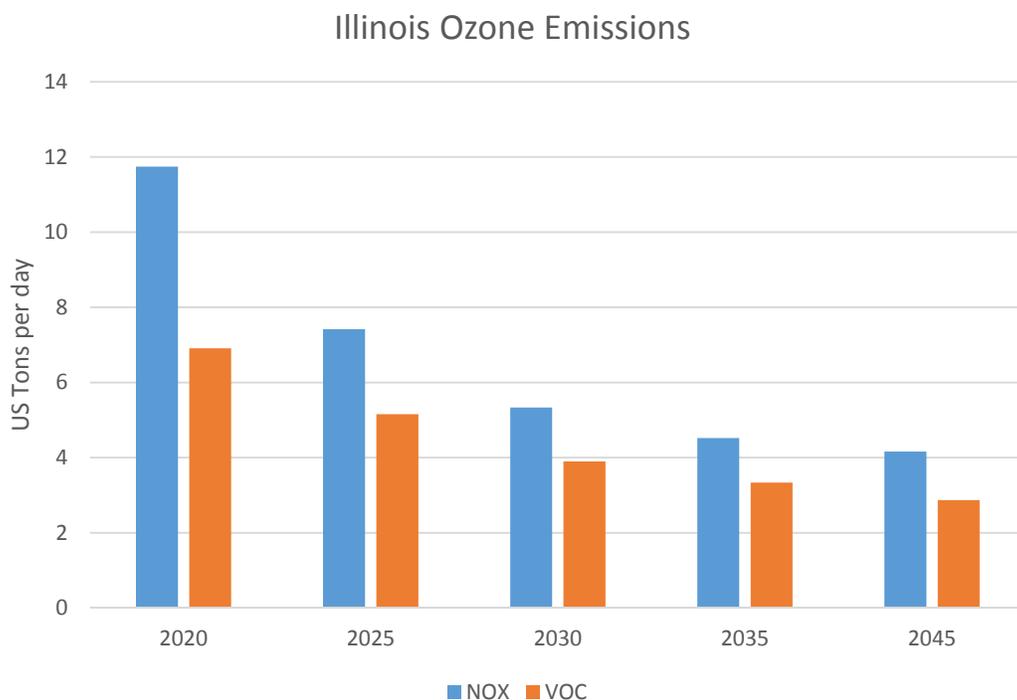
**Table 8: Illinois Ozone for 2008 Standard (US tons per day)**

	<i>NOX</i>	<i>VOC</i>
<b>Year 2025</b>		
<i>Emissions Running:</i>	5.5117	2.4990
<i>Emissions Profile:</i>	0.0000	0.5672
<i>Emissions Vehicle:</i>	2.3488	2.4204
<b>Total Emissions</b>	<b>7.8605</b>	<b>5.4865</b>
<b>Year 2030</b>		
<i>Emissions Running:</i>	3.6216	1.9587
<i>Emissions Profile:</i>	0.0000	0.4476
<i>Emissions Vehicle:</i>	2.0415	1.7524
<b>Total Emissions</b>	<b>5.6630</b>	<b>4.1586</b>

# Appendix D MOVES2014 Model

<b>Year 2035</b>		
<i>Emissions Running:</i>	2.8381	1.7054
<i>Emissions Profile:</i>	0.0000	0.3680
<i>Emissions Vehicle:</i>	1.8116	1.3691
<b>Total Emissions</b>	<b>4.6497</b>	<b>3.4424</b>
<b>Year 2045</b>		
<i>Emissions Running:</i>	2.6084	1.6089
<i>Emissions Profile:</i>	0.0000	0.3022
<i>Emissions Vehicle:</i>	1.7919	1.1429
<b>Total Emissions</b>	<b>4.4003</b>	<b>3.0540</b>

**Figure 8: Total VOC and NOx in U.S. Tons per day by analysis year, 2015 Standard**



**Table 9: Illinois Ozone for 2015 Standard (US tons per day)**

	<b>NOX</b>	<b>VOC</b>
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# Appendix D

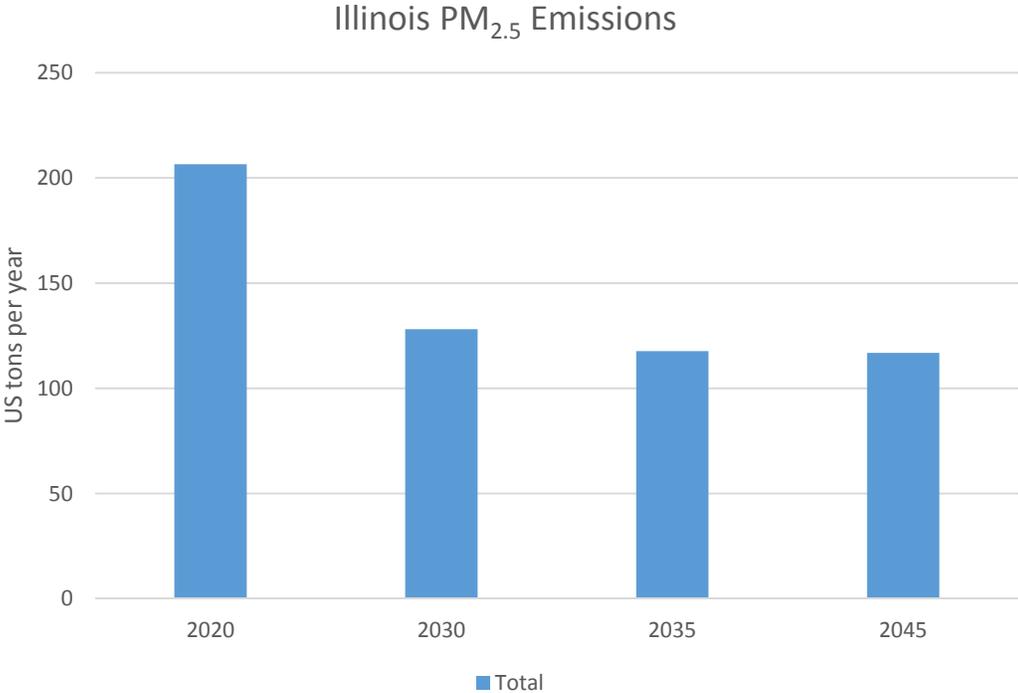
## MOVES2014 Model

<b>Year 2020</b>		
<i>Emissions Running:</i>	8.9554	3.3216
<i>Emissions Profile:</i>	0.0000	0.6689
<i>Emissions Vehicle:</i>	2.7868	2.9175
<b>Total Emissions</b>	<b>11.7423</b>	<b>6.9081</b>
<b>Year 2025</b>		
<i>Emissions Running:</i>	5.1979	2.3499
<i>Emissions Profile:</i>	0.0000	0.5328
<i>Emissions Vehicle:</i>	2.2174	2.2754
<b>Total Emissions</b>	<b>7.4153</b>	<b>5.1582</b>
<b>Year 2030</b>		
<i>Emissions Running:</i>	3.4082	1.8361
<i>Emissions Profile:</i>	0.0000	0.4191
<i>Emissions Vehicle:</i>	1.9247	1.6429
<b>Total Emissions</b>	<b>5.3329</b>	<b>3.8981</b>
<b>Year 2035</b>		
<i>Emissions Running:</i>	2.7583	1.6518
<i>Emissions Profile:</i>	0.0000	0.3561
<i>Emissions Vehicle:</i>	1.7630	1.3264
<b>Total Emissions</b>	<b>4.5213</b>	<b>3.3344</b>
<b>Year 2045</b>		
<i>Emissions Running:</i>	2.4658	1.5129
<i>Emissions Profile:</i>	0.0000	0.2837
<i>Emissions Vehicle:</i>	1.6966	1.0754
<b>Total Emissions</b>	<b>4.1624</b>	<b>2.8720</b>

