SR 52 PD&E STUDY REEVALUATION

Florida Department of Transportation
Project Development and Environment (PD&E) Study Reevaluation

FINAL

Air Quality Report

SR 52 From East of Suncoast Parkway to West of I-75

WPI Segment No. 256243 1
FAP No. 1851-108

Florida Department of Transportation
District Seven
Tampa, Florida

June 5, 2007

FINAL
AIR QUALITY REPORT

SR 52 Project Development & Environment Study Reevaluation

From East of the Suncoast Parkway to West of I-75
Pasco County, Florida

WPI Segment Number: 256243 1

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The proposed action includes widening SR 52 from the existing two-lane rural roadway to a six-lane urban and six-lane rural divided roadway. The study limits extend approximately 13.9 miles, from east of the Suncoast Parkway to west of I-75 in Pasco County, Florida.

Florida Department of Transportation
District Seven
Tampa, Florida

Prepared By:
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Tampa, Florida

June 5, 2007

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) conducted a Project Development and Environment (PD&E) Study Reevaluation of a previously approved study of the SR 52 project corridor from east of the Suncoast Parkway to west of I-75 in Pasco County. The Reevaluation assessed the engineering and environmental effects associated with the widening of the existing two-lane rural roadway to a six-lane divided urban and rural roadway for the segment of SR 52 from east of the Suncoast Parkway to west of I-75, approximately 13.9 miles.

In July 1988, the Federal Highway Administration (FHWA) approved the Environmental Assessment/Finding of No Significant Impact for the SR 52 PD&E Study from US 19 to I-75 (SR 93). The 1988 study proposed widening SR 52 to a multilane divided highway for approximately 23.3 miles. A six-lane divided urban cross section was proposed from US 19 to Moon Lake Road, and a four-lane rural cross section was proposed from Moon Lake Road to I-75. For this Reevaluation, a six-lane divided urban roadway is proposed from east of the Suncoast Parkway to Shady Hills Road, and a six-lane divided rural roadway is proposed from Shady Hills Road to west of I-75.

Since the original PD&E Study, two Design Change Reevaluations have been conducted within the project limits. The first Reevaluation (FHWA approved December 17, 2001) covered the segment from the Suncoast Parkway to US 41. The second Reevaluation (FHWA approved February 2, 2007) covered the segment from the Suncoast Parkway to I-75.

In accordance with the Clean Air Act Amendments of 1990 and Part 2, Chapter 16 of the FDOT PD&E Manual, an air quality analysis was conducted to determine whether project-related motor vehicle emissions will cause or contribute to an exceedance of National Ambient Air Quality Standard (NAAQS) for carbon monoxide (CO). Based on the FDOT's air quality screening test, CO Screening Model 2.0.5 (August 2004), the proposed improvements will not cause the NAAQS for CO to be exceeded. Therefore, the proposed action will have a minimal effect on air quality.

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1.0 INTRODUCTION

The Florida Department of Transportation (FDOT) conducted a Reevaluation of the previously approved Project Development and Environment (PD&E) Study for the segment of SR 52 from east of the Suncoast Parkway to west of I-75 in Pasco County, Florida. The Reevaluation examined changes in the engineering and environmental effects between the originally selected alternative and the proposed design improvements.

In July 1988, the Federal Highway Administration (FHWA) approved the Environmental Assessment/Finding of No Significant Impact (EA/FONSI) for the SR 52 PD&E Study from US 19 to I-75 (SR 93). The 1988 study proposed widening SR 52 to a multilane divided highway for approximately 23.3 miles, and replacing a low level bridge over Bear Creek, located approximately 1.5 miles east of US 19. A six-lane divided urban roadway was proposed from US 19 to Moon Lake Road, and a four-lane rural roadway was proposed from Moon Lake Road to I-75. For this Reevaluation, a six-lane divided urban roadway is proposed from east of the Suncoast Parkway to Shady Hills Road, and a six-lane divided rural roadway is proposed from Shady Hills Road to west of I-75.

