

APPENDIX E
AIR QUALITY ANALYSIS

SEPTEMBER 2015

**CITY OF BATON ROUGE/
PARISH OF EAST BATON ROUGE**
STATE PROJECT NO. H.004104/FEDERAL AID PROJECT NO. IM 1709(507)



BUILDING BETTER ROADS FOR
EAST BATON ROUGE PARISH



LOUISIANA DEPARTMENT OF
TRANSPORTATION & DEVELOPMENT



**AIR QUALITY
TECHNICAL REPORT**

**PECUE LANE/I-10
INTERCHANGE
ENVIRONMENTAL
ASSESSMENT**

**EAST BATON ROUGE
PARISH, LOUISIANA**

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Project Number 653-002 Task 3.2



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ACRONYMS AND ABBREVIATIONS

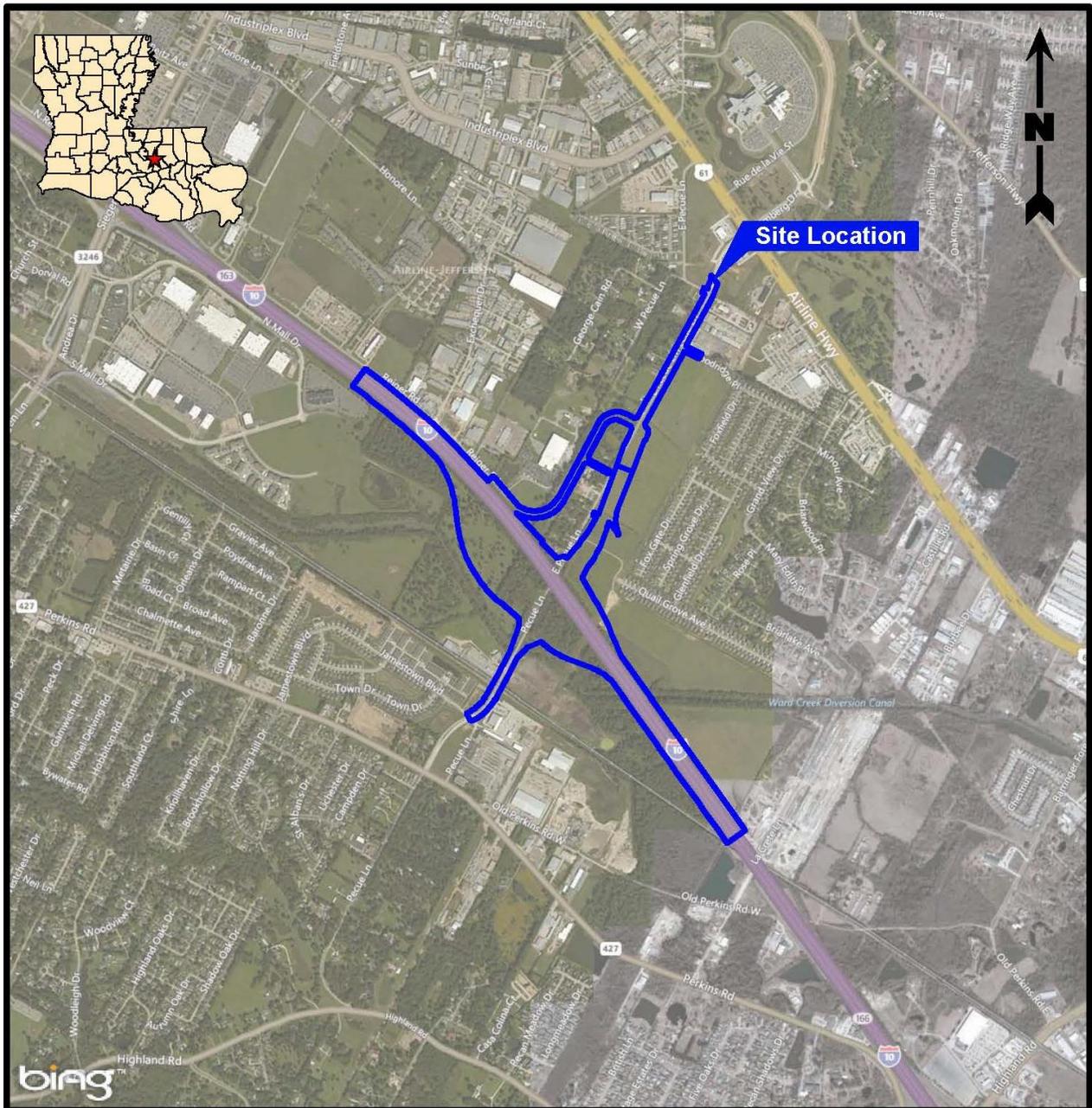
AADT	Average Annual Daily Traffic
ADT	Average Daily Traffic
BG	Background
BRNA	Baton Rouge Nonattainment Area
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CALINE	California Line Source Dispersion Model
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
DDI	Diverging Diamond Interchange
DOTD	Louisiana Department of Transportation and Development
EA	Environmental Assessment
ETC	Estimated Time of Completion
FHWA	Federal Highway Administration
GLP	Green Light Plan
HEI	Health Effects Institute
I-10	Interstate 10
IRIS	Integrated Risk Information System
LDEQ	Louisiana Department of Environmental Quality
MOVES	Motor Vehicle Emissions Simulator
mph	Miles Per Hour
MSATs	Mobile Source Air Toxics
MTP	Metropolitan Transportation Plan
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment
NEPA	National Environmental Policy Act
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
O ₃	Ozone
PM	Particulate Matter
ppb	Parts per Billion
ppm	Parts per Million
Providence	Providence Engineering and Environmental LLC
ROW	Right-of-Way
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
ug/m ³	Micrograms per Cubic Meter
USEPA	United States Environmental Protection Agency
VMT	Vehicle Miles Traveled
Vpd	Vehicles per Day
VOC	Volatile Organic Compounds

