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5.9 Air Quality

Changes made to this section since the publication of the Draft Environmental Impact Statement (DEIS) consist of updates to referenced planning documents and a notation that overall vehicle miles traveled with the Refined Preferred Alternative (RPA) would be of a magnitude similar to the build alternatives that were reviewed in the DEIS.

In compliance with the Clean Air Act (CAA) and its amendments, related federal regulations and FHWA Guidance, along with INDOT procedures, this section discusses the conformity status and the air quality impact of the project. This section presents a discussion on carbon monoxide (CO), ozone, fine particulate matter ($PM_{2.5}$), mobile source air toxics, and greenhouse gases (GHG).

As approved in the Tier 1 ROD, I-69 Section 6 is approximately 26 miles long, from the northern terminus of I-69 Section 5 to I-465. The preferred alternative from Tier 1 would begin just south of the intersection of SR 37 and SR 39 on the south side of Martinsville, and continue northward to Edgewood Avenue in Indianapolis where it would leave SR 37 and head northwest for approximately 0.9 mile to a new I-465 interchange.

Constructing I-69 Section 6 within the Tier 1 preferred alternative alignment would involve upgrading the existing four-lane, divided highway to interstate highway design standards. Access to I-69 would be fully controlled and limited to interchanges, requiring the elimination of intersections and driveways and the realignment of local service roads at selected locations. As described in **Chapter 3, Alternatives**, four alternatives (C1, C2, C3 and C4) were considered in the DEIS and a Refined Preferred Alternative (RPA) has been added as part of the FEIS.

5.9.1 Regulatory Setting

The CAA and the 1990 CAA Amendments (CAAA) require the United States Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants that are considered to be harmful to the public health and environment.[1] USEPA set forth standards for six "criteria pollutants" – carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter (PM), and sulfur dioxide (SO_2). When levels of pollutants do not exceed the standards, an area is considered in attainment of the NAAQS. An area that does not meet the NAAQS for one or more pollutants is designated by the USEPA as a nonattainment area.

[1] *For further information about the NAAQS and criteria pollutant levels, please refer to USEPA's National Ambient Air Quality Standards website. (Source: USEPA, "National Ambient Air Quality Standards (NAAQS)," https://www.epa.gov/criteria-air-pollutants/naaqs-table*

Section 176(c) of the CAA prohibits federal agencies from approving, funding or supporting in any way actions in nonattainment or maintenance areas unless the federal agency determines that the action "conforms" to the purpose of the applicable State Implementation Plan (SIP) for that area. Section 176(c) includes specific "transportation conformity" requirements, which apply to a metropolitan transportation plan and transportation improvement program (TIP) and to individual highway and transit projects that require approval by FHWA or FTA.

For projects in metropolitan areas, compliance with transportation conformity involved both regional and project-level conformity determinations:

- At the regional level, a project must be included in a regional emission analysis that supports the conformity determination of the metropolitan transportation plan and TIP; the analysis must show that future emissions from the transportation system are consistent with the SIP for any pollutants contributing to the designation of an area as nonattainment or maintenance for transportation related NAAQS.

- At the project level, some projects in CO and/or PM areas may require additional project level hot-spot analyses to ensure that emissions from the projects will not cause new or worsen existing violations, or delay timely attainment of any standard or any required interim emissions reductions or other milestones in the area. For projects subject to conformity requirements, a project-level conformity determination is required before federally funded or approved projects are adopted, accepted, approved, or funded.

5.9.1.1 Air Quality Status of Section 6 Project Area

The proposed I-69 Section 6 project is located in Morgan, Johnson, and Marion counties. All three counties are within the Metropolitan Indianapolis Intrastate Air Quality Control Region #80. As described below, the region is currently in attainment status for all transportation-related criteria pollutants, except for the portion of the region is in maintenance status for CO. The portions of the three counties which the I-69 Section 6 passes through are all in attainment for all transportation related criteria pollutants.

- CO Standard. Marion County includes a 0.5 square mile CO maintenance area in central downtown Indianapolis.[2] This maintenance area is approximately 5 miles north of the northern limits of the proposed I-69 Section 6 project. Aside from that maintenance area, all other areas in Marion County are in attainment for CO, as are all of Johnson and Morgan counties. Therefore, transportation conformity determinations are required for CO only in the CO maintenance area in central downtown Indianapolis, which is outside this project area.

