



SR 400 (I-4) Project Development and Environment (PD&E) Study
FM No.: 432100-1-22-01



Air Quality Analysis Technical Memorandum

**Segment 2: State Road 400 (SR 400) / Interstate 4 (I-4)
from West of SR 528 (Beachline Expressway)
to West of SR 435 (Kirkman Road)**

Orange County (75280), Florida

July, 2016



AIR QUALITY ANALYSIS

TECHNICAL MEMORANDUM

Date: July 2016

To: FDOT District 5 through HNTB Corporation

From: John Moore Jr., PE, Stantec Consulting Services, INC

Subject: PD&E Study for Interstate 4: Segment 2 from west of SR 528 to west of SR 435 (Kirkman Road)

Re: Air Quality Screening

The Florida Department of Transportation (FDOT) is proposing to reconstruct and widen Interstate 4 (I-4) as part of the I-4 Beyond the Ultimate (BtU) concept. This involves the build-out of I-4 to its ultimate condition through Central Florida, including segments in Polk, Osceola, Orange, Seminole, and Volusia Counties. The concept design proposes the addition of two new express lanes in each direction, resulting in a total of ten dedicated lanes. The project limits for the segment analyzed in this report are within a 3.9-mile segment of I-4 which extends from west of SR 528 (MP 5.650) to west of Kirkman Road (MP 9.528) in Orange County (herein referred to as I-4, Segment 2). Two mainline typical sections are proposed for I-4, Segment 2. The typical section from east of Central Florida Parkway to SR 528 includes a 44-foot rail envelope in the median within a minimum 300 foot right of way (6+4 with rail envelope). The typical section from SR 528 to west of SR 435 does not include the rail corridor and also has a proposed minimum 300 foot right of way (6+4 without rail envelope). Both typical sections have a design speed of 70 miles per hour (mph) and will include three 12-foot general use lanes with a 10-foot inside shoulder and a 12-foot outside shoulder (10-foot paved) and two 12-foot express lanes with a 4-foot inside shoulder and a 10-foot outside shoulder, in each direction. A barrier wall between adjacent shoulders will separate the express lanes from the general use lanes. Additionally, up to three auxiliary lanes in either direction of travel will be provided in some areas. The study area in this section from south of the SR 528 to SR 435 (Kirkman Road) includes the interchanges at SR 528, Sand Lake Road, and at Universal Boulevard. The proposed improvements will address capacity, safety, and quality of life issues that are substandard with the existing roadway design.

The land use adjacent to I-4 within the proposed project limits consists of primarily Commercial and Services, with some Residential, a hospital, and a limited amount of natural lands. Some undeveloped natural areas are located at the interchange with I-4 and SR 528, along portions west of Turkey Lake Road, and in the median areas between Sand Lake Road and Kirkman Road. The majority of the corridor along Turkey Lake Road, Sand Lake Road, and International Drive is commercial, retail, hotel and restaurants, and includes the Orange County Convention Center and Universal Studios Orlando.

The referenced proposed project was reviewed for air quality impacts consistent with the guidance provided by the Federal Highway Administration (FHWA). Orange County is an area currently designated as being *attainment* for the following air pollutants: *ozone, nitrogen dioxide, particulate matter (2.5 microns in size and 10 microns in size), sulfur dioxide, carbon monoxide, and lead.*

The project was subjected to a carbon monoxide (CO) screening model that makes various conservative worst-case assumptions related to site conditions, meteorology and traffic. The FDOT's screening model, CO Florida 2012 (released March 12, 2012) uses the United States Environmental Protection Agency (USEPA) – approved software (**MOVES 2010a and CAL3QHC2**) to produce estimates of one-hour and eight-hour CO at default air quality receptor locations. The one-hour and eight-hour estimates can be directly compared to the one-hour and eight-hour **National Ambient Air Quality Standards (NAAQS)** for CO that are 35 parts per million (ppm) and 9 parts per million (ppm), respectively.

The roadway intersection forecast to have the highest total approach traffic volume (for both the Build and No-Build scenarios) is the intersection of Sand Lake Road and Turkey Lake Road. The Build and No-Build scenarios for the opening year (2020) and the design year (2040) were evaluated (for design hour volumes). The traffic data input used in the evaluation is attached to this memorandum.

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 one-hour and eight-hour levels are not predicted to meet or exceed the one-hour or eight-hour **National Ambient Air Quality Standards (NAAQS)** for this pollutant with either the Build or No-Build alternatives. As such, the project “passes” the screening model. The results of the screening model are attached to this memorandum.

The project is located in an area which is designated attainment for all of the **National Ambient Air Quality Standards** under the criteria provided in the **Clean Air Act**. Therefore, the **Clean Air Act** conformity requirements do not apply to the project.

