SR 400 (I-4) Project Development and Environment (PD&E) Study
FM No.: 201210-2-22-01

Air Quality Analysis Technical Memorandum

Segment 5: SR 400 (I-4) from West of SR 25/US 27 to West of CR 532 (Polk/Osceola County Line)

Polk County (16320)

April, 2017

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: September 23, 2015

To: FDOT District 5 through HNTB Corporation

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

Subject: PD&E Study for Interstate 4 from west of US 27 to west of Osceola Polk Line Road

Re: Air Quality Screening

The Florida Department of Transportation (FDOT) is proposing to reconstruct and widen I-4 as part of the I-4 Ultimate 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 are within an approximate 4.5-mile segment of I-4 which extends from west of US 27 to west of the Osceola/Polk County Line, in Polk County, Florida as shown in **Figure 1**. Although the interstate is a designated east-west corridor, the alignment follows a southwest to northeast orientation through the limits of Segment 5. The proposed improvements will address capacity, safety, and environmental and social issues with the existing roadway design. The study area in this section from west of US 27 to west of Osceola Polk Line Road includes the US 27 interchange.

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. Generally, the typical section will be consistent throughout Segment 5 and will have three 12-foot general use travel lanes with 12-foot inside and outside shoulders (10-foot paved outside) and two 12-foot express lanes with 10-foot inside and 12-foot outside shoulders in each direction. A 2-foot barrier wall between the adjacent shoulders will separate the express lanes from the general use lanes. The typical section includes a 44-foot transit envelope in the median within a minimum 300 foot right of way (ROW).

The land use adjacent to I-4 within the proposed project limits consists primarily of commercial and services, retail, residential, and natural lands. The commercial, retail, and residential development is concentrated around the interchange with US 27. Some undeveloped natural areas are located along both sides of I-4 south of the Ronald Reagan Parkway overpass and along the western limits of the project area. Some areas to the southeast of the US 27 interchange are classified as open land, and are not currently developed. The remaining land use within the corridor is primarily pine tree plantations and citrus groves with some areas of pasture.

The referenced proposed project was reviewed for air quality impacts consistent with the guidance provided by the Federal Highway Administration (FHWA) and Part 2 Chapter 16 of the FDOT PD&E Manual. Polk County is currently an area that is 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 US 27 and Homerun Boulevard/Posner Boulevard. None of the intersections reviewed in this segment are located in close proximity to dense developments or areas of regular outdoor use. 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. A map of this intersection is shown in **Figure 2**.

Estimates of CO were predicted for the default receptors which are located 10 feet to 150 feet from the edge of the roadway. Vehicle speeds were based on posted speed limits or if not posted, by driving in traffic and recording average speeds. 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 currently 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: October 30, 2014

Prepared by: John Moore Jr., PE

Project Description: PD&E Study for Interstate 4 from west of SR 25 (US 27) to west of CR 532 (Osceola Polk Line Road)

Opening Year: **2020**

Land Use: Urban

Intersection: US 27 and Homerun Boulevard/Posner Boulevard

	Intersection Type	EB (vph)	WB (vph)	NB (vph)	SB (vph)	Speed (mph)
Build	4 X 6	313	2,385	8,060	9,504	35 – 45*
No-Build	4 X 6	304	2,316	7,798	8,771	35 – 45*

* Homerun Boulevard/Posner Boulevard average vehicle speed was 35 mph and US 27 has a posted speed limit of 45 mph.

Design Year: **2040**

Land Use: Urban

Intersection: US 27 and Homerun Boulevard/Posner Boulevard

	Intersection Type	EB (vph)	WB (vph)	NB (vph)	SB (vph)	Speed (mph)
Build	4 X 6	388	3,035	10,467	11,966	35 – 45*
No-Build	4 X 6	358	2,801	9,592	10,952	35 – 45*

* Homerun Boulevard/Posner Boulevard average vehicle speed was 35 mph and US 27 has a posted speed limit of 45 mph.

