

# US 192 Feasibility Study

Prepared for  
Space Coast Transportation Planning Organization  
Work Order 11-07K

in cooperation with

Florida Department of Transportation District 5  
Financial Management No. 430209-1-18-01

## Final Report

October 2012



Final Report

# US 192 Feasibility Study

Brevard County, Florida

Prepared For:

**Space Coast Transportation Planning Organization**

2725 Judge Fran Jamieson Way, Building B

Viera, Florida 32940

(321) 690-6890

Prepared By:

**Kittelson & Associates, Inc.**

225 E. Robinson Street, Suite 450

Orlando, Florida 32801

(407) 540-0555

In Association with:

**Infrastructure Engineers, Inc.**

2121 Old Hickory Tree Road

St. Cloud, Florida 34772

(407) 957-8744

Project Manager: Karl Passetti, PE

Project Analyst: Travis Hills, EIT

Project No. 9891.07

October 2012





# Table of Contents

<b>Section 1</b> Executive Summary.....	2
<b>Section 2</b> Study and Report Scope.....	7
<b>Section 3</b> Existing Conditions .....	11
<b>Section 4</b> Traffic Analysis .....	42
<b>Section 5</b> Roadway Concept Development .....	77
<b>Section 6</b> Intersection Improvements .....	97
<b>Section 7</b> Cost Estimates.....	113
<b>Section 8</b> Recommendations and Endorsement .....	117



# List of Figures

**Figure 1** Study Vicinity..... 8

**Figure 2** Pedestrian Facilities..... 12

**Figure 3** Pedestrian and Transit Facilities ..... 13

**Figure 4** Pedestrian and Transit Facilities ..... 14

**Figure 5** Pedestrian and Transit Facilities ..... 15

**Figure 6** Crash Trends for the Study Corridor from January 1, 2006 to December 31, 2010 ..... 17

**Figure 7** Pedestrian and Bicycle Crashes ..... 18

**Figure 8** Crash Trends by Roadway Feature for US 192 from January 1, 2006 to December 31, 2010.. 23

**Figure 9** Space Coast Area Transit Routes within the Study Vicinity ..... 24

**Figure 10** Location of Platt Ranch Development ..... 26

**Figure 11** Environmental Data ..... 30

**Figure 12** Social Data..... 32

**Figure 13** Existing Land Use ..... 33

**Figure 14** Generalized Future Land Use ..... 34

**Figure 15** Data Collection Locations ..... 36

**Figure 16** Data Collection Locations ..... 37

**Figure 17** Data Collection Locations ..... 38

**Figure 18** Data Collection Locations ..... 39

**Figure 19** FDOT Count Station Locations..... 44

**Figure 20** FDOT Count Station Locations..... 45

**Figure 21** Existing 2011 Traffic Volumes ..... 47

**Figure 22** Existing 2011 Lane Configurations ..... 48

**Figure 23** Existing 2011 Intersection Operating Conditions ..... 53

**Figure 24** Average Weekday Speed for Eastbound US 192 (John Rodes Boulevard to Greenway Drive).. 55

**Figure 25** Average Weekday Speed for Westbound US 192 (Greenway Drive to John Rodes Boulevard). 55

**Figure 26** Weekday A.M. Bicycle Segment LOS ..... 58

**Figure 27** Weekday P.M. Bicycle Segment LOS ..... 59

**Figure 28** Weekday A.M. and P.M. Pedestrian Segment LOS..... 60



**Figure 29** Weekday A.M. and P.M. Transit LOS..... 61

**Figure 30** CFRPM US 192 Subarea Calibration Boundary and Cut Lines..... 63

**Figure 31** US 192 Existing Typical Section..... 78

**Figure 32** FDOT Exhibit Typ-6..... 79

**Figure 33** US 192 Outside Widening Typical Section ..... 80

**Figure 34** US 192 Inside Widening Typical Section..... 82

**Figure 35** US 192 Proposed Typical Section..... 85

**Figure 36** US 192 Utility Locations ..... 87

**Figure 37** US 192 Utility Locations ..... 88

**Figure 38** US 192 Six Lane Conceptual Layout ..... 90

**Figure 39** US 192 Six Lane Conceptual Layout ..... 91

**Figure 40** US 192 Six Lane Conceptual Layout ..... 92

**Figure 41** Wickham Road Eastern Widening..... 100

**Figure 42** Wickham Road Western Widening with Skew..... 101

**Figure 43** Wickham Road Western Widening without Skew..... 102

**Figure 44** Hollywood Boulevard Conceptual Layout ..... 108



# List of Tables

Table 1 Urban Intersection Crash History (2006-2010)..... 20

Table 2 Crash Rate Comparison by Urban Four-Lane Divided Highway Segment (2006-2010) ..... 21

