One Stop Development Shop
PLANNING BUILDING INFRASTRUCTURE SAINT JOHN
onestop@saintjohn.ca Phone: 658-2911 Fax: 632-6199

General Application Form

GROWTH & COMMUNITY SERVICES
CITY OF SAINT JOHN

LOCATION	CIVIC ADDRESS :	35 University Ave	PID # :	55221717
STAFF USE	HERITAGE AREA: Y / N	INTENSIFICATION AREA: Y / N	FLOOD RISK AREA: Y / N	APPROVED GRADING PLAN: Y / N
	APPLICATION #:		DATE RECEIVED:	
			RECEIVED BY:	

APPLICANT INFORMATION

APPLICANT	EMAIL	PHONE
Plazacorp Property Holdings Inc.	doug.bannister@plaza.ca	506-434-2390
MAILING ADDRESS		POSTAL CODE
98 Main Street, Fredericton		E3A 9N6
CONTRACTOR	EMAIL	PHONE
to be determined		
MAILING ADDRESS		POSTAL CODE
OWNER	EMAIL	PHONE
MAILING ADDRESS		POSTAL CODE

PRESENT USE: vacant land

PROPOSED USE: McDonalds Restaurant with drive-thru

CHECK ALL THAT APPLY

BUILDING		PLANNING	INFRASTRUCTURE	HERITAGE
☐ INTERIOR RENOVATION	☐ NEW CONSTRUCTION	☐ VARIANCE	☑ STREET EXCAVATION	☐ HERITAGE DEVELOPMENT
☐ EXTERIOR RENOVATION	☐ ACCESSORY BLDG	☐ PLANNING LETTER	☐ DRIVEWAY CULVERT	☐ HERITAGE SIGN
☐ ADDITION	☐ POOL	☑ PAC APPLICATION	☐ DRAINAGE	☐ HERITAGE INFILL
☐ DECK	☐ DEMOLITION	☑ COUNCIL APP	☑ WATER & SEWERAGE	☐ HERITAGE DEMO
☐ CHANGE OF USE	☐ SIGN	☐ SUBDIVISION	☐ OTHER	☐ OTHER
☐ MINIMUM STANDARDS	☐ OTHER	☐ OTHER		

DESCRIPTION OF WORK

McDonalds restaurant with drive-thru

☐ I consent to the City of Saint John sending to me commercial electronic messages, from time to time, regarding City initiatives and incentives.

General Collection Statement

This information is being collected in order for the City of Saint John to deliver an existing program / service; the collection is limited to that which is necessary to deliver the program / service. Unless required to do so by law, the City of Saint John will not share your personal information with any third party without your express consent.

The legal authority for collecting this information is to be found in the Municipalities Act and the Right to Information and Protection of Privacy Act. For further information or questions regarding the collection of personal information, please contact the Access & Privacy Officer:

City Hall Building
15 Market Square Saint
John, NB E2L 1E8
commonclerk@saintjohn.ca
(506) 658-2862

The City of Saint John

I, the undersigned, hereby apply for the permit(s) or approval(s), indicated above for the work described on plans, submissions and forms herewith submitted. This application includes all relevant documentation necessary for the applied for permit(s) or approval(s). I agree to comply with the plans, specifications and further agree to comply with all relevant City By-laws and conditions imposed.

Kimberly Strange, Secretary of Plazacorp Property Holdings Inc.
Applicant Name

Applicant Signature

August 30, 2024
Date

Council Application

GROWTH & COMMUNITY SERVICES
CITY OF SAINT JOHN

CIVIC ADDRESS	35 University Ave	APPLICATION #		FEE PAID	Y	N

TYPE OF APPLICATION

- ☐ Land for Public Purposes Release — Service Fee: $300
- ☐ Non-Conforming Use — Service Fee: $200
- ☐ Satisfactory Servicing — Service Fee: $200
- ☑ Section 59 Amendment — Service Fee: $2,650
- ☐ Zoning By-law Amendment — Service Fee: $2,650
- ☐ Zoning By-law Amendment with a Municipal Plan Amendment — Service Fee: $3,700

DETAILED DESCRIPTION OF APPLICATION

Where applicable, indicate the changes to existing Section 39 conditions, zoning, or Municipal Plan designation being requested. Attach site plans, building elevations, floor plans, and other documentation to fully describe the application. The submission of a preliminary proposal and a Pre-Application Meeting is encouraged prior to seeking approval. Please contact the One-Stop Development Shop at (506) 658-2911 for further information.

McDonalds restaurant with drive-thru, site work to be done by Landlord and building to be constructed by Tenant

ENCUMBRANCES

Describe any easements, restrictive covenants, and other encumbrances affecting the land.

AUTHORIZATION

As of the date of this application, I, the undersigned, am the registered owner of the land described in this application or the authorized agent thereof, and I have examined the contents of this application and hereby certify that the information submitted with the application is correct insofar as I have knowledge of these facts, and I hereby authorize the applicant to represent this matter and to provide any additional information that will be necessary for this application.

Kimberly Strange, Sectretary of Plazacorp Property Holdings Inc.
Registered Owner or Authorized Agent

Additional Registered Owner

August 30, 2024
Date

Date

The information contained in this application and any documentation, including plans, drawings, reports, and studies, provided in support of this application will become part of the public record.

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. THE HORIZONTAL DATUM UTILIZED IS NAD83 (CSRS) NEW BRUNSWICK DOUBLE STEREOGRAPHIC PROJECTION.
3. ALL ELEVATIONS ARE IN GEODETIC METRES AND REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928 (CGVD28).
4. ALL CHAINAGES ARE IN METRES.
5. LOCATION OF EXISTING SERVICES, STRUCTURES AND BUILDINGS APPROXIMATE ONLY.
6. CONTRACTOR TO ENSURE THAT ALL MUNICIPAL INFRASTRUCTURE, PUBLIC UTILITIES, NATURAL GAS AND OTHER INFRASTRUCTURE ARE LOCATED IN THE FIELD PRIOR TO START OF EXCAVATION.
7. ALL FIELD SURVEY INFORMATION PROVIDED BY CBCL LIMITED.
8. TYPICAL TRENCH DETAIL, PIPE INSTALLATION, FITTINGS & STRUCTURES, ETC. REFER TO CITY, TOWN OR VILLAGE SPECIFICATIONS FOR DEVELOPERS.
9. SANITARY MANHOLES TO BE 1050ø UNLESS OTHERWISE NOTED.
10. ALL CATCH BASINS, MANHOLES, GATE VALVE CHAMBERS AND AIR RELEASE CHAMBERS TO HAVE MINIMUM 100mm RISER BETWEEN FRAME & CONCRETE COVER. TOP RISER TO BE MADE OF RUBBER.
11. AT ALL PIPE CONNECTIONS TO EXISTING WATER MAINS, FUTURE EXTENSIONS AND FIRE LINES, PROVIDE A 25mm (1") MAIN STOP AND SADDLE BOTH SIDES OF GATE VALVE TO FACILITATE TESTING AND CHLORINATION.
12. ALL WATER LINES LESS THAN 1.8m COVER TO BE INSULATED WITH 50mm THICK RIGID "STYROFOAM SM" BOARD.
13. ALL WATER, SANITARY AND STORM STUBS TO BE PLUGGED /CAPPED & WATER MAIN FITTINGS TO BE RESTRAINED. LOCATION TO BE MARKED WITH A 38x89 STUD FROM INVERT OF PIPE TO 300mm BELOW FINISH GRADE

LEGEND:

PROPOSED		EXISTING
●	SANITARY MANHOLE (SMH)	○
■	CATCH BASIN (CB)	□
◉	STORM MANHOLE (STMH)	⊡
———	SANITARY SEWER	SAN
– – –	SANITARY FORCE MAIN	FM
———	STORM SEWER	ST
– – –	WATER MAIN	W
———	COMBINED SEWER	CS
)	CULVERT	)
⊗	ISOLATION VALVE (BUTTERFLY/GATE)	⊗
⊖	CURB STOP	⊖
⊗	VALVE IN CHAMBER	⊗
⊕	FIRE HYDRANT	⊕
P/L	PROPERTY LINE	P/L
EAS	EASEMENT	EAS
E/P	EDGE OF PAVEMENT	E/P
	ROAD SHOULDER	
G/R	GUIDE RAIL	G/R
S/W	SIDEWALK	S/W
curb	CURB	curb
C/G	CURB & GUTTER	C/G
	DITCH	
X	FENCE	X
O/H	OVERHEAD UTILITIES	O/H
U/G	UNDERGROUND UTILITIES	U/G
E	UNDERGROUND ELECTRICAL	E
E T	ELECTRICAL / TELEPHONE MANHOLE	E T
	POWER, UTILITY, GUY POLES	PP GUY
	LIGHT STANDARD	
	SIGN	
	BENCH MARK	
	BORE HOLE / TEST PIT	BH #1 TP #1
	CONTOUR	12.0
	GRADE	

No.	Description	Date	By
B	RE-ISSUED FOR REVIEW	AUG 29/24	KAS
A	ISSUED FOR REVIEW	APR 15/24	KAS

Revision or Issue

plaza REIT

PLAZA GROUP MANAGEMENT LTD.

COMMERCIAL DEVELOPMENT

CIVIL

GRADING PLAN

CBCL

CBCL No 232885.00	Contract No -
Date SEPT 2023	Scale AS SHOWN
Designed KAS	Drawn KAS
Checked TMC	Approved TMC
Sheet No 1 of 1	
Drawing No **SK01**	

NOT FOR CONSTRUCTION

McDONALD’S RESTAURANT MILLIDGEVILLE

ADDRESS: MILLIDGE AV AND UNIVERSITY AVE., SAINT JOHN, NB

PRESENTATION DOCUMENT
DATE : 2024-10-22

TABLE OF CONTENTS

PROPOSED SITE PLAN AND ZONING PARAMETERS
PROPOSED SITE PLAN:
- A. 30’ DELIVERY TRUCK MANOEUVRE
- B. PICKUP TRUCK MANOEUVRE IN THE DRIVETHRU
- C. WASTE TRUCK MANOEURVRE

PROPOSED GROUND FLOOR PLAN
ELEVATIONS
BUILDING WALL SIGNS

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TITLE
PRESENTATION DOCUMENT

SCALE
N/A

NOT FOR CONSTRUCTION

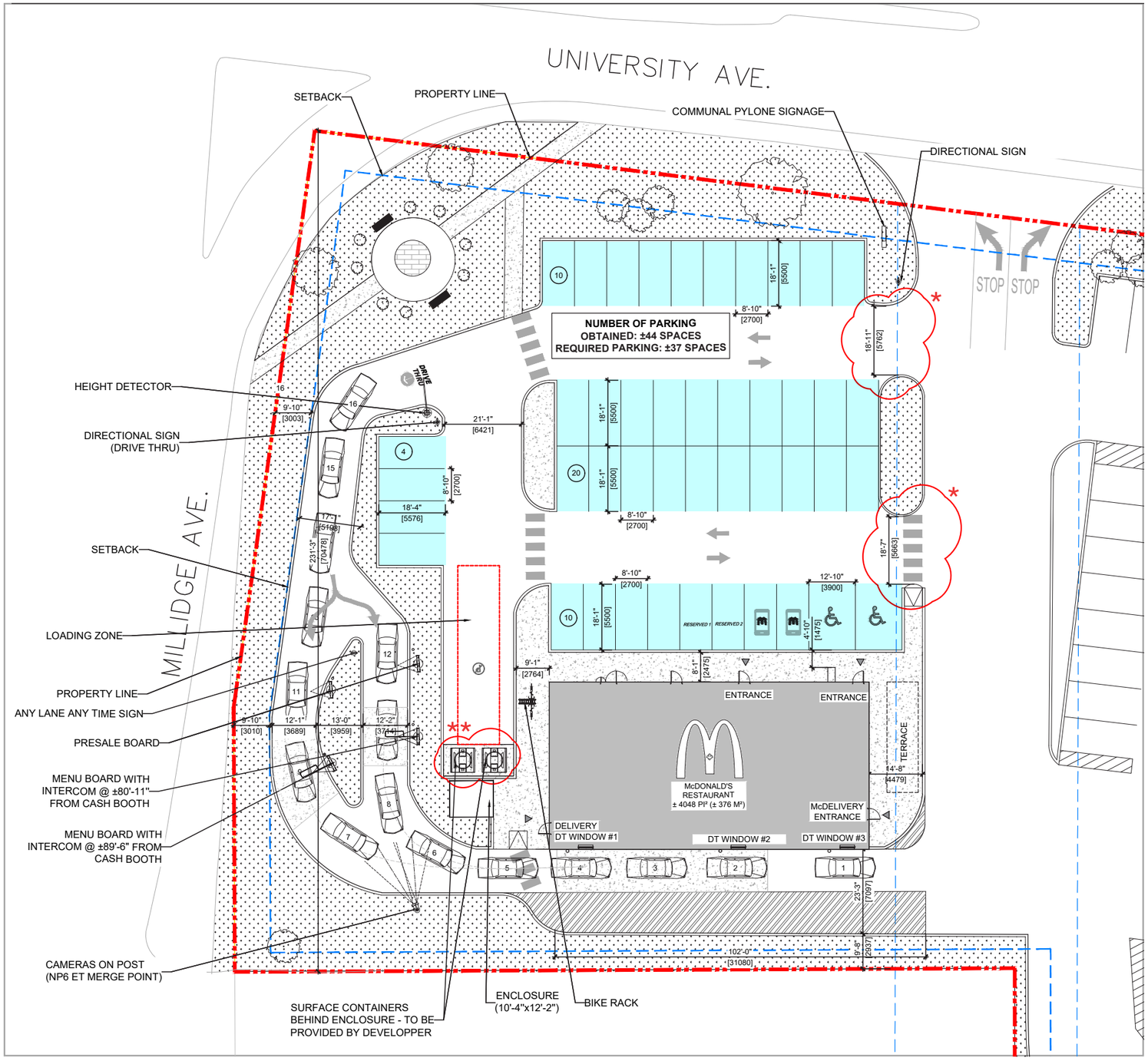
KEY

PROJECT :
McDONALD’S RESTAURANT

ADDRESS :
MILLIDGEVILLE / UNIVERSITY,
SAINT JOHN, NB.

DATE:
2024-10-22

CLIENT



* THE ENTRY OF THE TWO CIRCULATION LANES IS NOT COMPLIANT AFTER THE MODIFICATIONS DONE BY THE DEVELOPER TO THE PLAN. THE MINIMUM WIDTH IS 6'-0"
** THE SEMI-BURIED CONTAINERS WILL BE REPLACED BY SURFACE CONTAINERS BEHIND AN ENCLOSURE BY THE DEVELOPER. THE DETAIL OF THE ENCLOSURE IS PROVIDED BY THE DEVELOPER. ENSURE VISUAL CONTINUITY BETWEEN THE TWO ENCLOSURES.

CITY OF SAINT JOHN

ADDRESS : MILL

ZONING: COMMERCIAL GENERAL (CG)

THE FOLLOWING SITE ANALYSIS IS BASED ON THE CITY OF SAINT JOHN ZONING BYLAW 2014 CONSOLIDATED MAY 2023

SITE ANALYSIS

11.7 (4) | ZONING STANDARDS:
- MIN. FRONT YARD: 3.0 M
- MIN.REAR YARD: 3.0 M
- MIN. SIDE YARD: 1.5 M
- MIN. FLANKAGE YARD: 1.5 M

4.2 (3) | PARKING SPACE AND AISLE DIMENSIONS (90°)
- AISLE WIDTH (MIN.): 6.0 M
- PARKING STALL WIDTH (MIN.): 2.70 M
- PARKING STALL LENGTH (MIN.): 5.50 M

4.3| GENERAL LOADING PROVISIONS:
- LENGTH (MIN.): 15 M
- WIDTH (MIN.): 3.5 M

AT LEAST ONE LOADING SPACE IS REQUIRED IF THE GROSS FLOOR AREA IS BETWEEN 301 SQ.M. AND 2000 SQ.M

4.4 | DRIVE-THRU FACILITIES:
- INBOUND QUEUING (MIN.): 14 VEHICLES
- OUTBOUNG QUEUING (MIN.): 1 VEHICLES

STATISTICS

CALCULATION OF REQUIRED PARKING SPACES:

4.2 | MIN. NUMBER OF REQUIRED PARKING SPACES:
1 STALL/ 10 SQ.M OF GROSS FLOOR AREA.
GFA = 348 SQ.M
348 SQ.M / 10 SQ.M = 35 STALLS
4.2 (4) | BARRIER- FREE PARKING SPACES:
2 STALLS

NUMBER OF PROPOSED PARKING SPACES:
STANDARD: 42 STALLS
BARRIER-FREE: 2 STALLS
BICYCLE: 1 UNIT OF 7 SPACES

GENERAL NOTES:
- The zoning map is taken from the City of Saint John's ZoningSF Interactive Map,June 2024.
- Cadastres, elevations and public utilities must be verified by a surveyor.
- The regulatory analysis is to be completed on the site and adjustments are to be expected on this drawing;
- This plan must not be used for construction purposes. The final adjustments will have to be made on the execution plans by the professionals who have been mandated.

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TITLE
PROPOSED SITE PLAN AND ZONING PARAMETERS

SCALE
1/32" = 1'-0"

NOT FOR CONSTRUCTION

KEY
- LOT LINE
- SETBACK
- PEDESTRIAN CROSSING
- BARIER-FREE PARKING STALLS
- PAINTED LINES
- GRASS
- CONCRETE
- RESERVED PARKING FOR THE RESTAURANT

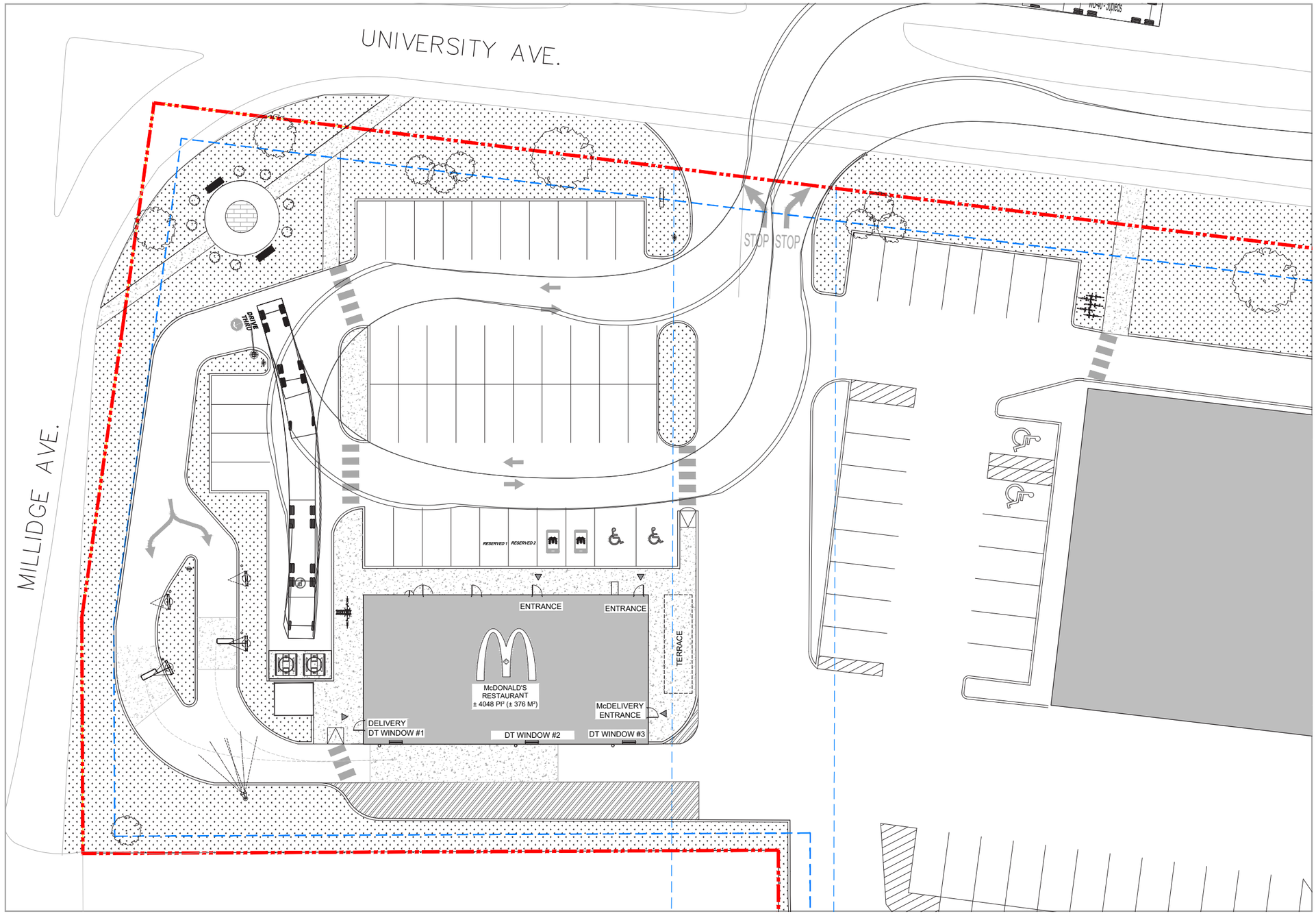
PROJECT :
McDONALD'S RESTAURANT

ADDRESS :
MILLIDGEVILLE / UNIVERSITY,
SAINT JOHN, NB.

