

**Air Quality Conformity  
Analysis**



**2035 Transportation Plan Update**

**Prepared By:  
The Michiana Area Council of Governments**

**Table of Contents**

1.0 Introduction..... 3  
    1.1 History..... 3  
2.0 Regulations Governing Conformity Determinations ..... 4  
3.0 Travel Demand Model Validation ..... 9  
    3.1 Background ..... 9  
    3.2 TDM Network Preparation ..... 9  
    3.3 Base Year Model Output Validation ..... 9  
    3.4 Model Conversion Factors ..... 9  
4.0 Mobile 6.2 Inputs..... 10  
5.0 Mobile 6.2 Outputs..... 13  
6.0 Interagency Consultation ..... 17  
7.0 Air Quality Analysis Exempt Projects..... 18

## Executive Summary

The Air Quality Conformity Determination for the 2035 Transportation Plan Update (2035 TP) was performed in order to meet federal regulations from the Clean Air Act Amendments of 1990 and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). As a maintenance area for ozone, the Michiana Area Council of Governments (MACOG) must demonstrate that its transportation plans will conform to air quality emission budgets for the ozone precursor pollutants of volatile organic compounds (VOC) and nitrogen oxides (NOx) that are established by the State Implementation Plan (SIP).

Air quality conformity for the 2035 TP was determined based on the analysis included in this report. As required, an emissions analysis was performed for each of the study years of this plan and it was determined that the emissions of VOCs and NOx would not exceed budgets established by the SIP, if the transportation projects are implemented as proposed by the TP. Thus, the MACOG 2035 Transportation Plan Update conforms to the Clean Air Act and the State Implementation Plan (SIP).

**Table E.1: State Implementation Plan Budgets (tons per day)**

Year	VOC (HC)	NOx
2006	20.68	27.24
2020	6.64	7.73

**Table E.2: Emissions Analysis Summary and Budget Comparison (tons per day)**

Year	Total VOC Emissions	VOC Passed By	Total NOx Emissions	NOx Passed By
2009	10.78	9.90	18.17	9.07
2015	6.89	13.79	9.73	17.51
2020	5.59	1.05	6.59	1.14
2025	5.21	1.43	5.31	2.42
2030	5.25	1.39	4.85	2.88
2035	5.39	1.25	4.81	2.92

The conformity determination was coordinated with stakeholder and regulatory agencies through an interagency consultation process to formally deliberate any issues. Copies of the various meeting transcripts are part of the 2035 Transportation Plan Update when available.

The complete project list for the transportation plan was distributed to the Interagency Consultation Group (ICG) along with a short description of the identified projects that were being updated at the start of the update process. A completely updated project list was re-sent for review by the members of the ICG at the start of the public comment period along with the 2035 Transportation Plan Update and Air Quality Conformity documentation.

In an effort to be proactive in working with our partners, the Indiana MPO Council has also scheduled occasional Air Quality Conformity meetings. IDEM, FHWA, INDOT and USEPA have been invited to attend the meetings, to discuss timing, modeling parameters, and related conformity issues. IDEM, INDOT and FHWA have been in regular attendance. The Indiana Traffic Modelers group (this includes IDEM, INDOT and FHWA representatives) also meets at various times during the year to provide an open forum to discuss the modeling and conformity process, modeling parameters, and as a mechanism for assuring that the partners have more than adequate opportunity to participate in the travel demand forecasting process.

## **1.0 Introduction**

As part of the joint regulatory requirements of the Clean Air Act the U.S. Department of Transportation (DOT) and the U.S. Environmental Protection Agency (EPA) require MACOG to conduct an air quality conformity analysis for the Transportation Plan (TP). This is triggered by the fact that both Elkhart and St. Joseph Counties were identified as being in non-attainment of the National Ambient Air Quality Standard (NAAQS) for ozone. The region was considered a maintenance area for the current 8-hour standard at the start of the update cycle.

### **1.1 History**

Under the Clean Air Act (CAA) of 1977, Elkhart and St. Joseph Counties in Indiana and Berrien and Cass Counties in Michigan were designated as non-attainment areas for ozone. In December of 1978, an initial plan for controlling hydrocarbon emissions was submitted to the Indiana State Board of Health and the Michigan Department of Natural Resources for inclusion in the Indiana and Michigan SIPs.

EPA required this area to submit a revised SIP, which indicated attainment by 1987. A Part "D" amendment as required by the EPA (Reasonably Available Control Technology, RACT approval) was completed. Final approval was awarded February 10, 1986.