Table 3 Segment Crash History Between Wickham Road/Minton Road and Meadowlane Avenue ..... 22

Table 4 Planned and Programmed Projects within Study Area..... 28

Table 5 Historical D30 and T24 Data for US 192..... 43

Table 6 National and Statewide Recommended D30 for Urban Arterials..... 43

Table 7 Summary of Design Year Traffic Characteristics ..... 46

Table 8 Summary of Weekday Peak-Hour Arterial Operating Conditions (Eastbound US 192) ..... 50

Table 9 Summary of Weekday Peak-Hour Arterial Operating Conditions (Westbound US 192) ..... 51

Table 10 Root Mean Square Error (RMSE) Comparison with FDOT Standards from Original Model..... 65

Table 11 Root Mean Square Error (RMSE) Comparison with FDOT Standards from Validated Model..... 66

Table 12 Summary Validation Values ..... 67

Table 13 Historical Traffic Volumes and Growth Rate Calculation on US 192 ..... 69

Table 14 Platt Ranch Land Use Development..... 70

Table 15 Growth Rates from 4 Lanes and 6 lanes with Platt Ranch ..... 71

Table 16 2035 Model AADT Comparison on US 192 for 4 Lanes, Partial 6 lanes and All 6 lanes with Platt Ranch..... 72

Table 17 2035 Model AADT Comparison on Ellis Rd. for 4 Lanes , Partial 6 lanes and All 6 lanes with Platt Ranch..... 73

Table 18 Conclusions and Recommendations Based on the 2035 Future Traffic Analysis ..... 75

Table 19 Summary of Qualitative Evaluation Considerations ..... 94

Table 20 Wickham Road Historical and Improved LOS Analysis – AM..... 105

Table 21 Wickham Road Historical and Improved LOS Analysis – PM ..... 106

Table 22 Hollywood Boulevard Historical and Improved LOS Analysis – AM..... 110

Table 23 Hollywood Boulevard Historical and Improved LOS Analysis – PM..... 111

Table 24 Summary of Cost Estimates by Project ..... 115



## Appendices

<b>Appendix A</b>	Excerpts from LRTP and Comprehensive Plans
<b>Appendix B</b>	Intersection Crash Data
<b>Appendix C</b>	Transit Information
<b>Appendix D</b>	Existing and Future Land Use Maps
<b>Appendix E</b>	Excerpts from I-95 SOAR Report
<b>Appendix F</b>	ROW Maps and I-95 Construction Drawings
<b>Appendix G</b>	Utility Information
<b>Appendix H</b>	Traffic Count Data
<b>Appendix I</b>	Signal Timing Sheets
<b>Appendix J</b>	Synchro and ARTPLAN Worksheets
<b>Appendix K</b>	Multimodal Level of Service Information
<b>Appendix L</b>	Subarea Model Development Support Material
<b>Appendix M</b>	Generalized LOS Table
<b>Appendix N</b>	Typical Sections Meeting Notes
<b>Appendix O</b>	Pond Sizing Calculations
<b>Appendix P</b>	Historical & Future Conditions Analysis
<b>Appendix Q</b>	Cost Estimate Materials
<b>Appendix R</b>	Presentation Slides

**Section 1**  
Executive Summary



# Executive Summary

The Space Coast TPO (SCTPO), jointly with the Florida Department of Transportation (FDOT) District 5, retained Kittelson & Associates, Inc. (KAI) to conduct a feasibility study to determine if a capacity improvement involving widening US 192 from four to six lanes from milepost 9.256 (west of I-95 in Brevard County) to the intersection with Babcock Street (SR 507, milepost 14.99 in the City of Melbourne) was feasible and needed. The feasibility and needs assessment incorporated factors such as engineering considerations, right of way and construction costs, traffic performance, utility impacts, business and community impacts, and consideration of other roadway projects in the study vicinity.