1.0 INTRODUCTION

1.0 INTRODUCTION

The City of Baton Rouge and Parish of East Baton Rouge (City-Parish), as part of the Green Light Plan Transportation and Street Improvements Program (GLP), are proposing to create a new interchange off of Interstate Highway 10 (I-10) at Pecue Lane in East Baton Rouge Parish, Louisiana. The proposed project involves the widening of Pecue Lane and the construction of a new interchange at I-10 and Pecue Lane, replacing the existing overpass. Ultimately, Pecue Lane will be widened from a primarily two-lane facility to an eight-lane facility; it's a five-lane facility from Jamestown Road to Perkins Road. In addition to lane widening, the project will include entrance and exit ramps on eastbound and westbound I-10, the replacement of the current two-lane overpass bridge and the Pecue Lane/Wards Creek Bridge, the installation of a raised median on Pecue Lane, and the construction of an extension of Rieger Road to Pecue Lane with a new intersection at Pecue Lane. **Figure 1** shows the proposed project location.

This air quality technical report summarizes the results of the air quality assessment for the Pecue Lane / I-10 Interchange project.



Legend

Project Boundary

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2015 Microsoft Corporation and its data suppliers.

Project Location Map

Pecue Lane Air Quality Technical Report
Baton Rouge, East Baton Rouge Parish, Louisiana

East Baton Rouge Parish
Pecue Lane / I-10 Interchange



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Checked By	LMH	08/21/15
Approved By	BT	08/21/15

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2.0 PURPOSE AND NEED

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Increased travel demand and changing travel patterns have resulted in heavy congestion on and at existing interchanges along I-10 within the project area. A new interchange is needed to alleviate congestion by providing additional access to and from I-10 in the project area.

The purpose of the project is to relieve congestion at existing I-10 interchanges in the project area, reduce travel time, redistribute traffic on the local network decreasing surface street delays, and provide access for trucks to and from I-10 to local commercial and industrial corridors.

3.0 DESCRIPTION OF EXISTING FACILITY

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The existing primary roadway network within the project limits consists of I-10, Pecue Lane, and Rieger Road. I-10 is a northwest-southeast oriented freeway. The existing I-10 facility consists of a six-lane divided principal arterial roadway with three 12-foot travel lanes in each direction. The existing Pecue Lane is primarily a two-lane facility with a single 12-foot travel lane in each direction from Airline Highway south to Jamestown Boulevard, where it transitions to a five-lane facility until it reaches Perkins Road. Rieger Road parallels I-10 on the north side from Siegen Lane to approximately 1,200 feet west of Pecue Lane where it dead ends. Rieger Road consists of a two-lane roadway with 12-foot travel lanes in each direction.

The typical existing right-of-way (ROW) width varies from approximately 100 feet for Rieger Road, 100-150 feet along Pecue Lane, and 250 feet for the main lane sections of I-10. The current speed limit within the project corridor is 70 miles per hour (mph) along I-10; 40 mph along Pecue Lane, and 45 mph along Rieger Road.

For the purpose of this analysis, vehicular traffic data within the project limits have been examined to determine potential Carbon Monoxide (CO) impacts along the proposed project alternative corridors for year 2020 [estimated time of completion (ETC)] and year 2037 [Baton Rouge Metropolitan Transportation Plan (MTP) out-year]. The maximum projected Average Daily Traffic (ADT) in vehicles per day (vpd) for each primary roadway within the project limits is shown in **Table 1**. The ADTs used in the CO analysis varied from those shown in **Table 1** depending on roadway segment analyzed.

Table 1 – Projected Maximum ADT along the Pecue Lane at I-10 Project Corridor

Location	Maximum ADT (vpd)	
	2020 (ETC)	2037 (MTP out-year)
Pecue Lane north of I-10	31,465	44,940
Pecue Lane south of I-10	18,609	26,579
Rieger Road	2,798	3,997
EB I-10 off ramp to Pecue Lane	7,272	10,387
EB I-10 on ramp from Pecue Lane	4,052	5,787
WB I-10 off ramp to Pecue Lane	6,333	9,045
WB I-10 on ramp from Pecue Lane	8,463	12,087
I-10 west of Pecue Lane	109,084	155,800
I-10 east of Pecue Lane	103,734	148,157

Source: Urban Systems Inc., Traffic Modeling, 2015

4.0 DESCRIPTION OF PROPOSED FACILITY

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A total of two alternatives are being considered for the Proposed Action. These alternatives include the Build (Preferred) Alternative, and the No-Build Alternative. A description of each alternative is provided below.

