

# MEMO

DRAFT VIA EMAIL

To: **Mr. Tim Loughrin**  
**Robertson Brothers Homes**

From: **Julie M. Kroll, PE, PTOE**  
**Fleis & VandenBrink**

Date: **June 4, 2018**

Re: **Proposed Residential Development**  
**Rochester Hills, Michigan**  
**Traffic Impact Study**

## INTRODUCTION

This memorandum presents the results of a Traffic Impact Study (TIS) for the proposed multi-family residential development in Rochester Hills, Michigan. The project site is located generally in the northwest quadrant of the Brewster Road & Walton Boulevard intersection and is currently undeveloped. The proposed development includes construction of 32 attached condominium units. Site access for the development is proposed via two site access drives on Brewster Road. Brewster Road is under City jurisdiction and Walton Boulevard is under the jurisdiction of the Road Commission for Oakland County (RCOC).

In accordance with City Ordinance, Rochester Hills has requested a TIS for permitting of site access and site plan approval. The purpose of this study is to identify the traffic related impacts, if any, from the proposed development at the intersection of Walton Boulevard & Brewster Road as well as the proposed site access points with Brewster Road.

The scope of the study was developed based on Fleis & VandenBrink's (F&V) knowledge of the study area, understanding of the development program, accepted traffic engineering practice, and methodologies published by the Institute of Transportation Engineers (ITE). Additionally, the City of Rochester Hills provided input regarding the scope of work for the TIS included herein.

## DATA COLLECTION

The existing weekday turning movement traffic volume data were collected by F&V subconsultant Traffic Data Collection, Inc. (TDC) on Thursday, October 26, 2017. Intersection turning movement counts were collected during the weekday AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak periods at the intersection of Walton Boulevard & Brewster Road. In addition, SCATS counts were obtained from the RCOC at this intersection and were used to validate the 2017 data for use in this analysis. Overall, the 2018 SCATS counts were lower than the 2017 turning movement counts collected, except the AM southbound right-turn traffic volume. Therefore, the southbound AM right-turn traffic volume was updated to reflect the current traffic volumes in this study. This data was used as a baseline to establish existing traffic conditions without the proposed development. Additionally, F&V collected an inventory of existing lane use and traffic controls, shown on the attached **Figure 1**. The existing AM and PM peak hour traffic volumes are shown on the attached **Figure 2** and were identified to occur between 8:00 AM to 9:00 AM and 5:00 PM to 6:00 PM.

## EXISTING CONDITIONS

Existing peak hour vehicle delays and Levels of Service (LOS) were calculated at the study intersections using Synchro (Version 10) traffic analysis software. This analysis was based on the existing lane use and traffic control shown on the attached **Figure 1**, the existing peak hour traffic volumes shown on the attached **Figure 2**, and the methodologies presented in the *Highway Capacity Manual, 6<sup>th</sup> Edition* (HCM6). Typically, LOS D is considered acceptable, with LOS A representing minimal delay, and LOS F indicating failing conditions. Additionally, SimTraffic network simulations were reviewed to evaluate network operations and vehicle queues. The existing conditions results are attached and summarized in **Table 1**.

**Table 1: Existing Intersection Operations**

Intersection	Control	Approach	AM Peak		PM Peak	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS
1 Walton Boulevard & Brewster Road	Signalized	EB LT	14.2	B	51.5	D
		EB T	9.9	A	9.0	A
		WB	19.6	B	28.0	C
		SB LT	45.0	D	73.8	E
		SB RT	66.8	E	32.9	C
		Overall	26.8	C	26.6	C

The results of the existing conditions analysis show that all approaches and movements at the study intersection currently operate acceptably at a LOS D or better during both peak periods with the exception of the SB right-and left-turn movements which currently operate at a LOS E during the AM and PM peak hours, respectively.