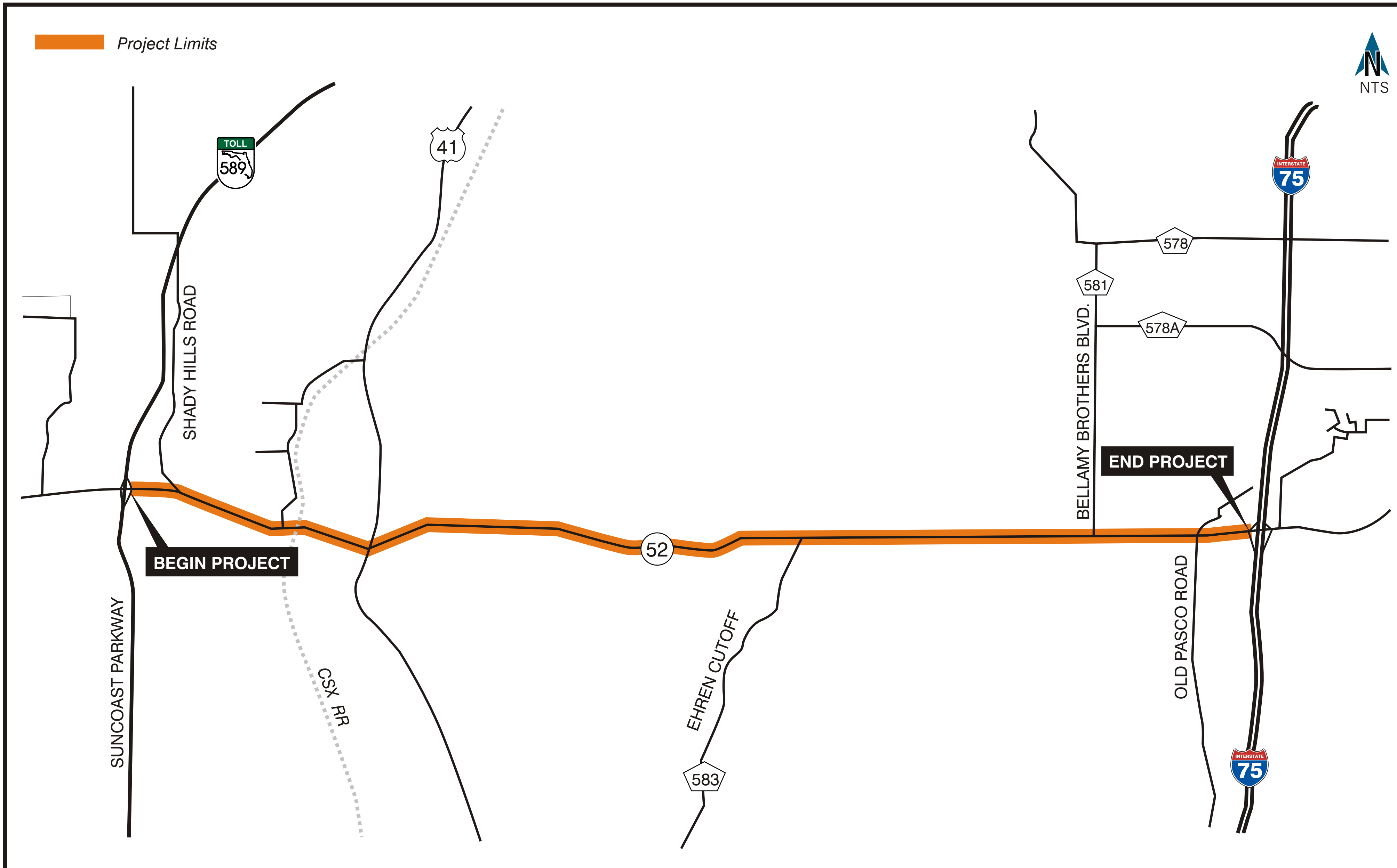
1.1 Project Description

The FDOT is proposing improvements to SR 52 from the Suncoast Parkway to I-75 in Pasco County, Florida, a distance of approximately 16 miles. The proposed improvements consist of widening the existing two-lane rural roadway to a six-lane divided urban highway from the Suncoast Parkway to Shady Hills Road and a six-lane divided rural highway from Shady Hills Road to east of I-75 to accommodate present and future traffic demands.

