October 15, 2020

Mr. Jason Longbrake
ms consultants, inc.
2221 Schrock Road
Columbus, Ohio 43229

RE: Traffic Impact Study Update
Proposed Whataburger
Lee's Summit, Missouri
CBB Job No. 060-20

Dear Mr. Longbrake:

As requested, CBB has completed an update to the Oakview Storage Traffic Impact Study prepared by Priority Engineers, Inc., dated March 16, 2018 to reflect the currently proposed Whataburger restaurant. The site is located on the west side of Douglas Street approximately 700 feet north of Victoria Drive in Lee's Summit, Missouri. The location of the site relative to the surrounding area is depicted in **Figure 1**.

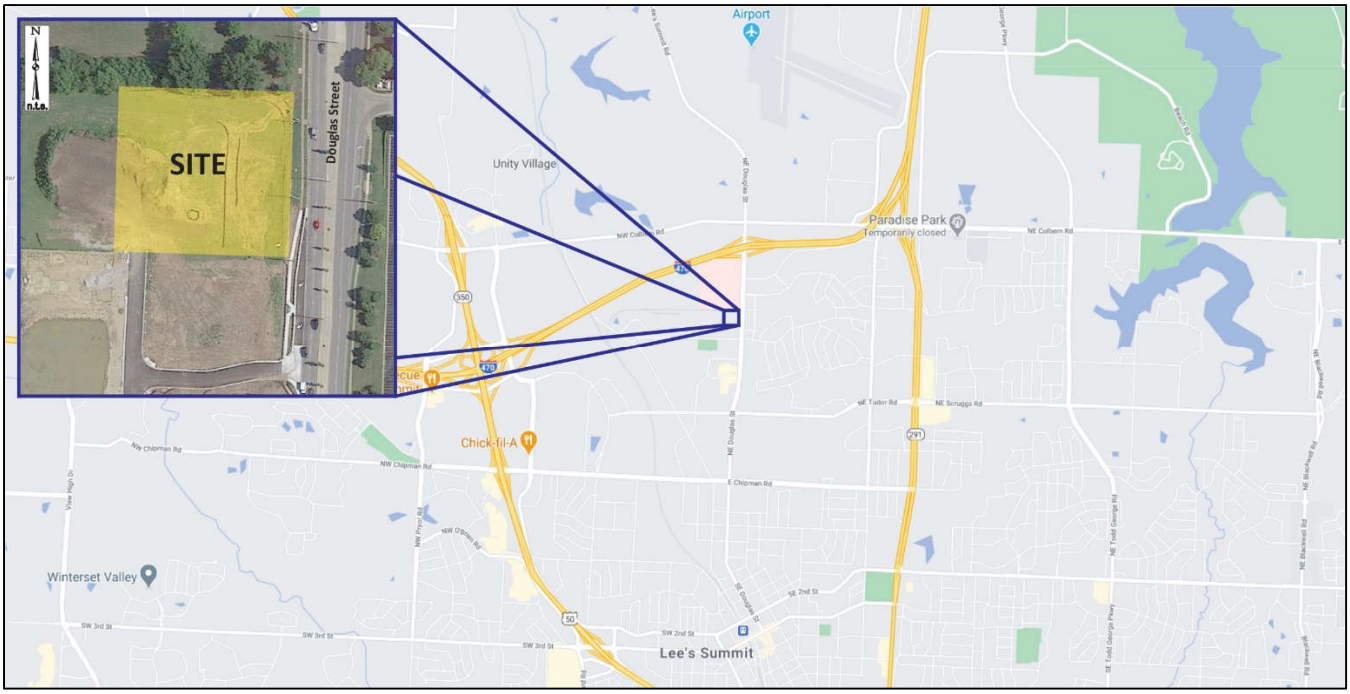

Figure 1: Project Location Map

Based on discussions with the City of Lee's Summit staff, a Traffic Impact Study was previously completed for the overall development site referred to as Oakview Storage. However, that study assumed the subject parcel would be developed as a hotel and a Whataburger fast-food restaurant with drive-through is now proposed. As such, City staff requested the previous traffic study be updated to reflect the current development plan of a Whataburger restaurant along with the remaining 0.87-acre commercial lot.

Based on the concept plan provided by ms consultants, inc., the proposed development consists of a 3,751 square foot Whataburger restaurant with drive-through. Access to the proposed Whataburger is proposed via one right-in/right-out (RIRO) drive on Douglas Street, as well as an indirect access on Victoria Drive via the existing cross access easement through the south side of the subject site. A schematic of the concept plan provided is shown in **Figure 2**.

