Air Quality Conformity Analysis
For
Berrien County, MI Nonattainment Area

January 14, 2019

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1.0 Conformity

1.1 Introduction

Transportation conformity provisions of the Clean Air Act Amendments require Metropolitan Planning Organizations (MPOs) make a determination that the Long Range Transportation Plan (LRTP), Transportation Improvement Program (TIP), and projects conform to the State Implementation Plan (SIP) and regional emissions will not negatively impact the region's ability to meet the National Ambient Air Quality Standards (NAAQS).

Conformity to the SIP means that the region's LRTPs and TIPs 1) will not cause any new violations of the NAAQS; 2) will not increase the frequency or severity of existing violation; and 3) will not delay attaining the NAAQS. A demonstration is conducted by comparing emissions estimates generated from implementation of LRTPs and TIPs for analysis years to the motor vehicle emissions budgets (MVEBs) contained in the maintenance SIP.

The purpose of this report is to document the process and findings of the transportation conformity analysis for the nonattainment area.

1.2 Nonattainment Area and Conformity

Berrien County is the nonattainment area. Within the boundary is the MPO of Twin Cities Area Transportation Study (TwinCATS) and part of the Niles-Buchanan-Cass Area Transportation Study (NATS) MPO, as well as, the rural projects contained in the State Transportation Improvement Program (STIP).

Findings of the transportation conformity analysis are for projects within Berrien County contained in:

- TwinCATS 2045 LRTP,
- TwinCATS 2017-20 TIP,
- NATS 2040 LRTP,
- NATS 2017-20 TIP, and
- STIP.

The conformity analysis is being conducted to include the amendment to the TwinCATS LRTP and TIP to bring the US-31 extension to I-94 project forward and adding new phases. The Michigan Department of Transportation has received a grant to complete the extension of US-31 connecting it to I-94. The construction phase will move from year 2045 to 2023 (open to traffic). Two phases, PE and utility, are being added.

1.3 Conformity Finding

The staff of the Southwest Michigan Planning Commission (SWMPC) finds that the LRTPs and TIPs conform to the SIP for the 2015 ozone standard and 1997 ozone standard based on the results of this conformity analysis. This report makes the determination that the region's transportation plan and programs satisfy all applicable criteria and procedures in the conformity regulations.

This conformity analysis document is subject to a public comment period from January 7, 2019 thru January 14, 2019. Comments received will be recognized, considered, and a response provided.

The MPO policy committee will make a formal conformity determination, through a resolution, at the:

- TwinCATS Policy Committee, January 14, 2018

1.4 Results of Conformity Analysis

Conformity is demonstrated when the analysis-year emissions are equal to or less than the SIP budget. For the 2015 and 1997 ozone standards, as shown in Table 1, the emission results for the analysis years show that the volatile organic compounds (VOC) and nitrogen oxides (NOx) emissions are lower than the SIP budgets; thus, conformity for the ozone standards are demonstrated. Both ozone standards are compared against the same SIP budget.

Table 1: Results of 2015 and 1997 Ozone Standard Conformity Analysis

Analysis Year	Emissions (tons/day)	
	VOC	NOx
SIP Budget	9.16	15.9
2020	2.74	4.20
2030	1.57	1.86
2040	1.09	1.16
2045	1.04	1.12

2.0 Background and Attainment Status

2.1 Background

The Federal Clean Air Act Amendments of 1990 (CAAA) established rules to improve the air, protect public health, and protect the environment. The act requires the U.S. Environmental Protection Agency (EPA) to set, review, and revise the National Ambient Air Quality Standards (NAAQS) periodically.

The Clean Air Act links together air quality planning and transportation planning through the transportation conformity process. Air quality planning is controlled by Michigan's SIP which includes the state's plans for attaining or maintaining the NAAQS. The main transportation planning tools are the metropolitan LRTP and the metropolitan TIP. Transportation conformity ensures that federal funding and approval are given to highway and transit activities that are consistent with the SIP and that these activities will not affect Michigan's ability to achieve the NAAQS.

Transportation activities that are subject to conformity are LRTPs, TIPs, and all non-exempt federal projects that receive Federal Highway Administration or Federal Transit Administration funding or approval. The conformity process ensures emissions from LRTP, TIP, or projects, are within acceptable levels specified within the SIP, and meet the goals of the SIP.