## TRAFFIC ANALYSIS

A subarea model using the 2005 FDOT Central Florida Regional Planning Model (CFRPM) as a base was developed for the study area. The subarea model was validated using historical traffic counts with increased emphasis placed on US 192 and Ellis Road. A future year model based on the model used for the SCTPO 2035 Long-Range Transportation Plan (LRTP) was also created. The future year model roadway network assumed that the St Johns Heritage Parkway from Micco Road to John Rodes Boulevard and the Ellis Road improvements (four lane widening and I-95 interchange) were in place. The Platt Ranch development, as described in the approved Comprehensive Plan Amendment, was also assumed in the future year model. Based on the results of the traffic analysis, the conclusions and recommendations in the table below were made.

Conclusions and Recommendations Based on the 2035 Future Traffic Analysis

#	Conclusion	Recommendation
1	US 192 between SJHP <sup>1</sup> and the I-95 interchange is forecast to be impacted by future development west of the I-95 interchange (assumed to be associated with the SJHP and the Platt Ranch).	Address the needs of this section of US 192 as part of a public private partnership as development moves forward. An alternative to widen US 192 to six lanes in this section is not proposed as part of this study.
2	The widening of US 192 east of the I-95 interchange is forecast to reduce traffic volume on Ellis Road <sup>2</sup> .	Monitor traffic conditions on Ellis Road and US 192 after the I-95/Ellis Road interchange and the four-laning of Ellis Road are complete. Consider the east-west capacity in the corridor available from both US 192 and Ellis Road when considering the future widening of US 192.
3	East of the I-95 interchange, the section of US 192 between Wickham Road and Dairy Road has the highest demand volumes.	Develop an alternative for a six lane capacity improvement on US 192 between Wickham Road and Dairy Road. This alternative provides relief to the most congested section of US 192 and draws fewer vehicles from Ellis Road (vs full six lane scenario).
4	Intersection improvements can be used to increase the capacity of US 192. The existing conditions analysis (Figure 23) showed and conversations with the project team confirmed the selection of the US 192/Wickham Road and US 192/Hollywood Boulevard intersections for study.	Develop geometric improvement alternatives at the US 192/Wickham Road and US 192/Hollywood Boulevard intersections.
1: SJHP = St. John's Heritage Parkway 2: I-95/Ellis Road interchange and four-laning of Ellis Road assumed.		



## CONCEPT DEVELOPMENT

Typical sections were developed and evaluated for the potential widening of US 192 from Wickham Road to Dairy Road. With the exception of the use of 11 foot travel lanes the recommended typical section incorporates the same geometric elements and dimensions as shown in Exhibit Typ-6 (1/1/12) from the FDOT Plans Preparation Manual, Volume 2. The result of using 11 foot lanes is that the needed right of way acquisition will drop from 12 feet to 6 feet. The use of 11 foot travel lanes was discussed with the FDOT and the FDOT did not object as long as the current SIS designation on US 192 was transferred to the improved Ellis Road corridor.

The study team recognized that the need/priority to focus on project development and funding for the Ellis Road improvements will likely mean that the widening of US 192 from four to six lanes from Wickham Road to Dairy Road will not occur in the foreseeable future. To provide short term improvements to the corridor, intersection improvements at key locations were developed. Based on a review of the existing conditions analysis and input from the study team, improvement concepts were developed for the US 192/Wickham Road and US 192/Hollywood Boulevard intersections.

## COST ESTIMATES

The proposed roadway concepts for the US 192 six-lane widening, the US 192/Wickham Road intersection improvements and the US 192/Hollywood Boulevard intersection improvements were the base for inputs into the FDOT Long Range Estimating (LRE) system. Other potential project elements included in the total cost estimate are: right of way acquisition for roadway improvements and stormwater treatment; design engineering; and construction engineering and inspection. The amounts were rounded due to the preliminary level accuracy in quantities and item costs. The estimated costs associated are shown on the following page.

