Air Quality Conformity Determination Report

Between

***NWI 2050+ Amendment No. 1*,**

The **2024 to 2028 Transportation Improvement Program Amendment No. 24-05**

and

The **Indiana State Implementation Plan (SIP)**

February 20, 2025

Northwestern Indiana Regional Planning Commission

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Acknowledgements

This *Air Quality Conformity Determination Report* between the *NWI 2050*+ Plan Amendment No.1, the 2024 to 2028 Transportation Improvement Program (2024-2028 TIP) Amendment No. 24-05, and the Indiana State Implementation Plan (SIP) was prepared by the Northwestern Indiana Regional Planning Commission (NIRPC). Individuals from the following agencies (hereafter collectively referred to as the Interagency Consultation Group on Air Quality or ICG) contributed their efforts towards the completion of the *Air Quality Conformity Determination Report*. They include:

- Northwestern Indiana Regional Planning Commission (NIRPC)
- Indiana Department of Transportation (INDOT)
- Indiana Department of Environment Management (IDEM)
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)
- United States Environmental Protection Agency (EPA)

Executive Summary

As part of its transportation planning process as a Metropolitan Planning Organization, NIRPC at least every 4 years is required to develop both a Metropolitan Transportation Plan, a plan of the Northwestern Indiana Region's priorities for the next few decades, as well as a Transportation Improvement Program, a listing of transportation projects (every 2 years) that are consistent with the Metropolitan Transportation Plan. Because NIRPC administers these transportation planning requirements in at least one area designated by the United States Environmental Protection Agency (EPA) as nonattainment or maintenance for one or more criteria pollutants in the Clean Air Act (CAA), NIRPC is also subjected to air quality conformity requirements.

The Clean Air Act (CAA) section 176(c) (42 U.S.C. 7506(c)) requires that federally funded or approved highway and transit activities are consistent with ("conform to") the purpose of the State Implementation Plan (SIP). Conformity to the purpose of the SIP means that transportation activities will not cause or contribute to new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS or any interim milestones (42 U.S.C. 7506(c)(1)). EPA's air quality conformity rules establish the criteria and procedures for determining whether metropolitan transportation plans (MTPs), transportation improvement programs (TIPs), and federally supported highway and transit projects conform to the SIP (40 CFR Parts 51.390 and 93). Additionally, EPA's air quality conformity rules dictate that any TIP amendment that includes regionally significant, non-exempt projects are also subject to air quality conformity requirements.

Of the six criteria pollutants regulated by the CAA (Ozone, Particulate Matter, Carbon Monoxide, Lead, Sulfur Dioxide, and Nitrogen Dioxide), only Ozone applies for this *Air Quality Conformity Determination Report* because it is the only one of the pollutants for which EPA has designated portions of the NIRPC planning area (Lake, Porter, and LaPorte Counties) nonattainment or maintenance that the ICG has found to have transportation-related emissions contributing to the nonattainment or maintenance designation. While portions of Lake County (East Chicago) are designated as a maintenance area for Particulate Matter less than 10 microns in diameter (PM10) as well as Carbon Monoxide (CO), the EPA has found onroad mobile sources (transportation) not to be significant contributors to the PM10 designation, so an air quality conformity review is not required for that standard (68 FR 1372). Moreover, the second 10-year maintenance plan for the 1971 CO National Ambient Air Quality Standard (NAAQS) expired on December 14, 2019, so an air quality conformity determination is no longer required (74 FR 52891). The EPA has made area designations for Ozone for the 1997, 2008, and 2015 NAAQSs. Air quality conformity must be demonstrated for the area designated under each NAAQS, unless an area for a newer designation is completely within the area from an older designation, in which case demonstrating conformity for the larger area is considered adequate for meeting the air quality conformity determination requirements. Lake and Porter Counties are designated as maintenance for the 1997 Ozone NAAQS and maintenance for the 2008 Ozone NAAQS. Portions of northern Lake and Porter Counties are designated as nonattainment for the 2015 Ozone NAAQS, but since this area is completely within the area designated by the 2008 NAAQS, an air quality conformity determination for the 2008 Ozone NAAQS is adequate for the 2015 NAAQS. LaPorte County is designated maintenance for the 1997 Ozone NAAQS. Per the *South Coast Air Quality Management District v. EPA* decision and EPA's *Transportation Conformity Guidance for the South Coast II Court Decision*, LaPorte County is subjected to less stringent air quality conformity determination requirements.

This *Air Quality Conformity Determination Report* was completed consistent with CAA requirements, existing associated regulations at 40 CFR Parts 51.390 and 93, and the *South Coast II* decision, according to EPA's *Transportation Conformity Guidance for the South Coast II Court Decision* issued on November 29, 2018.

1.0 Background

1.1 Air Quality Conformity Process

The concept of air quality conformity was introduced in the Clean Air Act (CAA) of 1970, which included a provision to ensure that transportation investments conform to a State implementation plan (SIP) for meeting the Federal air quality standards. Conformity requirements were made substantially more rigorous in the CAA Amendments of 1990. The air quality conformity regulations that detail implementation of the CAA requirements were first issued in November 1993, and have been amended several times. The regulations establish the criteria and procedures for transportation agencies to demonstrate that air pollutant emissions from MTPs, TIPs and projects are consistent with ("conform to") the State's air quality goals in the SIP. This document has been prepared for State and local officials who are involved in decision making on transportation investments.

Air quality conformity is required under CAA Section 176(c) to ensure that Federally-supported (though not necessarily federally funded) transportation activities are consistent with ("conform to") the purpose of a State's SIP. Air quality conformity establishes the framework for improving air quality to protect public health and the environment. Conformity to the purpose of the SIP means Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) funding and approvals are given to highway and transit activities that will not cause new air quality violations, worsen existing air quality violations, or delay timely attainment of the relevant air quality standard, or any interim milestone.

Lake, Porter, and LaPorte Counties were designated as nonattainment for the 1997 Ozone NAAQS effective June 15, 2004 according to 69 FR 23857. On July 19, 2007, LaPorte County was reclassified to attainment with a maintenance plan (became a maintenance area) according to 72 FR 39574. On May 11, 2010, Lake and Porter Counties were reclassified to attainment with a maintenance plan (became a maintenance area) according to 75 FR 26113.

Lake and Porter Counties were designated as nonattainment for the 2008 Ozone NAAQS effective July 20, 2012 according to 77 FR 34221. EPA granted IDEM's redesignation request for Lake and Porter Counties for attainment on May 20, 2022, according to 87 FR 30821, so Lake and Porter Counties are designated as a maintenance area for the 2008 Ozone NAAQS.

Portions of Lake County (Calumet, Hobart, North, Ross, and St. John Townships) were designated as nonattainment for the 2015 Ozone NAAQS effective August 3, 2018 according to 83 FR 25776. Portions of Porter County (Center, Jackson, Liberty, Pine, Portage, Union, Washington, and Westchester Townships) were added as nonattainment to the 2015 Ozone NAAQS effective July 14, 2021 according to 86 FR 31438. Since these townships are all completely within the 2008 Ozone NAAQS nonattainment area that spans all of Lake and Porter Counties, demonstrating air quality conformity for all of Lake and Porter Counties with respect to the 2008 Ozone NAAQS satisfies the requirement for demonstrating air quality conformity for the Lake and Porter County portions of the 2015 Ozone NAAQS.

2.0 Metropolitan Transportation Plan (MTP)

Metropolitan Planning Organizations (MPOs) operating fully or in part in NAAQS nonattainment or maintenance areas such as NIRPC are required to develop a metropolitan transportation plan (MTP) at least every 4 years that looks out to a horizon at least 20 years in the future according to 23 CFR Part 450.324.

2.1 *NWI 2050+* Plan Amendment No.1

The *NWI 2050+* Plan was adopted by the NIRPC Full Commission on July 20, 2023.[1] This plan satisfies the requirements mentioned in section 2.0 above and will be the MTP for the Northwestern Indiana Region that includes all of Lake, Porter, and LaPorte Counties in Indiana, provided that FHWA and FTA determine Amendment No.1 to demonstrate Air Quality Conformity.

The *NWI 2050+* Plan includes the regionally significant, non-exempt transportation projects as shown in Table 2.1.1 completed since the 2019 baseline year subject to the air quality conformity requirements (see Appendix A-2 for Regional Significance Guidance).

NWI 2050+ Amendment No.1 adds the I-80/94 FlexRoad Project to the list of regionally significant projects complete by 2030 as shown in Table 2.1.1.

[1] Available at https://nirpc.org/nwi-2050plus/

Table 2.1.1 Air Quality Conformity-Required Projects Included in *NWI 2050+* Plan

Projects Complete by 2020	Beginning Point	End Point	Sponsor	Federal Estimated Cost (YOE)	Non-Federal Estimated Cost (YOE)
Cline Ave Bridge	Riley Rd Interchange	Michigan Ave Interchange	East Chicago	$0	2019: $150,000,000
101st Ave Added Travel Lanes	Georgia St	Mississippi St	Merrillville	2019: $2,423,000	2019: $643,546
US 20 Added Center Turn Lane	US 421	US 35/SR 212	INDOT	2018: $8,961,600	2018: $2,240,400
US 20 New Interchange at SR 2	1,590 feet from US 20/SR 2 Interchange	1,590 feet from US-20/SR-2 Interchange	INDOT	2019: $9,398,400	2019: $2,349,600

Projects Complete by 2025	Beginning Point	End Point	Sponsor	Federal Estimated Cost (YOE)	Non-Federal Estimated Cost (YOE)
US 41 Added Center Turn Lane	Standard Ave	US 231	INDOT	2019: $3,991,200	2019: $997,800
SR 49 Consecutive Intersection Improvements	Porter Ave	Gateway Blvd	INDOT	2023: $10,856,317	2023: $2,714,079
US 20 Added Center Turn Lane	SR 39	Fail Rd	INDOT	2023: $14,460,108	2023: $3,615,027
109th Ave Consecutive Intersection Improvements	SR 53	Iowa St	Crown Point/INDOT	2021: $2,643,125	2021: $7,576,875
Gostlin St/Sheffield Ave/Chicago St Added Travel Lanes	Illinois State Line	US 41	Hammond	2020: $9,400,000	2020: $2,350,000
45th St Added Center Turn Lane	Colfax St	Chase St	Lake County	2020: $9,928,142	2020: $2,482,036
Mississippi St Added Travel Lanes	93rd Ave	101st Ave	Merrillville	2020: $3,612,000	2020: $903,250
45th St Grade	0.3 miles West	Southwood Dr	Munster	2019:	2019:

Separation and Realignment	of Calumet Ave			$16,800,000	$4,843,293
93rd Ave Added Center Turn Lane	White Oak Ave	US 41	St. John	$0	2024: $3,487,347
109th Ave Added Center Turn Lane	Calumet Ave	US 41	St. John	$0	2024: $3,812,928
Calumet Ave Added Center Turn Lane	101st Ave	109th Ave	St. John	$0	2024: $3,398,710
Vale Park Rd Extension	Winter Park Dr	Windsor Tr	Valparaiso	$0	2020: $4,480,000
South Shore Line Double Track	Tennessee St	Michigan Blvd	NICTD	$0	2022: $388,603,154

Projects Complete by 2030	**Beginning Point**	**End Point**	**Sponsor**	**Federal Estimated Cost (YOE)**	**Non-Federal Estimated Cost (YOE)**
US 41 Added Center Turn Lane	US 231	135th Pl	INDOT	2028: $36,877,815	2028: $9,219,454
Willowcreek Rd Extension	700 N	SR 130	Porter County	2025: $4,617,000	2025: $1,188,000
85th Ave Added Center Turn Lane	US 41	Parrish Ave	St. John	$0	2028: $5,828,139
93rd Ave Added Travel Lanes	Calumet Ave	Cline Ave	St. John	$0	2028: $36,217,098
109th Ave Added Travel Lanes	Calumet Ave	US 41	St. John	$0	2028: $10,220,018
Blaine Ave Added Center Turn Lane	93rd Ave	101st Ave	St. John	$0	2028: $5,438,393
Calumet Ave Added Travel Lanes	101st Ave	109th Ave	St. John	$0	2028: $9,906,218
Cline Ave Added Travel Lanes	101st Ave	109th Ave	St. John	$0	2028: $4,513,833
Cline Ave Gap Extension	93rd Ave	101st Ave	St. John	2028: $8,100,000	2028: $2,025,000
White Oak Ave Added Center Turn Lane	93rd Ave	101st Ave	St. John	$0	2028: $7,051,199
Kennedy Ave Added Travel Lanes	Main St	US 30	Schererville	2025: $17,401,579	2025: $4,350,395

Vale Park Rd Added Center Turn Lane	Calumet Ave	Silhavy Rd	Valparaiso	2027: $3,423,275	2027: $855,819
West Lake Corridor commuter rail service	Hammond Gateway Station	Main St - Munster/Dyer	NICTD	$0	2022: $768,335,733
I-80/I94 Transportation Systems Management and Operations project	IN-IL State Line	I-65	INDOT	2026: $214,068,849	2026: $24,362,331

Projects Complete by 2040	**Beginning Point**	**End Point**	**Sponsor**	**Federal Estimated Cost (YOE)**	**Non-Federal Estimated Cost (YOE)**
Main St Extension	Burnham Ave (Illinois)	Columbia Ave/Sheffield Ave	Munster	2032: $2,848,472	2032: $712,118
Willowcreek Rd Extension	SR 130	US 30	Porter County	2030: $31,920,000	2030: $7,980,000
Division Rd Added Center Turn Lane	Sturdy Rd	375 E	Valparaiso	2038: $2,868,640	2040: $717,160
LaPorte County North-South Connector	SR 39	US 35	LaPorte County	2035: $104,000,000	2035: $26,000,000

Projects Complete by 2050	**Beginning Point**	**End Point**	**Sponsor**	**Federal Estimated Cost (YOE)**	**Non-Federal Estimated Cost (YOE)**
Division Rd Added Center Turn Lane	SR 2	Sturdy Rd	Valparaiso/Porter County	2048: $6,151,100	2048: $1,537,775

3.0 Transportation Improvement Program (TIP)

Metropolitan Planning Organizations (MPOs) such as NIRPC are required to develop a Transportation Improvement Program (TIP), which is a listing of FHWA and FTA funded transportation projects, covering a period of at least 4 years and in cooperation with the state and public transit providers according to 23 CFR Part 450.326. MPOs in Indiana produce TIPs covering 5 years.

