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

Air Quality Analysis Technical Memorandum

Segment 1: SR 400 (I-4) from West of CR 532 (Polk/Osceola County Line) to West of SR 528 Beachline Expressway

Polk County (16320), Osceola County (92130), Orange County (75280)

July 2016

Stantec
300 Primera Drive
Suite 300
Lake Mary, FL 32746

HNTB Corporation
610 Crescent Executive Court
Suite 400
Lake Mary, FL 32746

AIR QUALITY ANALYSIS

TECHNICAL MEMORANDUM

Date: June 11, 2015

To: FDOT District 5 through HNTB Corporation

From: John C. Moore Jr., PE, Stantec Consulting Services, Inc.

Subject: PD&E Study for SR 400 (I - 4) from west of CR 532 (Polk/Osceola County Line) to west of SR 528 Beachline Expressway

Re: Air Quality Screening

FDOT is proposing to reconstruct and widen 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 an approximate 14-mile segment of I-4 which extends from just west of CR 532 (Polk/Osceola County Line) to west of SR 528 (Beachline Expressway), from Milepost (MP) 31.607 to MP 32.022 in Polk County, MP 0.000 to MP 7.885 in Osceola County and from MP 0.000 to 5.650 in Orange County (herein referred to as I-4, Segment 1). Although, the interstate is a designated east-west corridor, the alignment follows a southwest to northeast orientation through the limits of Segment 1. The study area in this section from west of CR 532 to west of SR 528 includes the following interchanges:

<u>Osceola County</u>

- I-4 and CR 532 (Osceola Polk Line Road)
- I-4 and SR 429 (Daniel Webster Western Beltway)
- I-4 and World Drive
- I-4 and SR 417 (Southern Connector)
- I-4 and US 192/SR 530 (W. Irlo Bronson Memorial Highway)
- I-4 and W. Osceola Parkway

<u>Orange County</u>

- I-4 and SR 536 (Epcot Center/World Center Drive)
- I-4 and SR 535 (S. Apopka Vineland Road)
- I-4 and Daryl Carter Parkway*
- I-4 and Central Florida Parkway

*Formerly Fenton Street/Wildwood Avenue (previously identified as Lake Avenue in the December 1999 FONSI). Daryl Carter Parkway is currently an existing overpass; alternative evaluations include a proposed full-access interchange.

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. Generally speaking, the typical section will be consistent throughout Segment 1 and will have three 12-foot general use travel lanes with 10-foot inside and 12-foot outside shoulders and two 12-foot express lanes with 4-foot inside and 10-foot outside shoulders in each direction. A barrier wall between the adjacent shoulders will separate the express lanes from the general use lanes. Twelve-foot auxiliary lanes will be provided in some areas in both the eastbound and westbound directions. The typical section includes a 44-foot rail envelope in the median within a minimum 300 foot right of way.

The land use adjacent to I-4 within the proposed project limits consists primarily of Commercial and Services, Residential, and natural lands. Undeveloped natural areas are located between SR 429 and US 192 (W. Irlo Bronson Memorial Highway), and a few other small isolated patches along the right-of-way. Reedy Creek and Bonnet Creek pass underneath I-4 and several lakes are located along the project corridor. Five golf courses are located within the project corridor, as well as Disney's Wide World of Sports Complex. The Reunion and Celebration resorts, along with several apartment complexes or condominiums represent the majority of the residential land use within the project corridor. The majority of the project corridor between US 192 and SR 528 is commercial, retail, hotel and restaurants, and includes the Gaylord Palms Resort, Disney's Typhoon Lagoon Water Park, Downtown Disney (proposed Disney Springs), and the Orlando Premium Outlets.

