

6. Design Traffic

CR 16A is a two-lane undivided rural facility in St. Johns County, Florida. Only one signalized intersection at SR 13 exists within the study limits. The following existing intersections were included in this study:

1. CR 16A at SR 13 (Signalized)
2. CR 16a at CR 210 (Unsignalized T-Intersection)
3. CR 16A at Hardwood Landing (Unsignalized T-Intersection)
4. CR 16A at SR 16 (T-Intersection with Flashing Signal)

The Annual Average Daily Traffic (AADT) volumes were obtained from St. Johns County and are summarized in Table 3.1 of the Final Project Traffic Report provided in **Appendix B** of this report. The intersection turning movement counts were collected in July 2005. The intersection turning movement counts were adjusted for peak season traffic using the appropriate peak season conversion factors. The AM and PM peak hour volumes, AADTs, and the existing lane configuration along CR 16A and at the intersections are depicted on **Figure 3-1** of the Final Project Traffic Report provided in **Appendix B**. **Table 6-1** provides a summary of the unsignalized intersection analysis performed in 2005.

TABLE 6-1
CR 16A Unsignalized Intersection Analysis Summary (2005)

Intersection	Minor Street Approach	STOP Control Movements	AM Peak		PM Peak	
			Vol (veh/hr)	LOS	Vol (veh/hr)	LOS
CR 16A @ CR 210	Southbound	Right	141	B	368	B
		Left	20	B	28	B
CR 16A @ Hardwood Landing	Northbound	Right	3	A	1	A
		Left	4	A	4	A
CR 16A @ SR 16	Southbound	Right	18	C	6	C
		Left	70	C	64	C

CR 16A is assumed as a north-south roadway and operates under STOP control at the SR 16 intersection.

Based on the traffic projections and HCS analysis results, the following conclusions were made:

- The analysis shows that all intersections are operating at Level of Service C or better. No operational problems were found at the intersections. However, the lack of left-turn

bays at the intersections will cause operational and safety problems with the expected growth in traffic within the study limits.

- All existing signalized and unsignalized intersections were analyzed for years 2010, 2020, and 2030 traffic conditions using Synchro Version 6.0 and the output was generated in the HCM format. The analysis was conducted for no-build conditions assuming the existing conditions and any planned improvements expected to be in place for the analysis years (lane geometry and traffic controls).

The following observations can be made from this analysis:

- Intersection of CR 16A and SR 13: This signalized intersection will operate at LOS B with existing geometry through the year 2020. In 2030, the intersection will operate at LOS D.
- Intersection of CR 16A and CR 210: The unsignalized intersections will operate at LOS F in 2010 and beyond.
- Intersection of CR 16A and Leo Maguire Pkwy Extension: This new intersection, introduced in 2015, will operate at LOS D or better in 2020 but will fail (LOS F) in 2030.
- Intersection of CR 16A and Hardwood Landing Road: This unsignalized intersection will operate at LOS C or better in 2010 but will fail in the year 2020 and beyond.
- Intersection of CR 16A and SR 16: This existing unsignalized intersection will operate at LOS F in 2010. In 2015, this intersection will be signalized and improved as part of the Silver Leaf DRI and an east leg (SR 16 Extension) will be introduced as a four-lane section. With the signalization and intersection improvements, the intersection will operate at LOS D in 2020 and LOS F in 2030.
- Based on travel demand forecast and the directional design hour volumes, the analysis shows that CR 16A would be able to provide acceptable levels of service through 2010 but would require widening to four lanes some time before 2020.

The future year analysis based on no-build geometry and traffic controls was reviewed. If an intersection failed to provide Level of Service E or better, geometric and signal improvements including installation of new signals were identified for the failing year and carried forward to the remaining analysis year(s). The levels of service with the recommended improvements are summarized in Table 4.3 of the Final Project Traffic Report located in **Appendix B** of this report. The recommended improvements for 2010, 2020, and 2030 are depicted in **Figures 4-4** through **4-6** in **Appendix B** and are based on no-build conditions i.e. the improvements shown are in addition to the existing lane geometry plus any planned improvements.

Based on the review and evaluation of the existing and future conditions, the following summarizes the major conclusions and recommendations:

- The study segment carries a higher percentage of truck traffic during peak hours than typically observed on rural highways.
- Safety does not appear to be of significant concern under existing conditions. The intersection of CR 16A and SR 16, however, should be monitored for any crash patterns resulting from the unusual geometric layout and traffic controls.

- All intersections within the study segment are operating at LOS C or better under existing conditions and do not require any immediate improvements. However, for safety and efficient traffic operations, left-turn bays should be provided for all left-turn movements at signalized intersections.
- Based on the travel demand forecasts, CR 16A will be able to provide acceptable levels of service through 2010 but will require widening to four lanes before year 2020.
- SR 16 west of CR 16A will operate at LOS E in 2010 and will require widening to four lanes by 2010.
- The unsignalized intersections along CR 16A at CR 210 and SR 16 will fail to provide acceptable LOS and will require signalization by 2010.
- The HCM unsignalized intersection analysis of CR 16A and Hardwood Landing Road for 2030 shows LOS F for the intersection. The intersection, however, does not meet the signal warrant criteria for signalization due to the low volume on the minor approach. The HCM methodology does not adequately address the two-stage left-turn movement from the minor street approach at unsignalized intersections and estimates much higher delays than experienced in the field. Due to this reason, it is expected that this intersection will provide acceptable operations through 2030 with the four lane widening of CR 16A. The intersection, however, should be monitored for any increase in traffic volumes on the minor approach that would exceed the signal warrant threshold and require signalization.
- Recommended lane geometry as depicted in **Figures 4-4 through 4-6 of Appendix B** should be provided at the intersections to achieve acceptable operations.