Transportation conformity only applies to on-road sources and transportation-related pollutants: ozone, particulate matter (particulate sizes 2.5 and 10), nitrogen dioxide, and carbon monoxide.

In addition to emissions that are directly emitted, regulations specifically require certain precursor pollutants to be addressed. Precursor pollutants are those pollutants that contribute to the formation of other pollutants. For example, ozone is not directly emitted but created when NOx and VOC react with sunlight.

When the EPA revises a NAAQS, all areas of the country are evaluated to determine if monitored levels of the pollutant are at or below the standard; these areas are classified as attainment. If the pollutant level is above the standard, these areas are classified as nonattainment. MPOs in areas classified as nonattainment must conduct conformity analysis on their transportation programs.

2.2 Attainment Status

On April 15, 2004, the EPA issued final designations of areas not attaining the 1997 ozone NAAQS (also referred to as 1997 ozone standard). Berrien County was designated nonattainment.

On May 16, 2007, the EPA redesignated the area attainment/maintenance, approving and finding adequate motor vehicle emissions budgets for VOC and NOx for the year 2018. Placing the area into maintenance, this requires conformity emission to be compared to the motor vehicle emission budgets contained in the SIP, referred to as SIP budgets.

On July 20, 2012, the EPA designated all of Michigan as attainment for the strengthened 2008 ozone NAAQS.

On July 20, 2013, the EPA partially revoked the 1997 ozone standard, revoking the requirement to do transportation conformity for areas that were in maintenance. On April 6, 2015, the EPA completely revoked the 1997 ozone standard, which resulted in removal of all transportation conformity requirements.

On Aug. 3, 2018, the EPA designated Berrien County as a nonattainment area for the strengthened 2015 ozone NAAQS (also referred to as 2015 ozone standard). MPO's in these nonattainment areas have one year from the designation date to show conformity of the existing or new LRTPs.

On Aril 23, 2018, the FHWA, complying with the court's decision in *South Coast Air Quality Management District v. EPA* (US Environmental Protection Agency) started requiring areas in the country that were maintenance for the 1997 ozone standard to conduct conformity.

2.3 SIP Budgets

The Berrien County nonattainment area has existing maintenance budgets from the 1997 ozone standard maintenance SIP. Regulations require use of these budgets to test against for both ozone standards. Emission generated must be equal to or less than the SIP budgets, also referred to as the motor vehicle emissions budget (MVEB). MVEB is the portion of the total allowable emissions allocated to highway and transit vehicle use in the maintenance or nonattainment area. By showing emissions below the MVEB, the LRTPs and TIPs are conforming to the SIP.

The ozone maintenance SIP assumes no transportation control measures (TCM); thus, measures are not included at this time.

3.0 Interagency Consultation

Consultation with federal, state, and local transportation authorities is conducted through the Michigan Transportation Conformity Interagency Workgroup (MITC-IAWG). Issues discussed include evaluating and choosing emission models and methods, determining regional significant project definition, procedures for future MITC-IAWG meetings and rules for reviewing projects.

An MITC-IAWG was held on December 17, 2019; individuals attended in person or by conference call. Other email MITC-IAWGs were held after. Summary of the meeting is in Appendix A. Copies of this conformity analysis were sent to each MITC-IAWG member to review and comment.

4.0 Public Participation

The Public Participation Plan adopted by the MPO Policy Committee establishes the procedures by which the MPOs reach affected public agencies and the public. The same procedures were followed for this document, ensuring the public has an opportunity to review and comment before the MPOs make a determination.

A formal public comment period for the draft Air Quality Conformity Analysis will be held from January 7 through January 14, 2019. Public comments received and responses to those comments will be in Appendix B.

5.0 Modeled Project in Conformity Analysis

All projects in the LRTPs, TIP, and amendments were evaluated for inclusion in the analysis. Projects classified as non-exempt must be analyzed. Projects with exempt classification that can be modeled with the travel demand model were modeled. Appendix C includes a complete list of the projects evaluated for, and included, in this analysis.