[2] *Federal Register, Vol. 65, No. 12, January 19, 2000, EPA, 40 CFR Parts 52 and 81, Approval and Promulgation of Implementation Plans; and Designation of Areas for Air Quality Planning Purposes; Indiana, pages 2883 - 2889.*

- 1997 $PM_{2.5}$ Standard. Morgan, Johnson, and Marion counties were redesignated to maintenance status for the 1997 $PM_{2.5}$ standard on July 11, 2013. As a maintenance area, the three counties remained subject to conformity requirements. With the implementation of the 2012 $PM_{2.5}$ standard, however, the USEPA revoked the 1997 $PM_{2.5}$ standard in areas that were in attainment or maintenance status for the 1997 standard. That revocation became effective on October 24, 2016. Therefore, transportation conformity determinations are no longer required for the 1997 $PM_{2.5}$ standard in these three counties.[3]

- 2012 $PM_{2.5}$ Standard. Morgan, Johnson, and Marion counties are in attainment for 2012 $PM_{2.5}$ standard. Therefore, transportation conformity determinations are not required for this standard in these three counties.[4]

- Ozone and NO_2 Standards All three counties are now in attainment for ozone and NO_2.

It should be noted that Perry Township in Marion County and Clay and Washington Townships in Morgan County are in non-attainment for sulfur dioxide (SO_2). However, SO_2 is not a transportation related pollutant.

5.9.1.2 Status of Section 6 Project in Plan and TIP

The proposed I-69 Section 6 project is included in the approved fiscally constrained Long Range Transportation Plan (LRTP) for the Indianapolis Metropolitan Planning Area. The 2035 LRTP, as amended on June 28, 2017, consolidates three projects which made up the proposed I-69 Segment 6 project in former LRTP versions to a single project: MPO project number 5004 from SR 39 in Martinsville to I-465 in Indianapolis. The I-69 Section 6 project also is included in the current Indianapolis Regional TIP (IRTIP). The current approved LRTP and IRTIP are:

- *2035 Long Range Plan Transportation Plan: 2017 June Amendment*,[5] and

- *2018-2021 Indianapolis Regional Transportation Improvement Program*, approved August 23, 2017.

Since the 1997 PM2.5 standard has been revoked, and all three counties are now in attainment for 2012 $PM_{2.5}$ standard, FHWA no longer needs to demonstrate conformity for PM2.5 when approving plans, TIPs, or projects in the Indianapolis Metropolitan Planning Area. The area also is in conformity for ozone and NO2, so conformity determinations also are not required for those

[3] *Federal Register, Vol. 81, No. 164, August 24, 2016, EPA, 40 CFR Parts 50, 51, and 93, Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements, pages 117 and 118.*

[4] *Federal Register, Vol. 81, No. 164, August 24, 2016, EPA, 40 CFR Parts 50, 51, and 93, Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements, pages 117 and 118.*

[5] *http://www.indympo.org/whats-underway/lrtp-2035-amendments 2017 - Summer, pages 4 and 6, accessed July 31, 2017.*

pollutants. Within this metropolitan area, conformity requirements only apply in the maintenance area for CO in downtown Indianapolis.

5.9.2 Analysis

5.9.2.1 Carbon Monoxide (CO)

FHWA Technical Advisory TA 6640.8A indicates that carbon monoxide is a project-related concern. As such CO, should be evaluated in the DEIS. FHWA allows the evaluation to be based on previous analyses for similar projects, previous general analyses for specific project types, and simplified graphical or "look-up" table evaluations. The assessment in this DEIS is based on INDOT Screening Criteria.

The portions of the three Indiana counties traversed by the I-69 Section 6 project are all in attainment for the CO standard. The project does not include two 8-lane arterials at signalized intersection or an interstate highway interchange involving a 10-lane by 8-lane grade-separated freeway crossover. Therefore, based on the Indiana CO Screening Criteria, this project does not require a CO project level analysis and will not produce a projected violation of the CO standards (35 ppm over a 1-hour period or 9 ppm over an 8-hour period).[6]

5.9.2.2 Ozone

As with CO, the entire study corridor is in attainment for ozone standards. FHWA no longer needs to demonstrate ozone conformity in this area.

5.9.2.3 $PM_{2.5}$

Section 5.9.1 addresses the implementation rule for the 2012 $PM_{2.5}$ standard, which was effective on October 24, 2016. The 2016 standard revokes the "1997 primary annual $PM_{2.5}$ NAAQS in areas that have always been designated attainment for that NAAQS and in areas that have been redesignated to attainment for that NAAQS. After the effective date of the revocation, areas that have been redesignated to attainment for the 1997 annual $PM_{2.5}$ NAAQS (*i.e.*, maintenance areas for the 1997 annual $PM_{2.5}$ NAAQS) will not be required to make transportation or general conformity determinations for the 1997 annual $PM_{2.5}$ NAAQS."[7] Therefore, no analysis of $PM_{2.5}$ emissions has been performed.