3.1 2024 to 2028 Transportation Improvement Program (TIP) Amendment No. 24-05

The 2024 to 2028 Transportation Improvement Program (2024-2028 TIP) was adopted by the NIRPC Full Commission on July 20, 2023.[2] The 2024-2028 TIP satisfies the requirements mentioned in section 3.0 above and will be the TIP for the Northwestern Indiana Region that includes all of Lake, Porter, and LaPorte Counties in Indiana, provided that FHWA and FTA determine that it demonstrates Air Quality Conformity.

The 2024-2028 TIP includes all federally funded projects in the State Fiscal Years 2024 to 2028 (July 1, 2023 through June 30, 2028) but does not include all of the projects listed in Table 2.1.1 above, namely those beyond the year 2028 or those that are not federally funded.

Amendment No. 24-05 adds the I-80/94 FlexRoad Project to the 2024-2028 TIP.

4.0 Air Quality Conformity Determination: General Process

Generally, demonstrating air quality conformity between an MTP/TIP and a SIP means showing that regionally significant, non-exempt highway and transit projects will not cause new air quality violations, worsen existing air quality violations, or delay timely attainment of the relevant air quality standard, or any interim milestone. The State of Indiana developed a Regional Significance Guidance document included in Appendix A-2 that satisfies the 40 CFR Part 93.101 definition of regionally significant project. A non-exempt project is any project not included as an exempt project type in 40 CFR Part 93.126. Thus, demonstrating air quality conformity is required for any transportation project that meets the Regional Significance Guidance and that is not on the list of exempt projects.

In nonattainment or maintenance areas for transportation-related criteria pollutants, demonstrating air quality conformity is required for all newly adopted MTPs and TIPs and for any amendments to MTPs or TIPs that include regionally significant, non-exempt projects. Since *NWI 2050+* Amendment No.1 is an MTP amendment and the 2024-2028 TIP Amendment No. 24-05 is a TIP amendment with regionally significant, non-exempt project(s), it is necessary to demonstrate air quality conformity to the SIP with respect to the applicable criteria pollutants and their associated precursors. In this case the only applicable criteria pollutant is Ozone, which includes Nitrous Oxides (NOx) and Volatile Organic Compounds (VOC) as precursors.

[2] Available at https://nirpc.org/wp-content/uploads/Invest-NWI-2024-2028-TIP-Final-Adopted.pdf

5.0 Requirements

5.1 Overview

The air quality conformity regulation at 40 CFR 93.109 sets forth the criteria and procedures for demonstrating air quality conformity. The air quality conformity criteria for MTPs and TIPs include: latest planning assumptions (93.110), latest emissions model (93.111), consultation (93.112), transportation control measures (93.113(b) and (c), fiscal constraint, consistency with motor vehicle emissions budgets in the SIP, and regional emissions analysis or interim emissions test (93.118 and/or 93.119).

For the 1997 Ozone NAAQS areas that are not designated nonattainment or maintenance for either the 2008 Ozone NAAQS or 2015 Ozone NAAQS (i.e. LaPorte County), air quality conformity can be demonstrated with only the latest planning assumptions, consultation, transportation control measures, and fiscal constraint requirements per 40 CFR 93.109(c) and the EPA Transportation Conformity Guidance for the South Coast II Court Decision.[3] Thus, all of the additional requirements in the previous paragraph only are applied to demonstrating air quality conformity with respect to Lake and Porter Counties in this *Air Quality Conformity Determination Report*.

For the 1987 PM10 NAAQS maintenance area in East Chicago, the EPA has found that on-road mobile sources do not significantly contribute to that designation, so conformity air quality review requirements do not apply for the PM10 standard and therefore are not analyzed in this *Air Quality Conformity Determination Report*.

5.2 Latest Planning Assumptions

Use of the latest planning assumptions in demonstrating air quality conformity is required per 40 CFR 93.110 of the Transportation Conformity Rule. The use of the latest planning assumptions ensures that the underlying assumptions and data that are inputted into the regional emissions analysis accurately reflect the planning assumptions of the region demonstrating air quality conformity. As part of the *NWI 2050+* Plan and the 2024 to 2028 TIP development, the Northwestern Indiana Region developed demographic forecasts for population and employment growth as shown on Table 5.2.1.

Table 5.2.1 Demographic Baseline and Forecasts for Lake, Porter, and LaPorte Counties

Year	Population	Households	Employment
2019	771,431	293,457	290,390
2020			
2025	784,974	298,567	300,688
2030	796,251	302,838	309,281
2035	807,536	307,111	317,853
2040	818,813	311,378	326,436
2050	841,382	319,903	343,604

Population forecasts are based on the baseline 2019 year as found in the US Census Bureau's American Community Survey, 2015-2019 Estimates Table B01003. The 2050 horizon year population forecast is based on an average of 5 different sources that have already conducted population forecasts for the NWI Region: INDOT Statewide Travel Demand Model, INDOT REMI PI+ 2.0 Model, Woods & Poole Economics, Inc., Louis Berger Group (for the Chicago Metropolitan Agency for Planning), and the Indiana

[3] Available from https://www.epa.gov/sites/production/files/2018-11/documents/420b18050.pdf

Business Research Center.[4] The interim years between the 2019 baseline year and the 2050 horizon year are extrapolated from a simple linear trend model of fit. Household forecasts are based on the baseline 2019 year as found in the US Census Bureau's American Community Survey, 2015-2019 Estimates Table S1101. All other years are based on the number of persons per household for each county found by dividing the county's population by its number of households. Employment forecasts are based on the baseline 2019 year as found in the US Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW) State and County Wages series annual average employment. The 2050 horizon year employment forecast is based on an average of 4 different sources that have already conducted employment forecasts for the NWI Region: INDOT Statewide Travel Demand Model, INDOT REMI PI+ 2.0 Model, Woods & Poole Economics, Inc., and Louis Berger Group (for the Chicago Metropolitan Agency for Planning).[5] The interim years between the 2019 baseline year and the 2050 horizon year are extrapolated from a simple linear trend model of fit.

The Highway Performance Monitoring System (HPMS) data provides the basis or an analysis of the growth in Vehicle-Miles of Travel as shown on Table 5.2.2.

[4] INDOT Statewide Travel Demand Model, INDOT REMI PI+ 2.0 Model, and Woods & Poole Economics, Inc. population forecasts were emailed to NIRPC by INDOT on October 11, 2017 and have privacy restrictions- these forecasts are technically for a 2045 horizon year that is extrapolated out to 2050 based on a linear trend model of fit; Louis Berger Group forecasts are available at https://datahub.cmap.illinois.gov/dataset/89f66569-5f51-4c14-8b02-5ecc1ca00909/resource/a812de2f-d465-47f2-87df-0427e81da2cf/download/CMAPSocioeconomicForecastFinal-Report04Nov2016.pdf; Indiana Business Research Center forecasts available at http://www.stats.indiana.edu/pop_proj/

[5] INDOT Statewide Travel Demand Model, INDOT REMI PI+ 2.0 Model, and Woods & Poole Economics, Inc. forecasts were emailed to NIRPC by INDOT on October 11, 2017 and have privacy restrictions- these forecasts are technically for a 2045 horizon year that is extrapolated out to 2050 based on a linear trend model of fit; Louis Berger Group forecasts are available at https://datahub.cmap.illinois.gov/dataset/89f66569-5f51-4c14-8b02-5ecc1ca00909/resource/a812de2f-d465-47f2-87df-0427e81da2cf/download/CMAPSocioeconomicForecastFinal-Report04Nov2016.pdf

Table 5.2.2 Growth in Vehicle Miles Traveled (VMT) in Lake, Porter, and LaPorte Counties

Year	Daily VMT Estimate (HPMS)	Annual Rate of Growth
1992	17,722,061	
1993	18,160,891	2.48%
1994	18,663,552	2.77%
1995	19,847,112	6.34%
1996	19,842,716	-0.02%
1997	21,058,741	6.13%
1998	21,638,065	2.75%
1999	21,249,847	-1.79%
2000	21,527,000	1.30%
2001	21,987,000	2.14%
2002	22,147,635	0.73%
2003	22,201,000	0.24%
2004	22,154,000	-0.21%
2005	22,216,000	0.28%
2006	22,305,000	0.40%
2007	22,397,000	0.41%
2008	21,792,000	-2.70%
2009	26,507,120	21.64%
2010	20,359,000	-23.19%
2011	26,545,000	30.38%
2012	25,461,000	-4.08%
2013	26,066,000	2.38%
2014	26,797,850	2.81%
2015	29,805,800	11.22%
2016	30,858,000	3.53%
2017	31,044,000	0.60%
2018	29,408,000	-5.27%
2019	29,605,000	0.67%

Based on this data, the actual annual rate of growth of travel can be determined. For the three-county area as shown in Table 5.2.2, the rates range from -23.19% to 30.38% between 1992 and 2019. Over this period, the annual rate of daily VMT growth is 1.92%.

Vehicle registration data have been received from the Indiana Bureau of Motor Vehicles. These data are split by vehicle type, and have an associated date of approximately December 31, 2022. The Indiana Department of Environmental Management provided vehicle age information for cars and light trucks, from the application of a vehicle identification number (VIN) decoder as well as registrations by vehicle type directly from the Bureau of Motor Vehicles. This vehicle registration data have been used in MOVES, reflecting vehicle fleet age by vehicle type for smaller vehicles. For larger vehicle types, default data have been determined to be the best available fleet age information.

The NIRPC Travel Demand Model was used to relate the Latest Planning Assumptions to the Regional Emissions Analysis (Section 5.8). For questions or inquiries about the NIRPC Travel Demand Model, please contact Scott Weber, Transportation Planner/Analyst (sweber@nirpc.org).

5.3 Latest Emissions Model

For demonstrating air quality conformity for the Lake and Porter Counties 2008 Ozone NAAQS, the MOVES3 model has been used for this *Air Quality Conformity Determination Report*. MOVES3 is an appropriate EPA emissions modeling tool. The latest emissions model requirement does not apply to demonstrating air quality conformity for the 1997 Ozone NAAQS with respect to LaPorte County as mentioned in the EPA *Transportation Conformity Guidance for the South Coast II Court Decision*. The Motor Vehicles Emissions Budgets (MVEB) for 2008 Ozone NAAQS with respect to Lake and Porter Counties are based on the INDOT Air Quality Post-Processor (AQPP), which combines inputs from the NIRPC Travel Demand Model and MOVES3.

5.4 Consultation Requirements

The consultation requirements in 40 CFR 93.112 were addressed both for interagency consultation and public consultation. See Appendix A-1 for further details about how interagency consultation was initiated.

5.5 Timely Implementation of TCMs

The Indiana SIP with respect to Lake, Porter, and LaPorte Counties does not include any TCMs.

5.6 Fiscal Constraint

Air quality conformity requirements in 40 CFR 93.108 state that transportation plans and TIPs must be fiscally constrained consistent with DOT's metropolitan planning regulations at 23 CFR part 450. The *NWI 2050+* Plan, including Amendment No.1, and 2024-2028 TIP including Amendment No. 24-05 are fiscally constrained, as demonstrated in the Action Plan section of the *NWI 2050+* Plan,[6] and the Fiscal Constraint section of the 2024-2028 TIP.[7]

5.7 Consistency with the Motor vehicle emissions budgets in the SIP

This *Air Quality Conformity Determination Report* is prepared consistent with the applicable EPA-approved Motor vehicle emissions budgets (MVEB) for the Ozone precursors of NOx and VOC. The MVEB are based on prior consultation between members of the Interagency Consultation Group on Air Quality (see Acknowledgments section) and are formulated using the latest emissions model and the NIRPC Travel Demand Model. Table 5.9.1 shows the MVEB for the applicable analysis years in the Regional Emissions Analysis. The consistency with the Motor vehicle emissions budgets requirement does not apply to demonstrating air quality conformity for the 1997 Ozone NAAQS with respect to LaPorte County as mentioned in the EPA *Transportation Conformity Guidance for the South Coast II Court Decision*.

5.8 Regional Emissions Analysis Methodology

The regional emissions analysis applicable to Lake and Porter Counties has estimated emissions of VOC

[6] Available at https://nirpc.org/nwi-2050/.
[7] Available at https://nirpc.org/wp-content/uploads/2024-2028-Transportation-Improvement-Program_draft.pdf.

and NO_X as ozone precursors. The regional emissions analysis includes estimates of emissions from the entire transportation system, including all regionally significant, non-exempt projects contained in the *NWI 2050+* Plan Amendment No.1 (see Table 2.1.1) and all other regionally significant, non-exempt highway and transit projects expected in the nonattainment area in the time frame of the transportation plan. Table 5.9.1 shows that regional emissions for the ozone precursors fall at or below the budgets in the State Implementation Plan for the 2008 Ozone NAAQS with respect to Lake and Porter Counties.

The emissions analysis methodology meets the requirements of 40 CFR 93.122(b) of the Transportation Conformity Rule, for air quality conformity determinations based on estimates of regional transportation-related emissions completed after January 1, 1997.

Implementation of the Lake and Porter County projects in the *NWI 2050+* Plan Amendment No.1 and 2024-2028 TIP Amendment No. 24-05 results in motor vehicle emissions that are at or below the levels of the applicable Motor vehicle emissions budgets, as shown in Table 5.9.1.

The regional emissions analysis for the transportation projects includes calculations of vehicle emissions at the aggregate level for the entire transportation system, including all regionally significant, non-exempt projects expected in the nonattainment area. The analysis includes FHWA/FTA-funded projects proposed in the *NWI 2050+* Plan (including in Amendment No.1), all Indiana Toll Road projects, and all other regionally significant, non-exempt projects that are disclosed to NIRPC (see Table 2.1.1 for the complete list). Vehicle miles traveled (VMT) from projects which are not regionally significant and non-exempt are estimated in accordance with reasonable professional practice, using the NIRPC Travel Demand Model.

The regional emissions analysis does not include any TCM. The regional emissions analysis does not include emissions reduction credit from projects, programs, activities, or control measures which require a regulatory action in order to be implemented.

Ambient temperatures used for the regional emissions analysis are consistent with those used to estimate the emissions in 2019. All other factors, for example the fraction of travel in a hot stabilized engine mode, are consistently applied.