6.0 Transportation Modeling

6.1 Travel Demand Forecasting Models

Nonattainment areas are established independent of MPO boundaries. The Berrien County nonattainment area is covered by three travel demand forecasting models: the TwinCATS model, the South Bend/Niles regional model, and the Statewide model covering the rural areas. Each of these models were developed in TransCAD modeling software. Both the travel demand models for the MPO areas were developed in 2018 using the latest demographic and employment data available to generate estimates of travel; vehicle miles of travel (VMT), and speeds. The statewide model used the latest socioeconomic data available at the time. Detailed documentation on each of these models is contained in separate documents available upon request.

6.1.2 TwinCATS Model

The TwinCATS model covers the greater Benton Harbor, St. Joseph, and Berrien Springs area. It was developed by MDOT and is a standard four-step model with time of day, with a base year of 2015 and horizon year of 2045. Each of the four steps - trip generation, trip distribution,

mode choice and traffic assignment - are checked for reasonableness against national standards. Final model validation verifies that the assigned volumes replicate actual traffic counts. The decennial 2010 census and 2015 five-year American Community Survey are the sources of population and household base data. Employment data is developed from a private business database verified with local knowledge. Future data is based on the Regional Economic Models, Inc. (REMI) economic and demographic forecasts. The University of Michigan and MDOT jointly develop county-specific forecast data.

6.1.3 Niles/South Bend Regional Model

This model is a regional model developed by a consultant and covers the NATS MPO and the Michiana Area Council of Governments (MACOG) MPO areas. The model reflects the interconnected travel patterns experienced in the Niles, Michigan and South Bend, Indiana region. The model is a hybrid, blending a traditional four-step model with an activity-based model, with a base year of 2015 and horizon year of 2045. Census data was used to develop base population and household data, employment data is developed from a private business database verified with local knowledge, and REMI was used to develop future year socioeconomic data.

6.1.4 Statewide Model

The statewide model developed by MDOT covers all counties in the state and was used for the non-urban parts of Berrien County. The model is a standard three-step, trip generation, trip distribution, and assignment model, with a base year 2010 and a 2045 future year. Trip assignment uses an equilibrium method and was validated against traffic counts using MDOT standards and those suggested by FHWA.

6.1.5 Coding Travel Demand Model Links for NFC by Urban and Rural

For emission modeling, the National Functional Classification (NFC) system is used to determine the function of roads; however, NFCs do not distinguish roads by urban and rural. The emission model, Motor Vehicle Emission Simulator (MOVES), require roads to be classified as urban or rural. MOVES require roads to be grouped into one of four road types: rural restricted, rural unrestricted, urban restricted, and urban unrestricted. To determine a roads urban or rural status, roads within the adjusted census urban boundary were considered urban and those outside as rural. NFCs designated as interstate and other freeways are considered restricted while all others are considered unrestricted. The Michigan Geographic Framework (GIS digital base map) was used to combine NFC with adjusted census urban boundary to generate MOVES road types for the network.

6.1.6 Highway Performance Monitoring System (HPMS)

The EPA and FHWA endorse HPMS as the source of VMT estimates. The travel demand modeling VMT is aggregated by NFC road types for the county then normalized to 2015 HPMS

data, which is the base year/validation years of the travel demand forecasting models. Normalization factors were applied to all analysis years.

6.1.7 Analysis Years

Analysis years were determined by the MITC-IAWG. Projects requiring modeling are grouped into an analysis year based on the projects open to traffic date. Emissions are generated for each analysis year.

Analysis Year	Reason
2020	2015 ozone standard attainment year
2030	Interim year (so analysis years not more than ten years apart)
2040	Last year of NATS long range transportation plan
2045	Last year of TwinCATS long range transportation plan

7.0 Emission Modeling

7.1 MOVES Specifications

The EPA's MOVES version MOVES2014b was used to generate emissions. Ozone is formed in the presence of heat and sunlight, so the highest ozone concentrations are monitored during the summer. This conformity analysis involves generating a summer (July) weekday emissions to simulate the meteorology of a high-ozone summer day.

7.2 Road Type Distribution

HPMS data is used to create MOVES road-type distribution fractions. Berrien County HPMS passenger data is used for motorcycle and passenger vehicles, and commercial HPMS is used for trucks and buses. HPMS VMT is aggregated to MOVES road types then converted to a fraction, generating a road-type distribution.