[6] *http://www.in.gov/indot/files/Procedural_Manual_for_Preparing_Environmental_Studies_2008.pdf, page 94, accessed August 31, 2016.*

[7] *Federal Register, Vol. 81, No. 164, August 24, 2016, EPA, 40 CFR Parts 50, 51, and 93, Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements, pages 117 and 118.*

5.9.2.4 MSAT

In October 2016, FHWA issued updated guidance for the analysis of mobile source air toxics (MSATs) in the National Environmental Policy Act (NEPA) process for highway projects (*Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*) requiring the use of the most recent version of USEPA's Motor Vehicle Emissions Simulator (MOVES2014a) model for air quality analysis in documents prepared in accordance with NEPA.[8] More information about MSATs is presented in **Appendix H**. The FHWA has developed a tiered approach to analyzing MSATs in NEPA documents that includes the following three levels of analysis:

1. No analysis for projects with no potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

Annual average daily traffic (AADT) for the four initial build alternatives ranges from 52,400 south of Martinsville to 96,000 at the northern terminus of the study corridor, and 127,000 along I-465. The Refined Preferred Alternative (RPA) is expected to serve a similar level of daily vehicle miles of travel. Based on FHWA's three levels of analysis, the I-69 Section 6 project has a low potential for meaningful increases in MSAT emission (**Appendix H**). Therefore, a qualitative analysis was performed for the I-69 Section 6 project.

The amount of MSAT emissions emitted for the build alternatives, along with the no-build scenario, would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the build alternatives is slightly higher than that for the no-build scenario (see **Table 5.9-1**), because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network.[9]

Table 5.9-1: Design Year 2045 Daily VMT

Alternatives	No-Build	Alt C1	Alt C2	Alt C3	Alt C4
Design Year Daily VMT	6,679,311	7,260,550	7,250,967	7,263,494	7,247,884

The nine percent increase in VMT for build alternatives compared with the no-build scenario would lead to higher MSAT emissions along the highway corridor, coupled with a corresponding decrease in MSAT emissions along the parallel routes of SR 67, SR 135, US 31 and I-65. The

[8] http://www.fhwa.dot.gov/Environment/air_quality/air_toxics/policy_and_guidance/msat/index.cfm, *accessed December 6, 2016.*

[9] *The 2045 forecast traffic volumes used in this analysis are the best available at the publication of this DEIS. Refinements to the traffic volume forecasts are ongoing at the time of publication.*

emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds. According to the USEPA MOVES2014 model, emissions of all the priority MSATs decrease as speed increases.

Since the estimated VMT with each of the build alternatives varies by less than 0.22 percent, it is expected there would be no appreciable difference in overall MSAT emissions among the alternatives including the RPA. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of USEPA national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes of the project alternatives would have the effect of moving some traffic closer to nearby homes, schools, and businesses. Therefore, under each alternative there may be localized areas where ambient concentrations of MSAT could be higher with certain build alternatives than the no-build scenario. The localized increases in MSAT concentrations would likely be most pronounced between SR 44 and SR 252 in Martinsville where auxiliary lanes are included with interchange construction, and north of SR 144 where added travel lanes are included with all the build alternatives. However, the magnitude and the duration of these potential increases compared to the no-build scenario cannot be reliably quantified due to incomplete or unavailable information in forecasting project specific MSAT health impacts.

In summary, when a highway is widened, the localized level of MSAT emissions for the build alternative could be higher relative to the no-build scenario, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT would be lower in other locations when traffic shifts away from them. However, on a regional basis, USEPA's vehicle and fuel regulations, coupled with fleet turnover, over time would cause substantial reductions that, in almost all cases, would cause region-wide MSAT levels to be significantly lower than today.

FHWA and INDOT have provided a qualitative analysis of MSAT emissions relative to the build alternatives and the no-build scenario. FHWA and INDOT have acknowledged that the project may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be reliably estimated.

5.9.2.5 Greenhouse Gases (GHG)

Human activity is changing the earth’s climate by causing the buildup of heat-trapping greenhouse gas (GHG) emissions through the burning of fossil fuels and other human influences. Carbon dioxide (CO2) is the largest component of human produced emissions; other prominent emissions include methane (CH4), nitrous oxide (N2O) and hydrofluorocarbons (HFCs). These

emissions are different from criteria air pollutants since their effects in the atmosphere are global rather than localized, and they remain in the atmosphere for decades to centuries, depending on the species. Greenhouse gas emissions are often reported together as CO2 equivalent (CO2e) emissions, weighting the global warming potential of the gases in terms of CO2.