SR 52 is an east-west arterial highway in Pasco County, beginning at US 19 and terminating at the US 98 Dade City Bypass. The FDOT proposed improvements to SR 52 from east of the Suncoast Parkway to west of I-75 in Pasco County, a distance of approximately 13.9 miles. The proposed improvements consist of widening the existing two-lane rural roadway to a six-lane divided urban and rural roadway to accommodate present and future traffic demands. The project location is shown in Figure 1.

1.2 Existing Facility

The existing SR 52 roadway is typically a two-lane rural facility with one 12-foot lane in each direction and 12-foot shoulders (4 feet paved). The roadway cross section varies throughout the length of the project. Turn lanes have been added at certain intersections. The existing right-of-way varies in width with a minimum of 100 feet.



SR 52 From East of Suncoast Parkway to West of I-75

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PROJECT LOCATION MAP

FIGURE 1

1.3 Proposed Improvements

1.3.1 Typical Section

In the EA/FONSI, the typical section proposed for the limits covered by this reevaluation provided a 52-foot median separating two 12-foot lanes for each direction of travel. Ten-foot shoulders would be provided on each side of the roadway. Five feet of the 10-foot width would be paved which would accommodate bicyclists. The total right-of-way width for this typical section totaled 212 feet.

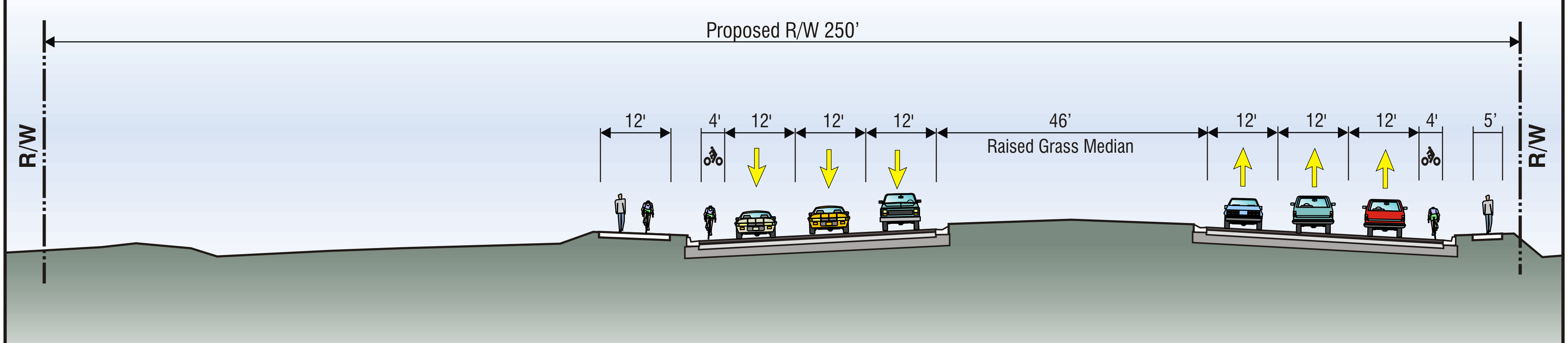
For the proposed design change, from the Suncoast Parkway to Shady Hills Road, the typical section provides a 46-foot raised grass median, separating three 12-foot lanes for each direction of travel. Four-foot bike lanes are provided on each side of the facility. A 5-foot sidewalk will be provided along the south side of the roadway and a 12-foot multi-use path will be provided on the north side of the roadway. From Shady Hills Road to I-75, the rural typical section provides a 46-foot median, separating three 12-foot lanes for each direction of travel. Ten-foot shoulders (5 feet paved) will accommodate bicyclists. A 12-foot multi-use path will be provided on the north side of the roadway. The proposed roadway typical sections are shown in Figure 2.