### Illinois: PM<sub>2.5</sub>

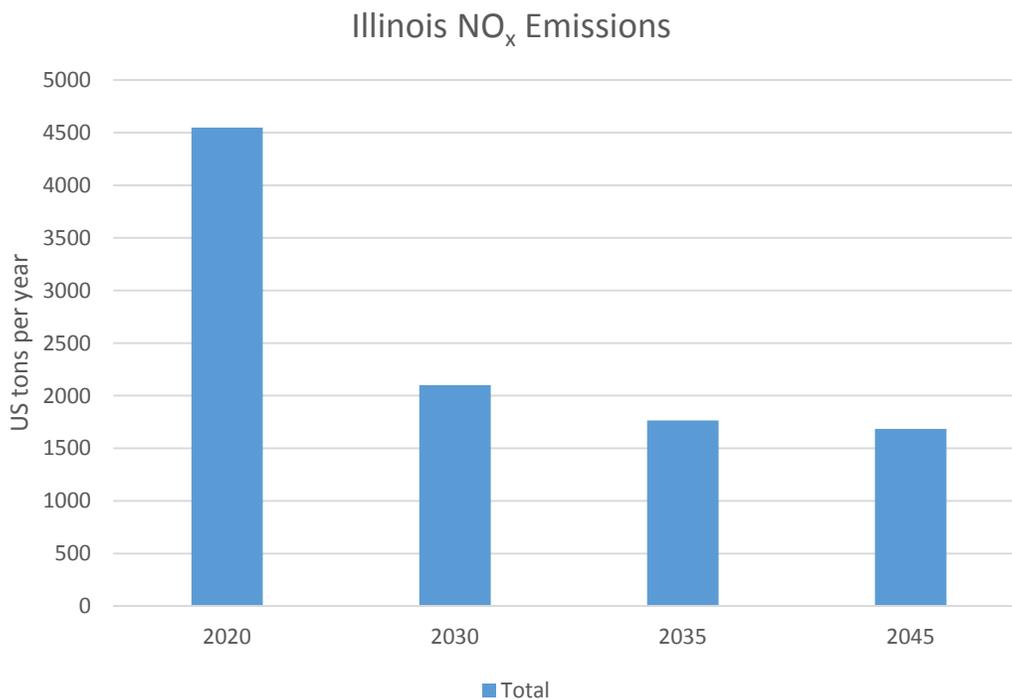
# Appendix D MOVES2014 Model

**Figure 9: Total PM<sub>2.5</sub> in U.S. Tons per year by analysis year, 1997 standard**



**Figure 10: Illinois PM<sub>2.5</sub>, Total NO<sub>x</sub> in U.S. Tons per year by analysis year, 1997 standard**

# Appendix D MOVES2014 Model



**Table 10: Illinois total PM<sub>2.5</sub> (US tons per year)**

	<i>Total Emissions</i>	
	NO <sub>x</sub>	PM <sub>2.5</sub>
<b>2020</b>	4547.6352	206.5016
<b>2030</b>	2100.8429	128.1168
<b>2035</b>	1765.2300	117.6981
<b>2045</b>	1684.3398	116.8264

Total PM<sub>2.5</sub> emissions are the sum of PM<sub>2.5</sub> emissions due to brake wear (BW), tire wear (TW) and exhaust (EX). Detailed emissions are shown below.

# Appendix D

## MOVES2014 Model

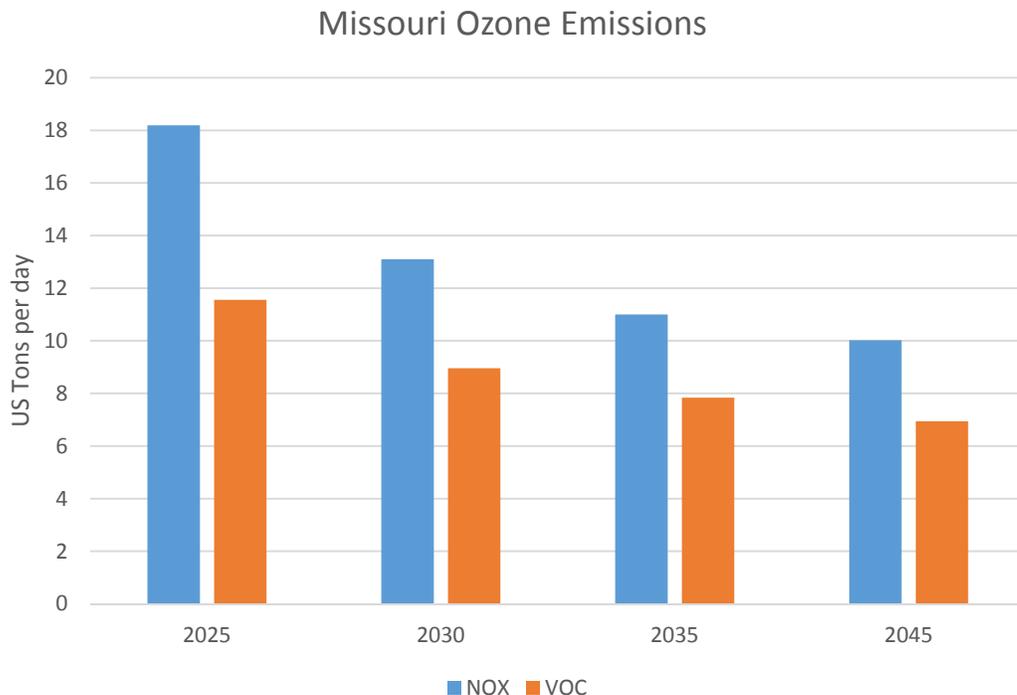
**Table 11: Illinois detailed PM<sub>2.5</sub> (US tons per year)**

<b>Year 2020</b>				
<i>Pollutant:</i>	NOx	PM2.5-EX	PM2.5-BW	PM2.5-TW
<i>Emissions:</i>	4547.64	139.6000	55.3439	11.5577
<b>Total</b>	<b>4547.6352</b>	<b>206.5016</b>		
<b>Year 2030</b>				
<i>Pollutant:</i>	NOx	PM2.5-EX	PM2.5-BW	PM2.5-TW
<i>Emissions:</i>	2100.84	57.5957	58.3488	12.1723
<b>Total</b>	<b>2100.8429</b>	<b>128.1168</b>		
<b>Year 2035</b>				
<i>Pollutant:</i>	NOx	PM2.5-EX	PM2.5-BW	PM2.5-TW
<i>Emissions:</i>	1765.23	45.6960	59.5805	12.4216
<b>Total</b>	<b>1765.2300</b>	<b>117.6981</b>		
<b>Year 2045</b>				
<i>Pollutant:</i>	NOx	PM2.5-EX	PM2.5-BW	PM2.5-TW
<i>Emissions:</i>	1684.34	41.5701	62.2878	12.9685
<b>Total</b>	<b>1684.3398</b>	<b>116.8264</b>		

# Appendix D MOVES2014 Model

## Missouri: Ozone

**Figure 11: Total VOC and NO<sub>x</sub> in U.S. Tons per day by analysis year, 2008 Standard**



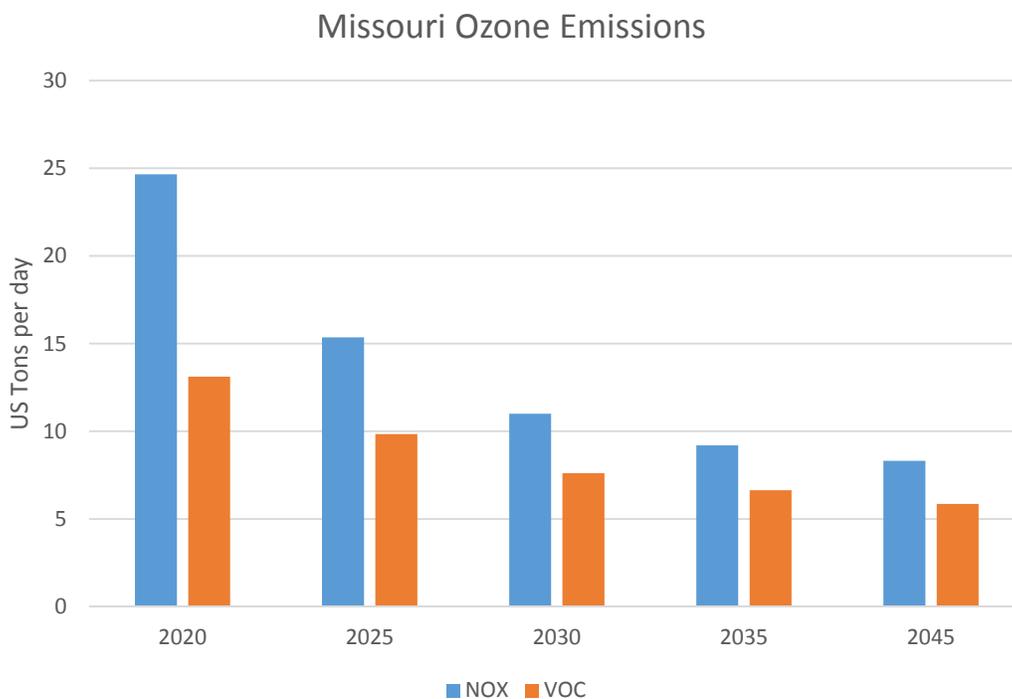
**Table 12: Missouri Ozone for 2008 Standard (US tons per day)**