The purpose of this study was to determine the number of additional trips that would be generated by the proposed development, assign the trips to the adjoining roadways, evaluate the impact of the additional trips on the operating conditions for the adjacent roadways, and determine the ability of motorists to safely enter and exit the site. If necessary, roadway improvements (lane additions and/or traffic control modifications) would be recommended to mitigate the impact of the development and to accommodate the additional traffic. The focus of this study was the AM and PM peak hours of a typical weekday.

As requested by the City, the updated traffic impact study will evaluate the following analysis scenarios for the weekday AM and PM peak hours:

- Base Conditions (Oakview Storage build-out traffic volumes minus the previously assumed Hotel trips); and
- Build Conditions (Base plus Whataburger and Commercial Lot Trips).

As requested, the study will evaluate the following study intersections:

- Douglas Street and Victoria Drive; and
- Douglas Street and proposed RIRO North Site Drive.

The following report presents the methodology and findings relative to the Base and Build conditions.

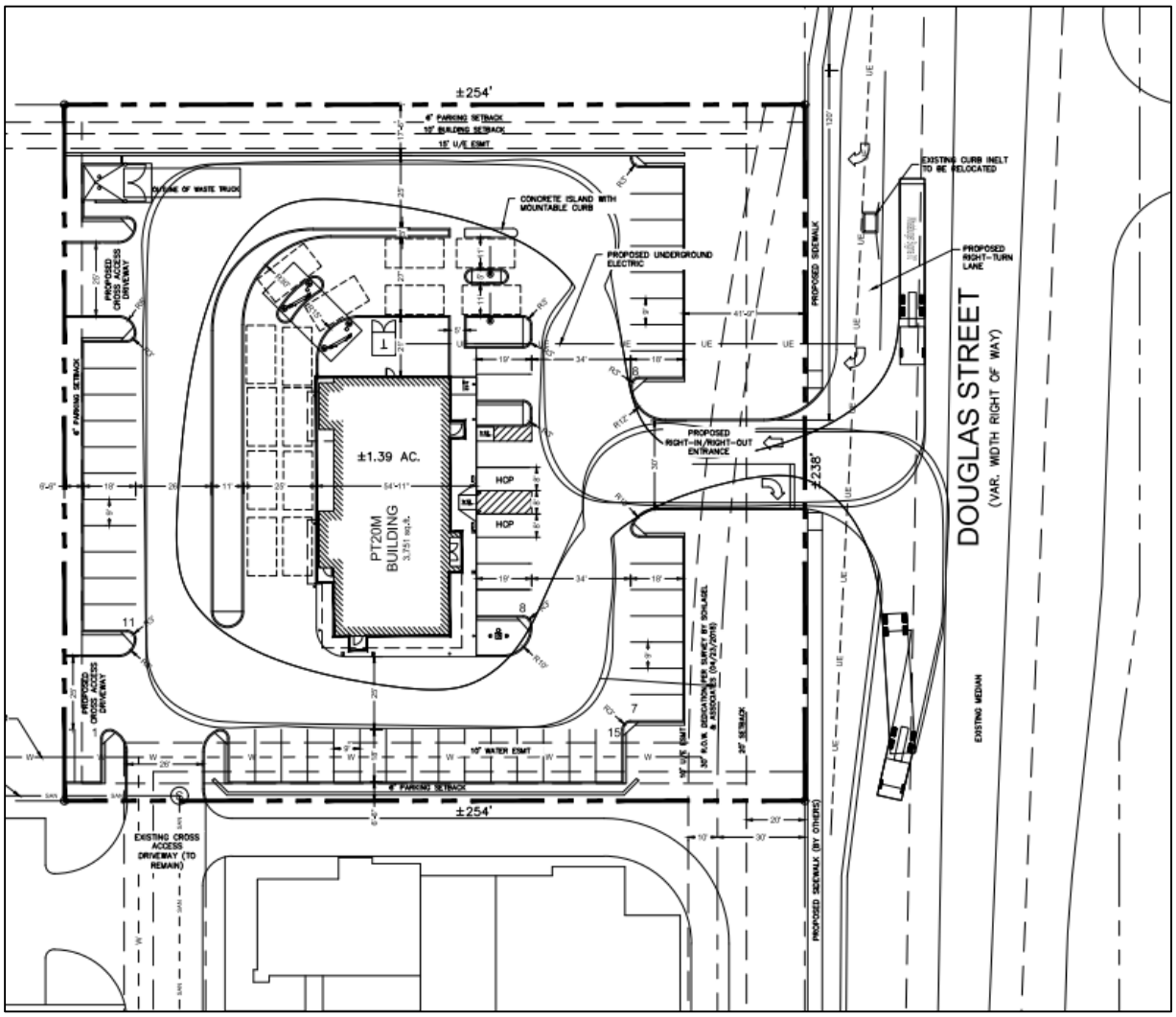

Figure 2: Concept Plan Excerpt (Provided by Others)