Reasonable methods have been used to estimate nonattainment area VMT on off-network roadways within the urban transportation planning area, and on roadways outside the urban transportation planning area. For 2019, 2020, 2025, 2030, 2035, 2040, and 2050, estimates of regional transportation-related emissions used to support the conformity determination have been made using the MOVES3 post-processor updated with the latest vehicle registration data. Regional transportation-related emissions estimates are included for 2011 and 2017, since 2011 and 2017 appear in the Lake and Porter Counties 2008 Ozone NAAQS attainment demonstration.

Land use, population, employment, and other network-based travel model assumptions have been documented based on the best available information (see Section 5.3). The distribution of population, households, and employment is based on prior 5-year moving averages of those trends in each of the 380 Travel Analysis Zones (TAZs) in Lake and Porter Counties and is a reasonable state of the practice.

A capacity-sensitive assignment methodology has been used, and emissions estimates are based on a methodology, which differentiates between peak and off-peak link volumes and speeds, and uses speeds based on final assigned volumes, post-processed in the database. TAZ-to-TAZ travel impedances used to distribute trips between origin and destination pairs are in reasonable agreement with the travel times that are estimated from final assigned traffic volumes, using a feedback procedure iterated five times. These times have also been used for modeling mode splits. The network-based travel model is reasonably sensitive to changes in the time(s), cost(s), and other factors affecting travel choices. Reasonable methods

in accordance with good practice have been used to estimate traffic speeds and delays in a manner that is sensitive to the estimated volume of travel on each roadway segment represented in the network-based travel model. Highway Performance Monitoring System (HPMS) estimates of vehicle miles traveled (VMT) are considered the primary measure of VMT within the portion of the nonattainment area and for the functional classes of roadways included in the nonattainment area.

The regional emissions analysis requirement does not apply to demonstrating air quality conformity for the 1997 Ozone NAAQS with respect to LaPorte County as mentioned in the EPA *Transportation Conformity Guidance for the South Coast II Court Decision*.

5.9 Regional Emissions Analysis Results

Table 5.9 shows the Regional Emissions Analysis Results for demonstrating air quality conformity between the *NWI 2050*+ Plan Amendment No.1 and 2024 to 2028 TIP Amendment No. 24-05 and the Indiana SIP for the 2008 Ozone NAAQS with respect to Lake and Porter Counties.

Table 5.9 Regional Emissions Analysis for Lake and Porter Counties - 2008 Ozone NAAQS

Year:	2011	2017	2019	2020	2025	2030	2035	2040	2050
NOx Budget	28.41	28.41	28.41	16.68	16.68	6.53	6.10	6.10	6.10
NOx Emissions	24.70	18.77	9.99	9.16	7.51	5.08	5.11	4.85	4.89
VOC Budget	11.02	11.02	11.02	6.85	6.85	2.47	2.90	2.90	2.90
VOC Emission	9.58	8.03	3.50	3.29	3.72	2.02	2.42	2.13	1.95

As shown in Table 5.9, baseline and forecasted emissions for the Ozone precursors of NOx and VOC are at or below the motor vehicle emissions budgets (MVEBs) in the Indiana SIP for the explicit MVEB years. Therefore, air quality conformity is demonstrated for the *NWI 2050*+ Plan Amendment No.1 and 2024-2028 TIP Amendment No. 24-05 for the 2008 Ozone NAAQS with respect to Lake and Porter Counties. Per the EPA *Transportation Conformity Guidance for the South Coast II Court Decision*, air quality conformity is demonstrated for the *NWI 2050*+ Plan Amendment No.1 and 2024-2028 TIP Amendment No. 24-05 for the 1997 Ozone NAAQS with respect to LaPorte County without a regional emissions analysis. Only the latest planning assumptions, consultation, transportation control measures, and fiscal constraint are required to demonstrate air quality conformity with respect to LaPorte County.

6.0 Conclusion

The air quality conformity determination process completed for the *NWI 2050*+ Plan Amendment No.1 and the 2024 to 2028 Transportation Improvement Program (2024-2028 TIP) Amendment No. 24-05

demonstrates that these planning documents meet the Clean Air Act and Transportation Conformity Rule requirements for the applicable National Ambient Air Quality Standards (NAAQS).

7.0 Appendices

7.1 Appendix A-1: Interagency Consultation Group Correspondence

On December 4, 2024, NIRPC staff attended the USDOT Planning Office Hours to seek informal guidance regarding Interagency Consultation Group (ICG) correspondence and review of NIRPC's Air Quality Conformity Determination Report. USDOT staff recommended that NIRPC staff reach out to Erica Tait (FHWA) to determine her availability to review NIRPC's Air Quality Conformity Determination Report and begin the formal ICG consultation period. NIRPC staff reached out to Erica on December 4, 2024, and were notified on December 5, 2024, that it would be best if NIRPC staff could submit their draft Air Quality Conformity Determination Report on or before December 6, 2024.

On December 19, 2024, the Interagency Consultation Group (ICG) met virtually to discuss the Air Quality Conformity process for the draft Air Quality Conformity Determination Report, *NWI 2050+* Amendment No. 1, and the 2024-2028 TIP Amendment No. 24-05. Scott Weber, Grace Benninger, Charles Bradsky, and Tom Vander Woude from NIRPC; Frank Baukert and Jay Mitchell from the Indiana Department of Transportation (INDOT); Shawn Seals from the Indiana Department of Environmental Management (IDEM); Karstin Carmany-George, Paige Story, and Erica Tait from FHWA; Daniel Forbush from FTA; Tony Maietta and Michael Leslie from US EPA; and Russell Petrowiak from the Chicago Metropolitan Agency for Planning (CMAP) attended the meeting.

Scott Weber discussed the upcoming anticipated deliverables for the Air Quality Conformity effort. NIRPC plans to release the Air Quality Conformity Determination Report, *NWI 2050+* Amendment No. 1, and 2024-2028 TIP Amendment No. 24-05 for a 30-day public comment period as required by NIRPC's public participation plan, *Engage NWI*, from December 24, 2024, to January 23, 2025, with a public meeting to be held on Thursday, January 16, 2025, from 2 PM – 4 PM CST at the NIRPC Offices in Portage, IN.

Scott Weber then discussed the relevant National Ambient Air Quality Standards (NAAQS) that pertain to the Air Quality Conformity Determination process. The ICG agreed that the 1997 Ozone NAAQS, the 2008 Ozone NAAQS, and the 2015 Ozone NAAQS are the three NAAQS that pertain to varying degrees to the Air Quality Conformity process. For the 1997 Ozone NAAQS, the Lake and Porter Counties maintenance area is superseded by the 2008 Ozone NAAQS Lake and Porter County maintenance area that covers the same geographical area. Conformity for the 1997 Ozone NAAQS with respect to La Porte County is covered by the *South Coast Air Quality Management District v. EPA* court decision. Regarding the 2015 Ozone NAAQS, 5 townships in Lake County and 8 townships in Porter County are currently designated as moderate nonattainment areas. However, since these geographic areas are completely within the Lake and Porter County maintenance area for the 2008 Ozone NAAQS which has established Motor Vehicle Emissions Budgets (MVEBs), the demonstrating Conformity to the MVEBs with respect to the 2008 Ozone NAAQS meets the Conformity Requirements for the 2015 Ozone NAAQS. Tony Maietta concurred with this assessment.

Scott Weber then discussed whether the draft Air Quality Conformity Determination Report meets the requirements in the September 2022 Indiana Air Quality Conformity Interagency Consultation Group Guidance. There was no ICG opposition to determining that the draft document appears to meet the requirements for interagency consultation, public involvement (pending its release for public comment), latest planning assumptions, timely implementation of transportation control measures (not applicable), and fiscal constraint. As pertaining to the latest emissions model requirement, there was some discussion. Scott Weber noted that the emissions modeling used to demonstrate Conformity according to the MVEB budget test utilized MOVES3 as apparently allowed by US EPA rulemaking until September 12, 2025. However, Erica Tait pointed out that Illinois agencies used MOVES4, a slightly newer version

of the emissions model. Tony Maietta, Shawn Seals, and Daniel Forbush all concurred that it could be problematic if one state used a different emissions model than the other, and that it would be advisable for NIRPC to upgrade to MOVES4 and rerun the regional emissions analysis. Tony Maietta said he would seek clarification from Michael Leslie. Russell Petrowiak confirmed that CMAP did in fact use MOVES4 for their separate Conformity process in Illinois, but that he was in regular communication with Grace Benninger who performed the emissions modeling for NIRPC and noted that the differences between MOVES3 and MOVES4 from CMAP's experiments showed very minor differences. Frank Baukert said that INDOT might be concerned with the I-80/94 FlexRoad project schedule being delayed if NIRPC had to upgrade to MOVES4 and that as long as each state's Conformity processes as allowed to be separate were clearly documented, then that should suffice. He also mentioned that INDOT would be more concerned about separate emissions models being used if this were project-level Conformity (i.e. hotspot analyses) instead of regional Conformity. Erica Tait noted that there will be one NEPA document, so it would be important for whoever assembles the NEPA document to clearly document each state's approach. Michael Leslie said that since the I-80/94 FlexRoad project is being modeled as part of two separate regional Conformity processes, as long as each state's regional Conformity process adheres to its set of established procedures and requirements, he did not see a concern with NIRPC using MOVES3. Scott Weber concluded that NIRPC would seek to use MOVES3 as Grace Benninger had already modeled.

Grace Benninger then demonstrated the regional emissions analysis results for the project, demonstrating that the I-80/94 FlexRoad project being added to the bundle of regionally significant, non-exempt projects in *NWI 2050+* and the 2024-2028 Transportation Improvement Program resulted in emissions projected to be at our below the Motor Vehicle Emissions Budgets in the EPA-approved State Implementation Plan appears to meet the regional Air Quality Conformity requirements. Members of the ICG concurred.

Scott Weber adjourned the meeting by noting the anticipated next steps in the Air Quality Conformity process. NIRPC plans to add the minutes of this meeting to the Air Quality Conformity Determination Report document and release the three major deliverables as noted above for a 30-day public comment period beginning December 24, 2024.

7.2 Appendix A-2: Regional Significance Guidance

Appendix 11 – Regional Significance Guidance

A "regionally significant project" is defined by 40 CFR Part 93 as "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."

Projects that are regionally significant, regardless of funding source, should be included in the regional emissions analysis. The determination of other regionally significant projects for the purposes of regional emissions analysis may vary in accordance with the interagency consultation procedures included in 40 CFR §93.105(c)(1)(ii) of the transportation conformity rule. Regionally significant additions or modifications to the transportation system should be identified and described in the following level of detail per §93.106(a)(2)(ii):

- Additions or modifications to highway segments should identify the design concept and scope sufficiently (e.g., number of lanes in each section, intersections, interchange locations if the facility is limited access) to model travel time under various traffic volumes, consistent with MPO modeling methods,
- Transit facilities, equipment and services proposed for the future should be defined in terms and design concept and scope and operating policies sufficient to model transit ridership (where applicable or required), and
- Additions or modifications to the transportation network should be sufficiently described to show a reasonable relationship between forecasted land use and the future transportation system, if applicable.

Suggested minimum *Regional Significance Guidance* can be found in Appendix 2. An MPO can adopt more restrictive thresholds for their MPO area if they like.

This document is being provided as a guidance resource for local municipalities and project implementers to:

1. Provide information on the regional air quality conformity process
2. Help define what is meant by the term "regionally significant project"
3. Provide guidance on expected project-level informational requirements of local municipalities.

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This document does not in any way change, modify, or supersede any regulatory or statutory requirements of the Clean Air Act, Clean Air Act Amendments, or other related federal and state legislation. The final determination on whether a project can be considered regionally significant is reserved by the ICG.

MPOs provide the conformity process as a service to local governments. By excluding regionally significant projects from the regional emissions analysis, project implementers may risk a violation of the Clean Air Act, and non-conformity for the MTP and TIP.

This guidance is intended to help the MPO and project sponsors to comply with the following federal regulation:

> **40 CFR Part 93** (Transportation Conformity Rule Amendments: Flexibility and Streamlining; Final Rule)
>
> **§93.101** (Definitions) *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 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.*;
>
> **§93.105** (Consultation) **(c)** (Interagency Consultation Procedures: Specific Processes) *Interagency consultation procedures shall also include the following specific processes:* **(ii)** *Determining which minor arterials and other transportation projects should be considered "regionally significant" for the purposes of regional emissions analysis (in addition to those functionally classified as principal arterial or higher or fixed guideway systems or extensions that offer an alternative to regional highway travel), and which projects should be considered to have a significant change in design concept and scope from the transportation plan or TIP.*; and
>
> **§93.121** (Requirements for adoption or approval of projects by other recipients of funds designated under title 23 U.S.C. or the Federal Transit Laws.) **(a)** *Except as provided in paragraph (b) of this section, no recipient of Federal funds designated under title 23 U.S.C. or the Federal Transit Laws shall adopt or approve a regionally significant highway or transit project, regardless of funding source, unless the recipient finds that the requirements of one of the following are met:* **(1)** *The project was included in the first three years of the most recently conforming transportation plan and TIP (or the conformity determination's regional emissions analysis), even if conformity status is currently lapsed; and the project's design concept and scope have not changed significantly from those analyses; or* **(2)**

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There is a currently conforming transportation plan and TIP, and a new regional emissions analysis including the project and the currently conforming plan and TIP demonstrates that the transportation plan and TIP would still conform if the project were implemented (consistent with the requirements of §93.118 and/or 93.119 for a project not from a conforming transportation plan and TIP). **(b)** *In isolated rural nonattainment areas and maintenance areas subject to §93.109(g), no recipient…*

The MPO transportation network models typically include all roads functionally classified as a collector and higher and all interchange ramps. The collectors and some local roads are included to accurately load traffic onto the higher classification roads, including the minor arterials, principal arterials, expressways and interstates. However, inclusion of collectors and local roads in the travel model network does not imply that they are considered regionally significant. All roads functionally classified as Minor Arterial or above should be considered as regionally significant. This includes all freeways, expressways, interchange ramps, principal arterials and minor arterials that are determined by the group (through consultation) to be regionally significant. All fixed guide-way transit services, including commuter rail are regionally significant. Fixed route bus services can also be regionally significant when they offer a significant alternative to regional highway travel.