	<b>NOX</b>	<b>VOC</b>
<b>Year 2025</b>		
<i>Emissions Running:</i>	15.6719	5.1398
<i>Emissions Profile:</i>	0.0000	1.4398
<i>Emissions Vehicle:</i>	2.5188	4.9789
<b>Total Emissions</b>	<b>18.1907</b>	<b>11.5585</b>
<b>Year 2030</b>		
<i>Emissions Running:</i>	11.3593	4.2100
<i>Emissions Profile:</i>	0.0000	1.1392
<i>Emissions Vehicle:</i>	1.7382	3.6067
<b>Total Emissions</b>	<b>13.0975</b>	<b>8.9559</b>

# Appendix D MOVES2014 Model

<b>Year 2035</b>		
Emissions Running:	9.5986	3.8228
Emissions Profile:	0.0000	1.0872
Emissions Vehicle:	1.4035	2.9268
<b>Total Emissions</b>	<b>11.0021</b>	<b>7.8367</b>
<b>Year 2045</b>		
Emissions Running:	8.7843	3.5343
Emissions Profile:	0.0000	0.9894
Emissions Vehicle:	1.2376	2.4212
<b>Total Emissions</b>	<b>10.0219</b>	<b>6.9449</b>

**Figure 12: Total VOC and NO<sub>x</sub> in U.S. Tons per day by analysis year, 2015 Standard**



# Appendix D

## MOVES2014 Model

**Table 13: Missouri Ozone for 2015 Standard (US tons per day)**

	<i>NOX</i>	<i>VOC</i>
<b>Year 2020</b>		
<i>Emissions Running:</i>	21.3217	5.8362
<i>Emissions Profile:</i>	0.0000	1.4741
<i>Emissions Vehicle:</i>	3.3306	5.8059
<b>Total Emissions</b>	<b>24.6523</b>	<b>13.1161</b>
<b>Year 2025</b>		
<i>Emissions Running:</i>	13.2160	4.3688
<i>Emissions Profile:</i>	0.0000	1.2278
<i>Emissions Vehicle:</i>	2.1414	4.2448
<b>Total Emissions</b>	<b>15.3573</b>	<b>9.8414</b>
<b>Year 2030</b>		
<i>Emissions Running:</i>	9.5331	3.5702
<i>Emissions Profile:</i>	0.0000	0.9694
<i>Emissions Vehicle:</i>	1.4723	3.0683
<b>Total Emissions</b>	<b>11.0054</b>	<b>7.6079</b>
<b>Year 2035</b>		
<i>Emissions Running:</i>	8.0163	3.2340
<i>Emissions Profile:</i>	0.0000	0.9233
<i>Emissions Vehicle:</i>	1.1847	2.4845
<b>Total Emissions</b>	<b>9.2010</b>	<b>6.6418</b>
<b>Year 2045</b>		
<i>Emissions Running:</i>	7.2791	2.9765
<i>Emissions Profile:</i>	0.0000	0.8373
<i>Emissions Vehicle:</i>	1.0389	2.0475
<b>Total Emissions</b>	<b>8.3180</b>	<b>5.8613</b>

# Appendix E

## 2008 and 2015 Eight-Hour Ozone Standards

### Air Quality Conformity Determination

#### E-1. Summary of Requirements for the Regional Emissions Analysis

The regional emissions analysis provisions found in 40 CFR 93.109 (e)(2)(iii) of the Conformity Rule are to be followed. The Missouri Department of Natural Resources (MoDNR) developed a 2008 eight-hour ozone Early Progress Plan containing 2015 motor vehicle emissions budgets. These budgets were established with the MOVES2010 model. In an October 28, 2013 letter to Missouri, the U.S. Environmental Protection Agency (EPA) found these budgets adequate for Conformity Determination purposes. In the January 14, 2016 Federal Register, EPA issued a final rule approving Missouri's Early Progress Plan (effective March 14, 2016). In February 2018 MoDNR submitted a Technical Correction to the Re-designation Request and Maintenance Plan for the St. Louis (Missouri) 2008 Ozone Standard (MO Maintenance Plan). The MO Maintenance Plan contained 2030 eight-hour ozone motor vehicle emissions budgets which were developed with MOVES2014. In a letter to MoDNR dated May 15, 2018, EPA found these budgets adequate for Conformity purposes. In the June 8, 2018 Federal Register, EPA issued a notice of adequacy for the 2030 budgets for Conformity purposes (effective June 22, 2018). In the September 20, 2018 Federal Register, EPA issued a final rule approving the request by MoDNR and re-designated Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis as being in attainment of the 2008 ozone standard. EPA also approved Missouri's Maintenance Plan and the 2030 VOC and NO<sub>x</sub> motor vehicle emission budgets.

The Illinois Environmental Protection Agency (Illinois EPA) prepared the Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 1997 8-Hour Ozone National Ambient Air Quality Standard (IL 8-Hour Ozone Maintenance Plan for the 1997 standard). This Plan contained 2008 and 2025 eight-hour ozone motor vehicle emissions budgets (developed with MOVES2010) and was for Madison, Monroe, St. Clair and Jersey Counties. EPA found these budgets to be adequate for use in Conformity Determination in December 2011 and approved the Maintenance Plan on June 12, 2012. The Illinois portion of the 2008 ozone non-attainment area includes Madison, Monroe and St. Clair Counties. The Conformity Determination for Illinois is also made in relation to the 2030 motor vehicle emission budgets from the Maintenance Plan for the Metro East Area for the 2008 Ozone Standard (IL 8-Hour Maintenance Plan for 2008 standard). These budgets were developed using MOVES2014a and were found adequate by EPA (September 26, 2017 letter). In the December 11, 2017 Federal Register, EPA issued a final rule finding these budgets adequate with an effective date of December 26, 2017. In the March 1, 2018 Federal Register, EPA issued a final rule, effective that date, re-designating Madison, Monroe and St. Clair Counties as in attainment of the 2008 ozone standard, approving the IL 8-Hour Maintenance Plan for 2008 standard and finding the 2030 motor vehicle emission budgets adequate.

# Appendix E

## 2008 and 2015 Eight-Hour Ozone Standards

### Air Quality Conformity Determination

#### E-2. 2008 Eight-Hour Ozone Standard

For the Missouri maintenance area (Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis), it is necessary to demonstrate that anticipated emission levels of VOC and NO<sub>x</sub> resulting from implementation of the Update to *Connected 2045: Long Range Transportation Plan for the St. Louis Region* (*Connected2045 Update*) for the 2025 analysis year will be less than the 2015 VOC and NO<sub>x</sub> motor vehicle emissions budgets, as set out in Missouri's 2008 eight-hour ozone Early Progress Plan (see Table E-1). For the analysis years 2030, 2035 and 2045 (horizon year for the Transportation Plan), it is necessary to demonstrate that anticipated emission levels of VOC and NO<sub>x</sub> which are expected to result from implementation of the *Connected2045 Update* will be less than the 2030 VOC and NO<sub>x</sub> motor vehicle emissions budgets, as set out in the MO Maintenance Plan (see Table E-1).

Table E-1 Missouri Motor Vehicle Emissions Budgets (US tons per day)		
Pollutant	2015 Budget MO Early Progress Plan	2030 Budget MO Maintenance Plan
Volatile Organic Compounds (VOC)	32.70	22.00
Oxides of Nitrogen (NO <sub>x</sub> )	76.70	40.00

For the Illinois maintenance area (Madison, Monroe and St Clair Counties), for the analysis year 2025, it is necessary to demonstrate that anticipated emission levels of VOC and NO<sub>x</sub> resulting from implementation of the *Connected2045 Update* for the 2025 analysis year will be less than the 2025 VOC and NO<sub>x</sub> motor vehicle emissions budgets, as set out in the eight-hour ozone IL 8-Hour Ozone Maintenance Plan for the 1997 standard (see Table E-2). For the analysis years 2030, 2035 and 2045, it is necessary to demonstrate that anticipated emission levels of VOC and NO<sub>x</sub> which are expected to result from implementation of the *Connected2045 Update* will be less than the 2030 VOC and NO<sub>x</sub> motor vehicle emissions budgets, as set out in the IL 8-Hour Ozone Maintenance Plan for the 2008 standard (see Table E-2).

