

March 11, 2020

General Development Company
Two Towne Square, Suite 850
Southfield, Michigan 48076

Attention: Ms. Teresa Bruce

Subject: Proposed Auburn Pharmaceutical Facility
Rochester Industrial Drive, City of Rochester Hills, Michigan
Traffic Impact Assessment

Dear Ms. Bruce:

Baker and Associates (Baker) has completed our traffic impact assessment related to the proposed Auburn Pharmaceutical development to be located on the north side of Rochester Industrial Drive approximately a half-mile north of Hamlin Road, in the City of Rochester Hills, Oakland County. As we understand it, the site plan indicates 31,450 sq. ft. of general office space and 33,550 sq. ft. of warehouse space, and will have access via a single driveway to Rochester Industrial Drive. This traffic impact assessment has been prepared in accordance with the requirements specified by the City of Rochester Hills.

Existing Conditions

In the vicinity of the proposed development, Rochester Industrial Drive is a two-lane City road with a posted speed limit of 25 MPH. The proposed driveway will be 26 feet wide, allowing for single lane access into and out of the site. The site is currently zoned REC-W Industrial per the City of Rochester Hills Zoning Map, and your office has indicated that no zoning changes are proposed.

There is no existing available information regarding current traffic volumes on Rochester Industrial Drive. The proposed Auburn Pharmaceutical development will be located near the northern end of Rochester Industrial Drive, where traffic volumes would be expected to be very low.

To provide a conservative review, information within the Research Park Development Traffic Impact Study prepared by Fleis and VandenBrink, Inc. dated October 15, 2019 was utilized. Specifically, information provided in Figure 4 Background Traffic Volumes regarding traffic entering and exiting Horizon Court and the EEI Global driveway on the west side of Livernois Road was used to conservatively estimate traffic on Rochester Industrial Drive near the proposed Auburn Pharmaceutical facility. The assumption is that traffic arriving and departing these sites via Rochester Industrial Drive would not be greater than traffic entering and exiting these areas via Livernois Road.

The Fleis and VandenBrink, Inc. Figure 4 is included in the materials attached to this letter, and the assumed volumes on Rochester Industrial Drive near the proposed Auburn Pharmaceutical facility are shown in Figure 2.

Trip Generation

Using the information and methodologies specified in the latest version of Trip Generation (10th Edition) published by the Institute of Transportation Engineers (ITE), Baker forecast the weekday AM and PM peak hour trips associated with the proposed Auburn Pharmaceutical development. The results of the trip generation forecasts for the proposed site are provided below in Table 1.

**Table 1
ITE Trip Generation for Proposed Auburn Pharmaceutical Development**

Land Use	Land Use Code	Size (sq. ft.)	AM Peak Hour			PM Peak Hour			Week Day
			In	Out	Total	In	Out	Total	
Warehouse	150	33,550	5	1	6	2	5	7	99
General Office Building	710	31,450	48	8	56	6	32	38	346
TOTAL TRIPS			53	9	62	8	37	45	445

Trip Distribution

Although there are existing connections between Rochester Industrial Drive and Livernois Road near the proposed Auburn Pharmaceutical facility, these connections are not public roadways and are circuitous paths through the Rochester Hills Fire Department Headquarters and EEI Global sites. As such, all traffic to and from the proposed Auburn Pharmaceutical facility would be from/to the south, via the Hamlin Road and Rochester Industrial Drive intersection.

The assumed volumes on Rochester Industrial Drive near the proposed site were combined with site generated traffic volumes to obtain the total future (build) traffic volumes, which are shown in Figure 3 attached to this letter.

Level of Service Analysis

A level of service (LOS) analyses for the total future (build) conditions for the AM and PM peak hours was performed for the proposed Auburn Pharmaceutical development’s driveway.

According to the most recent edition (6th Edition) of the Highway Capacity Manual, level of service is a qualitative measure describing operational conditions of a traffic stream or intersection. Level of service ranges from A to F, with LOS A being the best. LOS D is generally considered to be acceptable. Table 2 presents the criteria for defining the various levels of service for unsignalized intersections.

