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M E M O R A N D U M

DATE: January 16, 2008

TO: Brian C. Curtis, P.E.
Nathan L. Jacobson & Associates, Inc.
86 Main Street
P.O. Box 337
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FROM: Bruce Hillson - Traffic Engineering Solutions, P.C.

RE: Review of Traffic Information relating to the proposed 51,545 Square Foot Retail Development – Route 17 at Route 147

Traffic Engineering Solutions, P.C. has prepared this memorandum to address the responses included in VHB's January 15 letter. VHB's responses followed the comments presented in my January 7, 2008 memo and the comments below follow the same format.

1. Comment 1 in the January 7 memo addressed the traffic counts and requested confirmation that the August counts were representative of typical traffic conditions in the study area. **VHB responded by making new traffic counts during the afternoon peak period at each of the study intersections and found that traffic volumes during January were similar if not less than the counts made during August.**
2. Comment 2 in the January 7 memo indicated that the trip generation information had been reviewed and found to be an accurate representation of the trips associated with the proposed development. **No further action was required of the Applicant.**
3. Comment 3 addressed the background growth factor used by VHB and found it to be consistent with standard practices. **No further action is required by the Applicant.**
4. Comment 4 addressed the Trip Distribution used by VHB and the fact that the distribution could not be reviewed since no support information was provided. **VHB provided support information with their January 15 response and the Trip Distribution presented in the Traffic Impact and Access Study was found to be representative of the distribution that should be expected. No further action is required by the Applicant.**
5. Comment 5 of the January 7 memo addressed the assignment of site trips at the site drives. VHB responded that they checked their assignment and found it to be correct. **During a telephone conversation it was explained**

that the distribution of by-pass trips did not follow the general distribution of the "New" trips. While we continue to disagree with the method used by VHB, the difference in trip assignment totals less than ten vehicles and has little or no impact in the results of the capacity analyses. No further action is required by the Applicant.

6. Comment 6 of the January 7 memo addressed the intersection sight distances from the two site drives. The January 7 memo also indicated that the December 7, 2007 Vicinity Map (V-1) shows the Intersection Sight Distance looking left from the Route 17 drive onto Route 17 is greater than 600 feet. This distance is great enough for vehicles approaching from the north on Route 17 at a speed of 54 mph (14 mph greater than the posted speed limit). This sight distance should be adequate for conditions in the field. **The Applicant did not provide in their January 15 response letter information relating to the 85th percentile speeds of travel for Route 147 so that the required Intersection Sight Distance can be determined. At this time Traffic Engineering Solutions, P.C. cannot state that the sight distance looking to the right from the Route 147 access drive onto Route 147 is adequate. During a telephone conversation with VHB we requested they provide a 40-scale plan showing the intersection sight line looking left (east) from the Route 147 drive onto Route 147 to allow assessment of any impacts the sight line will have on the abutting property.**

7. Comment 7 in the January 7 memo addressed the Route 17 corridor study and asked the Applicant to discuss how their proposed recommendations are consistent with or differ from the recommendations of the Route 17 corridor study. **No specific information was provided in the January 15 response, except to say that the Route 17 study identified that the most appropriate physical improvement strategy for the Route 17 corridor is that of making improvements at selected intersections.**

   Traffic Engineering Solutions, P.C. reviewed the intersection improvements recommended by the Route 17 study and found that the improvement identified for the Route 17 at Route 147 and Haddam Quarter Road was to realign Haddam Quarter Road top intersect Route 17 directly opposite Route 147 and to add a southbound left turn lane at the newly configured intersection as well as providing an exclusive left turn lane and combination through and right turn lane on both side street approaches.

8. Comment 8 addressed the capacity and queuing analyses that were completed by the Applicant and the need to provide additional information so that Traffic Engineering Solutions, P.C. could check the input data for the analyses. The requested information was provided by the Applicant. **No further information is required form the Applicant.**

   Below is a summary of our review of the capacity and queuing analyses for the intersections included in the Applicant's study. Most of the following information was included in our January 7 memo. Information that has been added with this memo is shown in italicized format.

   One location presently operates at a Level of Service that is typically considered unacceptable (Route 17 at Route 68 operates at Level of

Service E during the afternoon peak hour). However, lengthy queues or queues longer than the distance between intersections exist at all three of the signalized intersections that were included in the study. The southbound queue on Route 17 at Middlefield Road is longer than 900 feet, the northbound left turn queue at the same intersection is 250 feet (distance back to Haddam Quarter Road is only 150 feet), the southbound queue on Route 17 at Haddam Quarter Road is 284 feet (distance back to Middlefield Road is 150 feet), the southbound queue on Route 17 at Route 68 is 955 feet and the eastbound queue on Route 68 at Route 17 is 700 feet. These queues occur during the afternoon peak hour.

