

December 7, 2022

VIA EMAIL [jordan@alrigusa.com](mailto:jordan@alrigusa.com)

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**RE: Response to Chick-fil-A Rochester Hills Comments – TIS**

Fleis & Vandenberg (F&V) staff has completed this letter in response to comments provided by Hubbell, Roth & Clark, Inc. in a review letter dated November 9, 2022, and by MDOT provided on November 20, 2022, regarding their review of the F&V Traffic Impact Study dated October 19, 2022. Additionally, F&V held hybrid meeting to discuss the review comments with MDOT, the City of Rochester Hills, and the City's traffic consultant (HRC) on November 21, 2022. The comments related to the traffic study and site plan provided by HRC and MDOT, and the corresponding F&V and Stonefield responses are summarized herein.

**HRC Comments (Critical items impacting the capacity analysis or safety are in *bold*)**

***Traffic Impact Study Comments***

***HRC Comment #1: Rochester Road is under the jurisdiction of the Michigan Department of Transportation (MDOT), but the permit application has not been approved. The applicant needs MDOT's approval on any impact or changes (added left-turn signal at Site Drive) before the city's traffic department can issue an approval.***

**F&V Response:** Noted. MDOT comments have been addressed and responses are provided below.

***HRC Comment #2: Lowe's is responsible for the maintenance of the signal adjacent to their property for the east and west legs, but Chick-fil-A will now generate significant traffic on the west leg. The applicant will need to agree to an updated maintenance agreement for the signal.***

**F&V Response:** Noted.

***HRC Comment #3: Background Data: Figure 2 shows the intersection of Rochester Road and the Site/Lowe's Driveway as being a two-way stop control, but the traffic control is signalized. Figure 2 should be updated to show the correct traffic control.***

**F&V Response:** Noted, revised Figure 2 attached.

***HRC Comment #4: TIS – Existing Conditions: The signal timing permits show pedestrian crossing times for the intersections of Rochester/Auburn Road and Rochester Road/Lowe's Driveway, but the models do not include the pedestrian phases. Not including the pedestrian phases can cause the capacity analysis and simulation to appear better than they actually are. The models should match the signal timing permits and include the pedestrian crossing times.***

**F&V Response:** The pedestrian crossings are push button only. In accordance with MDOT Electronic Control Guidelines, and through discussion with MDOT Lansing Signal Unit *when a pedestrian movement is equipped with pushbuttons, the vehicle split can be entered as the minimum split in SYNCHRO as a starting point.* F&V has reached out to RCOC to discuss pedestrian activity at this intersection and impacts to the signal timing. To date, they have not responded to our requests for information.

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**HRC Comment #5:** *The Saturday Midday and PM conditions (non-improvement) are modeled with the splits from PL3 (signal timing permits), but PL1 should have been followed. The F&V TIS Response Letter indicates the models have been updated to reflect the signal timing permits. The Saturday Models should follow the correct plan, or if PL3 was purposely used, it should be noted in the report*

**F&V Response:** The timing permit provided for Saturday is incorrect. A field review was performed and the intersection is following the PL3 timing, consistent with the other intersections along the corridor.

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**HRC Comment #6:** *The report indicates the queuing analysis performed at the existing Chick-fil-A in Novi is attached, but there is no data included as an attachment. The report also did not include critical details regarding the queuing analysis.*

**a. How often were the queuing vehicles observed? Every 15 minutes? 30 minutes?**

**b. The previous queuing analysis performed by Progressive AE only included the number of vehicles after the kiosk. Did this queuing analysis include all drive-through vehicles starting with the first vehicle at the pickup window up to the last vehicle turning in?**

**The report should include the raw data as an attachment and the critical details regarding the analysis.**

**F&V Response:** F&V provided the raw data to HRC and MDOT review and consideration on November 16, 2022. This information and data was reviewed and discussed at the meeting on November 21, 2022.