Table 2
Level of Service Criteria (Unsignalized Intersection)

Level of Service	Average Stopped Delay/Vehicle (seconds)
A	≤10
B	>10 and ≤ 15
C	>15 and ≤ 25
D	>25 and ≤ 35
E	>35 and ≤ 50
F	> 50

Note: LOS "D" is considered acceptable in urban/suburban areas.

The results of the level of service analysis for the intersection is summarized in Table 3.

Unsignalized Intersection of Rochester Industrial Drive and the Proposed Auburn Pharmaceutical Driveway

The proposed Auburn Pharmaceutical development site driveway will be located on the north side of Rochester Industrial Drive approximately a half-mile north of Hamlin Road. The results of the level of service analysis for the driveway intersection indicate that under total future traffic conditions, all approaches would operate at a LOS A during both the AM and PM peak hours.

The operational results for the intersection of Rochester Industrial Drive and the proposed Auburn Pharmaceutical development site driveway are presented in Table 3.

Table 3
AM Peak Hour
Level of Service Analysis for Rochester Industrial Drive
and the Proposed Auburn Pharmaceutical Driveway

Approach	AM Peak Hour	PM Peak Hour
Southwestbound Rochester Industrial Drive	A (-)	A (-)
Northeastbound Rochester Industrial Drive	A (7.5)	A (7.3)
Southeastbound Auburn Pharmaceutical Driveway	A (8.7)	A (8.7)

(XX.X) Average seconds of delay per vehicle. (-) Approach is unopposed and experiences no delay.

1. Results are for left-turn movement; through movement is unopposed and experiences no delay.

Turn Lane Treatment Warrant Evaluations

The MDOT guidelines for left-turn by-pass lanes and right-turn treatments at driveways were evaluated for the proposed Auburn Pharmaceutical development driveway. The forecasted daily traffic on Rochester Industrial Drive at the proposed site driveway would be approximately 1,000 vehicles per day,

the total southbound peak hour approach volume would be 49 vehicles, the peak hour left-turns would be 53 vehicles, and the peak hour right-turns would be 0 vehicles. Based on MDOT guidelines, a left-turn by-pass lane is not warranted, and only a right-turn radius would be warranted. The MDOT guidelines are included in the appendix materials attached to this letter.

Conclusions and Recommendations

The proposed Auburn Pharmaceutical development consists of 31,450 sq. ft. of general office space and 33,550 sq. ft. of warehouse space. The proposed Auburn Pharmaceutical will have access to Rochester Industrial Drive via a single site driveway located approximately a half mile north of Hamlin Road.

The proposed Auburn Pharmaceutical development is forecast to generate 62 total trips during the AM peak hour (53 inbound and 9 outbound from the site) and 45 total trips during the PM peak hour (8 inbound and 37 outbound from the site).

Traffic count information was not available for Rochester Industrial Drive in the vicinity of the proposed development. Information within the traffic study completed for the Research Park Development for the EEI Global driveway and Horizon Court was used to conservatively estimate volumes on Rochester Industrial Drive in the vicinity of the proposed development during the AM and PM peak hours.

An operational analysis of Rochester Industrial Drive and the proposed site driveway was performed under total future (build) conditions. This operational review indicated that all approaches to the driveway intersection would operate at a LOS A during both peak periods.

A review of MDOT guidelines indicated that no turn lane treatments are warranted at the site driveway.

Please see the attached site plan for the proposed layout for the site.

We trust that this letter fulfills your current transportation needs regarding your site. If you have any questions, please feel free to contact our office at (313)-203-4400.