DATE:
2024-10-22

CLIENT

NOTE
30' DELIVERY TRUCK USED



N

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TITLE
PROPOSED SITE PLAN
30' DELIVERY TRUCK MANOEUVRE

SCALE
1/32" = 1'-0"

NOT FOR CONSTRUCTION

KEY

- LOT LINE
- SETBACK
- PEDESTRIAN CROSSING
- BARIER-FREE PARKING STALLS
- PAINTED LINES
- GRASS
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- RESERVED PARKING FOR THE RESTAURANT

PROJECT :
McDONALD'S RESTAURANT

ADDRESS :
MILLIDGEVILLE / UNIVERSITY,
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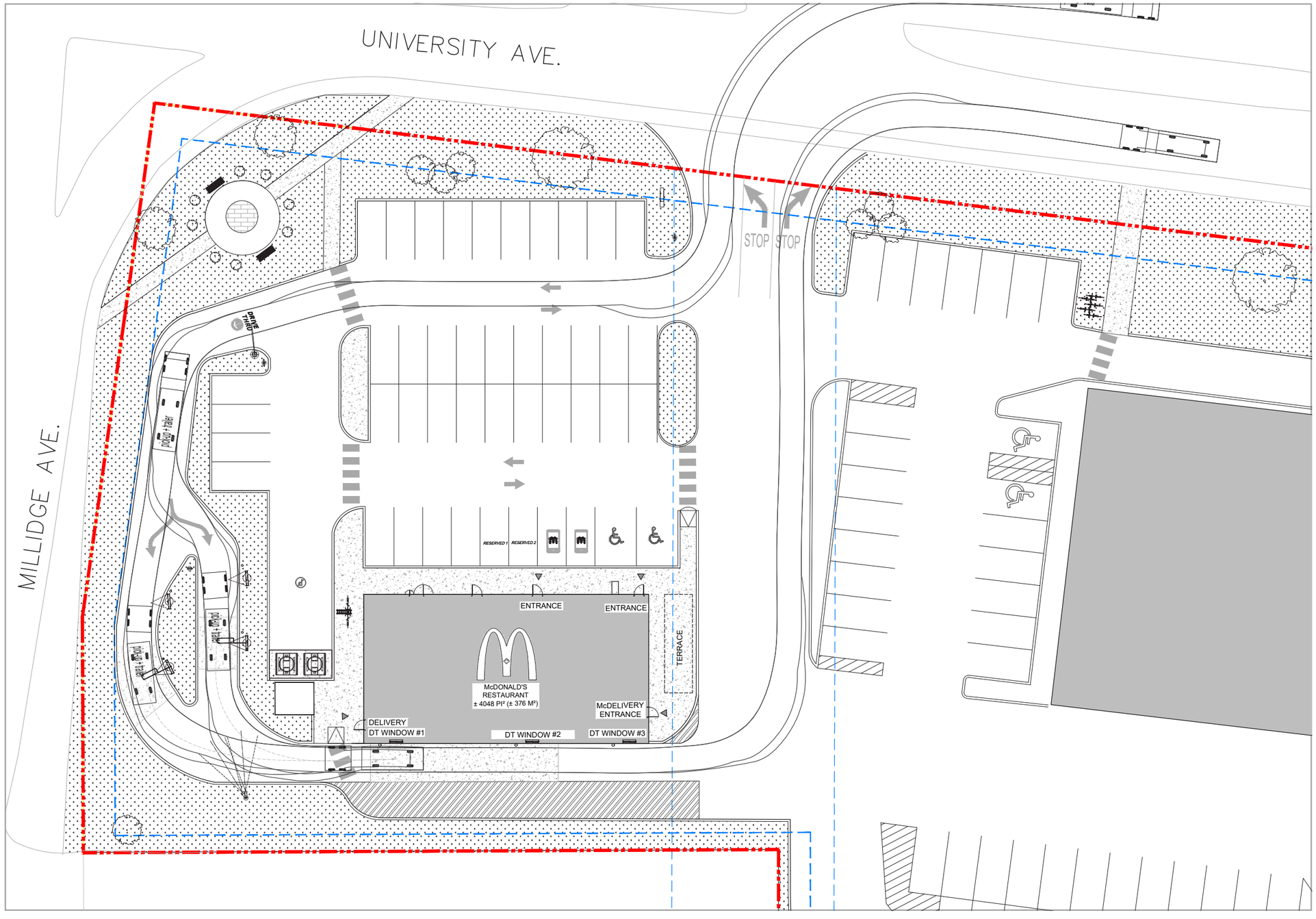

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+ design

TITLE
PROPOSED SITE PLAN
PICKUP TRUCK MANOEUVRE

SCALE
1/32" = 1'-0"

NOT FOR CONSTRUCTION

KEY

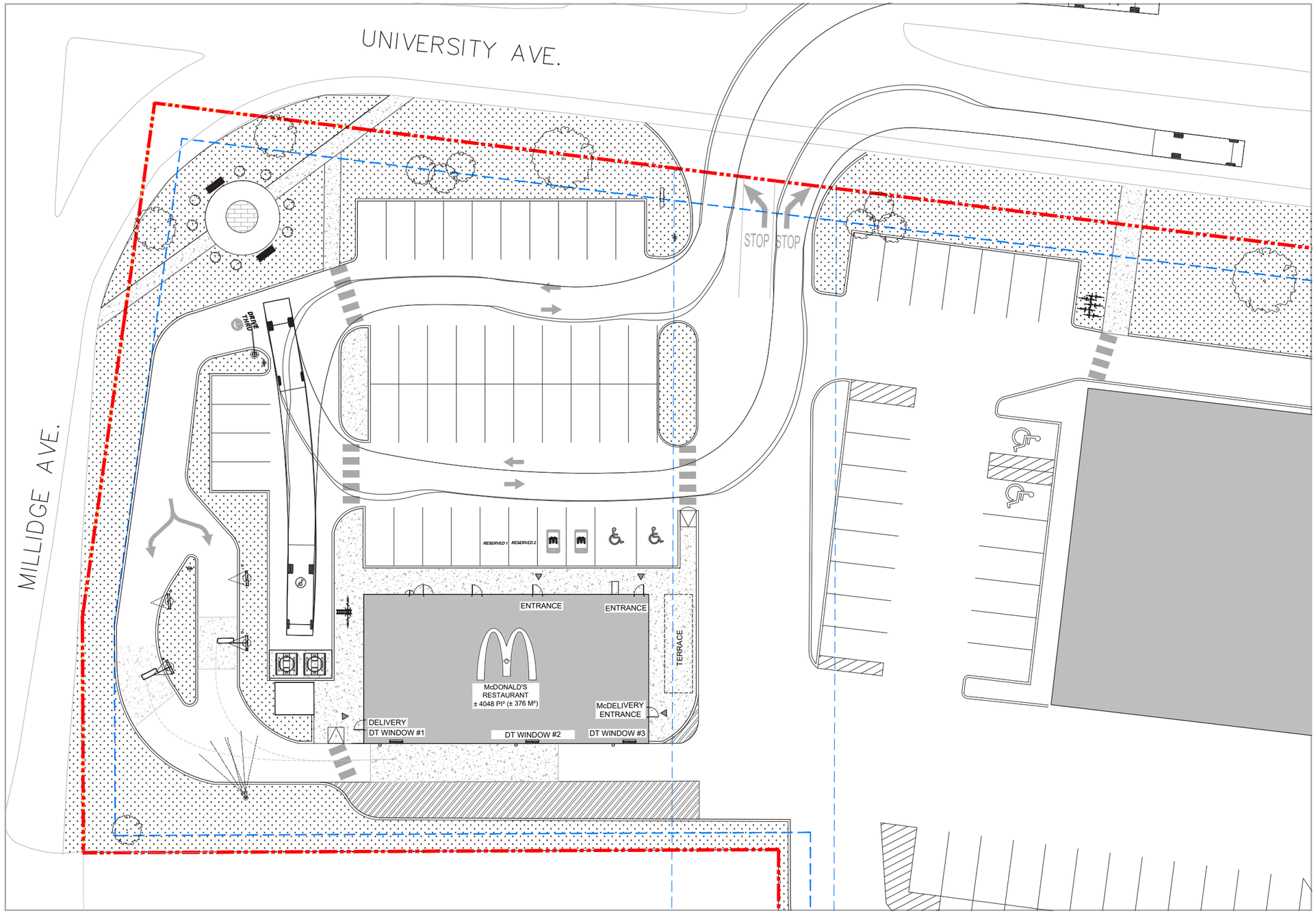
- LOT LINE
- SETBACK
- PEDESTRIAN CROSSING
- BARIER-FREE PARKING STALLS
- PAINTED LINES
- GRASS
- CONCRETE
- RESERVED PARKING FOR THE RESTAURANT

PROJECT :
McDONALD'S RESTAURANT

ADDRESS :
MILLIDGEVILLE / UNIVERSITY,
SAINT JOHN, NB.

DATE:
2024-10-22

CLIENT



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mra
architecture
+ design

TITLE
PROPOSED SITE PLAN
WASTE TRUCK MANOEUVRE

SCALE
1/32" = 1'-0"

NOT FOR CONSTRUCTION

KEY

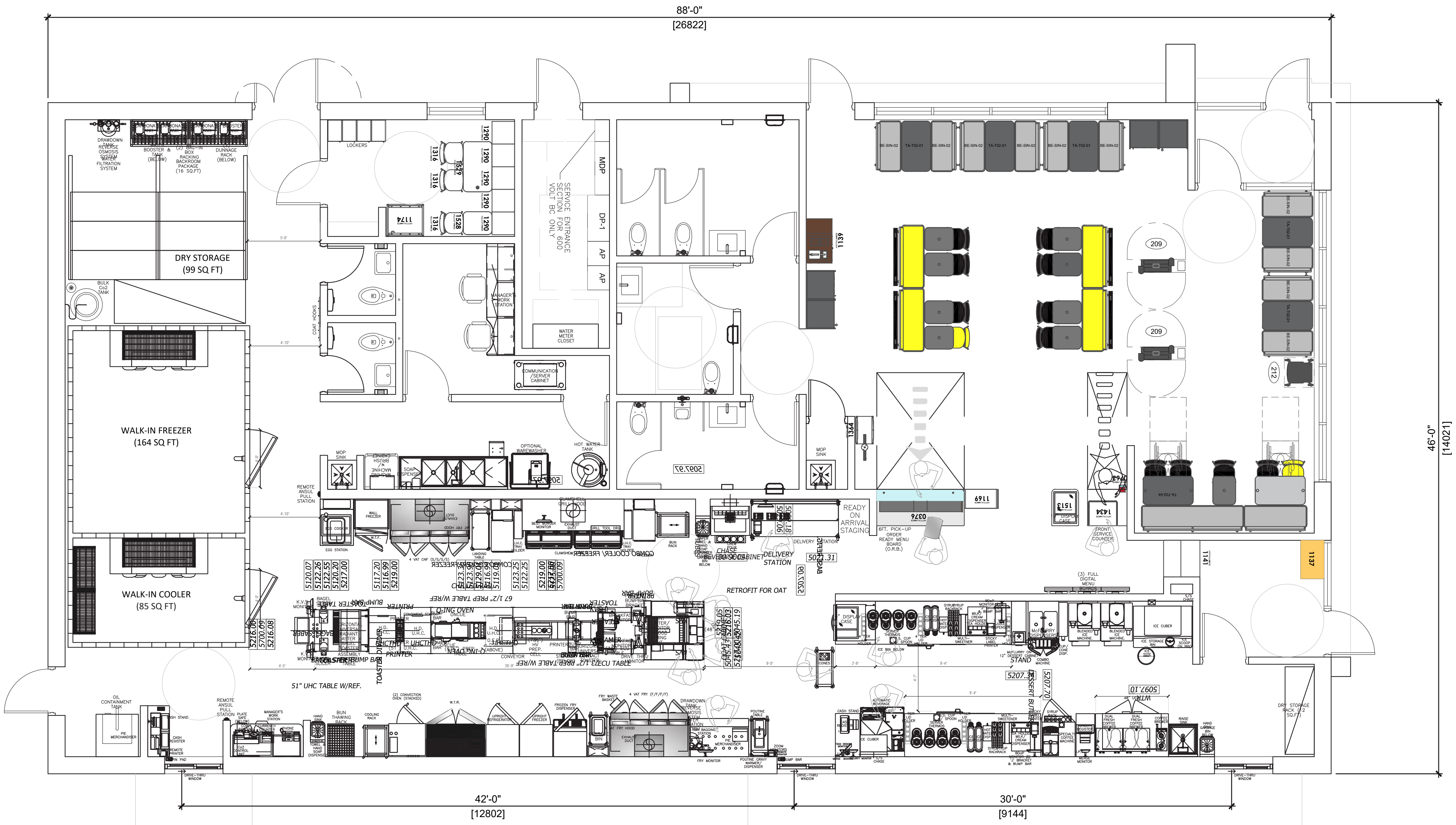
- LOT LINE
- SETBACK
- PEDESTRIAN CROSSING
- BARIER-FREE PARKING STALLS
- PAINTED LINES
- GRASS
- CONCRETE
- RESERVED PARKING FOR THE RESTAURANT

PROJECT :
McDONALD'S RESTAURANT

ADDRESS :
MILLIDGEVILLE / UNIVERSITY,
SAINT JOHN, NB.

DATE:
2024-10-22

CLIENT



PROJECT :
McDONALD'S RESTAURANT

ADDRESS :
MILLIDGEVILLE / UNIVERSITY, SAINT JOHN, NB.

DATE:
2024-10-22

CLIENT

PAGE 6

TITLE
PROPOSED GROUND FLOOR PLAN

SCALE
1/8" = 1'-0"

NOT FOR CONSTRUCTION

PROTOTYPE: R4

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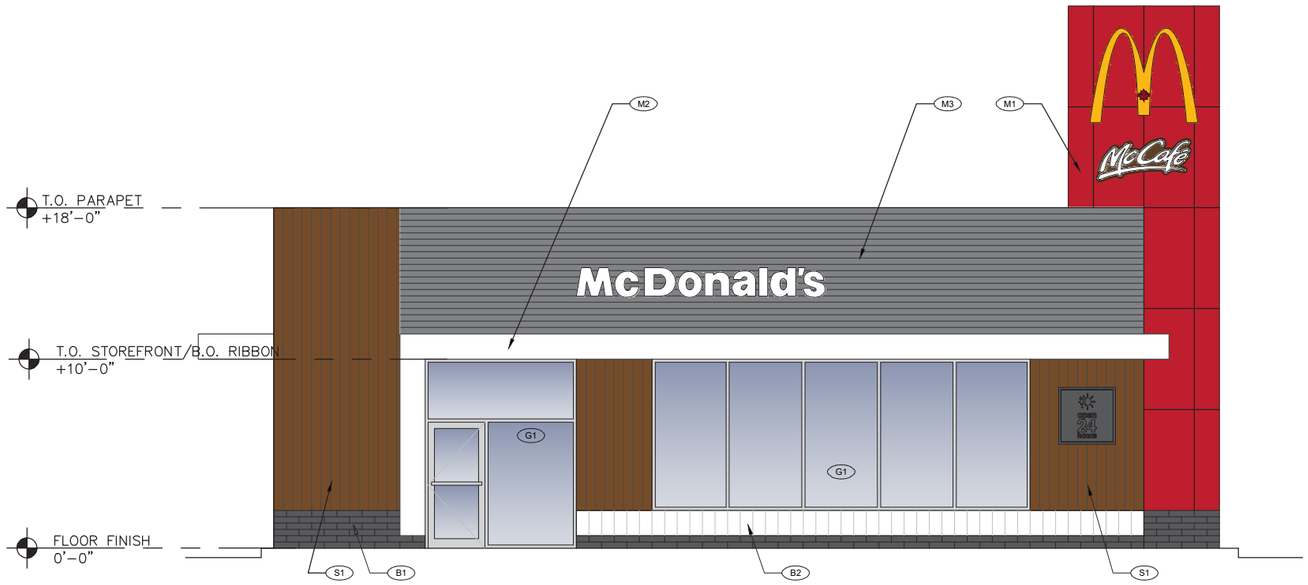
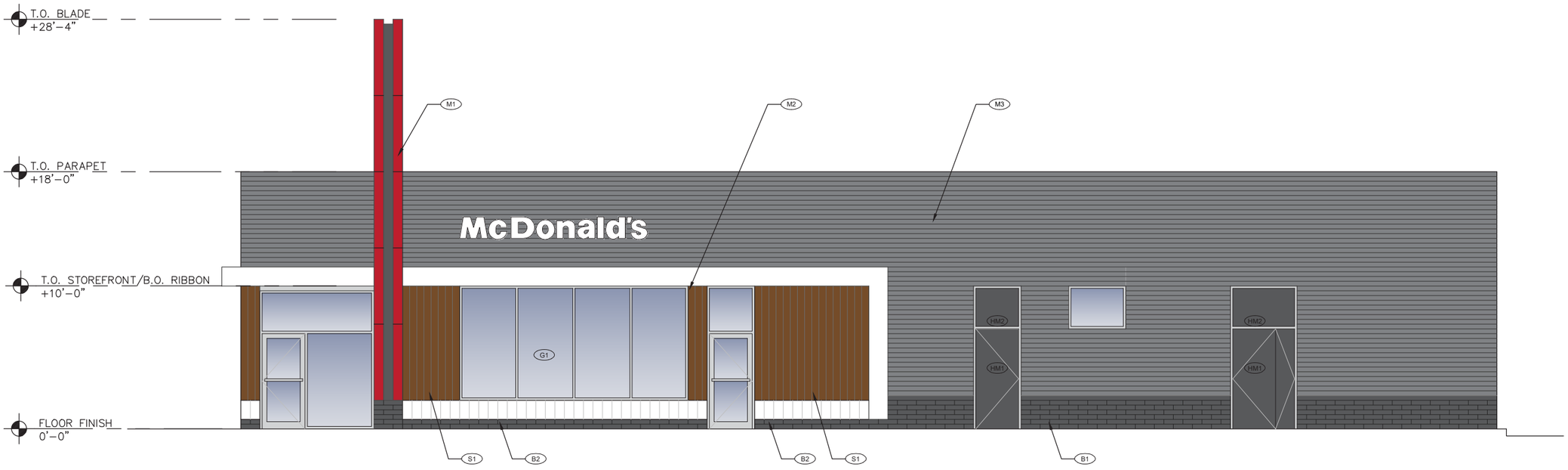


LEFT ELEVATION



FRONT FACADE - UNIVERSITY AVENUE

CALCULATION FOR MAXIMUM FACE AREA OF ALL SIGNS

	LENGTH
LOT FRONTAGE	± 70.5 M

ARTICLE 7.9: WALL SIGNS
COMMERCIAL GENERAL ZONE (CG) MAXIMUM SIGN FACE AREA:
0,7 M^2 PER METER OF LOT FRONTAGE.

MAXIUM SIGN FACE AREA= **± 49.3 M^2**

TABLE OF AREAS FOR BUILDING SIGNS

	PRPOSED SIGN AREA	QUANTITY
McDONALD'S 18''	± 3.8 M^2	3
M LOGO + McCAFÉ	± 5.0 M^2	2

TOTAL : **± 21.4 M^2**

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TITLE
ELEVATIONS

SCALE
1/8" = 1'-0"

NOT FOR CONSTRUCTION

PROTOTYPE: R4

MATERIAL SCHEDULE		
#	DESCRIPTION	COLOUR
M1	MITSUBISHI 4mm ALPOLIC METAL CLADDING	RON RED
M2	MITSUBISHI 4mm ALPOLIC METAL CLADDING	BONE WHITE
M3	VICWEST CORRUGATED METAL SIDING CL7040	DEEP GREY 55174
B1	RICHVALE YORK CAMBRIDGE SERIES CONCRETE BLOCK	ONYX
B2	RICHVALE YORK CAMBRIDGE SERIES CONCRETE BLOCK	ARCTIC WHITE
S1	LONGBOARD TONGUE & GROOVE SIDING	LT. NATIONAL. WALNUT
G1	STOREFRONT GLAZING SYSTEM	CLEAR ANODIZED
G2	QUIK-SERV DRIVE THRU WINDOW	CLEAR ANODIZED
G3	SPANDREL PANEL	SOLAR GREY
HM1	HOLLOW METAL DOORS	CHARCOAL GREY
HM2	HOLLOW METAL PANEL	CHARCOAL GREY

PROJECT :
McDONALD'S RESTAURANT

ADDRESS :
MILLIDGEVILLE / UNIVERSITY,
SAINT JOHN, NB.

DATE:
2024-10-22

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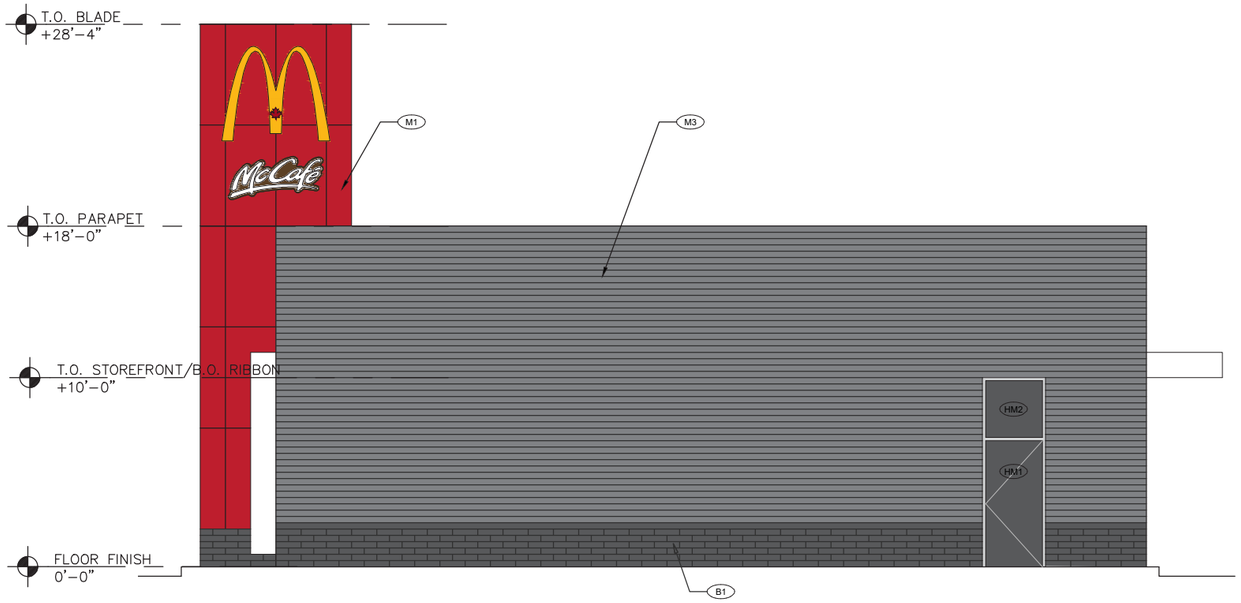
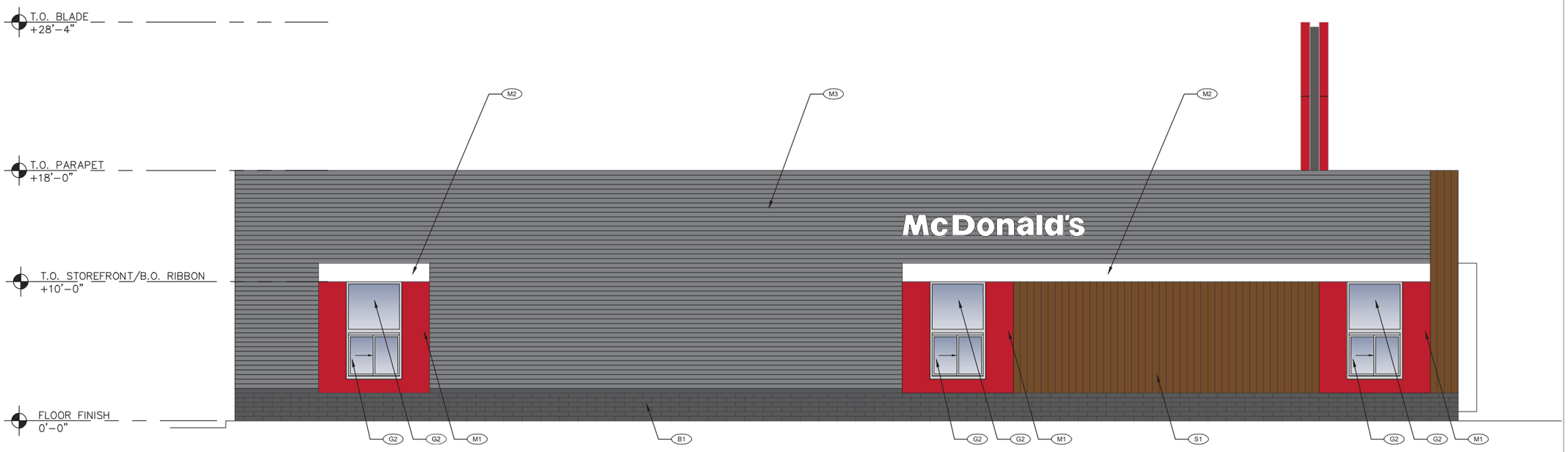


SECONDARY FRONT FACADE - MILLIDGE AVENUE



REAR ELEVATION

CALCULATION FOR MAXIMUM FACE AREA OF ALL SIGNS

	LENGTH
LOT FRONTAGE	± 70.5 M

ARTICLE 7.9: WALL SIGNS
COMMERCIAL GENERAL ZONE (CG) MAXIMUM SIGN FACE AREA:
0,7 M^2 PER METER OF LOT FRONTAGE.