1.3.2 Alignment

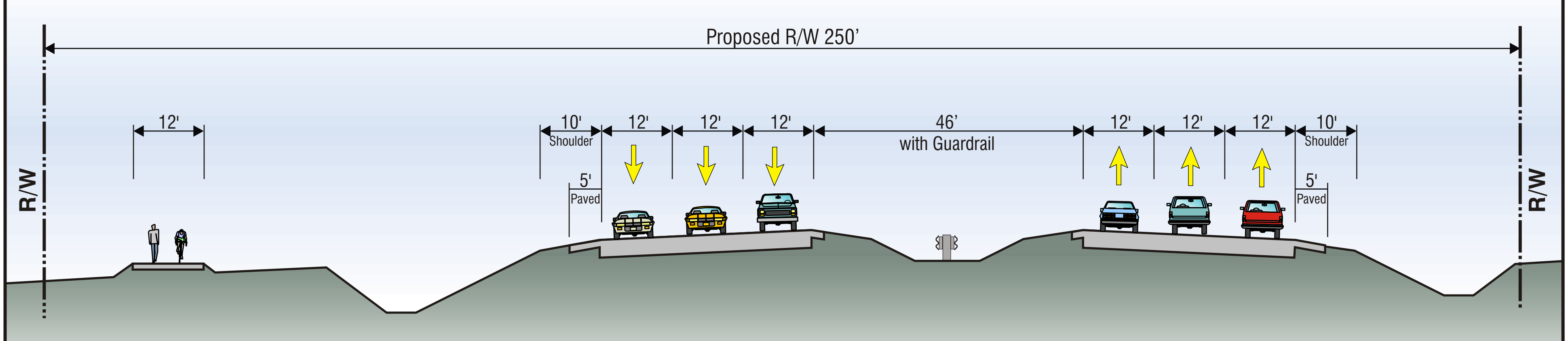
The recommended alignment for the SR 52 project corridor was evaluated and compared to the approved EA/FONSI. The alignment is consistent with the 1988 study from the Suncoast Parkway to 3,400 feet west of Ehren Cutoff. From approximately 3,400 feet west of Ehren Cutoff to I-75, the proposed alignment is shifted to the north. This keeps the proposed multi-use path on the north side of the roadway, without a need for a bridge over SR 52 if the alignment from the approved EA/FONSI is used.

1.3.3 Design Change Reevaluation

Since the original PD&E Study, two Design Change Reevaluations have been conducted within the project limits. The first Reevaluation (FHWA approved December 17, 2001) covered the segment from the Suncoast Parkway to US 41. It kept the same alignment as the original PD&E Study, but changed the typical section from a 212-foot wide rural facility to a 156-foot wide urban facility. The second Reevaluation (FHWA approved February 2, 2007) covered the segment from the Suncoast Parkway to I-75. It provides for a 250-foot rural typical section. An alignment shift to the south was studied in the vicinity of Kent Grove Drive and the CSX Railroad. However, it was decided to keep the alignment to the north, consistent with the original PD&E Study. From US 41 to Ehren Cutoff, the alignment is consistent with the original PD&E Study. From Ehren Cutoff to I-75, the alignment is shifted to the north.



6-LANE URBAN - Suncoast Parkway to Shady Hills Road



6-LANE RURAL - Shady Hills Road to I-75

SR 52 From East of Suncoast Parkway to West of I-75

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PROPOSED ROADWAY TYPICAL SECTIONS

FIGURE 2

1.4 Purpose

The purpose of this Air Quality Technical Memorandum is to document the effect the proposed improvements will have on motor vehicle emissions. Specifically, this study will predict and analyze carbon monoxide (CO) concentrations for the No-Build and Build Alternatives. The air quality analysis will determine whether the project-related motor vehicle emissions will cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) for CO.

2.0 METHODOLOGY

An air quality screening analysis, specifically an analysis of Carbon Monoxide (CO) concentrations, was performed in accordance with the methodology established in the FDOT PD&E Manual, Part 2, Chapter 16. The proposed alternatives were evaluated using FDOT's CO Screening Model 2.0.5 (August 2004) air quality screening model for the Opening Year (2010) and Design Year (2030) with and without the proposed improvements.

The purposes of this analysis were to evaluate the air quality effects that would be caused by the proposed improvements and to determine whether the project would cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) for CO.