Base Traffic Volumes: As discussed with City staff, the Base Traffic Volumes for this analysis were developed using the Oakview Storage Traffic Impact Study. Specifically, the previously assumed hotel trips were subtracted from the Oakview Storage Build-Out Traffic Volumes to determine the Base Traffic Volumes. The base peak hour traffic volumes are summarized in **Figure 3**.

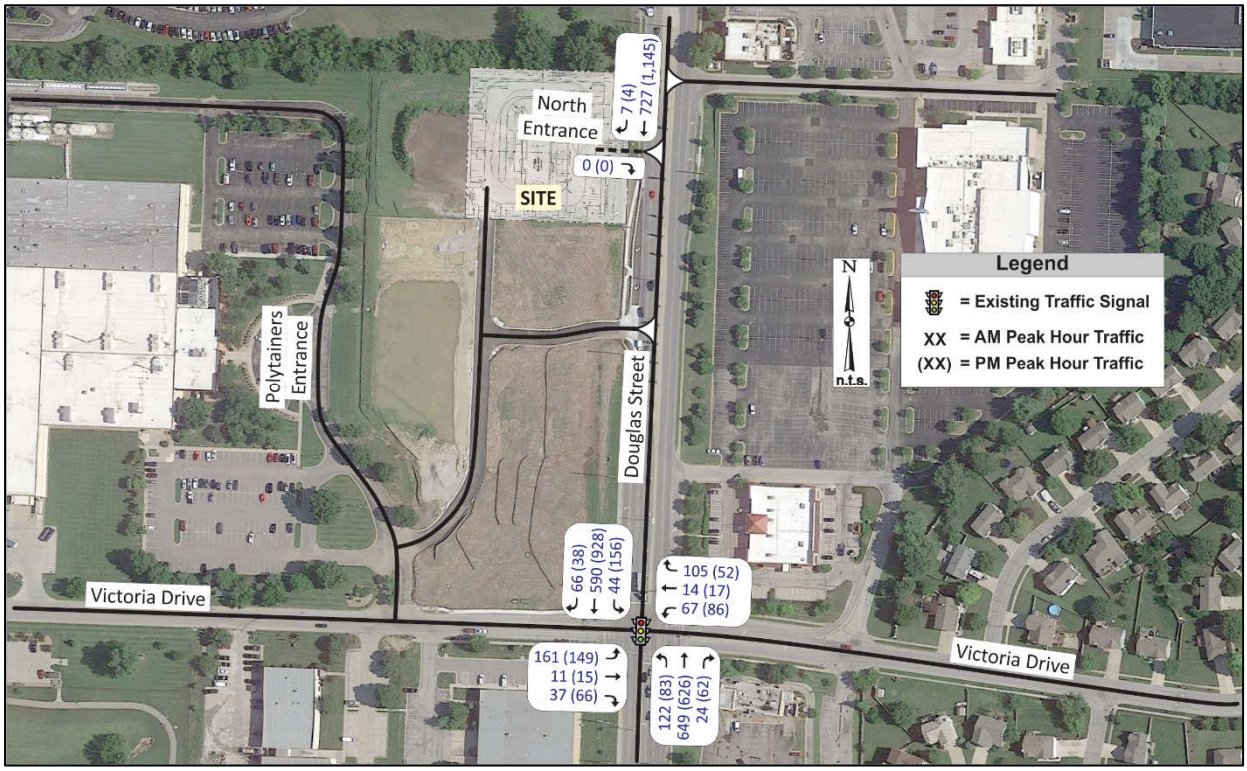

Figure 3: Base Traffic Volumes
(Oakview Storage build-out volumes minus the previously assumed hotel trips)

Proposed Land Use: Based upon the most recent site plan, a 3,751 square foot Whataburger restaurant with drive-through is proposed on the site. The proposed Whataburger will not occupy the entire tract previously assumed to be a hotel, resulting in approximately 0.87 acres for future development. As such, it was assumed the remaining parcel would be a 5,500 square foot retail building.

