



# Project Development & Environment (PD&E) Study

## Air Quality Impact Technical Memorandum

### Simpson Road Improvements US 192 to 560 feet south of Myers Road

*Osceola County, Florida*

*Contract No. PS-18-9906-DG*

**Osceola County**

Department of Transportation and Transit

**Prepared By**

Environmental Transportation Planning, LLC

**May 2020**



# Air Quality Impact

Technical Memorandum



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The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by Osceola County pursuant to Title 23, Section 327 of the United States Code (23 U.S.C. § 327) and a Memorandum of Understanding dated December 14, 2016 and executed by the Federal Highway Administration (FHWA) and Florida Department of Transportation (FDOT).



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### ACRONYMS

ALT	Alternative
CO	Carbon Monoxide
CO <sup>2</sup>	Carbon Dioxide
CR	County Road
DHV	Design Hourly Volume
EB	Eastbound
EPA	U.S. Environmental Protection Agency
FDOT	Florida Department Of Transportation
FHWA	Federal Highway Administration
FM No.	FDOT Financial Management Number
L RTP	Long Range Transportation Plan
MPH	Miles Per Hour
NAAQS	National Ambient Air Quality Standards
NB	Northbound
NEPA	National Environmental Policy Act
PD&E	Project Development & Environment
PPM	Parts per Million
ROW	Right-of-Way
SB	Southbound
SR	State Road
TPO	Transportation Planning Organization
VPH	Vehicles per Hour
WB	Westbound



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### 1.0 Introduction

Osceola County is conducting a Project Development and Environment (PD&E) study for an approximate 4.2-mile portion of Simpson Road. The Simpson Road PD&E Study evaluated road corridor alternatives for providing additional roadway capacity to meet the needs of the growing Osceola County community along a 4.2-mile segment of Simpson Road from US 192 to 560 feet south of Myers Road, as shown on **Figure 1**.



**Figure 1: Project Location Map**





### 1.1 Technical Memorandum Objective

This Air Quality Impact Technical Memorandum is one of several documents prepared as part of the PD&E Study. The analysis of air quality effects is based on the local area's attainment status for each of the National Ambient Air Quality Standards (NAAQS) <sup>1</sup> established by the U.S. Environmental Protection Agency (EPA). The objective of this technical memorandum is to summarize the air quality impact analyses conducted for the proposed project. The analysis contained herein will be used in the project's environmental document.

### 1.2 Project Description

Although the Simpson Road PD&E Study addressed the entire corridor from US 192 to 560 feet south of Myers Road, incremental implementation of the improvements is anticipated. For this reason, the Simpson Road corridor is segmented into four construction phases, as defined by Osceola County. Construction Phase 1 is outside of the project limits and under design by others. Construction Phases 2, 3, and 4 are within the PD&E Study limits. Pond sites and a floodplain compensation area are also evaluated as part of this PD&E Study.

The four segments, listed in order of proposed construction phase, are described below:

#### Phase 1

**560 feet south of Myers Road to Boggy Creek Road:** This 1.4-mile, two lane segment is outside the limits of the Simpson Road PD&E Study from US 192 to 560 feet south of Myers Road. While this segment is undergoing design by others, it is identified to facilitate completeness of the Simpson Road corridor.

#### Phase 2

**Hilliard Isle Road to 560 feet south of Myers Road:** This 1.4-mile, two lane segment, was evaluated to widen to four lanes, including a 10-foot shared use path on both sides of the roadway. The improvements recommended by this PD&E Study provide a typical section that ties into the existing four lane roadway 560 feet south of Myers Road and the intersection with Osceola Parkway.

#### Phase 3

**US 192 to Fortune Road:** This 1.3-mile, two lane segment, was evaluated to widen to four lanes, including a 10-foot shared use path on both sides of the roadway. The improvements would tie into the planned new bridge over the Turnpike, which will be designed and constructed by others.