The EPA again cited the State of Indiana for the ozone non-attainment areas of Elkhart and St. Joseph Counties in Indiana. The Director of the St. Joseph County Environmental Sanitation Department and a representative of the Chamber of Commerce met with State and Federal EPA officials November 30, 1989, to further discuss the direction the two areas would be required to follow in order to comply with the standards.

Although no incidences of ozone, hydro-carbon, carbon monoxide, sulfur dioxide, or PM-10 particulate matter, had occurred from 1989 to 1991 in Elkhart and St. Joseph Counties, the area was still designated as a non-attainment area for ozone under an "operation of the law" clause written into the 1990 Clean Air Act Amendments (CAAA).

The MACOG Policy Board endorsed the 2015 Long Range Plan Update on October 20, 1993. The Elkhart and St. Joseph County area was re-designated as a maintenance area November 30, 1994.

Once again the Elkhart and St. Joseph Counties were re-designated as basic non-attainment areas for the stricter 8-hour ozone standard. This occurred in June of 2004. All plans, programs and projects must be reviewed and analyzed to assure that they conform and do not exceed the emissions inventory, which is part of the SIP budget, or worsen the regions air quality.

## 2.0 Regulations Governing Conformity Determinations

Federal Regulations for Metropolitan Planning in 23 CFR (Code of Federal Regulations) Part 450 require that federally funded highway and transit projects are included in a conforming plan and Transportation Improvement Program (TIP). 40 CFR Part 93 amended August 15, 1997, outlines the requirements for making conformity determinations under Subpart A. Applicable requirements are listed below.

### **1. The Transportation Plan must specifically describe the transportation system envisioned for certain future years, which are called horizon years.**

- The horizon years may be no more than 10 years apart.
- The first horizon year may not be more than 10 years from the base year used to validate the travel demand model.
- If the attainment year is in the time span of the Transportation Plan, the attainment year must be a horizon year.
- The last horizon year must be the last year of the Transportation Plan's forecast year.

The base year for validation of the travel demand model is 2005. The Federal Register identifies the baseline inventory year for Elkhart and St. Joseph Counties to be 2002. This was part of the areas re-designation as a basic non-attainment area. Section 3.0 *Travel Demand Model Validation* contains documentation on the validation of the travel demand model to the 2005 base year. The base and horizon years used in developing the conformity analysis of the MACOG 2035 Long Range Transportation Plan are:

- 2005: The validated base year for the transportation network
- 2009: Required attainment year for the 8-hour ozone standard
- 2015: Proposed 5-year analysis year after attainment year
- 2020: Year selected to be no more than 10-years between horizon years
- 2025: Year selected to be no more than 10-years between horizon years
- 2030: Year selected to be no more than 10-years between horizon years
- 2035: Final horizon year of the Transportation Plan

### **2. The Transportation Plan will quantify and document the demographic and employment factors influencing the expected transportation demand; and the highway and transit system shall be described in terms of the regionally significant additions or modifications to the existing transportation network, which the transportation plan envisions to be operational in the horizon years.**

The socio-economic data for all study-years is included in the Transportation Plan. This data represents the estimates of the population, households, auto ownership per household, employment, school enrollment, and household income. Using the geographic information systems for Elkhart and St. Joseph Counties, MACOG developed land use maps and zoning maps as a tool in developing a socio-economic allocation process. Additional assumptions on future land use were made after reviewing the general land use plans adopted by local governments, the anticipated economic growth, and verifying the data with the appropriate agencies. These methodologies are clearly documented in the 2035 Amended Transportation Plan, and were originally presented at the interagency Air Quality Conformity meeting on January 27, 2005.

Two computer software programs, TransCAD and Mobile 6.2 were used to determine the combined emissions for Elkhart and St. Joseph Counties. TransCAD, a travel demand forecasting application provides vehicle miles traveled (VMT) and speed by functional classification for each horizon year model based on the collected socio-economic data. Mobile 6.2 then provides the emission factors, which will be used to determine whether the emissions generated are above or below the region's emissions budget.

The highway and transit systems are detailed as part of the TP. Each lists regionally significant projects. The MACOG model does not employ modal split, as the VMT generated from transit ridership is less than the models estimated margin of error. As a result, an accurate representation of transit trips in the model cannot be accomplished.

**3. The Transportation Plan must be financially reasonable and the TIP must be fiscally constrained consistent with the U.S. DOT's metropolitan planning regulations at 23 CFR part 450 in order to be found in conformity.**

The Transportation Plan contains a section on financial analysis, which demonstrates that the TP is financially reasonable. Cost information from the Indiana Department of Transportation (INDOT) and other jurisdictions have, for the most part, not been identified for horizon year projects; therefore assumptions have been made for conformity purposes.