# Appendix E

## 2008 and 2015 Eight-Hour Ozone Standards

### Air Quality Conformity Determination

Table E-2 Illinois Motor Vehicle Emissions Budgets (US tons per day)			
Pollutant	2008 Budget Illinois 8-Hour Ozone Maintenance Plan for the 1997 Standard	2025 Budget Illinois 8-Hour Ozone Maintenance Plan for the 1997 Standard	2030 Budget Illinois 8-Hour Ozone Maintenance Plan for 2008 Standard
Volatile Organic Compounds (VOC)	17.27	5.67	9.05
Oxides of Nitrogen (NO <sub>x</sub> )	52.57	15.22	16.68

#### E-3. 2015 Eight-Hour Ozone Standard

For the Missouri non-attainment area (St. Charles and St. Louis Counties, the City of St. Louis and Boles Township in Franklin County), it is necessary to demonstrate that for the analysis years of 2020 and 2025, anticipated emission levels of VOC and NO<sub>x</sub> resulting from implementation of *Connected2045* Update will be less than the 2015 VOC and NO<sub>x</sub> motor vehicle emissions budgets, as set out in Missouri's 2008 eight-hour ozone Early Progress Plan (see Table E-1). For the analysis years 2030, 2035 and 2045, it is necessary to demonstrate that anticipated emission levels of VOC and NO<sub>x</sub> which are expected to result from implementation of *Connected2045* Update will be less than the 2030 VOC and NO<sub>x</sub> motor vehicle emissions budgets, as set out in the MO Maintenance Plan (see Table E-1).

For the Illinois non-attainment counties of Madison and St. Clair, it is necessary to demonstrate that for the 2020 analysis year the anticipated emission levels of VOC and NO<sub>x</sub> resulting from implementation of the *Connected2045* Update will be less than the 2008 VOC and NO<sub>x</sub> motor vehicle emissions budgets, as set out in the eight-hour ozone IL 8-Hour Ozone Maintenance Plan for the 1997 standard (see Table E-2). For the analysis year 2025, it is necessary to demonstrate that anticipated emission levels of VOC and NO<sub>x</sub> resulting from implementation of the *Connected2045* Update will be less than the 2025 VOC and NO<sub>x</sub> motor vehicle emissions budgets for Illinois, as set out in the eight-hour ozone IL 8-Hour Ozone Maintenance Plan for the 1997 standard (see Table E-2). For the remaining analysis years of 2030, 2035 and 2045, it is necessary to show that anticipated emission levels of VOC and NO<sub>x</sub> resulting from implementation of the *Connected2045* Update will be less than the 2030 VOC and NO<sub>x</sub> motor vehicle emissions budgets as set out in the IL 8-Hour Ozone Maintenance Plan for the 2008 standard (see Table E-2).

At this time, neither Missouri nor Illinois have motor vehicle emissions budgets for the 2015 eight-hour ozone standard which have been approved or found adequate for conformity purposes by EPA. Approved or adequate motor vehicle emissions budgets from an

# Appendix E

## 2008 and 2015 Eight-Hour Ozone Standards

### Air Quality Conformity Determination

applicable SIP or SIP submission for another (previous) ozone standard can be used in the regional emissions analysis. Since both the Missouri and Illinois non-attainment areas for the 2015 eight-hour ozone standard have a smaller geographic area than what was established for the 2008 eight-hour ozone standard, EPA's Transportation Conformity Regulation sets out the option to use in the regional emissions analysis either the corresponding portion of the previous budgets which matches the 2015 non-attainment area or to use the existing budget as is. EWG, after inter agency consultation, has decided to use the existing motor vehicle emission budgets from the Missouri and Illinois SIPs as is.

#### E-4. Carbon Monoxide

Part of the region, consisting of the City of St. Louis and that portion of St. Louis County within the I-270 loop, is classified as a limited maintenance area for carbon monoxide (CO). On June 17, 1997 the Missouri Department of Natural Resources submitted The Missouri State Implementation Plan for Carbon Monoxide - St. Louis Metropolitan Area: Maintenance Provisions and Re-designation Request, October 1996 to EPA. The re-designation request was approved by EPA on March 31, 1999. MoDNR submitted their second CO maintenance plan, Revision to the Limited Maintenance Plan for St. Louis Nonclassifiable Maintenance Area for the 8-Hour Carbon Monoxide National Ambient Air Quality Standard to EPA on April 3, 2014. The plan adequately demonstrated that the area will maintain the CO standard through 2022. Plan approval by EPA was published in the October 2, 2015 Federal Register. As a result, the Limited Carbon Monoxide Maintenance Plan option allows plan conformity without a technical analysis. However, individual projects remain subject to the requirement for "hot spot" analysis by their project sponsors.

#### E-5. Summary of Results for the Regional Emissions Analysis

To establish conformity, the projected net mobile source emissions are then subject to each of the required tests. EWG will utilize the MOVES2014a model for the ozone regional emissions analysis. The results are set out in Tables F-3 - F-6, which shows all the required tests are passed. This provides the basis for the Conformity Determination in respect of the projects and programs included in the *Connected2045* Update.

# Appendix E

## 2008 and 2015 Eight-Hour Ozone Standards

### Air Quality Conformity Determination

Table E-3  
**Regional Emissions Analysis: Conformity Tests - MISSOURI**  
**Based on Conformity Requirements for 2008 Eight-Hour Ozone Standard**  
**Maintenance Area**  
 (US tons per day)

Analysis Year	Volatile Organic Compounds		Nitrogen Oxides	
	Emissions	2015 Budget	Emissions	2015 Budget
2025	11.56	32.70	18.19	76.70
	Emissions	2030 Budget	Emissions	2030 Budget
2030	8.96	22.00	13.10	40.00
2035	7.84	22.00	11.00	40.00
2045	6.94	22.00	10.02	40.00

All tests have been passed for all years.

Table E-4  
**Regional Emissions Analysis: Conformity Tests – ILLINOIS\***  
**Based on Conformity Requirements for 2008 Eight-Hour Ozone Standard**  
**Maintenance Area**  
 (US tons per day)

Analysis Year	Volatile Organic Compounds		Nitrogen Oxides	
	Emissions	2025 Budget	Emissions	2025 Budget
2025	5.49	5.68	7.86	15.22
	Emissions	2030 Budget	Emissions	2030 Budget
2030	4.16	9.05	5.66	16.68
2035	3.44	9.05	4.65	16.68
2045	3.05	9.05	4.40	16.68

All tests have been passed for all years.  
 \*Includes Jersey County

**\* This Conformity Determination is made for: the eight-hour ozone maintenance area: Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis in Missouri; and Madison, Monroe and St. Clair Counties in Illinois.**

# Appendix E

## 2008 and 2015 Eight-Hour Ozone Standards

### Air Quality Conformity Determination

Table E-5  
**Regional Emissions Analysis: Conformity Tests - MISSOURI**  
**Based on Conformity Requirements for 2015 Eight-Hour Ozone Standard**  
**3 County and 1 Township Non-Attainment Area**

Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Action	2015 Budget	Action	2015 Budget
2020	13.12	32.70	24.65	76.70
2025	9.84	32.70	15.36	76.70
		2030 Budget		2030 Budget
2030	7.61	22.00	11.01	40.00
2035	6.64	22.00	9.20	40.00
2045	5.8613	22.00	8.3180	40.00
All tests have been passed for all years				

Table E-6  
**Regional Emissions Analysis: Conformity Tests – ILLINOIS\***  
**Based on Conformity Requirements for 2015 Eight-Hour Ozone Standards**  
**2 County Non-Attainment Area**

Analysis Year	Volatile Organic Compounds		Oxides of Nitrogen	
	Action	2008 Budget	Action	2008 Budget
2020	6.91	17.27	11.74	52.57
		2025 Budget		2025 Budget
2025	5.16	5.68	7.42	15.22
		2030 Budget		2030 Budget
2030	3.90	9.05	5.33	16.68
2035	3.33	9.05	4.52	16.68
2045	2.87	9.05	4.16	16.68
All tests have been passed for all years.				