#### Phase 4

**Fortune Road to Hilliard Isle Road:** This 1.5-mile segment, includes an existing 5-lane undivided highway with limited sidewalks and no bicycle facilities. It was evaluated to increase capacity through intersection improvements with the addition of auxiliary lanes while also maintaining four through lanes. Additionally, improvements include a 10-foot shared use path on both sides of the roadway.

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<sup>1</sup> National Ambient Air Quality Standards (NAAQS). [www.epa.gov/criteria-airpollutants/naaqs-table](http://www.epa.gov/criteria-airpollutants/naaqs-table)





### 1.3 Purpose and Need

The primary project purpose will be to enhance mobility along Simpson Road from US 192 to 560 feet south of Myers Road and to improve connections between the City of Kissimmee, the emerging NeoCity, the Orlando International Airport (OIA), and the emerging Medical City at Lake Nona. A secondary purpose will be to improve overall traffic operations and safety along the existing highway network within the PD&E Study area.

The primary needs for this project include providing consistency with transportation plans, establishing system linkages, increasing capacity, addressing transportation demand, improving safety, and meeting social and economic needs. In addition, the proposed project will provide improved modal interconnections.

### 1.4 Preferred Alternative

With public participation, coordination with Osceola County staff, and approval from the Osceola Board of County Commissioners, the alternatives advancing for further engineering development and environmental analyses are Alternative B for the corridor roadway improvements and Option 2 for the intersection improvements at Fortune Road and Buenaventura Boulevard, including the use of standard intersection designs for the interim period.

The Alternative B typical section in Phase 2 and 3 (refer to **Figure 2** on the following page) would include a four-lane divided roadway with a 26-foot median. This alternative would include a 10-foot shared path for both bicycles and pedestrians and requires a 115-foot right-of-way (ROW). In Phase 4, the ROW need expands to 125 feet to support four lanes plus an auxiliary turn lane in each direction with a 10-foot shared use path for bikes and pedestrians (refer to **Figure 3** on the following page).

The proposed Option 2 Quad Road configuration would utilize short connector roads or “Quad Roads” to re-route traffic near Fortune Road and Buenaventura Boulevard. The Quad Roads configuration would improve traffic flow by distributing traffic across the entire network and alleviating the demand at major intersections.

At Fortune Road, the Quad Road would be constructed in the northeast quadrant to service the southbound left-turn and the westbound right-turn at Fortune Road. The southbound left-turn lane would be removed from the main intersection to facilitate use of the Quad Road. However, the westbound right-turn would remain to provide access to businesses on the east side of Simpson Road. The Quad Road would service the majority of the westbound right-turn volume since it provides a “short cut” to bypass the main intersection. Two new signalized intersections would be required to support the Quad Road.

At Buenaventura Boulevard, the Quad Road would be constructed in the southwest quadrant utilizing existing roads adjacent to the shopping center. The Buenaventura Boulevard intersection would serve as the primary intersection for all movements; however, the Quad Road would support bypass traffic to the shopping center or nearby residential communities.





### 1.5 No-Build Alternative

Consistent with the Federal Highway Administration (FHWA) guidelines, this analysis also considers an alternative that assesses what would happen to the environment in the future if this proposed project was not built. This alternative, called the No-Build Alternative, maintains the existing configuration of Simpson Road and adjacent roadways within the study area. Also included in the No-Build Alternative are the Florida Department of Transportation (FDOT) intersection improvements at Fortune Road that have been planned for construction prior to 2025. The FDOT planned intersection configuration changes would include: converting the free-flow southbound right-turn lane to a signalized dual right-turn lane; adding a second southbound left-turn lane; adding a second eastbound and westbound through lane on Fortune Road; adding a northbound right-turn lane; and installing medians at all approaches.