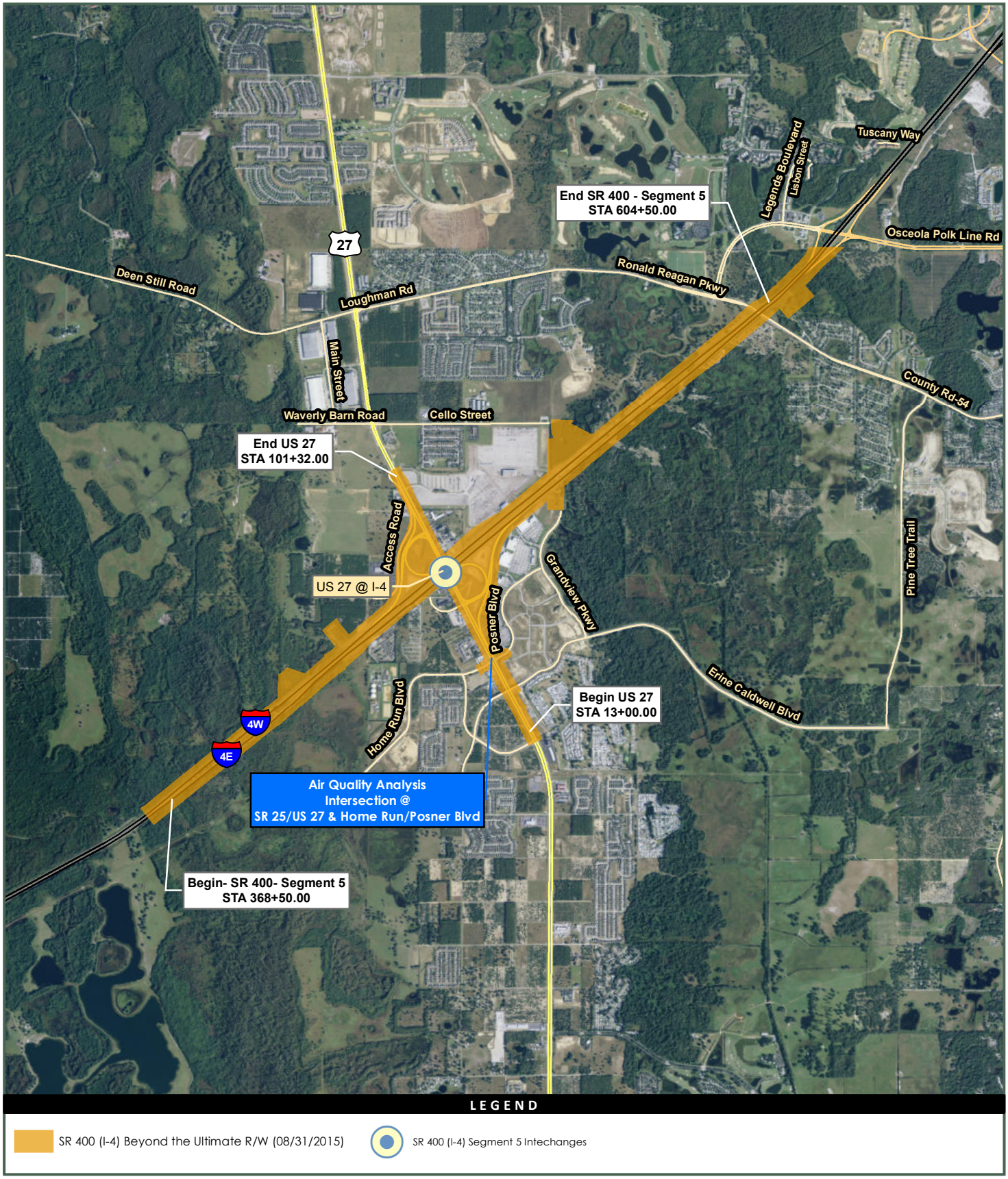

Figure 1- Project Location Map

0 2,400 4,800 Feet

1 " = 4,000 '

