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MEMORANDUM

DATE: March 30, 2011

TO: Mr. Terry Whelan, AICP – Principal Town Planner, Town of Chatham

FROM: Douglas C. Prentiss, P.E., PTOE DcP Sarah Borenstein
SUBJECT: West Chatham Intersection Level of Service - Chatham, Massachusetts

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INTRODUCTION

Fay Spofford & Thorndike (FST) has been contracted by the Town of Chatham to develop conceptual improvement schemes for the West Chatham corridor from Barn Hill Road to the east, to George Ryder Road to the west. Under a separate cover, FST has developed the following two conceptual schemes:

- Composite Scenario 1 - Roundabout at George Ryder Road, Signal at Barn Hill Road with selected turn lanes along the corridor as required; and
- Composite Scenario 2 - Signals at George Ryder Road and Barn Hill Road with center turn lanes along corridor.

TRAFFIC ANALYSIS

FST conducted traffic analysis of the two alternatives noted above using procedures outlined in the Highway Capacity Manual[1]. MassDOT has approved these procedures. For signalized and unsignalized intersection analysis, SYNCHRO was used for the traffic analysis and VISSIM for roundabouts.

- Level of Service Criteria

Level of Service (LOS), an expression of the quality of traffic flow, is commonly used as the accepted measure of effectiveness for peak hour traffic operating conditions. It takes into account such factors as automobile and truck volumes, roadway width, speed, grades, parking restrictions, pedestrian activity, and traffic control devices.

LOS is designated by a range from Level "A", which is the optimal condition where roadway-operating conditions are at their best, to Level "F" which indicates traffic-congested conditions. Levels "A" through "D" are typically associated with acceptable levels of peak hour traffic. Traffic congestion is considered to be unacceptable at Level of Service "E" or "F" in accordance with the methodologies set forth in the 2000 Highway Capacity Manual (HCM).

As defined in the HCM, LOS for signalized and unsignalized intersections is based on average

1 Highway Capacity Manual; Transportation Research Board; 2000

control delay in seconds per vehicle approaching the intersection. The delay criteria and their associated LOS rankings for signalized and unsignalized intersections are given in Table 1 below.

Table 1 – Intersection Level-of-Service Criteria

	Unsignalized	Signalized
Level of Service	Control Delay (sec/veh)	Control Delay (sec/veh)
A	Less than or equal to 10.0	Less than or equal to 10.0
B	10.1 to 15.0	10.1 to 20.0
C	15.1 to 25.0	20.1 to 35.0
D	25.1 to 35.0	35.1 to 55.0
E	35.1 to 50.0	55.1 to 80.0
F	Greater than 50.0	Greater than 80.0

Source: 2000 Highway Capacity Manual

- Analysis Results

The LOS for the study area intersections of George Ryder Road and Barn Hill Road is shown in Table 2 below. Results are summarized for the existing 2010 AM and PM summer peak periods, the future year 2020 No Build summer conditions (without any improvements) and for the future 2020 Build (with improvements) summer peak conditions.

Table 2 - Intersection Level of Service (Control Delay) Summary*

Intersection	Existing		2020 No Build		2020 Build (With signals)		2020 Build (With roundabout)	
Rte 28/Geo Ryder Rd	AM	PM	AM	PM	AM	PM	AM	PM
Geo Ryder southbound	D (31.9)	**F** (112.8)	**F** (78.0)	**F** (573.3)	B (10.1)	C (20.6)	A (2.1)	C (16.1)
Geo Ryder So northbound	D (26.7)	D (29.4)	**E** (42.3)	**E** (48.3)				
Rte 28/ Barn Hill Rd	AM	PM	AM	PM	AM	PM	AM	PM
Northbound	**E** (36.4)	**F** (196.5)	**F** (107.1)	**F** (691.3)	B (13.3)	B (16.8)	NA	NA

Note: LOS (Control Delay in seconds per vehicle); NA = not applicable; **Bold face**= unacceptable conditions
* Composite Scenario 1 or Composite Scenario 2

CONCLUSION

Level of Service results at the intersections are the same for both Composite Scenario 1 and 2, regardless of the configuration between the two intersections. Both composite scenarios include curb cut consolidation.