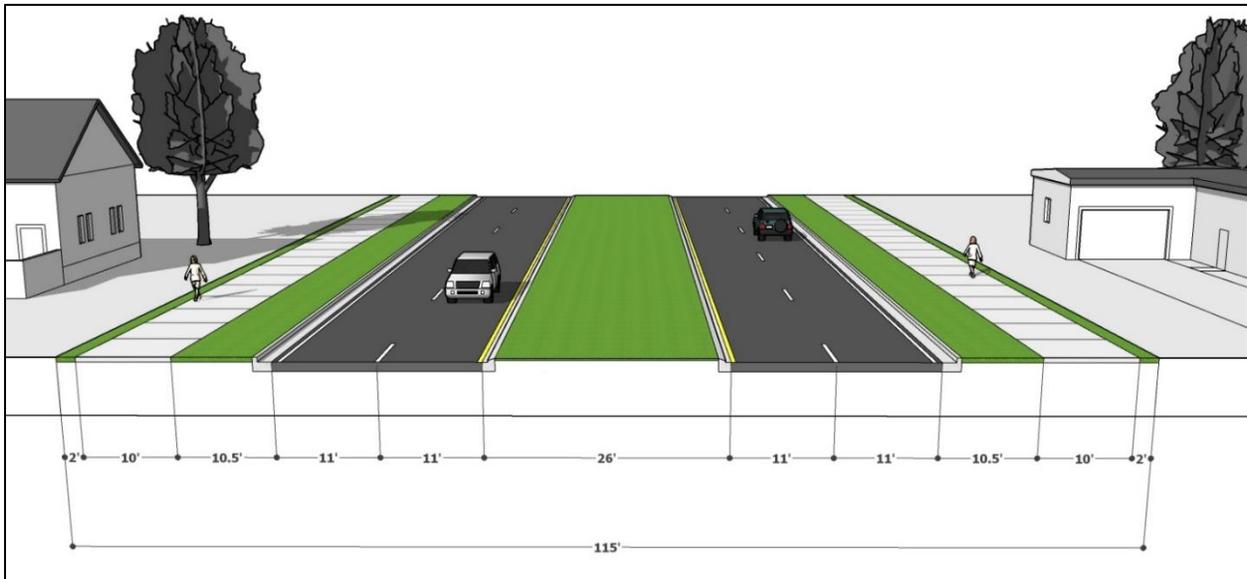


Figure 2: Phase 2 & 3 Typical Section

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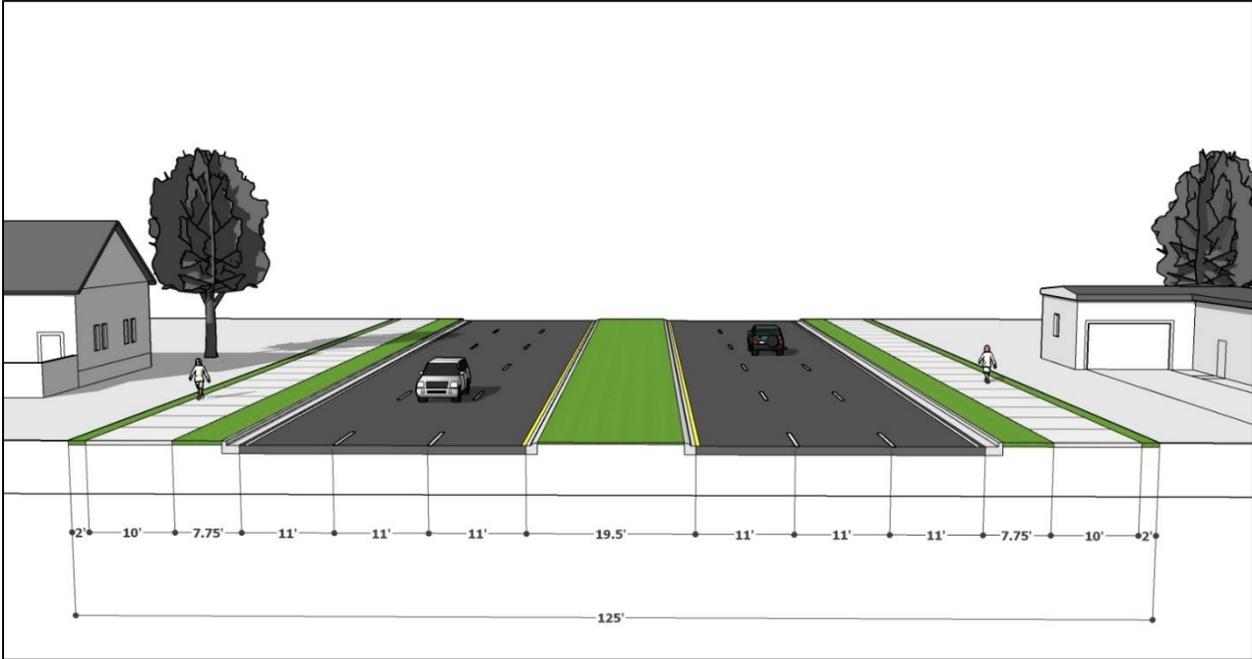