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**HRC Comment #7:** *Table 12 includes queue length calculations for the proposed operations, but it did not include any random arrivals. Random arrivals are typically considered in a queuing analysis to account for early or late arrivals. The queue length calculations should include a variable for random arrivals*

**F&V Response:** When vehicle demand exceeds capacity of the operations, then a queue is formed. When the demand does not exceed capacity, in theory, there is no queue formed. In these cases, a Poisson analysis is performed to determine the potential for random arrivals entering the queue at any one time. A Poisson analysis was performed for this site, and is attached. This would be vehicles that would entering the queue as a group, and not additional vehicle queueing for the site.

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**HRC Comment #8:** *Table 12 calculated the number of arrivals for normal operations to be 70% of the Saturday midday inbound trips, but the analysis did not account for the worst-case scenario. The analysis should use the Saturday midday outbound trips. Assuming 70% of the outbound trips results in 137 arrivals rather than 133. This conservative approach also increases the total queue for opening day and normal operations, which exceeds the allowable stacking shown on Sheets EX-1 and EX-2.*

**F&V Response:** The queueing analysis evaluated the ingress/egress trip generation as calculated for the site. Not all of the egress vehicles necessarily entered during the peak hour as calculated for the site, as this is an estimate and will vary.

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**HRC Comment #9:** *The report estimates the queuing leading up to the service window, but it does not address potential queuing leaving the site. There are several concerns that could make it challenging to exit the site.*

**a. There is only 100 linear feet between the building and driveway, which does not allow for much stacking space to leave the site. F&V Response:** There is adequate capacity on-site to accommodate the projected vehicle queuing at the intersection.

**b. Vehicles need to navigate to their desired lane (inner vs outer) very quickly to be able to turn left or right out of the site. F&V Response:** Wayfinding will be provided onsite to help drivers determine what lane to be in exiting the site. This can be provided at the drive-through exit and at other locations through the site.

- c. **Vehicles will be competing against a high volume of exiting vehicles from the Lowe's Driveway to turn onto Rochester Road. F&V Response:** The majority of traffic exiting the Lowe's Driveway is left-turns. There is adequate gaps in the conflicting traffic volumes to accommodate the turning vehicles from this site.
- d. **If the service rate (36 seconds per vehicle) exceeds the rate vehicles can exit the site, this could create a gridlock within the site that causes spillback onto Rochester Road. F&V Response:** There is adequate capacity on-site to accommodate the projected vehicle queuing at the intersection.
- e. **The circuitous access is subject to additional startup lost time (elapsed time it takes for vehicle to start moving) when exiting the site. F&V Response:** The Synchro/Sim Traffic model assumes a vehicle turning speed of 15mph for left-turns and 9 mph for right-turns.
- f. **When northbound traffic spills back to the Lowe's Driveway from the Auburn Road signal, it prevents vehicles from turning left onto Rochester Road. F&V Response:** Through discussions with MDOT Lansing Signals on November 21, 2022 a signal timing optimization study for the corridor should be considered by MDOT to ensure that timings and offsets are correct. Additionally, RCOC was contacted to determine if the clocks in the signal controllers are synced, as this would create the potential for queues between intersections as noted.
- g. **Vehicles queuing between the building and driveway will block in parked vehicles along the east side. F&V Response:** The blocked parking spaces would be for employees only.

**The report should provide evidence vehicles can overcome these challenges to safely exit without negatively impacting Rochester Road.**

#### **Site Plan Comments**

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**HRC Comment #11:** Sheet C-3 shows the driveway throat between the parking lot and Rochester Road, but it is very short. Inadequate throat lengths can form queues that prevent vehicles from entering and begin spilling back onto the roadway (Rochester). There is also a crosswalk intersecting the driveway that vehicles may block. The driveway throat should be increased further into the site property like the Lowe's driveway across the street. a. Item #17 from HRC Traffic Review #4 dated August 9, 2022.