7.3 Average Speed

Speed distributions are created using a method developed by EPA for taking a single average speed and creating a distribution. The method generates an average speed fraction by MOVES road type, by day, by hour, and speed bin from speeds generated by the travel demand forecasting models. The same distribution is used for each vehicle type.

7.4 Ramp Fraction

The default vehicle hours traveled ramp fraction of 8 percent was used.

7.5 Average Weekday VMT to Annual VMT

Monthly VMT adjustment factors were obtained from MDOT's data collection area. The EPA's AADVT Converter-Tool MOVES 2014 was used to convert annual average daily VMT to annual VMT, monthly VMT fractions, and daily VMT fractions. Hourly fractions use MOVES default data. For motorcycles, the monthly fractions use MOVES defaults since local data is limited. Future analysis years utilize the same fractions.

7.6 Vehicle Population

The source of the vehicle population is the Michigan Secretary of State (SOS) vehicle registration database on Oct. 1, 2015. The database was supplemented with school bus data from the Michigan Department of Education and MDOT Public Transit bus data. The EPA's default distributions were used to determine intercity bus, refuse trucks, single-unit trucks categories, and combination trucks categories. The SOS data must be converted to MOVES source (vehicle) types. Table 2 shows how vehicle body style combined with plate type and company code is used to obtain MOVES vehicle types.

Table 2: MOVES Source Types from SOS Body Style, Plate Type, and Company Code

MOVES Source Type	SOS Body Style, Plate Type, and Company code
11 – Motorcycles	Motorcycles
21 – Passenger Cars	Two-Door Four-Door Convertible Roadster Low-Speed
31 – Passenger Trucks	Station Wagon Pickup Van Hearse with Plate Type, Personal Ambulance with Plate Type, Personal Panel Van with Plate Type, Personal
32 – Light Commercial Trucks	Pickup Commercial or Company Van Commercial or Company Hearse Commercial or Company Ambulance Commercial or Company Panel Van Commercial or Company Utility Truck Wrecker
40 – Buses (MOVES: 41*, 42, 43)	Bus; Supplemented with Other Data Sources
50 – Single-Unit Trucks* (MOVES: 51, 52, 53)	Dump Truck Mixer Truck Stake Truck
54 – Motorhomes	Motorhome
60 – Combination Trucks* (MOVES: 61, 62)	Tractor Trailer Tanker

* The EPA default age distribution is applied to calculate individual MOVES Source Type categories.

Future year vehicle population is based on growth in VMT from base year to analysis year. Growth rate is applied to all MOVES vehicle types. Table 3 shows the VMT for each analysis year and growth rate.

Table 3: Growth Rate for Vehicle Population by Year and VMT

	Analysis year				
	Base Year 2015	2020	2030	2040	2045
VMT	5,362,141	5,383,39	5,438,339	5,479,396	5,550,861
Growth Rate	1.00000	1.00793	1.01895	1.02624	1.04106

7.7 Vehicle Age Distribution

MOVES require vehicle age as one of the local data inputs. The Michigan SOS vehicle registration database, as of Oct. 1, 2015, was the source of vehicle ages. Vehicle are assigned to an age group, from 0 to 30-plus, based on model year indicated in the SOS database, with 0 being the newest vehicles (2015 or newer) and each year is its own group until vehicles are 30 years and older, which are aggregated into the 30-plus group. The SOS database is sorted by MOVES vehicle types and age. For intercity buses, refuse trucks, single-unit trucks, and combination trucks, the EPA's default age distribution are used to calculate splits in population because of limited numbers. Base year age distribution fractions were used for all future years.

7.8 Other Local Data

The MOVES model provides input for other types of local data, if available. This conformity demonstration used default meteorology data since the budgets were developed using default data; thus, analysis should also. Lacking local data, defaults were used for hoteling (truck parking) and starts. The default fuel data is correct for Michigan.

8.0 Conclusion

Conformity has a two-step approval process. The MPOs must make a formal conformity determination through a resolution that the findings of this conformity analysis conform to the SIP; thus, emissions are at or below the budgets found in the SIP. Then FHWA, jointly with the FTA, after consultation with the EPA, issues a letter of concurrence with the determination.

The conformity analysis described here and conducted by MDOT, with support of the SWMPC, concludes that the TwinCATS 2045 LRTP and 2017-20 TIP and amendments, NATS 2040 LRTP and 2017-20 TIP, and the rural projects, meet all applicable requirements for conformity for the 2015 and 1997 ozone standards; thus, it is recommended for approval by FHWA.

