



Technical Memorandum

To: Mr. Eduardo Garcia, PSW Real Estate, LLC
From: Christy Lambeth, P.E., PTOE
 Lambeth Engineering Associates, PLLC, F-19508
Date: May 29, 2018
Re: Traffic Assessment for Proposed Single-Family Development on White Rock Trail in Dallas, Texas
 (Dallas Case #Z178-278/SM, LEAP #18105)

Introduction

The services of Lambeth Engineering Associates, PLLC (LEAP) have been retained to conduct a traffic assessment for the proposed single-family residential development in the southwest corner of the Walnut Hill Lane/White Rock Trail intersection in Dallas, Texas. The currently vacant property formerly had office buildings that were demolished. The proposed development will have 38 single-family lots with vehicular access on White Rock Trail. The property is currently zoned NO(A) Neighborhood Office District with deed restrictions; a residential planned development is being proposed.

The purpose of this study is to project the anticipated traffic that will be generated by the proposed development and make observations of current traffic flow near the site. The development is not expected to have significant impact to the roadway network (as will be shown in this memo) and approval is recommended.

Projected Traffic Volumes

The Institute of Traffic Engineers (ITE) *Trip Generation Manual, 10th Edition*, is a collection of traffic data for specified uses. The manual provides data collected over several years for a wide variety of uses for the purpose of calculating projected traffic volumes that a proposed development will generate. The traffic volumes are summarized in terms of “trips” to and from the development. For example, a vehicle leaving home to go to work and then returning home will generate two “trips” – one outbound trip during the morning and one inbound trip during the afternoon.

The projected traffic for 38 single-family lots, including the highest peak hours, is summarized in **Table 1**. There will be additional vehicles leaving/entering the site during the morning/afternoon periods, however this activity is expected to occur outside of the “peak hours”. As shown, the peak travel periods to/from the development include 24 vehicles leaving the site during the AM peak hour and 25 vehicles arriving during the PM peak hour.

Table 1. Projected Traffic Volume Summary for 38 Single Family Lots

	Total	Inbound	Outbound
AM Peak Hour	32	8	24
School Afternoon Peak Hour	31	18	13
PM Peak Hour	40	25	15
Weekday Total	427	213	213

Note: This study does not consider the site’s proximity to the Lake Highlands DART station, which may decrease the projected vehicular traffic to/from the site.

Existing Queue on White Rock Trail

In order to assess the ability of vehicles to easily leave the site during peak hours, the current queue was observed with respect to the proposed access roadway location near the center of the property. This observation noted that approximately 10-12 northbound vehicles can queue before blocking the proposed access road.

The northbound queue on White Rock Trail at Walnut Hill Lane was evaluated during the AM peak hour, school afternoon peak hour, and during the PM peak hour on Friday, May 25, 2018. Observations are described below and detailed notes are attached.

- The White Rock Trail northbound/southbound movements operate during the same phase/at the same time and there are no protected left-turn movements (only permitted). Therefore, northbound left-turning vehicles must yield to opposing southbound through/right-turning vehicles.
- **AM Peak Hour:**
 - White Rock Trail had approximately 44 seconds of “green time” and Walnut Hill Lane about 115 seconds of “green time.”
 - The queue completely dispersed during each cycle at each approach.
 - The queue exceeded ten (10) vehicles during four cycles. However, the peak queue lasted only about 5-15 seconds per cycle and the queue completely dispersed during each cycle.
 - The southbound traffic on White Rock Trail was minimal; therefore, northbound through and left-turning vehicles were nearly free-flowing through the intersection.
 - Traffic flowed smoothly from White Rock Trail during the AM peak hour.
 - The majority of the proposed site traffic is expected to turn left toward Walnut Hill Lane rather than travel through the neighborhood. There were plenty of “gaps” in traffic for left-turning vehicles to leave the proposed access during the AM peak hour.
- **School PM Peak Hour:**
 - White Rock Trail had approximately 33 seconds of “green time” and Walnut Hill Lane about 125 seconds of “green time.”
 - The southbound traffic on White Rock Trail was light; therefore, northbound through and left-turning vehicles did not have difficulty proceeding through the intersection.
 - The northbound queue did not completely disperse during each cycle, appearing to be attributed to the shorter green time for White Rock Trail compared to the morning.
 - The queue exceeded ten (10) vehicles during four cycles: lasting about 5-35 seconds for three of the cycles and about a minute for one cycle. If the queue were to be able to completely disperse during each cycle, the queue would be shorter and would lessen the times the queue exceeds ten (10) vehicles.
 - The queues created on Walnut Hill Lane during its “red time” cleared during each cycle.
 - Since the queue lessened between the few cycles when there were more than ten (10) queued vehicles, this provided plenty of “gaps” for left-turning vehicles to leave the proposed driveway during the school afternoon peak hour.
 - **Recommendation:** Extend green time on White Rock Trail during school PM period to allow the northbound queue to fully disperse during each cycle.