**Stonefield Response:** The throat length cannot be extended due to site constraints and parking requirements.

**HRC Comment #12:** Sheet C-3 shows a dedicated right-turn lane into the site across four upstream driveways, but there is concern this may have an adverse effect on vehicles exiting from the developments north of the site. The previous comment suggested extending the right-turn lane but reviewing the design with MDOT. MDOT has indicated the right-turn lane should only extend up to the upstream driveway (Lens Crafters). HRC acknowledges the right-turn lane was acceptable on the previous sheet dated July 21, 2022 and apologizes for any confusion.

**Stonefield Response:** The right-turn lane will be modified as requested to only extend up to the upstream driveway.

**HRC Comment #13:** Sheet C-3 includes a note about the retail being conditional from periodic stacking counts at Chick-fil-A, but the number of vehicles (40) exceeds the allowable stacking space on Sheet EX-2. Sheet EX-2 shows a stacking distance of 844 linear feet. Assuming the industry standard of 25 feet for a vehicle stacking length (consistent with queuing analysis in report), the stacking distance only allows for 34 vehicles. The note should be modified to indicate periodic counts of no more than 34 stacking vehicles.

**Stonefield Response:** The note can be modified as referenced

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**HRC Comment #14:** *Sheet EX-1 shows auxiliary stacking, but it encroaches the entrance and blocks several parking spots. With congestion and lack of direction upon entering, there is concern vehicles will start to queue and spill back onto Rochester Road. Dine-in (parked) vehicles are also subject to being blocked in, which will create more internal congestion. The auxiliary stacking should be revised to give full clearance to the entrance and not block any parking spaces*

**Stonefield Response:** This auxiliary staking lane is shown to demonstrate how excess staking can be handled onsite without spilling into Rochester Road. In the event this lane needs to be utilized there will be staff onsite to direct traffic and would only be utilized for a short period of time.

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### **MDOT Comments-Oakland TSC Comments**

**MDOT Comment #1:** *Trip generation: Per previous MDOT discussions the highest pass-by rate MDOT will allow is 10%. (Comment includes a screenshot of the Trip Generation Summary table).*

**F&V Response:** At the August 19<sup>th</sup>, 2022, review meeting with MDOT and the City, it was determined that the TIS would evaluate two (2) scenarios for the proposed Chick-fil-A trip generation:

- Opening Day operations: 10% pass-by
- Steady State operations: 30% pass-by

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**MDOT Comment #2:** *How vehicles are going to weave to exit with short queue for exiting vehicles at driveway. What impact does exiting backups have on service rate? Internal circulation comment has consistently not addressed since 1st review.*

**F&V Response:** See **HRC Comment # 9** and corresponding responses

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**MDOT Comment #3:** *Right turn for the driveway needs to show existing crosswalk on Rochester Rd.*

**Stonefield Response:** Noted.

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**MDOT Comment #4:** *Provide detailed calculations for queueing analysis. Provide sources used for data used in queueing analysis (e.g., time per vehicles) for Chick-fil-A. Random arrival analysis is missing and needed as a part of queueing analysis.*

**F&V Response:** F&V provided the raw data to HRC and MDOT review and consideration on November 16, 2022. This information and data was reviewed and discussed at the meeting on November 21, 2022. When vehicle demand exceeds capacity of the operations, then a queue is formed. When the demand does not exceed capacity, in theory, there is no queue formed. In these cases, a Poisson analysis is performed to determine the potential for random arrivals entering the queue at any one time. A Poisson analysis was performed for this site, and is attached. This would be vehicles that would entering the queue as a group, and not additional vehicle queueing for the site.

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**MDOT Comment #5:** *How emergency is going to be handled due to lack of escape lane if someone in the queue has emergency and when they are trying to exit?*

**Stonefield Response:** In the event of an emergency restaurant staff can help direct traffic out of the drive thru lane to assist in moving the distressed patron out of the drive thru lane. Emergency services can also utilize Hickory lawn to provide emergency services if needed.