**4. The conformity determination must be based on the latest emission estimation model available.**

Mobile 6.2 was used during the development of this plan. Inputs for Mobile 6.2 include environmental and vehicular data. This data includes the following variables, which are changed for each model run:

- *Calendar Year*: the horizon year being modeled in a scenario
- *Temperature*: the minimum and maximum temperature in the region for the time frame being modeled
- *Fuel Reid Vapor Pressure*: the legally required pressure
- *Evaluation Month*: used to determine the vehicle fleet distribution to use, i.e. more cars of the current model year are on the road at the end of the model year (July) than in the middle (January)
- *Average Speed*: the calculated average speed by functional class

More details on these variables can be found in section 4.0 *Mobile 6.2 Inputs*.

Twelve functional classes (comprising interstates, expressways, arterials, collectors, and local roads) are used to describe both urban and rural routes in Elkhart and St. Joseph Counties. These functional classes were then assigned to one of four Mobile 6.2 facility types, although a Mobile Scenario is run for each individual functional class. Table 4.2 illustrates the correlation of the two classifications that were used.

The six network years identified earlier (2009, 2015, 2020, 2025, 2030 and 2035) were forecasted using TransCAD and each was modeled with Mobile 6.2 for determining air quality conformity.

Speed was varied by functional classification. MACOG uses its historical travel time study database to calculate the base speed for each functional classification. The travel time studies, collected annually for both Elkhart and St. Joseph Counties, are completed on a three-year cycle. Once input, the model is then calibrated in TransCAD using traffic counts from the traffic count program. An average speed by functional class is then generated from the congested speed, using only the road segments with a traffic count.

$$\text{Weighted Speed} = \text{Link Speed} * \text{Link Length}$$

The weighted speeds for each link used are then totaled up and divided by the total linear length of each link used, to calculate the average speed for the functional class. The speed inputs used for the Mobile 6.2 model are found in table 4.3.

The VMT is also calculated by functional class. The length of each link is multiplied by the assigned volume on the link and added to the running total of VMT for the functional class. It should be noted that the

MACOG travel demand model was spatially adjusted, using data from the areas geographic information system, during a previous model update to provide more accurate link length according to the curvature of the road. For the local roads, the centroids used to represent the local roads were classified as either a Rural Local Road or an Urban Local Road and included when the VMT for the functional class was calculated. The VMT inputs used for each horizon year can be found in tables 5.1 to 5.7.

Highway Performance Monitoring Data (HPMS) data is collected for the state by MACOG and the other MPO's on a three-year count cycle and is reported annually. The traffic count and other data collected for HPMS is specifically designed as a nationwide statistical tool for use by Congress in determining funding formulas and as a basis for judging the condition of our nation's highways. Although an acceptable tool for the purpose for which it was developed, it lacks the accuracy needed for regional modeling applications. The federal rules only require its use in serious and above areas not meeting the National Ambient Air Quality Standards (NAAQS). The MPOs traffic count dataset, which was used to develop the travel demand-forecasting model, is the superior choice for conformity purposes. The total number of traffic counts used for the HPMS system in Elkhart and St. Joseph County is 168. The MACOG travel demand-forecasting (TDF) model however, uses over 2000 traffic count sites to generate VMT in the non-attainment area.

Previously, IDEM has questioned the difference between the HPMS estimated VMT and the MACOG TDF generated data. HPMS has generated a higher VMT than the MACOG model with a discrepancy of nearly 1,500,000 in additional VMT. After a review of the data, a more than 1,000,000 VMT difference in the rural major collectors are generated by the HPMS statistical data which is based on only 6 traffic count stations versus 134 count sites used in the development of the TDF model. The remaining 500,000 VMT HPMS error seems to be spread over the eleven remaining roads types.

IDEM has provided MACOG with vehicle fleet mix data from 2002. The vehicle fleet mix data, which includes local fleet age distribution datasets for Elkhart and St. Joseph Counties, was used in the development of the conformity analysis rather than the national default data in the Mobile 6 model.

The fleet age distribution data was generated by ERG using local vehicle identification number (VIN) registration data from 2003 and decoded using a 2002 VIN decoder developed by ERG. IDEM has indicated that heavy-duty vehicle age distribution data was not developed as it was too difficult an exercise and expense to decode the VIN information from heavy-duty vehicle registrations. This is because the small changes to the VMT distribution account for less than 15% of the emissions results. Therefore, the distribution data for heavy-duty vehicles is based on the trended national default data developed from estimated 1996 national vehicle registrations. The motorcycle age distributions are based on trended national defaults from the 1987 Motorcycle Statistical Annual published by the Motorcycle Industry Council.