***This Conformity Determination is made for: the 2015 eight-hour ozone standard non-attainment area: St. Charles and St. Louis Counties, the City of St. Louis and Boles Township in Franklin County in Missouri; and Madison and St. Clair Counties in Illinois.***

# Appendix F

## Fine Particulate Matter (PM<sub>2.5</sub>)

### Air Quality Conformity Determination

#### F-1. Net Mobile Source Emissions

The various tests of conformity are based upon projected net mobile source emissions as described in Appendix D. Estimates of mobile source emissions are summarized in Table F-1.

#### F-2. Summary of Requirements for the PM<sub>2.5</sub> Regional Emissions Analysis

The regional emissions analysis provisions in 40 CFR 93.109 and 119, as relates to areas in non-attainment of the 1997 annual fine particulate (PM<sub>2.5</sub>) standard, of the Conformity Rule are to be followed. In 2005 the entire eight-county St. Louis region was designated by EPA as a non-attainment area for the PM<sub>2.5</sub> standard. In addition, Baldwin Township in Randolph County, Illinois is part of the St. Louis PM<sub>2.5</sub> non-attainment area. Until motor vehicle emissions budgets are found adequate or the SIPs are approved by EPA, Federal regulations set out an interim process to follow for a Conformity Determination. This process is to be used to demonstrate Conformity until EPA finds adequate or approves the motor vehicle emissions budgets. Either the no-greater-than-2002 baseline test or the build-less-than-or-equal-to-no-build test can be selected. East-West Gateway, with the consensus of the Inter Agency Consultation Group (IACG), chose to use the no-greater-than-2002 baseline test as it is the most appropriate for the St. Louis region.

#### F-3. Attainment of the 1997 Annual PM<sub>2.5</sub> Standard and Conformity Requirements

The Missouri Department of Natural Resources (MoDNR) submitted the Redesignation Demonstration and Maintenance Plan for the Missouri Portion of the St. Louis Nonattainment Area for the 1997 Annual Fine Particulate National Ambient Air Quality Standard (MO Annual PM<sub>2.5</sub> Maintenance Plan) to EPA in August 2011. The Missouri Air Conservation Commission approved a technical supplement for this plan on March 24, 2014 which included direct PM<sub>2.5</sub> and NO<sub>x</sub> motor vehicle emission budgets, request for redesignation to attainment and 2008 base year emissions inventory. Effective October 2, 2018, EPA redesignated the Missouri portion to attainment of the 1997 annual PM<sub>2.5</sub> standard and the approved the Missouri Annual PM<sub>2.5</sub> Maintenance Plan.

In EPA's August 24, 2016 Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements: Final Rule, one item addressed was the timing of the revocation of the 1997 annual PM<sub>2.5</sub> standard and associated conformity determination obligations. This rule laid out the requirements state, local and tribal air agencies will have to meet to implement current and future PM<sub>2.5</sub> standards. Effective October 24, 2016, the 1997 standard is to be revoked (for all purposes) in those areas previously designated by EPA as being in attainment. This includes areas initially designated attainment for the 1997 standard and non-attainment areas EPA redesignated to attainment prior to that date. The 1997 PM<sub>2.5</sub> standard will remain in effect after October 2016 in those areas which have not been redesignated to attainment and the requirements to perform a conformity determination will continue. On the effective date of EPA's redesignation of an area to attainment of this

# Appendix F

## Fine Particulate Matter (PM<sub>2.5</sub>)

### Air Quality Conformity Determination

standard after October 2016, the 1997 annual PM<sub>2.5</sub> standard will be revoked for that area and conformity requirements no longer apply.

EPA redesignated the Missouri portion of the St. Louis PM<sub>2.5</sub> non-attainment area to attainment and approved the Missouri Annual PM<sub>2.5</sub> Maintenance Plan on October 2, 2018. With this action, the 1997 standard has been revoked and conducting a conformity determination for this standard for Missouri is no longer required.

Illinois is in the process of completing its redesignation request and PM<sub>2.5</sub> maintenance SIP, including motor vehicle emissions budgets, for submittal to EPA. Because the Illinois portion of the area remains in non-attainment for the 1997 PM<sub>2.5</sub> standard, it remains subject to the transportation conformity process.

#### F-4. Baldwin Township, Illinois

Through the Inter Agency Consultation Group (IACG) process, consensus was reached that the Illinois Department of Transportation (IDOT) would be the lead agency in overseeing the Baldwin Township Conformity Determination process. In June 2007, a Memorandum of Agreement (MOA) describing the process for including Baldwin Township in the Conformity Determination effort was signed. The MOA was signed by IDOT, the Illinois Environmental Protection Agency, Road District 1 (includes Baldwin Township) of Randolph County and the East-West Gateway Council of Governments.

Utilizing the IACG process, it was decided that emissions estimates and projections for Baldwin Township would be calculated and added to the Metro East three county analysis. It was agreed that for each of the analysis years, estimated emissions data for Baldwin Township in Randolph County, Illinois would be added to the Illinois 2002 baseline inventory and the Illinois "Action" scenario for the "Action"/2002 Baseline tests for the analysis years 2020, 2025, 2030, 2035 and 2045. These estimated and projected emissions were added to the emissions totals for Madison, Monroe and St. Clair Counties. Baldwin Township has been found to be in compliance with all applicable Conformity rules and procedures (see Appendix G).

#### F-5. Summary of Results for the Regional Emissions Analysis

For the analysis years 2020, 2025, 2030, 2035 and 2045, the projected net emissions of direct fine particles (PM<sub>2.5</sub>) resulting from implementation of the Update to Connected 2045: Long Range Transportation Plan for the St. Louis Region (Connected2045 Update) will be less than the 2002 PM<sub>2.5</sub> baseline emissions inventory (809.55 tons per year) for the Illinois PM<sub>2.5</sub> non-attainment area. Emissions of oxides of nitrogen (NO<sub>x</sub>, a pollutant which is a potential precursor of PM<sub>2.5</sub> formation) which are expected to result from implementation of the *Connected2045* Update in Illinois will be less than the 2002 NO<sub>x</sub> baseline emissions inventory (21,788.78 tons per year) for the Illinois PM<sub>2.5</sub> non-attainment area. In order to ensure consistency in the regional emissions analysis, EWG, with input from Illinois EPA, developed 2002 baseline emissions estimates using the MOVES2010 model. The results are

# Appendix F

## Fine Particulate Matter (PM<sub>2.5</sub>)

### Air Quality Conformity Determination

set out in Table F-1 which shows the regional emissions analysis tests for PM<sub>2.5</sub> are passed. This provides the basis for the Conformity Determination in respect of the projects and programs in the *Connected2045* Update.

Table F-1 Regional Emissions Analysis: Conformity Test for Illinois* Based on Conformity Requirements for Annual PM <sub>2.5</sub> Standard (US tons per year)				
Analysis Year	Direct PM <sub>2.5</sub>		Oxides of Nitrogen	
	Action	Baseline	Action	Baseline
2020	206.5016	809.55	4,547.6352	21,788.78
2030	128.1168	809.55	2,100.8429	21,788.78
2035	117.6981	809.55	1,765.2300	21,788.78
2045	116.8264	809.55	1,684.3398	21,788.78
All tests have been passed for all years.				
*Includes Baldwin Township				

***This Conformity Determination is made for the Illinois PM<sub>2.5</sub> non-attainment area. This area includes: Madison, Monroe and St. Clair Counties and Baldwin Township in Randolph County. For more information about Baldwin Township, see Appendix G.***

# Appendix F

## Fine Particulate Matter (PM<sub>2.5</sub>)

### Air Quality Conformity Determination

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# Appendix G

## Baldwin Township, Illinois

On January 5, 2005, with an effective date of April 5, 2005, the U.S. Environmental Protection Agency (EPA) designated the eight-county St. Louis region as being in non-attainment of the annual PM<sub>2.5</sub> standard. The regional emissions analysis provisions in 40 CFR 93.109 and 119, as relates to areas in non-attainment of the PM<sub>2.5</sub> standard, of the Conformity Rule have here into been followed. This non-attainment area includes: Franklin, Jefferson, St. Charles and St. Louis Counties and the City of St. Louis in Missouri; and Madison, Monroe and St. Clair Counties in Illinois. Baldwin Township in Randolph County, Illinois is also part of the non-attainment area. Under the provisions of the Clean Air Act Amendments of 1990, East-West Gateway Council of Governments (EWG), as the Metropolitan Planning Organization (MPO) for the St. Louis region, is the agency responsible for making the Conformity Determination.