4.1 Build (Preferred) Alternative

The proposed project involves the widening of Pecue Lane and the construction of a new interchange at I-10 and Pecue Lane, replacing the existing overpass. Ultimately, Pecue Lane will be widened to an eight-lane facility. In addition to lane widening, the project will include entrance and exit ramps on eastbound and westbound I-10; the replacement of the current two-lane overpass bridge and the Pecue Lane/Wards Creek Bridge; the installation of a raised median on Pecue Lane; and the construction of an extension of Rieger Road to Pecue Lane with a new intersection at Pecue Lane. Multiple build alternatives for the interchange of Pecue Lane with I-10 were developed and screened during the Environmental Assessment (EA) process. Alternative G, a Diverging Diamond Interchange (DDI), was ultimately selected as the Preferred Alternative. A DDI is a diamond interchange that more efficiently facilitates heavy left-turn movements. The Rieger Road Extension will be a signalized intersection with the proposed Pecue Lane with a dedicated left and right turn along with a through lane to access the property across Pecue Lane. **Figure 1** depicts the proposed Preferred Alternative.

The Preferred Alternative would generally have three 12-foot lanes in each direction along Pecue Lane with a raised median barrier. Rieger Road would consist of one 12-foot through travel lane in each direction from the existing terminus of Rieger Road south to Pecue Lane. Additional turn lanes would be constructed at the Pecue Lane and Rieger Road intersection. The I-10 ramps would generally consist of one 12-foot travel lane exiting or entering the I-10 main lanes. No construction would occur on the I-10 main lanes except for typical acceleration and deceleration lanes from/to the new I-10 interchange ramps. The typical ROW width for this alternative would vary from approximately 100-130 feet for Rieger Road, 200-300 feet along Pecue Lane, and from 250 feet for the main lane sections of I-10 to approximately 900 feet along I-10 at the proposed Pecue Lane intersection.

The design speed for the Preferred Alternative is 70 miles per hour for I-10, 45 mph for Pecue Lane, 20 to 30 mph across the Pecue Lane DDI, and 45 mph for Rieger Road.

4.2 No-Build Alternative

The No-Build Alternative would abandon the proposed improvements to Pecue Lane and the construction of a new interchange at Pecue Lane and I-10 and would maintain the current roadway alignment and traffic capacity. The No Build Alternative would involve taking no action to address traffic congestion or access deficiencies as identified in the Project Need. Routine maintenance of Pecue Lane would continue as needed, including pavement work, structural bridge repairs, and other rehabilitation efforts. Routine maintenance would not do anything to widen or otherwise increase capacity or access requirements of the existing roadway network.

5.0 EXISTING CONDITIONS

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This section provides an overview of air quality standards and the regulatory setting, existing air quality and National Ambient Air Quality Standard (NAAQS) compliance, regional attainment and the attainment status for the area potentially affected by the proposed project, transportation conformity requirements, and mobile source air toxics (MSATs).

5.1 Air Quality Standards and Regulatory Setting

Background emissions are influenced by a number of factors, including climate, topography, wind conditions, and the production of airborne pollutants by natural or artificial sources. Tailpipe emissions from cars and trucks produce approximately a third of the air pollution in the United States and are a major source of CO, oxides of nitrogen/nitrogen dioxide (NO_x/NO₂), and volatile organic compounds (VOCs). Ozone (O₃), which is not directly emitted from automobiles (or other sources), is formed in the atmosphere by chemical reactions involving VOCs, NO_x, and sunlight. Carbon monoxide is the primary component of vehicle exhaust and contributes approximately 60 percent of all CO emissions in the United States. Particulate matter (PM) emissions are also important if the local environment includes a high concentration of diesel emission sources, such as heavy trucks. In addition, MSAT emissions are associated with motor vehicle sources.

In compliance with the requirements of the Federal Clean Air Act (CAA) of 1970 and the Clean Air Act Amendments (CAAA) of 1977 and 1990, the United States Environmental Protection Agency (USEPA) promulgated and adopted the NAAQS to protect public health, safety, and welfare from known or anticipated effects of six criteria pollutants. The six criteria pollutants are ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM with an aerodynamic diameter of 10 microns or less (PM₁₀) and 2.5 microns or less (PM_{2.5}), and lead. The NAAQS define the allowable concentrations of pollutants that may be reached but not exceeded during a given period of time. The purpose of these standards is primarily to protect human health and secondarily, human welfare with a reasonable margin of safety. The CAA requires that all states attain compliance through adherence to the NAAQS, as demonstrated by the comparison of measured pollutant concentrations with the NAAQS.

The NAAQS are typically measured in units of micrograms per cubic meter (µg/m³), parts per million (ppm), or parts per billion (ppb). The NAAQS primary and secondary standards are shown in **Table 2**.

Table 2 – National Ambient Air Quality Standards

Pollutant	Averaging Period	Threshold for Standard	Primary NAAQS	Secondary NAAQS
Carbon Monoxide (CO)	1-hr	Not to be exceeded more than once per calendar year.	35 ppm	None
	8-hr	Not to be exceeded more than once per calendar year.	9 ppm	None
Lead (Pb)	Rolling 3-Month Average	Not to be at or above this level.	0.15 µg/m ³	0.15 µg/m ³
Nitrogen Dioxide (NO ₂)	1-hr	The three-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed this level.	0.100 ppm	None
	Annual	Annual mean.	0.053 ppm	.053 ppm
Particulate Matter (PM ₁₀)	24-hr	Not to be exceeded more than once per year on average over three years.	150 µg/m ³	150 µg/m ³
Particulate Matter (PM _{2.5})	24-hr	The three-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed this level.	35 µg/m ³	35 µg/m ³
	Annual	The three-year average of the weighted annual mean concentrations from single or multiple community-oriented monitors is not to exceed this level.	12 µg/m ³	15 µg/m ³
Ozone (O ₃)	8-hr (2008 std)	The annual fourth-highest daily maximum 8-hour concentration averaged over three years at each monitor within an area must not exceed this level.	0.075 ppm	0.075 ppm
Sulfur Dioxide (SO ₂)	1-hr	The three-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed this level.	0.075 ppm	None
	3-hr	Not to be exceeded more than once per year.	None	0.5 ppm