2.1 National Ambient Air Quality Standards

The US Environmental Protection Agency (USEPA) has established the NAAQS to protect public health, the environment and the quality of life from the detrimental effects of ambient (i.e., outdoor) air pollution. These standards, which are summarized in Table 1, have also been adopted as the ambient air quality standards for Florida. The "primary" standards have been established to protect the public health. The "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

The project is in an area which has been designated as attainment for all the air quality standards under the criteria provided in the Clean Air Act Amendments of 1990, therefore conformity does not apply.

Table 1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Averaging Period	National/State Standards	
		Primary	Secondary
Ozone (O_3)	1-Hour[1]	0.12 ppm (235 μg/m^3)	Same as Primary Standard
	8-Hour[2]	0.08 ppm (157 μg/m^3)	Same as Primary Standard
Carbon Monoxide (CO)	8-Hour[3]	9 ppm (10 mg/m^3)	Same as Primary Standard
	1-Hour[3]	35 ppm (40 mg/m^3)	Same as Primary Standard
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm (100 μg/m^3)	Same as Primary Standard
Sulfur Dioxide (SO_2)	Annual Average	0.03 ppm (80 μg/m^3)	none
	24-Hour[3]	0.14 ppm (365 μg/m^3)	none
Suspended Particulate Matter (PM_{10})	24-Hour[4]	150 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	50 μg/m^3	Same as Primary Standard
Suspended Fine Particulate Matter ($PM_{2.5}$)	24-Hour[4]	65 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	15 μg/m^3	Same as Primary Standard
Lead (Pb)	Quarterly Mean	1.5 μg/m^3	Same as Primary Standard

Sources: USEPA, "National Primary and Secondary Ambient Air Quality Standards" (49 CFR 50)

Abbreviations: ppm - parts per million, μg/m^3 - micrograms per cubic meter, mg/m^3 - milligrams per cubic meter

Notes:
1 Applicable to current non-attainment areas until such areas meet the standard for three consecutive years.
2 New Standards effective September 16, 1997 (final rules can be found in Federal Register July 18, 1997).
3 Not to be exceeded more than once a year per site.
4 The number of days with hourly levels greater than the standards is not to be exceeded more than once per year.

2.2 Criteria Pollutants

The pollutants that are most important for transportation air quality analyses are those that can be traced principally to motor vehicles. Pollutants that can be attributed to motor vehicles include hydrocarbons (HC), NO_X, O_3, PM_{10} and $PM_{2.5}$, and CO. Emissions of NO_X, PM_{10} and $PM_{2.5}$ come from both mobile and stationary sources. Transportation sources account for a very small percentage of regional emissions of SO_X and Pb, and therefore these pollutants are not evaluated in a mobile source study.