Review of SimTraffic network simulations indicates acceptable traffic operations during the AM peak hour with vehicle queues processed during each signal cycle and minimal residual queues. During the PM peak hour, a long vehicle queue is observed for the SB left turn movement throughout the duration of the peak hour which blocks the right turn storage bay for approximately 5 minutes of the peak period. The existing vehicle queue lengths are summarized in **Table 2**.

**Table 2: Existing Intersection Queues**

Intersection	Calculation Method	Approach	AM Peak		PM Peak	
			Avg. Queue	95th Queue	Avg. Queue	95th Queue
1 Walton Boulevard & Brewster Road	SimTraffic	EB LT	41	82	140	228
		EB T	79	144	130	207
		WB	187	301	330	464
		SB LT	219	390	269	510
		SB RT	147	280	81	261

## BACKGROUND CONDITIONS

In order to determine the applicable traffic growth rate for the existing traffic volumes to the project build-out year of 2020, historical traffic data for the study intersection was obtained from the RCOC SCATS system. The historical traffic volume data indicates traffic volumes at the intersection increased at an annual rate of 2.3% per year between 2011 and 2018. Therefore, a growth rate of 2.3% per year was utilized in this study for the analysis of background conditions *without the proposed development*.

In addition to background growth, it is important to account for traffic that is expected to be generated by approved developments within the vicinity of the study area that have yet to be constructed or are currently under construction. No background developments were identified near the study area that are expected to be completed prior to the site buildout of the proposed development.





**Table 8: Future Intersection Queues**

Intersection	Control	Approach	Background Conditions (2020)				Future Conditions (2020)				
			AM Peak		PM Peak		AM Peak		PM Peak		
			Avg. Queue	95th Queue	Avg. Queue	95th Queue	Avg. Queue	95th Queue	Avg. Queue	95th Queue	
1	Walton Boulevard & Brewster Road	SimTraffic	EB LT	48	90	172	302	48	92	149	244
			EB T	86	158	143	229	91	171	141	231
			WB	217	347	396	587	226	369	378	538
			SB LT	228	400	244	398	255	425	342	722
			SB RT	172	306	79	246	193	337	111	323
2	Site Drive & Brewster Road	Unsignalized	NB					3	18	7	39
			EB					9	33	5	25

**AUXILIARY LANES**

In order to determine the configuration of the proposed site access locations with Brewster Road, the City of Rochester Hills warrants for right and left turn lanes were evaluated. According to City standards, RCOC turn lane warrant criteria shall be utilized in order to determine where turn lanes shall be required. The 2018 SCATS count data provided by RCOC were utilized in this evaluation. The results of the analysis indicate that neither a left turn treatment nor right turn treatments are necessary at the proposed site access drive to Brewster Road. The RCOC turn lane warrant analysis worksheets are attached.

**INTERSECTION SIGHT DISTANCE**

The intersection sight distance was reviewed at the proposed site driveway and Brewster Road intersection. According to *Section 9.5 – Intersection Sight Distance* of the AASHTO design manual *A Policy on Geometric Design of Highways and Streets, 2011*, an intersection sight distance of 445 feet is required for a left turn from a complete stop. Also, a stopping sight distance of 305 feet is required for northbound vehicles enable a vehicle traveling at or near the design speed to stop before reaching a vehicle turning left at the site driveway. The intersection and stopping sight distances are based on the existing 40 mph design speed (35 mph speed limit).

The intersection sight distance measurements are shown on the attached **Figure 6**.

The results of the sight distance analysis show that there is adequate distance for a northbound driver on Brewster to stop for a vehicle waiting to make a left-turn into the site driveway. In addition, there is adequate distance for vehicles exiting onto northbound Brewster Road to make a left-turn the site drive without any visual obstruction from south.