References:

FDOT's PD&E Manual – Part 2, Chapter 16 “Air Quality Analysis” (09-13-06)

TRAFFIC DATA FOR AIR QUALITY ANALYSIS

Date: September 5, 2013

Prepared by: John Moore Jr., PE

Project Description: PD&E Study for Interstate 4 from SR 528 to SR 435 (Kirkman Road)

Opening Year: 2020

Land Use: Urban

Intersection: Sand Lake Road and Turkey Lake Road

	No. of Lanes	EB (vph)	WB (vph)	NB (vph)	SB (vph)	Speed (mph)
Build	6X4	2,654	3,635	2,448	1,561	45
No-Build	6X4	2,695	3,805	2,557	1,453	45

Design Year: 2040

Land Use: Urban

Intersection: Sand Lake Road and Turkey Lake Road

	No. of Lanes	EB (vph)	WB (vph)	NB (vph)	SB (vph)	Speed (mph)
Build	6X4	2,925	4,223	2,920	1,707	45
No-Build	6X4	2,873	4,440	3,076	1,859	45

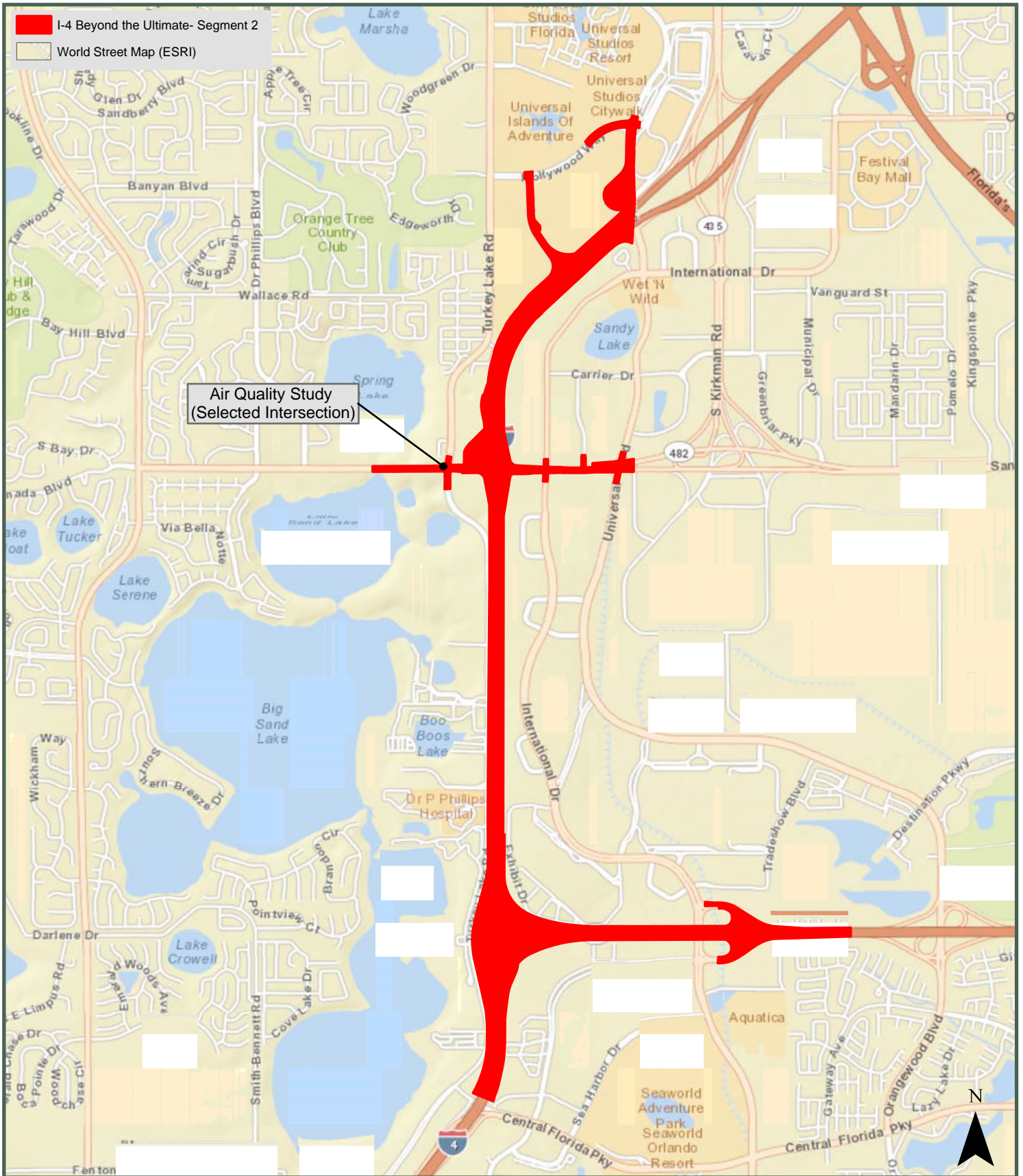


Figure 1

1" = 3,000'