The Oakview Storage Traffic Impact Study recommended a southbound right-turn lane on Douglas Street at the proposed North RIRO Entrance. This recommended right-turn lane is proposed with the development of the Whataburger.

Trip Generation: Traffic forecasts were prepared to estimate the amount of traffic that the proposed fast-food restaurant and future retail would generate during the weekday AM and PM peak periods. These forecasts were based upon information provided in the *Trip Generation Manual*, 10th Edition, published by the Institute of Transportation Engineers (ITE). This manual, which is a standard resource for transportation engineers, is based on a compilation of nationwide studies documenting the characteristics of various land uses.

Estimates for the proposed Whataburger restaurant were based on Land Use 934 – Fast-Food Restaurant with Drive-Through. Estimates for the potential future retail were based on Land Use 820 – Shopping Center/Retail.

Not all of these trips would represent *new* traffic on the adjacent roadways. Nationwide studies have found that a large percentage of convenience-oriented trips, such as a fast food restaurants and retail uses, would already be present on the adjacent roads and would be attracted to the development on their way to or from home, work or another destination (i.e., pass-by trips). The statistical information provided in the *Trip Generation Handbook, A Recommended Practice*, supports a pass-by percentage of approximately 50% for fast-food restaurants during the AM and PM peak hours and 34% for general retail during the PM peak hour. The pass-by trips will add turning movements at the site access drive but will not increase total traffic levels on the adjacent roadways.

The resulting trip generation estimate, including both new trips and pass-by trips, for the proposed Whataburger and future retail outlot are summarized in **Table 1**. As shown in the table, the proposed Whataburger and future retail outlot are estimated to generate 82 new trips during the weekday AM peak hour and 76 new trips during the weekday PM peak hour with another 74 and 68 pass-by trips respectively during the AM and PM peak hours.

Table 1: Trip Generation Estimate – Proposed Whataburger/Future Retail Outlot

Land Use	Size	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Fast-food w/ drive-through	3,751 ft²	77	74	151	64	59	123
General Retail	5,500 ft²	3	2	5	10	11	21
	Net Total Trips	80	76	156	74	70	144
	Pass-by Trips [1]	**37**	**37**	**74**	**34**	**34**	**68**
	New Trips	**43**	**39**	**82**	**40**	**36**	**76**

[1] Pass by Trips: Fast-Food = 50% AM & PM; Retail = 34% PM

Trip Distribution*:* The new site-generated trips for the proposed Whataburger and future retail were assigned into and out of the site based the following estimated directional distribution previously identified in the Oakview Storage Traffic Impact Study:

- To/from the north on Douglas Street 52%
- To/from the south on Douglas Street 30%
- To/from the east on Mulberry Street 5%
- To/from the west on Mulberry Street..... 2%
- To/from the east on Victoria Drive 5%
- To/from the west on Victoria Drive 2%
- To/from the east on Sycamore Street..... 2%
- To/from the west on Sycamore Street..... 2%

It should be noted that the pass-by trips were assigned in accordance with the adjacent street traffic. The site-generated traffic volumes for the proposed Whataburger and retail building during the weekday AM and PM peak hours are shown in **Figure 4.**

Build Traffic Volumes: The assigned traffic volumes resulting from the trip distribution for the proposed Whataburger and retail use (Figure 4) were added to the Base traffic volumes (Figure 3) to determine the total volumes in the forecasted, or Build, scenario. The Build traffic volumes for the AM and PM peak hours are shown in **Figure 5.**