Sincerely,

BAKER AND ASSOCIATES



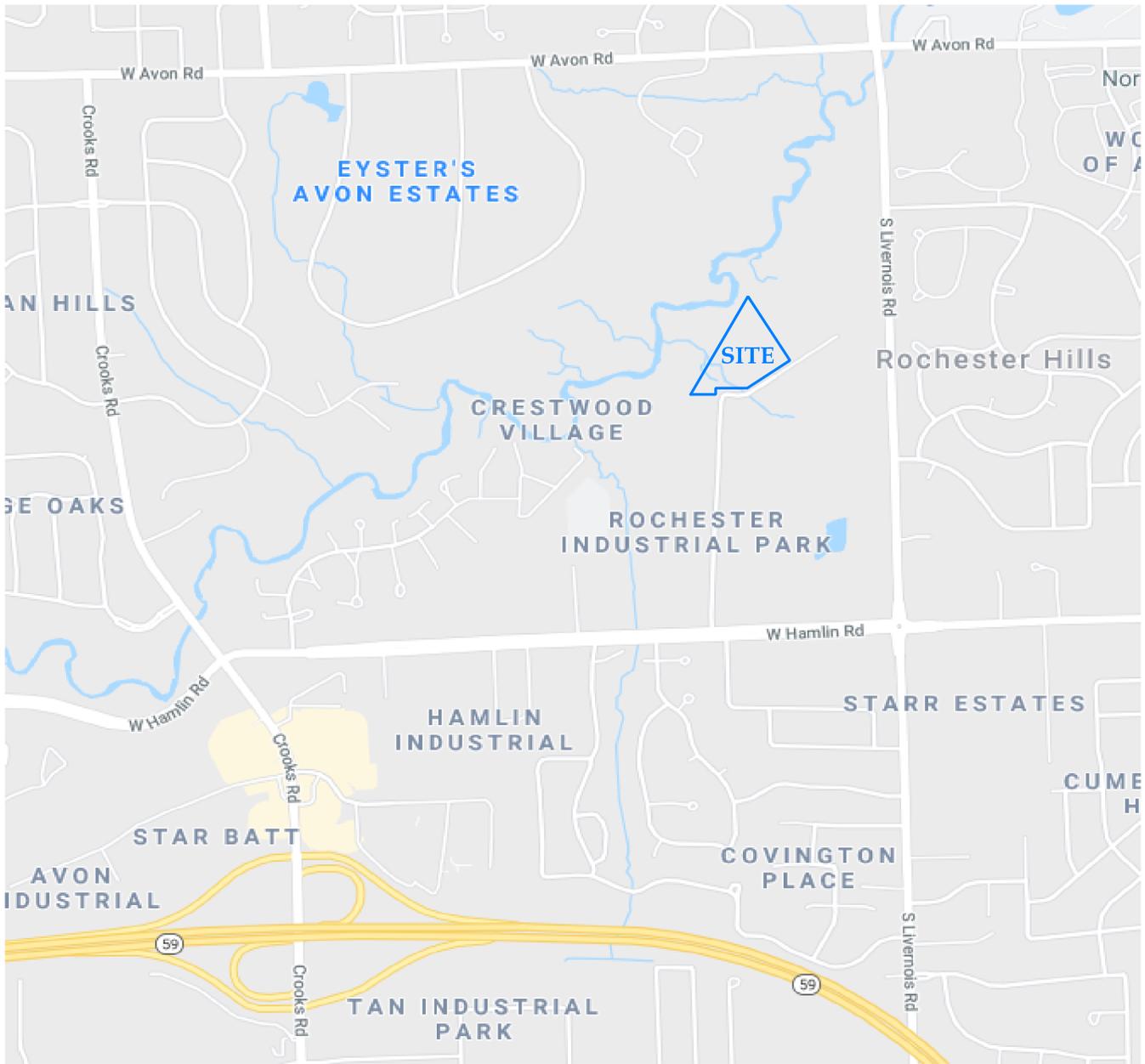
Kyle Ramakers, P.E., PTOE
Senior Traffic Engineer