Figure 3: Phase 4 Typical Section





## 2.0 Air Quality Screening Test

A PD&E Study air quality impact analysis focuses on carbon monoxide (CO) and two sizes of particulate matter, 2.5 microns (PM<sub>2.5</sub>) and 10 microns (PM<sub>10</sub>). The extent of the analysis varies according to the size of the project, existing air quality issues, and the degree of controversy regarding the project. The proposed project is located in Osceola County, an area currently designated as being in attainment for the following criteria air pollutant(s): ozone, nitrogen dioxide, PM<sub>2.5</sub> and PM<sub>10</sub>, sulfur dioxide, CO, and lead. Therefore, the Clean Air Act (CAA) conformity requirements do not apply to the project.

In accordance with Chapter 19 of the FDOT PD&E Manual<sup>2</sup>, both the No-Build and Build Alternatives were subjected to a project level (hot spots) analysis using a screening model to estimate localized concentrations of CO that may exceed the NAAQS. The FDOT's screening model, CO Florida 2012, makes various worst-case assumptions related to site conditions, meteorology, and traffic and uses the latest EPA-approved software to produce estimates of one-hour and eight-hour CO at default receptor locations. The one-hour and eight-hour estimates can be directly compared to the current one- and eight-hour NAAQS for CO.

The roadway intersection with the highest forecast total approach traffic volume is Simpson Road at Fortune Road. The No-Build and Build Alternatives for both the opening year (2025) and the design year (2045) were evaluated. The traffic data input used in the evaluation were obtained from the project's traffic report and are included in this Technical Memorandum as **Appendix A**.

Estimates of CO were predicted for the default receptors, which are located 10 feet to 150 feet from the edge of the roadway. Based on the results from the screening model, the highest project-related CO levels are below the NAAQS of 35 ppm for a one-hour concentration and 9 ppm for an eight-hour concentration with either the No-Build or Build Alternatives. The results of the screening model are included in **Appendix B**.

The project is not predicted to have substantial air quality impacts and has passed the NAAQS model screening. Construction activities may cause minor short-term air quality impacts in the form of dust from earthwork and unpaved roads. These impacts can be minimized by adherence to all applicable local and State regulations and application of appropriate construction specifications.

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<sup>2</sup> Florida Department of Transportation, *Project Development and Environment Manual*, Part 2, Chapter 19, (January 14, 2019)



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## APPENDIX A: TRAFFIC DATA



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**TRAFFIC DATA FOR AIR QUALITY ANALYSIS**

Date: 11/1/2019 Prepared by: Robbin Ossi, AICP  
 FM Number: N/A Environmental Transportation Planning, LLC  
 Osceola County # PS-18-9906-DG  
 Project Description: PD&E Services: Simpson Road Improvements from US-192 to 560' south of Myers Road

NOTE: Traffic data should be provided for the intersection that is forecast to have the highest total approach traffic volume. Notably, the intersection may not be the same for the Build and No-Build alternatives. The number of lanes should be the number of intersection approach through lanes. The traffic volumes should be representative of vehicles per hour (vph) and vehicle speeds should be representative of posted speeds if intersection cruise approach speeds are unknown. This traffic data sheet was prepared to assist in obtaining appropriate traffic data for the FDOT CO Florida 2012 Intersection Screening Model. Notably, additional traffic data is required for diamond interchanges (see User's Guide).