**<sup>1</sup>CONCLUSIONS**

2. The conclusions of this Traffic Impact Study are as follows:

3. Currently all approaches and movements at the study intersection of Walton Boulevard & Brewster Road will operate acceptably at a LOS D or better except the SB right- and left-turn movements which currently operate at a LOS E during the AM and PM peak hours, respectively.
4. Based on historical traffic volume data, a 2.3% per year growth rate was applied to the existing traffic volumes to the project build-out year of 2020.

Under background conditions ***without the proposed development***, all approaches and movements at the study intersection of Walton Boulevard & Brewster Road will continue to operate in a manner similar to existing conditions with minor increases in vehicle delays.

**The proposed development will not have a significant impact on the study intersection of Walton Boulevard & Brewster Road. Overall vehicle delays at the intersection will increase by approximately one second during the peak periods which will not be discernable. Additionally, the proposed development will only increase traffic at this intersection by less than 1% during both peak periods, which is not significant.**

The proposed site access drives to Brewster Road will operate acceptably at a LOS C or better during both peak periods.

Neither a left turn nor right turn treatment is required at the proposed site access drive to Brewster Road.

There is adequate intersection sight distance and stopping sight distance provided at the proposed site driveway on Brewster Road

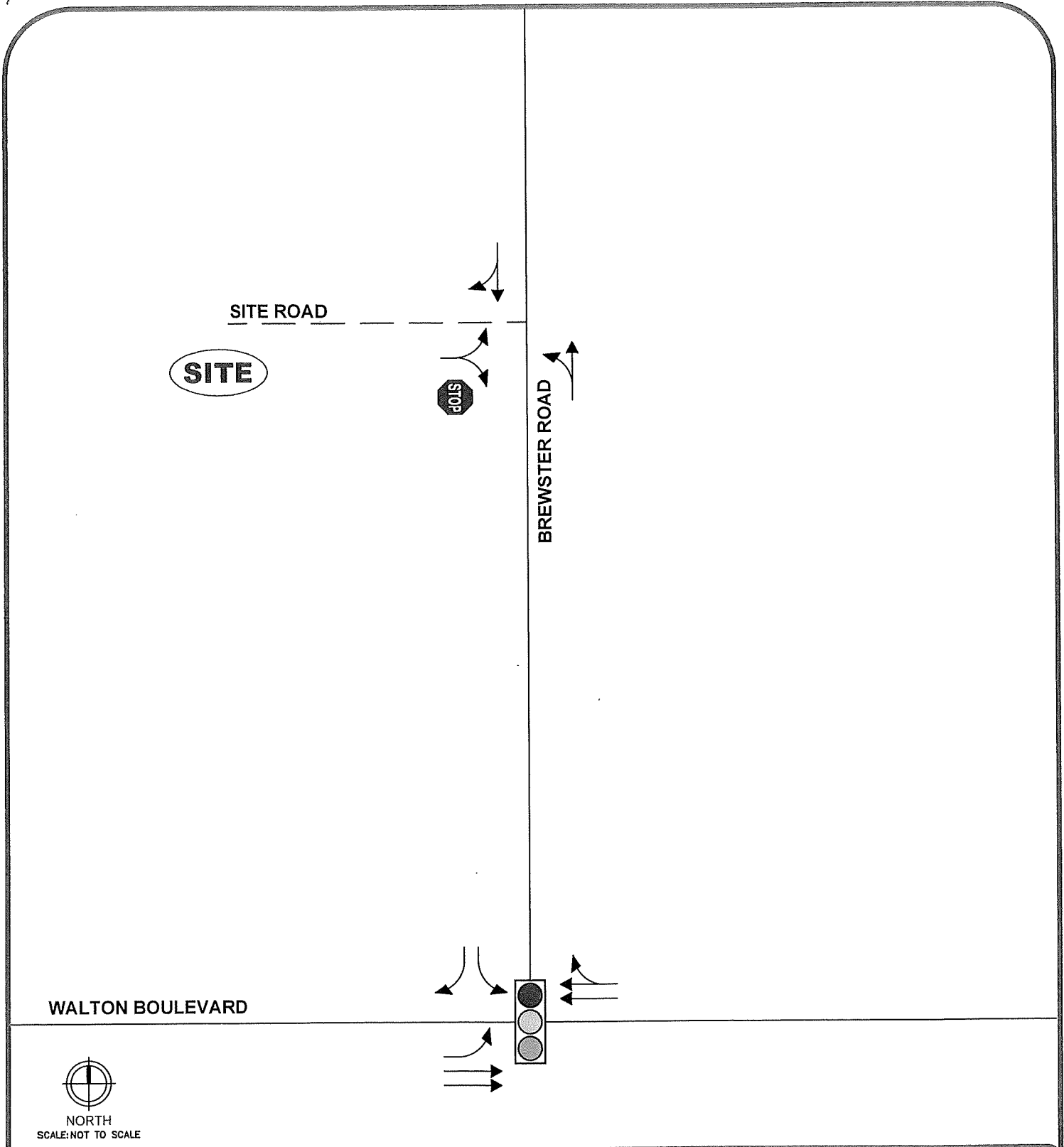
5. No improvements are recommended to mitigate traffic generated by the proposed development at the site driveway intersection or the intersection of Walton Blvd. & Brewster Road.
- 6.

