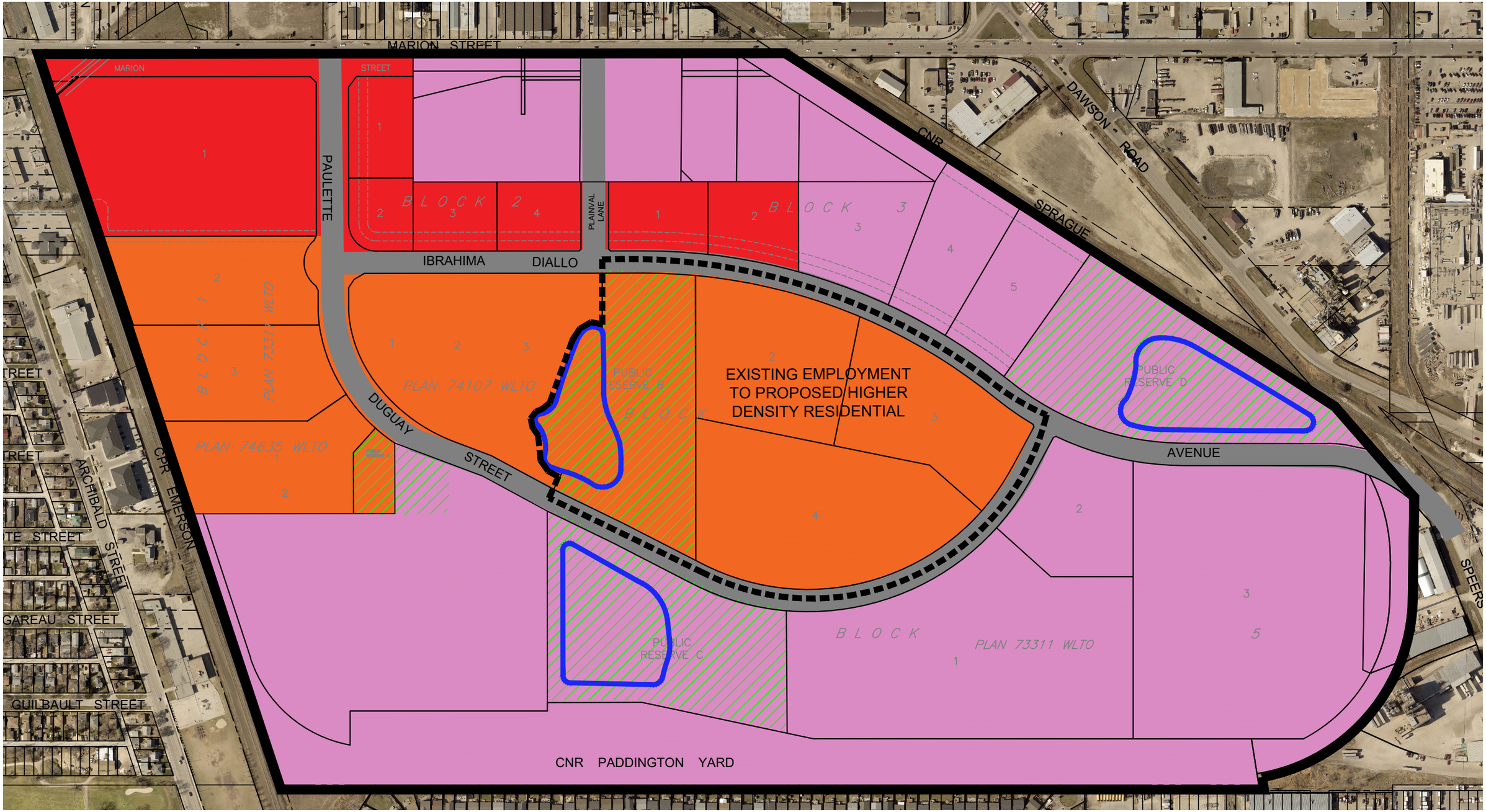
Table 1 - Proposed Policy Amendments
Public Markets Secondary Plan
May 5, 2025

Policy	Proposed Amendments
Policy 3.2.2.9	
New residential development shall be setback 300 metres (984.25 feet) from any "M3" Manufacturing Heavy zoning district outside the planning area, except for lands located directly across Marion Street to the north, where new residential development shall be setback 150 metres (492.13 feet) from any other Manufacturing-zoned industrial lands. Setback distances shall be measured from the nearest property line to nearest property line.	New residential development shall be setback 300 metres (984.25 feet) from any "M3" Manufacturing Heavy zoning district outside the planning area. Except for a. lands located directly across Marion Street to the north b. lands located within the area bounded by Sprague line, east property line of 864 Marion Street (WFPS Station No.9), Marion Street and Dawson Road where new residential development shall be setback 150 metres (492.13 feet) from any other Manufacturing-zoned industrial lands. Setback distances shall be measured from the nearest property line to nearest property line.
Policy 3.3.3.13b.	
A 300 metre setback from the Paddington Yard. The setback distance shall be measured from the nearest Paddington Yard property line to the closest location of a habitable room or space within a dwelling.	A ~~300~~ 150 metre setback from the Paddington Yard . The setback distance shall be measured from the nearest Paddington Yard property line to the closest location of a habitable room or space within a dwelling.
Policy 3.3.2.14	
New Residential zoning districts shall be setback 300 metres (984.25 feet) from any "M3" Manufacturing Heavy zoning district outside the planning area, except for lands located directly across Marion Street to the north, where new Residential zoning districts shall be setback 150 metres (492.13 feet) from any other Manufacturing-zoned industrial lands. Setback distances shall be measured from the nearest property line to nearest property line.	New Residential zoning districts shall be setback 300 metres (984.25 feet) from any "M3" Manufacturing Heavy zoning district outside the planning area. Except for a. lands located directly across Marion Street to the north b. lands located within the area bounded by Sprague line, Marion Street and Dawson Road where new Residential zoning districts shall be setback 150 metres (492.13 feet) from any other Manufacturing-zoned industrial lands. Setback distances shall be measured from the nearest property line to nearest property line.
Policy 8.2.2	
Up to 1,200 dwelling units may be permitted within Phase 1 with collector road access to Marion Street, generally located across from Dupuy Avenue, and access at the northern terminus of and connected to Speers Road. Up to 2,000 dwelling units may be permitted in the planning area following the successful implementation of a predictive rail crossing blockage alert system, or some alternate solution, to the satisfaction of the Chief of the Winnipeg Fire and Paramedic Service, the Director of Public Works and the Director of Planning, Property and Development.	Up to 1,200 dwelling units may be permitted within Phase 1 with collector road access to Marion Street, generally located across from Dupuy Avenue, and access at the northern terminus of and connected to Speers Road. Up to ~~2,000~~ 2800 dwelling units may be permitted in the planning area following the successful implementation of a predictive rail crossing blockage alert system, or some alternate solution, to the satisfaction of the Chief of the Winnipeg Fire and Paramedic Service, the Director of Public Works and the Director of Planning, Property and Development.



PUBLIC MARKETS MRS D - WATER TOWER DISTRICT

MAP 1 - APPENDIX A - MODIFIED LAND USE AND TRANSPORTATION MAP

MAY 2025

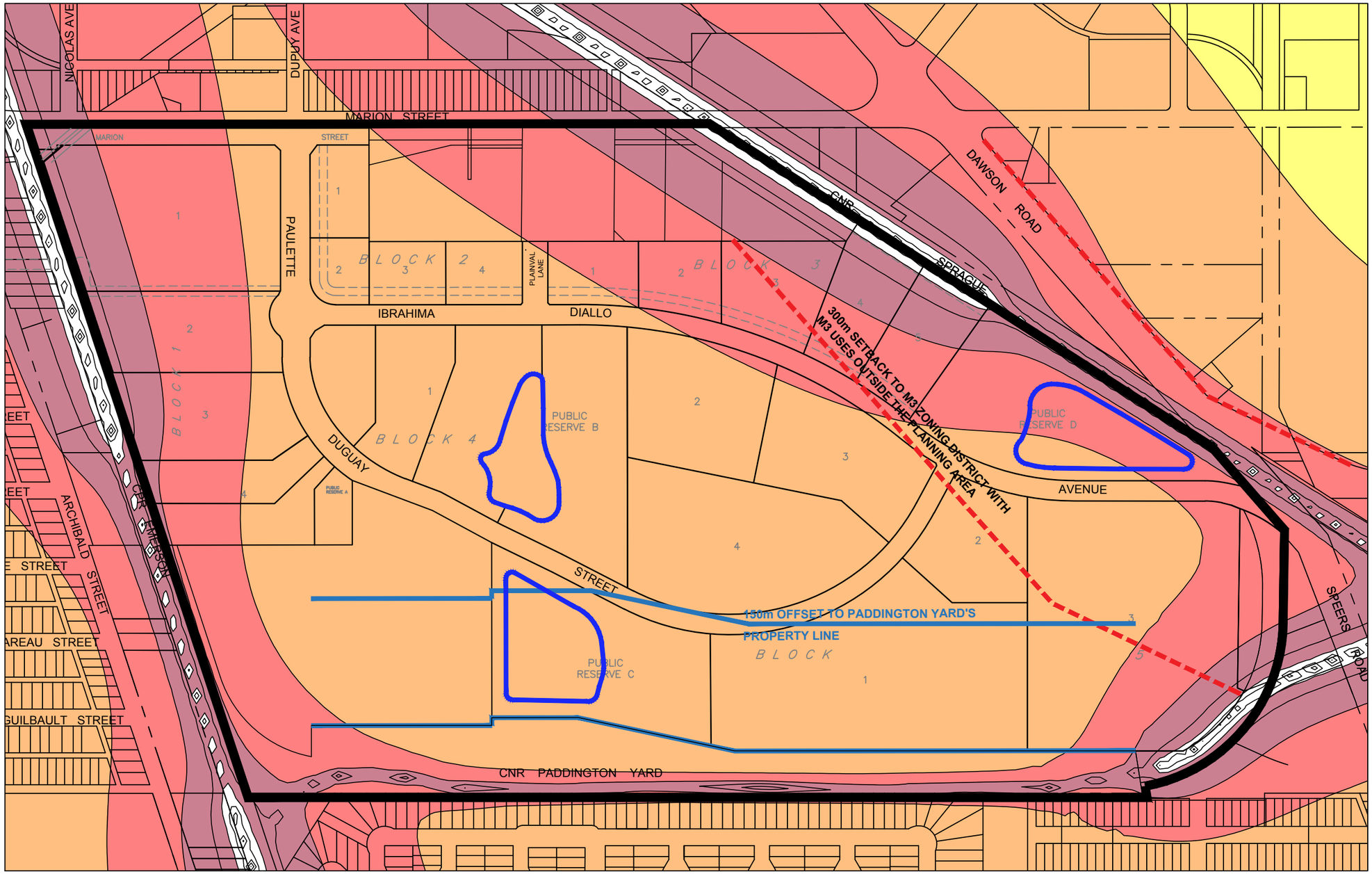
SCALE 1:4000

0 10 25 50 100 200m

NORTH

LEGEND

- EMPLOYMENT
- COMMERCIAL
- HIGHER DENSITY RESIDENTIAL
- LOTS TO BE REDESIGNATED
- PUBLIC RESERVE
- RETENTION POND
- COLLECTOR ROAD



RAIL TRAFFIC NOISE IMPACT AREA
(WORST-CASE DAY TIME LEVELS)

- LEVEL 1 No noise control measures required. See IOC
- LEVEL 2 No noise control measures required. See NCM 6, See IOC
- LEVEL 3 Noise control measures recommended. See NCM 1, 3, 4 and 6. Vibration mitigation measures recommended. See VCM 1, 2, 3, and 4 See IOC
- LEVEL 4 Noise control measures recommended. See NCM 2, 3, 4, 5, and 6. Vibration mitigation measures recommended. See VCM 1, 2, 3 and 4 See IOC

NOISE CONTROL MEASURES (NCM) Apply to residential locations only.

1. Upgraded Glazing Area Level 3 10 Storey highrise, facades with direct line of sight to rail/sleeping quarters STC-31, living/dining rooms STC-30
2. Upgraded Glazing Area Level 4 10 storey high rise, facades with direct line of sight to rail line, sleeping quarters STC-34, living/dining rooms STC-33
3. Non-glazing facade construction requirements acoustical equivalent of STC 54 (Brick veneer or upgraded facade construction)
4. Installation of central air conditioning and Type C warning clause.
5. Acoustical barrier or Type A warning clause for outdoor living areas
6. Inclusion of a CP/CN warning clause regarding the potential for noise and vibration impacts for all residential locations within 300m of the rail line

VIBRATION MITIGATION MEASURES (VCM)

1. Vibration mitigation measures are required for buildings within 75m of the rail line.
2. Vibration Mitigation Measures may also be needed outside the 75m setback to meet the applicable criterion of 0.14mm/s maximum.
3. Vibration mitigation measures such as trenching to isolate source from receiver and isolation pads/isolators for building foundation may be required.
4. Inclusion of CP/CN warning clause regarding the potential for noise and vibration impacts for all residential locations within 300m of the rail line.

INDUSTRIAL ODOUR CONTROL MEASURES (IOC)

1. Required for all residential location
2. Installation of central air conditioning and inclusion of warning clause regarding the potential for odour emanating from existing industrial land uses outside the planning area

PUBLIC MARKETS (MRS D)

FIGURE 2 - NOISE AND ODOR CONTROL MEASURES

APRIL 2025
SCALE 1:2000

0 10 25 50 100 300m NORTH

Public Markets Stakeholder Meetings for Proposed SPA February 2025

Two meetings were held to review the proposed secondary plan amendments for the public markets to change the lands in the centre of the development from employment to residential. The presentations included information on:

- The proposed changes
- Review of the existing secondary plan map
- Information on the proposed changes including reducing the setback to M3 along the Sprague line and from the Paddington yards to 150m.
- Supporting reasoning for the changes to the setbacks and the land use
- Supporting reasoning for the increase in density of units

Meeting with Industrial Stakeholders

The meeting for industrial stakeholders was held February 3, 2025 and included 8 people from 5 stakeholders including Enterprises Riel, Star Building, ABC Fire and Safety, Darling Ingredients, and Maple Leaf Foods. The attendees were invited from the list of stakeholders for previous applications on this project through a direct email.

Summary of Questions from the Stakeholders

Q Are there concerns with smells and noise from industrial?

A The policies in the secondary plan for odor and noise mitigation are not changing in the secondary plan. All new residential will need to follow the requirements set out for the existing residential.

Q With residential moving into industrial area does this put industrial land at risk?

A As the site is within a contained area and is adjacent to the central parks we do not feel this will affect the existing industrial any more than the residential already in existence. There are intervening uses in the development of industrial and public reserve to buffer the existing industrial.

Q Will traffic be affected by the increase in residential?

A The project engineers have noted that the residential use will have a reduction of traffic overall from the industrial use and the timing of trips will not be during regular business hours. Also there is no connection to Dawson Road so traffic will not be directed toward those industrial users. On Speers the developer is required to upgrade Speers to Maginot and the Maginot intersection to accommodate the new industrial users. This will not change with this amendment.

Meeting with CN

The meeting with CN was held February 5, 2025 with the CN representative. The same presentation was provided with the addition of the noise and vibration assessment done for the project showing that the area proposed to be residential is no more impacted by noise or vibration than the existing residential in the development.

The comments from the CN representative were focused on CN not accepting the professional noise and vibration study completed by Dillon Consulting that was previously accepted. The representative was generally not in favour of residential development within 300m of any rail facility. Their position is that the Sprague and Emerson lines are actually rail yard lines even though the Rail Association of Canada has classified them as main lines. The meeting was ended with an understanding that CN is not in favour of the proposed amendment.

Conclusions

All information provided by the stakeholders will be taken into consideration. It is understood that there are perceived potential impacts to industrial and rail by residential developments. These are not confirmed impacts but are the perception of the industrial proponents.

MEMO

TO: Oxela Developments

FROM: Eva Kwok, P.Eng. & Ken Wimble, P.Eng. (WSP Canada Inc.)

SUBJECT: **Public Markets MRS-D – Updated Trip Generation Analysis for 2025 Site Plan**

DATE: **March 14, 2025**

EXECUTIVE SUMMARY

- The updated site plan for the Public Markets MRS-D development adds 800 multi-family residential units by removing 60,000 sq.ft. of office space and 281,000 sq.ft. of recreational community centre.
- For Phase 1, this results in a change to overall development trip generation of -6% to +8% depending on the time period and direction.
- For Phase 2 (full build-out), this results in a change to overall development trip generation of -23% to +1% depending on the time period and direction.
- The Phase 1 and Phase 2 (full build-out) transportation infrastructure modifications recommended in the 2024 TIS (*Public Markets MRS-D, Traffic Impacts Study Update, Revision 1, May 3, 2024, WSP Canada Inc.)* would be expected to have adequate capacity to accommodate the updated site plan land uses based on the updated trip generation for the overall site.
- **Based on the updated trip generation, no changes are required to the road infrastructure as currently designed.**

1 INTRODUCTION

Oxela Developments retained WSP Canada Inc. (WSP) to update trip generation analysis previously prepared by WSP for the Traffic Impact Study (TIS) report *Public Markets MRS-D, Traffic Impacts Study Update, Revision 1, May 3, 2024* (2024 TIS). The update reflects changes in development land use including replacing the Recreational Community Centre (Block 4 Lots 2, 3 & 4 / TIS Zone 9) and commercial office park (Block 3 Lots 1 & 2 / TIS Zone 13 Specialty Trade Centre) with 800 multi-family units. This results in the development now having a total of 2,800 multi-family units.

This memo outlines the differences in vehicle trips generated in Phase 1 (partial build-out) and Phase 2 (full build-out) based on the updated site plan.

The locations of Zone 9 and Zone 13 on the development site are shown in **Figure 1.1**.

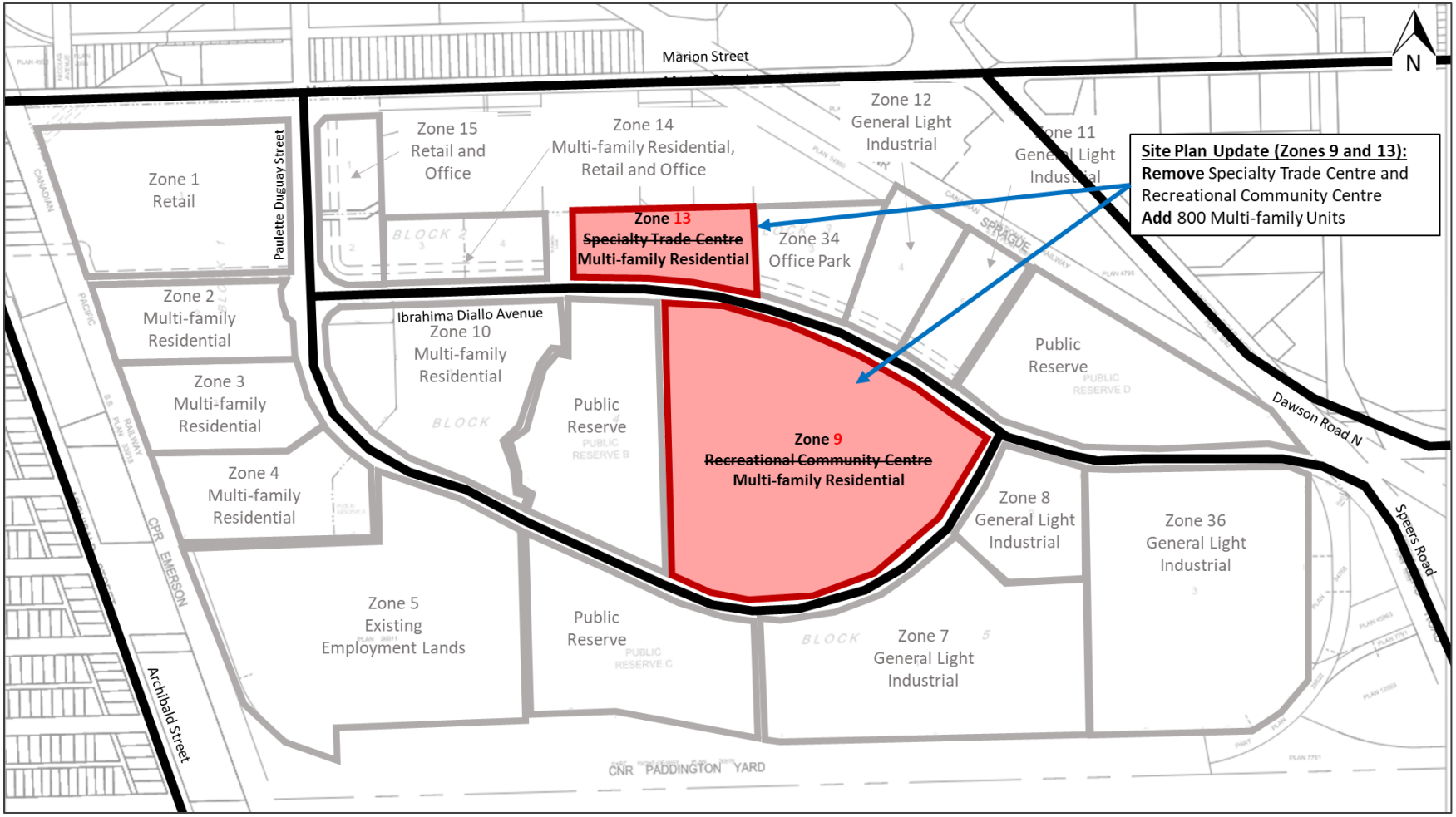


Figure 1.1: Site Plan Changes

2 UPDATED TRIP GENERATION

The difference in vehicular trips generated by the proposed land use changes were estimated for the weekday a.m. and p.m. peak hours and weekday period. The following assumptions were made when calculating the new Phase 1 and 2 site trips, consistent with the 2024 TIS:

- 50% of the residential development would be completed in Phase 1.
- The commercial office park development in Zone 13 (Specialty Trade Centre) is fully built-out for Phase 1.
- The recreational community centre in Zone 9 is not constructed during Phase 1. It is therefore only included in Phase 2 calculations.
- The *Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition* was used to obtain trip generation rates.
  - Rates of 0.32, 0.41 and 5.44 trips / dwelling unit from ITE Land Use 221 Mid-Rise Residential were applied to calculate the increased residential trip generation for the a.m. peak hour, p.m. peak hour and weekday period, respectively. A non-auto mode share of 20% was applied to the new calculated ITE residential trips.
  - Trips generated by the recreational and office park land uses in Zone 9 and Zone 13 were determined in a previous TIS for the Public Markets Development by Stantec Consulting Ltd. (*Development of MRS-D Traffic Impact Study Supporting Phase 1 Development Application and Internal Road Design DRAFT, September 2020*)

Using these assumptions, the site trips were recalculated for the new land uses. The net difference in trips, accounting for the replacement of Zones 9 and 13, is summarized in **Table 2.1** and **Table 2.2** for the a.m. peak, p.m. peak, and weekday periods for Phase 1 and Phase 2, respectively. The total new trips generated for each phase are also summarized in **Table 2.3** and **Table 2.4.**

Table 2.1:Phase 1 Trip Generation – Difference in Auto Trips

ZONE	LAND USE TYPE	UNITS	AM PEAK			PM PEAK			DAILY		
			IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
2024 TIS											
Zone 9	Recreational Community Centre	0 sq.ft.	0	0	0	0	0	0	0	0	0
Zone 13	Specialty Trade Centre	60,000 sq.ft.	73	27	100	38	80	118	307	307	614
	Total	**60,000 sq.ft.**	**73**	**27**	**100**	**38**	**80**	**118**	**307**	**307**	**614**
2025 UPDATED SITE PLAN											
Zone 9 and 13	Multi-Family Residential	400 Dwelling Units	**28**	**74**	**102**	**79**	**52**	**131**	**871**	**871**	**1742**
DIFFERENCE											
	Total	-60,000 sq.ft. +400 Dwelling Units	**-45**	**+45**	**+2**	**+41**	**-28**	**+13**	**+564**	**+564**	**+1128**

Table 2.2: Phase 2 Trip Generation – Difference in Auto Trips

ZONE	LAND USE TYPE	UNITS	AM PEAK			PM PEAK			DAILY		
			IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
2024 TIS											
Zone 9	Recreational Community Centre	281,000 sq.ft.	220	120	340	206	232	438	2733	2733	5466
Zone 13	Specialty Trade Centre	60,000 sq.ft.	73	27	100	38	80	118	307	307	614
	Total	**341,000 sq.ft.**	**293**	**147**	**440**	**244**	**312**	**556**	**3040**	**3040**	**6080**
2025 UPDATED SITE PLAN											
Zone 9 and 13	Multi-Family Residential	800 Dwelling Units	**55**	**150**	**205**	**157**	**105**	**262**	**1741**	**1741**	**3482**
DIFFERENCE											
	Total	-341,000 sq.ft. +800 Dwelling Units	**-238**	**+3**	**-235**	**-87**	**-207**	**-294**	**-1299**	**-1299**	**-2598**

Table 2.3: Phase 1 Total Site Trip Generation and Difference

LAND USE	2024 TIS			2025 UPDATED SITE PLAN			DIFFERENCE		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
AM PEAK PERIOD									
Residential	73	189	262	101	263	364	28	74	102
Commercial	105	81	186	105	81	186	0	0	0
Recreational	0	0	0	0	0	0	0	0	0
Industrial / Office Park	516	86	602	443	59	502	-73	-27	-100
Total	**694**	**356**	**1050**	**649**	**403**	**1052**	**-45 (-6%)**	**47 (+13%)**	**2 (+0.1%)**
PM PEAK PERIOD									
Residential	200	133	333	279	185	464	79	52	131
Commercial	208	218	426	208	218	426	0	0	0
Recreational	0	0	0	0	0	0	0	0	0
Industrial / Office Park	85	456	541	47	376	423	-38	-80	-118
Total	**493**	**807**	**1300**	**534**	**779**	**1313**	**41 (+8%)**	**-28 (-3%)**	**13 (+1%)**
DAILY									
Residential	2178	2178	4356	3049	3049	6098	871	871	1742
Commercial	3122	3122	6244	3122	3122	6244	0	0	0
Recreational	0	0	0	0	0	0	0	0	0
Industrial / Office Park	2200	2200	4400	1893	1893	3786	-307	-307	-614
Total	**7500**	**7500**	**15000**	**8064**	**8064**	**16128**	**564 (+8%)**	**564 (+8%)**	**1128 (+8%)**

Table 2.4: Phase 2 Total Site Trip Generation and Difference

LAND USE	2024 TIS			2025 UPDATED SITE PLAN			DIFFERENCE		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
AM PEAK PERIOD									
Residential	141	376	517	196	526	722	55	150	205
Commercial	118	89	207	118	89	207	0	0	0
Recreational	220	114	334	0	0	0	-220	-114	-334
Industrial / Office Park	571	94	665	498	67	565	-73	-27	-100
Total	**1050**	**673**	**1723**	**812**	**682**	**1494**	**-238 (-23%)**	**9 (+1%)**	**-229 (-13%)**
PM PEAK PERIOD									
Residential	397	265	662	554	370	924	157	105	262
Commercial	231	243	474	231	243	474	0	0	0
Recreational	206	232	438	0	0	0	-206	-232	-438
Industrial / Office Park	92	505	597	54	425	479	-38	-80	-118
Total	**926**	**1245**	**2171**	**839**	**1038**	**1877**	**-87 (-9%)**	**-207 (-17%)**	**-294 (-14%)**
DAILY									
Residential	4354	4354	8708	6095	6095	12190	1741	1741	3482
Commercial	3356	3356	6712	3356	3356	6712	0	0	0
Recreational	2733	2733	5466	0	0	0	-2733	-2733	-5466
Industrial / Office Park	2423	2423	4846	2116	2116	4232	-307	-307	-614
Total	**12866**	**12866**	**25732**	**11567**	**11567**	**23134**	**-1299 (-10%)**	**-1299 (-10%)**	**-2598 (-10%)**

3 DISCUSSION

Previously in Phase 1 only Zone 13 was fully built out, generating 100 auto trips (73 entering and 27 exiting) during the a.m. peak hour, 118 auto trips (38 entering and 80 exiting) during the p.m. peak hour, and 614 auto trips (307 entering and 307 exiting) during the weekday period. In this update, it is assumed that half of the additional multi-family development (400 units) will be complete in Phase 1, replacing the Zone 13 (specialty trade centre) trips, resulting in 102 auto trips (28 entering and 74 exiting) during the a.m. peak hour, 131 auto trips (79 entering and 52 exiting) during the p.m. peak hour, and 1742 auto trips (871 entering and 871 exiting) during the weekday period. This results in a net **increase** of 2, 13, and 1128 total auto trips in the a.m. peak hour, p.m. peak hour, and weekday periods, respectively.

The only infrastructure modification to be constructed between Phase 1 and Phase 2 is a second northbound left-turn lane at the Lagimodiere Boulevard / Maginot Street intersection. The largest inbound traffic volume increase for the overall site is +41 vehicles during the Phase 1 weekday p.m. peak hour. The trip distribution for the northbound left-turn at Lagimodiere Boulevard / Maginot Street was 9.6% in the 2024 TIS which, based on a total increase of 41 vehicles, equates to an increase of 4 vehicles for this movement during the p.m. peak hour. This is considered a negligible increase, therefore the Phase 1 intersection modifications recommended in the 2024 TIS would be expected to have adequate capacity to accommodate the updated site plan land uses for Phase 2.

Previously in Phase 2 (full build-out), both Zones 9 and 13 were proposed to be fully built out, generating 440 auto trips (293 entering and 147 exiting) during the a.m. peak hour, 556 (244 entering and 312 exiting) during the p.m. peak hour, and 6080 auto trips (3040 entering and 3040 exiting) during the weekday period. In this update, the entire additional multi-family development (800 units) will be complete in Phase 2 (full build-out), replacing the Zone 9 (recreational community centre) and Zone 13 (specialty trade centre) trips, resulting in 205 auto trips (55 entering and 150 exiting) during the a.m. peak hour, 262 auto trips (157 entering and 105 exiting) during the p.m. peak hour, and 3482 auto trips (1741 entering and 1741 exiting) during the weekday period. This results in a net **decrease** of 235, 294, and 2598 total auto trips in the a.m. peak, p.m. peak, and weekday periods, respectively.

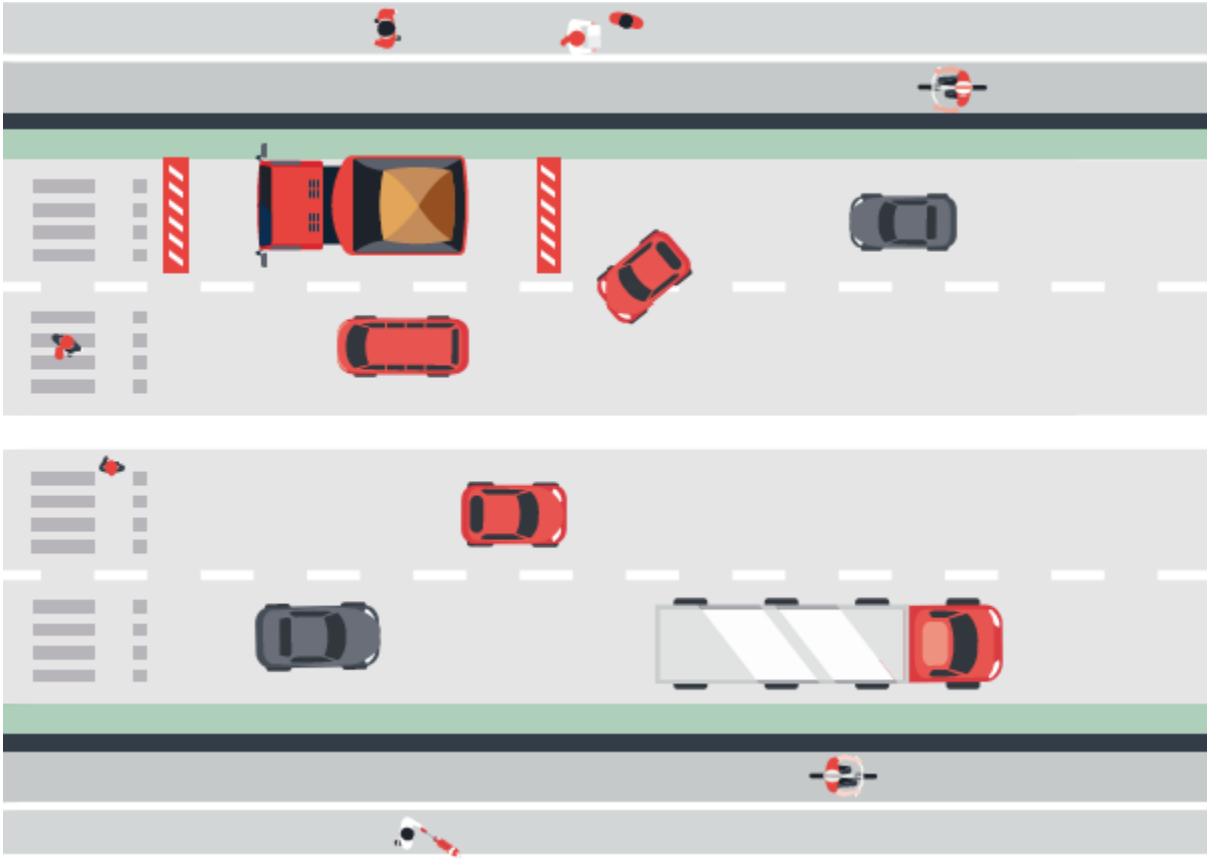
Therefore, the Phase 2 (full build-out) transportation infrastructure modifications recommended in the 2024 TIS would be expected to have adequate capacity to accommodate the updated site plan land uses.

OLEXA DEVELOPMENTS
211-07590-00

PUBLIC MARKETS MRS-D
TRAFFIC IMPACT STUDY UPDATE

JUNE 10, 2025

REVISION 2



PUBLIC MARKETS MRS-D

TRAFFIC IMPACT STUDY UPDATE

OLEXA DEVELOPMENTS

REVISION 2

PROJECT NO.: 211-07590-00
DATE: JUNE 10, 2025

WSP
1600 BUFFALO PLACE
WINNIPEG, MB
CANADA R3T 6B8

T: +1 204 477-6650
F: +1 204 474-2864
WSP.COM

REVISION HISTORY

FIRST ISSUE				
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Prepared by	Reviewed by	Approved By		
Eva Kwok Cohen Lussier Vanessa Schmidt	Ken Wimble	Kerra Mruss		
REVISION 1				
May 3, 2024	Resubmission to City of Winnipeg			
Prepared by	Reviewed by	Approved By		
Vanessa Schmidt Ken Wimble	Ken Wimble	Ken Wimble		
REVISION 2				
June 10, 2024	Resubmission to City of Winnipeg (revised development land uses)			
Prepared by	Reviewed by	Approved By		
Eva Kwok	Ken Wimble	Ken Wimble		

SIGNATURES

APPROVED[1] BY *(must be reviewed for technical accuracy prior to approval)*



Ken Wimble, P.Eng.
Senior Project Engineer

June 10, 2025
Date

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TABLE OF CONTENTS

1 INTRODUCTION 1

1.1 Background 2

1.2 Proposed Development 3

2 TRAFFIC VOLUMES 5

2.1 Existing Traffic 5

2.2 Site Generated Traffic 6

2.2.1 Trip Generation 6

2.2.2 Trip Distribution and Assignment 12

3 TRAFFIC ANALYSIS 20

3.1 Signal Warrant Analysis 20

3.1.1 Paulette Duguay Street and Commercial Access 20

3.1.2 Paulette Duguay Street and Ibrahima Diallo Avenue 20

3.2 Intersection Analysis 20

3.2.1 Marion Street / Dupuy Avenue / Paulette Duguay Street 22

3.2.2 Paulette Duguay Street / Commercial Access Intersection 23

3.2.3 Paulette Duguay Street / Ibrahima Diallo Avenue 25

3.2.4 Lagimodiere Boulevard / Maginot Street 26

3.2.5 Maginot Street / Speers Road 28

3.2.6 Queuing Analysis 30

4 TRANSIT REVIEW 32

5 WALKING AND CYCLING REVIEW 34

5.1 Pedestrian Crossing Treatments 34

5.2 School Travel Planning 35

6 TRUCK ACCESS REVIEW 37

7 CONCLUSIONS 38

TABLES

TABLE 1-1: PREVIOUS TIS SUBMISSIONS TO THE CITY OF WINNIPEG 1
TABLE 2-1: PHASE 1 SITE TRIP GENERATION 7
TABLE 2-2: PHASE 2 SITE TRIP GENERATION 9
TABLE 2-3: NEW SITE TRIP GENERATION 11
TABLE 2-4: UPDATED TRIP DISTRIBUTION 12
TABLE 3-1: MARION STREET / DUPUY AVENUE / PAULETTE DUGUAY STREET SYNCHRO ANALYSIS RESULTS 23
TABLE 3-2: PAULETTE DUGUAY STREET / COMMERCIAL ACCESS SYNCHRO ANALYSIS RESULTS (HCM 6TH EDITION) 24
TABLE 3-3: PAULETTE DUGUAY STREET / IBRAHIMA DIALLO AVENUE SYNCHRO ANALYSIS RESULTS (HCM 6TH EDITION) 26
TABLE 3-4: LAGIMODIERE BOULEVARD / MAGINOT STREET SYNCHRO ANALYSIS RESULTS 28
TABLE 3-5: MAGINOT STREET / SPEERS ROAD SIDRA ROUNDABOUT ANALYSIS RESULTS 29
TABLE 3-6: 2034 (PHASE 2) 95TH PERCENTILE QUEUE LENGTHS 30
TABLE 5-1: PEDESTRIAN CROSSING TREATMENTS 34

FIGURES

FIGURE 1-1: PROPOSED DEVELOPMENT AREA AND STUDY AREA INTERSECTIONS 3
FIGURE 1-2: PROPOSED DEVELOPMENT TRAFFIC ZONES AND LAND USES 4
FIGURE 2-1: EXISTING 2024 TRAFFIC VOLUMES 5
FIGURE 2-2: PHASE 1 NEW AND INTERNAL DEVELOPMENT TRIPS 13
FIGURE 2-3: PHASE 1 PASS-BY TRIPS 14
FIGURE 2-4: PHASE 2 / FULL BUILD-OUT NEW AND INTERNAL DEVELOPMENT TRIPS 15
FIGURE 2-5: PHASE 2 (FULL BUILD-OUT) PASS-BY TRIPS 16

FIGURE 2-6: 2029 POST-DEVELOPMENT PEAK HOUR TRAFFIC VOLUMES (PHASE 1) 17
FIGURE 2-7: 2034 POST-DEVELOPMENT PEAK HOUR TRAFFIC VOLUMES (PHASE 2 / FULL BUILD-OUT) 18
FIGURE 2-8: 2034 POST-DEVELOPMENT TRAFFIC VOLUMES (PHASE 2 / FULL BUILD-OUT) 19
FIGURE 3-1: MARION STREET AND DUPUY AVENUE / PAULETTE DUGUAY STREET INTERSECTION CONFIGURATION 22
FIGURE 3-2: PAULETTE DUGUAY STREET AND COMMERCIAL ACCESS INTERSECTION CONFIGURATION 24
FIGURE 3-3: PAULETTE DUGUAY STREET AND IBRAHIMA DIALLO AVENUE INTERSECTION CONFIGURATION 25
FIGURE 3-4: LAGIMODIERE BOULEVARD AND MAGINOT STREET INTERSECTION CONFIGURATION 27
FIGURE 3-5: MAGINOT STREET AND SPEERS ROAD ROUNDABOUT CONFIGURATION .. 29
FIGURE 4-1: PROPOSED 2025 TRANSIT SERVICE . 33
FIGURE 4-2: PROPOSED BUS STOP LAYOUT AT MARION STREET AND PAULETTE DUGUAY STREET 33
FIGURE 5-1:PEDESTRIAN CROSSING PATHS 35
FIGURE 5-2: SCHOOL TRAVEL PLAN 36

APPENDICES

A 2025 DESIGN DRAWINGS

B TRAFFIC COUNTS

C SIGNAL WARRANT ANALYSIS

D SYNCHRO, SIMTRAFFIC AND SIDRA REPORTS

1 INTRODUCTION

Oxela Developments retained WSP Canada Inc. (WSP) to conduct an updated Transportation Impact Study (TIS) to assess updated proposed land uses at the proposed Public Markets MRS-D development site. There have been several submissions previously submitted to the City of Winnipeg regarding the proposed development, as shown in **Table 1-1**.

Table 1-1: Previous TIS Submissions to the City of Winnipeg

SUBMISSION TITLE	SUBMISSION DATE	AUTHOR	DESCRIPTION	REFERENCE NAME
Development of MRS-D Traffic Impact Study	February 2020 (revised and re-submitted May 2020)	Stantec Consulting Ltd. (Stantec)	Stantec completed a TIS for the proposed development, which included commercial, mixed commercial/office, mixed office/residential, mid-rise multi-family, recreational, and mixed office/general light industrial land uses.	May 2020 TIS
Development of MRS-D Traffic Impact Study Supporting Phase 1 Development Application and Internal Road Design FINAL	September 2020	Stantec Consulting Ltd.	Stantec updated the original TIS for the proposed development with updated land use, phased build-out and analysis of internal intersections.	September 2020 TIS
Public Markets Development – Marion Street and Private Access Functional Plan Memo	February 2022	WSP	WSP presented a proposed functional design for a new signalized intersection at Marion Street and Dupuy Avenue / Paulette Duguay Street.	Functional Plan Memo
Public Markets Development – Marion Street and Private Access Intersections Review Memo	March 2022	WSP	WSP provided additional traffic analysis of the proposed signalized Marion Street and Dupuy Avenue / Paulette Duguay Street intersection to supplement the Functional Plan Memo.	Intersections Review Memo
Public Markets Development – Traffic Impact Study Update	May 2024	WSP	WSP provided a TIS Update to reassess the transportation impacts of the development based on increased multi-family density and removal of a proposed right-in / right-out on Marion Street east of the future Paulette Duguay Street collector road. The 2023 Design was reassessed to determine if it can accommodate the updated forecast development traffic. The City accepted the proposed design configurations presented in this TIS Update.	May 2024 TIS Update
Public Markets Development – Traffic Analysis of Stop Controlled Paulette Duguay Street / Ibrahima Diallo Avenue Intersection Letter	July 2024	WSP	Public Works identified a concern with site access redundancy due to the proposed single lane roundabout at the Paulette Duguay Street and Ibrahima Diallo Avenue intersection. WSP analyzed whether stop-control could replace the proposed roundabout, and recommended a four-way stop-controlled or three-legged one-way stop-controlled intersection with RRFB pedestrian crossing control.	July 2024 Stop-Control Review Letter

SUBMISSION TITLE	SUBMISSION DATE	AUTHOR	DESCRIPTION	REFERENCE NAME
Public Markets Development – Updated Trip Generation Analysis for 2025 Site Plan	March 2025	WSP	WSP provided an updated trip generation analysis based on changes in development land use, including replacing the Recreational Community Centre and commercial office park with 800 additional multi-family units.	March 2025 Trip Generation Update Memo

The purpose of this 2025 TIS Update is to reassess the transportation impacts of the development based on the most current development proposal, incorporating the design changes and updates in the May 2024 TIS Update, the July 2024 Stop-Control Review Letter, and the March 2025 Trip Generation Update Memo. A detailed design of the main development access at the Marion Street and Dupuy Avenue / Paulette Duguay Street intersection, Paulette Duguay Street and Ibrahim Diallo Avenue intersection has been submitted by WSP to the City's Underground Structures Group for review. Drawings of the detailed design (not yet approved by Underground Structures) are provided in **Appendix A.**

This 2025 TIS Update includes updated calculations of the new, pass-by and internal trips generated by the development using the latest Institute of Transportation Engineers (ITE) data from the 11th Edition of the *Trip Generation Manual* instead of the trip generation originally calculated in the September 2020 TIS and used for all previous reports.

The roadway design currently under review by Underground Structures is also re-evaluated in this report to confirm whether it can accommodate the updated forecasted traffic volumes.

As in the May 2024 TIS Update, the proposed development will be analysed in two phases. The horizon years for this updated study include 2024 as a base year, 2029 (Phase 1 of the development), and 2034 (Phase 2 of the development / full build-out). This updated study will include post-development weekday a.m., p.m. and daily traffic forecasts and analysis, signal warrant analysis, pedestrian crossing analysis, an updated transit review, and a review of truck movements to and from the industrial land uses.

1.1 BACKGROUND

The location and study area of the proposed development is shown in **Figure 1-1**. The following intersections were reviewed in this updated TIS:

- Marion Street / Dupuy Ave / Paulette Duguay Street (signalized)
- Paulette Duguay Street / Commercial Access (unsignalized)
- Paulette Duguay Street / Ibrahima Diallo Avenue (unsignalized)
- Lagimodiere Boulevard / Maginot Street (signalized)
- Maginot Street / Speers Road (roundabout)



Figure 1-1: Proposed Development Area and Study Area Intersections

1.2 PROPOSED DEVELOPMENT

The proposed development is approximately 222 acres (89.8 hectares) and is connected to the existing road network via the Marion Street and Dupuy Avenue intersection and at Speers Road. The previous TIS's divided the proposed development area into trip generation zones for the purpose of assigning site trips to the internal road network. The zone layout of the previous TIS was duplicated for this update, as illustrated in **Figure 1-2**.

In the most recent analysis contained in the May 2024 TIS Update, Zone 9 was designated as a Recreational Community Centre and Zone 13 was designated as a Specialty Trade Centre. These two zones have been updated to multi-family residential land uses. This results in the following overall changes since the May 2024 TIS:

- Subtract 60,000 square feet of Specialty Trade Centre.
- Subtract 281,000 square feet of Recreational Community Centre.
- Add 800 multi-family units, bringing the development total to 2,800 multi-family units.

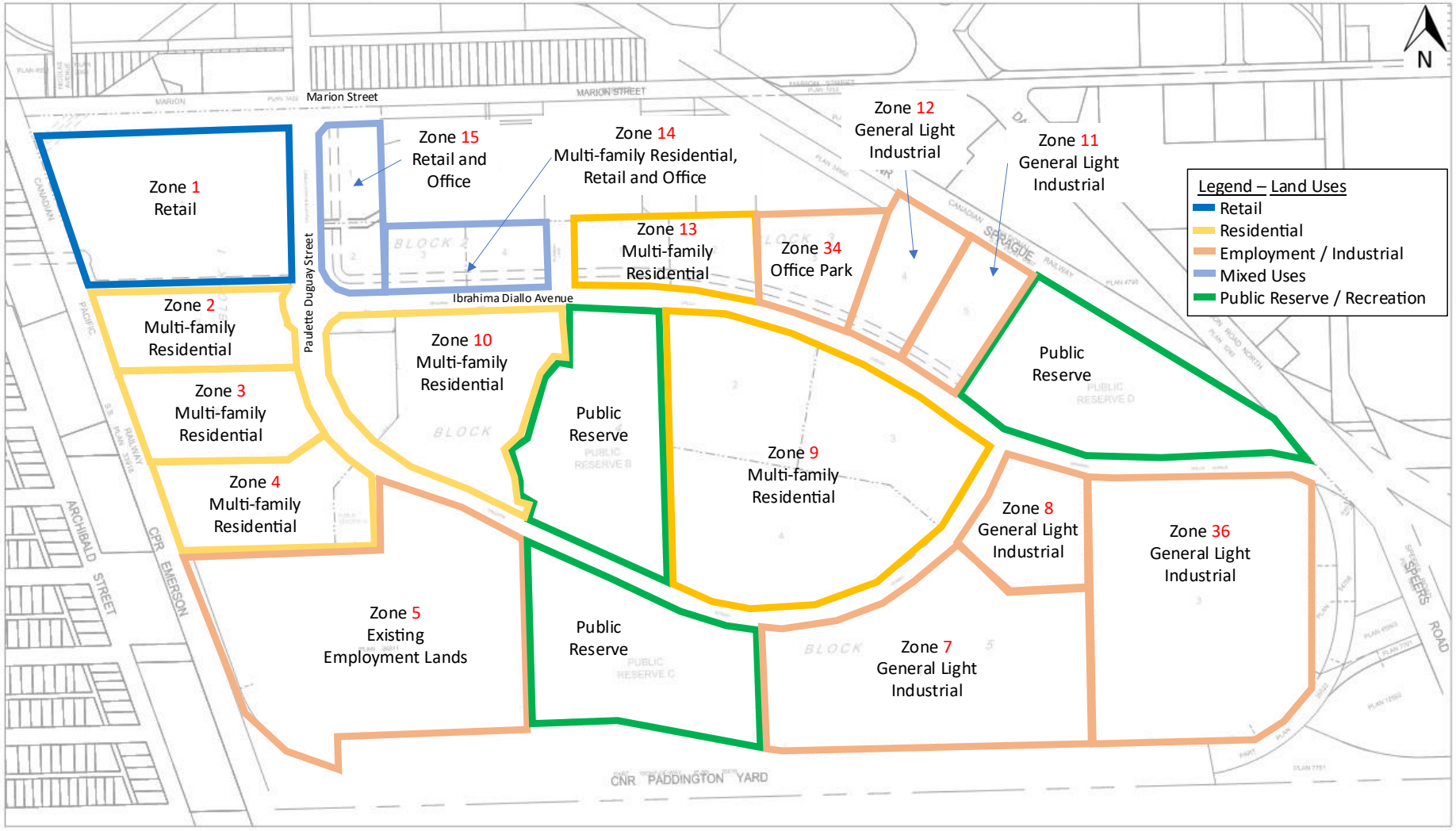


Figure 1-2: Proposed Development Traffic Zones and Land Uses

2 TRAFFIC VOLUMES

2.1 EXISTING TRAFFIC

WSP conducted a peak hour traffic count at the Lagimodiere Boulevard and Maginot Street intersection on February 6, 2024, using MioVision Scout Video Collection Units.

The existing traffic volumes for the other existing study area intersections were obtained from 2019 counts conducted for the September 2020 TIS. The following growth rates based on the City of Winnipeg Public Works Department 10-year average annual growth rate from 2010 to 2019 were applied to traffic volumes collected in previous years:

- 0.2 percent in the a.m. peak period.
- 0.1 percent in the p.m. peak period.

The weekday a.m. and p.m. peak hours were selected for analysis for this development as these are the most critical times for traffic in the area and are also typical busy periods for the proposed land uses in the development. Existing traffic volumes for the weekday a.m. and p.m. peak hours are shown in **Figure 2-1.** The 2024 traffic counts for the Lagimodiere Boulevard / Maginot Street intersection are provided in **Appendix B**. Truck traffic volumes and peak hour factors were obtained from the counts and the September 2020 TIS and used in the analysis.

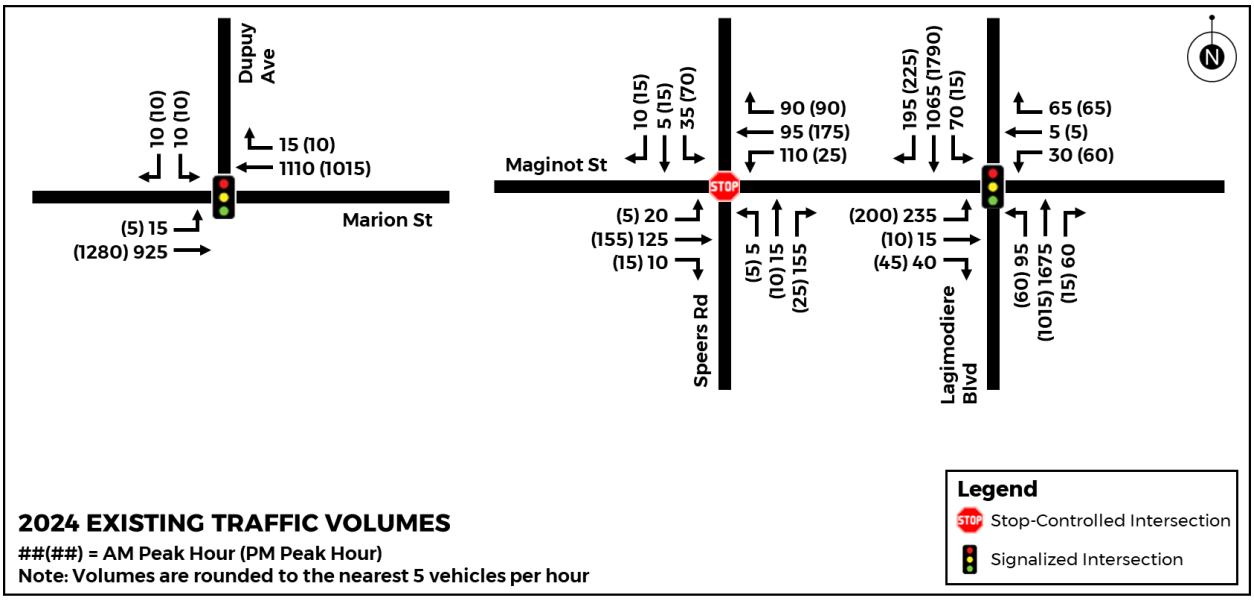


Figure 2-1: Existing 2024 Traffic Volumes

2.2 SITE GENERATED TRAFFIC

2.2.1 TRIP GENERATION

Vehicular trips generated by the proposed development were estimated for the weekday a.m. and p.m. peak hours and weekday using the *ITE Trip Generation Manual, 11th Edition* to obtain trip generation rates for the site. The following assumptions were made when calculating the new Phase 1 and 2 site trips:

- 50% of the residential development would be completed in Phase 1.
- Zone 10 was split into two sub-zones (10A and 10B), as there are two land parcels in Zone 10 that have different land-uses, road network accesses, and trip distribution.
- The mode share split used in the September 2020 TIS was also applied to the new calculated trips for this report.
- Internal trips are trips made within a development without using the major road network. The internal capture rates for the proposed development were calculated for the entire site using the process outlined in Chapter 6 of the *ITE Trip Generation Handbook, 3rd Edition*. Internal capture rates were applied to the office, retail, and residential land-uses. The trips were distributed to the internal study area intersections based on the approximate area of each zone.
- The retail land uses are anticipated to generate pass-by trips, which are vehicular trips made as an intermediate stop along the course of a trip between an origin and primary destination. The *ITE Trip Generation Manual, 11th* Edition indicates vehicle pass-by rates of 34% for the Shopping Centre (Code 820) land use in the PM peak period, and this was used in this study for both PM and daily peak periods. For this study, pass-by trips are defined as trips that divert from Marion Street through traffic to retail land uses located throughout the development, not just the development fronting Marion Street.