The outputs from the Mobile 6.2 model include CO, NOx and VOC emission factors for each of the functional classes based on the default inputs to Mobile and all of the inputs listed in section 4.0 *Mobile 6.2 Inputs*. The emission factors were then multiplied by the VMT for each functional classification and added to determine the total emissions. The compiled outputs are included in section 5.0 *Mobile 6.2 Outputs*, which shows the total emissions estimated for each network year. A sample input file, used to run Mobile 6.2, the vehicle age distribution table, and the report file generated, are included as attachments.

**5. The MPO must make the conformity determination according to the interagency consultation procedures required in 40 CFR Parts 51 and 93 (sections 51.390 and 93.105), and according to the public involvement procedures established by the MPO in compliance with 23 CFR Part 450.**

MACOG is updating the approved 2035 Amended Transportation Plan to reflect changes in project timelines as well as to better clarify some projects whose phasing may have changed despite otherwise

following the same build out schedule. The process for a minor transportation plan amendment outlined in the ICG Conformity Consultation Guidance was followed with an expedited timeline approved by the ICG group at the start of the update process.

**6. The Transportation Plan must provide for the timely implementation of Traffic Control Measures (TCM) from the applicable State Implementation Plan (SIP). Nothing in the plan may interfere with the implementation of any TCM in the applicable implementation plan.**

The SIP, under section 6.2 List of Contingency Measures (page 12), provides a partial list of available TCM’s in the Maintenance Plan for Ozone Attainment for Elkhart or St. Joseph Counties.

**7. The Transportation Plan must be consistent with the motor vehicle emissions budget in the applicable State Implementation Plan (SIP).**

The SIP sets the motor vehicle emission budget pursuant to the Federal Register Direct Final Rule of August 25, 1997. The motor vehicle emission budgets for Elkhart and St. Joseph Counties are in tons of pollutant per day.

**Table 2.1: State Implementation Plan Budgets (tons per day)**

Year	VOC (HC)	NOx
2006	20.68	27.24
2020	6.64	7.73

As the 8-hour ozone rule requires areas with existing 1-hour budgets to use those budgets for conformity determinations, the 2009-attainment year budget is identical to the 2006 maintenance budget. It is used for the 2005, 2009, and 2015 conformity determinations.

The 2020 budget, which was approved by the EPA, is stricter than the 1-hour budget, and used for determining the conformity of the 2020 and later horizon years.

**8. The regional emissions analysis shall estimate emissions from the entire transportation system, including all regionally significant projects contained in the Transportation Plan and all other regionally significant highway and transit projects expected in the non-attainment area in the time frame of the Transportation Plan.**

The analysis estimates emissions of both VOC and NOx as ozone precursors. Elkhart and St. Joseph Counties are in attainment for CO emissions and conformity with the budget is not required; no analysis of CO emissions was completed.

**Table 2.2: Emissions Analysis Summary and Budget Comparison (tons per day)**

Year	Total VOC Emissions	VOC Passed By	Total NOx Emissions	NOx Passed By
2009	10.78	9.90	18.17	9.07
2015	6.89	13.79	9.73	17.51
2020	5.59	1.05	6.59	1.14
2025	5.21	1.43	5.31	2.42
2030	5.25	1.39	4.85	2.88
2035	5.39	1.25	4.81	2.92

Since the emissions budget test is passed for each analysis year, the Long Range Transportation Plan is in conformity with the State Implementation Plan and therefore complies with the Clean Air Act and other applicable federal and state requirements.

**9. The emissions analysis methodology shall meet the requirement of section 93.122: (a) Regional emissions analysis for the Transportation Plan shall include all regionally significant projects expected in the maintenance area. Projects that are not regionally significant are not required to be explicitly modeled, but VMT from such projects must be estimated in accordance with reasonable professional practices. The affects of TCM's and similar projects that are not regionally significant may also be estimated in accordance with reasonable professional practices. (b) For TCM's demonstrating a quantifiable emission reduction benefit, the emissions analysis may include that emissions reduction credit. (c) For areas with a Transportation Plan that meets the content requirements of section 93.106, the emissions analysis shall be performed for each horizon year.**

The emissions analysis methodology meets the requirement of section 93.122.

(a) The transportation model includes all regionally significant projects that are planned to occur over the life of this plan. In addition, the VMT from projects not specifically modeled, have been accounted for with the validation of the travel demand model output.

(b) There are no required TCM's for the South Bend/Elkhart 8-Hour Maintenance Area. There are also no additional credits being sought from the Congestion Mitigation and Air Quality (CMAQ) program funded projects that are continually being implemented in Elkhart and St. Joseph Counties.

(c) The emissions analysis was performed for each horizon year; the results were then summarized in a spreadsheet and included in section *5.0 Mobile 6.2 Outputs*.