Transportation projects, whether single or multi-jurisdictional, that modify these facilities can be regionally significant. Individually, projects can be considered as regionally significant when they are above certain thresholds. Collectively, when a series of smaller projects on a regionally significant facility are completed, the overall improvements can be regionally significant.

The minimum definition that the ICG uses to define what is and what is not "Regionally Significant" are listed in the following table:

Interstates, Expressways, Toll Roads	
Expansion Type	Regionally Significant when …
New Segment	Any
Added Through Lanes	Any
Continuous Auxiliary Lanes	> ¼ mile
New Interchanges	Any
Modification of Existing Interchanges	ICG consultation required to determine significance

Principal Arterials	
Expansion Type	Regionally Significant when ...
New Segment	Any
Added Through Lanes	Any
Continuous Auxiliary Lanes	> 1 mile
New Interchanges	Any
Modification of Existing Interchanges	ICG consultation required to determine significance
Separation of existing railroad grade crossings	Not Regionally Significant

Minor Arterials	
Expansion Type	Regionally Significant when ...
New Segment	> 1 Mile
	¾ to 1 mile, ICG consultation required to determine significance
	< ¾ Mile, not Regionally Significant
Added Through Lanes	> 1 Mile
	¾ to 1 mile, ICG consultation Required to determine significance
	< ¾ mile, not Regionally Significant
Continuous Auxiliary Lanes	> 1 mile
Separation of existing railroad grade crossings	Not Regionally Significant

Rail and Fixed Guide-way Transit	
Expansion Type	Regionally Significant when ...
New Route or Service	Any
Route Extension with Station	> 1 mile
Added track or guide-way capacity	> 1 mile
New Intermediate Station	ICG consultation required to determine significance

Bus and Demand Response Transit	
Expansion Type	Regionally Significant when ...
New Fixed Route	ICG consultation required to determine significance
New Demand Response Service	Not Regionally Significant
Added Service to existing	Not Regionally Significant

New segments or added through lanes on arterials that are also associated with large land development projects may need AQ consultation even if the project is below the threshold in the table. Land development projects can be regionally significant when they have the potential to generate many trips or vehicle-miles of travel. Such developments are incorporated into the regional model during the update of socioeconomic forecasts, at the beginning of the update cycle for a new regional transportation plan. Local agencies should provide their comprehensive plans to the MPO as they're updated, which reflect the known development projects.

Local agencies should proactively include anticipated developments in their comprehensive plans without specific reference to potential high profile private sector developments.

Implementation

At the start of each conformity cycle, the MPO should solicit new project and related development information from all local agencies, so that the analysis uses the latest planning assumptions. Local agencies that wish to precede with transportation

improvement projects, regardless of funding sources, should respond to the solicitation to be sure that their projects are included in the regional emissions analysis. Projects that are excluded from the analysis may be delayed until the next conformity cycle (a minimum of six months), when they could be included in the regional emissions or transportation conformity (for 97 Ozone only) analysis. In addition, at the start of each plan update cycle the MPO should request an update of land development that local agencies anticipate, for inclusion in the regional emissions analysis, by including updated population, household and employment data.

7.2 Appendix A-3: MOVES3 Input Data and Parameters

MOVES3 Input Data and Parameters

March 24, 2023

Northwestern Indiana Regional Planning Commission (NIRPC) Lake and Porter Counties: 2008 8-Hour Ozone Maintenance Area

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1.0 Introduction

This report documents the methods used to create input parameters prior to running a set of MOVES3 runs for Northwest Indiana Regional Planning Commission (NIRPC) covering the 2008 8-hour Ozone Maintenance Area for Lake and Porter Counties. This report contains a discussion of the input settings used in MOVES3 and the development of the input datasets. Any topic not explicitly discussed in this report is assumed to use the MOVES3 national defaults or not be relevant for completing the 2008 8-hour Ozone Maintenance Area runs for Lake and Porter Counties.

Table 1: What Has Been Updated Since the MOVES2014a-based Runs?

MOVES Input	Updated?	Notes
Source (Vehicle) Type Population	Yes	*New BMV data*
Vehicle Type VMT (by 13 MOVES Vehicle Types)	Yes	*HourVMTFraction updated using INDOT WIM & ATR data*
Age Distribution (Vehicle Population by Age of Vehicle)	Yes	*New BMV data*
Fuel (AVFT, % Fuel Type/Engine Type by Vehicle Type)	Yes	*New BMV data*
Fuel (all other files)	Yes	*Used MOVES3 defaults for each county*
Average Speed Distribution (% of VHT in each 5 mph speed bin)	Yes	*Used MOVES3 defaults for each county*
Road Type Distribution (VMT by 5 MOVES Road Types)	Yes	*Updated using INDOT WIM & ATR data*
Ramp Fraction	No	*Retained inputs from MOVES2014a-based Runs*
Meteorology Data	Yes	*Used MOVES3 defaults for each county*
I/M Program	No	*Retained inputs from MOVES2014a-based Runs*

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2.0 Source Type Population

The vehicle populations for light duty vehicles, which include motorcycles, passenger cars, passenger trucks, and light commercial trucks (source types 11, 21, 31, and 32 respectively) were developed from a new vehicle registration dataset provided to INDOT by the Indiana Bureau of Motor Vehicles (BMV) in February 2023. These are discussed in section 2.1 below. The vehicle populations for heavy duty vehicles, which include trucks and buses (source types 41, 42, 43, 51, 52, 53, 54, 61, and 62 respectively) were developed using procedures recommended in EPA's MOVES guidance. This is discussed in section 2.2.

2.1 BMV Vehicle Registration Data

A vehicle fleet dataset covering Lake, Porter, and LaPorte Counties (LaPorte County is part of NIRPC's Metropolitan Planning Area, even though it is not part of the 2008 8-Hour Ozone Nonattainment Area covered in this report) was provided to NIRPC courtesy of INDOT in February 2023. The analysis was performed by NIRPC staff. The dataset was processed by BMV and did not contain any personally identifiable or otherwise confidential information. The dataset also did not include any raw Vehicle Identification Numbers (VINs).

The raw BMV dataset contained the number of vehicles classified by the combination of:

- Vehicle Type
- Vehicle Year
- Fuel Type
- County

There were approximately 751,011 vehicles in the Lake, Porter, and LaPorte Counties vehicle registration dataset. Out of these, 683,109 were for On-road vehicles and of interest to this analysis.

BMV Vehicle Type Records Excluded from Further Analysis:

- Low Speed
- Off-Road Vehicle
- RV-Travel Trailer
- Snowmobile
- Special Machinery
- Trailer
- Watercraft

Table 2: BMV Data to MOVES3

BMV Type	MOVES Usage			
	Source Type ID	Source Type Population	Vehicle Age Distribution	AVFT File
MOTORCYCLE	11	X	X	MD
Dealer	21	X	X	X
PASSENGER	21	X	X	X
RV-Truck Camper	31	X	X	X
Truck 7,000	31	X	X	X
Truck 9,000	31	X	X	X
Truck Camper	31	X	X	X
Farm Truck	32	X	X	X
Truck 10,000	32	X	X	X
Truck 11,000	32	X	X	X
City Bus	42	T	MD	MD
Commercial Bus	42	T	MD	MD
Church Bus	43	T	MD	MD
School Bus	43	T	MD	MD
Special Bus	43	T	MD	MD
Recovery Vehicle	52	T	MD	MD
Truck 16,000	52	T	MD	MD
Truck 20,000	52	T	MD	MD
Truck 23,000	52	T	MD	MD
Truck 26,000	52	T	MD	MD
Truck 30,000	52	T	MD	MD
Truck 36,000	53	T	MD	MD
Truck 42,000	53	T	MD	MD
Truck 48,000	53	T	MD	MD
Truck 54,000	53	T	MD	MD
Truck 60,000	53	T	MD	MD
RV	54	T	MD	MD
RV-Motorhome	54	T	MD	MD
Farm Semi Tractor	61	T	MD	MD
Truck 66,000	61	T	MD	MD
Truck 66,000+	61	T	MD	MD
Semi Tractor	62	T	MD	MD
Truck	62	T	MD	MD
SEMI	62	T	MD	MD
Semi	62	T	MD	MD
LOW SPEED	N/A	N/A	N/A	N/A
OFF-ROAD VEHICLE	N/A	N/A	N/A	N/A
RV-Travel Trailer	N/A	N/A	N/A	N/A
SNOWMOBILE	N/A	N/A	N/A	N/A
SPECIAL MACHINERY	N/A	N/A	N/A	N/A
TRAILER	N/A	N/A	N/A	N/A
WATERCRAFT	N/A	N/A	N/A	N/A

Legend	
X	BMV values were used
MD	MOVES Defaults used in place of BMV data
T	BMV data used for Heavy Duty Veh. control total applied to MAR method
N/A	Discarded

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2.2 Heavy Vehicle Source Types

Vehicle populations for all other source types (buses and heavy vehicles) were derived by applying the Mileage Accumulation Rate (MAR) method documented in EPA's Technical Guidance on the Use of MOVES2010 for Emission Inventory Preparation in State Implementation Plans and Transportation Conformity, Section 3.3 Source Type Population.

Mileage Accumulation Rates:
Development of the Mileage Accumulation Rates was done during the previous 2015-2019 emission rate development process facilitated by INDOT. The MARs developed at that time have been carried forward into this update, but have been updated to reconcile with current BMV data related to heavy vehicles. The default MARs were extracted from MOVES by running MOVES for a single pollutant and a single year for all vehicles, fuels, months, days, and hours. The activity output was set to report both distance and population. A ratio of population to vehicle-miles-traveled (VMT) was calculated from these outputs. The ratios were calculated for each source type.

The Northwestern Indiana Regional Planning Commission (NIRPC), which is the metropolitan planning organization (MPO) for Lake and Porter Counties, provided VMT by MOVES road types extracted from their travel demand model's base year. Since the default MARs in MOVES vary by year (but not by location), the MOVES run that was executed to extract the MARs was run for a year consistent with the travel demand model's base year. This resulted in MARs that could be applied directly to the validated VMTs reported by the travel demand model. The travel demand model VMTs were converted into annual VMT and distributed by vehicle types using statewide default VMT distribution factors documented in this report in the section on Default VMT Distributions. The MARs were then applied to the annual vehicle type VMTs. The result was an estimated vehicle population for each source type for the travel demand model's base year. Since the vehicle populations for source types 11, 21, 31, and 32 were developed directly from the vehicle registration data, the population estimates derived for those source types using the MAR method were discarded and the observed data were used instead. As a final step, MAR-derived heavy duty vehicle classes were adjusted proportionally to match heavy duty vehicle population totals for each county from BMV data.

2.3 Forecasting Vehicle Populations by Source Types

Future year vehicle populations were developed base on socioeconomic growth rates for the maintenance area. NIRPC provided base year and horizon year population and employment data for the area. Annual growth rates were calculated for population growth and employment growth individually. Population growth rates were then used to grow the light vehicle populations (source types 11, 21, 31, and 32). Employment growth rates were used to grow the heavy vehicle populations (source types 41, 42, 43, 51, 52, 53, 54, 61, and 62). Vehicle populations were calculated in 5-year increments from 2020 to 2050, including a 2019 base year. The county level source type values and forecasts are shown in Table 3. When generating MOVES3 emission rates the vehicle populations for Lake and Porter Counties are combined into a single input file.

Table 3: Lake and Porter Counties Vehicle Population by Year

SourceTypeID	Year 2019	2020	2025	2030	2035	2040	2050
11	20,266	20,332	19,569	19,891	20,219	20,552	21,234
21	284,893	285,825	219,319	222,931	226,603	230,334	237,984
31	164,454	164,992	214,148	217,674	221,259	224,903	232,372
32	50,349	50,514	91,741	93,252	94,787	96,348	99,548
41	314	315	317	322	328	333	344
42	166	167	168	170	173	176	182
43	2,154	2,161	2,175	2,211	2,247	2,284	2,360
51	59	59	60	61	62	63	65
52	3,906	3,919	3,953	4,018	4,084	4,151	4,289
53	464	466	469	476	484	492	508
54	891	894	1440	1,464	1,488	1,512	1,563
61	6,974	6,997	7,043	7,159	7,277	7,396	7,642
62	7,956	7,982	8,034	8,167	8,301	8,438	8,718

Data Sources: SourceTypes 11, 21, 31, and 32 use 2014 Indiana BMV summary statistics for vehicle registration & license plate data by county. All other Source Types use Mileage Accumulation Rate (MAR) method.

2.4 Vehicle Age Distribution

The vehicle age distributions for MOVES source types 11, 21, 31, and 32 (motorcycles, cars, passenger trucks, and light commercial vehicles respectively) were developed through an analysis of Indiana's 2022 vehicle registration data. The BMV dataset allowed the totals for each model year by vehicle type and county to be assembled into the required MOVES3 format. Whereby, the vehicles are classified into one year age bins between 0 and 29 years old, and older vehicles into the 30 years old or more bin.

In keeping with previous practice, vehicle age distributions were only derived for light duty vehicles from the BMV data (source types 11, 21, 31, and 32 from the vehicle registration data). Because of the transient nature of the heavy vehicle classes, MOVES3 default vehicle age distributions specific to each source types were used. Vehicle age distributions for all source types were grown using the EPA's Age Distribution Projection Tool for MOVES3. The vehicle age distributions for Lake and Porter Counties as a combined area are shown in Tables 4-9.