MAXIUM SIGN FACE AREA= **± 49.3 M^2**

TABLE OF AREAS FOR BUILDING SIGNS

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TITLE
ELEVATIONS

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1/8" = 1'-0"

NOT FOR CONSTRUCTION

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SAINT JOHN, NB.

DATE:
2024-10-22

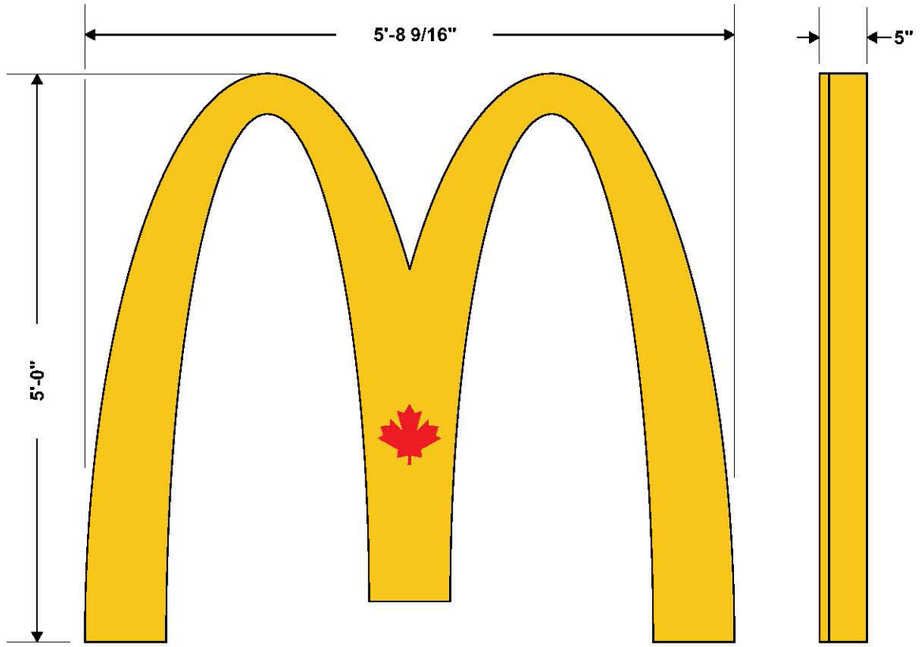
CLIENT

SPEC BOOK ENGLISH

ILLUMINATED ARCHES LOGOS

Electrical specifications:					
Volts:	T.B.D.	Amp.:	T.B.D.	Circ.:	T.B.D.
Installation:	☐ Interior:		☑ Exterior:		

#	Description:
1	COIL YELLOW SABIC FABRICATED CABINET
2	PRE-PAINTED BLACK & WHITE ALUMINUM BACKING
3	1" YELLOW SABIC TRIM
4	FLAT YELLOW SABIC POLYCARBONATE FACE WITH VINYL APPLIED ON FIRST SURFACE
*	SELF-CONTAINED POWER SUPPLY
*	ILLUMINATED WITH WHITE LED



FRONT VIEW
60" ARCHES LOGO

SIDE VIEW

ARCHES LOGO:		
SIZE	SQFT	PRODUCT CODE
60"	29.05 FT²	MCD1S4D7037

#	Colors:
A	RED VINYL 3M 3630-33

Customer:	
MCDONALD'S STORE #	
Site Address:	
VARIOUS	
Designer:	Checked By:
CLAUDIA VOGT	N/A
Date:	Scale:
12.03.2018	3/4"=1'-0"

Pattison Sign Group
Powering Your Brand
Toll Free: 1-800-561-9798 Fax: (877) 737-1734 www.pattisonsign.com

IF THIS AGREEMENT INCLUDES THE MANUFACTURING AND INSTALLATION OF A BASE(S) BY PATTISON SIGN GROUP FOR THE SIGNS ORDERED HEREIN, SUCH BASE(S) SHALL BE BUILT AND INSTALLED IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS. IF A BASE(S) IS TO BE BUILT OR PROVIDED BY THE CUSTOMER (OR HIS AGENT), AND NOT BY PATTISON SIGN GROUP, THE CUSTOM SHALL ENSURE THAT THE BASE(S) ARE BUILT AND INSTALLED IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS AND SHALL HOLD PATTISON SIGN GROUP HARMLESS AND INDEMNIFY IT AGAINST ANY AND ALL CLAIMS, LIABILITIES, ACTIONS, PENALTIES, FINES, AND ANY LEGAL FEES INCURRED BY PATTISON SIGN GROUP ARISING FROM THE FAILURE OF THE CUSTOMER (AND/OR IT'S AGENT) IN DOING SO.

THIS SIGN IS INTENDED TO BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE 600 OF THE NATIONAL ELECTRICAL CODE AND SECTION 34 OF THE CANADIAN ELECTRICAL CODE AND/OR OTHER APPLICABLE LOCAL CODES. THIS INCLUDES PROPER GROUNDING AND BONDING OF THE SIGN.

PATTISON SIGN GROUP ILLUMINATED SIGNS CONTAIN FLUORESCENT, NEON AND/OR HID LAMPS. THESE LAMPS CONTAIN MERCURY (Hg). DISPOSE OF THESE LAMPS ACCORDING TO LOCAL, PROVINCIAL, STATE OR FEDERAL LAWS.

SPEC BOOK ENGLISH

ILLUMINATED
MCCAFE CLOUD SIGN

Electrical specifications:					
Volts:	T.B.D.	Amp.:	T.B.D.	Circ.:	T.B.D.
Installation: ☐ Interior:		☑ Exterior:			

#	Description:
1	1" TK. ACRYLIC CO-EXTRUDED PUSH-THRU LETTERS
2	1/8" TK. ROUTED ALUMINUM FACE
3	CABINET FABRICATED WITH 0.090"TK. ALUM. BACKING AND 0.063"TK. ALUM. SIDE
*	ILLUMINATED WITH WHITE LED

FRONT VIEW

SIDE VIEW

MC CAFÉ CLOUD SIGN:	
SQFT	PRODUCT CODE
12,03 FT²	MCD1S9C7012

#		Colors:
A		PAINTED BROWN TO MATCH PMS 4695
B		WHITE VINYL 3635-70 DIFFUSER APPLIED TO SECOND SURFACE

Customer:	
MCDONALD'S STORE #	
Site Address:	
VARIOUS	
Designer:	Checked By:
CLAUDIA VOGT	N/A
Date:	Scale:
12.03.2018	1 1/2"=1'-0"

Pattison Sign Group
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SPEC BOOK ENGLISH

ILLUMINATED MCDONALD'S WORDMARK

Electrical specifications:					
Volts:	T.B.D.	Amp.:	T.B.D.	Circ.:	T.B.D.
Installation:	☐ Interior:		☑ Exterior:		

#	Description:
1	PRE-PAINTED ALUMINUM COIL CLEAR SATIN ANODIZED (SILVER) RETURNS WITH PRE-PAINTED ALUMINUM BACKING B/W
2	FLAT WHITE ACRYLIC FACES WITH 1" WHITE JEWELITE RETAINER
3	FABRICATED 0.064 ALUMINUM RACEWAY
*	POWER SUPPLY (INSIDE RACEWAY)
*	ILLUMINATED WITH WHITE LED

CHANNEL LETTERS:		
SIZE	SQFT	PRODUCT CODE
18" THRU WALL	18.45 FT²	MCD1C4D7145

#	Colors:
A	PAINTED OBSIDIAN GREY OONN 13/000

Customer:	
MCDONALD'S STORE #	
Site Address:	
VARIOUS	
Designer:	Checked By:
CLAUDIA VOGT	N/A
Date:	Scale:
12.03.2018	3/8"=1'-0"

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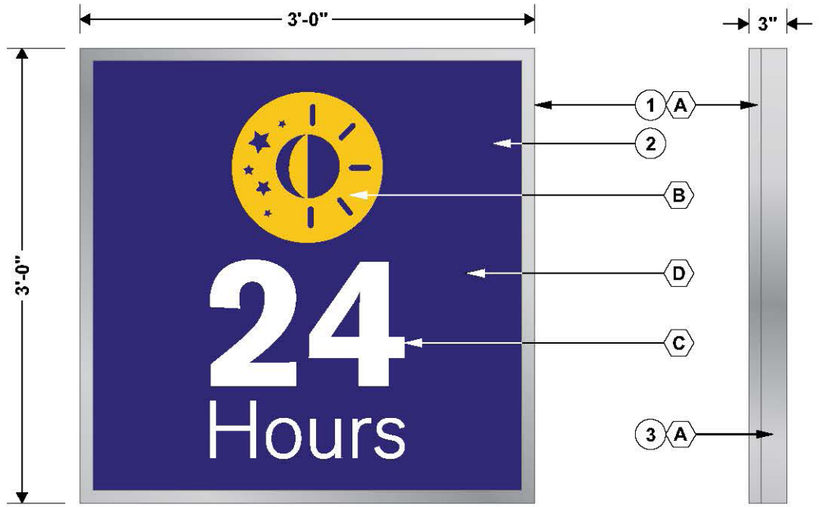

FRONT VIEW/24H **SIDE VIEW**

SPEC BOOK ENGLISH

S/F ILLUMINATED WALL MOUNTED SIGN

Electrical specifications:					
Volts:	T.B.D.	Amp.:	T.B.D.	Circ.:	T.B.D.
Installation:	☐ Interior:	☑ Exterior:			

#	Description:
1	ALUMINUM ANGLE RETAINER 1" X 1" X 1/8"
3	3/16" TK. CLEAR FLAT ACRYLIC FACE WITH VINYL APPLICATION ON SECOND SURFACE
2	FABRICATED SIGNBOX 0.064" TK. ALUM.
*	ILLUMINATED WITH WHITE LED

WALL SIGNS:		
TYPE	SQFT	PRODUCT CODE
24H	9.0 FT²	MCD1S3D7017

#		Colors:
A		PAINTED GREY COIL AT 70% GLOSS
B		YELLOW VINYL #3630-125
C		WHITE VINYL #3630-20
D		BLUE VINYL 3630-137

Customer:	
MCDONALD'S STORE #	
Site Address:	
VARIOUS	
Designer:	Checked By:
CLAUDIA VOGT	N/A
Date:	Scale:
12.03.2018	1"=1'-0"

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Traffic Impact Study for a McDonald's Restaurant on University Avenue – Saint John, NB

Plaza REIT

Type of Document:
Final Report

Project Number:
FRE-23015229-A0

Prepared By:
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Date Submitted:
2024-02-13

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1 Introduction

1.1 Background

The City of Saint John has requested a Traffic Impact Study (TIS) for a proposed McDonald's restaurant at 55 University Avenue in Saint John, NB. The proposed development is scheduled to be in operation in 2025. Therefore, a 6-year horizon period (2030) is utilized to identify any impacts related to the development.

Figure 1 shows the location and initial site plan layout of the development in relation to the surrounding street network and the existing Jean Coutu pharmacy. A larger scale site plan is included in **Appendix 1.**

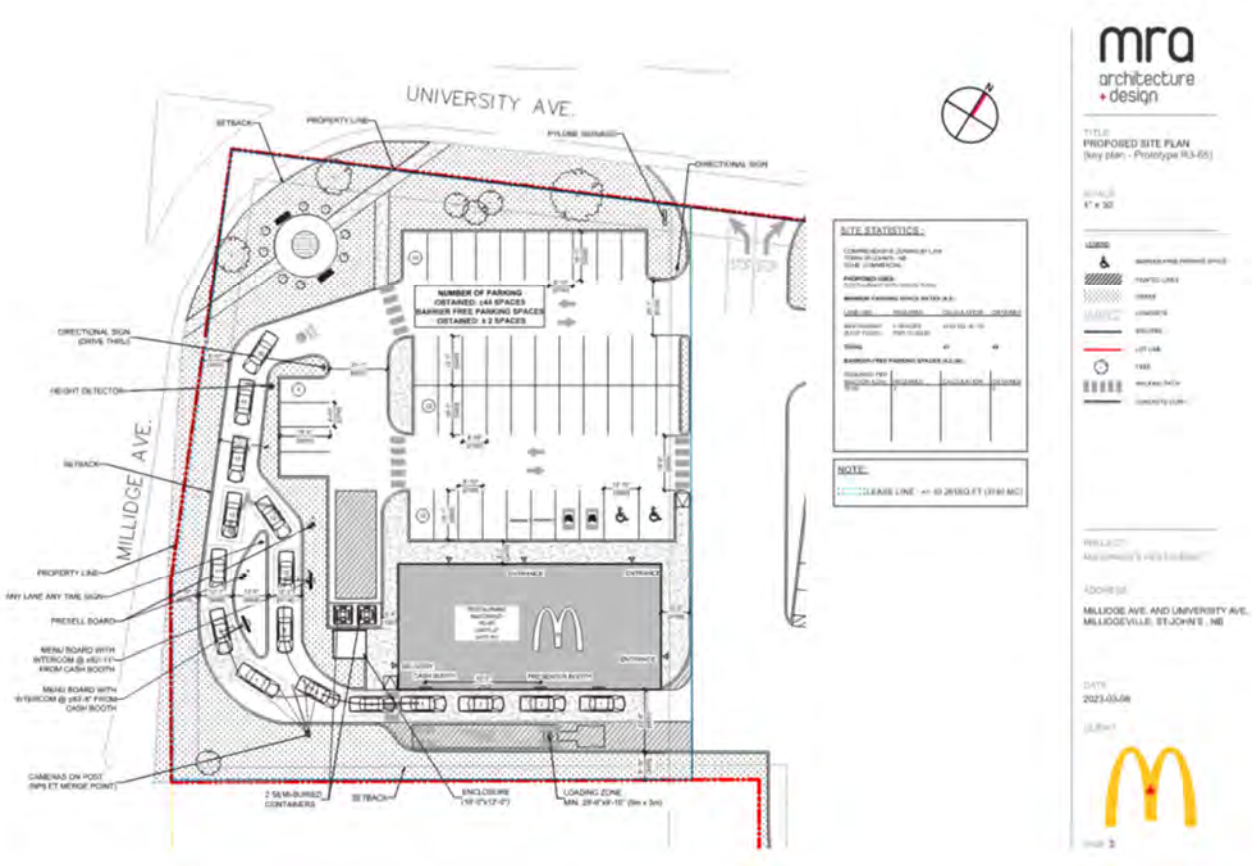


Figure 1: Location and Initial Site Plan of the Proposed Development

1.2 Approach

The objective of this project is to complete a traffic impact study for the proposed development. The work activities summarized in **Table 1** were undertaken to complete the study.

1.3 Study Area and Horizon Year

The Study Area includes the University Avenue/ Millidge Avenue signalized intersection and the existing University Avenue/ Tim Hortons-Jean Coutu Driveway stop control intersection, as well as a potential driveway on Millidge Avenue. The development is projected to be in operation by 2025, therefore a 2030 horizon year was chosen for the analysis.

Table 1: Work Plan

Task Name	Description
Data Collection	• Traffic counts were collected at the University Avenue/Millidge Avenue signalized intersection and the University Avenue/Jean Coutu/Tim Hortons Driveway stop sign-controlled intersection using Miovision camera technology. The counts were completed Wednesday December 6, 2023 for the hours of 0700 to 0900, 1100 to 1300 and 1600 to 1800. The traffic signal phasing and timing characteristics at the signalized intersection were obtained from the City.
Evaluate Existing and Horizon Year Traffic Conditions without Development	• Based on the counts, existing AM and PM peak traffic operational conditions were determined at the two Study Area intersections using Synchro 11 software. The existing traffic conditions for each of the intersection turning movements were expressed in terms of level of service (LOS), average delay per vehicles, volume to capacity ratio (v/c) and queuing on the approaches. Any existing deficiencies were identified. • The existing traffic counts were expanded to represent 2030 traffic volumes without the proposed development in place. The expansion factor utilized was selected following discussions with the City. Traffic operations for 2030 AM and PM peak travel volumes without the development in place, as well as any deficiencies, were determined. This provides the basis for determining any traffic impacts associated with the proposed development.
Evaluate Traffic Conditions with the Proposed Development	• An estimate of the trips that can be expected to be generated by the proposed development for the AM and PM peak travel periods were completed using the Institute of Transportation Engineers trip rates documented in their 11th edition of the Trip Manual. • The generated trips were assigned to the Study Area intersections and the development driveway(s) based on existing travel patterns. The assignment of trips was based on two access scenarios: 1) Access via the existing Jean Coutu driveway, and 2) Access via the existing Jean Coutu driveway and an additional driveway on Millidge Avenue. The City requested an analysis of this scenario. • A level of service analysis was completed for each driveway scenario and the results summarized. Any deficiencies attributable to the development were identified and improvement options selected and evaluated as to their effectiveness. • A left turn lane warrant analysis was completed to determine whether a left turn lane on University Avenue for movements into the existing Jean Coutu driveway is required under either driveway scenario. • The City provided historical collision data in the vicinity of the existing driveway. An evaluation of this collision data was undertaken. **It should be noted that this data were not available at the time this report was prepared.** • Based on the results from the activities above a recommendation was made as to the most appropriate driveway scenario for the development. • A review of the proposed site plan was completed with respect to internal site circulation and queuing at the drive thru and any improvements recommended.
Provide Report	• A draft report was prepared summarizing the results and submitted to the Client for review. • Following comments received a final report was prepared and submitted.

2 Existing 2023 Conditions

2.1 Traffic Volumes

The existing AM and PM peak hour turning movement traffic volumes for the University Avenue/ Millidge Avenue and the University Avenue/ Tim Hortons-Jean Coutu Driveway intersections are summarized in **Figure 2**.

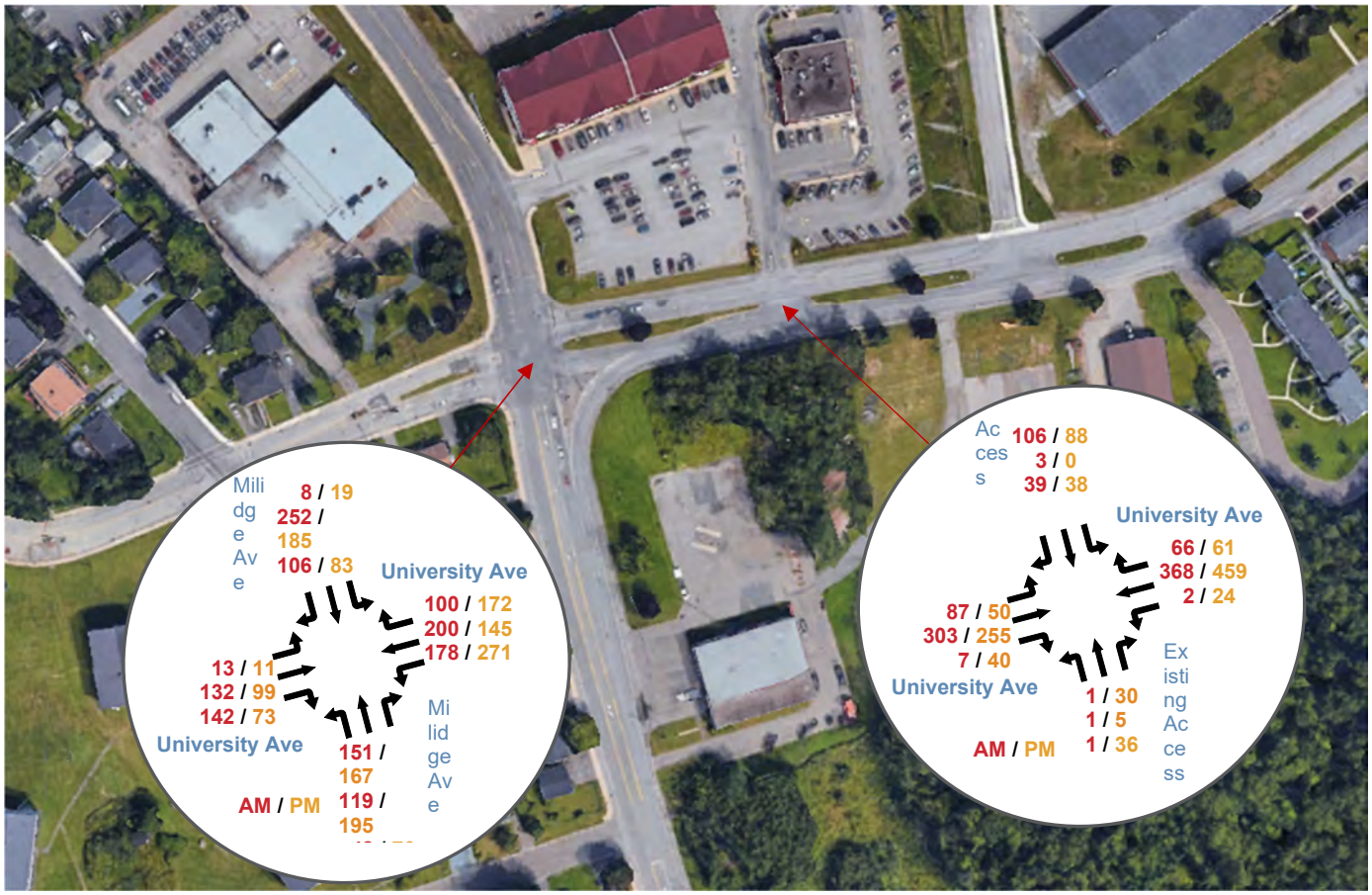


Figure 2: Summary of Existing 2023 Traffic Volumes

2.2 Existing Level of Service

Existing (2023) operational conditions at the University Avenue/ Millidge Avenue and the University Avenue/Tim Hortons-Jean Coutu Driveway intersections were evaluated using Synchro 11 traffic analysis software (based on existing traffic volumes, road configuration, and traffic control). Key operational measures include level of service (LOS), average delay per vehicle in seconds and volume to capacity (v/c) ratios for the various intersection turn movements. Queuing on the approaches is also identified. Standard LOS criteria for both signalized and stop sign-controlled intersections are shown in **Table 2**.

