3.4 Air Quality

Air quality is important to protect public health from air pollutants. Air quality is protected by the Clean Air Act and air quality standards established by the United States Environmental Protection Agency (USEPA).

How is air quality assessed?

Predicted air quality resulting from a roadway project is compared to Air Quality Standards set by the USEPA. The standards, set for six pollutants, are set at concentration levels designed to protect public health. If the standards are not met an area is called "non-attainment" and air quality is required to be improved.

The pollutants most often involved with motor vehicles are carbon monoxide (CO), particulate matter, and ozone. Ozone is not emitted directly from vehicles; however, the volatile organic compounds (VOCs) vehicles produce contribute to ground-level ozone creation.

What is the current air quality in the study area?

The study area meets the air quality standards for all six pollutants for which the USEPA has set standards: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide. Christian, Shelby, Fayette, Marion, Clinton, Washington, and Jefferson counties are all listed as attainment areas.

How could air quality be affected by the proposed alternatives?

Variables that play the biggest role in determining differences in air quality for alternatives for a roadway project are vehicle miles traveled (VMT), congestion, how many diesel trucks (which pollute more) there are compared to passenger cars, how old the average vehicle is (older cars pollute more than newer cars), and types of fuel used.

The estimated VMT, congestion, diesel trucks, average vehicle age, and types of fuel used under each of the alternatives carried forward are nearly the same it is expected there would be no appreciable difference in overall emissions among the various alternatives. Further information regarding air quality is contained in Volume III.

A carbon monoxide analysis was completed for the proposed project. The results indicate that even the worst-case scenario will still meet air quality standards for CO.

How will construction activities affect air quality?

Demolition and construction activities can result in short-term increases in dust and equipment emissions. The potential air quality impacts will be short-term, occurring only while demolition and construction work is in progress. The Department's Standard Specifications for Road and Bridge Construction include provisions on dust control. Under these provisions, dust and airborne dirt generated by construction activities will be controlled through dust control procedures when warranted. Techniques include minimizing track-out of soil onto nearby publicly-traveled roads, reducing speed on unpaved roads, covering haul vehicles, and applying chemical dust suppressants or water to exposed surfaces. With the application of appropriate measures to limit dust emissions during construction, the project will not cause any significant, short-term particulate matter air quality impacts.

Emissions from construction vehicles are also directly addressed for the project by IDOT requiring use of cleaner diesel fuel and idling restrictions.

What is the impact on greenhouse gas emissions (climate change)?

Climate change is an important national and global concern. While the earth has gone through many natural changes in climate in its history, there is general agreement that the earth's climate is currently changing at an accelerated rate and will continue to do so for the foreseeable future. Anthropogenic (human-caused) greenhouse gas (GHG) emissions contribute to climate change. Carbon dioxide (CO2) makes up the largest component of these GHG emissions. Other prominent transportation GHGs include methane (CH4) and nitrous oxide (N2O).

Many GHGs occur naturally. Water vapor is the most abundant GHG and makes up approximately two thirds of the natural greenhouse effect. However, the burning of fossil fuels and other human activities are adding to the concentration of GHGs in the atmosphere. Many GHGs remain in the atmosphere for time periods ranging from decades to centuries. GHGs trap heat in the earth's atmosphere. Because atmospheric concentration of GHGs continues to climb, our planet will continue to experience climate-related phenomena. For example, warmer global temperatures can cause changes in precipitation and sea levels.

The transportation sector is the second largest source of total GHG emissions in the US, behind electricity generation. In 2009, it was responsible for approximately 27% of all anthropogenic (human caused) GHG emissions in the US. The majority of transportation GHG emissions are the result of fossil fuel combustion. CO2 makes up the largest component of these GHG emissions.

US CO2 emissions from the consumption of energy accounted for about 18% of worldwide energy consumption CO2 emissions in 2009. U.S. transportation CO2 emissions accounted for about 6% of worldwide CO2 emissions.

