

MEMO

VIA EMAIL bdmulka@gmail.com

To: Robert Mulka
Corrado Contracting, LLC

From: Julie M. Kroll, PE, PTOE
Mary Flanagan, EIT
Fleis & VandenBrink Engineering

Date: May 8, 2024

Re: Credit Union One
Detroit, Michigan
Traffic Impact Assessment

1 INTRODUCTION

This memorandum presents the results of the Traffic Impact Assessment (TIA) for the proposed Credit Union One redevelopment in Detroit, Michigan. The project site is located at 1545 Junction Avenue, generally located in the south quadrant of Junction Avenue & Eldred Street intersection, as shown on the attached **Figure 1**. The project includes the construction of a new credit union on the property that includes the entire block between Eldred Street and Christiancy Street. The existing Credit Union One building and adjacent parking lot will be razed with the proposed project. Site access is proposed via two (2) driveways on Junction Avenue, which is under the jurisdiction of the City of Detroit.

Scope of this study was based on Fleis & VandenBrink's (F&V) knowledge of the study area, understanding of the development program, professional experience, accepted traffic engineering practice, and information published by Institute of Transportation Engineers (ITE). Sources of data for this study include information provided by ITE and the Michigan Department of Transportation (MDOT). Applicable background information is attached.

2 BACKGROUND DATA

2.1 EXISTING ROADWAY NETWORK

Vehicle transportation for the study area is provided via Junction Avenue. Information on the study roadway is summarized in **Table 1**. Additionally, the lane use and traffic control within the study roadway network is shown on the attached **Figure 2**.

Table 1: Roadway Information

Roadway Segment	Junction Avenue
Number of Lanes	2 Lanes (1 lane each direction)
Functional Classification	Major Collector
Jurisdiction	City of Detroit
Posted Speed Limit	30 mph
Traffic Volumes (AADT)	6,800 (MDOT 2022)

3 SITE TRIP GENERATION

The number of weekday peak hour (AM and PM) and daily vehicle trips that would be generated by the proposed development was forecast based on data published by ITE in the *Trip Generation Manual, 11th Edition*. The proposed development includes construction of a credit union with three (3) drive-thru lanes to replace the existing credit union on the property. The peak hour trip generation for both the AM and PM for the site is summarized in **Table 2**. The addition of the drive-through facility for this site is not anticipated to significantly increase the volume of trips generated by the development, only redistribute the existing trips from walk-in to drive-through.

Table 2: Site Trip Generation Summary

Land Use		ITE Code	Amount	Units	Average Daily Traffic (vpd)	AM Peak Hour (vph)			PM Peak Hour (vph)		
						In	Out	Total	In	Out	Total
Existing	Walk - In Bank	911	3,025	SF	367	35	33	68	41	39	80
Proposed	Drive-in Bank	912	4,246	SF	426	33	30	63	45	44	89
Net New Trips					59	-2	-3	-5	4	5	9

4 SITE TRIP DISTRIBUTION

The vehicular trips that would be generated by the proposed development were assigned to the study roadway network based on the proposed site access plan and driveway configurations, existing peak hour traffic patterns in the adjacent roadway network, and methodologies published by ITE. This use is a neighborhood credit union and for purposes of this evaluation, it was assumed that trips generated by the development will be equality distributed both north and south of the site. The site trip distribution used in the analysis is summarized in **Table 3**.

Table 3: Site Trip Distribution

To/From	Via	AM	PM
North	Junction Avenue	50%	50%
South	Junction Avenue	50%	50%
Total		100%	100%

The vehicular traffic volumes shown in **Table 2** were distributed to the study network according to the distribution shown in **Table 3**. The projected future peak hour traffic volumes at the site driveways are shown on the attached **Figure 2**.

5 SITE CIRCULATION

The projected drive-through vehicle queuing was reviewed to determine if the proposed on-site drive-through storage is adequate to accommodate the projected operations. For purposes of this evaluation, it was assumed that 50% of the entering site generated trips would utilize the drive-through lanes.

The evaluation of the queue length included two criteria as summarized in **Table 4**:

- 1) A queuing analysis was performed to determine if the projected demand of the proposed development exceeds the service rate and calculate the projected queuing. The projected demand results in a queue of three (3) vehicles in the drive-through.
- 2) Additionally, a Poisson Distribution was performed to determine the probability of random arrivals; the results indicate a maximum potential of three (3) vehicles arriving at any given time.