It is noted that the v/c ratio at signalized intersections is typically considered "acceptable" if it is at or below 0.85 for through movements and 0.90 for exclusive turning movements.

Table 2: Level of Service Criteria for Intersections

LOS	Signalized Intersections Control Delay (sec/veh)	LOS Description	Stop Controlled Intersections Control Delay (sec/veh)
A	less than 10.0	Very low delay; most vehicles do not stop **(Excellent)**	less than 10.0
B	between 10.0 and 20.0	Higher delay; more vehicles stop **(Very Good)**	between 10.0 and 15.0
C	between 20.0 and 35.0	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping **(Good)**	between 15.0 and 25.0
D	between 35.0 and 55.0	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop **(Satisfactory)**	between 25.0 and 35.0
E	between 55.0 and 80.0	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay **(Marginal)**	between 35.0 and 50.0
F	greater than 80.0	Considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection **(Unacceptable)**	greater than 50.0

Table 3 summarizes the existing (2023) AM and PM peak hour levels of service for the various turn movements at the University Avenue/ Milidge Avenue and the University Avenue/ Tim Hortons-Jean Coutu Driveway intersections. The Synchro outputs are included in **Appendix 2**.

Table 3: Operational Analysis Results under Existing 2023 Conditions

Scenario	Intersection	Traffic Control	Peak Hour	Overall LOS & Delay (sec/veh)	Criteria	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
						University Avenue			*University Avenue*			*Millidge Avenue*			*Millidge Avenue*		
Existing	1. University/ Millidge		AM	32.2 C	V/C		0.39	0.33	0.47	0.51		0.18	0.20	0.14	0.39	0.65	
					Delay (s/veh)	*Shared*	44.6	*8*	33	33.1	*Shared*	28.7	29.9	0.9	45.3	51.3	*Shared*
					LOS		D	A	C	C		C	C	A	D	D	
					Queue (m)		53	17	53	87		18	37	5	42	93.0	
			PM	32.2 C	V/C		0.30	0.18	0.66	0.54		0.24	0.33	0.27	0.34	0.53	
					Delay (s/veh)	*Shared*	42.8	*3.5*	39.5	30.7	*Shared*	29.5	22.1	5.1	45.3	47.4	*Shared*
					LOS		D	A	D	C		C	C	A	D	D	
					Queue (m)		42	6	81	86		26	59	15	35	73	
						University Avenue			*University Avenue*			*Jean Coutu*			*Tim Hortons*		
Existing	2. University/ Jean Coutu-Tim Hortons		AM	3.5 A	V/C	0.09	0.00		0.01	0.00		0.01	0.01			0.37	
					Delay (s/veh)	8.6	0	*Shared*	8	0	*Shared*	19.2	15.8	*Shared*	*Shared*	18.1	*Shared*
					LOS	A	A		A	A		C	C			C	
					Queue (m)	6	0		0	0		0	0			12.0	
			PM	4.0 A	V/C	0.05	0.00		0.02	0.00		0.14	0.07			0.36	
					Delay (s/veh)	8.8	0	*Shared*	8	0.1	*Shared*	20.4	12	*Shared*	*Shared*	19.8	*Shared*
					LOS	A	A		A	A		C	B			C	
					Queue (m)	6	0		0	0		6	6			12	

95th percentile volume exceeds capacity, queue may be longer

The results of the traffic operations show that, under **existing conditions**, the University Avenue/ Milidge Avenue intersection is operating at an overall good LOS C during both peak periods, while the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection is operating at an overall excellent LOS A during both peak periods. All individual movements for these intersections are operating at satisfactory LOS D or better with v/c ratios of 0.65 or less.

It is noted that the 95th percentile queue lengths are generally acceptable for all approaches except the westbound approach at the University Avenue/Millidge Avenue intersection. An 87 m (AM) and 86 m (PM) queue length on this westbound approach results in the queue at times extending back from Millidge Avenue past the University Avenue/Tim Hortons-Jean Coutu Driveway intersection. This impacts traffic circulation in this area to some extent.

In summary, both Study Area intersections are operating efficiently. However, an 87 m (AM) and 86 (PM) 95th percentile queue length on the University Avenue/Millidge Avenue intersection westbound approach results in the queue at times extending past the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection.

3 Horizon Year (2030) Traffic Conditions without Development

3.1 2030 Traffic Volumes without Development

To reflect horizon year 2030 travel conditions without development, the 2023 AM and PM peak hour volumes along University Avenue and Millidge Avenue were expanded at a 1 percent/annum rate for the Study Area intersections. The projected 2030 volumes without development are summarized in **Figure 3**.

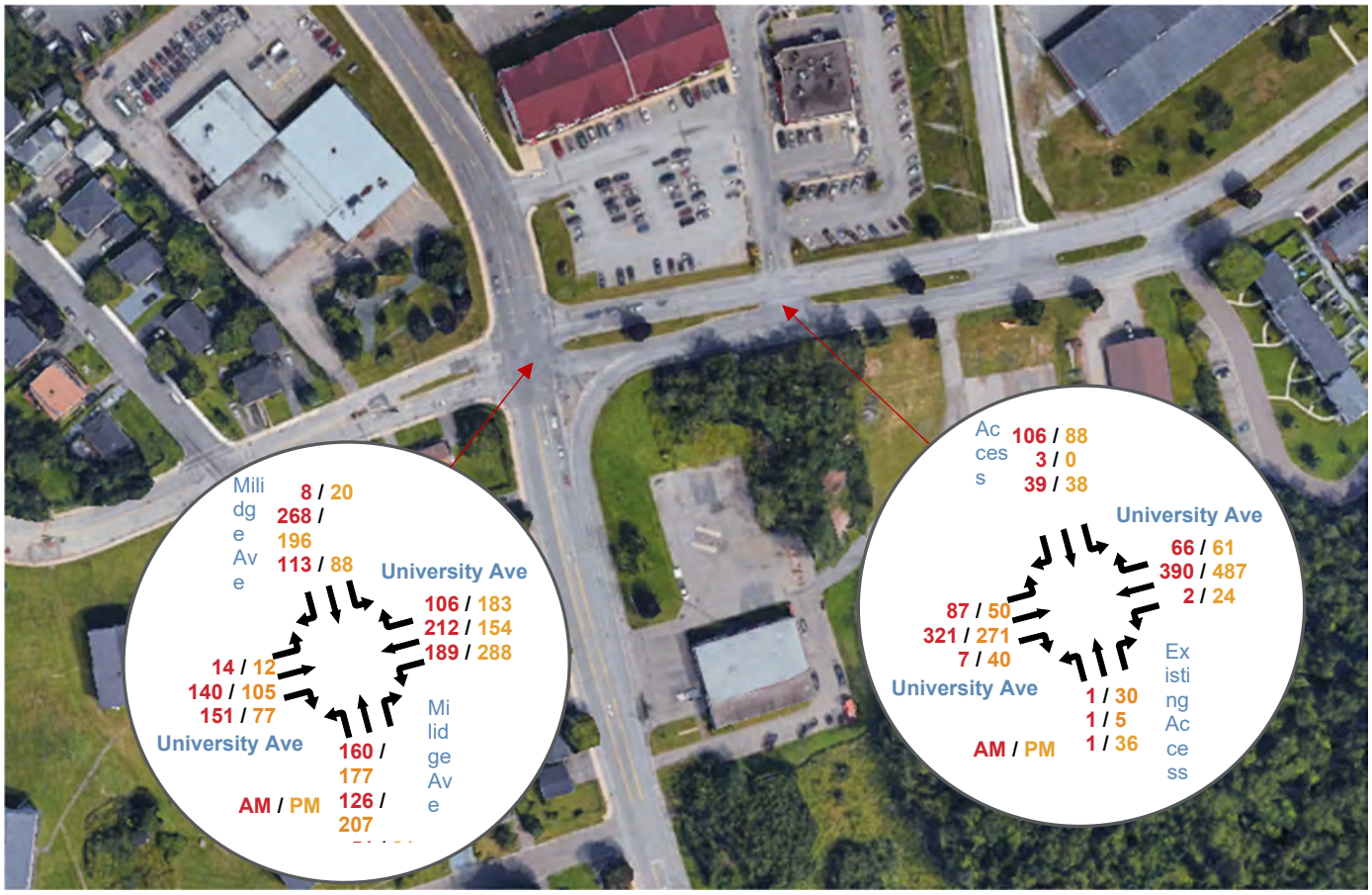


Figure 3: Summary of Future 2030 Traffic Volumes without Development

3.2 2030 Level of Service without Development

Table 4 summarizes the future (2030) without development AM and PM peak hour levels of service for the various turn movements at the University Avenue/ Milidge Avenue and the University Avenue/ Tim Hortons-Jean Coutu Driveway intersections. The Synchro outputs are included in **Appendix 3**.

The results of the traffic operations show that, under **future (2030) conditions without development**, both intersections are projected to operate similarly to existing (2023) conditions. The 95th percentile queue lengths for the University Avenue westbound approach to Millidge Avenue are projected to increase to 93 m in both peak periods, which continues to extend at times beyond the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection.

Table 4: Operational Analysis Results under Future 2023 Conditions without Development

Scenario	Intersection	Traffic Control	Peak Hour	Overall LOS & Delay (sec/veh)	Criteria	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
						University Avenue			*University Avenue*			*Millidge Avenue*			*Millidge Avenue*		
Future 2030 wo Development	1. University/ Millidge		AM	33.4 C	V/C		0.41	0.34	0.50	0.54		0.20	0.21	0.27	0.42	0.69	
					Delay (s/veh)	*Shared*	45.2	*8*	34	34	*Shared*	29	30.1	5.2	46.2	53.1	*Shared*
					LOS		D	A	C	C		C	C	A	D	D	
					Queue (m)		56	17	56	93		18	39	15	45	99	
			PM	33.3 C	V/C		0.32	0.19	0.71	0.57		0.27	0.35	0.28	0.37	0.56	
					Delay (s/veh)	*Shared*	43.2	*4.1*	42.3	31.9	*Shared*	29.2	32.5	5	46	48.4	*Shared*
					LOS		D	A	D	C		C	C	A	D	D	
					Queue (m)		44	7	86	93		27	62	16	37	77	
						University Avenue			*University Avenue*			*Jean Coutu*			*Tim Hortons*		
Existing	2. University/ Jean Coutu-Tim Hortons	STOP	AM	3.6 A	V/C	0.09	0.00		0.01	0.00		0.01	0.01			0.39	
					Delay (s/veh)	8.7	0	*Shared*	8	0	*Shared*	20.1	16.3	*Shared*	*Shared*	*19.2*	*Shared*
					LOS	A	A		A	A		C	C			*C*	
					Queue (m)	6	0		0	0		0	0			*6*	
			PM	4.0 A	V/C	0.06	0.00		0.02	0.00		0.15	0.07			0.39	
					Delay (s/veh)	8.9	0	*Shared*	8	0	*Shared*	21.5	12.4	*Shared*	*Shared*	21.4	*Shared*
					LOS	A	A		A	A		C	B			C	
					Queue (m)	6	0		6	0		6	5			11	

95th percentile volume exceeds capacity, queue may be longer

All individual movements at the University Avenue/Tim Hortons-Jean Coutu Driveway intersection are projected to operate at satisfactory LOS C or better with v/c ratios of 0.39 or less. The 95th percentile queue lengths are acceptable and do not exceed available turning storage lengths on any approach.

In summary, both intersections operate similarly to existing (2023) conditions, but with slight decreases in operability. In addition, the 95th percentile queue lengths on the University Avenue westbound approach to Millidge Avenue are projected to increase to 93 m in both peak periods, which continues to extend at times past the University Avenue/ Development Access Road intersection.

4 Trip Generation and Assignment

4.1 Trip Generation

Generally, when estimating the amount of traffic that will be generated by a new development, the Institute of Transportation Engineers (ITE) trip rates are utilized. ITE has developed trip rates for various types of developments based on the development characteristics such as floor area, number of employees, lot size and/or number of units. ITE has published their trip rates for various developments in a document entitled "Trip Generation". The 11th edition has been utilized to estimate the trips to and from the proposed development.

The 11th edition has various residential land uses and the closest use to a McDonald's development is a fast-food restaurant with drive-thru. **Table 5** summarizes the estimated trips that would be generated by the proposed development for both the AM and PM peak hour travel periods. It is estimated the development will generate 197 trips to and from the development in the AM peak and 146 in the PM peak.

Table 5: Trip Generation for the New Development

Lot Classification	ITE Land Use Code	Unit	Size	Land Use Description	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Services	934	Square Footage	4400	Fast-Food Restaurant with Drive-Through	100	97	197	76	70	146

* Pass-by Trips are calculated based on Commercial Development Trips

4.2 Trip Assignment

The generated trips have been assigned to the Study Area streets and intersections for each of the two driveway scenarios based on existing traffic distribution on University Avenue and Millidge Avenue during the peak travel periods. It should be noted that fast food stores generally are comprised of new trips and pass-by trips, with pass-by trips comprising 50 percent of the total trips. This means that 50 percent of the trips make an intermediate stop at the fast food development as part of an overall trip and are not new to the surrounding streets. However, the total trips shown in **Table 5** are assigned to the development driveway(s).

Scenario 1-Existing Driveway Only

Figure 4 shows the trips generated at the University Avenue/ Milidge Avenue and the University Avenue/ Tim Hortons-Jean Coutu Driveway intersections during the AM and PM peak periods for **Scenario 1 – Existing Driveway only**. **Figure 5** illustrates the total AM and PM traffic volumes at the Study Area intersections with the development in place for the 2030 horizon year.

Scenario 2-Existing Driveway and Millidge Avenue Driveway

With this scenario (**Scenario 2-Millidge Avenue Driveway and Existing Driveway**) the distribution of the generated trips at the Study Area intersections (including the driveways) is shown in **Figure 6. Figure 7** summarizes the 2030 total trips for the AM and PM peak travel periods with the development in place.