Figure 4: Site-Generated Trips

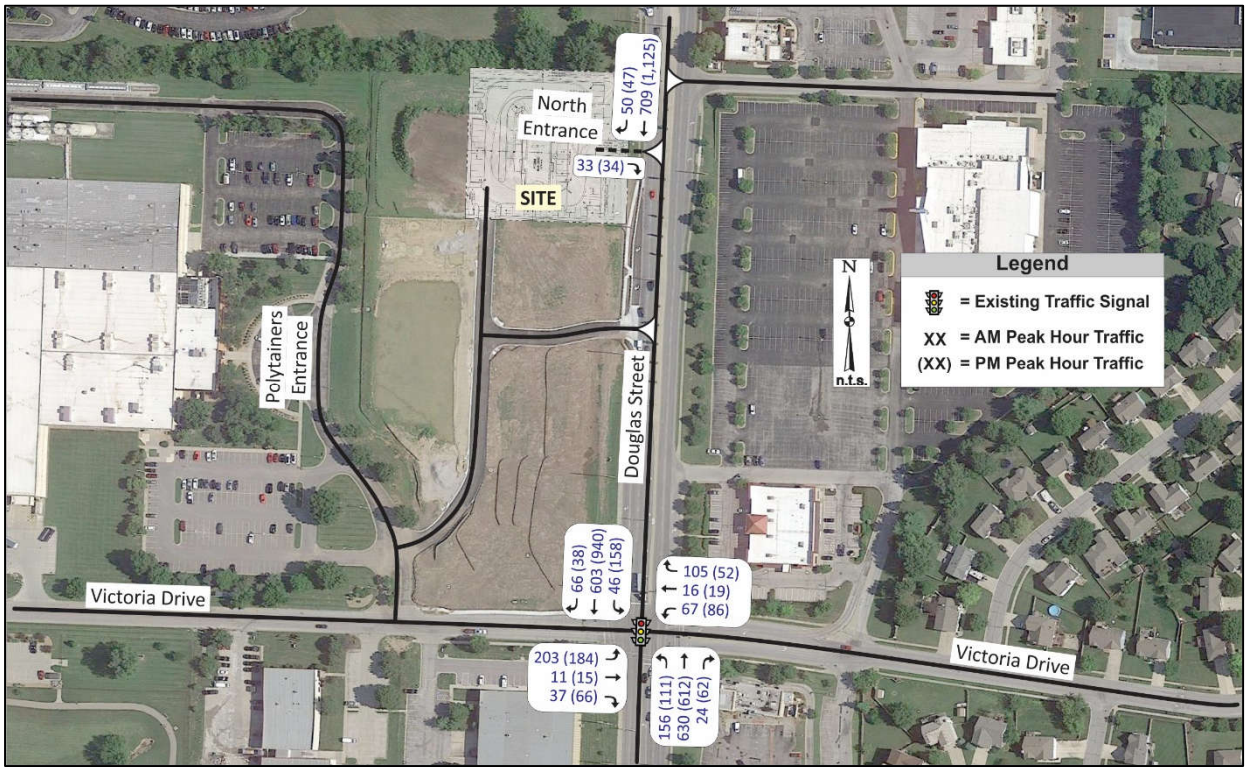

Figure 5: Build Traffic Volumes

Operating Conditions: The study intersections were evaluated using SYNCHRO 10. **Table 2** summarizes the results of the analysis, which reflects the Base and Build operating conditions and average delays for the study intersections during the weekday AM and PM peak hours.

Table 2: Operating Conditions

Intersection / Approach	Weekday AM Peak Hour		Weekday PM Peak Hour	
	Base	Build	Base	Build
Douglas Street and Victoria Drive (signalized)				
Eastbound Victoria Drive Approach	D (41.2)	D (41.6)	D (35.0)	D (37.4)
Westbound Victoria Drive Approach	B (16.9)	B (14.9)	C (25.5)	C (23.2)
Northbound Douglas Street Approach	B (10.3)	B (12.0)	B (11.3)	B (12.2)
Southbound Douglas Street Approach	B (12.0)	B (14.8)	B (11.8)	B (13.8)
Overall Intersection	**B (15.0)**	**B (17.1)**	**B (14.9)**	**B (16.6)**
Douglas Street and Proposed RIRO North Entrance (Side-Street STOP)				
Eastbound RIRO North Entrance Right-Turn	N/A	B (11.2)	N/A	B (14.0)
Southbound Douglas Street Approach	Free Flow	Free Flow	Free Flow	Free Flow

X (XX.X) - Level of Service (Vehicular delay in seconds per vehicle)

As shown in the table, the study intersections currently operate at overall favorable levels of service and would continue to operate favorably with the addition of the proposed Whataburger and future retail. As shown, the proposed Whataburger does not have a significant impact at the study intersections. The overall delay is expected to increase by approximately two seconds at the Douglas Street and Victoria Drive intersection with all movements forecasted to operate acceptably at LOS D or better. As such the previous findings in the Oakview Storage Traffic Impact Study would remain valid.

We trust this traffic impact study update adequately describes the forecasted traffic conditions that should be expected as a result of the proposed Whataburger and potential future retail development. If additional information is desired, please feel free to contact me at 314-449-9572 or swhite@cbbtraffic.com.

Sincerely,

Shawn Lerai White, P.E., PTOE
Associate - Senior Traffic Engineer