<sup>7</sup>Any questions related to this memorandum, study, analysis, and results should be addressed to Fleis & VandenBrink.

8.

**Attached:** Figures 1 – 6  
Traffic Volume Data  
Synchro / SimTraffic Results  
RCOC Turn Lane Warrants





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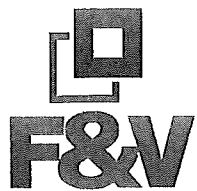


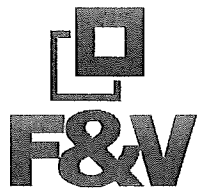
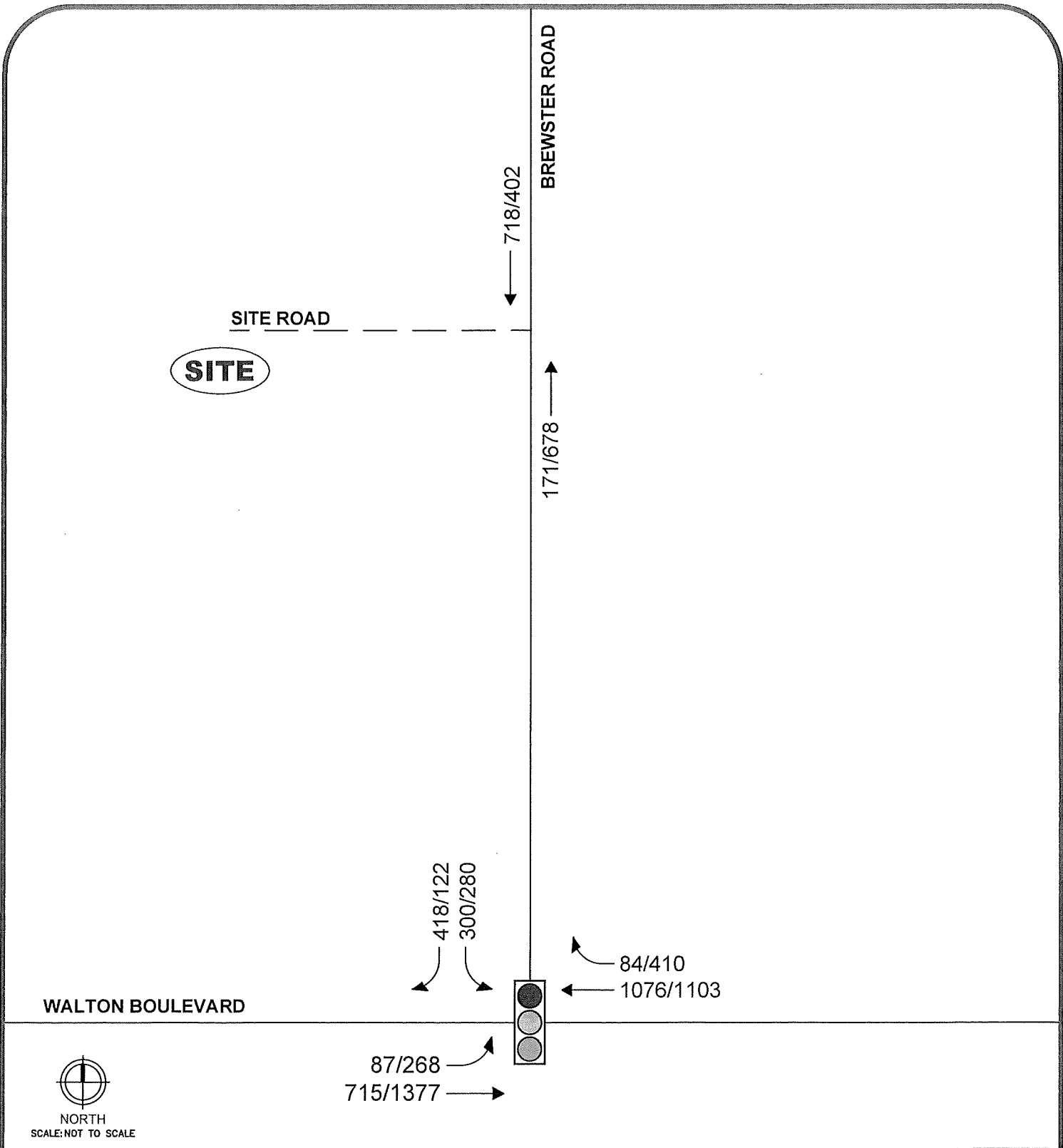
**FIGURE 1**  
**LANE USE AND TRAFFIC CONTROL**