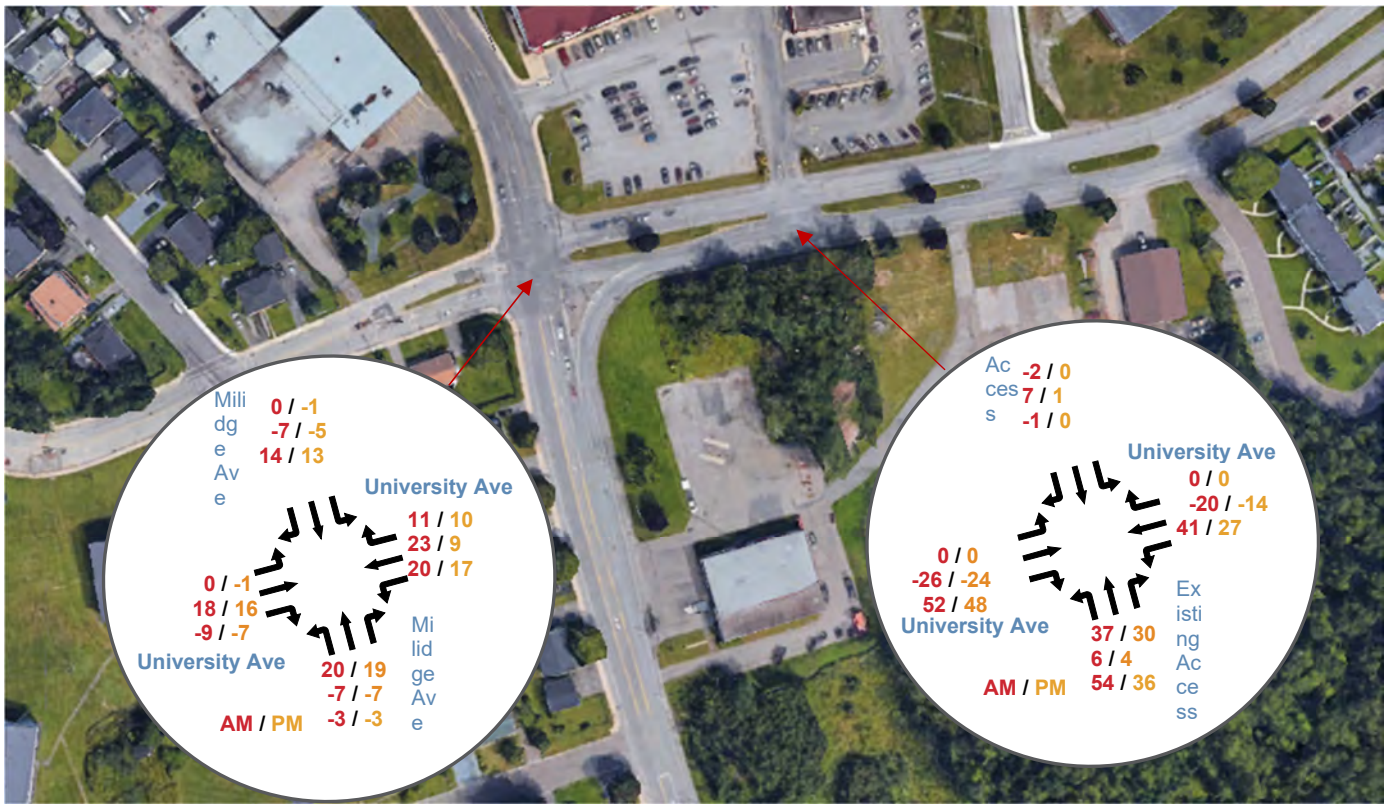


Figure 4: Trip Assignment-Scenario 1

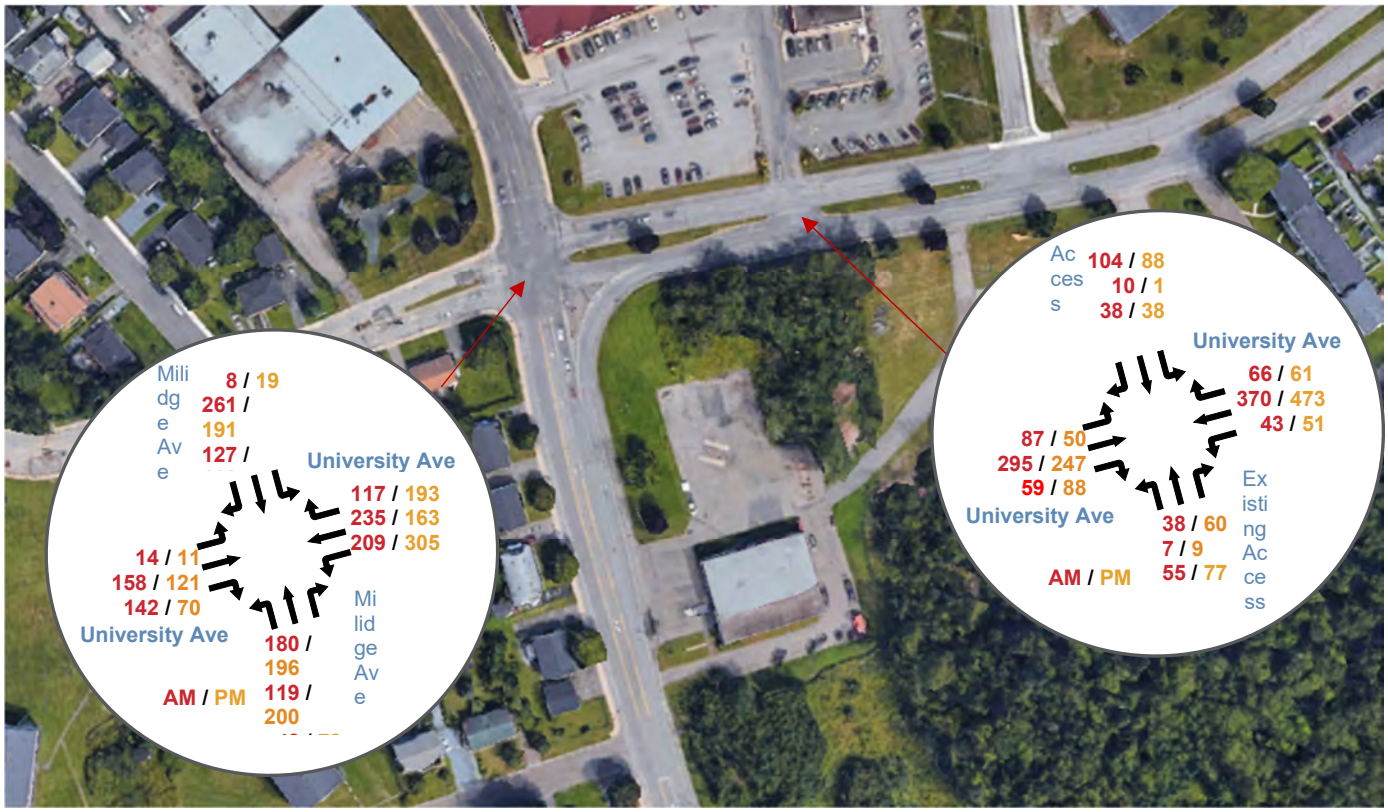


Figure 5: Summary of Future 2030 Traffic Volumes with Development-Scenario 1

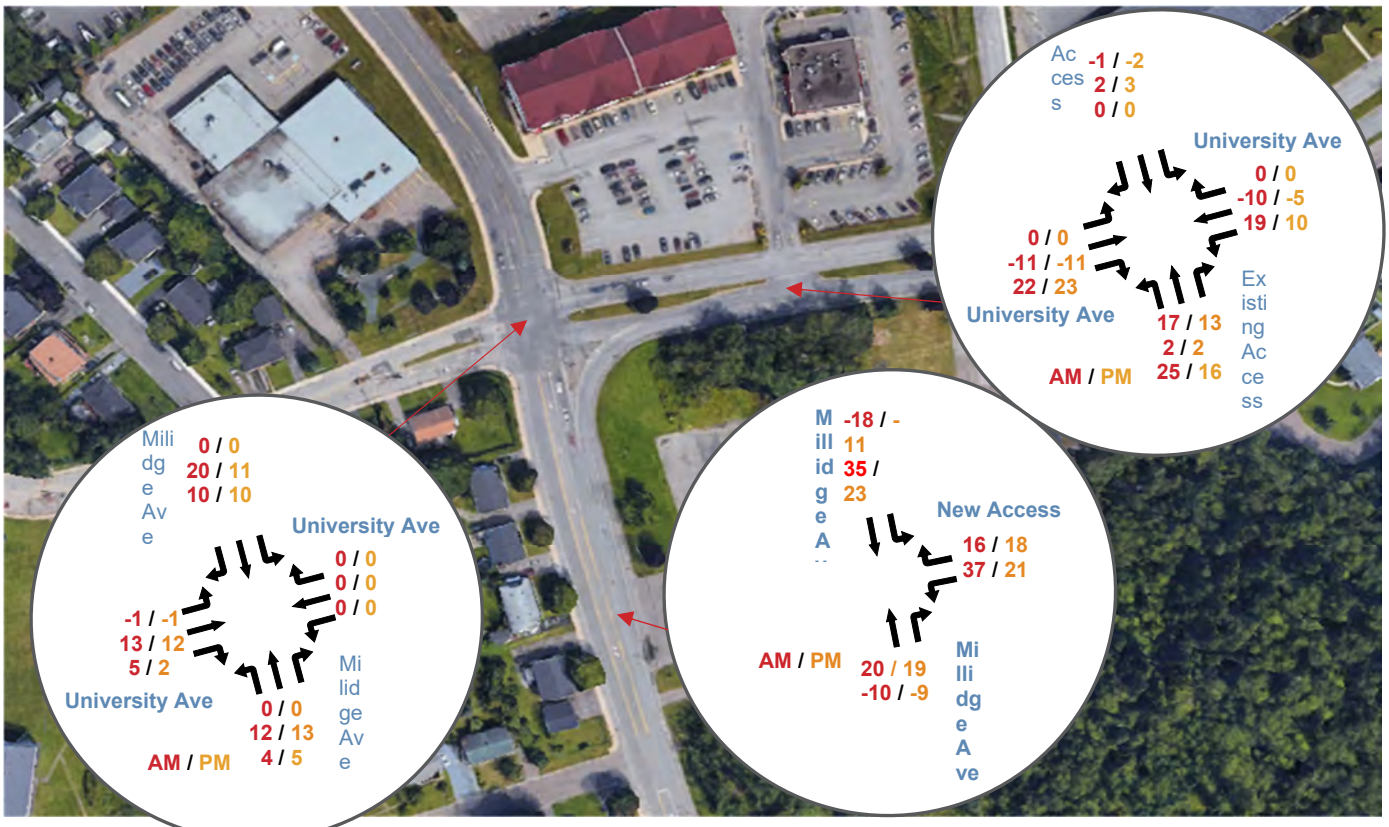


Figure 6: Trip Assignment-Scenario 2

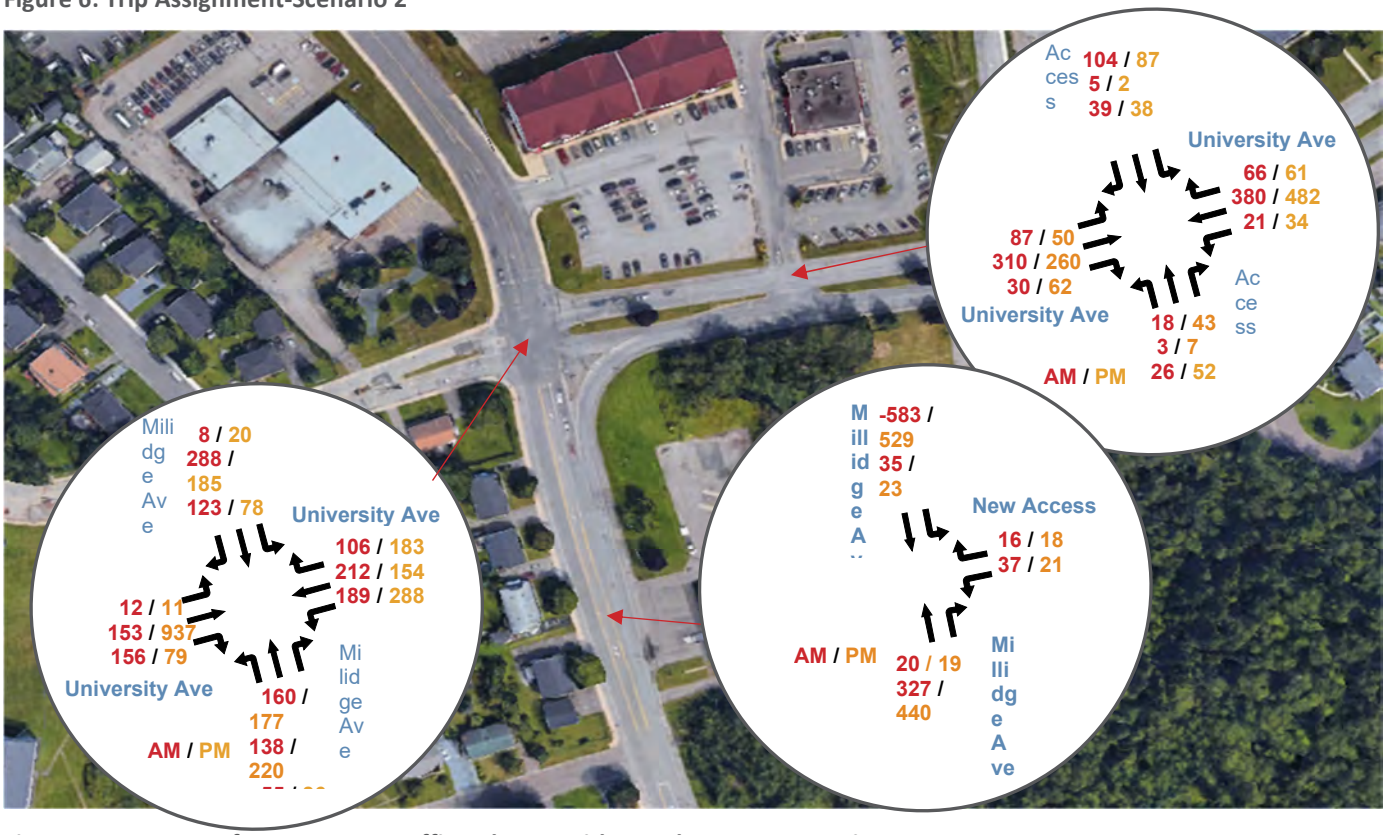


Figure 7: Summary of Future 2030 Traffic Volumes with Development-Scenario 2

5 Horizon Year (2030) Traffic Conditions without Development

5.1 2030 Level of Service with Development-Scenario 1

Table 6 summarizes the future (2030) with development AM and PM peak hour levels of service for the various turn movements at the University Avenue/ Milidge Avenue intersection and the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection. These results are for **Scenario 1**, which reflects the use of the existing Jean Coutu driveway only for the proposed development. The Synchro outputs are included in **Appendix 4**.

Table 6: Operational Analysis Results under Future 2030 Conditions with Development-Scenario 1

Scenario	Intersection	Traffic Control	Peak Hour	Overall LOS & Delay (sec/veh)	Criteria	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
						University Avenue			*University Avenue*			*Millidge Avenue*			*Millidge Avenue*		
Future 2030 with Development	1. University/ Millidge		AM	34.1 C	V/C		0.47	0.33	0.59	0.60		0.19	0.30	0.38	0.33	0.67	
					Delay (s/veh)	*Shared*	46.5	*8*	36.6	35.9	*Shared*	28.9	41.8	7.6	31.1	52.3	*Shared*
					LOS		D	A	D	D		C	D	A	C	D	
					Queue (m)		63	17	62	105		18	44	19	39	97	
			PM	34.5 C	V/C		0.36	0.17	0.78	0.60		0.25	0.34	0.31	0.43	0.55	
					Delay (s/veh)	*Shared*	44	*4*	47.1	33.1	*Shared*	29.7	32.2	4.9	47.7	47.8	*Shared*
					LOS		D	A	D	C		C	C	A	D	D	
					Queue (m)		50	7	#99	100		26	60	16	43	76	
						University Avenue			*University Avenue*			*Jean Coutu*			*Tim Hortons*		
Future 2030 with Development	2. University/ Jean Coutu-Tim Hortons		AM	6.3 A	V/C	0.09	0.00		0.04	0.00		0.31	0.10			0.49	
					Delay (s/veh)	8.6	0	*Shared*	8.2	0.2	*Shared*	31.2	13.4	*Shared*	*Shared*	25.8	*Shared*
					LOS	A	A		A	A		D	B			D	
					Queue (m)	6	0		6	0		12	6			18.0	
			PM	7.3 A	V/C	0.06	0.00		0.06	0.00		0.47	0.19			0.51	
					Delay (s/veh)	8.9	0	*Shared*	8.3	0.3	*Shared*	37.9	14.2	*Shared*	*Shared*	31.7	*Shared*
					LOS	A	A		A	A		E	B			D	
					Queue (m)	6	0		6	0		18	6			18	

95th percentile volume exceeds capacity, queue may be longer

At the University Avenue/ Milidge Avenue intersection, both peak periods are projected to continue to operate at an overall good LOS C, with all individual turning movements operating at LOS D or better with v/c ratios of 0.78 or less. The 95th percentile queue lengths for the westbound approach (105 m in the AM and 100 m in the PM) are projected to extend beyond the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection at times. The operational conditions at this intersection are similar to conditions without development.

Most individual movements at the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection are projected to operate at satisfactory LOS D or better with v/c ratios of 0.51 or better, indicating there is sufficient capacity. The exception is the northbound left approach (Jean Coutu exit) with an acceptable LOS E and a v/c ratio of 0.47 in the PM peak travel period. The 95th percentile queue lengths are projected to be acceptable and do not exceed available turning storage lengths on any approach.

In summary, at the University Avenue/ Milidge Avenue intersection, both peak periods are projected to continue to operate at an overall good LOS C, with all individual turning movements operating at LOS D or better. The westbound through movement 95th percentile queue extends beyond the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection at times. These operational characteristics are similar to those without development.

The northbound left turn movement at the Jean Coutu driveway is projected to operate at an acceptable LOS E with average delays per vehicles of 38 seconds and a v/s ratio of 0.47, indicating sufficient capacity to meet demand.

5.2 2030 Level of Service with Development-Scenario 2

Scenario 2 reflects the addition of a full movement driveway on Millidge Avenue to/from the proposed development. The existing Jean Coutu Driveway would also be available for the proposed development.

Table 7 summarizes the operational results for the future (2030) with development AM and PM travel conditions with both driveways in place. The analysis includes the University Avenue/Millidge Avenue signalized intersection and the two stop sign controlled intersections available to the proposed development. The Synchro outputs are included in **Appendix 5**.

Table 7: Operational Analysis Results under Future 2030 Conditions with Development–Scenario 2

Scenario	Intersection	Traffic Control	Peak Hour	Overall LOS & Delay (sec/veh)	Criteria	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
						University Avenue			*University Avenue*			*Millidge Avenue*			*Millidge Avenue*		
Future 2030 with Development	1. University/ Millidge		AM	33.7 C	V/C		0.44	0.35	0.52	0.54		0.22	0.23	0.27	0.47	0.69	
					Delay (s/veh)	*Shared*	45.8	*8*	34.4	34	*Shared*	29.3	30.4	5.2	47.6	53.1	*Shared*
					LOS		D	A	C	C		C	C	A	D	D	
					Queue (m)		60	18	57	93		20	43	15	49	99	
			PM	33.8 C	V/C		0.35	0.20	0.73	0.57		0.28	0.37	0.28	0.42	0.56	
					Delay (s/veh)	*Shared*	43.7	*5.7*	43.3	31.9	*Shared*	30.2	32.9	5	47.5	48.4	*Shared*
					LOS		D	A	D	C		C	D	A	D	D	
					Queue (m)		48	9	87	94		28	66	16	41	77	
						University Avenue			*University Avenue*			*Jean Coutu*			*Tim Hortons*		
Future 2030 with Development	2. University/ Jean Coutu-Tim Hortons	STOP	AM	4.7 A	V/C	0.09	0.00		0.02	0.00		0.13	0.05			0.44	
					Delay (s/veh)	8.7	0	*Shared*	8.1	0.1	*Shared*	24.3	12.5	*Shared*	*Shared*	21.9	*Shared*
					LOS	A	A		A	A		C	B			C	
					Queue (m)	6	0		6	0		6	6			12.0	
			PM	5.0 A	V/C	0.06	0.00		0.03	0.00		0.24	0.11			0.43	
					Delay (s/veh)	8.9	0	*Shared*	8.1	0.2	*Shared*	24.9	12.8	*Shared*	*Shared*	24.4	*Shared*
					LOS	A	A		A	A		D	B			C	
					Queue (m)	6	0		6	0		6	6			12	
									McDonalds Driveway			*Millidge Avenue*			*Millidge Avenue*		
Future 2030 with Development	3. Milidge/ New Access	STOP	AM	1.4 A	V/C				0.19		0.02				0.03	0.00	
					Delay (s/veh)				26.2		9.6		*Free*	*Shared*	8.2	0	
					LOS				D		A		*Flow*		A	A	
					Queue (m)				6		6				6	0	
			PM	0.9 A	V/C				0.12		0.03				0.02	0.00	
					Delay (s/veh)				26.4		10.1		*Free*	*Shared*	8.6	0	
					LOS				D		B		*Flow*		A	A	
					Queue (m)				6		6				6	0	

m Volume for 95th percentile queue is metered by upstream signal

At the University Avenue/ Milidge Avenue intersection, both peak periods are projected to operate at an overall good LOS C, with all individual movements operating at a satisfactory LOS D or better with v/c ratios of 0.69 or less. The 95th percentile queue length for the westbound approach to Millidge Avenue is projected to extend beyond the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection with queue lengths in the AM and PM peak periods of 93 and 94 m, respectively.

All individual movements at the University Avenue/Tim Hortons-Jean Coutu Driveway intersection are projected to operate at satisfactory LOS D or better with v/c ratios of 0.44 or less, indicating there is sufficient capacity. The 95th percentile queue lengths are projected to be acceptable and do not exceed available turning storage lengths on any approach.

All individual movements at the Milidge Avenue/ Development Access Road intersection are projected to operate at satisfactory LOS D or better with v/c ratios of 0.19 or less, indicating there is sufficient capacity. The 95th percentile queue lengths are projected to be acceptable and do not exceed available turning storage lengths on any approach.

In summary, the Study Area intersections are projected to operate at good levels of service with no significant delays. These operational conditions are slightly better than those projected for Scenario 1.

5.3 Potential Improvement

The University Avenue/Millidge Avenue intersection is currently operating at an overall LOS C during both peak travel periods and is projected to continue to operate efficiently in 2030 without or with the proposed development in place. However, the University Avenue westbound approach to Millidge Avenue is projected to experience a 95th percentile queue between 93 and 105 metres.

One option to reduce this queue is to optimize the phasing and timing signal plan at the University Avenue/Millidge Avenue intersection. Currently there is a dedicated pedestrian phase (scramble walk) in place which stops traffic on all approaches for 28 seconds for each cycle while pedestrians are permitted to cross the intersection in all directions. There are currently 20 pedestrians in the AM peak and 11 in the PM peak.

This also impacts the overall operation at the intersection. If the dedicated pedestrian phase is removed and integrated into the overall phasing and timing plan, the westbound queue would be reduced by approximately 25 metres or more during peak travel periods. **It is recommended the City consider changing the dedicated pedestrian phase to improve overall intersection efficiency and reduce queuing on the approaches.**

6 Left Turn Lane Requirements

The City of Sait John requested that a left turn lane warrant analysis be completed for left turns from University Avenue to the existing Jean Coutu driveway **(Scenario 1)**. In addition, an analysis was completed for left turns from Millidge Avenue to a new driveway to the proposed McDonald's development **(Scenario 2)**.

The Ontario methodology for left turn lane warrants has been utilized in this study. The methodology is based on a set of nomographs for various variables. As input the methodology requires the design speed, the percent of left turns in the advancing volume, the advancing volume and the opposing volume for the AM and PM peak travel periods.

For two lane roads the variables used in the analysis include the design speed, advancing volume, the percent left turns and the opposing volume. This is applicable for Millidge Avenue. For divided roads, the variables used are opposing volume and left turns. This is applicable for University Avenue.

Table 8 summarizes the various values and results for **Scenario 1** and **Scenario 2** under 2030 traffic conditions with development.

Table 8: Left Turn Lane Warrant Analysis (2030 Traffic Conditions with Development)

Peak Period	Advancing Volume (vph)	Left Turns (vph)	% Left Turns	Opposing Volume (vph)	Warranted?	Storage Length (metres)
Scenario 1 - Existing Jean Coutu Driveway Only-University Avenue						
AM	479	43	9	441	Yes	15
PM	613	61	10	418	yes	15
Scenario 2 - Driveway on Millidge Avenue + Existing Driveway						
a) Millidge Avenue						
AM	613	23	4	373	yes	15
PM	563	35	6	502	yes	15
b) University Avenue						
AM	472	21	5	432	No	N/A
PM	582	35	6	378	No	N/A

Under Scenario 1 traffic conditions with only the existing driveway available for access to the proposed development, a left turn lane is warranted on University Avenue. The storage length required is 15 m plus taper. Under Scenario2 with both a driveway on Millidge Avenue and the existing Jean Coutu driveway, a left turn lane is warranted on Millidge Avenue (15 m plus taper), but not on University Avenue.

Currently on Millidge Avenue adjacent to a potential driveway to the proposed development, there is a two-way, left turn lane (TWLTL). This could remain as is to accommodate left turns into the development or a short dedicated left turn lane with taper could be provided.

7 Site Plan Review

Figure 1 shows the initial site plan for the proposed development while **Appendix 1** provides a larger scale drawing. It should be noted that this site plan represents **Scenario 1-existing driveway only**. At this time there is no site plan for **Scenario 2- driveway on Millidge Ave plus existing driveway**. However, if a second access is provided on Millidge Avenue, this would impact both the number of available parking spaces, available queue lengths at the drive-thru and site circulation.

The site plan shows 46 parking spaces, including 2 barrier free spaces and 4 reserved spaces for customer pick-up. The Saint John Zoning By-Law requires 41 spaces be provided, so this requirement is met. The dimensions of the parking spaces and aisle widths also meet the by-law requirements.

The site plan shows that the drive-thru will have two order locations, 14 inbound queue spaces and 1 outbound space. This also meets the zoning by-law requirements. It should be noted there is a significant distance from the last queue space shown on the site plan to the driveway entrance. It is unlikely the drive-thru queue would extend back to the driveway entrance and impact traffic flow on University Avenue.

Appendix 1 shows the turning movement requirements of the various design vehicles to, from and withing the site. It appears the design vehicles can be accommodated on site.

If a second driveway is to be provided, a review will also be undertaken of the site plan.

8 Comparison of Driveway Scenarios

Section 5 summarized the operational characteristics of the two driveway scenarios to accommodate the proposed development, while **Section 6** summarized the left turn lane requirements. The following comparisons are made based on the analysis.

1. **Scenario 2** results in slightly better operational conditions at the University Avenue/Millidge Avenue intersection than **Scenario 1**. The overall delay at the intersection is reduced by less than 1 second. Individual turn movements are very similar.
2. The northbound left turn movement from the Jean Coutu driveway for the PM peak is improved to a satisfactory LOS D with **Scenario 2,** versus an acceptable LOS E with **Scenario 1.** This results in a 13 second reduction in delay per for vehicles making this movement. However, this additional delay would be experienced by vehicles on site and would not impact traffic circulation significantly on University Avenue or Millidge Avenue.
3. Movements from the Tim Hortons driveway are improved to LOS C from LOS D during both the AM and PM peak travel periods under **Scenario 2.**
4. With **Scenario 1** a separate left turn lane on University Avenue for turns into the Jean Coutu driveway is warranted. Under **Scenario 2** a left turn lane is warranted on Millidge Avenue but not on University Avenue.
5. If a second access is provided on Millidge Avenue, this would impact both the number of available parking spaces, available queue lengths at the drive-thru and site circulation without additional property.

Based on the above summary it is recommended that Scenario 1 be implemented for the proposed development. Although slightly better operational characteristics would be experienced with Scenario 2, the impact on the site layout and circulation would be significant without additional property. It is also recommended that a 15 metre plus taper separate left turn lane on University Avenue be constructed for vehicles turning left into the site.

9 Summary of Findings

It should be noted that the analysis of traffic operations with the development in place was based on two scenarios:

1) Access via the existing Jean Coutu driveway, and
2) Access via the existing Jean Coutu driveway and an additional full turning movement driveway on Millidge Avenue. The City requested an analysis of this scenario.