GHG emissions have accumulated rapidly as the world has industrialized, with concentration of atmospheric CO2 increasing from roughly 300 parts per million in 1900 to over 400 parts per million today. Over this timeframe, global average temperatures have increased by roughly 1.5 degrees Fahrenheit (1 degree Celsius), and the most rapid increases have occurred over the past 50 years. Scientists have warned that significant and potentially dangerous shifts in climate and weather are possible without substantial reductions in greenhouse gas emissions. They commonly have cited 2 degrees Celsius (1 degree Celsius beyond warming that has already occurred) as the total amount of warming the earth can tolerate without serious and potentially irreversible climate effects. For warming to be limited to this level, atmospheric concentrations of CO2 would need to stabilize at a maximum of 450 ppm, requiring annual global emissions to be reduced 40-70 percent below 2010 levels by 2050. State and national governments in many developed countries have set GHG emissions reduction targets of 80 percent below current levels by 2050, recognizing that post-industrial economies are primarily responsible for GHGs already in the atmosphere. As part of a 2014 bilateral agreement with China, the U.S. pledged to reduce GHG emissions 26-28 percent below 2005 levels by 2025; this emissions reduction pathway is intended to support economy-wide reductions of 80 percent or more by 2050.

The transportation sector is the second largest source of total GHG emissions in the U.S., behind electricity generation. The transportation sector was responsible for approximately 26 percent of all anthropogenic (human caused) GHG emissions in the U.S. in 2014. Most transportation GHG emissions are the result of fossil fuel combustion. CO2 makes up the largest component of these GHG emissions.

The three largest sources of highway-related GHG emissions are tailpipe emissions, upstream fuel cycle emissions (the emissions associated with producing and transporting the fuel used by highway vehicles), and roadway construction emissions. As tailpipe and fuel cycle emissions generally increase with VMT, the project area would likely have an increase in GHG emissions under any of the build alternatives compared to the no-build scenario. Some of the increase in GHG emissions could be offset due to increases in speeds and reductions in congestion (which are associated with lower GHG emissions). Construction of the project would also generate GHG emissions. Preparation of the roadway corridor (e.g., earth-moving activities) involves a considerable amount of energy consumption and resulting GHG emissions. Manufacture of the construction materials and fuel used by construction equipment also contribute GHG emissions.

To help address the global issue of climate change, the United States Department of Transportation (USDOT) is committed to reducing GHG emissions from vehicles traveling on the nation’s highways. USDOT and USEPA are working together to reduce these emissions by substantially improving vehicle efficiency and shifting toward less carbon intensive fuels. The agencies have jointly established new, more stringent fuel economy and first ever GHG emissions standards for model year 2012-2025 cars and light trucks, with an ultimate fuel

economy standard of 54.5 miles per gallon for cars and light trucks by model year 2025. Further, on September 15, 2011, the agencies jointly published the first ever fuel economy and GHG emissions standards for heavy-duty trucks and buses.[10] Increasing use of technological innovations that can improve fuel economy, such as gasoline- and diesel-electric hybrid vehicles, will improve air quality and reduce CO_2 emissions future years.

The contribution of GHGs from transportation in the nation is a large component of U.S. GHG emissions, but as the scale of analysis is reduced, the GHG contributions become quite small. Based on projections from the Energy Information Administration, CO_2 emissions from motor vehicles in the entire state of Indiana contributed less than two tenths of one percent of global emissions in 2010. With global economies growing and the U.S. government working to reduce CO_2 emissions by substantially improving vehicle efficiency, Indiana's contributions to global emissions will be an even smaller fraction in 2045.

The Council on Environmental Quality (CEQ) issued on August 2, 2016, its "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews"[11] describing how federal agencies should address climate change in NEPA documents. The guidance was withdrawn on May 19, 2017.[12]

5.9.3 Mitigation

Based on the air quality assessment completed for I-69 Section 6, the project would not contribute to any violation of the NAAQS. MSAT emissions would decrease, compared to current levels, and neither carbon monoxide nor $PM_{2.5}$ levels would exceed the air quality standards. Therefore, no measures to mitigate air quality impacts have been identified.

5.9.4 Summary

The I-69 Section 6 project is located in Morgan, Johnson, and Marion counties. All three counties are within the Metropolitan Indianapolis Intrastate Air Quality Control Region #80. The portions of the three counties which the I-69 Section 6 passes through are all in attainment for all transportation related criteria pollutants. Therefore, FHWA no longer needs to demonstrate conformity for ozone and $PM_{2.5}$.

The localized level of MSAT emissions for the build alternative could be higher relative to the no-build scenario, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT would be lower in other

[10] *For more information on fuel economy proposals and standards, see the National Highway Traffic Safety Administration's Corporate Average Fuel Economy website: http://www.nhtsa.gov/fuel-economy/.*

[11] *https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf*

[12] *https://www.fhwa.dot.gov/environment/sustainability/resilience/policy_and_guidance/ceqwithdrawal.cfm*

locations when traffic shifts away from them. On a regional basis, USEPA's vehicle and fuel regulations coupled with fleet turnover will cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

To date, no national standards have been established regarding GHGs, nor has USEPA established criteria or thresholds for ambient GHG emissions pursuant to its authority to establish motor vehicle emission standards for CO_2 under the Clean Air Act. Based on the air quality assessment completed for I-69 Section 6, this project will not contribute to any violation of the NAAQS.