**Opening Year: 2025**

Intersections: Build Simpson Rd @ Fortune Rd No-Build Same  
 Land Use: Urban \_\_\_\_\_ Suburban  Rural \_\_\_\_\_

Alternative	EB			WB			NB			SB*1		
	No. of Lanes	VPH	Speed	No. of Lanes	VPH	Speed	No. of Lanes	VPH	Speed	No. of Lanes	VPH	Speed
Build	5	1595	45	4	860	45	5	909	45	4	1152	45
No-Build	5	1595	45	4	860	45	4	909	40	5	1675	45

**Design Year: 2045**

Intersections: Build Simpson Rd @ Fortune Rd No-Build Same  
 Land Use: Urban \_\_\_\_\_ Suburban  Rural \_\_\_\_\_

Alternative	EB			WB			NB			SB*1		
	No. of Lanes	VPH	Speed									
Build	5	2339	45	4	1449	45	5	1397	45	4	2127	45
No-Build	5	2339	45	4	1449	45	4	1397	40	5	2945	45

\*1 - Build Alternative eliminates the SB left turn at Fortune Road (movement occurs at new quad road north of Fortune Rd)

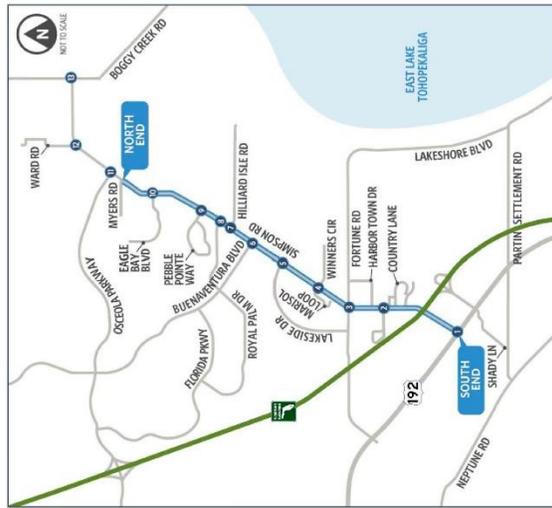
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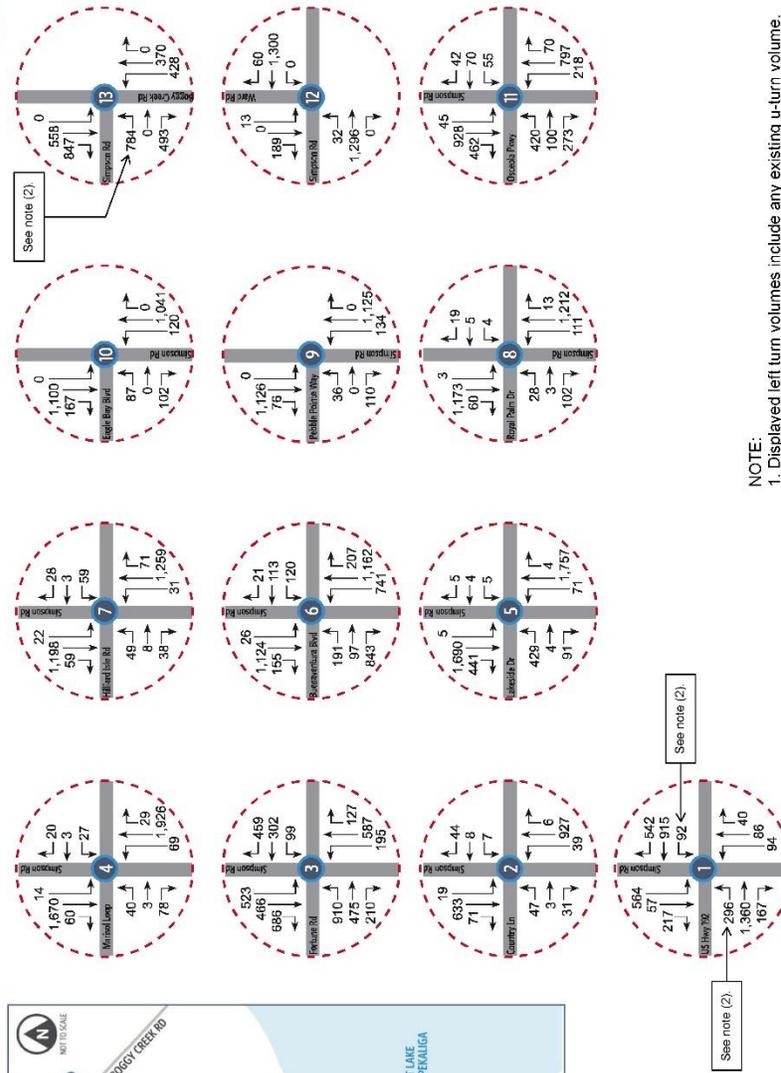