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### **MDOT Comments-Lansing Signals**

**MDOT Comment #1:** *140s cycle length was used for all existing and future scenarios. Any final proposed timings need to be optimized, and not just using the max 140s cycle that SCATS allows. The backup timings for SCATS should come from optimized models.*

**F&V Response:** Through previous discussion with MDOT and HRC, the max cycle lengths were recommended to evaluate the intersection operations. Additionally, field reviews during the peak period showed that the signals are generally running the 140s max cycle lengths.

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**MDOT Comment #2:** *Concern about accommodating total queue of 2150' on opening day with 1636' stacking.*

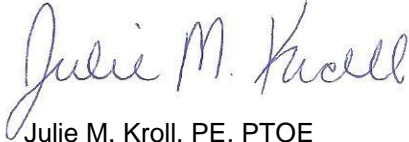
**F&V Response:** The site plan has been designed to accommodate both the peak operations and steady state operations. The queue management is provided through a traffic management plan developed for this site, in coordination with the City and the CFA operator.

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Please let me know if there are any further questions or comments related to the letter.

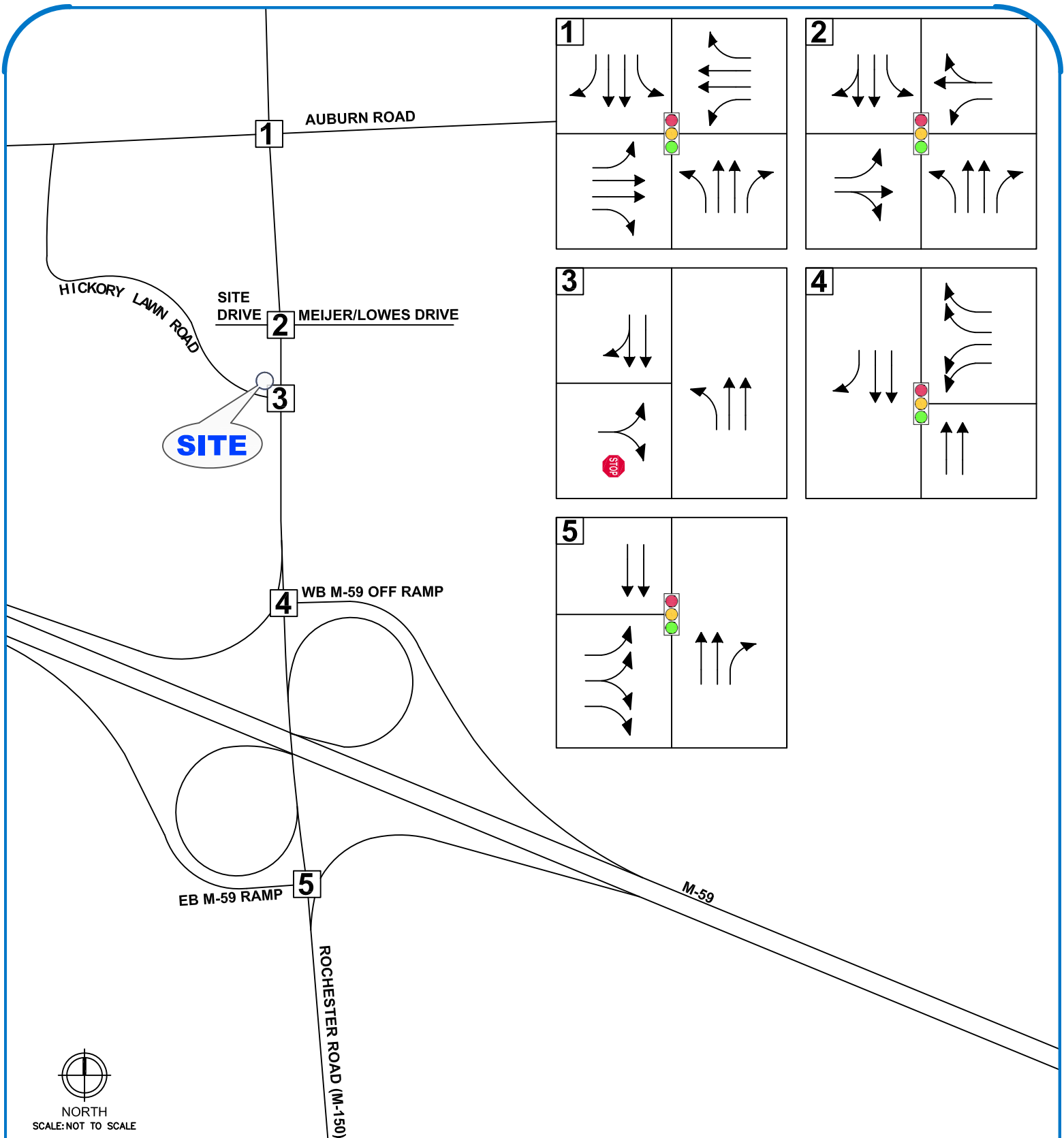
Sincerely,

FLEIS & VANDENBRINK



Julie M. Kroll, PE, PTOE  
Traffic Services Manager

**Attachments:** Figure 2-Revised  
Poisson Analysis



**FIGURE 2**  
**LANE USE AND TRAFFIC CONTROL**

CHICK-FIL-A TIS - ROCHESTER HILLS, MI