Baldwin Township in Randolph County is outside the boundaries of the EWG region. Through the Inter Agency Consultation process, consensus was reached that the Illinois Department of Transportation (IDOT) would be the lead agency in overseeing the Randolph County Conformity Determination process for Baldwin Township. In turn, IDOT has indicated that there are no regionally significant projects in the county. From historical (2001-2013) vehicle miles traveled (VMT) data for Randolph County Road District 1, IDOT estimated VMT levels for years 2017 - 2042. Baldwin Township is entirely within Road District 1 of Randolph County. These VMT projections were broken out by function class and used in the estimation of the township-wide emissions for Baldwin Township for 2020, 2025, 2030, 2035 and 2045.

In June 2007, a Memorandum of Agreement (MOA) describing the process for including Baldwin Township in the Conformity Determination effort was signed. The MOA was signed by IDOT, the Illinois Environmental Protection Agency, Road District 1 (includes Baldwin Township) of Randolph County and the East-West Gateway Council of Governments.

The Inter Agency Consultation Group (IACG) agreed that for each of the analysis years, estimated emissions data for Baldwin Township in Randolph County, Illinois would be added to the Illinois 2002 baseline inventory and the Illinois "Action" scenario for the "Action"/2002 Baseline tests. Thus, these estimated and projected emissions were added into the emissions totals for Madison, Monroe and St. Clair Counties.

Herein, Baldwin Township in Randolph County has been found to be in compliance with all applicable Conformity rules and procedures.

# Appendix G Baldwin Township, Illinois

## Supplement G-1 Estimates for Road District 1, Randolph County

### ILLINOIS DEPARTMENT OF TRANSPORTATION TRAFFIC PROJECTION MYRTLE (830 To 918)

TO: 2/20/2015  
 FROM:  
 DATE:

PREPARED BY: 2023 00010000  
 Randolph

KEY ROUTE CODE: 2700  
 COUNTY/NAME: 3000

KEY ROUTE CODE: 2023 00010000  
 COUNTY/NAME: Randolph

MODEL NAME: Linear Regression

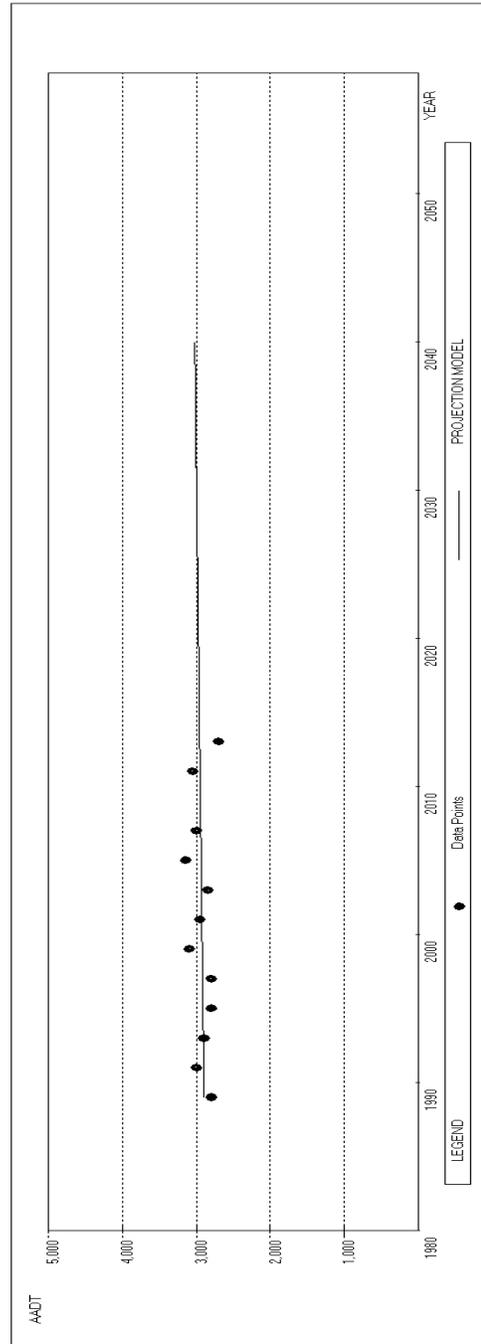
GROWTH / YEAR: 2

%AADT OF YEAR 2013: 0.0%

GROWTH-OVER 27 YEAR: 300

%GROWTH-OVER 27 YEAR: 11.1111%

YEAR	AADT	PROJECTION YEAR	AADT
2013	2700	2040	3000
2011	3050	2035	3000
2007	3000	2030	3000
2005	3150	2025	3000
2003	2850	2020	2950
2001	2950	2015	2950
1999	3100		
1997	2800		
1995	2800		
1993	2900		
1991	3000		
1989	2800		



# Appendix G

## Baldwin Township, Illinois

<b>Supplement G-2</b>					
<b>VMT Estimates for Baldwin Township, Randolph County</b>					
Facility Type	Forecasted for All Applicable Analysis Years				
	2020	2025	2030	2035	2045
Local Roads or Streets	57,865	58,254	58,254	58,254	59,807
Minor Collector	15,228	15,330	15,330	15,330	15,739
Major Collector	54,820	55,188	55,188	55,188	56,660
Minor Arterial	91,368	91,980	91,980	91,980	94,433
Other Principal Arterial	85,275	85,848	84,848	85,848	88,137
Highway	0	0	0	0	0
Ramps	0	0	0	0	0
<b>Total Daily VMT</b>	<b>304,556</b>	<b>306,600</b>	<b>306,600</b>	<b>306,600</b>	<b>314,776</b>

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# Appendix G Baldwin Township, Illinois

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# Appendix H

## 1997 Eight-Hour Ozone Standard Air Quality Conformity Determination Jersey County, Illinois

### H-1. Background

In 2012, Jersey County Illinois was designated by the U.S. Environmental Protection Agency (EPA) as a maintenance area for the 1997 ozone standard. Later that year EPA designated this county as being in attainment of the 2008 ozone standard while the eight-county St. Louis region (MO-IL) was identified as non-attainment. In the July 2012 Transportation Conformity Guidance for 2008 Ozone Nonattainment Areas, EPA stated that transportation conformity requirements for counties like Jersey cease to apply on July 20, 2013 and that no further conformity determinations for the 1997 ozone standard are required on or after that date. In addition the 1997 ozone standard has been revoked (March 6, 2015) by EPA, so no further conformity determinations for this ozone standard were required. In 2018 EPA found Jersey County to be in attainment for the 2015 ozone standard.

On February 16, 2018, the U.S. Court of Appeals for the District of Columbia issued a decision in the South Coast Air Quality Management District vs. EPA. This case challenged EPA's final rule for implementing the 2008 ozone National Ambient Air Quality Standard (NAAQS), 2008 ozone NAAQS State Implementation Plan (SIP) Requirements rule. The court vacated portions of this rule but upheld EPA's revocation of the 1997 ozone standard on March 6, 2015. In its decision, the court used the term "orphan areas" to describe those 1997 ozone standard non-attainment or maintenance areas which EPA had designated as being in attainment of the 2008 ozone standard. This decision has been under review by EPA, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). FHWA and FTA released interim guidance in April and October 2018 which delineated the conformity process for the 1997 ozone standard for the 82 orphan areas. The eight county St. Louis (MO-IL) region and Jersey County Illinois was identified as an orphan area. The East-West Gateway Council of Governments (EWG) used this interim guidance to prepare the Conformity Determination for the FY 2019-2022 Transportation Improvement Program (TIP) and Related Amendments to *Connected2045*. Only regionally significant projects in Jersey County were affected by this interim guidance.

In April 2018 EPA requested a rehearing by the court of certain aspects of the February decision. On September 14, 2018, the court agreed to stay its vacatur of the portion of the EPA rule "that exempts orphan areas from transportation conformity" until February 16, 2019 and denied the other aspects of the rehearing request. Transportation conformity for the revoked 1997 ozone standard is to be performed for orphan areas starting February 16, 2019. EPA then issued guidance in November 2018 describing how transportation conformity determinations can be made in the total or partial orphan areas which were either in nonattainment or maintenance for the 1997 ozone standard at the time EPA revoked that standard in 2015. A partial orphan maintenance area has attained the 1997 ozone standard and is maintaining the standard as of March 6, 2015 and is not included in the smaller 2008 ozone nonattainment area.