Appendix A: Meeting Summary of the Interagency Workgroups

Summary of Meeting

Michigan Transportation Conformity Interagency Workgroup (MITC- IAWG)

Berrien County Nonattainment Area

11 AM – 11:30 AM (EST), Monday December 17, 2018

TPS 3rd floor, Van Wagoner Building, Lansing, MI

Conference number and web link information provided in email

Name	**Agency**
In attendance:	
Arron Dawson	Federal Highway Administration (FHWA)
Breanna Bukowski	Michigan Department of Environmental Quality (MDEQ)
Michael Leslie	US Environmental Protection Agency (EPA)
Susan Weber	Federal Transit Administration (FTA)
Donna Wittl	Michigan Department of Transportation (MDOT)
Brandon Kovnat	Southwest Michigan Planning Commission (SWMPC) representing TwinCATS and NATS MPOs
Jason Latham	Berrien County Road Department (BCRD)
Katie Beck	MDOT
Ryan Gladding	MDOT
Amy Lipset	MDOT
Jim Sturdevant	MDOT
Brian Sanada	MDOT

Attendance at the meeting was in person or teleconferencing with web linking.

Agenda:

1) Review analysis years and model information.
2) Review project list.
   Project lists are color coded with yellow being non-exempt projects, orange being exempt but might want to discuss, and blue are project that need more information for a decision to be made. Workbooks may have more than one worksheet.

Berrien County MITC-IAWG discussed an amendment to the TwinCATS' long rang transportation plan and TIP for to change the US-31 project from 2045 to being open to traffic in 2023, and adding new phases. The Michigan Department of Transportation has received a grant to complete the extension of US-31 connecting it to I-94. The construction phase will move from year 2045 to 2023 (open to traffic). Three phases, PE, PE-S, and utility, are being added. The group agreed a new conformity analysis will be required and the analysis years of 2018 would not be required.

Appendix B: Public Comments and Responses

No comments received to date.

Appendix C: Projects Included in Conformity Analysis

The list of projects begins on the following page.

Fiscal Year	Job Type	JobNet ID	MPO Area*	Included in: LRTP, TIP, or STIP	County	Responsible Agency**	Project Name	Limits	Length	Primary Work Type	Project Description	Phase	Fed Estimated Amount	State Estimated Amount	Local Estimated Amount	Total Estimated Amount	Fund Source	Air Quality	Comments
2021	Trunkline	130008	TwinCATS	LRTP	Berrien	MDOT	I-94	Britain Avenue to I-196	4.721	Reconstruction	Reconstruction of I-94 and partial interchange.	CON	$66,431,475	$7,381,275	$0	$73,812,750	IM	Exempt	discussed at July 9 MITC-IAWG, put in travel demand model
2019	Trunkline	49719	TwinCATS	TIP/LRTP	Berrien	MDOT	US-31	Napier road to I-94	2.5	Construct New Road	connect US-31 from Napier Rd to I-94 at I-94 BL	PE	$7,500,000	$4,500,000		$10,000,000	UNKOWN	Exempt	new phase
2019	Trunkline	49719	TwinCATS	TIP/LRTP	Berrien	MDOT	US-31	Napier road to I-94	2.5	Construct New Road	connect US-31 from Napier Rd to I-94 at I-94 BL	Z (utility)	$5,400,000	$3,600,000		$8,000,000	UNKOWN	Exempt	new phase
2020	Trunkline	49719	TwinCATS	LRTP	Berrien	MDOT	US-31	Napier road to I-94	2.5	Construct New Road	connect US-31 from Napier Rd to I-94 at I-94 BL	CON	$22,806,000	$17,764,000	$0	$40,570,000	UNKOWN	Non-exempt	Project moved from 2045 to 2020 with an open to traffic date of 2023

***NATS** = Niles-Buchanan-Cass Area Transportation Study
***TwinCATS** = Twin Cities Area Transportation Study
****BCRD** = Berrien County Road Department
****SWMPC** = Southwest Michigan Planning Commission
****TCATA** = Twin Cities Area Transportation Authority
****BCPT** = Berrien County Public Transit