9.1 Existing 2023 Conditions

Both Study Area intersections (University Avenue/Millidge Avenue and University Avenue/Tim Hortons-Jean Coutu) are operating efficiently with overall levels of service C or better. Individual turn movements are operating at LOS D or better. However, an 87 m (AM) and 86 (PM) 95th percentile queue length on the University Avenue/Millidge Avenue intersection westbound approach results in the queue at times extending past the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection.

9.2 Future 2030 Conditions without Development

Under future 2030 conditions without development, both intersections operate similarly to existing (2023) conditions, but with slight decreases in operability. The 95th percentile queue length has also increased to 93 m in both peak travel periods, which at times continues to extend past the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection.

9.3 Trip Generation and Assignment

The 11th edition has various residential land uses and the closest use to a McDonald's development is a fast-food restaurant with drive-thru. It is estimated the development will generate 197 trips to and from the development in the AM peak and 146 in the PM peak.

The generated trips have been assigned to the Study Area streets and intersections for each of the two driveway scenarios based on existing traffic distribution on University Avenue and Millidge Avenue during the peak travel periods. It should be noted that fast food stores generally are comprised of new trips and pass-by trips, with pass-by trips comprising 50 percent of the total trips. This means that 50 percent of the trips make an intermediate stop at the fast food development as part of an overall trip and are not new to the surrounding streets.

Scenario 1-Existing Driveway Only

Figure 4 shows the trips generated at the University Avenue/ Milidge Avenue and the University Avenue/ Tim Hortons-Jean Coutu Driveway intersections during the AM and PM peak periods for **Scenario 1 – Existing Driveway only**. **Figure 5** illustrates the total AM and PM traffic volumes at the Study Area intersections with the development in place for the 2030 horizon year.

Scenario 2-Existing Driveway and Millidge Avenue Driveway

With this scenario (**Scenario 2-Millidge Avenue Driveway and Existing Driveway**) the distribution of the generated trips at the Study Area intersections (including the driveways) is shown in **Figure 6. Figure 7** summarizes the 2030 total trips for the AM and PM peak travel periods with the development in place.

It is recommended the City consider changing the dedicated pedestrian phase to improve overall intersection efficiency and reduce queuing on the approaches.

9.4 Horizon Year 2030 Conditions with Development

Scenario 1-Existing Jean Coutu Driveway

At the University Avenue/ Millidge Avenue intersection, both peak periods are projected to continue to operate at an overall good LOS C, with all individual turning movements operating at LOS D or better. The westbound through movement 95th percentile queue extends beyond the University Avenue/ Tim Hortons-Jean Coutu Driveway intersection at times. **These operational characteristics are similar to those without development.**

The northbound left turn movement at the Jean Coutu driveway is projected to operate at an acceptable LOS E with average delays per vehicles of 38 seconds and a v/c ratio of 0.47.

Scenario 2-Existing Driveway Plus a Driveway on Millidge Avenue

The Study Area intersections are projected to operate at good levels of service with no significant delays. These operational conditions are slightly better than those projected for **Scenario 1.**

9.5 Left Turn Lane Requirements

The Ontario methodology for left turn lane warrants has been utilized in this study. The methodology is based on a set of nomographs for various variables. As input the methodology requires the design speed, the percent of left turns in the advancing volume, the advancing volume and the opposing volume for the AM and PM peak travel periods.

Under Scenario 1 traffic conditions with only the existing driveway available for access to the proposed development, a left turn lane is warranted on University Avenue. The storage length required is 15 m plus taper. Under Scenario2 with both a driveway on Millidge Avenue and the existing Jean Coutu driveway, a left turn lane is warranted on Millidge Avenue (15 m plus taper), but not on University Avenue.

Currently on Millidge Avenue adjacent to a potential driveway to the proposed development, there is a two-way, left turn lane (TWLTL). This could remain as is to accommodate left turns into the development or a short dedicated left turn lane with taper could be provided.

9.6 Site Plan Review

The proposed site plan shown in **Figure 1** and included in **Appendix 1** is based on access to and from the development via the existing Jean Coutu driveway. If a second driveway is incorporated into the design, this would impact both the number of available parking spaces, available queue lengths at the drive-thru and site circulation.

The proposed site plan meets the Saint John Zoning By-Law requirements for the number of parking spaces, parking space dimensions and available queuing spaces at the drive-thru. Access to, from and within the site appears to be available for the design vehicles.

9.7 Comparison of Driveway Scenarios

Section 5 summarized the operational characteristics of the two driveway scenarios to accommodate the proposed development, while **Section 6** summarized the left turn lane requirements. The following comparisons are made based on the analysis.

3) **Scenario 2** results in slightly better operational conditions at the University Avenue/Millidge Avenue intersection than **Scenario 1**. The overall delay at the intersection is reduced by less than 1 second. Individual turn movements are very similar.
4) The northbound left turn movement from the Jean Coutu driveway for the PM peak is improved to a satisfactory LOS D with **Scenario 2,** versus an acceptable LOS E with **Scenario 1.** This results in a 13 second reduction in delay per for vehicles making this movement. However, this additional delay would

be experienced by vehicles on site and would not impact traffic circulation significantly on University Avenue or Millidge Avenue.

5) Movements from the Tim Hortons driveway are improved to LOS C from LOS D during both the AM and PM peak travel periods under **Scenario 2.**
6) With **Scenario 1** a separate left turn lane on University Avenue for turns into the Jean Coutu driveway is warranted. Under **Scenario 2** a left turn lane is warranted on Millidge Avenue but not on University Avenue.
7) If a second access is provided on Millidge Avenue, this would impact both the number of available parking spaces, available queue lengths at the drive-thru and site circulation.

Based on the above summary it is recommended that Scenario 1 be implemented for the proposed development. Although slightly better operational characteristics would be experienced with Scenario 2, the impact on the site layout and circulation would be significant without additional property. It is also recommended that a 15 metre plus taper separate left turn lane on University Avenue be constructed for vehicles turning left into the site.

Appendix 1 – Site Plan

mra
architecture
+ design

TITLE
PROPOSED SITED PLAN
(aerial plan - Prototype R3-65)

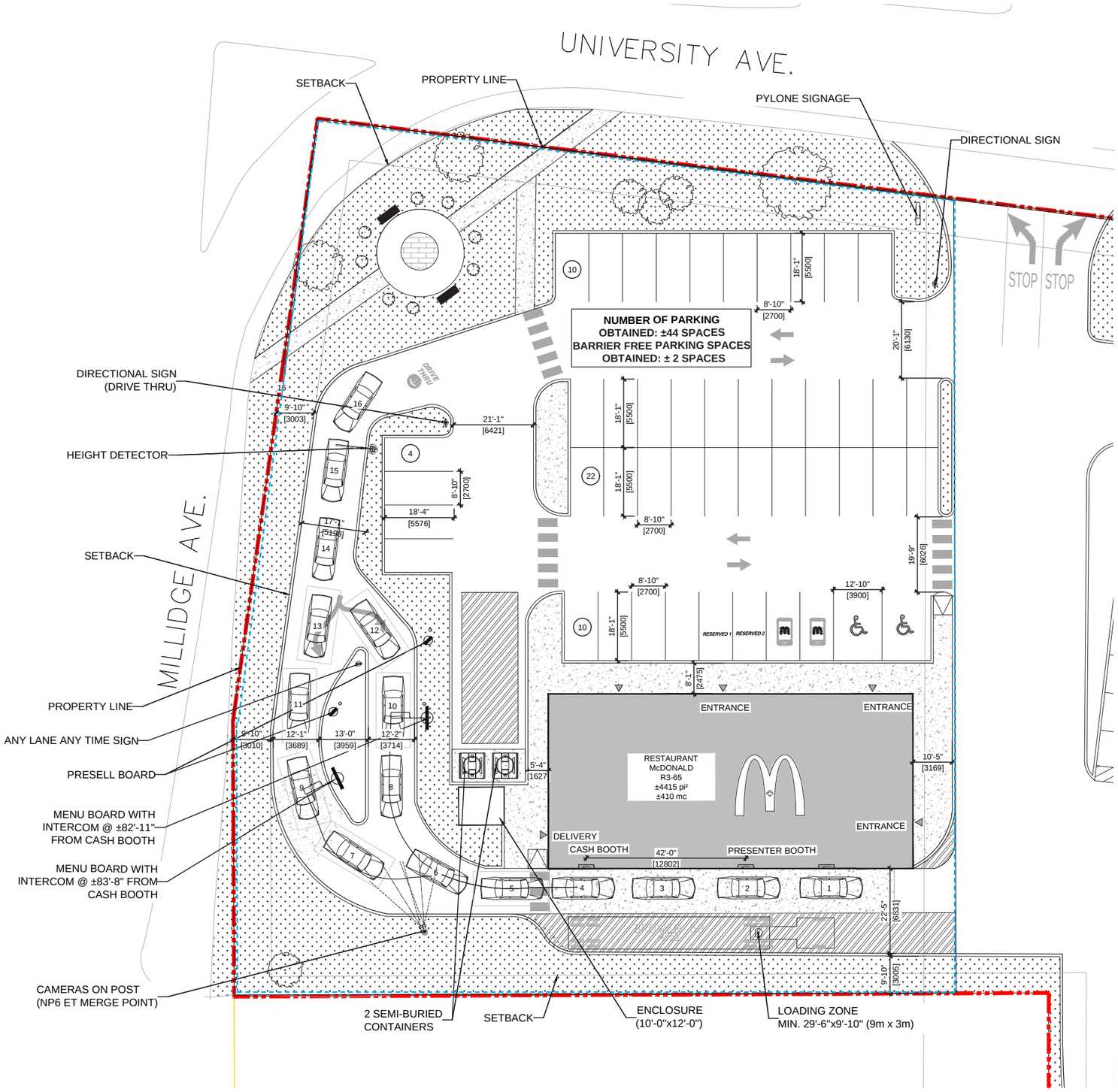
SCALE
N/A

PROJECT
McDONALD'S RESTAURANT

ADDRESS
MILLIDGE AVE. AND UNIVERSITY AVE. ,
MILLIDGEVILLE, ST-JOHN'S , NB

DATE
2023-03-08

CLIENT



SITE STATISTICS :

COMPREHENSIVE ZONING BY-LAW
TOWN ST-JOHN'S - NB
ZONE :COMMERCIAL

PROPOSED USES :
RESTAURANT WITH DRIVE-THRU

MINIMUM PARKING SPACE RATES (4.2) :

LAND USE	REQUIRED	CALCULATION	OBTAINED
RESTAURANT (FAST FOOD)	1 SPACES PER 10 SQ.M	±410 SQ. M./10	.
TOTAL		***41***	***46***

BARRIER-FREE PARKING SPACES (4.2.(4)) :

REQUIRED PER SECTION 4.2(4)	REQUIRED	CALCULATION	OBTAINED
26-50	2	-	2

NOTE:

LEASE LINE : +/- 40 261SQ.FT (3740 MC)

mra architecture + design

TITLE
PROPOSED SITE PLAN
(key plan - Prototype R3-65)

SCALE
1'' = 30'

LEGEND

- BARRIER-FREE PARKING SPACE
- PAINTED LINES
- GRASS
- CONCRETE
- BUILDING
- LOT LINE
- TREE
- WALKING PATH
- CONCRETE CURB

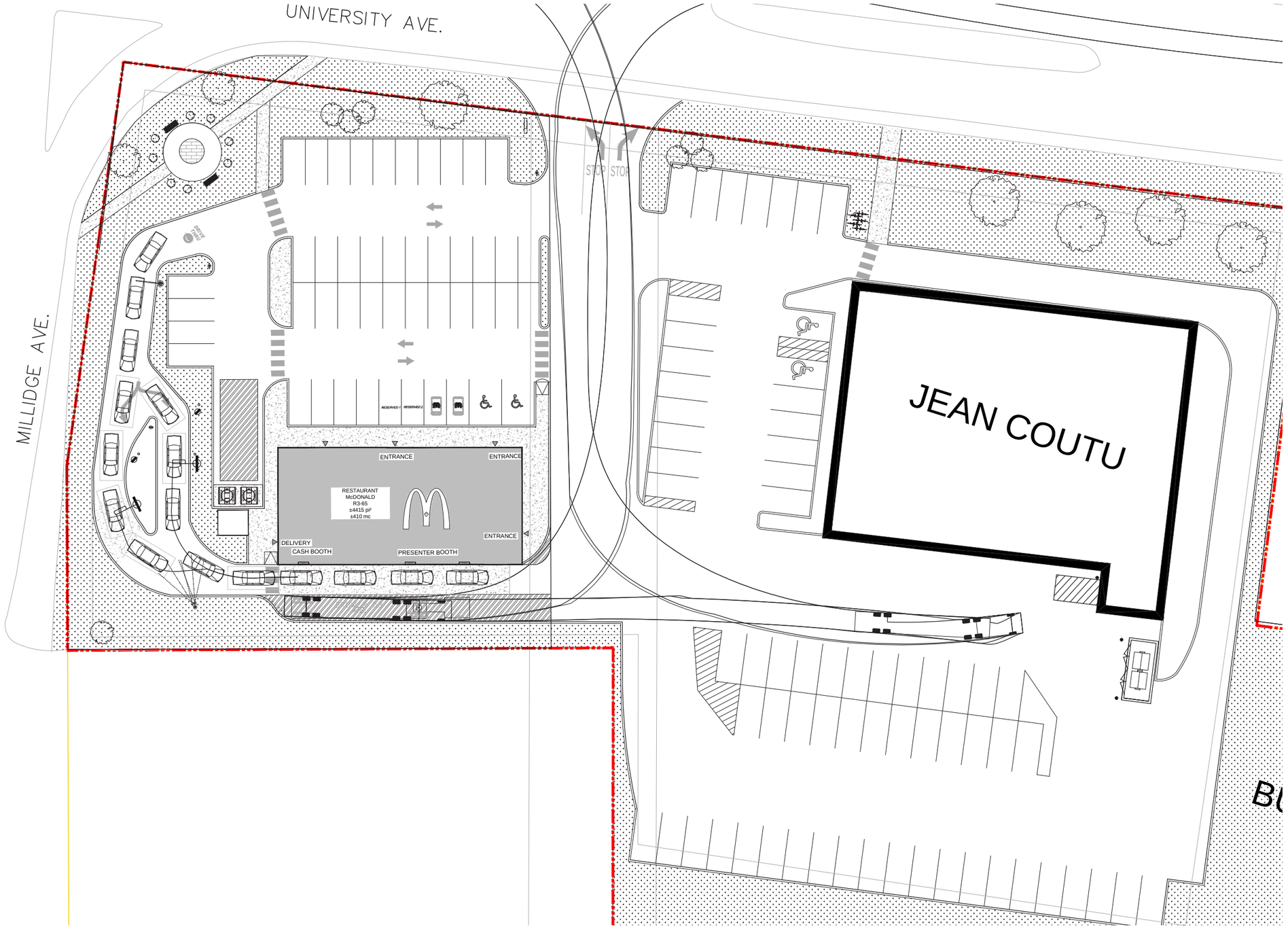
PROJECT
McDONALD'S RESTAURANT

ADDRESS

MILLIDGE AVE. AND UNIVERSITY AVE. ,
MILLIDGEVILLE, ST-JOHN'S , NB

DATE
2023-03-08

CLIENT



mra
architecture
+ design

TITLE
PROPOSED SITE PLAN
(delivery truck trajectory 53' - option 1)

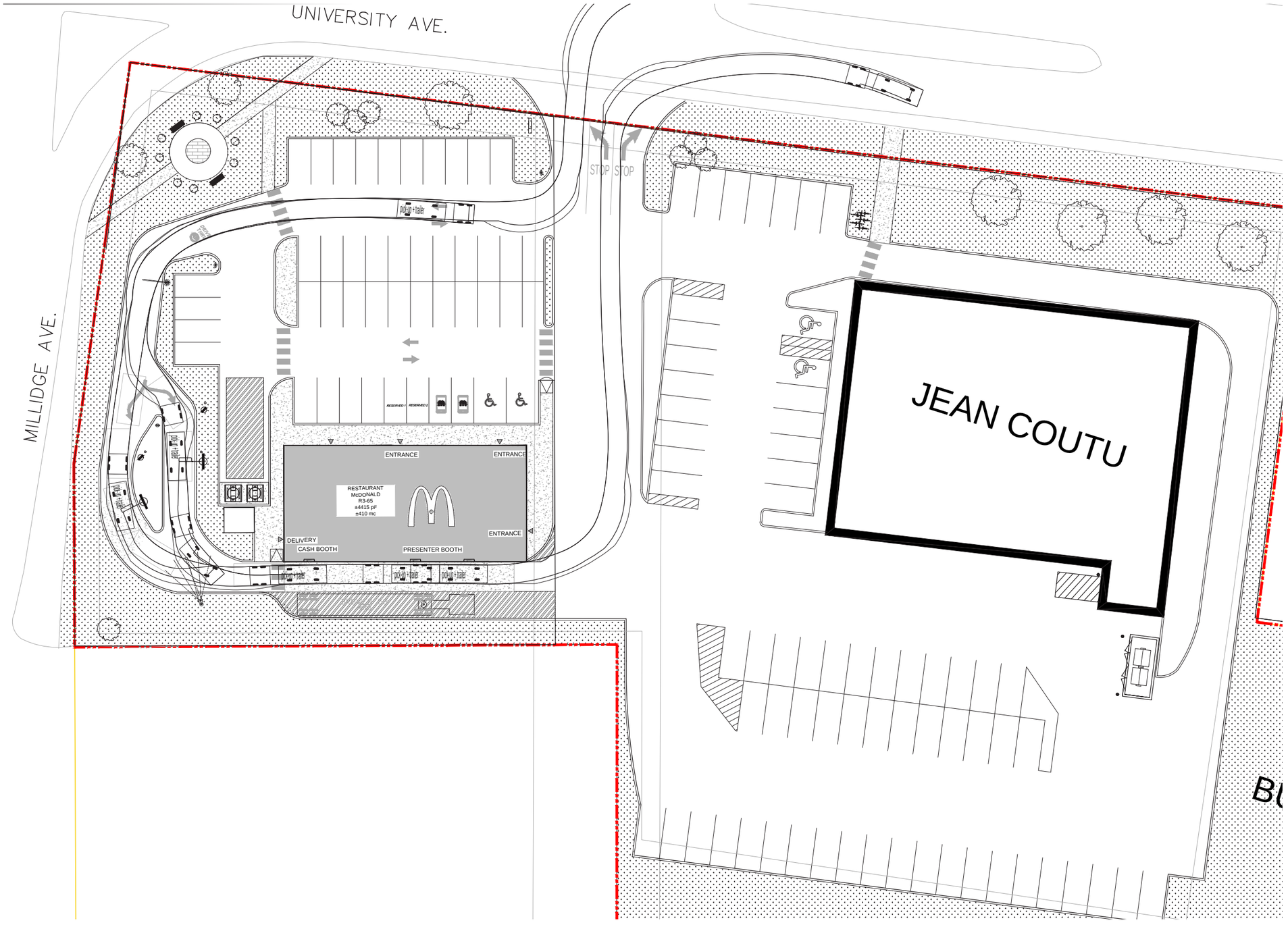
SCALE
1" = 40'

PROJECT
McDONALD'S RESTAURANT

ADDRESS
MILLIDGE AVE. AND UNIVERSITY AVE. ,
MILLIDGEVILLE, ST-JOHN'S , NB

DATE
2023-03-08

CLIENT



mra
architecture
+ design

TITLE
PROPOSED SITE PLAN
(pick up trajectory - option 1)

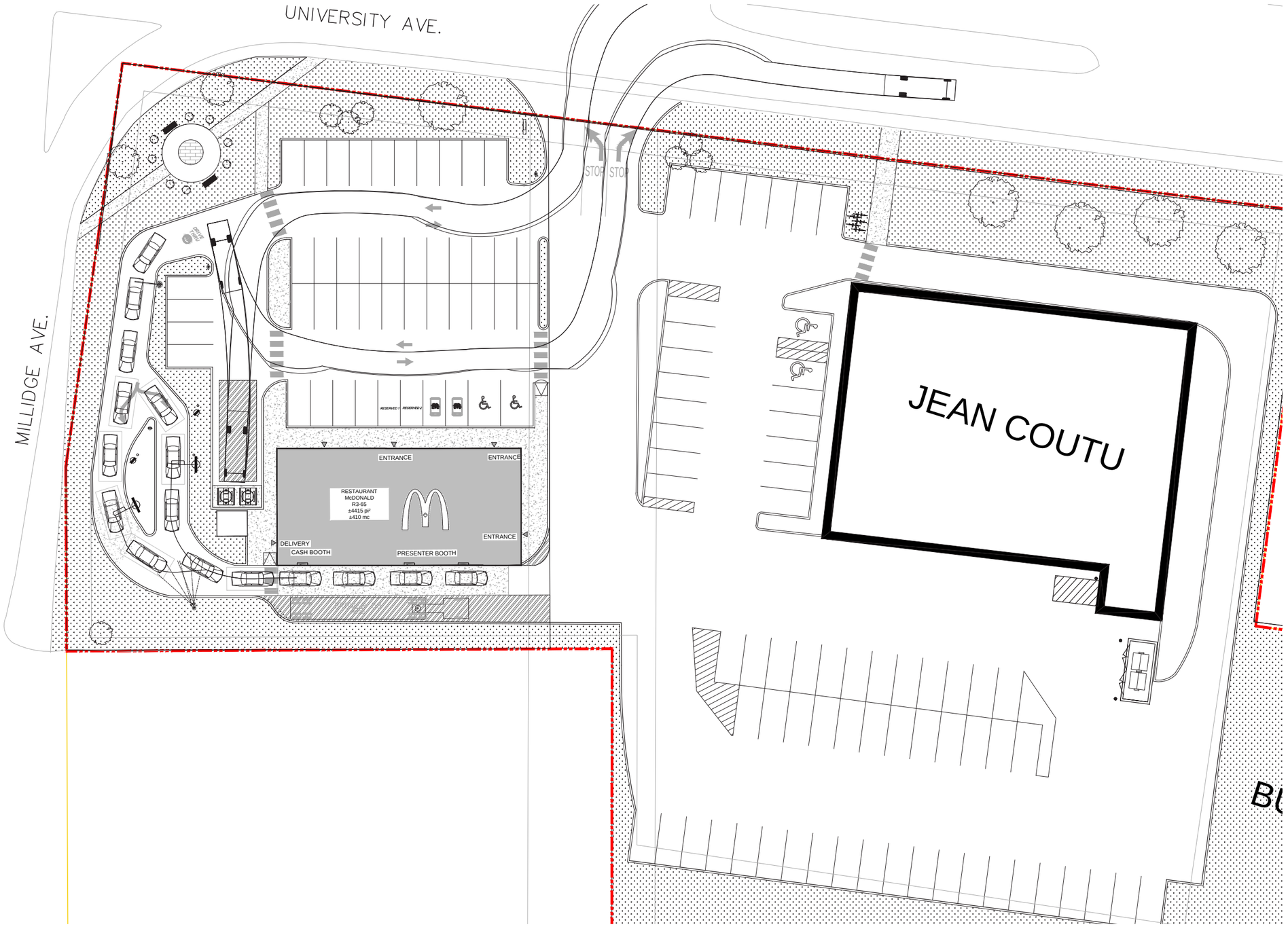
SCALE
1” = 40’