The combined projected queue length is six (6) vehicles, in the three (3) lanes available, for a total of 150 feet. The proposed drive-through provides a total vehicle queueing storage of approximately 450 feet, between the 3 lanes, to accommodate 18 vehicles, at 25 feet per vehicle.

Therefore, the proposed development plan will adequately accommodate the projected vehicle queue lengths. In the event the vehicle demands exceed the drive-through capacity, the internal site circulation has adequate space to accommodate the additional vehicle storage on-site, without impacting the adjacent street operations along Junction Avenue.

Table 4: Credit Union One Drive Through Vehicle Queuing Analysis

CREDIT UNION ONE DRIVE-THROUGH STACKING SPACE CALCULATOR	
Number of Arrivals	23
Time per Vehicle (s)	180
Service Rate (veh/hr)	20
Peak Arrival (veh)	3
Random Arrival (veh)	3
Vehicle Length	25
TOTAL QUEUE (ft)	150

6 CONCLUSIONS

The conclusions of this TIA are as follows:

1. The proposed development includes construction of a credit union with three (3) drive-thru lanes to replace the existing credit union on the property. The addition of the drive-through facility for this site is not anticipated to significantly increase the volume of trips generated by the development, only redistribute the existing trips from walk-in to drive-through.
2. The proposed development plan will adequately accommodate the projected vehicle queue lengths. In the event the vehicle demands exceed the drive-through capacity, the internal site circulation has adequate space to accommodate the additional vehicle storage on-site, without impacting the adjacent street operations along Junction Avenue.

Any questions related to this memorandum, study, analysis, and results should be addressed to Fleis & VandenBrink.



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Michigan.

Digitally signed by
 Julie M. Kroll
 Date: 2024.05.08
 11:24:01 -04'00'

- Attachments:** Figures 1-2
 Proposed Site Plan
 Traffic Volume Data
 Poisson Queue Analysis



FIGURE 1 SITE LOCATION MAP

CREDIT UNION ONE TIA - DETROIT, MI

LEGEND



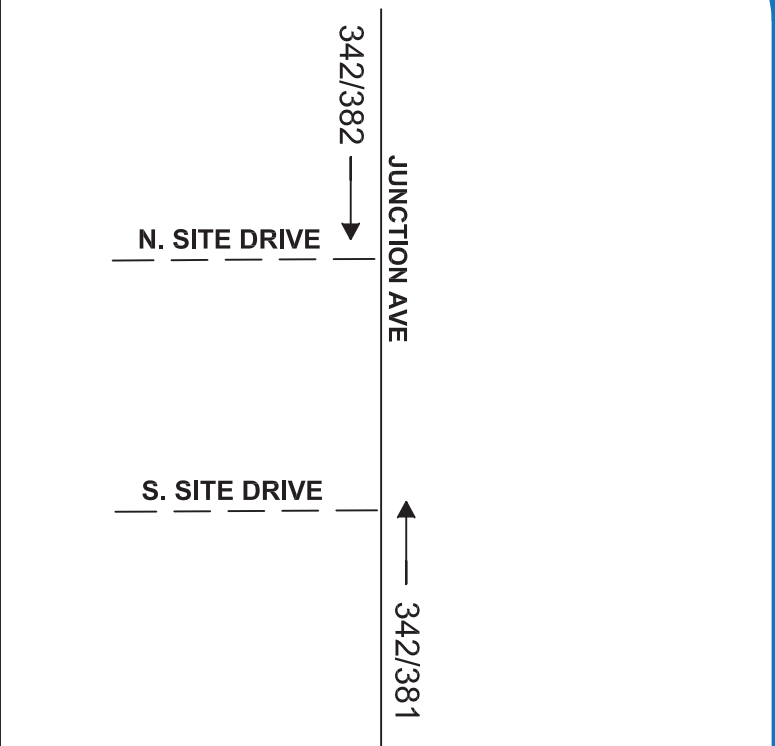
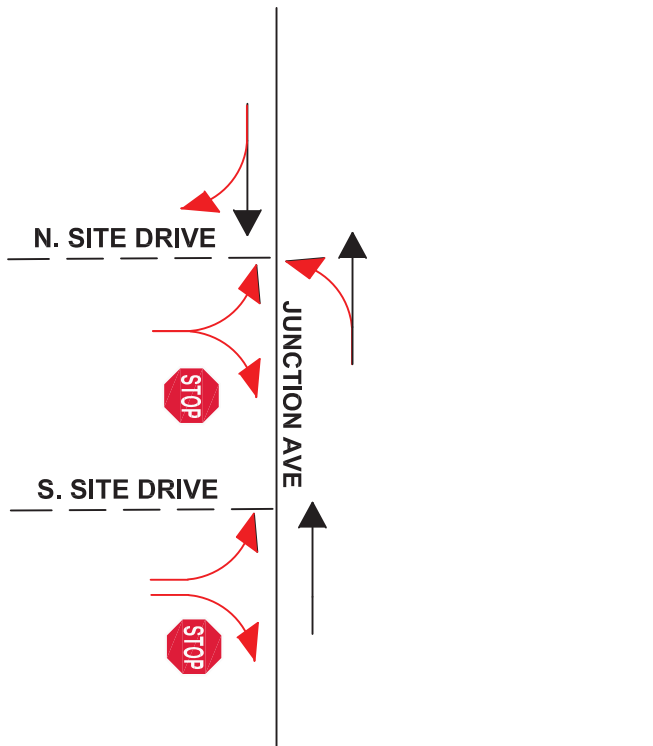
SITE LOCATION