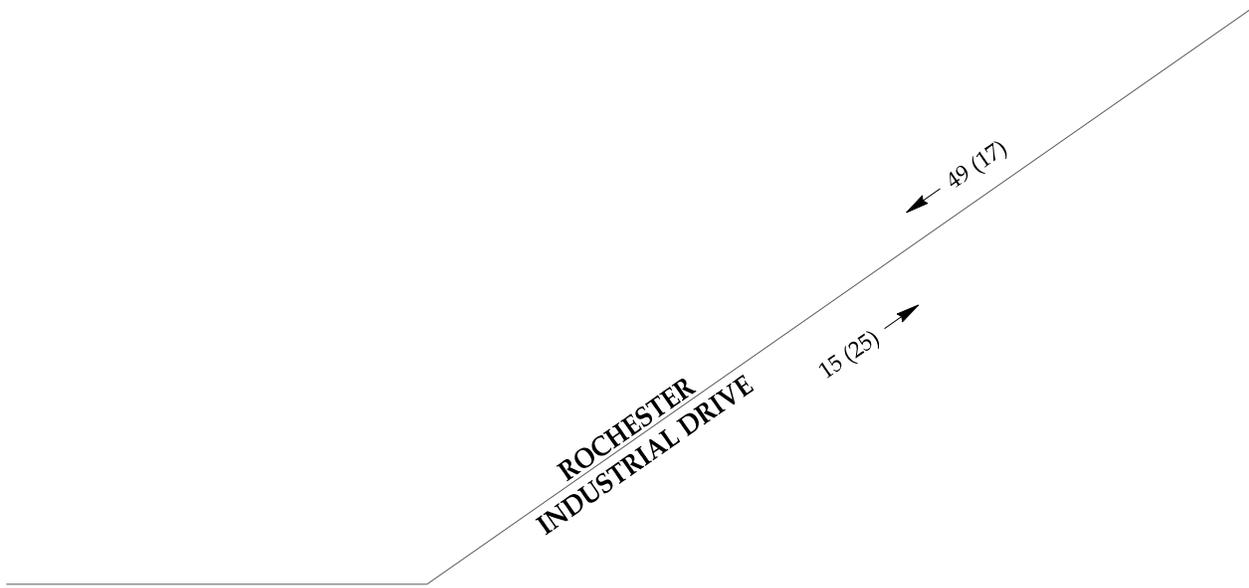
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Enclosures