# Appendix H

## 1997 Eight-Hour Ozone Standard

### Air Quality Conformity Determination

### Jersey County, Illinois

The eight-county St. Louis (MO-IL) region and Jersey County Illinois were identified as a partial orphan maintenance area. Jersey County is considered the orphan area because EPA found it to be in maintenance for the 1997 ozone standard and then in attainment for both the 2008 and 2015 ozone standards. Regionally significant projects in Jersey County have to be part of the Conformity Determination process for the 1997 ozone standard.

The current transportation conformity regulation, Final Conformity Rule 40 CFR Part 93 (April 2012) states that a regional emissions analysis is required starting one year after a non-attainment designation for a particular standard and continues until the effective date of the revocation of that standard by EPA. As the February 2018 court decision upheld EPA's 2015 revocation of the 1997 ozone standard, a regional emissions analysis is not required in a conformity determination for that standard in orphan areas. For the regionally significant project(s) in Jersey County, the determination of conformity for the 1997 ozone standard is to be demonstrated by showing the following criteria delineated in the Final Conformity Rule 40 CFR Part 93 have been met: use of latest planning assumptions for Transportation Control Measures (TCMs) in approved SIP if TCMs are in that SIP; consultation requirements; timely implementation of any approved SIP TCMs if TCMs are in that SIP; and fiscal constraint. The use of the latest emissions model and either the emissions budget test or the interim emissions test is not required.

Through the Inter Agency Consultation process, the Illinois Department of Transportation (IDOT) identified one such project in Jersey County and provided information about the U.S. Route 67 Delhi Bypass.

#### H-2. Criteria for Conformity Determination for the 1997 Ozone Standard

- Use of latest planning assumptions for TCMs in approved SIP if TCMs are in that SIP.

This criteria is not applicable as both the 8-Hour Ozone Attainment Demonstration for the Metro-East Nonattainment Area (AQPSTR 07-02, June 15, 2007) and Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 1997 8-Hour Ozone National Ambient Air Quality Standard (Revised) (AQPSTR 11-03) do not contain TCMs. On June 12, 2012, EPA approved the request by Illinois to re-designate the Illinois counties of Madison, Monroe, St. Clair and Jersey to attainment of the 1997 eight-hour ozone standard and the Maintenance Plan. Attachment H-1 is a copy of an email from the Illinois Environmental Protection Agency (Illinois EPA) to EWG confirming that these SIPs which included Jersey County do not contain TCMs.

- Consultation requirements cover both inter agency consultation and public consultation.

Section 5: Consultation and Public Participation of this document describes: consultation procedures; when Inter Agency Consultation Group (IACG) meetings took place; decision by

# Appendix H

## 1997 Eight-Hour Ozone Standard Air Quality Conformity Determination Jersey County, Illinois

the IACG for when conformity analysis for the Connected2045 Update began; comment period; and the public participation/consultation process.

- Timely implementation of any approved SIP TCMs if TCMs are in that SIP.

This criteria is not applicable as both the 8-Hour Ozone Attainment Demonstration for the Metro-East Nonattainment Area (AQPSTR 07-02, June 15, 2007) and Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 1997 8-Hour Ozone National Ambient Air Quality Standard (Revised) (AQPSTR 11-03) do not contain TCMs. Attachment H-1 is a copy of an email from the Illinois Environmental Protection Agency (Illinois EPA) to EWG confirming that these SIPs which included Jersey County do not contain TCMs.

- Transportation conformity regulations state that transportation plans and TIPs must be fiscally constrained consistent with the U.S. Department of Transportation's metropolitan planning requirements at 23 CFR part 450.

Each year IDOT develops a fiscally constrained six-year program which details how it will invest transportation dollars in the state and local highway system. The most recent Multi-Year Plan (MVP) prepared by IDOT was the May 2018 Fiscal Year 2019-2024 Proposed Highway Improvement Program (MVP) totaled \$11.05 billion and included a Fiscal Year annual highway program of \$2.2 billion. The U.S. Route 67 Delhi Bypass project in Jersey County is included in the MVP (pages 8-ii and 8-11). The project is programmed to occur during FY 2020-2024 at a cost of \$23 million. Attachment H-2 contains correspondence between IDOT and EWG confirming that this project is fiscally constrained.

### H-3. Conformity Determination Finding

The U.S. Route 67 Delhi Bypass project in Jersey County has been found to be in conformity with the 1997 ozone standard.

# Appendix H

## 1997 Eight-Hour Ozone Standard Air Quality Conformity Determination Jersey County, Illinois

### Attachment H-1

#### Correspondence between Illinois Environmental Protection Agency and East-West Gateway Council of Governments

**From:** "Asselmeier, Buzz" <Buzz.Asselmeier@Illinois.gov>  
**To:** Carol Lawrence <carol.lawrence@ewgateway.org>  
**CC:** "Bloomberg, David E." <David.Bloomberg@Illinois.gov>  
**Date:** 03/05/2019 10:49 AM  
**Subject:** RE: [External] Conducting conformity for 1997 standard for Jersey County

I discussed this with David. To our knowledge, there aren't any transportation control measures in the attainment demonstration/maintenance plan. I've been looking at that document for the eventual SIP submittal for the 2nd maintenance plan for Jersey County so confidence is high no TCMs are in there. That's something we usually don't put in the SIP.

From: Carol Lawrence <carol.lawrence@ewgateway.org>  
Sent: Monday, February 25, 2019 11:25 AM  
To: Asselmeier, Buzz <Buzz.Asselmeier@Illinois.gov>; Bloomberg, David E. <David.Bloomberg@Illinois.gov>  
Subject: [External] Conducting conformity for 1997 standard for Jersey County

David and Buzz,

East-West Gateway is working on the Conformity Determination for our long range transportation plan update and is trying to figure out what needs to happen for the conformity determination for the 1997 ozone standard for the partial orphan maintenance area of Jersey County. If there are regionally significant projects in the County, there are four criteria to satisfy according to EPA's November 2018 guidance. They are: use of latest planning assumptions as relates to Transportation Control Measures (TCMs) in approved SIP/if there are TCMs; inter agency and public consultation; timely implementation of TCMs from approved SIP; and fiscal constraint.

Just want to confirm that the 8-Hour Ozone Attainment Demonstration for the Metro-East Nonattainment Area (AQPSTR 07-02, June 15, 2007) and the Maintenance Plan for the Metro-East St. Louis Ozone Nonattainment Area for the 1997 8-Hour Ozone NAAQS (Revised) (AQPSTR 11-03) do not contain any TCMs. It is my understanding that these would be the only SIPs that would include Jersey County.

Want to wrap up the draft Conformity Determination by end of the first week in March.  
Thank you for your assistance.

Carol Lawrence

Manager, Environmental Services  
East-West Gateway Council of Governments  
Gateway Tower  
One Memorial Drive, Suite 1600  
St. Louis, MO 63102  
T 314-421-4220  
T 618-274-2750  
carol.lawrence@ewgateway.org<mailto:carol.lawrence@ewgateway.org>

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# Appendix H

## 1997 Eight-Hour Ozone Standard Air Quality Conformity Determination Jersey County, Illinois

### Attachment H-2

Correspondence between Illinois Department of Transportation and East-West Gateway  
Council of Governments

**From:** "Jemison, Kevin M." <Kevin.Jemison@illinois.gov>  
**To:** Jim Wild <jim.wild@ewgateway.org>, Rachael Pawlak <rachael.pawlak@ewgateway.org>  
**CC:** Jason Lange <jason.lange@ewgateway.org>, Josh Schwenk <Josh.Schwenk@ewgateway.org>, Carol Lawrence <carol.lawrence@ewgateway.org>, "Roberts, Keith W" <Keith.Roberts@illinois.gov>, "Brown, Kirk H" <Kirk.Brown@illinois.gov>, "Lagemann, Gwen E" <Gwen.Lagemann@illinois.gov>, "Hunt, Jennifer M" <Jennifer.Hunt@illinois.gov>  
**Date:** 03/21/2019 11:23 AM  
**Subject:** Conformity Determination for FY 2020-2023 TIP Program--Jersey County  
**Attachments:** Fiscal Constraint--Jersey County for Conformity.pdf

Ms. Pawlak,

Attached is a letter indicating fiscal constraint for the regionally significant project in the Jersey County Orphan Area to satisfy Conformity Determinations for the 1997 ozone standard.