Source: USEPA 2015

5.2 Local Monitoring Data

The Baton Rouge metropolitan area is located about 60 miles inland from the Gulf of Mexico and has a warm, humid subtropical climate. Average monthly high temperatures ranges from 62°F in January to 92°F in July and August. Average annual precipitation is 60.6 inches, placing Baton Rouge fifth among the ten wettest cities in the United States. Prevailing winds are from the south or southeast, with the influence from Gulf of Mexico air to the south quite pronounced. Afternoon sea breeze activity off the Gulf of Mexico allows for efficient mixing of local air pollutants. As a result, long-term air pollution episodes resulting from stagnant air masses are uncommon. Air pollution episodes in the Baton Rouge area are usually associated with the high temperatures and intense sunlight of the summer months, which are more conducive to ozone production than the winter months.

Outdoor air quality in a given location is described by the concentration of various pollutants in the atmosphere. Air quality is a function of several factors, including the quantity and dispersion rates of pollutants in the region, temperature, the presence or absence of meteorological inversions, and topographic features of the region.

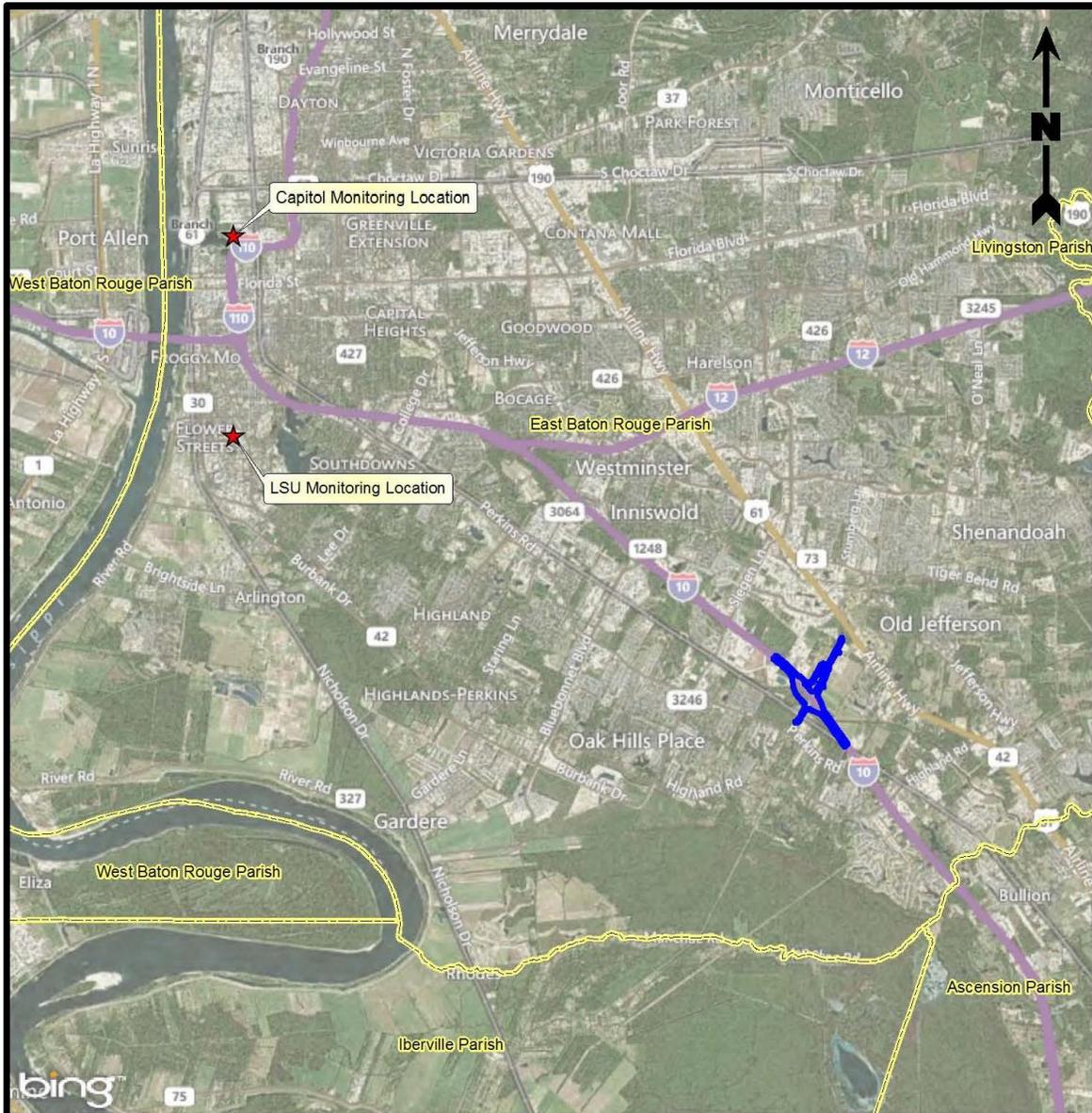
The USEPA has delegated authority for monitoring and enforcing air quality regulations in Louisiana to the Louisiana Department of Environmental Quality (LDEQ) Assessment Division. The LDEQ may adopt other, more stringent, air quality standards than those of the USEPA; however, the LDEQ observes the same air quality standards as the USEPA.