### SIMPSON ROAD PD&E STUDY

Project Traffic Analysis Report



- LEGEND:**
- Study Intersections and ID Number
  - 000 Total Traffic
  - Project Limits



**NOTE:**

1. Displayed left turn volumes include any existing u-turn volume.
2. U-turn movements are above 15 vehicles per hour EB/WB on US 192 and EB on Simpson Road at Boggy Creek Road.

**Figure 6-2 - Opening Year 2025 PM Peak**





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## APPENDIX B: CO FLORIDA 2012 OUTPUT



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CO Florida 2012 - Results  
Friday, November 01, 2019

### Project Description

Project Title	Simpson Rd Improvements - PS-18-9906-DG
Facility Name	Simpson Rd @ Fortune Rd
User's Name	R. Ossi, AICP - ETP
Run Name	Year Open - NoBuild
FDOT District	5
Year	2025
Intersection Type	4 X 4
Speed	Arterial 40 mph
Approach Traffic	Arterial 1675 vph

### Environmental Data

Temperature	47.8 °F
Reid Vapor Pressure	13.3 psi
Land Use	Suburban
Stability Class	D
Surface Roughness	108 cm
1 Hr. Background Concentration	3.3 ppm
8 Hr. Background Concentration	2.0 ppm

Receptor	Results (ppm, including background CO)	
	Max 1-Hr	Max 8-Hr
1	4.8	2.9
2	4.9	2.9
3	5.2	3.1
4	4.8	2.9
5	4.5	2.7
6	4.8	2.9
7	4.9	2.9
8	5.2	3.1
9	4.8	2.9
10	4.5	2.7
11	4.9	2.9
12	4.9	2.9
13	5.3	3.2
14	4.8	2.9
15	4.5	2.7
16	4.8	2.9
17	5.0	3.0
18	5.2	3.1
19	4.8	2.9
20	4.5	2.7

\*\*\*\*\*  
\*\*\*\*\*PROJECT PASSES\*\*\*\*\*  
\*\*\*\*\*NO EXCEEDANCES OF NAAQ STANDARDS ARE PREDICTED\*\*\*\*\*  
\*\*\*\*\*



# Air Quality Impact

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CO Florida 2012 - Results  
Friday, November 01, 2019

### Project Description

Project Title	Simpson Rd Improvements - PS-18-9906-DG
Facility Name	Simpson Rd @ Fortune Rd
User's Name	R. Ossi, AICP - ETP
Run Name	Year Open - Build
FDOT District	5
Year	2025
Intersection Type	4 X 4
Speed	Arterial 40 mph
Approach Traffic	Arterial 1595 vph

### Environmental Data

Temperature	47.8 °F
Reid Vapor Pressure	13.3 psi
Land Use	Suburban
Stability Class	D
Surface Roughness	108 cm
1 Hr. Background Concentration	3.3 ppm
8 Hr. Background Concentration	2.0 ppm