NORTH
SCALE: NOT TO SCALE

LAND USE TRAFFIC CONTROL

EXISTING TRAFFIC VOLUMES



SITE-GENERATED TRAFFIC VOLUMES

FUTURE TRAFFIC VOLUMES

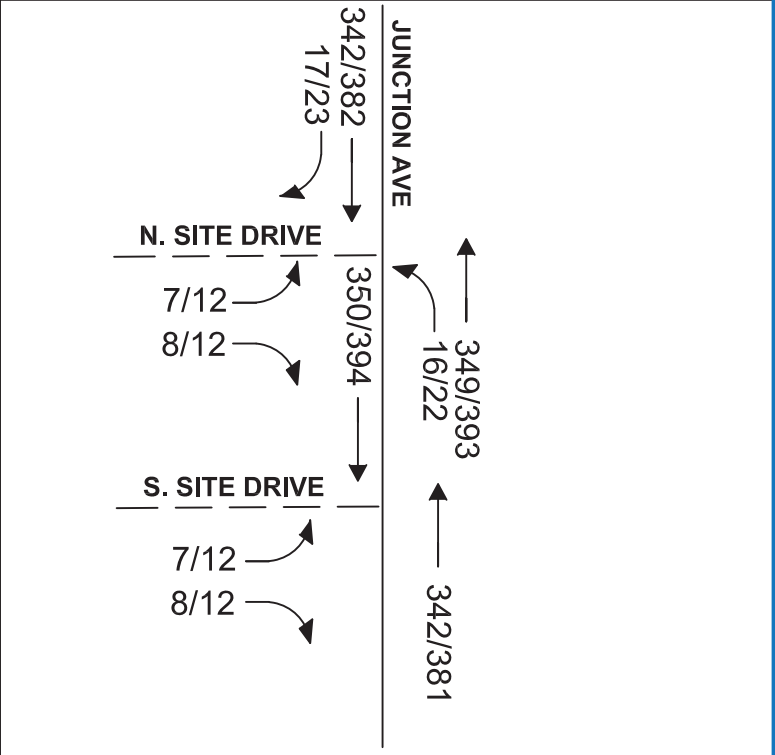
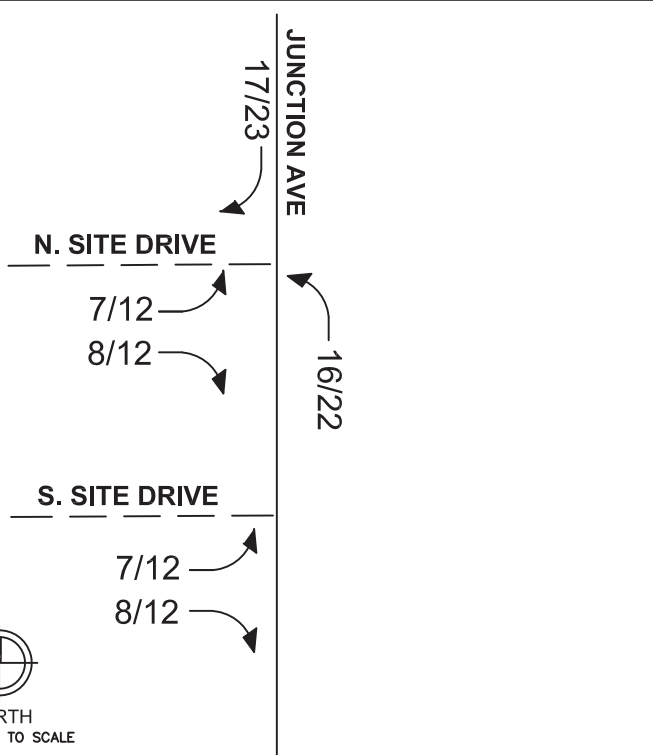