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Table 4: Lake and Porter Counties Vehicle Age Distribution in 2019 Base Year

	SourceTypeID												
AgeID	11	21	31	32	41	42	43	51	52	53	54	61	62
0	0.210969	0.026737	0.014506	0.035512	0.064302	0.054574	0.062222	0.049424	0.058853	0.078754	0.06151	0.053563	0.067085
1	0.192115	0.053018	0.050066	0.073407	0.062673	0.053191	0.060645	0.048172	0.057361	0.076759	0.059951	0.053563	0.067085
2	0.157347	0.066554	0.058207	0.078647	0.062485	0.053032	0.060464	0.048028	0.05719	0.076529	0.059772	0.054105	0.067762
3	0.135977	0.061032	0.051985	0.065665	0.062423	0.052979	0.060403	0.04798	0.057133	0.076453	0.059712	0.057558	0.072087
4	0.105845	0.06598	0.078055	0.079362	0.061737	0.052397	0.05974	0.047452	0.056505	0.075612	0.059056	0.056418	0.07066
5	0.075091	0.064563	0.073391	0.073287	0.055917	0.047458	0.054108	0.042979	0.051178	0.068485	0.053488	0.048929	0.06128
6	0.047681	0.060839	0.074713	0.064772	0.046837	0.039751	0.045321	0.035999	0.042867	0.057363	0.044802	0.036603	0.045843
7	0.033103	0.064939	0.080665	0.072156	0.042579	0.036137	0.041201	0.032727	0.03897	0.052148	0.040729	0.034074	0.042676
8	0.019728	0.065	0.064383	0.059769	0.046827	0.039743	0.045312	0.035992	0.042858	0.057351	0.044793	0.035809	0.044849
9	0.011847	0.067713	0.068911	0.0689	0.053438	0.045353	0.051709	0.041073	0.048909	0.065448	0.051117	0.052629	0.065914
10	0.005325	0.060751	0.064803	0.058817	0.053271	0.045212	0.051548	0.040945	0.048756	0.065244	0.050958	0.062452	0.078217
11	0.002538	0.052437	0.055815	0.051075	0.040795	0.05362	0.041108	0.031356	0.039149	0.052388	0.030273	0.047826	0.059899
12	0.001301	0.05298	0.050114	0.0424	0.033192	0.048994	0.038293	0.025512	0.029448	0.039407	0.04661	0.038913	0.048735
13	0.000612	0.042526	0.038638	0.032614	0.027735	0.045609	0.033375	0.054598	0.03164	0.019477	0.029167	0.032515	0.046299
14	0.000248	0.044814	0.039004	0.033051	0.036429	0.037775	0.043086	0.063266	0.036444	0.019469	0.03478	0.042708	0.046207
15	0.000153	0.03273	0.03577	0.028287	0.028351	0.033295	0.021016	0.039565	0.035789	0.031185	0.03352	0.033237	0.030044
16	0.000067	0.02706	0.02441	0.019672	0.023588	0.027913	0.025367	0.034157	0.025999	0.02302	0.023315	0.027654	0.023052
17	0.00003	0.019745	0.016248	0.013518	0.017564	0.024497	0.020683	0.014635	0.019796	0.005226	0.020675	0.020591	0.013845
18	0.000013	0.015721	0.012994	0.010679	0.020119	0.025048	0.026689	0.040196	0.019374	0.003721	0.015546	0.023587	0.010007
19	0.000006	0.010933	0.009734	0.008337	0.022579	0.036661	0.030145	0.034228	0.022734	0.017578	0.020363	0.02647	0.00986
20	0.000002	0.009717	0.009659	0.007861	0.022641	0.028197	0.017388	0.027008	0.02894	0.018387	0.026594	0.026543	0.009576
21	0.000001	0.006084	0.007545	0.00536	0.021297	0.022441	0.020903	0.036743	0.025509	0.012162	0.023847	0.024967	0.00834
22	0.000001	0.00472	0.004359	0.003176	0.022137	0.020761	0.021174	0.029424	0.021171	0.002921	0.023292	0.025952	0.002197
23	0	0.003466	0.00326	0.002819	0.018775	0.017685	0.018686	0.036737	0.025574	0.00066	0.017364	0.022011	0.002282
24	0	0.003405	0.002806	0.002124	0.01658	0.015344	0.016222	0.019537	0.018134	0.001323	0.018639	0.019438	0.002895
25	0	0.002067	0.001898	0.001429	0.013046	0.011961	0.012527	0.020286	0.010153	0.001326	0.018907	0.015295	0.001496
26	0	0.001524	0.00101	0.000913	0.005207	0.011471	0.004628	0.005879	0.015824	0	0.012386	0.006104	0.000305
27	0	0.000741	0.000827	0.000854	0.004438	0.006255	0.003427	0.006619	0.008243	0.000585	0.007312	0.005202	0.000237
28	0	0.000821	0.000651	0.000655	0.003853	0.002715	0.004023	0.005865	0.007845	0.000422	0.00402	0.004518	0.000754
29	0	0.000749	0.000285	0.000238	0.00502	0.007381	0.003956	0.00147	0.008291	0	0.00053	0.005885	0.000248
30	0	0.010636	0.005287	0.004645	0.004164	0.002547	0.004629	0.002149	0.009364	0.000597	0.006972	0.004882	0.000264

Table 5: Lake and Porter Counties Vehicle Age Distribution in 2025

	Source TypeID												
AgeID	11	21	31	32	41	42	43	51	52	53	54	61	62
0	0.048342	0.048342	0.0651	0.0651	0.055196	0.055196	0.055196	0.05644	0.05644	0.05644	0.05644	0.053196	0.053196
1	0.047747	0.047483	0.062737	0.06406	0.054027	0.054577	0.054114	0.05469	0.05473	0.054084	0.054368	0.052998	0.052657
2	0.046623	0.047041	0.060182	0.062907	0.053007	0.054086	0.053267	0.053094	0.053201	0.051877	0.0523	0.052887	0.052216
3	0.032797	0.024006	0.067353	0.049358	0.059959	0.052757	0.05846	0.045183	0.054287	0.069707	0.054904	0.050995	0.062493
4	0.026197	0.020759	0.061232	0.04959	0.05844	0.05142	0.056979	0.044039	0.052911	0.067941	0.053512	0.050995	0.062493
5	0.022844	0.031273	0.070056	0.052313	0.057801	0.050783	0.056327	0.043672	0.052438	0.067333	0.053111	0.051069	0.062493
6	0.02398	0.037687	0.076286	0.059693	0.056806	0.049738	0.055287	0.043157	0.051749	0.066448	0.05258	0.053389	0.065121
7	0.029656	0.045486	0.07574	0.055862	0.055231	0.04815	0.053671	0.042213	0.050538	0.064892	0.051538	0.051418	0.062474
8	0.030111	0.057715	0.075543	0.047105	0.049189	0.042712	0.04773	0.037817	0.045205	0.058046	0.046258	0.043815	0.053042
9	0.030065	0.057269	0.066145	0.049113	0.040854	0.035404	0.039613	0.0315	0.037627	0.048315	0.038571	0.032486	0.039256
10	0.034879	0.067788	0.055887	0.044136	0.036814	0.031823	0.035664	0.028477	0.033985	0.043639	0.034907	0.029973	0.036141
11	0.035788	0.071226	0.041043	0.038961	0.040157	0.034659	0.038881	0.031148	0.037149	0.047701	0.038214	0.031222	0.037589
12	0.034607	0.071717	0.030489	0.029927	0.045436	0.039136	0.043961	0.035348	0.042127	0.054093	0.043411	0.045476	0.054647
13	0.035016	0.059779	0.026726	0.027477	0.044524	0.038192	0.043015	0.034849	0.041467	0.053246	0.042883	0.053006	0.063456
14	0.023889	0.045344	0.023285	0.029736	0.033804	0.044814	0.033984	0.026538	0.033085	0.042483	0.02536	0.040225	0.048063
15	0.021073	0.037103	0.017173	0.02076	0.027258	0.040476	0.031345	0.02147	0.024724	0.031747	0.038868	0.032433	0.038664
16	0.036514	0.030551	0.011964	0.014901	0.022588	0.037307	0.027077	0.045696	0.026401	0.015595	0.02421	0.026857	0.036345
17	0.043054	0.034466	0.01887	0.025058	0.029412	0.030567	0.034627	0.052654	0.030215	0.015489	0.028737	0.034955	0.035871
18	0.050548	0.034673	0.018586	0.027093	0.022494	0.026363	0.016572	0.032561	0.029294	0.024494	0.027441	0.026712	0.022812
19	0.050139	0.025775	0.01381	0.024972	0.018552	0.021861	0.019813	0.027951	0.021144	0.017964	0.018999	0.02202	0.017308
20	0.048459	0.024226	0.014515	0.025494	0.013573	0.018769	0.015848	0.011842	0.015893	0.004026	0.016692	0.016097	0.010164
21	0.036878	0.017772	0.011947	0.024967	0.015411	0.01898	0.020254	0.032339	0.015454	0.002848	0.012493	0.018268	0.007264
22	0.046097	0.015974	0.010399	0.022293	0.017136	0.027449	0.022645	0.02738	0.018013	0.013364	0.016289	0.02031	0.007073
23	0.037241	0.011621	0.007686	0.019087	0.017037	0.020897	0.012943	0.021484	0.022786	0.013892	0.021174	0.020179	0.006795
24	0.029066	0.00998	0.005134	0.017747	0.015884	0.016446	0.015409	0.02906	0.019954	0.009129	0.018899	0.018802	0.00585
25	0.027295	0.007451	0.003897	0.013825	0.016357	0.015032	0.015448	0.023137	0.01645	0.002178	0.018374	0.019361	0.001523
26	0.021073	0.006319	0.003526	0.01227	0.013754	0.012673	0.013508	0.028726	0.019745	0.000489	0.013633	0.016268	0.001564
27	0.016804	0.004008	0.00185	0.008563	0.012037	0.010872	0.011612	0.015189	0.013909	0.000974	0.014566	0.014231	0.001962
28	0.014033	0.003544	0.001759	0.009428	0.009383	0.008371	0.008874	0.015679	0.007735	0.000969	0.014707	0.011091	0.001002
29	0.013716	0.002184	0.000792	0.005409	0.003713	0.007945	0.003248	0.004518	0.011979	0	0.009589	0.004385	0.000202
30	0.00547	0.001437	0.000288	0.002796	0.004164	0.002547	0.004629	0.002149	0.009364	0.000597	0.006972	0.004882	0.000264

Table 6: Lake and Porter Counties Vehicle Age Distribution in 2030

	SourceTypeID												
AgeID	11	21	31	32	41	42	43	51	52	53	54	61	62
0	0.052706	0.052706	0.059215	0.059215	0.049091	0.049091	0.049091	0.051242	0.051242	0.051242	0.051242	0.045356	0.045356
1	0.052841	0.051943	0.059226	0.059759	0.049365	0.049454	0.049372	0.051383	0.051043	0.050461	0.051082	0.046493	0.045937
2	0.051899	0.051639	0.058611	0.059768	0.049837	0.050072	0.049893	0.051909	0.051124	0.049694	0.050796	0.048052	0.04694
3	0.04831	0.051066	0.057889	0.059725	0.050381	0.050792	0.050486	0.051974	0.05107	0.048968	0.050607	0.049745	0.048057
4	0.046266	0.051848	0.057485	0.060247	0.051411	0.052075	0.051584	0.052788	0.051434	0.048841	0.051073	0.051743	0.04945
5	0.043894	0.051859	0.056071	0.059744	0.050696	0.051911	0.05095	0.051765	0.050752	0.047412	0.050034	0.051602	0.048972
6	0.040655	0.050572	0.053258	0.057943	0.048882	0.05052	0.049187	0.049592	0.048632	0.044895	0.047674	0.050512	0.047576
7	0.038083	0.049592	0.05009	0.055782	0.04724	0.049255	0.047667	0.047612	0.046717	0.042557	0.045392	0.049532	0.046295
8	0.026789	0.024969	0.054651	0.042656	0.052239	0.046879	0.051103	0.039848	0.046835	0.05618	0.046922	0.046528	0.053861
9	0.021398	0.021274	0.048393	0.041731	0.04976	0.044535	0.048624	0.038206	0.044844	0.053793	0.045069	0.045328	0.052329
10	0.018659	0.031524	0.05386	0.042812	0.048465	0.043229	0.047297	0.037478	0.043921	0.052685	0.044303	0.04461	0.051326
11	0.019587	0.037321	0.057013	0.047471	0.04691	0.041645	0.045698	0.036621	0.042829	0.051376	0.043402	0.04582	0.052472
12	0.024224	0.044212	0.055016	0.043161	0.044905	0.039622	0.043645	0.035424	0.041327	0.049574	0.04212	0.043352	0.049361
13	0.024595	0.053681	0.053365	0.035382	0.039384	0.034576	0.038207	0.031374	0.036525	0.043813	0.037397	0.036285	0.041112
14	0.024558	0.049119	0.045465	0.035881	0.032207	0.028176	0.031202	0.025842	0.030038	0.036033	0.030868	0.026427	0.029838
15	0.02849	0.052963	0.037025	0.031071	0.028572	0.024884	0.027634	0.023107	0.026809	0.032158	0.027665	0.023954	0.026933
16	0.029232	0.050213	0.026211	0.02643	0.030688	0.026651	0.029648	0.024988	0.028952	0.03473	0.029967	0.024507	0.027473
17	0.028267	0.045322	0.018776	0.019569	0.034179	0.029567	0.03297	0.028039	0.032435	0.038907	0.033702	0.035057	0.039149
18	0.028601	0.03454	0.01588	0.017325	0.032975	0.028377	0.031749	0.027326	0.031541	0.037835	0.032928	0.040122	0.044577
19	0.019513	0.024779	0.013366	0.018099	0.024645	0.032726	0.024675	0.020575	0.024861	0.029822	0.019274	0.029899	0.033098
20	0.017213	0.019387	0.009636	0.012347	0.019407	0.028796	0.022204	0.016363	0.018241	0.021882	0.029081	0.023456	0.025839
21	0.029825	0.015417	0.006579	0.008682	0.015829	0.026082	0.018866	0.034432	0.019241	0.010618	0.017928	0.019071	0.023806
22	0.035167	0.016933	0.01019	0.014333	0.020284	0.020987	0.023724	0.039233	0.021755	0.010418	0.021071	0.024373	0.023023
23	0.041288	0.016682	0.00988	0.015252	0.015269	0.017791	0.011169	0.023982	0.020834	0.016273	0.019906	0.018283	0.01435
24	0.040954	0.012198	0.007236	0.013852	0.012391	0.014488	0.013129	0.020352	0.014853	0.011789	0.013642	0.014795	0.010665
25	0.039582	0.011337	0.007511	0.013964	0.008993	0.01233	0.010415	0.008573	0.011096	0.002626	0.011923	0.010715	0.0062
26	0.030122	0.008238	0.006116	0.013526	0.010049	0.012254	0.013092	0.023142	0.010656	0.001835	0.008828	0.011936	0.004342
27	0.037653	0.007353	0.005271	0.011957	0.010993	0.017401	0.014388	0.019369	0.012267	0.008503	0.011393	0.013023	0.004141
28	0.030419	0.005322	0.003863	0.01015	0.010842	0.01313	0.008155	0.015111	0.015423	0.008784	0.014732	0.012819	0.003938
29	0.023742	0.004553	0.002562	0.009368	0.009947	0.010154	0.009548	0.020202	0.013339	0.005701	0.013006	0.011722	0.003321
30	0.00547	0.001437	0.000288	0.002796	0.004164	0.002547	0.004629	0.002149	0.009364	0.000597	0.006972	0.004882	0.000264