Summary of Cost Estimates by Project

Project	Construction Costs		Engineering <sup>A</sup>	CEI <sup>B</sup>	Right of way		Total
	Construction	Utility Relocation			Roadway	Stormwater Ponds	
US 192/Wickham Road Intersection Improvements <sup>1</sup>	\$1,400,000	\$160,000 <sup>5</sup>	\$310,000 <sup>5</sup>	\$160,000 <sup>5</sup>	\$16,400,000 <sup>5</sup>	\$1,200,000	\$19,630,000 <sup>5</sup>
		\$1,200,000 <sup>6</sup>	\$520,000 <sup>6</sup>	\$260,000 <sup>6</sup>	\$14,800,000 <sup>6</sup>		\$19,380,000 <sup>6</sup>
		\$1,200,000 <sup>7</sup>	\$520,000 <sup>7</sup>	\$260,000 <sup>7</sup>	\$15,500,000 <sup>7</sup>		\$20,080,000 <sup>7</sup>
US 192/Hollywood Blvd. Intersection Improvements <sup>2</sup>	\$1,300,000	\$1,600,000	\$580,000	\$290,000	\$1,500,000	\$1,600,000	\$6,870,000
US 192 Four to Six Lane Widening from Wickham Road to Dairy Road <sup>3,4</sup>	\$11,300,000 <sup>8</sup>	\$2,900,000	\$2,800,000	\$1,400,000	\$24,800,000	\$800,000	\$44,000,000
<b>Total</b>	<b>\$14,000,000</b>	<b>\$4,660,000<sup>5</sup></b>	<b>\$3,690,000<sup>5</sup></b>	<b>\$1,850,000<sup>5</sup></b>	<b>\$42,700,000<sup>5</sup></b>	<b>\$3,600,000</b>	
		<b>\$5,700,000<sup>6</sup></b>	<b>\$3,900,000<sup>6</sup></b>	<b>\$1,950,000<sup>6</sup></b>	<b>\$41,100,000<sup>6</sup></b>		
		<b>\$5,700,000<sup>7</sup></b>	<b>\$3,900,000<sup>7</sup></b>	<b>\$1,950,000<sup>7</sup></b>	<b>\$41,800,000<sup>7</sup></b>		

1: See Figures 41, 42 and 43 for alternative concepts.  
 2: See Figure 44 for concept plan.  
 3: See Figures 38, 39 and 40 for concept plans.  
 4: Assumes Wickham Rd. and Hollywood Blvd. improvements in place.  
 5: Cost for Eastern Widening Alternative.  
 6: Cost for Western Widening w/Skew Alternative.  
 7: Cost for Western Widening w/o Skew Alternative  
 8: Cost for widening four lanes to six lanes with milling & resurfacing existing pavement.  
 9: Assumes US 192 north side widening. South side widening utility relocation approximately \$15,400,000.  
 A: Engineering cost is 20% of construction + utility relocation costs.  
 B: CEI cost is 10% of construction + utility relocation costs.

## RECOMMENDATIONS

Based on the results of the study, the following recommendations were made.

1. Commit to and focus funding resources to the planned improvements on Ellis Road. These improvements include:
  - a) Widening Ellis Road to four travel lanes, extending Ellis Road to I-95, and constructing an interchange with I-95; and
  - b) Changing the current SIS designation from US 192 to Ellis Road. The change in designation will allow the consideration of 11 foot travel lanes on US 192 which will reduce property impacts and costs of a future widening project.
2. Prioritize intersection improvements at US 192/Hollywood Boulevard and US 192/Wickham Road as interim measures.
3. Study traffic patterns in the study area (including US 192) after Ellis Road improvements have been implemented to determine the need for additional (i.e. beyond the capacity provided by the widening of Ellis Road) east-west capacity.



4. If additional east-west capacity beyond the capacity provided by the widening of Ellis Road is needed, consider widening US 192 from four to six lanes from Wickham Road to Dairy Road. The future widening of US 192 would require the completion of a Project Development and Environment (PD&E) Study. Public involvement activities would be required as part of the PD&E Study.

## TPO APPROVAL

At the September 10, 2012 joint Technical Advisory/Citizens Advisory Committee Meeting and the September 13, 2012 SCTPO Board Meeting the recommendations of the US 192 Feasibility Study were approved.