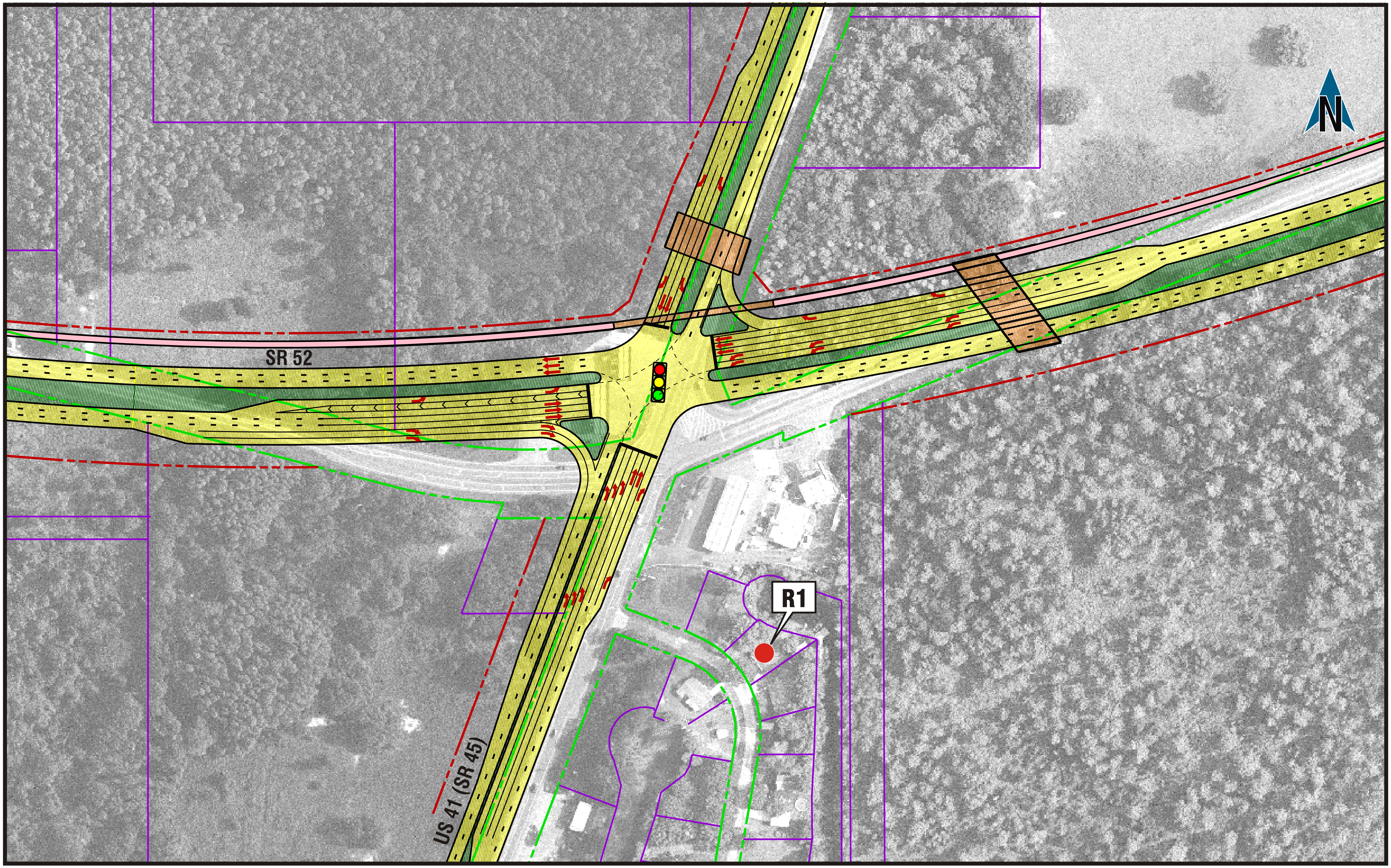
HC and NO_X emissions from motor vehicles are precursors in the formation of O_3. O_3 is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Since the reactions are slow and occur as the pollutants diffuse downwind, elevated levels of O_3 are often found many miles from the source of the precursor pollutants. Therefore, the effects of HC and NO_X are examined during the regional planning process, not during a project-level analysis.

CO is a colorless and odorless gas, associated primarily with the incomplete combustion of fossil fuels. CO concentrations can vary greatly over comparatively short distances. Relatively high concentrations are typically found near crowded intersections, along heavily traveled and congested roadways and at relatively low elevations. Therefore, motor vehicle CO concentrations associated with the proposed improvements were analyzed as a part of this study.

2.3 Receptor

CO concentrations are highest near the travel lanes of the intersection where pollutants are emitted. The concentrations decrease as the distance from the intersection increases. As a worst-case scenario, CO concentrations were predicted at a reasonable receptor to the most congested intersection – SR 52 and US 41 (SR 45).

A reasonable receptor is a site where people are expected to spend time comparable to the 1-hour and 8-hour periods used in establishing the NAAQS of CO. The most reasonable and closest receptor to the intersection of SR 52 and US 41 (SR 45) is a single family home located 409 feet south and 188 feet east of the improved intersection. The location receptor relative to the intersection is shown in Figure 3.



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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

AIR QUALITY RECEPTOR LOCATION MAP

FIGURE 3

2.4 Traffic

The design hour traffic volumes and average speeds used in the CO Screening Model 2.0.5 were developed specifically for this analysis and are shown in Table 2 of Section 3.0.

The documented traffic data are included in Appendix A.