Following these assumptions, the total, internal, pass-by and new site trips for each zone were calculated for the entire development. Development trips for the a.m. peak period, p.m. peak period, and weekday periods for Phase 1 and Phase 2 are detailed in **Table 2-1** and **Table 2-2**, respectively and summarized in **Table 2-3**.

In the 2029 Phase 1 scenario, the development is proposed to generate 964 auto trips (580 entering and 384 exiting) during the weekday a.m. peak hour, 1,014 auto trips (382 entering and 632 exiting) during the p.m. peak hour, and 10,166 auto trips (5,083 entering and 5,083 exiting) daily.

In the 2034 Phase 2 / Full Development scenario, the additional residential units are forecast to generate 1,460 auto trips (738 entering and 722 exiting) during the weekday a.m. peak hour, 1,577 auto trips (691 entering and 886 exiting) during the p.m. peak hour, and 16,108 auto trips (8,054 entering and 8,054 exiting) daily.

Table 2-1: Phase 1 Site Trip Generation

ZONE	ITE LAND USE (CODE)	QUANTITY	ITE RATE	TOTAL TRIPS			MODE SPLIT %	INTERNAL TRIPS			PASS-BY TRIPS			NEW TRIPS		
				IN	OUT	TOT.		IN	OUT	TOT.	IN	OUT	TOT.	IN	OUT	TOT.
AM PEAK PERIOD																
1	Shopping Centre (820)	82,500 sq. ft.	0.84	43	26	**69**	90%	6	6	**12**				33	17	**50**
2	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	0.37	21	72	**93**	80%	0	1	**1**				17	57	**74**
3	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	0.37	21	72	**93**	80%	0	1	**1**				17	57	**74**
4	Multifamily Housing – Mid-Rise (221)	120 Dwelling Units	0.37	10	34	**44**	80%	0	1	**1**				8	26	**34**
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	0.08	6	2	**8**	100%							6	2	**8**
7	General Light Industrial (110)	0 sq. ft.	0.74	0	0	**0**	90%							0	0	**0**
8	General Light Industrial (110)	200,000 sq. ft.	0.74	130	18	**148**	90%							117	16	**133**
9	Multifamily Housing – Mid-Rise (221)	300 Dwelling Units	0.37	26	85	**111**	80%	1	2	**3**				20	66	**86**
10	Multifamily Housing – Mid-Rise (221)	175 Dwelling Units	0.37	15	50	**65**	80%	0	1	**1**				12	39	**51**
	Multifamily Housing – High Rise (222)	115 Dwelling Units	0.27	8	23	**31**	80%	0	0	**0**				6	18	**24**
11	General Light Industrial (110)	55,000 sq. ft.	0.74	36	5	**41**	90%							32	5	**37**
12	General Light Industrial (110)	55,000 sq. ft.	0.74	36	5	**41**	90%							32	5	**37**
13	Multifamily Housing – Mid-Rise (221)	100 Dwelling Units	0.37	9	28	**37**	80%	0	1	**1**				7	21	**28**
14	Shopping Centre (820)	27,000 sq. ft.	0.84	14	9	**23**	90%	2	2	**4**				11	6	**17**
	Multifamily Housing – Mid-Rise (221)	90 Dwelling Units	0.37	8	25	**33**	80%	0	1	**1**				6	19	**25**
	Office Park (750)	60,000 sq. ft.	1.33	71	9	**80**	80%	5	3	**8**				52	4	**56**
15	Shopping Centre (820)	27,000 sq. ft.	0.84	14	9	**23**	80%	2	2	**4**				9	5	**14**
	Office Park (750)	72,000 sq. ft.	1.33	85	11	**96**	80%	6	3	**9**				62	6	**68**
34	Office Park (750)	60,000 sq. ft.	1.33	71	9	**80**	90%	5	3	**8**				59	5	**64**
36	General Light Industrial (110)	125,000 sq. ft.	0.74	82	11	**93**	90%							74	10	**84**
Total				**706**	**503**	**1209**		**27**	**27**	**54**				**580**	**384**	**964**
PM PEAK PERIOD																
1	Shopping Centre (820)	82,500 sq. ft.	3.40	135	146	**281**	90%	11	29	**40**	41	45	**86**	70	57	**127**
2	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	0.39	60	38	**98**	80%	8	3	**11**				40	27	**67**
3	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	0.39	60	38	**98**	80%	8	3	**11**				40	27	**67**
4	Multifamily Housing – Mid-Rise (221)	120 Dwelling Units	0.39	29	18	**47**	80%	4	1	**5**				19	13	**32**
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	0.10	3	7	**10**	100%	0	0					3	7	**10**
7	General Light Industrial (110)	0 sq. ft.	0.65	0	0	**0**	90%	0	0					0	0	**0**
8	General Light Industrial (110)	200,000 sq. ft.	0.65	18	112	**130**	90%	0	0					16	101	**117**
9	Multifamily Housing – Mid-Rise (221)	300 Dwelling Units	0.39	71	46	**117**	80%	10	5	**15**				47	32	**79**
10	Multifamily Housing – Mid-Rise (221)	175 Dwelling Units	0.39	41	27	**68**	80%	6	2	**6**				27	20	**47**
	Multifamily Housing – High Rise (222)	115 Dwelling Units	0.32	23	14	**37**	80%	3	1	**4**				15	10	**25**
11	General Light Industrial (110)	55,000 sq. ft.	0.65	5	31	**36**	90%	0	0					5	28	**33**
12	General Light Industrial (110)	55,000 sq. ft.	0.65	5	31	**36**	90%	0	0					5	28	**33**
13	Multifamily Housing – Mid-Rise (221)	100 Dwelling Units	0.39	24	15	**39**	80%	3	1	**4**				16	11	**27**
14	Shopping Centre (820)	27,000 sq. ft.	3.40	44	48	**92**	90%	4	9	**13**	13	15	**28**	23	19	**42**
	Multifamily Housing – Mid-Rise (221)	90 Dwelling Units	0.39	21	14	**35**	80%	3	1	**4**				14	10	**24**
	Office Park (750)	60,000 sq. ft.	1.30	11	67	**78**	80%	5	5	**10**				4	49	**53**
15	Shopping Centre (820)	27,000 sq. ft.	3.40	44	48	**92**	80%	4	9	**13**	12	13	**25**	19	16	**35**
	Office Park (750)	72,000 sq. ft.	1.30	13	81	**94**	80%	6	6	**12**				4	59	**63**
34	Office Park (750)	60,000 sq. ft.	1.30	11	67	**78**	90%	5	5	**10**				5	55	**60**
36	General Light Industrial (110)	125,000 sq. ft.	0.65	11	70	**81**	90%	0	0					10	63	**73**

ZONE	ITE LAND USE (CODE)	QUANTITY	ITE RATE	TOTAL TRIPS			MODE SPLIT %	INTERNAL TRIPS			PASS-BY TRIPS			NEW TRIPS		
				IN	OUT	TOT.		IN	OUT	TOT.	IN	OUT	TOT.	IN	OUT	TOT.
Total				**629**	**918**	**1547**		**80**	**80**	**160**	**66**	**73**	**139**	**382**	**632**	**1014**
DAILY																
1	Shopping Centre (820)	82,500 sq. ft.	37.01	1527	1527	**3054**	90%	122	291	**413**	467	467	**934**	785	616	**1401**
2	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	4.54	568	568	**1136**	80%	85	40	**125**				369	414	**783**
3	Multifamily Housing – Mid-Rise (221)	250 Dwelling Units	4.54	568	568	**1136**	80%	84	40	**124**				370	414	**784**
4	Multifamily Housing – Mid-Rise (221)	120 Dwelling Units	4.54	273	273	**546**	80%	38	20	**58**				180	198	**378**
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	1.4	70	70	**140**	100%							70	70	**140**
7	General Light Industrial (110)	0 sq. ft.	4.87	0	0	**0**	90%							0	0	**0**
8	General Light Industrial (110)	200,000 sq. ft.	4.87	487	487	**974**	90%							438	438	**876**
9	Multifamily Housing – Mid-Rise (221)	300 Dwelling Units	4.54	681	681	**1362**	80%	95	48	**143**				450	497	**947**
10	Multifamily Housing – Mid-Rise (221)	175 Dwelling Units	4.54	398	398	**796**	80%	56	30	**86**				172	189	**361**
	Multifamily Housing – High Rise (222)	115 Dwelling Units	4.54	261	261	**522**	80%	37	20	**57**				262	288	**550**
11	General Light Industrial (110)	55,000 sq. ft.	4.87	134	134	**268**	90%							121	121	**242**
12	General Light Industrial (110)	55,000 sq. ft.	4.87	134	134	**268**	90%							121	121	**242**
13	Multifamily Housing – Mid-Rise (221)	100 Dwelling Units	4.54	227	227	**454**	80%	32	16	**48**				150	166	**316**
14	Shopping Centre (820)	27,000 sq. ft.	37.01	500	500	**1000**	90%	54	37	**91**	153	153	**306**	243	260	**503**
	Multifamily Housing – Mid-Rise (221)	90 Dwelling Units	4.54	205	205	**410**	80%	29	15	**44**				135	149	**284**
	Office Park (750)	60,000 sq. ft.	11.07	332	332	**664**	80%	41	100	**141**				225	166	**391**
15	Shopping Centre (820)	27,000 sq. ft.	37.01	500	500	**1000**	80%	68	44	**112**	136	136	**272**	196	220	**416**
	Office Park (750)	72,000 sq. ft.	11.07	399	399	**797**	80%	41	100	**141**				278	219	**497**
34	Office Park (750)	60,000 sq. ft.	11.07	332	332	**664**	90%	56	37	**93**				243	262	**505**
36	General Light Industrial (110)	125,000 sq. ft.	4.87	305	305	**610**	90%							275	275	**550**
Total				**7901**	**7901**	**15802**		**838**	**838**	**1676**	**756**	**756**	**1512**	**5083**	**5083**	**10166**

Table 2-2: Phase 2 Site Trip Generation

ZONE	ITE LAND USE (CODE)	QUANTITY	ITE RATE	TOTAL TRIPS			MODE SPLIT %	INTERNAL TRIPS			PASS-BY TRIPS			NEW TRIPS		
				IN	OUT	TOT.		IN	OUT	TOT.	IN	OUT	TOT.	IN	OUT	TOT.
AM PEAK PERIOD																
1	Shopping Centre (820)	110,000 sq. ft.	0.84	57	35	**92**	90%	13	11	**24**				38	21	**59**
2	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	0.37	43	142	**185**	80%	1	3	**4**				33	111	**144**
3	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	0.37	43	142	**185**	80%	1	3	**4**				33	111	**144**
4	Multifamily Housing – Mid-Rise (221)	240 Dwelling Units	0.37	20	69	**89**	80%	0	1	**1**				16	54	**70**
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	0.08	6	2	**8**	100%							6	2	**8**
7	General Light Industrial (110)	100,000 sq. ft.	0.74	65	9	**74**	90%							59	8	**67**
8	General Light Industrial (110)	200,000 sq. ft.	0.74	130	18	**148**	90%							117	16	**133**
9	Multifamily Housing – Mid-Rise (221)	600 Dwelling Units	0.37	51	171	**222**	80%	2	3	**5**				39	134	**173**
10	Multifamily Housing – Mid-Rise (221)	350 Dwelling Units	0.37	30	100	**130**	80%	1	2	**3**				29	98	**127**
	Multifamily Housing – High Rise (222)	230 Dwelling Units	0.27	16	46	**62**	80%	0	1	**1**				13	36	**49**
11	General Light Industrial (110)	55,000 sq. ft.	0.74	36	5	**41**	90%							32	5	**37**
12	General Light Industrial (110)	55,000 sq. ft.	0.74	36	5	**41**	90%							32	5	**37**
13	Multifamily Housing – Mid-Rise (221)	200 Dwelling Units	0.37	17	57	**74**	80%	0	1	**1**				14	45	**59**
14	Shopping Centre (820)	27,000 sq. ft.	0.84	14	9	**23**	90%	3	3	**6**				10	5	**15**
	Multifamily Housing – Mid-Rise (221)	180 Dwelling Units	0.37	15	52	**67**	80%	0	1	**1**				12	41	**53**
	Office Park (750)	60,000 sq. ft.	1.33	71	9	**80**	80%	5	3	**8**				52	4	**56**
15	Shopping Centre (820)	27,000 sq. ft.	0.84	14	9	**23**	80%	3	3	**6**				8	4	**12**
	Office Park (750)	72,000 sq. ft.	1.33	85	11	**96**	80%	6	3	**9**				62	6	**68**
34	Office Park (750)	60,000 sq. ft.	1.33	71	9	**80**	90%	5	2	**8**				59	6	**65**
36	General Light Industrial (110)	125,000 sq. ft.	0.74	82	11	**93**	90%							74	10	**84**
Total				**902**	**911**	**1813**		**40**	**40**	**80**				**738**	**722**	**1460**
PM PEAK PERIOD																
1	Shopping Centre (820)	110,000 sq. ft.	3.40	180	194	**374**	90%	10	29	**49**	55	59	**114**	97	87	**184**
2	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	0.39	119	76	**195**	80%	8	5	**13**				87	56	**143**
3	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	0.39	119	76	**195**	80%	8	5	**13**				87	56	**143**
4	Multifamily Housing – Mid-Rise (221)	240 Dwelling Units	0.39	57	37	**94**	80%	4	2	**6**				42	28	**70**
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	0.10	3	7	**10**	100%							3	7	**10**
7	General Light Industrial (110)	100,000 sq. ft.	0.65	9	56	**65**	90%							8	50	**58**
8	General Light Industrial (110)	200,000 sq. ft.	0.65	18	112	**130**	90%							16	101	**117**
9	Multifamily Housing – Mid-Rise (221)	600 Dwelling Units	0.39	143	91	**234**	80%	10	5	**15**				104	68	**172**
10	Multifamily Housing – Mid-Rise (221)	350 Dwelling Units	0.39	84	53	**137**	80%	6	3	**9**				78	50	**128**
	Multifamily Housing – High Rise (222)	230 Dwelling Units	0.32	46	27	**73**	80%	3	2	**5**				34	20	**54**
11	General Light Industrial (110)	55,000 sq. ft.	0.65	5	31	**36**	90%							5	28	**33**
12	General Light Industrial (110)	55,000 sq. ft.	0.65	5	31	**36**	90%							5	28	**33**
13	Multifamily Housing – Mid-Rise (221)	200 Dwelling Units	0.39	48	30	**78**	80%	3	2	**5**				35	22	**57**
14	Shopping Centre (820)	27,000 sq. ft.	3.40	44	48	**92**	90%	4	9	**13**	13	15	**28**	23	19	**42**
	Multifamily Housing – Mid-Rise (221)	180 Dwelling Units	0.39	43	27	**70**	80%	3	2	**5**				31	20	**51**
	Office Park (750)	60,000 sq. ft.	1.30	11	67	**78**	80%	7	4	**11**				2	50	**52**
15	Shopping Centre (820)	27,000 sq. ft.	3.40	44	48	**92**	80%	4	9	**13**	12	13	**25**	19	16	**35**
	Office Park (750)	72,000 sq. ft.	1.30	13	81	**94**	80%	8	4	**12**				2	61	**63**
34	Office Park (750)	60,000 sq. ft.	1.30	11	67	**78**	90%	7	4	**11**				3	56	**59**
36	General Light Industrial (110)	125,000 sq. ft.	0.65	11	70	**81**	90%							10	63	**73**

ZONE	ITE LAND USE (CODE)	QUANTITY	ITE RATE	TOTAL TRIPS			MODE SPLIT %	INTERNAL TRIPS			PASS-BY TRIPS			NEW TRIPS		
				IN	OUT	TOT.		IN	OUT	TOT.	IN	OUT	TOT.	IN	OUT	TOT.
Total				**1013**	**1229**	**2242**		**85**	**85**	**170**	**80**	**87**	**167**	**691**	**886**	**1577**
DAILY																
1	Shopping Centre (820)	110,000 sq. ft.	37.01	2036	2036	**4072**	90%	150	390	540	623	623	**1246**	819	819	**1638**
2	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	4.54	1135	1135	**2270**	80%	100	68	168				840	840	**1680**
3	Multifamily Housing – Mid-Rise (221)	500 Dwelling Units	4.54	1135	1135	**2270**	80%	100	68	168				840	840	**1680**
4	Multifamily Housing – Mid-Rise (221)	240 Dwelling Units	4.54	545	545	**1090**	80%	50	33	83				403	403	**806**
5	High-Cube Transload and Short-Term Storage Warehouse (154)	100,000 sq. ft.	1.4	70	70	**140**	100%							70	70	**140**
7	General Light Industrial (110)	100,000 sq. ft.	4.87	244	244	**487**	90%							220	220	**440**
8	General Light Industrial (110)	200,000 sq. ft.	4.87	487	487	**974**	90%							438	438	**876**
9	Multifamily Housing – Mid-Rise (221)	600 Dwelling Units	4.54	1362	1362	**2724**	80%	100	78	178				1012	1012	**2024**
10	Multifamily Housing – Mid-Rise (221)	350 Dwelling Units	4.54	795	795	**1590**	80%	72	48	120				747	747	**1494**
	Multifamily Housing – High Rise (222)	230 Dwelling Units	4.54	522	522	**1044**	80%	45	31	76				387	387	**774**
11	General Light Industrial (110)	55,000 sq. ft.	4.87	134	134	**268**	90%							121	121	**242**
12	General Light Industrial (110)	55,000 sq. ft.	4.87	134	134	**268**	90%							121	121	**242**
13	Multifamily Housing – Mid-Rise (221)	200 Dwelling Units	4.54	454	454	**908**	80%	41	25	66				338	338	**676**
14	Shopping Centre (820)	27,000 sq. ft.	37.01	500	500	**1000**	90%	40	100	140	153	153	**306**	197	197	**394**
	Multifamily Housing – Mid-Rise (221)	180 Dwelling Units	4.54	409	409	**818**	80%	37	25	62				302	302	**604**
	Office Park (750)	60,000 sq. ft.	11.07	332	332	**664**	80%	95	40	135				226	226	**452**
15	Shopping Centre (820)	27,000 sq. ft.	37.01	500	500	**1000**	80%	40	100	140	136	136	**272**	164	164	**328**
	Office Park (750)	72,000 sq. ft.	11.07	399	399	**798**	80%	120	44	164				275	275	**550**
34	Office Park (750)	60,000 sq. ft.	11.07	332	332	**664**	90%	100	40	140				259	259	**518**
36	General Light Industrial (110)	125,000 sq. ft.	4.87	305	305	**610**	90%							275	275	**550**
Total				**11830**	**11830**	**23660**		**1090**	**1090**	**2180**	**912**	**912**	**1824**	**8054**	**8054**	**16108**

Table 2-3: New Site Trip Generation

LAND USE	PHASE 1 NEW TRIPS			PHASE 2 / FULL DEVELOPMENT NEW TRIPS		
	IN	OUT	TOTAL	IN	OUT	TOTAL
AM PEAK PERIOD						
Residential	93	303	**396**	189	630	**819**
Commercial	53	28	**81**	56	30	**86**
Industrial	261	38	**299**	320	46	**366**
Office Park	173	15	**188**	173	16	**189**
Total	**580**	**384**	**964**	**738**	**722**	**1460**
PM PEAK PERIOD						
Residential	218	150	**368**	498	320	**818**
Commercial	112	92	**204**	139	122	**261**
Industrial	39	227	**266**	47	277	**324**
Office Park	13	163	**176**	7	167	**174**
Total	**382**	**632**	**1014**	**691**	**886**	**1577**
DAILY						
Residential	2088	2315	**4403**	4869	4869	**9738**
Commercial	1224	1096	**2320**	1180	1180	**2360**
Industrial	1025	1025	**2050**	1245	1245	**2490**
Office Park	746	647	**1393**	760	760	**1520**
Total	**5083**	**5083**	**10166**	**8054**	**8054**	**16108**

2.2.2 TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution refers to the directional split of traffic entering and exiting the study area, and trip assignment refers to the allocation of distributed vehicle trips to the adjacent road network. The trips generated by the proposed development were assumed to follow the same overall distribution as the September 2020 TIS, with some distributions combined to account for the smaller study area in this TIS update. For the daily trip distribution, the average distribution of the a.m. and p.m. periods was used, and the same distribution was used for both inbound and outbound trips as people generally leave and return to the same place over the course of a day.

The trip distribution for the proposed development is summarized in **Table 2-4**.

Table 2-4: Updated Trip Distribution

NETWORK ACCESS ROADWAY	AM		PM		DAILY
	From (Entering)	To (Exiting)	From (Entering)	To (Exiting)	From / To (Entering / Exiting)
Marion St West	48.5%	59.0%	58.2%	47.0%	53.0%
Marion St East	23.0%	17.0%	13.0%	20.0%	18.5%
Lagimodiere South	9.5%	8.0%	9.6%	11.0%	9.5%
Speers South	9.5%	8.0%	9.6%	11.0%	9.5%
Maginot West	9.5%	8.0%	9.6%	11.0%	9.5%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Figure 2-2 and **Figure 2-3** illustrate the assignment of Phase 1 new development trips and pass-by trips to the study area road network. **Figure 2-4** and **Figure 2-5** illustrate Phase 2 new development trips and pass-by trips.

The total new trips, internal trips, and pass-by trips were assigned to the road network to determine total traffic projections for the combined post-development scenarios. **Figure 2-6** and **Figure 2-7** illustrate the total post-development traffic for the horizon years 2029 (Phase 1) and 2034 (Phase 2, full build-out), respectively. The 2034 daily traffic volumes for the internal road network are shown in **Figure 2-8**.

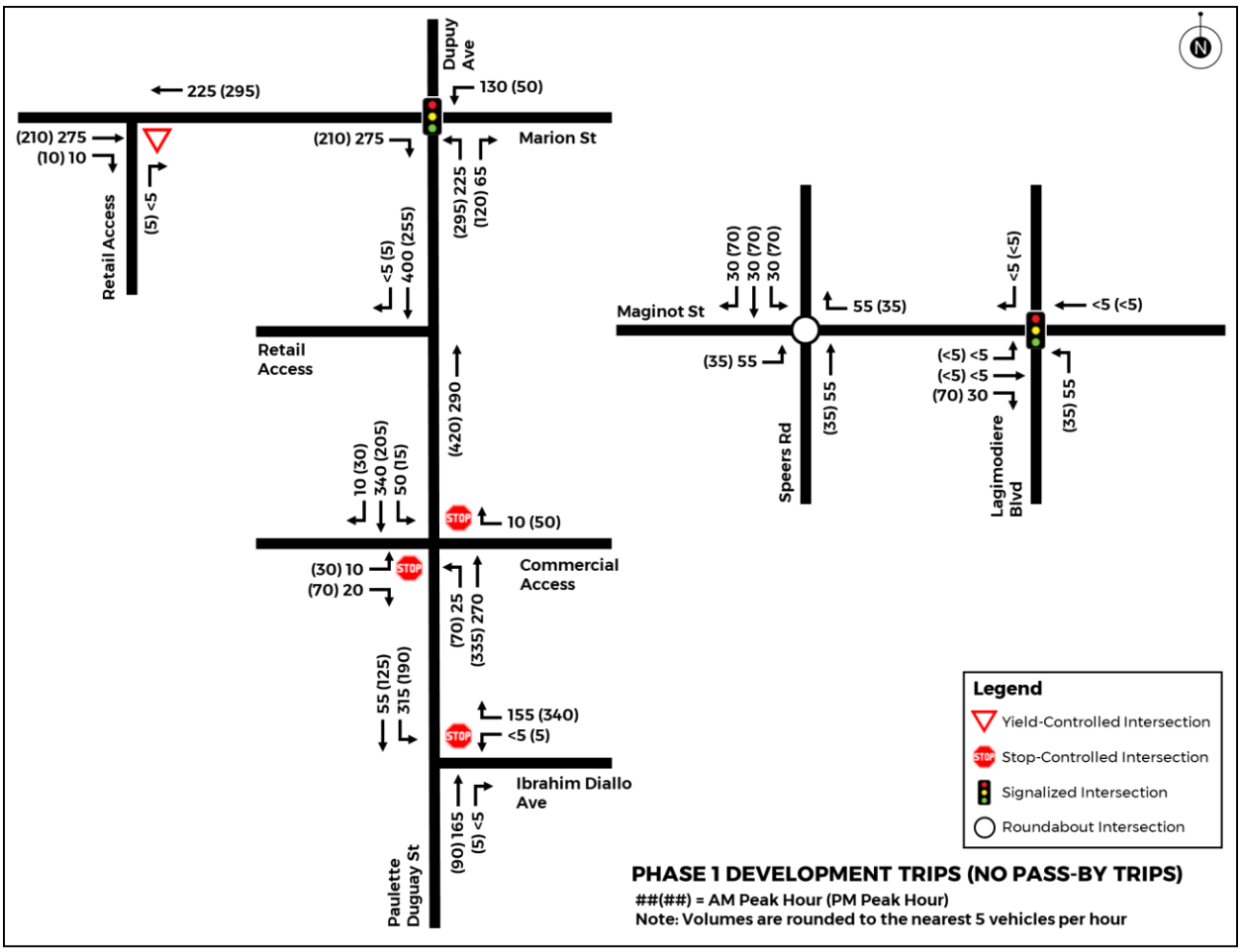


Figure 2-2: Phase 1 New and Internal Development Trips

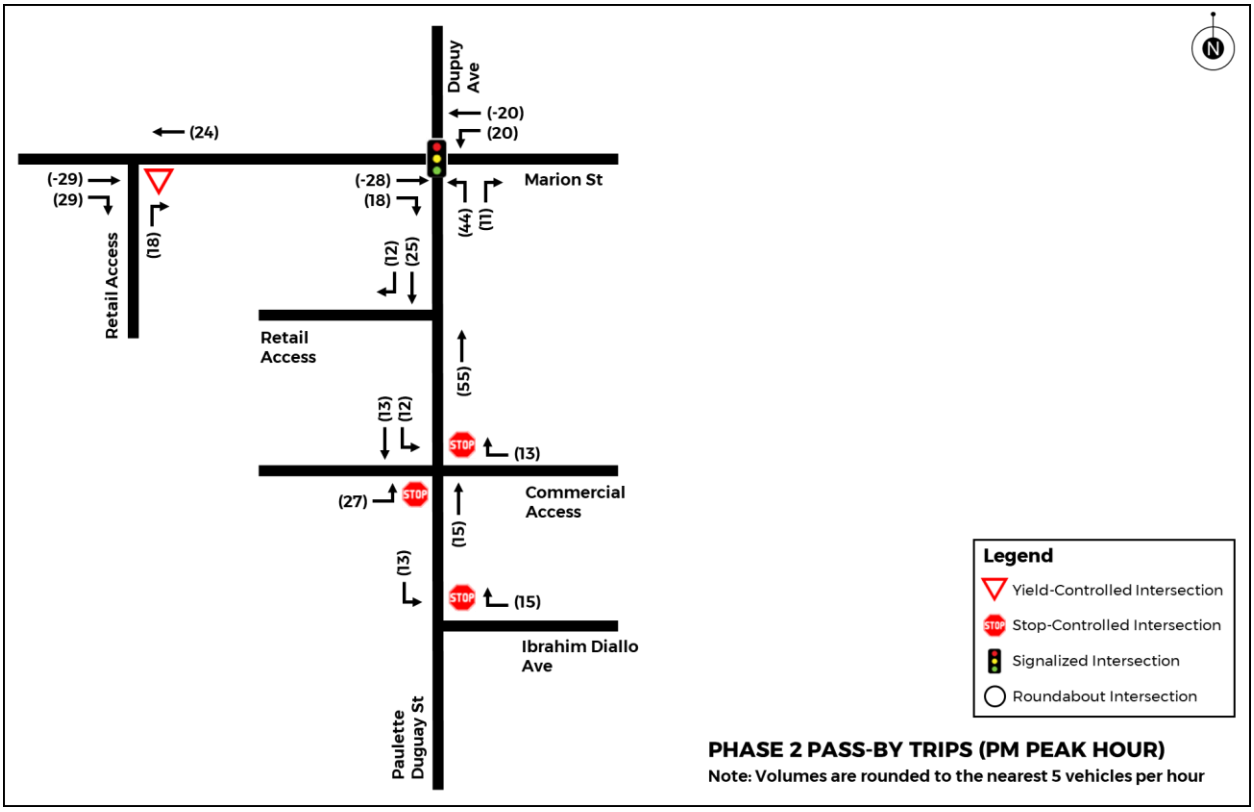


Figure 2-3: Phase 1 Pass-By Trips

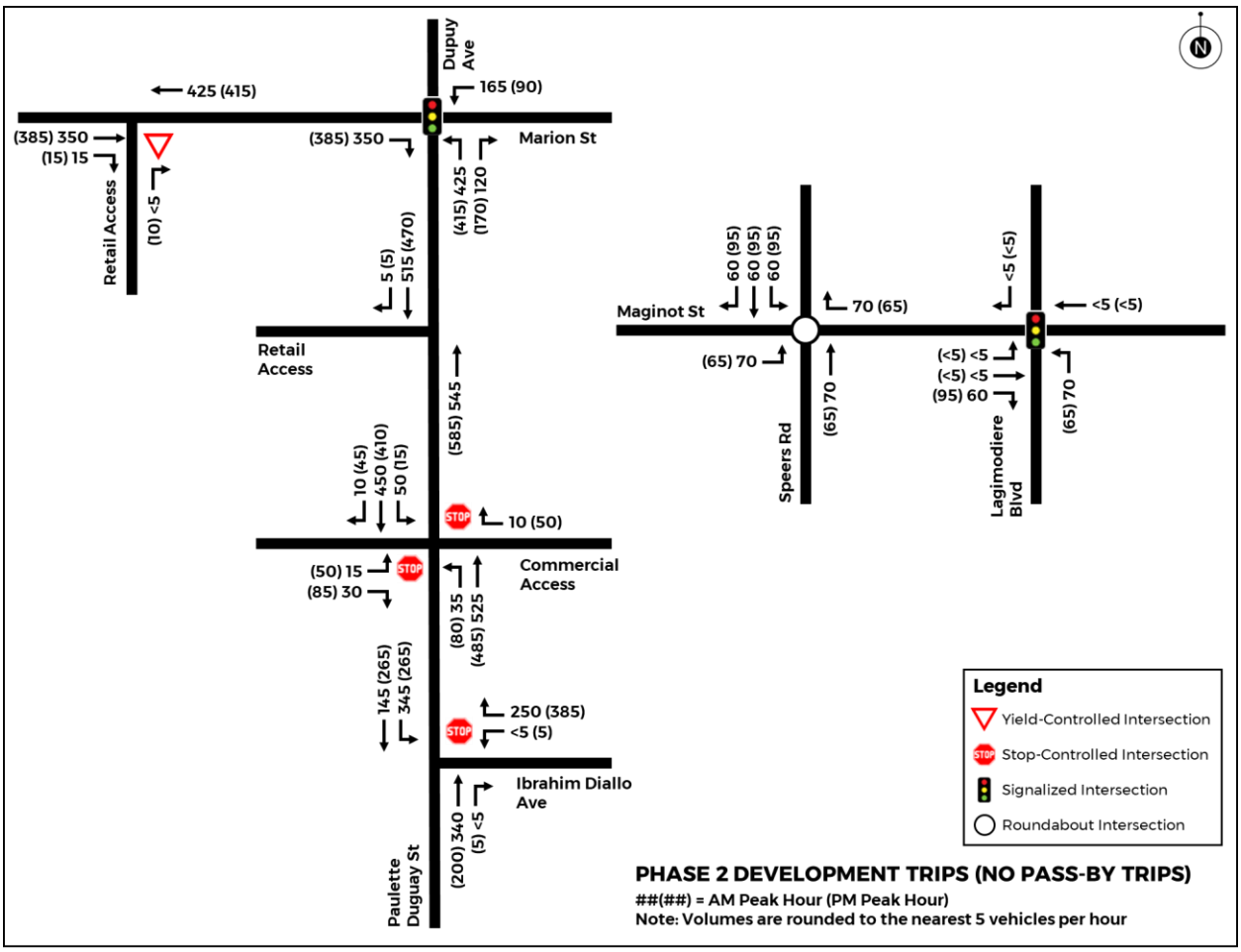


Figure 2-4: Phase 2 / Full Build-Out New and Internal Development Trips

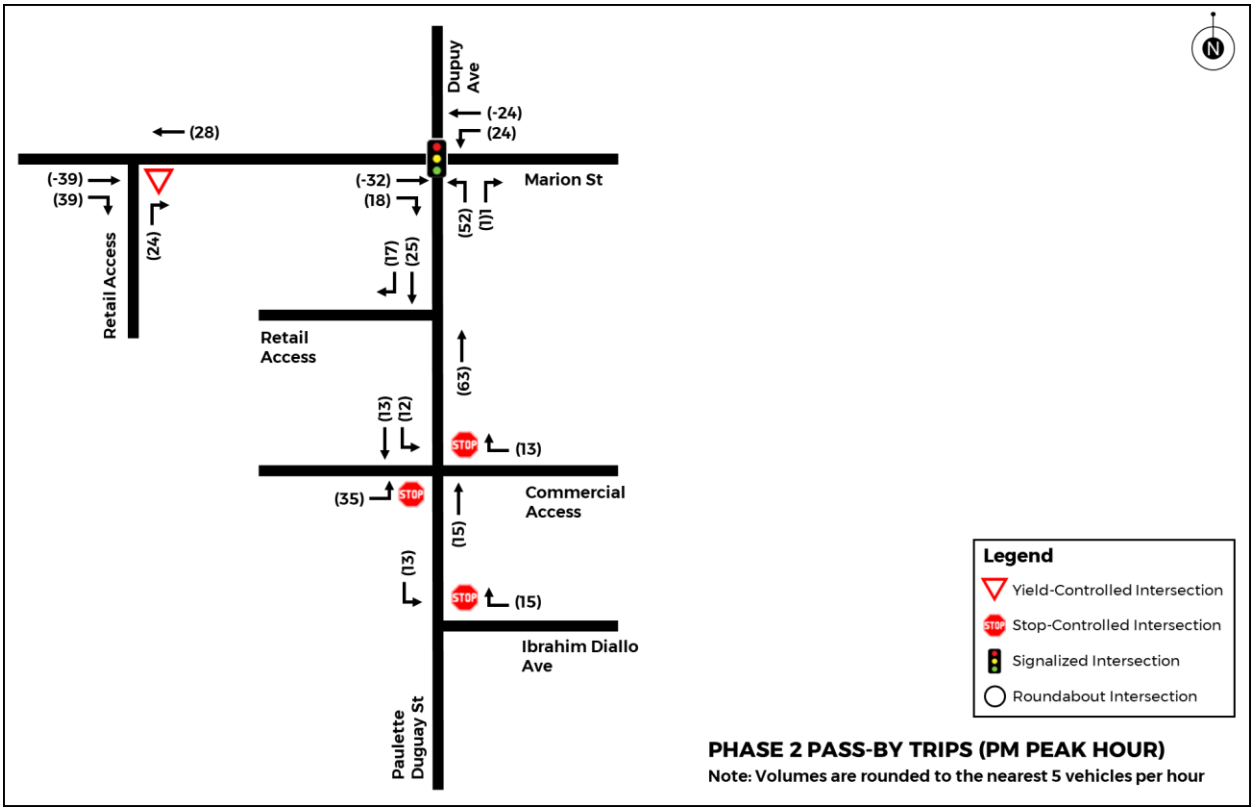


Figure 2-5: Phase 2 (Full Build-Out) Pass-By Trips

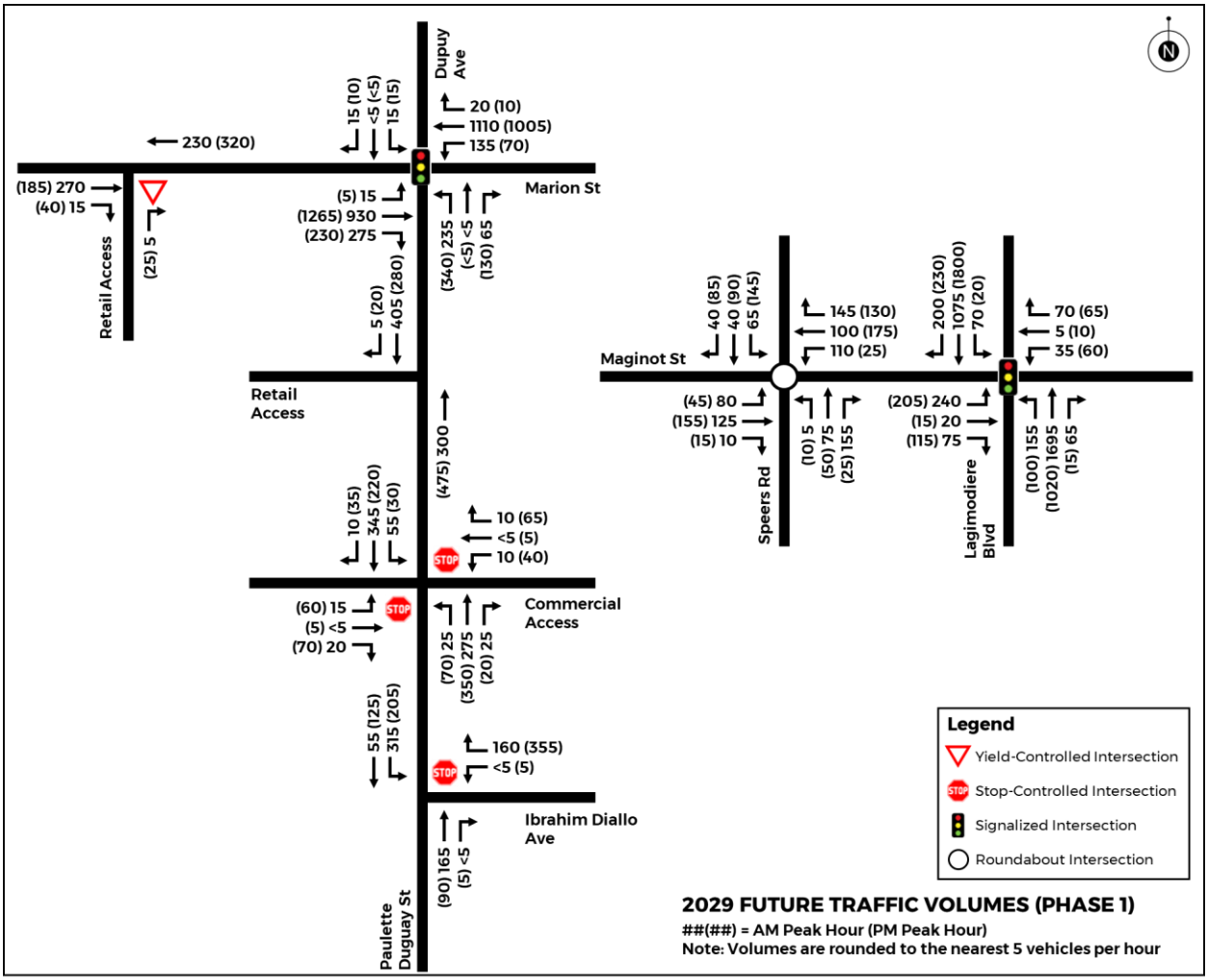


Figure 2-6: 2029 Post-Development Peak Hour Traffic Volumes (Phase 1)

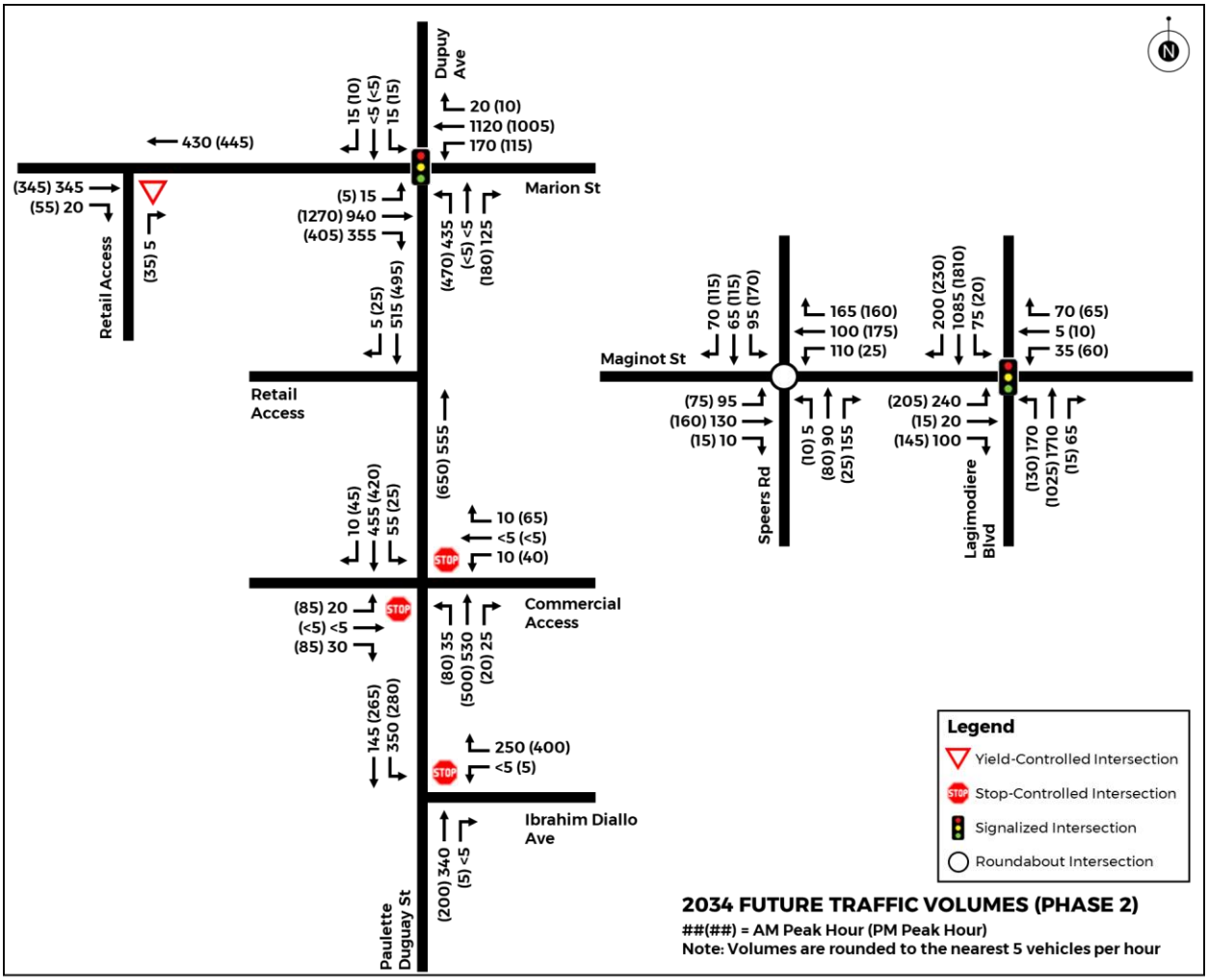


Figure 2-7: 2034 Post-Development Peak Hour Traffic Volumes (Phase 2 / Full Build-Out)

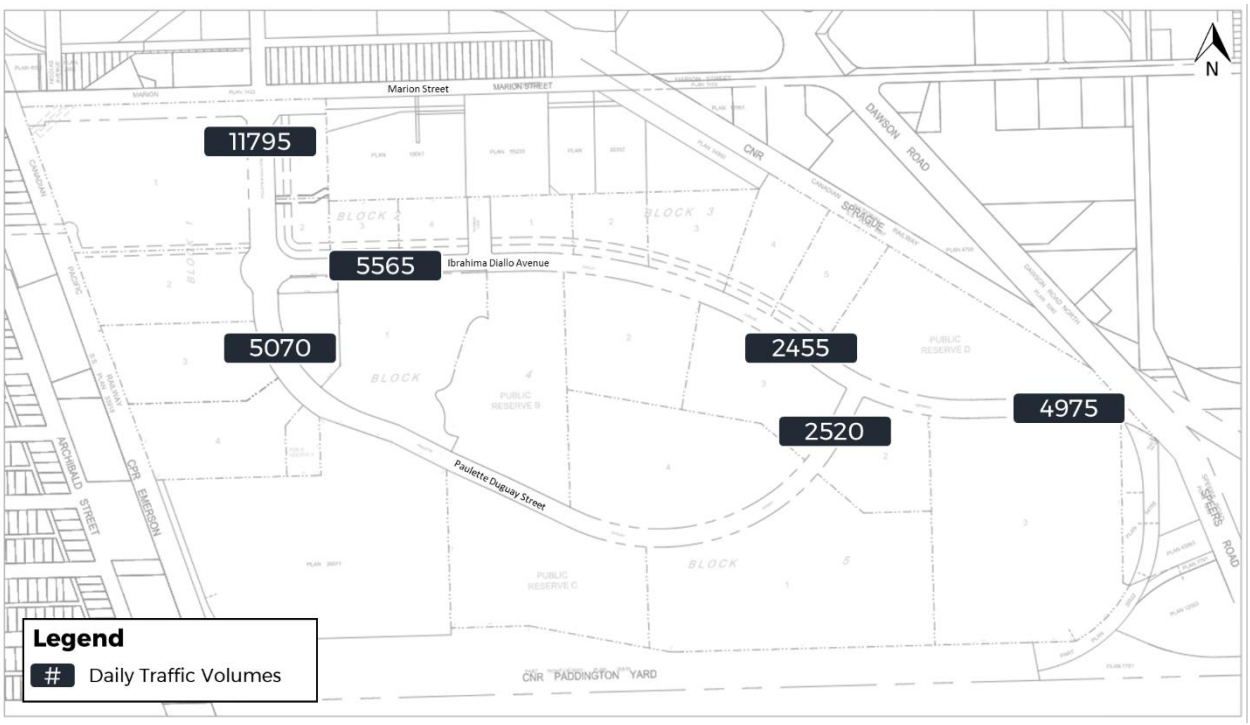


Figure 2-8: 2034 Post-Development Traffic Volumes (Phase 2 / Full Build-out)

3 TRAFFIC ANALYSIS

3.1 SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was carried out for the Paulette Duguay Street / Commercial Access intersection and the Paulette Duguay / Ibrahima Diallo intersection using the Transportation Association of Canada's (TAC) *Traffic Signal & Pedestrian Signal Head Warrant Analysis*. The warrant is based on a review of the average six-hour peak turning movements, the distance to upstream traffic signals, median width, and local demographics. The process uses a 100-priority point warrant; where a traffic signal is warranted for consideration when the 100-priority point threshold is exceeded, and there are greater than 75 vehicles per hour approaching on the minor street, not including minor street right-turn volumes as per the City's methodology (Vs).

Future 2034 traffic volumes were estimated using the hourly distribution of entering and exiting vehicle trips by land use outlined in the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition*, as there were no recent traffic volume counts nearby available. The main land use using the commercial access intersection would be the Shopping Center (ITE Code 820). The signal warrant requires the highest six hours of data; therefore, the ratio of the six highest hours for the Shopping Center land use was applied to the site generated traffic determined for this intersection in **Section 2.2**. There is expected to be some demand for pedestrians to cross Paulette Duguay Street at this intersection given it is surrounded by a mix of commercial and retail development, therefore pedestrian volumes were estimated and included in the warrant analysis. The same ratios were used for the Paulette Duguay Street and Ibrahima Diallo Avenue intersection.

The *Traffic Signal & Pedestrian Signal Head Warrant Analysis* worksheets for these intersections are included in **Appendix C.**

3.1.1 PAULETTE DUGUAY STREET AND COMMERCIAL ACCESS

The signal warrant analysis with forecast 2034 traffic volumes at the Paulette Duguay Street and Commercial Access intersection resulted in a total of 77 warrant points (59 vehicle warrant points and 18 pedestrian warrant points), below the threshold of 100 points required in the City of Winnipeg. Therefore, signals are not warranted by full build-out.

3.1.2 PAULETTE DUGUAY STREET AND IBRAHIMA DIALLO AVENUE

The signal warrant analysis with forecast 2034 traffic volumes at the Paulette Duguay Street and Ibrahima Diallo Avenue intersection resulted in a total of 72 warrant points (61 vehicle points and 12 pedestrian warrant points), below the threshold of 100 points required in the City of Winnipeg. Therefore, signals are not warranted by full build-out.

3.2 INTERSECTION ANALYSIS

The intersection analysis for the proposed development was undertaken for all future horizon years using Synchro 11.0 and SIDRA traffic analysis software, and SimTraffic simulation software. The relative performance of an intersection is measured in terms of the level of service (LOS). LOS ranges from A (excellent) to F (beyond capacity). In general, LOS E is considered to be at capacity.

LOS for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Delay is a complex measure and is dependent on a

number of variables, including the quality of progression, cycle length, green ratio and ratio for the lane group in question.

LOS criteria for unsignalized intersections are also defined in terms of delay. Delay is the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. This includes the time required for the vehicle to travel from the last-in-queue position to the first.

Intersection capacity utilization level of service (ICU LOS) provides additional insight into how a signalized intersection is functioning, and how much extra capacity is available to handle traffic fluctuations and incidents. ICU LOS ranges from A (excellent) to H (beyond capacity), with ICU LOS E generally considered to be at practical capacity.

The volume to capacity (v/c) ratio is used to determine the level of congestion for each lane group. If the v/c ratio is greater than or equal to 1.00 that approach is operating above capacity. Public Works defines the ideal maximum v/c ratio for through and shared through / turning lanes as 0.85, and a v/c ratio of 0.90 for turning lanes.

The following assumptions were used in the Synchro and SimTraffic analyses:

- HCM 6th Edition methodology results are reported for stop-controlled intersections;
- Heavy vehicle percentages were assumed to be the same as the September 2020 TIS for all scenarios;
- The peak hour factor used for all scenarios is 0.92;
- Existing speed limits were used for all scenarios;
- A minimum phase length of 13 seconds was used even when minimum splits are less than 13 seconds; and
- 95th percentile queue lengths were obtained by running five consecutive one-hour simulations in SimTraffic and taking an average of the results.
- The maximum signal cycle length for Marion Street is 120 seconds.
- The maximum signal cycle length of Lagimodiere Boulevard is 150 seconds.

SIDRA Intersection 9.0 software was used for the traffic analysis of the roundabouts, which is a preferred software for roundabout analyses. The following parameters were used when modelling the roundabouts in SIDRA:

- Lane width: Lane width: 3.7 metres, 5.0 metre circulating in roundabout;
- Roundabout Island Diameter: 30 metres;
- SIDRA Roundabout Entry Radius / Angle: 20 metres / 30 degrees;
- SIDRA Standard Roundabout Capacity Model; and
- SIDRA Roundabout Level-of-Service Method.

The detailed Synchro, SimTraffic and SIDRA analysis results are included in **Appendix D**.