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Table 7: Lake and Porter Counties Vehicle Age Distribution in 2035

	SourceTypeID												
AgeID	11	21	31	32	41	42	43	51	52	53	54	61	62
0	0.057016	0.057016	0.056219	0.056219	0.047745	0.047745	0.047745	0.049862	0.049862	0.049862	0.049862	0.043771	0.043771
1	0.05905	0.057096	0.056192	0.056322	0.047625	0.047708	0.047667	0.049513	0.049476	0.049211	0.049672	0.0442	0.044095
2	0.058695	0.056719	0.055768	0.056117	0.047252	0.047403	0.047399	0.049384	0.048747	0.048171	0.048969	0.044445	0.04412
3	0.056067	0.056401	0.055367	0.055976	0.047098	0.047516	0.047386	0.049269	0.048238	0.047513	0.048474	0.044978	0.044353
4	0.053214	0.055993	0.05495	0.055887	0.046882	0.047447	0.047076	0.049007	0.047901	0.046877	0.048121	0.045327	0.044355
5	0.050082	0.055376	0.053894	0.05528	0.046194	0.046861	0.046391	0.048529	0.047056	0.045666	0.047212	0.045229	0.043899
6	0.046724	0.054159	0.053137	0.055008	0.045739	0.046506	0.045943	0.047992	0.046262	0.044383	0.046395	0.045545	0.043676
7	0.043781	0.053264	0.05157	0.053973	0.045468	0.04638	0.045717	0.047836	0.045738	0.043146	0.045511	0.04624	0.043834
8	0.040754	0.051929	0.049676	0.052624	0.044925	0.046002	0.045215	0.046958	0.044824	0.04171	0.044438	0.046616	0.043689
9	0.03903	0.051907	0.048069	0.051751	0.044809	0.046105	0.045154	0.046792	0.044305	0.040829	0.043996	0.04721	0.043748
10	0.037028	0.051018	0.045633	0.049968	0.043514	0.045261	0.043918	0.045305	0.043169	0.039137	0.042555	0.046251	0.042542
11	0.034296	0.048831	0.042154	0.047155	0.041319	0.04339	0.041753	0.042829	0.04084	0.036588	0.039999	0.044471	0.040589
12	0.032126	0.046953	0.038553	0.044165	0.039314	0.041655	0.039837	0.040584	0.038732	0.034241	0.037585	0.042825	0.038773
13	0.022599	0.02256	0.040927	0.032876	0.042797	0.039042	0.042044	0.033499	0.038317	0.044606	0.038302	0.039506	0.044295
14	0.018051	0.01763	0.03528	0.031325	0.040136	0.036526	0.039387	0.031696	0.036221	0.042166	0.036302	0.03779	0.042246
15	0.015741	0.023652	0.037866	0.03101	0.038488	0.034908	0.037718	0.030694	0.035025	0.040773	0.035227	0.036524	0.040674
16	0.016523	0.025112	0.038662	0.033189	0.036678	0.033119	0.03588	0.029591	0.033715	0.039248	0.034037	0.036837	0.040824
17	0.020435	0.026516	0.036	0.029136	0.03456	0.031019	0.03373	0.028246	0.032112	0.037382	0.032593	0.034215	0.037687
18	0.020748	0.029306	0.033715	0.023075	0.029831	0.026651	0.02906	0.024668	0.028001	0.032597	0.028523	0.028115	0.030811
19	0.020717	0.025283	0.027772	0.022637	0.024012	0.021383	0.023361	0.020048	0.022732	0.026462	0.023227	0.020098	0.021944
20	0.024034	0.026002	0.022118	0.019178	0.020799	0.018444	0.0202	0.017563	0.019889	0.023153	0.020389	0.017719	0.019257
21	0.02466	0.023761	0.015351	0.015999	0.021987	0.019446	0.02133	0.018739	0.0212	0.02468	0.021787	0.01779	0.019272
22	0.023846	0.02085	0.010803	0.011641	0.0241	0.021233	0.023344	0.020752	0.023443	0.02729	0.024181	0.024979	0.026943
23	0.024128	0.015543	0.008997	0.010151	0.022884	0.020062	0.022123	0.019948	0.022497	0.02619	0.023295	0.028058	0.030104
24	0.016461	0.010957	0.007466	0.010458	0.016828	0.022767	0.016918	0.014818	0.017499	0.020371	0.013451	0.020515	0.021923
25	0.01452	0.008472	0.005317	0.00705	0.013144	0.019874	0.0151	0.011703	0.012753	0.014847	0.020154	0.015943	0.016951
26	0.02516	0.006669	0.003592	0.004906	0.01055	0.01772	0.012626	0.024288	0.013275	0.007109	0.012249	0.012719	0.015322
27	0.029667	0.007272	0.00551	0.008023	0.0133	0.014029	0.015619	0.027299	0.01481	0.006883	0.0142	0.015947	0.01453
28	0.03483	0.007126	0.005299	0.008468	0.00993	0.011797	0.007293	0.016571	0.014087	0.010678	0.013321	0.011849	0.00897
29	0.034548	0.005189	0.003853	0.007637	0.007929	0.009455	0.008435	0.013869	0.009909	0.007633	0.008999	0.009407	0.006539
30	0.00547	0.001437	0.000288	0.002796	0.004164	0.002547	0.004629	0.002149	0.009364	0.000597	0.006972	0.004882	0.000264

Table 8: Lake and Porter Counties Vehicle Age Distribution in 2040

AgeID	SourceTypeID 11	21	31	32	41	42	43	51	52	53	54	61	62
0	0.057001	0.057001	0.053876	0.053876	0.04665	0.04665	0.04665	0.048514	0.048514	0.048514	0.048514	0.042886	0.042886
1	0.057724	0.056875	0.053848	0.053818	0.046337	0.046469	0.046394	0.048054	0.047984	0.048124	0.048378	0.04295	0.042995
2	0.058032	0.056983	0.053642	0.05356	0.045823	0.04613	0.045947	0.048002	0.047416	0.047396	0.047946	0.042733	0.042877
3	0.055771	0.056706	0.053492	0.053403	0.045669	0.045936	0.045871	0.048293	0.047068	0.046793	0.047762	0.043108	0.043222
4	0.05405	0.05653	0.053198	0.053143	0.045852	0.046141	0.045938	0.048557	0.047092	0.046716	0.047946	0.04395	0.04398
5	0.052558	0.056428	0.052803	0.052843	0.045721	0.046056	0.045826	0.048481	0.046753	0.046316	0.047696	0.044389	0.044335
6	0.050844	0.056077	0.052015	0.052185	0.044922	0.045368	0.045065	0.047427	0.045764	0.045094	0.046794	0.04405	0.043907
7	0.048286	0.055104	0.050612	0.050992	0.043915	0.044451	0.044154	0.046613	0.044494	0.043558	0.045438	0.043538	0.043197
8	0.046124	0.054008	0.04899	0.049609	0.0428	0.043618	0.043166	0.04549	0.043154	0.042108	0.043965	0.042932	0.042332
9	0.043777	0.052776	0.047361	0.048267	0.04166	0.042633	0.041936	0.04428	0.042008	0.040726	0.04267	0.042161	0.041267
10	0.041201	0.051277	0.045191	0.046468	0.04044	0.041511	0.040714	0.04322	0.040725	0.039153	0.04124	0.041349	0.040153
11	0.038438	0.049206	0.043317	0.044973	0.039436	0.040604	0.039713	0.042109	0.039496	0.037539	0.039907	0.040913	0.039263
12	0.036017	0.047434	0.040864	0.042912	0.038612	0.039913	0.038923	0.041363	0.038527	0.036004	0.038555	0.040815	0.03873
13	0.033526	0.044131	0.038286	0.040713	0.03757	0.039019	0.037911	0.039991	0.037242	0.034331	0.037065	0.040422	0.037935
14	0.032108	0.040468	0.036052	0.038978	0.036909	0.038547	0.037291	0.039263	0.036315	0.033154	0.036133	0.040222	0.037333
15	0.030461	0.035993	0.032988	0.036297	0.035303	0.037298	0.035726	0.037463	0.034914	0.031357	0.034421	0.038719	0.03568
16	0.028214	0.030837	0.029377	0.03304	0.033007	0.035236	0.033444	0.034883	0.032577	0.028913	0.031851	0.036568	0.033448
17	0.026429	0.026336	0.025911	0.029861	0.030926	0.033334	0.031423	0.032568	0.030476	0.026691	0.02947	0.034592	0.031393
18	0.018591	0.01148	0.026544	0.021463	0.033145	0.030787	0.032652	0.02647	0.029733	0.034289	0.02956	0.031339	0.035234
19	0.01485	0.008444	0.022114	0.019777	0.030609	0.028385	0.030122	0.024671	0.027723	0.031972	0.027581	0.029444	0.033017
20	0.012949	0.01079	0.023204	0.019148	0.028672	0.026531	0.028179	0.023352	0.026256	0.03028	0.02614	0.027695	0.030949
21	0.013593	0.011029	0.023222	0.020093	0.026902	0.024804	0.026394	0.022174	0.024927	0.028747	0.024861	0.027431	0.030515
22	0.016811	0.011311	0.021236	0.017329	0.024959	0.02289	0.024432	0.020852	0.02342	0.027009	0.023437	0.025023	0.027673
23	0.017068	0.012219	0.01958	0.013515	0.021204	0.019373	0.020719	0.01793	0.020136	0.023222	0.020184	0.020187	0.022219
24	0.017043	0.010353	0.015897	0.013072	0.016802	0.015313	0.016395	0.014352	0.01612	0.018591	0.016179	0.014169	0.015541
25	0.019771	0.010519	0.012506	0.010941	0.014441	0.013111	0.014068	0.012477	0.014007	0.016154	0.014089	0.012377	0.013516
26	0.020286	0.009513	0.008587	0.009032	0.015023	0.013616	0.01462	0.013106	0.01472	0.016976	0.014814	0.012199	0.013282
27	0.019617	0.008283	0.005984	0.006509	0.016208	0.014644	0.015748	0.014294	0.016051	0.01851	0.016182	0.016814	0.018234
28	0.019849	0.006141	0.004942	0.00563	0.01527	0.013735	0.014808	0.013634	0.015296	0.01764	0.015464	0.018713	0.02019
29	0.013541	0.004311	0.004071	0.005758	0.011049	0.015351	0.011143	0.009969	0.011729	0.013527	0.008785	0.013429	0.014435
30	0.00547	0.001437	0.000288	0.002796	0.004164	0.002547	0.004629	0.002149	0.009364	0.000597	0.006972	0.004882	0.000264

Table 9: Lake and Porter Counties Vehicle Age Distribution in 2050

	SourceTypeID												
AgeID	11	21	31	32	41	42	43	51	52	53	54	61	62
0	0.05535	0.05535	0.053392	0.053392	0.044474	0.044474	0.044474	0.04626	0.04626	0.04626	0.04626	0.04025	0.04025
1	0.056363	0.055744	0.053518	0.053441	0.044942	0.044776	0.044942	0.046376	0.046409	0.046538	0.046384	0.041118	0.041221
2	0.056179	0.056126	0.05363	0.053487	0.04517	0.044846	0.045169	0.046301	0.046365	0.046625	0.046327	0.041704	0.041907
3	0.053468	0.056112	0.053532	0.053296	0.045425	0.04495	0.045422	0.046202	0.046291	0.046685	0.046255	0.042492	0.042786
4	0.050881	0.055939	0.053166	0.052767	0.045865	0.045247	0.045861	0.046248	0.046345	0.046868	0.046327	0.043615	0.043992
5	0.048278	0.055433	0.052519	0.05203	0.045856	0.045143	0.045847	0.045881	0.045973	0.046609	0.045993	0.044273	0.044709
6	0.045938	0.054801	0.051162	0.050617	0.045128	0.044367	0.045105	0.044867	0.044956	0.04569	0.04503	0.044119	0.044594
7	0.043973	0.054262	0.049926	0.049386	0.044307	0.043495	0.044266	0.043894	0.043988	0.044827	0.044121	0.043511	0.04402
8	0.042226	0.053688	0.04864	0.048091	0.043175	0.042326	0.043109	0.042705	0.042822	0.043777	0.043021	0.042478	0.043032
9	0.040236	0.052416	0.046744	0.046187	0.042057	0.04115	0.041963	0.041442	0.041581	0.042651	0.041863	0.041748	0.042359
10	0.038129	0.050929	0.044809	0.044281	0.041052	0.040302	0.040949	0.040286	0.040453	0.041625	0.040692	0.041139	0.041798
11	0.036253	0.049492	0.042949	0.042419	0.039643	0.039108	0.039582	0.038866	0.039029	0.040277	0.039548	0.039848	0.040532
12	0.034958	0.048092	0.040814	0.040271	0.038111	0.037811	0.038097	0.037801	0.037614	0.038687	0.038183	0.038345	0.039101
13	0.033596	0.045034	0.038634	0.038117	0.036631	0.036405	0.036669	0.036752	0.03616	0.03699	0.036782	0.037073	0.037784
14	0.032559	0.040562	0.036458	0.035994	0.035461	0.035341	0.035397	0.035696	0.035029	0.035757	0.035685	0.036211	0.036846
15	0.03166	0.036023	0.033975	0.033605	0.034346	0.034329	0.03429	0.034669	0.033894	0.03455	0.034545	0.035339	0.0359
16	0.030628	0.031475	0.031407	0.031144	0.032771	0.032909	0.032738	0.032992	0.032328	0.032777	0.032988	0.033884	0.034356
17	0.029086	0.026968	0.028684	0.028567	0.031114	0.031376	0.031145	0.031542	0.030631	0.030855	0.031175	0.032352	0.032659
18	0.027784	0.022922	0.026093	0.02612	0.029452	0.029968	0.029563	0.029956	0.028956	0.029072	0.029374	0.030819	0.03092
19	0.02637	0.019373	0.023752	0.023929	0.02784	0.028504	0.027884	0.028365	0.027468	0.0274	0.027746	0.029238	0.029125
20	0.024819	0.016257	0.021382	0.021736	0.026034	0.026808	0.02607	0.026732	0.025768	0.025491	0.02591	0.027437	0.027119
21	0.023154	0.013475	0.019388	0.0199	0.024649	0.025514	0.024682	0.025329	0.024346	0.02381	0.024398	0.026221	0.025618
22	0.021696	0.011234	0.017342	0.018006	0.023436	0.0244	0.023485	0.024198	0.023143	0.022254	0.022936	0.025259	0.024408
23	0.020196	0.009288	0.015451	0.016247	0.022139	0.023209	0.022202	0.022757	0.021796	0.020675	0.021462	0.024153	0.023085
24	0.019341	0.007884	0.01387	0.014831	0.021112	0.022302	0.021193	0.021723	0.020703	0.019448	0.020352	0.023206	0.021941
25	0.018349	0.006604	0.012264	0.013346	0.019601	0.020986	0.019703	0.020148	0.019389	0.017918	0.018854	0.021562	0.020248
26	0.016996	0.005396	0.010596	0.011787	0.017781	0.019279	0.017891	0.018237	0.017617	0.016088	0.016968	0.01965	0.018318
27	0.01592	0.004444	0.009094	0.010367	0.01616	0.017728	0.016301	0.016542	0.016045	0.014459	0.015261	0.017929	0.016587
28	0.011199	0.001884	0.0091	0.007279	0.016936	0.016034	0.016559	0.013161	0.015346	0.01821	0.01499	0.015818	0.018134
29	0.008945	0.001356	0.007421	0.006566	0.015168	0.01437	0.014812	0.011921	0.013931	0.016531	0.013599	0.014329	0.016386
30	0.00547	0.001437	0.000288	0.002796	0.004164	0.002547	0.004629	0.002149	0.009364	0.000597	0.006972	0.004882	0.000264