3.0 RESULTS

CO concentrations associated with the proposed action were calculated at the selected receptor location for the Opening Year (2010) and Design Year (2030) with and without the proposed improvements. The CO Screening Model 2.0.5 calculates the maximum 1-hour and 8-hour CO concentrations in parts per million (ppm). Background concentrations are added to the modeling results to estimate total pollutant concentration at the receptor location. Background CO concentrations of 1.7 ppm for 1-hour and 1.0 ppm for 8-hour were applied to the calculated concentrations under all alternatives considered. The background level accounts for CO entering the area from other sources upwind from the receptor locations at which the modeling predictions are being made.

The traffic data used in the CO Screening Model 2.0.5 and maximum 1-hour and 8-hour CO concentrations, including background, for the air quality receptor are shown in Table 2.

Table 2
Predicted Maximum CO Concentrations

Year	Alternative	Average Speed (mph)	Directional Design Hour Traffic (vph)				1-hour Conc. (ppm)	8-hour Conc. (ppm)
			SR 52		US 41			
			WB	EB	NB	SB		
2010	No-Build	55	1000	1000	1165	1000	3.6	2.1
	Build	55	1000	1000	1165	1000	3.5	2.1
2030	No-Build	55	1430	1000	1480	1000	3.4	2.0
	Build	55	1430	1000	1480	1000	3.4	2.0

The NAAQS for CO are 35 ppm for the 1-hour period and 9 ppm for the 8-hour period. Since the maximum 8-hour CO concentrations do not exceed the NAAQS of 9 ppm for any of the alternatives, a more detailed computer analysis is not necessary. As shown in Table 2, CO concentrations are predicted to be below the NAAQS for CO for all alternatives. Therefore, this project is not expected to have a significant effect on air quality. The output files from the CO Screening Model 2.0.5 for each alternative are provided in Appendix B.

4.0 CONFORMITY

The project is in Pasco County, an area that has been designated as attainment for all air quality standards under the Clean Air Act Amendments of 1990. Therefore, conformity requirements do not apply to this project.

5.0 CONSTRUCTION

Construction activities will cause minor short-term air quality impacts in the form of dust from earthwork and unpaved roads. These impacts will be minimized by adherence to all state and local regulations and to the latest edition of FDOT's Standard Specifications for Road and Bridge Construction.

Appendix A
Documented Traffic Data

Demand Traffic (Hourly Approach Volumes) at SR 52 and US 41 Intersection

Approach	Existing Year (2005)	No-Build Alternative		Build Alternative	
		Opening Year (2010)	Design Year (2030)	Opening Year (2010)	Design Year (2030)
SR 52 EB Volume	580	670	995	670	995
SR 52 WB Volume	635	795	1,430	795	1,430
US 41 NB Volume	1,085	1,165	1,480	1,165	1,480
US 41 SB Volume	335	380	520	380	520

Appendix B
CO Screening Model 2.0.5 Output Files

04-11-2006

CO Florida 2004

Project: Existing Year (2005)
Facility: SR 52 Reevaluation
Analyst: R. Magsanoc (PBQD)

Environmental Data:
Temperature: 48 F
Reid Vapor Pressure: 11.5 psi
Land Use: Rural
Stability Class: E
Surface Roughness: 10
Background Concentration: 1-hr = 1.7 ppm 8-hr = 1.0 ppm

Project Data:
Region: 3: Central Florida
Year: 2005
Intersection Type: 4 x 4 Intersection
Max Approach Traffic Volume: 1085 veh/hour
Speed: 55

Receptor Data (all distances are in feet):

Receptor Name	East-West Distance from Intersection	North-South Distance from Intersection	Receptor Height
Resident SE of inter	164	334	6

RESULTS (including background CO):

Receptor Name	Max 1-Hr Conc (ppm)	Max 8-Hr Conc (ppm)
Resident SE of inter	4.2	2.5

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PROJECT PASSES - NO EXCEEDANCES OF NAAQ CO STANDARDS ARE PREDICTED
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04-11-2006

CO Florida 2004

Project: Opening Year (2010) No Build
Facility: SR 52 Reevaluation
Analyst: R. Magsanoc (PBQD)