3.2.1 MARION STREET / DUPUY AVENUE / PAULETTE DUGUAY STREET

The Marion Street / Dupuy Avenue / Paulette Duguay Street intersection is currently an unsignalized T-intersection. A fourth approach on the south side of Marion Street will be added with the construction of the proposed development, and the future intersection was assumed to be signalized as it was signalized in all previous analyses. The 2025 proposed intersection configuration was analysed and is provided in **Appendix A**. A road widening and median had been introduced to accommodate the proposed left-turn lanes on Marion Street. As shown in **Figure 3-1,** the signalized intersection was analyzed with the following geometry:

- The northbound approach on Paulette Duguay Street consists of a left-turn lane and a shared left / through / right-turn lane with a right-turn cut-off;
- The southbound approach on Dupuy Avenue consists of a shared left-turn / through / right-turn lane;
- The eastbound approach on Marion Street consists of a left-turn lane, two through lanes, and a right-turn lane; and
- The westbound approach on Marion Street consists of a left-turn lane, a through lane, and a shared through / right-turn lane.



Figure 3-1: Marion Street and Dupuy Avenue / Paulette Duguay Street Intersection Configuration

Table 3-1 summarizes the results of the signalized intersection Synchro analysis for the Marion Street and Dupuy Avenue / Paulette Duguay Street intersection. It should be noted that the adjacent intersection at Archibald Street was added to the model to ensure the effects of metering and coordination are taken into account at the Dupuy Avenue / Paulette Duguay Street intersection. The Marion Street and Archibald Street traffic volumes from the September 2020 TIS were used and eastbound and westbound volumes were balanced with the Dupuy Avenue / Paulette Duguay Street intersection. The existing timing plan at Archibald Street was used in the model, but when conducting the analysis in Synchro, the signal timing splits and offsets were optimized.

Table 3-1: Marion Street / Dupuy Avenue / Paulette Duguay Street Synchro Analysis Results

SCENARIO	INTERSECTION			CRITICAL MOVEMENT		
	LOS (DELAY)	ICU LOS (%)	MAX V/C	MOVEMENT	LOS (DELAY)	V/C
WEEKDAY A.M. PEAK HOUR						
2029 Forecast Traffic Volumes	B (15 sec)	B (61%)	0.65 (NBL)	NBL	D (47 sec)	0.65
2034 Forecast Traffic Volumes	B (17 sec)	C (71%)	0.83 (NBL)	**NBL**	**E (63 sec)**	0.83
WEEKDAY P.M. PEAK HOUR						
2029 Forecast Traffic Volumes	B (17 sec)	C (71%)	0.82 (NBL)	**NBL**	**E (55 sec)**	0.82
2034 Forecast Traffic Volumes	B (19 sec)	D (80%)	0.89 (EBT)	**NBL**	**E (56 sec)**	0.88

The analysis indicates that all scenarios feature an overall intersection LOS B. The 2029 p.m. peak hour, 2034 a.m. peak hour, and 2034 p.m. peak hour scenarios feature and a critical northbound left movement with LOS E, but the maximum v/c ratio for all scenarios are less than 1.0.

3.2.2 PAULETTE DUGUAY STREET / COMMERCIAL ACCESS INTERSECTION

A new four-legged intersection is proposed within the development to provide access to commercial areas. As discussed in **Section 3.1**, a signal is not warranted at this intersection for any scenarios. As shown in **Figure 3-2**, this intersection was analyzed as an unsignalized intersection with the following geometry:

- The northbound approach on Paulette Duguay Street is free flowing and consists of a shared left-turn / through lane and a shared through / right-turn lane.
- The southbound approach on Paulette Duguay Street is free flowing and consists of a left-turn lane, a through lane, and a shared through / right-turn lane.
- The eastbound and westbound approaches on the commercial accesses are stop-controlled and consist of a shared left-turn / through lane and a right-turn lane.



Figure 3-2: Paulette Duguay Street and Commercial Access Intersection Configuration

Table 3-2 summarizes the results of the stop-controlled intersection Synchro analysis for the commercial access intersection.

Table 3-2: Paulette Duguay Street / Commercial Access Synchro Analysis Results (HCM 6th Edition)

SCENARIO	INTERSECTION		CRITICAL MOVEMENT		
	LOS (DELAY)	MAX V/C	MOVEMENT	LOS (DELAY)	V/C
WEEKDAY A.M. PEAK HOUR					
2029 Forecast Traffic Volumes	A (2 sec)	0.05 (SBL)	WBL/T	C (17 sec)	0.06
2034 Forecast Traffic Volumes	A (2 sec)	0.11 (EBL/T)	**WBL/T**	**E (41 sec)**	0.099
WEEKDAY P.M. PEAK HOUR					
2029 Forecast Traffic Volumes	A (5 sec)	0.23 (EBL/T)	WBL/T	D (28 sec)	0.23
2034 Forecast Traffic Volumes	A (7 sec)	0.49 (EBL/T)	**WBL/T**	**F (74 sec)**	0.47

The analysis indicates that the intersection performs at an acceptable LOS A and the maximum v/c ratio is under 1.0 for all scenarios. The 2034 p.m. peak scenario features a critical shared westbound left / through movement with LOS F; however, the movement features a v/c ratio of 0.47, indicating that the delay is not due to a lack of capacity on the approach but instead due to gaps in Paulette Duguay Street traffic. Lower LOS values are not uncommon for cross-streets at an unsignalized intersection during peak periods.

3.2.3 PAULETTE DUGUAY STREET / IBRAHIMA DIALLO AVENUE

A new three-legged collector intersection is proposed within the development site at Paulette Duguay Street and Ibrahima Diallo Avenue. As discussed in **Section 3.1**, a signal is not warranted at this intersection for any scenarios. As shown in **Figure 3-3**, this intersection was analyzed as an unsignalized intersection with the following geometry:

- The northbound approach on Paulette Duguay Street is free flowing and consists of a through lane and a shared through / right-turn lane.
- The southbound approach on Paulette Duguay Street is free flowing and consists of a left-turn lane and two through lanes.
- The westbound approach on Ibrahima Diallo Avenue is stop-controlled and consists of a shared left-turn / right-turn lane.



Figure 3-3: Paulette Duguay Street and Ibrahima Diallo Avenue Intersection Configuration

Table 3-3 summarizes the results of the stop-controlled intersection Synchro analysis for the Paulette Duguay Street and Ibrahima Diallo Avenue intersection.

Table 3-3: Paulette Duguay Street / Ibrahima Diallo Avenue Synchro Analysis Results (HCM 6th Edition)

SCENARIO	INTERSECTION		CRITICAL MOVEMENT		
	LOS (DELAY)	MAX V/C	MOVEMENT	LOS (DELAY)	V/C
WEEKDAY A.M. PEAK HOUR					
2029 Forecast Traffic Volumes	A (6 sec)	0.25 (SBL)	WBL	A (10 sec)	0.19
2034 Forecast Traffic Volumes	A (6 sec)	0.35 (WBL)	WBL	B (12 sec)	0.35
WEEKDAY P.M. PEAK HOUR					
2029 Forecast Traffic Volumes	A (7 sec)	0.39 (WBL)	WBL	B (11 sec)	0.39
2034 Forecast Traffic Volumes	A (7 sec)	0.50 (WBL)	WBL	B (13 sec)	0.50

The results in **Table 3-3** indicate that the intersection operates at an acceptable overall LOS A with v/c ratios below 0.85 and critical movements operating at LOS B or better in all scenarios.

3.2.4 LAGIMODIERE BOULEVARD / MAGINOT STREET

Lagimodiere Boulevard / Maginot Street is currently a signalized four-legged intersection. As in the previous TISs, the intersection has been analyzed in phases, with a second northbound left-turn lane being added for the Phase 2 analysis. The exiting configuration is shown in **Figure 3-4**, which consists of the following geometry:

- The northbound approach on Lagimodiere Boulevard consists of a left-turn lane, two through lanes, and a right-turn lane.
- The southbound approach on Lagimodiere Boulevard consists of a left-turn lane, two through lanes, and a right-turn lane with a right-turn cut-off.
- The eastbound approach on Maginot Street consists of two left-turn lanes, a through lane, and a shared through / right-turn lane with a right-turn cut-off.
- The westbound approach on Maginot Street consists of a left-turn lane, a through lane, and a right-turn lane.

Phase 2 included analysis of a second northbound left-turn lane meaning the northbound approach on Lagimodiere Boulevard consisted of two left-turn lanes, two through lanes, and a right-turn lane.

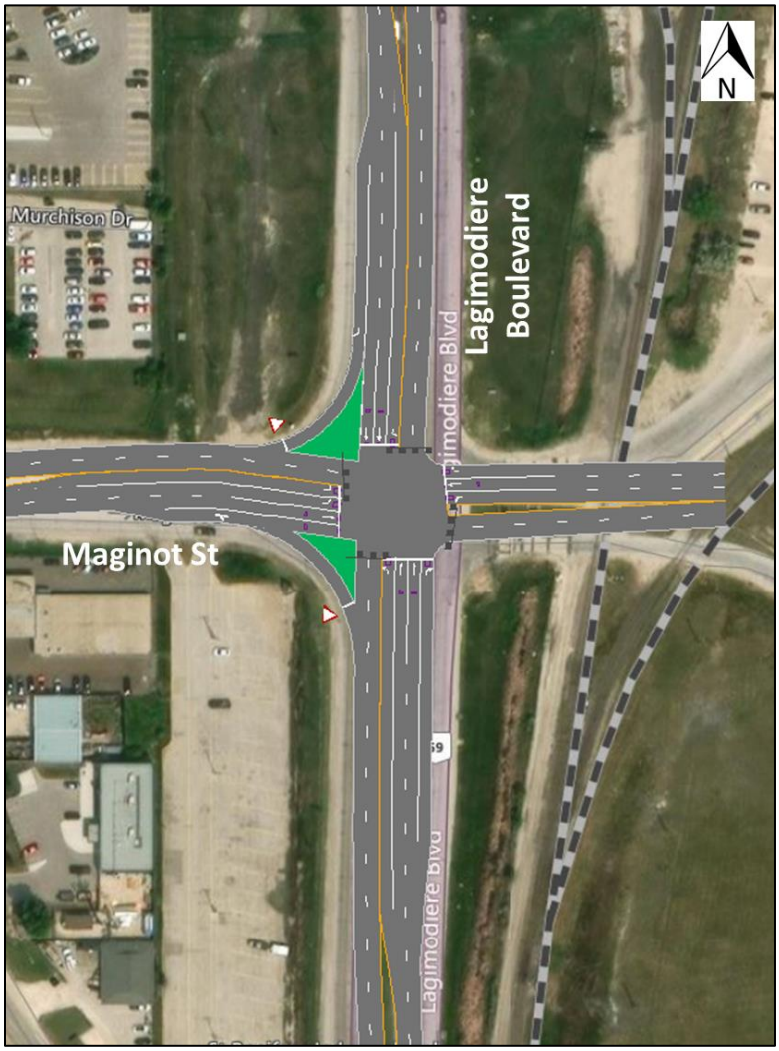


Figure 3-4: Lagimodiere Boulevard and Maginot Street Intersection Configuration

Table 3-4 summarizes the results of the signalized intersection Synchro analysis for the Lagimodiere Boulevard / Maginot Street intersection. The analysis was completed with both one and two northbound left-turn lanes as has been the case for the analysis in the previous TISs.

Table 3-4: Lagimodiere Boulevard / Maginot Street Synchro Analysis Results

SCENARIO	INTERSECTION			CRITICAL MOVEMENT		
	LOS (DELAY)	ICU LOS (%)	MAX V/C	MOVEMENT	LOS (DELAY)	V/C
WEEKDAY A.M. PEAK HOUR						
2029 Future Traffic Volumes	C (25 sec)	D (80%)	0.87 (NBT)	**SBL**	**E (78 sec)**	0.67
2034 Future Traffic Volumes (1 northbound left lane)	C (29 sec)	D (81%)	0.82 (NBT)	**SBL**	**E (79 sec)**	0.60
2034 Future Traffic Volumes (2 northbound left lanes)	C (25 sec)	D (81%)	0.87 (NBT)	**SBL**	**E (79 sec)**	0.68
WEEKDAY P.M. PEAK HOUR						
2029 Future Traffic Volumes	C (23 sec)	D (75%)	0.88 (SBT)	**NBL**	**E (67 sec)**	0.58
2034 Future Traffic Volumes (1 northbound left lane)	C (31 sec)	**E (88%)**	**0.93 (SBT)**	**SBL**	**E (79 sec)**	0.29
2034 Future Traffic Volumes (2 northbound left lanes)	C (24 sec)	D (80%)	0.89 (SBT)	**NBL**	**E (76 sec)**	0.73

The analysis indicates that all scenarios feature an overall intersection LOS C and v/c ratios less than 1.0. The intersection approaches capacity (max v/c of 0.93) during the 2034 p.m. peak hour with only one northbound left-turn lane. The second northbound left-turn lane provides additional capacity for the intersection which reduces the max v/c ratio to less than 0.90 and reduces the overall average delay by 7 seconds.

A cantilever lane designation overhead sign structure would be required for the dual northbound left-turn lane and substantial modifications to intersection geometry may be required to ensure all truck movements are accommodated. These are future considerations would be confirmed during detailed design.

3.2.5 MAGINOT STREET / SPEERS ROAD

The existing four-legged unsignalized intersection at Maginot Street / Speers Road is proposed to be upgraded to a roundabout as per the previous TIS studies. As shown in **Figure 3-5**, the roundabout was analyzed with the following geometry:

- The northbound, southbound and eastbound roundabout approaches consist of a shared left-turn / through / right-turn lane.
- The westbound approach consists of a shared left-turn / through lane and a right-turn bypass lane.

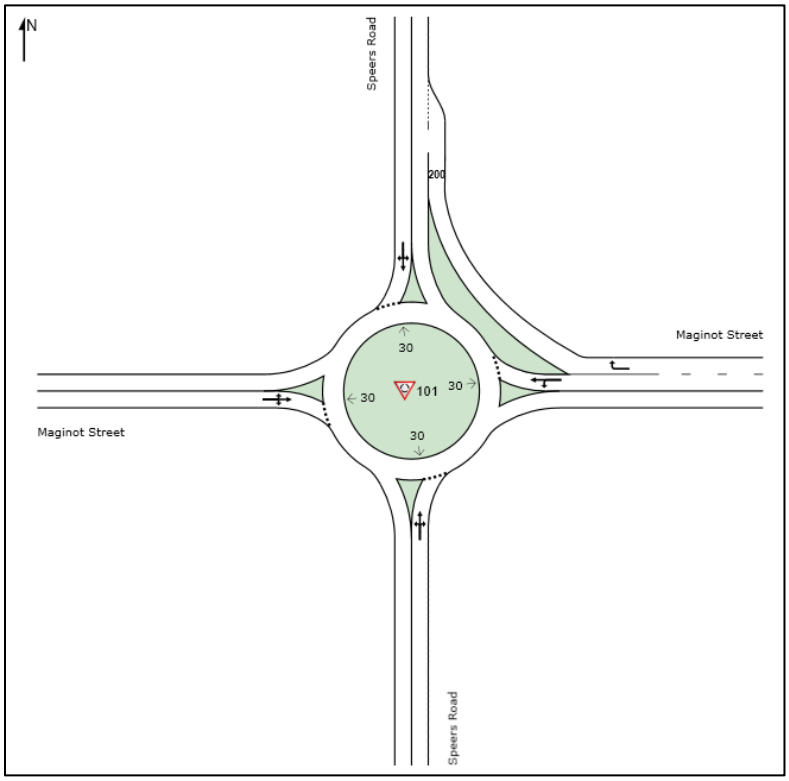


Figure 3-5: Maginot Street and Speers Road Roundabout Configuration

Table 3-5 summarizes the results of the roundabout intersection SIDRA analysis for the Maginot Street / Speers Road intersection.

Table 3-5: Maginot Street / Speers Road SIDRA Roundabout Analysis Results

SCENARIO	INTERSECTION		CRITICAL MOVEMENT	
	LOS (DELAY)	MAX V/C	MOVEMENT	LOS (DELAY)
WEEKDAY A.M. PEAK HOUR				
2029 Future Traffic Volumes	A (5 sec)	0.24 (NB)	SB	A (6 sec)
2034 Future Traffic Volumes	A (5 sec)	0.27 (NB)	EB	A (6 sec)
WEEKDAY P.M. PEAK HOUR				
2029 Future Traffic Volumes	A (5 sec)	0.31 (SB)	SB	A (6 sec)
2034 Future Traffic Volumes	A (5 sec)	0.40 (SB)	SB	A (6 sec)

The results in **Table 3-5** indicate that the collector roundabout would perform at an acceptable overall LOS A with v/c ratios below 0.85 and critical movements operating at LOS A in all scenarios.

It is noted that Maginot Street between Speers Road and Lagimodiere Boulevard will need to be reviewed during detailed design to determine what extent of reconstruction is required to accommodate the roundabout.

3.2.6 QUEUING ANALYSIS

The 95th percentile queue lengths at each intersection were obtained by taking an average from five consecutive one-hour simulations in SimTraffic for the signalized and stop-controlled intersections and using the reported 95th percentile queue lengths in SIDRA for the roundabouts. The forecast 2034 a.m. and p.m. peak hour analysis 95th percentile queues on each approach at each intersection are provided in **Table 3-6**Error! Reference source not found.**.** Queues are considered critical if they may impact adjacent intersections, exceed storage lane lengths, or in the case of eastbound Marion Street, may queue over the rail line.

Table 3-6: 2034 (Phase 2) 95th Percentile Queue Lengths

INTERSECTION	MOVEMENT	STORAGE LENGTH (M)	CRITICAL 95th PERCENTILE QUEUE (M)	
			WEEKDAY A.M. PEAK	WEEKDAY P.M. PEAK
Marion St. / Dupuy Ave. / Paulette Duguay St.	NBL	105[1]	70.7	59.4
	NBL/T/R	105[1]	72.1	85.5
	SBL/T/R	27	24.5	23.1
	EBL	25[3]	12.8	10.1
	EBT	290[2]	33.8	56.6
	EBR	90[3]	39.5	55.3
	WBL	80[3]	45.5	29.2
Paulette Duguay St. / Commercial Access	NBL/T	50[1]	12.5	16.5
	SBL	20[3]	11.7	8.7
	EBL/T	-	13.1	26.5
	WBL/T	-	9.8	18.6
Paulette Duguay St / Ibrahima Diallo Ave	NBT/R	210[1]	0	0.9
	SBL	45[3]	23.2	18.8
	WBL/R	135[1]	24.7	35.1
Maginot St / Speers Rd (Roundabout)	NB	45[1]	12.3	7.2
	SB	200[1]	10.8	20.1
	EB	45[1]	10.5	13.6
	WB	135[1]	7.2	7.2
Lagimodiere Blvd. / Maginot St. with 1 NBL Lane	NBL	100[3]	53.0	59.9
	SBL	80[3]	40.1	20.1
	EBL #1	60[3]	51.0	44.1
	EBL #2	135[1]	55.7	47.8
	WBL	35[1]	24.3	30.7

INTERSECTION	MOVEMENT	STORAGE LENGTH (M)	CRITICAL 95th PERCENTILE QUEUE (M)	
			WEEKDAY A.M. PEAK	WEEKDAY P.M. PEAK
Lagimodiere Blvd. / Maginot St. with 2 NBL Lanes	NBL #1	-	43.8	28.2
	NBL #2	100[3]	51.1	34.3
	SBL	80[3]	41.7	18.4
	EBL #1	60[3]	41.2	43.0
	EBL #2	135[1]	44.1	47.1
	WBL	35[1]	29.4	26.7

1 – Distance to adjacent intersection with public road
2 – Distance to rail line
3 – Length of turning lane

The 2034 a.m. and p.m. peak hour analysis 95th percentile queue lengths presented in **Table 3-6**Error! Reference source not found. indicate that there are no queueing issues.

4 TRANSIT REVIEW

The September 2020 TIS and this TIS update both assume a non-private vehicle driver mode share of up to 20% for the Public Markets MRS-D development, depending on the land use, which was included in the trip generation calculations. The rationale for this mode share was outlined in detail in the September 2020 TIS. It is based on *"expectations developed by the secondary plan approval process where a mode split of 20% to 30% is anticipated by the City"* and *"on experience in other jurisdictions, that new developments located near or serviced by Frequent and Rapid transit services will attract transit mode share in the 20% to 30% range*".

To achieve this mode share it will be necessary for transportation infrastructure to prioritize Transit service efficiency and reliability, as well as user access and amenities. The City of Winnipeg has designing a new bus network for the City of Winnipeg[2] that includes provision for future service to the proposed development site. The new network is planned to be in service in late June 2025, with service to the proposed development likely to be phased in as the area is built-out. The new network classifies bus routes into eight different classes, with Class 1 (Rapid Transit) being the most frequent service and Class 8 being the least frequent.

As shown in **Figure 4-1**, Frequent Line F9 will run along Lagimodiere Boulevard and utilize Speers and Maginot Road in the study area vicinity. A frequent bus line has headways of 10 to 15 minutes on weekdays and stops every 350 to 500 metres. This route will run north-south from the University of Manitoba to the Kildonan Place Transit terminal.

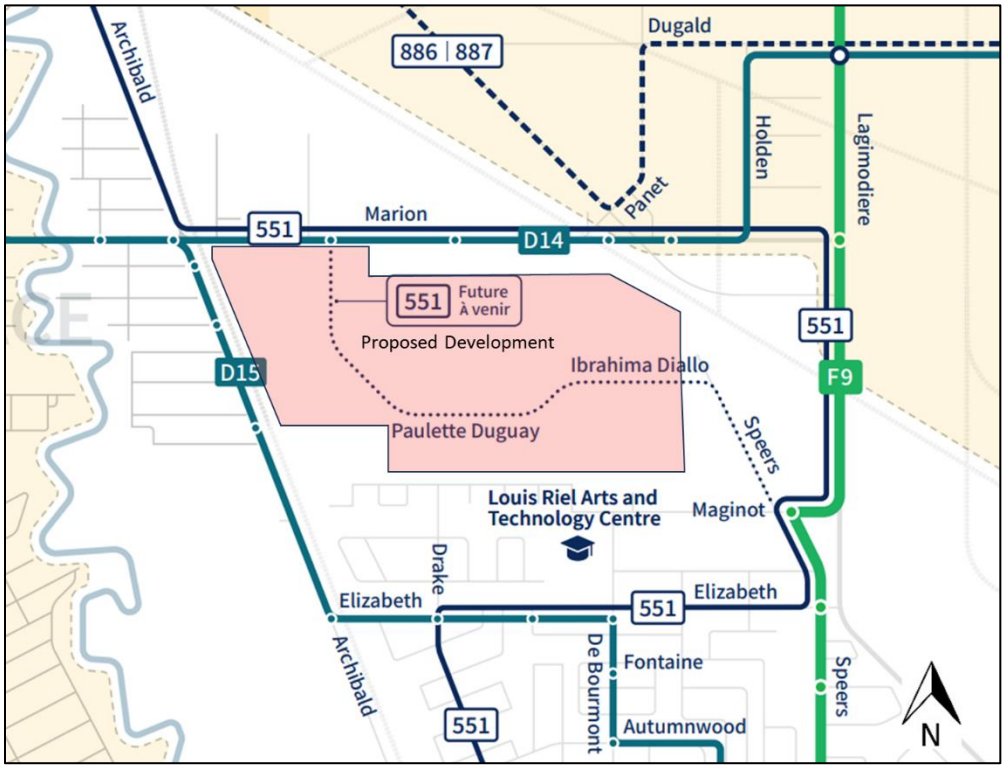
Additionally, Direct Lines D14 and D15 will run alongside the edge of the Public Markets site on Archibald and Marion Streets. A direct bus line is defined as having headways of 10 to 20 minutes on weekdays and stops every 200 to 500 metres. Both D14 and D15 run roughly east-west through the city and provide opportunities to transfer to bus routes with city wide destinations.

Lastly, a new connector route is proposed to service Paulette Duguay Street and Ibrahima Diallo Avenue within the proposed development. Connector Route 551 will run roughly north-south and will service neighbourhoods between its southern terminus in the Sage Creek neighbourhood to its northern terminus in the Rossmere neighbourhood. Connector routes are intended to have stops every 200 to 500 metres and headways of 15 to 30 minutes on weekdays.

The upgrades to Winnipeg's Transit system planned for June 2025 will provide significant improvements for access to transit in the Public Markets area. Route 551 is of particular importance, as its alignment will run directly through Public Markets and provide transit services to an area that presently has no bus routes that serve it.

Figure 4-2 illustrates the updated proposed bus stop layout at the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection based on discussions with the City's Public Works and Transit departments.

[2] City of Winnipeg: The Primary Transit Network and its feeder routes, https://www.winnipeg.ca/city-governance/strategic-plans-policies/winnipeg-transit-master-plan/primary-transit-network



Source: Winnipeg Transit

Figure 4-1: Proposed 2025 Transit Service



Figure 4-2: Proposed Bus Stop Layout at Marion Street and Paulette Duguay Street

5 WALKING AND CYCLING REVIEW

This section outlines two walking and cycling considerations requested by the City for review in this TIS update. These include reviewing roundabout pedestrian crossing treatments and school travel planning.

5.1 PEDESTRIAN CROSSING TREATMENTS

Pedestrian crossing warrants were completed using Table 1 of the *TAC Pedestrian Crossing Control Guide, Third Edition*, for two intersections along Paulette Duguay Street and the proposed Maginot Street / Speers Road roundabout to evaluate the need for enhanced pedestrian crossings. Paulette Duguay Street is a free-flowing corridor, and pedestrian access to the adjacent retail developments are an important consideration.

Pedestrians walking along the north side of Ibrahima Diallo Avenue can access the retail area by walking along the east side of Paulette Duguay Street and crossing at the south side of the Commercial Access intersection, while pedestrians on the south side of Ibrahima Diallo Avenue can cross on the south side of the Ibrahima Diallo Avenue intersection. These locations are best suited for pedestrian crossings because the south legs of these intersections feature lower traffic volumes and median refuge. The north legs of these intersections would require pedestrians to cross five traffic lanes without a median refuge, due to the presence of a southbound left-turn.

Table 5-1 summarizes the results of the pedestrian warrant, which recommends Rectangular Rapid Flashing Beacon (RRFB) treatments at both Paulette Duguay Street crossing locations, and crosswalks with ground mounted signage at all roundabout approaches. **Figure 5-1** illustrates the recommended pedestrian crossing paths and treatment locations.

Table 5-1: Pedestrian Crossing Treatments

LOCATION	2034 AADT	SPEED LIMIT (KM/H)	NUMBER OF LANES	MEDIAN REFUGE?	CROSSING TREATMENT[1]
Paulette Duguay Street & Commercial Access					
South Approach	10,300	50	4	Y	RRFB
Paulette Duguay Street & Ibrahima Diallo Avenue					
South Approach	5,100	50	4	Y	RRFB
Maginot Street / Speers Road					
North Approach	6,700	50	3	Y	GM
East Approach	7,400	50	3	Y	GM
South Approach	3,500	50	2	Y	GM
West Approach	4,800	50	2	Y	GM

1 – GM is a crosswalk with side mounted signs. RRFB is a Rectangular Rapid Flashing Beacon.

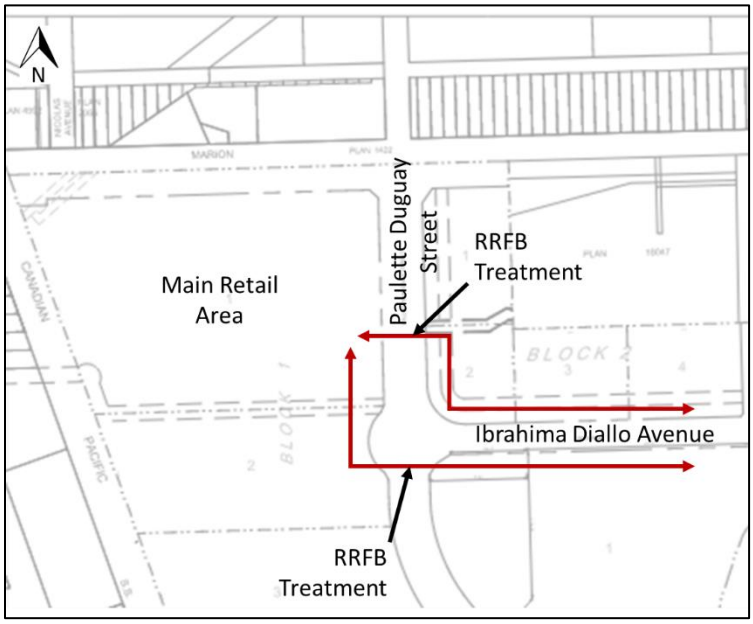
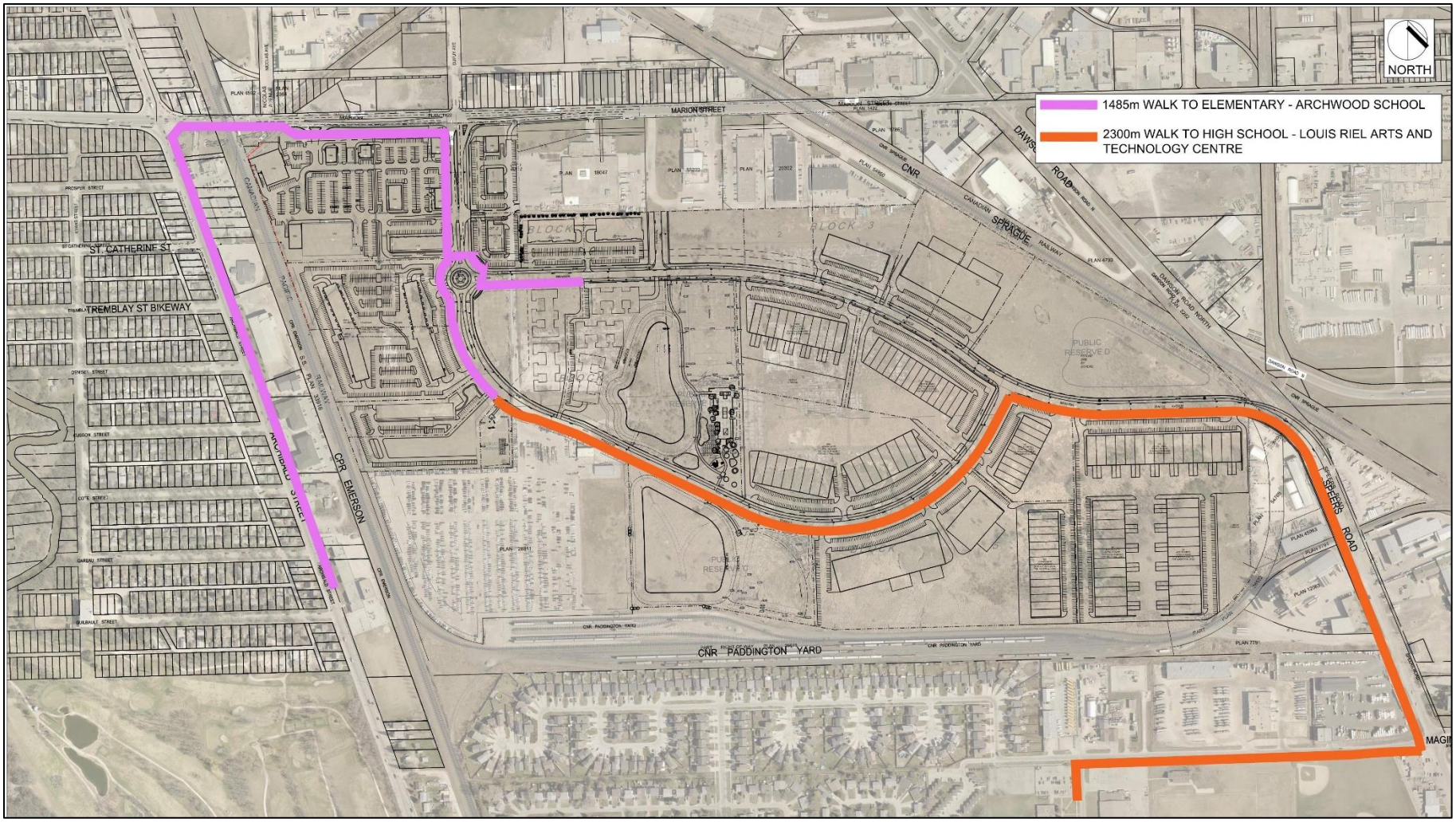


Figure 5-1:Pedestrian Crossing Paths

5.2 SCHOOL TRAVEL PLANNING

Figure 5-2 illustrates the school travel plan for the proposed development which includes walking paths and distances to the nearest elementary school (Archwood School) and high school (Louis Riel Arts and Technology Centre). The developer (Oxela Developments) previously completed a study for a pedestrian bridge over the CPKC Sprague rail line that would improve walking and cycling connections to Archwood School, however, there was no interested from stakeholders at the time and the project did not progress beyond the study.



Source: McGowan Russell

Figure 5-2: School Travel Plan

6 TRUCK ACCESS REVIEW

The proposed development is mixed-use and includes residential, commercial and employments lands. It is anticipated that the employment lands will generate some goods movement commercial truck traffic that will use the collector road network to access the City's surrounding Regional Street and goods movement networks. The future employment lands are located on the east side of the site to mitigate the potential impact of truck traffic on the residential land uses on the west side (refer to proposed development land uses in **Figure 1-2** in **Section 1.2**).

Marion Street and Lagimodiere Boulevard are both designated as Regional Streets and Truck Routes; however, Lagimodiere Boulevard via Speers Road is expected to be a more attractive access for truck movements to/from the proposed employment lands. This is primarily because it provides more efficient access to significant goods movements routes and destinations including:

- The Perimeter Highway, and destinations beyond the Perimeter Highway.
- The Winnipeg Inner Ring Roads, especially Lagimodiere Boulevard, Abinojii Mikanah and Chief Peguis Trail.
- Industrial lands in the north, east and south areas of Winnipeg.

Marion Street provides a shorter route to most industrial lands in central and northwest Winnipeg but may be a less desirable route for goods movement due to requiring truck travel through downtown.

Regardless of the preferred travel route, all development intersections and roundabouts will be designed to accommodate a WB-20 design vehicle. The 2025 draft detailed design of the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection, and Paulette Duguay Street / Ibrahima Diallo Avenue intersection (**Appendix A**) are designed to accommodate WB-20s, and the Maginot Street / Speers Road roundabout will accommodate a WB-20 design vehicle but has not yet been designed in detail.

7 CONCLUSIONS

The following conclusions are made for the proposed development based on the results of the analysis:

- The purpose of this 2025 TIS Update is to reassess the transportation impacts of the development based on the most current development proposal, incorporating the design changes and updates in the May 2024 TIS Update, the July 2024 Stop-Control Review Letter, and the March 2025 Trip Generation Update Memo. The most current development proposal includes the following updates since the previous reports:
  - Remove 60,000 square feet of Specialty Trade Centre.
  - Remove 281,000 square feet of Recreational Community Centre.
  - Add 800 multi-family units, bringing the development total to 2,800 multi-family units.
- In the 2029 Phase 1 scenario, the development is proposed to generate 964 auto trips (580 entering and 384 exiting) during the weekday a.m. peak hour, 1,014 auto trips (382 entering and 632 exiting) during the p.m. peak hour, and 10,166 auto trips (5,083 entering and 5,083 exiting) daily.
- In the 2034 Phase 2 / Full Development scenario, the additional residential units are forecast to generate 1,460 auto trips (738 entering and 722 exiting) during the weekday a.m. peak hour, 1,577 auto trips (691 entering and 886 exiting) during the p.m. peak hour, and 16,108 auto trips (8,054 entering and 8,054 exiting) daily.
- A traffic signal is not warranted for the Paulette Duguay Street / Commercial Access and the Paulette Duguay Street / Ibrahim Diallo Avenue intersections in any of the scenarios.
- Capacity analysis of the Marion Street / Dupuy Avenue / Paulette Duguay Street intersection, Paulette Duguay Street / Commercial Access intersection, Paulette Duguay Street / Ibrahima Diallo intersection and proposed Maginot Street / Speers Road roundabout indicates that these intersections are forecast to operate acceptably during the 2029 and 2034 post development scenarios with the intersection configurations included in the 2025 design (**Appendix A**).
- The Lagimodiere Boulevard / Maginot Street intersection is approaching capacity in the 2034 development full build-out scenario but is forecast to operate acceptably with overall intersection LOS C and max v/c ratio of less than 1. Previous TISs included a second northbound left-turn lane at this intersection for the Phase 2 (full build-out) scenario, and in this updated TIS a second northbound left-turn lane is shown to reduce the max v/c ratio to less than 0.90 and reduce the overall average delay by 7 seconds. A cantilever lane designation overhead sign structure would be required for the dual northbound left-turn lane and substantial modifications to intersection geometry may be required to ensure all truck movements are accommodated. These are future considerations would be confirmed during detailed design.
- Route upgrades to Winnipeg's Transit system planned for 2025 will provide significant improvements for access to transit in the Public Markets area. Some Transit trips to / from the proposed development are expected to transfer between Direct Route D14 and Connector Route 551 at the proposed Marion Street / Dupuy Avenue / Paulette Duguay Street intersection. Direct Route D14 is proposed to be served by stops on far-side eastbound Marion Street and near-side westbound Marion Street, while Connector Route 551 is proposed to be served by stops on northbound and southbound Paulette Duguay Street.
- The majority of truck traffic generated by employment lands in the proposed development is expected to access the area via Speers Road, Maginot Street and Lagimodiere Boulevard.
- RRFB pedestrian crossings are recommended across Paulette Duguay Street south of the Commercial Access and south of Ibrahima Diallo Avenue. All four approaches to the Maginot Street / Speers Road roundabout warrant a painted crosswalk with side mounted signs.
- The nearest elementary school is Archwood School (1,485m) and the nearest high school is Louis Riel Arts and Technology Centre (2,300m).

APPENDIX

A 2025 DESIGN DRAWINGS

THE CITY OF WINNIPEG

FINANCE #

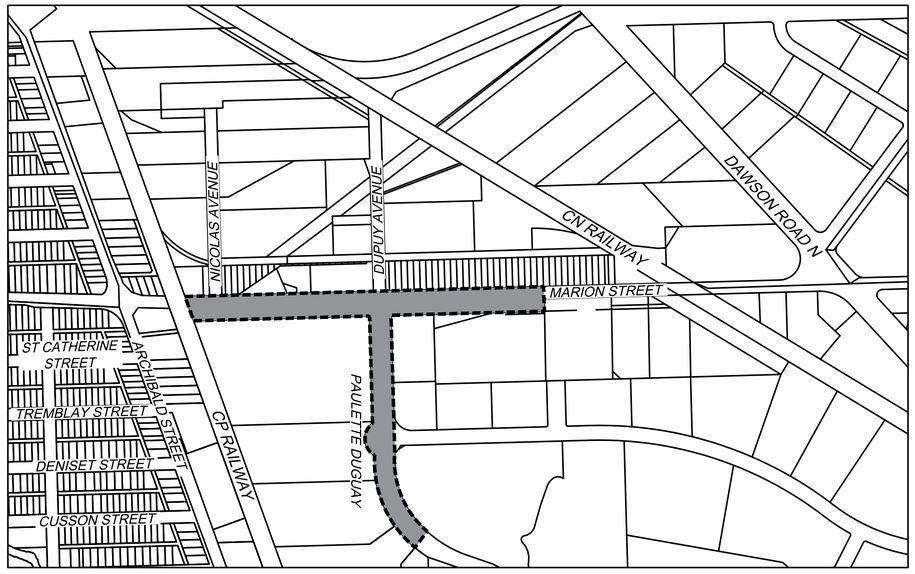
MARCH, 2022

MARION STREET
PUBLIC MARKETS

UNDERGROUND SERVICING AND ROADWORK

DASZ 30/2020

CITY DWG #	DRAWING #	SHEET #	DRAWING NAME	DESCRIPTION	
-	211-07590-00-C000	1 OF 11	COVER	COVER, LOCATION PLAN AND DRAWING INDEX	
-	211-07590-00-C201	2 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS	- UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C202	3 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS	- UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C203	4 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS	- UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C204	5 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS	- UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C205	6 OF 11	MARION STREET	PLAN, PROFILE AND DETAILS	- UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C206	7 OF 11	PAULETTE DUGUAY STREET	PLAN, PROFILE AND DETAILS	- UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C207	8 OF 11	PAULETTE DUGUAY STREET	PLAN, PROFILE AND DETAILS	- UNDERGROUND SERVICING AND ROADWORK
-	211-07590-00-C501	9 OF 11	DETAIL PLAN	PLAN	- JOINT PLAN
-	211-07590-00-C502	10 OF 11	DETAIL PLAN	PLAN	- JOINT PLAN
-	211-07590-00-C503	11 OF 11	DETAIL PLAN	PLAN	- JOINT PLAN



1600 BUFFALO PLACE
WINNIPEG, MANITOBA, CANADA R3T 6B8
TEL: 204-477-6650 | FAX: 204-474-2864 | WWW.WSP.COM

ISSUED FOR CONSTRUCTION

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

RELEASED FOR Winnipeg CONSTRUCTION BY:

DATE:

SHEET 1 OF 11

CITY DRAWING NO.

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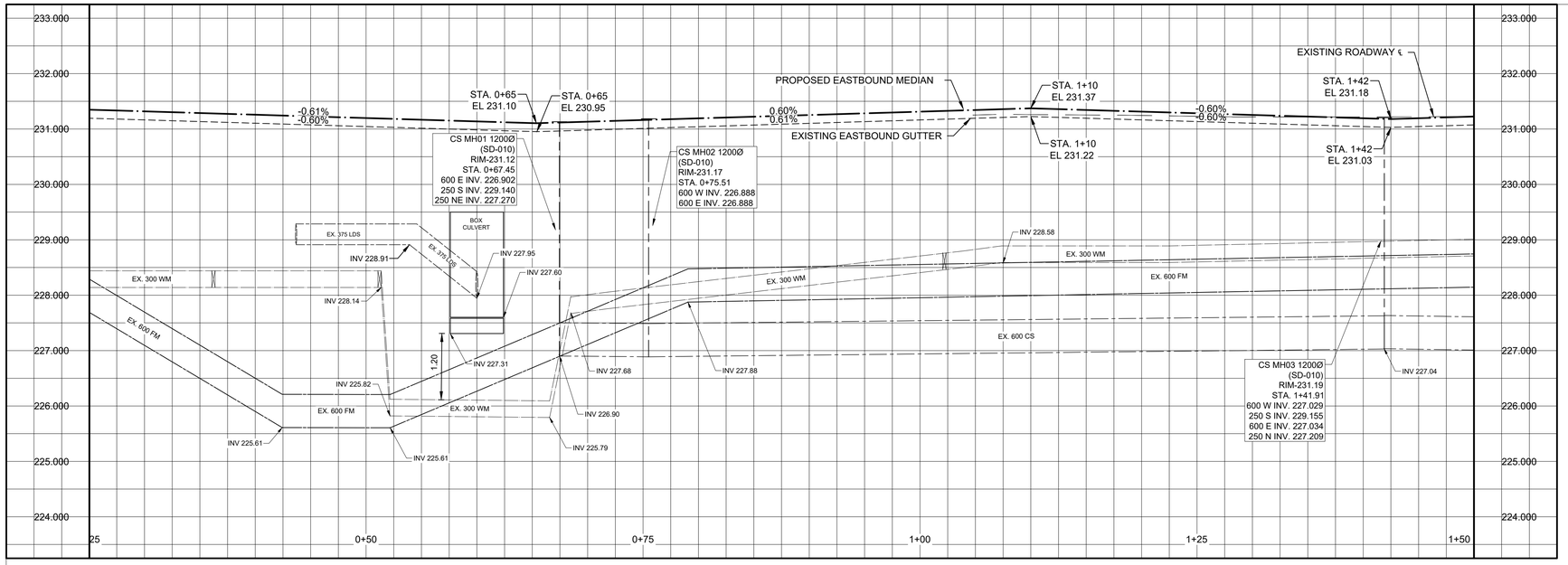
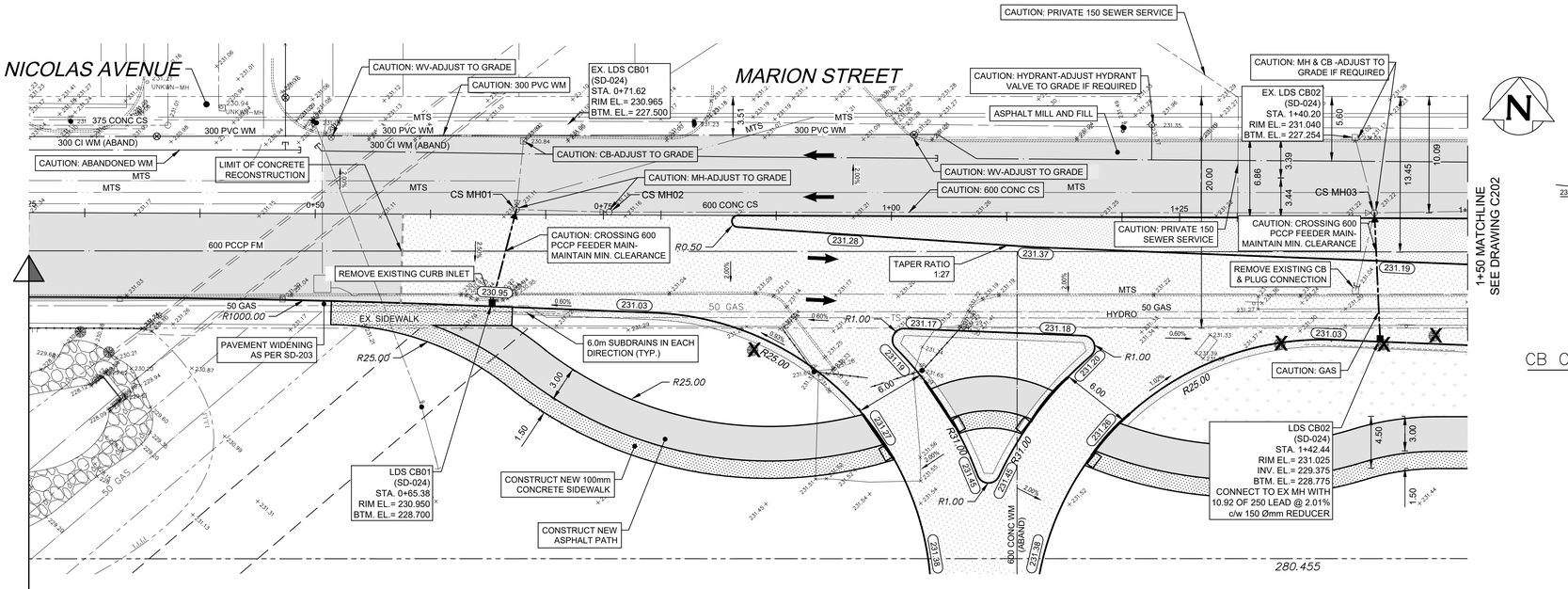


NOTES FOR MARION ST ONLY

1. PIPE CLASSES SHOWN FOR L.D.S. ARE FOR CONCRETE PIPE UNLESS OTHERWISE SHOWN.
2. ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 3 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
3. ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
4. MINIMUM- 0.44% GRADE ON 300 C.B. LEADS.
5. MINIMUM- 0.56% GRADE ON 250 C.B. LEADS.
6. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
7. INSTALL DETECTABLE WARNING TILE AS SHOWN PER CW3328 AT ALL SIDEWALK/PATHWAY CONNECTIONS.
8. ADJUST ALL WATER VALVES, MANHOLES, CATCH BASINS, CATCH PITS AND WATER SHUT OFF VALVES TO GRADE.
9. ALL RADII 25m OR LESS SHALL BE INTEGRAL MODIFIED BARRIER CURB

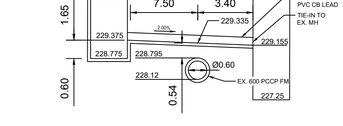
CAUTION: AQUEDUCT AND/OR FEEDERMAIN

1. DO NOT OPERATE VIBRATORY EQUIPMENT OVER OR WITHIN 3.0 METERS OF THE AQUEDUCT AND/OR FEEDERMAIN CENTRELINE.
2. INSTALLATION EQUIPMENT FOR THE PROPOSED WORKS SHALL NOT CROSS OR TRAVEL ALONG EITHER SIDE OF THE AQUEDUCT AND/OR FEEDERMAIN WITHIN A LATERAL DISTANCE OF 5.0 METERS FROM THE CENTRELINE OF THE AQUEDUCT AND/OR FEEDERMAIN.
3. CONCRETE DEMOLITION AND REMOVAL WITHIN 3 METERS HORIZONTALLY OF THE AQUEDUCT AND/OR FEEDERMAIN SHALL BE COMPLETED BY SAWCUTTING AND REMOVAL, OR BY THE USE OF THE HAND HELD JACKHAMMERS. USE OF MACHINE MOUNTED CONCRETE BREAKERS ABOVE THE AQUEDUCT AND/OR FEEDERMAIN SHALL NOT BE PERMITTED.