## **3.0 Travel Demand Model Validation**

The following analysis was performed to determine the validity of the Travel Demand Model (TDM) being used for the 2035 Transportation Plan Update. In addition, the methodology was used to convert the TDM outputs into inputs for the air quality model, for purposes of the Conformity Determination.

### **3.1 Background**

The model being used to forecast future traffic on the transportation network being proposed by the 2035 TP is based on the traditional 4-step travel demand forecasting process - trip generation, trip distribution, modal split, and traffic assignment. The modal split component has not been included in the model, as the primary mode of travel in the region is automobile traffic.

The model was initially based in MINUTP software, and calibrated to a 1996 base year. Since that time, the model has been converted to the TransCAD software platform and recalibrated to a 2005 base year.

### **3.2 TDM Network Preparation**

The 2005 base year network was updated from the 2002 network to reflect the most recent changes in the road network. The traffic counts were also updated with the most recent Annualized Average Daily Traffic (AADT) count data (2005). The project list was then updated and modeled in the TDM to coincide with the changes that have been made to the project list in terms of expected completion dates for the road projects that have been planned or finished.

Socio-economic data was determined using data from the previous TP, the 2000 Census Transportation Planning Package (parts one and two), and the most recently available forecasts from STATS Indiana and Woods & Poole. This data was then disaggregated to the traffic analysis zones using input from the areas elected officials, planners, and developers, to get future year numbers. A complete description of the process and methods used can be found in the 2035 Transportation Plan.

### **3.3 Base Year Model Output Validation**

The TransCAD model was calibrated for the base year to the traffic counts from MACOG's three-year traffic count program, which also includes state traffic counts, HPMS traffic counts, and counts collected at all railroad crossings. The model is then calibrated within an acceptable tolerance based on traffic count data, as compared to the travel demand model's assigned traffic volumes.

The total VMT for the model was then compared to the total VMT of the traffic counts to determine the overall accuracy of the model.

### **3.4 Model Conversion Factors**

No model conversion factors have been used for the emissions modeling. The steps used to determine the total emissions have remained consistent with the prior practices used when the 1-hour ozone budget was created. The MACOG travel demand model has followed the air quality conformity requirements listed in 93.122 subpart C.

## 4.0 Mobile 6.2 Inputs

The following tables represent the data used as inputs to Mobile 6.2 when the defaults are not utilized. Sample copies of the input files used to test for conformity are attached.

**Table 4.1: Mobile Command Summary**

Command	Description
MOBILE6 INPUT FILE	Used to identify the full file path of the input file.
REPORT FILE	The location of the descriptive output file. The output from this command is located in the appendix.
SPREADSHEET	The location of the spreadsheet output file. This is the file used to automate the reporting of the emissions.
POLLUTANTS	The pollutants being modeled by the input file. The pollutants are HC, CO, and NOx. Carbon Monoxides are not required to be run however.
EXPRESS HC AS VOC	Instructs Mobile 6 to output Hydrocarbons as Volatile Organic Compounds.
NO REBUILD	Assumes that heavy-duty diesel vehicles have not been rebuilt to lower emissions.
NO REFUELING	Instructs Mobile 6 to not model evaporative emissions from refueling gas tanks.
MIN/MAX TEMP	The average daily minimum and maximum temperatures for the modeled time period. The temperatures used for the 8-hour ozone budget are 62.8° and 83.7° Fahrenheit.
FUEL RVP	The legal Reid Vapor Pressure of the fuel being used. In this region, an RVP of 9.0 is required.
SCENARIO RECORD	The start of a specific scenario. The following commands are included with each scenario.
CALENDAR YEAR	The horizon year being modeled. The potential years are 2005, 2009, 2015, 2020, 2025, 2030, and 2035.
EVALUATION MONTH	The month of the evaluation, either January or July. Other months must be interpolated. For ozone, a typical summer day is modeled, so July (7) is used for the month.
AVERAGE SPEED	The average speed by functional class.
OXYGENATE	These commands are carryovers from Mobile 5a. KIPDA's air quality consultant provided the equivalent Mobile 6.2 values that can be found in the input files.
RVP OXY WAIVER	

**Table 4.2: Relationship between Functional Classes and Mobile 6.2 Facility Types**

Functional Class	Average Speed Facility Type
Rural Interstates	Freeway
Other Principal Arterial (Rural)	Non-Ramp
Minor Arterial (Rural)	Arterial
Major Collector (Rural)	Arterial
Minor Collector (Rural)	Arterial
Local (Rural)	Arterial
Urban Interstate	Freeway
Other Freeways and Expressways (Urban)	Freeway
Other Principal Arterial (Urban)	Arterial
Other Minor Arterial (Urban)	Arterial
Collector (Urban)	Arterial
Local (Urban)	Local