FIGURE 2

TRAFFIC VOLUMES

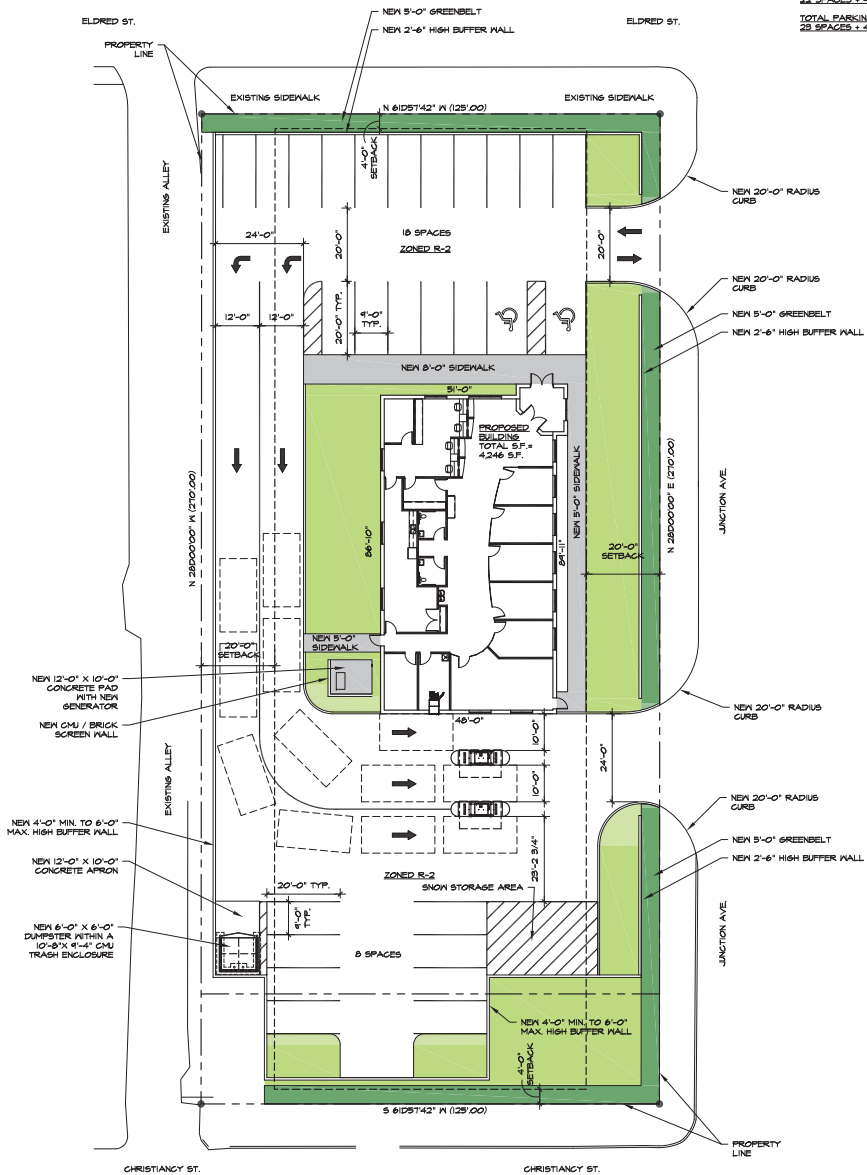
CREDIT UNION ONE TIA - DETROIT, MI



LEGEND

- ROADS
- PROPOSED ROADS
- LANE USE
- PROPOSED LANE USE
- UNSIGNALIZED INTERSECTION
- TRAFFIC VOLUMES (AM/PM)