The referenced proposed project was reviewed for air quality impacts consistent with the guidance provided by the Federal Highway Administration (FHWA). Polk, Osceola, and Orange Counties are currently areas that are 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 latest 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 Palm Parkway and SR 535. However, this intersection is located several intersections away from I-4 and was not used for this analysis. The intersection of Hotel Plaza Boulevard and SR 535 is forecast to have slightly lower total approach traffic volume (for both the Build and No-Build scenarios) than the intersection of Palm Parkway and SR 535. It was selected as the intersection to analyze based on its proximity to I-4 and CO reception sites. 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: June 15, 2014

Prepared by: John Moore Jr., PE

Project Description: PD&E Study for Interstate 4 from west of CR 532 (Polk/Osceola County Line) to west of SR 528 Beachline Expressway

Opening Year: **2020**

Land Use: Urban

Intersection: Hotel Plaza Boulevard and SR 535

	Intersection Type	EB (vph)	WB (vph)	NB (vph)	SB (vph)	Speed (mph)
Build	4 X 6	2,915	636	3,876	5,399	35 – 40*
No-Build	4 X 6	2,564	550	4,228	5,047	35 – 40*

*Hotel Plaza Boulevard has a posted speed limit of 35 mph and SR 535 has a posted speed limit of 40 mph.