LIMIT OF MARION ST. CONSTRUCTION

MATCH EXISTING GRADES



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NTS

CB CROSS-SECTION AT STA. 1+42.44

NTS

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
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No. 5750

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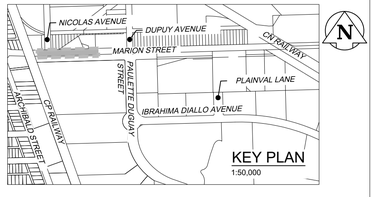

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	COMBINED SEWER			VALVE/PLUG				
	LAND DRAINAGE SEWER			CATCH BASIN				
	WASTE WATER SEWER			UTILITIES ADJUSTED				
	PROPERTY LINE			CURB RAMP				
	EDGE OF ASPHALT			DETECTABLE WARNING SURFACE TILE				
	EDGE OF CONCRETE		230.99	GROUND GRADE				
	MODIFIED BARRIER CURB			PAVEMENT GRADE	231.000			
	EDGE OF SIDEWALK			LANDSCAPE				
	M.T.S.			CONCRETE SLAB			NORTH & EAST GUTTER	
	BARRIER CURB AND GUTTER			CONC SIDEWALK			SOUTH & WEST GUTTER	
	GAS			ASPHALT			EASTBOUND MEDIAN	
	HYDRO | HYDRO POLE			MILLED SURFACE			ROADWAY CENTRELINE	
EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PROFILE	PROPOSED

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE
COMMITTEE

NOTE:

LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

B.M. CWBM 33-006
ELEV. 231.595m

NO.	REVISIONS	DATE	BY
E	RE-ISSUED FOR UNDERGROUND STRUCTURES	12/05/25	JD
D	RE-ISSUED FOR UNDERGROUND STRUCTURES	02/04/25	AG
C	RE-ISSUED FOR UNDERGROUND STRUCTURES	20/03/25	AG
B	ISSUED FOR UNDERGROUND STRUCTURES	14/03/24	JD
A	ISSUED FOR REVIEW	18/08/22	SS

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DESIGNED BY	AG	CHECKED BY	SS
DRAWN BY	AG	APPROVED BY	JD
HOR. SCALE:	1:250	RELEASED FOR CONSTRUCTION BY	JD
VERT. SCALE:	1:50	DATE:	14-03-2024
DATE:	18-08-2022		

ENGINEERS SEAL

PROVINCE OF MANITOBA
A.D.W. DUNN
Member
38563
2025-06-16
REGISTERED PROFESSIONAL ENGINEER

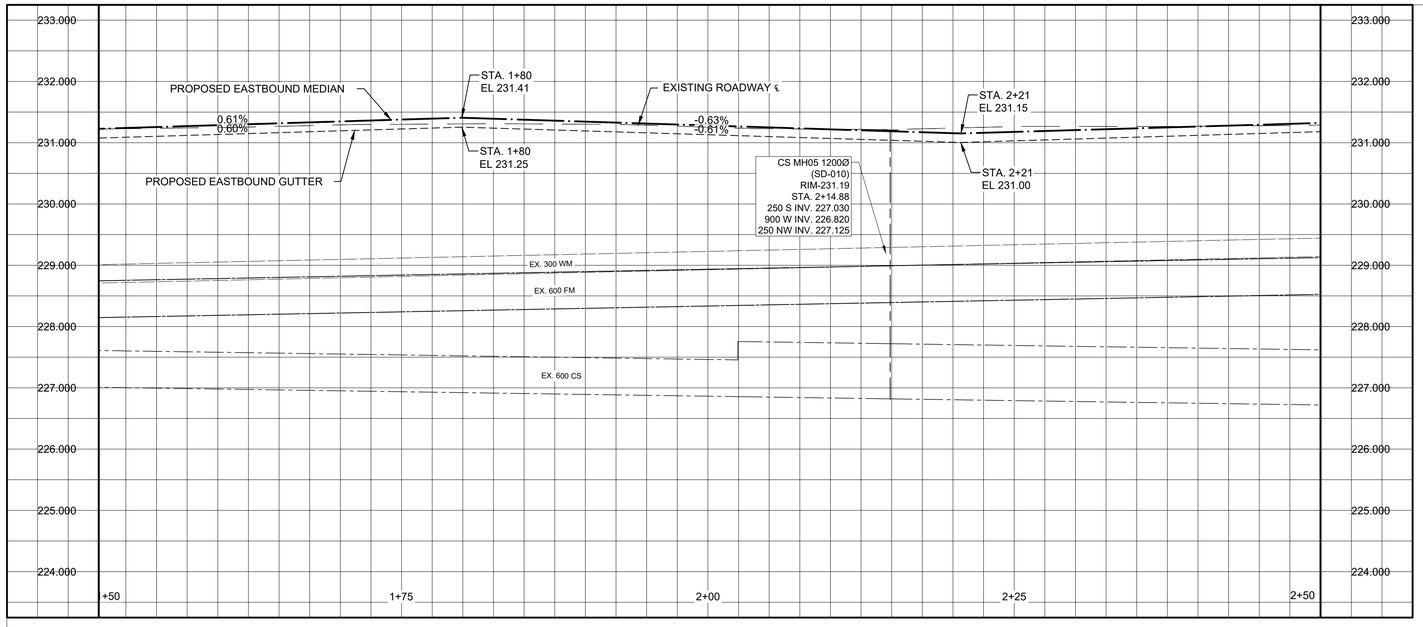
CONSULTANT DRAWING NO.
C201

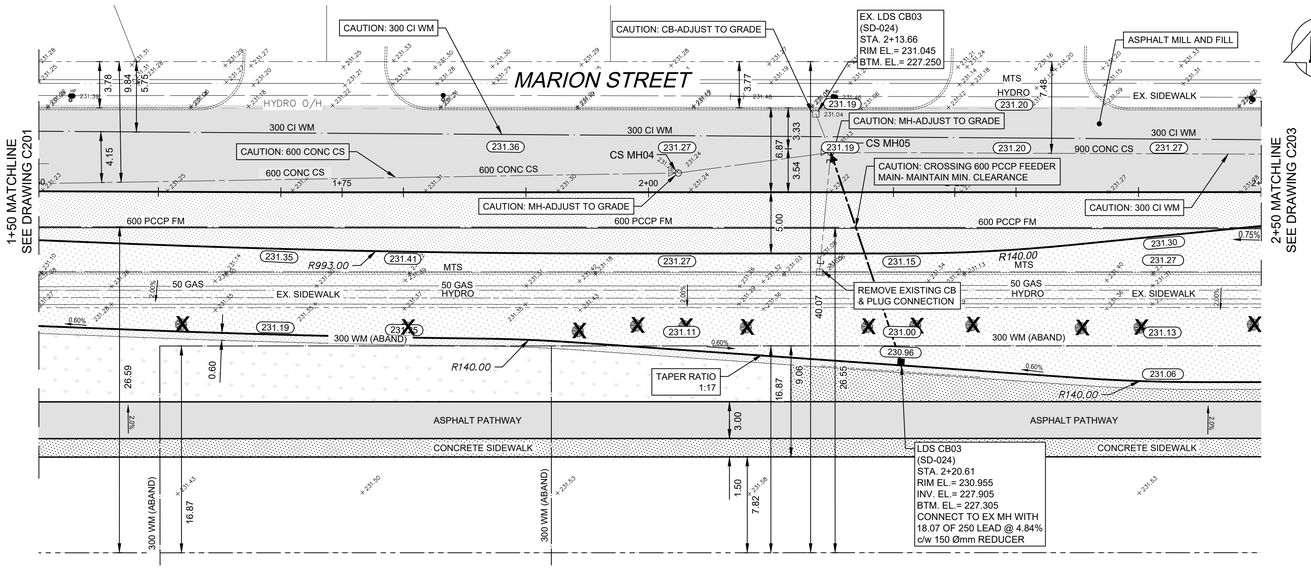
Winnipeg

THE CITY OF WINNIPEG

PUBLIC MARKETS
PLAN AND PROFILE
STA. 0+25 TO 1+50
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 2 OF 11
CITY DRAWING NO.





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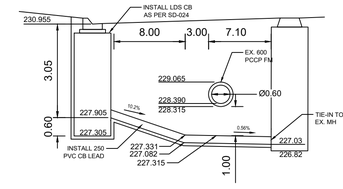
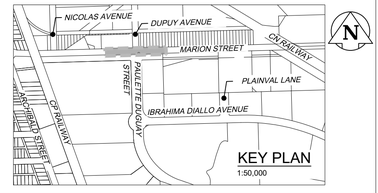


CB CROSS-SECTION AT STA. 2+20.61
NTS

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

ISSUED FOR CONSTRUCTION



EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PROFILE	PROPOSED
	WATERMAIN			HYDRANT ASSEMBLY				
	COMBINED SEWER			VALVE/PLUG				
	LAND DRAINAGE SEWER			CATCH BASIN				
	WASTE WATER SEWER			UTILITIES ADJUSTED				
	PROPERTY LINE			CURB RAMP				
	EDGE OF ASPHALT			DETECTABLE WARNING SURFACE TILE				
	EDGE OF CONCRETE		230.99	GROUND GRADE				
	MODIFIED BARRIER CURB			PAVEMENT GRADE	231.000			
	EDGE OF SIDEWALK			LANDSCAPE				
	M.T.S.			CONCRETE SLAB			NORTH & EAST GUTTER	
	BARRIER CURB AND GUTTER			CONC SIDEWALK			SOUTH & WEST GUTTER	
	GAS			ASPHALT			EASTBOUND MEDIAN	
HP	HYDRO | HYDRO POLE			MILLED SURFACE			ROADWAY CENTRELINE	

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE
COMMITTEE

NOTE:

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B.M. CWBM 33-006
ELEV. 231.595m

NO.	REVISIONS	DATE	BY
E	RE-ISSUED FOR UNDERGROUND STRUCTURES	12/05/25	JD
D	RE-ISSUED FOR UNDERGROUND STRUCTURES	02/04/25	AG
C	RE-ISSUED FOR UNDERGROUND STRUCTURES	20/03/25	AG
B	ISSUED FOR UNDERGROUND STRUCTURES	14/03/24	JD
A	ISSUED FOR REVIEW	18/08/22	SS

1600 BUFFALO PLACE
WINNIPEG, MANITOBA, CANADA R3T 6B8
TEL: 204-477-6650 | FAX: 204-474-2864 | WWW.WSP.COM

DESIGNED BY	AG	CHECKED BY	SS
DRAWN BY	AG	APPROVED BY	JD
HOR. SCALE:	1:250	RELEASED FOR CONSTRUCTION	JD
VERT. SCALE:	1:50		
DATE:	18-08-2022	DATE:	14-03-2024

ENGINEERS SEAL
PROVINCE OF MANITOBA
J.D.W. DUNN
Member
38563
2025-05-14
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
C202

Winnipeg

THE CITY OF WINNIPEG

PUBLIC MARKETS

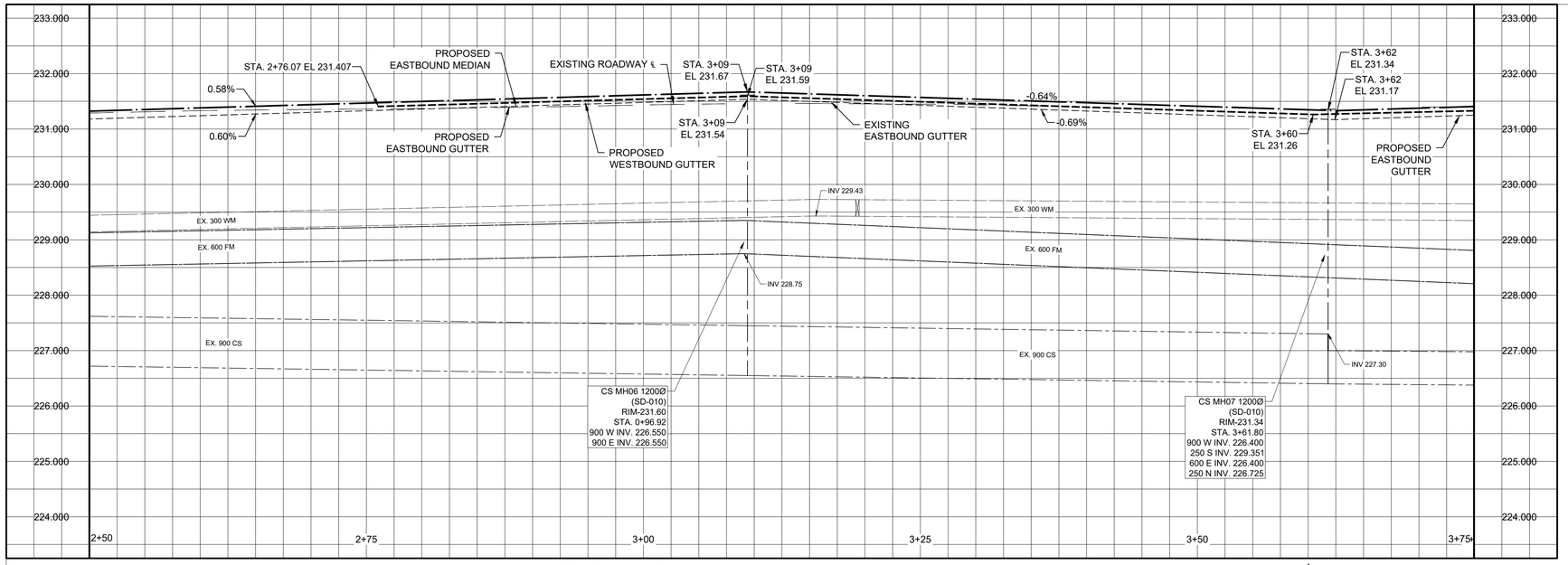
PLAN AND PROFILE STA. 1+50 TO 2+50

MARION STREET

UNDERGROUND SERVICING AND ROADWORK

SHEET 3 OF 11

CITY DRAWING NO.

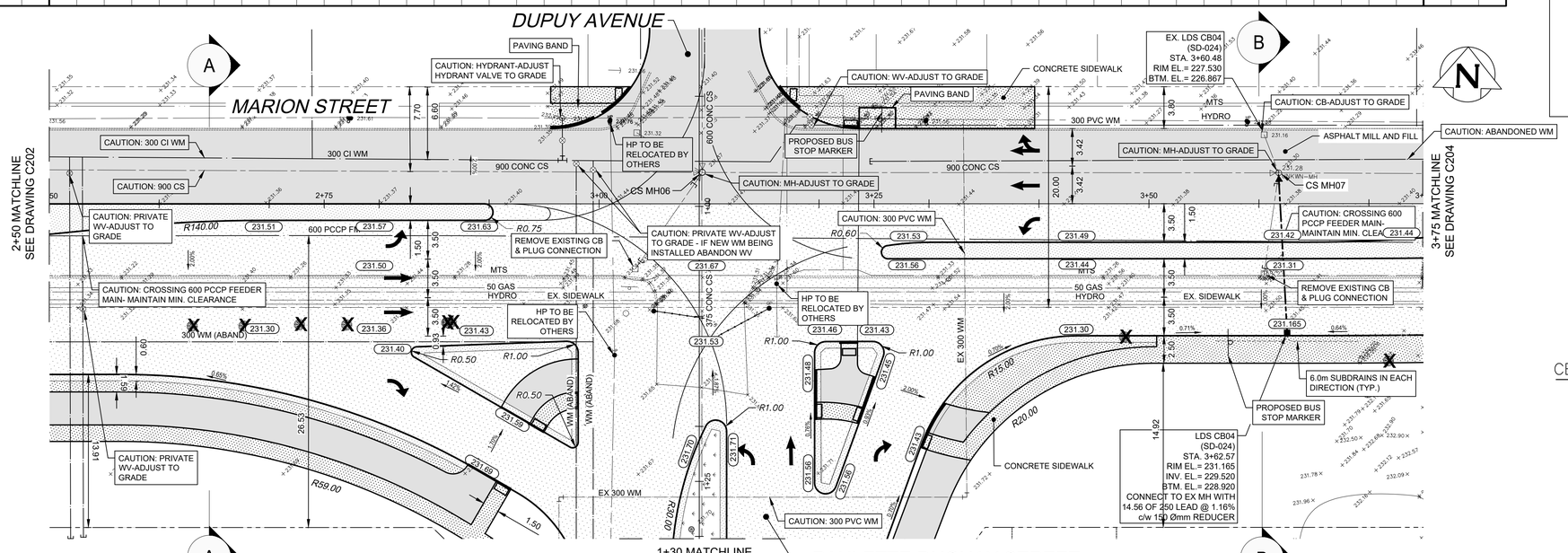


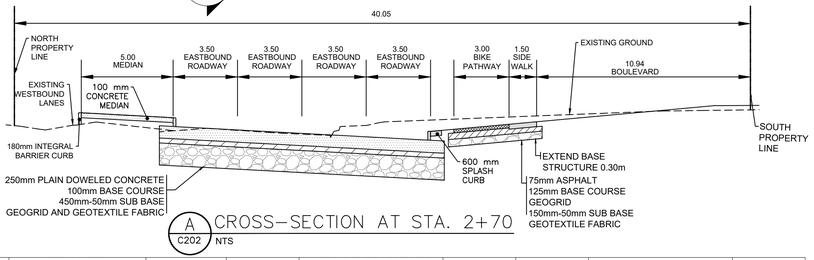
NOTES FOR MARION ST ONLY

1. PIPE CLASSES SHOWN FOR L.D.S. ARE FOR CONCRETE PIPE UNLESS OTHERWISE SHOWN.
2. ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 3 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
3. ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
4. MINIMUM- 0.44% GRADE ON 300 C.B. LEADS.
5. MINIMUM- 0.56% GRADE ON 250 C.B. LEADS.
6. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
7. INSTALL DETECTABLE WARNING TILE AS SHOWN PER CW3328 AT ALL SIDEWALK/PATHWAY CONNECTIONS.
8. ADJUST ALL WATER VALVES, MANHOLES, CATCH BASINS, CATCH PITS AND WATER SHUT OFF VALVES TO GRADE.
9. ALL RADII 25m OR LESS SHALL BE INTEGRAL MODIFIED BARRIER CURB

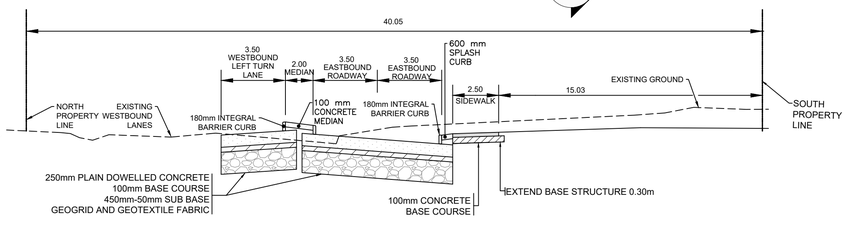
CAUTION: AQUEDUCT AND/OR FEEDERMAIN

1. DO NOT OPERATE VIBRATORY EQUIPMENT OVER OR WITHIN 3.0 METERS OF THE AQUEDUCT AND/OR FEEDERMAIN CENTRELINE.
2. INSTALLATION EQUIPMENT FOR THE PROPOSED WORKS SHALL NOT CROSS OR TRAVEL ALONG EITHER SIDE OF THE AQUEDUCT AND/OR FEEDERMAIN WITHIN A LATERAL DISTANCE OF 5.0 METERS FROM THE CENTRELINE OF THE AQUEDUCT AND/OR FEEDERMAIN.
3. CONCRETE DEMOLITION AND REMOVAL WITHIN 3 METERS HORIZONTALLY OF THE AQUEDUCT AND/OR FEEDERMAIN SHALL BE COMPLETED BY SAWCUTTING AND REMOVAL, OR BY THE USE OF THE HAND HELD JACKHAMMERS. USE OF MACHINE MOUNTED CONCRETE BREAKERS ABOVE THE AQUEDUCT AND/OR FEEDERMAIN SHALL NOT BE PERMITTED.

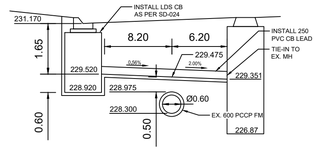




A C202 CROSS-SECTION AT STA. 2+70
NTS



B C202 CROSS-SECTION AT STA. 3+60
NTS

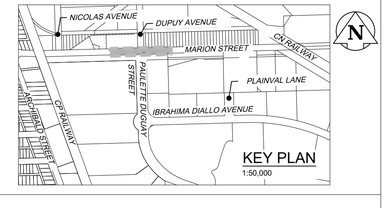


CB CROSS-SECTION AT STA. 3+62.57
NTS

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

ISSUED FOR CONSTRUCTION



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	WATERMAIN			HYDRANT ASSEMBLY				
	COMBINED SEWER			VALVE/PLUG				
	LAND DRAINAGE SEWER			CATCH BASIN				
	WASTE WATER SEWER			UTILITIES ADJUSTED				
	PROPERTY LINE			CURB RAMP				
	EDGE OF ASPHALT			DETECTABLE WARNING SURFACE TILE				
	EDGE OF CONCRETE		230.99	GROUND GRADE				
	MODIFIED BARRIER CURB			PAVEMENT GRADE	231.000			
	EDGE OF SIDEWALK			LANDSCAPE				
	M.T.S.			CONCRETE SLAB			NORTH & EAST GUTTER	
	BARRIER CURB AND GUTTER			CONC SIDEWALK			SOUTH & WEST GUTTER	
	GAS			ASPHALT			EASTBOUND MEDIAN	
	HYDRO | HYDRO POLE			MILLED SURFACE			ROADWAY CENTRELINE	

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE — DATE

NOTE:
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B.M. CWBM 33-006
ELEV. 231.595m

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wsp
1600 BUFFALO PLACE
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ENGINEERS SEAL
PROVINCE OF MANITOBA
A.D.W. DUNN
Member
38563
2025.05.14
REGISTERED PROFESSIONAL ENGINEER

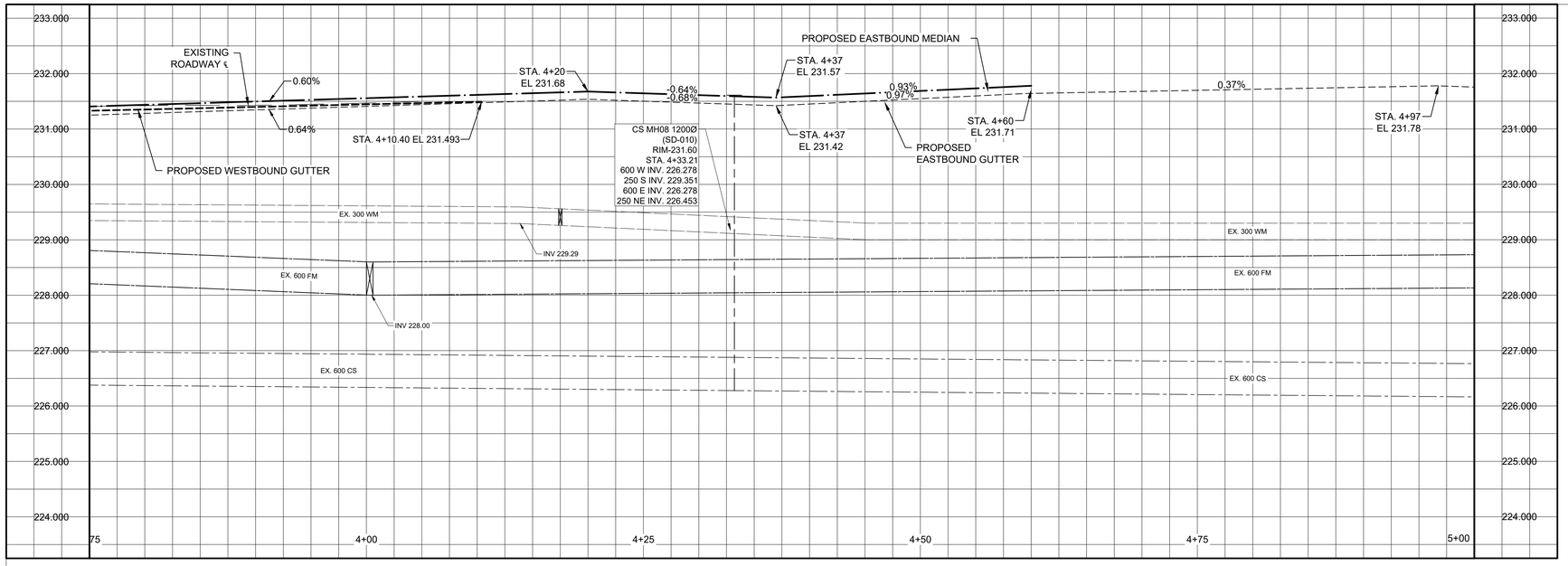
CONSULTANT DRAWING NO.
C203

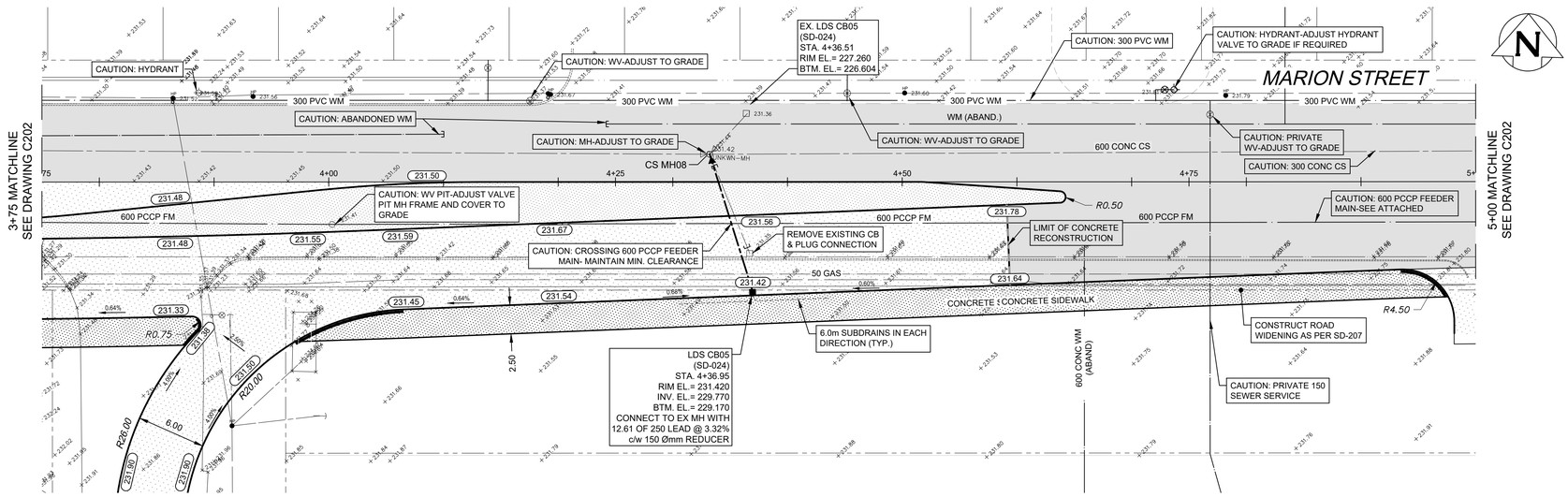
Winnipeg

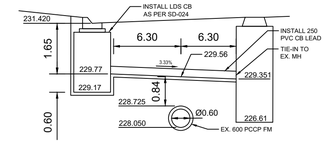
THE CITY OF WINNIPEG

PUBLIC MARKETS
PLAN AND PROFILE
STA. 2+50 TO 3+75
MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 4 OF 11
CITY DRAWING NO.







CB CROSS-SECTION AT STA. 4+36.95

NTS

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2. ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 3 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
3. ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
4. MINIMUM- 0.44% GRADE ON 300 C.B. LEADS.
5. MINIMUM- 0.56% GRADE ON 250 C.B. LEADS.
6. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
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8. ADJUST ALL WATER VALVES, MANHOLES, CATCH BASINS, CATCH PITS AND WATER SHUT OFF VALVES TO GRADE.
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NOTES FOR MARION ST ONLY

1. ALL PAVEMENT TO BE 200mm REINFORCED CONCRETE WITH MODIFIED BARRIER CURB, UNLESS OTHERWISE SHOWN.
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	WATERMAIN			HYDRANT ASSEMBLY				
	COMBINED SEWER			VALVE/PLUG				
	LAND DRAINAGE SEWER			CATCH BASIN				
	WASTE WATER SEWER			UTILITIES ADJUSTED				
	PROPERTY LINE			CURB RAMP				
	EDGE OF ASPHALT			DETECTABLE WARNING SURFACE TILE				
	EDGE OF CONCRETE		230.99	GROUND GRADE				
	MODIFIED BARRIER CURB			PAVEMENT GRADE	231.000			
	EDGE OF SIDEWALK			LANDSCAPE				
	M.T.S.			CONCRETE SLAB			NORTH & EAST GUTTER	
	BARRIER CURB AND GUTTER			CONC SIDEWALK			SOUTH & WEST GUTTER	
	GAS			ASPHALT			EASTBOUND MEDIAN	
	HYDRO | HYDRO POLE			HEAVY DUTY ASPHALT			ROADWAY CENTRELINE	

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE
COMMITTEE

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B.M. CWBM 33-006
ELEV. 231.595m

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E	RE-ISSUED FOR UNDERGROUND STRUCTURES	12/05/25	JD
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1600 BUFFALO PLACE
WINNIPEG, MANITOBA, CANADA R3T 6B8
TEL: 204-477-6650 | FAX: 204-474-2864 | WWW.WSP.COM

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ENGINEERS SEAL

PROVINCE OF MANITOBA
J.D.W. DUNN
Member
38563
2025-05-14
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
C204

Winnipeg

THE CITY OF WINNIPEG

PUBLIC MARKETS

PLAN AND PROFILE FROM STA. 3+75 TO 5+00

MARION STREET

UNDERGROUND SERVICING AND ROADWORK

SHEET 5 OF 11

CITY DRAWING NO.

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
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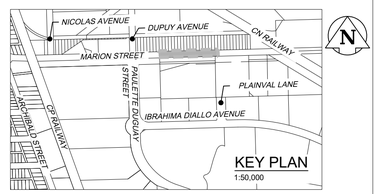

KEY PLAN
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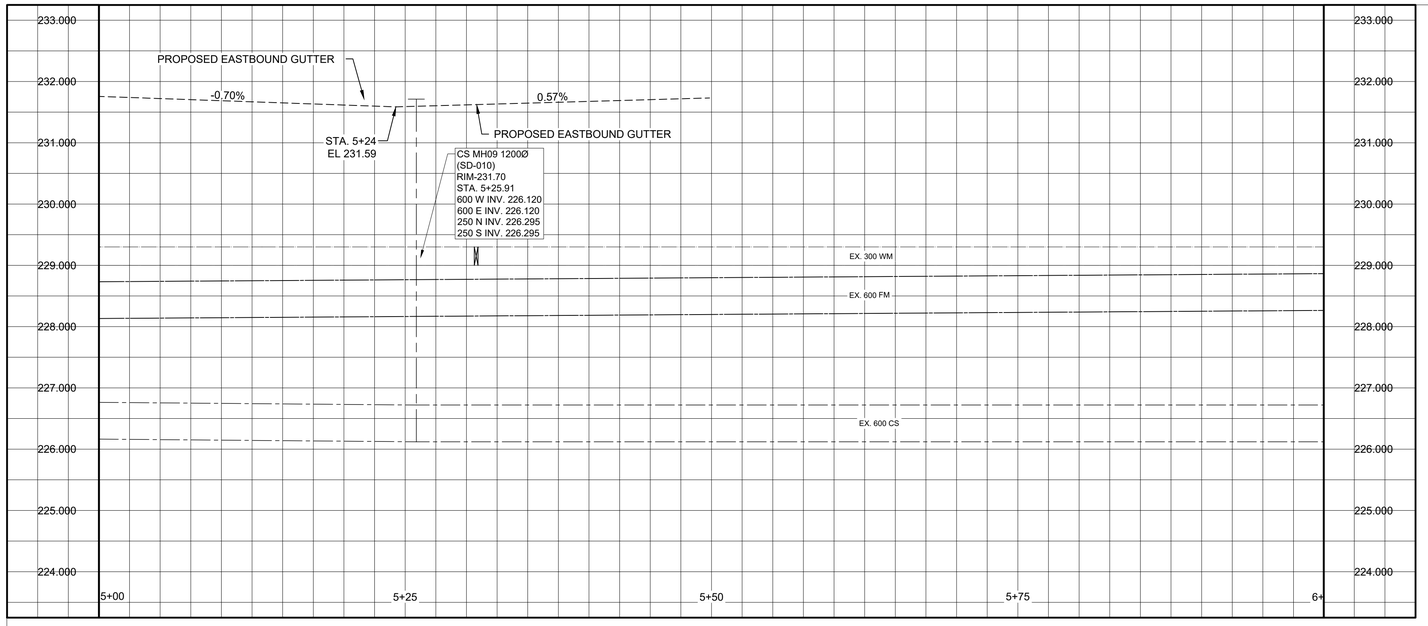

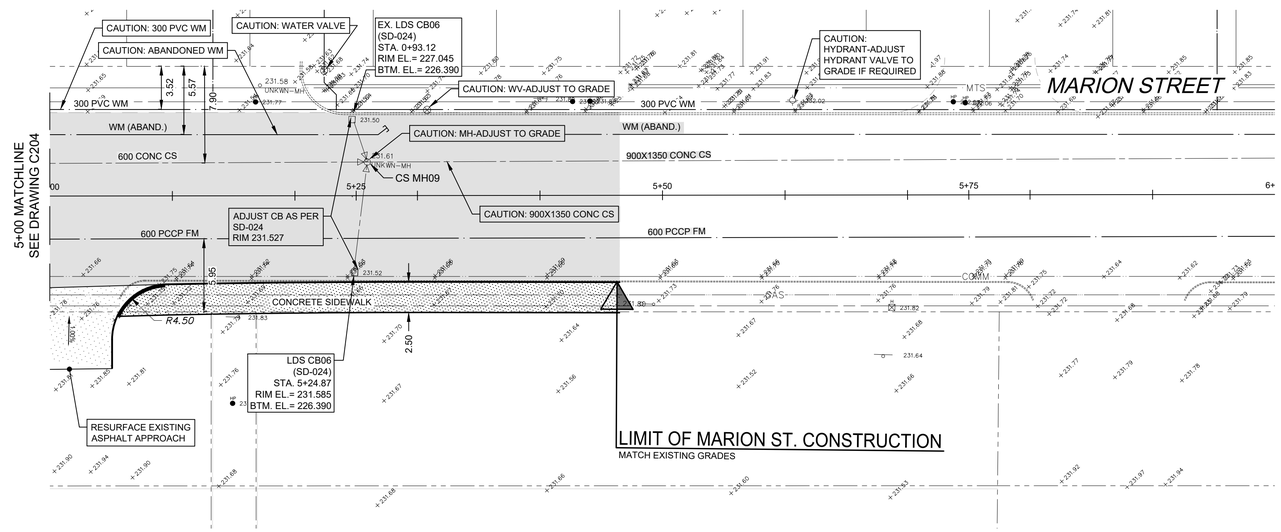

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UNDERGROUND STRUCTURES

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ENGINEERS SEAL

PROVINCE OF MANITOBA
J.D.W. DUNN
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38563
2025-05-14
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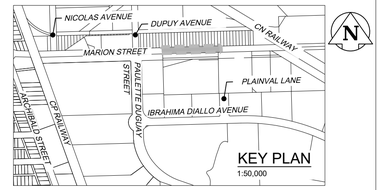


THE CITY OF WINNIPEG

Winnipeg

PUBLIC MARKETS

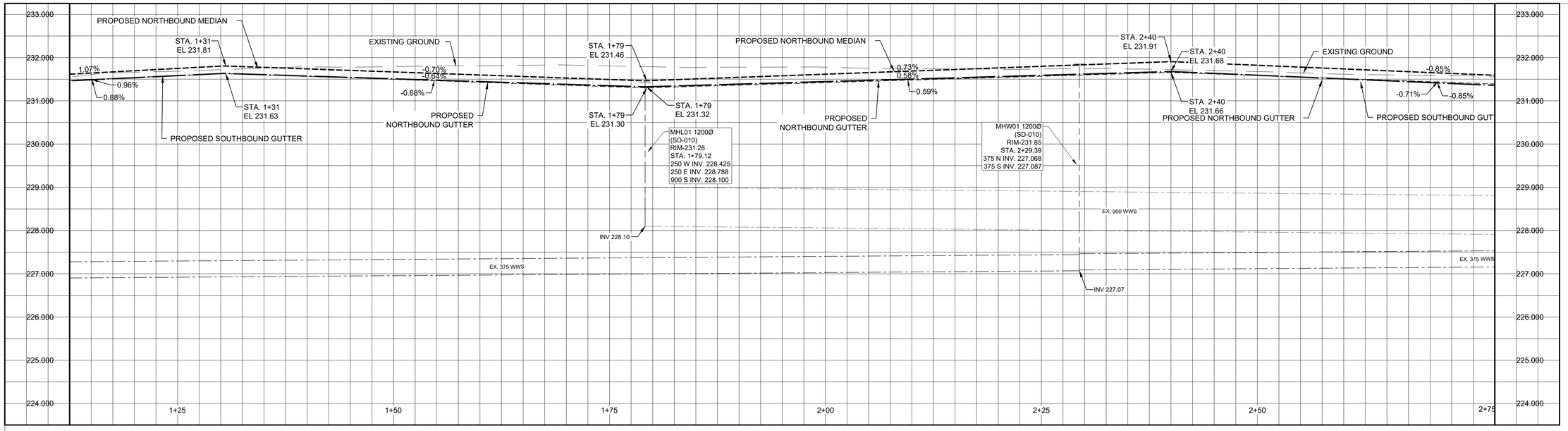
PLAN AND PROFILE FROM STA. 3+90 TO 5+72

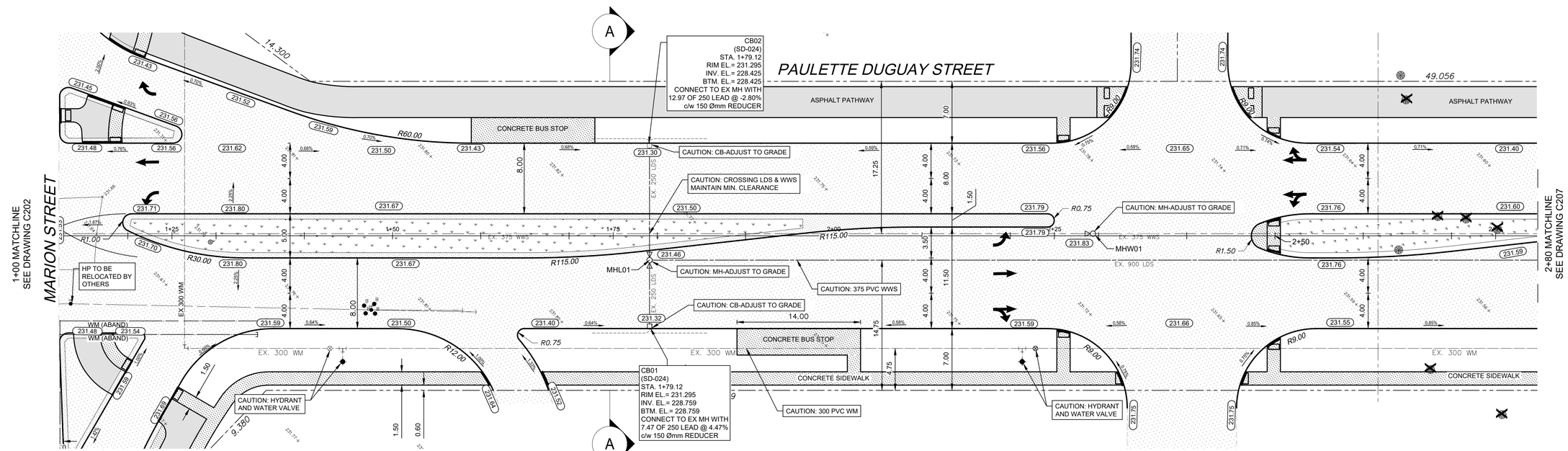
MARION STREET

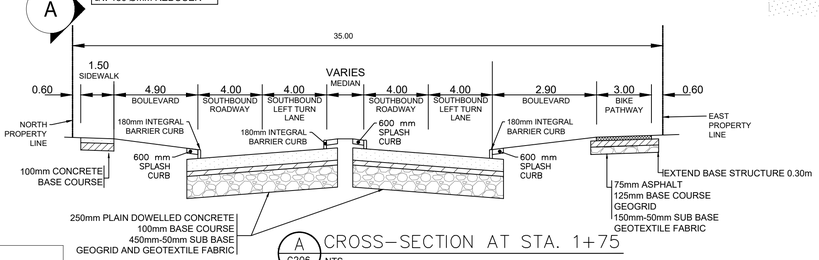
UNDERGROUND SERVICING AND ROADWORK

SHEET 6 OF 11

CITY DRAWING NO.







A C206 CROSS-SECTION AT STA. 1+75
NTS

NOTES

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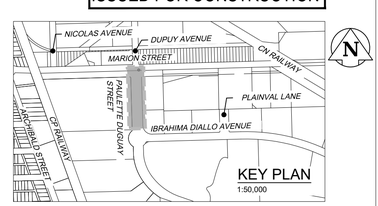
2. ALL PIPES 375 AND SMALLER TO BE CORED, ALL PIPES 450 AND LARGER CLASS 2 BACKFILL AT ALL PROPOSED AND EXISTING PAVEMENT CROSSINGS.
3. MINIMUM CORNER RADII TO BE 12.0m UNLESS OTHERWISE SHOWN.
4. COLLECTOR ON TO A COLLECTOR TO BE A 12.0m RADIUS.
5. ALL SIDEWALK/PATHWAY CROSSINGS TO HAVE CURB RAMPS.
6. MINIMUM- 0.44% GRADE ON 300 C.B. LEADS.
7. MINIMUM- 0.56% GRADE ON 250 C.B. LEADS.
8. ALL WORK TO CONFORM TO THE CITY OF WINNIPEG STANDARD CONSTRUCTION SPECIFICATIONS.
9. INSTALL DETECTABLE WARNING TILE AS SHOWN PER CW3328 AT ALL SIDEWALK/PATHWAY CONNECTIONS.
10. ADJUST ALL WATER VALVES, MANHOLES, CATCH BASINS, CATCH PITS AND WATER SHUT OFF VALVES TO GRADE.

EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PROFILE	PROPOSED
	WATERMAIN			HYDRANT ASSEMBLY				
	COMBINED SEWER			VALVE/PLUG				
	LAND DRAINAGE SEWER			CATCH BASIN				
	WASTE WATER SEWER			UTILITIES ADJUSTED				
	PROPERTY LINE			CURB RAMP				
	EDGE OF ASPHALT			DETECTABLE WARNING SURFACE TILE				
	EDGE OF CONCRETE		230.99	GROUND GRADE				
	MODIFIED BARRIER CURB			PAVEMENT GRADE	231.000			
	EDGE OF SIDEWALK			LANDSCAPE				
	M.T.S.			CONCRETE SLAB			NORTH & EAST GUTTER	
	BARRIER CURB AND GUTTER			CONC SIDEWALK			SOUTH & WEST GUTTER	
	GAS			ASPHALT			EASTBOUND MEDIAN	
	HYDRO | HYDRO POLE			MILLED SURFACE			ROADWAY CENTRELINE	

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Inc.
No. 5750

ISSUED FOR CONSTRUCTION



LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE
COMMITTEE

NOTE:

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B.M. CWBM 33-006
ELEV. 231.595m

NO.	REVISIONS	DATE	BY
E	RE-ISSUED FOR UNDERGROUND STRUCTURES	12/05/25	JD
D	RE-ISSUED FOR UNDERGROUND STRUCTURES	02/04/25	AG
C	RE-ISSUED FOR UNDERGROUND STRUCTURES	20/03/25	AG
B	ISSUED FOR UNDERGROUND STRUCTURES	14/03/24	JD
A	ISSUED FOR REVIEW	18/08/22	SS

wsp
1600 BUFFALO PLACE
WINNIPEG, MANITOBA, CANADA R3T 6B8
TEL: 204-477-6650 | FAX: 204-474-2864 | WWW.WSP.COM

DESIGNED BY	AG	CHECKED BY	SS
DRAWN BY	AG	APPROVED BY	JD
HOR. SCALE:	1:250	RELEASED FOR CONSTRUCTION	JD
VERT. SCALE:	1:50		
DATE:	18-08-2022	DATE:	14-03-2024

ENGINEERS SEAL
PROVINCE OF MANITOBA
J.D.W. DUNN
Member
38563
2025-05-14
REGISTERED PROFESSIONAL ENGINEER

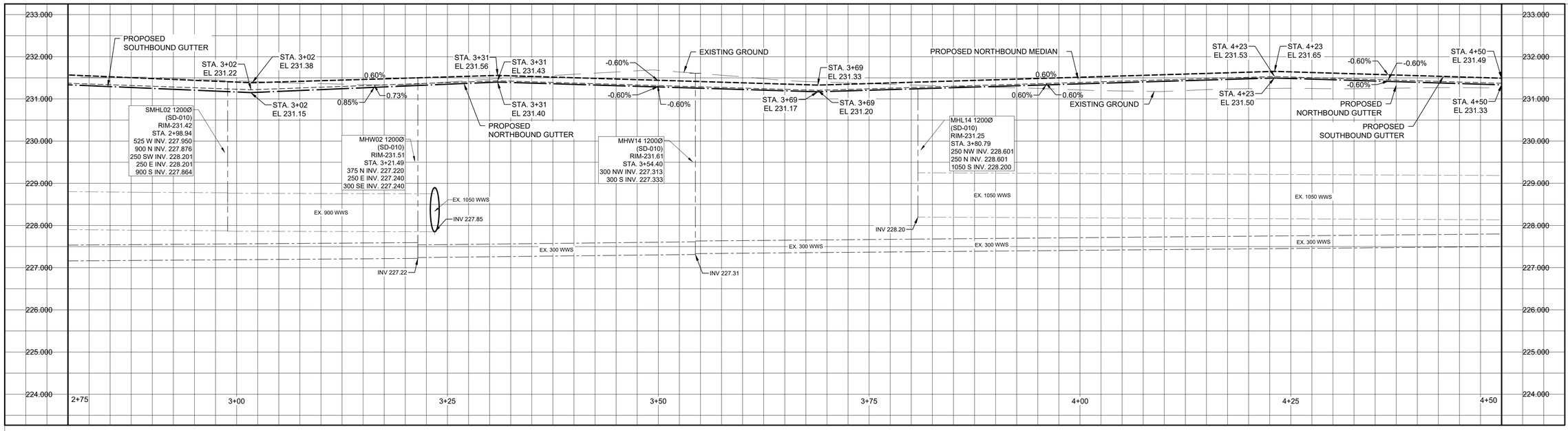
CONSULTANT DRAWING NO.
C206

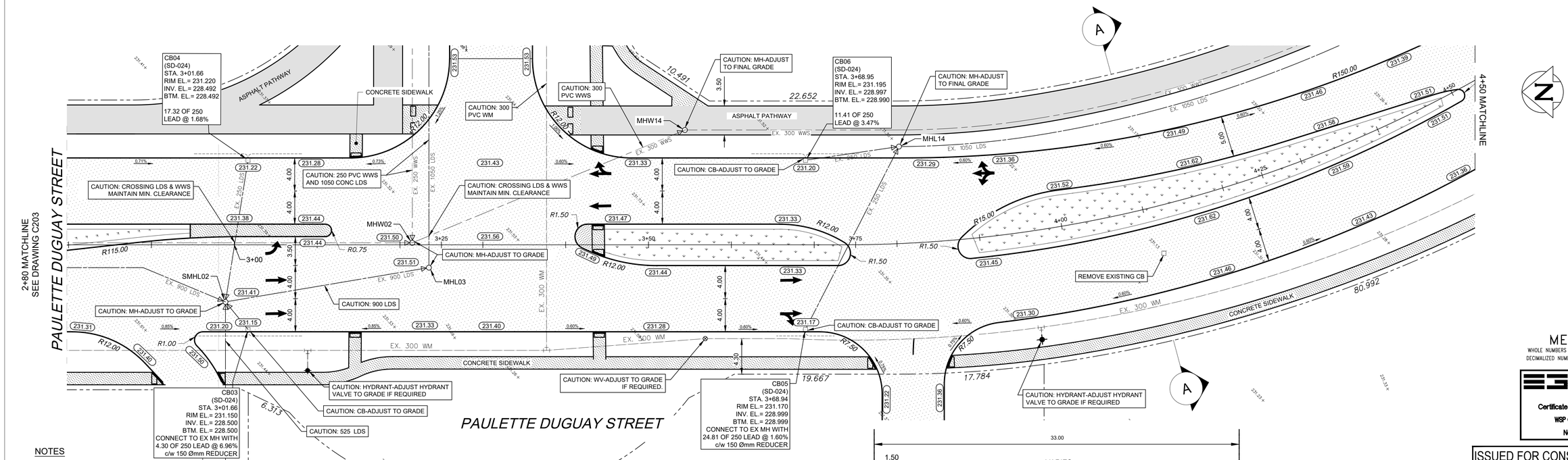
Winnipeg

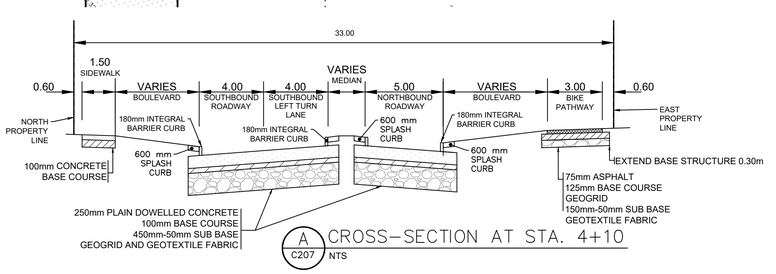
THE CITY OF WINNIPEG

PUBLIC MARKETS
PLAN AND PROFILE FROM STA. 0+90 TO 2+80
PAULETTE DUGUAY STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 7 OF 11
CITY DRAWING NO.







A C207 CROSS-SECTION AT STA. 4+10
NTS

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	COMBINED SEWER			VALVE/PLUG				
	LAND DRAINAGE SEWER			CATCH BASIN				
	WASTE WATER SEWER			UTILITIES ADJUSTED				
	PROPERTY LINE			CURB RAMP				
	EDGE OF ASPHALT			DETECTABLE WARNING SURFACE TILE				
	EDGE OF CONCRETE		230.99	GROUND GRADE				
	MODIFIED BARRIER CURB			PAVEMENT GRADE	231.000			
	EDGE OF SIDEWALK			LANDSCAPE				
	M.T.S.			CONCRETE SLAB			NORTH & EAST GUTTER	
	BARRIER CURB AND GUTTER			CONC SIDEWALK			SOUTH & WEST GUTTER	
	GAS			ASPHALT			EASTBOUND MEDIAN	
	HYDRO | HYDRO POLE			MILLED SURFACE			ROADWAY CENTRELINE	

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE
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ELEV. 231.595m

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ENGINEERS SEAL
PROVINCE OF MANITOBA
J.D.W. DUNN
Member
38563
2025-05-14
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
C207

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WHOLE NUMBERS INDICATE MILLIMETRES
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ENGINEERS GEOSCIENTISTS MANITOBA
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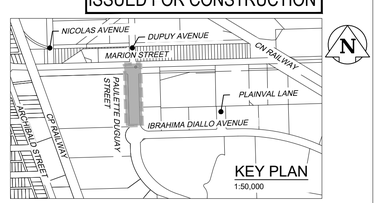
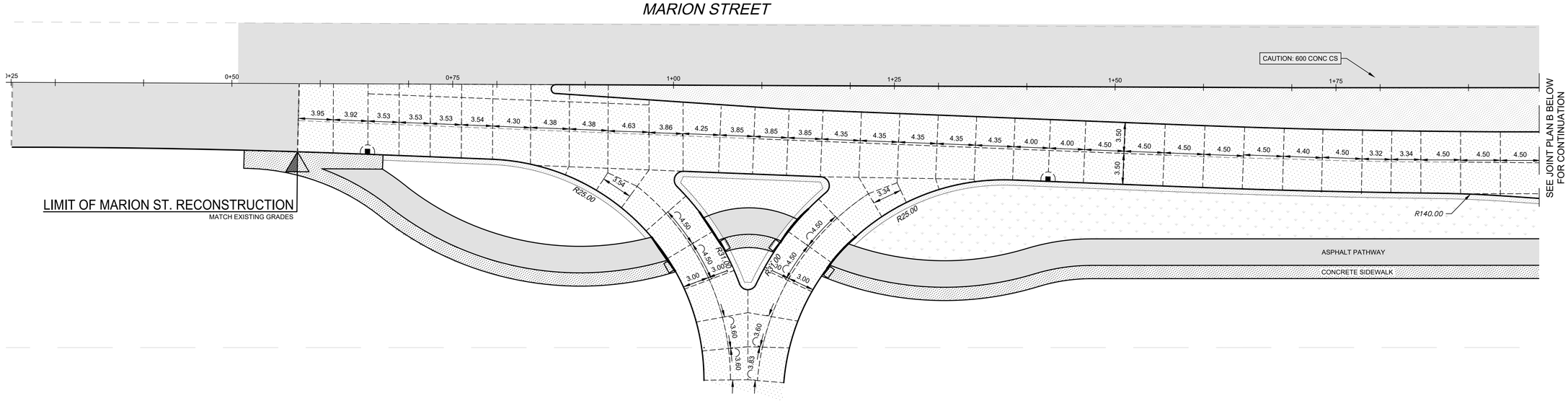


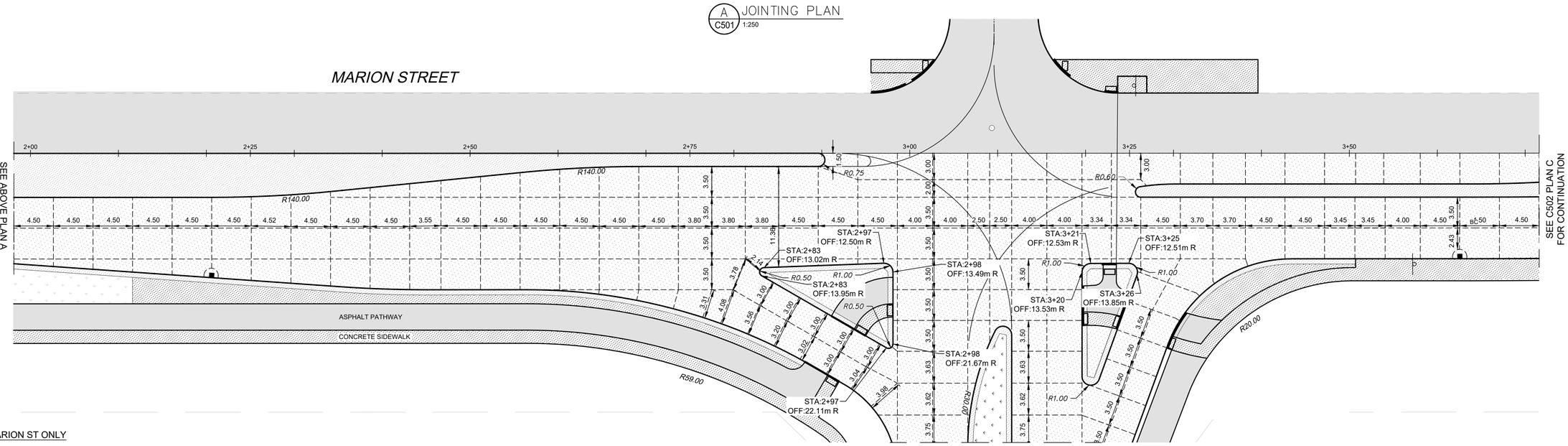
THE CITY OF WINNIPEG
Winnipeg

PUBLIC MARKETS
PLAN AND PROFILE FROM STA. 2+80 TO 4+50
PAULETTE DUGUAY STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 8 OF 11
CITY DRAWING NO.



A C501 JOINTING PLAN 1:250



B C501 JOINTING PLAN 1:250

SEE C502 PLAN D FOR CONTINUATION

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8. ADJUST ALL WATER VALVES, MANHOLES, CATCH BASINS, CATCH PITS AND WATER SHUT OFF VALVES TO GRADE.
9. CONTRACTOR TO ALIGN THE PROPOSED LONGITUDINAL JOINT LOCATIONS WITH EXISTING JOINTS ON WESTBOUND MARION ST, WHERE POSSIBLE.

EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PLAN	PROPOSED	EXISTING	LEGEND - PROFILE	PROPOSED
	WATERMAIN			HYDRANT ASSEMBLY				
	COMBINED SEWER			VALVE/PLUG				
	LAND DRAINAGE SEWER			CATCH BASIN				
	WASTE WATER SEWER			UTILITIES ADJUSTED				
	PROPERTY LINE			CURB RAMP				
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	EDGE OF CONCRETE		230.99	GROUND GRADE				
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	M.T.S.			CONCRETE SLAB			NORTH & EAST GUTTER	
	BARRIER CURB AND GUTTER			CONC SIDEWALK			SOUTH & WEST GUTTER	
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ENGINEERS SEAL

PROVINCE OF MANITOBA
D.W. DUNN
Member
38563
2025.05.14
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
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ENGINEERS GEOSCIENTISTS MANITOBA
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No. 5750

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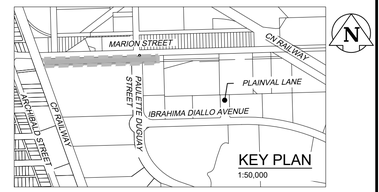


Winnipeg

THE CITY OF WINNIPEG

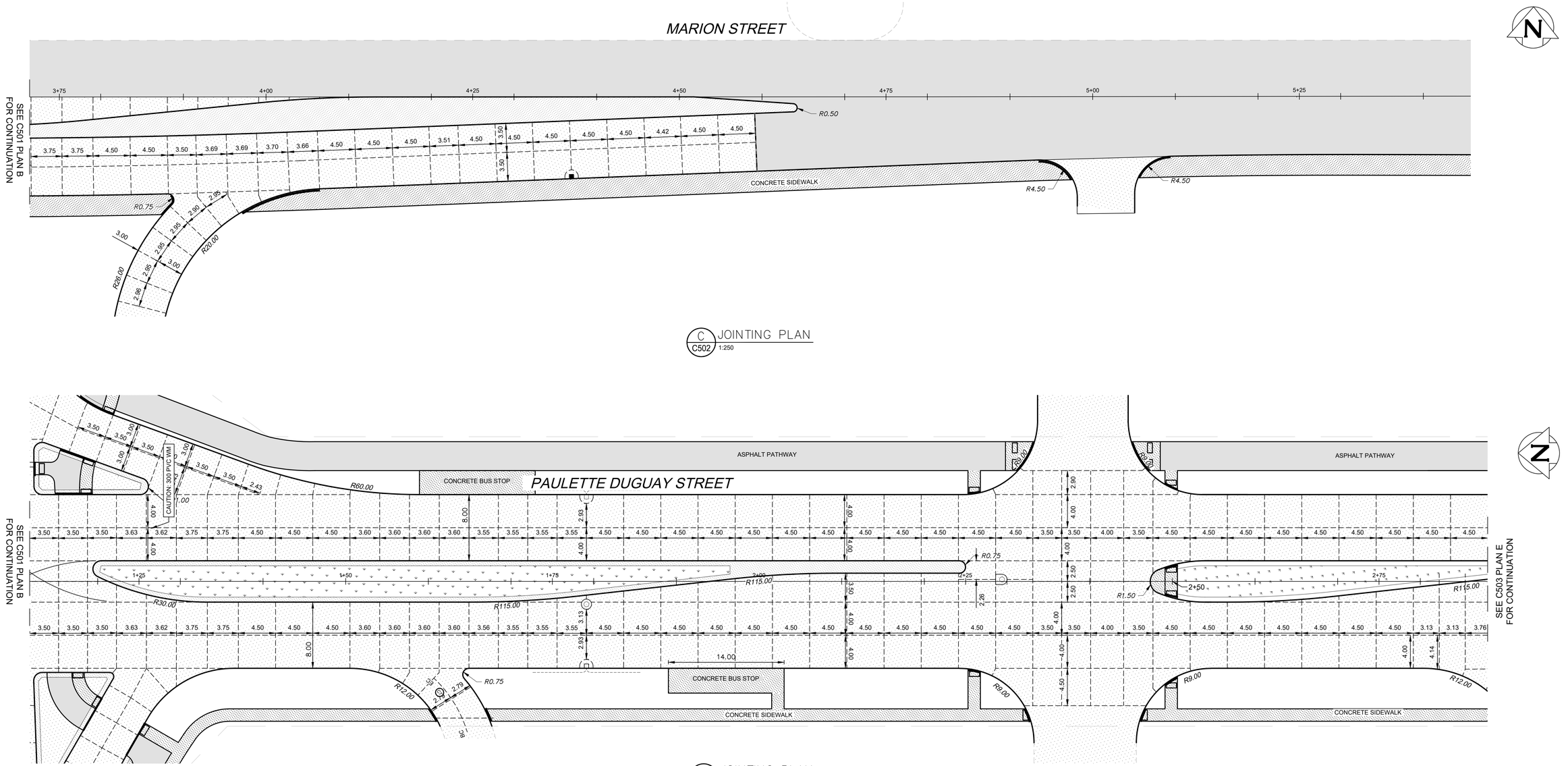
PUBLIC MARKETS

JOINT PLAN

MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 9 OF 11
CITY DRAWING NO.

May 14, 2025 - 10:16am
L:\Projects\2021\21-07990-00 Public Markets\14.0 Tech + Prof Services\14.04 Land_Dev_Mun_Eng\14.04.14. CAD\2_Production\07990-C201-C502 Marion Street-Plan & Profile.dwg -tab:C501 JOINT PLAN



C C502 JOINTING PLAN
1:250

D C502 JOINTING PLAN
1:250

NOTES FOR MARION ST ONLY

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	WASTE WATER SEWER			UTILITIES ADJUSTED				
	PROPERTY LINE			CURB RAMP				
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	EDGE OF CONCRETE		230.99	GROUND GRADE				
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LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES DATE
COMMITTEE

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ELEV. 231.595m

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ENGINEERS SEAL
PROVINCE OF MANITOBA
A.D.W. DUNN
Member
38563
2025-05-14
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
C502

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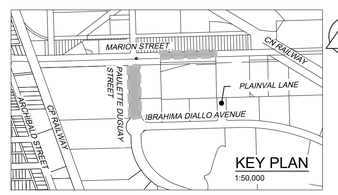


Winnipeg

THE CITY OF WINNIPEG

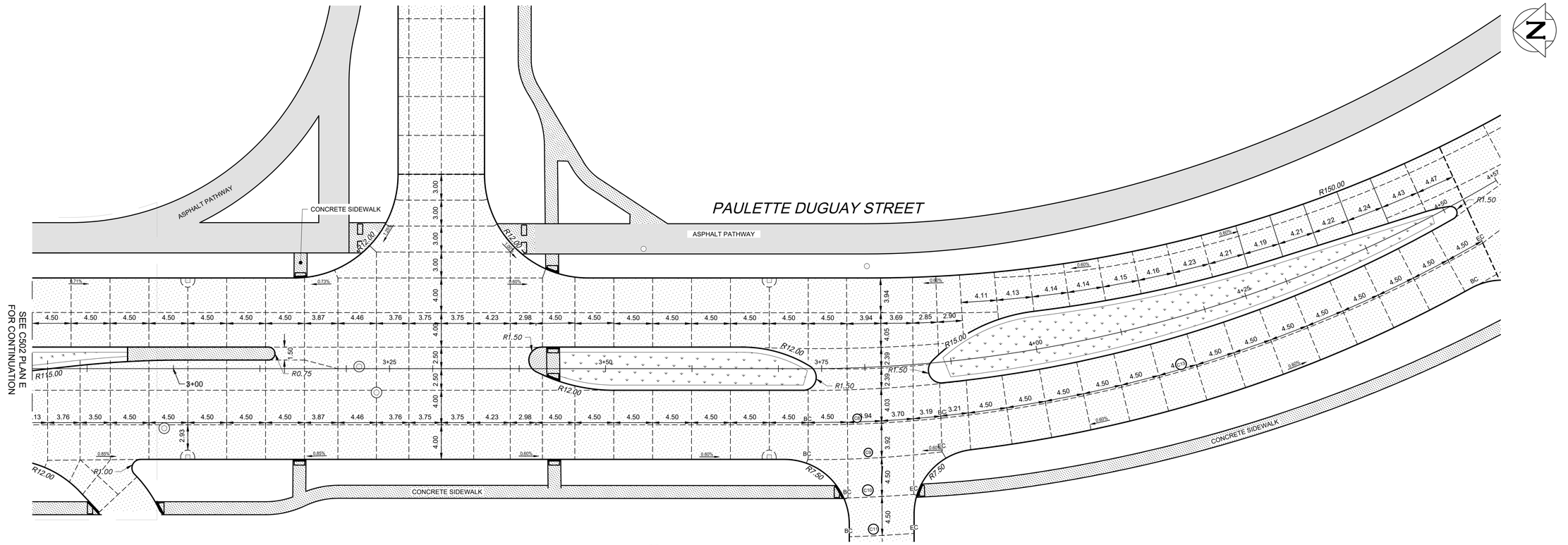
PUBLIC MARKETS

JOINT PLAN

MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 10 OF 11
CITY DRAWING NO.

May 14, 2025 - 10:17am
L:\Projects\2021\21-07590-00 Public Markets\14.0 Tech + Prof Services\14.04 Land_Dev_Mun_Eng\14.04.14. CAD\2_Production\07590-C201-C502 Marion Street Plan & Profile.dwg -tab:C502 JOINT PLAN



E JOINTING PLAN
C503 1:250

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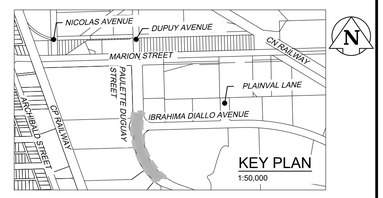

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Winnipeg

THE CITY OF WINNIPEG

PUBLIC MARKETS

JOINT PLAN

MARION STREET
UNDERGROUND SERVICING AND ROADWORK

SHEET 11 OF 11
CITY DRAWING NO.

May 14, 2025 - 10:17am
L:\Projects\2021\21-07990-00 Public Markets\14.0 Tech + Prof Services\14.04 Land_Dev_Mun_Eng\14.04.14. CAD\2_Production\07990-C201-C502 Marion Street-Plan & Profile.dwg -tab:C503 JOINT PLAN

APPENDIX

B TRAFFIC COUNTS

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification Cars

	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	24	211	10	0	17	0	7	0	10	361	7	0	1	6	30	0
7:15 AM	25	211	19	0	2	1	2	0	8	393	9	0	4	3	43	0
7:30 AM	33	219	23	0	8	1	1	0	26	427	7	0	6	10	51	0
7:45 AM	59	268	26	0	4	1	2	0	27	458	23	0	4	5	49	0
8:00 AM	54	252	8	0	48	1	26	0	2	389	30	0	3	0	68	0
8:15 AM	34	236	10	0	4	0	0	0	5	355	25	0	14	1	52	0
8:30 AM	25	232	9	0	4	0	1	0	7	341	11	0	8	1	54	0
8:45 AM	37	254	2	0	1	0	1	0	5	327	7	0	5	1	40	0
3:00 PM	40	326	11	0	33	1	18	0	6	228	8	3	9	3	29	0
3:15 PM	39	439	24	0	11	1	7	0	5	224	4	0	7	4	32	0
3:30 PM	47	415	18	0	20	0	12	0	5	249	13	0	4	4	43	0
3:45 PM	56	433	9	0	1	1	3	0	11	277	12	1	13	9	43	0
4:00 PM	40	421	1	0	42	5	28	0	1	231	9	1	10	1	34	0
4:15 PM	62	443	2	0	6	1	16	0	2	249	15	0	4	1	39	0
4:30 PM	57	449	2	1	12	0	12	0	1	211	17	0	12	0	71	0
4:45 PM	51	488	1	1	3	0	3	0	1	251	13	1	10	1	28	0
5:00 PM	49	453	2	0	7	1	8	0	3	235	9	1	13	0	45	0
5:15 PM	47	366	2	0	3	1	5	0	2	222	6	0	1	1	40	0
5:30 PM	42	392	6	0	0	0	3	0	4	213	9	0	8	1	38	0
5:45 PM	19	337	4	0	10	0	5	0	3	210	7	2	2	0	27	0

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification LightTrucks

	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	2	4	0	0	1	0	0	0	1	4	0	0	0	0	1	0
7:15 AM	1	11	0	0	1	0	0	0	0	4	1	0	0	0	2	0
7:30 AM	2	9	0	0	2	0	0	0	0	6	1	0	0	0	1	0
7:45 AM	0	10	0	0	0	0	0	0	0	5	0	0	2	1	1	0
8:00 AM	1	13	0	0	0	0	1	0	1	8	1	0	0	0	2	0
8:15 AM	0	13	2	0	0	0	2	0	0	11	1	0	1	0	0	0
8:30 AM	1	16	1	0	3	0	0	0	1	13	1	0	0	0	5	0
8:45 AM	1	20	0	0	1	0	0	0	0	7	1	0	1	0	4	0
3:00 PM	0	11	0	0	0	0	0	0	0	7	2	0	1	0	1	0
3:15 PM	0	6	0	0	1	0	0	0	0	6	0	0	1	0	0	0
3:30 PM	1	7	1	0	1	0	0	0	0	12	1	0	0	0	2	0
3:45 PM	0	12	0	0	0	0	0	0	0	6	0	0	0	0	2	0
4:00 PM	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0
4:15 PM	1	6	0	0	0	0	0	0	0	6	0	0	0	0	0	0
4:30 PM	0	7	0	0	0	0	0	0	0	3	0	0	0	0	3	0
4:45 PM	0	1	0	0	0	0	0	0	0	5	0	0	0	0	1	0
5:00 PM	0	7	0	0	0	0	1	0	0	11	0	0	0	0	3	0
5:15 PM	0	6	0	0	0	0	1	0	0	4	0	0	0	0	1	0
5:30 PM	0	1	0	0	1	0	0	0	1	5	0	0	0	0	0	0
5:45 PM	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification ArticulatedTrucks

	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	3	2	1	0	1	0	0	0	0	3	1	0	1	0	1	0
7:15 AM	1	3	0	0	1	0	0	0	0	3	1	0	1	0	1	0
7:30 AM	0	2	0	0	0	0	0	0	0	5	1	0	2	0	2	0
7:45 AM	1	10	1	0	1	0	0	0	0	2	2	0	3	0	1	0
8:00 AM	0	6	0	0	0	0	0	0	0	4	2	0	2	0	2	0
8:15 AM	3	16	0	0	0	0	0	0	0	6	3	0	2	0	0	0
8:30 AM	0	7	1	0	1	0	0	0	1	4	0	0	1	0	3	0
8:45 AM	2	5	0	0	0	0	0	0	0	4	0	0	0	0	0	0
3:00 PM	0	5	0	0	0	0	0	0	1	2	1	0	0	0	1	0
3:15 PM	1	7	0	0	2	0	0	0	0	7	0	0	0	0	0	0
3:30 PM	1	6	0	0	0	0	0	0	0	5	1	0	1	0	0	0
3:45 PM	1	5	1	0	1	0	0	0	0	10	1	0	2	0	1	0
4:00 PM	1	3	0	0	0	0	0	0	0	6	1	0	0	0	0	0
4:15 PM	1	7	1	0	1	0	0	0	0	2	0	0	0	0	0	0
4:30 PM	1	2	1	0	1	0	0	0	0	3	1	0	2	0	0	0
4:45 PM	1	4	0	0	0	0	0	0	0	2	2	0	2	0	1	0
5:00 PM	1	3	0	0	1	0	0	0	0	6	2	0	0	0	0	0
5:15 PM	0	4	0	0	0	0	0	0	0	5	1	0	0	0	0	0
5:30 PM	0	2	0	0	1	0	0	0	1	4	2	0	1	0	0	0
5:45 PM	1	6	1	0	0	0	0	0	0	2	1	0	1	0	0	0

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification Buses

	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	2	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
7:15 AM	5	0	0	0	0	0	0	0	0	1	0	0	4	0	1	0
7:30 AM	3	2	0	0	0	0	0	0	0	0	0	0	2	0	2	0
7:45 AM	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	3	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0
8:15 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
8:30 AM	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	2	4	0	0	0	0	0	0	0	1	1	0	0	0	3	0
3:00 PM	1	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0
3:15 PM	1	1	0	0	0	0	0	0	0	1	0	0	0	0	6	0
3:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
3:45 PM	3	1	0	0	0	0	0	0	0	1	1	0	0	0	2	0
4:00 PM	1	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0
4:15 PM	1	1	0	0	0	0	0	0	0	1	2	0	0	0	5	0
4:30 PM	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4:45 PM	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0
5:00 PM	1	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0
5:15 PM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
5:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification Bikes

	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Crosswalk
Classification Peds

	PTH 59 Southbound			Maginot St Westbound			PTH 59 Northbound			Maginot St Eastbound		
Start Time	Peds CW	Peds CCW	Peds Combined	Peds CW	Peds CCW	Peds Combined	Peds CW	Peds CCW	Peds Combined	Peds CW	Peds CCW	Peds Combined
7:00 AM	0	0		0	0		0	0		0	0	
7:15 AM	0	0		0	0		0	0		0	0	
7:30 AM	0	0		1	0		1	0		0	0	
7:45 AM	0	0		0	0		0	0		0	0	
8:00 AM	0	0		0	0		0	0		0	0	
8:15 AM	0	0		0	0		1	0		0	0	
8:30 AM	0	0		0	0		0	0		0	0	
8:45 AM	0	0		0	0		0	0		0	0	
3:00 PM	0	0		0	0		0	0		0	0	
3:15 PM	0	0		0	0		0	0		0	0	
3:30 PM	0	0		0	0		0	0		0	0	
3:45 PM	0	0		0	0		0	0		0	0	
4:00 PM	0	0		0	0		0	0		0	0	
4:15 PM	0	0		0	0		0	0		0	0	
4:30 PM	0	0		0	0		0	0		0	0	
4:45 PM	0	0		0	0		0	0		0	0	
5:00 PM	0	0		0	0		0	0		0	0	
5:15 PM	0	0		0	0		0	0		0	0	
5:30 PM	0	0		0	0		0	0		0	0	
5:45 PM	0	0		0	0		0	0		0	0	

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Crosswalk
Classification Bicycles

	PTH 59 Southbound			Maginot St Westbound			PTH 59 Northbound			Maginot St Eastbound		
Start Time	Peds CW	Peds CCW	Peds Combined	Peds CW	Peds CCW	Peds Combined	Peds CW	Peds CCW	Peds Combined	Peds CW	Peds CCW	Peds Combined
7:00 AM	0	0		0	0		0	0		0	0	
7:15 AM	0	0		0	0		0	0		0	0	
7:30 AM	0	0		0	0		0	0		0	0	
7:45 AM	0	0		0	0		0	0		0	0	
8:00 AM	0	0		0	0		0	0		0	0	
8:15 AM	0	0		0	0		0	0		0	0	
8:30 AM	0	0		0	0		0	0		0	0	
8:45 AM	0	0		0	0		0	0		0	0	
3:00 PM	0	0		0	0		0	0		0	0	
3:15 PM	0	0		0	0		0	0		0	0	
3:30 PM	0	0		0	0		0	0		0	0	
3:45 PM	0	0		0	0		0	0		0	0	
4:00 PM	0	0		0	0		1	0		0	0	
4:15 PM	0	0		0	0		0	0		0	0	
4:30 PM	0	0		0	0		0	0		0	0	
4:45 PM	0	0		0	0		0	0		0	0	
5:00 PM	0	0		0	0		0	0		0	0	
5:15 PM	0	0		0	0		0	0		0	0	
5:30 PM	0	0		0	0		0	0		0	0	
5:45 PM	0	0		0	0		0	0		0	0	

Study Name Public Markets
Start Date 2/6/2024
Start Time 7:00 AM
Site Code PTH 59 / Maginot St
Project 221-07590-00

Type Road
Classification Totals

	PTH 59 Southbound				Maginot St Westbound				PTH 59 Northbound				Maginot St Eastbound			
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn
7:00 AM	31	217	11	0	19	0	7	0	11	368	8	0	3	6	33	0
7:15 AM	32	225	19	0	4	1	2	0	8	401	11	0	9	3	47	0
7:30 AM	38	232	23	0	10	1	1	0	26	438	9	0	10	10	56	0
7:45 AM	62	292	27	0	5	1	2	0	27	465	25	0	9	6	51	0
8:00 AM	58	274	8	0	48	1	27	0	3	401	33	0	5	0	74	0
8:15 AM	39	265	12	0	4	0	2	0	5	372	29	0	17	1	54	0
8:30 AM	29	255	11	0	8	0	1	0	9	358	12	0	9	1	62	0
8:45 AM	42	283	2	0	2	0	1	0	5	339	9	0	6	1	47	0
3:00 PM	41	342	11	0	33	1	18	0	7	239	11	3	10	3	33	0
3:15 PM	41	453	24	0	14	1	7	0	5	238	4	0	8	4	38	0
3:30 PM	50	428	19	0	21	0	12	0	5	266	15	0	5	4	47	0
3:45 PM	60	451	10	0	2	1	3	0	11	294	14	1	15	9	48	0
4:00 PM	42	425	1	0	42	5	28	0	1	245	11	1	10	1	35	0
4:15 PM	65	457	3	0	7	1	16	0	2	258	17	0	4	1	44	0
4:30 PM	60	459	3	1	13	0	12	0	1	217	18	0	14	0	75	0
4:45 PM	54	494	1	1	3	0	3	0	1	258	15	1	12	1	32	0
5:00 PM	51	463	2	0	8	1	9	0	3	253	11	1	13	0	51	0
5:15 PM	49	376	2	0	3	1	6	0	2	231	7	0	1	1	42	0
5:30 PM	42	396	6	0	2	0	3	0	6	222	11	0	9	1	39	0
5:45 PM	21	345	5	0	10	0	5	0	3	213	8	2	3	0	28	0

APPENDIX

C SIGNAL WARRANT ANALYSIS

City of Winnipeg - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Paulette Duguay Street
Side Street (name)	Commercial Access
Quadrant / Int #	
Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	Future 2034 (Phase 2 FBO)
Road Authority:	City of Winnipeg
City:	Winnipeg, MB
Analysis Date:	2025 May 07, Wed
Count Date:	2025 May 07, Wed
Date Entry Format:	(yyyy-mm-dd)

CHECK SHEET

for Warrant Calculation Results, please hit 'Page Down'

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Paulette Duguay Street	NB	0	1	0	0	1	0	n	2,000	2	perm	y	n
Paulette Duguay Street	SB	1	0	1	0	1	0	n	100	2	perm	y	n
Commercial Access	WB	0	1	0	0	0	1	n	2,000	1	perm	y	n
Commercial Access	EB	0	1	0	0	0	1	n	2,000	1	perm	y	n

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

Are the Paulette Duguay Street NB right turns significantly impeded by through movements? (y/n) n

Are the Paulette Duguay Street SB right turns significantly impeded by through movements? (y/n) n

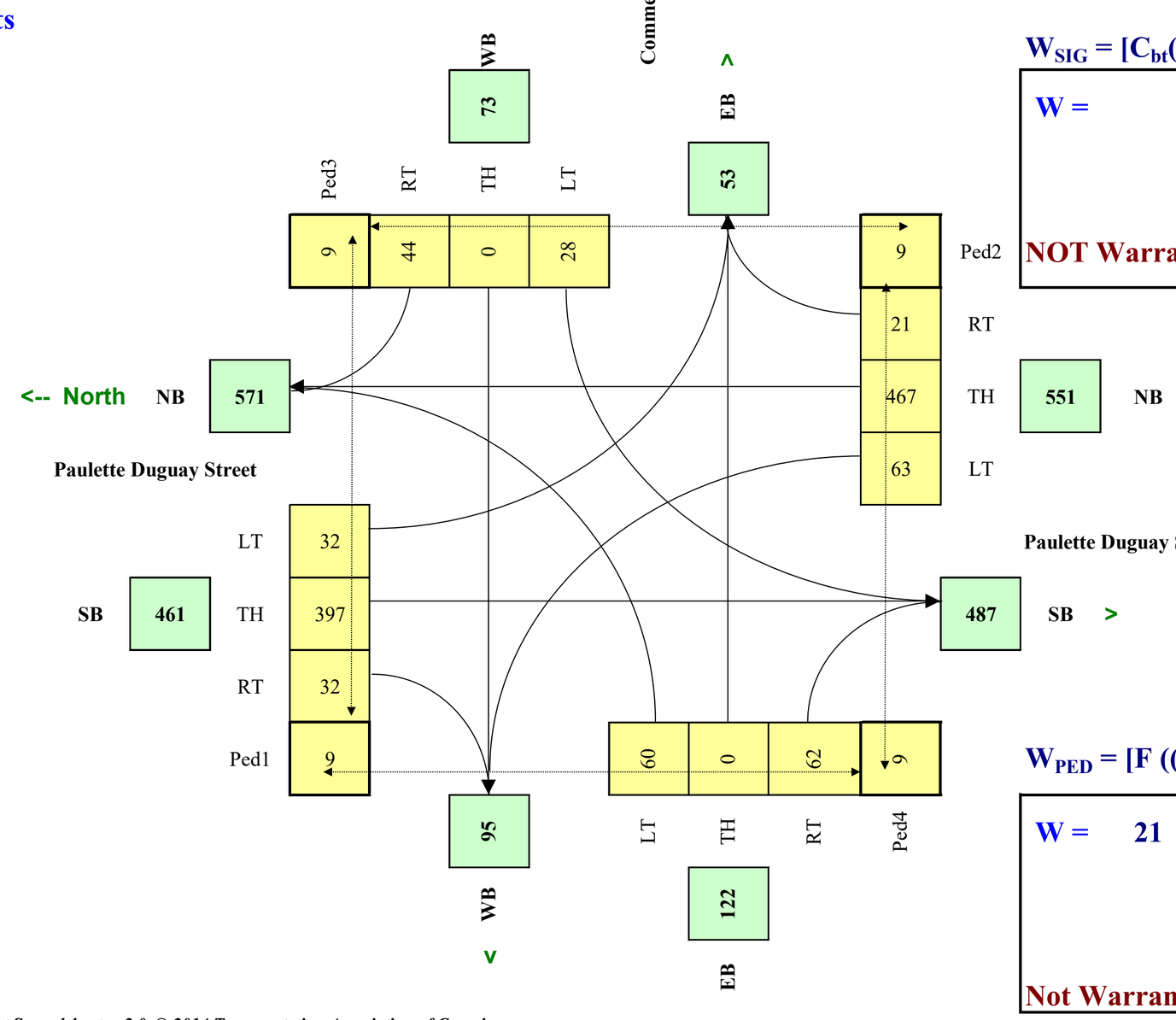
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	780,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Paulette Duguay Street	NS	50	2.0%	n	0.0
Commercial Access	EW	50	2.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
	37	528	27	53	454	11	10	0	10	19	0	32	10	10	10	10
	25	354	18	36	304	7	7	0	7	13	0	21	7	7	7	7
	76	464	20	25	392	42	37	0	60	79	0	77	9	9	9	9
	77	469	20	25	396	42	38	0	61	80	0	78	9	9	9	9
	80	489	21	26	413	44	39	0	64	83	0	81	10	10	10	10
	82	499	21	27	421	45	40	0	65	85	0	83	10	10	10	10
Total (6-hour peak)	377	2,803	126	192	2,379	192	171	0	267	359	0	373	55	55	55	55
Average (6-hour peak)	63	467	21	32	397	32	28	0	44	60	0	62	9	9	9	9
												Actual Pedestrian Crossing Distance (m)	15.0	15.0	15.0	15.0

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F (X_{v\text{-}p}) L) / K_2] \times C_i$

W =	77	59	18
		Veh	*Ped*

NOT Warranted

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 21

Not Warranted - Ped Vol<25(avg)

Traffic Signal Warrant Spreadsheet - v2.0 © 2014 Transportation Association of Canada

City of Winnipeg - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Paulette Duguay Street
Side Street (name)	Ibrahima Diallo Avenue
Quadrant / Int #	
CHECK SHEET	

for Warrant Calculation Results, please hit 'Page Down'

Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	Future 2034 (Phase 2 FBO)

Road Authority:	City of Winnipeg
City:	Winnipeg, MB
Analysis Date:	2025 May 07, Wed
Count Date:	2025 May 07, Wed
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Paulette Duguay Street	NB	0	0	1	0	1	0	n	2,000	2	perm	y	n
Paulette Duguay Street	SB	1	0	2	0	0	0	n	200	2	perm	y	n
Ibrahima Diallo Avenue	WB	0	0	0	1	0	0	n	2,000	1	perm	y	n
Ibrahima Diallo Avenue	EB	0	0	0	0	0	0	n	2,000	0	perm	y	n

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

re the Ibrahima Diallo Avenue WB right turns significantly impeded by through movements? (y/n)	n
	n
Are the Paulette Duguay Street NB right turns significantly impeded by through movements? (y/n)	n
	n

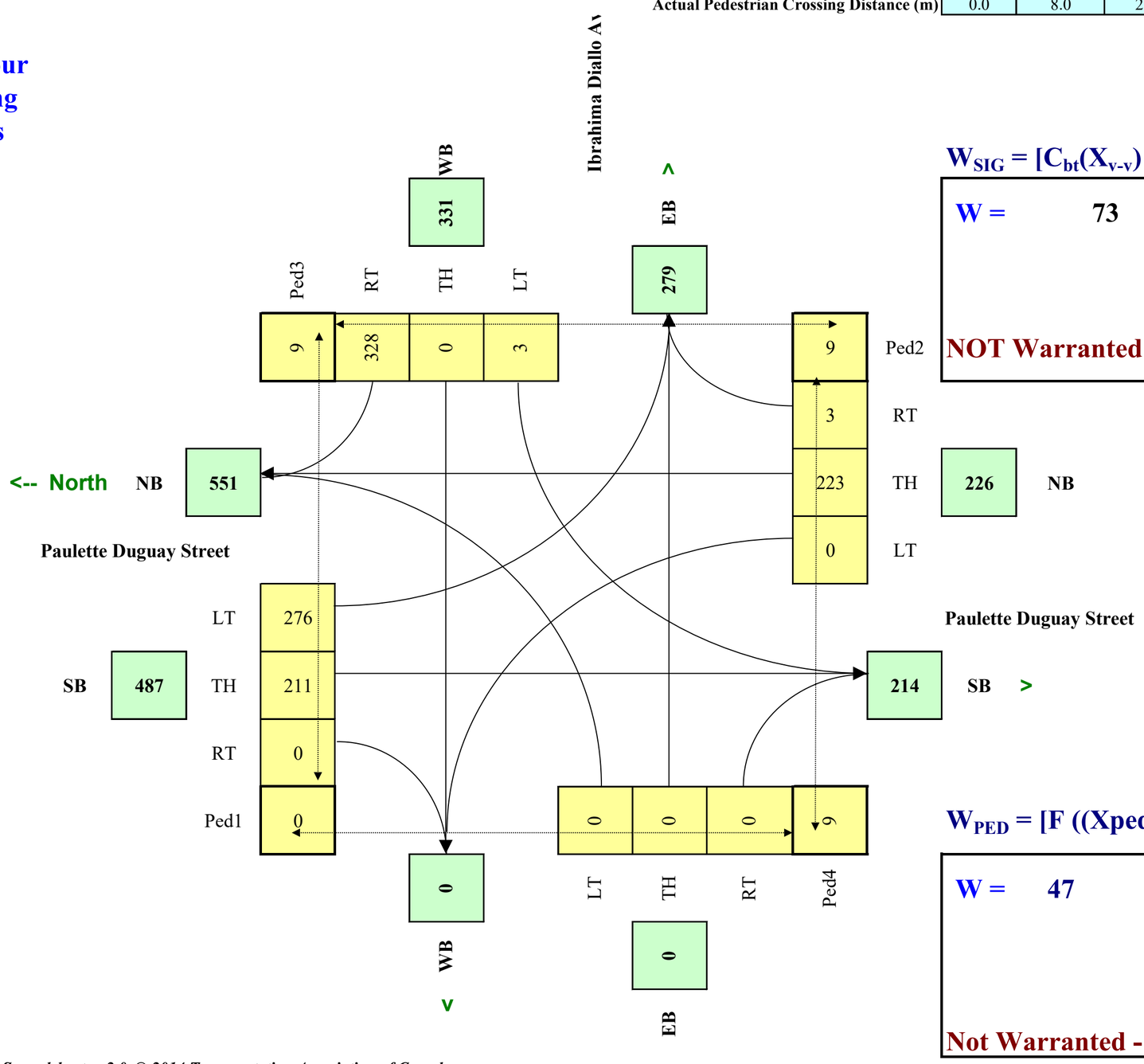
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	780,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Paulette Duguay Street	NS	50	2.0%	y	0.0
Ibrahima Diallo Avenue	EW	50	2.0%	y	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
	0	340	2	348	147	0	2	0	252	0	0	0	0	10	10	10
	0	228	1	233	98	0	1	0	169	0	0	0	0	7	7	7
	0	186	4	259	246	0	4	0	374	0	0	0	0	9	9	9
	0	188	4	262	249	0	4	0	378	0	0	0	0	9	9	9
	0	196	4	273	260	0	4	0	394	0	0	0	0	10	10	10
	0	200	4	279	265	0	4	0	402	0	0	0	0	10	10	10
Total (6-hour peak)	**0**	**1,338**	**19**	**1,655**	**1,266**	**0**	**19**	**0**	**1,969**	**0**	**0**	**0**	**0**	**55**	**55**	**55**
Average (6-hour peak)	**0**	**223**	**3**	**276**	**211**	**0**	**3**	**0**	**328**	**0**	**0**	**0**	**0**	**9**	**9**	**9**
												Actual Pedestrian Crossing Distance (m)	0.0	8.0	20.0	16.0

Average 6-hour Peak Turning Movements



$W_{SIG} = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$

W =	73	61	12
		Veh	*Ped*

NOT Warranted

RESET SHEET

$W_{PED} = [F\,((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 47

Not Warranted - Ped Vol<25(avg)

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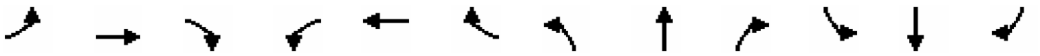
APPENDIX

D SYNCHRO, SIMTRAFFIC AND SIDRA REPORTS

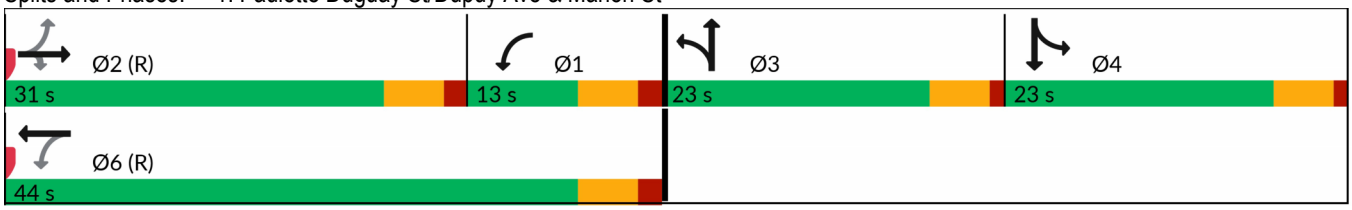


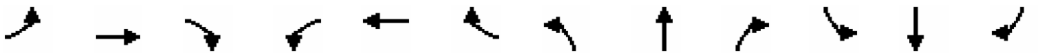
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	932	276	134	1108	18	235	0	66	13	0	13
Future Volume (vph)	17	932	276	134	1108	18	235	0	66	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		45.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.932			0.932	
Flt Protected	0.950			0.950			0.950	0.973			0.976	
Satd. Flow (prot)	1437	3544	1601	1789	3478	0	1700	1623	0	0	1037	0
Flt Permitted	0.152			0.195			0.950	0.973			0.976	
Satd. Flow (perm)	230	3544	1601	367	3478	0	1700	1623	0	0	1037	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			208		2			158			158	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		425.9			427.4			116.2			148.9	
Travel Time (s)		25.6			25.6			8.4			10.7	
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
Heavy Vehicles (%)	27%	3%	2%	2%	4%	50%	2%	2%	2%	55%	2%	82%
Adj. Flow (vph)	18	1013	300	146	1204	20	255	0	72	14	0	14
Shared Lane Traffic (%)							34%					
Lane Group Flow (vph)	18	1013	300	146	1224	0	168	159	0	0	28	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2		2	6								
Detector Phase	2	2	2	1	6		3	3		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5		23.0	23.0		23.0	23.0	
Total Split (s)	31.0	31.0	31.0	13.0	44.0		23.0	23.0		23.0	23.0	
Total Split (%)	34.4%	34.4%	34.4%	14.4%	48.9%		25.6%	25.6%		25.6%	25.6%	
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)	1.5	1.5	1.5	1.5	1.5		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	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effct Green (s)	43.9	43.9	43.9	56.9	56.9		13.8	13.8			8.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.63	0.63		0.15	0.15			0.09	
v/c Ratio	0.16	0.59	0.34	0.42	0.56		0.65	0.42			0.12	
Control Delay (s/veh)	25.2	21.9	7.9	20.9	13.5		46.9	9.0			1.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay (s/veh)	25.2	21.9	7.9	20.9	13.5		46.9	9.0			1.0	
LOS	C	C	A	C	B		D	A			A	
Approach Delay (s/veh)		18.8			14.3			28.5			1.0	
Approach LOS		B			B			C			A	
Queue Length 50th (m)	1.8	69.8	9.2	10.3	64.2		30.5	0.2			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	9.6	#142.5	36.1	28.7	129.0		50.2	16.9			0.0	
Internal Link Dist (m)		401.9			403.4			92.2			124.9	
Turn Bay Length (m)	26.0		45.0	38.0								
Base Capacity (vph)	112	1728	887	350	2199		340	451			333	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.16	0.59	0.34	0.42	0.56		0.49	0.35			0.08	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay (s/veh): 17.6		Intersection LOS: B	
Intersection Capacity Utilization 61.8%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Paulette Duguay St/Dupuy Ave & Marion St



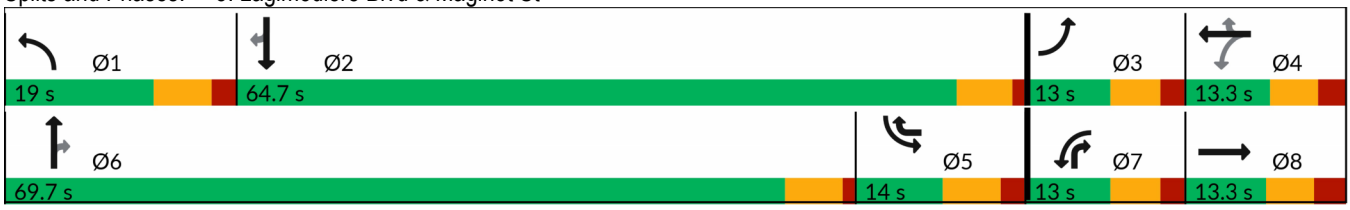


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	19	74	34	5	69	154	1694	63	72	1075	200
Future Volume (vph)	238	19	74	34	5	69	154	1694	63	72	1075	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	33.0			7.5			30.0			35.0		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	*0.84	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.98		1.00					0.99	1.00		
Frt		0.881				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3309	2466	0	1659	1883	1555	2738	3544	1601	1738	3349	1498
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3309	2466	0	1739	1883	1555	2738	3544	1580	1738	3349	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		80				153			102			217
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		168.0			95.5			349.7			499.8	
Travel Time (s)		12.1			6.9			15.7			22.5	
Confl. Peds. (#/hr)			2	2					1	1		
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
Heavy Vehicles (%)	7%	6%	34%	10%	2%	5%	12%	3%	2%	5%	9%	9%
Adj. Flow (vph)	259	21	80	37	5	75	167	1841	68	78	1168	217
Shared Lane Traffic (%)												
Lane Group Flow (vph)	259	101	0	37	5	75	167	1841	68	78	1168	217
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	3	8		7	4	5	1	6	7	5	2	
Permitted Phases				4		4			6			2
Detector Phase	3	8		7	4	5	1	6	7	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	7.0	5.0	5.0	7.0	7.0
Minimum Split (s)	11.0	11.6		11.0	11.3	11.7	11.7	43.7	11.0	11.7	43.7	43.7
Total Split (s)	13.0	13.3		13.0	13.3	14.0	19.0	69.7	13.0	14.0	64.7	64.7
Total Split (%)	11.8%	12.1%		11.8%	12.1%	12.7%	17.3%	63.4%	11.8%	12.7%	58.8%	58.8%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.7	4.7	4.7	4.0	4.7	4.7	4.7
All-Red Time (s)	2.0	2.6		2.0	2.3	2.0	2.0	1.0	2.0	2.0	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	0.0	0.0
Total Lost Time (s)	6.0	6.6		6.0	6.3	6.7	6.7	5.7	6.0	6.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	Max
Act Effct Green (s)	14.5	6.4		8.0	6.0	8.4	10.9	64.2	70.5	7.2	60.4	60.4
Actuated g/C Ratio	0.14	0.06		0.07	0.06	0.08	0.10	0.60	0.66	0.07	0.57	0.57
v/c Ratio	0.58	0.45		0.30	0.05	0.28	0.60	0.87	0.06	0.67	0.62	0.23
Control Delay (s/veh)	50.1	23.3		50.7	49.8	2.7	55.7	24.2	0.4	78.0	18.2	2.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	50.1	23.3		50.7	49.8	2.7	55.7	24.2	0.4	78.0	18.2	2.4
LOS	D	C		D	D	A	E	C	A	E	B	A
Approach Delay (s/veh)		42.6			19.9			26.0			19.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			B			C			B	
Queue Length 50th (m)	26.9	2.4		8.1	1.1	0.0	21.5	178.2	0.0	17.5	93.1	0.0
Queue Length 95th (m)	#64.0	11.3		16.6	5.0	0.0	34.8	220.4	0.9	#41.2	117.7	11.1
Internal Link Dist (m)		144.0			71.5			325.7			475.8	
Turn Bay Length (m)	75.0						100.0		80.0	90.0		80.0
Base Capacity (vph)	447	230		131	123	266	316	2128	1084	119	1894	941
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.44		0.28	0.04	0.28	0.53	0.87	0.06	0.66	0.62	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 106.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay (s/veh): 24.8		Intersection LOS: C	
Intersection Capacity Utilization 80.3%		ICU Level of Service D	
Analysis Period (min) 15			
* User Entered Value			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	1	22	8	1	11	27	274	26	53	343	10
Future Vol, veh/h	16	1	22	8	1	11	27	274	26	53	343	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	10	22.1	-	-
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	17	1	24	9	1	12	29	298	28	58	373	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	703	879	379	877	870	163	384	0	0	326	0	0
Stage 1	495	495	-	370	370	-	-	-	-	-	-	-
Stage 2	208	384	-	507	500	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
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	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	338	285	667	255	289	854	1173	-	-	1232	-	-
Stage 1	555	545	-	623	619	-	-	-	-	-	-	-
Stage 2	775	611	-	547	542	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	313	263	667	231	267	854	1173	-	-	1232	-	-
Mov Cap-2 Maneuver	313	263	-	231	267	-	-	-	-	-	-	-
Stage 1	538	519	-	604	600	-	-	-	-	-	-	-
Stage 2	740	593	-	502	517	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	13.5	14.6	0.8	1.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1173	-	-	310	667	235	854	1232	-	-
HCM Lane V/C Ratio	0.025	-	-	0.06	0.036	0.042	0.014	0.047	-	-
HCM Ctrl Dly (s/v)	8.1	0.1	-	17.3	10.6	21	9.3	8.1	-	-
HCM Lane LOS	A	A	-	C	B	C	A	A	-	-
HCM 95th %tile Q (veh)	0.1	-	-	0.2	0.1	0.1	0	0.1	-	-

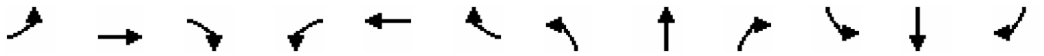
Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	159	167	1	317	56
Future Vol, veh/h	1	159	167	1	317	56
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	-	-	-	14	-
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	1	173	182	1	345	61

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	904	92	0	0	183	0
Stage 1	183	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	277	947	-	-	1389	-
Stage 1	830	-	-	-	-	-
Stage 2	443	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	208	947	-	-	1389	-
Mov Cap-2 Maneuver	208	-	-	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	333	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	9.8	0	7.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	926	1389	-
HCM Lane V/C Ratio	-	-	0.188	0.248	-
HCM Ctrl Dly (s/v)	-	-	9.8	8.4	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q (veh)	-	-	0.7	1	-

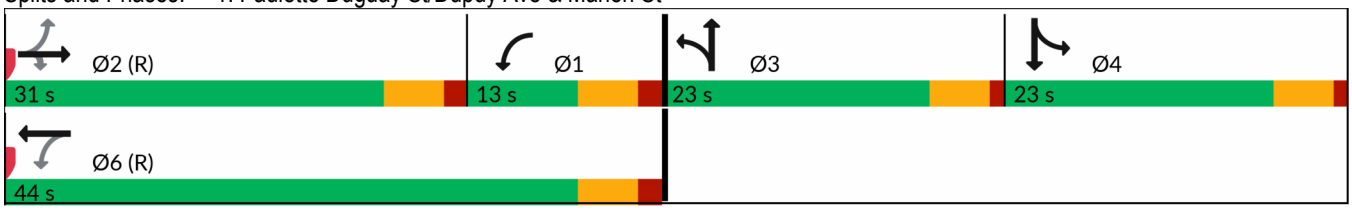


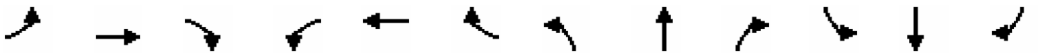
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1267	229	70	1004	11	341	0	132	14	0	11
Future Volume (vph)	7	1267	229	70	1004	11	341	0	132	14	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		45.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.913			0.940	
Flt Protected	0.950			0.950			0.950	0.979			0.973	
Satd. Flow (prot)	1141	3544	1601	1789	3517	0	1700	1599	0	0	1320	0
Flt Permitted	0.177			0.087			0.950	0.979			0.973	
Satd. Flow (perm)	213	3544	1601	164	3517	0	1700	1599	0	0	1320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152		1			158			158	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		425.9			427.4			116.2			148.9	
Travel Time (s)		25.6			25.6			8.4			10.7	
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
Heavy Vehicles (%)	60%	3%	2%	2%	3%	56%	2%	2%	2%	58%	2%	2%
Adj. Flow (vph)	8	1377	249	76	1091	12	371	0	143	15	0	12
Shared Lane Traffic (%)							28%					
Lane Group Flow (vph)	8	1377	249	76	1103	0	267	247	0	0	27	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2		2	6								
Detector Phase	2	2	2	1	6		3	3		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5		23.0	23.0		23.0	23.0	
Total Split (s)	31.0	31.0	31.0	13.0	44.0		23.0	23.0		23.0	23.0	
Total Split (%)	34.4%	34.4%	34.4%	14.4%	48.9%		25.6%	25.6%		25.6%	25.6%	
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)	1.5	1.5	1.5	1.5	1.5		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	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lead	Lead	Lead	Lag			Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effct Green (s)	43.4	43.4	43.4	53.8	53.8		16.9	16.9			8.0	
Actuated g/C Ratio	0.48	0.48	0.48	0.60	0.60		0.19	0.19			0.09	
v/c Ratio	0.08	0.81	0.29	0.34	0.52		0.84	0.58			0.10	
Control Delay (s/veh)	23.6	28.6	9.4	26.6	13.9		58.5	18.3			0.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay (s/veh)	23.6	28.6	9.4	26.6	13.9		58.5	18.3			0.8	
LOS	C	C	A	C	B		E	B			A	
Approach Delay (s/veh)		25.7			14.7			39.2			0.8	
Approach LOS		C			B			D			A	
Queue Length 50th (m)	0.9	121.2	10.6	5.8	62.0		48.9	14.5			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	5.1	#218.3	34.6	16.6	110.2		#89.7	39.7			0.0	
Internal Link Dist (m)		401.9			403.4			92.2			124.9	
Turn Bay Length (m)	26.0		45.0	38.0								
Base Capacity (vph)	102	1709	850	233	2103		340	446			390	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.08	0.81	0.29	0.33	0.52		0.79	0.55			0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay (s/veh): 23.7		Intersection LOS: C	
Intersection Capacity Utilization 70.8%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Paulette Duguay St/Dupuy Ave & Marion St



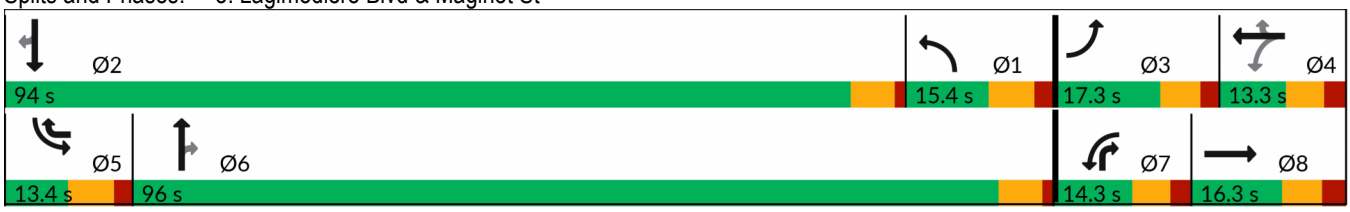


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	204	13	115	61	9	66	99	1021	17	19	1802	229
Future Volume (vph)	204	13	115	61	9	66	99	1021	17	19	1802	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	33.0			7.5			30.0			35.0		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	*0.84	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99										
Frt		0.865				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3278	2852	0	1789	1883	1555	2738	3476	1601	1560	3544	1541
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3278	2852	0	1883	1883	1555	2738	3476	1601	1560	3544	1541
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		125				120			80			185
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		168.0			95.5			349.7			499.8	
Travel Time (s)		12.1			6.9			15.7			22.5	
Confl. Bikes (#/hr)			1									
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
Heavy Vehicles (%)	8%	2%	10%	2%	2%	5%	12%	5%	2%	17%	3%	6%
Adj. Flow (vph)	222	14	125	66	10	72	108	1110	18	21	1959	249
Shared Lane Traffic (%)												
Lane Group Flow (vph)	222	139	0	66	10	72	108	1110	18	21	1959	249
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	3	8		7	4	5	1	6	7	5	2	
Permitted Phases				4		4			6			2
Detector Phase	3	8		7	4	5	1	6	7	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	7.0	5.0	5.0	7.0	7.0
Minimum Split (s)	11.0	11.6		11.0	11.3	11.7	11.7	43.7	11.0	11.7	43.7	43.7
Total Split (s)	17.3	16.3		14.3	13.3	13.4	15.4	96.0	14.3	13.4	94.0	94.0
Total Split (%)	12.4%	11.6%		10.2%	9.5%	9.6%	11.0%	68.6%	10.2%	9.6%	67.1%	67.1%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.7	4.7	4.7	4.0	4.7	4.7	4.7
All-Red Time (s)	2.0	2.6		2.0	2.3	2.0	2.0	1.0	2.0	2.0	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	0.0	0.0
Total Lost Time (s)	6.0	6.6		6.0	6.3	6.7	6.7	5.7	6.0	6.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	Max
Act Effct Green (s)	17.2	7.9		9.3	6.2	8.9	8.4	93.1	106.7	6.4	88.4	88.4
Actuated g/C Ratio	0.13	0.06		0.07	0.05	0.07	0.06	0.69	0.79	0.05	0.65	0.65
v/c Ratio	0.53	0.49		0.53	0.12	0.34	0.64	0.46	0.01	0.29	0.84	0.23
Control Delay (s/veh)	60.5	19.6		74.0	66.3	5.2	79.8	11.5	0.0	73.9	23.3	3.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	60.5	19.6		74.0	66.3	5.2	79.8	11.5	0.0	73.9	23.3	3.4
LOS	E	B		E	E	A	E	B	A	E	C	A
Approach Delay (s/veh)		44.8			40.0			17.3			21.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			C	
Queue Length 50th (m)	29.8	2.0		18.6	2.8	0.0	18.0	76.5	0.0	5.9	215.9	6.3
Queue Length 95th (m)	#55.7	13.2		31.5	9.2	2.3	#32.7	99.6	0.0	15.5	274.0	17.9
Internal Link Dist (m)		144.0			71.5			325.7			475.8	
Turn Bay Length (m)	75.0						100.0		80.0	90.0		80.0
Base Capacity (vph)	418	323		129	97	218	176	2398	1287	77	2321	1073
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.43		0.51	0.10	0.33	0.61	0.46	0.01	0.27	0.84	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 135			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay (s/veh): 23.0		Intersection LOS: C	
Intersection Capacity Utilization 74.8%		ICU Level of Service D	
Analysis Period (min) 15			
* User Entered Value			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