- **PM Peak Hour:**

- White Rock Trail had approximately 33 seconds of “green time” and Walnut Hill Lane about 125 seconds of “green time.”
- During the time observed, the queue exceeded ten (10) vehicles during seven cycles.
- The northbound queue did not completely disperse during each cycle due to northbound vehicles yielding right-of-way to southbound vehicles and shorter green time.
- The southbound traffic on White Rock Trail was not very heavy, but was enough to cause delay for northbound vehicles during several PM cycles with northbound/southbound vehicles yielding to each other. Twice it was observed that only one or two of the northbound, left-turning vehicles were able to clear the intersection during a cycle due to yielding to southbound vehicles and some northbound vehicles had to wait through three cycles before they could proceed through the intersection.

It is important to note that, while this did not occur often, it did create a significant delay on White Rock Trail when it occurred.

- As an alternative to waiting through the cycles, vehicles leaving the proposed site can turn right during the rare peak times when the queue is not dispersing near the proposed access roadway.
- **Recommendation:** Extend green time on White Rock Trail during the PM peak periods to allow the northbound queue to fully disperse during each cycle. After green time is extended, reassess the northbound queue on White Rock Trail to determine if the queue is more quickly being dispersed or if protected left-turns on White Rock Trail should be evaluated to facilitate the northbound/southbound traffic yielding to one another.

Sight Distance

Adequate sight distance must be provided at intersections for motorists to turn safely. The City of Dallas’s *Off-Street Parking and Driveways Handbook* provides required and desirable sight distances based upon speed. A cursory sight distance evaluation was made during the field visit to ensure that the location of the proposed access satisfies the City’s requirements. As shown in **Table 2**, sight distance is satisfied. Pictures of the proposed access location are shown in **Figure 1** and **Figure 2**.

Table 2. Sight Distance for Proposed Access Road on White Rock Trail

Study Driveway	Design Speed	Left Sight Distance			Right Sight Distance		
		Min Req'd	Desireable	Provided	Min Req'd	Desireable	Provided
Proposed Access Drive at White Rock Trail	30 MPH	145'	315'	>~335'	200	315	>~560'



Figure 1. Left Sight Distance



Figure 2. Right Sight Distance

Summary

The proposed 38-lot, single-family development will not have a significant impact on the surrounding roadway network. LEAP understands that there are currently traffic delays at the White Rock Trail/Walnut Hill Lane intersection during certain afternoon cycles and has provided recommendations that may lessen these delays. However, the project will not have a significant impact even without the recommended signal improvements since it is projected to generate only 15 northbound vehicles leaving the site during the PM peak hour – which equates to about one vehicle every four minutes.

It is important to consider the fact that the majority of the traffic for a single-family development is *entering* the development during the PM peak hour, with a smaller percentage leaving during this period. The site is currently zoned for office-uses. If an office were developed at this location, the majority of traffic would be *leaving* the site during the afternoon. And, if an office of the same size as the one that was demolished were built, the amount of traffic leaving the site during the afternoon heading toward Walnut Hill Lane is projected to be **three times** that of the proposed single-family development. A medical office use is also permitted on the site with the current zoning and would have **seven times** the traffic leaving the site during the PM peak hour compared to the proposed single-family development.