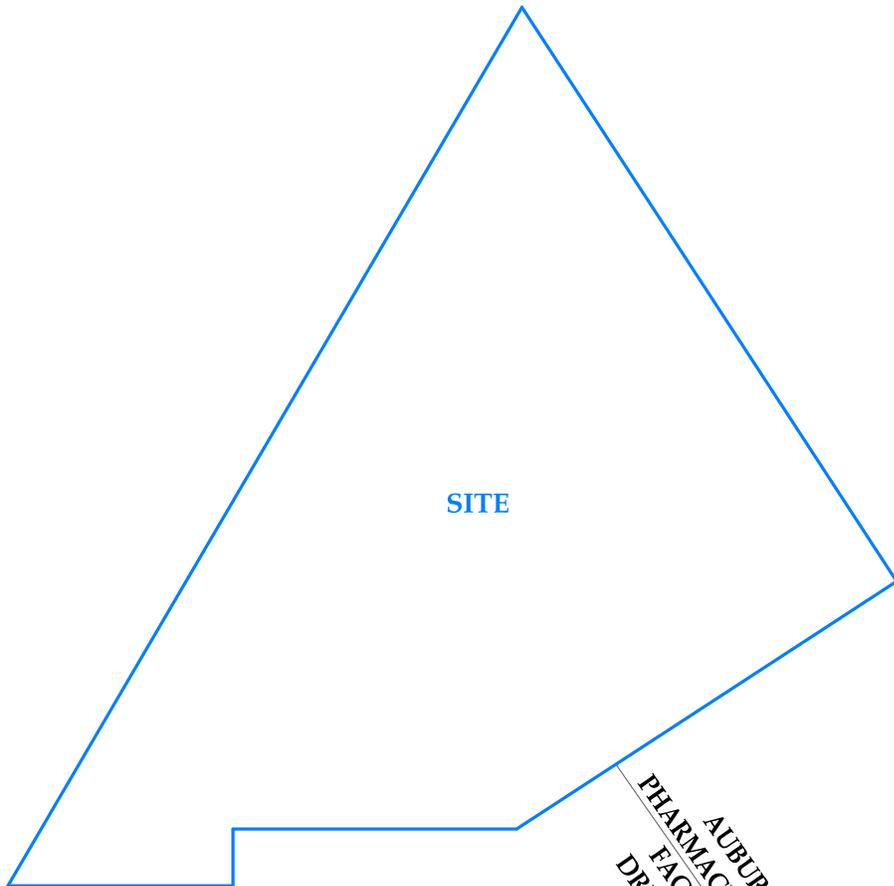
APPENDIX A

REPORT FIGURES





XX = AM PEAK HOUR
(XX) = PM PEAK HOUR

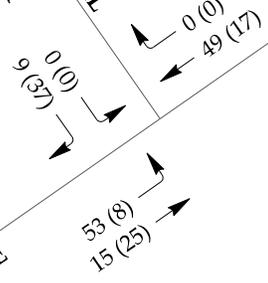


SITE

PHARMACEUTICAL FACILITY DRIVEWAY

AUBURN

ROCHESTER INDUSTRIAL DRIVE



XX = AM PEAK HOUR
(XX) = PM PEAK HOUR

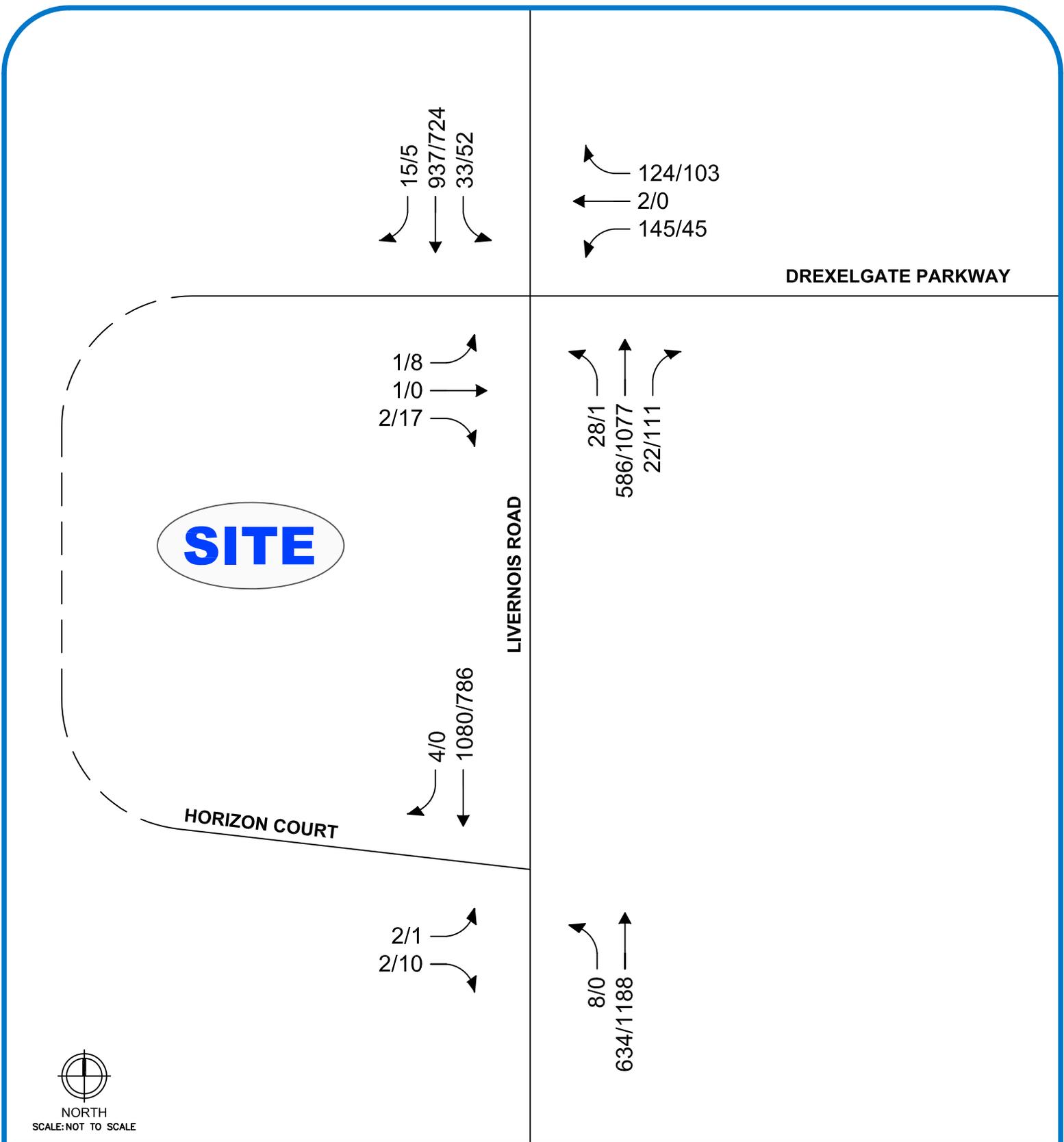
APPENDIX B

FIGURE 4 BACKGROUND TRAFFIC VOLUMES

FROM

**FLEIS & VANDENBRINK, INC.
RESEARCH PARK DEVELOPMENT
TRAFFIC IMPACT STUDY**

DATED OCTOBER 15, 2019



NORTH
SCALE: NOT TO SCALE



FIGURE 4 BACKGROUND TRAFFIC VOLUMES

ROCHESTER RESEARCH PARK TIS - ROCHESTER HILLS, MI

LEGEND

- ROADS
- TRAFFIC VOLUMES (AM/PM)
- SIGNALIZED INTERSECTION
- UNSIGNALIZED INTERSECTION

APPENDIX C

OPERATIONAL ANALYSIS REPORTS

Intersection						
Int Delay, s/veh	3.8					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	0	9	53	15	49	0
Future Vol, veh/h	0	9	53	15	49	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	15	88	25	82	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	283	82	82	0	-	0
Stage 1	82	-	-	-	-	-
Stage 2	201	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	707	978	1515	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	833	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	665	978	1515	-	-	-
Mov Cap-2 Maneuver	665	-	-	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	833	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	8.7	5.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1515	-	978	-	-
HCM Lane V/C Ratio	0.058	-	0.015	-	-
HCM Control Delay (s)	7.5	0	8.7	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0	-	-

Intersection						
Int Delay, s/veh	4.4					
Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	0	37	8	25	17	0
Future Vol, veh/h	0	37	8	25	17	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	60	60	60	60
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	62	13	42	28	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	96	28	28	0	-	0
Stage 1	28	-	-	-	-	-
Stage 2	68	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	903	1047	1585	-	-	-
Stage 1	995	-	-	-	-	-
Stage 2	955	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	896	1047	1585	-	-	-
Mov Cap-2 Maneuver	896	-	-	-	-	-
Stage 1	987	-	-	-	-	-
Stage 2	955	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	8.7	1.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NEL	NET SELn1	SWT	SWR
Capacity (veh/h)	1585	- 1047	-	-
HCM Lane V/C Ratio	0.008	- 0.059	-	-
HCM Control Delay (s)	7.3	0 8.7	-	-
HCM Lane LOS	A	A A	-	-
HCM 95th %tile Q(veh)	0	- 0.2	-	-

