PROJECT CAPACITY ANALYSIS

Capacity Analysis and Intersection Levels of Service

Capacity analysis was conducted at the intersections with proposed safety improvements to determine the operational characteristics based on the existing and future conditions. The capacity analysis was undertaken using the methodologies outlined in the Highway Capacity manual (HCM) and the Synchro 7.0 software program. There are six levels of service (LOS) in the HCM by which the operational performance of an intersection may be described. These levels of service range between LOS "A", which indicates a free-flowing condition, and LOS "F", which indicates a forced/breakdown flow condition.

A LOS for all the minor movements at an unsignalized two-way-stop-controlled (TWSC) intersection is determined by computing their respective control delays. The LOS for the worst approach is reported below although the HCM computes LOS for all movements. A capacity analysis was conducted for the existing condition and the future anticipated no-build and build conditions. The HCM determines LOS for the side street approaches by computing the control delay for these approaches for the existing and no-build conditions. The results of the capacity analysis for the no-build existing and anticipated future conditions are summarized in Table 3.

The capacity analysis for proposed roundabouts at the SR 136 at SR 136 Connector intersection (the SR 136 at SR 136 Connector East, SR 136 at SR 136 Connector South and SR 136 at SR 136 Connector West intersections were combined) and the relocated SR 136 at Ellijay Road intersection and were conducted using the SIDRA software package. The SIDRA software is based on methodology developed in Australia and also uses a gap-acceptance approach to model roundabout operations. The SIDRA software calculates capacity, delay, queue and LOS for each roundabout approach leg and the entire roundabout. The proposed roundabouts' capacity analysis results for the future build and design years are summarized in Table 5.

Traffic signals are not warranted on this project based upon the peak hour volumes, so traditional stop-sign intersections with turn lanes were analyzed as an alternative instead. A traditional stop-sign controlled intersection with turn lanes would have a 2014 LOS of approximately B/B and a 2034 LOS of approximately C/B for the AM and PM peak, respectively. The traditional stop-sign intersections with turn lanes alternative capacity analysis results for the future build and design years are summarized in Table 4.

Table 1. No-Build Existing and Anticipated Future Level of Service

Intersection	Traffic Control	Approach	Level of Service (AM/PM)		
			2010	2014 No-Build	2034 No-Build
SR 136/Swan Bridge Road	Stop Control on Swan Bridge Road	SB	A/A	B/B	B/B
SR 136@ SR 136 Connector West	Stop Control on SR 136 West	NB	B/B	B/B	B/B
SR 136@ SR 136 Connector South	Stop Control on SR 136 South	EB	A/A	A/A	A/A
SR 136@ SR 136 Connector East	Stop Control on SR 136 Connector East	EB	B/B	B/B	D/C
SR 136 @ Antioch Church Road	Stop Control on Antioch Church Road	NB	B/B	B/B	C/C
SR 136 @ Ellijay Road	Stop Control on Ellijay Road	SB	B/B	B/B	D/C
SR 136 @ SR 515 connector road	Stop Control on SR 515 connector road	SB	A/A	A/B	B/C

Table 2. Traditional Stop-Sign & Turn Lane Anticipated Future Intersection Level of Service

Intersection	Traffic Control	Approach	2014 Build	2034 Build
SR 136/Swan Bridge Road	Stop Control on Swan Bridge Road	SB	B/B	B/B
SR 136@ SR 136 Connector Combined	Stop Control on SR 136 Connector	EB	B/B	C/C
SR 136 @ Antioch Church Road	Stop Control on Antioch Church Road	NB	B/B	C/C
SR 136 @ Ellijay Road Relocated	Stop Control on SR 136 (West Leg)	EB	B/A	C/B
SR 136 @ SR 515 connector road	Stop Control on SR 515 connector road	SB	A/B	B/C

Table 3. Roundabout Anticipated Future Intersection Level of Service

Intersection	LOS (AM/PM)	
	2014 Build	2034 Build
SR 136@ SR 136 Connector Combined	B/B	B/B
SR 136 @ Ellijay Road Relocated	B/B	B/B

Operational Analysis

A.M. and P.M. peak hour turning movement counts and 24-hour bi-directional counts were obtained at the major study area intersections and roadways by All Traffic Data, Inc. on September 10th, 2008. These "short-term" traffic counts were adjusted using day of the week, month of the year and axle adjustment factors (obtained from GDOT) to develop annual average daily traffic (AADT) volumes. The opening year for this project was assumed to be 2014 and the design year to be 2034. The 2014 "Opening Year" and the 2034 "Design Year" AADT for the roadways with the proposed safety improvements are presented on Page 7.

The existing AM and PM peak hour turning movement volumes, existing AADT volumes, the design year AM and PM peak hour turning movement volumes and the opening year and design year AADT volumes are provided as an attachment (See Crash Summary and Traffic Diagrams attachment) with this report.