Thanks.

Kevin

Kevin Jemison  
Urban Planning Chief  
Illinois Department of Transportation, D8  
1102 Eastport Plaza Drive  
Collinsville, IL 62234  
618-346-3149  
Kevin.jemison@illinois.gov<mailto:Kevin.jemison@illinois.gov>

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# Illinois Department of Transportation

Office of Highways Project Implementation / Region 5 / District 8  
1102 Eastport Plaza Drive / Collinsville, Illinois 62234-6198

March 21, 2019

Mr. Jim Wild  
Executive Director  
East-West Gateway Council of Governments  
Gateway Tower  
One Memorial Drive  
Suite 1600  
St. Louis, MO 63102-2451

Attention: Ms. Rachael Pawlak

RE: Fiscal Constraint for US 67 Delhi Bypass Project in Jersey County for  
Air Quality Conformity

Dear Ms. Pawlak:

Each Year the Illinois Department of Transportation (IDOT) develops a fiscally constrained six-year program that details how it will invest transportation dollars in the state and local highway system. The Fiscal Year 2019-2024 Proposed Highway Improvement Program (sometimes referred to as the Multi-Year Plan, or MYP) totals \$11.05 billion and includes a FY 2019 annual highway program of \$2.2 billion.

The US 67 at Delhi Bypass in Jersey County project is programmed during FY 2020-2024 at a cost of \$23 million. It will consist of new construction of 3.2 miles of a four-lane expressway for the bypass around Delhi including new construction, grading, paving, drainage, signing and lighting. In addition, land acquisition and utility adjustments are programmed during FY 2020-2024 at a cost of \$1.4 million from the Madison County line to Jerseyville.

The FY 2019-2024 Multi-Year Plan document pages 8-ii and 8 – 11 referencing the US 67 Delhi Bypass project are attached for your reference.

Should you have any questions, please contact Mr. Kevin Jemison at 618-346-3149 or Ms. Gwen Lagemann at 618-346-3150.

Sincerely,

A handwritten signature in blue ink, appearing to read 'KR', with a stylized flourish at the end.

Keith Roberts P.E.  
Acting Region Five Engineer

cc: Mr. Jason Lange  
Mr. Josh Schwenk  
Ms. Carol Lawrence

- **Interstate 55/US 40/Illinois 3/Interstate 64 from Mississippi River to Interstate 64 (Tri-Level) Interchange in St. Clair County.** Resurfacing on 2.7 miles and bridge rehabilitation are programmed during FY 2020-2024 at a cost of \$18.4 million.
- **Interstate 57 from Jefferson County line to 0.7 mile north of Illinois 161 in Marion County.** Reconstruction of 3.8 miles, ramp repair on 1.1 miles, bridge deck repairs, bridge approach roadway, bridge joint repair, bridge deck waterproofing, bridge painting and rip rap are programmed during FY 2020-2024 at a cost of \$25 million.
- **Interstate 64 under Illinois 111 in St. Clair County.** A bridge replacement, ramp repair, engineering for contract plans, land acquisition, utility adjustments, and construction engineering are programmed during FY 2019-2024 at a cost of \$28.5 million. Of this total, engineering for contract plans are programmed in FY 2019 at a cost of \$2 million. *This project has been approved for Illinois Major Bridge Program funding.*
- **Interstate 70/US 40 from Madison County line to 0.3 mile west of Sugar Loaf Road in Bond County.** Resurfacing on 7.8 miles, bridge repair, a bridge new deck, bridge painting, bridge joint repair, a bridge deck overlay, bridge deck sealing, culvert repair, wing wall repair, ramp repair, miscellaneous work and rip rap are programmed during FY 2020-2024 at a cost of \$28.4 million.
- **Interstate 255/US 50 from 0.5 mile north of Illinois 157 to Collinsville Road in St. Clair and Madison Counties.** Resurfacing on 17.3 miles, patching, ramp repair, bridge rehabilitation, a bridge new deck, bridge repair, shoulder repair, bridge deck waterproofing, rip rap, bridge joint repair, bridge deck sealing and bridge painting are programmed during FY 2020-2024 at a cost of \$96.1 million.
- **Interstate 270 at Mississippi River in Madison County.** A bridge replacement, engineering for contract plans, land acquisition, utility adjustments and construction engineering, are programmed during FY 2019-2024 at a cost of \$223.3 million. Of this total, engineering for contract plans is programmed in FY 2019 at a cost of \$2 million. There is an additional \$80,000 programmed during FY 2020-2024 for bridge deck sealing on the existing bridges. Illinois is the lead agency for the project with Missouri sharing equally in the bridge replacement and engineering costs.
- **US 67 at Delhi Bypass in Jersey County.** New construction of 3.2 miles of a four-lane expressway for the bypass around Delhi including new construction, grading, paving, drainage, signing and lighting are programmed during FY 2020-2024 at a cost of \$23 million. In addition, land acquisition and utility adjustments from the Madison County line to Jerseyville are programmed during FY 2020-2024 at a cost of \$1.4 million.
- **Illinois 4 from 0.3 mile south of Interstate 55 to 0.1 mile south of Illinois 143.** Resurfacing on 9.8 miles and new shoulders are programmed during FY 2020-2024 at a cost of \$16 million.
- **Illinois 161 over Crooked Creek 8.6 miles east of Illinois 127 and over a creek 1 mile west of Centralia.** A bridge replacement and culvert replacement are programmed in FY 2019 at a cost of \$22 million. *This project has been approved for Illinois Major Bridge Program funding.*
- **King Bridge Ramps at the 3<sup>rd</sup> Street exit and ramps to Martin Luther King Drive, over Interstate 55/64 westbound, Missouri Avenue, relocated Illinois 3, Terminal Railroad Association and Union Pacific Railroads in East St. Louis 0.7 mile east of the Mississippi River and approach.** A bridge replacement, bridge rehabilitation, bridge joint repair, bridge deck waterproofing, bridge deck sealing, bridge repair, bridge painting, lighting, railroad flagger, resurfacing on 1.3 miles and ramp repair are programmed in FY 2019 at a cost of \$36.2 million. *The project on the King Bridge ramps over Interstate 55/64 westbound, Missouri Avenue, relocated Illinois 3, Terminal Railroad Association and Union Pacific Railroads in East St. Louis 0.7 mile east of the Mississippi River project has been approved for Illinois Major Bridge Program funding.*

**FY 2019-2024 Highway Improvement Program  
District 8  
State Highways**

Route/Street	Location	Improvements	Est. Cost	County	MYP Years	
					Past	Current
US 67	MISSISSIPPI RIVER (CLARK BRIDGE)	P.E. (PHASE II) P.E. (BRIDGE INSPECTION)	\$1,500,000	MADISON	1	2020-2024
ILLINOIS LEAD AGENCY; MISSOURI AND ILLINOIS WILL SHARE COST EQUALLY.						
US 67	MISSISSIPPI RIVER (CLARK BRIDGE)	BRIDGE DECK SEALING	\$300,000	MADISON	2	2020-2024
ILLINOIS LEAD AGENCY; MISSOURI AND ILLINOIS WILL SHARE COST EQUALLY. PRESERVATION PROJECT						
US 67	DELHI BYP Miles = 3.15	NEW CONSTRUCTION GRADING PAVING DRAINAGE SIGNING (NEW) LIGHTING	\$23,000,000	JERSEY	8	2020-2024
SAFETE-A-LU HIGH PRIORITY PROJECT. STATE AND/OR LOCAL MATCH REQUIRED. PROJECT MAY REQUIRE ADDITIONAL STATE AND OR LOCAL FUNDS TO IMPLEMENT.						
US 67	MADISON CO LINE TO JERSEYVILLE	LAND ACQUISITION	\$500,000	JERSEY	7	2020-2024
US 67	MADISON CO LINE TO JERSEYVILLE	UTILITY ADJUSTMENT	\$900,000	JERSEY	7	2020-2024
ILL 3	AT PONTOON RD Miles = 0.30	RECONSTRUCTION	\$2,400,000	MADISON	1	2019

Roadway Information			
Miles	Roughness(IRI)	Rutting	Truck Pct NHS
0.30	ACCEPTABLE	0.31	28.7
		13,500	Y