With no improvements two locations will operate at Levels of Service which are typically considered unacceptable during the afternoon peak hour *for the Build conditions***. Route 17 at Route 68 will operate at Level of Service F and Route 17 at Middlefield Road will operate at Level of Service E. Saturday Levels of Service are LOS D or better. The southbound queue on Route 17 at Middlefield Road would be longer than 1050 feet, the northbound left turn queue at the same intersection would be 333 feet (distance back to Haddam Quarter Road is only 150 feet), the southbound queue on Route 17 at Haddam Quarter Road would be 226 feet (distance back to Middlefield Road is 150 feet), the southbound queue on Route 17 at Route 68 would be more than 1,100 feet and the eastbound queue on Route 68 at Route 17 would be 772 feet.**

With the proposed improvements only the intersection of Route 17 at Route 68 would operate at a Level of Service that is typically considered unacceptable. This intersection would operate at Level of Service E but would be on the cusp of Level of Service F (average delay per vehicle would be 79.8 seconds and the threshold between LOS E and LOS F is 80.0 seconds per vehicle). The southbound queue on Route 17 at Middlefield Road would be 352 feet, the northbound left turn queue at the same intersection would be 265 feet (still greater than the 150 foot distance back to Haddam Quarter Road), the southbound queue on Route 17 at Haddam Quarter Road would be 60 feet (shorter than the 150 foot distance back to Middlefield Road), the southbound queue on Route 17 at Route 68 would be more than 1,250 feet and the eastbound queue on Route 68 at Route 17 would be 868 feet. *While VHB has attempted to improve the operating Level of Service for Route 17 at Route 68 during the afternoon peak hour by adjusting the signal timing, this revision would result in longer queues than would be found by leaving the timings alone. Traffic Engineering Solutions, P.C. suggests the signal timing be left alone as the benefit of less delay is offset by the longer queues that would exist.*

Below is a Table showing the Levels of Service and queues for the intersections of Route 17 at Route 147 and Haddam Quarter Road for the convenience of the Commission to compare the Levels of Service and queue lengths for the Build conditions with and without the improvements suggested by the Applicant.

Comparison of Build Conditions without and with Improvements (PM Peak Hour)

	PM Peak Build Conditions without Improvements		***PM Peak Build Conditions with Improvements***	
	LOS	***95th Percentile Queue***	***LOS***	***95th Percentile Queue***
Route 17 at Route 147	*E*		*C*	
N-Bd Rte 17 Left Turn		*333 Feet*		*265 Feet*
N-Bd Rte 17 Through		*40 Feet*		*40 Feet*
Southbound Rte 17		*1,063 Feet*		*352 Feet*
Eastbound Rte 147		*306 Feet*		*306 Feet*
Route 17 at Haddam Quarter	*C*		*B*	
Northbound Rte 17		*345 Feet*		*345 Feet*
Southbound Rte 17		*226 Feet*		*60 Feet*
W-Bd Haddam Quarter		*87 Feet*		*87 Feet*

9. Comment 9 addressed the roadway improvements proposed for Route 17 through the intersection with Route 147 and Haddam Quarter Road. The Applicant was asked to discuss the impact these improvements would have on driveways in the vicinity of the improvements and the need to provide a bypass at the Route 147 drive to allow through traffic to continue past vehicles turning left onto the site drive. **The January 15 response indicates that the intersection operates at good levels of service and review of the ConnDOT Highway Design Manual guidelines for providing left turn lanes at unsignalized intersections, the volume thresholds do not warrant a left turn lane or a by-pass lane. Re: the impact of widening Route 17, the January 15 response indicates that vehicles turning left from the abutting properties along the west side of Route 17 may have to wait a little longer to enter Route 17. However, considering the positive impacts of the proposed improvements in providing safe and efficient operation conditions for vehicles traveling on Route 17, it is our professional opinion that the added delays experienced by vehicles turning left from the adjacent driveways is tolerable and consistent with other areas within urban settings.**

   The Applicant was requested in our January 7 memo to identify the drives that would be impacted by the widening. This information was not provided.

Suggestions have been made by residents that additional local roads should have been included in the Study since traffic presently uses these roads to avoid congestion on Route 17 or Route 68. The Applicant has provided additional information for the intersection of Middlefield Road and Maple Avenue in their December 5, 2007 memorandum. While this review agrees that traffic may presently seek alternate routes to avoid congestion on Route 17, implementation of recommendations included in the Route 17 Corridor

Study would be needed to reduce or eliminate drivers from seeking alternate travel routes. Our review of the Applicant's traffic study focused on the impacts of the proposed development, the Applicant's proposed improvements, and the implications of the proposed improvements.

If you have any questions, please call me.

Bruce