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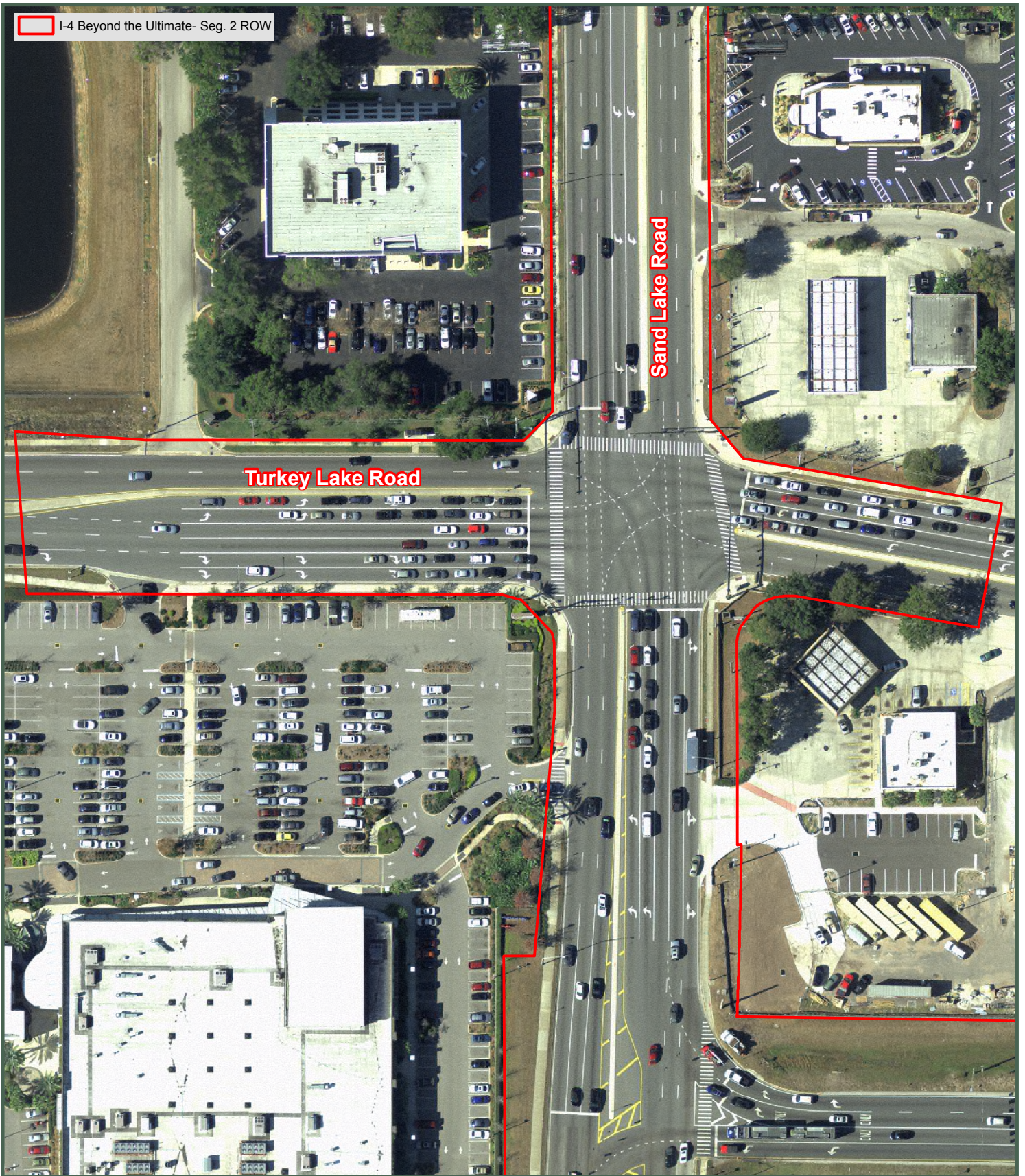


Figure 2

1" = 100'

CO Florida 2012 - Results
 Friday, September 06, 2013

Project Description

Project Title I-4 PD&E Air Quality
 Facility Name Stantec
 User's Name Mike Holdsworth
 Run Name Segment 2 Build
 FDOT District 5
 Year 2020
 Intersection Type 6 X 4
 Speed Arterial 45 mph
 Approach Traffic Arterial 3635 vph