ZONED R-2 (TWO-FAMILY RESIDENTIAL)
 BANK = 1 SPACE PER 200 SQ.FT. + 4 STACKING SPACES
 TOTAL PARKING SPACES REQUIRED = 22 SPACES + 4 STACKING SPACES
 TOTAL PARKING SPACES PROVIDED = 28 SPACES + 4 STACKING SPACES



SITE PLAN NO. 6
 1/16" = 1'-0"



7300 DIXIE HWY. #600
 CLARKSTON, MI 48346
 PHONE 248.605.2030
 FAX 248.605.2030
 WEB DSARCHITECTS.COM

Sheet

Project
CREDIT UNION ONE DETROIT

1545 JUNCTION AVE
 CITY OF DETROIT, MI 48209

Drawing Title
SITE PLAN NO. 6

Project Number
22-40-162

Drawn KJM

Checked DJS

Scale 1/16" = 1'-0"

CREDIT UNION ONE - SITE PLAN

Month Day Year
 OWNER REVIEW 3-23 DJS

Sheet Number

SI
 of
 1



Transportation Data Management System

Disclaimer: The Michigan Department of Transportation (MDOT) works with individual agencies (cities/villages, counties, metropolitan planning organizations (MPOs), regional planning organizations (RPOs), and other areas of MDOT) to identify existing traffic count programs and/or traffic data. [...more](#)

List View

All DIRs

Report Center

	Record			1			of 1	Goto Record	<input type="text" value="go"/>
Location ID	82-1363	MPO ID	7970						
Type	SPOT	HPMS ID							
On NHS	No	On HPMS	No						
LRS ID	6800165	LRS Loc Pt.	0.8355624						
SF Group	Urban Non State	Route Type							
AF Group	NoFactor	Route							
GF Group	Urban Non State	Active	Yes						
Class Dist Grp	NTL_5	Category	Primary						
Seas Class Grp									
WIM Group									
QC Group	Default								
Funct'l Class	(5) Major Collector	Milepost							
Located On	JUNCTION								
Loc On Alias									
BETWEEN	Brandon St AND Plumer St								
More Detail									
STATION DATA									

Directions:

AADT

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2023	6,948 ³		11		6,760 (97%)	188 (3%)	Grown from 2022
2022	6,798	763	11		6,599 (97%)	199 (3%)	
2021	4,536 ³				4,258 (94%)	278 (6%)	Grown from 2020
2020	3,981 ³				3,702 (93%)	279 (7%)	Grown from 2019
2019	4,662 ³				4,474 (96%)	188 (4%)	Grown from 2018

1-5 of 8

VOLUME COUNT			
	Date	Int	Total
	Wed 3/2/2022	15	6,771
	Tue 3/1/2022	15	6,825
	Mon 11/8/2010	60	7,749

VOLUME TREND

Year	Annual Growth
2023	2%
2022	50%
2021	14%
2020	-15%
2019	0%
2018	0%
2017	4%

CLASSIFICATION

95th Percentile Probability - Drive Through Queue Length (# of Vehicles)

Volume = 23
 service rate = 60
 $\lambda = 0.383333$

λ^x	1	2	3	4	5	6	7	8	9	Poisson Queue
No Veh in Cycle	X	X!	$P = (e^{-\lambda})(\lambda^x)/X!$	ΣP	P* # Cycle containing Volume in 1	Σ Cycles in 6	Volume in Cycle (1*6)	Σ volume		
1.0000	0	0	1	68.16%	68.16%	41	41	0	0	NO
0.3833	1	1	1	26.13%	94.29%	16	57	16	16	NO
0.1469	2	2	2	5.01%	99.29%	3	11	6	22	NO
0.0563	3	3	6	0.64%	99.93%	0	11	1	23	MET
0.0216	4	4	24	0.06%	99.99%	0	11	0	23	MET
0.0083	5	5	120	0.00%	100.00%	0	11	0	23	MET
0.0032	6	6	720	0.00%	100.00%	0	11	0	23	MET
0.0012	7	7	5040	0.00%	100.00%	0	11	0	23	MET
0.0005	8	8	40320	0.00%	100.00%	0	11	0	23	MET
0.0002	9	9	362880	0.00%	100.00%	0	11	0	23	MET
0.0001	10	10	3628800	0.00%	100.00%	0	11	0	23	MET
0.0000	11	11	39916800	0.00%	100.00%	0	11	0	23	MET