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 CO2 under the Clean Air Act. However, there is a considerable body of scientific literature addressing the sources of GHG emissions and their adverse effects on climate, including reports from the Intergovernmental Panel on Climate Change, the US National Academy of Sciences, and USEPA and other Federal agencies. GHGs are different from other air pollutants evaluated in Federal environmental reviews because their impacts are not localized or regional due to their rapid dispersion into the global atmosphere, which is characteristic of these gases. The affected environment for CO2 and other GHG emissions is the entire planet. In addition, from a quantitative perspective, global climate change is the cumulative result of numerous and varied emissions sources (in terms of both absolute numbers and types), each of which makes a relatively small addition to global atmospheric GHG concentrations. In contrast to broad scale actions such as those involving an entire industry sector or very large geographic areas, it is difficult to isolate and understand the GHG emissions impacts for a particular transportation project. Furthermore, presently there is no scientific methodology for attributing specific climatological changes to a particular transportation project's emissions.

While the contribution of GHGs from transportation in the United States, as a whole, is a large component of United States' GHG emissions, as the scale of analysis is reduced the GHG contributions become quite small. Table 3.4-1 below presents the relationship between existing and projected Illinois' highway GHG emissions and total global GHG emissions. The emissions in Table 3.4-1 are presented as carbon dioxide equivalent (CO2e) emissions, which take into account the global warming potential of chemical emissions from a source. The combustion of fossil fuels emits small amounts of N2O and CH4. The global warming potential of N2O and CH4 are 310 and 21 times that of CO2, respectively.

Table 3.4-1: Global and Illinois GHG Emissions in Million Metric Tons CO_2 Equivalent per Year

Pollutant	Global CO_2e[a]	Illinois CO_2e[b]	Illinois % of Global Total
Existing Conditions (2010)	31,305	60.8	0.19%
Future Projections (2040)	46,103	84.0	0.18%

[a] *Global emissions from EIA's International Energy Outlook 2011. The 2040 emissions were estimated by applying 1.3 percent growth rate to 2035 emissions.*
[b] *Illinois emissions from MOVES using Illinois defaults.*

Based on Illinois' emissions estimates, and global CO2e estimates and projections from the Energy Information Administration (EIA), CO2e emissions from motor vehicles in the entire State of Illinois contributed less than one percent of global emissions in 2010 (0.19%), and are projected to contribute an even smaller fraction (0.18) in 2040. Illinois emissions represent a smaller share of global emissions in 2040 because global emissions increase at a faster rate.

Under National Environmental Policy Act (NEPA), detailed environmental analysis should be focused on issues that are significant and meaningful to decision-making. FHWA has concluded, based on the nature of GHG emissions and the exceedingly small potential GHG impacts of transportation projects, more detailed information on GHG emissions "is not essential to a reasoned choice among reasonable alternatives" (40 CFR 1502.22(a)) or to making a decision in the best overall public interest based on a balanced consideration of transportation, economic, social, and environmental needs and impacts (23 CFR 771.105(b)). For these reasons, no project-level GHG analysis has been performed for the project.

Mitigation for Global GHG Emissions

Consistent with its view that broad-scale efforts hold the greatest promise for addressing the global climate change problem, FHWA is engaged in developing strategies to reduce transportation's contribution to GHGs—particularly CO2 emissions—and to assess the risks to transportation systems and services from climate change. FHWA's efforts include research, education, outreach and technical assistance. Additional information on FHWA's climate change activities is available at: http://www.fhwa.dot.gov/hep/climate/.

The IDOT is also committed to reducing GHG emissions and has implemented various statewide roadwork and construction strategies, promoting the use of improved vehicle fuels to reduce overall GHG emissions and encouraging employees to reduce their travel. These strategies include:

1. *Improving system and operational efficiencies*- The Department implements statewide traffic flow improvements on their road network through intelligent transportation systems, route optimization, traffic signal optimization, and improved intermodal links and system continuity;

2. *Reducing growth of vehicle miles traveled*- The Department implements pedestrian and bicycle facilities and promotes travel demand management programs;

3. *Encouraging lower GHG fuels*- The Department uses biodiesel in diesel trucks. In addition, the Department utilizes flexible fueled vehicles in its fleet that run on E-85;

4. *Requiring emission reductions from construction activities*- The Department implemented a statewide idling Special Provision for construction contracts;

5. *Improved operations at truck weight stations*- The Department implemented a PrePass program at various weight stations on Illinois' Interstates; and,

6. *Reducing Travel*- The Department encourages conference calls and videoconferencing whenever possible to reduce travel and greenhouse gas emissions.