**Table 4.3: Speed Inputs (MPH) by Functional Class**

Functional Class (Rural)	2005	2009	2015	2020	2025	2030	2035
Rural Interstate	60.7	60.7	60.7	60.7	60.7	60.7	60.7
Other Principal Arterial	39.9	39.7	41.4	41.6	41.6	41.6	41.5
Minor Arterial	43.4	43.4	43.6	44.4	45.0	45.0	44.6
Major Collector	34.1	34.1	34.1	34.0	33.9	33.8	33.8
Minor Collector	35.0	35.1	35.0	34.8	34.9	34.9	34.9
Local	34.7	34.7	34.6	34.8	34.8	34.8	34.8
Functional Class (Urban)							
Urban Interstate	60.7	60.7	60.7	60.7	60.7	60.7	60.7
Other Freeways and Expressways	42.6	42.6	42.2	42.9	42.9	42.8	42.7
Other Principal Arterial	30.4	30.5	30.7	31.2	31.3	31.2	31.1
Other Minor Arterial	30.3	30.4	30.5	30.7	30.7	30.7	30.6
Collector	30.3	30.3	30.0	30.2	30.3	30.3	30.2
Local	31.3	31.3	31.3	31.3	31.2	31.2	31.2

**Table 4.4: Number of Registered Local Light-Duty Vehicles by Age**

Area	Vehicle Type		Number of Vehicles				
			1	2	3	4	5
Region	1	LDGV	8,102	10,803	10,463	10,822	12,197
Region	2	LDGT1	1,172	1,562	1,508	1,049	814
Region	3	LDGT2	3,896	5,194	5,013	5,101	6,288
Region	4	LDGT3	1,413	1,884	1,816	1,906	2,252
Region	5	LDGT4	424	565	543	727	724
Area	Vehicle Type		Number of Vehicles				
			6	7	8	9	10
Region	1	LDGV	12,369	11,226	12,611	11,904	14,140
Region	2	LDGT1	727	1,039	932	1,639	1,845
Region	3	LDGT2	6,162	6,349	6,221	4,524	4,307
Region	4	LDGT3	2,774	1,842	1,985	1,895	2,230
Region	5	LDGT4	1,052	784	688	486	450
Area	Vehicle Type		Number of Vehicles				
			11	12	13	14	15
Region	1	LDGV	11,711	11,632	10,447	9,353	7,881
Region	2	LDGT1	2,201	1,815	1,508	1,987	1,724
Region	3	LDGT2	3,779	3,583	2,674	1,802	1,227
Region	4	LDGT3	2,067	1,539	1,382	885	908
Region	5	LDGT4	448	143	156	88	132
Area	Vehicle Type		Number of Vehicles				
			16	17	18	19	20
Region	1	LDGV	7,285	5,747	4,094	3,581	2,593
Region	2	LDGT1	2,143	1,695	1,704	1,345	909
Region	3	LDGT2	1,096	1,308	354	373	291
Region	4	LDGT3	1,169	991	773	644	565
Region	5	LDGT4	69	71	58	77	70
Area	Vehicle Type		Number of Vehicles				
			21	22	23	24	25
Region	1	LDGV	1,873	980	531	541	3,785
Region	2	LDGT1	626	289	258	193	427
Region	3	LDGT2	317	196	82	55	407
Region	4	LDGT3	406	242	156	93	1,604
Region	5	LDGT4	38	21	9	7	459

## 5.0 Mobile 6.2 Outputs

The following tables represent the emissions analyses performed for the Conformity Determination on the 2035 Transportation Plan Update. The TransCAD transportation model was run to determine the amount of vehicle miles of travel for each horizon year by functional classification of the road based on the amended project list. The Mobile model computed the emission factors for volatile organic compounds (VOC), nitrogen oxides (NOx), and carbon monoxide (CO). Copies of the descriptive outputs are included in the appendix.

The total emissions generated for VOC and NOx by functional classification of roadway are compared against the allowable budget set by the SIP. The emissions budget test was passed for each analysis year, and therefore the 2035 Transportation Plan Update is in conformity.