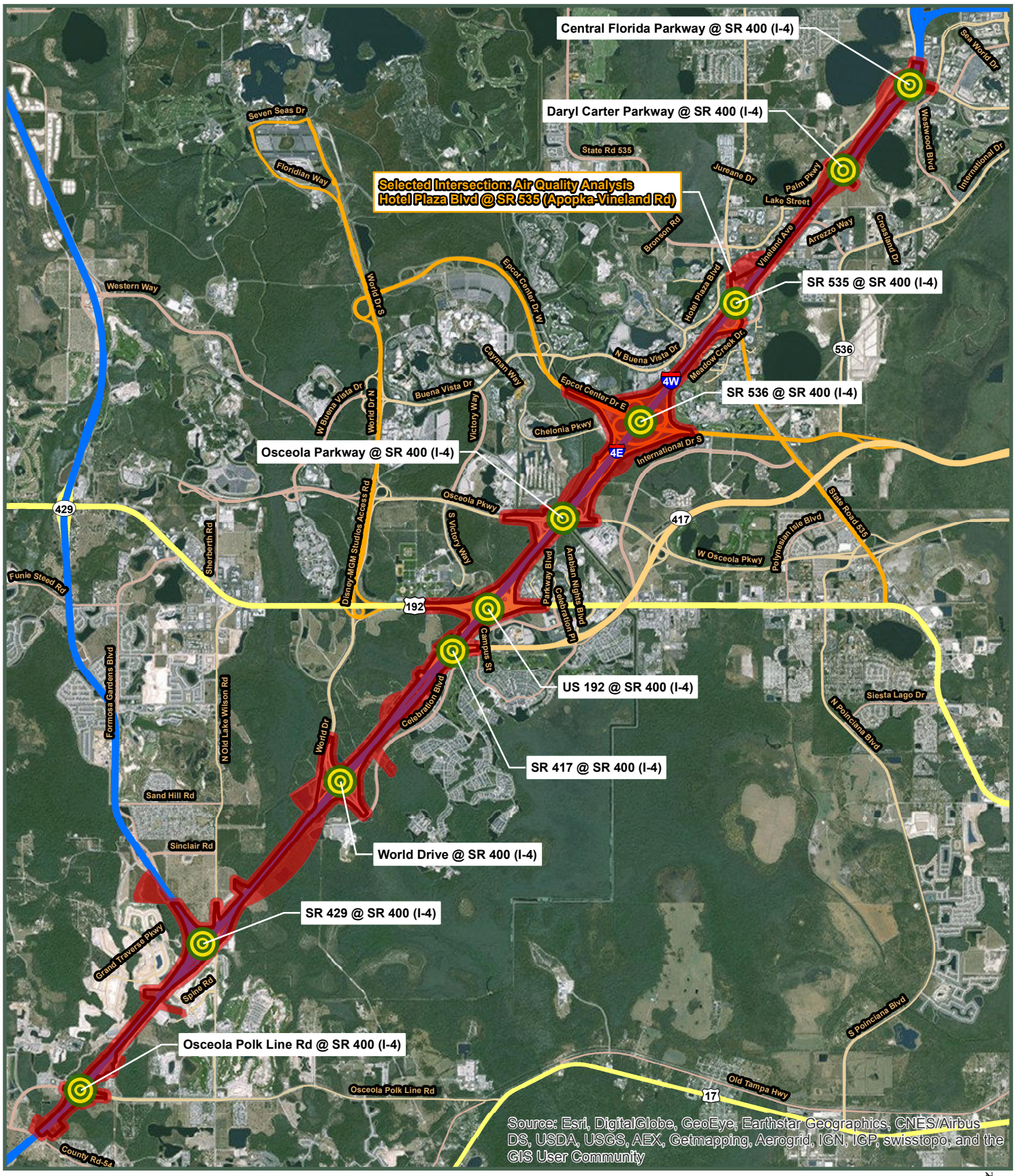
Design Year: **2040**

Land Use: Urban

Intersection: Hotel Plaza Boulevard and SR 535

	Intersection Type	EB (vph)	WB (vph)	NB (vph)	SB (vph)	Speed (mph)
Build	4 X 6	3,349	723	4,597	6,286	35 – 40*
No-Build	4 X 6	3,057	685	4,822	5,964	35 – 40*

*Hotel Plaza Boulevard has a posted speed limit of 35 mph and SR 535 has a posted speed limit of 40 mph.



0 3,500 7,000 14,000 Feet

SR 400 (I-4) BtU Segment 1 Corridor

Segment 1- Major Intersections

N

1 " = 7,000 '

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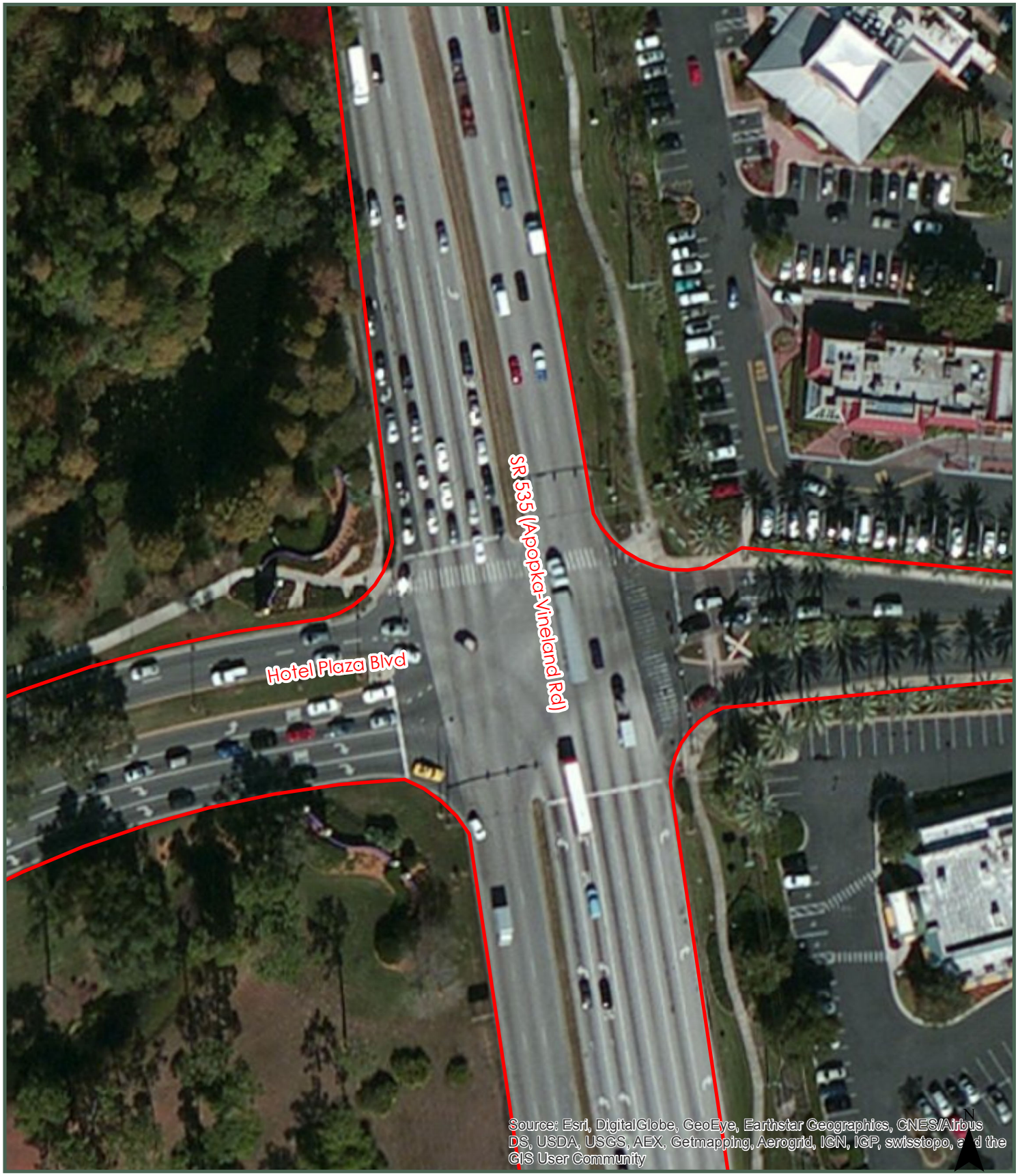