Figure 2- Intersection Map

0 100 200 Feet

1 " = 200 '

CO Florida 2012 - Results
Thursday, July 17, 2014

Project Description

Project Title	I-4 PD&E Air Quality
Facility Name	Stantec
User's Name	Mike Holdsworth
Run Name	Segment 5 Build
FDOT District	1
Year	2020
Intersection Type	4 X 6
Speed	Arterial 35 mph
Approach Traffic	Arterial 9504 vph

Environmental Data

Temperature	48.3 °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	12.0	7.2
2	12.6	7.6
3	14.2	8.5
4	13.0	7.8
5	11.7	7.0
6	12.9	7.7
7	13.6	8.2
8	14.1	8.5
9	12.3	7.4
10	11.0	6.6
11	12.2	7.3
12	12.8	7.7
13	14.0	8.4
14	12.8	7.7
15	11.6	7.0
16	12.9	7.7
17	13.8	8.3
18	14.4	8.6
19	12.3	7.4
20	11.0	6.6

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

CO Florida 2012 - Results
Thursday, July 17, 2014

Project Description

Project Title	I-4 PD&E Air Quality
Facility Name	Stantec
User's Name	Mike Holdsworth
Run Name	Segment 5 No-Build
FDOT District	1
Year	2020
Intersection Type	4 X 6
Speed	Arterial 35 mph
Approach Traffic	Arterial 8771 vph

Environmental Data

Temperature	48.3 °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	11.5	6.9
2	11.9	7.1
3	13.7	8.2
4	12.4	7.4
5	11.2	6.7
6	12.3	7.4
7	13.0	7.8
8	13.5	8.1
9	11.7	7.0
10	10.2	6.1
11	11.7	7.0
12	12.1	7.3
13	13.5	8.1
14	12.3	7.4
15	11.1	6.7
16	12.3	7.4
17	13.2	7.9
18	13.7	8.2
19	11.7	7.0
20	10.4	6.2

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

CO Florida 2012 - Results
Thursday, July 17, 2014

Project Description

Project Title	I-4 PD&E Air Quality
Facility Name	Stantec
User's Name	Mike Holdsworth
Run Name	Segment 5 Build
FDOT District	1
Year	2040
Intersection Type	4 X 6
Speed	Arterial 35 mph
Approach Traffic	Arterial 11966 vph

Environmental Data

Temperature	48.3 °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	12.6	7.6
2	12.9	7.7
3	14.5	8.7
4	12.9	7.7
5	11.7	7.0
6	13.3	8.0
7	13.9	8.3
8	14.3	8.6
9	12.4	7.4
10	11.1	6.7
11	12.7	7.6
12	13.0	7.8
13	14.5	8.7
14	12.9	7.7
15	11.7	7.0
16	13.3	8.0
17	13.9	8.3
18	14.3	8.6
19	12.4	7.4
20	11.2	6.7

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

CO Florida 2012 - Results
Thursday, July 17, 2014

Project Description

Project Title	I-4 PD&E Air Quality
Facility Name	Stantec
User's Name	Mike Holdsworth
Run Name	Segment 5 No-Build
FDOT District	1
Year	2040
Intersection Type	4 X 6
Speed	Arterial 35 mph
Approach Traffic	Arterial 10952 vph

Environmental Data

Temperature	48.3 °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	12.0	7.2
2	12.4	7.4
3	13.7	8.2
4	12.3	7.4
5	11.1	6.7
6	12.6	7.6
7	13.4	8.0
8	13.7	8.2
9	11.9	7.1
10	10.4	6.2
11	12.1	7.3
12	12.5	7.5
13	13.7	8.2
14	12.3	7.4
15	11.1	6.7
16	12.6	7.6
17	13.4	8.0
18	13.7	8.2
19	11.9	7.1
20	10.5	6.3

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