Receptor	Results (ppm, including background CO)	
	Max 1-Hr	Max 8-Hr
1	4.7	2.8
2	4.9	2.9
3	5.1	3.1
4	4.7	2.8
5	4.5	2.7
6	4.7	2.8
7	4.9	2.9
8	5.1	3.1
9	4.7	2.8
10	4.5	2.7
11	4.8	2.9
12	4.9	2.9
13	5.1	3.1
14	4.7	2.8
15	4.5	2.7
16	4.7	2.8
17	5.0	3.0
18	5.1	3.1
19	4.8	2.9
20	4.5	2.7

\*\*\*\*\*  
\*\*\*\*\*PROJECT PASSES\*\*\*\*\*  
\*NO EXCEEDANCES OF NAAQ STANDARDS ARE PREDICTED\*  
\*\*\*\*\*



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## Technical Memorandum



CO Florida 2012 - Results  
Friday, November 01, 2019

### Project Description

Project Title	Simpson Rd Improvements - PS-18-9906-DG
Facility Name	Simpson Rd @ Fortune Rd
User's Name	R. Ossi, AICP - ETP
Run Name	Design Year - No-Build
FDOT District	5
Year	2045
Intersection Type	4 X 4
Speed	Arterial 40 mph
Approach Traffic	Arterial 2945 vph

### Environmental Data

Temperature	47.8 °F
Reid Vapor Pressure	13.3 psi
Land Use	Suburban
Stability Class	D
Surface Roughness	108 cm
1 Hr. Background Concentration	3.3 ppm
8 Hr. Background Concentration	2.0 ppm

Receptor	Results (ppm, including background CO)	
	Max 1-Hr	Max 8-Hr
1	5.9	3.5
2	6.1	3.7
3	6.5	3.9
4	5.7	3.4
5	5.3	3.2
6	5.9	3.5
7	6.1	3.7
8	6.4	3.8
9	5.7	3.4
10	5.3	3.2
11	5.9	3.5
12	6.1	3.7
13	6.4	3.8
14	5.7	3.4
15	5.3	3.2
16	5.9	3.5
17	6.2	3.7
18	6.4	3.8
19	5.8	3.5
20	5.3	3.2

\*\*\*\*\*  
\*\*\*\*\*PROJECT PASSES\*\*\*\*\*  
\*\*\*\*\*NO EXCEEDANCES OF NAAQ STANDARDS ARE PREDICTED\*\*\*\*\*  
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CO Florida 2012 - Results  
Friday, November 01, 2019

### Project Description

Project Title	Simpson Rd Improvements - PS-18-9906-DG
Facility Name	Simpson Rd @ Fortune Rd
User's Name	R. Ossi, AICP - ETP
Run Name	Design Year - Build
FDOT District	5
Year	2045
Intersection Type	4 X 4
Speed	Arterial 40 mph
Approach Traffic	Arterial 2339 vph

### Environmental Data

Temperature	47.8 °F
Reid Vapor Pressure	13.3 psi
Land Use	Suburban
Stability Class	D
Surface Roughness	108 cm
1 Hr. Background Concentration	3.3 ppm
8 Hr. Background Concentration	2.0 ppm

Receptor	Results (ppm, including background CO)	
	Max 1-Hr	Max 8-Hr
1	5.3	3.2
2	5.4	3.2
3	5.7	3.4
4	5.2	3.1
5	4.8	2.9
6	5.3	3.2
7	5.4	3.2
8	5.6	3.4
9	5.2	3.1
10	4.8	2.9
11	5.3	3.2
12	5.4	3.2
13	5.6	3.4
14	5.2	3.1
15	4.8	2.9
16	5.3	3.2
17	5.5	3.3
18	5.6	3.4
19	5.3	3.2
20	4.8	2.9

\*\*\*\*\*  
\*\*\*\*\*PROJECT PASSES\*\*\*\*\*  
\*NO EXCEEDANCES OF NAAQ STANDARDS ARE PREDICTED\*  
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