The LDEQ operates air monitoring stations throughout the Baton Rouge metropolitan area. The nearest active LDEQ ozone monitoring station to the proposed project is the Louisiana State University (LSU) monitoring site, which is located approximately 8.5 miles to the west-northwest. A second LDEQ ozone and carbon monoxide monitoring site (Capitol) is located approximately 10.2 miles to the northwest. **Table 3** shows the air monitoring site information. The locations of the air monitors are shown in **Figure 2**.

Table 3 – Nearest Active Ozone Air Monitoring Stations

Air Monitoring Station	Location	Parameters Monitored	Date Active
LSU USEPA AQS 220330003	East End Aster Lane, Baton Rouge – within 8.5 miles of the project study area	O ₃ , VOC, NO _x , meteorology	November 1977
Capitol USEPA AQS 220330009	1061A Leesville Avenue – within 10.2 miles of the project study area	PM _{2.5} /PM ₁₀ , O ₃ , SO ₂ , CO, VOC, NO _x , Lead, meteorology	August 1, 1982

Source: LDEQ 2015



2 1 0 2 Miles

Legend

- Project Boundary
- Parish Boundary
- ★ Air Monitoring Location

Reference

Base map comprised of Bing Maps aerial imagery from (c) 2015 Microsoft Corporation and its data suppliers..

Air Monitoring Location Map

Pecue Lane Air Quality Technical Report
Baton Rouge, East Baton Rouge Parish, Louisiana

East Baton Rouge Parish
Pecue Lane / I-10 Interchange

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As shown in **Table 4**, the three-year average of the fourth highest daily maximum monitored eight-hour average ozone concentration registered at the nearest active ozone monitoring stations between 2012 and 2014 is 0.075 ppm at the LSU monitoring site and 0.072 ppm at the Capitol monitoring site. Both values are equal to or less than the eight-hour ozone NAAQS of 0.075 ppm.

Table 4 – Local Air Monitoring Stations Ozone Data Summary 8-Hour Maximum Concentration (ppm)

Pollutant	Location	2012	2013	2014	Three-Year Average*
Ozone (O ₃)	LSU USEPA AQS 220330003	0.079	0.075	0.072	0.075
	Capitol USEPA AQS 220330009	0.076	0.072	0.069	0.072

* Represents the annual fourth-highest daily maximum 8-hour concentration (in ppm) averaged over a three year period for comparison of ozone monitoring data with the ozone NAAQS.

Source: LDEQ, 2015

As shown in **Table 5**, the maximum monitored one-hour average carbon monoxide concentration registered at the Capitol monitoring site between 2012 and 2014 is 5.34 ppm. This level is less than the one-hour carbon monoxide NAAQS of 35 ppm. The maximum Annual Mean background concentration for the three-year period is 0.26 ppm in 2014.

Table 5 – Local Air Monitoring Station Carbon Monoxide Data Summary 1-Hour Maximum Concentration (ppm)

Pollutant	Location	2012	2013	2014
Carbon Monoxide (CO)	Capitol USEPA AQS 220330009	2.27	2.10	5.34*

* The corresponding Annual Mean (background) concentration for 2014 is 0.26 ppm. This value is used for the ambient carbon monoxide concentration in the CO modeling analysis.

Source: LDEQ, 2015

5.3 Regional Air Quality and Attainment Status

The USEPA designates geographic areas in a state with respect to meeting the NAAQS as attainment, nonattainment, or unclassifiable. Areas transitioning from nonattainment to attainment are termed maintenance areas. The nonattainment areas are designated based on the degree of violation of the NAAQS. For ozone, the designations are marginal, moderate, serious, severe, and extreme. For each nonattainment area, the USEPA requires a separate local plan detailing how NAAQS levels will be met. These plans are incorporated into a State Implementation Plan (SIP)

for the state. Transportation projects in nonattainment areas are coordinated with the SIP under what is called the conformity process.

The proposed project is located in East Baton Rouge Parish which is part of the Baton Rouge 5-parish area that was designated by USEPA in July 2012 as a marginal nonattainment area for the 8-hour ozone standard; therefore, the transportation conformity rules apply. The USEPA has given the Baton Rouge 5-parish nonattainment area an attainment date of December 31, 2015. The Baton Rouge area is considered in attainment or unclassifiable with respect to all other NAAQS pollutants including carbon monoxide.

On June 17, 2015, the LDEQ submitted a formal request for redesignation to attainment for the 2008 8-hour Ozone National Ambient Air Quality Standard (NAAQS) and a maintenance plan for the 5-parish Baton Rouge Nonattainment Area (BRNA). The request was based on the most recent monitoring data for the BRNA that showed a design value of 0.075 ppm or 75 ppb as of December 31, 2013.