PROJECT
McDONALD’S RESTAURANT

ADDRESS
MILLIDGE AVE. AND UNIVERSITY AVE. ,
MILLIDGEVILLE, ST-JOHN’S , NB

DATE
2023-03-08

CLIENT



mra
architecture
+ design

TITLE
PROPOSED SITE PLAN
(waste truck trajectory - option 1)

SCALE
1" = 40'

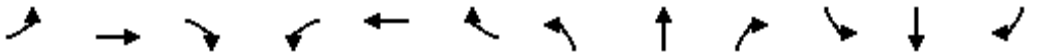
PROJECT
McDONALD'S RESTAURANT

ADDRESS
MILLIDGE AVE. AND UNIVERSITY AVE. ,
MILLIDGEVILLE, ST-JOHN'S , NB

DATE
2023-03-08

CLIENT

Appendix 2 –
Existing Synchro Output



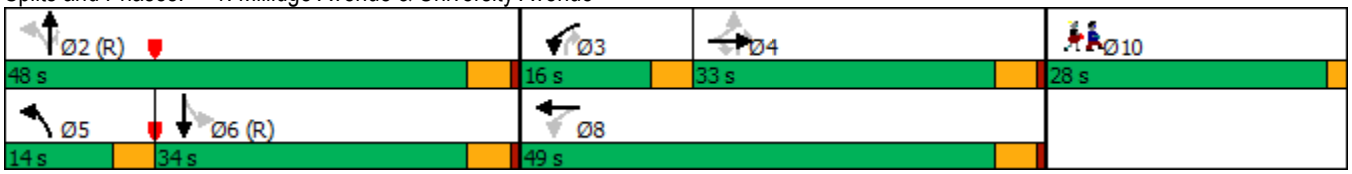
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	132	142	178	200	100	48	119	151	106	252	8
Future Volume (vph)	12	132	142	178	200	100	48	119	151	106	252	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		67.1	0.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.97	1.00	0.99		1.00		0.98	1.00	1.00	
Frt			0.850		0.950				0.850		0.995	
Flt Protected		0.996		0.950			0.950			0.950		
Satd. Flow (prot)	0	1876	1601	1789	1776	0	1789	1883	1601	1789	1873	0
Flt Permitted		0.958		0.489			0.286			0.674		
Satd. Flow (perm)	0	1804	1558	920	1776	0	537	1883	1563	1265	1873	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			154		22				164		1	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		69.9			75.3			104.8			46.5	
Travel Time (s)		5.2			5.6			7.9			3.5	
Confl. Peds. (#/hr)	2		3	1		1	4		5	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	143	154	193	217	109	52	129	164	115	274	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	154	193	326	0	52	129	164	115	283	0
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	custom	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8			2		3 2 3 4	6		
Minimum Split (s)	33.0	33.0	33.0	14.0	33.0		14.0	33.0		33.0	33.0	
Total Split (s)	33.0	33.0	33.0	16.0	49.0		14.0	48.0		34.0	34.0	
Total Split (%)	26.4%	26.4%	26.4%	12.8%	39.2%		11.2%	38.4%		27.2%	27.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0		0.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0	5.0	4.0	5.0		4.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	
Lead-Lag Optimize?												
Act Effct Green (s)		28.0	28.0	45.0	44.0		44.0	43.0	93.0	29.0	29.0	
Actuated g/C Ratio		0.22	0.22	0.36	0.35		0.35	0.34	0.74	0.23	0.23	
v/c Ratio		0.39	0.33	0.47	0.51		0.18	0.20	0.14	0.39	0.65	
Control Delay		44.6	8.0	33.0	33.1		28.7	29.9	0.9	45.3	51.3	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		44.6	8.0	33.0	33.1		28.7	29.9	0.9	45.3	51.3	
LOS		D	A	C	C		C	C	A	D	D	
Approach Delay		26.4			33.0			15.9			49.6	
Approach LOS		C			C			B			D	
Queue Length 50th (m)		32.8	0.0	33.8	58.6		8.5	22.3	0.0	24.1	63.1	
Queue Length 95th (m)		53.0	17.1	52.7	86.9		17.5	37.1	5.0	42.2	93.1	
Internal Link Dist (m)		45.9			51.3			80.8			22.5	
Turn Bay Length (m)									67.1			

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	22%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		404	468	414	639		289	647	1204	293	435	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.39	0.33	0.47	0.51		0.18	0.20	0.14	0.39	0.65	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 125			
Control Type: Pretimed			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 32.2		Intersection LOS: C	
Intersection Capacity Utilization 83.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Millidge Avenue & University Avenue



Lane Group	Ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

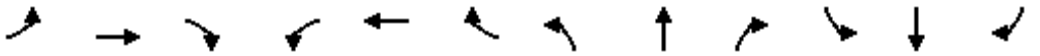
Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	87	303	7	2	368	66	1	1	1	39	3	106
Future Vol, veh/h	87	303	7	2	368	66	1	1	1	39	3	106
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	95	329	8	2	400	72	1	1	1	42	3	115

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	472	0	0	337	0	0	729	999	333	964	967	236
Stage 1	-	-	-	-	-	-	523	523	-	440	440	-
Stage 2	-	-	-	-	-	-	206	476	-	524	527	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1088	-	-	1221	-	-	324	243	708	222	253	766
Stage 1	-	-	-	-	-	-	536	530	-	567	577	-
Stage 2	-	-	-	-	-	-	777	556	-	536	527	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1088	-	-	1221	-	-	254	221	708	206	230	766
Mov Cap-2 Maneuver	-	-	-	-	-	-	254	221	-	206	230	-
Stage 1	-	-	-	-	-	-	489	484	-	518	576	-
Stage 2	-	-	-	-	-	-	655	555	-	487	481	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0	16.9	18.1
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	254	337	1088	-	-	1221	-	-	434
HCM Lane V/C Ratio	0.004	0.006	0.087	-	-	0.002	-	-	0.371
HCM Control Delay (s)	19.2	15.8	8.6	-	-	8	0	-	18.1
HCM Lane LOS	C	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0	0	0.3	-	-	0	-	-	1.7



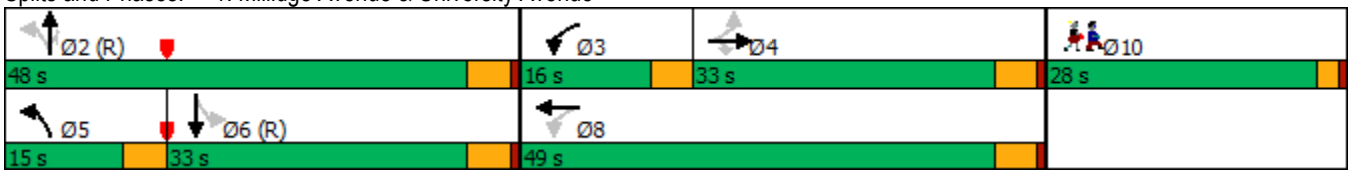
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	99	73	271	145	172	76	195	167	83	185	19
Future Volume (vph)	11	99	73	271	145	172	76	195	167	83	185	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		67.1	0.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor										0.99	1.00	
Frt			0.850		0.919				0.850		0.986	
Flt Protected		0.995		0.950			0.950			0.950		
Satd. Flow (prot)	0	1874	1601	1789	1731	0	1789	1883	1601	1789	1851	0
Flt Permitted		0.950		0.554			0.375			0.625		
Satd. Flow (perm)	0	1789	1601	1043	1731	0	706	1883	1601	1167	1851	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			113		53				182		4	
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		69.9			75.3			104.8			46.5	
Travel Time (s)		8.4			9.0			12.6			5.6	
Confl. Peds. (#/hr)										5		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	108	79	295	158	187	83	212	182	90	201	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	120	79	295	345	0	83	212	182	90	222	0
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Minimum Split (s)	33.0	33.0	33.0	15.0	33.0		15.0	33.0	33.0	33.0	33.0	
Total Split (s)	33.0	33.0	33.0	16.0	49.0		15.0	48.0	48.0	33.0	33.0	
Total Split (%)	26.4%	26.4%	26.4%	12.8%	39.2%		12.0%	38.4%	38.4%	26.4%	26.4%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0		0.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0	5.0	4.0	5.0		4.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	
Lead-Lag Optimize?												
Act Effct Green (s)		28.0	28.0	45.0	44.0		44.0	43.0	43.0	28.0	28.0	
Actuated g/C Ratio		0.22	0.22	0.36	0.35		0.35	0.34	0.34	0.22	0.22	
v/c Ratio		0.30	0.18	0.66	0.54		0.24	0.33	0.27	0.34	0.53	
Control Delay		42.8	3.5	39.5	30.7		29.5	32.1	5.1	45.3	47.4	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		42.8	3.5	39.5	30.7		29.5	32.1	5.1	45.3	47.4	
LOS		D	A	D	C		C	C	A	D	D	
Approach Delay		27.2			34.8			21.3			46.8	
Approach LOS		C			C			C			D	
Queue Length 50th (m)		24.7	0.0	55.2	56.9		13.8	38.4	0.0	18.7	47.5	
Queue Length 95th (m)		42.1	5.5	81.0	86.3		25.4	58.9	15.1	34.9	73.1	
Internal Link Dist (m)		45.9			51.3			80.8			22.5	
Turn Bay Length (m)									67.1			

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	22%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		400	446	447	643		343	647	670	261	417	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.30	0.18	0.66	0.54		0.24	0.33	0.27	0.34	0.53	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 15 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 125			
Control Type: Pretimed			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 32.2		Intersection LOS: C	
Intersection Capacity Utilization 67.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Millidge Avenue & University Avenue



Lane Group	Ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	4

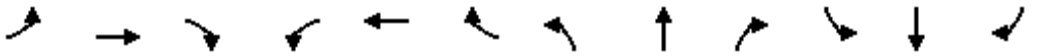
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	255	40	24	459	61	36	5	30	38	0	88
Future Vol, veh/h	50	255	40	24	459	61	36	5	30	38	0	88
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	277	43	26	499	66	39	5	33	41	0	96

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	565	0	0	320	0	0	709	1024	299	1010	1012	283
Stage 1	-	-	-	-	-	-	407	407	-	584	584	-
Stage 2	-	-	-	-	-	-	302	617	-	426	428	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1005	-	-	1238	-	-	335	235	740	206	238	715
Stage 1	-	-	-	-	-	-	620	596	-	465	497	-
Stage 2	-	-	-	-	-	-	683	480	-	606	584	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1005	-	-	1238	-	-	272	215	740	181	218	715
Mov Cap-2 Maneuver	-	-	-	-	-	-	272	215	-	181	218	-
Stage 1	-	-	-	-	-	-	587	564	-	440	482	-
Stage 2	-	-	-	-	-	-	573	465	-	543	552	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.4	16.3	19.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	272	549	1005	-	-	1238	-	-	378
HCM Lane V/C Ratio	0.144	0.069	0.054	-	-	0.021	-	-	0.362
HCM Control Delay (s)	20.4	12	8.8	-	-	8	0.1	-	19.8
HCM Lane LOS	C	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.2	0.2	-	-	0.1	-	-	1.6

Appendix 3 –
Horizon Year 2030 without Development Synchro Output



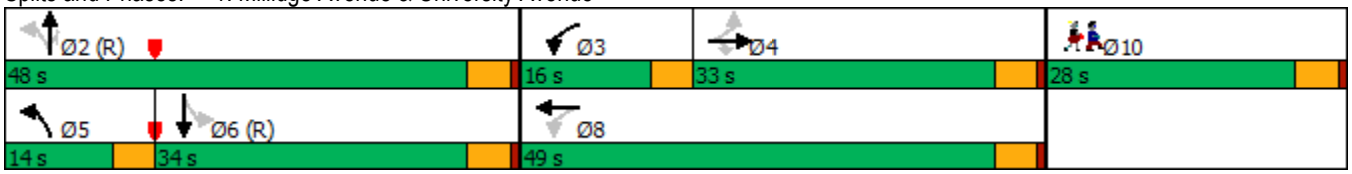
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	140	151	189	212	106	51	126	160	113	268	8
Future Volume (vph)	13	140	151	189	212	106	51	126	160	113	268	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		67.1	0.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.97	1.00	0.99		1.00		0.97	1.00	1.00	
Frt			0.850		0.950				0.850		0.995	
Flt Protected		0.996		0.950			0.950			0.950		
Satd. Flow (prot)	0	1876	1601	1789	1777	0	1789	1883	1601	1789	1873	0
Flt Permitted		0.955		0.472			0.259			0.669		
Satd. Flow (perm)	0	1798	1558	888	1777	0	486	1883	1558	1256	1873	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164		22				174		1	
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		69.9			75.3			104.8			46.5	
Travel Time (s)		8.4			9.0			12.6			5.6	
Confl. Peds. (#/hr)	2		3	1		1	4		5	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	152	164	205	230	115	55	137	174	123	291	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	166	164	205	345	0	55	137	174	123	300	0
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Minimum Split (s)	33.0	33.0	33.0	14.0	33.0		14.0	33.0	33.0	33.0	33.0	
Total Split (s)	33.0	33.0	33.0	16.0	49.0		14.0	48.0	48.0	34.0	34.0	
Total Split (%)	26.4%	26.4%	26.4%	12.8%	39.2%		11.2%	38.4%	38.4%	27.2%	27.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0		0.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0	5.0	4.0	5.0		4.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	
Lead-Lag Optimize?												
Act Effct Green (s)		28.0	28.0	45.0	44.0		44.0	43.0	43.0	29.0	29.0	
Actuated g/C Ratio		0.22	0.22	0.36	0.35		0.35	0.34	0.34	0.23	0.23	
v/c Ratio		0.41	0.34	0.50	0.54		0.20	0.21	0.27	0.42	0.69	
Control Delay		45.2	8.0	34.0	34.0		29.0	30.1	5.2	46.2	53.1	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		45.2	8.0	34.0	34.0		29.0	30.1	5.2	46.2	53.1	
LOS		D	A	C	C		C	C	A	D	D	
Approach Delay		26.7			34.0			18.1			51.1	
Approach LOS		C			C			B			D	
Queue Length 50th (m)		35.1	0.0	36.2	63.1		9.0	23.7	0.0	25.9	67.7	
Queue Length 95th (m)		56.3	17.3	55.8	92.7		18.2	39.2	14.8	44.9	98.8	
Internal Link Dist (m)		45.9			51.3			80.8			22.5	
Turn Bay Length (m)									67.1			

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	22%
Yellow Time (s)	4.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		402	476	406	639		275	647	650	291	435	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.41	0.34	0.50	0.54		0.20	0.21	0.27	0.42	0.69	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 97 (78%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 125			
Control Type: Pretimed			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 33.4		Intersection LOS: C	
Intersection Capacity Utilization 84.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Millidge Avenue & University Avenue



Lane Group	Ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

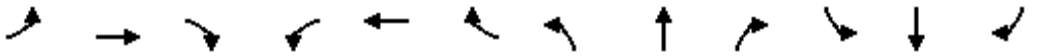
Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	87	321	7	2	390	66	1	1	1	39	3	106
Future Vol, veh/h	87	321	7	2	390	66	1	1	1	39	3	106
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	95	349	8	2	424	72	1	1	1	42	3	115

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	496	0	0	357	0	0	761	1043	353	1008	1011	248
Stage 1	-	-	-	-	-	-	543	543	-	464	464	-
Stage 2	-	-	-	-	-	-	218	500	-	544	547	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1066	-	-	1200	-	-	308	229	690	207	239	753
Stage 1	-	-	-	-	-	-	523	519	-	548	563	-
Stage 2	-	-	-	-	-	-	765	542	-	522	517	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1066	-	-	1200	-	-	240	208	690	191	217	753
Mov Cap-2 Maneuver	-	-	-	-	-	-	240	208	-	191	217	-
Stage 1	-	-	-	-	-	-	476	473	-	499	562	-
Stage 2	-	-	-	-	-	-	643	541	-	474	471	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.8	0	17.6	19.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	240	320	1066	-	-	1200	-	-	413
HCM Lane V/C Ratio	0.005	0.007	0.089	-	-	0.002	-	-	0.39
HCM Control Delay (s)	20.1	16.3	8.7	-	-	8	0	-	19.2
HCM Lane LOS	C	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0	0	0.3	-	-	0	-	-	1.8



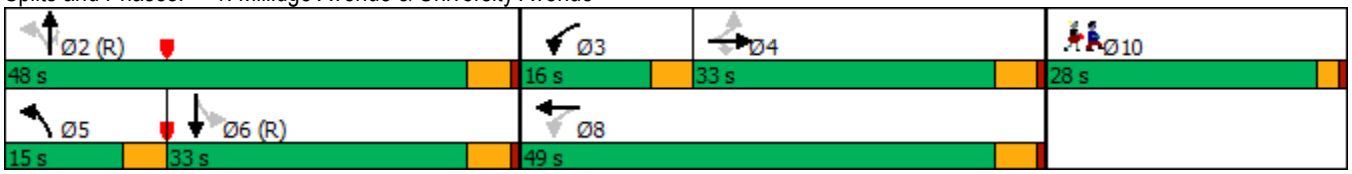
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	105	77	288	154	183	81	207	177	88	196	20
Future Volume (vph)	12	105	77	288	154	183	81	207	177	88	196	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		67.1	0.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor										0.99	1.00	
Frt			0.850		0.918				0.850		0.986	
Flt Protected		0.995		0.950			0.950			0.950		
Satd. Flow (prot)	0	1874	1601	1789	1729	0	1789	1883	1601	1789	1851	0
Flt Permitted		0.945		0.541			0.353			0.618		
Satd. Flow (perm)	0	1780	1601	1019	1729	0	665	1883	1601	1154	1851	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			113		53				192		4	
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		69.9			75.3			104.8			46.5	
Travel Time (s)		8.4			9.0			12.6			5.6	
Confl. Peds. (#/hr)										5		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	114	84	313	167	199	88	225	192	96	213	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	84	313	366	0	88	225	192	96	235	0
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Minimum Split (s)	33.0	33.0	33.0	15.0	33.0		15.0	33.0	33.0	33.0	33.0	
Total Split (s)	33.0	33.0	33.0	16.0	49.0		15.0	48.0	48.0	33.0	33.0	
Total Split (%)	26.4%	26.4%	26.4%	12.8%	39.2%		12.0%	38.4%	38.4%	26.4%	26.4%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0		0.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0	5.0	4.0	5.0		4.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	
Lead-Lag Optimize?												
Act Effct Green (s)		28.0	28.0	45.0	44.0		44.0	43.0	43.0	28.0	28.0	
Actuated g/C Ratio		0.22	0.22	0.36	0.35		0.35	0.34	0.34	0.22	0.22	
v/c Ratio		0.32	0.19	0.71	0.57		0.27	0.35	0.28	0.37	0.56	
Control Delay		43.2	4.1	42.3	31.9		29.9	32.5	5.0	46.0	48.4	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		43.2	4.1	42.3	31.9		29.9	32.5	5.0	46.0	48.4	
LOS		D	A	D	C		C	C	A	D	D	
Approach Delay		27.6			36.7			21.6			47.7	
Approach LOS		C			D			C			D	
Queue Length 50th (m)		26.3	0.0	59.3	62.1		14.7	41.0	0.0	20.2	50.8	
Queue Length 95th (m)		44.0	7.1	86.3	93.3		26.7	62.1	15.5	36.7	77.0	
Internal Link Dist (m)		45.9			51.3			80.8			22.5	
Turn Bay Length (m)									67.1			

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	22%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		398	446	440	642		332	647	676	258	417	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.32	0.19	0.71	0.57		0.27	0.35	0.28	0.37	0.56	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 15 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 125			
Control Type: Pretimed			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 33.3		Intersection LOS: C	
Intersection Capacity Utilization 68.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Millidge Avenue & University Avenue



Lane Group	Ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	4

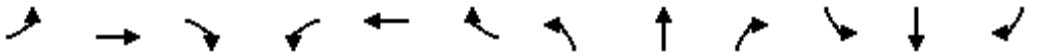
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	50	271	40	24	487	61	36	5	30	38	0	88
Future Vol, veh/h	50	271	40	24	487	61	36	5	30	38	0	88
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	295	43	26	529	66	39	5	33	41	0	96

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	595	0	0	338	0	0	742	1072	317	1058	1060	298
Stage 1	-	-	-	-	-	-	425	425	-	614	614	-
Stage 2	-	-	-	-	-	-	317	647	-	444	446	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	979	-	-	1220	-	-	318	220	723	190	223	699
Stage 1	-	-	-	-	-	-	606	586	-	447	482	-
Stage 2	-	-	-	-	-	-	669	466	-	592	573	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	979	-	-	1220	-	-	257	201	723	166	204	699
Mov Cap-2 Maneuver	-	-	-	-	-	-	257	201	-	166	204	-
Stage 1	-	-	-	-	-	-	573	554	-	422	467	-
Stage 2	-	-	-	-	-	-	559	451	-	529	541	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.4	17	21.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	257	527	979	-	-	1220	-	-	355
HCM Lane V/C Ratio	0.152	0.072	0.056	-	-	0.021	-	-	0.386
HCM Control Delay (s)	21.5	12.4	8.9	-	-	8	0.1	-	21.4
HCM Lane LOS	C	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.2	0.2	-	-	0.1	-	-	1.8