APPENDIX D

TURN LANE

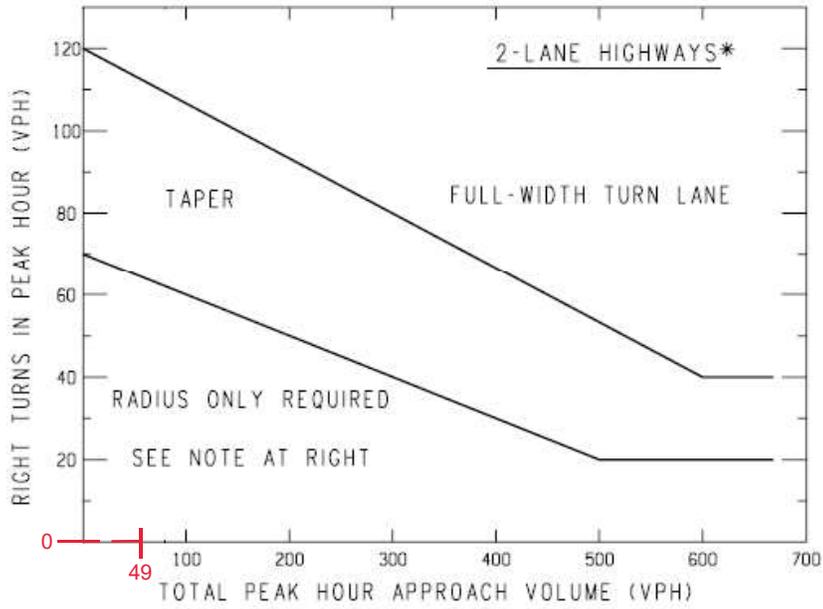
WARRANT ANALYSES

Geometric Design Guidance



**PREPARED BY
TRAFFIC AND SAFETY**

September 2017

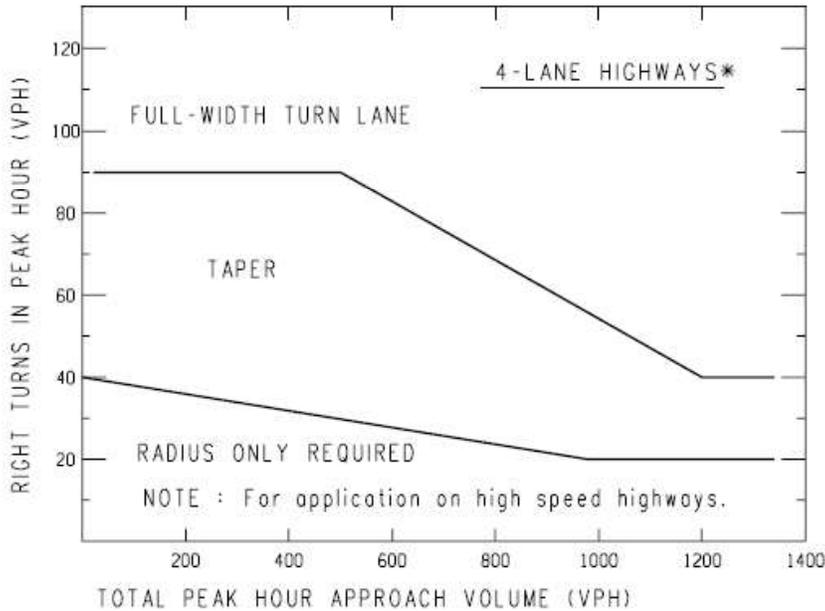


NOTE: For posted speeds at or under 45 mph, peak hour right turns greater than 40 vph, and total peak hour approach less than 300 vph, adjust right turn volumes.

Adjust peak hour
 Right turns = Peak hour
 Right turns – 20

A.M. Peak Hour:
 Total Right Turns = 0
 Total Approach Volume = 49 + 0 = 49

Only Right Turn Radius Warranted at Site Driveway



*If a center left-turn lane exists (ie 3 or 5 lane roadway), subtract the number of left turns in approach volume from the total approach volume to get an adjusted total approach volume.