3.0 Vehicle Type VMT

As part of the previous 2015-2019 emission rate development effort, INDOT developed a default set of VMT distribution factors by Highway Performance Monitoring System (HPMS) vehicle type and by MOVES road type. The original distribution factors were developed by analyzing four consecutive years of continuous traffic count data ending in 2018 for various permanent traffic count stations throughout Indiana. During the current update, NIRPC staff evaluated the latest five years of continuous traffic count data; covering the years 2015, 2016, 2017, 2018, and 2019.

The vehicle counts reported at each station were provided by vehicle class. These were aggregated into the five basic HPMS vehicle types: motorcycle, light duty vehicle, bus, single-unit heavy truck, and combination heavy truck. The distribution of VMT by vehicle type was calculated for each road type by taking each vehicle type's percentage of total traffic. Control totals for VMT growth was derived from NIRPC's travel demand model for the years 2020, 2025, 2030, 2035, 2040, and 2050, and the percentages of VMT by the five HPMS vehicle types was applied to these growth control totals to get the future year Vehicle Type VMT as shown below in Table 10.

Table 10: Vehicle Type VMT by Year

HPMS Veh Type	2019 VMT	2020 VMT	2025 VMT	2030 VMT	2035 VMT	2040 VMT	2050 VMT
10	23,784,315	24,040,763	25,250,951	26,473,148	27,754,501	29,097,875	31,982,836
25	6,232,528,267	6,303,223,113	6,635,840,243	6,971,933,556	7,325,054,220	7,696,065,125	8,495,413,356
40	18,427,453	18,613,276	19,493,452	20,381,784	21,310,597	22,281,738	24,358,803
50	68,388,962	69,157,756	72,776,860	76,433,443	80,273,745	84,306,999	92,991,625
60	845,478,773	853,800,435	893,267,911	933,092,192	974,691,947	1,018,146,331	1,110,953,408

3.1 Road Type, Daily, and Monthly Distributions

Road Type, Daily and Monthly distribution factors were calculated from INDOT's official count adjustment factors which are more commonly used to develop AADT from raw traffic counts. These factors are based on the set of daily traffic counts collected from all permanent count stations throughout the state. Table 11 shows the Road Type distribution factors derived from updated INDOT traffic counts in 2015-2019.

Table 11: Road Type Distribution Factors

Road Type	Motorcycle	Passenger Car	Light Duty Truck	Bus	Single Unit Truck	Combination Truck
2	0.074537	0.029227	0.022458	0.056774	0.028751	0.091961
3	0.051197	0.106098	0.086256	0.030059	0.112989	0.083255
4	0.395221	0.20632	0.345467	0.603627	0.272032	0.642037
5	0.479044	0.545819	0.545819	0.30954	0.586228	0.182747

The daily distribution factors determine what percentage of VMT is occurring on weekdays and what percentage is occurring on weekends. The monthly distribution factors determine what percentage of annual VMT is occurring in each month of the year. Previously developed MOVES Daily and Monthly VMT fraction files were retained for use in the MOVES3 analysis using statewide defaults as shown in Table 12.

Table 12: Indiana Default Daily Distribution Factors

MonthID	DayID 2	5
1	0.232541	0.767459
2	0.238055	0.761945
3	0.239340	0.760660
4	0.239605	0.760395
5	0.248476	0.751524
6	0.248974	0.751026
7	0.248115	0.751885
8	0.252703	0.747297
9	0.249608	0.750392
10	0.246281	0.753719
11	0.243974	0.756026
12	0.225878	0.774122

3.2 Hourly Distributions

The same set of permanent traffic count locations discussed in the section on Default VMT Distributions was analyzed to develop a set of hourly distribution factors. These factors were calculated by road type, by HPMS vehicle type. Hourly factors were only calculated for the average weekday. The hourly distribution pattern for each traffic count location was reviewed. Any data that appeared to reflect either an error in the data or an outlier of behavior were removed to prevent bias in the data. Tables 13-16 show the hourly distributions for each MOVES3 Road Type.

Table 13: Hourly VMT Fraction: RoadType 2, Rural Restricted Access

	Vehicle Type					
Hr	Motorcycle	Passenger Car	Light Duty Truck	Bus	Single Unit Truck	Combination Truck
1	0.01259	0.010122	0.008497	0.025491	0.012661	0.019791
2	0.010407	0.006924	0.006642	0.02695	0.011462	0.021212
3	0.009804	0.005657	0.006128	0.02311	0.010774	0.020162
4	0.014033	0.006966	0.008429	0.023446	0.012872	0.021307
5	0.016521	0.010094	0.013403	0.024409	0.01742	0.025048
6	0.031205	0.024173	0.031655	0.032292	0.026101	0.030498
7	0.039908	0.039097	0.048153	0.030234	0.042045	0.033995
8	0.048286	0.052876	0.053515	0.038607	0.055612	0.038344
9	0.047232	0.04931	0.054144	0.045414	0.064738	0.044735
10	0.052129	0.048863	0.057068	0.05332	0.071111	0.051774
11	0.05592	0.05137	0.057585	0.057671	0.073023	0.055771
12	0.057282	0.053305	0.058275	0.054954	0.073187	0.057144
13	0.059201	0.055159	0.059941	0.054154	0.073932	0.056701
14	0.061515	0.05955	0.063502	0.057075	0.074649	0.05675
15	0.064778	0.066271	0.06839	0.055193	0.070423	0.057823
16	0.07135	0.076488	0.077211	0.055196	0.06286	0.057754
17	0.075498	0.084716	0.079255	0.055798	0.053471	0.056291
18	0.069376	0.082122	0.069325	0.050101	0.04369	0.052702
19	0.054219	0.062008	0.052105	0.045967	0.036341	0.050222
20	0.043214	0.045902	0.039079	0.046296	0.031205	0.046712
21	0.035814	0.03726	0.031102	0.04186	0.026124	0.042131
22	0.029429	0.031274	0.02498	0.03665	0.021582	0.038139
23	0.022345	0.023573	0.018296	0.034752	0.018976	0.034233
24	0.017942	0.01692	0.013319	0.03106	0.01574	0.030763

Table 14: Hourly VMT Fraction: RoadType 3, Rural Unrestricted Access

	Vehicle Type					
Hr	Motorcycle	Passenger Car	Light Duty Truck	Bus	Single Unit Truck	Combination Truck
1	0.00403	0.007318	0.005464	0.0037	0.004399	0.016416
2	0.00403	0.004113	0.003462	0.004554	0.004187	0.016751
3	0.004182	0.00328	0.003069	0.004649	0.00735	0.016548
4	0.005311	0.005725	0.004808	0.003984	0.008404	0.019584
5	0.014096	0.015126	0.014318	0.008253	0.015318	0.025847
6	0.029272	0.031678	0.035434	0.029314	0.029974	0.034425
7	0.03976	0.046849	0.051631	0.049616	0.055778	0.044047
8	0.044818	0.063391	0.063626	0.076843	0.077889	0.051279
9	0.037011	0.046036	0.055863	0.104924	0.085303	0.056824
10	0.041699	0.042784	0.054785	0.106536	0.087973	0.059976
11	0.050939	0.044418	0.056845	0.118679	0.088634	0.063351
12	0.056386	0.051297	0.061892	0.115454	0.085905	0.063586
13	0.063872	0.053725	0.061082	0.099991	0.085854	0.06441
14	0.07087	0.0545	0.063201	0.086424	0.08522	0.063704
15	0.077463	0.06569	0.068138	0.059292	0.077455	0.060966
16	0.084916	0.077596	0.076512	0.029504	0.066338	0.057006
17	0.09161	0.087189	0.079601	0.031781	0.043352	0.051744
18	0.08559	0.085673	0.073742	0.018404	0.029073	0.046776
19	0.068526	0.065633	0.054527	0.012048	0.018774	0.041319
20	0.050366	0.04573	0.039098	0.011858	0.012971	0.036413
21	0.035342	0.040062	0.029406	0.009677	0.010617	0.031888
22	0.021785	0.028902	0.021846	0.006166	0.007997	0.029026
23	0.011938	0.020503	0.013673	0.004838	0.006156	0.025557
24	0.006188	0.012783	0.007976	0.00351	0.005081	0.022558

Table 15: Hourly VMT Fraction: RoadType 4, Urban Restricted Access

	Vehicle Type					
Hr	Motorcycle	Passenger Car	Light Duty Truck	Bus	Single Unit Truck	Combination Truck
1	0.011484	0.01045	0.00904	0.018649	0.009097	0.019417
2	0.00718	0.00625	0.00563	0.016341	0.00801	0.019871
3	0.006369	0.004969	0.004649	0.015778	0.007836	0.018649
4	0.007378	0.005843	0.00588	0.016177	0.008683	0.019823
5	0.010814	0.009855	0.0109	0.022133	0.011745	0.023252
6	0.023546	0.02316	0.026352	0.029976	0.020401	0.029464
7	0.046175	0.049509	0.054241	0.039381	0.043526	0.037555
8	0.056723	0.078835	0.067451	0.050387	0.065953	0.044618
9	0.049317	0.063828	0.061411	0.058956	0.075633	0.051584
10	0.040614	0.046648	0.05363	0.058156	0.079073	0.055319
11	0.041513	0.04281	0.051259	0.061603	0.082472	0.058308
12	0.046517	0.045233	0.052979	0.064425	0.082064	0.058938
13	0.051796	0.047849	0.054798	0.063764	0.080809	0.057593
14	0.056671	0.050215	0.057688	0.062559	0.08118	0.057167
15	0.067188	0.058038	0.065678	0.061948	0.079509	0.057343
16	0.081004	0.07156	0.078691	0.060947	0.072772	0.056721
17	0.086386	0.083854	0.082137	0.057726	0.056336	0.055191
18	0.084326	0.087451	0.075693	0.051016	0.037172	0.053113
19	0.064595	0.060436	0.054367	0.045099	0.024934	0.04872
20	0.046954	0.042475	0.037395	0.038493	0.018813	0.04321
21	0.037378	0.035328	0.029318	0.032232	0.016245	0.039032
22	0.031656	0.03134	0.024997	0.028205	0.014246	0.035512
23	0.024599	0.025156	0.020351	0.02427	0.012447	0.031771
24	0.019816	0.018906	0.015462	0.021781	0.011042	0.027829

Table 16: Hourly VMT Fraction: RoadType 5, Urban Unrestricted Access

	Vehicle Type					
Hr	Motorcycle	Passenger Car	Light Duty Truck	Bus	Single Unit Truck	Combination Truck
1	0.009228	0.008527	0.006067	0.012683	0.003716	0.01064
2	0.005532	0.004853	0.003768	0.009949	0.003812	0.012431
3	0.004727	0.00379	0.003313	0.006948	0.004417	0.012151
4	0.004702	0.00442	0.004239	0.01136	0.005628	0.01447
5	0.008186	0.007942	0.008722	0.01539	0.008655	0.021051
6	0.022536	0.020386	0.023867	0.025693	0.019182	0.029917
7	0.043518	0.047828	0.054195	0.044833	0.041807	0.043678
8	0.060212	0.072146	0.067535	0.06919	0.073148	0.058865
9	0.055631	0.056701	0.064366	0.074706	0.088093	0.064086
10	0.048582	0.046649	0.060328	0.0804	0.092131	0.068094
11	0.049599	0.046815	0.059066	0.077406	0.094397	0.07034
12	0.057306	0.051603	0.061565	0.075333	0.091143	0.069831
13	0.060775	0.055532	0.062673	0.073976	0.089563	0.068541
14	0.060921	0.056221	0.062989	0.077999	0.091265	0.067118
15	0.064991	0.060758	0.066791	0.076104	0.090573	0.065126
16	0.072442	0.071548	0.075179	0.072804	0.077539	0.060524
17	0.077352	0.080365	0.075703	0.052641	0.046434	0.055769
18	0.077078	0.083225	0.068491	0.034769	0.026034	0.050646
19	0.063598	0.063785	0.052639	0.028509	0.017334	0.040275
20	0.048308	0.046228	0.037284	0.022059	0.011254	0.031067
21	0.038316	0.038657	0.029229	0.017408	0.007662	0.026853
22	0.030503	0.032511	0.023617	0.013712	0.006236	0.023192
23	0.02145	0.023602	0.01706	0.013944	0.005328	0.019375
24	0.014507	0.015908	0.011315	0.012185	0.004651	0.015962

4.0 Average Speed Distribution

National MOVES defaults are used for the average speed distribution inputs. Per the *User Guide for MOVES3*, when running MOVES3 in emission rate mode, the speed distribution is needed for model setup, but not used in the development of emission rates. The speed distribution for a given scenario is accounted for later in the inventory development process, when the emission rates are applied to detailed travel demand model outputs as part of the NIRPC Air Quality Post-Processor.