**LEGEND**

- ROADS
- PROPOSED ROADS
- ↔ LANE USE
- ↔ PROPOSED LANE USE
- 🚦 SIGNALIZED INTERSECTION
- 🛑 UNSIGNALIZED INTERSECTION

Opening Peak Operations-Random Arrivals  
 95th Percentile Probability - Drive Through Queue Length (# of Vehicles)

Volume = 186 vph  
 service rate = 36 sec  
 $\lambda = 5.166667$

	1	2	3	4	5
$\lambda^x$	No Veh in Cycle	X	X!	$P = (e^{-\lambda})(\lambda^x)/X!$	$\Sigma P$
1.0000	0	0	1	0.57%	0.57%
5.1667	1	1	1	2.95%	3.52%
26.6944	2	2	2	7.61%	11.13%
137.9213	3	3	6	13.11%	24.24%
712.5934	4	4	24	16.93%	41.18%
3681.7324	5	5	120	17.50%	58.67%
19022.2840	6	6	720	15.07%	73.74%
98281.8005	7	7	5040	11.12%	84.87%
507789.3027	8	8	40320	7.18%	92.05%
2623578.0639	9	9	362880	4.12%	96.17%
13555153.3304	10	10	3628800	2.13%	98.30%
70034958.8735	11	11	39916800	1.00%	99.30%

Normal Peak Operations-Random Arrivals  
 95th Percentile Probability - Drive Through Queue Length (# of Vehicles)

Volume = 133 vph  
 service rate = 36 sec  
 $\lambda = 3.694444$

	1	2	3	4	5
$\lambda^x$	No Veh in Cycle	X	X!	$P = (e^{-\lambda})(\lambda^x)/X!$	$\Sigma P$
1.0000	0	0	1	2.49%	2.49%
3.6944	1	1	1	9.18%	11.67%
13.6489	2	2	2	16.97%	28.64%
50.4252	3	3	6	20.89%	49.53%
186.2930	4	4	24	19.30%	68.83%
688.2492	5	5	120	14.26%	83.09%
2542.6983	6	6	720	8.78%	91.87%
<b>9393.8578</b>	<b>7</b>	<b>7</b>	<b>5040</b>	<b>4.63%</b>	<b>96.50%</b>
34705.0857	8	8	40320	2.14%	98.64%
128216.0112	9	9	362880	0.88%	99.52%
473686.9302	10	10	3628800	0.32%	99.84%
1750010.0477	11	11	39916800	0.11%	99.95%