Appendix 4 –
Horizon Year 2030 with Development Synchro Output



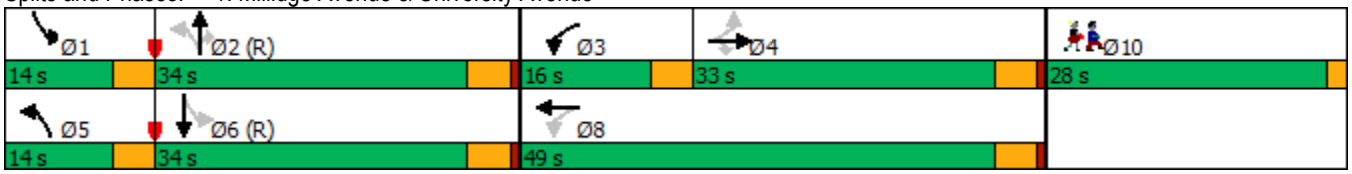
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	158	142	209	235	117	48	119	180	127	261	8
Future Volume (vph)	14	158	142	209	235	117	48	119	180	127	261	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		67.1	0.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.97	1.00	0.99		1.00		0.97	1.00	1.00	
Frt			0.850		0.950				0.850		0.995	
Flt Protected		0.996		0.950			0.950			0.950		
Satd. Flow (prot)	0	1876	1601	1789	1777	0	1789	1883	1601	1789	1873	0
Flt Permitted		0.953		0.435			0.307			0.618		
Satd. Flow (perm)	0	1795	1558	819	1777	0	576	1883	1552	1161	1873	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			154		22				196		1	
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		69.9			75.3			104.8			46.5	
Travel Time (s)		8.4			9.0			12.6			5.6	
Confl. Peds. (#/hr)	2		3	1		1	4		5	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	172	154	227	255	127	52	129	196	138	284	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	187	154	227	382	0	52	129	196	138	293	0
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		
Minimum Split (s)	33.0	33.0	33.0	14.0	33.0		14.0	33.0	33.0	14.0	33.0	
Total Split (s)	33.0	33.0	33.0	16.0	49.0		14.0	34.0	34.0	14.0	34.0	
Total Split (%)	26.4%	26.4%	26.4%	12.8%	39.2%		11.2%	27.2%	27.2%	11.2%	27.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0		0.0	1.0	1.0	0.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0	5.0	4.0	5.0		4.0	5.0	5.0	4.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?												
Act Effct Green (s)		28.0	28.0	45.0	44.0		40.0	29.0	29.0	40.0	29.0	
Actuated g/C Ratio		0.22	0.22	0.36	0.35		0.32	0.23	0.23	0.32	0.23	
v/c Ratio		0.47	0.33	0.59	0.60		0.19	0.30	0.38	0.33	0.67	
Control Delay		46.5	8.0	36.6	35.9		28.9	41.8	7.6	31.1	52.3	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		46.5	8.0	36.6	35.9		28.9	41.8	7.6	31.1	52.3	
LOS		D	A	D	D		C	D	A	C	D	
Approach Delay		29.1			36.1			22.2			45.5	
Approach LOS		C			D			C			D	
Queue Length 50th (m)		40.1	0.0	40.6	72.3		8.5	26.3	0.0	23.7	65.8	
Queue Length 95th (m)		63.0	17.1	61.8	105.0		17.5	44.0	18.6	39.3	96.4	
Internal Link Dist (m)		45.9			51.3			80.8			22.5	
Turn Bay Length (m)									67.1			

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	22%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		402	468	387	639		281	436	510	421	435	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.47	0.33	0.59	0.60		0.19	0.30	0.38	0.33	0.67	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 125			
Control Type: Pretimed			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 34.1		Intersection LOS: C	
Intersection Capacity Utilization 77.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Millidge Avenue & University Avenue



Lane Group	Ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

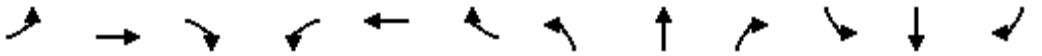
Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	87	295	59	43	370	66	55	7	38	38	10	104
Future Vol, veh/h	87	295	59	43	370	66	55	7	38	38	10	104
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	95	321	64	47	402	72	60	8	41	41	11	113

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	474	0	0	385	0	0	844	1111	353	1100	1107	237
Stage 1	-	-	-	-	-	-	543	543	-	532	532	-
Stage 2	-	-	-	-	-	-	301	568	-	568	575	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1086	-	-	1172	-	-	269	208	690	178	210	765
Stage 1	-	-	-	-	-	-	523	519	-	500	525	-
Stage 2	-	-	-	-	-	-	684	505	-	507	502	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1086	-	-	1172	-	-	196	180	690	145	181	765
Mov Cap-2 Maneuver	-	-	-	-	-	-	196	180	-	145	181	-
Stage 1	-	-	-	-	-	-	477	474	-	457	496	-
Stage 2	-	-	-	-	-	-	539	477	-	428	458	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0.9	23.2	25.8
HCM LOS			C	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	196	479	1086	-	-	1172	-	-	335
HCM Lane V/C Ratio	0.305	0.102	0.087	-	-	0.04	-	-	0.493
HCM Control Delay (s)	31.2	13.4	8.6	-	-	8.2	0.2	-	25.8
HCM Lane LOS	D	B	A	-	-	A	A	-	D
HCM 95th %tile Q(veh)	1.2	0.3	0.3	-	-	0.1	-	-	2.6



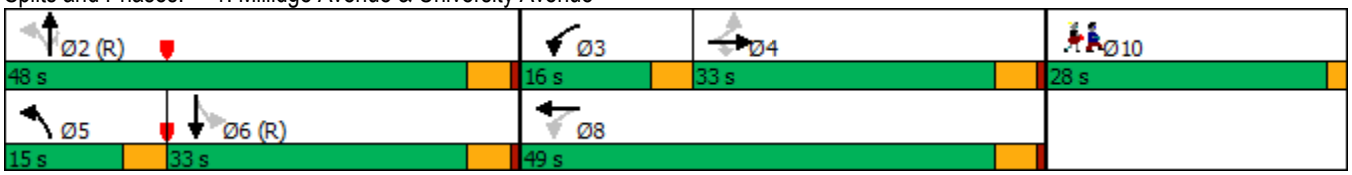
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	121	70	305	163	193	78	200	196	103	191	19
Future Volume (vph)	11	121	70	305	163	193	78	200	196	103	191	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		67.1	0.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor										0.99	1.00	
Frt			0.850		0.919				0.850		0.986	
Flt Protected		0.996		0.950			0.950			0.950		
Satd. Flow (prot)	0	1876	1601	1789	1731	0	1789	1883	1601	1789	1851	0
Flt Permitted		0.954		0.511			0.363			0.622		
Satd. Flow (perm)	0	1797	1601	962	1731	0	684	1883	1601	1162	1851	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105		53				213		4	
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		69.9			75.3			104.8			46.5	
Travel Time (s)		8.4			9.0			12.6			5.6	
Confl. Peds. (#/hr)										5		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	132	76	332	177	210	85	217	213	112	208	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	144	76	332	387	0	85	217	213	112	229	0
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Minimum Split (s)	33.0	33.0	33.0	15.0	33.0		15.0	33.0	33.0	33.0	33.0	
Total Split (s)	33.0	33.0	33.0	16.0	49.0		15.0	48.0	48.0	33.0	33.0	
Total Split (%)	26.4%	26.4%	26.4%	12.8%	39.2%		12.0%	38.4%	38.4%	26.4%	26.4%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0		0.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0	5.0	4.0	5.0		4.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	
Lead-Lag Optimize?												
Act Effct Green (s)		28.0	28.0	45.0	44.0		44.0	43.0	43.0	28.0	28.0	
Actuated g/C Ratio		0.22	0.22	0.36	0.35		0.35	0.34	0.34	0.22	0.22	
v/c Ratio		0.36	0.17	0.78	0.60		0.25	0.34	0.31	0.43	0.55	
Control Delay		44.0	4.0	47.1	33.1		29.7	32.2	4.9	47.7	47.9	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		44.0	4.0	47.1	33.1		29.7	32.2	4.9	47.7	47.9	
LOS		D	A	D	C		C	C	A	D	D	
Approach Delay		30.2			39.6			20.5			47.8	
Approach LOS		C			D			C			D	
Queue Length 50th (m)		30.1	0.0	63.8	67.3		14.1	39.3	0.0	23.8	49.3	
Queue Length 95th (m)		49.4	6.5	#98.3	100.1		25.7	60.0	16.2	42.3	75.3	
Internal Link Dist (m)		45.9			51.3			80.8			22.5	
Turn Bay Length (m)									67.1			

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	22%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		402	440	425	643		338	647	690	260	417	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.36	0.17	0.78	0.60		0.25	0.34	0.31	0.43	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 15 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 125			
Control Type: Pretimed			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 34.5		Intersection LOS: C	
Intersection Capacity Utilization 87.1%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Millidge Avenue & University Avenue



Lane Group	Ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

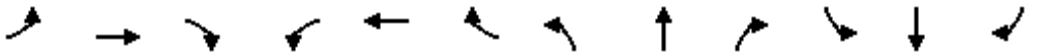
Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	53	271	94	61	487	65	87	11	73	38	1	88
Future Vol, veh/h	53	271	94	61	487	65	87	11	73	38	1	88
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	58	295	102	66	529	71	95	12	79	41	1	96

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	600	0	0	397	0	0	859	1194	346	1205	1210	300
Stage 1	-	-	-	-	-	-	462	462	-	697	697	-
Stage 2	-	-	-	-	-	-	397	732	-	508	513	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	975	-	-	1160	-	-	263	186	696	150	182	697
Stage 1	-	-	-	-	-	-	579	564	-	398	442	-
Stage 2	-	-	-	-	-	-	601	426	-	546	535	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	975	-	-	1160	-	-	201	160	696	112	157	697
Mov Cap-2 Maneuver	-	-	-	-	-	-	201	160	-	112	157	-
Stage 1	-	-	-	-	-	-	545	531	-	375	404	-
Stage 2	-	-	-	-	-	-	473	389	-	445	503	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	1.1	26.3	31.7
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	201	484	975	-	-	1160	-	-	269
HCM Lane V/C Ratio	0.47	0.189	0.059	-	-	0.057	-	-	0.513
HCM Control Delay (s)	37.9	14.2	8.9	-	-	8.3	0.3	-	31.7
HCM Lane LOS	E	B	A	-	-	A	A	-	D
HCM 95th %tile Q(veh)	2.3	0.7	0.2	-	-	0.2	-	-	2.7



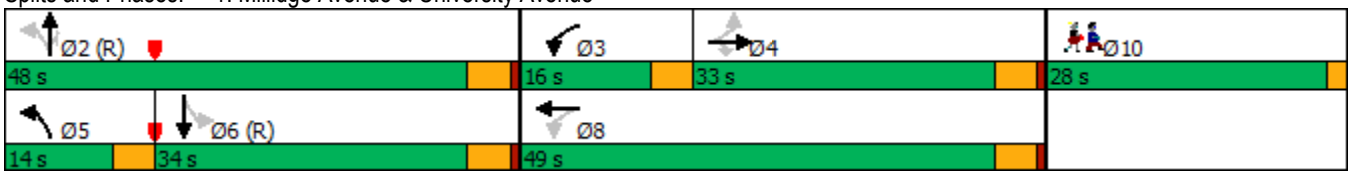
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	153	156	189	212	106	55	138	160	123	268	8
Future Volume (vph)	12	153	156	189	212	106	55	138	160	123	268	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		67.1	0.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00	0.97	1.00	0.99		1.00		0.97	1.00	1.00	
Frt			0.850		0.950				0.850		0.995	
Flt Protected		0.996		0.950			0.950			0.950		
Satd. Flow (prot)	0	1876	1601	1789	1777	0	1789	1883	1601	1789	1873	0
Flt Permitted		0.962		0.449			0.259			0.662		
Satd. Flow (perm)	0	1812	1558	845	1777	0	486	1883	1558	1242	1873	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			170		22				174		1	
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		69.9			75.3			91.7			46.5	
Travel Time (s)		8.4			9.0			11.0			5.6	
Confl. Peds. (#/hr)	2		3	1		1	4		5	2		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	166	170	205	230	115	60	150	174	134	291	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	179	170	205	345	0	60	150	174	134	300	0
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Minimum Split (s)	33.0	33.0	33.0	14.0	33.0		14.0	33.0	33.0	33.0	33.0	
Total Split (s)	33.0	33.0	33.0	16.0	49.0		14.0	48.0	48.0	34.0	34.0	
Total Split (%)	26.4%	26.4%	26.4%	12.8%	39.2%		11.2%	38.4%	38.4%	27.2%	27.2%	
Maximum Green (s)	28.0	28.0	28.0	12.0	44.0		10.0	43.0	43.0	29.0	29.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0		0.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0	5.0	4.0	5.0		4.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	
Lead-Lag Optimize?												
Act Effct Green (s)		28.0	28.0	45.0	44.0		44.0	43.0	43.0	29.0	29.0	
Actuated g/C Ratio		0.22	0.22	0.36	0.35		0.35	0.34	0.34	0.23	0.23	
v/c Ratio		0.44	0.35	0.52	0.54		0.22	0.23	0.27	0.47	0.69	
Control Delay		45.8	8.0	34.4	34.0		29.3	30.4	5.2	47.6	53.1	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		45.8	8.0	34.4	34.0		29.3	30.4	5.2	47.6	53.1	
LOS		D	A	C	C		C	C	A	D	D	
Approach Delay		27.4			34.1			18.8			51.4	
Approach LOS		C			C			B			D	
Queue Length 50th (m)		38.2	0.0	36.2	63.1		9.9	26.2	0.0	28.6	67.7	
Queue Length 95th (m)		60.2	17.7	55.8	92.7		19.5	42.5	14.8	48.6	98.8	
Internal Link Dist (m)		45.9			51.3			67.7			22.5	

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	22%
Maximum Green (s)	26.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (m)									67.1			
Base Capacity (vph)		405	480	394	639		275	647	650	288	435	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.44	0.35	0.52	0.54		0.22	0.23	0.27	0.47	0.69	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 125			
Control Type: Pretimed			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 33.7		Intersection LOS: C	
Intersection Capacity Utilization 84.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 1: Millidge Avenue & University Avenue



Lane Group	Ø10
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	92	311	29	21	381	70	26	3	18	39	5	105
Future Vol, veh/h	92	311	29	21	381	70	26	3	18	39	5	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	100	338	32	23	414	76	28	3	20	42	5	114

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	490	0	0	370	0	0	810	1090	354	1064	1068	245
Stage 1	-	-	-	-	-	-	554	554	-	498	498	-
Stage 2	-	-	-	-	-	-	256	536	-	566	570	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1071	-	-	1187	-	-	285	214	689	189	221	756
Stage 1	-	-	-	-	-	-	516	513	-	524	543	-
Stage 2	-	-	-	-	-	-	727	522	-	508	504	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1071	-	-	1187	-	-	215	189	689	165	195	756
Mov Cap-2 Maneuver	-	-	-	-	-	-	215	189	-	165	195	-
Stage 1	-	-	-	-	-	-	468	465	-	475	528	-
Stage 2	-	-	-	-	-	-	594	508	-	444	457	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	0.4	19	21.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	215	500	1071	-	-	1187	-	-	372
HCM Lane V/C Ratio	0.131	0.046	0.093	-	-	0.019	-	-	0.435
HCM Control Delay (s)	24.3	12.5	8.7	-	-	8.1	0.1	-	21.9
HCM Lane LOS	C	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.4	0.1	0.3	-	-	0.1	-	-	2.1

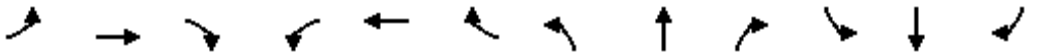
Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	16	353	20	35	578
Future Vol, veh/h	37	16	353	20	35	578
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	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	17	384	22	38	628

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1099	203	0	0	406	0
Stage 1	395	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Critical Hdwy	6.63	6.93	-	-	4.13	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	221	805	-	-	1151	-
Stage 1	650	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	210	805	-	-	1151	-
Mov Cap-2 Maneuver	210	-	-	-	-	-
Stage 1	650	-	-	-	-	-
Stage 2	464	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.2	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	210	805	1151	-
HCM Lane V/C Ratio	-	-	0.192	0.022	0.033	-
HCM Control Delay (s)	-	-	26.2	9.6	8.2	0
HCM Lane LOS	-	-	D	A	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	0.1	-



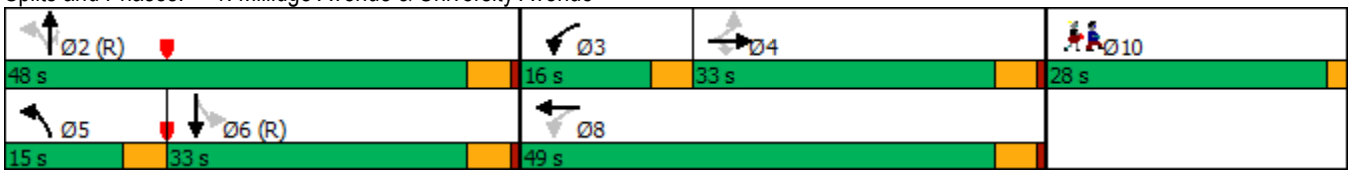
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	117	79	288	154	183	86	220	177	98	196	20
Future Volume (vph)	11	117	79	288	154	183	86	220	177	98	196	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		67.1	0.0		0.0
Storage Lanes	0		1	1		0	1		1	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor										0.99	1.00	
Frt			0.850		0.918				0.850		0.986	
Flt Protected		0.996		0.950			0.950			0.950		
Satd. Flow (prot)	0	1876	1601	1789	1729	0	1789	1883	1601	1789	1851	0
Flt Permitted		0.954		0.520			0.353			0.610		
Satd. Flow (perm)	0	1797	1601	979	1729	0	665	1883	1601	1140	1851	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			105		53				192		4	
Link Speed (k/h)		30			30			30			30	
Link Distance (m)		69.9			75.3			91.7			46.5	
Travel Time (s)		8.4			9.0			11.0			5.6	
Confl. Peds. (#/hr)										5		6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	127	86	313	167	199	93	239	192	107	213	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	139	86	313	366	0	93	239	192	107	235	0
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4		4	8			2		2	6		
Minimum Split (s)	33.0	33.0	33.0	15.0	33.0		15.0	33.0	33.0	33.0	33.0	
Total Split (s)	33.0	33.0	33.0	16.0	49.0		15.0	48.0	48.0	33.0	33.0	
Total Split (%)	26.4%	26.4%	26.4%	12.8%	39.2%		12.0%	38.4%	38.4%	26.4%	26.4%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	0.0	1.0		0.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0	5.0	4.0	5.0		4.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead			Lag	Lag	
Lead-Lag Optimize?												
Act Effct Green (s)		28.0	28.0	45.0	44.0		44.0	43.0	43.0	28.0	28.0	
Actuated g/C Ratio		0.22	0.22	0.36	0.35		0.35	0.34	0.34	0.22	0.22	
v/c Ratio		0.35	0.20	0.73	0.57		0.28	0.37	0.28	0.42	0.56	
Control Delay		43.7	5.7	43.3	31.9		30.2	32.9	5.0	47.5	48.4	
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		43.7	5.7	43.3	31.9		30.2	32.9	5.0	47.5	48.4	
LOS		D	A	D	C		C	C	A	D	D	
Approach Delay		29.2			37.2			22.2			48.1	
Approach LOS		C			D			C			D	
Queue Length 50th (m)		29.0	0.0	59.3	62.1		15.5	43.9	0.0	22.7	50.8	
Queue Length 95th (m)		47.9	9.1	86.3	93.3		27.8	66.1	15.5	40.5	77.0	
Internal Link Dist (m)		45.9			51.3			67.7			22.5	
Turn Bay Length (m)									67.1			

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	10
Permitted Phases	
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	22%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		402	440	430	642		332	647	676	255	417	
Starvation Cap Reductn		0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0	0	0		0	0	0	0	0	
Storage Cap Reductn		0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio		0.35	0.20	0.73	0.57		0.28	0.37	0.28	0.42	0.56	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125			
Actuated Cycle Length: 125			
Offset: 15 (12%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 125			
Control Type: Pretimed			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 33.8		Intersection LOS: C	
Intersection Capacity Utilization 68.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Millidge Avenue & University Avenue



Lane Group	Ø10
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	53	260	65	35	482	65	52	7	43	38	3	86
Future Vol, veh/h	53	260	65	35	482	65	52	7	43	38	3	86
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	15	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	58	283	71	38	524	71	57	8	47	41	3	93

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	595	0	0	354	0	0	775	1106	319	1098	1106	298
Stage 1	-	-	-	-	-	-	435	435	-	636	636	-
Stage 2	-	-	-	-	-	-	340	671	-	462	470	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.23	7.33	6.53	6.93
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	979	-	-	1203	-	-	301	210	721	178	210	699
Stage 1	-	-	-	-	-	-	599	580	-	433	471	-
Stage 2	-	-	-	-	-	-	649	454	-	579	559	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	979	-	-	1203	-	-	237	188	721	148	188	699
Mov Cap-2 Maneuver	-	-	-	-	-	-	237	188	-	148	188	-
Stage 1	-	-	-	-	-	-	564	546	-	407	448	-
Stage 2	-	-	-	-	-	-	531	432	-	502	526	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.7	19	24.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	237	516	979	-	-	1203	-	-	321
HCM Lane V/C Ratio	0.238	0.105	0.059	-	-	0.032	-	-	0.43
HCM Control Delay (s)	24.9	12.8	8.9	-	-	8.1	0.2	-	24.4
HCM Lane LOS	C	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.9	0.4	0.2	-	-	0.1	-	-	2.1

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	18	483	19	23	540
Future Vol, veh/h	21	18	483	19	23	540
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	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	20	525	21	25	587

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1173	273	0	0	546	0
Stage 1	536	-	-	-	-	-
Stage 2	637	-	-	-	-	-
Critical Hdwy	6.63	6.93	-	-	4.13	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219	-
Pot Cap-1 Maneuver	198	725	-	-	1021	-
Stage 1	552	-	-	-	-	-
Stage 2	526	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	191	725	-	-	1021	-
Mov Cap-2 Maneuver	191	-	-	-	-	-
Stage 1	552	-	-	-	-	-
Stage 2	507	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.9	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	191	725	1021	-
HCM Lane V/C Ratio	-	-	0.12	0.027	0.024	-
HCM Control Delay (s)	-	-	26.4	10.1	8.6	0
HCM Lane LOS	-	-	D	B	A	A
HCM 95th %tile Q(veh)	-	-	0.4	0.1	0.1	-