Figure 2

1 " = 75 '

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

0 75 150 Feet

CO Florida 2012 - Results
Wednesday, June 11, 2014

Project Description

Project Title	I-4 PD&E Air Quality
Facility Name	Stantec
User's Name	Mike Holdsworth
Run Name	Segment 1 Build
FDOT District	5
Year	2020
Intersection Type	4 X 6
Speed	Arterial 35 mph
Approach Traffic	Arterial 5399 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	10.4	6.2
4	9.5	5.7
5	9.1	5.5
6	9.7	5.8
7	10.1	6.1
8	10.3	6.2
9	9.2	5.5
10	8.3	5.0
11	9.2	5.5
12	9.6	5.8
13	10.3	6.2
14	9.5	5.7
15	9.1	5.5
16	9.8	5.9
17	10.3	6.2
18	10.5	6.3
19	9.1	5.5
20	8.5	5.1

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

CO Florida 2012 - Results
Wednesday, June 11, 2014

Project Description

Project Title	I-4 PD&E Air Quality
Facility Name	Stantec
User's Name	Mike Holdsworth
Run Name	Segment 1 No-Build
FDOT District	5
Year	2020
Intersection Type	4 X 6
Speed	Arterial 35 mph
Approach Traffic	Arterial 5047 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	9.1	5.5
3	10.1	6.1
4	9.4	5.6
5	8.9	5.3
6	9.5	5.7
7	9.7	5.8
8	10.2	6.1
9	9.0	5.4
10	8.2	4.9
11	8.9	5.3
12	9.4	5.6
13	10.0	6.0
14	9.4	5.6
15	8.9	5.3
16	9.6	5.8
17	9.9	5.9
18	10.4	6.2
19	8.9	5.3
20	8.4	5.0

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

CO Florida 2012 - Results
Wednesday, June 11, 2014

Project Description

Project Title	I-4 PD&E Air Quality
Facility Name	Stantec
User's Name	Mike Holdsworth
Run Name	Segment 1 Build
FDOT District	5
Year	2040
Intersection Type	4 X 6
Speed	Arterial 35 mph
Approach Traffic	Arterial 6286 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	9.0	5.4
2	9.2	5.5
3	10.3	6.2
4	9.3	5.6
5	8.9	5.3
6	9.5	5.7
7	9.7	5.8
8	10.1	6.1
9	9.1	5.5
10	8.1	4.9
11	9.1	5.5
12	9.4	5.6
13	10.3	6.2
14	9.3	5.6
15	8.9	5.3
16	9.5	5.7
17	9.7	5.8
18	10.2	6.1
19	9.1	5.5
20	8.2	4.9

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

CO Florida 2012 - Results
Wednesday, June 11, 2014

Project Description

Project Title	I-4 PD&E Air Quality
Facility Name	Stantec
User's Name	Mike Holdsworth
Run Name	Segment 1 No-Build
FDOT District	5
Year	2040
Intersection Type	4 X 6
Speed	Arterial 35 mph
Approach Traffic	Arterial 5964 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	8.9	5.3
2	9.0	5.4
3	10.0	6.0
4	9.2	5.5
5	8.6	5.2
6	9.4	5.6
7	9.5	5.7
8	9.9	5.9
9	8.9	5.3
10	8.0	4.8
11	9.0	5.4
12	9.1	5.5
13	10.0	6.0
14	9.2	5.5
15	8.6	5.2
16	9.4	5.6
17	9.5	5.7
18	10.0	6.0
19	8.9	5.3
20	8.1	4.9

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