**Table 5.1: 2005 Network Emissions Analysis**

Functional Class (Rural)	Vehicle Miles Traveled	VOC Emissions (Tons/Day)	NOx Emissions (Tons/Day)
Rural Interstate	764,472	0.83	2.51
Other Principal Arterial	296,167	0.36	0.73
Minor Arterial	712,914	0.85	1.63
Major Collector	968,439	1.25	2.13
Minor Collector	105,110	0.13	0.23
Local	264,079	0.54	0.61
<b>Functional Class (Urban)</b>			
Urban Interstate	545,650	0.60	1.79
Other Freeways and Expressways	864,031	1.05	2.15
Other Principal Arterial	2,861,258	3.86	6.32
Other Minor Arterial	1,739,071	2.35	3.85
Collector	866,005	1.17	1.91
Local	850,155	1.75	1.95
<b>Totals:</b>	<b>10,837,349</b>	<b>14.76</b>	<b>25.81</b>

**Table 5.2: 2009 Network Emissions Analysis (8-Hour Ozone Attainment Year)**

Functional Class (Rural)	Vehicle Miles Traveled	VOC Emissions (Tons/Day)	NOx Emissions (Tons/Day)
Rural Interstate	797,290	0.64	1.80
Other Principal Arterial	304,419	0.27	0.51
Minor Arterial	727,612	0.64	1.16
Major Collector	950,421	0.89	1.46
Minor Collector	99,019	0.09	0.15
Local	269,119	0.39	0.44
<b>Functional Class (Urban)</b>			
Urban Interstate	558,134	0.45	1.26
Other Freeways and Expressways	861,493	0.76	1.47
Other Principal Arterial	2,929,615	2.86	4.52
Other Minor Arterial	1,720,040	1.68	2.66
Collector	872,878	0.85	1.35
Local	852,027	1.24	1.40
<b>Totals:</b>	<b>10,942,069</b>	<b>10.78</b>	<b>18.17</b>
<b>Budget:</b>		<b>20.68</b>	<b>27.24</b>
<b>Passed By:</b>		<b>9.90</b>	<b>9.07</b>

**Table 5.3: 2015 Network Emissions Analysis**

Functional Class (Rural)	Vehicle Miles Traveled	VOC Emissions (Tons/Day)	NOx Emissions (Tons/Day)
Rural Interstate	826,329	0.41	0.91
Other Principal Arterial	155,248	0.08	0.13
Minor Arterial	799,415	0.43	0.65
Major Collector	942,642	0.54	0.74
Minor Collector	124,071	0.07	0.10
Local	271,943	0.24	0.23
<b>Functional Class (Urban)</b>			
Urban Interstate	568,347	0.29	0.63
Other Freeways and Expressways	1,234,307	0.67	1.06
Other Principal Arterial	3,118,949	1.84	2.47
Other Minor Arterial	1,731,830	1.02	1.37
Collector	901,539	0.53	0.71
Local	871,883	0.77	0.73
<b>Totals:</b>	<b>11,546,502</b>	<b>6.89</b>	<b>9.73</b>
<b>Budget:</b>		<b>20.68</b>	<b>27.24</b>
<b>Passed By:</b>		<b>13.79</b>	<b>17.51</b>

**Table 5.4: 2020 Network Emissions Analysis**

Functional Class (Rural)	Vehicle Miles Traveled	VOC Emissions (Tons/Day)	NOx Emissions (Tons/Day)
Rural Interstate	857,276	0.34	0.60
Other Principal Arterial	151,354	0.06	0.08
Minor Arterial	888,180	0.37	0.48
Major Collector	985,835	0.44	0.51
Minor Collector	139,788	0.06	0.07
Local	268,687	0.19	0.15
<b>Functional Class (Urban)</b>			
Urban Interstate	580,616	0.23	0.41
Other Freeways and Expressways	1,256,252	0.53	0.70
Other Principal Arterial	3,285,238	1.51	1.72
Other Minor Arterial	1,755,537	0.81	0.92
Collector	881,602	0.41	0.46
Local	885,809	0.64	0.49
<b>Totals:</b>	<b>11,936,174</b>	<b>5.59</b>	<b>6.59</b>
<b>Budget:</b>		<b>6.64</b>	<b>7.73</b>
<b>Passed By:</b>		<b>1.05</b>	<b>1.14</b>

**Table 5.5: 2025 Network Emissions Analysis**

Functional Class (Rural)	Vehicle Miles Traveled	VOC Emissions (Tons/Day)	NOx Emissions (Tons/Day)
Rural Interstate	886,596	0.31	0.46
Other Principal Arterial	148,735	0.06	0.06
Minor Arterial	980,310	0.36	0.42
Major Collector	1,038,345	0.42	0.43
Minor Collector	139,031	0.06	0.06
Local	280,060	0.19	0.12
<b>Functional Class (Urban)</b>			
Urban Interstate	596,675	0.21	0.31
Other Freeways and Expressways	1,292,284	0.49	0.56
Other Principal Arterial	3,394,541	1.41	1.40
Other Minor Arterial	1,766,036	0.74	0.73
Collector	873,457	0.37	0.36
Local	904,824	0.60	0.39
<b>Totals:</b>	<b>12,300,893</b>	<b>5.21</b>	<b>5.31</b>
<b>Budget:</b>		<b>6.64</b>	<b>7.73</b>
<b>Passed By:</b>		<b>1.43</b>	<b>2.42</b>