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	60	4	70	39	4	64	72	350	21	29	221	33
Future Vol, veh/h	60	4	70	39	4	64	72	350	21	29	221	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	10	22.1	-	-
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	65	4	76	42	4	70	78	380	23	32	240	36

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	670	881	258	910	888	202	276	0	0	403	0	0
Stage 1	322	322	-	548	548	-	-	-	-	-	-	-
Stage 2	348	559	-	362	340	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
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	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	356	285	780	242	282	806	1285	-	-	1154	-	-
Stage 1	689	650	-	489	516	-	-	-	-	-	-	-
Stage 2	642	510	-	656	639	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	295	255	780	198	253	806	1285	-	-	1154	-	-
Mov Cap-2 Maneuver	295	255	-	198	253	-	-	-	-	-	-	-
Stage 1	635	632	-	451	476	-	-	-	-	-	-	-
Stage 2	536	470	-	572	621	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	15.4	17.2	1.5	0.8
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1285	-	-	292	780	202	806	1154	-	-
HCM Lane V/C Ratio	0.061	-	-	0.238	0.098	0.231	0.086	0.027	-	-
HCM Ctrl Dly (s/v)	8	0.2	-	21.1	10.1	28.1	9.9	8.2	-	-
HCM Lane LOS	A	A	-	C	B	D	A	A	-	-
HCM 95th %tile Q (veh)	0.2	-	-	0.9	0.3	0.9	0.3	0.1	-	-

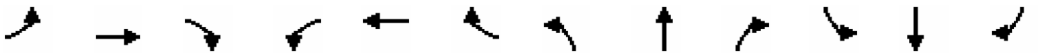
Intersection	
Int Delay, s/veh	7.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	355	88	3	205	125
Future Vol, veh/h	3	355	88	3	205	125
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	-	-	-	14	-
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	3	386	96	3	223	136

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	612	50	0	0	99	0
Stage 1	98	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	425	1008	-	-	1492	-
Stage 1	915	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	362	1008	-	-	1492	-
Mov Cap-2 Maneuver	362	-	-	-	-	-
Stage 1	915	-	-	-	-	-
Stage 2	481	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	10.9	0	4.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	993	1492	-
HCM Lane V/C Ratio	-	-	0.392	0.149	-
HCM Ctrl Dly (s/v)	-	-	10.9	7.8	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q (veh)	-	-	1.9	0.5	-



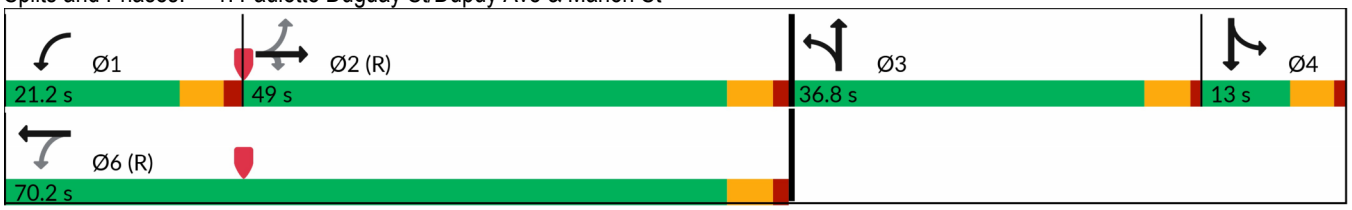
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	941	353	170	1119	18	433	0	123	13	0	13
Future Volume (vph)	17	941	353	170	1119	18	433	0	123	13	0	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		45.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.932			0.932	
Flt Protected	0.950			0.950			0.950	0.974			0.976	
Satd. Flow (prot)	1437	3544	1601	1789	3478	0	1700	1624	0	0	1037	0
Flt Permitted	0.216			0.161			0.950	0.974			0.976	
Satd. Flow (perm)	327	3544	1601	303	3478	0	1700	1624	0	0	1037	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			223		2			118			118	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		425.9			427.4			116.2			148.9	
Travel Time (s)		25.6			25.6			8.4			10.7	
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
Heavy Vehicles (%)	27%	3%	2%	2%	4%	50%	2%	2%	2%	55%	2%	82%
Adj. Flow (vph)	18	1023	384	185	1216	20	471	0	134	14	0	14
Shared Lane Traffic (%)							34%					
Lane Group Flow (vph)	18	1023	384	185	1236	0	311	294	0	0	28	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2		2	6								
Detector Phase	2	2	2	1	6		3	3		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5		27.0	27.0		10.0	10.0	
Total Split (s)	49.0	49.0	49.0	21.2	70.2		36.8	36.8		13.0	13.0	
Total Split (%)	40.8%	40.8%	40.8%	17.7%	58.5%		30.7%	30.7%		10.8%	10.8%	
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)	1.5	1.5	1.5	1.5	1.5		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	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effct Green (s)	59.3	59.3	59.3	76.8	76.8		26.4	26.4			5.5	
Actuated g/C Ratio	0.49	0.49	0.49	0.64	0.64		0.22	0.22			0.05	
v/c Ratio	0.11	0.58	0.43	0.54	0.56		0.83	0.65			0.18	
Control Delay (s/veh)	10.4	8.7	1.8	16.7	14.9		63.1	31.5			2.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay (s/veh)	10.4	8.7	1.8	16.7	14.9		63.1	31.5			2.4	
LOS	B	A	A	B	B		E	C			A	
Approach Delay (s/veh)		6.9			15.1			47.7			2.4	
Approach LOS		A			B			D			A	
Queue Length 50th (m)	0.5	14.4	0.7	19.3	94.2		77.3	41.6			0.0	

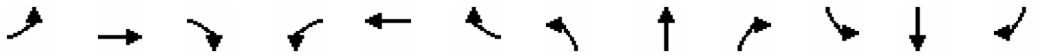
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	m1.3	m60.4	m6.9	34.1	127.8		108.3	70.6			0.0	
Internal Link Dist (m)		401.9			403.4			92.2			124.9	
Turn Bay Length (m)	26.0		45.0	38.0								
Base Capacity (vph)	161	1750	903	394	2225		450	517			179	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.11	0.58	0.43	0.47	0.56		0.69	0.57			0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 56 (47%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay (s/veh): 17.3		Intersection LOS: B	
Intersection Capacity Utilization 71.4%		ICU Level of Service C	
Analysis Period (min) 15			

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

Splits and Phases: 1: Paulette Duguay St/Dupuy Ave & Marion St



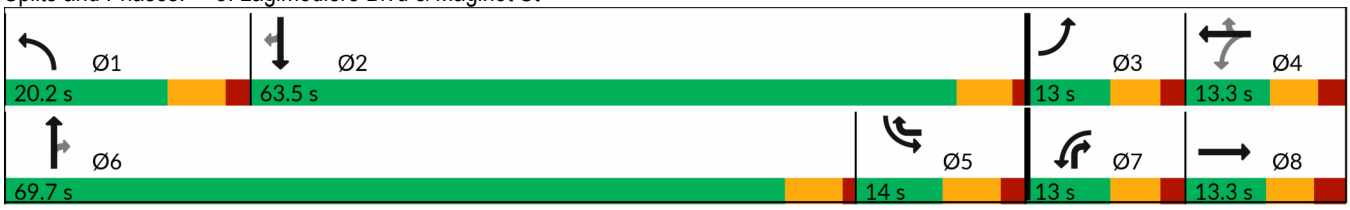


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	19	101	34	5	70	170	1711	64	73	1086	202
Future Volume (vph)	241	19	101	34	5	70	170	1711	64	73	1086	202
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	33.0			7.5			30.0			35.0		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	*0.84	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.98		1.00					0.99	1.00		
Frt		0.874				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3309	2418	0	1659	1883	1555	2738	3544	1601	1738	3349	1498
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3309	2418	0	1740	1883	1555	2738	3544	1580	1738	3349	1498
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		110				153			102			220
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		168.0			95.5			349.7			499.8	
Travel Time (s)		12.1			6.9			15.7			22.5	
Confl. Peds. (#/hr)			2	2					1	1		
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
Heavy Vehicles (%)	7%	6%	34%	10%	2%	5%	12%	3%	2%	5%	9%	9%
Adj. Flow (vph)	262	21	110	37	5	76	185	1860	70	79	1180	220
Shared Lane Traffic (%)												
Lane Group Flow (vph)	262	131	0	37	5	76	185	1860	70	79	1180	220
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	3	8		7	4	5	1	6	7	5	2	
Permitted Phases				4		4			6			2
Detector Phase	3	8		7	4	5	1	6	7	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	7.0	5.0	5.0	7.0	7.0
Minimum Split (s)	11.0	11.6		11.0	11.3	11.7	11.7	43.7	11.0	11.7	43.7	43.7
Total Split (s)	13.0	13.3		13.0	13.3	14.0	20.2	69.7	13.0	14.0	63.5	63.5
Total Split (%)	11.8%	12.1%		11.8%	12.1%	12.7%	18.4%	63.4%	11.8%	12.7%	57.7%	57.7%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.7	4.7	4.7	4.0	4.7	4.7	4.7
All-Red Time (s)	2.0	2.6		2.0	2.3	2.0	2.0	1.0	2.0	2.0	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	0.0	0.0
Total Lost Time (s)	6.0	6.6		6.0	6.3	6.7	6.7	5.7	6.0	6.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	Max
Act Effct Green (s)	14.5	6.4		8.0	6.0	8.5	11.7	64.2	70.5	7.2	59.7	59.7
Actuated g/C Ratio	0.14	0.06		0.07	0.06	0.08	0.11	0.60	0.66	0.07	0.56	0.56
v/c Ratio	0.59	0.53		0.30	0.05	0.29	0.62	0.87	0.06	0.68	0.63	0.24
Control Delay (s/veh)	50.3	22.0		50.7	49.8	2.7	55.2	24.8	0.4	78.5	19.1	2.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	50.3	22.0		50.7	49.8	2.7	55.2	24.8	0.4	78.5	19.1	2.5
LOS	D	C		D	D	A	E	C	A	E	B	A
Approach Delay (s/veh)		40.9			19.8			26.6			19.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			B			C			B	
Queue Length 50th (m)	27.3	2.4		8.1	1.1	0.0	23.9	182.0	0.0	17.7	96.1	0.0
Queue Length 95th (m)	#65.0	12.5		16.6	5.0	0.0	37.6	224.7	1.0	#42.1	122.7	11.5
Internal Link Dist (m)		144.0			71.5			325.7			475.8	
Turn Bay Length (m)	75.0						100.0		80.0	90.0		80.0
Base Capacity (vph)	447	254		132	123	266	346	2128	1083	119	1868	933
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.52		0.28	0.04	0.29	0.53	0.87	0.06	0.66	0.63	0.24

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 106.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay (s/veh): 25.3		Intersection LOS: C	
Intersection Capacity Utilization 80.8%		ICU Level of Service D	
Analysis Period (min) 15			
* User Entered Value			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	0	32	10	0	10	37	528	27	53	454	11
Future Vol, veh/h	19	0	32	10	0	10	37	528	27	53	454	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	10	22.1	-	-
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	21	0	35	11	0	11	40	574	29	58	493	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	982	1298	499	1302	1290	302	505	0	0	603	0	0
Stage 1	615	615	-	669	669	-	-	-	-	-	-	-
Stage 2	367	683	-	633	621	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
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	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	215	161	571	128	163	695	1058	-	-	973	-	-
Stage 1	478	481	-	414	455	-	-	-	-	-	-	-
Stage 2	626	448	-	467	478	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	193	143	571	110	144	695	1058	-	-	973	-	-
Mov Cap-2 Maneuver	193	143	-	110	144	-	-	-	-	-	-	-
Stage 1	451	452	-	390	429	-	-	-	-	-	-	-
Stage 2	581	422	-	412	449	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	17	25.8	0.7	0.9
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1058	-	-	193	571	110	695	973	-	-
HCM Lane V/C Ratio	0.038	-	-	0.107	0.061	0.099	0.016	0.059	-	-
HCM Ctrl Dly (s/v)	8.5	0.2	-	25.9	11.7	41.3	10.3	8.9	-	-
HCM Lane LOS	A	A	-	D	B	E	B	A	-	-
HCM 95th %tile Q (veh)	0.1	-	-	0.4	0.2	0.3	0	0.2	-	-

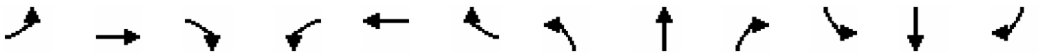
Intersection	
Int Delay, s/veh	5.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	252	340	2	348	147
Future Vol, veh/h	2	252	340	2	348	147
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	-	-	-	14	-
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	2	274	370	2	378	160

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1207	186	0	0	372	0
Stage 1	371	-	-	-	-	-
Stage 2	836	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	176	824	-	-	1183	-
Stage 1	668	-	-	-	-	-
Stage 2	386	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	120	824	-	-	1183	-
Mov Cap-2 Maneuver	120	-	-	-	-	-
Stage 1	668	-	-	-	-	-
Stage 2	262	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	12	0	6.7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	788	1183	-
HCM Lane V/C Ratio	-	-	0.35	0.32	-
HCM Ctrl Dly (s/v)	-	-	12	9.5	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q (veh)	-	-	1.6	1.4	-



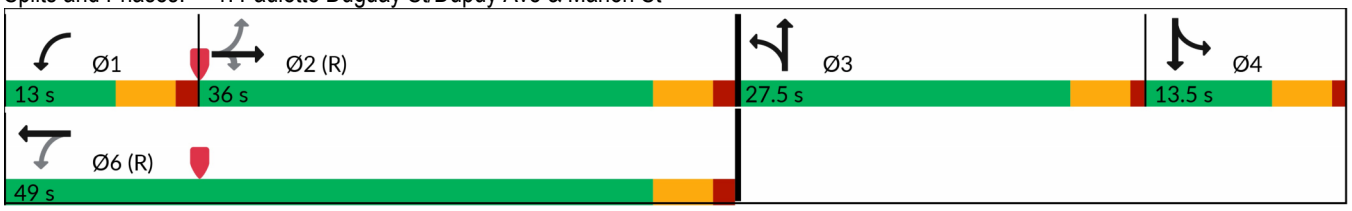
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1276	403	110	1009	11	461	0	180	14	0	11
Future Volume (vph)	7	1276	403	110	1009	11	461	0	180	14	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	26.0		45.0	38.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	45.0			45.0			0.0			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt			0.850		0.998			0.912			0.940	
Flt Protected	0.950			0.950			0.950	0.980			0.973	
Satd. Flow (prot)	1141	3544	1601	1789	3517	0	1700	1599	0	0	1320	0
Flt Permitted	0.257			0.094			0.950	0.980			0.973	
Satd. Flow (perm)	309	3544	1601	177	3517	0	1700	1599	0	0	1320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			241		2			158			158	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		425.9			427.4			116.2			148.9	
Travel Time (s)		25.6			25.6			8.4			10.7	
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
Heavy Vehicles (%)	60%	3%	2%	2%	3%	56%	2%	2%	2%	58%	2%	2%
Adj. Flow (vph)	8	1387	438	120	1097	12	501	0	196	15	0	12
Shared Lane Traffic (%)							28%					
Lane Group Flow (vph)	8	1387	438	120	1109	0	361	336	0	0	27	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	
Protected Phases		2		1	6		3	3		4	4	
Permitted Phases	2		2	6								
Detector Phase	2	2	2	1	6		3	3		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	23.5	23.5	23.5	10.5	23.5		27.0	27.0		10.5	10.5	
Total Split (s)	36.0	36.0	36.0	13.0	49.0		27.5	27.5		13.5	13.5	
Total Split (%)	40.0%	40.0%	40.0%	14.4%	54.4%		30.6%	30.6%		15.0%	15.0%	
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)	1.5	1.5	1.5	1.5	1.5		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	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.0	5.0			5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	
Act Effct Green (s)	40.1	40.1	40.1	53.8	53.8		21.5	21.5			5.5	
Actuated g/C Ratio	0.45	0.45	0.45	0.60	0.60		0.24	0.24			0.06	
v/c Ratio	0.06	0.88	0.52	0.48	0.53		0.89	0.67			0.12	
Control Delay (s/veh)	11.0	17.5	2.5	17.3	12.9		58.2	23.1			1.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay (s/veh)	11.0	17.5	2.5	17.3	12.9		58.2	23.1			1.0	
LOS	B	B	A	B	B		E	C			A	
Approach Delay (s/veh)		13.9			13.3			41.3			1.0	
Approach LOS		B			B			D			A	
Queue Length 50th (m)	0.3	33.7	2.5	7.7	51.1		65.8	29.6			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	m0.4	m#157.8	m2.8	23.0	91.4		#116.9	61.4			0.0	
Internal Link Dist (m)		401.9			403.4			92.2			124.9	
Turn Bay Length (m)	26.0		45.0	38.0								
Base Capacity (vph)	137	1579	847	259	2103		425	518			267	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.06	0.88	0.52	0.46	0.53		0.85	0.65			0.10	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 80 (89%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay (s/veh): 18.7		Intersection LOS: B	
Intersection Capacity Utilization 79.4%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Paulette Duguay St/Dupuy Ave & Marion St

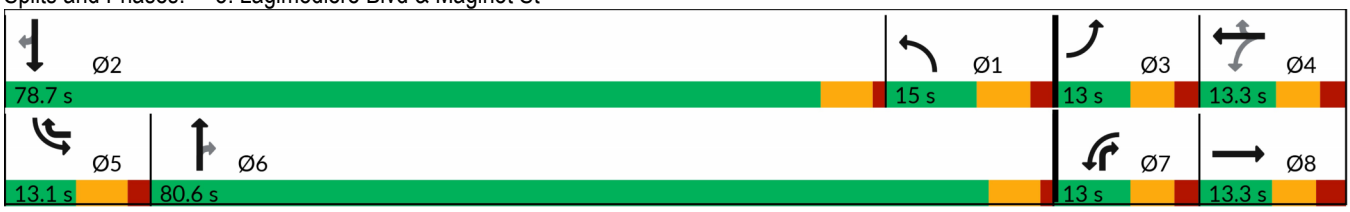


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	205	13	143	61	9	66	129	1026	17	19	1811	231
Future Volume (vph)	205	13	143	61	9	66	129	1026	17	19	1811	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		50.0	0.0		0.0	100.0		80.0	90.0		80.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	33.0			7.5			30.0			35.0		
Lane Util. Factor	0.97	0.95	0.95	1.00	1.00	1.00	*0.84	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99										
Frt		0.862				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3278	2836	0	1789	1883	1555	2738	3476	1601	1560	3544	1541
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	3278	2836	0	1883	1883	1555	2738	3476	1601	1560	3544	1541
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		155				140			94			204
Link Speed (k/h)		50			50			80			80	
Link Distance (m)		168.0			95.5			349.7			499.8	
Travel Time (s)		12.1			6.9			15.7			22.5	
Confl. Bikes (#/hr)			1									
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
Heavy Vehicles (%)	8%	2%	10%	2%	2%	5%	12%	5%	2%	17%	3%	6%
Adj. Flow (vph)	223	14	155	66	10	72	140	1115	18	21	1968	251
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	169	0	66	10	72	140	1115	18	21	1968	251
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	Perm
Protected Phases	3	8		7	4	5	1	6	7	5	2	
Permitted Phases				4		4			6			2
Detector Phase	3	8		7	4	5	1	6	7	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	7.0	5.0	5.0	7.0	7.0
Minimum Split (s)	11.0	11.6		11.0	11.3	11.7	11.7	43.7	11.0	11.7	34.7	34.7
Total Split (s)	13.0	13.3		13.0	13.3	13.1	15.0	80.6	13.0	13.1	78.7	78.7
Total Split (%)	10.8%	11.1%		10.8%	11.1%	10.9%	12.5%	67.2%	10.8%	10.9%	65.6%	65.6%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.7	4.7	4.7	4.0	4.7	4.7	4.7
All-Red Time (s)	2.0	2.6		2.0	2.3	2.0	2.0	1.0	2.0	2.0	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	0.0	0.0
Total Lost Time (s)	6.0	6.6		6.0	6.3	6.7	6.7	5.7	6.0	6.7	5.7	5.7
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	Max	None	None	Max	Max
Act Effct Green (s)	14.5	6.3		8.2	6.1	8.7	8.3	77.9	90.4	6.1	73.1	73.1
Actuated g/C Ratio	0.12	0.05		0.07	0.05	0.07	0.07	0.67	0.77	0.05	0.63	0.63
v/c Ratio	0.55	0.57		0.52	0.10	0.29	0.73	0.48	0.01	0.26	0.89	0.24
Control Delay (s/veh)	54.2	18.7		65.8	56.1	3.0	75.7	11.8	0.0	62.6	25.6	3.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	54.2	18.7		65.8	56.1	3.0	75.7	11.8	0.0	62.6	25.6	3.0
LOS	D	B		E	E	A	E	B	A	E	C	A
Approach Delay (s/veh)		38.9			34.6			18.6			23.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			B			C	
Queue Length 50th (m)	25.6	1.7		16.2	2.4	0.0	20.5	74.0	0.0	5.1	209.3	4.4
Queue Length 95th (m)	#60.2	13.2		27.9	8.2	0.0	#39.1	92.0	0.0	13.9	256.3	15.3
Internal Link Dist (m)		144.0			71.5			325.7			475.8	
Turn Bay Length (m)	75.0						100.0		80.0	90.0		80.0
Base Capacity (vph)	405	308		130	112	249	194	2317	1280	85	2217	1040
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.55		0.51	0.09	0.29	0.72	0.48	0.01	0.25	0.89	0.24

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 116.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay (s/veh): 23.8		Intersection LOS: C	
Intersection Capacity Utilization 80.2%		ICU Level of Service D	
Analysis Period (min) 15			
* User Entered Value			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Lagimodiere Blvd & Maginot St



Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	77	0	83	40	0	65	82	499	21	27	421	45
Future Vol, veh/h	77	0	83	40	0	65	82	499	21	27	421	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	10	22.1	-	-
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	84	0	90	43	0	71	89	542	23	29	458	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	990	1284	483	1318	1297	283	507	0	0	565	0	0
Stage 1	541	541	-	732	732	-	-	-	-	-	-	-
Stage 2	449	743	-	586	565	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.53	6.23	7.33	6.53	6.93	4.13	-	-	4.13	-	-
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	3.519	4.019	3.319	3.519	4.019	3.319	2.219	-	-	2.219	-	-
Pot Cap-1 Maneuver	213	164	583	124	161	715	1056	-	-	1005	-	-
Stage 1	524	520	-	380	426	-	-	-	-	-	-	-
Stage 2	560	421	-	495	507	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	170	140	583	93	137	715	1056	-	-	1005	-	-
Mov Cap-2 Maneuver	170	140	-	93	137	-	-	-	-	-	-	-
Stage 1	460	505	-	333	374	-	-	-	-	-	-	-
Stage 2	443	369	-	406	492	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	28.1	34.7	1.5	0.5
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1056	-	-	170	583	93	715	1005	-	-
HCM Lane V/C Ratio	0.084	-	-	0.492	0.155	0.468	0.099	0.029	-	-
HCM Ctrl Dly (s/v)	8.7	0.4	-	45.1	12.3	73.9	10.6	8.7	-	-
HCM Lane LOS	A	A	-	E	B	F	B	A	-	-
HCM 95th %tile Q (veh)	0.3	-	-	2.4	0.5	2	0.3	0.1	-	-

Intersection	
Int Delay, s/veh	6.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	402	200	4	279	265
Future Vol, veh/h	4	402	200	4	279	265
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	-	-	-	14	-
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	4	437	217	4	303	288

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	969	111	0	0	221	0
Stage 1	219	-	-	-	-	-
Stage 2	750	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	251	921	-	-	1345	-
Stage 1	796	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	195	921	-	-	1345	-
Mov Cap-2 Maneuver	195	-	-	-	-	-
Stage 1	796	-	-	-	-	-
Stage 2	331	-	-	-	-	-

Approach	WB	NB	SB
HCM Ctrl Dly, s/v	13	0	4.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	888	1345	-
HCM Lane V/C Ratio	-	-	0.497	0.225	-
HCM Ctrl Dly (s/v)	-	-	13	8.5	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q (veh)	-	-	2.8	0.9	-

Intersection: 2: Paulette Duguay St & Commercial West/Commercial East

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	LT	TR	L	TR
Maximum Queue (m)	27.0	21.0	21.0	17.9	21.2	7.8	8.9	0.6
Average Queue (m)	11.8	9.5	8.5	9.1	6.5	0.3	2.6	0.1
95th Queue (m)	23.9	16.8	18.2	15.5	15.5	5.1	8.0	0.8
Link Distance (m)	67.6	67.6	62.0	62.0	89.6			85.5
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)						10.0	22.1	
Storage Blk Time (%)					2			
Queuing Penalty (veh)					5			

Intersection: 3: Paulette Duguay St & Ibrahima Diallo Ave

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (m)	42.9	22.4
Average Queue (m)	20.0	10.2
95th Queue (m)	34.5	19.0
Link Distance (m)	347.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		14.0
Storage Blk Time (%)		2
Queuing Penalty (veh)		2

Zone Summary

Zone wide Queuing Penalty: 7

March 13, 2025

Confidential

Cover Letter for Servicing Report Revision 3 – Public Markets

To Whom It May Concern:

The following servicing report for the Public Markets subdivision in the City of Winnipeg has been updated according to a proposed increase in density for the Marion Street WWS connection and the Speers Road WWS connection. For the purposes of simplifying your review, the following updates have been made from the Revision 1 version of this report:

- Increase in residential density from 0 units to 60 MF units for Block 3, Lot 1 (Marion Street WWS Connection).
- Decrease in car park unit count from 700 units to 566 units to maintain maximum full flow cap for Marion Street connection.
- Modified the following WWS flows to the Speers Road WWS connection:
    - WWS MH06 to MH07
        - Add 65 MF units – Block 3, Lot 2.
        - Add 190 MF units – Block 4, Lot 2.
        - Modified Commercial, Light Industrial and Wet Industrial areas to be 0 ha
        - Previously, this connection had areas of 0.85ha Commercial, 0.59ha Light Industrial, and 3.35ha Wet Industrial.
    - WWS MH08 to MH09
        - Added 180 MF units – Block 4, Lot 3.
        - Modified Light Industrial areas to be 0.201 ha and Wet Industrial to be 1.139 ha.
        - Previously, this connection had areas of 0.56 ha Light Industrial and 3.16 ha Wet Industrial
    - WWS MH17 to MH18
        - 305 MF units – Block 4, Lot 4
        - Modified Light Industrial and Wet Industrial area to be 0 ha
        - Previously, this connection had areas of 0.61 ha Light Industrial and 3.43 ha Wet Industrial.
- All increases in density impact the wastewater sewer only (specific to this report – transportation impact study is updated separate from this report)
- There are no impacts to the water distribution or land drainage designs. The increase in peak wet weather waste water flows to 37.99 L/s to Speers Road is within the available flow and therefore has no impact on downstream infrastructure.

Please contact the undersigned should you have any questions.

Sincerely,

Jason Dunn, P.Eng., PMP,

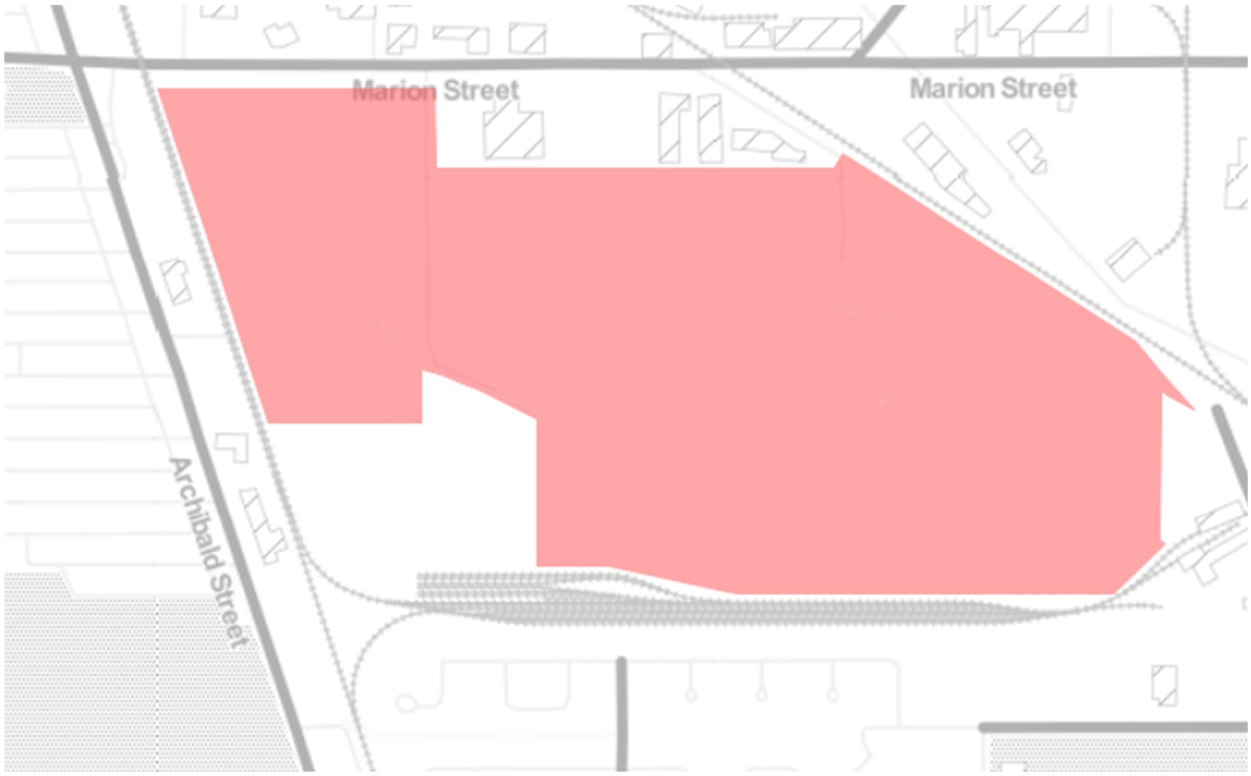
Senior Project Engineer

Land Development, Manitoba

OLEXA DEVELOPMENTS

PUBLIC MARKETS
SERVICING REPORT

MARCH 13, 2025



PUBLIC MARKETS
SERVICING REPORT
OLEXA DEVELOPMENTS

DESIGN REPORT-R3

PROJECT NO.: 211-07590-00
DATE: MARCH 13, 2025

WSP
1600 BUFFALO PLACE
WINNIPEG, MB
CANADA R3T 6B8

T: +1 204 477-6650
F: +1 204 474-2864
WSP.COM

WSP Canada Inc.

SIGNATURES

PREPARED BY



2025-03-14

Jason Dunn, P.Eng., PMP,
Senior Project Engineer
Land Development, Manitoba

APPROVED[1] BY



2025-03-14

Bob Hinkelman, C.E.T
Senior Advisor
Land Development, Manitoba



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TABLE OF CONTENTS

1 INTRODUCTION 1

2 WATERMAIN 1

2.1 Watermain Design Criteria 1

2.2 Existing Watermain 2

2.3 Proposed Watermain 2

2.3.1 Model Results 2

3 WASTEWATER SEWER 6

3.1 Wastewater Sewer Design Criteria 6

3.2 Existing Wastewater Sewer 7

3.3 Proposed Wastewater Sewer 7

4 LAND DRAINAGE SEWER 7

4.1 Land Drainage Sewer Design Criteria 8

4.2 Pipe Design 8

4.3 Pond Design and System Routing 9

4.3.1 Model Parameters 9

4.3.2 Pond Sizing and Control Levels 10

4.3.3 Water Level Rise 10

4.3.4 Drawdown Times 11

4.3.5 Discharge 11

4.4 Effects on the Existing Land Drainage Sewer 13

4.5 Summary 13

TABLES

TABLE 1: RESIDUAL PRESSURE DURING PEAK HOUR WATER DEMAND. 3

TABLE 2: MAXIMUM FLOW RATE IS DETERMINED AT EACH JUNCTION WHILE MAINTAINING THE MINIMUM RESIDUAL PRESSURE WITHIN THE SYSTEM. JUNCTIONS HIGHLIGHTED IN RED DO NOT MEET THE FIRE FLOW REQUIREMENTS FROM A SINGLE FIRE HYDRANT. 4

TABLE 3: RESULTS OF A FIRE FLOW ANALYSIS WHERE THE INDUSTRIAL FIRE FLOW RATE IS WITHDRAWN FROM FOUR FIRE HYDRANTS WITHIN THE WORST PERFORMING AREA OF THE DEVELOPMENT..... 5

TABLE 4: WASTEWATER SEWER DISCHARGE FROM THE DEVELOPMENT..... 7

TABLE 5: SWMM PARAMETERS USED TO DEFINE THE ST. CATHERINE STREET AND PUBLIC MARKETS CATCHMENTS. 9

TABLE 6: DESIGN STORM PARAMETERS FOR THE ABOVE EQUATION FROM THE DRAINAGE CRITERIA MANUAL FOR THE CITY OF WINNIPEG. 10

TABLE 7: RETENTION POND WATER LEVELS AND DRAWDOWN TIMES..... 11

FIGURES

FIGURE 1: POND DRAWDOWNS FOR VARIOUS DESIGN STORMS RELATIVE TO THE BEGINNING OF THE STORM. THE NORMAL WATER LEVEL IS AT A DEPTH OF 2.50 M. 12

FIGURE 2: DISCHARGE DOWNSTREAM OF THE WEIR MANHOLE DURING VARIOUS DESIGN STORMS. 12

FIGURE 3: MODEL OF EXISTING CONDITIONS FOR ST CATHERINE STREET LAND DRAINAGE SEWER. 13

APPENDICES

A WATERMAIN DESIGN

- **A-1** Watermain Layout
- **A-2** Multi-Family Dwelling Densities
- **A-3** Simulated Simultaneous Fire Flow Tests
- **A-4** Design Table

B WASTEWATER SEWER DESIGN

- **B-1** Wastewater Sewer Layout
- **B-2** Design Table

C LAND DRAINAGE SEWER DESIGN

- **C-1** Land Drainage Sewer Layout
- **C-2** Archibald Street As-Builts
- **C-3** Design Table
- **C-4** Stage-Area and Stage-Volume Curves
- **C-5** Proposed Changes to St Catherine Street Land Drainage Sewer
- **C-6** St Catherine Street Hydraulic Profiles

D CITY OF WINNIPEG SERVICING CRITERIA

1 INTRODUCTION

Olexa Developments is developing 67 ha of land within the Stockyards, hereon referred to as Public Markets, for multi-family, commercial, and industrial use. This servicing report details the design for the development's watermain, gravity sewer, and land drainage systems.

Water and sewer works are contained within the development, with connections to those existing along Marion Street and Speers Road. The land drainage system crosses the Canadian Pacific (CP) Railway and Archibald Street to connect to that along St Catherine Street which discharges into the Seine River.

While the area currently being using to offload vehicles from the railway is considered in the water, sewer, and land drainage designs, it is not a part of this development and has only been included as an allowance.

The City of Winnipeg plans to construct a retention pond in the northeastern public reserve and connect to it to the combined sewer on Marion Street by way of an easement parallel to the right-of-way. Neither the retention pond nor piping are a part of this design or the project's construction.

2 WATERMAIN

The proposed watermain shown in ***Appendix A-1*** follows the development's right-of-ways and has two connections to existing watermains. A WaterCAD model has been developed with the design criteria summarized in *Section 2.1 Watermain Design Criteria* and flow data provided by the City of Winnipeg at the connection points identified in *Section 2.2 Existing Watermain.* The watermain sizing and available flows are presented in *Section 2.3 Proposed Watermain*.

2.1 WATERMAIN DESIGN CRITERIA

The design of the proposed watermain is based on the City of Winnipeg's *Water Demand Estimation and Design Guidelines*. The typical dwelling densities for the multi-family lots originate from the correspondence with the City of Winnipeg in ***Appendix A-2***. The following criteria and assumptions were used to estimate the water demand within Public Markets and design the system:

General

- Max day water demand: 1.6 × average day water demand
- Peak hour water demand: 2.5 × average day water demand

Residential Demand

- Average day water demand: 225 L/cap/day + 10%
- Population/dwelling: 2.30
- Dwelling density (see ***Appendix A-2***)
  - Residential Multi-Family – Medium: 106.52 dwellings/ha
  - Residential Multi-Family – Large: 134.78 dwellings/ha

Non-Residential Demand

- Commercial average day water demand: 16,800 L/ha/day
- Light industrial average day water demand: 22,500 L/ha/day
- Wet industrial average day water demand: 33,600 L/ha/day
- 85% of the industrial wastewater generation will be at the wet industry rate
- Non-residential flows occur over 24 hours

Design Criteria

- Hazen-Williams C-value (diameter > 200 mm): 130
- Minimum residual pressure during peak hour: 207 kPa (30 psi)
- Minimum residual pressure during fire flows: 140 kPa (20 psi)
- Allowance for fire hydrant losses: 33 kPa (4.8 psi)
- Fire flows targets are in conjunction with max day water demand
- The following fire flow targets have been used:
  - Residential Multi-family: 200 L/s
  - Commercial: 250 L/s
  - Industrial: 383 L/s

2.2 EXISTING WATERMAIN

The development has access to the watermains along Marion Street and Speers Road:

1. 300 mm cast iron watermain at the intersection of Marion Street and Dupuy Avenue.
2. 300 mm asbestos cement watermain extending from Speers Road, south of the Canadian National (CN) Railway crossing.

To aid in the design of the development's watermain, the City of Winnipeg has provided the simultaneous flows and pressures at these two connections points as attached in ***Appendix A-3***.

2.3 PROPOSED WATERMAIN

The WaterCAD model shown in ***Appendix A-1*** has been developed using fire hydrant locations as model junctions, the simulated fire flows attached in ***Appendix A-3***, and the water demands calculated in ***Appendix A-4***. It generally resembles that proposed in Stantec's *Canada Packers Land – Preliminary Servicing Analysis* (2019) memo, but without the second connection to Marion Street and all pipes being 300 mm.

Water demand within the development is from a combination of multi-family residential, commercial, and industrial land uses. As the specifics of the industrial lots are unknown at this time, it is assumed that 85% by area will be wet industry as defined by the City of Winnipeg. Calculations based on the land use and the demands in *Section 2.1 Watermain Deign Criteria*, the average day, peak hour, and maximum day flows have been completed at each junction and are attached in ***Appendix A-4***.

2.3.1 MODEL RESULTS

Table 1 shows that the minimum residual pressure during peak hour demand is greater than the minimum 207 kPa required at every junction within the system, and therefore in conformance with the guidelines.

Table 2 shows the maximum day demand and required fire flow for each junction within the system based on adjacent land use. Junctions 18 through 23, highlighted in red, do not achieve the required fire flow at the minimum residual pressure if the full amount is withdrawn at a single point. Note that these nodes are partially adjacent to the public reserves.

An additional analysis has been performed in this area, where the 383 L/s is divided amongst the four worst performing hydrants. Adding an additional 96 L/s (383 L/s ÷ 4) to Junctions 19 though 22 results in a minimum residual pressure of 171 kPa as shown in Table 3. While slightly less than the minimum 173 kPa stated in *Section 2.1 Watermain Design Criteria*, it is within the rounding resulting from unit conversions.

Therefore, the proposed 300 mm watermain presented in ***Appendix A-1*** with connections to the existing watermain along Marion Street and Speers Road can provide the required residual pressure during peak hour demand and during the combination of fire flows and maximum day demand. Water servicing for the development requires the two existing watermain connections and the interconnecting watermain to provide fire flows and system redundancy.

Table 1: Residual pressure during peak hour water demand.

JUNCTION	PEAK HOUR DEMAND (L/S)	PRESSURE (KPA)
J-01	2.55	464
J-02	0.25	464
J-03	0.00	463
J-04	3.48	463
J-05	0.00	463
J-06	0.00	463
J-07	0.80	463
J-08	3.63	463
J-09	1.26	463
J-10	3.46	462
J-11	0.00	462
J-12	0.00	462
J-13	0.00	462
J-14	6.65	462
J-15	0.00	462
J-16	1.50	462
J-17	0.00	462
J-18	5.96	462
J-19	3.73	462
J-20	0.00	462
J-21	0.00	462
J-22	0.00	462
J-23	0.00	462
J-24	9.36	463
J-25	5.68	463
J-26	0.00	463
J-27	1.75	463

Table 2: Total flow available is determined at each junction while maintaining the minimum residual pressure within the system. Junctions highlighted in red do not meet the fire flow requirements from a single fire hydrant.

JUNCTION	MAX. DAY DEMAND (L/S)	FIRE FLOW NEEDED (L/S)	TOTAL FLOW NEEDED (L/S)	TOTAL FLOW AVAILABLE (L/S)	JUNCTION WITH MIN PRESSURE (173 KPA)
J-01	1.63	250	251.63	481.49	J-02
J-02	0.16	250	250.16	460.53	J-27
J-03	—	250	250.00	431.28	J-04
J-04	2.98	250	252.98	410.95	J-05
J-05	—	250	250.00	394.00	J-06
J-06	—	250	250.00	386.02	J-07
J-07	0.51	383	383.51	383.62	J-06
J-08	2.32	383	385.32	386.41	J-07
J-09	0.80	383	383.80	390.36	J-08
J-10	2.21	383	385.21	402.11	J-09
J-11	—	383	383.00	416.99	J-10
J-12	—	383	383.00	438.43	J-16
J-13	—	383	383.00	443.83	J-12
J-14	4.26	383	387.26	456.55	J-13
J-15	—	383	383.00	465.95	J-14
J-16	0.96	383	383.96	410.64	J-17
J-17	—	383	383.00	390.78	J-18
J-18	3.81	383	386.81	381.99	J-19
J-19	2.39	383	385.39	372.91	J-20
J-20	—	383	383.00	366.61	J-21
J-21	—	383	383.00	365.79	J-20
J-22	—	383	383.00	368.15	J-21
J-23	—	383	383.00	374.05	J-22
J-24	6.47	383	389.47	390.50	J-23
J-25	2.32	200	202.32	402.77	J-24
J-26	2.88	200	202.88	427.28	J-25
J-27	2.85	250	252.85	452.68	J-26

Table 3: Results of a fire flow analysis where the industrial fire flow rate is withdrawn from four fire hydrants within the worst performing area of the development.

JUNCTION	MAX. DAY DEMAND (L/S)	FIRE FLOW (L/S)	TOTAL FLOW NEEDED (L/S)	RESIDUAL PRESSURE (KPA)
J-01	1.63	—	1.63	307
J-02	0.16	—	0.16	281
J-03	—	—	—	262
J-04	2.98	—	2.98	262
J-05	—	—	—	262
J-06	—	—	—	261
J-07	0.51	—	0.51	261
J-08	2.32	—	2.32	261
J-09	0.80	—	0.80	260
J-10	2.21	—	2.21	260
J-11	—	—	—	260
J-12	—	—	—	260
J-13	—	—	—	282
J-14	4.26	—	4.26	300
J-15	—	—	—	319
J-16	0.96	—	0.96	239
J-17	—	—	—	218
J-18	3.81	—	3.81	197
J-19	2.39	96.00	98.39	177
J-20	—	96.00	96.00	171
J-21	—	96.00	96.00	171
J-22	—	96.00	96.00	176
J-23	—	—	—	194
J-24	6.47	—	6.47	212
J-25	2.32	—	2.32	231
J-26	2.88	—	2.88	249
J-27	2.85	—	2.85	262

3 WASTEWATER SEWER

Given the orientation and relative flatness of the site, the optimal design for the wastewater sewer is to connect to the existing sewer at the northwestern and eastern edges with high points in the center of the development. This allows for the grade and cover to be maximized and a reduction in the amount of piping as the center area being used for the retention ponds and does not require sewer servicing.

The design of the wastewater sewer system is based on the design criteria in *Section 3.1 Wastewater Sewer Design Criteria* and the connections to the existing sewers detailed in *Section 3.2 Existing Wastewater Sewer*. It is, itself, presented and discussed in *Section 3.3 Proposed Wastewater Sewer*.

3.1 WASTEWATER SEWER DESIGN CRITERIA

The design of the proposed wastewater sewer is based on the City of Winnipeg's *Wastewater Flow Estimation and Servicing Guidelines*. The following criteria and assumptions were used to estimate the wastewater generation within the proposed development and design the system:

General

- Wastewater generation is based on contributing area's land use as shown in ***Appendix B-1***
- Pipe sizing in based on peak wet weather flows as property developments will have on-site land drainage systems
- Peak wet weather flows: peak dry weather flow + extraneous flows

Residential Flow

- Population/dwelling: 2.30
- Dwelling density (see ***Appendix A-2***)
  - Residential Multi-Family – Medium: 106.52 dwellings/ha
  - Residential Multi-Family – Large: 134.78 dwellings/ha
- Average dry weather flow: 270 L/capita/day
- Peak dry weather flow: Average flow × Harmon's Peaking Factor

Non-Residential Flow

- Commercial peak dry weather flow: 28,100 L/ha/day
- Light industrial peak dry weather flow: 37,600 L/ha/day
- Wet industrial peak dry weather flow: 44,900 L/ha/day
- 85% of the industrial wastewater generation is at the wet industry rate
- Non-residential flows occur over 24 hours

Extraneous Flow

- Groundwater infiltration: 2,200 L/ha/day
- Manhole infiltration: 12 L/min/manhole
- Manhole density: 1.6 manholes/ha
- Undeveloped lots are assumed to have a manhole density of 1.6 manholes/ha. Actual manhole counts are used for the right-of-ways
- No weeping tile flow

Design Criteria

- Manning's n: 0.013

- Minimum pipe slope: as per City of Winnipeg requirements
- Minimum pipe diameter: 0.250 m
- Maximum manhole spacing: 150 m
- Maximum flow depth: 75%
- Minimum full flow velocity: 0.60 m/s

3.2 EXISTING WASTEWATER SEWER

The proposed design splits wastewater discharge between the existing combined sewers along Marion Street and Speers Road. As shown in ***Appendix B-1***, the two discharge locations are:

1. 900 mm combined sewer at the intersection of Marion Street and Dupuy Avenue
2. 1350 × 2025 mm combined sewer extending from Speers Road, south of the CN Railway crossing

The connections to the existing combined sewer along Marion Street and Speers Road will be completed by coring into the existing manholes.

3.3 PROPOSED WASTEWATER SEWER

The proposed wastewater sewer design consists of a high point generally in the centre of the development and two discharge points as to maximize bury depth.

Wastewater generation within the proposed development is from a combination of multi-family residential, commercial, and industrial land uses as shown in ***Appendix B-1***. As the specifics of the industrial lots are unknown at this time, it is assumed that 85% by area will be wet industry and the remainder light industry, as defined by the City of Winnipeg.

Using the criteria in *Section 3.1 Wastewater Sewer Design Criteria*, peak dry weather and extraneous flows are combined to determine each pipe segment's peak wet weather flow. Manning's equation is used to set the pipe diameters such that flow depth does not exceed 75%. The calculations of wastewater generation from each manhole's contributing land use, and the design of the pipe sections to accommodate, are included in ***Appendix B-2***. A plan showing the piping is also included in ***Appendix B-1***. The total wastewater discharge from the development is summarized in Table 4.

Table 4: Wastewater sewer discharge from the development.

DISCHARGE LOCATION	PEAK WET WEATHER FLOW	PEAK DRY WEATHER FLOW	PIPE SLOPE	PIPE DIAMETER
Marion Street @ Dupuy Avenue	71.23 L/s	63.70 L/s	0.143%	375 mm
Speers Road @ CN Rail	37.99 L/s	29.18 L/s	0.192%	300 mm

4 LAND DRAINAGE SEWER

The Public Markets development is approximately 67 ha and a combination of multi-family residential, commercial, and industrial land use as shown in ***Appendix C-1***. It contains three public reserves – two of which are located centrally and will be partially used for the naturalized retention ponds. The third northeastern public reserve will be used by the City of Winnipeg for a retention pond that is not a part of this development or design, nor is the piping to connect it to Marion Street.

The overall drainage plan is based on that proposed in Stantec's *MRS D Drainage Brief* (2019), in that it includes two centrally located naturalized retention ponds which discharge into the Seine River. Although not part of the

development, the catchment area for the retention ponds includes Speers Road's right-of-way from the development to Maginot Street as per City of Winnipeg requirements for this project. To reach the Seine River, the land drainage sewer crosses the CP Railway and Archibald Street west of the development and connects to the existing land drainage sewer along St. Catherine Street. A preliminary evaluation of the existing land drainage sewer along St. Catherine Street was completed in Stantec's brief and found it to have capacity if the most upstream section of pipe is upsized. The City of Winnipeg has identified that the development's land drainage sewer can discharge into that of St. Catherine if an analysis shows that the existing level of service is maintained.

The piping of the land drainage sewer is based on the Rational Method and Manning's equation. A PCSWMM model has been developed to design the retention ponds and determine the temporal characteristics of the system to ensure that they are in accordance with the City of Winnipeg's guidelines. *Section 4.1 Land Drainage Sewer Design Criteria* summarizes the design criteria from the City of Winnipeg and the assumptions used in the design. *Sections 4.2 Pipe Design* and *4.3 Pond Design and System Routing* detail the design of the piping and retention ponds, respectively. Finally, *Section 4.4 Effects on the Existing Land Drainage Sewer* reviews the impacts of the additional stormwater on the existing St. Catherine Street system and what upgrades are required to maintain the pre-development level of service.

4.1 LAND DRAINAGE SEWER DESIGN CRITERIA

The City of Winnipeg's *City-UDI Task Group on Criteria for Stormwater Management* provides the guidelines for the development of the land drainage sewer system, summarized as:

Piped Systems

- Piped systems are to have a hydraulic capacity for a City of Winnipeg 5-year MacLaren design storm
- Hydraulic grade lines are to remain at least 0.15 m below ground level at the upstream end
- Manning's *n* of 0.013

Retention Pond

- Maximum water level rise (25-year design storm): 1.20 m
- High water level (HWL): Greater of 100-year design storm and May 2010 event
- Freeboard elevation: 0.60 m above HWL
- Drawdown time
  - 5-year design storm: 48 hours
  - 100-year design storm: 120 hours
- Minimum water depth: 2.50 m
- Side slopes: 7:1 from freeboard to 3.00 m horizontal from NWL

4.2 PIPE DESIGN

The land drainage piping design uses the Rational Method to calculate runoff and Manning's equation for conveyance to the retention ponds, assuming the system only drains to the retention ponds and without the piping west of MHL02.

Applying the Rational Method requires the definition of the catchment area, runoff coefficient, and rainfall intensity. Catchments have been defined based on a combination of the grading plan's local high and low points and the lots themselves. The lots are representative of catchments as each lot owner will be responsible for restricting runoff and storing stormwater onsite separately. The catchments and associated areas are shown in ***Appendix C-1***. The catchments for Public Markets and Speers Road have been given respective runoff coefficients of 0.80 and 0.60. The rainfall intensity is from a 5-year design storm defined in the *Drainage Criteria Manual for the City of Winnipeg*

and presented in Table 6. The storm duration for a given segment, t_b, is the time of concentration plus the travel time of stormwater upstream.

Referring to the manholes labelled in ***Appendix C-1***, ***Appendix C-3*** details the calculations for the pipe design. Under the surcharged conditions of the 5-year design storm, the hydraulic grade line is at least 0.15 m below ground elevation and all pipes exceed the minimum 0.60 m/s cleansing velocity. The pipe sizes determined in ***Appendix C-3*** are input into a PCSWMM model for the retention pond design and system routing.

4.3 POND DESIGN AND SYSTEM ROUTING

A PCSWMM model is used to determine the retention pond size, drawdown, and routing. It consists of the pipe design in *Section 4.2 Pipe Design*, and the remaining downstream piping to the Seine River outfall. *Section 4.3.1 Model Parameters* details the parameters used in the PCSWMM model to develop the retention pond design presented in the subsequent sections.

4.3.1 MODEL PARAMETERS

Table 5 summarizes the parameters used to define the catchments which are typical for the associated land use – most notably the increased portion of impervious area for the multifamily, commercial, and industrial lots versus the single-family lots of St. Catherine Street.

Table 5: SWMM parameters used to define the St. Catherine Street and Public Markets catchments.