Environmental Data:
Temperature: 48 F
Reid Vapor Pressure: 11.5 psi
Land Use: Rural
Stability Class: E
Surface Roughness: 10
Background Concentration: 1-hr = 1.7 ppm 8-hr = 1.0 ppm

Project Data:
Region: 3: Central Florida
Year: 2010
Intersection Type: 4 x 4 Intersection
Max Approach Traffic Volume: 1165 veh/hour
Speed: 55

Receptor Data (all distances are in feet):

Receptor Name	East-West Distance from Intersection	North-South Distance from Intersection	Receptor Height
Resident SE of inter	164	334	6

RESULTS (including background CO):

Receptor Name	Max 1-Hr Conc (ppm)	Max 8-Hr Conc (ppm)
Resident SE of inter	3.6	2.1

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

04-10-2006

CO Florida 2004

Project: Opening Year (2010) Build
Facility: SR 52 Reevaluation
Analyst: R. Magsanoc (PBQD)

Environmental Data:
Temperature: 48 F
Reid Vapor Pressure: 11.5 psi
Land Use: Rural
Stability Class: E
Surface Roughness: 10
Background Concentration: 1-hr = 1.7 ppm 8-hr = 1.0 ppm

Project Data:
Region: 3: Central Florida
Year: 2010
Intersection Type: 6 x 4 Intersection
Max 4-Lane Traffic: 1165 veh/hour
Max 6-Lane Traffic: 1000 veh/hour
4-Lane Speed: 55
6-Lane Speed: 55

Receptor Data (all distances are in feet):

Receptor Name	East-West Distance from Intersection	North-South Distance from Intersection	Receptor Height
Resident SE of inter	188	409	6

RESULTS (including background CO):

Receptor Name	Max 1-Hr Conc (ppm)	Max 8-Hr Conc (ppm)
Resident SE of inter	3.5	2.1

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PROJECT PASSES - NO EXCEEDANCES OF NAAQ CO STANDARDS ARE PREDICTED
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04-11-2006

CO Florida 2004

Project: Design Year (2030) No Build
Facility: SR 52 Reevaluation
Analyst: R. Magsanoc (PBQD)

Environmental Data:
- Temperature: 48 F
- Reid Vapor Pressure: 11.5 psi
- Land Use: Rural
- Stability Class: E
- Surface Roughness: 10
- Background Concentration: 1-hr = 1.7 ppm 8-hr = 1.0 ppm

Project Data:
- Region: 3: Central Florida
- Year: 2030
- Intersection Type: 4 x 4 Intersection
- Max Approach Traffic Volume: 1480 veh/hour
- Speed: 55

Receptor Data (all distances are in feet):

Receptor Name	East-West Distance from Intersection	North-South Distance from Intersection	Receptor Height
Resident SE of inter	164	334	6

RESULTS (including background CO):

Receptor Name	Max 1-Hr Conc (ppm)	Max 8-Hr Conc (ppm)
Resident SE of inter	3.4	2.0

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PROJECT PASSES - NO EXCEEDANCES OF NAAQ CO STANDARDS ARE PREDICTED
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04-10-2006

CO Florida 2004

Project: Design Year (2030) Build
Facility: SR 52 Reevaluation
Analyst: R. Magsanoc (PBQD)

Environmental Data:
Temperature: 48 F
Reid Vapor Pressure: 11.5 psi
Land Use: Rural
Stability Class: E
Surface Roughness: 10
Background Concentration: 1-hr = 1.7 ppm 8-hr = 1.0 ppm

Project Data:
Region: 3: Central Florida
Year: 2030
Intersection Type: 6 x 4 Intersection
Max 4-Lane Traffic: 1480 veh/hour
Max 6-Lane Traffic: 1430 veh/hour
4-Lane Speed: 55
6-Lane Speed: 55

Receptor Data (all distances are in feet):

Receptor Name	East-West Distance from Intersection	North-South Distance from Intersection	Receptor Height
Resident SE of inter	188	409	6

RESULTS (including background CO):

Receptor Name	Max 1-Hr Conc (ppm)	Max 8-Hr Conc (ppm)
Resident SE of inter	3.4	2.0

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