5.4 Transportation Conformity

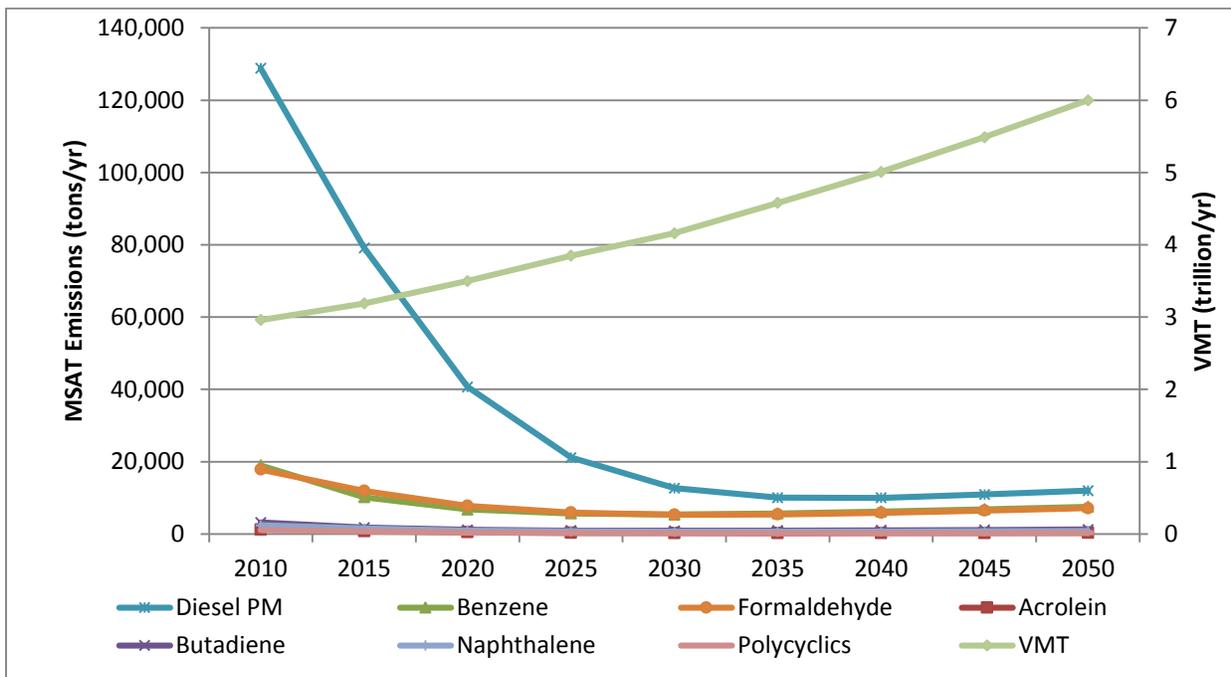
The proposed project is located within an ozone nonattainment or maintenance area; therefore, the project must comply with the project-level conformity criteria as listed in 40 CFR Part 93. A project conforms to the SIP if it comes from a conforming MTP. The proposed Pecue Lane / I-10 Interchange project is included in the *Baton Rouge Metropolitan Transportation Plan 2037*, (Capital Region Planning Commission, July 2013). The project is also included in the latest version of the TIP, *Transportation Improvement Program for the Baton Rouge Metropolitan Area, 2015-2018* (Capital Region Planning Commission, last modified July 2015), as State Project No. H.003047 and MTP No. 136. The USEPA and the Federal Highway Administration (FHWA) last approved the air quality conformity plans on July 12, 2013.

5.5 Mobile Source Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. The USEPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (<http://www.epa.gov/ncea/iris/index.html>). In addition, the USEPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (<http://www.epa.gov/ttn/atw/nata1999/>). These seven compounds are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these compounds as the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future USEPA rules.

The 2007 USEPA MSAT rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. Based on an FHWA analysis using USEPA’s MOVES2010b model, as shown in the **Figure 3** and **Table 6**, even if vehicle activity (vehicle-miles travelled, VMT) increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Figure 3 – Projected National MSAT Emission Trends 2010 – 2050 for Vehicles Operating on Roadways Using USEPA’s MOVES2010b Model



Source: Table 6 below.

Note: Trends for specific locations may be different, depending on locally derived information representing vehicle miles traveled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

Table 6 – Projected National MSAT Emission Trends 2010 – 2050 for Vehicles Operating on Roadways Using USEPA’s MOVES2010b Model

Pollutant / VMT	Pollutant Emissions (tons) and Vehicle-Miles Traveled (VMT) by Calendar Year									Change
	2010	2015	2020	2025	2030	2035	2040	2045	2050	2010 to 2050
Acrolein	1,244	805	476	318	258	247	264	292	322	-74%
Benzene	18,995	10,195	6,765	5,669	5,386	5,696	6,216	6,840	7,525	-60%
Butadiene	3,157	1,783	1,163	951	890	934	1,017	1,119	1,231	-61%
Diesel PM	128,847	79,158	40,694	21,155	12,667	10,027	9,978	10,942	11,992	-91%
Formaldehyde	17,848	11,943	7,778	5,938	5,329	5,407	5,847	6,463	7,141	-60%
Naphthalene	2,366	1,502	939	693	607	611	659	727	802	-66%
Polycyclics	1,102	705	414	274	218	207	219	240	262	-76%
Trillions VMT	2.96	3.19	3.5	3.85	4.16	4.58	5.01	5.49	6	102%

Source: USEPA MOVES2010b model runs conducted during May – June 2012 by FHWA.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA). The FHWA, USEPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

6.0 AIR QUALITY IMPACTS

6.0 AIR QUALITY IMPACTS

This section provides results of the air quality analysis, provides an assessment of potential mobile source air toxics emissions along the project corridor, and discusses construction-related air emissions and potential mitigation activities.