PARAMETER	ST CATHERINE STREET	PUBLIC MARKETS	SPEERS ROAD
Slope	0.50%	0.65%	0.65%
% Area Impervious	50% [1]	75%	50%
Impervious Manning's n	0.013	0.013	0.013
Impervious Depression Storage	2 mm	2 mm	2 mm
% Impervious Area Without Depressions	25%	25%	25%
Pervious Manning's n	0.25	0.25	0.25
Pervious Depression Storage	5 mm	5 mm	5 mm
Maximum Infiltration Rate	76.2 mm/hr	76.2 mm/hr	76.2 mm/hr
Minimum Infiltration Rate	3 mm/hr	3 mm/hr	3 mm/hr
Decay Constant	4.14 hr^{-1}	4.14 hr^{-1}	4.14 hr^{-1}
Drying Time	7 days	7 days	7 days

[1] The catchment representing Archibald uses an impervious area of 70%.

To assess the land drainage sewer system, the PCSWMM model considers 5 different design storms:

1. The **5-year** discretized design storm from Table 3.2 of the *Drainage Criteria Manual for the City of Winnipeg* is used to determine the water level in the ponds, the sizing of the piping, and to check the hydraulic grade line for the piping sized in *Section 4.2 Pipe Design*. The Seine River water level is set at 226.13 m (10-year Summer – FM #940).
2. The **5-year (May)** design storm from Figure 2.13 of the *Drainage Criteria Manual for the City of Winnipeg* is considered with the Seine River water level set to 228.19 m (50-year Spring – FM #935). The results are

compared against those from the 5-year storm conditions described above and the higher of the two is used for the design.

3 The **25-year** discretized design storm from Table 3.2 of the *Drainage Criteria Manual for the City of Winnipeg* is used in the sizing of the retention ponds.

4 The **100-year** design storm is used to size the retention ponds, set the high water level, and set the freeboard elevation. In the absence of a 100-year discretized design storm in the *Drainage Criteria Manual for the City of Winnipeg*, the 100-year design storm derived in the *Seine River Hydrology Study* prepared by Acres is used. Discretized 100-year design storms were developed based on data from Environment and Climate Change Canada (V-3.20) for the Winnipeg A CS and Winnipeg The Forks stations, but were found to be less that those in Acre's report – therefore the latter is used.

5 The recorded rainfall from the **May 2010** event provided by the City of Winnipeg is used to set the high water level and freeboard elevation if it is greater than that during the 100-year design storm.

The design storms from the *Drainage Criteria Manual for the City of Winnipeg* are defined by:

$$i\ [mm/hr] = \frac{a}{(t_d + b)^c}$$

Table 6: Design storm parameters for the above equation from the *Drainage Criteria Manual for the City of Winnipeg*.

DESIGN STORM	a	b	c
5-year	1198.88	8	0.828
5-year (May)	302.26	3	0.740
25-year	1841.50	9	0.842

4.3.2 POND SIZING AND CONTROL LEVELS

The model was run with the 5-year, 25-year, 100-year, and May 2010 storm events to evaluate system performance and design the retention ponds. Through an iterative process, the ponds have been sized to accommodate the runoff volume from Public Markets while adhering to the water level rise and drawdown times states in *Section 4.1 Land Drainage Sewer Design Criteria*. The shapes of the retention ponds are shown in ***Appendix C-1***. They will consist of a 6.00 m bottom channel connecting the outfalls and a 7:1 slope from 3.00 m below to normal water level to the proposed ground daylight. ***Appendix C-4*** shows the resulting elevation-area and elevation-volume curves for the north and south retention ponds. The retention ponds are directly connected and therefore have similar water level and drawdown response. Notable water levels are:

- Freeboard: 231.09 m
- High water level: 230.49 m
- Normal water level: 228.60 m

The normal water level is controlled by a weir manhole at the west edge of the development as shown in ***Appendix C-1***, which can also allow for a 300 mm drawdown for vegetation maintenance.

4.3.3 WATER LEVEL RISE

The proposed retention ponds are designed as naturalized wetlands with a channel connecting the outfalls. The two ponds are connected and are both governed by the same weir control downstream (see *Section 4.3.2 Pond Sizing and Control Levels*), so they share the same operating levels.

Figure 1 shows the retention ponds' water depth time series during all the design storms. Note that the 5-year design storm results in a greater water level rise than the 5-year (May) design storm, and therefore governs the design. Table 7 summarizes the responses of the retention ponds to the various storms and shows that they are generally within the City of Winnipeg guidelines. The water level rise during a 25-year event is 1.31 m, which is comparable to the guidelines' 1.20 m. Notably, the water level rises 1.89 m during the May 2010 event, and therefore governs the high water level and freeboard.

4.3.4 DRAWDOWN TIMES

Time series of the drawdowns for the various design storms are shown in Figure 1. The model suggests the 5-year drawdown to be 50.5 hours, which is slightly longer than the guideline's suggested 48 hours. Since the retention ponds will be naturalized, this additional drawdown time is not expected to result in any damage to the vegetation. It will also benefit the downstream land drainage system by further attenuating the peak discharge. Table 7 also shows that retention ponds meet the guideline's 100-year drawdown requirement of 120 hours.

4.3.5 DISCHARGE

Stantec's *MRS D Drainage Brief* (2019) demonstrates that a peak discharge of 198 L/s appears to have no negative impacts on the existing system. Peak discharges are summarized below and shown in Figure 2. Only the May 2010 event is greater than 198 L/s, but not by a significant amount. Regardless, the following subsection reviews the changes in the existing land drainage sewer's level of service.

- 5-year (May): 89.33 L/s
- 5-year: 167.67 L/s
- 25-year: 183.61 L/s
- 100-year: 194.75 L/s
- May 2010: 202.88 L/s

Table 7: Retention pond water levels and drawdown times.

	5-YEAR		25-YEAR		100-YEAR		MAY 2010	
	NORTH POND	SOUTH POND	NORTH POND	SOUTH POND	NORTH POND	SOUTH POND	NORTH POND	SOUTH POND
Water Level	229.50 m		229.91 m		230.24 m		230.49 m	
Rise	0.90 m		1.31 m		1.64 m		1.89 m	
Drawdown *	50.5 hours		72.0 hours		90.0 hours		103.5 hours †	
Active Volume Required	9,862 m^3	13,930m^3	15,533 m^3	21,340 m^3	20,082 m^3	27,630 m^3	24,052 m^3	32,830 m^3
Active Volume Available ‡	9,862 m^3	13,930m^3	13,875 m^3	19,309 m^3	20,082 m^3	27,630 m^3	24,052 m^3	32,830 m^3

* Drawdown times are measured to within 0.150 m of NWL

† Measured from the peak depth

‡ 25-year active volume available is measured at a 1.20 m depth

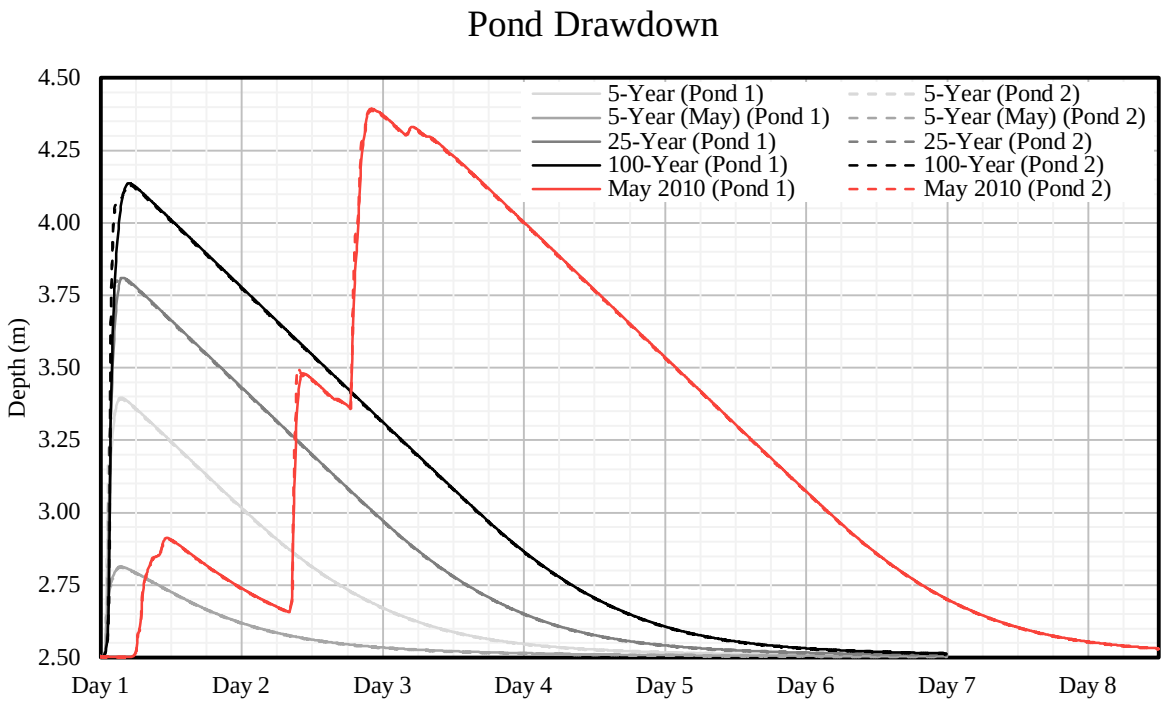

Figure 1: Pond drawdowns for various design storms relative to the beginning of the storm. The normal water level is at a depth of 2.50 m.

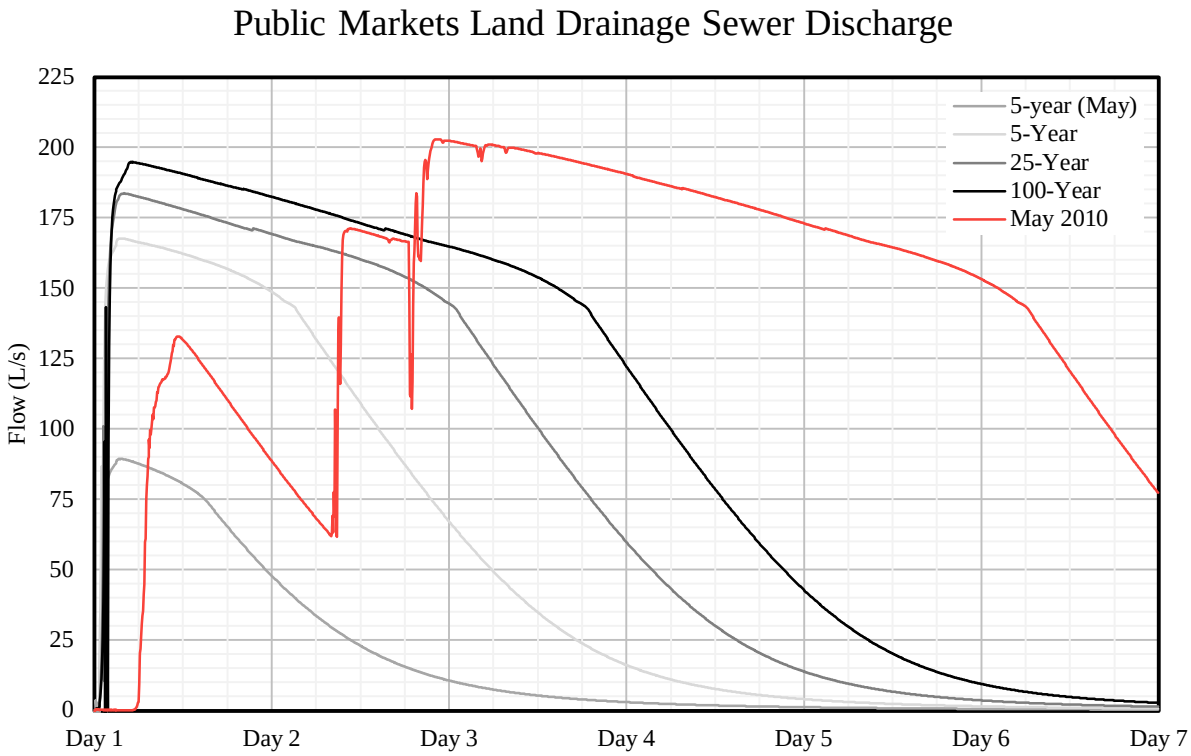

Figure 2: Discharge downstream of the weir manhole during various design storms.

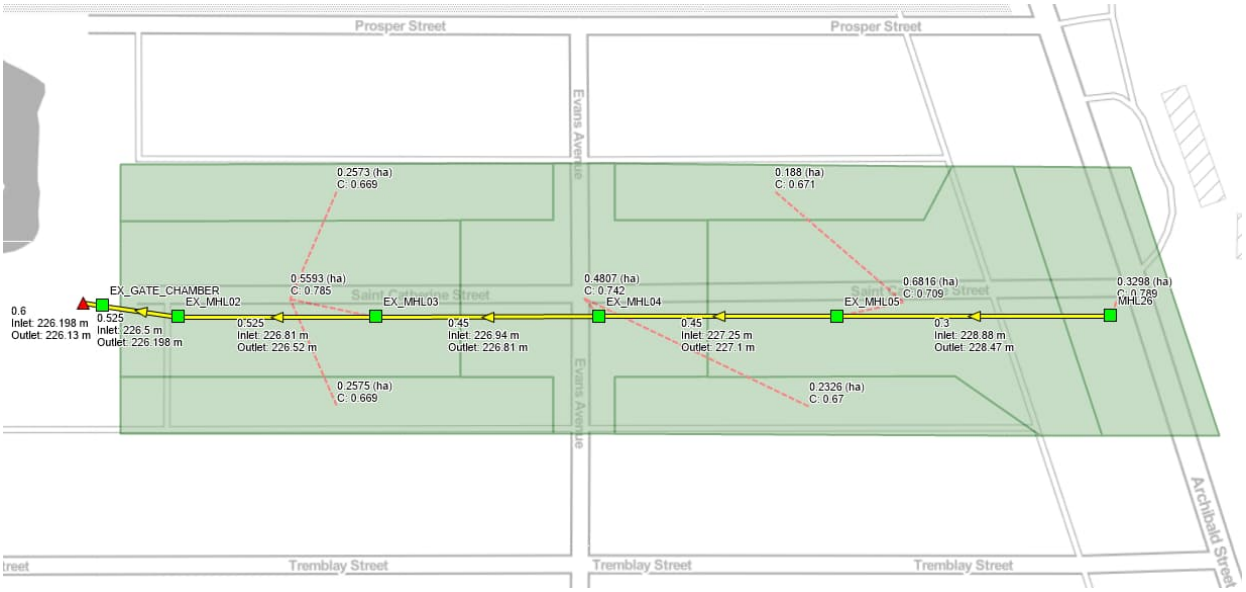

Figure 3: Model of existing conditions for St Catherine Street land drainage sewer.

4.4 EFFECTS ON THE EXISTING LAND DRAINAGE SEWER

To evaluate the effects of the additional stormwater on the existing St Catherine system, 5-year and 25-year design storms have been applied to the pre- and post-development conditions. The pre-development conditions are based on as-builts from the City of Winnipeg and the catchment parameters defined in Table 5. The model of the existing system is shown in Figure 3. The post development conditions upsize the 89 m of pipe between EX_MHL05 and MHL26 from 300 mm to 450 mm and lower it so that it can be extended to the weir manhole and cross the existing works on Archibald Street. The proposed changes have been superimposed on as-builts provided by the City of Winnipeg in ***Appendix C-5***. Profiles of the hydraulic grade lines are in ***Appendix C-6***.

The profiles show that the system surcharges onto the road during a 5-year storm, but the upsizing of the pipe mitigates this surcharge with the additional stormwater flows from Public Markets. During a 25-year design storm, both the pre- and post-development conditions surcharge above the rim of the catch basins, but do not exceed 0.300 m of depth above the rim.

4.5 SUMMARY

A land drainage sewer system has been proposed for Public Markets in accordance with City of Winnipeg guidelines as it maintains hydraulic capacity during a 5-year design storm. The stormwater flows to two naturalized retention ponds within the development. It has been shown that the water level rise within the ponds is within the City of Winnipeg guidelines for a 25-year storm and that the May 2010 event would be contained within the freeboard. The drawdown following the 5-year design storm slightly exceeds the guideline, however the retention ponds will contain natural vegetation and be more resilient to an increased drawdown time. The 100-year and May 2010 event drawdown times are within the guidelines.

The retention ponds discharge by a pipe crossing the CP Railway and Archibald Street to connect to the existing system on St Catherine Street. An evaluation of the existing system was performed and found that if the last section of existing pipe is upsized and lowered, the effects of the additional storm water on the existing system are mitigated.

APPENDIX

A WATERMAIN DESIGN

APPENDIX

A-1 WATERMAIN LAYOUT



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A3 REPORT VERSION 11.0

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PROJECT NO: 211-07590-00

SCALE: 1:4000

DATE: 2021/12/20

DESIGNED BY: B.F.

DRAWN BY: B.F.

PROJECT: PUBLIC MARKETS SERVICING REPORT

TITLE: WATERMAIN LAYOUT

DRAWING: A-1

APPENDIX

A-2 MULTI-FAMILY DWELLING DENSITIES

Friesen, Bruce

From: Lau, Ho <HLau@winnipeg.ca>
Sent: Friday, August 6, 2021 3:28 PM
To: Friesen, Bruce
Cc: Kulczycki, Gregory
Subject: RE: Public Markets Wastewater Sewer Servicing

Hi Bruce,

We are working on a Wastewater Servicing Standards and this is what we will be proposing:

Dwelling Type	Zoning District[a]	Population Equivalent [ppha] (dwellings/ha)
Single Family	R1, R2, etc.	40 (13.11)
Assisted Living	RMF, RMU, etc.	135 (75)
Residential Multi-Family – Large	RMF-L	310 (134.78)
Residential Multi-Family – Medium	RMF-M	245 (106.52)
Residential Multi-Family – Small	RMF-S	175 (76.09)
Residential Mixed Use	RMU	300 (130.43)

Also, I realize taking each incremental area and adding it to the next one is easiest but this tends to increase the overall design flows. When Harmon Peaking Factor are used on these incremental areas, when added to a downstream area, the PF would decrease the design flows.

Regardless, the flows I calculated is only slightly lower and the sewer mains can handle the proposed flows.

Ho Lau, C.E.T.
Project Coordinator - Wastewater Planning and Project Delivery
Engineering Services
Water and Waste Department
City of Winnipeg

T. 204.986.5418
M. 204.232.0292
E. hlau@winnipeg.ca

winnipeg.ca

From: Friesen, Bruce <Bruce.Friesen@wsp.com>
Sent: Friday, August 6, 2021 12:15 PM
To: Lau, Ho <HLau@winnipeg.ca>
Subject: RE: Public Markets Wastewater Sewer Servicing

** EXTERNAL EMAIL: USE CAUTION **

Good afternoon Ho,

What density would you expect to see for RMF-M and RMF-L zoning?

Bruce Friesen, P.Eng.
Project Engineer, Land Development
Transportation and Infrastructure Manitoba

T+ 1 204-259-1659

From: Lau, Ho <HLau@winnipeg.ca>
Sent: Friday, August 6, 2021 11:39 AM
To: Friesen, Bruce <Bruce.Friesen@wsp.com>
Cc: Kulczycki, Gregory <GKulczycki@winnipeg.ca>
Subject: RE: Public Markets Wastewater Sewer Servicing

Good morning Bruce,

I am in the process of reviewing the servicing report (SR). One thing I wanted to bring to your attention right away are the multifamily densities used – 74.13 Dwellings/ha is the minimum we currently use (similar to an RMF-S zoned lot).

To avoid issues down the road, the densities should be reflective of the intended zoning for those properties. Issues arise when multifamily intensification is higher than the designed allotments in the SR (i.e. the properties are zoned RMF-M or RMF-L and designed to an RMF-S equivalent).

I will continue to review the SR but please review the residential densities and confirm if you wish to revise or this could pose future issues.

Thanks.

Ho Lau, C.E.T.
Project Coordinator - Wastewater Planning and Project Delivery
Engineering Services
Water and Waste Department
City of Winnipeg

T. 204.986.5418
M. 204.232.0292
E. hlau@winnipeg.ca

winnipeg.ca

From: Kulczycki, Gregory
Sent: Thursday, August 5, 2021 1:02 PM
To: Lau, Ho <HLau@winnipeg.ca>
Subject: FW: Public Markets Wastewater Sewer Servicing

Hey Ho,

Can you take a look at this and let me know what you find.

Gregory Kulczycki, P.Eng
Wastewater Collections Planning Engineer
City of Winnipeg
M: 204-805-2470
E: GKulczycki@winnipeg.ca
WATER AND WASTE DEPARTMENT
ENGINEERING SERVICES DIVISION
winnipeg.ca

From: Friesen, Bruce <Bruce.Friesen@wsp.com>
Sent: Tuesday, August 3, 2021 11:35 AM
To: Kulczycki, Gregory <GKulczycki@winnipeg.ca>
Subject: Public Markets Wastewater Sewer Servicing

** EXTERNAL EMAIL: USE CAUTION **

Good morning Gregory,

Further to a preliminary analysis completed by Stantec in 2019, I am working on the servicing report for development southeast of the intersection of Marion Street and Archibald Street. I have attached the proposed layout, wastewater generation, and pipe design for the development that will be included in the report. The system has discharge points into the existing combined sewer manhole at the intersection of Marion Street and Dupuy Avenue and into the combined sewer between Speers Road and the CN RoW.

Can you have a look at it to confirm that you agree with the wastewater generation, pipe design, discharge locations, and that the combined sewer will have capacity?

Regards,

Bruce Friesen, P.Eng.
Project Engineer, Land Development
Transportation and Infrastructure Manitoba

T+ 1 204-259-1659

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8 Canada

wsp.com

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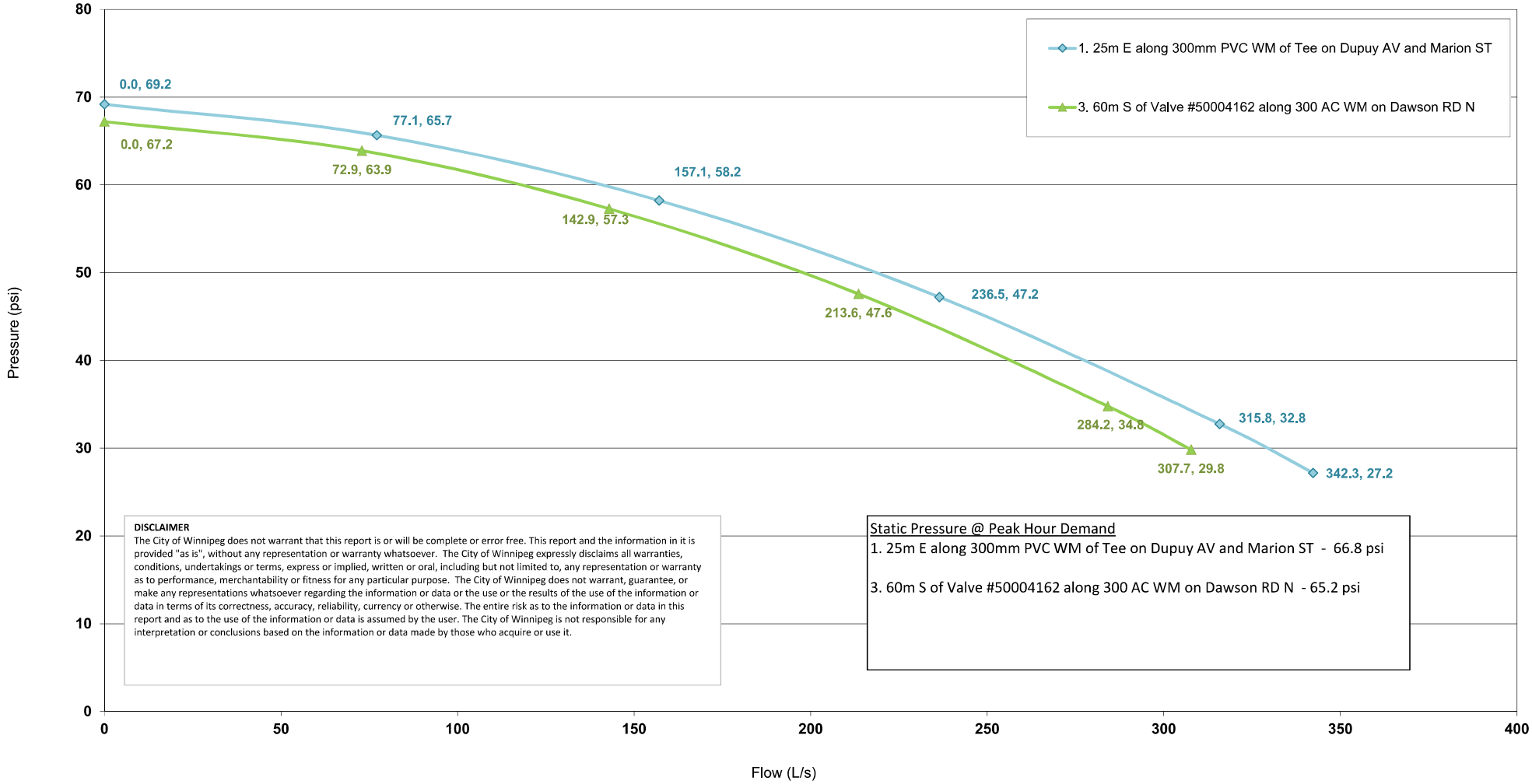
APPENDIX

A-3 SIMULATED SIMULTANEOUS FIRE FLOW TESTS

Simulated Available Simultaneous Flows and Pressures for MDD

August 13, 2021



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Static Pressure @ Peak Hour Demand

1. 25m E along 300mm PVC WM of Tee on Dupuy AV and Marion ST - 66.8 psi

3. 60m S of Valve #50004162 along 300 AC WM on Dawson RD N - 65.2 psi

A-4 DESIGN TABLE

Residential

Junction	Single Family				Multi-Family				Summary			
	(1)	(2)	(3)	(1)x(2)x(3) (4)	(5)	(6)	(7)	(5)x(6)x(7) (8)	(4)+(8) (9)	(10)	1.6x(10) (11)	2.5x(10) (12)
Downstream	Area	Dwellings / ha	Population / Dwelling	Population	Area	Dwellings / ha	Population / Dwelling	Population	Population	Average Day Water Demand	Max Day Water Demand	Peak Hour Water Demand
J-01												
J-02												
J-03												
J-04					2.27 ha	106.52	2.3	557	557	1.60 L/s	2.56 L/s	4.00 L/s
J-05												
J-06												
J-07												
J-08												
J-09												
J-10												
J-11												
J-12												
J-13												
J-14												
J-15												
J-16												
J-17												
J-18												
J-19												
J-20												
J-21												
J-22												
J-23												
J-24					1.54 ha	106.52	2.3	377	377	1.08 L/s	1.73 L/s	2.70 L/s
J-25					2.06 ha	106.52	2.3	505	505	1.45 L/s	2.32 L/s	3.63 L/s
J-26					2.02 ha	134.78	2.3	627	627	1.80 L/s	2.88 L/s	4.50 L/s
J-27					2.01 ha	134.78	2.3	623	623	1.78 L/s	2.85 L/s	4.45 L/s

Junction	Non-Residential														
	Commercial					Light Industrial					Wet Industrial				
	(13)	(14)	(13)x(14) (15)	1.6x(15) (16)	2.5x(15) (17)	(18)	(19)	(18)x(19) (20)	1.6x(20) (21)	2.5x(20) (22)	(23)	(24)	(23)x(24) (25)	1.6x(25) (26)	2.5x(25) (27)
Downstream	Area	Typical Rate	Average Day Water Demand	Maximum Day Water Demand	Peak Hour Water Demand	Area	Typical Rate	Average Day Water Demand	Maximum Day Water Demand	Peak Hour Water Demand	Area	Typical Rate	Average Day Water Demand	Maximum Day Water Demand	Peak Hour Water Demand
J-01	5.24 ha	16,800 L/ha/day	1.02 L/s	1.63 L/s	2.55 L/s										
J-02	0.53 ha	16,800 L/ha/day	0.10 L/s	0.16 L/s	0.25 L/s										
J-03															
J-04	1.35 ha	16,800 L/ha/day	0.26 L/s	0.42 L/s	0.65 L/s										
J-05															
J-06															
J-07	1.66 ha	16,800 L/ha/day	0.32 L/s	0.51 L/s	0.80 L/s										
J-08						0.59 ha	22,500 L/ha/day	0.15 L/s	0.24 L/s	0.38 L/s	3.35 ha	33,600 L/ha/day	1.30 L/s	2.08 L/s	3.25 L/s
J-09						0.20 ha	22,500 L/ha/day	0.05 L/s	0.08 L/s	0.13 L/s	1.14 ha	33,600 L/ha/day	0.45 L/s	0.72 L/s	1.13 L/s
J-10						0.56 ha	22,500 L/ha/day	0.15 L/s	0.24 L/s	0.38 L/s	3.16 ha	33,600 L/ha/day	1.23 L/s	1.97 L/s	3.08 L/s
J-11															
J-12															
J-13															
J-14						1.08 ha	22,500 L/ha/day	0.28 L/s	0.45 L/s	0.70 L/s	6.13 ha	33,600 L/ha/day	2.38 L/s	3.81 L/s	5.95 L/s
J-15															
J-16						0.24 ha	22,500 L/ha/day	0.06 L/s	0.10 L/s	0.15 L/s	1.38 ha	33,600 L/ha/day	0.54 L/s	0.86 L/s	1.35 L/s
J-17															
J-18						0.97 ha	22,500 L/ha/day	0.25 L/s	0.40 L/s	0.63 L/s	5.47 ha	33,600 L/ha/day	2.13 L/s	3.41 L/s	5.33 L/s
J-19						0.61 ha	22,500 L/ha/day	0.16 L/s	0.26 L/s	0.40 L/s	3.43 ha	33,600 L/ha/day	1.33 L/s	2.13 L/s	3.33 L/s
J-20															
J-21															
J-22															
J-23															
J-24						1.20 ha	22,500 L/ha/day	0.31 L/s	0.50 L/s	0.78 L/s	6.82 ha	33,600 L/ha/day	2.65 L/s	4.24 L/s	6.63 L/s
J-25															
J-26															
J-27															

Water Demand Summary

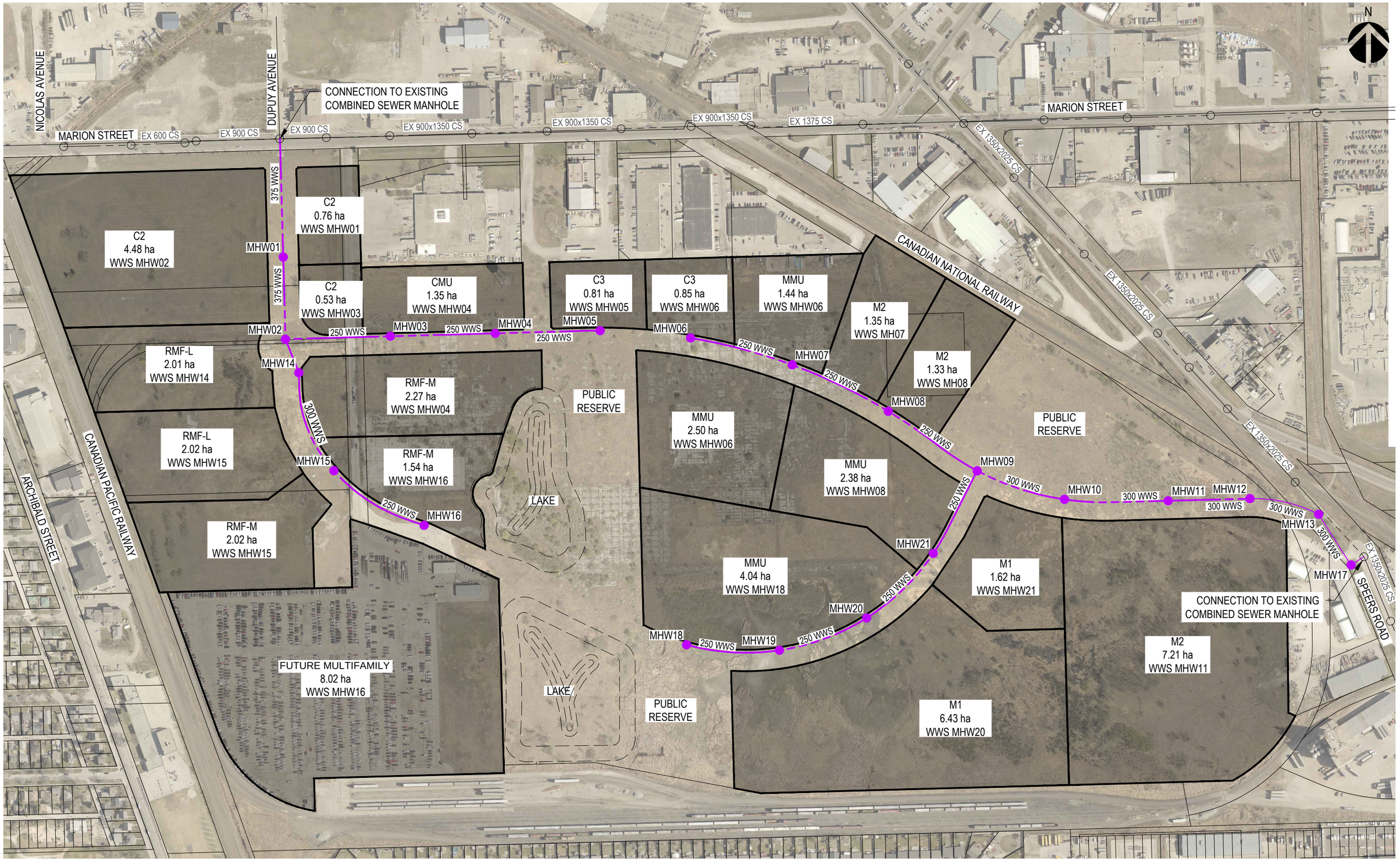
Junction	(10)+(15)+(20)+(25) (28)	(11)+(16)+(21)+(26) (29)	(12)+(17)+(22)+(27) (30)
Downstream	Total Average Day Water Demand	Total Max Day Water Demand	Total Peak Hour Water Demand
J-01	1.02 L/s	1.63 L/s	2.55 L/s
J-02	0.10 L/s	0.16 L/s	0.25 L/s
J-03			
J-04	1.86 L/s	2.98 L/s	4.65 L/s
J-05			
J-06			
J-07	0.32 L/s	0.51 L/s	0.80 L/s
J-08	1.45 L/s	2.32 L/s	3.63 L/s
J-09	0.50 L/s	0.80 L/s	1.26 L/s
J-10	1.38 L/s	2.21 L/s	3.46 L/s
J-11			
J-12			
J-13			
J-14	2.66 L/s	4.26 L/s	6.65 L/s
J-15			
J-16	0.60 L/s	0.96 L/s	1.50 L/s
J-17			
J-18	2.38 L/s	3.81 L/s	5.96 L/s
J-19	1.49 L/s	2.39 L/s	3.73 L/s
J-20			
J-21			
J-22			
J-23			
J-24	4.04 L/s	6.47 L/s	10.11 L/s
J-25	1.45 L/s	2.32 L/s	3.63 L/s
J-26	1.80 L/s	2.88 L/s	4.50 L/s
J-27	1.78 L/s	2.85 L/s	4.45 L/s
	22.83 L/s	**36.55 L/s**	**57.13 L/s**

APPENDIX

B WASTEWATER SEWER DESIGN

APPENDIX

B-1 WASTEWATER SEWER LAYOUT



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PROJECT NO: 211-07590-00

SCALE: 1:4000

DATE: 2021/12/20

DESIGNED BY: B.F.

DRAWN BY: B.F.

PROJECT:
PUBLIC MARKETS SERVICING REPORT

TITLE:
WASTEWATER SEWER LAYOUT

DRAWING: B-1

MARION STREET
EX. CS
CS
CNR
DAWSON ROAD
SPRAGUE
LOT 1
BLK 1
4.463 Ha
LOT 1
BLK 2
0.763 Ha
0.354 Ha
375 PVC WWS
0.424 Ha
250 PVC WWS
LOT 2
0.531 Ha
LOT 3
0.677 Ha
LOT 4
0.677 Ha
LOT 1
60 MF
0.809 Ha
LOT 2
65 MF
0.849 Ha
LOT 3
1.442 Ha
0.418 LIGHT
2.369 WET
1.345 Ha
LOT 4
BLK 3
0.201 LIGHT
1.139 WET
LOT 5
1.340 Ha
PUBLIC
RESERVE
FUTURE
SRB
BY
OTHERS
LOT 2
2.023 Ha
0.433 Ha
0.155 Ha
0.302 Ha
0.283 Ha
0.291 Ha
0.345 Ha
0.359 Ha
0.358 Ha
1
2
3
4
5
6
7
8
9
10
11
14
15
16
17
18
19
CS
2.27 Ha
LOT 1
BLK 4
1.54 Ha
1.666 Ha
0.441 Ha
LOT 3
2.025 Ha
0.254 Ha
0.216 Ha
SRB-1
PUBLIC
RESERVE
190 MF
2.535 Ha
LOT 2
180 MF
2.348 Ha
LOT 3
LOT 4
2.024 Ha
0.364 Ha
LOT 4
305 MF
4.048 Ha
0.273 Ha
0.242 LIGHT
1.376 WET
1.619 Ha
LOT 2
1.079 LIGHT
6.117 WET
7.196 Ha
LOT 3
0.239 Ha
0.346 Ha
0.962 LIGHT
5.451 WET
6.413 Ha
LOT 1
BLK 5
8.022 Ha
SRB-2
PUBLIC
RESERVE
ARCHIBALD STREET
CPR EMERSON
SPEERS ROAD
CNR PADDINGTON YARD

APPENDIX

B-2 DESIGN TABLE

Flow to Marion St

Wastewater Sewer Design - Flow Calculation Table

13-Mar-25

	Single Family	3.05	/unit	Per Capita Flow	270	lpcd average
Common Factors		10.85	units/acre	Schools	70	l/day/student average
		26	units/ha			
	Multi-family	2.3	/unit			
			units/acre	Manhole infl	12.0	l/mh/min
		176	units/ha			
		Average	Peak Day			
	Commercial flow	16,800	28,100	l/ha/day	Groundwate	2200	l/ha/day
	Light Industrial/Business Park flow	22,500	37,600	l/ha/day	Manholes	1.6	/ha SF residential
	Wet Industrial flow	33,600	44,900	l/ha/day		1.0	/ha commercial / industrial /MF

			1	2,3	4	5	6,7	8	9	9	
			16-15	15-14	14-02	5-4	4-3	3-2	2-1	1-exist	
	Gross Area (Ha) Residential		**8.020**	**4.440**	**2.023**	**0.809**	**3.810**	**0.000**	**0.000**	**0.000**	
	Net Area Residential (Ha) net of SRB's and large PR's		**8.020**	**4.440**	**2.023**	**0.809**	**3.810**	**0.000**	**0.000**	**0.000**	
	Single family (ha)		**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	
	Multi family (ha)		**8.020**	**4.080**	**2.010**	**0.809**	**3.810**	**0.000**	**0.000**	**0.000**	
											Totals
	Total Single Family Lots		0	0	0	0	0	0	0	0	0
	Area Total Single Family Population		0	0	0	0	0	0	0	0	
	Accumulated Total Single Family Population		0	0	0	0	0	0	0	0	
	Average flow (l/d) based on 270 lpcd		0	0	0	0	0	0	0	0	
	Total Multi Family Units		566 Units	591 Units	729 Units	60 Units	530 Units	230 Units	Units	Units	2706 Units
	Area Total Multi Family Population		1302	1360	1677	138	1219	529	0	0	
	Accumulated Total Multi Family Population		1302	2662	4339	138	1357	1886	6225	6225	
	Average flow (l/d) based on 270 lpcd		351,540	718,740	1,171,530	37,260	366,390	509,220	1,680,750	1,680,750	
	Total Average Flow Residential		351,540	718,740	1,171,530	37,260	366,390	509,220	1,680,750	1,680,750	
	Harmon Peaking Factor		3.72	3.49	3.30	4.20	3.71	3.61	3.16	3.16	
1.	**Peak Day flow Residential (l/sec)**		**15.149**	**28.999**	**44.766**	**1.812**	**15.735**	**21.250**	**61.384**	**61.384**	
	Commerical / Industrial Peak Day										
	Commerical - area (Ha)		0.000	0.000	0.000	0.000	1.350	0.531	4.463	0.763	
	Commerical Flow l/sec		0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.44 l/s	0.17 l/s	1.45 l/s	0.25 l/s	
	Business park - area (Ha)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Business park mix Flow		0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	
	Light industrial - area (Ha) incl schools		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Light industrial Flow incl schools l/sec		0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	
	Wet industrial - area (Ha)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Wet industrial Flow l/sec		0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	
	Total Net Area Commercial / Industrial (Ha)		**0.00**	**0.00**	**0.00**	**0.00**	**1.35**	**0.53**	**4.46**	**0.76**	
2.	**Total Peak Dry Weather Flows Commercial / Industrial**		**0.00**	**0.00**	**0.00**	**0.00**	**0.44**	**0.17**	**1.45**	**0.25**	
3.	**Total Accumulated Peak Dry Weather Flows Com and Ind**		**0.00**	**0.00**	**0.00**	**0.00**	**0.44**	**0.61**	**2.06**	**2.31**	
4.	**Total Peak Day Dry Weather Flows Sub-total 1+3**		**15.15**	**29.00**	**44.77**	**1.81**	**16.17**	**21.86**	**63.45**	**63.70**	
	Additional area for infiltration in commercial/industrial (ROW's)	Ha	0.216	0.254	0.441	0.155	0.433	0.424	0.334	0.352	
	No. of manholes	Res	8.0	4.0	2.0	1.0	4.0	0.0	0.0	0.0	
		Commerical	0.0	0.0	0.0	0.0	1.0	1.0	4.0	1.0	
		ROW	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
			9.00	5.00	3.00	2.00	6.00	2.00	5.00	2.00	
	Manhole infiltration (l/sec)		1.80	1.00	0.60	0.40	1.20	0.40	1.00	0.40	
	Groundwater infiltration (l/sec)		0.210	0.120	0.063	0.025	0.142	0.024	0.122	0.028	
	Total infiltration (l/sec)		2.010	1.120	0.663	0.425	1.342	0.424	1.122	0.428	
5.	**Accumulated Total infiltration (l/sec)**		**2.010**	**3.129**	**3.792**	**0.425**	**1.767**	**2.191**	**7.105**	**7.534**	
	Total peak day wet weather flow (l/sec)		**17.158**	**32.128**	**48.558**	**2.237**	**17.941**	**24.053**	**70.553**	**71.230**	
		Pipe Dia	**250**	**300**	**300**	**250**	**250**	**250**	**375**	**375**	
	Full Flow cap @ Min Slope	**Max capacity**	**29.000**	**42.000**	**42.000**	**29.000**	**29.000**	**29.000**	**66.000**	**66.000**	
	@ Asbuilt Slope	**Asbuilt**			**59.000**				**73.000**	**73.000**	
		Orig Design	**12.340**	**27.260**	**35.807**	**0.751**	**9.524**	**10.088**	**49.106**	**49.822**	

East to Speers Rd

Wastewater Sewer Design - Flow Calculation Table

25-Jan-25

	Single Family	3.05	/unit		Per Capita Flow	270	lpcd average
Common Factors		10.85	units/acre		Schools	70	l/day/student average
		26	units/ha				
	Multi-family	2.3	/unit				
			units/acre		Manhole infl	12.0	l/mh/min
		176	units/ha				
		Average	Peak Day				
	Commercial flow	16,800	28,100	l/ha/day	Groundwater	2200	l/ha/day
	Light Industrial/Business Park flow	22,500	37,600	l/ha/day	Manholes	1.6	/ha SF residential
	Wet Industrial flow	33,600	44,900	l/ha/day		1.0	/ha commercial / industrial /MF

			17-18	18-19	19-09		6-7	7-8	8-9	9-10	10-11	11-CS
Gross Area (Ha) Residential			**4.048**	**0.000**	**0.000**		**3.384**	**0.000**	**2.348**	**0.000**	**0.000**	**0.000**
Net Area Residential (Ha) net of SRB's and large PR's			**4.048**	**0.000**	**0.000**		**3.384**	**0.000**	**2.348**	**0.000**	**0.000**	**0.000**
Single family (ha)			**0.000**	**0.000**	**0.000**		**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Multi family (ha)			**4.048**	**0.000**	**0.000**		**3.384**	**0.000**	**2.348**	**0.000**	**0.000**	**0.000**
Total Single Family Lots			0	0	0		0	0	0	0	0	0
Area Total Single Family Population			0	0	0		0	0	0	0	0	0
Accumulated Total Single Family Population			0	0	0		0	0	0	0	0	0
Average flow (l/d) based on 270 lpcd			0	0	0		0	0	0	0	0	0
Total Multi Family Units			305 Units				255 Units		180 Units	Units		
Area Total Multi Family Population			702	0	0		587	0	414	0	0	0
Accumulated Total Multi Family Population			702	702	702		587	587	1001	1703	1703	1703
Average flow (l/d) based on 270 lpcd			189,540	189,540	189,540		158,490	158,490	270,270	459,810	459,810	459,810
Total Average Flow Residential			189,540	189,540	189,540		158,490	158,490	270,270	459,810	459,810	459,810
Harmon Peaking Factor			3.89	3.89	3.89		3.94	3.94	3.80	3.64	3.64	3.64
1. Peak Day flow Residential (l/sec)			**8.542**	**8.542**	**8.542**		**7.223**	**7.223**	**11.886**	**19.366**	**19.366**	**19.366**
Commerical / Industrial Peak Day												
Commerical - area (Ha)		.000 Ha	0.000	0.000	0.000	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Commerical Flow l/sec			0.00 l/s	0.00 l/s	0.00 l/s		0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s
Business park - area (Ha)		.000 Ha	0.000	0.000	0.000	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Business park mix Flow			0.00 l/s	0.00 l/s	0.00 l/s		0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s	0.00 l/s
Light industrial - area (Ha) incl schools		1.204 Ha	0.000	0.962	0.242	1.70	0.000	0.418	0.201	0.000	1.079	0.000
Light industrial Flow incl schools l/sec			0.00 l/s	0.42 l/s	0.11 l/s		0.00 l/s	0.18 l/s	0.09 l/s	0.00 l/s	0.47 l/s	0.00 l/s
Wet industrial - area (Ha)		6.827 Ha	0.000	5.451	1.376	9.63	0.000	2.369	1.139	0.000	6.117	0.000
Wet industrial Flow l/sec			0.00 l/s	2.83 l/s	0.72 l/s		0.00 l/s	1.23 l/s	0.59 l/s	0.00 l/s	3.18 l/s	0.00 l/s
Total Net Area Commercial / Industrial (Ha)		8.03	**0.000**	**6.413**	**1.618**	11.32	**0.000**	**2.787**	**1.340**	**0.000**	**7.196**	**0.000**
2. Total Peak Dry Weather Flows Commercial / Industrial			**0.00**	**3.25**	**0.82**		**0.00**	**1.41**	**0.68**	**0.00**	**3.65**	**0.00**
3. Total Accumulated Peak Dry Weather Flows Com and Ind			**0.00**	**3.25**	**4.07**		**0.00**	**1.41**	**2.09**	**6.16**	**9.81**	**9.81**
4. Total Peak Day Dry Weather Flows Sub-total 1+3			**8.54**	**11.79**	**12.61**		**7.22**	**8.64**	**13.98**	**25.53**	**29.18**	**29.18**
Additional area for infiltration in commercial/industrial (ROW's)	Ha		0.239	0.346	0.273		0.302	0.283	0.291	0.345	0.359	0.388
No. of manholes	Res		4.0	0.0	0.0		4.0	0.0	3.0	0.0	0.0	0.0
	Commerical		0.0	6.0	2.0		0.0	2.0	1.0	0.0	7.0	2.0
	ROW		1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Total Manholes			5.00	7.00	3.00		5.00	3.00	5.00	1.00	8.00	3.00
Manhole infiltration (l/sec)			1.00	1.40	0.60		1.00	0.60	1.00	0.20	1.60	0.60
Groundwater infiltration (l/sec)			0.109	0.172	0.048		0.094	0.078	0.101	0.009	0.192	0.010
Total infiltration (l/sec)			1.109	1.572	0.648		1.094	0.678	1.101	0.209	1.792	0.610
5. Accumulated Total infiltration (l/sec)			**1.109**	**2.681**	**3.329**		**1.094**	**1.772**	**2.873**	**6.412**	**8.204**	**8.814**
Total peak day wet weather flow (l/sec)			**9.651**	**14.475**	**15.943**		**8.316**	**10.408**	**16.852**	**31.942**	**37.383**	**37.993**
		Pipe Dia	**250**	**250**	**250**		**250**	**250**	**250**	**300**	**300**	**300**
Full Flow cap	**@ Min Slope**	**Max capacity**	**29.000**	**29.000**	**29.000**		**29.000**	**29.000**	**29.000**	**42.000**	**42.000**	**42.000**

APPENDIX

C LAND DRAINAGE SEWER DESIGN

APPENDIX

C-1 LAND DRAINAGE SEWER LAYOUT

N

INSTALL MH AND RECONNECT EXISTING PIPING

CONNECT TO EXISTING LAND DRAINAGE SEWER

WEIR MH

ST CATHERINE STREET

MARION STREET

NICOLAS AVENUE

DUPUY AVENUE

CANADIAN NATIONAL RAILWAY

CANADIAN PACIFIC RAILWAY

ARCHIBALD STREET

SPEERS ROAD

MAGINOT STREET

LAKE

PUBLIC RESERVE 4.09 ha

PUBLIC RESERVE 3.78 ha

PUBLIC RESERVE

EX_GATE_CHAMBER

LAND DRAINAGE SEWER OUTFALL

EX_MHL02

EX_MHL03

EX_MHL04

EX_MHL05

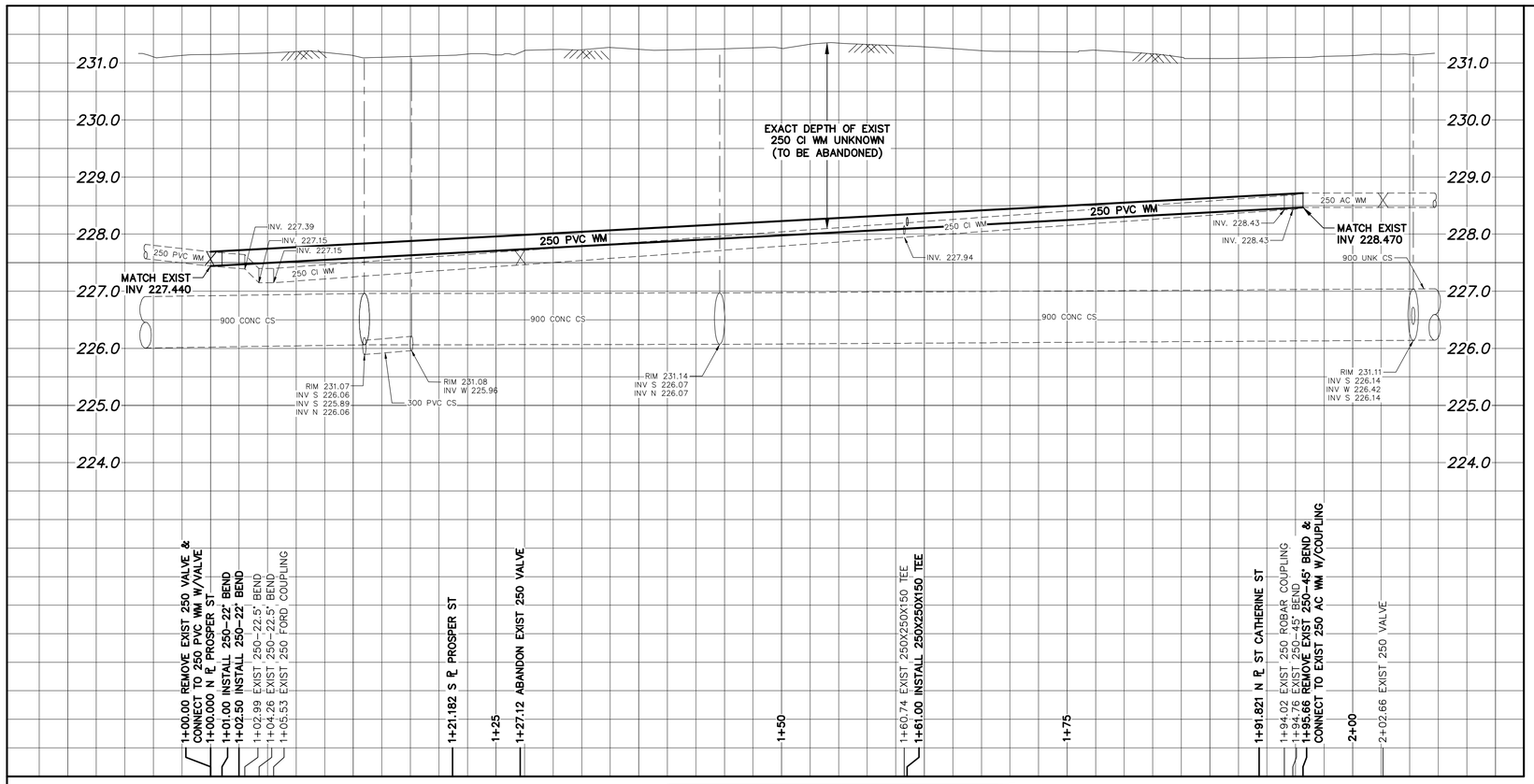
MHL01 MHL02 MHL03 MHL04 MHL05 MHL06 MHL07 MHL08 MHL09 MHL10 MHL11 MHL12 MHL13 MHL14 MHL15 MHL16 MHL17 MHL18 MHL19 MHL20 MHL21 MHL22 MHL24 MHL25 MHL26 MHL27 MHL28 MHL29 MHL30 MHL31

S09 2.95 ha
S10 0.38 ha
S11 0.76 ha
S12 2.13 ha
S13 0.34 ha
S14 0.53 ha
S15 0.34 ha
S16 0.68 ha
S17 0.34 ha
S18 0.68 ha
S19 0.60 ha
S20 0.81 ha
S21 0.85 ha
S22 0.35 ha
S23 1.44 ha
S24 1.35 ha
S25 0.29 ha
S26 1.33 ha
S27 0.28 ha
S28 0.26 ha
S29 2.98 ha
S30 0.29 ha
S31 4.23 ha
S32 0.28 ha
S33 1.61 ha
S34 4.87 ha
S35 0.35 ha
S36 0.32 ha
S37 2.37 ha
S38 1.38 ha
S39 2.50 ha
S40 1.27 ha
S41 0.32 ha
S42 1.57 ha
S43 1.38 ha
S44 0.38 ha
S45 0.38 ha
S46 0.38 ha
S47 0.38 ha
S48 0.38 ha
S49 1.08 ha
S50 1.19 ha
S51 0.27 ha
S52 8.10 ha
S53 0.42 ha
S54 1.00 ha
S55 0.36 ha
S56 0.35 ha
S57 2.70 ha
S58 0.35 ha
S59 2.78 ha
S60 0.38 ha
S61 0.36 ha
S62 0.51 ha
S63 0.64 ha

600 LDS 12.5m
375 LDS 119.4m
525 LDS 24.0m
525 LDS - 244.0m
900 LDS 22.2m
1050 LDS 74.4m
1200 LDS 140.8m
1350 LDS 96.6m
1350 LDS 86.9m
1350 LDS 145.9m
1350 LDS 129.6m
1350 LDS 117.3m
1050 LDS 112.4m
1050 LDS 116.2m
1050 LDS 122.5m
750 LDS 127.3m
750 LDS 101.6m
600 LDS 121.1m
600 LDS 47.2m
450 LDS 118.9m
1050 LDS 116.0m
1200 LDS 121.5m
1050 LDS 118.0m
750 LDS 146.1m
1050 LDS 108.6m
1050 LDS 116.4m
1050 LDS 116.4m
1050 LDS 109.4m
1050 LDS 109.4m
1050 LDS 109

APPENDIX

C-2 ARCHIBALD STREET AS-BUILTS



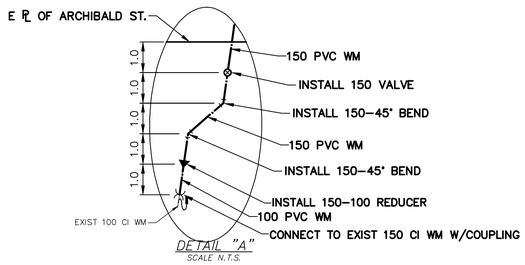
NOTE: CHAINAGES SHOWN ARE ALONG E. ℄ OF ARCHIBALD STREET

ARCHIBALD STREET

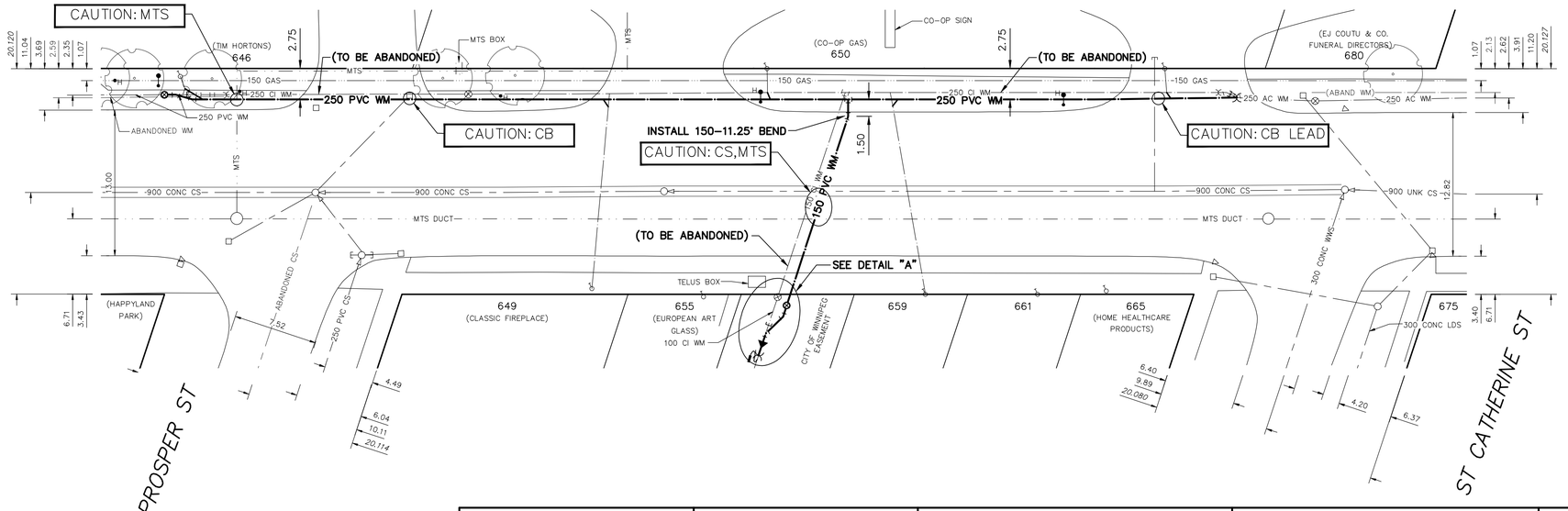
CLASS 2 OR 3 BACKFILL IS REQUIRED WHERE EXCAVATION IS WITHIN 1.0m OF EXISTING OR PROPOSED SIDEWALK AND/OR PAVEMENT

ALL PIPES, SERVICE CONNECTIONS & CATCH LEADS CROSSING STREET (LANE) TO BE INSTALLED USING TRENCHLESS METHOD

ANY RESTORATION OF PAVEMENT CUTS MUST ADHERE TO THE PAVEMENT RESTORATION GUIDELINES SET FORTH IN THE CITY OF WINNIPEG'S 2019 STREET CUTS MANUAL



DETAIL "A"
SCALE N.T.S.