Environmental Data

Temperature 47.8 °F
 Reid Vapor Pressure 13.3 psi
 Land Use Urban
 Stability Class D
 Surface Roughness 175 cm
 1 Hr. Background Concentration 5.0 ppm
 8 Hr. Background Concentration 3.0 ppm

Results

(ppm, including background CO)

Receptor	Max 1-Hr	Max 8-Hr
1	9.1	5.5
2	9.4	5.6
3	9.7	5.8
4	8.8	5.3
5	7.9	4.7
6	8.7	5.2
7	8.9	5.3
8	9.6	5.8
9	8.6	5.2
10	8.3	5.0
11	9.1	5.5
12	9.4	5.6
13	9.7	5.8
14	8.8	5.3
15	7.9	4.7
16	8.7	5.2
17	8.9	5.3
18	9.6	5.8
19	8.6	5.2
20	8.3	5.0

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

CO Florida 2012 - Results
 Friday, September 06, 2013

Project Description

Project Title I-4 PD&E Air Quality
 Facility Name Stantec
 User's Name Mike Holdsworth
 Run Name Segment 2 No-Build
 FDOT District 5
 Year 2020
 Intersection Type 6 X 4
 Speed Arterial 45 mph
 Approach Traffic Arterial 3805 vph

Environmental Data

Temperature 47.8 °F
 Reid Vapor Pressure 13.3 psi
 Land Use Urban
 Stability Class D
 Surface Roughness 175 cm
 1 Hr. Background Concentration 5.0 ppm
 8 Hr. Background Concentration 3.0 ppm

Results

(ppm, including background CO)

Receptor	Max 1-Hr	Max 8-Hr
-----	-----	-----
1	9.3	5.6
2	9.5	5.7
3	9.8	5.9
4	8.9	5.3
5	8.0	4.8
6	8.9	5.3
7	9.0	5.4
8	9.7	5.8
9	8.7	5.2
10	8.4	5.0
11	9.3	5.6
12	9.5	5.7
13	9.8	5.9
14	8.9	5.3
15	8.0	4.8
16	8.9	5.3
17	9.0	5.4
18	9.7	5.8
19	8.7	5.2
20	8.4	5.0

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

CO Florida 2012 - Results
 Friday, September 06, 2013

Project Description

Project Title I-4 PD&E Air Quality
 Facility Name Stantec
 User's Name Mike Holdsworth
 Run Name Segment 2 Build
 FDOT District 5
 Year 2040
 Intersection Type 6 X 4
 Speed Arterial 45 mph
 Approach Traffic Arterial 4223 vph

Environmental Data

Temperature 47.8 °F
 Reid Vapor Pressure 13.3 psi
 Land Use Urban
 Stability Class D
 Surface Roughness 175 cm
 1 Hr. Background Concentration 5.0 ppm
 8 Hr. Background Concentration 3.0 ppm

Results

(ppm, including background CO)

Receptor	Max 1-Hr	Max 8-Hr
1	8.8	5.3
2	9.2	5.5
3	9.5	5.7
4	8.6	5.2
5	7.7	4.6
6	8.7	5.2
7	8.7	5.2
8	9.6	5.8
9	8.4	5.0
10	7.8	4.7
11	8.8	5.3
12	9.2	5.5
13	9.5	5.7
14	8.6	5.2
15	7.7	4.6
16	8.7	5.2
17	8.7	5.2
18	9.6	5.8
19	8.4	5.0
20	7.8	4.7

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

CO Florida 2012 - Results
Friday, September 06, 2013

Project Description

Project Title I-4 PD&E Air Quality
Facility Name Stantec
User's Name Mike Holdsworth
Run Name Segment 2 No-Build
FDOT District 5
Year 2040
Intersection Type 6 X 4
Speed Arterial 45 mph
Approach Traffic Arterial 4440 vph

Environmental Data

Temperature 47.8 °F
Reid Vapor Pressure 13.3 psi
Land Use Urban
Stability Class D
Surface Roughness 175 cm
1 Hr. Background Concentration 5.0 ppm
8 Hr. Background Concentration 3.0 ppm

Results
(ppm, including background CO)

Receptor	Max 1-Hr	Max 8-Hr
1	9.3	5.6
2	9.3	5.6
3	9.6	5.8
4	8.8	5.3
5	7.8	4.7
6	8.8	5.3
7	8.8	5.3
8	9.8	5.9
9	8.6	5.2
10	8.2	4.9
11	9.3	5.6
12	9.3	5.6
13	9.6	5.8
14	8.8	5.3
15	7.8	4.7
16	8.8	5.3
17	8.8	5.3
18	9.8	5.9
19	8.6	5.2
20	8.2	4.9

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