**Table 5.6: 2030 Network Emissions Analysis**

Functional Class (Rural)	Vehicle Miles Traveled	VOC Emissions (Tons/Day)	NOx Emissions (Tons/Day)
Rural Interstate	918,511	0.32	0.41
Other Principal Arterial	153,141	0.06	0.06
Minor Arterial	1,022,569	0.37	0.39
Major Collector	1,091,144	0.43	0.40
Minor Collector	146,663	0.06	0.05
Local	293,900	0.19	0.11
<b>Functional Class (Urban)</b>			
Urban Interstate	608,520	0.21	0.27
Other Freeways and Expressways	1,325,786	0.49	0.51
Other Principal Arterial	3,399,537	1.39	1.26
Other Minor Arterial	1,824,802	0.75	0.68
Collector	915,602	0.38	0.34
Local	923,967	0.61	0.36
<b>Totals:</b>	<b>12,624,142</b>	<b>5.25</b>	<b>4.85</b>
<b>Budget:</b>		<b>6.64</b>	<b>7.73</b>
<b>Passed By:</b>		<b>1.39</b>	<b>2.88</b>

**Table 5.7: 2035 Network Emissions Analysis**

Functional Class (Rural)	Vehicle Miles Traveled	VOC Emissions (Tons/Day)	NOx Emissions (Tons/Day)
Rural Interstate	951,752	0.33	0.41
Other Principal Arterial	158,431	0.06	0.06
Minor Arterial	1,057,680	0.38	0.39
Major Collector	1,148,331	0.45	0.41
Minor Collector	155,645	0.06	0.06
Local	310,183	0.20	0.11
<b>Functional Class (Urban)</b>			
Urban Interstate	621,994	0.21	0.27
Other Freeways and Expressways	1,362,287	0.50	0.50
Other Principal Arterial	3,456,183	1.41	1.24
Other Minor Arterial	1,873,420	0.77	0.67
Collector	966,297	0.40	0.35
Local	944,722	0.62	0.35
<b>Totals:</b>	<b>13,006,924</b>	<b>5.39</b>	<b>4.81</b>
<b>Budget:</b>		<b>6.64</b>	<b>7.73</b>
<b>Passed By:</b>		<b>1.25</b>	<b>2.92</b>

## **6.0 Interagency Consultation**

ICG Consultation for the 2035 Transportation Plan Update began on Tuesday, September 7, 2010 with an email sent out by MACOG outlining the proposed schedule for a transportation plan amendment. After researching questions proposed by FHWA in response to the email, it was decided to complete an update to the transportation plan rather than a simple amendment cycle in order to reset the conformity clock. A conference call was then setup for September 16, 2010 to get concurrence from the ICG on the planning assumptions to be used.

A spreadsheet outlining the proposed changes to the existing 2035 Amended Transportation Plan was sent out to the ICG partners on September 22, 2010, followed by two maps visualizing the changes on the 23<sup>rd</sup>. A conference call was held Friday morning, September 24, 2010, to go over the project list.

The Air Quality Conformity Determination was updated and the new emissions analysis completed for the 2035 Transportation Plan Update by September 28, 2010. At that point, it was then sent out for review by the ICG partners.

## 7.0 Air Quality Analysis Exempt Projects

The roadway project list can be found in the 2035 Transportation Plan Update and describes which projects have been included in the air quality analysis and which have not. There are two categories that the project can fall into: exempt, and non-exempt. Following are definitions of each category:

1. Exempt: there are four types of projects that are assumed to be exempt from the air quality analysis because they do not create new capacity, these are:
  - a. Bridge Replacements: a bridge is being replaced in-kind because of a deteriorating structure, without adding new lanes.
  - b. Intersection Improvements: minor improvements at isolated intersections such as safety enhancements and realignment.
  - c. Pedestrian Improvements: enhancements such as sidewalks and crosswalks.
  - d. Geometric Improvements: roadway segments with deficiencies in lane width, horizontal/vertical curvature or other safety issues that are being improved. No new travel lanes being constructed.
  - e. Railroad Underpass/Overpass: as railroads are accounted for in the model by calibrating travel time speeds to traffic counts, the benefits of an underpass or overpass cannot reasonably be measured.
2. Non-Exempt: these projects are included in the Air Quality analysis and travel demand-forecasting model and are generally comprised of added capacity projects or new road construction greater than a mile in length.