6.1 Carbon Monoxide Traffic Air Quality Analysis

Carbon monoxide is a product of incomplete combustion and occurs when carbon in the fuel is partially oxidized rather than fully oxidized to carbon dioxide (CO₂). CO reduces the flow of oxygen in the bloodstream and is particularly dangerous to persons with heart disease. Exposure to CO can impair visual perception, manual dexterity, learning ability, and performance of complex tasks.

The maximum traffic volumes within the project limits for the estimated time of completion year (2020) and the design year / MTP out-year (2037) are shown in Table 1. Maximum predicted traffic along Pecue Lane occurs north of I-10 and is estimated to be 31,465 vehicles per day in 2020, and 44,940 vehicles per day in 2037. Maximum predicted traffic along I-10 is higher with 109,084 vehicles per day in 2020, and 155,800 vehicles per day in 2037. Except for new ramps to be constructed at I-10 and associated acceleration and deceleration lanes to/from I-10, no additional roadway construction will occur along the I-10 main lanes. However, emissions from the new I-10 ramps and adjacent main lane sections have been included in the CO air quality analysis with resulting concentrations determined at the I-10 and Pecue Lane ROW.

CO concentrations for the proposed action were modeled using Motor Vehicle Emissions Simulator (MOVES2014) emission factors and the CALINE3 dispersion model and factoring in adverse meteorological conditions and sensitive receptors at the right-of-way line. The following section discusses the CO modeling methodology followed for the project Preferred Alternative.

6.1.1 CO Modeling Methodology

A conservative approach was used to determine maximum predicted CO modeling for the project's Preferred Alternative, Alternative G. Each primary roadway (I-10 and I-10 Ramps, Pecue Lane, and Rieger Road) was analyzed for ADT¹ within the existing project limits and proposed alignment for the Preferred Alternative. Based on this analysis, peak AM and PM traffic volumes, including combined main lane and ramp traffic on I-10 and combined two-way traffic on Pecue Lane and Rieger Road, were identified for each primary roadway for each year modeled (i.e., 2020 or 2037). The corresponding ROW width for the roadway segment was also noted.

Table 7 provides the primary roadway segments within the project limits, the proposed ROW width, the anticipated maximum traffic volumes for the roadway segment, and the peak design hourly traffic volume (DHV) used in the CO

¹ Traffic data used in the analysis was obtained from Urban Systems Inc. and concurred with for use by East Baton Rouge Parish and the Louisiana Department of Transportation and Development (DOTD).

modeling analysis. Input data into the CALINE3 air quality model included all primary roadway segments within the project limits, peak design hourly traffic volumes per roadway segment, MOVES2014 based CO emissions per roadway segment in grams/mile, and CO receptors placed at the nearest ROW. Proposed typical sections and aerial geometry developed during the course of the EA were reviewed for this analysis.

Table 7 – CO Modeling Input Variables

Year	Alternative	Roadway Segment	Proposed ROW Width (feet)	Maximum Traffic Volume	Peak Hourly Traffic Volume (DHV)
2020	Preferred	I-10	250-900	109,084	10,521
		I-10 Ramps	100	8,463	1,032
		Pecue Lane	200-300	31,465	4,132
		Rieger Road	100-130	2,798	1,559
2037	Preferred	I-10	250-900	155,800	15,092
		I-10 Ramps	100	12,087	1,481
		Pecue Lane	200-300	44,940	5,879
		Rieger Road	100-130	3,997	2,225

6.1.2 CO Modeled Results

Local concentrations of CO within the project limits are not expected to exceed national standards at any time. The following table summarizes the results of the air quality analysis for the Preferred Alternative and primary roadway segments. As shown in **Table 8**, the maximum predicted 1-hour CO concentration within the Preferred Alternative project limits for any roadway is 1.6 parts per million (ppm). This value is approximately 4.6% of the corresponding CO 1-hr NAAQS standard of 35 ppm. The maximum predicted 8-hour CO concentration within the project limits for the Preferred Alternative is 1.0 ppm. This value is approximately 11.1% of the corresponding CO 8-hr NAAQS standard of 9 ppm. In both cases, the maximum predicted concentration occurs at the ROW closest to the beginning of the I-10 eastbound off ramp to Pecue Lane.

Eight-hour CO concentrations were determined based on the following 1-hour conversion formula:

$$CO8 = (CO1 - BG1) 0.6 + BG8$$

Where:

- CO8 = Eight-hour CO concentration
- CO1 = One-hour CO concentration
- BG1 = One-hour background CO concentration
- 0.6 = Persistence factor (meteorology and traffic)
- BG8 = Eight-hour background CO concentration

Table 8 – Maximum Carbon Monoxide Concentrations (ppm)*

Year	Alternative	Roadway Segment	1-hr CO Concentration	1-hr % NAAQS	8-hr CO Concentration	8-hr % NAAQS
2020	Preferred	I-10 Ramps	1.6	4.6%	1.0	11.1%
		Pecue Lane	0.6	1.7%	0.4	4.4%
		Rieger Road	0.9	2.6%	0.6	6.7%
2037	Preferred	I-10 Ramps	1.1	3.1%	0.7	7.8%
		Pecue Lane	0.5	1.4%	0.3	3.3%
		Rieger Road	0.6	1.7%	0.4	4.4%

*The National Ambient Air Quality Standard (NAAQS) for CO is 35 ppm for one-hour and 9 ppm for eight hours. Analysis includes a one-hour background concentration of 0.3 ppm and an 8-hour background concentration of 0.2 ppm.