The location of the new access roadway provides adequate sight distance and there are sufficient gaps in the traffic for motorists to leave the site during the morning and school afternoon peak periods. When southbound White Rock Trail traffic is light, there are sufficient gaps during the PM peak hour as well. It is recommended that the City reevaluate and extend the green time on White Rock Trail at the Walnut Hill Lane intersection to help lessen the existing northbound queue on White Rock Trail during the PM peak period.

Lambeth Engineering Associates, PLLC, recommends approval of the requested zoning change to allow development of the 38 single-family residential lots. The proposed residential development will have the least impact to the White Rock Trail/Walnut Hill Lane intersection compared to other uses (such as an office, medical office or financial institution) for which the property is currently zoned.

END

Appendix

Queue Observations



Date: Friday, May 25, 2018
 Location: White Rock Trail at Walnut Hill Lane, Dallas, TX
 Description: Northbound Queue on White Rock Trail at Walnut Hill Ln
 Sunny and clear, White Rock Elementary School in Session
 Observed by: Christy Lambeth
 Project: Traffic Assessment for Proposed Single Family Development on White Rock Trail in Dallas, TX
 LEAP# 18103



Friday, May 25, 2018

Time	Northbound Queue
AM:	All queued vehicles cleared intersection during each cycle during the AM observations.
7:41 AM	6
7:42 AM	9
7:45 AM	8
7:47 AM	11
7:49 AM	11
7:51 AM	14
7:53 AM	11
7:55 AM	3
7:57 AM	7
7:59 AM	2
8:01 AM	8
8:03 AM	2
8:21 AM	2



School Afternoon:	<i>White Rock Trail green time about 10 seconds less than AM</i>	
2:53 PM	6	Queue did not completely clear intersection each cycle during school PM, some vehicles waited two cycles to clear intersection. Longer green time would likely allow all to clear.
3:00 PM	6	
3:02 PM	9	
3:05 PM	7	
3:07 PM	15	3 vehicles did not clear intersection
3:10 PM	15	6 vehicles did not clear intersection
3:12 PM	12	3 vehicles did not clear intersection
3:15 PM	9	
3:18 PM	16	School PM Peak: 16 vehicles
3:20 PM	9	
3:23 PM	8	
3:26 PM	3	
3:28 PM	6	
3:30 PM	7	

PM:	<i>White Rock Trail green time about 10 seconds less than AM</i>	
4:30 PM	14	8 vehicles did not clear intersection
4:32 PM	11	
4:36 PM	12	11 vehicles did not clear intersection
4:39 PM	15	7 vehicles did not clear intersection
4:41 PM	12	4 vehicles did not clear intersection
4:43 PM	10	2 vehicles did not clear intersection
4:47 PM	3	
4:49 PM	0	<i>light queue from 4:50 to 5:00</i>
5:01 PM	2	
5:04 PM	10	5 vehicles did not clear intersection
5:06 PM	9	7 vehicles did not clear intersection <i>(Christy had to leave site)</i>
		4:36 Vehicle 1 cleared (1 vehicle cleared)
		4:36 Vehicles 2-9 cleared (8 vehicles cleared)
		4:36 vehicles 10-12+ cleared (8 vehicles cleared) (8 vehicles cleared)
		5:04 vehicles 1-5 cleared (5 vehicles cleared)
		5:04 Vehicles 6-7 cleared (2 vehicles cleared)
		5:04 Vehicles 8-10 +cleared

Trip Generation Summary



ITE Land Use	Quantity	AM	In	Out	PM	In	Out	Weekday
210 Single Family	38 Lots	32	8	24	40	25	15	427
710 General Office	46,415 SF	70	60	10	55	9	46	504
720 Medical Office	46,415 SF	113	88	25	159	45	114	1,696

Calculated using ITE Trip Generation Manual, 10th Edition