5.0 Ramp Fraction

The ramp fractions represent the percentage of vehicle-hours-traveled (VHT) for road types 2 (rural restricted access) and 4 (urban restricted access) occurring on the ramps associated with those road types. These fractions were calculated based on the percentage of VHT occurring on

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ramps reported by the base year travel demand model. These ramp fractions are shown in Table 17.

Table 17: Lake and Porter Counties Ramp Fractions

Road Type	Ramp Fraction
2	0.79%
4	6.66%

6.0 Meteorology Data

The default set of hourly temperatures and hourly relative humidity for use in MOVES3 was used. Meteorological data reflect summer conditions for ozone using MOVES3 inputs for a typical July day. The MOVES formatted meteorological data for the NIRPC counties of Lake and Porter are shown below in Table 18.

Table 18: Meteorology Assumptions, Lake and Porter Counties

monthID	zoneID	HourID	temperature	relHumidity
7	180890	1	67.0	88.0
7	180890	2	65.8	91.8
7	180890	3	64.9	94.9
7	180890	4	64.2	97.2
7	180890	5	63.6	99.0
7	180890	6	63.0	100.0
7	180890	7	62.5	100.0
7	180890	8	62.9	100.0
7	180890	9	65.5	92.6
7	180890	10	69.7	80.2
7	180890	11	74.0	69.4
7	180890	12	77.7	61.4
7	180890	13	80.9	55.3
7	180890	14	82.6	52.2
7	180890	15	83.2	51.2
7	180890	16	83.4	50.9
7	180890	17	83.0	51.6
7	180890	18	81.7	53.7
7	180890	19	79.7	57.5
7	180890	20	77.0	62.9
7	180890	21	74.3	68.8
7	180890	22	71.9	74.5
7	180890	23	70.3	78.8
7	180890	24	68.6	83.4

7.0 Fuel

Development of the updated NIRPC emission rates uses default MOVES3 fuel supply, fuel formulation, and fuel usage fractions, and defaults to summer conditions. Fuel supply, fuel formulation, and fuel usage fractions were held constant throughout all modeled years in accordance with EPA guidance. Tables 19-21 show the MOVE3 default fuel supply, fuel formulation, and fuel usage fractions for the Lake and Porter Counties region.

Table 19: MOVES3 Default Fuel Supply for Lake and Porter Counties

fuelRegionID	fuelYearID	monthGroupID	fuelFormulationID	marketShare	marketShareCV
1470011000	2019	7	8009	1	0.5
1470011000	2019	7	25003	1	0.5
1470011000	2019	7	27002	1	0.5

Table 20: MOVES3 Default Fuel Formulation for Lake and Porter Counties

Fuel Formulation ID	fuelSubtype ID	RVP	Sulfur Level	ETOH Volume	MTBE Volume	ETBE Volume	TAME Volume	aromatic Content	Olefin Content	benzene Content	e200	e300	BioDiesel Ester Volume	Cetane Index	PAH Content	T50	T90
10	10	6.9	30	0	0	0	0	26.1	5.6	1	41.09	83.09	0	0	0	218	329
20	20	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	51	7.7	11	85	0	0	0	0	0	0	999	999	0	0	0	999	999
96	10	8.7	338	0	0	0	0	26.4	11.9	1.64	50	83	0	0	0	199.82	329.41
97	10	6.6	150	0	0	0	0	24	11	0.8	52	84	0	0	0	195.74	324.86
98	12	8.8	30	10	0	0	0	25.77	8.44	0.65	47.61	84.89	0	0	0	212.28	321.72
99	12	8.8	30	10	0	0	0	25.77	8.44	0.65	47.61	84.89	0	0	0	212.28	321.72
8009	12	7	9.37595	10	0	0	0	16.6693	5.90573	0.500822	46.932	86.43	0	0	0	210.48	317.2
8309	10	7	9.37595	0	0	0	0	18.8693	4.30573	0.500822	39.932	86.63	0	0	0	220.36	312.91
8609	15	6.9	8.90715	15	0	0	0	15.8358	5.61045	0.475781	56.443	86.633	0	0	0	164.18	314.3
25003	21	0	6	0	0	0	0	0	0	0	0	0	3.4	0	0	0	0
27002	51	7.7	8	74	0	0	0	0	0	0.16	999	999	0	0	0	999	999

Table 21: MOVES3 Default Fuel Usage Fraction for Lake and Porter Counties

countyID	fuelYearID	modelYear GroupID	sourceBinFuel TypeID	fuelSupplyFuel TypeID	usageFraction
18089	2019	0	1	1	1
18089	2019	0	2	2	1
18089	2019	0	5	1	0.982134
18089	2019	0	5	5	0.017866

7.1 AVFT Assumptions

The 2022 BMV fleet mix data allowed the differentiation of vehicle types by fuel types. NIRPC staff analyzed the dataset for passenger cars and light duty trucks for model years 2020 and newer by their fuel/energy usage types. NIRPC staff deemed that the fuel types from the 2015-2019 emissions rate development process should be used for all older model years for these vehicle types. In accordance with EPA guidance, the fuel/energy usage types for the 2022 model year for these vehicle types was assumed to be held constant for all future model years. For all other MOVES3 vehicle types, national defaults were used. Table 22 shows the model year 2022 and newer fuel types for passenger cars, passenger trucks, and light commercial trucks.

Table 22: BMV-Derived Fuel Types for Model Year 2022 and Newer, Passenger Cars, Passenger Trucks, and Light Commercial Trucks

Fuel Type and Vehicle Technology *Lake and Porter Counties*			FuelType	1	2	5	1	9
			EngTech	1	1	1	12	30
Data Source	Vehicle Type	Code	Year	Gasoline	Diesel	E-85	Hybrid	Electric
BMV	Passenger Car	21	2022	89.24%	0.0063%	1.61%	5.63%	3.52%
BMV	Passenger Truck	31	2022	89.44%	0.15%	4.89%	4.45%	1.08%
BMV	Light Commercial Truck	32	2022	87.62%	7.20%	2.69%	2.23%	0.27%

8.0 Inspections and Maintenance (I/M) Program

Vehicles registered in Lake and Porter counties are required to undergo emissions tests and tampering inspections every two years if they were manufactured after 1976 and have a gross vehicle weight rating (GVWR) of 9,000 pounds or less. Vehicles manufactured in odd-numbered years are tested during odd-numbered years and vehicles manufactured in even-numbered

years tested during even-numbered years. Exemptions include vehicles manufactured during the four latest model years and antique vehicles. MOVES input coding is consistent with the current local I/M Program in Lake and Porter counties. Table 23 shows the MOVES3-formatted I/M parameters administered in Lake and Porter Counties.

Table 23: MOVES3-Formatted I/M Parameters for Lake and Porter Counties (Base Year 2019)

polProcessID	stateID	countyID	yearID	sourceTypeID	fuelTypeID	IMProgramID	inspectFreq	testStandardsID	begModelYearID	endModelYearID	useIMyn	complianceFactor
101	18	18089	2019	21	1	1	2	11	1976	1980	N	93.12
101	18	18089	2019	31	1	1	2	11	1976	1980	N	93.12
101	18	18089	2019	32	1	1	2	11	1976	1980	N	93.12
102	18	18089	2019	21	1	1	2	11	1976	1980	N	93.12
102	18	18089	2019	31	1	1	2	11	1976	1980	N	93.12
102	18	18089	2019	32	1	1	2	11	1976	1980	N	93.12
101	18	18089	2019	21	1	6	2	33	1981	1995	N	93.12
101	18	18089	2019	31	1	6	2	33	1981	1995	N	93.12
101	18	18089	2019	32	1	6	2	33	1981	1995	N	93.12
102	18	18089	2019	21	1	6	2	33	1981	1995	N	93.12
102	18	18089	2019	31	1	6	2	33	1981	1995	N	93.12
102	18	18089	2019	32	1	6	2	33	1981	1995	N	93.12
301	18	18089	2019	21	1	6	2	33	1981	1995	N	93.12
301	18	18089	2019	31	1	6	2	33	1981	1995	N	93.12
301	18	18089	2019	32	1	6	2	33	1981	1995	N	93.12
302	18	18089	2019	21	1	6	2	33	1981	1995	N	93.12
302	18	18089	2019	31	1	6	2	33	1981	1995	N	93.12
302	18	18089	2019	32	1	6	2	33	1981	1995	N	93.12
101	18	18089	2019	21	1	10	2	51	1996	2017	N	93.12
101	18	18089	2019	31	1	10	2	51	1996	2017	N	93.12
101	18	18089	2019	32	1	10	2	51	1996	2017	N	93.12
102	18	18089	2019	21	1	10	2	51	1996	2017	N	93.12
102	18	18089	2019	31	1	10	2	51	1996	2017	N	93.12
102	18	18089	2019	32	1	10	2	51	1996	2017	N	93.12
301	18	18089	2019	21	1	10	2	51	1996	2017	N	93.12
301	18	18089	2019	31	1	10	2	51	1996	2017	N	93.12
301	18	18089	2019	32	1	10	2	51	1996	2017	N	93.12
302	18	18089	2019	21	1	10	2	51	1996	2017	N	93.12
302	18	18089	2019	31	1	10	2	51	1996	2017	N	93.12
302	18	18089	2019	32	1	10	2	51	1996	2017	N	93.12
112	18	18089	2019	21	1	7	2	41	1976	1995	N	93.12
112	18	18089	2019	21	1	8	2	43	1996	2017	N	93.12
112	18	18089	2019	31	1	7	2	41	1976	1995	N	93.12
112	18	18089	2019	31	1	8	2	43	1996	2017	N	93.12
112	18	18089	2019	32	1	7	2	41	1976	1995	N	93.12
112	18	18089	2019	32	1	8	2	43	1996	2017	N	93.12
113	18	18089	2019	21	1	7	2	41	1976	1995	N	93.12
113	18	18089	2019	21	1	8	2	43	1996	2017	N	93.12
113	18	18089	2019	31	1	7	2	41	1976	1995	N	93.12
113	18	18089	2019	31	1	8	2	43	1996	2017	N	93.12
113	18	18089	2019	32	1	7	2	41	1976	1995	N	93.12
113	18	18089	2019	32	1	8	2	43	1996	2017	N	93.12
101	18	18089	2019	21	1	11	2	11	1976	1980	Y	95
101	18	18089	2019	31	1	11	2	11	1976	1980	Y	95
101	18	18089	2019	32	1	11	2	11	1976	1980	Y	95
102	18	18089	2019	21	1	11	2	11	1976	1980	Y	95
102	18	18089	2019	31	1	11	2	11	1976	1980	Y	95
102	18	18089	2019	32	1	11	2	11	1976	1980	Y	95
301	18	18089	2019	21	1	11	2	11	1976	1980	Y	95
301	18	18089	2019	31	1	11	2	11	1976	1980	Y	95
301	18	18089	2019	32	1	11	2	11	1976	1980	Y	95
302	18	18089	2019	21	1	11	2	11	1976	1980	Y	95
302	18	18089	2019	31	1	11	2	11	1976	1980	Y	95

302	18	18089	2019	32	1	11	2	11	1976	1980	Y	95
101	18	18089	2019	21	1	12	2	33	1981	1995	Y	95
101	18	18089	2019	31	1	12	2	33	1981	1995	Y	95
101	18	18089	2019	32	1	12	2	33	1981	1995	Y	95
102	18	18089	2019	21	1	12	2	33	1981	1995	Y	95
102	18	18089	2019	31	1	12	2	33	1981	1995	Y	95
102	18	18089	2019	32	1	12	2	33	1981	1995	Y	95
301	18	18089	2019	21	1	12	2	33	1981	1995	Y	95
301	18	18089	2019	31	1	12	2	33	1981	1995	Y	95
301	18	18089	2019	32	1	12	2	33	1981	1995	Y	95
302	18	18089	2019	21	1	12	2	33	1981	1995	Y	95
302	18	18089	2019	31	1	12	2	33	1981	1995	Y	95
302	18	18089	2019	32	1	12	2	33	1981	1995	Y	95
112	18	18089	2019	21	1	13	2	41	1976	1995	Y	95
112	18	18089	2019	31	1	13	2	41	1976	1995	Y	95
112	18	18089	2019	32	1	13	2	41	1976	1995	Y	95
113	18	18089	2019	21	1	13	2	41	1976	1995	Y	95
113	18	18089	2019	31	1	13	2	41	1976	1995	Y	95
113	18	18089	2019	32	1	13	2	41	1976	1995	Y	95
101	18	18089	2019	21	1	14	2	51	1996	2015	Y	95
101	18	18089	2019	31	1	14	2	51	1996	2015	Y	95
101	18	18089	2019	32	1	14	2	51	1996	2015	Y	95
102	18	18089	2019	21	1	14	2	51	1996	2015	Y	95
102	18	18089	2019	31	1	14	2	51	1996	2015	Y	95
102	18	18089	2019	32	1	14	2	51	1996	2015	Y	95
301	18	18089	2019	21	1	14	2	51	1996	2015	Y	95
301	18	18089	2019	31	1	14	2	51	1996	2015	Y	95
301	18	18089	2019	32	1	14	2	51	1996	2015	Y	95
302	18	18089	2019	21	1	14	2	51	1996	2015	Y	95
302	18	18089	2019	31	1	14	2	51	1996	2015	Y	95
302	18	18089	2019	32	1	14	2	51	1996	2015	Y	95
112	18	18089	2019	21	1	15	2	45	1996	2015	Y	95
112	18	18089	2019	31	1	15	2	45	1996	2015	Y	95
112	18	18089	2019	32	1	15	2	45	1996	2015	Y	95
113	18	18089	2019	21	1	15	2	45	1996	2015	Y	95
113	18	18089	2019	31	1	15	2	45	1996	2015	Y	95
113	18	18089	2019	32	1	15	2	45	1996	2015	Y	95