Notes:

- (1) The CO analysis was based on MOVES2014.
- (2) In accordance with FHWA guidance, CO concentrations were determined with receptors placed at the ROW line.

6.2 Mobile Source Air Toxics

The proposed project adds capacity and the design-year traffic projections within the project limits indicate an annual average daily traffic (AADT) of less than 140,000 vehicles per day; therefore, a qualitative MSAT analysis has been performed for each project alternative.

The following subsections include a qualitative MSAT assessment for the Preferred and No Build alternatives.

6.2.1 Qualitative MSAT Analysis

6.2.1.1 Project Specific MSAT Information

A qualitative MSAT analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from various alternatives of a project. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at:

http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.pdf.

For each alternative in this document, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Preferred Alternative is slightly higher than for the No Build Alternative along I-10, and higher than for the No Build Alternative along Pecue Lane, because the new interchange and future area development attracts trips on Pecue Lane that were not occurring in this area before. This increase in VMT means MSATs under the Preferred Alternative would probably be higher than the No Build Alternative along Pecue Lane. However, substantially higher levels of MSAT are not expected along I-10 from the Preferred Alternative compared to the No Build Alternative. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050. The project-specific conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. In addition, the national projections reflect an earlier start year (2010 versus 2020) and longer study duration (40 years versus 30 years). 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 virtually all locations.

In addition, there may be localized areas within the project limits where VMT would increase, and other areas where VMT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along new roadway sections constructed closer to adjacent residential areas including along Pecue Lane north of I-10, along Rieger Road west of Pecue Lane, and near the Pecue Lane and I-10 interchange. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of USEPA's vehicle and fuel regulations.

In sum, under the Preferred Alternative in the design year, it is expected there would be higher MSAT emissions in the study area relative to the No Build Alternative due to increased VMT. There could be slightly elevated but unquantifiable changes in MSATs to residents and others in a few localized areas where VMT increases, which may be important to members of sensitive populations. However, on a regional basis, USEPA's vehicle and fuel regulations coupled with fleet turnover will cause region-wide MSAT levels to be significantly lower than today in almost all cases.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with the proposed alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The USEPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the CAA and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (USEPA, <http://www.epa.gov/iris/>). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, <http://pubs.healtheffects.org/view.php?id=282>) or in the future as vehicle emissions substantially decrease (HEI, <http://pubs.healtheffects.org/view.php?id=306>).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the

extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (<http://pubs.healtheffects.org/view.php?id=282>). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The USEPA (<http://www.epa.gov/risk/basicinformation.htm#g>) and the HEI (<http://pubs.healtheffects.org/getfile.php?u=395>) have not established a basis for quantitative risk assessment of diesel PM in background settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the USEPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires USEPA to determine an “acceptable” level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than one in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld USEPA’s approach to addressing risk in its two step decision framework.

Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable. Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities, plus improved access for emergency response, that are better suited for quantitative analysis.

Conclusion

A qualitative MSAT assessment has been provided relative to the various alternatives of MSAT emissions and has acknowledged that the project's Preferred Alternative may result in increased exposure to MSAT emissions in certain locations. However, since concentrations and duration of exposures are uncertain, the health effects from these emissions cannot be estimated.

6.2.1.2 Impacts of the No Build Alternative

The No Build Alternative would result in gradually increasing VMT as traffic volumes increase and traffic congestion worsens within the existing roadway system over time. However, MSAT emissions will likely be lower than present levels in future years as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050.

6.3 Construction-Related Air Emissions

During the construction phase of this project, temporary increases in air pollutant emissions may occur from construction activities. The primary construction-related emissions are particulate matter (fugitive dust) from site preparation which is temporary in nature (only occurring during actual construction). The potential impacts of particulate matter emissions will be minimized by using fugitive dust control measures such as covering or treating disturbed areas with dust suppression techniques, sprinkling of water in dust prone areas, covering loaded trucks, and other dust abatement controls, as appropriate.

The construction activity phase of this project may also generate a temporary increase in MSAT emissions from construction activities, equipment and related vehicles. The primary construction-related MSAT emissions are particulate matter from site preparation and diesel particulate matter from diesel powered construction equipment and vehicles.

The MSAT emissions will be minimized by federal measures that require the use of low emission diesel fuel for non-road diesel construction equipment operated in East Baton Rouge Parish, and by provisions that would be included in the plans and specifications that require the contractor to minimize construction air quality impacts through abatement measures such as limits on construction equipment idling and other emission limitation techniques, as appropriate.

However, considering the temporary and transient nature of construction-related emissions, as well as the mitigation actions to be utilized, it is not anticipated that emissions from construction of this project would have any significant impact on air quality in the area.

7.0 CONCLUSIONS

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The Pecue Lane at I-10 Interchange project would not be expected to cause or exacerbate a violation of any NAAQS. There would be no adverse air quality impacts associated with the implementation of the proposed project. Therefore, no mitigation measures are proposed with respect to operational activities.

Construction activities have the potential to produce short-term, localized air quality impacts. Potential impacts include increased MSAT emissions from construction equipment and vehicles and temporary impacts due to fugitive dust emissions. Mitigation measures to alleviate temporary impacts from construction activities are described in the previous section.

8.0 REFERENCES

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