WATER SERVICE INFORMATION

ADDRESS	SIZE (mm) MATERIAL (STREET)	SIZE (mm) MATERIAL (PROP.)	SHORT & LONG MEASUREMENT	CORP. LOCATION	REMARKS
646 ARCHIBALD ST COMMERCIAL	50 CU	50 CU	7.37 SNL BLDG 19.766 NSL PROSPER ST	0.2 S OF S/C	RECONNECT SERVICE –
649 ARCHIBALD ST COMMERCIAL	25 CU	– –	2.89 NSL BLDG 16.951 SSL PROSPER ST	1.6 S OF S/C	RECONNECT SERVICE –
650 ARCHIBALD ST COMMERCIAL	25 CU	– –	4.26 NNL BLDG 32.578 SSL PROSPER ST	OPP S/C	RECONNECT SERVICE –
650 ARCHIBALD ST COMMERCIAL	50 CU	50 CU	15.95 SSL BLDG 2.575 NNL ST CATHERINE ST	OPP S/C	RECONNECT SERVICE –
655 ARCHIBALD ST COMMERCIAL	– –	25 CU	2.74 NSL BLDG 26.904 SSL PROSPER ST	–	RECONNECT SERVICE –
659 ARCHIBALD ST RESIDENTIAL	20 CU	12 CU	1.42 NSL HSE 23.935 NNL ST CATHERINE ST	3.1 N OF S/C	RECONNECT SERVICE –
661 ARCHIBALD ST RESIDENTIAL	– –	20 CU	0.98 NSL HSE 13.929 NNL ST CATHERINE ST	–	RECONNECT SERVICE –
665 ARCHIBALD ST COMMERCIAL	– –	20 CU	2.31 NSL BLDG 7.802 NNL ST CATHERINE ST	–	RECONNECT SERVICE –
675 ARCHIBALD ST COMMERCIAL	38 CU	38 CU	4.30 EWL BLDG 20.708 WWL ARCHIBALD ST	OPP S/C	OUTSIDE LIMITS –
680 ARCHIBALD ST COMMERCIAL	– –	25 CU	1.28 NNL BLDG 28.289 SSL ST CATHERINE ST	0.6 N OF S/C	OUTSIDE LIMITS –

* SERVICES TO BE RENEWED TO ℄. ALL OTHERS TO BE RECONNECTED

FOR INDEX SEE D–15381

NOTE: ALL VALVES TO BE INSTALLED CLOCKWISE TO CLOSE

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

0.0 5.0 10.0 15.0 20.0 25.0

WARNING

IF POWER EQUIPMENT OR EXPLOSIVES ARE TO BE USED FOR EXCAVATION ON THIS PROJECT THE CONTRACTOR MUST:

1) NOTIFY THE GAS COMPANY OF THE PROPOSED LOCATION OF EXCAVATION.

2) TAKE PRECAUTION TO AVOID DAMAGE TO GAS COMPANY INSTALLATIONS.

SEE PROVINCIAL REGULATION 210/72 FOR DETAILS

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE _____ DATE _____

NOTE:

LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

B.M. ELEV.

NO.	REVISIONS	DATE	BY

DESIGNED BY	T.G.S.	CHECKED BY	SC
DRAWN BY	BL	APPROVED BY	KZ
SCALE: HORIZONTAL	1:250	RELEASED FOR CONSTRUCTION	K.ZUREK
VERTICAL	1:50		
DATE	2019 04 08	DATE	2019 04 05

PLOT DATE: 2019 04 08

ENGINEER'S SEAL

ORIGINAL SIGNED BY S.R.J. COURNOYER 19/04/04

CONSULTANT DRAWING NUMBER –

BID OPPORTUNITY: 200–2019
CONTRACT NUMBER: 2

THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT
ENGINEERING DIVISION

2019 WATER MAIN RENEWALS
CONTRACT 2

ARCHIBALD STREET
PROSPER STREET TO ST CATHERINES STREET

SHEET 3 OF 15

CITY DRAWING NUMBER

D–15382

FILE PATH: R:\DRAWINGS\WATER\RENEWAL\2019 RENEWALS\Contract 2\Construction dwgs\
FILE NAME: ARCHIBALD ST.dwg

C-3 DESIGN TABLE

Pipe Sizing

Job Name:	Public Markets
Job Number:	211-07590-00
Location	Winnipeg, MB
Client:	Olexa Developments
Date:	June 8, 2022
Designed By:	Bruce Friesen

Upstream time of Concentration (min.):	**10 min**
Total Subdivision Area:	**64.7 ha.**
Rainfall Intensity Coeff **A**	**1198.880**
Rainfall Intensity Coeff **C**	**0.828**
Rainfall Intensity Coeff **B**	**8.000**
Allowable Runoff Coefficient C	**0.800**

Rainfall Intensity Formula $R = A \times T_c^{-B}$

Where: T = Time in hours

A - Area in hectares

HGL Slope = $[\frac{nV}{R^{2/3}}]^2$

where $R = d/4$

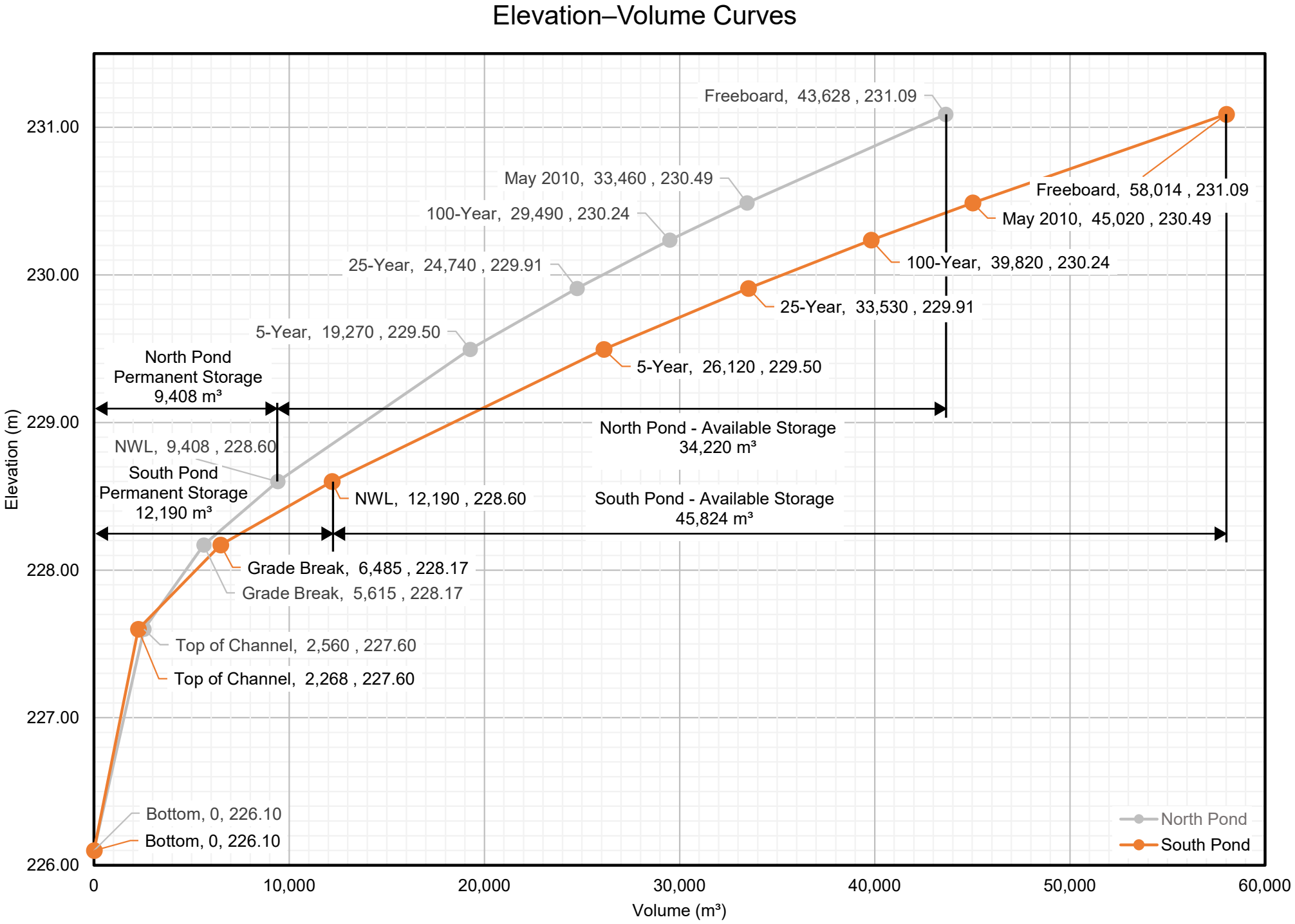
Manhole		Catchment	Area	Runoff Coefficient C	CxA	U/S Total C x A	Inlet time	Total Time	Intensity (I)	Runoff Flow (Q)	Pipe Selection							Full Flow Travel Time	Pipe Invert		Manhole Drop	Ground Elevation			HGL Elevation		
											Pipe Dia.	Length	Pipe Slope	Manning's "n"	Full Flow Cap.	Velocity	HGL Slope		U/S Invert	D/S Invert		U/S Ground	U/S BD	U/S Cover	U/S HGL	D/S HGL	U/S HGL Cover
From	To		(m^2)		(m^2)	(m^2)	(min)	(min)	(mm/hr)	(m^3/s)	(mm)	(m)	%		(m^3/s)	(m/s)	%	(min)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
MHL01	MHL02	S09+S10+S11	40977	0.800	32,782	32782	10.00	10.00	109.50	0.997	900	132.5	0.20%	0.013	0.810	1.57	0.30%	1.41	228.24	227.97	0.00	231.66	3.42	2.52	230.64	230.24	1.02
MHL02	MHL03	S12+S13+S14	29994	0.800	23,995	56777	10.00	11.41	102.88	1.622	900	25.2	0.10%	0.013	0.572	2.55	0.80%	0.16	227.95	227.93	0.02	231.47	3.52	2.62	230.24	230.03	1.23
MHL03	MHL04			0.800	0	56777	10.00	11.57	102.16	1.611	1050	74.4	0.10%	0.013	0.864	1.86	0.35%	0.67	227.93	227.86	0.00	231.98	4.05	3.00	230.03	229.77	1.95
MHL04	MHL05	S15+S16+S53	14370	0.800	11,496	68273	10.00	12.24	99.37	1.884	1200	140.8	0.10%	0.013	1.233	1.67	0.23%	1.41	226.51	226.37	1.34	231.28	4.77	3.57	229.77	229.45	1.51
MHL05	MHL06	S17+S18+S49	20976	0.800	16,781	85054	10.00	13.65	93.99	2.221	1350	96.6	0.15%	0.013	2.067	1.55	0.17%	1.04	226.37	226.23	0.00	231.42	5.05	3.70	229.45	229.28	1.97
MHL27	MHL28	S63	6375	0.600	3,825	3825	10.00	10.00	109.50	0.116	450	118.5	0.26%	0.013	0.145	0.73	0.17%	2.70	229.89	229.59	0.00	232.00	2.11	1.66	231.71	231.51	0.29
MHL28	MHL29	S62	5101	0.600	3,061	6886	10.00	12.70	97.54	0.187	600	147.2	0.17%	0.013	0.256	0.66	0.09%	3.72	229.59	229.34	0.00	232.00	2.41	1.81	231.51	231.37	0.49
MHL29	MHL30	S61	5476	0.600	3,286	10171	10.00	16.42	85.07	0.240	600	143.8	0.17%	0.013	0.256	0.85	0.15%	2.82	229.34	229.09	0.00	232.00	2.66	2.06	231.37	231.15	0.63
MHL30	MHL31	S60	8883	0.600	5,330	15501	10.00	19.24	77.71	0.335	750	107.6	0.13%	0.013	0.400	0.76	0.09%	2.37	229.09	228.95	0.00	232.50	3.41	2.66	231.15	231.05	1.35
MHL31	MHL13					15501	10.00	21.61	72.52	0.312	750	137.3	0.13%	0.013	0.400	0.71	0.08%	3.24	228.95	228.77	0.00	232.50	3.55	2.80	231.05	230.95	1.45
MHL13	MHL12	S29+S28	32439	0.800	25,951	41452	10.00	24.84	66.55	0.766	1050	122.5	0.10%	0.013	0.864	0.89	0.08%	2.31	228.77	228.65	0.00	232.77	4.00	2.95	230.95	230.85	1.82
MHL12	MHL11	S31+S30	45168	0.800	36,134	77587	10.00	27.15	62.92	1.356	1050	116.2	0.10%	0.013	0.864	1.57	0.25%	1.24	228.65	228.53	0.00	233.00	4.35	3.30	230.85	230.56	2.15
MHL11	MHL10	S32	2760	0.800	2,208	79795	10.00	28.39	61.14	1.355	1050	112.8	0.10%	0.013	0.864	1.57	0.25%	1.20	228.53	228.42	0.00	232.87	4.34	3.29	230.56	230.29	2.31
MHL10	MHL09	S26+S27+S37	39623	0.800	31,698	111493	10.00	29.59	59.52	1.843	1200	117.3	1.56%**	0.013	4.868	1.63	0.22%	1.20	228.42	226.59	0.00	232.54	4.12	2.92	230.29	230.02	2.25
MHL09	MHL08	S24+S25	16404	0.800	13,123	124616	10.00	30.79	57.99	2.007	1350	129.6	0.10%	0.013	1.688	1.40	0.14%	1.54	226.59	226.46	0.00	232.11	5.52	4.17	230.02	229.84	2.09
MHL08	MHL07	S21+S22+S23+S39	51358	0.800	41,086	165703	10.00	32.33	56.15	2.585	1350	145.9	0.10%	0.013	1.685	1.81	0.23%	1.35	226.46	226.32	0.00	231.69	5.23	3.88	229.84	229.50	1.85
MHL07	MHL06	S19+S20	14098	0.800	11,278	176981	10.00	33.67	54.64	2.686	1350	86.9	0.10%	0.013	1.688	1.88	0.25%	0.77	226.32	226.23	0.00	231.78	5.46	4.11	229.50	229.28	2.28
MHL06	POND			0.800	0	176981	10.00	34.44	53.82	4.866	1650	63.4	0.20%	0.013	4.126	2.28	0.29%	0.46	226.23	226.10	0.00	232.25	6.02	4.37	229.28	229.10*	2.97
MHL14	MHL15	S54+S58+S59	41318	0.800	33,054	33054	10.00	10.00	109.50	1.005	1050	92.6	0.10%	0.013	0.864	1.16	0.14%	1.33	228.20	228.10	0.00	231.46	3.26	2.21	230.57	230.44	0.89
MHL15	MHL16	S55+S56+S57	34073	0.800	27,258	60313	10.00	11.33	103.23	1.729	1050	106.6	0.33%	0.013	1.569	2.00	0.40%	0.89	228.10	227.75	0.00	231.90	3.80	2.75	230.44	230.01	1.46
MHL16	MHL17	S50+S51+S52	95607	0.800	76,486	136798	10.00	12.22	99.45	3.779	1200	116.3	0.66%	0.013	3.167	3.34	0.94%	0.58	227.75	226.98	0.00	231.35	3.60	2.40	230.01	228.92	1.34
MHL17	POND	S48	3584	0.800	2,867	139666	10.00	12.80	97.15	3.769	1350	88.3	1.00%	0.013	5.337	2.63	0.50%	0.56	226.98	226.10	0.00	231.33	4.35	3.00	228.92*		2.41
MHL22	MHL21	S35+S33	19581	0.800	15,665	15665	10.00	10.00	109.50	0.476	750	146.3	1.02%	0.013	1.124	1.08	0.18%	2.26	229.53	228.04	0.00	232.22	2.69	1.94	230.83	230.56	1.39
MHL21	MHL20	S34+S36+S38	65700	0.800	52,560	68225	10.00	12.26	99.28	1.881	1050	118.0	0.10%	0.013	0.864	2.17	0.47%	0.91	227.74	227.62	0.30	231.93	4.19	3.14	230.56	230.00	1.37
MHL20	MHL19	S40+S41+S42	31647	0.800	25,318	93542	10.00	13.17	95.75	2.488	1200	121.5	0.10%	0.013	1.233	2.20	0.41%	0.92	227.62	227.50	0.00	231.95	4.33	3.13	230.00	229.51	1.95
MHL18	MHL19	S47	3771	0.800	3,017	3017	10.00	10.00	109.50	0.092	450	93.7	0.30%	0.013	0.156	0.58	0.10%	2.71	229.48	229.20	0.00	231.78	2.30	1.85	229.60	229.51	2.18
MHL19	POND	S43+S44	17624	0.800	14,099	110658	10.00	14.09	92.44	2.841	1200	76.9	1.82%	0.013	5.260	2.51	0.53%	0.51	227.50	226.10	1.70	231.96	4.46	3.26	229.51	229.10*	2.45

* HGL at taken from SWMM model at branch's maximum HGL

** Pipe grade subject to minor change based on future Speers Road Design

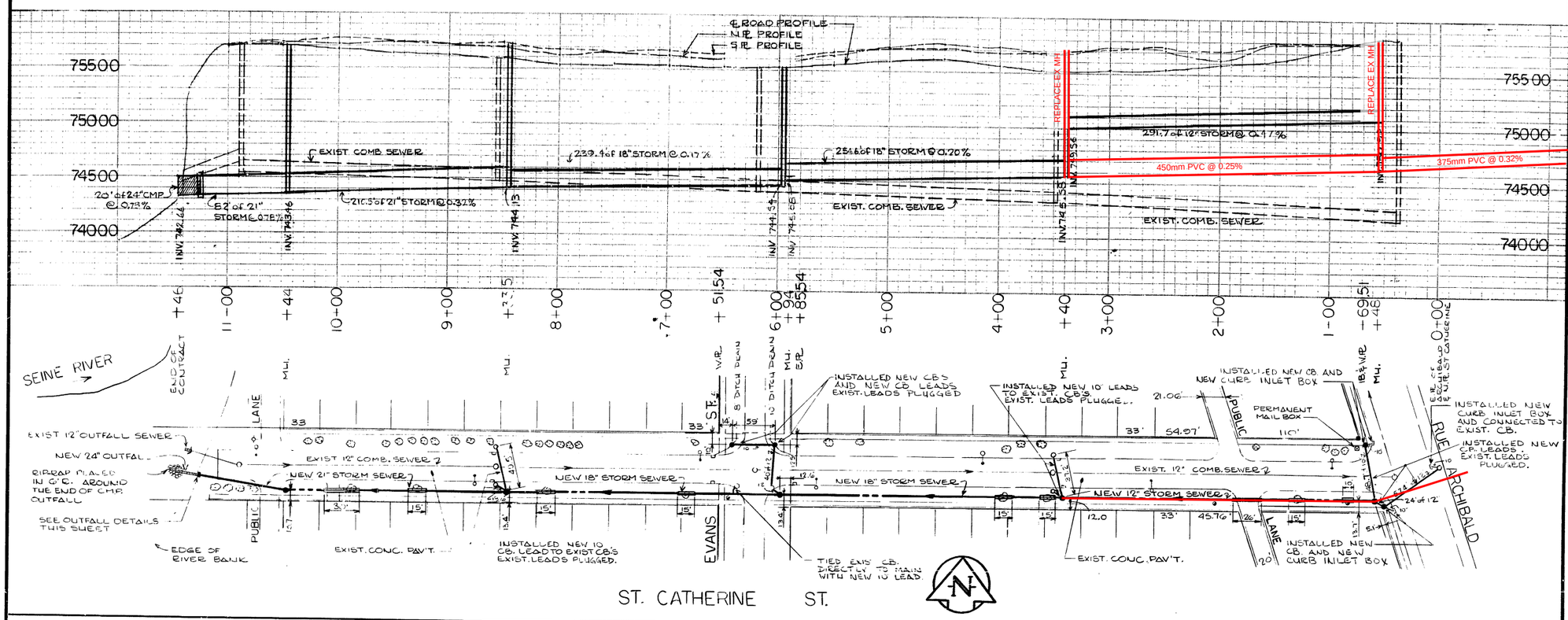
APPENDIX

C-4 STAGE-AREA AND STAGE-VOLUME CURVES


Elevation–Volume Curves
Freeboard, 43,628 , 231.09
May 2010, 33,460 , 230.49
100-Year, 29,490 , 230.24
25-Year, 24,740 , 229.91
5-Year, 19,270 , 229.50
Freeboard, 58,014 , 231.09
May 2010, 45,020 , 230.49
100-Year, 39,820 , 230.24
25-Year, 33,530 , 229.91
5-Year, 26,120 , 229.50
North Pond
Permanent Storage
9,408 m³
North Pond - Available Storage
34,220 m³
NWL, 9,408 , 228.60
South Pond
Permanent Storage
12,190 m³
NWL, 12,190 , 228.60
South Pond - Available Storage
45,824 m³
Grade Break, 6,485 , 228.17
Grade Break, 5,615 , 228.17
Top of Channel, 2,560 , 227.60
Top of Channel, 2,268 , 227.60
Bottom, 0, 226.10
Bottom, 0, 226.10
North Pond
South Pond
Elevation (m)
231.00
230.00
229.00
228.00
227.00
226.00
0
10,000
20,000
30,000
40,000
50,000
60,000
Volume (m³)

APPENDIX

C-5 PROPOSED CHANGES TO ST CATHERINE STREET LAND DRAINAGE SEWER



LEGEND

PROPOSED
- SANITARY SEWERS
- STORM SEWERS
- C.M.P. SEWERS
- FORCEMAINS
- DIRECTION OF FLOW
- MANHOLES
- CATCH BASINS
- CATCH BASIN LEADS
- FENCES

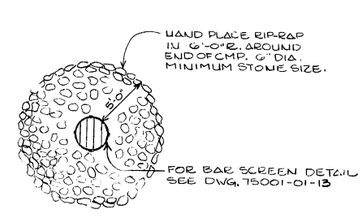
PROPOSED
- WATERMAINS
- VALVES
- HYDRANTS
- VALVE CHAMBER
- ROAD EDGES, CURBS
- CURB INLETS
- CURB INLET LEADS
- CULVERTS
- SIDEWALKS

EXISTING FEATURES
- TREES
- SIGNS
- VALVES
- GAS LINES
- TRAFFIC SIGNALS
- POWER POLES
- LAMP STANDARDS
- MTS UTILITY MANHOLES
- UNDERGROUND CABLES
- KIOSK - (TRANSFORMER)
- ALUMINUM PINS
- IRON BARS

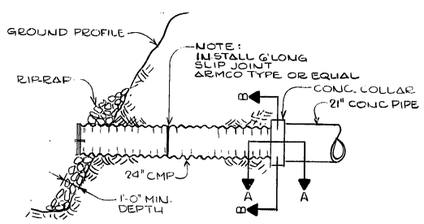
ALL ELEVATIONS ARE BASED ON GEODETIC DATUM (1929 ADJ.)
FIELD BOOK TOG — REG'D PLAN ATLAS A8 27, A8 28

B.M. — ELEV. & DESCRIPTION
O' OPEN HYD APPROX. 100'N OF DENISET ON EVANS - ELEV 750.74

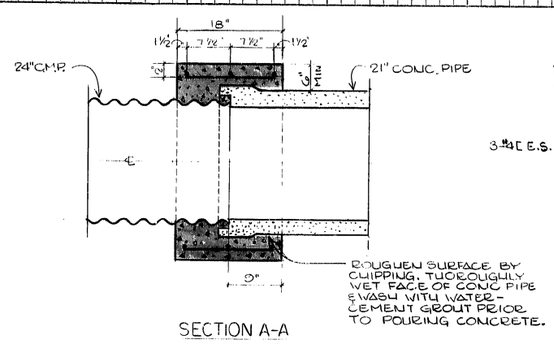
ADDITIONAL LEGEND
- THESE SECTIONS OF STORM SEWER AUGERED



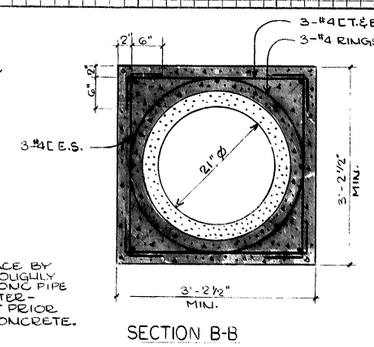
END ELEVATION



SIDE ELEVATION



SECTION A-A



SECTION B-B

24" OUTFALL DETAILS
NTS.

DISTRICT 5 WORKS & OPERATIONS DEPT.

AS - BUILT

DATE	FB. NO.	PAGE
APR 76	947	11

NO.	DESCRIPTION	DATE	BY
1	AS-BUILT- GRADES, ELEV'S & DRAINAGES REVISED	APR 76	NRD

REVISIONS

CITY OF WINNIPEG
WORKS & OPERATIONS DEPARTMENT
OPERATIONS DIVISION — DISTRICT 5

W. L. WARDROP & ASSOCIATES LTD.
ENGINEERING CONSULTANTS
WINNIPEG · THUNDER BAY · REGINA · BARRIE · EDMONTON

LAND DRAINAGE SEWERS
STAGE I

ST. CATHERINE ST. - ARCHIBALD TO SEINE RIVER

PROVINCE OF MANITOBA — D. W. T. LOWRY — REGISTERED ENGINEER

DESIGNED BY:	DRAWN BY:	CHECKED BY:
S.J. & W.E.R.	D.W.	

APPROVED BY:

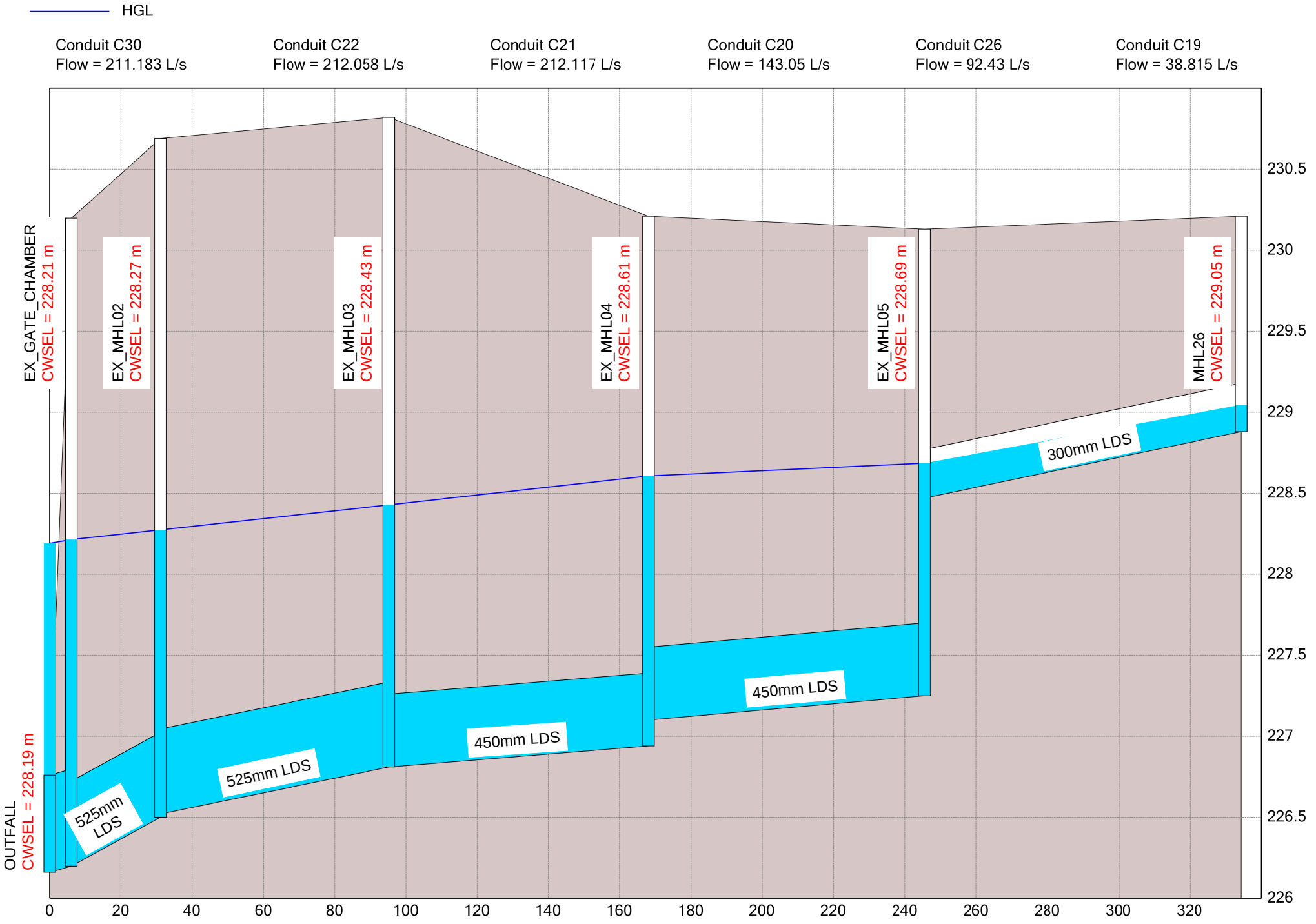
SCALE: HORIZ. 1"=50' VERT. 1"=5' | DATE: NOV. 1975

DRAWING NO: 75001-01-12 | REV. 1

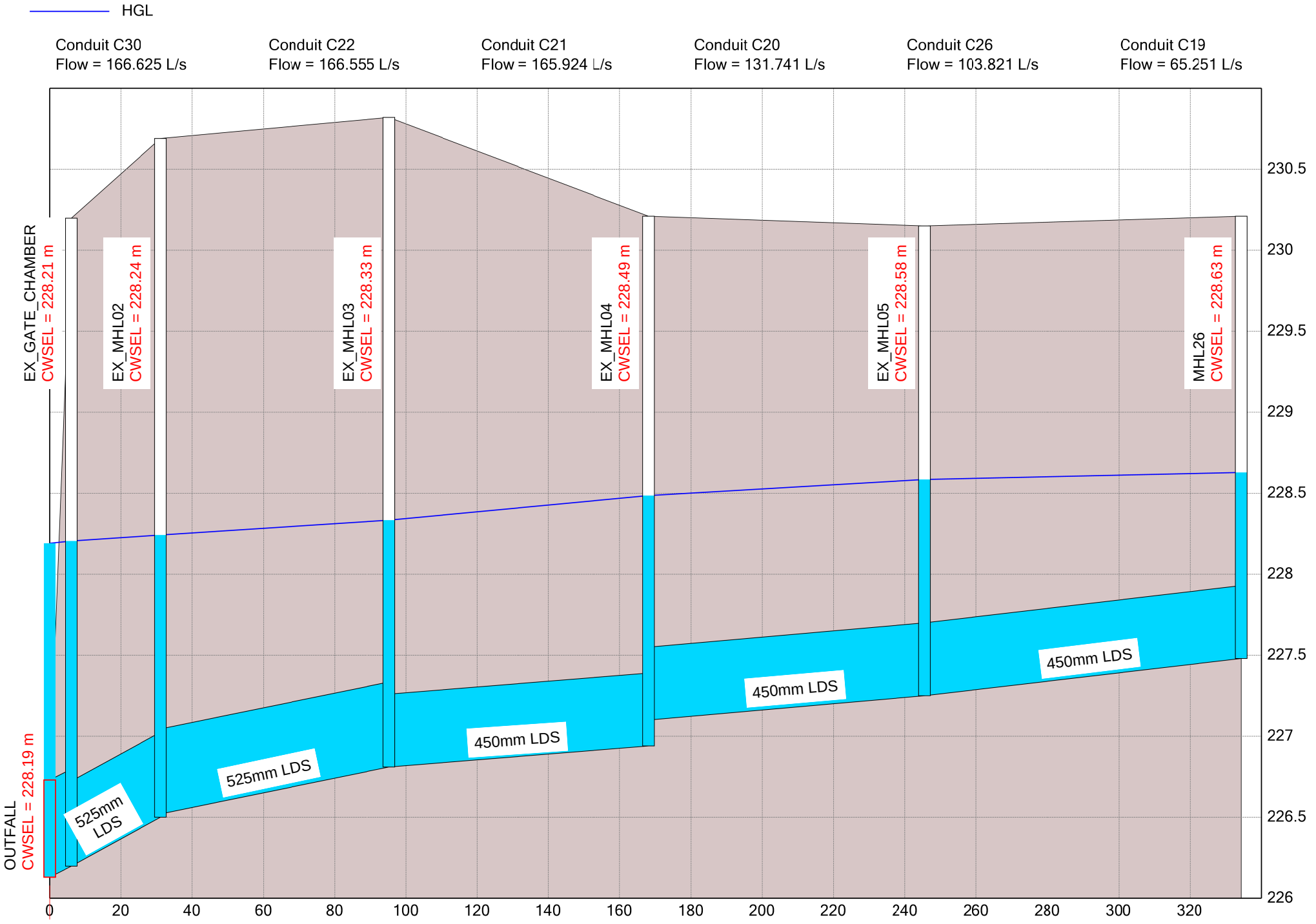
APPENDIX

C-6 ST CATHERINE STREET HYDRAULIC PROFILES

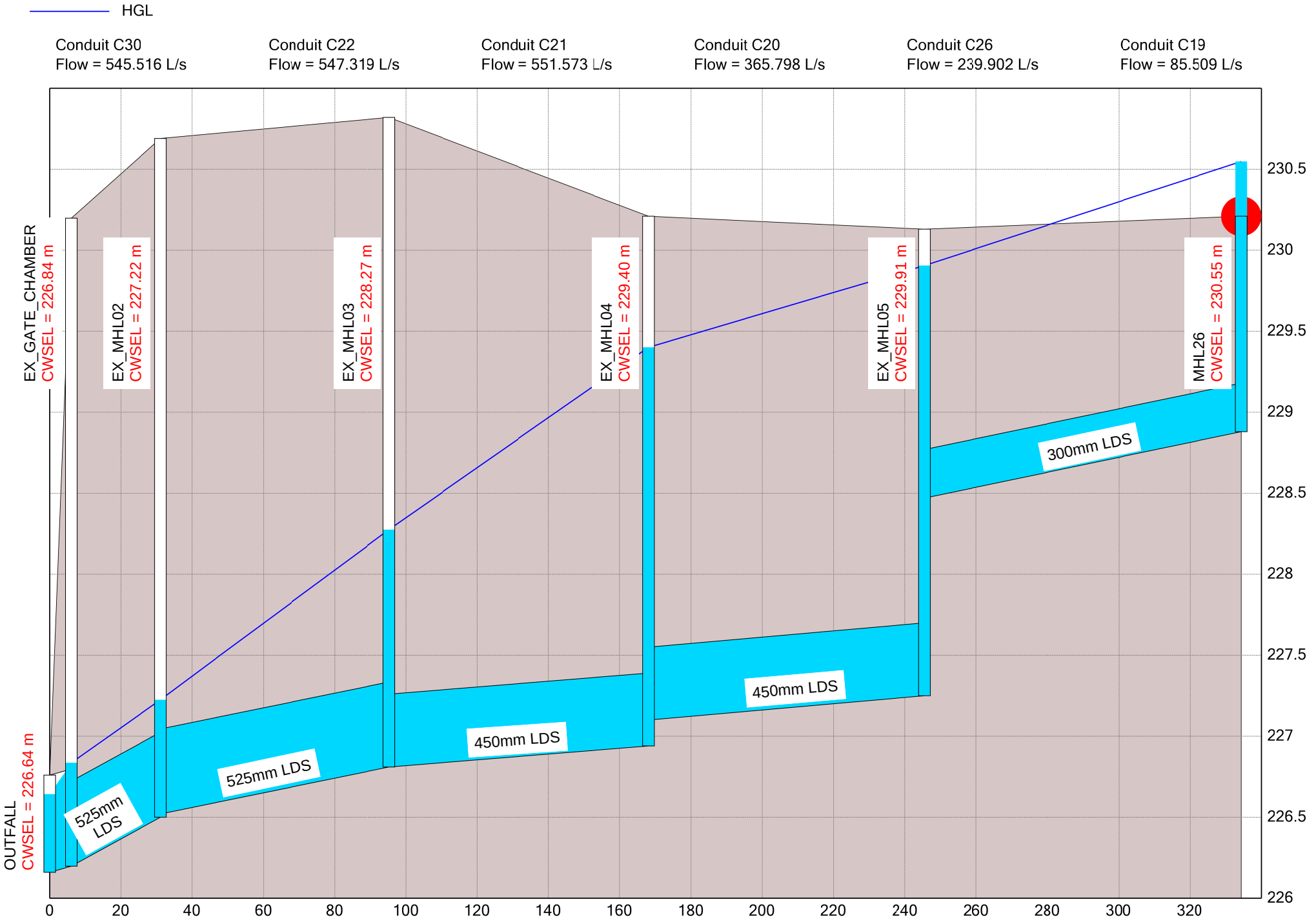
St Catherine Street - 5-Year (May) Storm without Public Markets



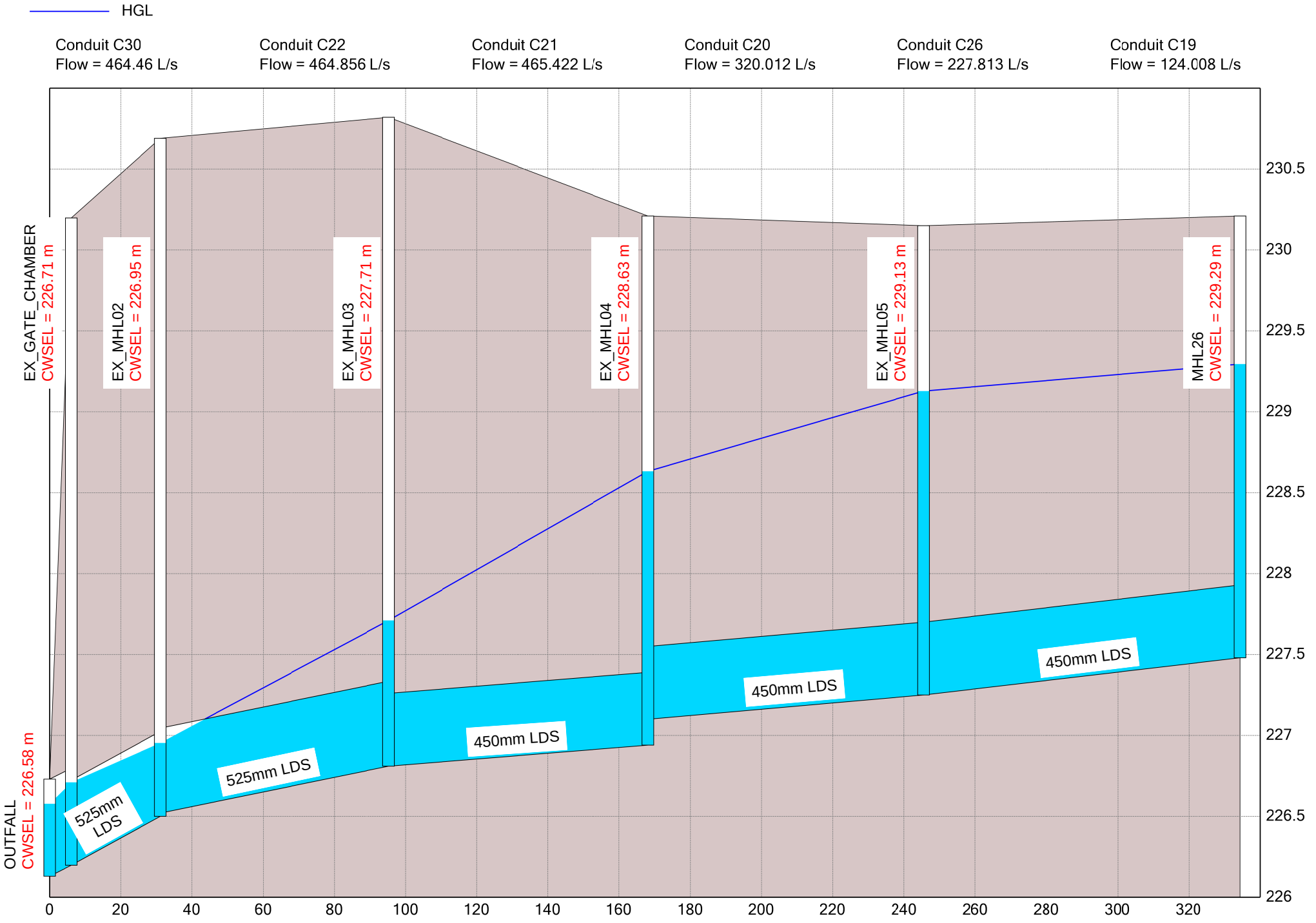
St Catherine Street - 5-Year (May) Storm with Public Markets



St Catherine Street - 5-Year Storm without Public Markets



St Catherine Street - 5-Year Storm with Public Markets



APPENDIX

D CITY OF WINNIPEG SERVICING CRITERIA

CITY OF WINNIPEG

WATERWORKS, WASTE AND DISPOSAL DIVISION

SERVICING CRITERIA

TO THE SUBMITTED AS PART OF
APPROVAL PROCESS WITH SERVICING PLANS

LOCATION: Public Markets

DRAWING REFERENCES: A-1, B-1, C-1

SUBMITTED BY (FIRM): WSP **DATE:** June 2022

WATER

SERVICE AREA: **(Maps to be included)**

Present: 67 **ha (see A-1)**

Ultimate: 67 **ha (see A-1)**

SYSTEM

FEED POINT LOCATION: 1 – Marion Street and Dupuy Avenue
2 – Speers Road and CN Railway Crossing

SYSTEM
FEED POINT DESIGN PRESSURE: 1 – 470 kPa (68 psi) Max Day 466 kPa (68 psi) Peak Hr.
2 – 467 kPa (68 psi) Max Day 462 kPa (67 psi) Peak Hr.

DESIGN FLOW:	**Average**		**Peak Hour**		**Fire**	
Residential	225+10%	**L/c/day**	619	**L/c/day**	200.00	**L/sec minimum**
Commercial	16,800	**L/ha/day**	42,000	**L/ha/day**	250.00	**L/sec minimum**
Light Industrial	22,500	**L/ha/day**	56,250	**L/ha/day**	383.00	**L/sec**
Wet Industrial	33,600	**L/ha/day**	84,000	**L/ha/day**	383.00	**L/sec**

MINIMUM SYSTEM PRESSURE:

Peak. Hour: 462 **kPa (67 psi)**

Fire: 171 **kPa (25 psi)**

SUBMITTED BY: Jason Dunn, P.Eng.

Signed:

Date: May 2024

WASTEWATER

Marion Street and Dupuy Avenue

SERVICE AREA: **(Maps to be included)**

Present: 35 **ha (see B-1)**

Ultimate: 35 **ha (see B-1)**

DESIGN FLOW:	**Average**	**Peak**
Residential	270 **L/c/day**	1080 **L/c/day** (Harmon Factor: Max = 4.0)
Commercial	16,800 **L/ha/d**	28,100 **L/ha/d**
Light Industrial	22,500 **L/ha/d**	37,600 **L/ha/d**
Wet Industrial	33,600 **L/ha/d**	44,900 **L/ha/d**

INFILTRATION: 2200 L/ha/day

MANHOLE INFILTRATION: 12 L/MH/min

EXTRANEOUS FLOW ALLOWANCE: n/a

GENERATED FLOWS FROM TOTAL SYSTEM: **(Ultimate)**

Average: 1,330,560 **L/day**

Maximum: 5,164,128 **L/day**

LIFT STATION: **(Supply Details)**

SUBMITTED BY: Jason Dunn, P. Eng.

Signed: 

Date: May 2024

WASTEWATER

Speers Road and CN Railway Crossing

SERVICE AREA: **(Maps to be included)**

Present: 32 **ha (see B-1)**

Ultimate: 32 **ha (see B-1)**

DESIGN FLOW:	**Average**	**Peak**
Commercial	16,800 **L/ha/d**	28,100 **L/ha/d**
Light Industrial	22,500 **L/ha/d**	37,600 **L/ha/d**
Wet Industrial	33,600 **L/ha/d**	44,900 **L/ha/d**

INFILTRATION: 2200 L/ha/day

MANHOLE INFILTRATION: 12 L/MH/min

EXTRANEOUS FLOW ALLOWANCE: n/a

GENERATED FLOWS FROM TOTAL SYSTEM: **(Ultimate)**

Average: 918,432 **L/day**

Maximum: 2,365,632 **L/day**

LIFT STATION: **(Supply Details)**

SUBMITTED BY: Jason Dunn, P.Eng.

Signed:

Date: May 2024

LAND DRAINAGE

SERVICE AREA: **(Map to be included)**

Present: 67 **ha (see C-1)**

Ultimate: 67 **ha**

PIPE SYSTEM:

Method Used: **Rational** X **Hydrograph** _____

Design Storm: **(Stated formula used)** $i = \frac{1198.88}{(t+8)^{0.828}}$

Design Hydraulic Grade Line – Minimum distance below gutter
(Degree of surcharge): 0.30 m

Describe any runoff retardation devices employed: None

Runoff Coefficients or % Imperviousness:

	Rational Method	**Hydrograph Method**
	Coefficient Inlet Time	**% Imperviousness**
Single Family Dwelling - conventional		
- zero lot line		
Multiple Family	0.80	
Apartments		
Commercial	0.80	
Parks		
Industrial	0.80	

For above rainfall frequency formula Maximum Generated Flow from Total System is:
see C-3 **cfs.**

RETENTION SYSTEM:

Rainfall Formula:	May 2010 timeseries
Normal Water Level:	228.60m
For Selected Rainfall Storms:	See results in report.

SUBMITTED BY: Jason Dunn, P.Eng.

Signed: 

Date: May 2024