

Air Quality

Summary of Technical Memorandum

The purpose of this Technical Memorandum is to generally identify, discuss and examine existing air quality situation in the improvement study area and to identify potential “worst case” impact to residents in accordance with the National Ambient Air Quality Standards (NAAQS) as a result of the proposed improvements.

The U.S. Environmental Protection Agency (USEPA) is responsible for adopting the National Ambient Air Quality Standards (NAAQS) for specific pollutants. Under the authority of the Clean Air Act and the 1990 Clean Air Act Amendments (CAAA) [42 USC 7401 *et. seq.*], a set of primary and secondary ambient air quality standards was established. The NAAQS establish maximum pollutant concentration limits for six “criteria pollutants.” The primary standards are established at levels intended to protect the public health. Secondary standards are intended to protect the public welfare and are based on a pollutant’s effect on vegetation and other materials.

The Michigan Department of Environmental Quality (MDEQ) operates an air-monitoring network in 28 counties, which represents the overall air quality in the state. Because of continued improvements in air quality, this network shows the project area is in a Michigan attainment area, reported for the year 2000, as complying with all six of the NAAQS criteria pollutant health standards.

Transportation sources emit carbon monoxide (CO), nitrogen dioxide (NO₂), and hydrocarbons (also known as volatile organic compounds or VOCs). Nitrogen oxides (NO_x) and VOCs are precursors to ozone (O₃). Particulate matter (PM) is emitted primarily by stationary fossil fuel-burning sources – power plants and industrial sources - and to a small extent by transportation sources.

Ozone (O₃), which results from a chemical interaction between NO_x, and VOCs in the presence of sunlight, is not a concern at the micro scale level. As part of Michigan’s State Implementation Plan (SIP) and conformity process ozone is analyzed as a regional pollutant. Therefore, a micro scale analysis of ozone (O₃) or oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) is not applicable and was not conducted.

CONFORMITY

The study area is not within a designated air quality non-attainment area for any of the air pollutants for which the U.S. Environmental Protection Agency (USEPA) has established standards. On April 30, 2004 the US EPA published in the Federal Register the “Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard-Phase I”, which designated new non-attainment boundaries for 8-hour ozone. In Michigan St. Joseph County continues to be an attainment area for all air pollutants, including the 8-hour ozone and particulate matter of 2.5 microns or less standards adopted in 1997. A conformity determination under 40 CFR Part 93 (“Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved under Title 23 U.S. Code of the Federal Transit Act”) is not required.

CARBON MONOXIDE MICRO SCALE ANALYSIS

The carbon monoxide (CO) micro scale dispersion analysis conducted is consistent with the mobile source emission factors for Michigan and those issued by the USEPA known as MOBILE5a and Conformity Regulations dated November 11, 1993 (40 CFR Part 93). The CAL3QHC model, Version 2.0 (USEPA, 1992) is the intersection model used for the CO dispersion analysis.

The CO concentrations were calculated for the maximum traffic volumes at representative “worst case” and “maximum” receptors for the years 2000 (existing), 2010 (estimated first year of potential operations), and 2025 (design year) for the No Build, PA-2 and PA-5/PA-5 MOD Alternatives. The “worst case” location is the property with the highest volume of traffic closest to a residential type receptor where occupants could be expected to remain for eight consecutive hours. The worst case location evaluated for this study is a motel in the northeast quadrant of the intersection of US-131 and Broadway Road. “Maximum” receptors were identified as those locations where the highest CO concentrations would be expected to occur, regardless of whether or not the location could be expected to have human inhabitants. The location for maximum CO concentration is at the ROW line in the southeast quadrant of the intersection of US-131 and Broadway.

Highest levels of CO tend to occur associated with idling traffic and the impacts for a new freeway on alignment would be expected to be less. For this reason, CO concentrations were calculated for the No Build, PA-5, and PA-5 MOD Alternatives. Alternative PA-2 was modeled because its corridor would be adjacent to US-131 service drive in the vicinity of Broadway Road.) A default background CO concentration of 3.0 parts per million (ppm) was used for an eight-hour analysis to represent the contribution of other sources to the ambient CO in the area. In addition, a persistence factor of 0.7 was used as per EPA guidance to reflect the fact that worst-case meteorological conditions would not be expected to persist for an eight-hour period.

The projected CO concentrations for the “worst case” and “maximum” receptors are shown in **Table A.1**. The highest worst case and maximum CO values for receptors occurred under the PA-2 scenario. The “worst case” and “maximum” CO values for PA-2 are below the NAAQS standard of 9.0 ppm. All other Practical Alternatives are likewise expected to be below the NAAQS standard of 9.0 ppm, and therefore no exceedance of the NAAQS is anticipated.

Table A.1 Eight-Hour Carbon Monoxide Concentrations (ppm)for the Maximum and (Worst-Case) Receptor Locations at US-131 and Broadway Road

Year	No-Build Alternative		Build Alternative PA-2	
	Maximum	Worst-Case	Maximum	Worst-Case
2000 – Existing	3.6	3.1	--	--
2010 – First Year of Operation	3.6	3.1	4.6	3.5
2025 – Design Year	3.8	3.2	4.5	3.7