MULTI-FAMILY RESIDENTIAL TIS - ROCHESTER HILLS, MI

**LEGEND**

-  ROADS
-  LANE USE
-  SIGNALIZED INTERSECTION
-  UNSIGNALIZED INTERSECTION









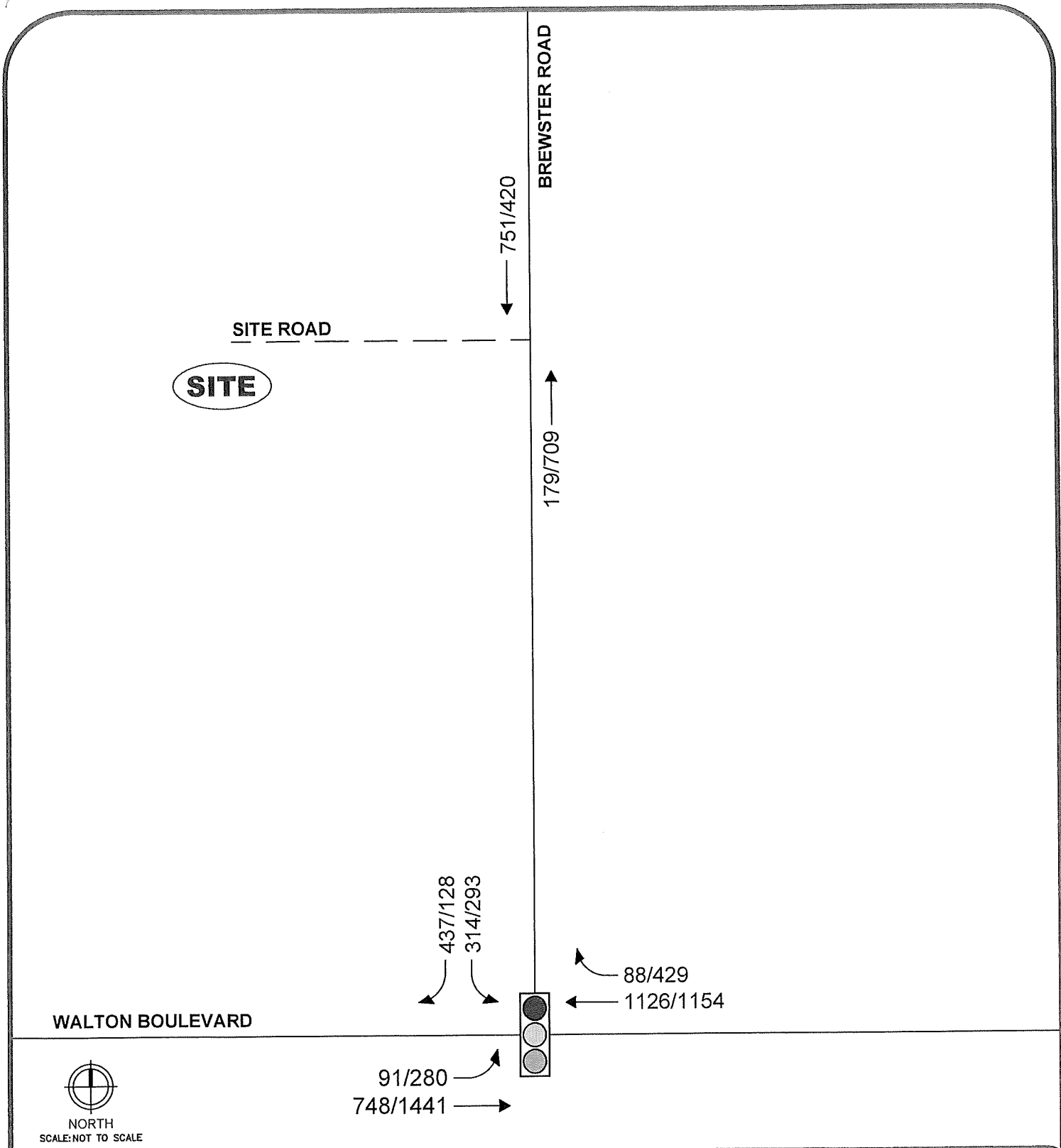
## FIGURE 2 EXISTING TRAFFIC VOLUMES

MULTI-FAMILY RESIDENTIAL TIS - ROCHESTER HILLS, MI

