Georgia Department of Transportation

SR20 @ Macedonia Rd
Bartow County

07/15/2019

Prepared By: Emma Mejia

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STUDY LOCATION

The location of study is at intersection SR20/US 411/HWY 411@Macedonia Rd.

REASON FOR INVESTIGATION

This intersection is being analyzed due to a citizen's concern. In an effort to analyze intersection a Warrant Analysis will be conducted along with any other analysis necessary for study.

TOPOGRAPHY

Intersection being studied is a three-leg intersection and is located in a rural area with a bridge to the East of it. Direction of travel for State Route 20/US 411/Hwy 411(mainline) is East to West and this section of road is a four-lane Rural Principal Arterial, consisting of one right turn lane westbound and one eastbound left turn to Macedonia Road. State Route 20/US 411/Hwy 411 currently is a grass divided highway with unpaved shoulders and a speed limit of 65 mph with nine percent truck traffic.

The intersecting road, Macedonia Rd, is a two-lane rural major collector road, direction of travel is North to South. Macedonia Rd is an undivided road with grass shoulder and a speed limit of 45 mph with no truck traffic.

After conducting site visit, there is 2972 feet of right site distance and 2240 feet of sight left sight distance. In addition to conducting site distance of existing intersection, sight distance right(looking Eastbound) was taken from the proposed design of crossover/U-Turn/Loon and found to be 1043 feet.

EXISTING TRAFFIC CONTROL

The existing traffic control is stop control. The main line is free flow and side road is stop control.

VEHICLE VOLUME HISTORY

The AADT for SR20 is 13,000 with nine percent truck traffic and Macedonia Rd AADT is 3,350.

CRASH HISTORY

There have been 21 crashes between January 31st, 2016 to January 31st, 2019. The majority of these crashes are angle crashes. Out of the 16 angle crashes, 11 of those can be corrected with an R-Cut.

SR20@Macedonia Road					
Year	2016	2017	2018	2019	Totals per Crash Type
Angle	3	4	8	1	16
Rear End	2		3		5
Side Swipe					0
Total per Year	5	4	11	1	21
Grand Total	21				
Injuries	2	3	4	1	10
Fatalities	0	0	1	0	1

ADJACENT SIGNALIZED INTERSECTIONS

There are no signals in 1000 feet in any direction of the intersection of State Route 20/US 411/Hwy 411 and Macedonia Road.

ROUNDABOUT ANALYSIS

We did not consider installing a roundabout at this location due to the high cost of a roundabout and with it being a high speed four lane section.

MUTCD WARRANT ANALYSIS

Traffic signal warrant analysis was performed for the intersection of SR20 @ Macedonia Rd using the criteria provided in the Manual on Uniform Traffic Control Device (MUTCD) published by the Federal Highway Administration (FWHA). According to the MUTCD, the investigation of the need for traffic control signal shall include an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to existing operation and safety at the study location:

- Warrant 1 – Eight Hour Volume
- Warrant 2 – Four Hour Volume
- Warrant 3 – Peak Hour
- Warrant 4 – Pedestrian Volume
- Warrant 5 – School Crossing
- Warrant 6 – Coordinated Signal System
- Warrant 7 – Crash Experience
- Warrant 8 – Roadway Network

This intersection satisfies Warrant 2&3.

HCS7: TWO-WAY STOP CONTROL and R-CUT ANALYSIS

SR20 at Macedonia Road (PM Peak Hour)		
Existing Condition – Two-Way Stop Control	Approach Delay (Seconds)	LOS
Eastbound	0.0	A
Westbound	1.3	B
Northbound	55.1	F
Proposed RCUT (PM Peak Hour)	Approach Delay	LOS
Eastbound	0	A
Westbound	1.3	A
Northbound	33.4	C

Note: V/C Ratio for Existing Condition Eastbound is "0,"Westbound "0.13," and Northbound "0.80."

After conducting HCS7 analysis for a Two-Way Stop control and R-CUT, the RCUT shows an overall improvement to the intersection control delay for Northbound traffic improving three letter grades from F to a C Level of Service (LOS). The Westbound increases control delay decreases by 9.0 seconds and still maintains a Level of Service of "A," for that approach.

CONCLUSION

After conducting a signal warrant analysis it has been determined that the intersection does not meet for a signal. A roundabout analysis was not conducted due to the high cost of constructability and the high speed of 65mph at this section of road. Last but not least an R-CUT with a single cross over to the East side was analyzed and analysis shows both an operational improvement to intersection, and an expected reduction in Northbound angle crashes.

RECOMMENDATIONS

Due to the fact that signal warrant analysis was not met, an R-Cut will be recommended because it eliminates the left turns from Macedonia Road (side road) and allows traffic to find a better gap downstream to turn left. An R-Cut will help with the Northbound left angle crashes studied during this analysis period. An R-CUT is financially more feasible and can be built in a shorter amount time since to address angle crashes from January 31st , 2016 thru January 31st ,2019, it would provide a faster solution.

RECOMMENDED BY: _____ DATE: _____

Civil Engineer III

RECOMMENDED BY: _____ DATE: _____

District Traffic Engineer