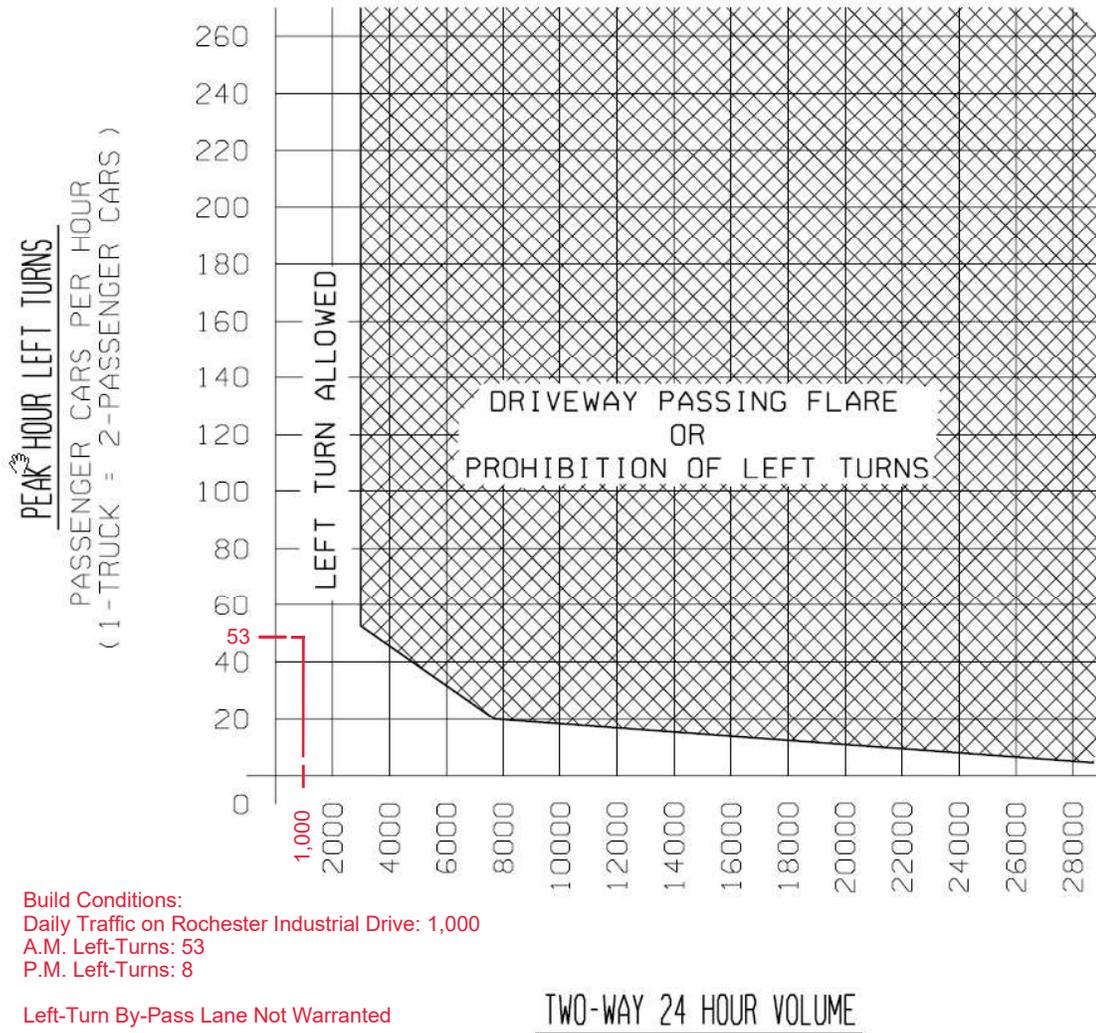
Sample Problem: The Design Speed is 55 mph. The Peak Hour Approach Volume is 300 vph. The Number of Right Turns in the Peak Hour is 100 vph. Determine if a right turn lane is recommended.

Solution: Figure indicates that the intersection of 300 vph and 100 vph is located above the upper trend line; thus, a right-turn lane may be recommended.

1.2.3 Traffic Volume Guidelines for Driveway Passing Flares

Driveways serving large developments along state trunkline highways frequently generate large numbers of left-turns. On two-lane, two-way roadways, this situation can aggravate the efficiency of traffic operations and often make shoulder maintenance difficult. In such situations, prohibition of left-turns at driveways to large developments or construction of driveway passing flares should be considered.

In an attempt to alleviate the types of problems outlined above, the following chart is provided showing the relationship between peak hour left-turns and 24-hour volumes. When peak hour left-turns and 24-hour volumes fall within the area above and to the right of the trend line, left-turns should be prohibited or a driveway passing flare be installed. If a driveway passing flare is constructed, the entire cost should be borne by the developer. For additional information and geometric design guidance regarding driveway passing flares, please refer to [Geometric Design Guide GEO-650](#).



NOTE: This chart is based on Total Development and is for Two-Way Roadways.

APPENDIX E

SITE PLAN