### LEGEND

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



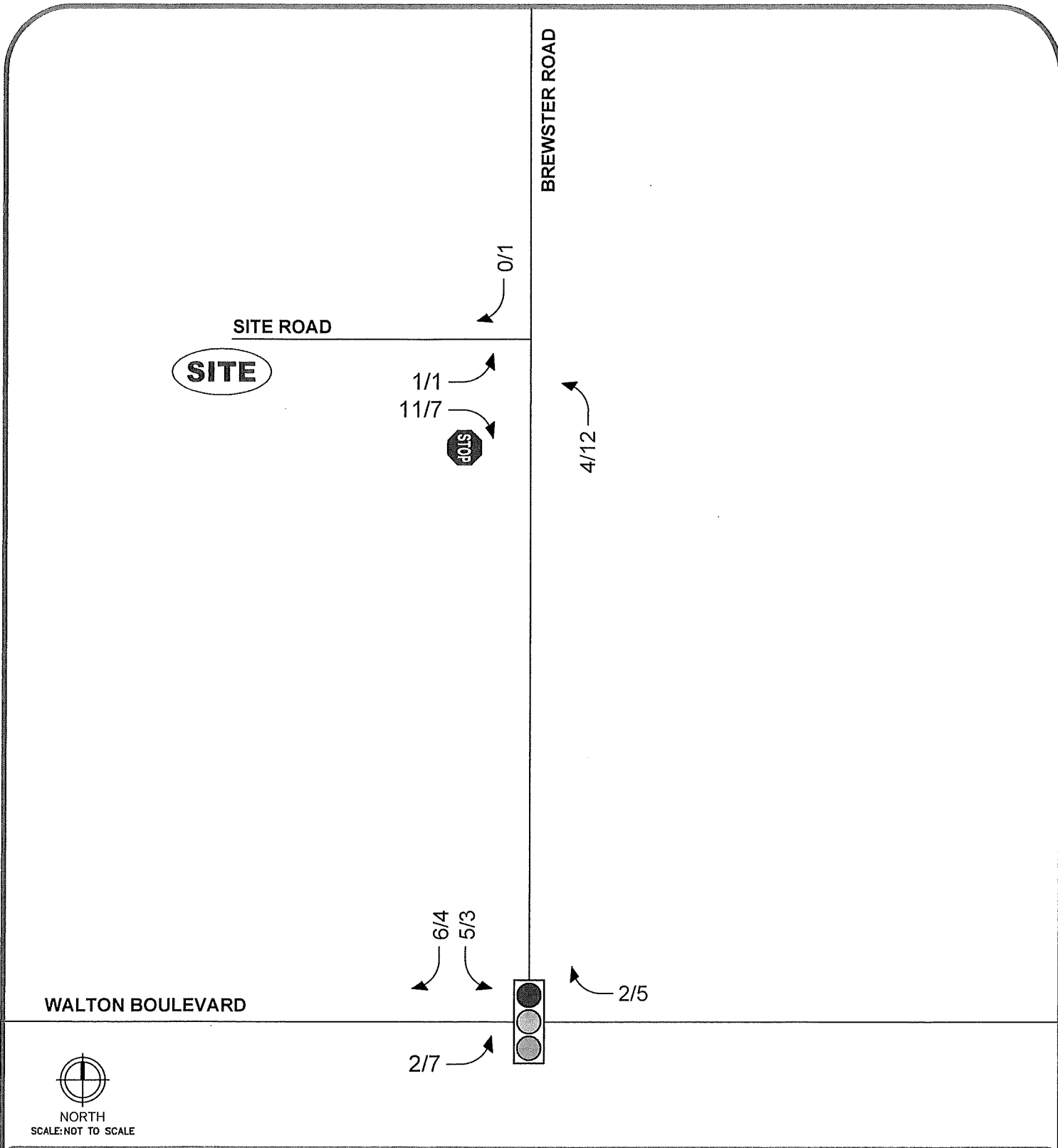


### FIGURE 3 BACKGROUND TRAFFIC VOLUMES

MULTI-FAMILY RESIDENTIAL TIS - ROCHESTER HILLS, MI

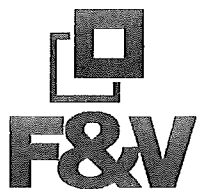
**LEGEND**

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



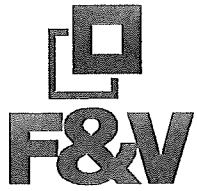
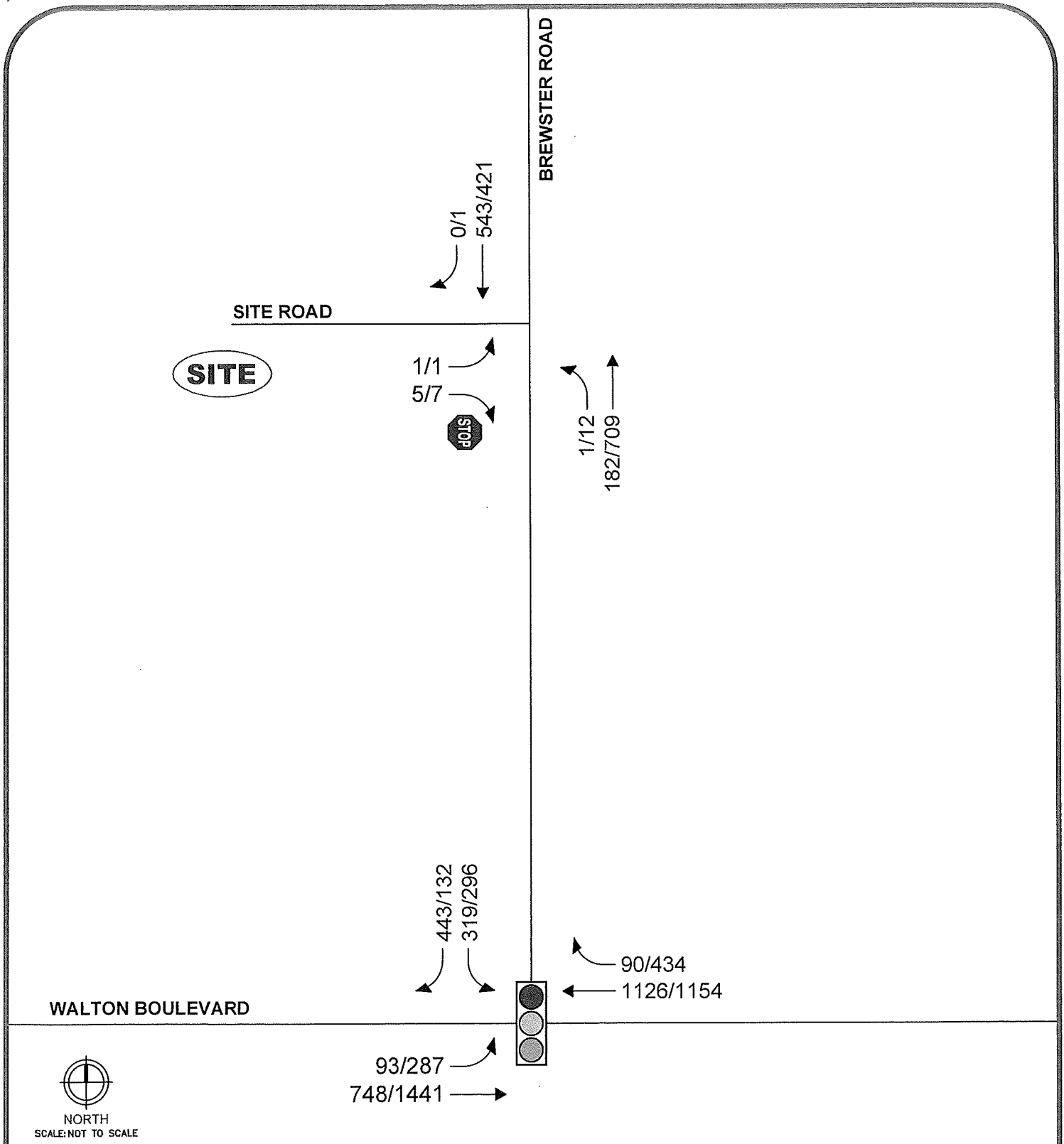
**LEGEND**

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



**FIGURE 4**  
**SITE-GENERATED**  
**TRAFFIC VOLUMES**

MULTI-FAMILY RESIDENTIAL TIS - ROCHESTER HILLS, MI

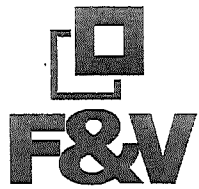


# FIGURE 5 FUTURE TRAFFIC VOLUMES

MULTI-FAMILY RESIDENTIAL TIS - ROCHESTER HILLS, MI

### LEGEND



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



**FIGURE 6**  
**SITE DRIVE INTERSECTION SIGHT**  
**DISTANCE**

MULTI-FAMILY RESIDENTIAL TIS - ROCHESTER HILLS, MI

**LEGEND**

-  SITE LOCATION
-  ELEVATION (FEET)

